

RECORD OF DECISION

Artco Industrial Laundries
State Superfund Project
Rochester, Monroe County
Site No. 828102
March 2017



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

DECLARATION STATEMENT - RECORD OF DECISION

Artco Industrial Laundries
State Superfund Project
Rochester, Monroe County
Site No. 828102
March 2017

Statement of Purpose and Basis

This document presents the remedy for the Artco Industrial Laundries 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 Artco Industrial Laundries 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. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, 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 gases 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 which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Cover System

A site cover currently exists in areas not occupied by buildings and will be maintained to allow for commercial use of the site. Any site redevelopment will maintain the existing site cover. The site cover may include paved surface parking areas, sidewalks or soil where the upper one foot of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for commercial use. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

3. In-Situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat chlorinated volatile organic compounds (VOCs) in groundwater. A chemical oxidant will be injected into the subsurface to destroy the contaminants in an approximately 4,000 square foot area located in the northeastern portion of the site as depicted on Figure 6 where total chlorinated VOC concentration exceed approximately 14,000 ppb at the site perimeter which is the limit of efficacy for the enhanced bioremediation element discussed in Paragraph 4. Once the chlorinated VOC concentrations are below 14,000 ppb, the same areas will be treated as part of the enhanced bioremediation element discussed in Paragraph 4. The chemical oxidant will be injected via two sets of injection wells screened from approximately 10 to 25 feet below ground surface (shallow bedrock) and approximately 20 to 30 feet below ground surface (intermediate bedrock). The remedial design will also evaluate implementing ISCO in the source area under the building as pre-treatment prior to implementing the enhanced bioremediation element discussed in Paragraph 4. The method and depth of injection will be determined during the remedial design.

4. Enhanced Bioremediation

In-situ enhanced biodegradation will be employed to treat contaminants in groundwater in the source area under the building and at the downgradient site boundary as depicted on Figure 6. The biological breakdown of contaminants through anaerobic reductive dechlorination will be enhanced by injecting liquid activated carbonTM and electron donor reagents into the overburden in the source area under the building and in the overburden, shallow bedrock, and intermediate bedrock near the downgradient site boundary to control contaminant migration and promote microbe growth via injection wells screened from approximately 3 to 35 feet depending on location.

5. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require 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);
- allow the use and development of the controlled property for commercial use or industrial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

6. Site Management Plan

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: The Environmental Easement discussed in Paragraph 5 above.

Engineering Controls: The cover system discussed in Paragraph 2 and the sub-slab depressurization system Interim Remedial Measure.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
 - a provision for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible. The nature and extent of contamination in areas where access was previously limited or unavailable will be immediately and thoroughly investigated pursuant to a plan approved by the Department. Based on the investigation results and the Department determination of the need for a remedy, a Remedial Action Work Plan (RAWP) will be developed for the final remedy for the site, including removal and/or treatment of any source areas to the extent feasible. Citizen Participation Plan (CPP) activities will continue through this process. Any necessary remediation will be completed prior to, or in association with, redevelopment. This includes all overburden and bedrock located under the existing on-site building.
 - a provision for removal or treatment of the source area located under the existing on-site building if and when the building is demolished or becomes vacant;
 - descriptions of the provisions of the environmental easement including any land use and/or groundwater water use restrictions;
 - a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 2 above will be placed in any areas where the upper one foot of exposed surface soil exceed the applicable soil cleanup objectives (SCOs);
 - a provision for evaluation of the potential for soil vapor intrusion for any new buildings developed on the site and in off-site areas of contamination, 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:
 - monitoring of groundwater, soil vapor, sub-slab soil vapor, and indoor air to assess the performance and effectiveness of the remedy;
 - a schedule of monitoring and frequency of submittals to the Department;
 - monitoring for vapor intrusion for any buildings as may be required by the Institutional and Engineering Control Plan discussed above.

c. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of the active vapor mitigation systems. The plan includes, but is not limited to:

- procedures for operating and maintaining the systems; and
- compliance inspection of the systems to ensure proper O&M as well as providing the data for any necessary reporting.

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, 2017

Date



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

RECORD OF DECISION

Artco Industrial Laundries
Rochester, Monroe County
Site No. 828102
March 2017

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:

Phillis Wheatley Community Library
Attn: Lori Frankunas
33 Dr. Samuel McCree Way
Rochester, NY 14608
Phone: (585) 428-8212

A public meeting was also held on March 13, 2017, which no members of the public attended.

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 Artco Industrial Laundries (Artco) site is located in a commercial area on the west side of the City of Rochester, Monroe County. The site is located on the south side of West Main Street approximately 0.6 miles west of the Genesee River and roughly 300 feet west of the intersection of West Main Street and Ford Street.

Site Features: The site is approximately 1.8 acres in size. The main site feature is an approximately 54,500 square foot occupied building. The rest of the site is mostly paved with some grass and landscaped areas immediately north and west of the building.

Current Zoning and Land Use: The site is currently used as an industrial laundry and is zoned Center City District which allows for commercial, and industrial uses. The site is owned by AFES, LLC and is occupied by Cintas Corp. The surrounding parcels are currently used for a variety of non-residential activities including commercial, light industrial, roads, and utility right-of-ways. The nearest residence is approximately 300 feet southeast of the site on Favor Street.

Past Use of the Site: The site and adjoining properties have long been an area of commercial and industrial development since the early 1900s. The site property was previously developed with former structures dating back to the 1800s. The area, including the site parcel, was part of a former rail yard from the early 1900s through the 1960s. Redevelopment as the Artco facility occurred in the late 1960s to early 1970s. Artco operated an industrial laundry service at the site between approximately 1972 and 1999 and operations included a dry cleaning process that used tetrachloroethene (PCE) as a solvent. It is this use that appears to have led to the PCE contamination at the site. The current occupant has never used PCE at the site.

Environmental testing performed in the early 1990s prior to and during construction of an adjacent building indicated that PCE was present in the soil and groundwater. In 1999, the Department conducted an investigation which indicated that the dry cleaning operation at Artco was an apparent source of the PCE.

In 2000, Artco entered the Voluntary Cleanup Program (VCP). Elevated levels of PCE were detected in the soil underneath the building and in 2004 a soil vapor extraction (SVE) system was installed as an interim remedial measure to treat contaminated soil. Additional sampling indicated that groundwater contaminated with PCE appeared to be migrating off-site to the north, west and east.

In 2005, Artco sold the property to KramKnarf, LLC, which assumed responsibility for the investigation and cleanup under the VCP. In 2006, KramKnarf notified the Department that they would not perform additional investigation and remediation activities. As a result, the VCP project was terminated and the SVE system was shut down.

In 2007, a new property owner, Barnes/Stevens Redevelopment LLC (BSR), was accepted into the Brownfield Cleanup Program (BCP) as a Volunteer. BSR was responsible for investigating the contamination on the site while the Department, in consultation with NYSDOH, was responsible for investigating contaminants that had migrated off-site.

The Department's off-site investigation, conducted in conjunction with NYSDOH, started in 2009 and included collecting groundwater and soil vapor intrusion samples at several nearby properties. BSR failed to complete the on-site investigation, so the Department terminated the BCP project in August 2009.

In October 2009, the Department and NYSDOH listed the site in the Registry of Inactive Hazardous Waste Disposal Sites. In September 2010, AFES, LLC, who acquired ownership of the property from BSR, entered into an Order on Consent with the Department to complete a full remedial program and also reimbursed the Department for the cost of the 2009 off-site investigation.

Site Geology and Hydrogeology: The site is generally flat. The overburden soils generally consist of a layer of fill materials varying in thickness from 4 to 8 feet below ground surface underlain generally by silty fine sand.

Groundwater at the site is present in the overburden at a depth of approximately 7 feet below ground surface. Bedrock is present at approximately 11 feet below ground surface. Groundwater from the site generally flows to the northwest, but is variable. Groundwater flow direction appears to be influenced by underground utilities, the depth interval evaluated, and seasonality.

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:

Barnes/Stevens Redevelopment, LLC

Artco Industrial Laundries

333 W. Main St, LLC

AFES, LLC

The Department and AFES, LLC entered into a Consent Order on September 30, 2010. 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:

- groundwater
- soil
- indoor air
- sub-slab vapor

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:

tetrachloroethene (PCE)
trichloroethene (TCE)

cis-1,2-dichloroethene
vinyl chloride

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

- groundwater
- soil
- soil vapor intrusion

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.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

On-Site Vapor Intrusion Mitigation IRM

The on-site soil vapor intrusion evaluation detected tetrachloroethene (PCE) in the indoor air at concentrations up to 160 micrograms per cubic meter (ug/m^3), which exceeds the NYSDOH air guideline concentration of $30 \text{ ug}/\text{m}^3$. In addition, trichloroethene (TCE) was detected in the indoor air at concentrations up to $2.3 \text{ ug}/\text{m}^3$, which exceeds the NYSDOH air guideline concentration of $2 \text{ ug}/\text{m}^3$. Based on these results, it was determined that mitigation measures were needed at the on-site building to address current and potential indoor air contamination of volatile organic compounds associated with soil vapor intrusion.

The IRM included construction of a sub-slab depressurization system consisting of 14 extraction points and 5 fans. Construction of the IRM was completed in September 2011.

Post construction testing verified that the system was effectively depressurizing the slab and indoor air concentrations of PCE and TCE were reduced to concentrations below the applicable NYSDOH air guideline concentrations. Construction details and post construction testing results are provided in the document entitled *Construction Completion Report Sub-Slab Depressurization System Installation*, dated April 23, 2012.

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 the site.

Nature and Extent of Contamination:

Based on investigations conducted to date, the primary contaminants of concern at the site include tetrachloroethene (PCE) and associated breakdown compounds such as trichloroethene (TCE) cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride. As discussed below, these contaminants have impacted the environmental media of soil, groundwater, bedrock, and soil vapor.

Soil - Subsurface soil contamination associated with the dry cleaning operation is present underneath the building with the highest concentrations located under the eastern section of the building where the dry cleaning equipment was formerly located.

In the source area under the building, maximum soil concentrations and the applicable 6 NYCRR Part 375 Protection of Groundwater soil cleanup objectives (SCOs), are provided below for PCE, TCE, and cis-1,2-DCE (note that for these compounds, the Protection of Groundwater SCO is the same as the Unrestricted Use SCO). PCE was detected in soils at up to 26,000 parts per million (ppm), which significantly exceeds the SCO of 1.3 ppm, and indicates the potential presence of non-aqueous phase liquid (NAPL). TCE was detected in soils at up to 110 ppm

which significantly exceeds the SCO of 0.47 ppm. Cis-1,2-DCE was detected in soils at up to 18 ppm which significantly exceeds the SCO of 0.25 ppm.

Subsurface soil impacts exceeding Unrestricted Use SCOs appear to extend approximately 10 ft. off-site to the east. This off-site area is paved and has subsurface utilities.

Groundwater - The soil contamination has resulted in significant groundwater contamination, as PCE and associated degradation products were detected in the on-site groundwater both under the building and outside the building footprint at concentrations significantly above groundwater standards (typically 5 ppb). Site-related contaminants also appear to be migrating off-site, especially to the north, east, and west.

In the source area overburden under the east side of building, PCE groundwater concentrations ranged from 500 parts per billion (ppb) to 160,000 ppb. Outside the source area, the highest concentrations under the building were detected in the overburden groundwater at the northwest portion of the building where PCE concentrations ranged from 4,000 ppb to 111,000 ppb. These results indicate the potential presence of NAPL in the groundwater under much of the building.

Outside the building footprint, groundwater concentrations in the overburden decrease significantly, but the groundwater in the shallow and intermediate bedrock (to about 35 ft below ground) is significantly impacted. The highest bedrock groundwater concentrations were detected outside the northeast corner of the building where PCE was detected at 35,000 ppb. Off-site, the highest groundwater concentrations were detected north of the site under West Main Street and just north of West Main Street in the shallow bedrock (to about 25 ft. below ground) where PCE concentrations ranged from about 3,600 ppb to 14,400 ppb. These results indicate the potential for NAPL to be migrating off-site with the groundwater under West Main Street.

PCE degradation products including trichloroethene, cis-1,2-dichloroethene, and vinyl chloride have also been detected in overburden and bedrock groundwater at concentrations exceeding groundwater standards (typically 5 ppb).

Groundwater impacts appear to extend about 250 ft. off-site to the north and west and to depths of approximately 45 ft. below ground.

Bedrock – Investigation results suggest that some PCE has diffused into the bedrock matrix. It is expected that this PCE will act as a long-term source of groundwater contamination as the PCE will slowly diffuse back into the groundwater over time.

Soil Vapor and Indoor Air - The soil and groundwater contamination at the site has resulted in on-site soil vapor contamination. In 2011, a sub-slab depressurization system (a system that ventilates/removes air beneath the building) was installed at the on-site building to prevent the inhalation of site-related contamination.

An off-site vapor intrusion investigation was conducted by the Department in 2009. Soil vapor intrusion samples were collected from three adjacent off-site structures. Levels of PCE were found to be within background levels typically observed in commercial buildings. The results

indicated that no additional actions were needed to address exposures associated with soil vapor intrusion.

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 will not come into contact with the contaminated soil unless they perform ground-intrusive work at the site. Contaminated groundwater is not being used for drinking water because the area is served by the public water supply. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), 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. A sub-slab depressurization system (a system that ventilates/removes air beneath the building) has been installed at the on-site building to prevent the inhalation of site-related contamination. Sampling indicates soil vapor intrusion is not a concern off-site.

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.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater 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 Enhanced Bioremediation of Source Area and Perimeter remedy.

The estimated present worth cost to implement the remedy is \$2,010,000. The cost to construct the remedy is estimated to be \$731,000 and the estimated average annual cost is \$119,000.

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, 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 gases and other emissions;

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- a provision for removal or treatment of the source area located under the existing on-site building if and when the building is demolished or becomes vacant;
- descriptions of the provisions of the environmental easement including any land use and/or groundwater water use restrictions;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 2 above will be placed in any areas where the upper one foot of exposed surface soil exceed the applicable soil cleanup objectives (SCOs);
- a provision for evaluation of the potential for soil vapor intrusion for any new buildings developed on the site and in off-site areas of contamination, 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:
 - monitoring of groundwater, soil vapor, sub-slab soil vapor, and indoor air to assess the performance and effectiveness of the remedy;
 - a schedule of monitoring and frequency of submittals to the Department;
 - monitoring for vapor intrusion for any buildings as may be required by the Institutional and Engineering Control Plan discussed above.
- c. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of the active vapor mitigation systems. The plan includes, but is not limited to:
 - procedures for operating and maintaining the systems; and
 - compliance inspection of the systems to ensure proper O&M as well as providing the data for any necessary reporting.

