PROPOSED REMEDIAL ACTION PLAN

Former Drape Master
State Superfund Project
East Elmhurst, Queens County
Site No. 241114
September 2018

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

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing 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 proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred 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 Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document repositories identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repositories:

Queens Library Langston Hughes
Attn: Shakira Smalls
100-01 Northern Boulevard
Corona, NY 11368
Phone: 718 651 1100

Queens Community Board 3
Attn: Giovanna A. Reid
82-11 37th Avenue
6th Floor, Suite 606
Jackson Hts., NY 11372
Phone: 718 458 2707

A public comment period has been set from:

9/24/2018 to 10/24/2018

A public meeting is scheduled for the following date:

10/18/2018 at 7:00 PM

Public meeting location:

VFW Post 2477, 89-07 Astoria Blvd., East Elmhurst, NY 11369

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through 10/10/2018 to:

Sadique Ahmed
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
sadique.ahmed@dec.ny.gov

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy identified herein. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

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 site is located at 89-01 Astoria Boulevard in an urban area in the borough of Queens. It is located at the northeast corner of the intersection of Astoria Boulevard and 89th Street in East Elmhurst.

Site Features: There is an occupied 2-story brick building with a full basement at the site. The site is approximately 5,200 square feet in size.

Current Zoning and Land Use: The site is zoned within a C1-1 overlay within an R6B zoning district which allows for both commercial and restricted residential uses. The on-site building is used for a commercial laundromat on the ground floor, and residential apartments on the second floor. Surrounding parcels are used for a combination of commercial, residential and utility right-of-ways. The nearest off-site residential areas are to the north, adjacent to the site along the east side of 89th Street.

Past Use of the Site: From approximately 1983 until approximately March 2004 the site was used as a dry cleaning facility. Past operations and practices appear to have led to site contamination via leaks and spills from the former dry cleaning equipment.

During October 2006 the previous owner conducted a subsurface investigation by installing 6 temporary shallow groundwater monitoring wells inside the basement. In March 2009 the Department conducted a limited Soil Vapor Intrusion evaluation and groundwater investigation at the on-site structure. In August 2010 the Department conducted a Site Characterization and, based upon the results of that study, the site was listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites in July 2011. The site is listed as a Class 2 site, meaning the site poses a significant threat to public health and/or the environment.

Site Geology and Hydrogeology: The overburden at the site consists mainly of brown, medium, poorly graded sand with round gravel, rock fragments and some silt from 2 feet to 20 feet below ground surface (bgs). Based on the data from the recently conducted remedial investigation, the depth to groundwater varies from 7 to 22 feet bgs (the wide variation in the depth to groundwater is due to uneven topography) and groundwater flow is to the west-southwest.

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) are/is being

evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation 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 declined to implement a remedial program when requested by the Department. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the Department will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

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

Astoria Holding Group, LLC

Impact Holding, LLC

Agavni Baghdassarian

Drapemasters of America

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,
- Soil borings, monitoring wells and soil vapor points installations,
- Sampling of subsurface soils, groundwater, soil vapor, indoor air and sub-slab vapor,
- Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor
- 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

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

- groundwater
- 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.

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

6.3: Summary of Environmental Assessment

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

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

Nature and Extent of Contamination: Based upon investigations conducted to date, the primary contaminants of concern include tetrachloroethylene (PCE), trichloroethylene (TCE) and cis-1,2-dichloroethylene (cis-1,2 DCE) in groundwater, soil vapor, and indoor air.

Soil - In 2014, during the Remedial Investigation, eleven soil samples were collected from on-site and off-site areas. All samples were analyzed for VOCs and three samples (approximately 30% including one from on-site) were analyzed for SVOCs, metals, pesticides and PCBs. Two of the samples were from beneath the on-site basement and within the saturated zone (groundwater under the basement was just under the slab). Review of soil analytical data indicates no VOCs detected in any samples. Two organic compounds, both SVOCs, were detected in a sample collected from off-site and determined to be not site related. No other contaminants were detected above unrestricted soil cleanup levels.

Groundwater - During the 2006 subsurface investigation PCE was detected in shallow groundwater under the basement at levels ranging from 15 to 720 parts per billion (ppb), and TCE ranged from not-detected (ND) to 18 ppb in one of six samples. The groundwater standard for both compounds is 5 ppb. The 2010 Site Characterization revealed that contamination had migrated off-site; the highest concentrations of PCE and TCE detected in off-site groundwater were 450 and 9.3 ppb, respectively, in samples collected from near the southwest corner of the site just outside the property line. During the 2014 RI, elevated PCE concentrations in groundwater were detected at a downgradient location across the street at a level of 700 ppb. The highest PCE contamination (950 ppb) was detected in a sump water sample collected from the basement of the on-site building.

Soil Vapor, sub-slab vapor and indoor air - In 2009 PCE was detected in basement indoor air samples at concentrations up to 650 micrograms per cubic meter ($\mu g/m^3$). During the 2010 Site Characterization, PCE was detected in soil vapor samples collected from the sidewalk immediately adjacent to the site at concentrations up to 67,000 $\mu g/m^3$. In 2014 RI sampling, PCE was found in soil vapor samples collected adjacent to the site at concentrations up to 19,000 $\mu g/m^3$. During the 2016-2017 heating season, additional SVI sampling was conducted on-site and at five off-site structures located north, northwest and west from the site. Tetrachloroethene (PCE) was detected in the indoor air at levels exceeding background levels in 5 of 6 structures sampled. Only the former Drape Master facility exceeded the New York State Department of Health Air Guideline Values for PCE of 30 $\mu g/m^3$. Indoor air samples from the on-site building were collected from the basement and first floor, with PCE concentrations in the basement indoor air detected at 82 $\mu g/m^3$, and in first floor air at 36 $\mu g/m^3$. Four of the five off-site

structures require no further action (NFA) to be taken based upon sampling results, while monitoring was recommended at the other off-site structure. Sub slab and indoor air results for PCE at that structure were 12 and 11 µg/m^3 respectively, and the outdoor air sample was non-detect (ND) for PCE.

Special Resources Impacted/Threatened: The site is located in the urban area and a Fish and Wildlife Impact Analysis was not warranted.

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*.

Direct contact with contaminants in the soil is unlikely because the site is covered with buildings and pavement. People may contact site related contaminants in the groundwater if they dig below the surface. People are not drinking the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds in soil vapor (air spaces within the soil) 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. Environmental sampling has identified impacts associated with soil vapor intrusion at the on-site building and actions are recommended to address exposure. Monitoring the potential for soil vapor intrusion is on-going at one off-site building.

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.

