

RECORD OF DECISION

Former Matt Brewer Oil Site
Environmental Restoration Project
Elmira, Chemung County
Site No. E808032
March 2016



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

DECLARATION STATEMENT - RECORD OF DECISION

Former Matt Brewer Oil Site
Environmental Restoration Project
Elmira, Chemung County
Site No. E808032
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Statement of Purpose and Basis

This document presents the remedy for the Former Matt Brewer Oil Site, an environmental restoration 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.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the Former Matt Brewer Oil 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:

Action Required

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.) Excavation

Excavation and off-site disposal of contaminant source areas, including:

- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- removal of any underground storage tanks (USTs), fuel dispensers, underground piping, drywells or other structures associated with a source of contamination; and
- approx. 3,000 cy. of soils which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
- All on-site surface soils (0-2") which exceed restricted residential SCOs, as defined by 6 NYCRR Part 375-6.8, will be excavated to accommodate acceptable cover systems (e.g. for grading purposes) and transported off-site for disposal.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the site. All remaining concrete labs will be removed and the site will be re-graded to accommodate installation of a cover system as described in remedy element 3. Additional testing may be necessary where existing soil cover systems are anticipated.

3.) Cover System

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

4.) Enhanced Bioremediation

In-situ enhanced biodegradation will be employed as a polishing step to treat contaminants in groundwater in an area to be determined following the removal of the source areas as described in remedy element number 2. The biological breakdown of contaminants through anaerobic reductive dechlorination will be enhanced by the placement of a hydrogen release compound (HRC), or similar material into the subsurface in the open excavation or method determined during the remedial design. A groundwater monitoring plan will be instituted after the source removal and Enhanced Bioremediation polishing to monitor the effectiveness of the remedy.

5.) Vapor Mitigation

Appropriate actions, such as the installation of a sub-slab depressurization system, or a similar engineered system, will be implemented to mitigate the migration of vapors into a building from the subsurface at off-site buildings where mitigation is recommended to address soil vapor intrusion due to contaminated soil vapor migrating from the site. Furthermore, at the residence

adjacent to the site, additional inspections/evaluations will be completed to improve the system or seal the basement to reduce TCE concentrations further in indoor air to below background levels.

6.) Institutional Control

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

- the remedy will achieve a Track 4 restricted residential cleanup at a minimum;
- requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allows the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;
- requires compliance with the Department approved Site Management Plan.

7.) 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 above.

Engineering Controls: The soil cover, groundwater monitoring and the sub-slab depressurization systems above.

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;
- descriptions of the provisions of the environmental easement including any land use, and/or groundwater and/or surface water use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, for any buildings developed or re-occupied in off-site areas impacted by site-related contamination, or in any off-site buildings

impacted by the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;

- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of groundwater 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 developed on the site and offsite subslab depressurization systems, as may be required by the Institutional and Engineering Control Plan discussed above.

New York State Department of Health Acceptance

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

Declaration

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

March 30, 2016

Date



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

RECORD OF DECISION

Former Matt Brewer Oil Site
Elmira, Chemung County
Site No. E808032
March 2016

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 contaminants 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 contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum. 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 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled, or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated, the property can then be reused.

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:

STEELE MEMORIAL PUBLIC LIBRARY
Attn: REFERENCE SECTION
101 EAST CHURCH STREET
ELMIRA, NY 14901
Phone: (607) 733-9176

A public meeting was also conducted. At the meeting, the findings of the remedial investigation (RI) and the alternatives analyses (AA) were presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the proposed remedy.

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

Receive Site Citizen Participation Information by Email

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

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Former Matt Brewer Oil site is located at 915 East Market, in the City of Elmira, an urban area of Chemung County, New York and occupies Tax Parcels 89.16-7-21 and 89.16-7-22.

Site Features: The 1.1-acre former petroleum bulk storage facility site is vacant, all above ground buildings, structures have been demolished and 33 PBS AST tanks have been removed or closed in place. Concrete floors, partial basement and asphalt cover the majority of site. 2 USTs are known to exist onsite and drywells facilitate surface drainage.

Current Zoning and Land Use: The property is bounded by East Market Street to the south, Ring Place (unimproved city street) to the north, residential properties to the west and a former elevated rail road siding to the east. The site is currently zoned RC (residential) 1 to 4 Family use and the surrounding parcels are currently zoned residential, commercial, or industrial. The nearest residential areas are immediately to the west of the site along East Market and Judson Street. The area is serviced by a public water supply.

Past Use of the Site: The site was used prior to the 1950's for lumber / coal storage and distribution. In the early 1950's there is evidence to suggest the property was used as a dump prior to being purchased by Matt Brewer in 1954. Matt Brewer operated the site for bulk storage

of lubricants, petroleum and solvents until the 1990s. 33 petroleum bulk storage tanks were registered with DEC and documented removed or closed in place. No chemical bulk storage tanks were registered however, testimony and environmental evidence document that dry cleaning solvent PCE and other solvent TCE were distributed from this facility.

Site Geology and Hydrogeology: The Site is located in the Appalachian Uplands Physiographic Province where local topographic features result from glacial and fluvial processes with a complex erosional history and deposited accumulations of till. Overburden soils at the site are greater than 45 feet thick according to data collected during the field investigations. Bedrock was not encountered. The aquifer under this site is considered a primary aquifer that are capable of producing well yields greater than 1,000 gallons per minute. Groundwater was encountered at 12 to 19 ft. bgs and flows in a southerly to a southwesterly direction toward the Chemung River. Shallow groundwater flow direction and gradients appear to be affected by the varying silt layers encountered beneath the site. The site is primarily covered with low permeable concrete or asphalt and surface runoff is collected in drywell structures and infiltrates into the subsurface soils.

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 restricted residential use (which allows for commercial use and 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.

No PRPs have been documented to date.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified. Chemung County will assist the state in its efforts by providing all information to the state which identifies PRPs. Chemung County will also not enter into any agreement regarding response costs without the approval of the Department.

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 contaminant

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)	lead
trichloroethene (TCE)	1,1,1-TCA
benzo(a)pyrene	xylene (mixed)
cis-1,2-dichloroethene	toluene
methylene chloride	

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

- groundwater
- soil
- soil vapor intrusion
- indoor air

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.

Based on the results of off-site soil vapor intrusion (SVI) investigation related to the site, a sub-slab depressurization system was installed at one building immediately adjacent to the site. Pressure field testing demonstrated good communication through soils underlying the basement slab. Post mitigation chemical sampling of indoor air resulted in the reduction of TCE concentrations in indoor air to below guidance value (2 ug/m³) however still above background levels (1 ug/m³). Further Remedial & Site Management actions will include inspections/evaluations to improve the system or seal the basement to further reduce TCE concentrations in indoor air to below background levels. The sub-slab depressurization system was installed by a certified installer.