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 for which contamination was identified, 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 four categories; volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/ polychlorinated biphenyls (PCBs), and inorganics (metals and cyanide). 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 4 and Section 6.1.1 are also presented.

Waste/Source Areas

As described in the RI 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 where 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 include soils, groundwater and bedrock beneath and north of the former dry cleaning area at the eastern interior of the building and extending in bedrock to the north side of West Main Street as shown in Figure 2.

These wastes are believed to be present as a result of poor housekeeping within the building associated with the former dry cleaning activities. While dense non-aqueous phase liquid (DNAPL), or free product was not observed in any soil or groundwater sample, the presence of DNAPL is suspected. Section 2.1(f) of DER-10 Technical Guidance For Site Investigation and Remediation, states that NAPL is suspected to be present in soil where a single contaminant is present at concentrations greater than 10,000 ppm and NAPL is suspected to be present in groundwater where the concentration is equal to or greater than 1% of the water solubility of the contaminant.

Soil under the building in the vicinity of the former dry cleaning machine exceeded 10,000 ppm for tetrachloroethene. Overburden groundwater under much of the building and bedrock groundwater north of the building exceeded 1% of the water solubility for tetrachloroethene. If present in bedrock, NAPL may reside within fractures or bedding plane porosity, and/or may be diffused into the bedrock matrix resulting in a long-term source of groundwater contamination. The existence of the active structure makes a full discovery or delineation of the potential source impracticable at this time.

The suspected presence of DNAPL and documented presence of contaminants above respective SCGs indicate a potentially persistent source.

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 samples were collected to assess groundwater conditions on and off-site. The results indicate that contamination in shallow groundwater at the site exceeds the SCGs for volatile organic compounds and inorganics. Contaminant levels in bedrock groundwater exceeded the guidance values for volatile organic compounds. The nature and extent of groundwater contamination is shown on Figures 3A to 3D.

Table #1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb) ^a	SCG ^b (ppb)	Frequency Exceeding SCG
VOCs			
Tetrachloroethene	ND to 160,000	5	78 of 198
Trichloroethene	ND to 18,700	5	67 of 198
cis-1,2-Dichloroethene	ND to 37,900	5	68 of 198
Vinyl Chloride	ND to 400	2	50 of 198
2-Butanone	ND - 720	50	5 of 198
SVOCs			
Not Analyzed			
Inorganics			
Iron	260 to 137,000	300	5 of 6
Magnesium	29,300 to 42,500	35,000	1 of 6
Manganese	25.4 to 5,900	300	4 of 6
Thallium	ND to 10.4	0.5	1 of 6
Pesticides/PCBs			
Not Analyzed			

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 the chlorinated VOCs tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, and vinyl chloride. As noted on Figure 3A, the primary groundwater contamination is associated with the former dry cleaning machine located on the eastern side of the site building.

The inorganic compounds found in groundwater were also found in upgradient monitoring wells and are considered to represent site background conditions. Therefore, the metal compounds found in groundwater are not considered site specific contaminants of concern.

Based on the findings of the RI, the presence of chlorinated VOCs 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: tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, and vinyl chloride.

Soil

Surface and subsurface soil samples were collected at the site during the RI. 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 2 inches to 12 feet to characterize historic fill and assess soil contamination impacts to groundwater. The results indicate that soils at the site exceed the unrestricted SCG for volatile and semi-volatile organics, and metals. The nature and extent of the soil contamination is summarized in Figure 4.

Table #2 - Soil

Detected Constituents	Concentration Range Detected (ppm) ^a	Unrestricted SCG ^b (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG ^c (ppm)	Frequency Exceeding Restricted SCG
VOCs					
Tetrachloroethene	ND to 18,000	1.3	9 of 52	1.3 ^d	9 of 52
Trichloroethene	ND to 570	0.47	3 of 52	0.47 ^d	3 of 52
cis-1,2-Dichloroethene	ND to 1	0.25	1 of 52	0.25 ^d	1 of 52
SVOCs					
Benzo(a)anthracene	ND to 13	1	4 of 11	5.6	3 of 11
Benzo(a)pyrene	ND to 14	1	4 of 11	1	4 of 11
Benzo(b)fluoranthene	ND to 12	1	4 of 11	5.6	3 of 11
Benzo(k)fluoranthene	ND to 11	0.8	4 of 11	56	0 of 11
Chrysene	ND to 13	1	4 of 11	56	0 of 11
Indeno(1,2,3-cd)pyrene	ND to 8.5	0.5	4 of 11	5.6	1 of 11
Inorganics					
Lead	8.9 to 221	63	6 of 12	1000	0 of 12
Mercury	ND to 0.9	0.18	4 of 12	2.8	0 of 12
Zinc	42.5 to 234	109	4 of 12	10,000	0 of 12
Pesticides/PCBs					
No Exceedances					

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.

d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.

The primary soil contaminants are the chlorinated VOCs tetrachloroethene, trichloroethene, and cis-1,2-dichloroethene. As noted on Figure 4, the primary soil contamination is associated with the former dry cleaning machine. From 2004 to 2006, a soil vapor extraction (SVE) system operated in a portion of the source area to remove chlorinated VOCs from the subsurface. The chlorinated VOCs were physically removed from the soil by applying a vacuum to wells installed into the vadose zone (the area below the ground but above the water table). The vacuum drew air through the soil matrix which carried the chlorinated VOCs from the soil to the SVE well.

The air extracted from the SVE wells was then treated by passing the air stream through activated carbon which removed the chlorinated VOCs from the air prior to being discharged to the atmosphere.

SVE wells were installed into the vadose zone and screened from three feet below the ground surface to a depth of approximately 13 feet. While the SVE system removed approximately 1,000 pounds of contaminant mass, the overall effectiveness of the project could not be determined due to the following: the SVE system was prematurely shut down when the VCP was terminated in 2006; vacuum readings indicated that the radius of influence of the system was smaller than expected; and post-shutdown soil sampling was not completed due to the termination of the VCP.

Metal and SVOC soil contamination is associated with historic fill activity at the site. Disposal of ash, coal, brick, concrete and other materials has resulted in inorganic and SVOC soil contamination above the unrestricted SCGs. However, the inorganic and SVOC concentrations are consistent to the background samples collected in the immediate area of the site and are not associated with the dry cleaning constituents. Therefore, metal and SVOC soil contamination is not considered a site specific contaminants of concern.

Based on the findings of the Remedial Investigation, the presence of chlorinated VOCs has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are, tetrachloroethene, trichloroethene, and cis-1,2-dichloroethene.

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 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 actions are needed to address exposures related to soil vapor intrusion.

Sub-slab soil vapor, indoor air, and outdoor air samples were collected on-site. Tetrachloroethene and trichloroethene were detected in the sub-slab soil vapor and the indoor air. Tetrachloroethene was detected at concentrations up to 160 micrograms per cubic meter (ug/m^3) in the indoor air which exceeds the NYSDOH air guideline concentration of $30 \text{ ug}/\text{m}^3$. In addition, trichloroethene was detected at concentrations up to $2.3 \text{ ug}/\text{m}^3$ in the indoor air which exceeds the NYSDOH air guideline concentration of $2 \text{ ug}/\text{m}^3$. The concentrations of other compounds detected in the on-site indoor air were mostly within background levels typically observed in commercial buildings

Based on the concentrations detected, and in comparison with the NYSDOH Soil Vapor Intrusion Guidance, soil vapor contamination identified during the RI was addressed during the IRM described in Section 6.2.

An off-site soil vapor intrusion investigation was conducted in 2009. Three off-site commercial properties were sampled. Tetrachloroethene was detected in indoor air at concentrations ranging from $0.086 \text{ ug}/\text{m}^3$ to $34 \text{ ug}/\text{m}^3$. One result exceeded the NYSDOH air guideline concentration of $30 \text{ ug}/\text{m}^3$. Although some site related VOCs were detected in each of the three commercial structures sampled, the concentrations were mostly within background levels typically observed in commercial buildings. Based on the concentrations detected, NYSDOH determined that actions are not needed off-site to address exposures related to soil vapor intrusion.

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 Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: 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 would include:

- Excavation and off-site disposal of all waste and soil contamination above the unrestricted soil cleanup objectives.
- In-Situ Thermal Treatment will be implemented to destroy or volatilize volatile organic compounds (VOCs) in groundwater over the approximately 157,000 square foot area indicated on Figure 5. The gases produced by the thermal treatment will be collected by vapor extraction wells and treated in an ex-situ treatment unit. Effluent vapors will be treated by adsorption on granular activated carbon. Electrical resistance heating (ERH) will be utilized to perform the treatment. An electrical current will be produced in the treatment area between electrodes installed underground. Heat will be generated as movement of the current meets resistance from the soil and bedrock. Treatment will continue until groundwater standards are met.

Capital Cost:..... \$28,300,000

Alternative 3: Migration Control via Groundwater Extraction and Treatment from a Blasted Bedrock Zone

This alternative would include, groundwater extraction and treatment to treat VOCs in groundwater and to ensure contaminated groundwater does not migrate off-site. The groundwater extraction system will be designed and installed so that the capture zone is sufficient to intercept the groundwater contaminant plume to stop further migration. Blast fracturing via controlled explosives will be used to increase the hydraulic conductivity and connectivity within a fractured, water-bearing zone across the native bedrock fracture network. The extraction system will create a depression of the water table so that contaminated groundwater is directed toward the extraction wells within the blasted bedrock zone. As shown of Figure 6, groundwater will be extracted from the blasted bedrock zone which will be approximately 220 feet long and located along the northern and western perimeter of the site where VOCs are migrating off-site in groundwater. Further details of the extraction system will be determined during the remedial design. The extracted groundwater will be treated using granular active

carbon (GAC) to remove dissolved contaminants from extracted groundwater by adsorption. The GAC system will consist of one or more vessels filled with carbon connected in series and/or parallel. Following treatment, the groundwater will be discharged to the sanitary sewer.

This alternative also includes: engineering controls, in the form of the existing site cover and the sub-slab depressurization system IRM; and institutional controls, in the form of an environmental easement and site management plan, necessary to protect public health and the environment from contamination remaining at the site.

<i>Present Worth:</i>	\$3,580,000
<i>Capital Cost:</i>	\$640,000
<i>Annual Costs:</i>	\$233,000

Alternative 4: Soil Vapor Extraction (SVE) in Soils Source Area and Migration Control via Groundwater Extraction and Treatment from a Blasted Bedrock Zone

This alternative would include:

- Groundwater extraction and treatment from a blasted bedrock zone as discussed in Alternative 3.
- Soil vapor extraction (SVE) will be implemented to remove VOCs from the subsurface. VOCs will be physically removed from the soil by applying a vacuum to wells that have been installed into the vadose zone (the area below the ground but above the water table). The vacuum draws air through the soil matrix which carries the VOCs from the soil to the SVE well. The air extracted from the SVE wells is then treated as necessary prior to being discharged to the atmosphere.

SVE will be accomplished using six existing SVE wells in the area shown on Figure 7. The SVE wells are installed into the vadose zone and screened from three feet below the ground surface to a depth of approximately 12 feet. The air containing VOCs extracted from the SVE wells will be treated by passing the air stream through activated carbon which removes the VOCs from the air prior to it being discharged to the atmosphere.

This alternative also includes: engineering controls, in the form of the existing site cover and the sub-slab depressurization system IRM; and institutional controls, in the form of an environmental easement and site management plan, necessary to protect public health and the environment from contamination remaining at the site.

<i>Present Worth:</i>	\$5,120,000
<i>Capital Cost:</i>	\$1,040,000
<i>Annual Costs:</i>	\$369,000

Alternative 5: In-Situ Thermal Treatment of Soil and Groundwater

In-Situ Thermal Treatment will be implemented to destroy or volatilize VOCs in soil and groundwater over the approximately 75,000 square foot area indicated on Figure 8. The gases produced by the thermal treatment will be collected by vapor extraction wells and treated in an ex-situ treatment unit. Effluent vapors will be treated by adsorption on granular activated carbon. Electrical resistance heating (ERH) will be utilized to perform the treatment. An electrical current will be produced in the treatment area between electrodes installed underground. Heat will be generated as movement of the current meets resistance from the soil and bedrock.

This alternative also includes: engineering controls, in the form of the existing site cover and the sub-slab depressurization system IRM; and institutional controls, in the form of an environmental easement and site management plan, necessary to protect public health and the environment from contamination remaining at the site.

Present Worth: \$10,800,000
Capital Cost: \$9,970,000
Annual Costs: \$30,700

Alternative 6: Enhanced Bioremediation of Source Area and Perimeter

This alternative would include:

- In-situ chemical oxidation (ISCO) will be implemented to pre-treat VOCs in groundwater. A chemical oxidant will be injected into the subsurface to destroy the contaminants in bedrock “hot spots” in the northeast portion of the site indicated on Figure 9 where total VOC concentrations in bedrock groundwater exceed 14,000 ppb, the current limit of efficacy for the enhanced bioremediation element of the remedy. The remedial design will also evaluate implementing ISCO in the source area under the eastern portion of the building to pre-treat VOCs in overburden groundwater. The method and depth of injection will be determined during the remedial design.
- In-situ enhanced biodegradation will be employed to treat VOCs in overburden groundwater in the source area under the eastern portion of the building and bedrock groundwater downgradient of the source area along the northern and western perimeter of the site. The biological breakdown of contaminants through anaerobic reductive dechlorination will be enhanced by injecting liquid activated carbonTM and electron donor reagents into the subsurface to promote microbe growth via injection wells. In the northeast portion of the site, the enhanced biodegradation injections will follow the application of the ISCO pre-treatment discussed above. In the source area under the building, an area of approximately 7,500 square feet will be treated by injecting into existing SVE and overburden wells typically screened from approximately three feet to 13 feet. The downgradient perimeter injection will create an approximately 300-foot perimeter “treatment zone” in the shallow bedrock and an approximately 160-foot perimeter treatment zone in intermediate bedrock. The perimeter treatment zones are indicated on Figure 9. The method and depth of injection will be determined during the remedial design.

This alternative also includes: engineering controls, in the form of the existing site cover and the sub-slab depressurization system IRM; and institutional controls, in the form of an environmental easement and site management plan, necessary to protect public health and the environment from contamination remaining at the site.

