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Pre-Design Work Plan

235 Metro Park Brighton Site
Town of Brighton, Monroe County, New York

Site No. 828150

September 2013

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Appendices

Acronyms

ASP	Analytical Services Protocol
bgs	below ground surface
CAMP	Community Air Monitoring Plan
cis-DCE	cis-dichloroethene
CLP	Contract Laboratory Program
COC	contaminants of concern
CPT	Cone Penetrometer Test
DER-10	Final DER-10, Technical Guidance for Site Investigation and Remediation
EC	Engineering Controls
ECD	electron capture detector
EDDs	Electronic Data Deliverables
ERD	Enhanced Reductive Dechlorination
FID	flame ionization detector
FS	Feasibility Study
HASP	Health and Safety Plan
IC	Institutional Controls
MIP	Membrane Interface Probe
µg/L	micrograms per liter
NYSDEC	New York State Department of Environmental Conservation
PAHs	Polycyclic Aromatic Hydrocarbons

PCE	tetrachloroethene
PDWP	Pre-Design Work Plan
PID	photo ionization detector
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
ROD	Record of Decision
SBT	Soil Behavior Types
SCO	soil cleanup objective
SMP	Site Management Plan
SOP	Standard Operating Procedure
SVI	soil vapor intrusion
TCE	trichloroethene
TOC	total organic carbon
VC	vinyl chloride
VOC	volatile organic compound

1. Introduction

The 235 Metro Park Brighton Site (Site) is located at 235 Metro Park in a commercial and light industrial area of the Town of Brighton, Monroe County, New York. Extensive environmental Site assessment work has been completed at the Site to characterize the nature and extent of contamination in the Site groundwater, soil, and soil vapor. The Site was initially the subject of a voluntary cleanup agreement between the Site owner and the New York State Department of Environmental Conservation (NYSDEC) which was later rescinded by the Department. The investigative and remedial measures have been conducted under a consent order following the termination of the voluntary agreement.

Per an Order on Consent and Administrative Settlement (#B8-0778-08-03) issued by the Department in September 2008, the Site was listed on the New York State Registry of Inactive Hazardous Waste Sites as Site No. 828150. The Site was classified as a Class 2 Site which is assigned to Sites posing significant threat to the public health or environment and requiring action.

A Remedial Investigation (RI) & Feasibility Study (FS) Report (ARCADIS, April 2011), included as Appendix A, was approved as final by the Department in March 2012 at the same time that the Department published the Record of Decision (ROD), included as Appendix B, for the Site which summarizes the required site remedy (Site Remedy).

This Pre-Design Work Plan (PDWP) provides a detailed plan for the additional investigation and sampling to be performed using Membrane Interface Probe (MIP)/Cone Penetration Test (CPT) technology. The results of this investigation will be utilized in the final design of the Site Remedy.

1.1 Site Background

Currently, the Site is situated on approximately 5-acres of land located in the Town of Brighton, Monroe County, New York. The Site location is shown on Figure 1. The Site area limits and general layout are shown on Figure 2. The Site is active and located in a commercial and light industrial park area situated approximately 4 miles south of downtown Rochester and due west of Monroe Community College. The main feature of the Site is a building with a footprint of approximately 20,000 sq. ft. that has a loading dock area and a parking lot. The site also has a vacant grassy area and a landscaped lawn. The building is currently being used for label manufacturing and associated office space.

1.2 Summary of Existing Environmental Conditions

The following sections describe the existing environmental setting and concerns.

1.2.1. Geology and Hydrogeology

Borings advanced at the Site indicate undifferentiated silt, silty sand, and clay strata extending to approximately 65 to 68 feet below ground surface (bgs). Glacio lacustrine deposits are underlain by a silty sand and to gravelly sand unit that may represent glacial outwash deposits. The glacial outwash deposits extend to approximately 74 feet bgs. Beneath the glacial outwash deposits is a very dense undifferentiated glacial till consisting of silty sand which is approximately 3.5 feet thick. Based on borings completed at the Site the till contacted top of bedrock at 76.5 feet and 84 feet bgs.

The saturated water table is typically less than 5 feet bgs. The groundwater beneath the site flows radially toward the southwest, north-northeast, and northwest from an elevated groundwater mound in the southeastern portion of the Site. A deeper zone of groundwater was encountered at approximately 18.5 - 24 feet bgs. Topographic expression indicates that regional groundwater drainage is northwesterly as the Site is located within the Genesee River drainage basin and approximately 2.5 miles southeast of the confluence of Red Creek, the Erie Canal and the Genesee River. Regional surface water drainage is north toward Lake Ontario.

1.2.2. Contaminants of Concern & Distribution

Based on the investigations conducted to date, the primary contaminants of concern at the Site (COCs) are chlorinated solvents, including tetrachloroethene (PCE), trichloroethene (TCE), and associated breakdown products which include cis-dichloroethene (cis-DCE) and vinyl chloride (VC). A description of the various contaminant distributions by media is provided below.

1.2.2.1 Groundwater

The RI identified two separate plumes of contaminated shallow groundwater (down to 25 ft. below the groundwater table) in the vicinity of the rear (eastern portion) of the subject building. TCE was detected at levels up to 9,400 ppb and PCE was detected at levels up to 540 ppb. Deeper groundwater (more than 25 ft. below the groundwater table) was also found to be impacted, but to a lesser degree (TCE at up to 120 ppb). The contamination to be targeted exists in the shallow groundwater.

Figure 3 includes a summary of the most recent data in the selected on-site groundwater monitoring wells. The highest volatile organic compound (VOC) concentrations on Site are present in the shallow zone in the areas of well MW-10 and near the southeast corner of the Site Building near wells MW-4S and MW-15S. Total VOCs in these two areas were approximately 520 ug/l and 6800 ug/l respectively in June of 2010. VOC concentrations decline rapidly downgradient to the northwest with MW-17S having no detections of VOCs. VOC concentrations within the deep zone are much lower than those present in the shallow zone, with the highest concentration

(approximately 100 µg/L total VOCs) present at well MW-4D which is paired with MW-4S, one of the most highly contaminated shallow wells on Site.

Elevated concentrations of cis-DCE and VC were detected in the on-Site groundwater during the June 2010 investigation, indicating a significant amount of PCE and TCE dechlorination is already occurring at the Site. The detection of PCE/TCE breakdown products continue to support that in-situ conditions conducive to enhanced biodegradation appear to be present within the Site overburden.

1.2.2.2 Soil

As detailed in the RI, polycyclic aromatic hydrocarbons (PAHs) were detected in surface soil samples during the September 2002 and February 2006 phased site investigations by Passero Associates. However, subsequent site development activity (including the asphalt pavement during the November 2006 driveway expansion) and soil sample collection identified PAH concentrations that were less than the NYSDEC restricted commercial soil cleanup objectives (SCOs) and determined that soil materials were not an environmental concern.

Based on the infrequency of detected chemical concentrations greater than the SCOs for Restricted-Commercial Use and the apparent location of impacted soils, the potential for adverse health effects in current/future commercial/industrial workers and visitors, current/future construction/utility workers, and future construction workers from exposure to chemicals in surface soil is not likely. Soil analytical data for historical sampling events have been compiled in the RI.

1.2.2.3 Soil Vapor/Indoor Air

VOCs in the groundwater may move into the soil vapor, which in turn may move into overlying buildings and affect indoor air quality. This process, referred to as soil vapor intrusion (SVI), represents a potential health concern if it is taking place at the Site. SVI sampling identified exposures to contaminants in indoor air, limited to the only on-site building. During the 2010 RI, PCE and TCE were non-detect in 4 of the 5 indoor air samples while one sample indicated PCE at a concentration of 0.18 ug/m3. The sub-slab soil vapor sampling results showed detections of PCE (3 to 240 ug/m3) and TCE (0.60 to 15 ug/m3). However, additional sampling and analysis is necessary to confirm whether vapor intrusion is occurring. In addition, a chemical survey of current Site operations will be completed.

2. Pre-Design Investigation

The following sections describe the pre-design investigation activities to be conducted at the Site in support of the design for the final remedial action(s).

Objectives for this investigation program include:

- To clearly delineate and define the vertical and horizontal extent and migration pathways of the contaminants onsite using MIP/CPT technology.
- Provide detailed contaminant distribution data across the site.
- Define soil stratigraphy and relative permeability of the soil.
- Collect groundwater samples from select locations.

2.1 Approach

The Site Remedy considered for mitigation of groundwater contamination requires a clear understanding of subsurface hydrogeologic conditions and the vertical extent of the VOC-impacted groundwater in the areas of proposed treatment. Prior to the final design and implementation of the Site Remedy, a pre-design characterization is recommended in the two suspected contaminant source areas.

To fully delineate the vertical and areal extents for source area treatment of groundwater, a drilling rig equipped with a membrane interface probe (MIP) and cone penetrometer test (CPT) will be utilized to develop vertical profiles of soil behavior type and the extent of VOC impact. Additional information related to MIP and CPT is detailed in the following sections. Specific SOP's, QA/QC, and calibration for the MIP/CPT direct sensing equipment is also described in detail in the attached Quality Assurance Project Plan (QAPP) (Appendix F), which includes literature provided by the selected vendor, ZEBRA Environmental Corp. (ZEBRA).

2.1.1. Membrane Interface Probe (MIP)

Subsurface stratigraphy and relative VOC concentrations will be measured from direct push borings using a MIP, which collects VOC concentration data. The MIP is a VOC sensor that can continuously log VOCs that diffuse through a semi-permeable membrane. Using carrier gas, the VOCs are brought to the surface through tubing, which is connected to a laboratory grade Photoionization Detector (PID), Flame Ionization Detector (FID), and Electron Capture Detector (ECD) for immediate screening. As the MIP sensor is advanced into the subsurface, a log is displayed real time on the field computer.

The MIP log will provide semi quantitative/qualitative information on specific contaminant levels. Targeted samples will be collected from contaminated zones to define specific analytes and precise concentrations. Information from the MIP logs will

help to determine contaminant distribution and migration pathways for refinement of the Site Conceptual Model. Because MIP provides real-time data, boring locations and depths can be adjusted in the field as the characterization program progresses. This will help to better achieve a complete characterization of the degree and extent of impacted groundwater and stratigraphic characteristics.

2.1.2. Cone Penetrometer Test (CPT)

CPT is an in-situ testing method used to determine the geotechnical engineering properties of soils and delineating soil stratigraphy. The CPT investigation will give an understanding of soil stratigraphy and hydraulic properties with respect to the subsurface architecture. The CPT is capable of qualitatively identifying the materials penetrated during drilling based on measurements of tip pressure, pore pressure, friction, and the rate of penetration. Measurements are taken continuously by the CPT as the instrument is driven through the borehole. For every 3 inches of penetration, the material is characterized as one of 12 possible Soil Behavior Types (SBT). This test method consists of pushing an instrumented cone tip into the ground at a controlled rate (usually 2 centimeters/second). The resolution of the CPT in delineating stratigraphic layers is related to the size of the cone tip, with typical cone tips having a cross-sectional area of either 10 or 15 cm^2. While this process does not identify soil type, the classification of SBT provides a relative understanding of likely permeability contrasts among the subsurface materials.

The CPT investigation will give an understanding of soil stratigraphy and hydraulic properties with respect to the subsurface architecture. The CPT tip resistance and sleeve friction allow definition of soil stratigraphy at high resolution, and the pore water pressure tool measures relative permeability of soil materials.

2.2 Investigation Details

Prior to MIP/CPT drilling, proper third party utility clearance will be performed and ZEBRA will utilize Air Knifing techniques at each proposed borehole location to 5 ft. bgs.

The pre-design investigation will include approximately 25 borings drilled from grade to approximately 25 ft. below grade surrounding source areas indicated on figure 3. Proposed boring locations for the assessment of the soil type and the distribution of VOCs on Site are shown on Figure 3. MIP analysis will be completed from the water-table elevation to approximately 25 ft. bgs.

In addition to assessing the relative distributions of VOC impacts to groundwater, data collected throughout the drilling program will be processed overnight, enabling the locations of proposed borings to be modified. Therefore, the final number and location

of borings will be determined based upon the real-time data generated during investigation.

In addition to the qualitative profiling efforts described above, approximately 20 groundwater samples will be collected from selected locations based on the MIP/CPT data to correlate/calibrate the MIP results and to qualitatively characterize the nature of the groundwater.

The grab groundwater samples will be collected using a discrete screen point sampler. Samples will be collected by driving the screen point sampler to the desired sampling depth. The protective sleeve will be retracted and the stainless steel screen will be exposed. Grab samples will be collected from inside the drill rods. Sample locations and depths will be selected based on the MIP/CPT data. All samples will be submitted to ALS Environmental a New York-certified analytical laboratory for the analysis of VOCs. The results of the MIP/CPT investigation will be documented and submitted to the NYSDEC as part of the Remedial Design (see Section 3.2).

2.3 Decontamination Procedures

A decontamination pad will be constructed onsite in a pre-determined location for all decontamination activities. All sampling tools will be decontaminated with Alconox and water between each MIP/CPT location and all poly tubing and acetate liners will be appropriately discarded after use. A steam/pressure washing unit with a portable generator will be provided for decontaminating the MIP/CPT sampling tools.

All water and material generated during the decontamination process will be collected and stored in 55 gallon drums and staged at an appropriate location onsite.

2.4 Bore Hole Abandonment Procedures

All MIP bore holes (approximately 1½" in diameter) will be sealed using a grout material mixed to a consistency appropriate for the complete abandonment of the bore hole. The CPT probes do not allow for grouting through the rods. A separate grouting procedure will be implemented by immediately tripping rods down the hole following probe retrieval, and pressure grouting neat cement in the previous borehole. ZEBRA will provide a high-pressure grout system (Geoprobe GS 1000). This system is capable of delivering grout through small diameter tubing or rods at pressures between 500 and 1,000 psi. If drilling through surface pavement is required, the pavement will be repaired with either ready mix concrete or cold patch asphalt (depending on existing site conditions).

2.5 Site Cover

An Engineering Control (EC) in the form of a site cover currently exists and will be maintained to allow for commercial use of the Site. Future development at the Site will require maintenance of the existing cover, and construction/implementation of a new site cover. New site cover systems could consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the applicable SCOs. Where a soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

ECs will be inspected and certified by a professional engineer licensed in the State of New York at a period specified in the SMP

2.6 Other Activities & Site Restoration

Remedial activities requiring soil and sediment control and storm water management are not currently planned for the site. If future, non-remedial, site activities require intrusive work, soil and sediment erosion control, storm water management, and community air monitoring would be addressed in subsequent work plans. The need for these work plans will be discussed further in the SMP.

3. Data Evaluation and Reporting

The following section briefly summarizes the reporting procedures for the remedial program.

3.1 Data Reports/Validation

Data quality control will be described in more detail in the SMP. In general, data quality control and reporting requirements will be completed in accordance with the requirements set forth in NYSDEC's Final DER-10, Technical Guidance for Site Investigation and Remediation (DER-10) Sections 2.2 and 2.3. The chemistry data will be transferred from the laboratories and maintained in a database format (GIS-KEY). The laboratories will provide Electronic Data Deliverables (EDDs), which will be uploaded directly into the database. The laboratories will produce NYSDEC Analytical Services Protocol (ASP) Category B deliverable packages and will produce Contract Laboratory Program (CLP)-type data packages that will contain all information needed for formal validation of the data. Data validation will be performed in accordance with USEPA Region II Standard Operating Procedures (SOPs) (USEPA 2001; USEPA 2003). These procedures are specific with regard to evaluation of holding time, surrogate and spike recoveries, precision of duplicate measurements, instrument performance, blank contamination, compound identification, and compound quantification. Data will be qualified as necessary in accordance with the SOPs.

3.2 Remedial Design Work Plan

The Remedial Design Work Plan (RD) will be prepared and submitted following completion of this pre-design investigation. The RD will summarize the results of these activities and will provide the final design of the full-scale Enhanced Reductive Dechlorination (ERD) injection and performance monitoring programs. This work plan may also be used to provide the detailed methodology for the baseline groundwater monitoring program. The exact chronology of work plan submittals for these activities will be dependent on the results of the pre-design investigation.

3.3 Progress Reports

Progress reports will be submitted to the Department as soon as practicable before the close of the specified reporting period. The reporting period will be specified in the SMP. Periodic progress reports will report on the progress of the remedial actions accomplished during the reporting period and discuss the items below.

- Any request for modifications to the approved work plan, along with the status of the requested modifications

- Tabulation of all sample results received during this period and submission of a report summarizing the data and presenting conclusions

- Periodic progress report will include:
    - a discussion of project progress and significant activities during the reporting period, including the status of any requisite permits
    - a discussion of pending/planned significant project activities during the next two months, unless another time frame is authorized
    - the approved remedial action schedule and proposed modifications to the remedial action schedule, resulting from new information and/or unforeseen conditions
    - a discussion of any problems or delays in the implementation of the remedial action relative to the work and/or the remedial action schedule
    - proposed actions to correct any identified problems, including how to mitigate any adverse schedule impacts
    - any additional, pertinent documentation that is available (e.g., photographs) that helps communicate progress/issues facing the project

4. Health and Safety Plan

A site-specific Health and Safety Plan (HASP) (Appendix D) has been prepared and will be implemented prior to pre-design activities as per DER-10 Section 1.9. All personnel involved in the remediation at the site will be required to adhere to the HASP. The HASP will be prepared in accordance with applicable general industry (29 CFR 1910) and construction (29 CFR 1926) standards of the federal Occupational Safety and Health Administration (OSHA), the U.S. Department of Labor, as well as other federal, state or local applicable statutes or regulations.

A Community Air Monitoring Plan (CAMP) has also been included as Appendix C.

5. Permitting

Implementation of the remedial activities may require permits/permit equivalencies in accordance with applicable regulations. The need for these permits/permit equivalencies is also dependent on the activity being pursued. A brief discussion of the potential permits/permit equivalencies is provided herein.

For on-site remedial activities, the following permits/permit equivalencies may be required:

- NYS Dig Safe permits; and,
- Local permits if permanent buildings or mechanical/structural infrastructure are required.

It is not anticipated that permanent buildings or mechanical/structural infrastructure will be required. Per DER-10 Section 1.10, it is anticipated that exemptions and/or permit equivalents will be provided for future well installation and UIC permits. This PDWP and future supplemental work plans will serve as the application mechanism to meet substantive permit requirements.

6. Schedule

The schedule for the first year of Site activity is presented in Appendix E.

7. References

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

ARCADIS U.S., Inc., Remedial Action Work Plan, 235 Metro Park Site, Town of Brighton, NY. (July 2012)

ARCADIS U.S., Inc., Remedial Investigation and Feasibility Study, 235 Metro Park Site, Town of Brighton, NY. (April 2011)

New York State Department of Environmental Conservation, 5/2010, Final DER-10, Technical Guidance for Site Investigation and Remediation.

New York State Department of Environmental Conservation, Division of Environmental Remediation, 3/2012, Record of Decision, 235 Metro Park Brighton, State Superfund Project

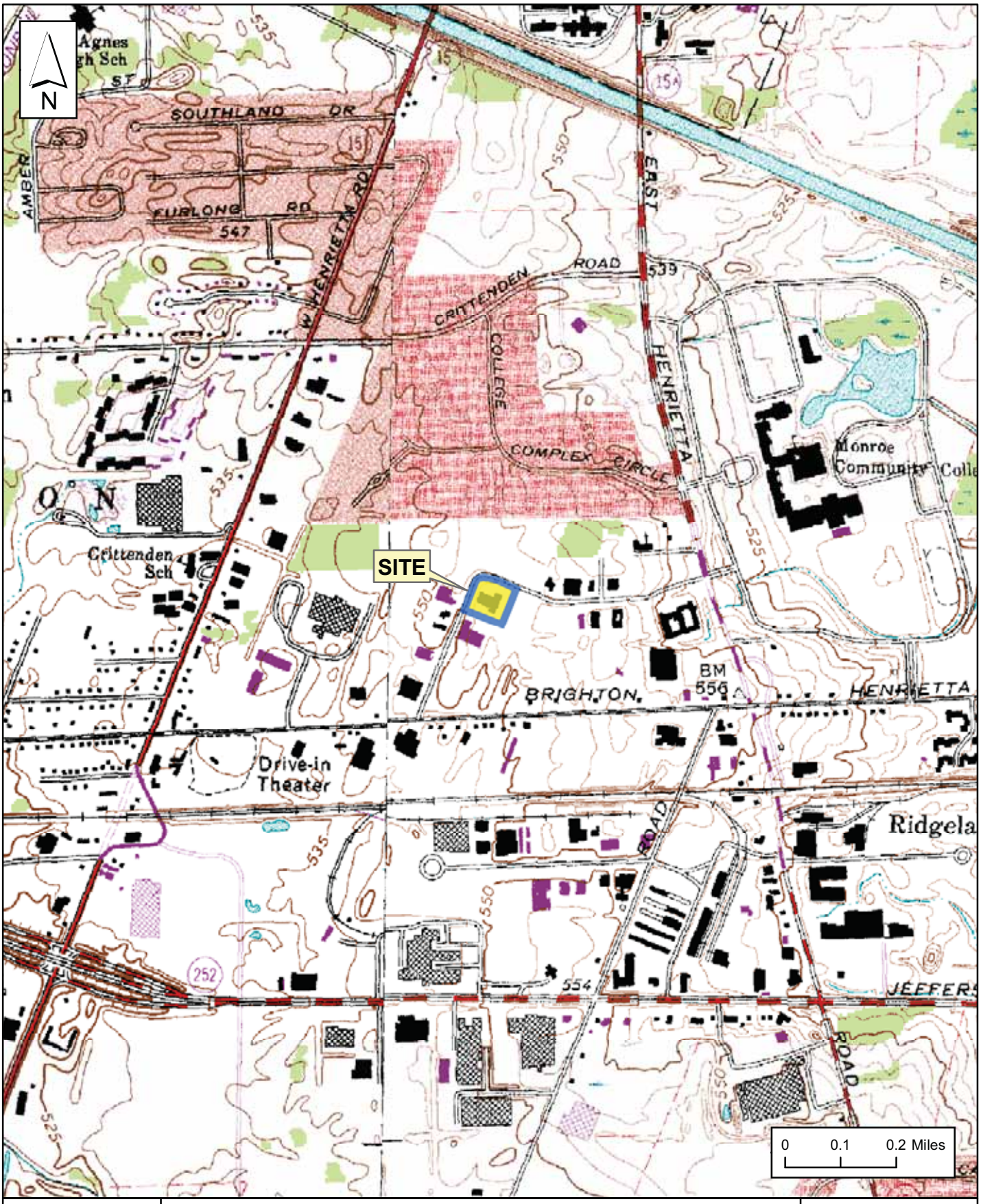
Passero Associates, P.C., Site Investigation Report for Fischbach & Moore Electric, LLC. 235 Metro Park Site, Town of Brighton, NY. (Revised December 2005).