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.

Soil: On-site - Tetrachloroethene concentrations in soil ranged from non-detect to 230 parts per million [ppm] (Protection of Groundwater (PGW) SCO - 1.3 ppm). Trichloroethene concentrations in soil ranged from non-detect to 1.6 ppm (PGW SCO - 0.47 ppm). Cis-1,2-dichloroethene concentrations in soil ranged from non-detect to 0.97 ppm (PGW SCO - 0.25 ppm). Methylene chloride concentrations in soil ranged from non-detect to 0.14 ppm (PGW SCO - 0.05 ppm). The concentration of PAHs ranged from non-detect to 3.3 ppm (Restricted Residential SCO - 1 ppm). The concentration of lead concentrations ranged from non-detect to 672 ppm (Restricted Residential SCO - 400 ppm). Based on the analytical data to date, soil contamination does not extend off-site from the on-site source area. One upgradient off-site soil boring had concentrations of trichloroethene, cis-1,2-dichloroethene, methylene chloride and xylene slightly above the PGW SCOs however Groundwater SCOs are not exceeded at that location. (Figure 3)

Drywell Source Material: On-site - Tetrachloroethene concentrations in source material ranged from non-detect to 91 ppm (PGW SCO - 1.3 ppm). Cis-1,2-dichloroethene concentrations in source material ranged from non-detect to 0.8 ppm (PGW SCO - 0.25 ppm). The concentration of PAHs ranged from non-detect to 18 ppm (Restricted Residential SCO - 1 ppm). Adjacent to the impacted drywells, soil borings were advanced to 15 to 18' below ground surface without documenting contaminant impacts above SCOs. (Figure 4)

Groundwater Shallow: On-site - Tetrachloroethene concentrations ranged from non-detect to 61,000 parts per billion [ppb]; trichloroethene concentrations ranged from non-detect to 12,000 ppb; cis-1,2-dichloroethene concentrations ranged from non-detect to 16,000 ppb; and 1,1,1-trichloroethane concentrations ranged from non-detect to 11,000 ppb (groundwater standard for each of the above - 5 ppb). Based on the analytical data to date, groundwater contamination extends off-site from the on-site source area. (Figure 5)

Groundwater Shallow: Off-site - Tetrachloroethene concentrations ranged from non-detect to 8,000 ppb; trichloroethene concentrations ranged from non-detect to 740 ppb (groundwater standard - 5 ppb); cis-1,2-dichloroethene concentrations ranged from non-detect to 830 ppb (groundwater standard - 5 ppb); and 1,1,1-trichloroethane concentrations ranged from non-detect to 520 ppb (groundwater standard - 5 ppb). Based on the analytical data to date, concentrations of groundwater contamination decrease significantly and to below groundwater standards with distance from the onsite source area. (Figure 5)

Groundwater Deep: On-site & Off-site - Tetrachloroethene concentrations ranged from 6 to 72 ppb (groundwater standard - 5 ppb); trichloroethene concentrations ranged from 2 to 5 ppb (groundwater standard - 5 ppb); cis-1,2-dichloroethene concentrations ranged from 0.9 to 3.0 ppb (groundwater standard - 5 ppb); and 1,1,1-trichloroethane concentrations ranged from 0.6 to 2.0 ppb (groundwater standard - 5 ppb). Based on the analytical data to date, vertical migration of shallow groundwater contamination limited decreases significantly and to below groundwater standards within a short distance from the onsite source area.

Sub-slab Vapor and Indoor Air: On-site & Off-site - No buildings remain at the site so no on-site soil vapor sampling was conducted. Soil vapor sampling was conducted at multiple residences

off-site. Soil vapor tetrachloroethene concentrations ranged from 1.4 to 48.0 micrograms per cubic meter (ug/m^3) in the sub-slab vapor and from 0.76 to 41.4 ug/m^3 in the indoor air. trichloroethene concentrations ranged from 0.66 to 79.0 ug/m^3 in the sub-slab vapor and from 0.27 to 16.0 ug/m^3 in the indoor air. The NYSDOH air guideline value of 2 ug/m^3 for trichloroethene was exceeded in three off-site buildings for indoor air. 1,1,1-trichloroethane concentrations ranged from 0.61 to 4.71 ug/m^3 in the sub-slab vapor and from 0.72 to 550 ug/m^3 in the indoor air. Based on the analytical data to date, it's anticipated that soil vapor contamination exists on-site and off-site. Soil vapor intrusion mitigation was recommended for three off-site properties and monitoring was recommended for five. At one of the three properties with an exceedance of NYSDOH's air guideline for TCE, soil vapor intrusion was mitigated with the installation of a sub-slab depressurization system. The second property refused the offer for mitigation, the building is currently vacant and there is a City of Elmira notice posted on the door indicating "use and occupancy of this building is prohibited; no person shall enter this building." One of the off-site buildings where mitigation actions were recommended, has been demolished to accommodate parking for a metal finishing business.

6.4: Summary of Human Exposure Pathways

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

People are not drinking contaminated groundwater because the area is served by a public water supply that is not affected by site-related contamination. People may come into contact with contaminants in soils if they contact surface soils or dig below surface materials (i.e., pavement, concrete). 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. Because there is no on-site building, inhalation of site contaminants in indoor air due to soil vapor intrusion does not represent a concern for the site in its current condition. However, the potential exists for the inhalation of site contaminants due to soil vapor intrusion for any future on-site redevelopment and occupancy. Environmental sampling indicates soil vapor intrusion is a concern for off-site buildings and actions are needed to minimize potential exposures.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil

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 alternatives analysis (AA) 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 Excavation with Offsite Disposal and Groundwater Treatment remedy.

The estimated present worth cost to implement the remedy is \$1,418,637. The cost to construct the remedy is estimated to be \$1,262,475 and the estimated average annual cost is \$36,000.

The elements of the selected remedy are as follows:

Action Required

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.) Excavation

Excavation and off-site disposal of contaminant source areas, including:

- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- removal of any underground storage tanks (USTs), fuel dispensers, underground piping, drywells or other structures associated with a source of contamination; and
- approx. 3,000 cy. of soils which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
- All on-site surface soils (0-2”) which exceed restricted residential SCOs, as defined by 6 NYCRR Part 375-6.8, will be excavated to accommodate acceptable cover systems (e.g. for grading purposes) and transported off-site for disposal.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the site. All remaining concrete labs will be removed and the site will be re-graded to accommodate installation of a cover system as described in remedy element 3. Additional testing may be necessary where

existing soil cover systems are anticipated.