Present Worth: \$2,010,000
Capital Cost: \$731,000
Annual Costs: \$119,000

Exhibit C**Remedial Alternative Costs**

Remedial Alternative	Capital Cost (\$)	Annual Costs (\$)	Total Present Worth (\$)
#1 No Further Action	\$0	\$0	\$0
#2 Restoration to Pre-Disposal or Unrestricted Conditions	\$28,300,000	\$0.00	\$28,300,000
#3 Migration Control via Groundwater Extraction and Treatment from a Blasted Bedrock Zone	\$640,000	\$233,000	\$3,580,000
#4 Soil Vapor Extraction (SVE) in Soils Source Area and Migration Control via Groundwater Extraction and Treatment from a Blasted Bedrock Zone	\$1,040,000	\$369,000	\$5,120,000
#5 In-Situ Thermal Treatment of Soil and Groundwater	\$9,970,000	\$30,700	\$10,800,000
#6 Enhanced Bioremediation of Source Area and Perimeter	\$731,000	\$119,000	\$2,010,000

Exhibit D

SUMMARY OF THE SELECTED REMEDY

The Department is selecting Alternative 6, Enhanced Bioremediation of Source Area and Perimeter as the remedy for this site. Alternative 6 would achieve the remediation goals for the site by injecting a combination chemical oxidants, bioremediation reagents and liquid activated carbon™ into the groundwater in the source area and downgradient perimeter. Exposure to contaminated soil and groundwater will be prevented by maintaining the existing cover system, restricting future use of the property to commercial and industrial activities, restricting groundwater use, and adherence to a Site Management Plan. Exposure to contaminated soil vapor will be prevented by the continued operation of the existing sub-slab depressurization system. The elements of this remedy are described in Section 7. The selected remedy is depicted in Figure 9.

Basis for Selection

The selected 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 selected remedy (Alternative 6) would satisfy this criterion by maintaining the existing protective cap to prevent contact with impacted soil; continued operation of the sub-slab depressurization IRM to prevent inhalation of impacted soil vapor; a long-term groundwater use restriction to prevent exposure to impacted groundwater; source area treatment to reduce source mass; and a groundwater treatment zone along the downgradient perimeter of the site to control off-site contaminant migration in the groundwater.

Alternative 1 (No Further Action) does not provide any additional protection to public health and the environment and will not be evaluated further. Alternative 2, by meeting groundwater standards and removing all soil contaminated above the unrestricted soil cleanup objective, meets the threshold criteria. Alternative 5 would be similar to Alternative 2, but with some contamination remaining above unrestricted soil cleanup objectives and groundwater standards. Alternative 3 does not attempt to directly reduce source mass, but it does provide a mechanism to control the off-site migration of contaminants in groundwater. Alternatives 4 and 6 attempt to directly reduce source mass to the extent practicable, and also provide a mechanism to control the off-site migration of contaminants in groundwater. Alternative 4 targets source mass in the unsaturated soil and Alternative 6 targets source mass in the saturated soil and bedrock.

Alternatives 3, 4 and 6 rely on a restriction of groundwater use at the site to protect human health. Alternatives 2 and 5 may require a short-term restriction on groundwater use; however, it is expected the restriction will be able to be removed in approximately five years. The potential for soil vapor intrusion will be significantly reduced by Alternatives 2, 5, and, to a somewhat lesser extent, Alternative 4. The potential for soil vapor intrusion will remain high under Alternatives 3 and 6. Continued operation of the existing soil vapor mitigation system is required under Alternatives 3, 4 and 6 in order to protect human health.

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.

Alternatives 4 and 6 comply with SCGs to the extent practicable. They address source areas of contamination to the extent practicable and comply with the restricted use soil cleanup objectives at the surface through maintenance of an existing cover system. They also contain contaminants to the site to the extent practicable and create conditions to restore groundwater quality to the extent practicable, especially off-site. Alternative 3 does not address source areas, but does contain contaminants to the site to an extent similar to Alternatives 4 and 6 and maintains the cover system. Alternative 2 meets soil vapor intrusion SCGs by removing all contamination from the site. Alternatives 3, 4, 5 and 6 meet soil vapor intrusion SCGs through the continued operation of the sub-slab depressurization system IRM. Alternatives 2 and 5 comply with this criterion to a greater extent and with greater certainty. Because Alternatives 2, 3, 4, 5 and 6 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site. It is expected Alternative 2 will achieve groundwater SCGs in less than three years and Alternative 5 could achieve groundwater SCGs a few years later. Groundwater contamination above SCGs will remain on-site under Alternatives 3, 4 and 6 for many years.

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.

For overburden soil, long-term effectiveness is best accomplished by those alternatives involving excavation of the contaminated soils (Alternative 2). For bedrock groundwater, alternatives involving thermal heating of the bedrock (Alternatives 2 and 5) are the most effective. For soil vapor intrusion, alternatives that remove the sources of contamination in soil and groundwater (Alternative 2) are the most permanent. Alternatives that use engineering controls to prevent exposure to contaminant vapors (Alternatives 3, 4, 5, and 6) are also effective. Alternatives 2 and 5 do not primarily rely on engineering or institutional controls to address VOCs following implementation of the remedy; as they are intended to remove the contaminants from the site; however some institutional and engineering controls may still be required for Alternative 5. Alternatives 4 and 6 are also effective over the long-term and permanent as they use a combination of technologies to control exposure, remove VOCs from soil and groundwater, and control off-site migration of impacted groundwater. The SVE element of Alternative 4 targets the contaminants in the overburden soil source area, but based on the results of the SVE IRM, additional mass removal with SVE is expected to be limited unless it is expanded with additional vapor extraction points. The source area treatment for Alternative 6 targets saturated soils and groundwater. Compared to Alternatives 3 and 4, Alternative 6 is favorable because the liquid activated carbonTM associated with Alternative 6 is expected to persist over time and distribute throughout the groundwater contaminant plume. The effectiveness of Alternative 6 is dependent upon effective distribution since physical contact of the treatment compounds with the contaminants is needed. This can be a challenge in bedrock and in the source area where very high concentrations of VOCs are present. Alternative 3 is the least effective since it does not attempt to reduce contaminant mass in the source area.

Alternatives 2 and 5 are expected to require short-term groundwater use restrictions. All of the other alternatives require long-term groundwater use restrictions.

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.

The excavation and off-site disposal of soils (Alternative 2) reduces the toxicity, mobility and volume of on-site waste by transferring the material to an approved off-site location. However, depending on the disposal facility, the volume of the material would not be reduced. Alternatives 3, 4, and 5 reduce the toxicity, mobility and volume of material by transferring the VOCs to another media, such as activated carbon, which is then managed at an approved off-site location. Alternative 3 does not remove contaminant mass directly from the source area; therefore it is the least effective at reducing the volume of on-site VOCs. Only Alternative 6 permanently reduces the toxicity, mobility and volume of contaminants by use of chemical and enhanced biological treatment. Alternatives 3 and 4 are expected to control off-site migration in groundwater.

Alternatives 2 and 5 are expected to require short-term groundwater use restrictions and also provide the greatest reduction in the potential for soil vapor intrusion. All of the other alternatives require long-term groundwater use restrictions and require continued operation of the existing on-site vapor mitigation system.

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 5 use in-situ thermal treatment technologies which require significantly more infrastructure in the form of heating/vacuum wells throughout the active facility and treatment equipment for extracted soil vapor. This infrastructure may require dedicated building space and will be disruptive to current operations.

Alternatives 3 and 4 extract and treat groundwater from a blasted bedrock trench. Installation of the trench requires the use of explosives to blast-fracture shallow bedrock adjacent to a major road with underground utilities. Traffic management (both vehicular and pedestrian) is needed during the blasting and system installation. Scheduling can be done to have the construction completed during low-traffic times of the day/week. During blasting activities, engineering controls are needed to protect site workers and monitor for noise, vibrations, and dust. Blasting activities would be disruptive to the site and nearby area, but would occur over a very short duration. Once the trench is installed, impact to the site and surrounding area is minimal. Once installed, the groundwater extraction and treatment system is anticipated to have high initial short-term effectiveness.

Alternative 4 also requires dedicated space within the building to house the SVE infrastructure, though the footprint of the equipment is less than that associated with a thermal technology. Installing additional vapor extraction wells within the source area under the building to improve the effectiveness of the SVE system would be disruptive to current operations.

The soil excavation element of Alternative 2 has the most disruptive impact given the current commercial use of on- and off-site areas as it requires relocation of the on-site business and demolition of the building. Additional disruptions include large amounts of truck traffic and other traffic related disruptions for several months during building demolition, remediation and backfilling. Engineering controls are needed to manage operations, traffic, dust, noise, and to protect on- and off-site workers and the public during implementation. Following implementation, however, this alternative is anticipated to be highly effective in the short-term as the source area contamination in the soil is completely removed.

Alternative 6 is applied in-situ and contaminants are not brought to the surface and do not present an exposure pathway. Minor disruption to the facility operations during installation of injection points and injection events can be easily managed. Similarly, proper protocols must be followed for the storage and use of the treatment chemicals. Alternative 6 is anticipated to have high initial short term effectiveness on groundwater in the source area.

Alternatives 2 and 5 use electric power to heat the subsurface and are energy intensive for a short duration. Building demolition and soil excavation are also short-term energy intensive activities. Alternatives 3 and 4 use less energy in the short term, but since they will operate indefinitely the long-term energy use is expected to be very high. Additionally, Alternatives 3 and 4 remove less contaminant mass over time and are the most energy inefficient alternatives. Alternative 6 is favorable in that it requires the least amount of energy to implement.

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 3, 4 and 6 are favorable in that they are readily implementable; however optimizing the source area treatment of Alternatives 4 and 6 by installing additional SVE wells or injection points is not readily implementable due to operations within the building. Alternatives 2 and 5 are not currently implementable because they require the currently active building to be vacated and potentially demolished.

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. With its building demolition, large volume of soil to be handled, and electrical costs for thermal treatment, Alternative 3 (excavation and off-site disposal) would have the highest present worth cost. Alternative 5 has the next highest present worth cost due primarily to electrical costs. Alternative 6 has the lowest cost and provides a similar level of protection to the groundwater resource as Alternative 4 and a greater level of protection than Alternative 3.

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 commercial, Alternatives 3 and 6 are less desirable because contaminated soil will remain on the property whereas Alternative 2 and 5 remove or treat the contaminated soil permanently. Alternative 4 also permanently removes contaminants from the soil, but only in a limited area. However, the remaining contamination with Alternatives 3, 4, 6, and, to a lesser extent, 5 is controllable with implementation of a Site Management Plan and maintenance of the site cover system.

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 has been prepared that describes public comments received and the manner in which the Department will address the concerns raised.

Alternative 6 is has been selected because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

**Artco Industrial Laundries
State Superfund Project
City of Rochester, Monroe County, New York
Site No. 828102**

The Proposed Remedial Action Plan (PRAP) for the Artco Industrial Laundries 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 24, 2017. The PRAP outlined the remedial measure proposed for the contaminated soil, soil vapor, and groundwater at the Artco Industrial Laundries 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 13, 2017, which no members of the public attended. The public comment period for the PRAP ended on March 27, 2017.

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:

Matt Geary of Provectus Environmental Products submitted a letter dated February 24, 2017 which included the following comment:

COMMENT 1: I represent a company that has a patented safer ISCO chemistry which readily transitions to bioremediation and patented anti-methanogenic ISCR/ERD that I think would be helpful for this remediation.

RESPONSE 1: The information was forwarded to the Respondent's technical consultant for consideration during the Remedial Design.

Richard A. Polumbo of AFES, LLC. submitted a letter dated March 2, 2017 which included the following comment:

COMMENT 2: This comment pertains to the identification of Richard Palumbo and Louis Micca ("Palumbo and Micca") as potential responsible parties in Section 5 of the PRAP.

The site is currently owned by AFES, LLC. Palumbo and Micca acquired membership interests in AFES from Joel Cohen on April 1, 2013. Prior to that date, Palumbo and Micca had no interest in, or connection to, the site. (Richard Palumbo was counsel to Joel Cohen prior to April 1, 2013, when Mr. Cohen owned AFES).

To be clear, Palumbo and Micca are not the current or past owner of the site, and they did not generate, transport or arrange for the disposal of waste at the site. Since they acquired their membership interests in AFES on April 1, 2013, AFES has complied fully with its Order on Consent with DEC.

I know you will consider this comment and make the appropriate revisions to the PRAP. If you have any questions or disagree in any way with this comment, please contact me with your concern.

RESPONSE 2: Section 5 of the ROD is corrected to remove Richard Palumbo and Louis Micca as potential responsible parties.

Spencer Shull of COTTON7 Global Enterprises submitted a letter dated March 6, 2017 which included the following comment:

COMMENT 3: NAS is the Natural Analog System. Dr. David Putman's comments concerning the project document is as follows: "Activated charcoal (carbon) is an adsorbent that will selectively absorb nonwater soluble chemicals, like TCE, etc. However, it can quickly become saturated and then does nothing...it certainly does not act as a "barrier." They will have to dig up the soil to mix in the charcoal...it cannot be injected into the soil. The problem arises from the fact that the proposed remediation plan does nothing to prevent ground water movement, and thus a spread of the contamination, plus requires the aforementioned removal and replacement of soil. NAS could be injected around the contaminated site, preventing ground water movement, while still allowing for microbial degradation of TCE and like compounds."

RESPONSE 3: The proposed remedy uses liquid activated carbon which can be injected into saturated soil and bedrock fractures. Site contaminants sorb to the carbon and undergo biological breakdown through anaerobic reductive dechlorination. When dechlorination is complete, the sorption site on the carbon is freed up so more contaminants can be sorbed to the carbon and remediated. Based on the information provided, the Natural Analog System is similar to concrete. To provide an effective barrier, it would need to be injected all around the Artco Industrial Laundries site which is not feasible.

Vincent B. Dick of Haley & Aldrich of New York submitted a letter dated March 26, 2017 which included the following comments:

COMMENT 4: Section 5: Enforcement Status - this section lists Potentially Responsible Parties (PRPs) for the site to include several parties, including Louis Micca and Richard Palumbo individually. These individuals have not disposed of waste at the site, arranged for disposal, nor do they own the site as individuals. They are not PRPs and their names should therefore be removed from the listing.

RESPONSE 4: See Response 2.

COMMENT 5: Section 6.5: RAOs for Groundwater – the defined RAOs for groundwater remediation indicate an objective is to “Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.” This is consistent with the language used throughout the Revised Feasibility Study approved by the Department. The PRAP further indicates an RAO for groundwater to “Remove the source of ground or surface water contamination.” We note the qualifying statement “to the extent practicable” is absent in the Draft PRAP. Again, in the Revised Feasibility Study, source removal or treatment was consistently stated to be something pursued “to the extent practicable.” We therefore request this phrase be included in the final PRAP.