Passero Associates, P.C., Site Investigation Report Addendum for Fischbach & Moore Electric, LLC. 235 Metro Park Site, Town of Brighton, NY. (April 2005)

Passero Associates, P.C., Driveway Expansion Final Report, Fischbach & Moore Electric, LLC., 235 Metro Park Site, Town of Brighton, NY. (January 2007)

Figure 1

Site Location Map



ARCADIS

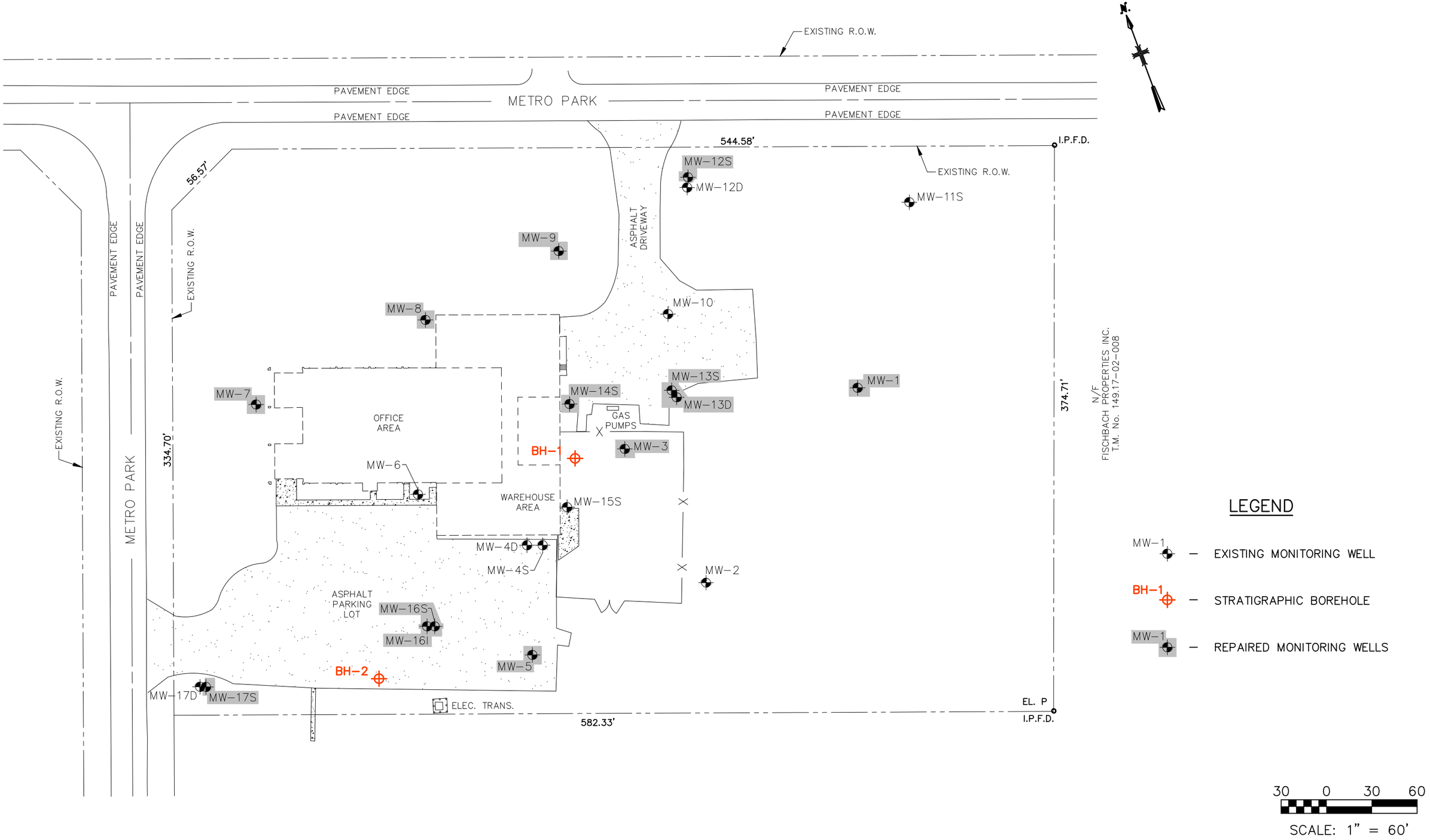
4124094

SITE LOCATION MAP
235 METRO PARK, ROCHESTER, NY
NYSDEC Site #828150

FIGURE 1

Figure 2

Site Plan and
Well Locations



ARCADIS

235 METRO PARK SITE
BRIGHTON, NEW YORK

PRE-DESIGN WORK PLAN – NYSDEC SITE #828150

SITE PLAN AND WELL LOCATIONS

SCALE: 1"=60'

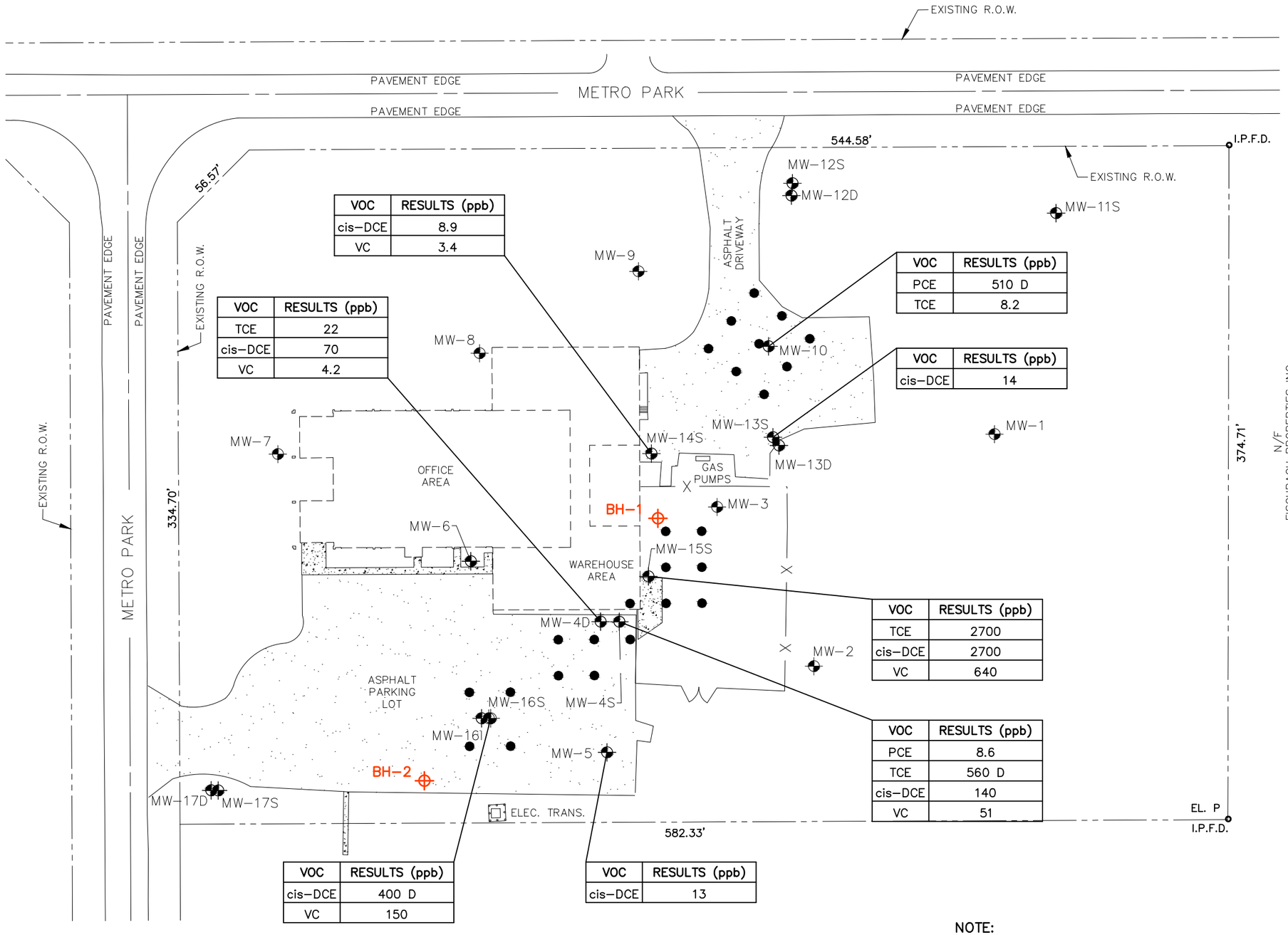
ARCADIS US, INC.

JULY 2013

FIGURE 2

Figure 3

Proposed Locations of MIP/CPT Points



VOC	RESULTS (ppb)
cis-DCE	8.9
VC	3.4

VOC	RESULTS (ppb)
TCE	22
cis-DCE	70
VC	4.2

VOC	RESULTS (ppb)
PCE	510 D
TCE	8.2

VOC	RESULTS (ppb)
cis-DCE	14

VOC	RESULTS (ppb)
TCE	2700
cis-DCE	2700
VC	640

VOC	RESULTS (ppb)
PCE	8.6
TCE	560 D
cis-DCE	140
VC	51

VOC	RESULTS (ppb)
cis-DCE	400 D
VC	150

VOC	RESULTS (ppb)
cis-DCE	13

LEGEND

MW-1 — EXISTING MONITORING WELL

BH-1 — STRATIGRAPHIC BOREHOLE

— LOCATION OF MEMBRANE INTERFERENCE PROBE (MIP) AND CONE PENETRATION TEST (CPT)

VOC	RESULTS (ppb)
cis-DCE	400 D
VC	150

— ANALYTICAL RESULTS FROM 6/5/10 INVESTIGATION INDICATIVE OF CLASS "GA" GROUNDWATER EXCEEDANCE FOR PCE/TCE/cis-DCE/VC

NOTE:

1. FINAL LOCATION AND NUMBER OF BORING LOCATIONS IS DEPENDENT ON SITE ACCESS (E.G., UTILITY CLEARANCE), AS WELL AS THE REAL-TIME DATA RESULTS AND EVALUATION PRODUCED DURING THE INVESTIGATION.

30 0 30 60

SCALE: 1" = 60'

ARCADIS

235 METRO PARK SITE
BRIGHTON, NEW YORK

PRE-DESIGN WORK PLAN – NYSDEC SITE #828150

PROPOSED LOCATIONS OF MIP / CPT POINTS
SCALE: 1"=60'

ARCADIS US, INC.
JULY 2013
FIGURE 3

Appendix A

Remedial Investigation &
Feasibility Study
(April 2012)

(Provided on CD)

Appendix B

Record of Decision

(March 2012)

RECORD OF DECISION

235 Metro Park Brighton
State Superfund Project
Brighton, Monroe County
Site No. 828150
March 2012

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - RECORD OF DECISION

235 Metro Park Brighton
State Superfund Project
Brighton, Monroe County
Site No. 828150
March 2012

Statement of Purpose and Basis

This document presents the remedy for the 235 Metro Park Brighton site, a Class 2 inactive hazardous waste disposal site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the 235 Metro Park Brighton site and the public's input to the proposed remedy presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:
• Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
• Reducing direct and indirect greenhouse gas and other emissions;
• Increasing energy efficiency and minimizing use of non-renewable energy;
• Conserving and efficiently managing resources and materials;
• Reducing waste, increasing recycling, and increasing reuse of materials which would otherwise be considered a waste;
• Maximizing habitat value and creating habitat when possible;
• Fostering green and healthy communities and working landscapes that balance ecological, economic, and social goals; and
• Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Injections of biological amendments via direct injections will be conducted in the PCE and the TCE areas of concern. The biological amendments are anticipated to be injected to a depth of approximately 20 feet below grade. The injection method and depth will be modified as needed based on site conditions and the remedial design program discussed in item 1 above. Prior to full implementation of this technology, a bench-scale study will be conducted to more clearly define the design parameters. Once the bench-scale study has been completed the full scale implementation of the remedy will be conducted at the site. Based on the current understanding of the geological and hydrogeological conditions at the site it is anticipated that the injection points will be closely spaced.

3. A site cover currently exists and will be maintained to allow for commercial use of the site. Any site redevelopment will maintain a site cover, which may consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

4. 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 commercial and industrial uses as defined by Part 375-1.8(g), although 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 NYSDOH or Monroe County Health Department;
• prohibits agriculture or vegetable gardens on the controlled property; and
• requires compliance with the Department approved Site Management Plan.

5. A Site Management Plan is required, which includes the following:
a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:
• Institutional Controls: See item #4 above.
• Engineering Controls: See item #3 above.

This plan includes, but may not be limited to:
• an Excavation Plan which details the provisions for management of future excavations;
• descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
• a provision for evaluation of the potential for soil vapor intrusion or any buildings occupied or developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
• provisions for the management and inspection of the identified engineering controls;

• maintaining site access controls and Department notification; and
• the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
• groundwater monitoring, primarily sampling for VOCs, will be conducted within the treatment area and downgradient of the treatment area to evaluate the effectiveness of the remedial alternative and determine the need for additional biological amendments;
• a schedule of monitoring and frequency of submittals to the Department;
• monitoring for vapor intrusion for any buildings occupied or developed on the site, as may be required by the Institutional and Engineering Control Plan discussed in item 5 above.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

March 30,2012

Date

Robert W. Schick, P.E., Acting Director
Division of Environmental Remediation

RECORD OF DECISION

235 Metro Park Brighton
Brighton, Monroe County
Site No. 828150
March 2012

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media. The remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This Record of Decision (ROD) identifies the selected remedy, summarizes the other alternatives considered, and discusses the reasons for selecting the remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repository:

Brighton Town Library
Attn: Karen Kase-Mclaren
2300 Elmwood Avenue
Rochester, NY 14618
Phone: (585) 784-5300

A public meeting was also conducted. At the meeting, the findings of the remedial investigation

(RI) and the feasibility study (FS) were presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the proposed remedy.

Comments on the remedy received during the comment period are summarized and addressed in the responsiveness summary section of the ROD.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location:
The 235 Metro Park Brighton site is located in a suburban area of Monroe County within the Town of Brighton. Metro Park is a commercial and light industrial park located along West Henrietta Road. The site is located approximately 4 miles south of downtown Rochester and is due west of Monroe Community College.

Site Features:
The main feature of the site includes a building with a footprint of approximately 20,000 sq ft that has a loading dock area and a parking lot. The site also has a vacant grassy area and a landscaped lawn. Metro Park roadways bound the site on 2 sides.

Current Zoning/Use(s):
The site is currently an active site and is zoned for commercial and light industrial use. The building is being used for label manufacturing and associated office space. The surrounding parcels are currently used for a combination of commercial, light industrial, and utility right-of-ways. The nearest residential area is an apartment complex known as Rustic Village Apartments about 2 tenths of a mile north of the site.

Past Use(s):
A variety of light industrial and commercial enterprises have occupied the site. The building, reportedly constructed in 1968, was used for sales and service of electric motors and transformers until May 2001. The building has been used more recently for label making operations and associated office space. Prior uses that appear to have led to site contamination include the servicing of electric motors, including degreasing, coil stripping, and spray painting operations.

The remedial investigation, interim remedial measure (IRM), and remedial design phase work was conducted under the Voluntary Cleanup Program by the site's owner (235 Metro Park Associates, LLC). The IRM consisted of the removal of an underground storage tank, surficial soil removal, and cleanup of PCBs on flooring slab. The environmental data collected during the remedial investigation, IRM, and the remedial design investigation was used during the remedy selection process.

The site is currently known as 235 Metro Park Brighton. A cross reference site number associated with the VCA is V00942.

Site Geology and Hydrogeology:
Borings advanced at the site indicate undifferentiated silt, silty sand, and clay strata extending to approximately 65 to 68 feet below ground surface. Glacio-lacustrine deposits are underlain by a silty sand and to gravelly sand unit that may represent glacial outwash deposits. The glacial outwash deposits extend to approximately 74 feet below ground surface. Beneath the glacial outwash deposits is a very dense undifferentiated glacial till consisting of silty sand which is approximately 3.5 feet thick. Based on borings completed at the site the till contacted top of bedrock at 76.5 feet and 84 feet below ground surface.

The saturated water table is typically less than 5 feet below ground surface. The groundwater beneath the site flows radially toward the southwest, north-northeast, and northwest from an elevated groundwater mound in the southeastern portion of the site. A deeper zone of groundwater was encountered at approximately 18.5 - 24 feet below ground surface.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the RI to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

Fischbach, LLC

The VCA with 235 Metro Park Associates, LLC was terminated by the State for failure to comply with the terms of the Agreement effective July 16, 2007.

Subsequently, an Order on Consent was signed by 235 Metro Park Associates, LLC on September 30, 2008. The September 2008 Order on Consent has now been superseded by an Order on Consent signed with Fischbach, LLC on November 19, 2009. The Order obligates the responsible parties to implement a full remedial program.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- air
- groundwater
- soil
- soil vapor
- indoor air

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of

concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

VINYL CHLORIDE	CARBON TETRACHLORIDE
TRICHLOROETHENE (TCE)	ARSENIC
TETRACHLOROETHENE (PCE)	BENZO(A)PYRENE
1,1-DICHLOROETHANE	DIBENZ[A,H]ANTHRACENE
1,1,1 TRICHLOROETHANE (TCA)	

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

There were no IRMs performed at this site during the RI.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OU 01.

Nature and Extent of Contamination:
Based on the investigations conducted to date, the primary contaminants of concern are chlorinated solvents, including tetrachloroethene (PCE), trichloroethene (TCE), and associated

breakdown products. The Remedial Investigation identified two separate plumes of contaminated shallow groundwater in the vicinity of the rear (eastern portion) of the subject building, both of which are contained on-site. Chlorinated solvents exceed the groundwater standards and guidance values. TCE was detected at levels up to 9,400 ppb and PCE was detected at levels up to 540 ppb. Deeper groundwater was also found to be impacted, but to a lesser degree (TCE at up to 120 ppb).

VOC analytical results for surface and subsurface soils exceeded Part 375 Unrestricted Use Soil Cleanup Objectives for acetone. The initial surface soil sampling (September 2002) did indicate Polycyclic Aromatic Hydrocarbons (PAHs) in the area east of the driveway exceeded Part 375 Unrestricted Use Soil Cleanup Objectives. Additional surface soil sampling was conducted in the area of highest concentration to determine the areal extent of the PAH contamination. The analytical results indicate that 7 PAHs exceeded Part 375 unrestricted use Soil Cleanup Objectives (SCOs); however, benzo(a)pyrene and dibenzo(a,h)anthracene exceeded the commerical SCOs. As part of the October 2006 driveway and truck turnaround expansion project the area with the elevated PAHs has been covered with asphalt.

Surface soil and sub-surface soil samples were analyzed for PCBs, metals, and pesticides. Pesticides did not exceed unrestricted use SCOs. One subsurface soil sample exceeded the unrestricted use SCOs for PCBs. One surface soil sample exceeded the unrestricted use SCOs for mercury and three surface soil samples exceeded the unrestricted use SCOs for zinc. The unrestricted use SCOs for arsenic and zinc was exceeded at two different sample locations; however, arsenic exceeded the commerical SCOs.

Supplemental remedial investigation activities were conducted in 2010. These investigational activities further delineated the chlorinated VOC contamination and the site's geology to fill data gaps for the site's remedy selection process. The additional investigation activities included an air quality characterization (indoor, sub-slab, perimeter soil gas survey, outdoor air sampling), soil borings to characterize the physical and stratigraphic nature of the overburden soils, and a groundwater sampling event that included groundwater elevation measurements and hydraulic conductivity testing.

Tetrachloroethene (PCE) and trichloroethene (TCE) was non-detect in 4 of the 5 indoor air samples while one sample indicated tetrachloroethene at a concentration of 0.18 ug/m3. The sub-slab soil vapor sampling results showed detections of tetrachloroethene (3 to 240 ug/m3) and trichloroethene (0.60 to 15 ug/m3).

Special Resources Impacted/Threatened:
There were no special resources identified at the site.

Significant Threat:
The site presents a significant environmental threat due to the ongoing releases of contaminants from source areas into groundwater.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

People are not coming into contact with the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Contact with contaminated soil is unlikely unless persons dig below the ground surface. Volatile organic compounds in the groundwater may move into the soil vapor (air between soil particles), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Soil vapor intrusion sampling identified exposures to contaminants in indoor air. This exposure is limited to the only on-site building and represents a potential health concern. Additional sampling is necessary to confirm vapor intrusion is occurring.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: SUMMARY OF THE SELECTED REMEDY

To be selected the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in

Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the feasibility study (FS) report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's remedy is set forth at Exhibit D.

The selected remedy is referred to as the In-situ Reductive Dechlorination remedy.

The estimated present worth cost to implement the remedy is $472,000. The cost to construct the remedy is estimated to be $393,000 and the estimated average annual cost is $12,000.

The elements of the selected remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:
• Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
• Reducing direct and indirect greenhouse gas and other emissions;
• Increasing energy efficiency and minimizing use of non-renewable energy;
• Conserving and efficiently managing resources and materials;
• Reducing waste, increasing recycling, and increasing reuse of materials which would otherwise be considered a waste;
• Maximizing habitat value and creating habitat when possible;
• Fostering green and healthy communities and working landscapes that balance ecological, economic, and social goals; and
• Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Injections of biological amendments via direct injections will be conducted in the PCE and the TCE areas of concern. The biological amendments are anticipated to be injected to a depth of approximately 20 feet below grade. The injection method and depth will be modified as needed based on site conditions and the remedial design program discussed in item 1 above. Prior to full implementation of this technology, a bench-scale study will be conducted to more clearly define the design parameters. Once the bench-scale study has been completed the full scale implementation of the remedy will be conducted at the site. Based on the current

understanding of the geological and hydrogeological conditions at the site it is anticipated that the injection points will be closely spaced.

3. A site cover currently exists and will be maintained to allow for commercial use of the site. Any site redevelopment will maintain a site cover, which may consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

4. 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 commercial and industrial uses as defined by Part 375-1.8(g), although 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 NYSDOH or Monroe County Health Department;
• prohibits agriculture or vegetable gardens on the controlled property; and
• requires compliance with the Department approved Site Management Plan.

5. A Site Management Plan is required, which includes the following:
a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:
• Institutional Controls: See item #4 above.
• Engineering Controls: See item #3 above.

This plan includes, but may not be limited to:
• an Excavation Plan which details the provisions for management of future excavations;
• descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
• a provision for evaluation of the potential for soil vapor intrusion or any buildings occupied or developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
• provisions for the management and inspection of the identified engineering controls;
• maintaining site access controls and Department notification; and
• the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

• groundwater monitoring, primarily sampling for VOCs, will be conducted within the treatment area and downgradient of the treatment area to evaluate the effectiveness of the remedial alternative and determine the need for additional biological amendments;
• a schedule of monitoring and frequency of submittals to the Department;
• monitoring for vapor intrusion for any buildings occupied or developed on the site, as may be required by the Institutional and Engineering Control Plan discussed in item 5 above.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the remedial investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into tables with four categories: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/ polychlorinated biphenyls (PCBs), and inorganics (metals). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 6.1.1 are also presented.

Waste/Source Areas

As described in the Remedial Investigation Report, waste/source materials were identified at the site and are impacting groundwater, soil, and soil vapor.

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas were identified at the site in the southwest corner of the warehouse and an isolated area of the northern access drive. See Figure 2 for a Site Layout Map.

The documented work practices along with the analytical and hydrogeological data indicate that the introduction of the chlorinated VOCs to the groundwater likely occurred over an extended period of time in the source areas identified above. The areal extent of the impacted groundwater and the distribution of the chlorinated VOCs is likely the result of more than one spill that occurred 2-3 decades earlier. The groundwater impact footprint is approximately 360 ft. long and 120 ft. wide. The analytical data indicates that chlorinated VOC mass is distributed within the uppermost 20 ft of the overburden unit (0-20 ft. below ground surface) at the site. The waste/source areas identified will be addressed in the remedy selection process.

Groundwater

Groundwater samples were collected from overburden and bedrock monitoring wells. The site has undergone a phased groundwater investigation starting in 2003. The groundwater samples were collected from more than 55 locations that included temporary wells, direct-push borings, and monitoring wells. The groundwater samples were collected to assess groundwater conditions on and off-site. The following table represents the most recent groundwater sampling effort completed in June 2010. The results indicate that contamination in shallow groundwater at the site exceeds the SCGs for volatile organic compounds and is consistent with the historical groundwater results. Contaminant levels in bedrock groundwater exceeded the standards and guidance values for trichloroethene and cis-1,2-dichloroethene. The recent analytical data indicates that natural attenuation is occurring in the bedrock groundwater. Based on the groundwater analytical data the contaminated groundwater plume is not going off-site.

Figure 3 presents the nature and extent of the groundwater contamination at the site. Figures 4-1, 4-2, 4-3, 4-4, and 4-5 illustrate the vertical distribution and profile of the VOC contaminated groundwater in shallow, intermediate and deep monitoring well locations at the site.

Table #1- Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
1,1,1-Trichloroethane	ND - 230	5	5 of 18
1,1-Dichloroethane	ND – 360	5	6 of 18
1,1-Dichloroethene	ND - 140	5	5 of 18
cis-1,2-Dichloroethene	ND - 2700	5	9 of 18
Tetrachloroethene	ND - 510	5	3 of 18
trans-1,2-Dichloroethene	ND - 72	5	2 of 18
Trichloroethene	ND - 2700	5	5 of 18
Vinyl chloride	ND - 640	2	6 of 18

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or 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 are chlorinated solvents that are associated with operation of a former business at the site that included the sales and service of electrical motors and transformers. The business operations included the use of chlorinated solvents to degrease and clean electrical equipment. As noted on Figure 3, the primary groundwater contamination is associated with an area thought to be used for servicing and storage of the electrical equipment.

Based on the findings of the remedial investigation, the presence and use of chlorinated solvents at the site has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

Soil

Surface and subsurface soil samples were collected at the site during the remedial investigation. Surface soil samples were collected from a depth of 0-2 inches to assess direct human exposure. Subsurface soil samples were collected from a depth of 1 - 20 feet to assess soil contamination impacts to groundwater. The results indicate that surface soils at the site exceed the unrestricted SCG for volatile organic compounds, semi-volatile organic compounds, and metals. The results for the subsurface soils at the site exceed the unrestricted SCG for volatile organic compounds, metals, and PCBs.

Table #2A - Surface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Commercial Use SCG[c] (ppm)	Frequency Exceeding Commercial SCG
VOCs					
Acetone	ND - 0.057	0.05	1 of 10	500	0 of 10
SVOCs					
Benzo(a)anthracene	ND – 4.1	1	2 of 13	5.6	0 of 13
Benzo(b)fluoranthene	ND – 5.1	1	3 of 13	5.6	0 of 13
Benzo(a)pyrene	ND - 5	1	3 of 13	1	3 of 13
Benzo(k)fluoranthene	ND – 3.4	0.8	4 of 13	56	0 of 13
Chrysene	ND - 5	1	3 of 13	56	0 of 13
Dibenzo(a,h)anthracene	ND – 0.86	0.33	2 of 13	0.56	1 of 13
Indeno(1,2,3-cd)pyrene	ND – 3.8	0.50	6 of 13	5.6	0 of 13
Inorganics					
Mercury	ND – 0.4	0.18	1 of 10	2.8	0 of 10
Zinc	ND - 1120	109	3 of 10	10000	0 of 10

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil.
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.