Soil

RAOs for Public Health Protection

- 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 PROPOSED 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 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 proposed remedy is set forth at Exhibit D.

The proposed remedy is referred to as the In-Situ Groundwater Treatment remedy.

The estimated present worth cost to implement the remedy is $444,000. The cost to construct the remedy is estimated to be $182,000 and the estimated average annual cost is $13,000.

The elements of the proposed 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. In-Situ Groundwater Treatment: In-situ chemical reduction (ISCR) will be implemented to treat tetrachloroethene (PCE), trichloroethene (TCE) and cis-1,2-dichloroethene (cis-1,2-DCE) in groundwater. There are a variety of in situ reductive products available for the treatment of groundwater. A chemical reducing agent will be injected into the subsurface to destroy the contaminants in an approximately 11,000 square foot source area beneath and in the immediate vicinity of the laundromat building, where chlorinated solvents and related compounds were elevated in the groundwater.

Prior to the full implementation of this technology, on-site pilot scale studies will be conducted to more clearly define design parameters.

3. Cover System: A site cover currently exists in areas not occupied by buildings and will be maintained to allow for restricted residential 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 two feet of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for restricted residential 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).

4. Vapor Mitigation: Ventilation - an active basement ventilation system will be required in the on-site laundromat building. The system will not only increase the frequency of air change outs in the basement, but more importantly will be used to create a positive pressure in the space. Creating a positive air pressure in the basement minimizes the intrusion of vapors that otherwise may be drawn into the space by combustion equipment, natural convection, and other forces. Energy Recovery Ventilators are available that recover a significant portion of the energy from the outgoing air and use it to heat or cool the incoming air. The ventilation system(s) needs to be coordinated with the existing heating, ventilation, and air conditioning (HVAC) systems to ensure that no adverse conditions are created, especially in regard to the combustion devices in the facility.

5. All cracks and openings in the basement of the on-site building, as well as the existing sump, will be properly sealed in order to minimize vapors from entering the building during chemical injections discussed in remedial element 2, above.

6. Water treatment will be performed at the existing sump to treat contaminated sump water before discharging into the sewer and/or storm drain. The simplest method of treatment would be

to install a liquid phase granular activated carbon drum on the discharge line from the sump pump. The details of the sump treatment system will be further refined during the design phase of the remedy.

7. Institutional Controls: Imposition of an institutional control in the form of an environmental easement or a deed restriction for the controlled property which will:

- allow the use and development of the controlled property for restricted residential use, 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 NYCDOH; and

- require compliance with the Department approved Site Management Plan.

8. 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 engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 5, above.

Engineering Controls: Continued In-Situ Groundwater Treatment system discussed in Paragraph 2 as necessary; the cover system discussed in Paragraph 3, above; and, the vapor mitigation system discussed in Paragraph 4, 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 or deed restriction including any land use, and groundwater use restrictions;

- a provision for continued evaluation of the potential for soil vapor intrusion for any occupied buildings off-site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;

- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 3 above will be placed in any areas where the upper two feet of exposed surface soil exceed the applicable soil cleanup objectives (SCOs)

- 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; and

- monitoring for vapor intrusion for any occupied existing or future buildings off-site, as well as at potentially impacted areas off-site, 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 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.

Groundwater

Groundwater samples were collected from overburden monitoring wells. From April 2014 to June 2015 three rounds of groundwater sampling were conducted from various locations to assess groundwater conditions on and off-site. The results indicated that contamination in shallow groundwater at and near the site exceed the SCGs for VOCs and inorganics.

All groundwater samples were analyzed for VOCs; during the first two rounds of groundwater sampling approximately one-third of the samples were also analyzed for SVOCs, pesticides/PCBs, and inorganics.

The primary groundwater contaminants of concern are tetrachloroethene (PCE), trichloroethene (TCE) and cis-1,2-dichloroethene (cis-1,2-DCE). PCE is associated with the former dry cleaning operations at the site, while TCE and cis-1,2-DCE are thought to be breakdown products of the PCE.

As shown on Figure 2, the primary groundwater contamination is associated with past on-site operations, and that contamination has migrated just off-site to the west, northwest and southwest.

Several inorganic compounds were found in overburden groundwater. Whether the inorganics in excess of their respective SCGs are related to past site operation as a dry cleaner or represent site background conditions will be verified during the remedial design phase (the samples analyzed were un-filtered). Therefore, at this time 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 (PCE)
- trichloroethene (TCE)
- cis-1,2-dichloroethene (cis-1,2-DCE)

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Tetrachloroethene	ND – 700 (ND-None Detect)	5	22 of 27
Trichloroethene	ND - 17	5	11 of 27
cis 1,2-Dichloroethene	ND - 35	5	14 of 27
SVOCs			
None detected above SCGs	-	-	None
Inorganics			
Arsenic	ND - 49	25	2 of 12
Chromium	ND - 460	50	2 of 8
Copper	ND – 320	200	2 of 8
Lead	ND - 140	25	3 of 8
Magnesium	17000 to 77000	35000	6 of 8
Manganese	ND - 20000	300	10 of 12
Pesticides/PCBs			
None detected above SCGs	-	-	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).

Soil

During the RI, eleven (11) soil samples were collected from eight (8) borings. Two samples from under the basement of the on-site structure and nine samples from off-site locations. Subsurface soil samples were collected from a depth of 7 - 20 feet to assess soil contamination impacts to groundwater. Review of the soil analytical results indicates that VOCs were not detected above unrestricted soil cleanup objectives (USCOs) in any of the samples (see Figure 3).

All of the soil samples were analyzed for VOCs; three of the samples were also analyzed for SVOCs, pesticides/PCBs, and inorganics. Two SVOCs were detected at concentrations exceeding their Unrestricted Use Soil Cleanup Objectives (UUSCOs). These were benzo(b)fluoranthene and indeno(1,2,3- cd)pyrene and both were detected in the same soil sample at concentrations only slightly above the UUSCOs. Iron was detected in all three samples above criteria of 2,000 parts per million (CP-51).

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					
None	ND (None Detected)				0 of 11
SVOCs					
Benzo(b)fluoranthene	ND – 1.2	1	1 of 3	1	1 of 3
indeno(1,2,3- cd)pyrene	ND – 0.5	0.5	1 of 3	0.5	1 of 3
Inorganics					
Iron (Criteria 2000; CP-51)	8600 - 21000				3 of 3
Pesticides/PCBs					
None	ND				0 of 3

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.

No site-related soil contamination of concern was identified during the RI. Therefore, no remedial alternatives need to be evaluated for soil.