RESPONSE 5: The Department did not approve the Revised Feasibility Study prepared by Haley & Aldrich of New York (AFES’s technical consultant) and the Department does not necessarily agree with every statement in that document. The Remedial Action Objectives in the Proposed Remedial Action Plan prepared by the Department are consistent with the Department’s Generic Remedial Action Objectives available at <http://www.dec.ny.gov/regulations/67560.html>. The Record of Decision was not revised based on this comment.

COMMENT 6: Summary of the Proposed Remedy, Site Management Plan – This portion of the PRAP appears to require, as part of a Site Management Plan yet to be developed, that a work plan (and presumably work) for immediate investigation and treatment or removal of soil and bedrock beneath the building be completed if the building is demolished or becomes vacant. While the Revised Feasibility Study evaluated potential remedies for such a circumstance, requiring as part of the PRAP that such remedy be written into a Site Management Plan presumptively assumes several factors such as how much remediation is accomplished by the preferred remedy and the nature of site redevelopment or demolition, among other unknown factors. We believe the requirement should be limited to evaluation of the circumstances of the redevelopment/demolition and clean-up status at that time, and implementation of additional investigation and potential additional remediation be based on results of that evaluation. Revision to the PRAP along these lines is respectfully requested.

RESPONSE 6: This provision of the Proposed Remedial Action Plan does not require the Site Management Plan to identify the specific remedial technology that will be used to address remaining contamination if the building is demolished or becomes vacant. Rather, the Site Management Plan will outline a process that will be followed to investigate and remediate/manage the remaining contamination. The Record of Decision has not been revised based on this comment.

COMMENT 7: Figures – We noted that the Department modified several Haley & Aldrich base plan figures from earlier reports we submitted, using Adobe markup tools to add details and notes, while leaving the Haley & Aldrich title block intact. This incorrectly implies that such interpretations were rendered by Haley & Aldrich. For example, Figure 2 presents interpretation of potential Soil and GW DNAPL limits which is not information we submitted in our reports and should therefore be identified as the Department’s independent interpretation. We request that the Department add a note indicating all markups on any figures that are the Department’s interpretations and notes.

RESPONSE 7: The Figures in the ROD are revised to include notes identifying changes made by the Department.

COMMENT 8: Alternatives Summary and Numbering – we note that the Department decided to limit its summary of alternatives to five of those required to be presented in the Revised Feasibility Study, and renumbered them for the PRAP presentation. While we have no issue with narrowing the summary down, it may be appropriate to include a brief table or other key that allows ready cross-referencing to the corresponding numbered alternatives in the Revised Feasibility Study.

RESPONSE 8: The requested cross-reference is provided in the table below.

Remedial Alternative in Record of Decision	Corresponding Remedial Alternative in Feasibility Study
1	1
2	7
3	5
4	8
5	9
6	11

Mark D. Gregor of the City of Rochester submitted a letter dated March 27, 2017 which included the following comment:

COMMENT 9: The City of Rochester is concerned that despite the use of PlumeStop in part to minimize contaminant migration, the portion of the remedy that includes the injection of chemical oxidants may result in the displacement, mobilization and off-site migration of DNAPL or VOC contaminated groundwater onto the 911 Center property, possibly resulting in nuisance odors, vapors or soil vapor intrusion inside the 911 Center building. Given the critical public safety mission of the 911 Center Emergency Communications Department, the City stresses there cannot be any disruption in emergency services at the 911 Center as a result of the remediation of the Artco site. The City strongly requests that the Department and NYSDOH consider conducting real-time indoor air sampling or monitoring inside the 911 Center building during all active injection phases of the proposed remedy. If adverse impacts to indoor air at the 911 Center building are encountered as a result of indoor air monitoring, the remedial injections at the Artco site can be immediately suspended until the cause of the indoor air quality problem can be identified and addressed.

RESPONSE 9: The Department understands the critical mission of the 911 Center in responding to emergencies throughout Monroe County. The Remedial Design document is the appropriate place to address this concern. The Department worked cooperatively with the City of Rochester and the 911 Center to address concerns raised during the remedial investigation and looks forward to continuing this cooperative relationship during the design and implementation of the remedy.

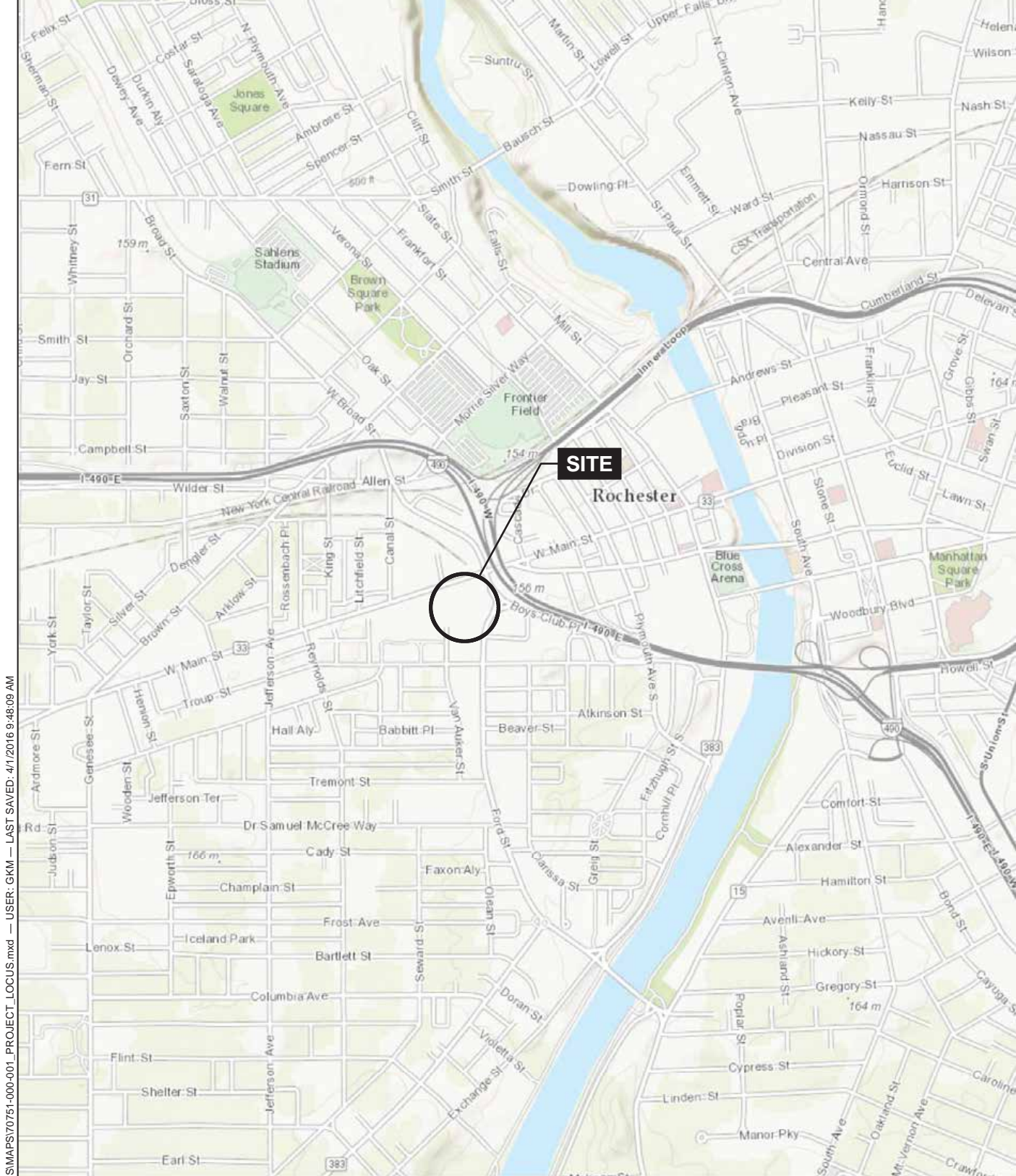
APPENDIX B

Administrative Record

Administrative Record

**Artco Industrial Laundries
State Superfund Project
City of Rochester, Monroe County, New York
Site No. 828102**

1. *Proposed Remedial Action Plan for the Artco Industrial Laundries site*, dated February 2017, prepared by the Department.
2. Order on Consent, Index No. B8-0561-99-08, between the Department and AFES, LLC, executed on September 30, 2010.
3. *Construction Completion Report: Sub-Slab Depressurization System Installation Artco Industrial Laundries*, dated April 23, 2013, prepared by Haley & Aldrich of New York.
4. *Second Revised Report on Remedial Investigation Artco Industrial Laundries Site*, dated February 9, 2015, prepared by Haley & Aldrich of New York.
5. *Report on Feasibility Study Artco Industrial Laundries Site*, dated April 2016, prepared by Haley & Aldrich of New York.
6. Letter dated February 24, 2017 from Matt Geary of Provectus Environmental Products.
7. Letter dated March 2, 2017 from Richard A. Polumbo of AFES, LLC.
8. Letter dated March 6, 2017 from Spencer Shull of COTTON7 Global Enterprises.
9. Letter dated March 26, 2017 from Vincent B. Dick of Haley & Aldrich of New York.
10. Letter dated March 27, 2017 from Mark D. Gregor of the City of Rochester.



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MAP SOURCE: ESRI
 SITE COORDINATES: 43° 9'11.88"N, 77°37'15.82"W

**HALEY
 ALDRICH**

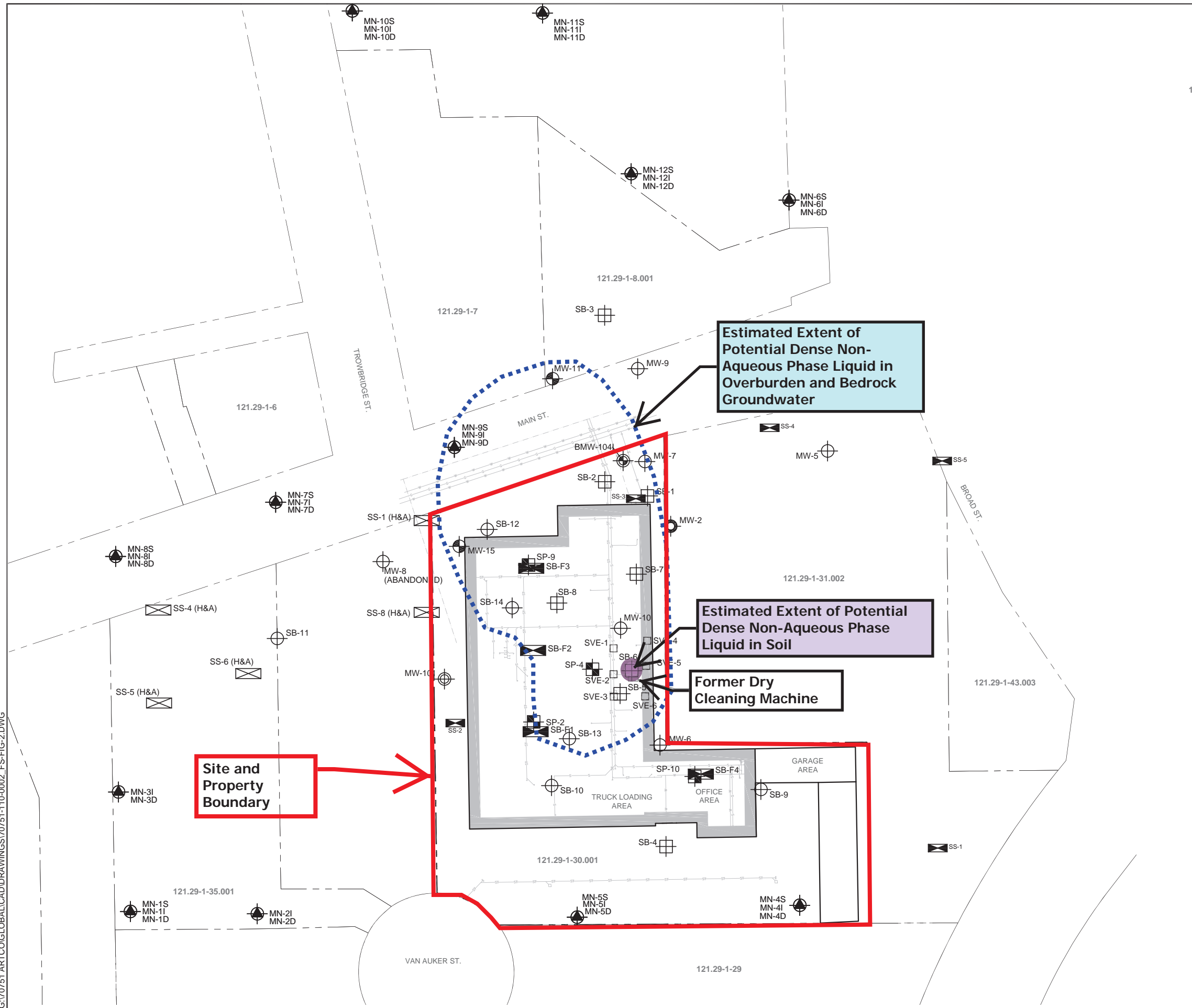
FORMER ARTCO INDUSTRIAL LAUNDRIES, INC.
 REMEDIAL INVESTIGATION REPORT
 331-337 WEST MAIN STREET
 ROCHESTER, NEW YORK

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
 MARCH 2016

FIGURE 1

LIBBY, PAT
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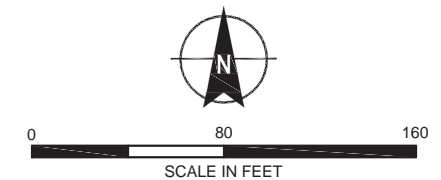


LEGEND

- PROPERTY LINE
- SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- █ EXISTING BUILDING
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- ⊙ WELL CLUSTER - VARIOUS INTERVALS (NYSDEC, 2009)
- ⊙ BEDROCK WELL (HALEY & ALDRICH, 2001)
- ⊙ BEDROCK WELL (HALEY & ALDRICH, 2013)
- ⊙ OVERBURDEN WELL (HALEY & ALDRICH, 2001 AND NYSDEC, 1998)
- ⊙ OVERBURDEN WELL (HALEY & ALDRICH, 2013)
- ⊙ BEDROCK/OVERBURDEN INTERVAL WELL (SEELER, ENV., 1993)
- ⊙ OVERBURDEN SOIL BORING (NYDEC, 1998)
- ⊙ OVERBURDEN SOIL BORING (HALEY & ALDRICH, 2011)
- SOIL VAPOR EXTRACTION WELL
- ⊠ SURFACE SOIL SAMPLE (HALEY & ALDRICH 2001)
- ⊠ SURFACE SOIL SAMPLE (NYDEC 1998)

- NOTES**
- HISTORIC DATA FROM PREVIOUS EXPLORATION AND SAMPLE LOCATIONS SHOWN (SOURCE AND INSTALLATION DATE IN LEGEND).
 - UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.