3.) Cover System

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

4.) Enhanced Bioremediation

In-situ enhanced biodegradation will be employed as a polishing step to treat contaminants in groundwater in an area to be determined following the removal of the source areas as described in remedy element number 2. The biological breakdown of contaminants through anaerobic reductive dechlorination will be enhanced by the placement of a hydrogen release compound (HRC), or similar material into the subsurface in the open excavation or method determined during the remedial design. A groundwater monitoring plan will be instituted after the source removal and Enhanced Bioremediation polishing to monitor the effectiveness of the remedy.

5.) Vapor Mitigation

Appropriate actions, such as the installation of a sub-slab depressurization system, or a similar engineered system, will be implemented to mitigate the migration of vapors into a building from the subsurface at off-site buildings where mitigation is recommended to address soil vapor intrusion due to contaminated soil vapor migrating from the site. Furthermore, at the residence adjacent to the site, additional inspections/evaluations will be completed to improve the system or seal the basement to reduce TCE concentrations further in indoor air to below background levels.

6.) Institutional Control

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

- the remedy will achieve a Track 4 restricted residential cleanup at a minimum;
- requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allows the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;

- requires compliance with the Department approved Site Management Plan.

7.) 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 above.

Engineering Controls: The soil cover, groundwater monitoring and the sub-slab depressurization systems above.

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;
 - descriptions of the provisions of the environmental easement including any land use, and/or groundwater and/or surface water use restrictions;
 - a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, for any buildings developed or re-occupied in off-site areas impacted by site-related contamination, or in any off-site buildings impacted by the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
 - provisions for the management and inspection of the identified engineering controls;
 - maintaining site access controls and Department notification; and
 - the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
- b. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
 - monitoring of groundwater, 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 developed on the site and offsite subslab depressurization systems, as may be required by the Institutional and Engineering Control Plan discussed above.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation (RI) 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). 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 are shown on Figures 3 & 4.

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 375-1.2(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 that were identified at the site include, solvent and petroleum products released to the environment through drywells and former aboveground storage tanks. A defined area of soil grossly contaminated with tetrachloroethene (PCE), a solvent predominantly used in dry cleaning that was stored and distributed at this site, is located in the southeastern portion of the site. In this area, groundwater is grossly contaminated with PCE in addition to trichloroethene (TCE), 1,1,1-trichloroethane (TCA) and cis-1,2 dichloroethene (cis-DCE) which may be daughter products of PCE. Concentrations of these contaminants decrease quickly in all directions from the source area and are close to or below drinking water standards at the nearest residential property boundaries. Soil vapor and indoor air at adjoining and nearby residential properties is contaminated primarily with TCE, with immediately adjacent properties also detecting PCE and TCA attributable to onsite sources. An Interim Remedial Measure (IRM) was undertaken to mitigate potential exposures through soil vapor intrusion (SVI) for an adjacent residential property.

The source areas identified include dry wells and 2 USTs that will be addressed in the remedy selection process.

Groundwater

Groundwater samples were collected from overburden monitoring wells. The samples were collected to assess groundwater conditions on and off-site. The results indicate that contamination in shallow overburden groundwater at the site exceeds the SCGs for volatile organic compounds and minor semi-volatile organic compounds and inorganics constituents. Contaminant levels in deep overburden groundwater slightly exceeded the guidance values for volatile organic compounds. During the Remedial Investigation (RI), twenty five (25) groundwater screening borings were installed to collect groundwater samples from various depths and locations on and off the subject site. Reports from previous investigations indicated two monitoring wells had been installed on the subject site, these wells were used during the RI.

Groundwater samples collected from on-site boring screens were analyzed for PCBs, metals, VOCs, and SVOCs. Screens were installed to depths ranging from 14-24 feet to 35-45 feet. A total of 50 groundwater screening samples were collected (27 first round, 23 second round). Of these samples, all (50) were analyzed for VOCs, twenty two (22) SVOCs, six (6) for Pesticides / PCBs, and twenty two (22) for metals. Sixteen (16) VOCs (most notably tetrachloroethene, trichloroethene and 1,1,1-trichloroethane), seven (7) metals (most notably lead and copper), and one (1) SVOCs (benzo(a)pyrene) were detected at concentrations that exceed the groundwater SCGs for these compounds.

The following table (Table 1) presents the findings of the groundwater screening samples related to the Former Matt Brewer Oil Site (frequency exceeding for final sampling round).

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb) ^a	SCG ^b (ppb)	Frequency Exceeding SCG
VOCs			
Benzene	19	1	2/23
1,1,1-Trichloroethane	0.6 – 11,000	5	9/23
1,1-Dichloroethane	0.58 – 320	5	8/23
1,1-Dichloroethene	0.7 - 750	5	5/23
trans-1,2-Dichloroethene	0.9 - 14	5	3/23
Trichloroethene	0.9 – 12,000	5	12/23
Chloroethane	0.8 - 41	5	1/23
cis-1,2-Dichloroethene	0.9 – 16,000	5	14/23
Tetrachloroethene	2.6 – 61,000	5	16/23
Vinyl Chloride	0.5 – 23	2	7/23
Acetone	5.7	5	1/23
Xylenes, total	0.72 – 2200	5	1/23
Methylene Chloride	0.9 – 130	5	1/23
Ethylbenzene	2 - 220	5	1/23
Isopropylbenzene	0.5 – 380	5	3/23
Methylcyclohexane	0.7 – 9	5	1/23
SVOCs			
Benzo(a)pyrene	0.2 – 0.3	ND	2/22
Inorganics			
Barium	129 - 2190	1,000	1/22
Chromium	4.1 – 183	50	1/22
Copper	16 - 518	200	1/22
Iron	65 – 220,000	300	20/22

Detected Constituents	Concentration Range Detected (ppb) ^a	SCG ^b (ppb)	Frequency Exceeding SCG
Lead	5.7 - 926	25	4/22
Manganese	14.3 – 11,600	300	17/22
Sodium	8,250 – 85,500	20,000	21/22
Pesticides / PCBs			
None			

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).

In shallow groundwater, the primary contaminant is tetrachloroethene (PCE) with elevated levels of cis-1,2-dichloroethene (cis-DCE), trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA). A VOC groundwater contamination source was delineated and found proximal to former ASTs / fill ports locations adjacent to the rail road spur in the south east area of the site. Shallow groundwater at the site was observed to flow in a southwesterly direction. Historic groundwater flow in a more southerly direction may have been influenced by multiple industrial production and recharge wells that were in operation at that time on the Kennedy Valve Foundry to the south. Consistent with historic groundwater chemical data, contaminant plume migration extends south / southwest and concentrations decrease quickly in downgradient sample locations. Plume attenuation or decrease in VOC concentration has been documented compared to historic data and VOC concentrations are near or below Ambient Water Quality Standards adjacent to off-site residential properties. Contaminant concentrations above SCGs in groundwater have been documented in the adjacent off-site public right of way, former rail road spur and a vacant portion of industrial property (Kennedy Valve Foundry).