The surface soil results for zinc and mercury that exceed the unrestricted use SCO are most likely attributable to historical fill material at the site. The acetone results can be attributable to natural degradation of organic material in the environment and is a common laboratory contaminant. The surface soil SVOC results that exceeded the unrestricted use SCGs are mainly located adjacent to the parking lot and driveway at the site. The exceedance could be attributed to poor cleanup and/or runoff issues after paving and sealing of those areas. The surface soil sample locations that exceeded the SVOCs restricted use SCGs are located adjacent to the driveway and parking lot at the site. As part of the October 2006 driveway and truck turnaround expansion project, the areas with elevated SVOCs were covered with asphalt. The site is located in a light industrial park area and is zoned for commercial/light industrial uses. The site is professionally landscaped and maintained on a routine basis. The surface soil meets the commercial SCOs.

Table #2B - Subsurface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Commercial Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
VOCs					
Acetone	ND – 0.1360	0.05	3 of 91	500	0 of 91
Inorganics					
Arsenic	ND – 39.5	13	1 of 40	16	1 of 40
Zinc	ND - 177	109	1 of 40	10000	0 of 40
Pesticides/PCBs					
PCB (total)	ND – 0.54	0.1	1 of 70	1	0 of 70

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil.
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.

The subsurface soil results for arsenic and zinc that exceed the unrestricted use SCO are most likely attributable to historical fill material at the site. The acetone results can be attributable to natural degradation of organic material in the environment and is a common laboratory contaminant. Suspected source areas were investigated during the remedial investigation. Although a source was not found it is believed to be a diffuse source in the vicinity of northern driveway access (MW-10) and the southeast corner of the warehouse (MW-4S and MW-4D). The subsurface soil sample with elevated PCBs was collected in the 0-1 foot depth underneath a concrete flooring slab in the warehouse area and can be attributable to past uses at the site. There is no potential exposure to that area through normal day to day activities. A Site Management Plan will address any subsurface soil issues through the Excavation Plan.

Soil Vapor

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 perimeter soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this 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.

Sub-slab soil vapor samples were collected from the sub-slab of the office area and the warehouse area of the building located on the property. Indoor air samples were also collected at this time in the office area and the warehouse area. Samples were collected from the sub-slab, indoor air, and ambient outdoor air sampling locations. The samples were collected to assess the potential for soil vapor intrusion. Perimeter soil vapor samples were also collected along the property boundaries.

The sub-slab vapor results indicate trichloroethene, 1,1,1-trichloroethane, carbon tetrachloride, and tetrachloroethene was detected in the sub-slab vapor in both sampling areas. Carbon tetrachloride, 1,1,1-tetrachlorothane, and tetrachloroethene were detected in the indoor air samples collected in the office area of the building. Perimeter soil vapor results indicated carbon tetrachloride, trichlorothene, 1,1,1-trichloroethane, and tetrachloroethene in soil vapor samples. The ambient air results indicated 1,1,1-trichloroethane, carbon

tetrachloride, and tetrachloroethene which could be attributed to other businesses and industrial facilities located in Metro Park, though no specific sources have been identified.

Based on the concentration detected, and in comparison with the NYSDOH Soil Vapor Intrusion Guidance as well as considering that the building is occupied, routine monitoring of the sub-slab vapor and indoor air is appropriate to determine whether concentrations in the indoor air or sub-slab vapor have changed.

Based on the findings of the remedial investigation, the presence and use of chlorinated solvents at the site has resulted in the contamination of the soil vapor. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of soil vapor to be addressed by the remedy selection process are: trichloroethene, 1,1,1-trichloroethane, carbon tetrachloride, and tetrachloroethene

Table 5-1
Summary of Soil Vapor Analytical Results
2010 Remedial Investigation
235 Metro Park Site

Compounds Analyzed by Method TO-15	NYSDOH Air Matrix Guidance Values ug/m³	PERIMETER SAMPLE LOCATIONS			CONTROL
		SV-1 6/16/10 µg/m³	SV-2 6/16/10 µg/m³	SV-6 6/16/10 µg/m³	OA-1 6/13/10 µg/m³
Chloromethane		0.80 J	5.4 U	2.8 U	1
Vinyl Chloride	< 5 (1)	0.54 U	0.72 U	0.37 U	0.10 U
Bromomethane		3.9 U	5.2 U	2.7 U	0.73 U
Chloroethane		5.2 U	7.0 U	3.6 U	0.98 U
Acetone		69	80	19 J	13
Trichlorofluoromethane		2.6 J	1.6 J	2.0 J	1.2
1,1-Dichloroethane	< 100 (2)	4.0 U	5.3 U	2.7 U	0.74 U
Methylene Chloride		0.8	6.9	2.0 J	0.44 J
1,1,2 Trichloro-1,2,2-Trifluoroethane		0.81 J	0.79 J	0.87 J	0.66
Carbon Disulfide		110	46	4.3	0.037 J
trans-1,2-Dichloroethene		4.0 U	5.3 U	2.7 U	0.74 U
1,1-Dichloroethane		4.1 U	5.4 U	2.8 U	0.76 U
Methyl tert-Butyl Ether		7.1 U	9.5 U	4.9 U	1.3 U
Vinyl Acetate		45 U	60 U	31 U	8.5 U
2-Butanone (MEK)		23	21	5.3	2.1
cis-1,2-Dichloroethene	< 100 (2)	4.0 U	5.3 U	0.69 U	0.74 U
Chloroform		32	99	31	0.13 J
1,2-Dichloroethane		4.1 U	5.4 U	2.8 U	0.76 U
1,1,1-Trichloroethane	< 100 (2)	5.4 U	0.29 J	0.26 J	0.054 J
Benzene		30	35	16	0.39 J
Carbon Tetrachloride	< 5 (1)	0.45 J	0.72 J	0.30 J	0.58
1,2-Dichloropropane		4.6 U	6.1 U	3.2 U	0.86 U
Bromodichloromethane		1.2 J	2.7	0.95	0.25 U
Trichloroethene	< 5 (1)	0.73	2.1	0.34 J	0.10 U
cis-1,3-Dichloropropene		9 U	12 U	6.2 U	1.7 U
4-Methyl 2 Pentanone		8.1 U	11 U	5.6 U	0.16 J
trans-1,3 -Dichloropropene		4.5 U	6.0 U	3.1 U	0.85 U
1,1,2-Trichloroethane		5.4 U	7.2 U	3.7 U	1.0 U
Toluene		170	230	110	0.87
2-Hexanone		4.1 U	5.4 U	2.8 U	0.38 J
Dibromochloromethane		1.7 U	2.3 U	1.2 U	0.32 U
1,2-Dibromoethane		1.5 U	2.0 U	1.1 U	0.29 U
Tetrachloroethene	< 100 (2)	13	14	17	0.090 J
Chlorobenzene		2.3 J	3.1 J	1.8 J	0.86 U
Ethyl Benzene		9.2	12	6.7	0.13 J
m,p-Xylene		40	54	24	0.39 J
Bromoform		10 U	14 U	7.1 U	1.9 U
Styrene		8.5 U	11 U	5.9 U	1.6 U
o-Xylene		12	17	8.1	0.14 J
1,1,2,2-Tetrachloroethane		1.4 U	1.8 U	0.94 U	0.25 U
1,3-Dichlorobenzene		12 U	16 U	8.2 U	2.2 U
1,4-Dichlorobenzene		0.90 J	2.2 J	2.2 J	0.051 BJ
1,2-Dichlorobenzene		12 U	16 U	8.2 U	2.2 U

Notes:

(1) New York State Department of Health Air Guideline Values (Air Matrix 1, NYSDOH, June 2007)

(2) New York State Department of Health Air Guideline Values (Air Matrix 2, NYSDOH, June 2007)

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Table 5-2
Summary of Sub Slab Soil Vapor/Indoor Air Analytical Results
2010 Remedial Investigation
235 Metro Park Site
Brighton, New York

Compound: Analyzed by Method TO-15	NYSDOH Air Matrix Guidance Values: µg/m³	OFFICE AREA SAMPLE LOCATIONS				WAREHOUSE AREA SAMPLE LOCATIONS							CONTROL
		IA-1 6/13/10 µg/m³	IA-2 6/13/01 µg/m³	SS-1 6/13/10 µg/m³	SS-2 6/13/10 µg/m³	IA-3 6/13/10 µg/m³	IA-4 6/13/10 µg/m³	IA-5 6/13/10 µg/m³	SS-3 6/13/10 µg/m³	DUPL 1[3] 6/13/10 µg/m³	SS-4 6/13/10 µg/m³	SS-5 6/13/10 µg/m³	OA-1 6/13/10 µg/m³
Chloromethane		1.3 J	2.9 J	.71 U	0.75	3.2 J	3.1 J	3.8 J	.52 J	2.6 U	0.68 U	0.69 U	1
Vinyl Chloride	< 5[1]	0.17 U	1.4 U	0.095 U	0.24 U	1.4 U	1.9 U	1.6 U	.35 U	0.35 U	0.092 U	0.092 U	0.10 U
Bromomethane		1.2 U	10 U	0.68 U	1.7 U	10 U	14 U	11 U	2.3 U	2.3 U	0.66 U	0.66 U	0.73 U
Chloroethane		1.6 U	14 U	0.92 U	2.3 U	14 U	18 U	15 U	3.4 U	3.4 U	0.89 U	0.89 U	0.98 U
Acetone		22	61 J	21	21	93 J	84 J	110 J	15 J	14 J	12	11	13
Trichlorofluoromethane		1.7 J	1.3 J	3	1.6 J	1.5 J	1.4 J	1.7 J	1.7 J	1.7 J	1.8	1.7	1.2
1,1-Dichloroethene	< 100[2]	1.2 U	11 U	0.70 U	1.8 U	11 U	14 U	12 U	2.6 U	2.5 U	0.67 U	0.67 U	0.74 U
Methylene Chloride		0.78 J	1.2 J	14 BJ	0.19 BJ	1.3 J	1.4 J	1.3 J	0.77 BJ	0.24 BJ	0.34 U	0.38 U	0.44 J
1,1,2-Trichloro-1,2,2-Trifluoroethane		0.7	0.74 J	0.9	1	.66 J	5.3 U	.60 J	1.0 J	0.99	0.76	0.9	0.66
Carbon Disulfide		0.13 J	0.45 J	1.5	0.79 J	0.44 J	.46 J	.59 J	.62	.68	0.47 J	.11	0.037 J
trans-1,2-Dichloroethene		1.2 U	11 U	0.70 U	1.8 U	11 U	14 U	12 U	2.6 U	2.5 U	0.67 U	0.67 U	0.74 U
1,1-Dichloroethane		1.1 U	11 U	.71 U	1.8 U	11 U	14 U	12 U	2.6 U	2.6 U	0.69 U	0.69 U	0.76 U
Methyl tert-Butyl Ether		2.2 U	19 U	1.2 U	3.3 U	19 U	25 U	21 U	4.6 U	4.6 U	1.2 U	1.2 U	1.3 U
Vinyl Acetate		0.45 J	120 U	7.9 U	.20 U	7.6 J	7.6 J	5.4 J	29 U	29 U	7.7 U	7.7 U	8.5 U
2-Butanone (MEK)		.31	400	3.5	4.1	420	400	450	7	3.3	5.1	3.3	2.1
cis-1,2-Dichloroethene	< 100[2]	1.2 U	11 U	0.70 U	1.8 U	11 U	14 U	12 U	1.2 J	1.2 J	0.67 U	0.67 U	0.74 U
Chloroform		0.20 J	13 U	.88 J	2.2 U	13 U	17 U	14 U	0.30 J	0.30 J	0.17 J	.3	0.13 J
1,2-Dichloroethane		0.15 J	11 U	0.09 J	1.8 U	11 U	14 U	12 U	2.6 U	2.6 U	0.69 U	0.25 J	0.76 U
1,1,1-Trichloroethane	< 100[2]	0.06 J	14 U	4.7	4	14 U	18 U	16 U	5.7	5.7	0.29 J	1.1	0.054 J
Benzene		0.60 J	2.3 J	2.6	1.1 J	2.3 J	2.3 J	2.7 J	4.4	4.4	0.34 U	.10	0.39 J
Carbon Tetrachloride	< 5[2]	0.62	1.7 U	0.25	0.35	1.7 U	2.2 U	1.9 U	.58 J	0.46	0.38	0.46	0.58
1,2-Dichloropropane		1.4 U	12 U	0.81 U	2.1 U	12 U	16 U	14 U	3.0 U	2.9 U	0.78 U	0.78 U	0.86 U
Bromodichloromethane		0.42 U	3.6 U	0.24 U	0.60 U	3.6 U	4.7 U	4.0 U	0.88 U	0.87 U	0.23 U	0.17 J	0.25 U
Trichloroethene	< 5[2]	0.17 U	1.4 U	1.1	1.4	1.4 U	1.9 U	1.6 U	.15	.15	0.6	0.87	0.10 U
cis-1,3-Dichloropropene		2.8 U	24 U	1.6 U	4.0 U	24 U	31 U	27 U	5.9 U	5.8 U	1.5 U	1.5 U	1.7 U
4-Methyl-2-Pentanone		0.10 J	1.7 J	.24 J	0.25 J	1.2 J	1.2 J	2.4 J	5.3 U	0.14 J	0.34 J	0.24 J	0.14 J
trans-1,3-Dichloropropene		1.4 U	12 U	0.79 U	2.0 U	12 U	16 U	13 U	2.9 U	2.9 U	0.77 U	0.77 U	0.85 U
1,1,2-Trichloroethane		1.7 U	14 U	0.95 U	2.4 U	14 U	19 U	16 U	3.5 U	3.5 U	0.92 U	0.92 U	1.0 U
Toluene		.42	610	.15	0.1	630	640	710	.28	.24	4.7	.41	0.87
2-Hexanone		0.31 J	.82 J	0.40 J	.27 J	.78 J	1.1 J	.83 J	2.6 U	2.6 U	0.29 J	0.38 J	0.38 J
Dibromochloromethane		0.53 U	4.6 U	.30 U	0.76 U	4.6 U	6.0 U	5.0 U	1.1 U	1.1 U	0.29 U	0.29 U	0.32 U
1,2-Dibromoethane		0.48 U	4.1 U	0.27 U	0.68 U	4.1 U	5.3 U	4.5 U	1.0 U	0.98 U	0.26 U	0.26 U	0.29 U
Tetrachloroethene	< 100[2]	0.18 J	1.9 U	.24	.19	1.9 U	2.5 U	2.1 U	.36	.40	.3	0.8	0.090 J
Chlorobenzene		1.4 U	12 U	0.81 U	2.1 U	12 U	16 U	14 U	3.0 U	2.9 U	0.78 U	0.78 U	0.86 U
Ethyl Benzene		0.93 J	5.2 J	1.0 J	.63 J	5.4 J	4.5 J	14 J	1.8 J	1.9 J	0.33 J	5.9	0.13 J
m,p-Xylene		2.8 J	18 J	8.2	5.2 J	18 J	15 J	33	.19	.19	0.74 J	.44	0.39 J
Bromoform		3.2 U	27 U	1.8 U	4.6 U	27 U	36 U	30 U	6.7 U	6.6 U	1.7 U	1.7 U	1.9 U
Styrene		1.0 J	3.8 J	.44 J	0.25 J	4.1 J	3.6 J	5.5 J	5.5 U	5.4 U	0.071 J	1.4 U	1.6 U
o-Xylene		0.98 J	5.4 J	2.1	1.4 J	5.7 J	5.1 J	16 J	5.8 J	5.0 J	0.20 J	.11	0.14 J
1,1,2,2-Tetrachloroethane		0.42 U	3.6 U	0.24 U	0.60 U	3.6 U	4.7 U	4.0 U	0.88 U	0.87 U	0.23 U	0.25 U	0.25 U
1,3-Dichlorobenzene		3.7 U	32 U	2.1 U	5.3 U	32 U	41 U	35 U	7.8 U	7.6 U	2.0 U	2.0 U	2.2 U
1,4-Dichlorobenzene		2.0 U	32 U	.19 J	2.0 U	32 U	41 U	35 U	7.8 U	7.6 U	2.0 U	2.0 U	0.051 BJ
1,2-Dichlorobenzene		3.7 U	32 U	2.1 U	5.3 U	32 U	41 U	35 U	7.8 U	7.6 U	2.0 U	2.0 U	2.2 U

Notes:

(1) New York State Department of Health Air Guideline Values (Air Matrix 1, NYSDOH, June 2007)

(2) New York State Department of Health Air Guideline Values (Air Matrix 2, NYSDOH, June 2007)

(3) Duplicate sample collected at sample location SS-3

Bolded and yellow highlighted concentrations indicate values that exceed NYSDOH Air Matrix guidance values.

Qualified with "U" qualifier flag to indicate non-detect result based on method blank contamination.

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Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: Monitored Natural Attenuation

This alternative is a non-engineered remedial alternative that involves the degradation of the chlorinated volatile organic compounds in the groundwater by naturally occurring processes (biodegradation). This alternative will consist of periodic sampling and laboratory analysis of the site's groundwater. This alternative will require minimal effort to implement and will have lower capital costs. The time needed to achieve the groundwater SCGs will be decades.

This alternative will include one round of groundwater samples collected annually for 30 years from 13 existing groundwater monitoring wells. The groundwater samples will be analyzed for the chlorinated volatile organic compounds and the critical monitored natural attenuation parameters such as nitrate, sulfate, iron (II). The presence of breakdown products of tetra- and tri-chloroethene suggest this is a viable alternative that would, in time, reduce the contaminant levels.

Implementation of institutional controls in the form of an environmental easement on the site will address soil, groundwater and soil vapor contamination. The institutional controls will consist of restrictions on the use of Site groundwater for any purpose without prior review and approval by NYSDEC; restrict the use of the Site to commercial use; and require the use of a NYSDEC-approved Site Management Plan (SMP) for any activities that could potentially involve exposure including addressing the potential for soil vapor intrusion. The SMP will include a Soil Vapor Intrusion Monitoring Plan for long-term monitoring of the sub-slab soil vapor and the indoor air on a routine basis. Periodic reports will include evaluation of the continuing protectiveness of this alternative and the need for additional measures. The scope of initial inspection and monitoring will be specified in the SMP. The SMP will be updated as appropriate over time in response to inspection and monitoring results and effectiveness of the remedy.

Present Worth: *$397,000*
Capital Cost: *$42,000*
Annual Costs (Year 1): *$97,000*
Annual Costs (Years 2-30): *$28,000*

Alternative 3: Restoration to Pre-Disposal or Unrestricted Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil clean objectives listed in Part 375-6.8 (a). This alternative will include: the demolition of the on-site building above the contaminated soil; excavation and off-site disposal of all waste and soil

contamination above the unrestricted use soil cleanup objective; and in-situ thermal remediation to introduce heat to the subsurface to increase the volatility and mobility of the chlorinated volatile organic compounds in the groundwater. The remedy will not rely on institutional or engineering controls to prevent future exposure. This alternative will not have a Site Management Plan, no restrictions, and no periodic review. This alternative will have not annual cost, only capital cost.

Capital Cost: *$3,167,000*

Alternative 4: In-situ Reductive Dechlorination

This alternative will consist of the direct closely spaced injections of a biological amendment (a lactate substrate) into the source areas. The biological amendments will encourage the growth of the naturally microbes. A pre-design characterization using a membrane interface probe (MIP) and a pilot study will be completed. The pre-design MIP phase will provide contaminant distribution and will further define the injection zone vertically and horizontally. Groundwater monitoring up gradient and down gradient from the treatment areas will evaluate the effectiveness of the injections at reducing the contaminant concentrations and stop the down gradient migration of the groundwater plume.

Implementation of institutional controls in the form of an environmental easement on the site will address soil, groundwater and soil vapor contamination. The institutional controls will consist of restrictions on the use of Site groundwater for any purpose without prior review and approval by NYSDEC; restrict the use of the Site to commercial use; and require the use of a NYSDEC-approved Site Management Plan (SMP) for any activities that could potentially involve exposure including addressing the potential for soil vapor intrusion. The SMP will include a Soil Vapor Intrusion Monitoring Plan for long-term monitoring of the sub-slab soil vapor and the indoor air on a routine basis. Periodic reports will include evaluation of the continuing protectiveness of this alternative and the need for additional measures. The scope of initial inspection and monitoring will be specified in the SMP. The SMP will be updated as appropriate over time in response to inspection and monitoring results and effectiveness of the remedy.

Present Worth: *$559,000*
Capital Cost: *$393,000*
Annual Costs (Year 1) *$77,000*
Annual Costs (Years 2-5): *$89,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Action	0	0	0
Monitored Natural Attenuation	42,000	28,000	397,000
Pre-Disposal Conditions	3,167,000	0	3,167,000
In-situ Reductive Dechlorination	393,000	25,000	559,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4, In-situ Reductive Dechlorination as the remedy for this site. Alternative 4 would achieve the remediation goals for the site by bioremediation of the chlorinated volatile organic contaminants. The elements of this remedy are described in Section 7. The proposed remedy is depicted in Figure 3. Figure 3 presents the proposed area of injections which will be further defined as part of the remedial design phase.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The proposed remedy (Alternative 4) would satisfy this criterion by reducing the contaminant concentrations in the groundwater. The reduction of the contaminants in groundwater will reduce the exposures relating to soil vapor intrusion in the on-site building. Alternative 4 addresses the source of the groundwater contamination, which is the most significant threat to public health and the environment. Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternative 3, by removing all soil contaminated above the unrestricted soil cleanup objective, meets the threshold criteria. Alternative 2 will comply with this criterion but to a lesser degree or with lower certainty.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis. Alternative 3 and 4 will operate under certain parameters that the reduction of the contaminant concentrations to below the applicable SCGs is obtainable. Alternative 2 complies with this criterion but a lesser degree or with lower certainty. Because Alternatives 2, 3 and 4 satisfy the threshold criteria, the remaining criteria are particularly important in selecting the final remedy for the site.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

Since the chlorinated volatile organic contaminated groundwater is the primary concern at the site Alternative 3 and 4 will achieve long-term effectiveness. The excavation and off-site disposal of the semi-volatile organic compound and metal contaminated soil above the unrestricted use SCG will achieve long-term effectiveness and permanence but those constituents are not the primary focus of the remedial program. Long-term effectiveness is best accomplished by the direct application of heat or lactate substrate to the contaminated groundwater plume (Alternatives 3 and 4). Alternative 4 utilizes greener remediation principles and techniques through lower energy usage and will allowed continued use of the building during the remedial phase. For Alternative 2, monitored natural attenuation remains effective, but the time to achieve the groundwater remedial objectives will be decades and the long term potential for exposure to soil vapor in the on-site building is an unacceptable risk.

4. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative 2 would control potential exposures with institutional controls only and reduction of the toxicity, mobility or volume of contaminants will require longer time frames to achieve the remedial objectives. Alternative 3, excavation and off-site disposal and in-situ thermal remediation, reduces the toxicity, mobility and volume of contaminants in the soil and groundwater. Alternative 4 will operate under parameters that will be effective at the reduction of the toxicity, mobility, and volume of the dissolved phase chlorinated volatile organic contamination. The biostimulation increases microbial populations and activity for the degradation of the chlorinated volatile organic contamination.

5. Short-term Impacts and Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternatives 2 and 4 all have short-term impacts which could easily be controlled; however, Alternative 2 would have the smallest impact. The time needed to achieve the remediation goals is the shortest for Alternative 3 and longer for Alternative 2 and 4. Alternative 3 will have the largest impact on the community, the workers, and the environment during the construction and implementation of the alternative. With the increased truck traffic, construction and demolition debris disposal, and amount of energy (fuel) required for building demolition and site redevelopment, Alternative 3 is less effective in the implementation of green remediation principles and techniques.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Alternatives 2 and 4 are favorable in that they are readily implementable. Alternative 3 is also implementable, but the demolition of the building, the volume of soil excavated, and the construction of a replacement building under this alternative would necessitate increased truck traffic on local roads for several months as well as the current business operating in the building would have to relocate.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing

criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The costs of the alternatives vary significantly. Alternative 2 has a low capital cost, but has a high present worth due to annual cost associated with 20 years of groundwater monitoring. With demolition of the on-site building, the large volume of soil to be handled, the installation of the in-situ thermal system, and the construction of the replacement building, Alternative 3 will have the highest present worth cost. In-situ dechlorination remediation (Alternative 4) would be less expensive than Alternative 3, yet when implemented and operated under certain parameters the alternative will achieve the groundwater SCGs.