Soil Vapor

The potential for soil vapor intrusion resulting from the presence of site related groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site, due to the presence of buildings in the impacted area, a full suite of samples were collected to evaluate whether soil vapor intrusion was occurring.

Soil vapor samples were collected from the area around the site. In addition, indoor air samples were collected from the basement of the on-site building (groundwater was present immediately under the basement slab preventing the collection of sub-slab vapor samples), as well as sub-slab vapor and indoor air samples collected from three off-site residential and commercial structures in 2014. During the 2016-2017 heating season, additional SVI sampling was conducted in the on-site building, as well as at five other off-site structures.

The results of the soil vapor samples collected from the area of the site indicate PCE and TCE are present in soil vapor along the southern side of the on-site building (see Figure 4). The results of the 2014 sub-slab vapor and indoor air samples indicate PCE was detected in on-site indoor air above Air Guidance Values and in sub-slab vapor of one of the off-site structures.

The primary soil vapor contaminant is tetrachloroethene (PCE) which is associated with the former on-site dry cleaning operation. Indoor air collected from the on-site building indicated the presence of PCE. During 2014 soil vapor testing in one of the adjacent private residences indicated the presence of PCE in sub-slab vapor. Based on the concentrations detected during 2016-2017, and in comparison with the NYSDOH Soil Vapor Intrusion Guidance, mitigation is recommended for the on-site building, while for the off-site structures assessed, monitoring was recommended for one residential building.

Based on the findings of the Remedial Investigation, the presence of PCE (and its breakdown products) has resulted in the contamination of soil vapor. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of soil vapor to be addressed by the remedy selection process are, PCE, TCE and cis 1,2- DCE.

Sump Water

Two sump water samples were collected in February 2015, one from the on-site structure and the other from an off-site downgradient structure. PCE, TCE and 1,2-DCE were detected in the water sample from the on-site basement sump. Site related contamination was not detected in the sump water sample collected from the off-site structure.

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: In-Situ Groundwater Treatment through ISCO

In-situ chemical Oxidation (ISCO) will be implemented to treat VOC contamination in groundwater. A chemical oxidant will be injected into the subsurface to destroy the contaminants in an approximately 11,000 square foot area inclusive of under the laundromat building, under the parking area/driveway to the north, and also along the adjacent sidewalks to the west, south and southeast of the site, where chlorinated solvents and related compounds were elevated in the groundwater. The basement of the on-site building (source area) is occupied by accessories associated with the laundromat that is housed on the first floor. The number of injection points in the basement are limited due to accessibility issues. However, efforts will be taken to inject the required/optimum amount of chemicals under the basement of the on-site building. The method and depth of injection will be determined during the remedial design.

In situ treatment will significantly reduce contaminant concentrations in the groundwater. ISCO achieves permanent degradation of groundwater contaminants in those areas where it can be effectively implemented.

It is anticipated that the injection wells will be predominately installed in the adjacent public sidewalks, in a parking area/drive way to the north and within the laundromat building. Approximately 25 wells will be installed with spacing between wells of approximately 10 feet (shown on Figure 5). It is assumed that the wells will be 4-inch diameter PVC and will be installed to a depth of approximately 15 feet into the groundwater. The wells will only be screened in the saturated zone. It is anticipated that this alternative will require multiple injection events.

All cracks and openings in the basement of the on-site building, as well as the existing sump, will also be properly sealed to minimize potential vapor intrusion caused by the chemical injection. Also, an active basement ventilation system will be required in the on-site laundromat building. This system will increase the frequency of air change outs in the basement and will also create a positive pressure in the space.

As a part of this alternative an institutional control in the form of an environmental easement, along with a Site Management Plan including any necessary monitoring for soil vapor intrusion, will be required.

Periodic monitoring over a first five-year period is included to assess the effectiveness of proposed remedial measures. Annual OM&M costs during first five-year period will be higher due to multiple sampling events in those years. Thereafter it is assumed that annual groundwater monitoring would be conducted for 30 years or until site SCGs are achieved.

Present Worth: *$600,000*

Capital Cost:.....*$337,000*
Annual Costs: *$13,000*

Alternative 3: In-Situ Groundwater Treatment through Enhanced Bioremediation

Under this alternative, the saturated zone will be treated through enhanced bioremediation via PlumeStop (a liquid activated carbon) and HRC (lactic acid based hydrogen release compound) to treat VOC contamination in groundwater. PlumeStop is composed of very fine particles of activated carbon suspended in water using organic polymer dispersion agents, and HRC is a lactic acid based hydrogen release compound engineered specifically to enhance the in-situ anaerobic bioremediation processes in the subsurface. The product enhances bioremediation through the controlled release of hydrogen.

This alternative involves the injection of products into the aquifer to promote the biological degradation of the chlorinated VOC contamination. In addition to the bioremediation products, PlumeStop Liquid Activated Carbon will be injected throughout the treatment area. PlumeStop is a highly sorptive medium that disperses throughout the plume to rapidly reduce the contaminant concentrations in the groundwater. It will be used in conjunction with enhanced bioremediation product, HRC, to enhance the biodegradation of the sorbed contamination.

It is anticipated that the injection wells will be predominately installed in the adjacent public sidewalks, in a parking area/driveway to the north and within the laundromat building. Efforts will be taken to inject required/optimum amount of chemicals under the basement of the on-site building. Approximately 25 wells will be installed with spacing between wells of approximately 10 feet (shown on Figure 6). One injection event is envisioned. The method and depth of injection will be determined during the remedial design.

All cracks and openings in the basement of the on-site building, as well as the existing sump, will also be properly sealed to minimize potential vapor intrusion caused by the chemical injection. Also, an active basement ventilation system will be required in the on-site laundromat building. This system will increase the frequency of air change outs in the basement and will also create a positive pressure in the space.

As a part of this alternative an institutional control in the form of an environmental easement, along with a Site Management Plan including any necessary monitoring for soil vapor intrusion, will be required.

Periodic monitoring over a first five-year period is included to assess the effectiveness of proposed remedial measures. Annual OM&M costs during first five-year period will be higher due to multiple sampling events per year. Thereafter it is assumed that annual groundwater monitoring would be conducted for 30 years or until site SCGs are achieved.

Present Worth:.....*$516,000*
Capital Cost:.....*$254,000*
Annual Costs:.....*$13,000*

Alternative 4: In-Situ Groundwater Treatment through Chemical Reduction

This alternative includes the injection of products into the aquifer to promote in-situ chemical reduction to chemically reduce the chlorinated VOC contamination to ethane and ethene.

