PROPOSED REMEDIAL ACTION PLAN

75-09 Woodhaven Boulevard (Home Depot Off-site)
Operable Unit Number 01: On-site Remedial Program
Operable Unit Number 02: Off-site Remedial Program
State Superfund Project
Rego Park, Queens County
Site No. 241036
February 2019

NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

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 75-09 Woodhaven Boulevard site and migration off-site resulted in threats to public health and the environment that were addressed by actions previously taken by the volunteer under the Department's Voluntary Cleanup Program (VCP) at the Home Depot in Woodhaven Blvd. & Metropol VCP site ("Home Depot", Site No. V00095). The volunteer addressed the on-site source area by implementing a remedial program approved the Department. The remedial actions undertaken at the VCP site by the volunteer are discussed in Section 6.2.

Based on the implementation of the VCP remedial program on-site, the off-site remedial investigation (RI) determined that the site no longer poses a significant threat to human health or the environment, provided that appropriate institutional controls and engineering controls (ICs/ECs) remain in place. The remedial program conducted by the volunteer at the Home Depot site attained and/or is expected to attain the remedial action objectives identified for the site, which are presented in Section 6.5, for the protection of public health and the environment. Limited In-Situ Chemical Oxidation (ISCO) treatment with Site Management is the remedy proposed by this Proposed Remedial Action Plan (PRAP) for the site. Site management, which will include continued operation of any remedial system installed during the remedial program on-site and the implementation of any prescribed institutional ICs/ECs that have been identified as being part of the proposed remedy for the site. This PRAP identifies the remedial program activities previously conducted under the VCP and discusses the basis for limited ISCO treatment for off-site.

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 repository 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 Public Library, North Forest Park Branch
Attn: Ms. Frances S. Tobin
98-27 Metropolitan Avenue
Forest Hills, NY 11375
Phone: (718) 261-5512

Community Board #5
Attn: Gary Giordano, District Manager
61-23 Myrtle Avenue
Glendale, NY 11385

Community Board #6
Attn: Frank P. Gulluscio, District Manager
104-01 Metropolitan Avenue
Forest Hills, NY 11375
Phone: 718-263-9250

A public comment period has been set from:

02/27/2019 to 03/29/2019

A public meeting is scheduled for the following date:

03/11/2019 at 06:00 PM

Public meeting location:

Queens Library at North Forest Park - Public library

98-27 Metropolitan Ave, Forest Hills, NY 11375

At the meeting, the findings of the remedial investigation (RI) 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 03/29/2019 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 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 75-09 Woodhaven Boulevard (Home Depot Off-Site) site (Operable Unit (OU) 1) comprises a portion of the Home Depot Voluntary Cleanup Program (VCP) site (Site No. V00095) and is 0.692 acres. The off-site area (OU2) is located southwest, south and southeast of the site. Approximately 90 acres of the off-site area have been investigated in the area bounded by 88th Street to the west, Forest View Crescent building and the end of 81st Road to the east, and Forest Park to the south.

Site Features: OU1 is currently used as part of a home improvement/building supply retail business. It makes up a small portion of the overall store complex; the nursery/garden section and the paved receiving area are located on the site. The OU2 area consists of mostly residential and some commercial uses to the west and southwest across Woodhaven Boulevard. To the south and immediately adjacent to the site are LIRR tracks and the Seither Ballfield. Further south is mostly residential, followed by Forest Park.

Current Zoning and Land Uses: The parcels within the investigated area are used for a combination of residential and commercial purposes. An abandoned railroad line is located east of the site, followed by a NYC public school (which was remediated under the VCP as Site No. V00500). Zoning of OU1 is M1-1 (manufacturing) and OU2 is a combination of Residence (R), Commercial

(C) and Manufacturing (M) districts.

Past Use of the Site: On-site - A single story building was constructed on the site between 1936 and 1950 with an addition annexed to the northern portion in 1960. The building was utilized as a steel warehouse in 1950. From 1967 to 1977 a knitting mill was operated on this property. Allborough Dist. Inc. (distributor of stationery and office supplies) bought the property in 1977 and utilized the building for office and warehouse purposes. The on-site building was demolished in 1998. Prior uses that may have led to site contamination include knitting mill operations, and steel warehousing.

In May 1997, a Voluntary Cleanup Agreement (VCA) was executed between the Department and the site owner as a part of the VCP. The VCP site was comprised of several lots including lot 46. The limits of the Home Depot on-site property include former lot 46 (which was merged with several other lots in 2008 and now collectively form lot 74).

In 1998, as a part of the VCP project, contaminated soil was excavated and removed from the Home Depot on-site area. A soil vapor extraction/air sparging (SVE/AS) system was designed by the volunteer and put in operation during October 1999 to remediate the remaining contamination in soil and groundwater from the VCP site. During December 2010, the volunteer completed the installation of an expanded AS/SVE system, which also targeted the deeper contamination at the Home Depot on-site area to prevent off-site migration of a plume of tetrachloroethylene (PCE). In 2017 and 2018, under a Remedial Optimization Work Plan (ROWP), the volunteer installed a new SVE/AS system and injected chemicals through 44 injection wells targeting the source area.

Between 2002 and 2006 the Department conducted investigations to collect off-site groundwater and soil vapor samples, and to conduct a soil vapor intrusion (SVI) study in 10 homes on the south side of the Seither Ballfield. The results of the SVI study indicated that actions were not needed to address exposures associated with soil vapor intrusion. The site was placed on the Registry of Inactive Hazardous Waste Disposal sites in 2007 so that a remedial program could be conducted for the contamination that has migrated off-site. Several phases of remedial investigations were conducted to further delineate the off-site PCE contamination.

Operable Units: An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

This site has two operable units. Operable unit 1 (OU1) is 0.692 acres of the 6.196-acre VCP site (V00095), which is the on-site source. Operable unit 2 (OU2) consists of the off-site soil, groundwater and soil vapor plumes.

Site Geology and Hydrogeology: The geology of the off-site area includes an upper unconsolidated formation primarily consisting of poorly sorted mix of highly variable sediments sand, cobbles and boulders. A confining clay layer is present at a depth of approximately 150 feet below grade close to the site. The depth of groundwater ranges from 55’-65’ close to the site. Further south (approximately 2,500 feet from the site), the groundwater depth is approximately 137’ below grade. Groundwater flow at shallow depths (at or near the water table) has

southwesterly and southeasterly components that converge south of site. Groundwater at intermediate depths (35-50 feet below water table) flows southeast.

Operable Unit (OU) number 1 is a No Further Action remedy. OU number 2 (OU2) is limited ISCO injection with monitoring. OU 2 is the focus of the remedy discussion that follows in this document.

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, an alternative which allows for unrestricted use of the site was evaluated.

A comparison of the results of the investigation against unrestricted use standards, criteria and guidance values (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:

Standard Tube Sales of New England

All Borough Distributors, Inc.

A.D.I. International Ltd.

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 vapor points and monitoring well installations,
- Sampling of subsurface soils, groundwater, and soil vapor,
- Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil 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 for this Operable Unit at this site is:

tetrachloroethene (PCE)

Based on the investigation results, comparison to the SCGs, and the potential public health and environmental exposure routes, certain media and areas of the site required remediation. These media were addressed by the volunteer described in Section 6.2. More complete information can be found in the RI Report and the Final Engineering Report (FER) for the VCP site.