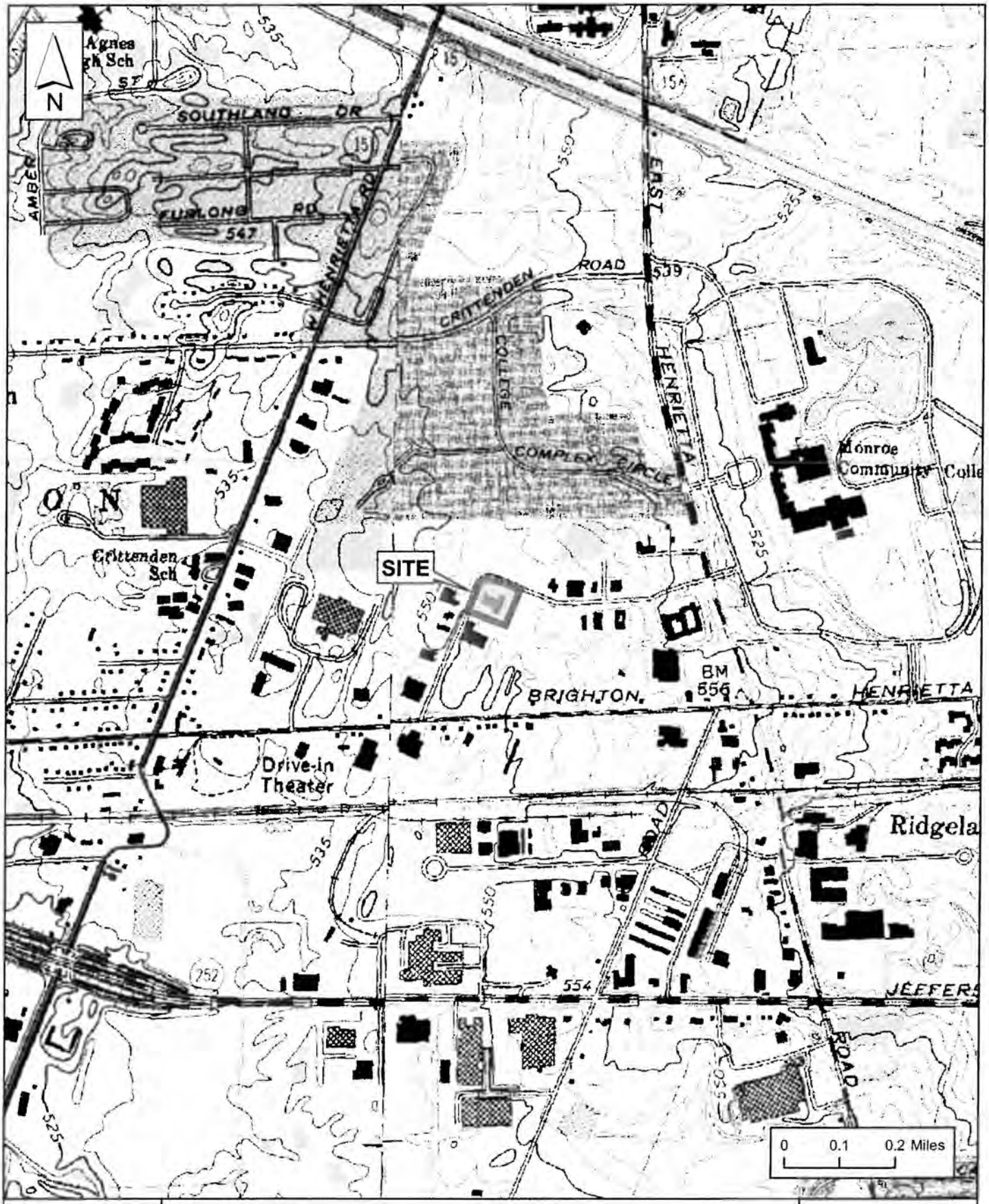
8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

Since the anticipated use of the site is to continue as commercial, Alternatives 2 and 4 would be desirable as there will be minimal impact the current commercial business enterprise located at the property. Alternative 3 would remove or treat the contaminated soil and groundwater but would highly impact the current commercial business enterprise with the removal of the soil contamination under the building and the installation of the thermal system. However, the soil contamination with Alternative 2 and 4 would be controllable with implementation of a Site Management Plan.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

Alternative 4 is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.



MALCOLM PIRNIE

4124094 SEPT. 2009

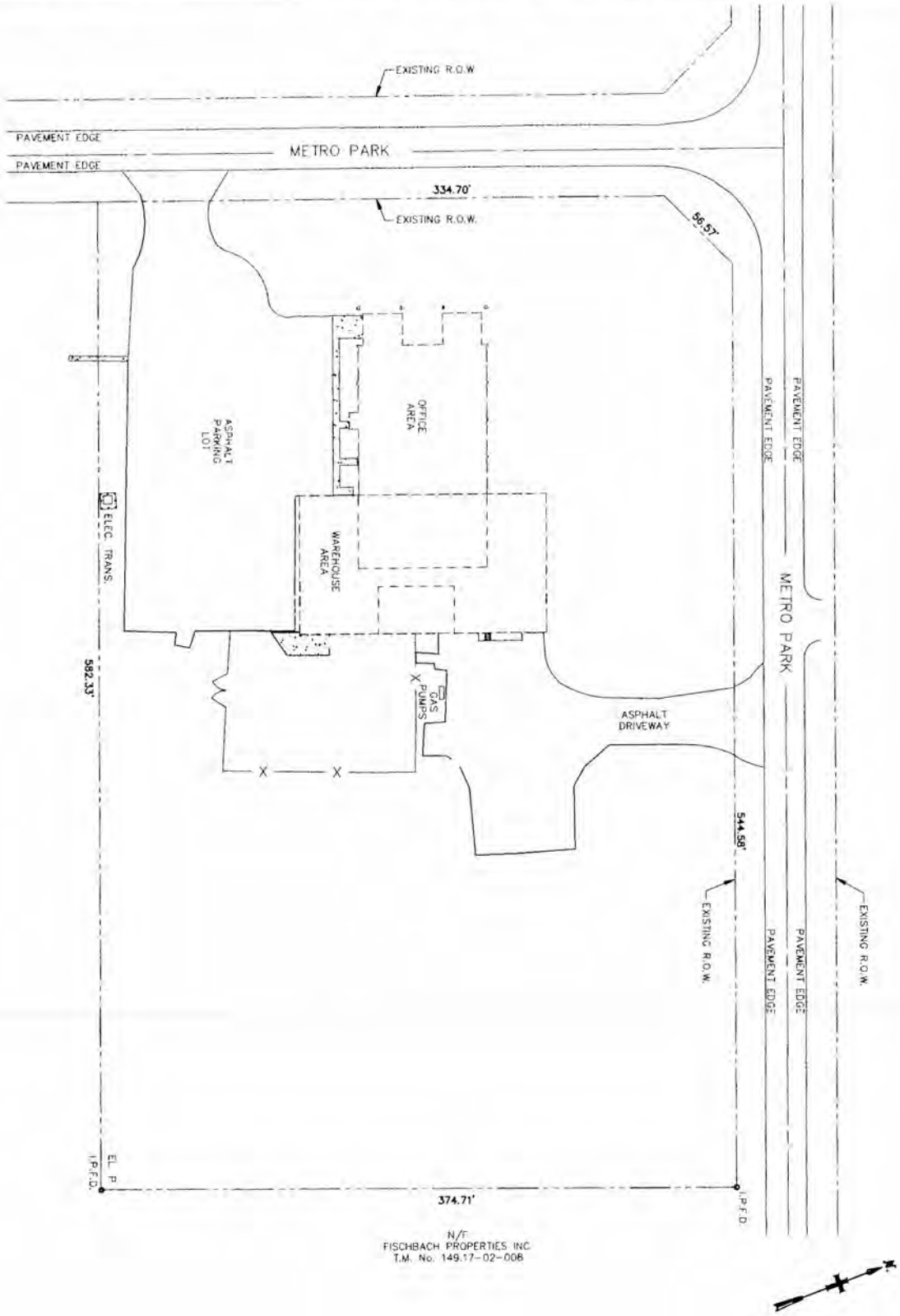
SITE LOCATION MAP
235 METRO PARK, ROCHESTER, NY

FIGURE 1-1

User: DEWYER Spec: PIRNIE STANDARD File: F:\Projects\4124094\CADD\FIGURES\FIG 1-2.DWG Scale: 1:1 Date: 09/23/2009 Time: 10:03 Layout: Layout1

MALCOLM PIRNIE

SUPPLEMENTAL
REMEDIAL INVESTIGATION
WORK PLAN



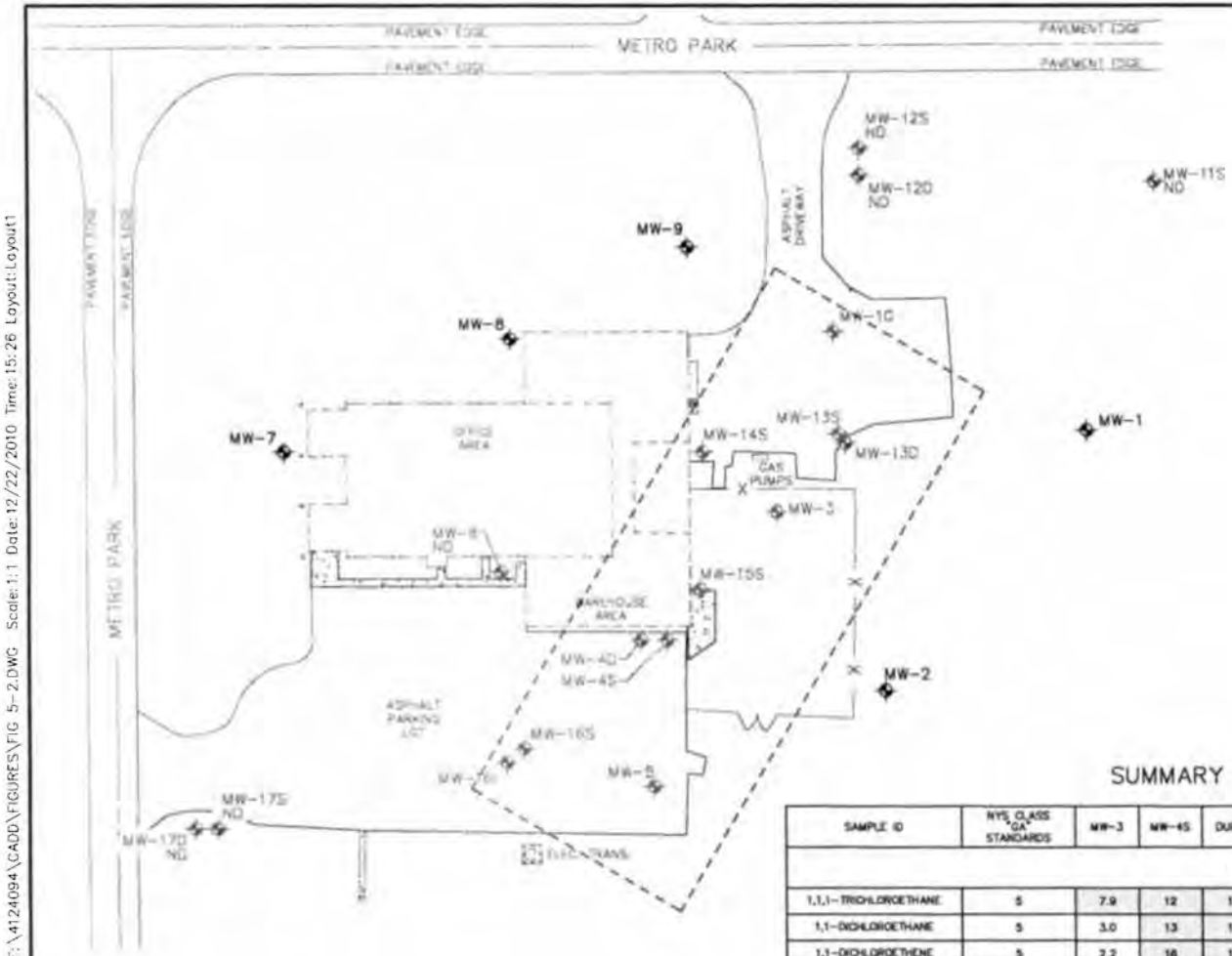
GENERAL SITE LAYOUT

SCALE: 1"=60'

MALCOLM PIRNIE, INC.

SEPTEMBER 2009

FIGURE 1-2



LEGEND

MW-1 — EXISTING MONITORING WELL W/ELEVATED VOC CONCENTRATION(S)

MW-6 ND — MONITORING WELL SHOWN WITH "ND" INDICATIVE OF NON-DETECT RESULTS

MW-7 — MONITORING WELL NOT SAMPLED DURING 2010 SAMPLING EVENTS

— — — — APPROXIMATE LIMIT OF VOC IMPACTED GROUNDWATER

NOTE: HIGHLIGHTED CONCENTRATIONS INDICATIVE OF CLASS "GA" GROUNDWATER EXCEENDANCE.

SUMMARY OF 6/5/10 ANALYTICAL RESULTS

SAMPLE ID	NYS CLASS "GA" STANDARDS	MW-3	MW-4S	DUP-1	MW-4D	MW-5	MW-10	MW-12D	MW-13D	MW-13S	MW-14S	MW-15S	MW-16S	MW-16I	MW-17D
VOLATILE ORGANIC COMPOUNDS (VOCS) (µG/L)															
1,1,1-TRICHLOROETHANE	5	7.9	12	12	1.0 U	1.8	1.0 U	2.0 U	1.0 U	1.0 U	50	230	1.0 U	10 U	5.0 UJ
1,1-DICHLOROETHANE	5	3.0	13	13	1.8	22	1.0 U	2.0 U	1.0 U	0.81 J	15	360	22	10 U	5.0 UJ
1,1-DICHLOROETHENE	5	2.2	16	15	1.1	7.1	1.0 U	2.0 U	1.0 U	1.0 U	58	140	2.8	10 U	5.0 UJ
ACETONE	50	1.7 J	4.9 J	3.3 J	4.7 J	2.9 UJ	1.8 J	10 UJ	5 UJ	5.0 U	5.0 U	100 U	2.0 J	50 U	25 UJ
BENZENE	0.7	1.0 U	2.5 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	20 U	0.47 J	10 U	5.0 UJ
CIS-1,2-DICHLOROETHENE	5	1.0 U	140	140	70	13	0.74 J	2.0 U	1.0 U	14	8.9	2700	400 D	7.8 J	5.0 UJ
METHYL TERT-BUTYL ETHER	50	1.0 U	2.5 U	0.42 J	1.0 U	8.5	1.0 U	2.0 U	1.0 U	1.0 U	2.7	4.8 J	3.0	10 U	5.0 UJ
TETRACHLOROETHENE	5	1.0 U	8.8	8.5	2.4	1.0 U	510 D	2.0 U	1.0 U	1.0 U	1.0 U	20 U	1.0 U	10 U	5.0 UJ
TRANS-1, 2-DICHLOROETHENE	5	1.0 U	2.8	2.7	0.66 J	0.38 J	1.0 U	2.0 U	1.0 U	0.29 J	0.25 J	72	19	10 U	5.0 UJ
TRICHLOROETHENE	5	1.0 U	560 D	520 D	22	1.0 U	8.2	2.0 U	1.0 U	0.97 J	1.0 U	2700	0.22 J	10 U	5.0 UJ
VINYL CHLORIDE	2	1.0 U	51	52	4.2	0.43 J	1.0 U	2.0 U	1.0 U	1.0 U	3.4	640	150	10 U	5.0 UJ

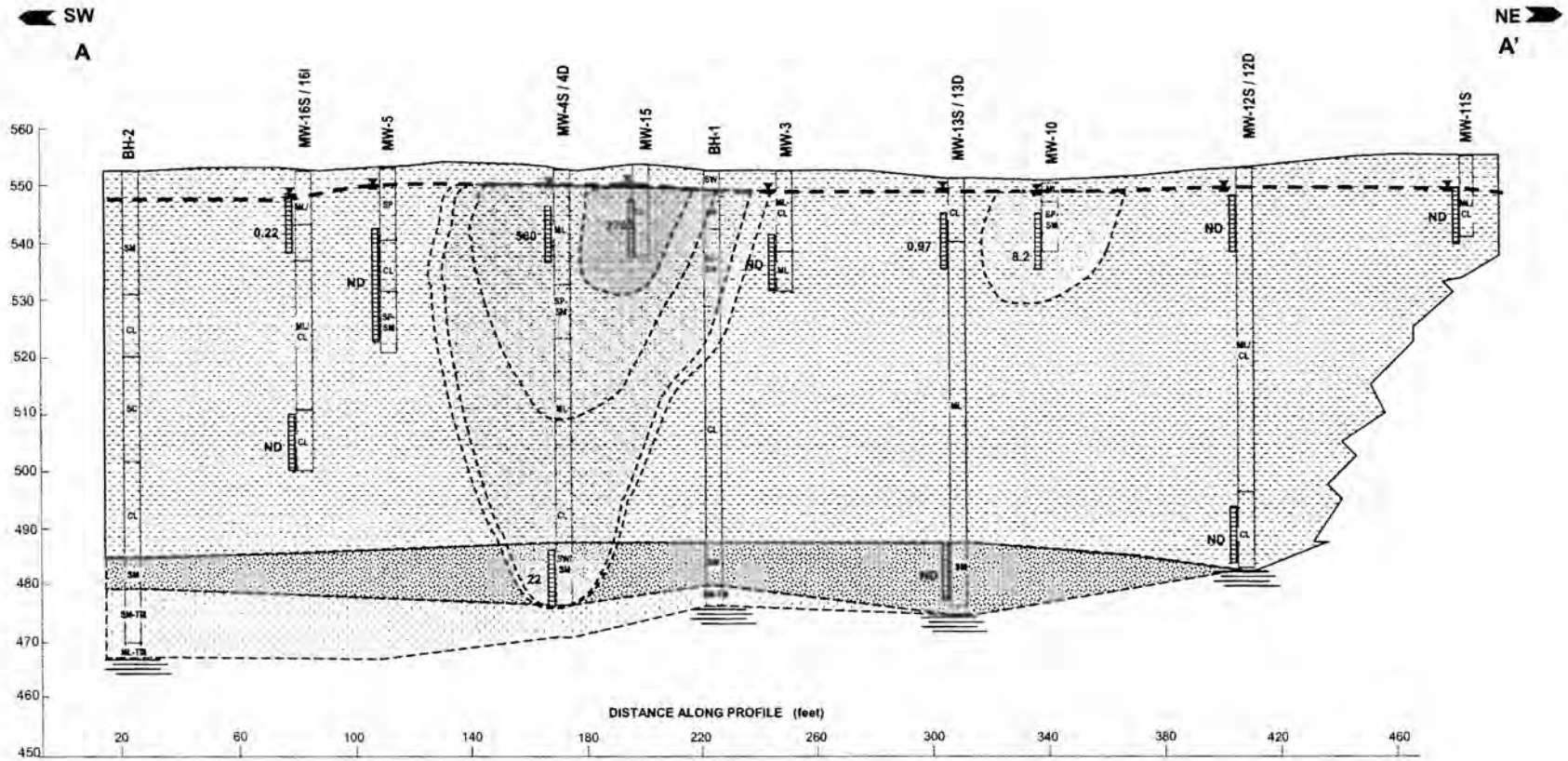
MALCOLM PIRNIE

235 METRO PARK SITE
BRIGHTON, NEW YORK
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT

VOCs GROUNDWATER MAP
06/05/10 SAMPLING EVENT
SCALE: 1"=60'

MALCOLM PIRNIE, INC.
JANUARY 2011
FIGURE 5-2

User:DEWYER Spec:PIRNIE STANDARD File:F:\4124094\CADD\FIGURES\FIG 5-2.DWG Scale:1:1 Date:12/22/2010 Time:15:26 Layout:Layout1



LEGEND

Geology

Quaternary

- Undifferentiated Lacustrine Clay and Silt
- Undifferentiated Silty Sand
- Glacial Till -Silty Sand

Silurian

- Bedrock—Vernon Shale

- Soil Boring Location
- Monitoring Well Screen
- Water Table

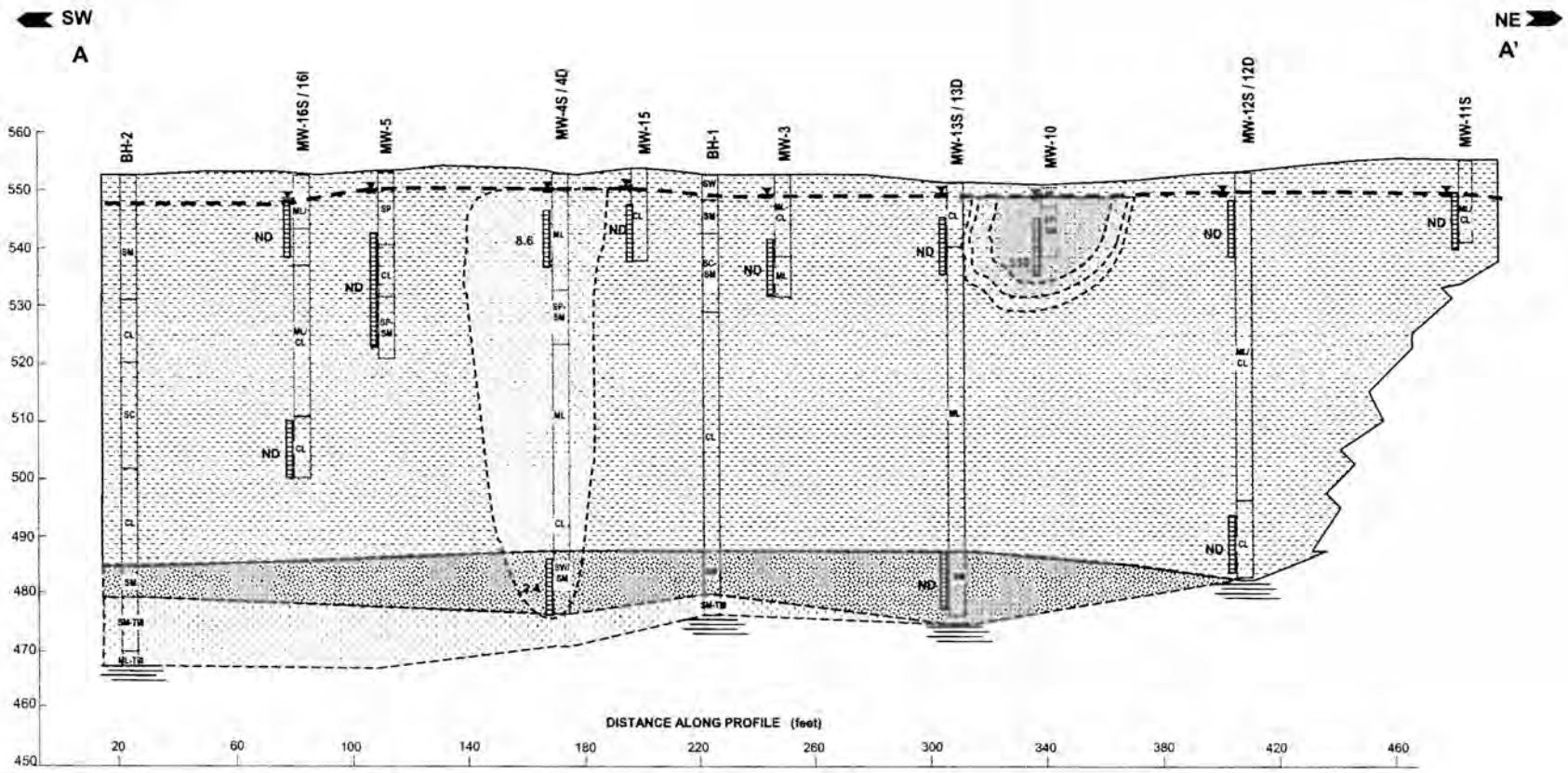
Chlorinated Volatile Organic Compound Concentrations

- 22 TCE Concentration
- Isoconcentration Line (ppb) (Inferred)

- > 1,000 ppb
- 100 - 1,000 ppb
- 10 - 100 ppb
- 1 - 10 ppb

Cross section represents geologic conditions as interpreted from the soil borings advanced during this investigation, and previous investigation; and may not accurately represent actual conditions between the boring locations.

MALCOLM PIRNIE	235 METRO PARK SITE BRIGHTON, NEW YORK SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILTY STUDY REPORT	Trichloroethene Concentration	JANUARY 2011 FIGURE 5 - 3



LEGEND

Geology

Quaternary

- Undifferentiated Lacustrine Clay and Silt
- Undifferentiated Silty Sand
- Glacial Till -Silty Sand

Silurian

- Bedrock—Vernon Shale

- Soil Boring Location
- Monitoring Well Screen
- Water Table

Chlorinated Volatile Organic Compound Concentrations

- 510 PCE Concentration
- Isoconcentration Line (ppb) (Inferred)

- > 1,000 ppb
- 100 - 1,000 ppb
- 10 - 100 ppb
- 1 - 10 ppb

Cross section represents geologic conditions as interpreted from the soil borings advanced during this investigation, and previous investigation; and may not accurately represent actual conditions between the boring locations.