Under this alternative, the saturated zone will be treated through In-situ Chemical Reduction. Though there are a variety of in situ reductive products available for the treatment of groundwater, for cost estimating purposes,

chemical reduction via EHC Liquid (which includes an organic carbon source and zero valent iron (ZVI)) to destroy the VOC contamination is considered here. EHC Liquid utilizes a lecithin substrate and ferrous iron. EHC Liquid is suitable for the treatment of contaminant plumes but not concentrated source areas. Because it is liquid, this product is easier to use and can be injected at lower pressures or even gravity fed through injection wells.

The technology will also enhance the bioremediation processes at the site. EHC includes an organic carbon source and zero valent iron (ZVI). ZVI also can be used for aquifer conditioning, primarily due to its ability to create reducing conditions. EHC products will be injected into the aquifer in a fashion similar to that presented in Alternative 2 to promote in-situ chemical reduction to chemically reduce the chlorinated VOC contamination to ethane and ethene. This technology will eventually achieve permanent degradation of groundwater contaminants in those areas where it can be effectively delivered to subsurface contamination. It is assumed that injections will be conducted during one event.

It is anticipated that the injection wells will be predominately installed in the adjacent public sidewalks, in a parking area/driveway to the north and within the laundromat building. Approximately 25 wells will be installed with spacing between wells of approximately 10 feet (shown on Figure 7). The method and depth of injection will be determined during the remedial design.

The basement of the on-site building (the assumed source area) is occupied by accessories associated with the laundromat that is housed on the first floor. Efforts will be taken to inject the required/optimum amount of chemicals under the basement of the on-site building.

All cracks and openings in the basement of the on-site building, as well as the existing sump, will also be properly sealed to minimize potential vapor intrusion caused by the chemical injection. Also, an active basement ventilation system will be required in the on-site laundromat building. This system will increase the frequency of air change outs in the basement and will also create a positive pressure in the space.

As a part of this alternative an institutional control in the form of an environmental easement, along with Site Management Plan including any necessary monitoring for soil vapor intrusion, will be required.

Periodic monitoring over a five-year period is included to assess the effectiveness of proposed remedial measures. Annual OM&M costs during first five-year period will be higher due to multiple sampling events per year. Thereafter it is assumed that annual groundwater monitoring would be conducted for 30 years or until site SCGs are achieved.

Present Worth: *$444,000*
Capital Cost: *$182,000*
Annual Costs: *$13,000*

Note:

Costs for the mitigation measures for on-site building are not included in the estimated present worth, as these costs are expected to be borne by the property owner.

Exhibit C

Remedial Alternative Costs

	Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1	No Action	0	0	0
2	In-Situ Groundwater Treatment through ISCO	337,000	13,000	600,000
3	In-Situ Groundwater Treatment via PlumeStop and Enhanced Bioremediation	254,000	13,000	516,000
4	In-Situ Groundwater Treatment through Chemical Reduction	182,000	13,000	444,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4, In-Situ Groundwater Treatment through Chemical Reduction as the remedy for this site. Alternative 4 will achieve the remediation goals for the site by injecting in-situ reductive products to enhance the bioremediation processes at the site. Suitable in-situ reductive products will be injected into the aquifer to promote in-situ chemical reduction to chemically reduce the chlorinated VOC contamination to ethane and ethene. The elements of this remedy are described in Section 7. The proposed remedy is depicted in Figure 7.

Basis for Selection

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

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

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

Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternatives 2, 3, and 4 are all protective of human health and the environment and are all viable alternatives for remediation of the site through in-situ treatment of VOC contamination in the saturated zone. All three alternatives provide a similar degree of protection.

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 2, 3 and 4 will significantly reduce contaminant concentrations in the groundwater, but SCGs would not be met for many years until natural processes attenuate the contamination remaining following treatment. All three alternatives provide a similar degree of compliance.

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.

Alternative 2 has been shown to be an effective technology for the chlorinated VOC contaminants present at the site. This alternative is better at treating higher concentration source areas than the lower concentrations found at this site. The benefit of Alternative 2 is that the aquifer is already in an oxidative state and thus amenable to oxidation.

Alternative 3 has been shown to be an effective technology for the chlorinated VOC contaminants present at the site. The use of PlumeStop would serve to reduce contaminant concentrations in the groundwater until the biological processes have established and help to prevent rebound of the groundwater contaminants from the soil matrix. Alternative 4 has also been shown to be effective for the chlorinated VOC contaminants present at the site.

Alternatives 3 and 4 (Alternative 4 - treatment through In-situ Chemical Reduction, which also enhances the bioremediation processes) are better suited to treat lower contaminant concentrations, but require reductive conditions and thus may be limited in effectiveness since the aquifer is already in an oxidative state. Remaining contamination above the SCGs may remain for an extended time. Institutional controls will restrict exposure to contamination, while remediation and natural processes reduce contaminant concentrations.

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

Alternative 2 achieves permanent degradation of groundwater contaminants in those areas where it can be effectively injected/introduced. However, there could be contamination remaining in some areas which are inaccessible and not possible to inject the ISCO product. Potentially inaccessible areas may exist under the basement of the on and off-site structures, as well as a portion of the area under Astoria Boulevard.

Alternative 3 will eventually achieve permanent degradation of groundwater contaminants in those areas where it can be effectively injected/introduced. However, there could be contamination remaining in inaccessible areas of the site as mentioned in the previous paragraph.

Alternative 4 will eventually achieve permanent degradation of groundwater contaminants where it can be effectively injected/introduced into the treatment area. However, as with other alternatives, there could be contamination remaining in inaccessible areas of the site.

All three alternatives should provide a similar degree of contaminant reduction.

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.

Alternative 2 would likely have the most short-term impacts to the community based on the installation of the injection wells and the multiple injection events. Alternative 3 would likely be the most effective in the short term due to the PlumeStop component of this alternative that theoretically provides a faster reduction in contaminant concentrations.

For Alternative 2, 3 and 4 there may be some potential impacts to the public and workers during installation of the injection wells while performing injection and sampling events. However, these can easily be controlled through the use of engineering controls and by limiting access to the laundromat building and adjacent sidewalks during these activities.

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.

Since multiple injections are required for Alternative 2, the injection points would be permanent and would be predominately installed in a public sidewalk, parking area/driveway to the north and within the basement of the on-site building.

Alternative 3 would be the most difficult to implement contractually since both the products and the injections are only available from one source. Alternatives 3 and 4 would be somewhat easier to implement from a technical standpoint since theoretically there will be only one round of injections.

The presence of an active business and a moderately congested Astoria Boulevard present implementability issues during construction and injection events for all three alternatives (Alternative 2, 3 and 4). Measures will be taken to reduce the disruption of business operations within the buildings and surrounding areas.