6.2: Remedial Actions at Source Area by Volunteer

This document pertains to contamination that emanated from source areas on the Home Depot VCP site. The volunteer addressed the on-site source area by implementing the Department's approved May 1997 remedial work plan, April 2010 Revised AS-SVE Expansion Work Plan, as well as by implementing a Remedial Optimization Work Plan in early 2018. These actions are summarized below:

1998 - Excavation of PCE-contaminated soil was performed in an approximately 4,000-square foot area to depths between two and six feet below grade. A total of 3,228 tons of contaminated soils were removed and disposed off-site as hazardous waste.

1999 - An air sparge/soil vapor extraction (AS/SVE) system targeting the source areas, the area immediately downgradient of the source area, and the downgradient boundary of the VCP site was constructed and began operating.

2005 - The AS/SVE system was expanded to address contamination at a depth of approximately 30 feet below the water table in the southwestern portion of the VCP site. The AS/SVE system was designed to include 35 air sparge (AS) wells, and 21 soil vapor extraction (SVE) wells. The AS and SVE blowers operated continuously for approximately 12 hours per day and remained off overnight to minimize noise during nighttime hours.

2010 - The AS/SVE system was again expanded. An addition in the southwestern corner of the VCP site was installed to provide further remediation in the southern source area by extending the sparging system deeper into the saturated zone to treat contamination below the level of the existing sparge wells. An addition along the southern and southeastern boundaries was installed to prevent potential off-site migration by treating the PCE identified in the intermediate groundwater depth (30 feet below the water table) while also remediating the shallow groundwater interval. Finally, an extension of the AS/SVE in the northern source area was added to prevent potential eastern migration of the contaminant plume.

2017-2018 - Implementation of a Remedial Optimization Work Plan (ROWP) was deemed necessary, as the treatment system had become inefficient. The ROWP consisted of a combination of in-situ chemical injection and an expansion of the AS/SVE system in various source areas.

6.3: Summary of Environmental Assessment

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

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OU 02 (i.e., for the off-site investigation area).

Nature and Extent of Contamination: Soil, groundwater and soil vapor were analyzed for volatile organic compounds (VOCs). Based upon the investigations conducted to date, the primary contaminant of concern is tetrachloroethylene (PCE).

Soil - During the Phase I Remedial Investigation (September 2010), soil samples were collected from depth intervals near the water table to determine whether contamination was present in the off-site subsurface. The analytical results indicated that VOCs were not detected in any of the soil samples collected from the borings advanced during the RI drilling program.

Groundwater - Data from an investigation performed in 2002 indicated that a groundwater plume had migrated off-site, with PCE concentrations up to 6,600 parts per billion (ppb) immediately downgradient of the site. Further downgradient migration of the PCE plume was confirmed during an off-site remedial investigation which was initiated in February 2010. Data from that study revealed PCE concentrations up to 1,300 ppb and 1,100 ppb approximately 400 and 550 feet downgradient from the site at depths of approximately 110 feet below grade (fbg), respectively. Subsequent phases of the investigation were conducted in March 2013, March 2014 and June 2015. The June 2015 investigation detected PCE contamination at depths of 40 to 50 feet below the groundwater table (the groundwater depth is approximately 112 feet below grade) approximately 2,000 feet downgradient from the site, close to Forest Park, with concentrations ranging from 230 to 1,900 ppb.

Soil Vapor and Indoor Air - Soil vapor data indicates the presence of PCE in soil vapor southwest of the site, west of Woodhaven Boulevard. In 2013 additional soil vapor data confirmed that elevated concentrations of PCE exist southwest of the site, across Woodhaven Blvd. Low levels of PCE degradation products, trichloroethene (TCE) and vinyl chloride (VC), were also detected in several soil vapor samples southwest of the site. During 2006 soil vapor intrusion sampling was conducted at 10 residential structures and no actions were needed to address the potential for exposure. Additional data collected in March 2014 confirmed that contaminated groundwater migrating from the site is not causing significant impacts to soil vapor. The Department will perform additional soil vapor, along with SVI investigation work if necessary, during Site Management.

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 the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds in the groundwater may move into the soil vapor (air space 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. Soil vapor intrusion sampling has concluded that actions were not needed to address soil vapor intrusion at some off-site structures. Additional monitoring is recommended to further assess the potential for exposure associated with soil vapor intrusion.

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 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 PROPOSED REMEDY

Based on the results of the investigations, the actions performed by the Volunteer, and the evaluation presented here, the Department is proposing limited in-situ chemical oxidation (ISCO) with site management remedy for off-site contamination. This proposed remedy does not change the selected remedy for OU 01 which was performed by the Volunteer. An extensive soil vapor extraction/air sparge (SVE/AS) system was installed and will continue operating to treat the contaminant source as well as preventing further off-site migration of the PCE plume. Additionally, a site cover in place on-site. The Department believes that this remedy is protective of public health and the environment and satisfies the remediation objectives described in Section 6.5.

In addition to the remedial actions that have been implemented for OU 1, ISCO with site management is the proposed alternative for OU 2. These actions, combined with natural attenuation and degradation processes, have begun and will continue to reduce contaminant concentrations in the off-site plume.

1. In-Situ Chemical Oxidation (ISCO):

In-situ chemical oxidation (ISCO) will be implemented to treat PCE contaminants in groundwater. A chemical oxidant will be injected into the subsurface to destroy the contaminants in an approximately 14,400 square foot area located in the south side of Seither

Field along abandoned railway line where PCE contaminations were elevated in the groundwater via injection wells screened from 80 to 120 feet. The method and depth of injection will be determined during the remedial design.

Prior to the full implementation of this technology, laboratory and pilot scale studies will be conducted to more clearly define design parameters. Between the pilot and the full-scale implementations, it is estimated that total of 46 injection points will be installed. It is estimated that the chemical oxidant will be injected during approximately five separate events over a five-year period.

2. A Site Management Plan is required, which includes a Monitoring Plan to assess the performance and effectiveness of the remedy. The existing site management plan for OU1 will be updated to include the following:

   a. a Monitoring Plan to assess the performance and effectiveness of the remedy implemented for OU 1 under the Home Depot On-Site project and monitoring for OU 2. The updates will include, but may not be limited to:

   - monitoring of groundwater at the off-site area to assess the performance and effectiveness of the on-site remedy;
   - a schedule of monitoring and frequency of submittals to the Department;
   - Soil vapor intrusion sampling of potentially impacted buildings, as determined to be necessary by the New York State Department of Health including a provision for implementing actions recommended to address exposures related to soil vapor intrusion; and,
   - the steps necessary for the periodic reviews and certifications.

Exhibit A

Nature and Extent of Contamination

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

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into just one category; volatile organic compounds (VOCs). 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. Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas were identified at the site include,

PCE releases were identified in soil underlying the former building at the Home Depot On-Site VCP. PCE concentrations were detected in soil samples at up to 8,000 parts per million (ppm) during the October 1996 Supplementary Sampling conducted under the Voluntary Cleanup Program. This concentration was identified under the building floor slab of the northern portion of the site. A second PCE detection of 18 ppm was identified in the southern portion of the building which is the southern PCE source area identified in Figure 2.

The waste/source areas identified at the site are being actively remediated by the volunteer for the Home Depot On-Site VCP project (site #V00095) described in Section 6.2.