A second area of elevated VOC groundwater contamination has been documented in an adjacent off-site area to the northwest upgradient of groundwater flow. The primary groundwater contaminant is tetrachloroethene (PCE) with slightly elevated levels trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA). The extent of the off-site upgradient groundwater contamination and potential sources are not defined to the north and west of the site which properties were formerly commercial and industrial facilities. Similar to the on-site contaminant plume, concentrations decrease quickly in the on-site downgradient sample locations.

In deep groundwater downgradient of the shallow “Hot Spot”, the only VOC contaminant detected is tetrachloroethene (PCE) at slightly elevated concentrations. Vertical plume attenuation or decrease in VOC concentration has been documented compared to shallow groundwater and historic data. Moreover, VOC concentrations are near or below NYS Part 703 Water Quality Standards in two of three deep monitoring well locations.

Based on the findings of the RI, the presence of source levels of VOCs in site soils and drywells has resulted in contamination of the groundwater. The primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: PCE, TCE, cis-DCE and 1,1,1 TCA.

Soil

Surface and subsurface soil samples were collected in two phases during the RI on the subject site and the adjacent off-site properties. 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 - 20 feet to 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.

A total of 15 on-site and 4 off-site subsurface soil samples were also collected from soil borings at varied depth intervals corresponding to contaminant screening, visual or olfactory evidence of contaminant impacts or the vadose zone above groundwater. In addition, 5 samples were also collected from on-site drywells and former floor drains. All 20 on-site subsurface samples were analyzed for VOCs, 9 for SVOCs and metals and 8 for Pesticides / PCBs. All 4 off-site subsurface samples were analyzed for VOCs, SVOCs and metals.

The on-site subsurface soil investigation delineated a concentrated source area of VOC contamination proximal to former ASTs / fill ports locations adjacent to the rail road spur in the south east area of the site. VOC concentrations grossly exceeding protection of groundwater SCGs were mainly at depths of 12-18 feet bgs, with a limited number of samples exceeding SCGs at depths of 3-6' bgs. One drywell had VOC concentrations significantly exceeding protection of groundwater SCGs however, an adjacent soil boring sample did not. Concentrations slightly exceeding protection of groundwater SCOs for SVOCs and metals were delineated in the vicinity of the VOC source area. One off-site subsurface sample slightly exceeded the protection of groundwater SCO for lead however the RI data supports that this occurrence is isolated from potential site disposal and / or contaminant migration. (Figure 3 & 4)

The following tables (Table 2a and Table 2b) present the findings of the subsurface soil investigation at the Former Matt Brewer Oil Site.

Table 2a - On-site Subsurface Soil

Detected Constituents	Concentration Range Detected (ppm) ^a	Unrestricted SCG ^b (ppm)	Frequency Exceeding SCG	Prot. GW SCG ^d (ppm)	Frequency Exceeding Prot. GW SCG
VOCs					
Acetone	0.032 – 0.150	0.05	3/20	0.05	3/20
Tetrachloroethene	0.008 – 230.0	1.3	6/20	1.3	6/20
Methylene Chloride	0.002 – 0.140	0.05	5/20	0.05	5/20
Trichloroethene	0.008 – 1.6	0.47	1/20	0.47	1/20
Toluene	0.043 – 1.100	0.7	1/20	0.7	1/20
cis-1,2-Dichloroethene	0.001 – 0.970	0.25	2/20	0.25	2/20
Xylenes, total	0.005 – 0.500	0.26	1/20	1.6	0/20

Detected Constituents	Concentration Range Detected (ppm) ^a	Unrestricted SCG ^b (ppm)	Frequency Exceeding SCG	Restricted Residential SCG ^c (ppm)	Frequency Exceeding Prot. GW SCG
SVOCs					
Benzo(a)pyrene	0.012 – 12	1	4/11	1	4/11
Benzo(a)anthracene	0.020 – 12.0	1	3/11	1	3/11
Indeno(1,2,3-cd)pyrene	0.012 – 1.300	0.5	2/11	0.5	2/11
Benzo(b)fluoranthene	0.014 – 18.0	1	3/11	1	3/11
Chrysene	0.008 – 15.0	1	3/11	3.9	3/11
Benzo(k)fluoranthene	0.014 – 0.980	0.8	1/11	1.7	0/11
DiBenzo(a,h)anthracene	0.07 – 0.68	0.33	1/11	1,000	0/11
Inorganics					
Lead	7.6 – 672	63	5/11	450	1/11
Mercury	0.023 – 0.21	0.18	1/11	0.73	0/11
Zinc	59.9 - 712	109	7/11	2,480	0/11
Pesticides / PCBs					
4,4'-DDT	0.0011 – 0.024	0.0033	2/8	136	0/8
Endrin	0.0009 – 0.022	0.014	1/8	0.06	0/8

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 Restricted Residential Use.

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

Table 2b - Off-site Subsurface Soil

Detected Constituents	Concentration Range Detected (ppm) ^a	Unrestricted SCG ^b (ppm)	Frequency Exceeding SCG	Residential SCG ^c (ppm)	Frequency Exceeding Prot. GW SCG
VOCs					
Tetrachloroethene	0.009 – 1.3	1.3	0/4	5.5	0/4
Methylene Chloride	0.009 – 0.120	0.05	1/4	51	0/4
Trichloroethene	0.003 – 0.640	0.47	1/4	10	0/4
cis-1,2-Dichloroethene	0.003 – 0.260	0.25	1/4	59	0/4
Xylenes, total	0.005 – 1.500	0.26	1/4	100	0/4
SVOCs					
Benzo(a)pyrene	0.020 – 0.540	1	0/4	1	0/4
Benzo(a)anthracene	0.024 – 0.580	1	0/4	1	0/4
Indeno(1,2,3-cd)pyrene	0.012 – 0.410	0.5	0/4	0.5	0/4
Benzo(b)fluoranthene	0.014 – 0.680	1	0/4	1	0/4
Chrysene	0.008 – 0.520	1	0/4	1	0/4
Benzo(k)fluoranthene	0.014 – 0.220	0.8	0/4	1	0/4

Detected Constituents	Concentration Range Detected (ppm) ^a	Unrestricted SCG ^b (ppm)	Frequency Exceeding SCG	Residential SCG ^c (ppm)	Frequency Exceeding Prot. GW SCG
DiBenzo(a,h)anthracene	0.110	0.33	0/4	0.33	0/4
Inorganics					
Barium	64.6 - 519	350	1/4	350	1/4
Lead	7.6 – 550	63	1/4	400	1/4
Manganese	441 – 1,140	1600	0/4	2,000	0/4
Mercury	0.023 – 0.097	0.18	0/4	0.81	0/4
Zinc	68.2 - 339	109	1/4	2,200	0/4

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 Residential Use.