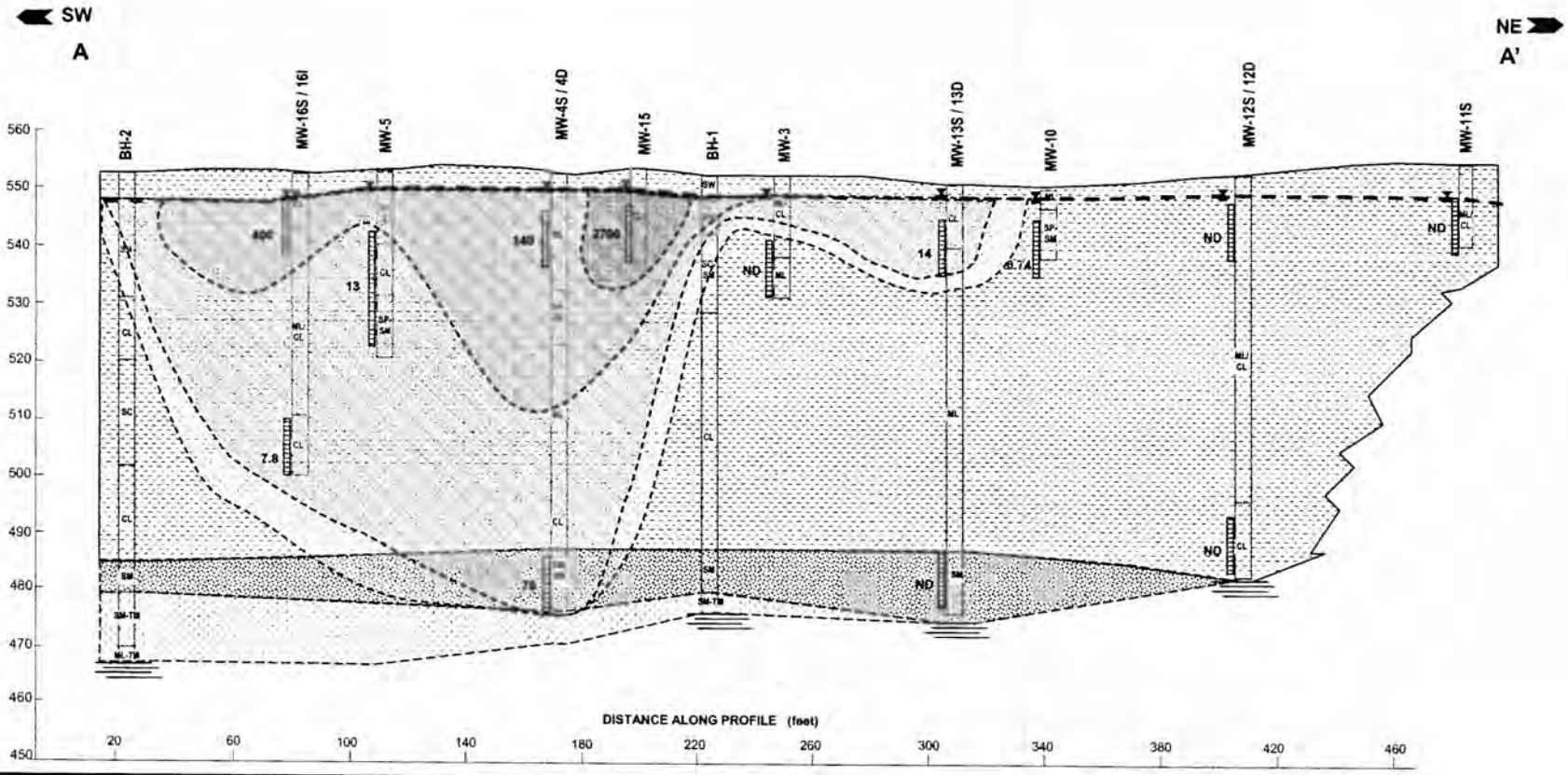
MALCOLM PIRNIE

235 METRO PARK SITE
BRIGHTON, NEW YORK
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILTY STUDY REPORT

Tetrachloroethene Concentration

JANUARY 2011

FIGURE 5 - 4



LEGEND

Geology

Quaternary

- Undifferentiated Lacustrine Clay and Silt
- Undifferentiated Silty Sand
- Glacial Till -Silty Sand

Silurian

- Bedrock—Vernon Shale

- Soil Boring Location
- Monitoring Well Screen
- Water Table

Chlorinated Volatile Organic Compound Concentrations

400 Cis 1,2-DCE Concentration

Isoconcentration Line (ppb) (Inferred)

- > 1,000 ppb
- 100 - 1,000 ppb
- 10 - 100 ppb
- 1 - 10 ppb

Cross section represents geologic conditions as interpreted from the soil borings advanced during this investigation, and previous investigation; and may not accurately represent actual conditions between the boring locations.

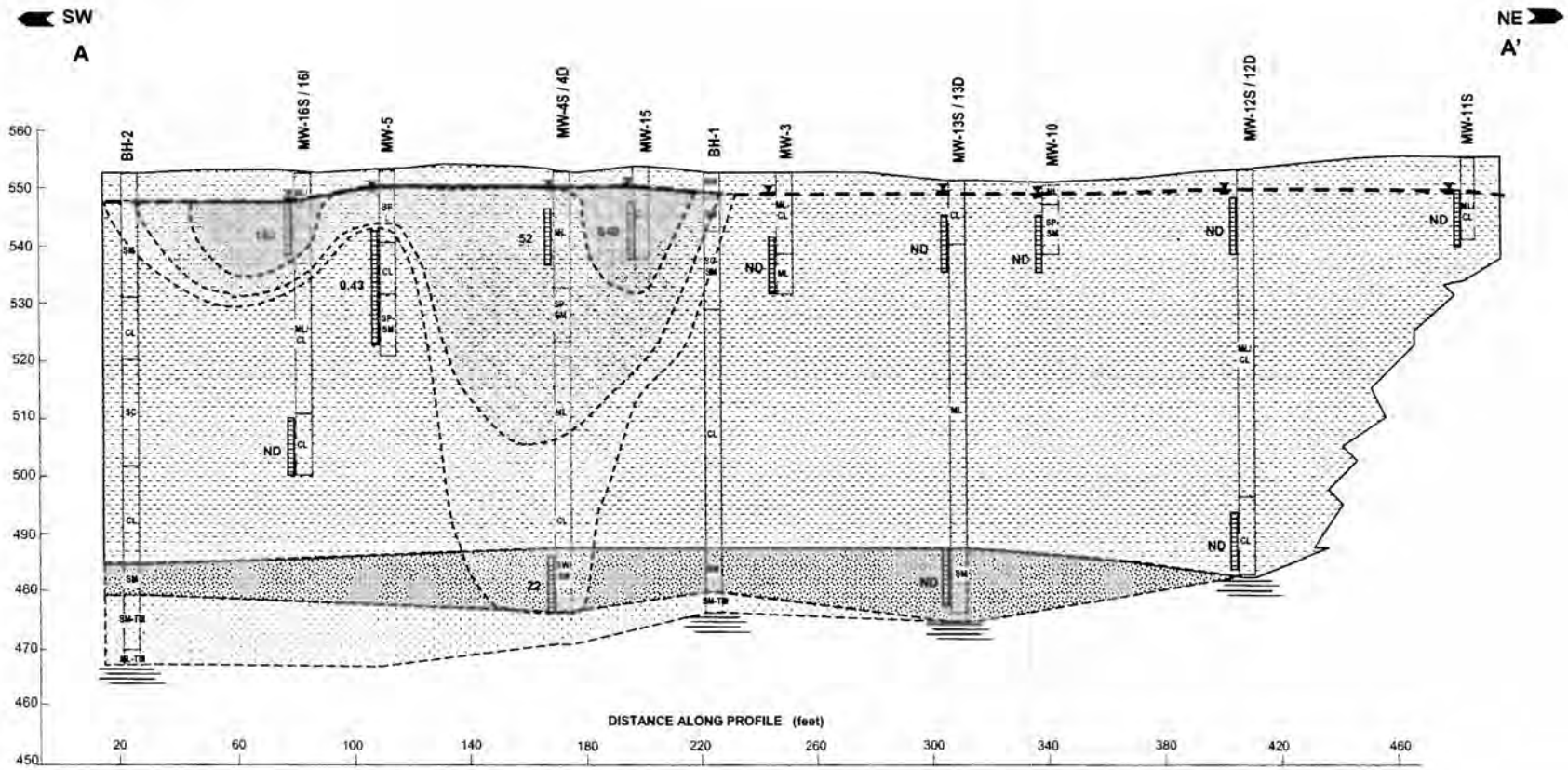
MALCOLM PIRNIE

235 METRO PARK SITE
BRIGHTON, NEW YORK
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILTY STUDY REPORT

Cis 1,2-Dichloroethene Concentration

JANUARY 2011

FIGURE 5 - 5



LEGEND

Geology

Quaternary

- Undifferentiated Lacustrine Clay and Silt
- Undifferentiated Silty Sand
- Glacial Till -Silty Sand

Silurian

- Bedrock—Vernon Shale

- Soil Boring Location
- Monitoring Well Screen
- Water Table

Chlorinated Volatile Organic Compound Concentrations

- 22 Vinyl Chloride Concentration
- Isoconcentration Line (ppb) (Inferred)

- > 1,000 ppb
- 100 - 1,000 ppb
- 10 - 100 ppb
- 1 - 10 ppb

Cross section represents geologic conditions as interpreted from the soil borings advanced during this investigation, and previous investigation; and may not accurately represent actual conditions between the boring locations.

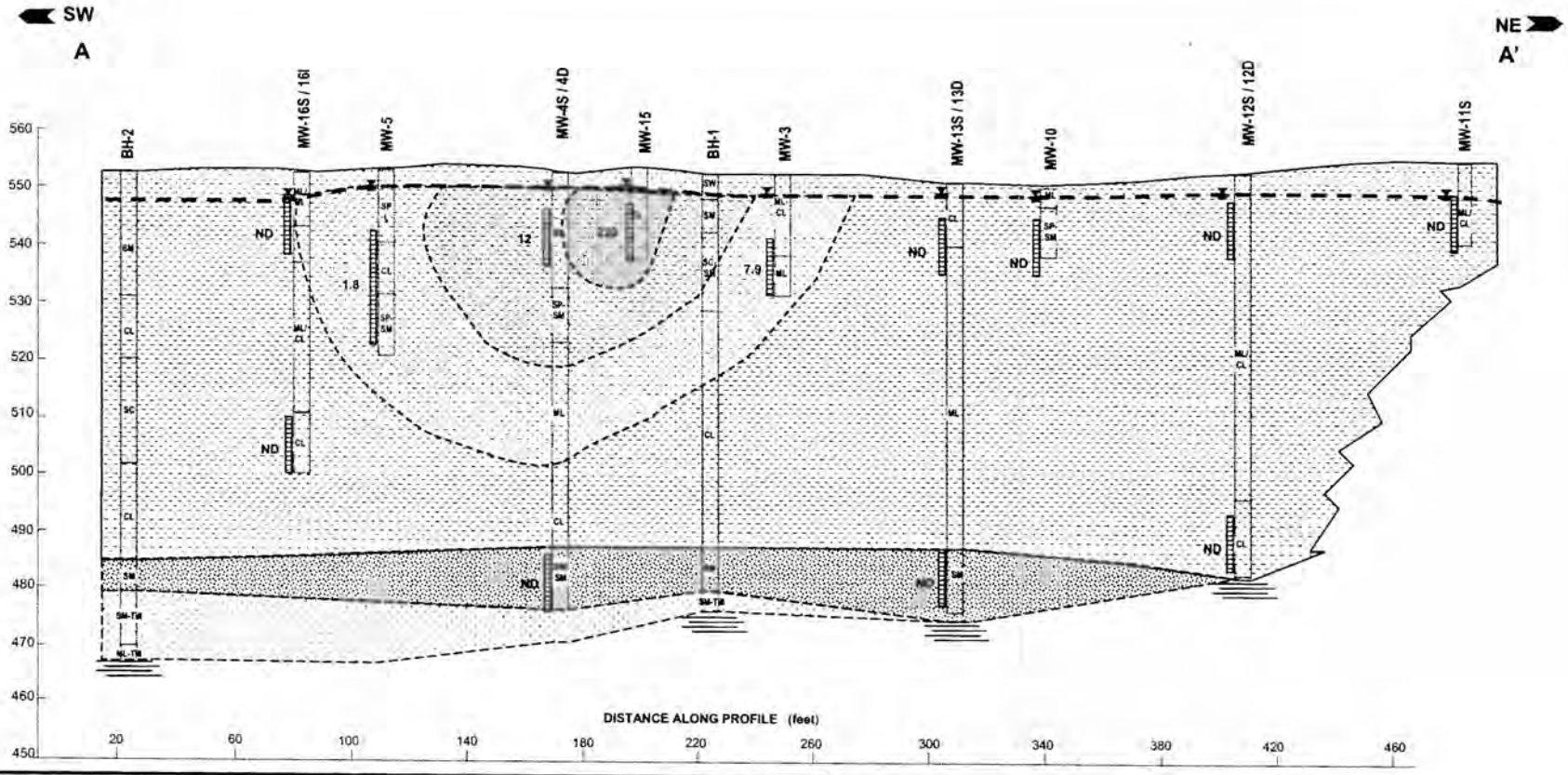
MALCOLM PIRNIE

235 METRO PARK SITE
BRIGHTON, NEW YORK
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILTY STUDY REPORT

Vinyl Chloride Concentration

JANUARY 2011

FIGURE 5 - 6



LEGEND

Geology

Quaternary

- Undifferentiated Lacustrine Clay and Silt
- Undifferentiated Silty Sand
- Glacial Till -Silty Sand

Silurian

- Bedrock—Vernon Shale

- Soil Boring Location
- Monitoring Well Screen
- Water Table

Chlorinated Volatile Organic Compound Concentrations

- 22 — 1,1,1-TCA Concentration
- Isoconcentration Line (ppb) (Inferred)
- > 1,000 ppb
- 100 - 1,000 ppb
- 10 - 100 ppb
- 1 - 10 ppb

Cross section represents geologic conditions as interpreted from the soil borings advanced during this investigation, and previous investigation; and may not accurately represent actual conditions between the boring locations.

MALCOLM PIRNIE

235 METRO PARK SITE
BRIGHTON, NEW YORK
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILTY STUDY REPORT

1,1,1-Trichloroethane Concentration

JANUARY 2011

FIGURE 5 - 7

APPENDIX A

RESPONSIVENESS SUMMARY

Responsiveness Summary

235 Metro Park Brighton
State Superfund Project
Town of Brighton, Monroe, New York
Site No. 828150

The Proposed Remedial Action Plan (PRAP) for the 235 Metro Park Brighton site, was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 29, 2012. The PRAP outlined the remedial measure proposed for the contaminated soil and groundwater at the 235 Metro Park Brighton site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on March 15, 2012, which included a presentation of the remedial investigation feasibility study (RI/FS) for the 235 Metro Park Brighton as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 29, 2012.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

COMMENT 1: How long will it take to clean groundwater?

RESPONSE 1: The treatment will probably take 2-3 injection events, spaced out over several months with sampling in between. The current estimate is 5 years, at which time DEC will reassess the need for additional monitoring and/or injections.

COMMENT 2: Easement – How does the town become aware the easements and its requirements?

RESPONSE 2: DEC will send the Town of Brighton a copy of the easement once it is filed with the County.

COMMENT 3: When will ROD be issued?

RESPONSE 3: The ROD is expected to be issued by the end of March 2012.

COMMENT 4: Will work need to be done in the building? Will the building come down?

RESPONSE 4: The need for work in the building will be evaluated during the design of the injection program. It will be dependent on utilities under the building slab. The remedial plan does not require that the building be demolished. Also, the injections will be a biological food substrate and not a chemical like permanganate.

APPENDIX B

Administrative Record

Administrative Record

235 Metro Park Brighton
State Superfund Project
Town of Brighton, Monroe County, New York
Site No. 828150

Proposed Remedial Action Plan for the 235 Metro Park Brighton site, dated February 2012, prepared by the Department.

Order on Consent, Index No. B8-0778-08-03A, between the Department and Fischbach, LLC., executed on November 19, 2009.

"Supplemental Remedial Investigation Work Plan" March 2010, prepared by Malcolm Pirnie, Inc.

Correspondence – Letter dated April 27, 2010 from Charlotte B. Theobald, New York State Department of Environmental Conservation, Approval with Modifications March 2010 Supplemental Remedial Investigation Work Plan.

"Supplemental Remedial Investigation and Feasibility Study Report", April 2011, prepared by ARCADIS U.S.

Appendix C

Community Air Monitoring Plan

Community Air Monitoring Plan
235 Metro Park
Brighton, New York

Monitoring and Mitigation Requirements:

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions:

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present.

The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

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

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

Particulate Monitoring, Response Levels, and Actions:

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

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

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

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

Appendix D

Health and Safety Plan

Site Specific Health and Safety Plan

Revision 10 4/16/2012

Project Name: Fishbach & Moore Site

Project Number: 04124094.0000
Client Name: Chartis Insurance
Date: 8/1/2012
Revision: 1

Approvals:

HASP Developer: Michael Nasca

HASP Reviewer: Greg Ertel

Project Manager: Ben Girard

Emergency Information

Site Address: 235 Metro Park
Rochester, NY 14607

Emergency Phone Numbers:

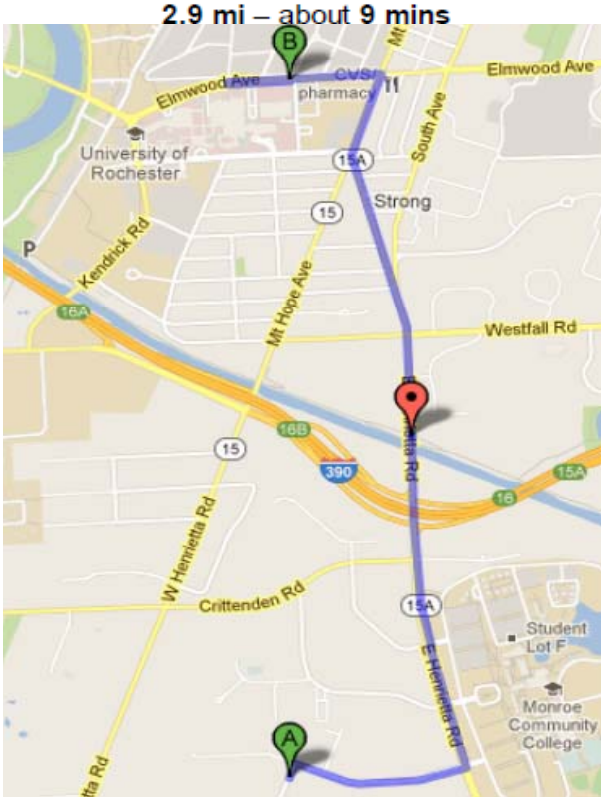
Emergency (fire, police, ambulance)	911
Emergency (facility specific, if applicable)	
In plant phone	
Cell phone	
Guard	
Emergency Other (specify) _____	
WorkCare	1-800-455-6155
Project H&S (specify) _____	
Corporate Health and Safety	1-720-344-3500

Hospital Name and Address: Strong Memorial Hospital
601 Elmwood Avenue
Rochester, NY 14620

Hospital Phone Number: 1-585-275-2100

Route to the Hospital

Directions to Strong Memorial Hospital
601 Elmwood Avenue, Rochester, NY 14620
2.9 mi – about **9 mins**



235 Metro Park, Rochester, NY 14623

	1. Head **north** on **Metro Park**	go 217 ft total 217 ft
	2. Turn right to stay on **Metro Park** About 1 min	go 0.4 mi total 0.5 mi
15A	3. Turn left onto **New York 15A N/E Henrietta Rd** About 5 mins	go 1.7 mi total 2.1 mi
	4. Slight right onto **Mt Hope Ave** About 1 min	go 0.2 mi total 2.4 mi
	5. Turn left onto **Elmwood Ave** About 1 min	go 0.4 mi total 2.7 mi
	6. Make a U-turn Destination will be on the right About 1 min	go 0.2 mi total 2.9 mi

Strong Memorial Hospital
601 Elmwood Avenue, Rochester, NY 14620

General Information

Site Type (select all applicable):

- [x] Active
- [ ] Inactive
- [ ] Secure
- [ ] Unsecured
- [ ] Residential
- [ ] Retail
- [x] Commercial
- [x] Industrial
- [ ] Government
- [ ] Utility
- [ ] Landfill
- [ ] Roadway
- [ ] Railroad
- [ ] Marine
- [ ] Remote Area
- [ ] Unknown
- [ ] Other (specify): _____

Surrounding Area and Topography (select one):

- [x] Surrounding area and topography are presented in the project work plan
- [ ] Surrounding area and topography (*briefly describe*):

Site Background (select one):

- [ ] Site background is presented in the project work plan
- [x] Site background (*briefly describe)* :

The Site is situated on approximately 5-acres of land located in the Town of Brighton, Monroe County, New York. The Site is active and located in a commercial and light industrial park area situated approximately 4 miles south of downtown Rochester and due west of Monroe Community College. The main feature of the Site is a building with a footprint of approximately 20,000 sq. ft. that has a loading dock area and a parking lot. The site also has a vacant grassy area and a landscaped lawn. The building is currently being used for label manufacturing and associated office space.

The contaminants of concern are chlorinated VOCs (PCE, TCE, and daughter products).

Project Tasks
The following tasks are identified for this project:

Examples: "Drilling/soil sampling", "Surveying", "Inspections"

1 General Site Work
2 Groundwater Sampling
3 Drilling
4 Biological Injections
5 Soil Vapor Monitoring

☐ Subcontractor supplied H&S information is attached

☑ Utility clearance required.
Comments:

Roles and Responsibilities

	Name	*Role*	*Additional Responsibilities (Describe)*
1	Ben Girard	PM	
2	TBD	TM	
3	Nicholas (Klaus) Beyrle	Field Lead	
4	TBD	SSO	
5			
6			

Training

All ARCADIS employees are required to have the following training:	*Selected ARCADIS employees are required to have the following additional training:*	Names or Numbers from above
☑ 40 hr HAZWOPER w current refresh.	☐ Not applicable	
☐ 24 hr HAZWOPER	☐ First aid/CPR/BBP	
☐ 10 hr Construction	☐ 30 hr Construction	
☐ HazMat #1 (Ground/Air/MOT)	☐ 10 hr Construction	
☐ HazMat #4 (MOT)	☑ HazMat #1 (Gr./Air/MOT)	
☐ HazCom/Emergency Action Plan	☐ HazMat #4 (MOT)	
☑ H&S Orientation (classroom); or	☐ Confined space entrant	
☐ H&S Orientation (on-line)	☐ Confined space rescue	
☐ PPE	☐ Excavation CP	
☐ Respiratory protection	☐ Electrical (NFPA 70E)	
☐ Smith System (hands on)	☐ Lockout/Tagout	
☑ Smith System (on-line)	☐ H&S Orientation (class)	
☐ OTS/eRailsafe	☐ OTS/eRailsafe	
☐ Client specific:	☐ Smith Sys. (hands on)	
	☐ Boating safety	
☐ Other:	☐ Other:	

Hazard Analysis

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Division
Environment

Business Unit
REM

Task 1: **General Site Work**

Hazardous Activity #1

Field-Contaminated media (contact with impacted soil, water, air, sediment, etc)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	H	Driving	-	Electrical	-
Environmental	M	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	M	Sound	-

Overall Unmitigated Risk: High Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Engineering Controls PPE (see HASP "PPE" section)

Secondary Controls: H&S Standards HASP Admin. Controls HAZWOPER Training

Hazardous Activity #2

Field-Traffic - parking lots

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	H
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK STAR Plan Engineering Controls

Secondary Controls: Job Briefing/Site Awareness

Hazardous Activity #3

General-Housekeeping - poor

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	-	Electrical	-
Environmental	-	Gravity	M	Mechanical	-	Motion	-
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK Housekeeping Inspections

Secondary Controls: JSAs Job Briefing/Site Awareness

Hazardous Activity #4

General-Lifting and movement of equipment of varying weights at varying frequencies by manual methods

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	-	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	-
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Medium if utilizing:

Primary Controls:	TRACK Engineering Controls Job Rotation
Secondary Controls:	JSAs Job Briefing/Site Awareness Specialized Equipment Admin. Controls Engineering Controls

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Task 2: **Groundwater Sampling**

Hazardous Activity #1

Field-Sampling - monitoring well sampling - manual (bailer, check valve)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	L	Driving	-	Electrical	-
Environmental	-	Gravity	L	Mechanical	-	Motion	M
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Low Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Engineering Controls Job Rotation PPE (see HASP "PPE" section)

Secondary Controls: Job Briefing/Site Awareness Admin. Controls

Hazardous Activity #2

Chemical-Oxidizers - working with or exposure to oxidizers in laboratory work, sample bottle preservatives, decon chemicals, etc

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	-
Environmental	L	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	M	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK HASP Engineering Controls PPE (see HASP "PPE" section)

Secondary Controls: JSAs Job Briefing/Site Awareness Hazcom Training MSDS (see also HASP Hazcom section) Admin. Controls Specialized Equipment Housekeeping

Hazardous Activity #3

Field-Tools, hand - use of hammers, screwdrivers, wrenches, etc

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	-	Electrical	-
Environmental	-	Gravity	L	Mechanical	-	Motion	M
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Engineering Controls PPE (see HASP "PPE" section) Inspections

Secondary Controls: H&S Standards Job Briefing/Site Awareness Admin. Controls Specialized Equipment Site Awareness

Hazardous Activity #4

General-Shipping - HazMat samples to laboratories for analysis

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	-
Environmental	M	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Medium if utilizing:

Primary Controls: TRACK HazMat #1 Training Shipping Determination Admin. Controls Inspections

Secondary Controls: PPE (see HASP "PPE" section) Housekeeping

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Task 3: **Drilling**

Hazardous Activity #1

Field-Drilling - Mechanical method (drill rig, DPT, etc)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	L	Driving	-	Electrical	M
Environmental	-	Gravity	H	Mechanical	H	Motion	H
Personal Safety	-	Pressure	M	Radiation	-	Sound	H

Overall Unmitigated Risk: High Mitigated Risk: Medium if utilizing:

Primary Controls: TRACK Engineering Controls Admin. Controls PPE (see HASP "PPE" section) JSAs Inspections

Secondary Controls: Job Briefing/Site Awareness H&S Standards Cont/Emerg. Planning

Hazardous Activity #2

Field-Construction- well repairs or decommissioning

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	-
Environmental	L	Gravity	M	Mechanical	M	Motion	M
Personal Safety	-	Pressure	L	Radiation	-	Sound	L