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 for all three alternatives are almost in the same range (present worth), although alternative 2 is likely to be the most expensive due to the construction of the injection wells and the fact that multiple injection events are assumed. Alternative 2 is the most expensive and least cost effective.

Alternative 4 is the most cost effective because it is effective and least expensive. Alternative 3 is less expensive than Alternative 2 however both are similar in effectiveness.

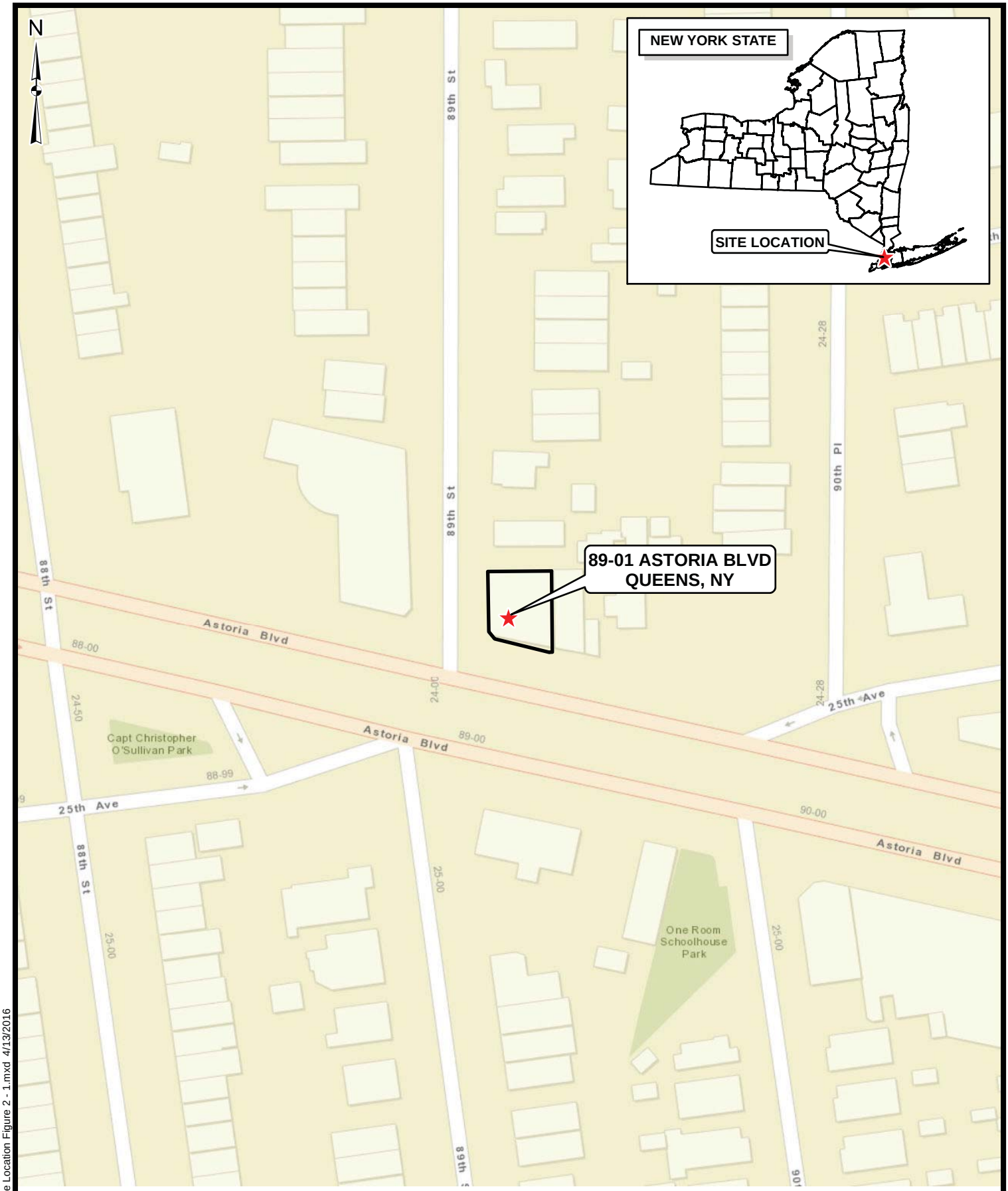
8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

All alternatives (Alternatives 2 through 4) would not affect the future use of the site as a commercial and residential property. All alternatives would be protective for continued site use.