Groundwater

The contaminant of concern at the off-site area (Operable Unit Number 02) is PCE and the 'source area' is located within the Home Depot On-Site VCP site. Remedial actions implemented within the VCP site are addressing the source, as well as preventing further migration of the PCE plume towards downgradient locations. The investigation of the off-site area focused on the extent of the PCE plume that has migrated from the site in the downgradient direction (generally south). Groundwater depths within the study area varies from 55-65 feet below grade surface (bgs) close to the Home Depot site, to approximately 137 feet bgs furthest south, 2,600 feet away from the source. To delineate the horizontal and vertical extent of the PCE plume during the five phases of investigation, ten (10) shallow wells (depth ranges 65'-100' bgs), eleven (11) intermediate depths wells (111'-165' bgs) and two (2) deep monitoring wells (depth ranges 150'-165' bgs) were installed. Bedrock was not encountered at any locations and all monitoring wells are considered overburden wells.

Based on August 2015 groundwater data (within Operable Unit Number 02), the highest PCE concentration detected in MW-14I (intermediate depth well) was 1,900 µg/l at a depth of 150 feet bgs (groundwater depth at this location is 110 feet bgs and the well is located approximately 1,800 feet downgradient from the source). The

2015 groundwater data also support that the PCE plume is very elongated and relatively narrow at intermediate depths.

For the purpose of the Feasibility Study (FS), the extent of the plume to be considered for active remediation was established as the groundwater containing PCE at concentrations approximately 100 µg/l or greater. The 40-foot thick groundwater plume assessed for active remediation is approximately 660 feet wide, 2,600 feet long, and 165 feet deep at the southernmost extent of the investigation area (please see Figure 3A and cross sections 3B and 3C). The remaining groundwater contamination was assumed to be addressed through long term monitoring and/or natural attenuation.

All groundwater samples were analyzed for VOCs only, as the investigations at the Home Depot on-site investigations had indicated the VOC plume migrating from there to be the only site-related concern. None of the groundwater samples were analyzed for SVOCs, inorganics or pesticides/PCBs.

Table #1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Tetrachloroethene (PCE)	ND -1900	5	16 of 22
Trichloroethene (TCE	ND - 6.2	5	1 of 22
cis-1,2-Dichloroethene	ND – 4.9 (in 1well)	5	0 of 22
Vinyl Chloride (VC)	ND	2	0 of 22
Methyl tert-butyl ether	ND – 23 (in 5 well)	10	1 of 22
Chloroform	ND - 3	7	0 of 22
SVOCs			
Not Analyzed			
Inorganics			
Not Analyzed			
Pesticides/PCBs			
Not Analyzed			

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

Groundwater contamination identified during the RI was addressed by the volunteer at the source area as described in Section 6.2.

Based on the findings of the RI, the past disposal of hazardous waste (PCE) 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 is:

- Tetrachloroethene (PCE)

Soil

As mentioned above in the Groundwater Section, the Site related contaminant of concern is PCE and the source area is located within the Home Depot VCP site. One objective of the 75-09 Woodhaven Boulevard Off-site RI was to determine the downgradient areal extent of the impacted groundwater. To collect data for vertical distribution of groundwater contamination, a series of shallow (~70 ft depth), intermediate (~110 ft depth), and deep (~150 ft depth) wells were installed during Phase I and Phase II off-site RI.

During RI Phase I (August 2010), soil samples were collected while drilling five intermediate wells from depth intervals near the water table to determine whether residual contamination was present at depth in the off-site subsurface. The analytical results indicate that VOCs were not detected above the minimum detection limit in any of the soil samples collected from the borings advanced during the Off-site RI drilling program.

Additional soil samples were collected during drilling of the RI Phase II (October 2011) wells; however, none of the samples were submitted for laboratory analysis since field screening did not indicate the presence of VOCs in the soil. This decision was supported by the fact that off-site soil samples collected during the previous phase of investigation nearer the source area yielded no detections of contaminants, despite their proximity to the former source area.

Table #2 - Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
VOCs					
Tetrachloroethene (PCE)	ND	1.3	0	5.5	0 of 7
SVOCs					
Not Analyzed					
Inorganics					
Not Analyzed					
Pesticides/PCBs					
Not Analyzed					

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, unless otherwise noted.

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

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

Based on the findings of the Remedial Investigations, the presence of PCE has resulted in the contamination of soil on-site i.e., on voluntary cleanup program site. The site contaminants identified in soil which are considered to be the primary contaminants of concern, are already being addressed by the volunteer of the Home Depot VCP site. No site-related soil contamination of concern was identified at the Home Depot Off-Site area 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 soil or groundwater contamination was evaluated by the sampling of soil vapor along sidewalks in the study area (Operable Unit Number 02) during the off-site RI. The off-site vapor evaluation was limited to sidewalks in this phase of work because the Department had previously conducted a Soil Vapor Intrusion (SVI) evaluation in ten (10) homes just downgradient and adjacent to the Home Depot on-site VCP site and no actions were needed to address the potential for exposure.

During the Off-Site RI Phase I and Phase II, a total of thirty (30) soil gas points were installed. Most of the soil gas points were located west/ southwest from the site and were placed in the sidewalks of residential neighborhoods. During the 2010 Phase I sampling, detections of PCE were noted in several soil gas points, ranging from 1.8 to 5,800 micrograms per meter cube (µg/m3) in the 13 soil gas samples collected.

The second phase of soil vapor sampling was conducted during October 2011. The field effort consisted of resampling the 13 soil vapor points installed and sampled during 2010 and sampling the additional 17 points installed during 2011. Detections of PCE were made in several soil gas points ranging from 4 to 2,000 µg/m3.

Notable detections of PCE from the 2011 sampling event were seen at SG-2 (2000 µg/m3), SG-3 (1500 µg/m3), SG-4 (200 µg/m3) and SG-7 (190 µg/m3). These soil gas sampling points were located adjacent to the site and across Woodhaven Boulevard (west side) near the residential areas. However, soil gas sampled from further west (within the residential areas) detected much lower concentrations of PCE (ranging from 3.9 to 290 µg/m3) with an exception at SG-22, where PCE was detected at1000 µg/m3. This location was furthest downgradient, near the intersection of Union Turnpike and 88th Street.

During the February 2013 Phase III investigation, an additional 15 soil gas points were installed within the same residential area but at other locations of potential concern (all these points were located on the west side of Woodhaven Boulevard). The most noteworthy detections included PCE at 1,900 µg/m3 from SG-34 along 88th Street, and PCE at a concentration of 820 µg/m3 at SG-45 along the north side of Union Turnpike. Vinyl chloride was also detected in four samples – all located toward the southwestern corner of the sampling area (points SG-37, SG-38, SG-43, and SG-44). The PCE detections noted above were by far the highest concentrations with no other compounds detected at levels exceeding 50 µg/m3.

Assessing all of the soil vapor sampling results collected during the three phases of study, it appears that relatively significant concentrations of PCE exist in several isolated areas, providing evidence for multiple sources since

some of the highest localized detections are at outlying points, far from the assumed source at the Home Depot property (for example, those along Union Turnpike and 88th Street).

An additional four soil vapor points were installed during a March 2014, Phase IV study to supplement the points at SG-22 (1000 µg/m3) and SG-34 (1900 µg/m3), where relatively high PCE detections occurred during previous phases of investigation. The depths of the initial vapor points were set at a shallow depth of approximately 8-ft below grade, while the Phase IV co-located soil vapor points were set at intermediate depth interval of approximately 20-ft, and at a deeper depth interval of approximately 40-ft below grade. The purpose of this investigation was to understand if the PCE contaminated soil vapor at those two locations was coming from a deeper source (i.e., from the contaminated groundwater plume) beneath the water table at those locations, or perhaps from a separate, more localized source. The results indicated that the PCE contaminated vapors were present in the deeper subsurface (i.e., 40 ft bgs), but at levels an order of magnitude lower versus the levels in the shallow and intermediate zones (Figure 4). This suggests that a more localized source is responsible for soil vapor contamination detected in the shallow and intermediate zones.