Department Notes: The original figure was modified by the New York State Department of Environmental Conservation (Department) to show the estimated extent of dense non-aqueous phase liquid in the soil and groundwater based on data provided by Haley & Aldrich.

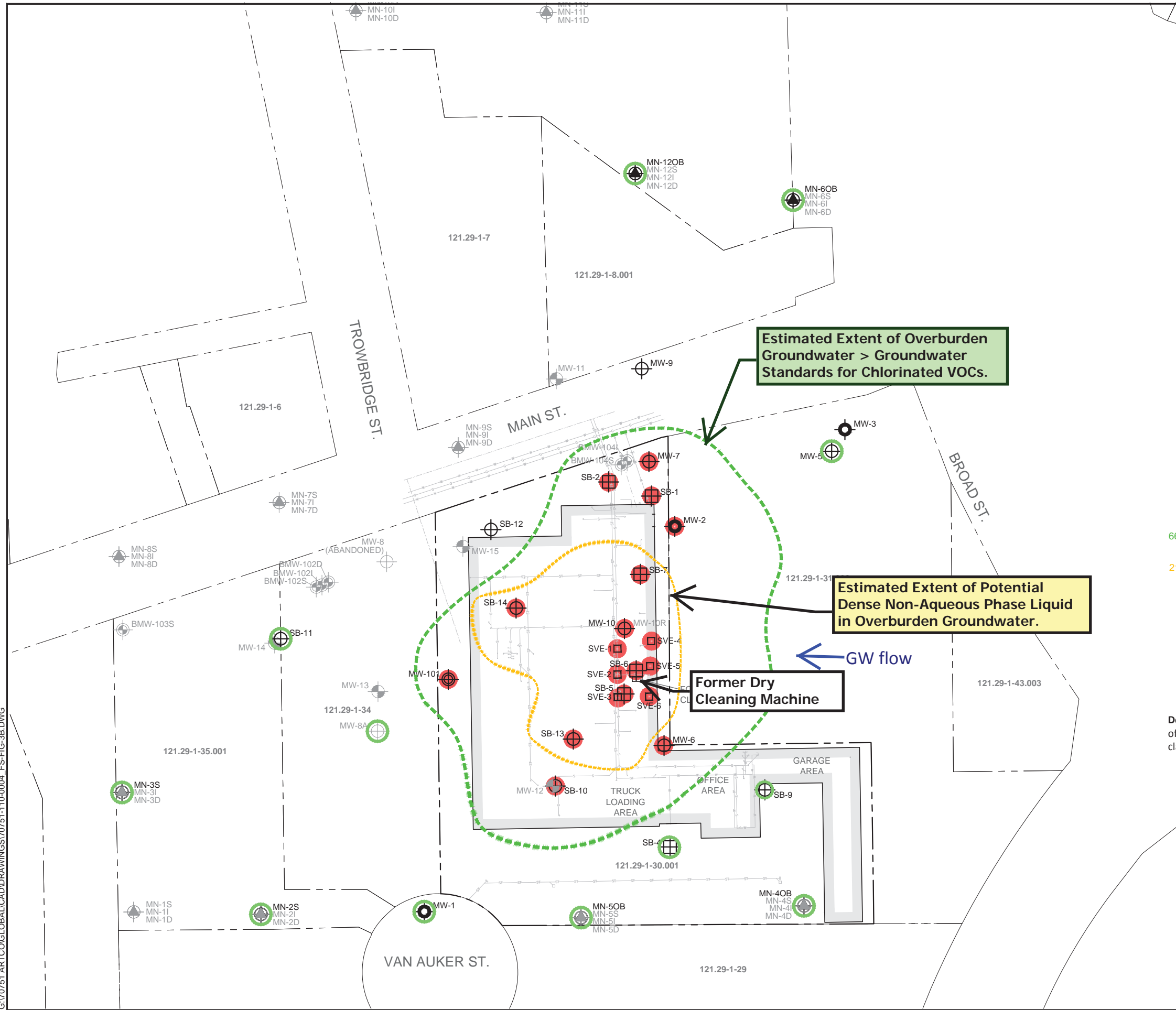


HALEY ALDRICH
 FEASIBILITY STUDY
 FORMER ARTCO INDUSTRIAL LAUNDRIES, INC.
 331-337 WEST MAIN STREET
 ROCHESTER, NEW YORK

ESTIMATED EXTENT OF WASTE/SOURCE AREAS IN SOIL AND GROUNDWATER

SCALE: AS SHOWN
 JUNE 2015

FIGURE 2



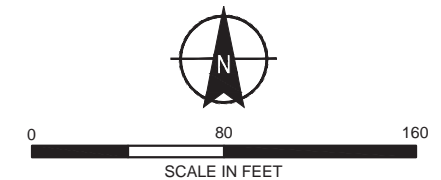
LEGEND

- PROPERTY LINE
- SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- EXISTING BUILDING
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- WELL CLUSTER - VARIOUS INTERVALS (NYSDEC, 2009)
- BEDROCK WELL (HALEY & ALDRICH, 2001)
- BEDROCK WELL (HALEY & ALDRICH, 2013)
- OVERBURDEN WELL (HALEY & ALDRICH, 2001 AND NYSDEC, 1998)
- OVERBURDEN WELL (HALEY & ALDRICH, 2013)
- BEDROCK/OVERBURDEN INTERVAL WELL (SEELER, ENV., 1993)
- OVERBURDEN SOIL BORING (NYDEC, 1998)
- SOIL VAPOR EXTRACTION WELL
- LOCATION CATEGORIZED AS OVERBURDEN
- LOCATION NOT CATEGORIZED AS OVERBURDEN
- TARGET CHLORINATED VOLATILE ORGANIC COMPOUND (TCVOC) IN OVERBURDEN GROUNDWATER > TOGS 1.1.1 GA CRITERIA
- NO TCVOC > TOGS 1.1.1 GA CRITERIA
- 66,687 SF EXTENT OF OVERBURDEN GROUNDWATER IMPACTS; TCVOCs > TOGS 1.1.1 GA CRITERIA IN MOST RECENT SAMPLING EVENT (MAY 2013 OR DEC 2013)
- 21,087 SF EXTENT OF POTENTIAL FREE PRODUCT PCE

NOTES

- HISTORIC DATA FROM PREVIOUS EXPLORATION AND SAMPLE LOCATIONS SHOWN (SOURCE AND INSTALLATION DATE IN LEGEND).
- UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.

Department Notes: The original figure was modified by the New York State Department of Environmental Conservation (Department) to show groundwater flow direction and clarify information in the Legend.



HALEY ALDRICH

FEASIBILITY STUDY
FORMER ARTCO INDUSTRIAL LAUNDRIES, INC.
331-337 WEST MAIN STREET
ROCHESTER, NEW YORK

SITE PLAN - INTERPRETED OVERBURDEN IMPACTS IN GROUNDWATER

SCALE: AS SHOWN
JUNE 2015

FIGURE 3A

Department Notes:

1. The original figure was modified by the New York State Department of Environmental Conservation (Department) to show groundwater flow directions.
2. Wells screened in the top 10 feet of bedrock.
3. No bedrock wells under the building near source area; contours may not represent actual conditions.

LEGEND

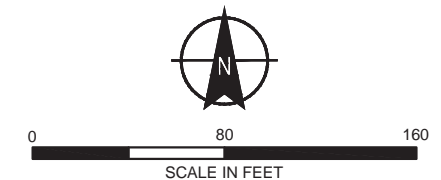
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- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- WELL CLUSTER - VARIOUS INTERVALS (NYSDEC, 2009)
- BEDROCK WELL (HALEY & ALDRICH, 2001)
- BEDROCK WELL (HALEY & ALDRICH, 2013)
- SOIL VAPOR EXTRACTION WELL
- TARGET CHLORINATED VOLATILE ORGANIC COMPOUND (TCVOC) IN SHALLOW BEDROCK > TOGS 1.1.1 GA CRITERIA
- EXTENT OF SHALLOW BEDROCK GROUNDWATER IMPACTS; TCVOC > TOGS 1.1.1 GA CRITERIA (AREA = 329,687 SF)
- 600 PCE CONCENTRATION POSTED FROM MOST RECENT SAMPLING RESULTS (MAY 2013 OR DECEMBER 2013)
- ND PCE NOT DETECTED IN MOST RECENT SAMPLING RESULTS (MAY 2013 OR DECEMBER 2013)

PCE ISOCONCENTRATION CONTOURS INTERPRETED FROM MOST RECENT DATA (MAY 2013 OR DECEMBER 2013)

- PCE ≥ 10 PPB (AREA = 118,226 SF)
- PCE ≥ 100 PPB (AREA = 90,008 SF)
- PCE ≥ 1,000 PPB (AREA = 49,711 SF)
- PCE ≥ 10,000 PPB (AREA = 12,488 SF)

NOTES

1. HISTORIC DATA FROM PREVIOUS EXPLORATION AND SAMPLE LOCATIONS SHOWN (SOURCE AND INSTALLATION DATE IN LEGEND).
2. UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.



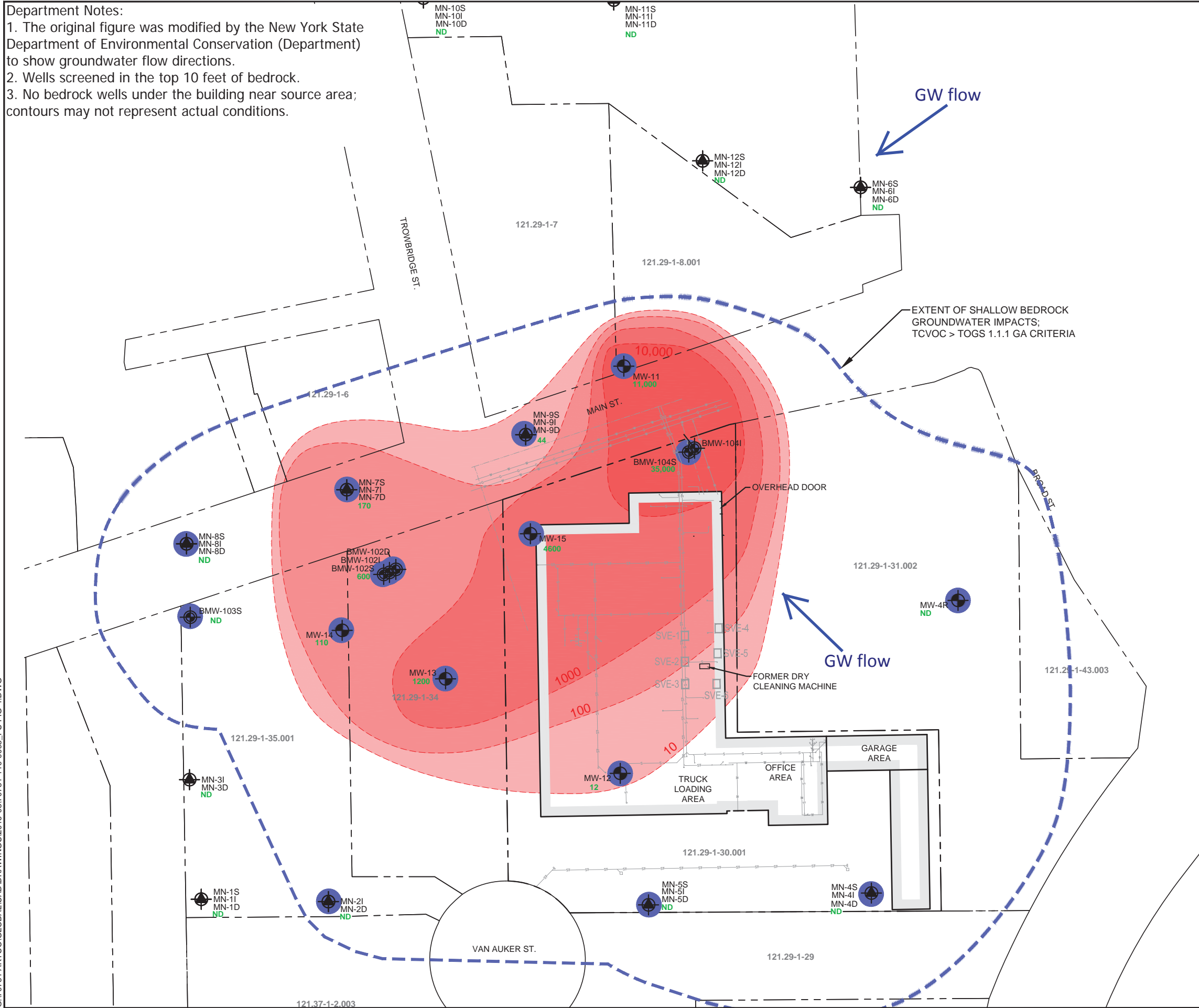
HALEY ALDRICH
 FEASIBILITY STUDY
 FORMER ARTCO INDUSTRIAL LAUNDRIES, INC.
 331-337 WEST MAIN STREET
 ROCHESTER, NEW YORK

SITE PLAN WITH INTERPRETED SHALLOW BEDROCK IMPACTS

SCALE: AS SHOWN
 MARCH 2016

FIGURE 3B

MOBINI, GITA
 G:\70751 ARTCO\GLOBAL\CAD\DRAWINGS\2016-03\70751-110-0005_FS-FIG-4.DWG
 Printed: 3/18/2016 11:10 AM Layout: FIG 4



Department Notes:
 1. The original figure was modified by the New York State Department of Environmental Conservation (Department) to show groundwater flow directions.
 2. Wells screened approximately 15 to 20 feet into bedrock.
 3. No bedrock wells under the building near source area; contours may not represent actual conditions.