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Work Plan Engineering Controls PPE (see HASP "PPE" section)

Secondary Controls: Job Briefing/Site Awareness Specialized Equipment

Hazardous Activity #3

Field-Utilities - drilling, digging or excavating in the vicinity of subsurface utilities

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	H	Driving	-	Electrical	H
Environmental	-	Gravity	-	Mechanical	-	Motion	L
Personal Safety	-	Pressure	M	Radiation	-	Sound	-

Overall Unmitigated Risk: High Mitigated Risk: Medium if utilizing:

Primary Controls: TRACK H&S Standards Engineering Controls Admin. Controls Inspections Specialized Equipment

Secondary Controls: JSAs Field H&S Handbook Job Briefing/Site Awareness Cont/Emerg. Planning Engineering Controls Admin. Controls

Hazardous Activity #4

Particulates-Nuisance dusts and particles - work activities creating dust (saw cutting, drilling, etc)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	H	Driving	-	Electrical	-

Environmental	M	Gravity	L	Mechanical	-	Motion	-
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Engineering Controls PPE (see HASP "PPE" section)

Secondary Controls: JSAs Job Briefing/Site Awareness Admin. Controls Specialized Equipment Housekeeping Hazcom Training

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Task 4: Biological Injections

Hazardous Activity #1

Field-Remediation - in-situ with injection chemicals (oxidizers, corrosives, etc.)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	-
Environmental	M	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK TKI SOP (as applicable) Engineering Controls PPE (see HASP "PPE" section)

Secondary Controls: JSAs Job Briefing/Site Awareness Hazcom Training MSDS (see also HASP Hazcom section) Cont/Emerg. Planning Specialized Equipment Housekeeping Inspections

Hazardous Activity #2

Field-HazMat and wastes - handling and storage at site locations (investigation derived wastes, process wastes, etc)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	-
Environmental	M	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Work Plan Engineering Controls PPE (see HASP "PPE" section)

Secondary Controls: Hazcom Training HAZWOPER Training Cont/Emerg. Planning Admin. Controls Specialized Equipment Housekeeping Inspections

Hazardous Activity #3

Field-Remediation - system installation and/or decommissioning

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	M
Environmental	-	Gravity	M	Mechanical	M	Motion	M
Personal Safety	-	Pressure	-	Radiation	-	Sound	L

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Work Plan Engineering Controls PPE (see HASP "PPE" section) Inspections

Secondary Controls: Job Briefing/Site Awareness Specialized Equipment TKI SOP (as applicable)

Hazardous Activity #4

Field-Measurement - water levels and well sounding

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	L	Driving	-	Electrical	-
Environmental	-	Gravity	L	Mechanical	-	Motion	M
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Low Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs PPE (see HASP "PPE" section)

Secondary Controls: Job Briefing/Site Awareness

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Task 5: **Soil Vapor Monitoring**

Hazardous Activity #1

Field-Sampling - subslab vapor screening/sampling

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	M
Environmental	-	Gravity	L	Mechanical	M	Motion	L
Personal Safety	-	Pressure	L	Radiation	-	Sound	M

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Engineering Controls PPE (see HASP "PPE" section) See HASP "Monitoring" section

Secondary Controls: Job Briefing/Site Awareness Admin. Controls Work Plan

Hazardous Activity #2

Field-Measurement - personal air monitoring

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	-
Environmental	-	Gravity	-	Mechanical	L	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK See HASP "Monitoring" section Inspections

Secondary Controls: JSAs Work Plan TKI SOP (as applicable)

Hazardous Activity #3

Field-Sampling - indoor and ambient air sampling

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	L	Driving	-	Electrical	-
Environmental	-	Gravity	L	Mechanical	-	Motion	L
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Low Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Work Plan

Secondary Controls: TKI SOP (as applicable) Job Briefing/Site Awareness Engineering Controls Admin. Controls PPE (see HASP "PPE" section)

Hazardous Activity #4

None

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological		Chemical		Driving		Electrical	
Environmental		Gravity		Mechanical		Motion	
Personal Safety		Pressure		Radiation		Sound	

Overall Unmitigated Risk: Not Ranked

Mitigated Risk: Not Ranked if utilizing:

Primary Controls:

Secondary Controls:

Hazard Communication (HazCom)

List the chemicals anticipated to be used by ***ARCADIS*** *on this project subject to HazCom requirements.*
(Modify quantities as needed)

	Acids/Bases	Qty
☐	Not applicable	
☑	Hydrochloric acid	<500 ml
☐	Nitric acid	<500 ml
☐	Sulfuric acid	<500 ml
☐	Sodium hydroxide	<500 ml
☐	Zinc acetate	<500 ml
☐	Ascorbic acid	<500 ml
☐	Acetic acid	<500 ml
☐	Other:	
	_____	
	_____	
	_____	
	_____	

	Decontamination	Qty
☐	Not applicable	
☑	Alconox	≤ 5 lbs
☐	Liquinox	≤ 1 gal
☐	Acetone	≤ 1 gal
☐	Methanol	≤ 1 gal
☐	Hexane	≤ 1 gal
☐	Isopropyl alcohol	≤ 4 gal
☐	Nitric acid	≤ 1 L
☐	Other:	
	_____	
	_____	
	_____	
	_____	

	Calibration	Qty.
☐	Not applicable	
☐	Isobutylene/air	1 cyl
☐	Methane/air	1 cyl
☐	Pentane/air	1 cyl
☐	Hydrogen/air	1 cyl
☐	Propane/air	1 cyl
☐	Hydrogen sulfide/air	1 cyl
☐	Carbon monoxide/air	1 cyl
☑	pH standards (4,7,10)	≤ 1 gal
☑	Conductivity standards	≤ 1 gal
☐	Other:	
	_____	
	_____	

	Fuels	Qty.
☑	Not applicable	
☐	Gasoline	≤ 5 gal
☐	Diesel	≤ 5 gal
☐	Kerosene	≤ 5 gal
☐	Propane	1 cyl
☐	Other:	
	_____	

	Kits		Qty.
☑	Not applicable		
☐	Hach (specify):	_____	1 kit
☐	DTECH (specify):	_____	1 kit
☐	EPA 5035 Soil (specify kit):	_____	1 kit
☐	Other:		
	_____	_____	
	_____	_____	

	Remediation	Qty.
☑	Not applicable	
☐	_____	
☐	_____	
☐	_____	
☐	_____	
☐	_____	

	Other:	Qty.		Qty.
☑	Not applicable		☐	_____
☐	Spray paint	≤ 6 cans	☐	_____
☐	WD-40	≤ 1 can	☐	_____
☐	Pipe cement	≤ 1 can	☐	_____
☐	Pipe primer	≤ 1 can	☐	_____
☐	Mineral spirits	≤ 1 gal	☐	_____

Material safety data sheets (MSDSs) must be available to field staff. Manufacturer supplied MSDSs are preferred, however, if the manufacturer's MSDS can not be located, use the source provided below. Indicate below how MSDS information will be provided:

☐ Not applicable
☐ Printed copy in company vehicle
☐ Printed copy in the project trailer/office
☑ Printed copy attached
☐ Electronic copy on field computer

☐ Bulk quantities of the following materials will be stored: _____

Contact the project H&S contact for information in determining code and regulatory requirements associated with bulk storage of materials.

Monitoring

☐ Chemical air monitoring is not required for this project.

For projects requiring air monitoring, list the relevant constituents representing a hazard to site workers.

Constituent	Max. Conc.	Units	TWA	Units	STEL	Units	IDLH	Units	LEL/UEL (%)	VD Air=1	VP (mm Hg)	IP (eV)
PCE	0.24	mg/m3	25	p	100	p	150	p,N	NA/NA	5.7	14	9.32
TCE	0.015	mg/m3	10	p	25	p	1000	p,N	8/10.5	4.53	58	9.45
Vinyl chloride	10	ppm	1	p	5	p,c,O	NA	0	3.6/33.0	3.9	2508	9.99
None			9999	-	0	-	0	-	0	0	0	0
None			9999	-	0	-	0	-	0	0	0	0
None			9999	-	0	-	0	-	0	0	0	0

Notes: TWAs are ACGIH 8 hr-TLVs unless noted.

p-ppm m-mg/m3
s- skin c-ceiling
r- resipirable i-inhalable

c2- ceiling (2 hr) se-sensitizer
"9999" - NA O-OSHA PEL
N-NIOSH 10 hr REL

"#N/A" -Constituent is not in database, manually enter information

Monitoring Equipment and General Protocols

Air monitoring is required for any task or activity where employees have potential exposure to vapors or particulates above the TWA. Action levels below are appropriate for most situations. Contact the project H&S contact for all stop work situations. Select monitoring frequency and instruments to be used.

Monitoring Frequency:	15 Minute intervals during potential contact with COC's
Indicator Tube/Chip Frequency:	Indicator tube/chip monitoring not required

	Instrument	Action Levels	Actions
☑	Photoionization Detector Lamp (eV): 10.6	< 10.000 10.000 - 20.000 > 20.000	Continue work Sustained >5 min. continuous monitor, review eng. controls and PPE, proceed with caution Sustained >5 min. stop work, contact SSO
☐	Flame Ionization Detector (FID)	< 0.0 0.0 - 0.0 > 0.0	Continue work Sustained >5 min. continuous monitor, review eng. controls and PPE, use caution Sustained >5 min. stop work, contact SSO
☐	LEL/O2 Meter	0-10% LEL >10-25% LEL >25% LEL 19.5%-23.5% O2 <19.5% O2 >23.5% O2	Continue work Continuous monitor, review eng. controls, proceed with caution Stop work, evacuate, contact SSO Normal, continue work O2 deficient, stop work, evacuate, cont. SSO O2 enriched, stop work, evacuate, contact SSO
☐	Indicator: ☐tube ☐chip Compound(s):	≤PEL/TLV >PEL/TLV	Continue work Stop work, review eng. controls and PPE, contact SSO
☐	Particulate Monitor (mists, aerosols, dusts in mg/m^3)	< 2.5 2.5 - 5.00 > 5.00	Continue work Use engineering controls, monitor continuously Stop work, review controls, contact SSO
☐	Other:	Specify:	Specify:

If sustained VOC levels are detected in the breathing zone monitor for vinyl chloride and upgrade to Level C PPE

Personal Protective Equipment (PPE)

See JSA for the task being performed for PPE requirements *. If the work is not conducted under a JSA, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for* *all tasks during field work* *not covered by a JSA on this project:*

Level D or Level D Modified:

					Specify Type:
☑	Hard hat	☐	Snake chaps/guards	☐	Coveralls:
☑	Safety glasses	☐	Briar chaps	☐	Apron:
☐	Safety goggles	☐	Chainsaw chaps	☐	Chem. resistant gloves:
☐	Face shield	☐	Sturdy boot	☑	Gloves other: nitrile
☐	Hearing protection	☑	Steel toe boot	☐	Chemical boot:
☐	Rain suit	☐	Metatarsal boot	☐	Boot other:
☐	Other:			☐	Traffic vest:
				☐	Life vest:

Task specific PPE: Nitrile gloves when contact with site COCs

Comments:

Medical Surveillance (*check all that apply*)

☐ Medical Surveillance is not required for this project.
☑ HAZWOPER medical surveillance applies to all ARCADIS site workers on the project.
☐ HAZWOPER medical surveillance applies to all subcontractors on the project.
☐ HAZWOPER medical surveillance applies to all site workers on the project except:

☐ Other medical surveillance required (describe type and who is required to participate):

☐ Client drug and/or alcohol testing required.

Hazardous Materials Shipping and Transportation (*check all that apply*)

☐ Not applicable, no materials requiring a Shipping Determination will be transported or shipped
☐ A Shipping Determination has been reviewed and provided to field staff
☐ A Shipping Determination is attached
☑ All HazMat will be transported under Materials of Trade by ARCADIS
☑ Other (specify): Site personnel shipping hazardous materials will complete a Hazardous Materials Shipping Form

Roadway Work Zone Safety (*check all that apply*)

☐ Not applicable for this project.
☐ All or portions of the work conducted under a TCP
☑ All or portions of the work conducted under a STAR Plan
☐ TCP or STAR Plan provided to field staff
☑ TCP or STAR Plan attached
☐ Other (specify):

ARCADIS Commercial Motor Vehicles (CMVs)

This section is applicable to ARCADIS operated vehicles only

☑ This project will **not** utilize CMV drivers
☐ This project will utilize CMV drivers

Site Control (*check all that apply*)

- ☐ Not applicable for this project.
- ☐ Site control protocols are addressed in JSA or other supporting document (attach)
- ☐ Maintain an exclusion zone of _____ ft. around the active work area
- ☐ Site control is integrated into the STAR Plan or TCP for the project
- ☐ Level C site control - refer to Level C Supplement attached
- ☑ Other (specify):
  As the work dictates, the SSO will establish a work area perimeter based on the dialy task activities and discussed with all project personnel during the tailgate meeting

Decontamination (*check all that apply*)

- ☐ Not applicable for this project.
- ☐ Decontamination protocols are addressed in JSA or other governing document (attach)
- ☑ Level D work- wash hands and face prior to consuming food, drink or tobacco.
- ☐ Level D Modified work- remove coveralls and contain, wash hands and face prior to consuming food, drink or tobacco. Ensure footwear is clean of site contaminants
- ☐ Level C work - refer to the Level C supplement attached.
- ☐ Other (specify):

Sanitation *(check all that apply)*

- ☐ Mobile operation with access to off-site restrooms and potable water
- ☑ Restroom facilities on site provided by client or other contractor
- ☐ Project to provide portable toilets (1 per 20 workers)
- ☑ Potable water available on site
- ☐ Project to provide potable water (assume 1 gal./person/day)
- ☐ Project requires running water (hot and cold, or tepid) with soap and paper towels

Safety Briefings (*check all that apply*)

- ☑ Safety briefing required daily
- ☐ Safety briefing required twice a day
- ☐ Safety briefings required at the following frequency: _____
- ☑ Subcontractors to participate in ARCADIS safety briefings
- ☐ ARCADIS to participate in client/contractor safety briefings
- ☐ Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JSA for the task being performed *. If work is not performed under a JSA, the following safety equipment is required to be present on site in good condition (Check all that apply):*

- ☑ First aid kit
- ☐ Bloodborne pathogens kit
- ☐ Fire extinguisher
- ☐ Eyewash (ANSI compliant)
- ☐ Eyewash (bottle)
- ☐ Drinking water
- ☐ Other: _____
- ☐ Insect repellent
- ☐ Sunscreen
- ☐ Air horn
- ☑ Traffic cones
- ☐ 2-way radios
- ☐ Heat stress monitor _____ _____

H&S Program (*check all that apply*)

☐ H&S metrics are provided on the account level, refer to account guidance
☐ TIP required at the following frequency on this project:
Select One: _____ mhrs _____ time(s) _____ Define: _____
☐ H&S Field Assessment required at the following frequency on this project:
Select One: _____ mhrs _____ time(s) _____ Define: _____
☐ Other (specify):

List tasks anticipated for TIP activity:

_____
_____
_____
_____

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Printed Name	Signature	Date

Add additional sheets if necessary

☑ Subcontractor Acknowledgement Form attached

You have an absolute right to STOP WORK if unsafe conditions exist!

Attachment 1-0
Utilities & Structures
Checklist

Utilities and Structures Checklist

Project: Fishbach & Moore Site
Project Number: 04124094.0000
Date:
Work locations applicable to this clearance checklist:

Pre-Field Work

One Call or "811" notified 48-72 hours in advance of work? ☐ Yes ☐ No
Utility companies notified during the One Call process ☐ See attached ticket

List any other utilities requiring notification: ☐ None

Client provided utility maps or "as built" drawings showing utilities? ☐ Yes ☐ No

Field Work

Markings present: ☐ Paint ☐ Pin flags/stakes ☐ Other ☐ None

Subsurface Utility Lines of Evidence Used (3 Minimum):

- ☐ One Call/"811"
- ☐ Client Provided Maps/Drawings
- ☐ Client Clearance
- ☐ Interviews: Name(s)/Affiliation(s)

Did persons interviewed indicate depths of any utilities in the subsurface?
☐ Yes, depths provided:

☐ Did not know or refused to answer

Comments:

- ☑ Site Inspection
- ☐ GPR
- ☐ Air-Knife
- ☐ Hydro-Knife
- ☐ Public Records/Maps
- ☐ Radiofrequency
- ☐ Metal Detector
- ☐ Handauger
- ☐ Potholing
- ☐ Probing
- ☐ Private Locator: Name and Company:
- ☐ Marine Locator: Name and Company:
- ☐ Other:

Tips for Successful Utility Location:
1. No excessive turning or downward force of handaugers/shovels, etc.
2. No hammering- no pickaxes-no digging bars-no hurrying or shortcutting
3. Select alternate/backup locations for clearance
4. Utilities may run directly under asphalt/concrete or be > 5 ft depth
5. Be on site when utilizing private utility locators

TRACK

Site Inspection

During inspections look for the following ("YES" requires follow up investigation):

		Utility color codes		
a)	Natural gas line present (evidence of a gas meter)?	Yellow	☐ Yes	☐ No
b)	Evidence of subsurface electric lines :	Red		
	i) Conduits to ground from electric meter?		☐ Yes	☐ No
	ii) Overhead electric lines absent		☐ Yes	☐ No
	iii) Light poles, electric devices with no overhead lines?		☐ Yes	☐ No
c)	Evidence of water lines:	Blue		
	i) Water meter on site?		☐ Yes	☐ No
	ii) Fire hydrants in vicinity of work?		☐ Yes	☐ No
	iii) Irrigation systems?		☐ Yes	☐ No
d)	Evidence of sewers or storm drains:	Green		
	i) Restrooms or kitchen on site?		☐ Yes	☐ No
	ii) Gutter down spouts going into ground		☐ Yes	☐ No
	iii) Grates in ground in work area		☐ Yes	☐ No
e)	Evidence of telecommunication lines:	Orange		
	i) Fiber optic warning signs in areas?		☐ Yes	☐ No
	ii) Lines from cable boxes running into ground?		☐ Yes	☐ No
	iii) Conduits from power poles running into ground?		☐ Yes	☐ No
	iv) Aboveground boxes or housings in work area?		☐ Yes	☐ No
f)	Underground storage tanks:			
	i) Tank pit present?		☐ Yes	☐ No
	ii) Product lines running to dispensers/buildings?		☐ Yes	☐ No
	iii) Vent present away from tank pit?		☐ Yes	☐ No
g)	Proposed excavation markings in work area?	White	☐ Yes	☐ No
h)	Other:			
	i) Evidence of linear asphalt or concrete repair		☐ Yes	☐ No
	ii) Evidence of linear ground subsidence or change in vegetation?		☐ Yes	☐ No
	iii) Manholes or valve covers in work area?		☐ Yes	☐ No
	iv) Warning signs ("Call Before you Dig", etc) on or adjacent to site?		☐ Yes	☐ No
	v) Utility color markings not illustrated in this checklist?		☐ Yes	☐ No
i)	Aboveground lines in or near the work area:			
	i) < 50 kV within 10 ft of work area?		☐ Yes	☐ No
	ii) >50 - 200 kV within 15 ft of work area?		☐ Yes	☐ No
	iii) >200-350 kV within 20 ft of work area?		☐ Yes	☐ No
	iv) >350-500 kV within 25 ft of work area?		☐ Yes	☐ No
	v) >500-750 kV within 35 ft or work area?		☐ Yes	☐ No
	vi) >750-1000 kV within 45 ft of work area?		☐ Yes	☐ No

Comments:

Do not initiate intrusive work if utilities are suspected to be present in area and are not located, markings are over 14 days old, or if clearance methods provide incomplete or conflicting information. Do not perform intrusive work within 30 inches of a utility marking without hand clearing.

Name and signature of person completing the checklist:

Name: _____

Signature: _____

Date: _____

Attachment 1-1
HS Standard -
Utility Clearance

EXECUTIVE SUMMARY

Damaging an underground or above ground utility can result in serious injury and loss of life, disrupt essential services, and create significant liability to ARCADIS, clients and subcontractors. Therefore, it is ARCADIS' policy that the presence of all existing utilities will be investigated and cleared (to the extent feasible) by locating, marking, and, where appropriate, visually verifying before the start of any field operation. The following requirements are mandatory under this policy:

- A minimum of three (3) reliable lines of evidence are required for an acceptable utility clearance.
- Additional lines of evidence are required if the primary lines of evidence cannot adequately identify subsurface, submarine or above ground utilities with reasonable certainty.
- The lines of evidence used will be reasonable and appropriate for the conditions expected to be encountered and the type of utilities expected to be encountered (e.g., gas line versus an irrigation line).
- Utility clearance information will be documented on the ARCADIS Utility and Structures Checklist or equivalent client provided checklist or permit presenting equivalent information.
- Employees overseeing utility clearance activities will:
    - Be familiar with the contents of this standard;
    - Have one year field experience in the identification of utilities; and
    - Have training and six months experience in the proper operation and results interpretation of any clearance equipment used by ARCADIS employees, including without limitation, magnetometers and ground penetrating radar.
- All utility strikes must be reported to Corporate Health and Safety and Legal within 24 hours using the Utility Line Strike Investigation Form. Do not enter the incident into 4-Sight until approved to do so by Corporate Legal.

Report Utility Incident Now

1. POLICY

It is the practice of ARCADIS and its affiliated companies to implement appropriate, reasonable and practical standards within acceptable and customary industry practices to promote the health and safety of its employees, and avoid and mitigate exposure of risk in the performance of their work. In furtherance of this policy, ARCADIS promotes and encourages compliance by all employees with this policy and standards relating to work in the vicinity of subsurface, submarine or aboveground utilities.

2. PURPOSE AND SCOPE

2.1 Purpose

This standard directs general safety standards and best practices associated with the identification and management of subsurface, submarine and aboveground utilities on project sites.

2.2 Scope

This standard assigns responsibilities and expectations for proper utility clearance by both ARCADIS employees and ARCADIS subcontractors at project sites.

3. DEFINITIONS

Refer to ARC HSFS-019 Supplement 1 for definitions of terms used in this standard.

4. RESPONSIBILITIES

4.1 Project Manager Responsibilities

For every project site having the potential to come into contact with utilities, Project Managers must ensure that:

- The requirements of this standard are followed.
- Local regulations governing utility clearance are followed. This includes ensuring local and or state laws defining activities or depth of intrusive work/excavation requiring utility clearance are reviewed as they vary by location.
- Efforts are made to work with the client, project site representatives and subcontractors to identify the nature of any utilities, and to determine what control processes need to be implemented by ARCADIS and the subcontractors to prevent damage to these utilities and to properly manage the effects in the event there is utility damage.
- Utility clearance activities are only delegated to a Task Manager or other individual meeting the requirements of section 4.2 below, as appropriate. However, even if the Project Manager delegates certain responsibilities, the

Project Manager maintains primary responsibility for a complete utility clearance.

4.2 Field Personnel Responsibilities

ARCADIS field personnel conducting work on a project site having the potential to come into contact with utilities have the responsibility to:

- Read, understand, and follow this standard and complete the appropriate checklists during the on-site utility locate process.
- Complete a minimum of 1 year of utility clearance related experience before accepting responsibility for any utility clearance tasks.
- Complete training and have 6 months of experience in operating and interpreting the results of remote sensing technologies, including without limitation, magnetometers and ground penetrating radar, before operating such technologies.
- Use their Stop Work Authority to eliminate any reasonable concern if utilities cannot be reasonably located.
- Ensure that ARCADIS subcontractors conduct their own reasonable independent utility clearance efforts as required by ARCADIS' standard subcontract, and are aware of any ARCADIS clearance standards used onsite.
- Be on site during any active intrusive activities involving contractor under contract to ARCADIS.

4.3 ARCADIS Subcontractor Responsibilities

According to ARCADIS' standard subcontract, subcontractors have agreed to take responsibility for any damages resulting from a utility impact cause by their work. Therefore, ARCADIS subcontractors are expected to take reasonable time and diligence to conduct their own independent utility clearance using reasonable standards and processes. Subcontractors have the responsibility to stop their work if utility concerns are identified and will report those concerns to the ARCADIS employee overseeing their work activities. ARCADIS staff should reinforce these responsibilities with subcontractors during job safety briefings.

In jurisdictions where the actual contractor performing the intrusive work activity is required to perform utility clearance notifications, the contractor will perform the clearance notification and will provide evidence of the notification to ARCADIS (ticket or ticket number, etc).

5. STANDARD

5.1 General

Protocols to be followed during utility clearance activities are outlined in:

- Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance (ARC HSFS-019 Supplement 2).

- Best Practices for Field Personnel Concerning Utility Clearance (ARC HSFS-019 Supplement 3).

5.2 Lines of Evidence

A minimum of 3 lines of evidence are required for an appropriate utility clearance as defined in this standard. Generally, the following lines of evidence may be utilized to meet this requirement:

- Contact the State One Call or equivalent service (Nationwide "811" is acceptable) if working within the right-of-way or public areas served by such services. For work on private property or in areas not served by such services, utilize a reputable private utility locating company to locate and mark the utilities. Utilization of a private utility locator is encouraged for all projects with subsurface or submarine utility issues.

- Use detailed scaled site utility plans, preferably in the form of an "as-built" or "record" drawing, to identify and/or confirm utility locations.