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, i.e., at the75-09 Woodhaven Boulevard (Home Depot Off-site) site within Operable Unit Number 02.

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: Limited ISCO with Site Management

This alternative utilizes the In-Situ Chemical Oxidation (ISCO) remedial technology to treat the groundwater through injection of a chemical reagent to oxidize the organic contaminants. Under this alternative in-situ chemical oxidation (ISCO) will be implemented to treat contaminants in groundwater using injections along a single transect across the PCE contaminated plume immediately downgradient from the on-site source. As groundwater passes through the treatment zone created by the injection transect, contaminants would be chemically oxidized as they come into contact with the reagents, reducing PCE concentrations in the groundwater. As the reagent disperses/degrades in the treatment zone, subsequent injections (assumed to be once per year) would be conducted to maintain the oxidizing treatment zone.

It is estimated that chemicals will be injected annually for a period of five years along this transect. At the same time, groundwater monitoring will continue on a periodic basis for a period of thirty years. After five injections, groundwater monitoring is anticipated to show degradation of the PCE plume and/or evidence of natural attenuation both at the source and downgradient. If monitoring indicates that PCE concentrations have not decreased in the downgradient locations, additional ISCO injections will be performed downgradient in the vicinity of Floral Park.

Chemical oxidation would consist of the injection of a chemical/reagent such as liquid peroxide (H_2O_2), permanganate (KMnO4), or Modified Fenton's Reagent® into the subsurface to degrade the organic contaminants. Fenton's Reagent is very effective at destroying organic contamination through chemical oxidation and reduction. This alternative would include bench scale testing to determine the most appropriate type of reagent and dosage. Analysis of the soil oxidant demand would be used to determine the reagent dosage to achieve the desired contaminant reduction.

To be effective, ISCO relies on dispersion of the oxidizing reagent across the aquifer to achieve the required direct contact with the contaminant plume. The radius of influence (ROI) of the ISCO injection wells was assumed to be 10 feet to ensure complete distribution in the aquifer. Figure 5 provides the conceptual ISCO injection well plan and performance monitoring within the active remediation area.

A Site Management Plan will be required and will include long-term groundwater monitoring using existing monitoring wells to document the reduction in the mobility, toxicity, or concentrations of PCE in groundwater.

The estimated width of the plume area at the proposed transect is approximately 400 feet. With an assumed radius of influence (ROI) of ten feet and, with two feet of overlap in two rows approximately 46 wells will be needed to implement the remedy.

For the purposes of the alternative analysis, it is assumed that each proposed injection well will have a 40-foot screen interval and an average depth ranging from 80 to 120 feet below ground surface (bgs) for the off-site contaminant treatment area. Pilot testing and field measurements during the Remedial Design will be conducted to verify the assumptions above and finalize the exact number, placement, and depth of injection wells.

The estimated cost to implement this alternative is $5.0M. The estimated cost for the contingency plan ranges from $3M to $7M, depending the efficiency of the proposed remedy.

Present Worth: *$5,000,000*
Capital Cost: *$1,600,000*
Annual Costs: *$113,000*

Alternative 3: Extensive ISCO

Alternative 3 is similar to Alternative 2, but includes an additional two transects in the central portion of the plume and temporary injection points located near the upgradient portion of the plume. Similar to alternative 2, chemical oxidant would be injected through monitoring wells orientated in transects across the groundwater plume. As groundwater passes through the transect treatment zone, contaminants would chemically oxidize as they come in contact with the reagents, reducing the concentrations to levels less than the GWQS. As the reagent disperses/degrades in the treatment zone, subsequent injections would be conducted to maintain the oxidizing treatment zone (assumed to be twice a year).

Alternative 3 consists of permanent injection points located near the upgradient portion of the plume, two transects oriented across the central portion of the plume, and one transect across the down gradient edge of the plume. Similar to alternative 2, a chemical oxidant would be injected through injection wells orientated in transects across the groundwater plume. As groundwater passes through the transect treatment zones created by these transects, contaminants would chemically oxidize as they come in contact with the reagents, reducing the concentrations to levels less than the GWQS and actively treating the larger portion of the plume.

For the purpose of developing the conceptual design, three transects (at approximately every 600 feet) were selected to achieve direct contact with the approximately 40-foot thick contaminant plume. An accessible area for a first transect along the Union Turnpike, a second transect along 81st Road, and a third transect in an undeveloped area south of 88th Place and north of the Forest Park Shop that would be suitable for installation of the injection wells. This alternative also includes installation of injection points within the ball field area to provide treatment coverage in the northern portion of the plume and to reduce the overall remediation time frame.

This alternative would also include bench-scale testing to determine the most appropriate type of reagent and dosage. Analysis of the soil oxidant demand would be used to determine the pounds of reagent to cubic yard of soil in the aquifer to achieve the desired contaminant reduction. ISCO treatment relies on dispersion of the oxidizing reagent across the aquifer to achieve the required direct contact with the contaminant plume. The ROI of ISCO injection wells was assumed to be 10 feet to ensure complete distribution in the aquifer.

The width of the plume area is estimated to be approximately 800 feet along Union Turnpike, 700 feet along 81st Road, and 280 feet across the southern edge of the plume in the Forest Park Area. With an assumed ROI of 10

feet and 8 feet of overlap, a total of approximately 137 permanent injection locations would be needed for all three transects. The area for injection points located in the ball fields is estimated to be 100,000 square feet. With an assumed ROI of 10 feet and no overlap, at total of 188 injection locations would be needed to provide treatment coverage in the northern portion of the plume. The approximate depth of injection points would be 100 to 140 feet bgs within the ball fields area; 120 to 160 feet bgs along Union Turnpike and 81st Road (the middle zone near the MW-12I), and 150 to 190 feet bgs near the down gradient edge of the off-site area (near MW-14I and MW-15I). Pilot testing and field measurement during the pre-design phase of the work would be conducted to verify the assumptions above and finalize the exact number, placement, and depth of injection points for the remedial design.

The duration of treatment would be determined by the time required for one pore volume of contaminated groundwater to travel through the transects. Again, a hydraulic conductivity of 130 feet per day and a hydraulic gradient of 0.0008 feet per feet, as cited in the RI, were used to calculate the travel time for contaminated groundwater to move through the treatment zones created by the injections wells. Based on the average groundwater velocity of 0.1 ft/day, it would take approximately 192 days for groundwater to travel across the 20-foot diameter ROI of an injection well. Based on the travel time, one injection would be required every 6 months, and it will take approximately 15 years to travel between the transects located approximately 600 feet apart. For the purposes of the Feasibility Study, three single rows of injection well transects were assumed with periodic injections of twice per year. Only one row of injection wells for each transect was assumed due to limited access.

Groundwater flow is very slow and because this alternative relies on groundwater to pass through each treatment zone, the remediation will likely take 15 to 17 years to complete. Groundwater monitoring would likely continue for a period of time after the active portion (i.e., ISCO injections) of the remediation is completed to monitor VOC concentrations outside of the active treatment area until the GWQS are met.