LEGEND

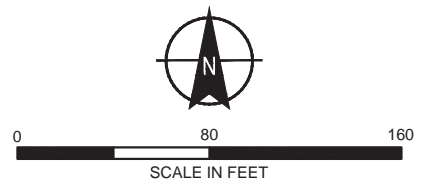
- PROPERTY LINE
- SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- EXISTING BUILDING
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- WELL CLUSTER - VARIOUS INTERVALS (NYSDEC, 2009)
- BEDROCK WELL (HALEY & ALDRICH, 2001)
- BEDROCK WELL (HALEY & ALDRICH, 2013)
- SOIL VAPOR EXTRACTION WELL
- TARGET CHLORINATED VOLATILE ORGANIC COMPOUND (TCVOC) IN INTERMEDIATE BEDROCK > TOGS 1.1.1 GA CRITERIA
- EXTENT OF INTERMEDIATE BEDROCK GROUNDWATER IMPACTS; TCVOC > TOGS 1.1.1 GA CRITERIA (AREA = 241,365 SF)
- 600 PCE CONCENTRATION POSTED FROM MOST RECENT SAMPLING RESULTS (MAY 2013 OR DECEMBER 2013)
- ND PCE NOT DETECTED IN MOST RECENT SAMPLING RESULTS (MAY 2013 OR DECEMBER 2013)
- NOT SAMPLED IN MAY 2013 OR DECEMBER 2013

PCE ISOCONCENTRATION CONTOURS INTERPRETED FROM MOST RECENT DATA (MAY 2013 OR DECEMBER 2013)

- PCE ≥ 10 PPB (AREA = 125,347 SF)
- PCE ≥ 100 PPB (AREA = 77,350 SF)
- PCE ≥ 1,000 PPB (AREA = 36,834 SF)
- PCE ≥ 10,000 PPB (AREA = 3,684 SF)

NOTES

- HISTORIC DATA FROM PREVIOUS EXPLORATION AND SAMPLE LOCATIONS SHOWN (SOURCE AND INSTALLATION DATE IN LEGEND).
- UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.



HALEY ALDRICH

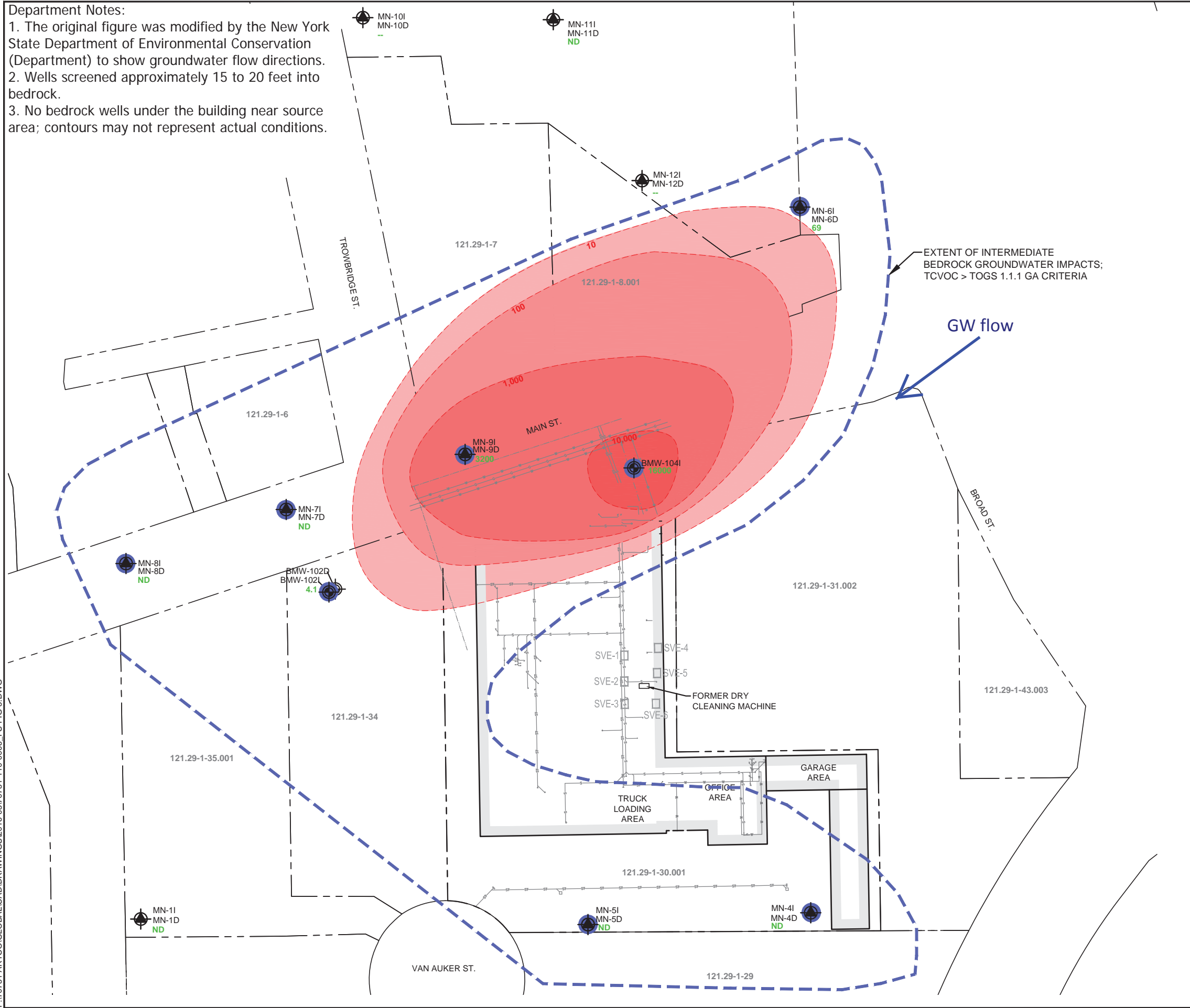
FEASIBILITY STUDY
 FORMER ARTCO INDUSTRIAL LAUNDRIES, INC.
 331-337 WEST MAIN STREET
 ROCHESTER, NEW YORK

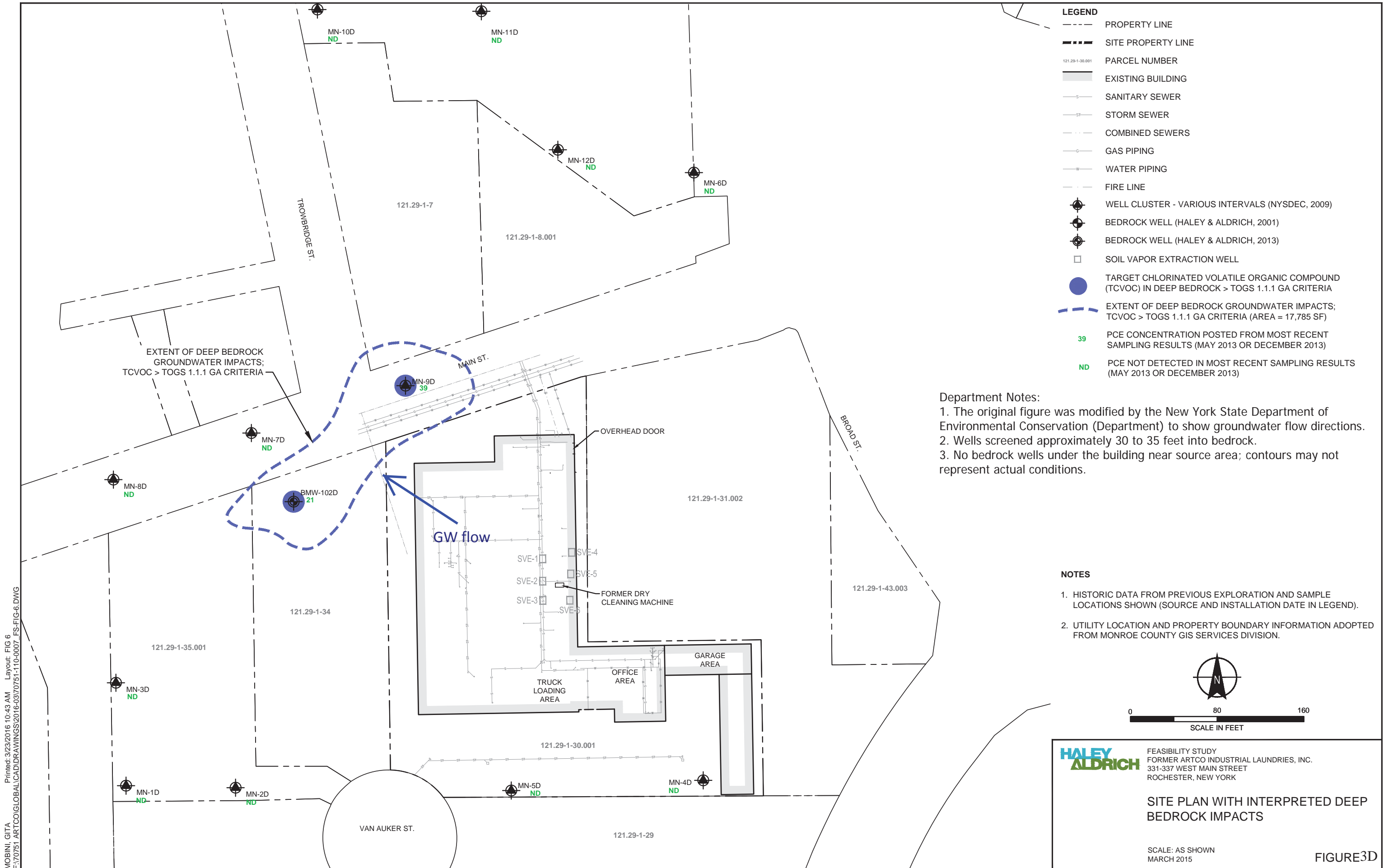
SITE PLAN WITH INTERPRETED INTERMEDIATE BEDROCK IMPACTS

SCALE: AS SHOWN
 MARCH 2016

FIGURE 3C

MOBINI, GITA
 F:\70751 ARTCO\GLOBAL\CAD\DRAWINGS\2016-03\70751-110-0006_FS-FIG-5.DWG
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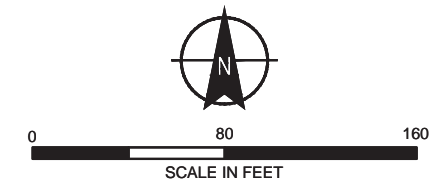


- LEGEND**
- PROPERTY LINE
 - SITE PROPERTY LINE
 - 121.29-1-30.001 PARCEL NUMBER
 - EXISTING BUILDING
 - S— SANITARY SEWER
 - SF— STORM SEWER
 - COMBINED SEWERS
 - G— GAS PIPING
 - W— WATER PIPING
 - FIRE LINE
 - WELL CLUSTER - VARIOUS INTERVALS (NYSDEC, 2009)
 - BEDROCK WELL (HALEY & ALDRICH, 2001)
 - BEDROCK WELL (HALEY & ALDRICH, 2013)
 - SOIL VAPOR EXTRACTION WELL
 - TARGET CHLORINATED VOLATILE ORGANIC COMPOUND (TCVOC) IN DEEP BEDROCK > TOGS 1.1.1 GA CRITERIA
 - EXTENT OF DEEP BEDROCK GROUNDWATER IMPACTS; TCVOC > TOGS 1.1.1 GA CRITERIA (AREA = 17,785 SF)
 - 39 PCE CONCENTRATION POSTED FROM MOST RECENT SAMPLING RESULTS (MAY 2013 OR DECEMBER 2013)
 - ND PCE NOT DETECTED IN MOST RECENT SAMPLING RESULTS (MAY 2013 OR DECEMBER 2013)

Department Notes:

1. The original figure was modified by the New York State Department of Environmental Conservation (Department) to show groundwater flow directions.
2. Wells screened approximately 30 to 35 feet into bedrock.
3. No bedrock wells under the building near source area; contours may not represent actual conditions.

- NOTES**
1. HISTORIC DATA FROM PREVIOUS EXPLORATION AND SAMPLE LOCATIONS SHOWN (SOURCE AND INSTALLATION DATE IN LEGEND).
 2. UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.



HALEY ALDRICH

FEASIBILITY STUDY
 FORMER ARTCO INDUSTRIAL LAUNDRIES, INC.
 331-337 WEST MAIN STREET
 ROCHESTER, NEW YORK

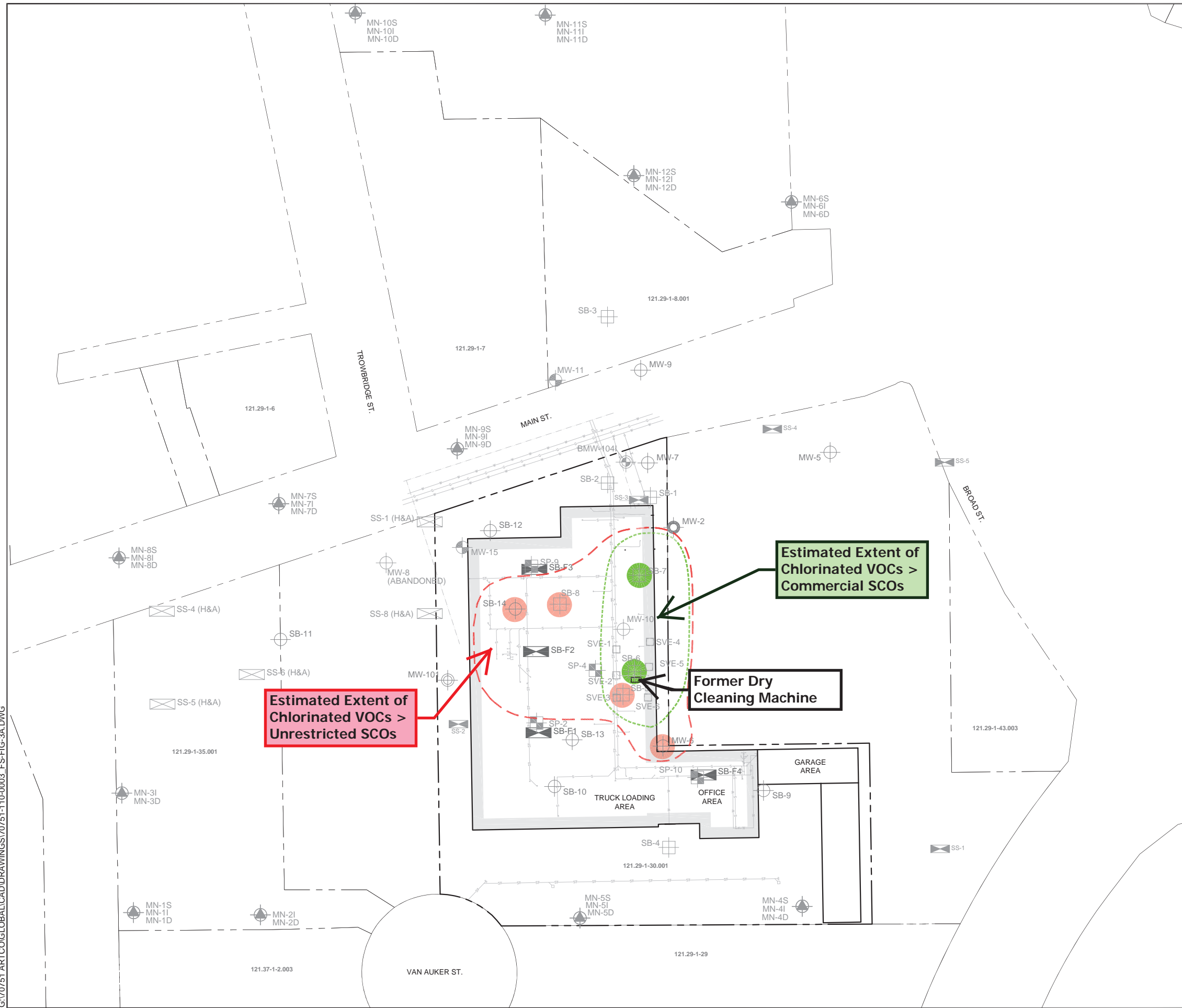
SITE PLAN WITH INTERPRETED DEEP BEDROCK IMPACTS

SCALE: AS SHOWN
 MARCH 2015

FIGURE3D

MOBINI, GTA
 F:\70751 ARTCO\GLOBAL\CAD\DRAWINGS\2016-03\70751-110-0007_FS-FIG-6.DWG
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LIBBY, PAT
G:\70751 ARTCO\GLOBAL\CAD\DRAWINGS\70751-110-0003_FS-FG-3A.DWG
Printed: 6/12/2015 11:18 AM Layout: FIG 3A