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

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

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



SOURCE: ESRI World Street Map 2015

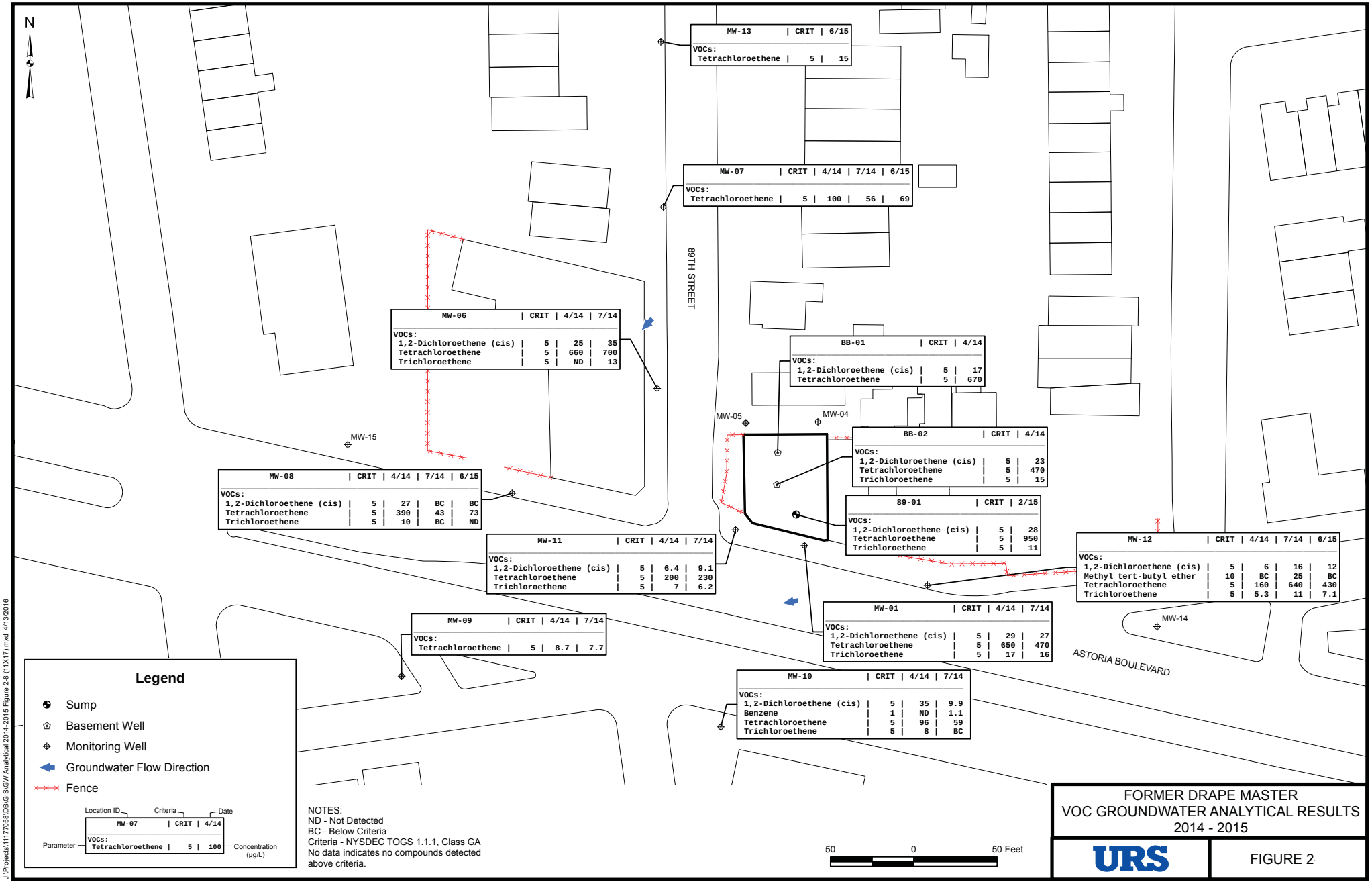
100 0 100 Feet

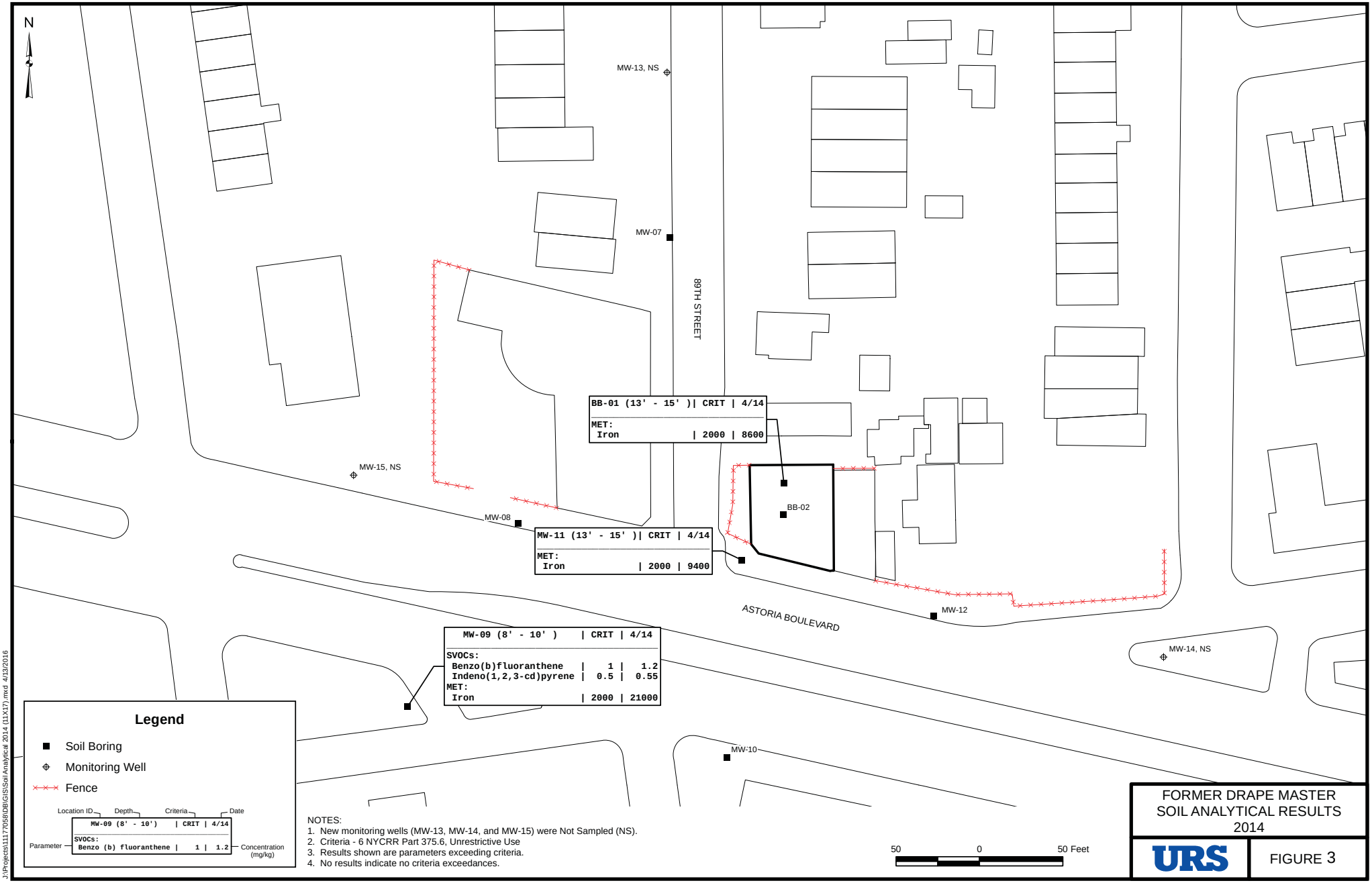
URS

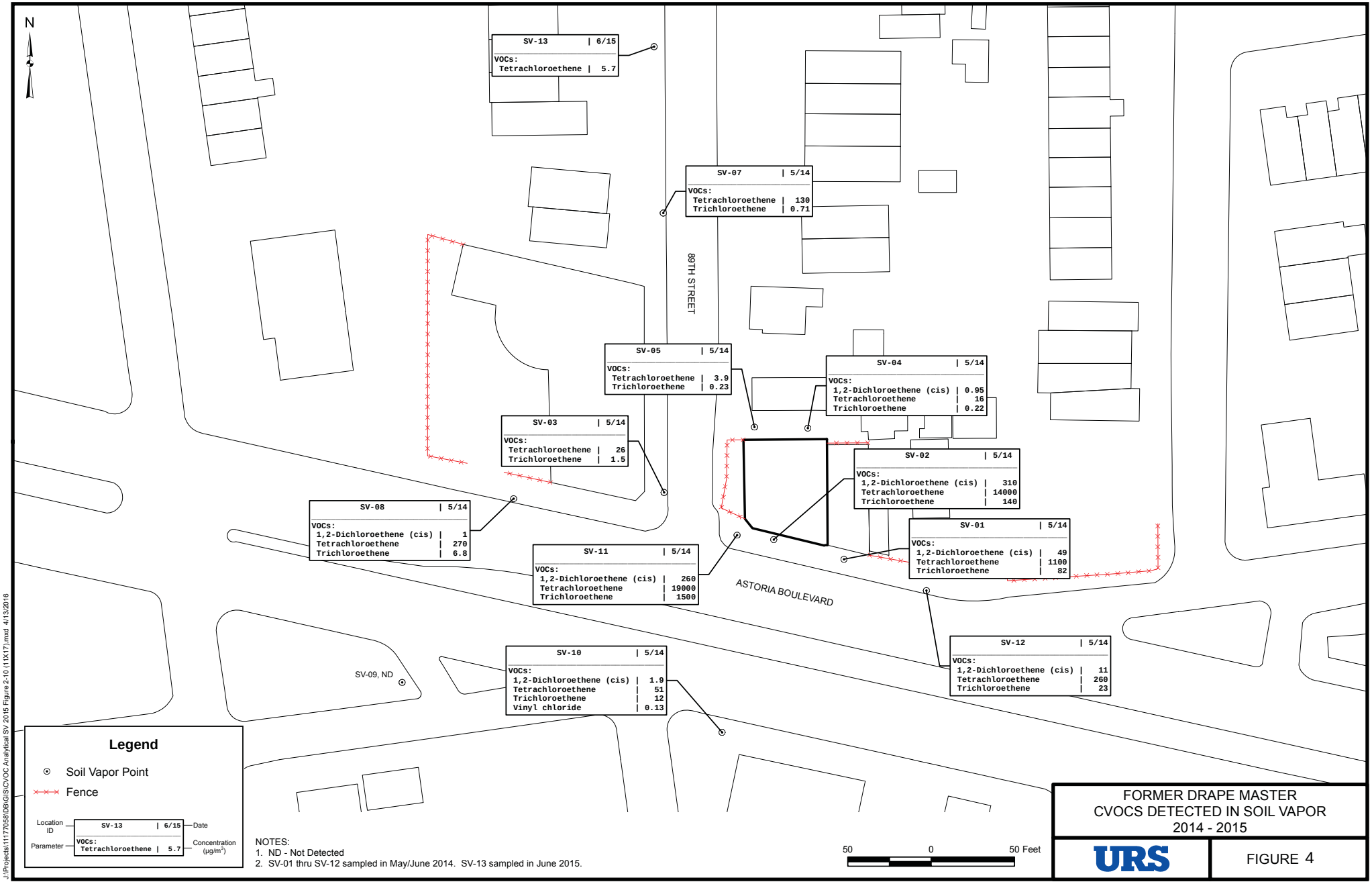
FORMER DRAPE MASTER
SITE LOCATION

FIGURE - 1

J:\Projects\11177058\DB\GIS\Site Location Figure 2 - 1.mxd 4/13/2016


N
MW-13 | CRIT | 6/15
VOCs:
Tetrachloroethene | 5 | 15
MW-07 | CRIT | 4/14 | 7/14 | 6/15
VOCs:
Tetrachloroethene | 5 | 100 | 56 | 69
MW-06 | CRIT | 4/14 | 7/14
VOCs:
1,2-Dichloroethene (cis) | 5 | 25 | 35
Tetrachloroethene | 5 | 660 | 700
Trichloroethene | 5 | ND | 13
BB-01 | CRIT | 4/14
VOCs:
1,2-Dichloroethene (cis) | 5 | 17
Tetrachloroethene | 5 | 670
BB-02 | CRIT | 4/14
VOCs:
1,2-Dichloroethene (cis) | 5 | 23
Tetrachloroethene | 5 | 470
Trichloroethene | 5 | 15
89-01 | CRIT | 2/15
VOCs:
1,2-Dichloroethene (cis) | 5 | 28
Tetrachloroethene | 5 | 950
Trichloroethene | 5 | 11
MW-08 | CRIT | 4/14 | 7/14 | 6/15
VOCs:
1,2-Dichloroethene (cis) | 5 | 27 | BC | BC
Tetrachloroethene | 5 | 390 | 43 | 73
Trichloroethene | 5 | 10 | BC | ND
MW-11 | CRIT | 4/14 | 7/14