- Conduct a detailed visual site inspection to identify and/or confirm utility locations. For underground utilities, conduct an inspection for structures that tend to indicate the presence and general location of such utilities, including, but not limited to manholes, vaults, valve covers, valve markers, telephone pedestals, transform housings, fire hydrants, spigots, sprinkler heads, air relief valves, backflow preventers, meters, downspouts going into the subsurface, power poles with wring going into the subsurface and line markers. Saw cut lines and concrete /asphalt repairs often yield valuable information regarding utility locations. Always discuss the presence of utilities with the site owner, operator or occupant to identify any potential utilities that might not be readily identified by non intrusive clearing methods or may be:

    - At depths > 5 ft below ground surface; or

    - At very shallow depths (< 2ft below ground surface) such as electrical conduits/wiring, irrigation lines, etc.

View the Utilities and Structures Checklist

If one of the above lines of evidence cannot be utilized, or if using the above lines of evidence does not adequately identify utilities with reasonable certainty, one or more additional lines of evidence must be utilized. Commonly used lines of evidence are listed on the Utility and Structures Checklist.

A discussion of use and limitations associated with common utility clearance methods is provided in ARC HSFS-019 Supplement 4.

The lines of evidence will be recorded on the Utility and Structures Checklist or equivalent client provided checklist or permit presenting equivalent information.

5.3 Color Codes Used for Utility Markings

The following colors are used for marking utilities. Some government agencies or large industrial facilities may use additional colors not provided below. ARCADIS policy is to assume any paint marking or pin flag color not provided below is a subsurface utility marking until proven otherwise.

COLOR	Utility Line
WHITE	Proposed Excavation
PINK	Temporary Survey Markings
RED	Electrical Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Potable Water
PURPLE	Reclaimed Water, Irrigation and Slurry Lines
GREEN	Sewer and Drain Lines

APWA and ANSI standard Z-53.1

5.4 Working in Close Vicinity of Subsurface Utilities

No work will be conducted within 30 inches of a subsurface utility marking, or as prescribed by the utility owner, unless the utility is exposed through hand clearing. Make sure to factor the diameter of the utility when determining the 30 inch buffer zone as this may increase the distance from the actual marking (if the markings do not indicate diameter of utility).

Manual clearing methods such as shoveling, using pick axes, digging bars and other hand tools should be used with caution. Excessive down force, prying or use in poor/obstructed visibility conditions is prohibited as these tools can damage utilities.

For borings and excavations, if the utility is known to be at depths where hand clearing is not reasonable or creates additional safety concerns, no work will be performed within 30 inches vertically or horizontally of the utility unless manual clearing is performed under the oversight of an Excavation Competent Person as defined in the ARCADIS Excavation and Trenching H&S standard (ARC HSCS005).

For horizontal borings, to avoid potential of utility strike, damage from vibration, damage by pressure of the advancing boring, do not plan the drill boring location within 30 inches vertically of utilities. This requirement applies even if the operating contractor has technology that places the location to within a few inches. Make sure to factor the diameter of the utility when determining the 30 inch buffer zone.

Additional cautions are required when coring/cutting through or removing concrete or asphalt. Utilities may be encased within these materials or in the gravel sub grade under these materials and may be damaged during the utility clearance process. Always work slowly, methodically and frequently stop work to evaluate conditions during these work activities.

Additional cautions for horizontal borings include gravity utilities such as sewers and storm drains as the depth of these utilities will change (sometimes significantly) as they run across the project site. Always obtain the utility depth at the location where the boring will actually cross the line.

5.5 Acceptable Clearance for Working in Vicinity of Overhead Power Lines

No work will be performed by ARCADIS or a subcontractor where any equipment is within the limits specified below, unless the power line has been properly covered or de-energized by the owner or operator of the power line:

Power Line Voltage Phase to phase (kV)	Minimum Safe Clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

ANSI standard B30.5-1994, 5-3.4.5

5.6 Reporting Utility Incidents

ARCADIS field personnel involved with any subsurface, submarine, and above-ground utility strikes should immediately stop work and contact the Project Manager to discuss the incident. The utility strike must be reported to Corporate Health and Safety and Legal Departments within 24 hours. Use the Utility Line Strike Investigation Form as part of the notification process.

Selected utility strike incidents may also utilize a conference call with operations management to review findings and lessons learned. The Divisional Health and Safety Manager will make the determination concerning the need to have the call, and will arrange the call, if deemed necessary.

5.7 Relationship of this standard to the Project Specific HASP

With the exception of the Utility and Structures Checklist, this standard, including most supplements, are not designed to be printed off and attached to project HASPs. During project health and safety planning, this standard will be reviewed

and applicable clearance technologies and methods will be documented on the Utility and Structures Checklist.

Additionally, emergency action standards specific to utility strikes should be addressed. ARC HSFS-019 Supplement 5 provides general guidelines for emergency response to utility strikes. Applicable information may be attached to the Utility and Structures Checklist to facilitate communication of response expectations.

5.8 Required Contract Terms and Conditions

ARCADIS' standard client and subcontractor contracts contain required terms and conditions defining responsibility for utility clearance and the allocation of risk associated with an impacted utility. These terms and conditions have prescribed language concerning subsurface work that is presented in ARCADIS client contracts and ARCADIS subcontractor contracts. If such provisions cannot be agreed upon, the reasons are documented and other risk-management actions should be identified, such as limits of liability, additional physical investigations, additional lines of evidence or utility location, assignment of risk to subcontractors, etc. In addition, any changes to these terms and conditions require approval by Legal Services.

6. TRAINING

Employees responsible for coordinating or conducting utility clearance activities will be familiar with the requirements of this standard.

7. REFERENCES

- Utility and Structures Checklist
- Utility Line Strike Investigation Form
- HSFS-019 Supplement 1, Utility Definitions
- HSFS-019 Supplement 2, Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance
- HSFS-019 Supplement 3, Best Practices for Field Personnel Concerning Utility Clearance
- HSFS-019 Supplement 4, Use and Limitations Associated with Common Utility Clearance Methods
- HSFS-019 Supplement 5, Emergency Action Plan guidelines for Utility Strikes
- ARC HSCS005 Excavation and Trenching
- Required client contract language concerning subsurface work

- Required subcontractor language concerning subsurface work

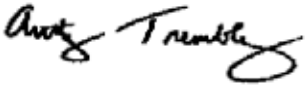
8. RECORDS

8.1 Utility Clearance Records

All records (maps, checklists and documentation of communications) used to determine the location of utilities should be retained and kept in the project file.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Tony Tremblay, Environment Division Health and Safety Manager



History of Change

Revision Date	Revision Number	Reason for change
13 December 2006	01	Original document
26 March 2007	02	Put in new company format
15 May 2007	03	Added nation-wide 811 number
6 September 2007	04	Changing over to new template format
22 February 2008	05	Changing over to new template format
13 January 2009	06	Define lines of evidence
4 October 2010	07	Reformatting and addition of utility clearance information
13 February 2012	08	Modified link information for utility strike reporting, clarified local/state requirements in section 4.1 and 4.3

Attachment 2-0
Field Forms

ARCADIS

Document Control Number:TGM - _____
TGM + *project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year*

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**
Client:		**Client Contact:**	**Subcontractor companies:**

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____
2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations ☐ If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working at Height		☐ Confined Space	
☐ Energy Isolation (LOTO)		☐ Excavation/Trenching		☐ Hot Work	
☐ Mechanical Lifting Ops		☐ Overhead & Buried Utilities		☐ Other permit	

Discuss following questions (for some review previous day's post activities). **Check if yes :**

		☐ Topics from Corp H&S to cover?
☐ Incidents from day before to review?	☐ Lessons learned from the day before?	☐ Any Stop Work Interventions yesterday?
☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?	☐ If deviations, notify PM & client
☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?	☐ All equipment checked & OK?
☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?	☐ Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

☒ **STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (*See statements below*)

☐ Elimination	☐ Substitution	☐ Isolation
☐ Engineering controls	☐ Administrative controls	☐ Monitoring
☐ General PPE Usage	☐ Hearing Conservation	☐ Respiratory Protection
☐ Personal Hygiene	☐ Exposure Guidelines	☐ Decon Procedures
☐ Emergency Action Plan (EAP)	☐ Fall Protection	☐ Work Zones/Site Control
☐ JLA to be developed/used ***(specify)***	☐ LPO conducted ***(specify job/JLA)***	☐ Traffic Control
☐	☐	☐ Other ***(specify)***
☐	☐	☐

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign in Time	Initial & Sign out Time	I have read and understand the

Important Information and Numbers

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at

Visitor Name/Co - not involved in work

In Out

In Out

In Out

In Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB,** I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

☐ Lessons learned and best practices learned today: _____

☐ Incidents that occurred today: _____

☐ Any Stop Work interventions today? _____

☐ Corrective/Preventive Actions needed for future work: _____

☐ Any other H&S issues: _____

Keep H&S 1st in all things

WorkCare - 1.800.455.6155

Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

Subcontractor Acknowledgement: Receipt of HASP Signature Form

ARCADIS claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, ARCADIS does not guarantee the health and/or safety of any person entering this site. Strict adherence to the health and safety guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

Printed Name	Company	Signature	Date

Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and ARCADIS and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		

Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

_____

_____

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

_____

_____

List Trained Employee(s):

_____

_____

Attachment 3-0
STAR Plan

Site Traffic Awareness and Response (STAR) Plan for Private Roadways and Parking Areas

1.0 GENERAL

Project Name	Fischbach & Moore Site
Project Number	04124094.0000
STAR Plan Developer Name	Michael Nasca
Reviewed By:	
Duration of Work (hours or days)	
Time restrictions (state times, describe in Section 2.0)	
Posted Speed Limits for Roadway	5 MPH
Number of Lanes for Roadway (each direction)	N/A – Parking Lot

2.0 WORK DESCRIPTION

The work activities in the parking area are to include:

- repairing wells;
- sampling from wells;
- utilizing a geo-probe for subsurface investigation; and
- potentially installing new wells.

3.0 TRAFFIC TYPE

Check all that apply:

☒ Automobiles ☐ Construction Equipment ☒ Pedestrian

☐ Straight Trucks ☐ Forklifts ☐ Other – Specify:

☐ Semi Trucks ☐ Bicycles

4.0 TRAFFIC CONTROL LAYOUT

For roadway and parking area work, check all that apply and click link to print layout and attach. Manually revise to address specific requirement.

Roadway Work:

☐ Work Beyond the Shoulder (DOT Facts-301i)

☐ Work on the Shoulder (DOT Facts-301j)

☐ Short Duration Work or Mobile Operations Work on the Shoulder (DOT Facts-301k)

☐ Shoulder Closure with Minor Encroachment (DOT Facts-301m)

☐ Lane Closure on 2 Lane Road with Flagger (DOT Facts-301n)

☐ Lane Closure on 2 Lane Road with Low Traffic Flow (DOT Facts-301o)

☐ Temporary Road Closure (DOT Facts-301p)

☐ Haul Road Crossing (DOT Facts-301q)

☐ Work in the Center of Low Volume Traffic Road (DOT Facts-301r)

☐ Atypical Roadway Layout or Work in Congested Facilities (Attach Drawing) (DOT Facts-301u)

Parking Area Work:

DOT Fact Sheets for parking areas have numbered scenarios. Select applicable scenario(s) and work duration (S-Short, I – Intermediate, L – Long)

☐ Short Duration (<1 Hour) Retail Gas Station or Small Single Business (DOT Facts-302a) 1 2 3 4 5

☐ Intermediate Duration (1-8 Hours) Retail Gas Station or Small Single Business (DOT Facts-302b) 1 2 3 4

☐ Long Duration (>8 Hours) Retail Gas Station or Small Single Business (DOT Facts-302c) 1 2 3

☐ Multi Business Parking Lot (Malls, Strip Malls, etc) (DOT Facts-302e) 1 2 3 4 5 6 7 8 9 S I L

☒ Facility Parking Area (DOT Facts-302e) 1 2 3 4 5 6 7 8 9 S I L

☐ Parking Garage (develop drawing for controls)

☐ Other:

5.0 REQUIRED TRAFFIC CONTROL DEVICES

Need Sign Help? DOT Facts-301d
Need Channelizing Device Help? DOT Facts-302d (see also DOT Facts-301e)
Need Flagger Help? DOT Facts-301f
Review Flagger training and certification requirements by state: DOT Facts-301w.

Device	Number Required	Wording or Pictogram	Comments
Warning Signs			
Warning Signs			
Stop/Slow Paddle			
Red Flag			
Channelizing Cones 10 lb			
Channelizing Cones 30 lb			
Cones	3		
Drums[1]			
Tubular Markers			
Vertical Panels[1]			
Barricade[1] (Type I)			

Barricade[1] (Type II)			
Barricade[1] (Type III)			
Arrow Panels			
Other:			
Other:			
Other:			

Notes:

1) Provide with warning lights if night work or traffic control use is required at night.

All vehicles used in the roadways or parking areas should be equipped with functioning high intensity rotating, flashing, oscillating, or strobe lights. If the vehicle is not equipped with supplemental lighting devices use vehicle flashers (be aware of battery drain when using any of the lighting devices).

Personal protective equipment required for this work is listed in the applicable project Job Loss analysis (JLA) or project specific HASP. A Class II (minimum) high visibility vest is required.

6.0 WORK SEQUENCE FOR ROADWAY WORK (PHASING)

Describe the sequence for placement, working and removal of traffic control devices:

Safely enter street and place cones and barricade type II around work area. Always conduct work facing traffic and be aware of traffic and have another person stand watch for dangerous traffic situation. Upon completion of work, remove roadway equipment with caution.

7.0 APPROVALS

STAR Plan Developer	Michael Nasca
Designated HASP Reviewer[1]	

1) An individual with Engineering Judgment may also approve this STAR Plan, even if not a designated HASP Reviewer

8.0 REVIEWED BY:

To be signed by each employee working on the project affected by this STAR Plan:

Name Printed	**Signature**

Attachment 4-0
Environmental Sample
Cooler Preparation

ARCADIS SHIPPING GUIDE NO. US-001

Environmental Sample Cooler Preparation for Hazardous Materials Shipping

1.0 General

This shipping guide provides guidance on the required shipping/transporting configuration for this material per U.S. Department of Transportation (DOT) and the International Air Transport Association (IATA) requirements. This guide **does not exempt** the user from the obligation of performing a proper Shipping Determination for the actual material to be shipped. This guide is subject to the limitations of Section 5.0 below.

2.0 Important ARCADIS Prohibitions

Unless otherwise permitted by another Shipping Guide, HazMat Shipping Support Package (HSSP) or as permitted in the project Shipping Determination, ice chests used for hazardous material shipments **must not contain drain plugs** (solid plastic ice chests must be used).

ARCADIS prohibits the use of Igloo® Playmate® type ice chests for hazardous material shipments.

3.0 Preparation of Solid Materials for Shipment

Once collected, soil/solid samples should be promptly placed in a sample cooler on ice for preservation. The following general procedure is applicable to cooler preparation:

1. Select a sample cooler of suitable size for the number of samples to be shipped. In general, sample coolers should not exceed 52 quart capacity to reduce lifting hazards. Sample coolers will be new or clean and should be in good condition (manufacturer supplied handles/lid hinges intact, and no cracks or other impairments that might affect cooler integrity). Samples with large containers (16 oz. soil jars, etc) should be placed in coolers with a nominal capacity of 48 quarts.
2. Place absorbent material in the bottom of the cooler (usually arrives in the cooler from the analytical laboratory). If not provided or the cooler is new,

vermiculite (approximately 2 inches) or other suitable absorbent may be placed in the bottom of the cooler.

3. Line the cooler with a large heavy duty plastic bag. *Note: for Excepted Quantity shipments, line the cooler with the bag first and place the absorbents inside the bag.*
4. Place the soil containers (**with lids taped or secured by other secondary method**) into bubble wrap bags and secure.
5. Group and place soil sample sets **into self-sealing plastic bags**.
6. Place bagged soil sample containers in cooler and **make sure all bottles are in an upright position**.
7. Use blue ice or bag wet ice in self-sealing plastic bags.
8. Place ice on top of sample containers (fill remaining annulus of cooler with as much as possible).
9. Seal bag encompassing the sample containers and ice.
10. Place layer of bubble wrap over bag, if necessary.
11. Place Chain- of- Custody in self sealing plastic bag and secure to lid of cooler with tape.
12. Close and seal cooler with Chain-of-Custody Seals.
13. Tape lid of cooler shut by wrapping strapping tape completely around the cooler and over the Chain-of-Custody Seals.
14. Tape the drain plug, if permitted to be present, of the cooler with duct tape or strapping tape. DO NOT TAPE THE DRAIN PLUG SHUT IF THE COOLER CONTAINS DRY ICE.
15. Affix laboratory name and address label and other labels and marking as required by the applicable shipping guide to the outside of the cooler.
16. Complete air waybill and other shipping papers as required by the Shipping Determination.
17. Offer cooler for shipment.

4.0 Preparation of Liquid Samples for Shipment

Once collected, water samples should be promptly placed in a sample cooler on ice for preservation. The following general procedure is applicable to cooler preparation:

1. Select a sample cooler of suitable size for the number of samples to be shipped. In general, sample coolers should not exceed 52 quart capacity to reduce lifting hazards while maintaining sufficient space for adequate ice placement. Sample coolers will be new or clean and should be in good

condition (manufacturer supplied handles/lid hinges intact, and no cracks or other impairments that might affect cooler integrity). Samples with large containers (1L glass, etc.) should be placed in coolers with a nominal capacity of 48 quarts.

2. Place absorbent material in the bottom of the cooler (usually arrives in the cooler from the analytical laboratory). If not provided or the cooler is new, vermiculite or other suitable absorbent may be placed in the bottom of the cooler (approximately 2 inches or sufficient quantity to contain the entire contents of the hazmat material contained in the cooler). Place a layer of bubble wrap over the absorbent material.
3. Line the cooler with a large heavy duty plastic bag. *Note: for Excepted Quantity shipments, line the cooler with the bag first and place the absorbents inside the bag.*
4. Place water containers (**with lids taped or secured by other secondary method)** into bubble wrap bags or wrap in bubble wrap and secure. If VOCs are collected, up to three 40 ml vials may be placed into a single bubble wrap bag. Large glass containers like 1L glass bottles to be double bubble wrapped/bagged for added protection. Sturdy plastic or metal containers do not need to be bubble wrapped.
5. Group and place water sample sets **into self-sealing plastic bags**. Since water sample sets may be large, a sample set may be grouped into several bags. Avoid mixing sample containers from different sample locations into the same bag to reduce potential for cross contamination.
6. Place water sample containers in cooler. **Keep all bottles in upright position**.
7. Use blue ice or bag wet ice in self-sealing plastic bags.
8. Place ice on top of sample containers (fill remaining annulus of cooler with as much as possible).
9. Seal large bag encompassing the sample containers and ice.
10. Place layer of bubble wrap over bag, if necessary.
11. Place Chain- of- Custody in self sealing plastic bag and secure to lid of cooler with tape.
12. Close and seal cooler with Chain-of-Custody Seals.
13. Tape lid of cooler shut by wrapping strapping tape completely around the cooler and over the Chain-of-Custody Seals.

14. Tape the drain plug, if permitted to be present, of the cooler with duct tape or strapping tape. DO NOT TAPE THE DRAIN PLUG SHUT IF THE COOLER CONTAINS DRY ICE.
15. Affix laboratory name and address label along with other required labels and markings as required by applicable shipping guide to the cooler.
16. Affix orientation ("UP") arrows **on each end of the cooler**.
17. Complete air waybill and other shipping papers as required by the Shipping Determination.
18. Offer cooler for shipment.

5.0 Limitations

This shipping guide is limited to the following conditions:

1) Packaging described must be used, alternate packaging to be approved by ARCADIS Corporate Health and Safety. Alternate absorbent materials may be used to ensure data quality objectives for the project as long as the material is capable of containing the entire release of liquids in cooler.
2) Sample coolers should be less than or equal to 52 quart in size.
3) Sample cooler used must have good integrity, without any cracks or deformities, with manufacturer supplied handles and lid hinges in good condition.
4) Specific packaging instructions may be presented in selected shipping guides and take precedence over requirements of this guide.
5) Employees preparing coolers for shipment are required to be trained in HazMat #1 training.

Attachment 4-1
MSDS

Section 1 - Chemical Product and Company Identification 61

Material Name: Hydrochloric Acid **CAS Number:** 7647-01-0
Chemical Formula: ClH
Structural Chemical Formula: HCl
EINECS Number: 231-595-7
ACX Number: X1002202-3
Synonyms: 4-D BOWL SANITIZER; ACIDE CHLORHYDRIQUE; ACIDO CLORHIDRICO; ACIDO CLORIDRICO; ANHYDROUS HYDROCHLORIC ACID; ANHYDROUS HYDROGEN CHLORIDE; AQUEOUS HYDROGEN CHLORIDE; BOWL CLEANER; CHLOORWATERSTOF; CHLOROHYDRIC ACID; CHLOROWODOR; CHLORURE D'HYDROGENE; CHLORURE D'HYDROGENE ANHYDRE; CHLORURO DE HIDROGENO; CHLORWASSERSTOFF; CLORURO DE HIDROGENO ANHIDRO; EMULSION BOWL CLEANER; EPA PESTICIDE CHEMICAL CODE 045901; HYDROCHLORIC ACID; HYDROCHLORIC ACID GAS; HYDROCHLORIDE; HYDROGEN CHLORIDE; HYDROGEN CHLORIDE (HCL); HYGEIA CREME MAGIC BOWL CLEANER; MURIATIC ACID; MURIATIC ACID); NOW SOUTH SAFTI-SOL BRAND CONCENTRATED BOWL CLEANSE WITHMAGIC ACTIO; PERCLEEN BOWL AND URINAL CLEANER; SPIRITS OF SALT; VARLEY'S OCEAN BLUE SCENTED TOILET BOWL CLEANER; VARLEY POLY-PAK BOWL CREME; WHITE EMULSION BOWL CLEANER; WUEST BOWL CLEANER SUPER CONCENTRATED
General Use: Hydrogen chloride is used to produce pharmaceutical hydrochlorides; vinyl chloride from acetylene; alkyl chlorides from olefins and arsenious chloride from arsenious oxide; electronic grade for etching semiconductor crystals. Used in the chlorination of rubber; in organic reactions involving isomerization, polymerization and alkylation; as a catalyst and condensing agent; for making chlorine where economical; in the separation of cotton from wool and cotton de-linting; as flux in the babbitt type of metal alloy; etching semi-conductor crystals.
Hydrochloric acid is used for pickling and heavy duty cleaning of metal parts; rust and scale removal. The production of chlorides; neutralizing bases; a laboratory reagent. For hydrolyzing starch and proteins in preparations for food. As a catalyst and solvent in organic synthesis. As "spirits of salts" for cleaning of lime and masonry from new brickwork. As flux or flux component for soldering; manufacture of "killed spirits".

Section 2 - Composition / Information on Ingredients

Name	CAS	%
hydrogen chloride	7647-01-0	> 99.0

OSHA PEL
Ceiling: 5 ppm, 7 mg/m^3.

NIOSH REL
Ceiling: 5 ppm (7 mg/m^3).

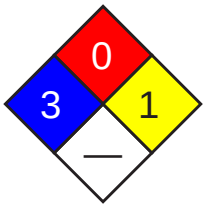
DFG (Germany) MAK
TWA: 5 ppm; PEAK: 5 ppm.

ACGIH TLV
Ceiling: 2 ppm.

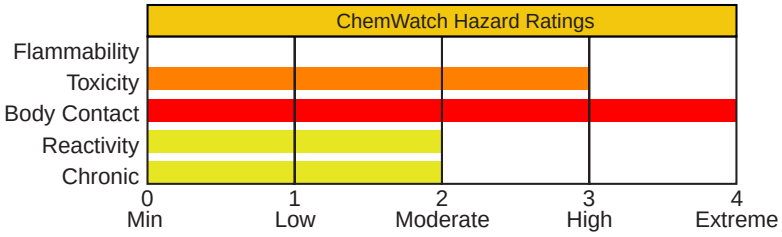
IDLH Level
50 ppm.

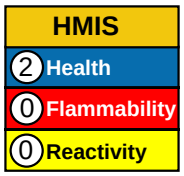
EU OEL
TWA: 5 ppm; STEL: 10 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Danger!


Corrosive Compressed Gas

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless gas; characteristic suffocating, pungent odor. Corrosive. Stored as compressed gas which may cause frostbite. Chronic Effects: erosion of teeth.

Potential Health Effects

Target Organs: eyes, skin, respiratory system, liver (in animals)
Primary Entry Routes: inhalation, skin contact, eye contact
Acute Effects

Inhalation: The vapor is extremely discomforting to the upper respiratory tract, may cause severe mucous membrane damage and may be harmful if inhaled.
Inhalation of quantities of liquid mist may be extremely hazardous, even lethal due to spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary edema.
A single severe exposure may cause coughing and choking; bleeding of nose, inflammation and occasionally ulceration of the nose, throat and larynx. Fluid on the lungs followed by generalized lung damage may follow.
Breathing of vapor may aggravate asthma and inflammatory or fibrotic pulmonary disease.
High concentrations cause necrosis of the tracheal and bronchial epithelium, pulmonary edema, atelectasis and emphysema and damage to the pulmonary blood vessels and liver.
Inhalation hazard is increased at higher temperatures.
The vapor from heated material is extremely discomforting to the upper respiratory tract and lungs if inhaled.
Continued severe exposure can result in pulmonary edema and corrosion of tissues in the nose and throat.