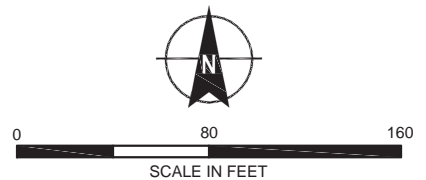


LEGEND

- PROPERTY LINE
- SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- EXISTING BUILDING
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- WELL CLUSTER - VARIOUS INTERVALS (NYSDEC, 2009)
- BEDROCK WELL (HALEY & ALDRICH, 2001)
- BEDROCK WELL (HALEY & ALDRICH, 2013)
- OVERBURDEN WELL (HALEY & ALDRICH, 2001 AND NYSDEC, 1998)
- OVERBURDEN WELL (HALEY & ALDRICH, 2013)
- BEDROCK/OVERBURDEN INTERVAL WELL (SEELER, ENV., 1993)
- OVERBURDEN SOIL BORING (NYDEC, 1998)
- OVERBURDEN SOIL BORING (HALEY & ALDRICH, 2011)
- SOIL VAPOR EXTRACTION WELL
- SURFACE SOIL SAMPLE (HALEY & ALDRICH 2001)
- SURFACE SOIL SAMPLE (NYDEC 1998)
- FILL MATERIAL; TARGET CHLORINATED VOLATILE ORGANIC COMPOUND OF CONCERN (TCVOC) > COMMERCIAL USE SCOs
- FILL MATERIAL; TARGET CHLORINATED VOLATILE ORGANIC COMPOUND OF CONCERN (TCVOC) > UNRESTRICTED USE SCOs AND PROTECTION OF GROUNDWATER SCOs
- 9,377 SF EXTENT OF FILL MATERIAL IMPACTS; TCVOCs > COMMERCIAL SCOs
- 24,024 SF EXTENT OF FILL MATERIAL IMPACTS; TCVOCs > UNRESTRICTED USE SCOs

Department Notes: The original figure was modified by the New York State Department of Environmental Conservation (Department) to clarify information in the Legend.

- NOTES**
- HISTORIC DATA FROM PREVIOUS EXPLORATION AND SAMPLE LOCATIONS SHOWN (SOURCE AND INSTALLATION DATE IN LEGEND).
 - UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.



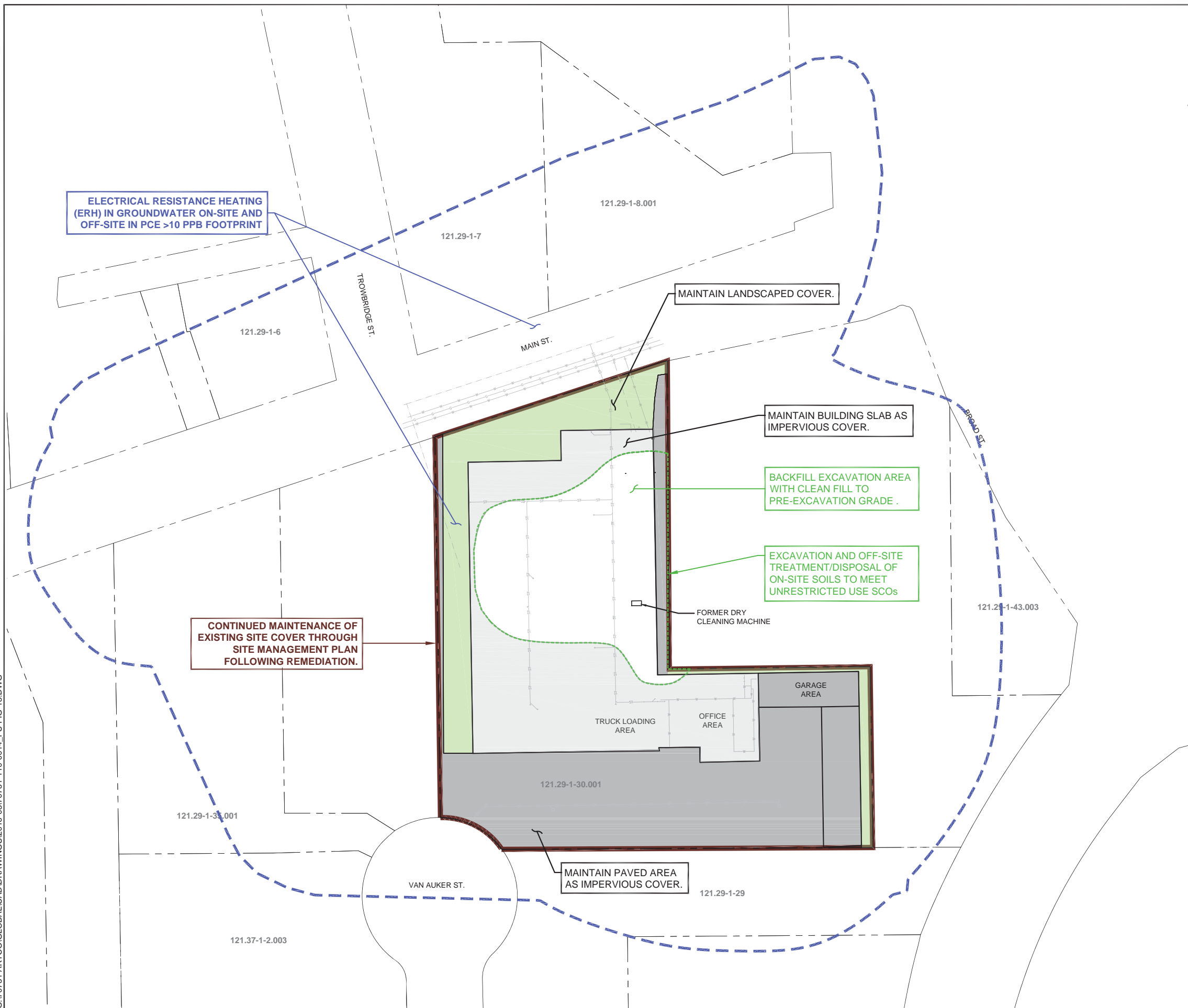
HALEY ALDRICH

FEASIBILITY STUDY
FORMER ARTCO INDUSTRIAL LAUNDRIES, INC.
331-337 WEST MAIN STREET
ROCHESTER, NEW YORK

SITE PLAN - INTERPRETED OVERBURDEN IMPACTS IN SOIL

SCALE: AS SHOWN
JUNE 2015

FIGURE 4

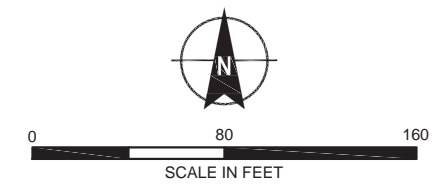


LEGEND

- PROPERTY LINE
- SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- EXTENT OF GROUNDWATER IMPACTS; TCVOCs > TOGS 1.1.1 GA CRITERIA
- EXTENT OF ON-SITE FILL MATERIAL IMPACTS; TCVOCs > UNRESTRICTED USE SCOs
- EXISTING BUILDING; FLOOR SLAB TO BE MAINTAINED
- PAVED AREA TO BE MAINTAINED
- MAINTAIN LANDSCAPED COVER; MANAGE THROUGH SITE MANAGEMENT PLAN

NOTES

1. UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.

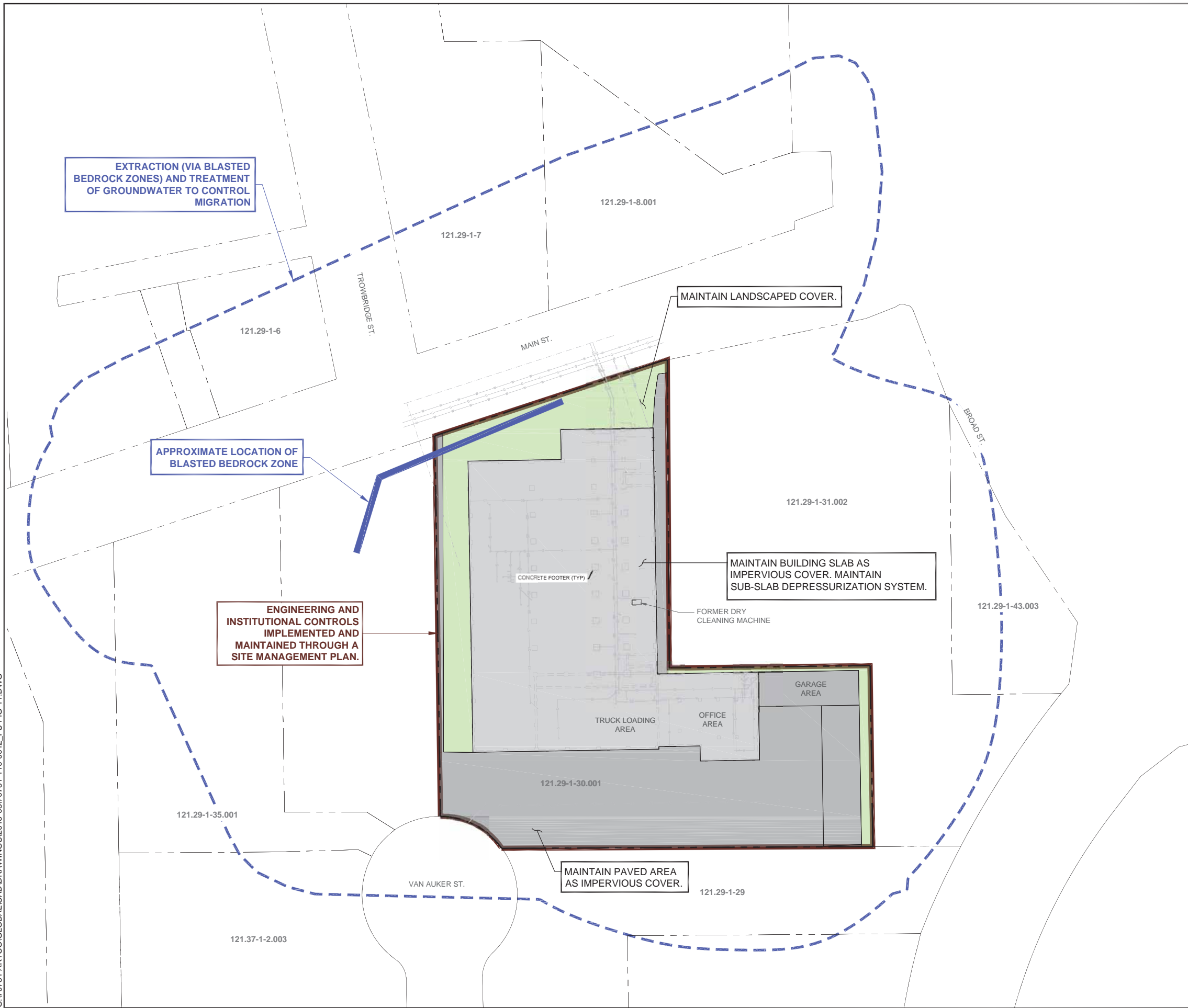


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CONCEPTUAL ALTERNATIVE 2

SCALE: AS SHOWN
 MRACH 2016

FIGURE 5

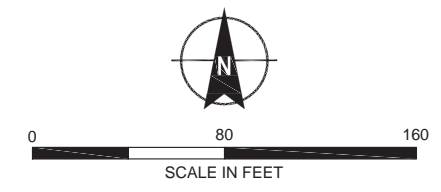


LEGEND

- PROPERTY LINE
- SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- EXTENT OF GROUNDWATER IMPACTS; TCVOCs > TOGS 1.1.1 GA CRITERIA
- EXISTING BUILDING; FLOOR SLAB TO BE MAINTAINED
- PAVED AREA TO BE MAINTAINED
- MAINTAIN LANDSCAPED COVER; MANAGE THROUGH SITE MANAGEMENT PLAN

NOTES

- UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.