For cost estimating, it was assumed that LTM will be conducted quarterly for the first 2 years, twice a year for years 3 through 5, and annually for years 6 through 30. Onetime injection for the injection points and periodic injections (every 6 months) for wells for 15 years have been assumed. It is assumed that ICs (e.g., environmental easement and Site Management Plan) would not be required, as there is no direct contact pathway with the contaminated groundwater (e.g., ingestion or inhalation).

Present Worth: *$22,139,000*
Capital Cost: *$4,576,000*
Annual Costs: *$291,000*

Alternative 4: Limited AS/SVE

Alternative 4 utilizes air sparging (AS) and soil vapor extraction (SVE) remedial technologies to treat the groundwater through the injection of air into the groundwater to sparge volatile contaminants and the collection of the contaminated vapor via vacuum extraction. Under this alternative, an AS/SVE system would be installed in a single transect of air injection and vapor extraction wells orientated across the down gradient edge of the contamination plume. As groundwater passes through the treatment zone created by the AS/SVE transect, contaminants would be physically removed from the groundwater via sparging, reducing concentrations to levels less than the GWQS. Contaminated soil vapor would be collected and treated ex-situ using granular activated carbon (GAC) adsorption.

For the AS system, an air compressor would be used to deliver compressed air under pressure to the subsurface via sparging wells. The SVE system blowers would be utilized to create a vacuum in the unsaturated portion of

the subsurface to collect contaminated vapor at vacuum extraction wells. The aboveground AS/SVE system components would also include a vapor treatment system and a process control system that will monitor and adjust the air delivery and the vapor extraction system for maximum remediation efficiency.

For the purpose of developing the conceptual design, a transect configuration approximately 280 feet in length intercepting the southern edge of the 40-foot thick groundwater plume was evaluated to represent an implementation of the AS/SVE technology. A preliminary assessment of the AS/SVE system configuration, radius of influence, and air flow rates have been made based on a typical application and available site geology and hydrogeology data.

The width of the estimated plume area is approximately 280 feet. With an assumed ROI of 20 feet and 5 feet of overlap, a total of 9 AS wells would be needed for the down gradient transect configuration. For this alternative, an AS well with a 40-foot screen is assumed with an average depth ranging from 150 to 190 feet bgs. An air compressor unit capable of producing a flow rate of approximately 150 standard cubic feet per minute (scfm) is assumed to operate the AS system. Vacuum extraction wells are collocated with the AS wells to prevent vapor migration to the nearby residential area. With an assumed ROI of 30 feet and 25 feet of overlap, a total of 9 SVE wells would be needed to address removal of VOCs transported through the unsaturated zone. For this alternative, an SVE well with an average depth ranging from 90 to 130 feet bgs is assumed to collect vapor phase VOCs. The overall vapor phase flow rate from the SVE wells is expected to be approximately 250 scfm. Pilot testing and field measurement during the pre-design phase of the work would be conducted to verify the assumptions above and finalize the exact number, placement, and depth of AS/SVE wells for the remedial design.

Based on the RIR, the hydraulic conductivity of 130 feet per day and a hydraulic gradient of 0.0008 feet per feet were used to calculate the travel time for contaminated groundwater to move through the treatment zone created by the AS/SVE wells. The groundwater flow is very slow, and because this alternative relies on groundwater to pass through the treatment zone, the remediation will likely take decades to complete. To develop the cost estimate, the remediation time frame was assumed to be 30 years with continuous operation of the AS/SVE system. Groundwater LTM will likely continue for a period of time after the active portion (i.e., AS/SVE system operation) of the remediation is completed to monitor the VOC concentrations until the GWQS are met.

For cost-estimating, it was assumed that LTM will be conducted twice a year for years 1 through 5, and annually for years 6 through 30. It is assumed that institutional controls (e.g., environmental easement and site Management Plan) would not be required as there is no direct contact pathway with the contaminated groundwater (e.g., ingestion or inhalation).

Present Worth: *$7,056,000*
Capital Cost: *$1,456,000*
Annual Costs: *$113,000*

Alternative 5: No Further Action (NFA) with Site Management (SM)

For OU 01 (on-site), this alternative consists of the continued operation of SVE/AS system and provide groundwater monitoring by the volunteer. For Off-Site area, OU 02, this alternative consists of the No Further Action (NFA) remedy with Site Management (SM). The NFA with SM alternative includes no treatment but does include an LTM component to document the groundwater contaminant levels through time. This alternative relies on the ongoing remedial activities, along with the implementation of remedial optimization technologies including in-situ chemical oxidation and the expansion of the existing SVE system at the Home Depot VCP site. All remedial activities at the Home Depot On-Site target the source of the groundwater contamination, with the

goal of eliminating this source in a relatively short period of time. Once fully implemented, it is thought the on-site remedy will prevent further migration of contamination into the off-site investigation area. A monitoring frequency of once every other year is included under this alternative, with an initial round of sampling to include all wells to establish baseline conditions for comparison to future rounds of sampling. This alternative also includes a soil vapor intrusion (SVI) study to affirm that no further action continues to be warranted in the residential area of the off-site study area.

LTM at existing monitoring wells is proposed to document the reduction in mobility, toxicity, and concentration of PCE in groundwater. It is expected that the PCE concentration within the off-site investigation area will decrease over time once the remedial optimization technologies, discussed above, are implemented at the Home Depot On-Site VCP site. The goal of LTM is to demonstrate a continued degradation of contaminants in groundwater, and ultimately the attainment of groundwater standards over time.

Groundwater LTM will likely continue for a long period of time, as the effects of the on-site work will take many years to be observed at the far downgradient wells. For cost-estimating purposes, it was assumed that LTM will be conducted once every two years (i.e., biennially) for 30 years. It is assumed that a Site Management Plan will be required under this alternative to implement the LTM program and to document that the contamination trend is decreasing over time.

Vapor intrusion investigations conducted during the previous investigations at vulnerable structures located within the off-site investigation area indicated no actions were needed to address exposure associated with soil vapor intrusion. However, for cost-estimating purposes, an SVI study of 10 residential units is included under this alternative to confirm that no further action is warranted in the investigated off-site residential area.

Present Worth: *$892,000*
Capital Cost: *$0*
Annual Costs: *$46,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1 - No Action	0	0	0
2 - Limited In-Situ Chemical Oxidation with Site Management	1,600,000	113,000	5,000,000
3 - Extensive In-Situ Chemical Oxidation	4,576,000	291,000	22,139,000
4 - Limited Air Sparge/Soil Vapor Extraction	1,456,000	113,000	7,056,000
5 - No Further Action with Site Management	0	46,000	892,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 2, Limited In-Situ Chemical Oxidation with Site Management as the remedy for this site i.e. for Operable Unit Number 02; 75-09 Woodhaven Boulevard (Home Depot Off-Site). Alternative 2 would achieve the remediation goals for the site through remedial actions implemented at the Home Depot On-Site VCP site by the volunteer, implantation of in-situ chemical oxidation (ISCO) to treat contaminants in groundwater using injections along a single transect across the PCE contaminated plume immediately downgradient from the on-site source and by implementing site management at the off-site area. The elements of this remedy are described in Section 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.