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

The primary on-site subsurface soil contaminants are PCE, methylene chloride, acetone (the latter two may be lab contaminants), benzo(a)pyrene. The primary contaminants of concern for soil resulting from the disposal or release of hazardous wastes or substances at the site are associated with former petroleum and solvent storage and distribution operations. Figures 2 through 4 depict the extent of contamination of VOCs and SVOCs.

Based on the findings of the Remedial Investigation, the presence of VOCs and SVOCs has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern (COCs), to be addressed by the remedy selection process are: PCE, TCE, cis-1,2-dichloroethene, benzo(a)pyrene and lead.

Off-site subsurface soil contamination up-gradient of the site does not indicate the migration of primary COCs from the site source area. A small, inconsequential area of soil contamination just north and up-gradient of the site was detected slightly above protection of groundwater SCOs for TCE, cis-DCE, Methylene Chloride and Xylenes. The source of these contaminants identified in the off-site soils to the north are unknown.

During the RI, a total of 6 on-site and 2 off-site surface soil samples were collected. All of these samples were collected from 0-2 inches below vegetated surface and analyzed for SVOCs, metals and PCBs while the on-site samples also included VOCs and Pesticides.

The on-site surface soil investigation indicated a slight exceedance of restricted residential SCOs for SVOCs and metals. The off-site surface soil investigation indicated a slight exceedance of unrestricted SCOs for metals and PCBs however no exceedance of residential SCOs.

The following tables (Table 2c and Table 2d) present the findings of the surface soil investigation at the Former Matt Brewer Oil Site.

Table 2c – On-site Surface Soil

Detected Constituents	Concentration Range Detected (ppm) ^a	Unrestricted SCG ^b (ppm)	Frequency Exceeding SCG	Restricted Residential SCG ^c (ppm)	Frequency Exceeding Residential SCG
VOCs					
Tetrachloroethene	0.008 – 0.011	1.3	0/6	19	0/6
Methylene Chloride	0.003 – 0.006	0.05	0/6	100	0/6
Trichloroethene	0.011 – 0.012	0.47	0/6	21	0/6
cis-1,2-Dichloroethene	0.006	0.25	0/6	100	0/6
SVOCs					
Benzo(a)pyrene	0.140 – 13.0	1	3/6	1	3/6
Benzo(a)anthracene	0.019 – 16.0	1	3/6	1	3/6
Indeno(1,2,3-cd)pyrene	0.091 – 8.50	0.5	2/6	0.5	2/6
Benzo(b)fluoranthene	0.210 – 17.0	1	3/6	1	3/6
Chrysene	0.210 – 17.0	1	3/6	3.9	2/6
Benzo(k)fluoranthene	0.082 – 7.30	0.8	3/6	3.9	2/6
DiBenzo(a,h)anthracene	0.078 – 2.40	0.33	2/6	0.33	1/6
Inorganics					
Chromium	7.7 – 20.1	1	6/6	110	0/6
Copper	29.9 – 341.0	50	3/6	270	2/6
Lead	35.2 – 737	63	4/6	400	2/6
Mercury	0.016 – 0.827	0.18	3/6	0.81	1/6
Zinc	92.6 - 508	109	5/6	10,000	0/6
Pesticides / PCBs					
Dieldrin	0.021	0.005	1/6	0.2	0/6
4,4'-DDT	0.036 – 0.062	0.0033	3/6	7.9	0/6
4,4'-DDD	0.0089	0.0033	1/6	13	0/6
Endrin	0.015	0.014	1/6	11	0/6
Aroclor 1254	0.0097 – 0.280	0.100	2/6	1	0/6
Aroclor 1260	0.044 – 0.430	0.100	3/6	1	0/6

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 Restricted Residential Use.

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

Table 2d - Off-site Surface Soil

Detected Constituents	Concentration Range Detected (ppm) ^a	Unrestricted SCG ^b (ppm)	Frequency Exceeding SCG	Residential SCG ^c (ppm)	Frequency Exceeding Residential SCG
SVOCs					
Benzo(a)pyrene	0.370 – 0.690	1	0/2	1	0/2
Benzo(a)anthracene	0.390 – 0.500	1	0/2	1	0/2

Detected Constituents	Concentration Range Detected (ppm) ^a	Unrestricted SCG ^b (ppm)	Frequency Exceeding SCG	Residential SCG ^c (ppm)	Frequency Exceeding Residential SCG
Indeno(1,2,3-cd)pyrene	0.098 – 0.380	0.5	0/2	0.5	0/2
Benzo(b)fluoranthene	0.510 – 0.960	1	0/2	1	0/2
Chrysene	0.340 – 0.690	1	0/2	1	0/2
Benzo(k)fluoranthene	0.039 – 0.180	0.8	0/2	1	0/2
DiBenzo(a,h)anthracene	0.042 – 0.100	0.33	0/2	0.33	0/2
Inorganics					
Chromium	15.6 – 18.9	1	2/2	22	0/2
Copper	45.0 – 63.2	50	1/2	270	0/2
Lead	70.0 – 190	63	2/2	400	0/2
Mercury	0.072 – 0.151	0.18	0/2	0.81	0/2
Zinc	122 - 434	109	2/2	2,200	0/2
Pesticides / PCBs					
Aroclor 1254	0.0081 – 0.170	0.100	1/2	1	0/2
Aroclor c1260	0.037	0.100	0/2	1	0/2

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 Residential Use.

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

The primary on-site surface soil contaminants are SVOCs, copper and lead. The primary SVOC soil contamination is believed to be associated with historic of petroleum and solvent storage and distribution operations at the site. Figure 2 depict the extent of contamination of SVOCs and metals.

Based on the findings of the Remedial Investigation, the presence of SVOCs and Metals 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: SVOCs, lead and copper

Off-site surface soil contamination does not indicate the migration of primary COCs from the site.

As shown in Figure 2, low level metals contamination were detected at most screening locations and may be attributed to years of industrial air emissions from metal plating and foundry activities adjacent to the site as well as adjoining residential properties.

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 and indoor air inside off-site residential structures. At this site no buildings were present.

During the Remedial Investigation (RI), soil vapor samples were collected from the sub-slab and indoor air of structures at nine off-site residential properties. Additional samples were collected from two multi-family residential structures. The samples were collected to assess the potential for soil vapor intrusion. Based on the sampling, mitigation was recommended for two single family and one multi-family residences, monitoring was recommended for five single family residences, and no further action was found to be necessary at one residence.