VOCs:
1,2-Dichloroethene (cis) | 5 | 6.4 | 9.1
Tetrachloroethene | 5 | 200 | 230
Trichloroethene | 5 | 7 | 6.2
MW-12 | CRIT | 4/14 | 7/14 | 6/15
VOCs:
1,2-Dichloroethene (cis) | 5 | 6 | 16 | 12
Methyl tert-butyl ether | 10 | BC | 25 | BC
Tetrachloroethene | 5 | 160 | 640 | 430
Trichloroethene | 5 | 5.3 | 11 | 7.1
MW-09 | CRIT | 4/14 | 7/14
VOCs:
Tetrachloroethene | 5 | 8.7 | 7.7
MW-01 | CRIT | 4/14 | 7/14
VOCs:
1,2-Dichloroethene (cis) | 5 | 29 | 27
Tetrachloroethene | 5 | 650 | 470
Trichloroethene | 5 | 17 | 16
MW-10 | CRIT | 4/14 | 7/14
VOCs:
1,2-Dichloroethene (cis) | 5 | 35 | 9.9
Benzene | 1 | ND | 1.1
Tetrachloroethene | 5 | 96 | 59
Trichloroethene | 5 | 8 | BC
MW-15
MW-05
MW-04
MW-14
89TH STREET
ASTORIA BOULEVARD
Legend
Sump
Basement Well
Monitoring Well
Groundwater Flow Direction
Fence
Location ID
Criteria
Date
MW-07 | CRIT | 4/14
VOCs:
Tetrachloroethene | 5 | 100
Parameter
Concentration (µg/L)
NOTES:
ND - Not Detected
BC - Below Criteria
Criteria - NYSDEC TOGS 1.1.1, Class GA
No data indicates no compounds detected above criteria.
50 0 50 Feet
FORMER DRAPE MASTER
VOC GROUNDWATER ANALYTICAL RESULTS
2014 - 2015
URS
FIGURE 2
J:\Projects\11177058\DB\GIS\GW Analytical 2014-2015 Figure 2-8 (11X17).mxd 4/13/2016