Alternatives 2, 3, 4 and 5 build upon remedial actions undertaken by the volunteer to remediate the PCE source areas identified at the Home Depot VCP site (OU-1). Injection of chemicals to further treat/reduce the PCE remaining in the source area was conducted by the volunteer during late 2018 and an extensive soil vapor extraction/air sparge (SVE/AS) system was installed and will continue operating to treat the contaminant source, preventing exposure to contaminated vapor and preventing further off-site migration of the PCE plume. Alternatives 2, 3 and 4 provide additional treatment of the off-site groundwater contamination to further protect the environment. These alternatives also include an SVI evaluation of 10 residences to confirm that no site-related vapor exposure exists in the off-site residential area. As a result, all three alternatives provide a similar degree of protection.

Alternative 1 (No Action) does not provide any further protection to public health and the environment since there is no monitoring of the conditions over time.

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 comply with SCGs to the extent practicable. Alternatives 2 and 3 will result in a reduction of VOC concentrations at the leading edge of the groundwater plume and prevent or minimize contaminant migration. Alternative 3 will result in a reduction of VOC concentrations achieving the groundwater SCGs within the treatment area relatively sooner. Areas outside treatment zone will take longer to meet SCGs for these three alternatives. For all the alternatives long term monitoring will likely continue for a long period of time to monitor the VOC concentrations until contaminated groundwater reaches concentrations below ambient water quality

standards. An estimated time frame of 30 years was used for monitoring for all four alternatives.

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 reduces the level of groundwater contaminants by permanently degrading VOCs as the groundwater passes through a treatment zone. Multiple injections would be required over an extended period of time to achieve permanent effectiveness. Areas outside treatment zone will take longer to meet SCGs. Alternative 3 provides plume-wide restoration and maximizes contaminant mass removal within a relatively short period of time. Alternative 4 provides permanent reduction of groundwater contaminants by physically removing VOCs from the environment as groundwater passes through the treatment zone. Contamination is irreversibly converted to the vapor phase and is adsorbed by granular activated carbon (GAC), permanently destroying contamination when the GAC is reactivated. This alternative would treat groundwater and maximize mass removal within the treatment zone in a relatively short period of time, but areas outside the treatment zone will take longer to meet SCGs. Alternative 5 provides a lesser degree of long-term effectiveness and permanence as it relies solely on reduction in contaminant concentrations at the on-site source area to stimulate decreasing trends in contaminant concentrations over time within the off-site area. Alternative 5 will take longer to meet SCGs, with an estimated time frame of 30 years.

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.

Alternatives 2, 3 and 4 reduce the toxicity, mobility and volume to varying degrees. Alternative 4 would reduce the volume of VOCs in groundwater at the leading edge of the groundwater plume. Active treatment at the down gradient edge of the contaminated plume will reduce the volume of contaminated groundwater migrating further downgradient. The volume of remaining contamination would continue to decrease as more of the contamination passes through the treatment zone. Alternative 3 would greatly reduce the volume of VOCs in the upgradient area, as well as within the downgradient portions of the plume and provide the greatest degree of reduction in contaminant volume. Alternative 2, would reduce the volume of contamination at the off-site area to a lesser degree, however in combinations with the on-going operation of the SVE/AS system and the implementation of chemical injections at the Home Depot On-Site VCP site, it would prevent further loading of contaminants to the plume and create the conditions for natural attenuation processes to further reduce the volume of contamination.

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

Alternatives 3 and 4 would generate noise and cause minimal traffic disruptions during well and/or SVE/AS wells installation and construction, injection activities as well as during construction of treatment building. Handling, storage and use of chemicals would require proper personal protective equipment (PPE) and training for Alternatives 2 and 3. Alternative 3 construction would transfer contamination to the surface, increasing the risk of exposure to workers, which can be mitigated with proper PPE. Alternate 3 would also generate noise and

disrupt vehicle traffic on major and minor roadways, as well as disrupt the use of ball fields during installation of injection points (8 to 10 months is assumed for injection well installation). Handling, storage and use of chemicals would require proper PPE and training. The remedial time frame is for 15 years, with a long-term monitoring time frame of 30 years. Alternative 5 would not result in disruption of traffic or pose a short-term impacts to the community.

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

Alternatives 2, 3 and 4 would create similarly small disruptions to traffic during well and/or SVE/AS point installation and injection activities, as well as during construction of the treatment building. Alternatives 2 and 3 would result in the need to transport, store and handle oxidizing agent in the field, whereas Alternative 4 could generate uncontrolled vapor phase contamination that could impact indoor air quality of nearby residential properties. Alternative 4 would have significant complications when installing wells along busy roadways, likely requiring road closures during installation and injection activities. Alternative 5 is easily implementable, as all existing monitoring wells are readily available for sampling. The implementation of Alternative 2 would not create disruptions to traffic during well installation since the area is located south of Seither ball field within abandoned railway line.

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. The present worth costs for Alternatives 2, 3 and 4 are $5 million, $22.1 million and $7.1 million, respectively. Alternative 3 is the most expensive due to the need to construct many injection wells and inject chemicals over a 15-year period. Alternative 5 is the most cost effective at $0.9 million, but it will take many more years to achieve remedial objectives. All alternatives are protective and are similar in effectiveness, though it is recognized that there are differences in the anticipated time to achieve remedial goals.

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.

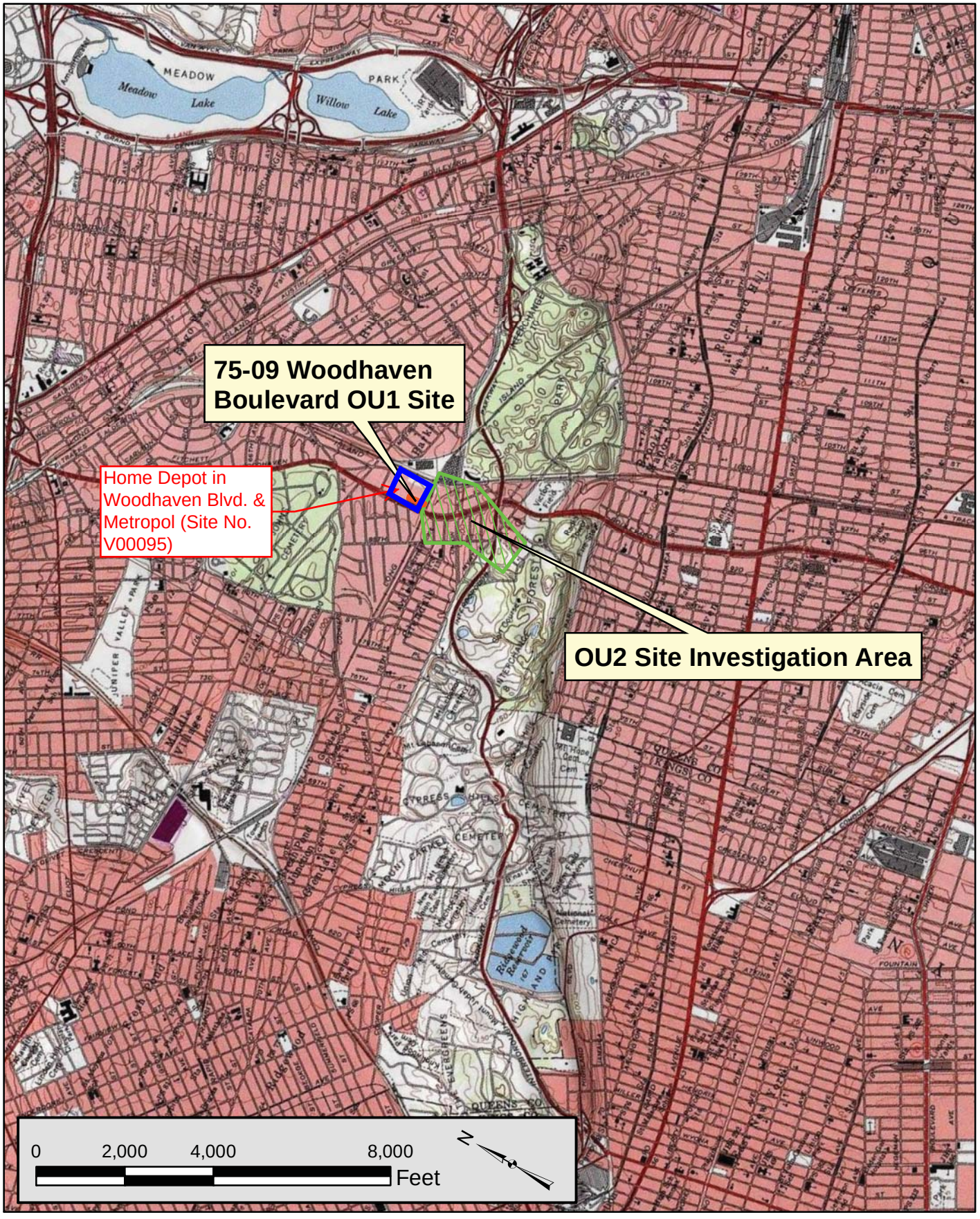
The off-site area overlying the plume is well-developed and is zoned for residential, commercial, and recreational uses. It is unlikely that the land use would change appreciably over time. It is unlikely that the contaminated portion of the aquifer would be used as a drinking water supply, as there are local restrictions precluding the installation of a drinking water supply well without first receiving approval by the NYC Department of Health. Further, all drinking water is supplied by upstate reservoirs. The investigation did not establish an impact to area residents via soil vapor intrusion. Given the above, the investigated area appears capable of supporting the current intended, and reasonably anticipated future uses, regardless of which alternative is chosen.