The results indicate trichloroethene (TCE), tetrachloroethene (PCE) and 1,1,1-trichloroethane (1,1,1-TCA) were detected in sub-slab vapor and in the indoor air of several structures. Based on the concentration detected, and in comparison with the NYSDOH Soil Vapor Intrusion Guidance, three (3) locations detected TCE in indoor air above the NYSDOH Indoor Air Guideline Value of 2 ug/m³ and at concentrations that exceed the guidance levels suggesting mitigation measures to reduce the potential for soil vapor intrusion (one building had two samples collected). A sub-slab mitigation system was installed at one single family residence and the post installation chemical testing of indoor air indicates that additional improvements to the system/basement are necessary to reduce indoor air concentrations below background levels (1 ug/m³). The pressure field testing at this residence demonstrated good communication through soils underlying the basement slab. The second multi-family residence that refused mitigation is now vacant and prohibited from occupancy and a third single family residence was purchased by an adjacent metal finishing industry and demolished to accommodate additional parking.

Based on the findings of the Remedial Investigation, the presence of VOCs in soils and groundwater has resulted in the contamination of soil vapor. The site contaminants identified in soil vapor which are considered to be the primary contaminants of concern (COCs), to be addressed by the remedy selection process are: PCE, TCE and 1,1,1-TCA.

Exhibit B

Description of Remedial Alternatives

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

Alternative 1: No Action

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

Alternative 2: Natural Attenuation / Access Restriction / Site Management

The Natural Attenuation / Site Management Alternative requires only fencing, monitoring and institutional controls for the site. This alternative includes institutional controls, in the form of an environmental easement, a groundwater / vapor monitoring plan and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth:	\$689,657
Capital Cost:	\$136,000
Annual Costs (30yrs):	\$36,000

Alternative 3: Restoration to Pre-Disposal or Unrestricted Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil clean objectives listed in Part 375-6.8 (a). This alternative would include excavation and off-site disposal of all waste and soil contamination above the unrestricted soil cleanup objectives in addition to reductive dechlorination polishing of the groundwater contaminants. Short term annual groundwater monitoring (3 yrs) will tract plume attenuation. The remedy will not rely on institutional or engineering controls to prevent future exposure. There is no long term Site Management, no restrictions, and no periodic review. This remedy will have no long term annual cost.

Present Worth:	\$2,026,302
Capital Cost:	\$1,960,944
Annual Costs (3yrs):	\$24,000

Alternative 4: Excavation with Off-site Disposal and Groundwater Treatment

This alternative would include, excavation with off-site disposal of approximately 3,000 cubic yards of soil exceeding the restricted residential or protection of groundwater SCO's. Groundwater will be treated by the placement of an electron donor material such as hydrogen release compound (HRC) or an enhanced reductive dechlorination product in the excavation prior to backfill and subsequently monitored. A design-phase investigation will be conducted to determine the limits of excavation for surface soils to meet restricted residential

and sub-surface soil source areas to meet protection of groundwater SCOs. The remedial design will include provisions for excavation with off-site disposal of any contaminated source material in the on-site drywell structures. On-site soil which does not exceed SCOs for the use of the site and/or the protection of groundwater may be used to backfill the excavation to the extent that a sufficient volume of on-site soil is available (additional testing may be required). Clean fill meeting the requirements of DER-10, Appendix 5 will be brought in to complete the backfilling of the excavation and establish the designed grades at the site. The site will be re-graded to shed water and covered with top soil and seeded. Soil derived from the re-grading may be used to backfill the excavation. Upon completion of the remedy, a site management plan (SMP) will be developed which includes: imposition of an environmental easement; restricts site use to residential uses; restricts groundwater use; includes provisions to evaluate soil vapor intrusion for any building developed on-site; includes a long-term groundwater monitoring plan; and includes the steps necessary for periodic inspection. Soil vapor mitigation systems installed at one off-site residential property will be enhanced and monitored, and additional off-site soil vapor intrusion assessment or monitoring will be conducted as necessary.

<i>Present Worth:</i>	<i>\$1,418,637</i>
<i>Capital Cost:</i>	<i>\$1,262,475</i>
<i>Annual Costs (5yrs):</i>	<i>\$36,000</i>

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost (\$)	Annual Costs (\$)	Total Present Worth (\$)
No Action	0	0	0
#2 Natural Attenuation/Access Restriction/ Site Management	136,000	36,000 (30 yr)	689,657
#3 Restoration to Pre-Disposal or Unrestricted Conditions	1,960,944	24,000 (3 yr)	2,026,302
#4 Excavation with Off-site Disposal and Groundwater Treatment	1,262,475	36,000 (5 yr)	1,418,637

Exhibit D

The Department has selected Alternative #4, Excavation with Off-site Disposal and Groundwater Treatment as the remedy for this site. Alternative #4 would achieve the remediation goals for the site by Excavation with off-site disposal of contaminated soil sources above Protection of Groundwater & other contaminated soils above the Restricted Residential SCOs or the installation of protective cover systems in addition to groundwater treatment and monitoring and mitigating exposures related to soil vapor intrusion. The elements of this remedy are described in Section 7. The selected remedy is depicted in Figures 2 through 5.

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 RI/RAR 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 #4) would satisfy this criterion by removing the contaminated VOC soil sources from the site above protection of groundwater SCOs and treating residual contamination in groundwater. Other contaminated soils above the restricted residential SCOs will be removed from the site or will be located below an appropriate cover system for the site use. Alternative 3, by removing all soil contaminated above the unrestricted soil cleanup objective and treating residual contamination in groundwater, meets the threshold criteria. Alternative 2 also complies with this criterion but to a lesser degree because the wastes will remain on-site. Alternative 1 does not comply with this criterion. Alternatives 2, 3 and 4 rely on a restriction of groundwater use at the site to protect human health. Since groundwater treatment is part of Alternatives 3 and 4, it is expected that groundwater restrictions will be able to be removed after contaminant levels decrease to below the groundwater standard. Alternatives 2, 3, and 4 are all protective of human health with respect to soil vapor intrusion.

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.

The selected remedy (Alternative #4) would satisfy this criterion by removing the contaminated VOC soil source from the site above protection of groundwater SCOs and treating residual contamination in groundwater that would remove or reduce sources to soil vapor intrusion. Other contaminated soils above the restricted residential SCOs will be removed from the site or will be located below an appropriate cover system for the site use. Alternative 2 also isolates the contaminated soils by restricting site access, but does not provide any treatment and the waste will remain on-site and would require long term mitigation of exposures related to soil vapor intrusion.. Alternative 3, by removing all soil contaminated above the unrestricted soil cleanup objective and treating contaminated groundwater, meets the threshold criteria. Alternatives 1 and 2 would not satisfy this criterion since they would not achieve groundwater standards for a very long, indefinite time period. Therefore, Alternatives 1 and 2 are not considered further. Since groundwater treatment is part of Alternatives 3 and 4, it is

expected that groundwater restrictions will be able to be removed after contaminant levels decrease to below the groundwater standard. The potential for soil vapor intrusion will be significantly reduced by Alternatives 3 and 4 because soil sources will be removed and contamination in groundwater will be treated. Under Alternatives 3 and 4 the need for off-site soil vapor mitigation should decrease within 5 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.