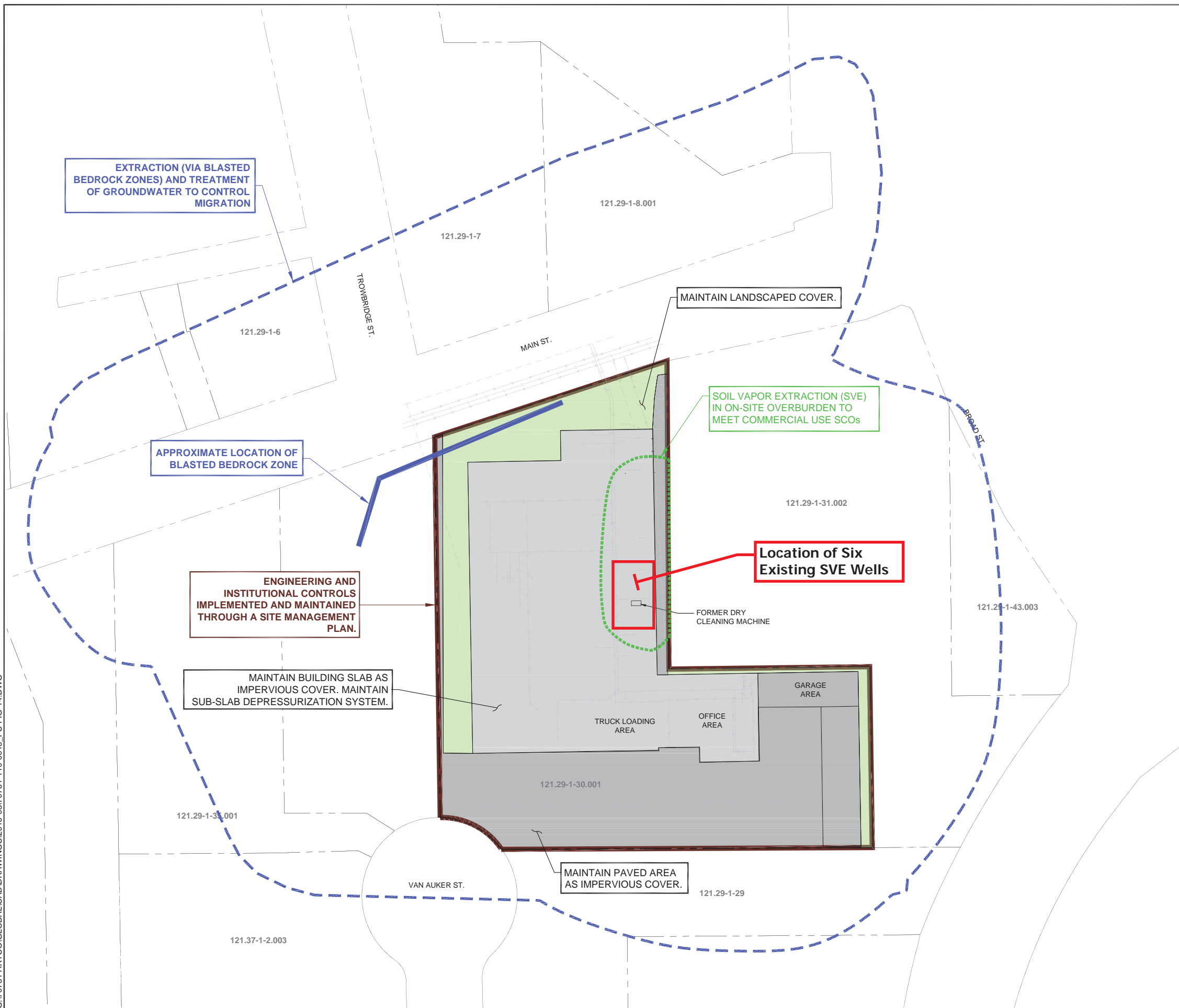


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CONCEPTUAL ALTERNATIVE 3

SCALE: AS SHOWN
 MARCH 2016

FIGURE 6



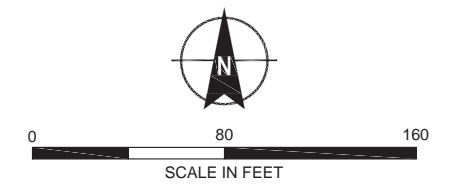
LEGEND

- PROPERTY LINE
- - - SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- EXTENT OF FILL MATERIAL IMPACTS; TCVOCS > COMMERCIAL USE SCOs
- EXTENT OF GROUNDWATER IMPACTS; TCVOCS > TOGS 1.1.1 GA CRITERIA
- EXISTING BUILDING; FLOOR SLAB TO BE MAINTAINED
- PAVED AREA TO BE MAINTAINED
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NYSDEC Notes:
 1. Additional SVE wells needed to remediate the full extent of chlorinated VOCs > Commercial Use SCOs.

NOTES
 1. UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.

Department Notes: The original figure was modified by the New York State Department of Environmental Conservation (Department) to show the approximate location of existing soil vapor extraction wells (SVE) wells.

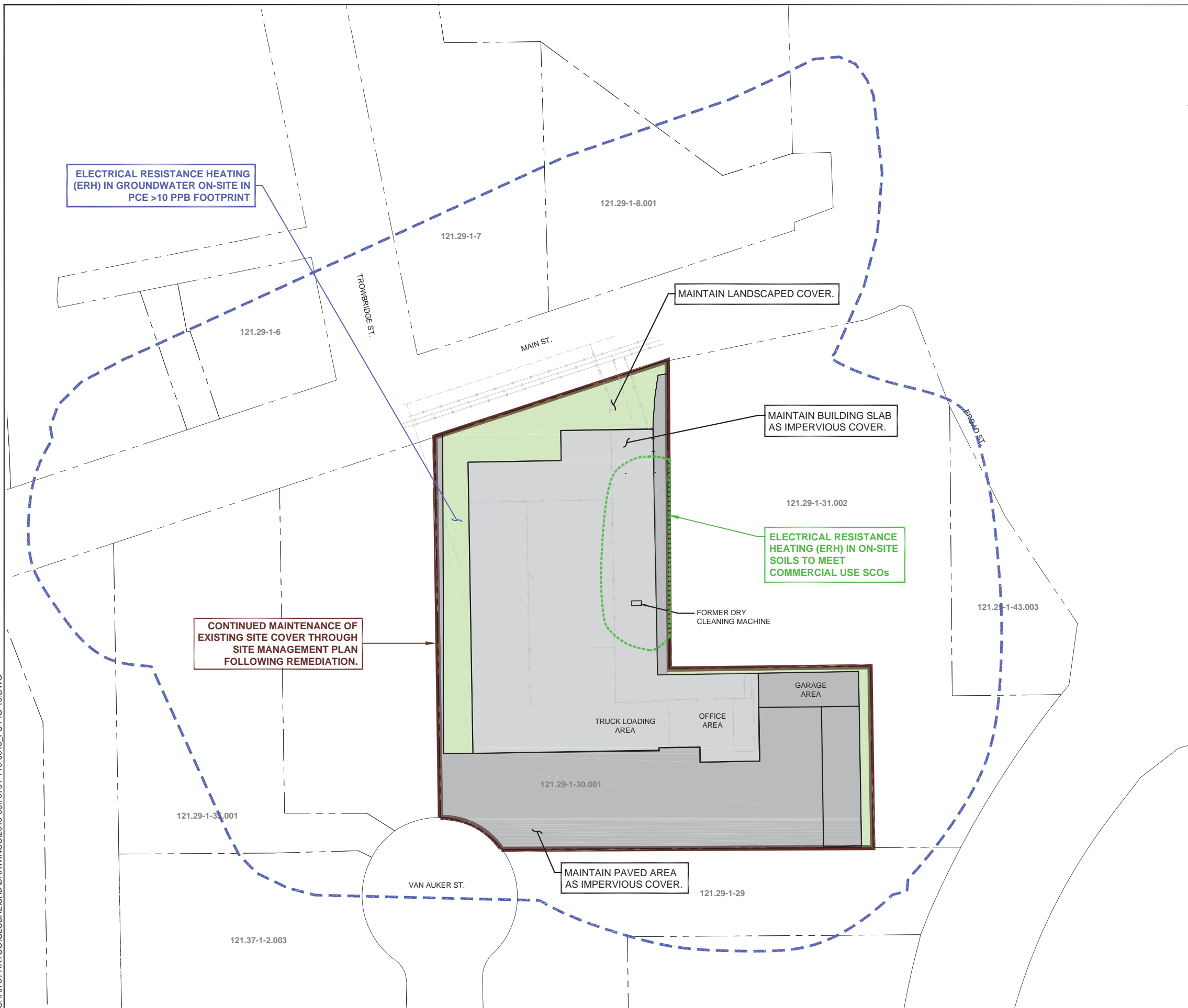


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CONCEPTUAL ALTERNATIVE 4

SCALE: AS SHOWN
 MARCH 2016

FIGURE 7

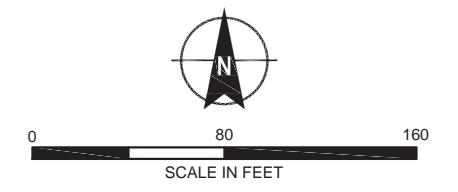


LEGEND

- PROPERTY LINE
- SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- EXTENT OF GROUNDWATER IMPACTS; TCVOCs > TOGS 1.1.1 GA CRITERIA
- EXTENT OF ON-SITE FILL MATERIAL IMPACTS; TCVOCs > COMMERCIAL USE SCOs
- EXISTING BUILDING; FLOOR SLAB TO BE MAINTAINED
- PAVED AREA TO BE MAINTAINED
- MAINTAIN LANDSCAPED COVER; MANAGE THROUGH SITE MANAGEMENT PLAN

NOTES

1. UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.



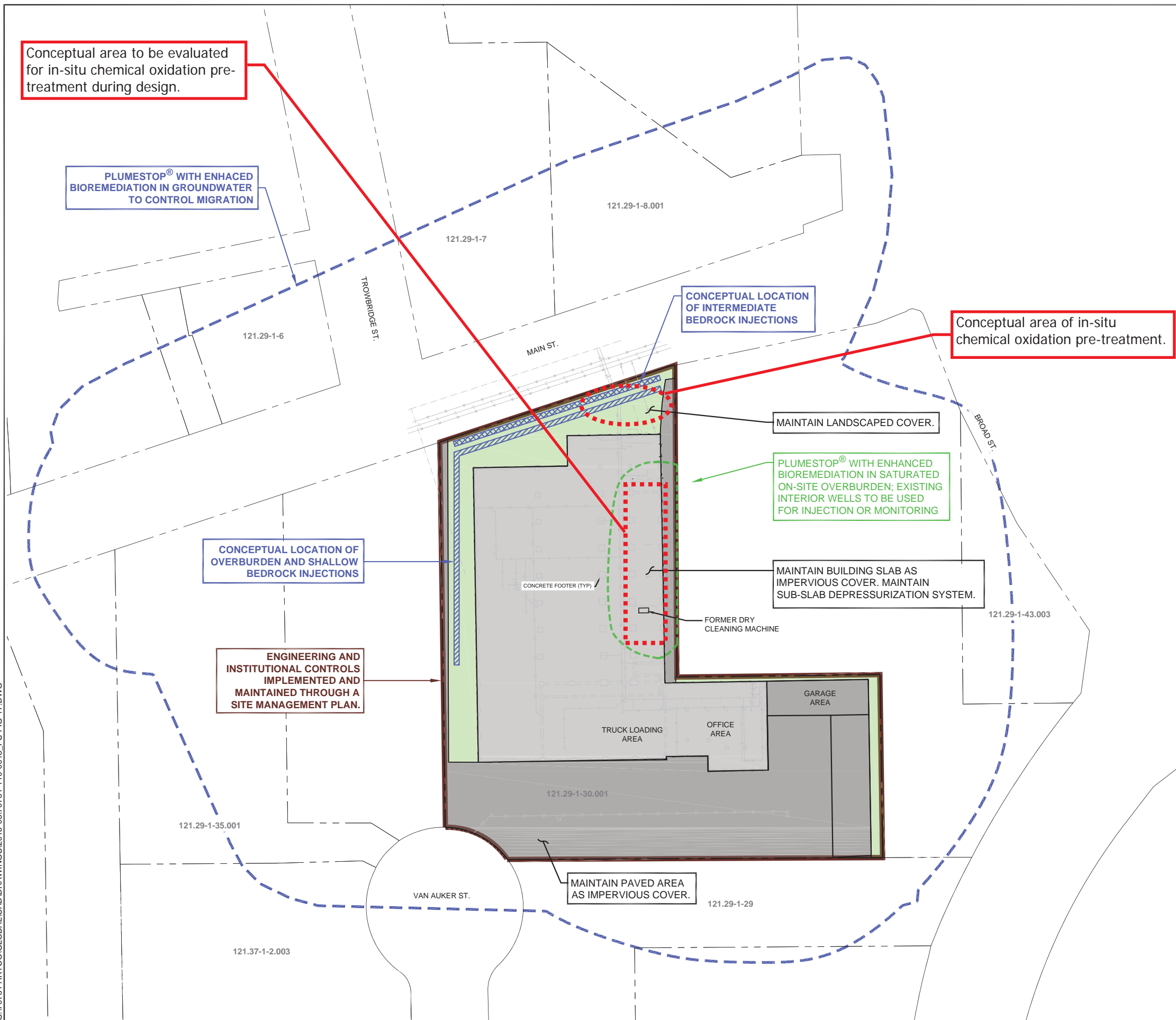
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CONCEPTUAL ALTERNATIVE 5

SCALE: AS SHOWN
 MRACH 2016

FIGURE 8

MOBINI, GITA
 G:\70751 ARTCO\GLOBAL\CAD\DRAWINGS\2016-03\70751-110-0018_FS-FIG-17.DWG
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 Layout: FIG 17



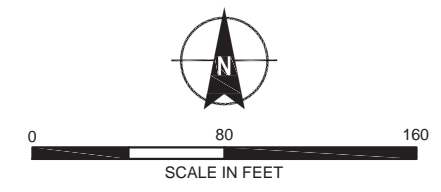
LEGEND

- PROPERTY LINE
- SITE PROPERTY LINE
- 121.29-1-30.001 PARCEL NUMBER
- SANITARY SEWER
- STORM SEWER
- COMBINED SEWERS
- GAS PIPING
- WATER PIPING
- FIRE LINE
- EXTENT OF GROUNDWATER IMPACTS; TCVOcs > TOGS 1.1.1 GA CRITERIA
- EXTENT OF FILL MATERIAL IMPACTS; TCVOcs > COMMERCIAL USE SCOs
- EXISTING BUILDING; FLOOR SLAB TO BE MAINTAINED
- PAVED AREA TO BE MAINTAINED
- MAINTAIN LANDSCAPED COVER; MANAGE THROUGH SITE MANAGEMENT PLAN

NOTES

- UTILITY LOCATION AND PROPERTY BOUNDARY INFORMATION ADOPTED FROM MONROE COUNTY GIS SERVICES DIVISION.

Department Notes:
 1. The original figure was modified by the New York State Department of Environmental Conservation (Department) to show conceptual areas for in-situ chemical oxidation pre-treatment.
 2. PlumeStop = Liquid activated carbon.



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CONCEPTUAL ALTERNATIVE 6

SCALE: AS SHOWN
 MARCH 2016

FIGURE 9