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.

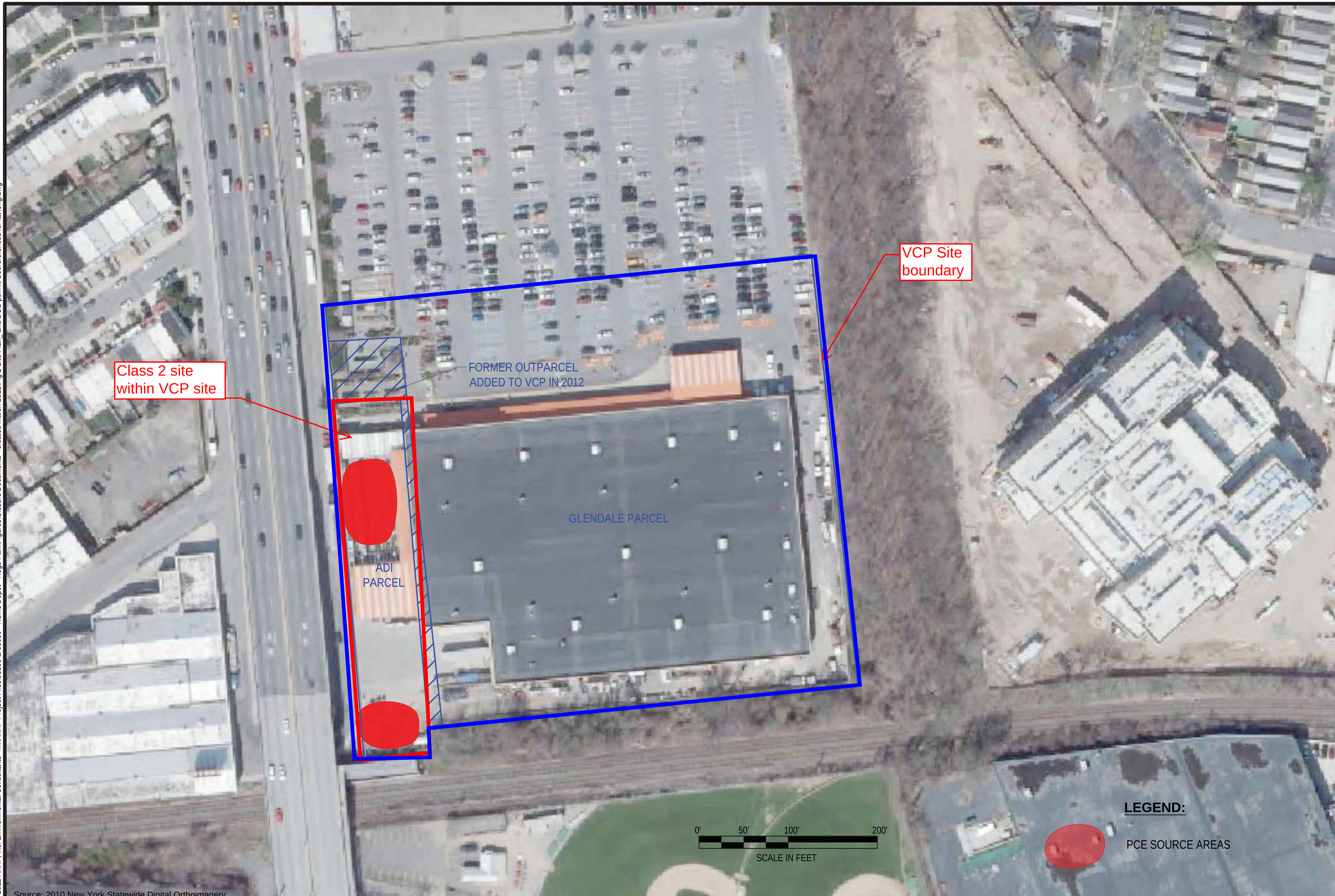
Alternative 2 is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.



C:\Users\apatel\Desktop\My Documents\ArcGIS\Woodhaven FS\Figure 1 Woodhaven OU2 Site Map.mxd

75-09 Woodhaven Boulevard OU2 Site Location
75-09 Woodhaven Boulevard Site (NYSDEC Site # 241036)
Rego Park - Queens, New York