Long-term effectiveness is best accomplished by those alternatives involving excavation of the contaminated overburden soils (Alternatives 3 and 4) and groundwater treatment. Alternative 3 restores the site to pre-release conditions and Alternative 4 provides for cleanup to restricted residential and protection of groundwater SCO's. Alternatives 3 and 4 address groundwater contamination and the future potential for soil vapor intrusion and will achieve groundwater cleanup goals much faster.

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

Alternative 3 removes contaminants to pre-release condition and provide the greatest reduction in toxicity, mobility and volume of contaminants. Alternative 4 removes soil contamination above residential and protection of groundwater SCO's and treats residually contaminated groundwater over time, but to a lesser degree than Alternative 3. Under Alternatives 3 and 4 the need for off-site soil vapor mitigation should decrease within 5 years.

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 3 and 4 both have short-term impacts which could easily be controlled, however, Alternative 4 would have the smallest impact. The time needed to achieve the remediation goals is the shortest for Alternative 4 and longer for Alternative 3. Alternative 4 permanently impacts the site through site use restrictions because wastes will remain on-site.

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 and 4 are favorable in that they are readily implementable. Alternative 3 would require additional soil removal and require more material to be imported to the site for backfill.

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 large volume of soil to be handled, Alternative 3 (excavation and off-site disposal to pre-release conditions) would have the highest present work cost. Excavation and off-site disposal to residential and protection of groundwater SCO's (Alternative 4) would be less expensive than Alternative 3, yet it would provide equal protection of the groundwater resource and equally reduce the potential for soil vapor intrusion. No institutional controls or restrictions are required for Alternative 3, but Alternative 4 allows for restricted residential use of the entire site which is the desired option.

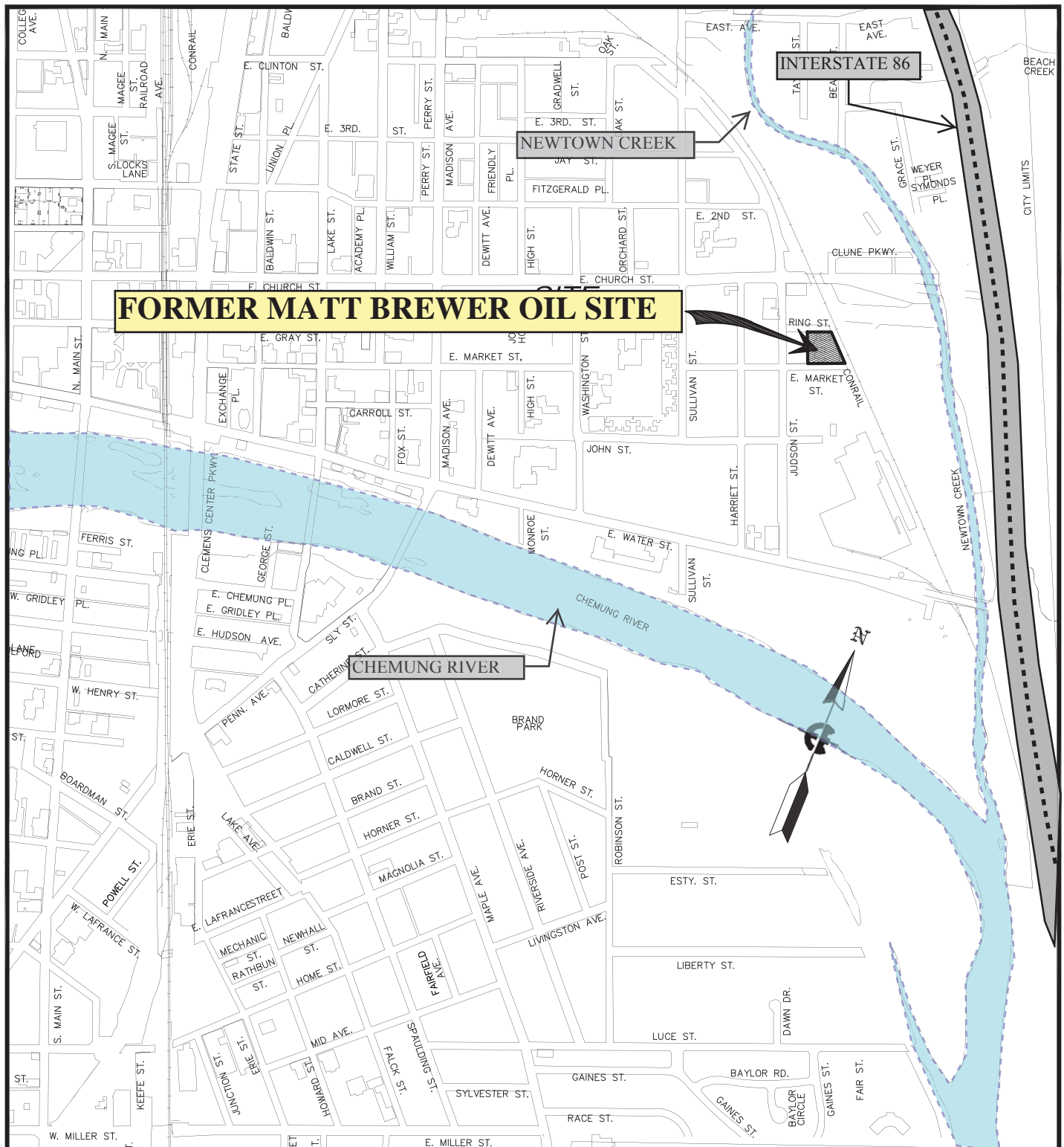
8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

Alternative 3 and 4 would remove the contaminated soil permanently. However, the residual contamination with Alternative 4 would be controllable with implementation of a Site Management Plan. With Alternative 3, removing all of the overburden contamination from the site and removing the contaminated soil to the water table, most of the unsaturated overburden would be removed and restrictions on the site use would not be necessary.

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 (PRAP) 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. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

Alternative 4 has been selected because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.