Eye: Hydrogen Chloride: The vapor is extremely discomforting to the eyes and is capable of causing pain and severe conjunctivitis. Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.
The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Hydrochloric Acid: Eye contact is extremely painful and may cause rapid corneal damage. The liquid is extremely corrosive to the eyes and is capable of causing severe damage with loss of sight.
The vapor is highly discomforting and may be corrosive to the eyes. The vapor from heated material is extremely discomforting to the eyes.

Skin: The material is corrosive to the skin and may cause chemical burns.
Toxic effects may result from skin absorption. Bare unprotected skin should not be exposed to this material. The material may accentuate any pre-existing skin condition.
The vapor is discomforting to the skin.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid is extremely corrosive if swallowed and is capable of causing burns to mouth, throat, esophagus, with extreme discomfort, pain and may be fatal if swallowed in quantity. Ingestion may result in nausea, abdominal irritation, pain and vomiting.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Chronic Effects: Chronic exposure may cause discoloration or erosion of the teeth, bleeding of the nose and gums; and ulceration of the nasal mucous membranes.
Repeated exposures of animals to concentrations of about 34 ppm produced no immediate toxic effects.
Workers exposed to hydrochloric acid suffered from gastritis and a number of cases of chronic bronchitis have also been reported.
Repeated or prolonged exposure to dilute solutions may cause dermatitis. Repeated exposure to low vapor concentrations can cause skin tenderness, bleeding of the nose and gums, chronic bronchitis, gastritis.

Section 4 - First Aid Measures

See DOT ERG

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately flush body and clothes with large amounts of water, using safety shower if available.
Quickly remove all contaminated clothing, including footwear.
Wash affected areas with water (and soap if available) for at least 15 minutes. Transport to hospital or doctor.

Ingestion: Contact a Poison Control Center. Rinse mouth out with plenty of water. Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to strong acids:
1.Airway problems may arise from laryngeal edema and inhalation exposure.
Treat with 100% oxygen initially.
2.Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.

3. Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
4.Strong acids produce a coagulation necrosis characterized by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

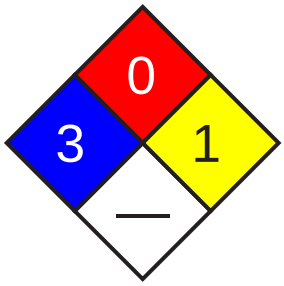
INGESTION:
1.Immediate dilution (milk or water) within 30 minutes post-ingestion is recommended.
2.Do not attempt to neutralize the acid since exothermic reaction may extend the corrosive injury.
3.Be careful to avoid further vomiting since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
4.Charcoal has no place in acid management.
5.Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:
1.Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
2.Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:
1.Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. Do not use neutralizing agents or any other additives. Several liters of saline are required.
2.Cycloplegic drops (1% cyclopentolate for short-term use or 5% homatropine for longer term use), antibiotic drops, vasoconstrictive agents, or artificial tears may be indicated dependent on the severity of the injury.
3.Steroid eye drops should only be administered with the approval of a consulting ophthalmologist.

Section 5 - Fire-Fighting Measures

See DOT ERG



Fire Diamond

Flash Point: Nonflammable
Autoignition Temperature: Not applicable
LEL: Not applicable
UEL: Not applicable
Extinguishing Media: Water spray or fog; foam; Bromochlorodifluoromethane (BCF) (where regulations permit); Dry agent; Carbon dioxide.
General Fire Hazards/Hazardous Combustion Products: Noncombustible liquid. Will not burn, but heat produces highly toxic fumes/vapors.
Heating may cause expansion or decomposition leading to violent rupture of containers. Decomposes on heating and produces toxic fumes of hydrogen chloride. Decomposition may produce toxic fumes of chlorine.
Reacts with metals producing flammable/explosive hydrogen gas. Contact with moisture or water may generate heat causing ignition. Reacts vigorously with alkalis. Moderate fire hazard when in contact with reducing agents.
Fire Incompatibility: Reacts with metals producing flammable/explosive hydrogen gas.
Avoid reactions with metals, metal oxides, hydroxides, amines, carbonates, alkaline materials, acetic anhydride, cyanides, sulphides, sulphites, phosphides, acetylides, borides, carbides, silicides, vinyl acetate, formaldehyde and potassium permanganate, unsaturated organics, metal acetylides, sulphuric acid.
Note: Compatibility with plastics should be confirmed prior to use.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation. Cool fire-exposed containers with water spray from a protected location. If safe to do so, remove containers from path of fire. Equipment should be thoroughly decontaminated after use. Water spray or fog may be used to disperse vapor. Do not approach cylinders suspected to be hot. If safe to do so, stop flow of gas.

Section 6 - Accidental Release Measures

See DOT ERG

Small Spills: DO NOT touch the spill material. Clean up all spills immediately. Wear fully protective PVC clothing and breathing apparatus. Contain and absorb spill with sand, earth, inert material or vermiculite. Use soda ash or slaked lime to neutralize. Collect residues and place in labeled plastic containers with vented lids. Clear area of personnel and move upwind. Avoid breathing vapors and contact with skin and eyes. Do not exert excessive pressure on valve; do not attempt to operate damaged valve. Water spray or fog may be used to disperse vapor.
Large Spills: Contact fire department and tell them location and nature of hazard. Clear area of personnel and move upwind. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation. Stop leak if safe to do so. Remove leaking cylinders to a safe place if possible. Release pressure under safe, controlled conditions by opening the valve. Do not exert excessive pressure on valve; do not attempt to operate damaged valve. Shut off all possible sources of ignition and increase ventilation. Water spray or fog may be used to disperse vapor. Use soda ash or slaked lime to neutralize.
Collect and seal in labeled drums for disposal. Wash spill area with large quantities of water. If contamination of

drains or waterways occurs, advise emergency services. After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing. DO NOT touch the spill material. Contain and absorb spill with sand, earth, inert material or vermiculite.
DO NOT USE WATER OR NEUTRALIZING AGENTS INDISCRIMINATELY ON LARGE SPILLS.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist and vapor, breathing vapors and contact with skin and eyes.
Avoid physical damage to containers. Use in a well-ventilated area. Wear protective clothing and gloves when handling containers. Handle and open container with care.
WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material. When handling, DO NOT eat, drink or smoke. Always wash hands with soap and water after handling. Work clothes should be laundered separately. Use good occupational work practices. Observe manufacturer's storing and handling recommendations.
Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Local exhaust ventilation may be required for safe working, i.e. to keep exposures below required standards; otherwise, PPE is required.
Keep dry. Reacts violently with water.
Transport containers on a trolley. Avoid sources of heat. DO NOT transfer gas from one cylinder to another.

Recommended Storage Methods: Packaging as recommended by manufacturer. Check that containers are clearly labeled.
Cylinder. Ensure the use of equipment rated for cylinder pressure. Ensure the use of compatible materials of construction. Valve protection cap to be in place until cylinder is secured, connected. Cylinder must be properly secured either in use or in storage. Cylinder valve must be closed when not in use or when empty. Segregate full from empty cylinders. WARNING: Suckback into cylinder may result in rupture. Use back-flow preventive device in piping.
Hydrochloric acid: Packs of 2.5 litres or less require a child-resistant closure. Glass container or Plastic carboy or Polylined drum.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: If risk of overexposure exists, wear air supplied breathing apparatus. Provide adequate ventilation in warehouse or closed storage areas. Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
If risk of inhalation or overexposure exists, wear NIOSH-approved respirator or work in fume hood. Hydrogen chloride vapors will not be adequately absorbed by organic vapor respirators.

Personal Protective Clothing/Equipment:

Eyes: Chemical goggles. Full face shield.
DO NOT wear contact lenses. Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Neoprene gloves; rubber gloves. Nitrile gloves.
Safety footwear. Rubber boots.
Hydrochloric acid: Barrier cream and Neoprene gloves or Elbow length PVC gloves. Nitrile gloves.
PVC boots or PVC safety gumboots.

Respiratory Protection:
Exposure Range >5 to <50 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range 50 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: white

Other: Ensure there is ready access to a safety shower; Eyewash unit.
Acid-resistant overalls. Full protective suit. Operators should be trained in procedures for safe use of this material.

Glove Selection Index:
BUTYL ..... Best selection
BUTYL/NEOPRENE ..... Best selection
HYPALON ..... Best selection
NEOPRENE..... Best selection
NEOPRENE/NATURAL..... Best selection
NITRILE+PVC ..... Best selection
PE/EVAL/PE ..... Best selection
SARANEX-23 ..... Best selection
VITON/NEOPRENE ..... Best selection
PVC..... Best selection

NITRILE ..... Best selection
NATURAL RUBBER..... Satisfactory; may degrade after 4 hours continuous immersion
NATURAL+NEOPRENE..... Satisfactory; may degrade after 4 hours continuous immersion
NAT+NEOPR+NITRILE ..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Hydrogen chloride: Colorless, corrosive gas. Pungent suffocating odor. White fumes in moist air. Soluble in methanol, ethanol, ether and benzene.
Hydrochloric acid: Clear to light yellow (orange tint for inhibited grades) fuming corrosive liquid with sharp, suffocating odor.

Physical State: Hydrogen chloride: Compressed gas; Hydrochloric acid: Liquid
Odor Threshold: 0.26 to 0.3 ppm
Vapor Pressure (kPa): < 24.8 at 25 °C
Vapor Density (Air=1): 1.268 at 20 °C
Formula Weight: 36.461
Specific Gravity (H_2O=1, at 4 °C): < 1.19 at 20 °C
Evaporation Rate: Slow

pH: Hydrochloric acid: < 1
Boiling Point: -85 °C (-121 °F)
Freezing/Melting Point: -114.44 °C (-173.992 °F)
Volatile Component (% Vol): 100
Decomposition Temperature (°C): Not applicable
Water Solubility: 56.1 g/100 cc hot water at 60 °C

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Decomposes in the presence of moisture to produce corrosive acid. May generate sufficient heat to ignite combustible materials. Presence of heat source and direct sunlight (ultra-violet radiation). Product is considered stable under normal handling conditions. Hazardous polymerization will not occur.
Storage Incompatibilities: Hydrogen chloride: Segregate from most common metals and their alloys, alkalis, unsaturated organics, fluorine, metal carbides, metal acetylides, potassium permanganate and sulfuric acid. Compatibility with plastics should be confirmed prior to use.
Hydrochloric acid: Segregate from alkalies, oxidizing agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates. Avoid storage with metals, metal oxides, hydroxides, amines, carbonates, alkaline materials, acetic anhydride, cyanides, sulphides, sulphites, phosphides, acetylides, borides, carbides, silicides, vinyl acetate, formaldehyde and potassium permanganate. Reacts with zinc, brass, galvanized iron, aluminum, copper and copper alloys.

Section 11 - Toxicological Information

Toxicity
Inhalation (human) LC_{Lo}: 1300 ppm/30 m
Inhalation (human) LC_{Lo}: 3000 ppm/5 m
Inhalation (rat) LC_{50}: 3124 ppm/60 m
Inhalation (rat) LC_{50}: 4701 ppm/30 m
Oral (rat) LD_{50}: 900 mg/kg

Irritation
Eye (rabbit): 5 mg/30 s - mild

See *RTECS* MW 4025000, for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.
Ecotoxicity: TL_m Gambusia affinis (mosquito fish) 282 ppm/96 hr (fresh water) /Conditions of bioassay not specified; Lethal Lepomis macrochirus (bluegill sunfish) 3.6 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Cockle 330 to 1,000 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Carassius auratus (goldfish) 178 mg/l (1 to 2 hr survival time) /Conditions of bioassay not specified; LC_{50} Shore crab 240 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Shrimp 100 to 330 ppm/48 hr (salt water) /Conditions of bioassay not specified; LC_{100} Trout 10 mg/l 24 hr /Conditions of bioassay not specified
Biochemical Oxygen Demand (BOD): none

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible. Consult manufacturer for recycling options. Treat and neutralize at an effluent treatment plant. Bury residue in an authorized landfill. Decontaminate empty containers with a lime slurry. Return empty containers to supplier or bury empty containers at an authorized landfill.
Return empty cylinders to supplier.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Hydrogen chloride, anhydrous
ID: UN1050
Hazard Class: 2.3 - Poisonous gas
Packing Group:
Symbols:
Label Codes: 2.3 - Poison Gas, 8 - Corrosive
Special Provisions: 3
Packaging: **Exceptions:** None **Non-bulk:** 304 **Bulk:** None
Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** Forbidden
Vessel Stowage: **Location:** D **Other:** 40

Shipping Name and Description: Hydrochloric acid
ID: UN1789
Hazard Class: 8 - Corrosive material
Packing Group: II - Medium Danger
Symbols:
Label Codes: 8 - Corrosive
Special Provisions: A3, A6, B3, B15, IB2, N41, T8, TP2, TP12
Packaging: **Exceptions:** 154 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 1 L **Cargo aircraft only:** 30 L
Vessel Stowage: **Location:** C **Other:**

Shipping Name and Description: Hydrochloric acid
ID: UN1789
Hazard Class: 8 - Corrosive material
Packing Group: III - Minor Danger
Symbols:
Label Codes: 8 - Corrosive
Special Provisions: IB3, T4, TP1, TP12
Packaging: **Exceptions:** 154 **Non-bulk:** 203 **Bulk:** 241
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** C **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4) 5000 lb (2268 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Listed
RQ: 5000 lb
TPQ: 500 lb
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

MATERIAL SAFETY DATA SHEET

ALCONOX®

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	**ALCONOX®**
CHEMICAL FAMILY NAME:	Detergent.
PRODUCT USE:	Critical-cleaning detergent for laboratory, healthcare and industrial applications
U.N. NUMBER:	Not Applicable
U.N. DANGEROUS GOODS CLASS:	Non-Regulated Material
SUPPLIER/MANUFACTURER'S NAME:	Alconox, Inc.
ADDRESS:	30 Glenn St., Suite 309, White Plains, NY 10603. USA
EMERGENCY PHONE:	**TOLL-FREE in USA/Canada** 800-255-3924
	International calls 813-248-0585
BUSINESS PHONE:	914-948-4040
DATE OF PREPARATION:	May 2011
DATE OF LAST REVISION:	February 2008

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is a white granular powder with little or no odor. Exposure can be irritating to eyes, respiratory system and skin. It is a non-flammable solid. The Environmental effects of this product have not been investigated.

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS

EUROPEAN and (GHS) Hazard Symbols

Signal Word: **Warning!**

EU LABELING AND CLASSIFICATION:

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1
EC# 205-633-8 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 268-356-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-838-7 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-767-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 207-638-8 Index# 011-005-00-2
EC# 205-788-1 This substance is not classified in the Annex I of Directive 67/548/EEC

GHS Hazard Classification(s):

Eye Irritant Category 2A

Hazard Statement(s):

H319: Causes serious eye irritation

Precautionary Statement(s):

P260: Do not breath dust/fume/gas/mist/vapors/spray
P264: Wash hands thoroughly after handling
P271: Use only in well ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection/

Hazard Symbol(s):

[Xi] Irritant

Risk Phrases:
R20: Harmful by inhalation
R36/37/38: Irritating to eyes, respiratory system and skin

Safety Phrases:
S8: Keep container dry
S22: Do not breath dust
S24/25: Avoid contact with skin and eyes

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: Exposure to this product may cause irritation of the eyes, respiratory system and skin. Ingestion may cause gastrointestinal irritation including pain, vomiting or diarrhea.

CHRONIC: This product contains an ingredient which may be corrosive.

TARGET ORGANS: ACUTE: Eye, respiratory System, Skin CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	HAZARD CLASSIFICATION; RISK PHRASES
Sodium Bicarbonate	144-55-8	205-633-8	1044	33 - 43%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	268-356-1	Not Listed	10 – 20%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Tripolyphosphate	7758-29-4	231-838-7	1469	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Tetrasodium Pyrophosphate	7722-88-5	231-767-1	1140	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Carbonate	497-19-8	207-638-8	1135	1 - 10%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Sodium Alcohol Sulfate	151-21-3	205-788-1	0502	1 – 5%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing dificulty continues.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, or eye problems may be aggravated by prolonged contact.

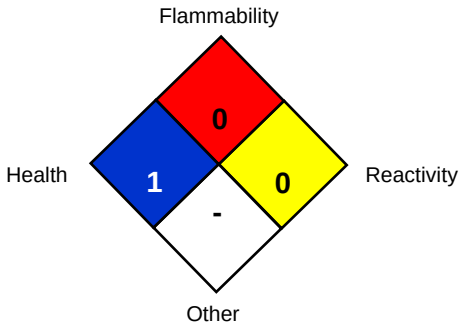
RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: Not Flammable
AUTOIGNITION TEMPERATURE: Not Applicable
FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): NA Upper (UEL): NA
FIRE EXTINGUISHING MATERIALS: As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is non-flammable and has no known explosion hazards.
Explosion Sensitivity to Mechanical Impact: Not Sensitive.
Explosion Sensitivity to Static Discharge: Not Sensitive
SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE)	**1**
FLAMMABILITY HAZARD (RED)	**0**
PHYSICAL HAZARD (YELLOW)	**0**

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Personnel should be trained for spill response operations.
SPILLS: Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use. Store away from strong acids or oxidizers.

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Sodium Bicarbonate	144-55-8	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium Tripolyphosphate	7758-29-4	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Tetrasodium Pyrophosphate	7722-88-5	5 mg/m³	5 mg/m³	5 mg/m³
Sodium Carbonate	497-19-8	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium Alcohol Sulfate	151-21-3	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Based on test data, exposure limits should not be exceeded under normal use conditions when using Alconox Detergent. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use chemical resistant gloves to prevent skin contact.. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE:	Solid
APPEARANCE & ODOR:	White granular powder with little or no odor.
ODOR THRESHOLD (PPM):	Not Available
VAPOR PRESSURE (mmHg):	Not Applicable
VAPOR DENSITY (AIR=1):	Not Applicable.
BY WEIGHT:	Not Available
EVAPORATION RATE (nBuAc = 1):	Not Applicable.
BOILING POINT (C°):	Not Applicable.
FREEZING POINT (C°):	Not Applicable.
pH:	9.5 (1% aqueous solution)
SPECIFIC GRAVITY 20°C: (WATER =1)	0.85 – 1.1
SOLUBILITY IN WATER (%)	>10% w/w
COEFFICIENT OF WATER/OIL DIST.:	Not Available
VOC:	None
CHEMICAL FAMILY:	Detergent

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable
DECOMPOSITION PRODUCTS: When heated to decomposition this product produces Oxides of carbon (COx)
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids and strong oxidizing agents.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials and dust generation.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is available for mixture:

CAS# 497-19-8 LD50 Oral (Rat)	4090 mg/kg
CAS# 497-19-8 LD50 Oral (Mouse)	6600 mg/kg
CAS# 497-19-8 LC50 Inhalation (Rat)	2300 mg/m³ 2H
CAS# 497-19-8 LC50 Inhalation (Mouse)	1200 mg/m³ 2H
CAS# 7758-29-4 LD50 Oral (Rat)	3120 mg/kg
CAS# 7758-29-4 LD50 Oral (Mouse)	3100 mg/kg
CAS# 7722-88-5 LD50 Oral (Rat)	4000 mg/kg

SUSPECTED CANCER AGENT: None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.
IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.
SENSITIZATION OF PRODUCT: This product is not considered a sensitizer.
REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: No Data available at this time.
EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:
THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.
PROPER SHIPPING NAME: Non-Regulated Material
HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable
UN IDENTIFICATION NUMBER: Not Applicable
PACKING GROUP: Not Applicable.
DOT LABEL(S) REQUIRED: Not Applicable
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): Not Applicable
MARINE POLLUTANT: None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:
This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:
This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):
This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:
This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes Chronic Health: No Fire: No Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): None of the ingredients are on the California Proposition 65 lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This product is categorized as a Controlled Product, Hazard Class D2B as per the Controlled Product Regulations

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory if Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

ANNEX:

IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE

Used to clean: Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, catheters, tubing, pipes, radioactive contaminated articles, optical parts, electronic components, pharmaceutical apparatus, cosmetics manufacturing equipment, metal castings, forgings and stampings, industrial parts, tanks and reactors. Authorized by USDA for use in federally inspected meat and poultry plants. Passes inhibitory residue test for water analysis. FDA certified.

Used to remove: Soil, grit, grime, buffing compound, slime, grease, oils, blood, tissue, salts, deposits, particulates, solvents, chemicals, radioisotopes, radioactive contaminations, silicon oils, mold release agents.

Surfaces cleaned: Corrosion inhibited formulation recommended for glass, metal, stainless steel, porcelain, ceramic, plastic, rubber and fiberglass. Can be used on soft metals such as copper, aluminum, zinc and magnesium if rinsed promptly. Corrosion testing may be advisable.

Cleaning method: Soak, brush, sponge, cloth, ultrasonic, flow through clean-inplace. Will foam—not for spray or machine use.

Directions: Make a fresh 1% solution (2 1/2 Tbsp. per gal., 1 1/4 oz. per gal. or 10 grams per liter) in cold, warm, or hot water. If available use warm water. Use cold water for blood stains. For difficult soils, raise water temperature and use more detergent. Clean by soak, circulate, wipe, or ultrasonic method. Not for spray machines, will foam. For nonabrasive scouring, make paste. Use 2% solution to soak frozen stopcocks. To remove silver tarnish, soak in 1% solution in aluminum container. RINSE THOROUGHLY—preferably with running water. For critical cleaning, do final or all rinsing in distilled, deionized, or purified water. For food contact surfaces, rinse with potable water. Used on a wide range of glass, ceramic, plastic, and metal surfaces. Corrosion testing may be advisable.

Appendix E

Schedule

ARCADIS

APPENDIX E - SITE REMEDIATION SCHEDULE
235 METRO PARK BRIGHTON SITE
NYSDEC Site #828150
TOWN OF BRIGHTON, NEW YORK

	2012																							2013															
	Aug				Sept				Oct					Nov				Dec						Jan				Feb				Mar				April			
Week Beginning Date (Monday)	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	4	11	18	25	1	8	15	22
NYSDEC signed Record of Decision (ROD) on March 30, 2012	◆																																					
Remedial Action Work Plan																																						
Submission of Draft Remedial Action Work Plan (RAWP)		◆																																				
NYSDEC Review of RAWP																																						
Response to NYSDEC Comments (Work continues under Pre-Design Work Plan)						◆																					◆											
Quarterly GW Elevation Measurement and Mapping, Well Repair and Installation																																						
Quarterly water elevation measurement and mapping events													Q4																								Q1	
Repair of existing monitoring wells																																						
Installation of additional Monitoring Wells (assume 2 new shallow wells)																																						
Pre-Design Work Plan																																						
Preparation and Submission of Draft Pre-Design Work Plan (PDWP)																																						
NYSDEC Review of PDWP																																						
Finalization and NYSDEC approval of the PDWP																																						
Detailed Characterization of Two Suspected Source Areas using CPT/MIP																																						
Cone Penetrometer Test/ Membrane Interface Probe (CPT/MIP) Characterization of 2 source areas																																						
Remedial Design, Remedial Injection, and Reporting																																						
Baseline groundwater monitoring																																						
Preparation and Submission of Remedial Design (RD) Document																																						
NYSDEC Review of RD																																						
Finalization and NYSDEC approval of the RD																																						
First Round of Remedial Injections																																						
Assessment and reporting of first round of remedial injections																																						
Soil Vapor Intrusion																																						
Installation of soil vapor monitoring points																																						
Soil vapor measurement																																						
Post Injection Groundwater Sampling (frequency TBD)																																						
Post Injection Groundwater Sampling (frequency TBD)																																						
Health and Safety Plan																																						
Preparation of Health and Safety Plan (HASP)	◆																																					
Site Management Plan																																						
Preparation of Site Management Plan (SMP)																																						

NYSDEC review
ARCADIS
Field work/Remedial contractors
Deliverable submittal date ◆

NOTE: The implementation of the selected remedy will be conducted through an adaptive design process, which will involve a general sequence of activities designed to provide optimal performance relative to its objectives for this site. The sequence of certain activities may be slightly modified depending on the results of the design investigation.

ARCADIS

APPENDIX E - SITE REMEDIATION SCHEDULE
235 METRO PARK BRIGHTON SITE
NYSDEC Site #828150
TOWN OF BRIGHTON, NEW YORK

	2013																																				
	May				June				July					Aug				Sept					Oct				Nov				Dec				
Week Beginning Date (Monday)	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
NYSDEC signed Record of Decision (ROD) on March 30, 2012																																			
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Quarterly GW Elevation Measurement and Mapping, Well Repair and Installation																																			
Quarterly water elevation measurement and mapping events				Q2										Q3												Q4									
Repair of existing monitoring wells																																			
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ARCADIS

APPENDIX E - SITE REMEDIATION SCHEDULE
235 METRO PARK BRIGHTON SITE
NYSDEC Site #828150
TOWN OF BRIGHTON, NEW YORK

	2014																				
	Jan				Feb				Mar					April				May			
Week Beginning Date (Monday)	6	13	20	27	3	10	17	24	3	10	17	24	31	7	14	21	28	5	12	19	26
NYSDEC signed Record of Decision (ROD) on March 30, 2012																					
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