N
MW-13, NS
MW-07
89TH STREET
BB-01 (13' - 15')| CRIT | 4/14
MET:
Iron | 2000 | 8600
MW-15, NS
BB-02
MW-08
MW-11 (13' - 15')| CRIT | 4/14
MET:
Iron | 2000 | 9400
ASTORIA BOULEVARD
MW-12
MW-14, NS
MW-09 (8' - 10') | CRIT | 4/14
SVOCs:
Benzo(b)fluoranthene | 1 | 1.2
Indeno(1,2,3-cd)pyrene | 0.5 | 0.55
MET:
Iron | 2000 | 21000
MW-10
Legend
Soil Boring
Monitoring Well
Fence
Location ID
Depth
Criteria
Date
MW-09 (8' - 10') | CRIT | 4/14
SVOCs:
Parameter
Benzo (b) fluoranthene | 1 | 1.2
Concentration (mg/kg)
NOTES:
1. New monitoring wells (MW-13, MW-14, and MW-15) were Not Sampled (NS).
2. Criteria - 6 NYCRR Part 375.6, Unrestrictive Use
3. Results shown are parameters exceeding criteria.
4. No results indicate no criteria exceedances.
50
0
50 Feet
FORMER DRAPE MASTER
SOIL ANALYTICAL RESULTS
2014
URS
FIGURE 3
J:\Projects\1117\7058\DB\GIS\Soil\Analytical 2014 (11X17).mxd 4/13/2016


N
SV-13 | 6/15
VOCs:
Tetrachloroethene | 5.7
SV-07 | 5/14
VOCs:
Tetrachloroethene | 130
Trichloroethene | 0.71
89TH STREET
SV-05 | 5/14
VOCs:
Tetrachloroethene | 3.9
Trichloroethene | 0.23
SV-04 | 5/14
VOCs:
1,2-Dichloroethene (cis) | 0.95
Tetrachloroethene | 16
Trichloroethene | 0.22
SV-03 | 5/14
VOCs:
Tetrachloroethene | 26
Trichloroethene | 1.5
SV-02 | 5/14
VOCs:
1,2-Dichloroethene (cis) | 310
Tetrachloroethene | 14000
Trichloroethene | 140
SV-08 | 5/14
VOCs:
1,2-Dichloroethene (cis) | 1
Tetrachloroethene | 270
Trichloroethene | 6.8
SV-01 | 5/14
VOCs:
1,2-Dichloroethene (cis) | 49
Tetrachloroethene | 1100
Trichloroethene | 82
SV-11 | 5/14
VOCs:
1,2-Dichloroethene (cis) | 260
Tetrachloroethene | 19000
Trichloroethene | 1500
ASTORIA BOULEVARD
SV-12 | 5/14
VOCs:
1,2-Dichloroethene (cis) | 11
Tetrachloroethene | 260
Trichloroethene | 23
SV-09, ND
SV-10 | 5/14
VOCs:
1,2-Dichloroethene (cis) | 1.9
Tetrachloroethene | 51
Trichloroethene | 12
Vinyl chloride | 0.13
Legend
Soil Vapor Point
Fence
Location ID
SV-13 | 6/15
Date
VOCs:
Tetrachloroethene | 5.7
Parameter
Concentration (µg/m3)
NOTES:
1. ND - Not Detected
2. SV-01 thru SV-12 sampled in May/June 2014. SV-13 sampled in June 2015.
50 0 50 Feet
FORMER DRAPE MASTER
CVOCS DETECTED IN SOIL VAPOR
2014 - 2015
URS
FIGURE 4
J:\Projects\11177058\DB\GIS\CVOC Analytical SV 2015 Figure 2-10 (11X17).mxd 4/13/2016

N

MW-13, 15

891TH STREET

MW-07, 69

MW-06, 700

700

600

500

400

300

200

100

MW-05, ND

MW-04, NS

MW-15, ND

ASTORIA BOULEVARD

MW-08, 73

MW-11, 230

MW-01, 470

MW-12, 430

MW-14, ND

MW-09, 7.7

MW-10, 59

Legend

- Proposed Injection Well
- Monitoring Well
- Fence
- 100 Concentration (µg/L)

Location Identifier — MW-10, 59 — Tetrachloroethene Concentration (µg/L)

NOTES:
1. ND - Not Detected
2. NS - Not Sampled
3. Most recent PCE concentrations used for each monitoring well location

50 0 50 Feet

FORMER DRAPE MASTER
ALTERNATIVE 2
IN-SITU GROUNDWATER TREATMENT
THROUGH ISCO

URS

FIGURE 5

J:\Projects\11177058\DB\GIS\Revised Final FS Report\05-01 Proposed Injection Well Alt 2.mxd 12/1/2017

N

MW-13, 15

891TH STREET

MW-07, 69

MW-06, 700

700

600

500

400

300

200

100

MW-05, ND

MW-04, NS

MW-15, ND

ASTORIA BOULEVARD

MW-08, 73

MW-11, 230

MW-01, 470

MW-12, 430

MW-14, ND

MW-09, 7.7

MW-10, 59

Legend

- Proposed Injection Boring
- Monitoring Well
- Fence
- 100 Concentration (µg/L)

Location Identifier — MW-10, 59 — Tetrachloroethene Concentration (µg/L)

NOTES:
1. ND - Not Detected
2. NS - Not Sampled
3. Most recent PCE concentrations used for each monitoring well location

50 0 50 Feet

FORMER DRAPE MASTER
ALTERNATIVE 3
IN-SITU GROUNDWATER TREATMENT THROUGH ENHANCED BIOREMEDIATION

URS

FIGURE 6

J:\Projects\11177058\DB\GIS\Revised Final FS Report\05-02 Proposed Injection Well Alt 3.mxd 12/1/2017

N

MW-13, 15

891TH STREET

MW-07, 69

MW-06, 700

700

600

500

400

300

200

100

MW-05, ND

MW-04, NS

MW-15, ND

ASTORIA BOULEVARD

MW-08, 73

MW-11, 230

MW-01, 470

MW-12, 430

MW-14, ND

MW-09, 7.7

MW-10, 59

Legend

- Proposed Injection Boring
- Monitoring Well
- Fence
- 100 Concentration (µg/L)

Location Identifier — MW-10, 59 — Tetrachloroethene Concentration (µg/L)

NOTES:
1. ND - Not Detected
2. NS - Not Sampled
3. Most recent PCE concentrations used for each monitoring well location

50 0 50 Feet

FORMER DRAPE MASTER
ALTERNATIVE 4
IN-SITU GROUNDWATER TREATMENT
THROUGH CHEMICAL REDUCTION

URS

FIGURE 7

J:\Projects\11177058\DB\GIS\Revised Final FS Report\05-03 Proposed Injection Well Alt 4.mxd 12/1/2017