**FORMER BREWER OIL CO.
SITE INVESTIGATION/REMEDIAL
ALTERNATIVE REPORT**

CITY OF ELMIRA
CHEMUNG COUNTY, NEW YORK
NOVEMBER, 2013

FIGURE 1
LOCATION MAP
Base map by Fagan
Engineers

ELEMENT OF REMEDY - SOIL REMEDIATION

EXCAVATION SHALLOW 0-7' bgs

EXCAVATION DEEP 0-19' bgs



- Soil Boring Above SCO
- Soil Boring Below SCO

**Former Matt
Brewer Oil Site
Boundary**

East Market Street

PCE - 1.3 ppm 16-18' bgs
TCE - 0.64 ppm 16-18'
cis-DCE - 0.26 ppm
Meth Chlor - 0.12 ppm
Xylenes - 1.5 ppm

PCE - 1.9 ppm 15-18' bgs

PCE - 230.0 ppm 15-18" bgs

PCE - 93.0 ppm 12-15' bgs
TCE - 6.4 ppm
cis-DCE - 0.97 ppm

PAHs - 6-16' bgs
Benzo - 3.3 ppm
Chrysene - 3.1 ppm
Lead - 672 ppm

cis-DCE - 0.8 ppm Drywell
Xylenes - 0.5 ppm

PCE - 8.0 ppm 3-6' bgs
Meth Chlor - 0.08 ppm

PCE - 6.0 ppm 3-6' bgs

PAHs - 8-12' bgs
Benzo - 0.7-1.8 ppm
Chrysene - 2.1 ppm
Lead - 297 ppm

Lead - 550 ppm 12-16' bgs
Zinc - 339 ppm

COC	Soil Cleanup Objective Protection of Groundwater (on-site)	Soil Cleanup Objective Residential (off-site)	parts per million (ppm)
PCE	1.3 ppm	5.5 ppm	
TCE	0.47 ppm	10 ppm	
cis-DCE	0.25 ppm	59 ppm	
Meth Chlor	0.05 ppm	51 ppm	
Xylenes	0.26 ppm	100 ppm	
BENZO	1.0 ppm	1-22 ppm	
Chrysene	1.0 ppm	1.0 ppm	
Lead	63 ppm	400 ppm	

FIGURE 3
Elements of Remedy
Sub-surface Soils
Base map by Fagan Engineers

ELEMENT OF REMEDY - DRYWELLS / UNDERGROUND STORAGE TANKS (UST)
GREEN SHADED AREAS = EXCAVATION 0-10' bgs



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NOVEMBER, 2013

COC	Soil Cleanup Objective Protection of Groundwater	parts per million (ppm)
PCE	1.3 ppm	
TCE	0.47 ppm	
cis-DCE	0.25 ppm	
Xylenes	1.6 ppm	
PAHs	1.0 ppm	

FIGURE 4
Elements of Remedy
Drywells / USTs
Base map by Fagan Engineers



FORMER BREWER OIL CO.
SITE INVESTIGATION/REMEDIATION
ALTERNATIVE REPORT

CITY OF ELMIRA
CHEMUNG COUNTY, NEW YORK
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ELEMENTS OF REMEDY - GROUNDWATER
SOIL SOURCE REMOVAL / GROUNDWATER TREATMENT
MONITOR ATTENUATION

FIGURE 5
Elements of Remedy
Groundwater
Base map by Fagan Engineers

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

**Former Matt Brewer Oil Site
Environmental Restoration Project
Elmira, Chemung County, New York
Site No. E808032**

The Proposed Remedial Action Plan (PRAP) for the Former Matt Brewer Oil 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 10, 2016. The PRAP outlined the remedial measure proposed for the contaminated soil, groundwater, soil vapor and indoor air at the Former Matt Brewer Oil 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 16, 2016, which included a presentation of the remedial investigation alternative analysis (RI/AA) for the Former Matt Brewer Oil Site as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 25, 2016.

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

COMMENT 1: I heard there was a pool area where they sold swimming pools.

RESPONSE 1: The Department is not aware of a pool area or that they sold swimming pools.

COMMENT 2: Were the pool chemicals sold during the time of Matt Brewer?

RESPONSE 2: Historic references indicate that in the 1970s Matt Brewer Oil Company expanded the business to include swimming pool products and chemicals.

COMMENT 3: What are the milestones (reference to State Superfund referral)?

RESPONSE 3: If the municipality chooses not to implement the selected remedy, a private entity does not step forward (e.g., the Brownfield Cleanup Program), or if no other party steps up, the site will be further evaluated for action under the petroleum spill response.

Chemung County submitted the following comments via email dated March 23, 2016:

COMMENT 4: What is the purpose of the proposed fence, and what would it safeguard against?

The 1.1 acre property has been abandoned and unfenced for decades. How long would the proposed fence be in place? I feel temporary construction fencing would be useless, as it would not stop intrusions of any kind.

RESPONSE 4: The remedy does not include a fence.

COMMENT 5: Who is paying the cost of the proposed fence? A rough estimate for a 6-ft high chain-link fence to enclose 1.1 acres is likely in the range of \$25-30K. Keep in mind the cost could be higher, as it will require large vehicle gates for access. Does the State of New York intend to compel Chemung County to install the proposed fencing? What would the legal basis be for such a decision? Will the State of New York reimburse all expenses if the County agrees to install the proposed fence?

RESPONSE 5: No, the County as property owner is responsible for controlling access to the property. Any fencing installed by the County would be at the County's expense.

COMMENT 6: Do you have any suggestions that are more affordable, practical, and practicable?

RESPONSE 6: The County could consider posting the site or otherwise restricting.

APPENDIX B

Administrative Record

Administrative Record

**Former Matt Brewer Oil Site
Environmental Restoration Project
Elmira, Chemung County, New York
Site No. E808032**

1. *Proposed Remedial Action Plan for the* Former Matt Brewer Oil Site, dated February 2016, prepared by the Department.
2. The Department and Chemung County entered into a State Assistance Contract, Contract No. C302700, August 29, 2005.
3. “Citizen Participation Plan”, Former Matt Brewer Oil Company Site, dated July 2006, prepared by Fagan Engineers.
4. “Site Investigation / Remedial Alternatives Report Work Plan”, Former Matt Brewer Oil Company Site, dated September 2006, prepared by Fagan Engineers.
5. “Addendum A to Site Investigation / Remedial Alternatives Report Work Plan for On-site and Off-site Investigation Soil Vapor Investigation Work Plan” Former Matt Brewer Oil Company Site, dated February 2008, revised April 2008, prepared by Fagan Engineers.
6. “Interim Remedial Measure (IRM) Work Plan for Installation of a Sub-slab Depressurization System (SSDS) Residential Structure Near the Former Matt Brewer Oil Company”, Former Matt Brewer Oil Company Site, dated August 2009.
7. “Addendum B to Site Investigation / Remedial Alternatives Report Work Plan for On-site and Off-site Investigation”, Former Matt Brewer Oil Company Site, dated December 2009, prepared by Fagan Engineers.
8. “Addendum C to Site Investigation / Remedial Alternatives Report Work Plan for On-site and Off-site Investigation Soil Vapor Investigation”, Former Matt Brewer Oil Company Site, dated February 2011, revised March 2011, prepared by Fagan Engineers.
9. “Site Investigation – Remedial Alternatives Report”, Former Matt Brewer Oil Company Site, dated December 2013, revised December 2015, prepared by Fagan Engineers.