Figure 1
November 2017



AKRF Environmental Consultants
440 Park Avenue South, New York, NY 10016

HOME DEPOT
REGO PARK - GLENDALE, NEW YORK

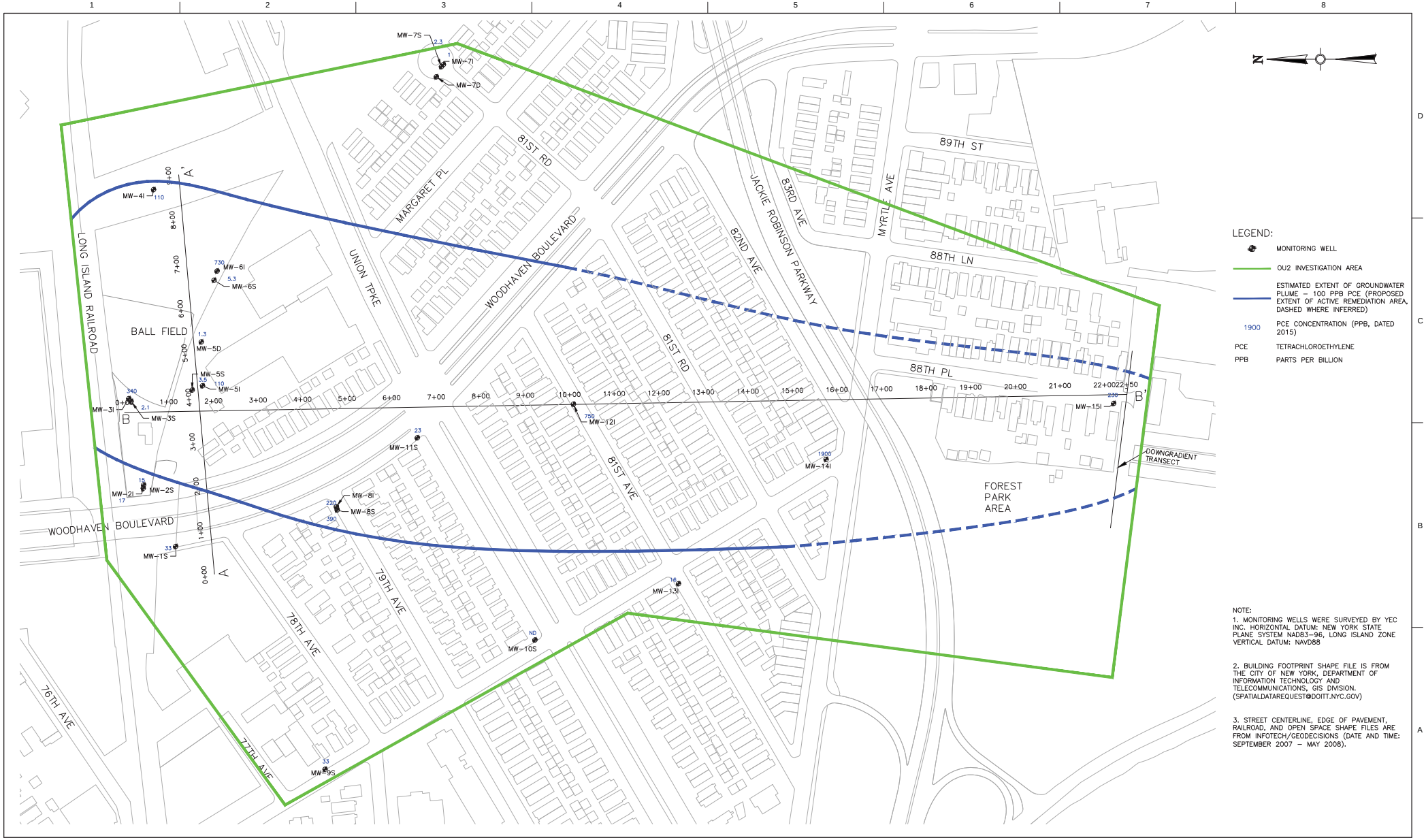
SITE PLAN

DATE
7.11.2012

PROJECT NO.
03399

SCALE
as shown

FIGURE
2



NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

FDR

ISSUE	DATE	DESCRIPTION
	OCTOBER 2016	DRAFT FS REPORT

PROJECT MANAGER A. PATEL

PROJECT NUMBER 147 - 268913

DRAFT

75-09 WOODHAVEN BOULEVARD OU2 SITE FS
(OFF-SITE GROUNDWATER)
NYSDEC SITE NO. 241036
REGO PARK - QUEENS, NEW YORK

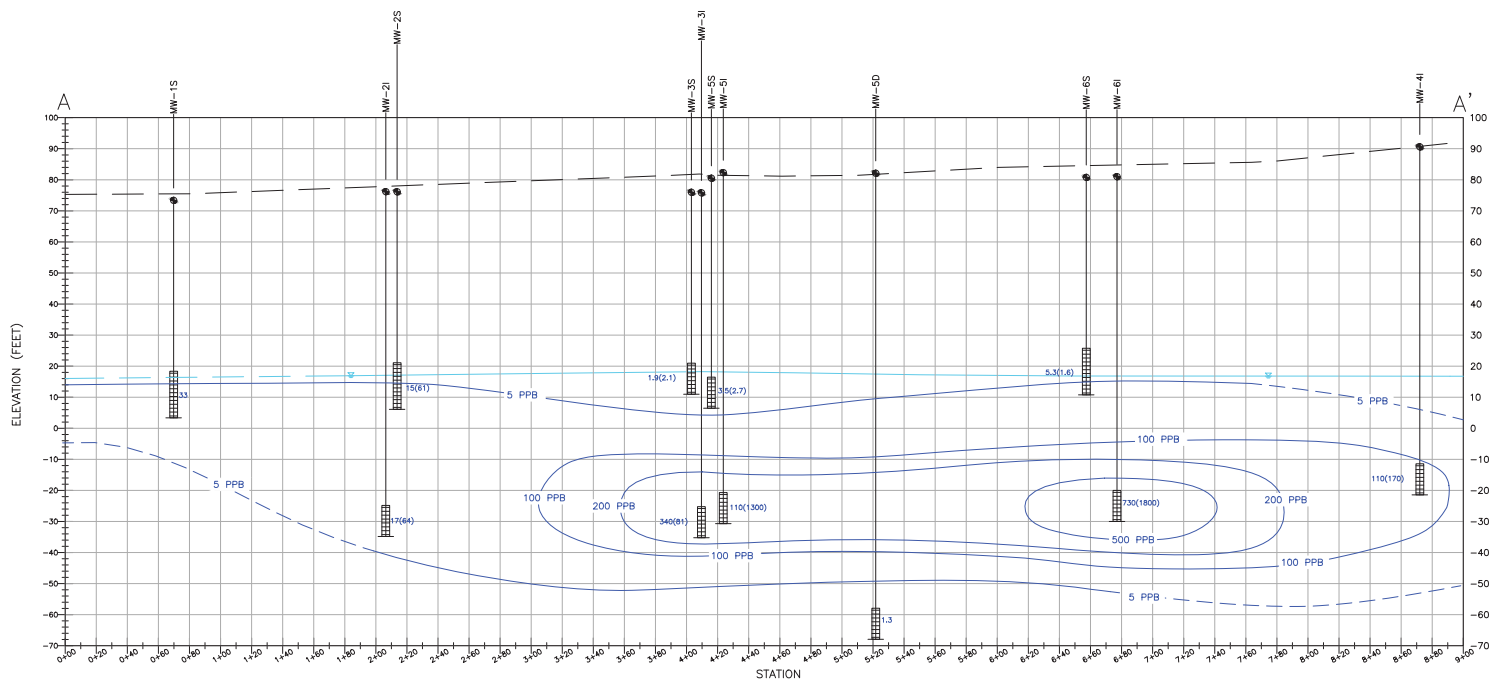
ESTIMATED EXTENT OF GROUNDWATER PLUME

0 100 200

FILENAME

SCALE 1"=100'

SHEET Figure 3A



LEGEND:

- EXISTING GROUND
- MONITORING WELL
- 5 PPB — PCE ISOCONCENTRATION (DASHED WHERE INFERRED)
- WATER TABLE (2015) DASHED WHERE INFERRED
- PCE — TETRACHLOROETHYLENE
- PPB — PARTS PER BILLION
- 5.3(1.6) — PCE CONCENTRATION (UNIT: PPB)
  - HISTORICAL HIGH PCE RESULT
  - 2015 PCE RESULT

VERTICAL SCALE: 1"=20'
HORIZONTAL SCALE: 1"=40'

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

HDR

ISSUE	DATE	DESCRIPTION
	OCTOBER 2016	DRAFT FS REPORT

PROJECT MANAGER A. PATEL
PROJECT NUMBER 147 - 268913

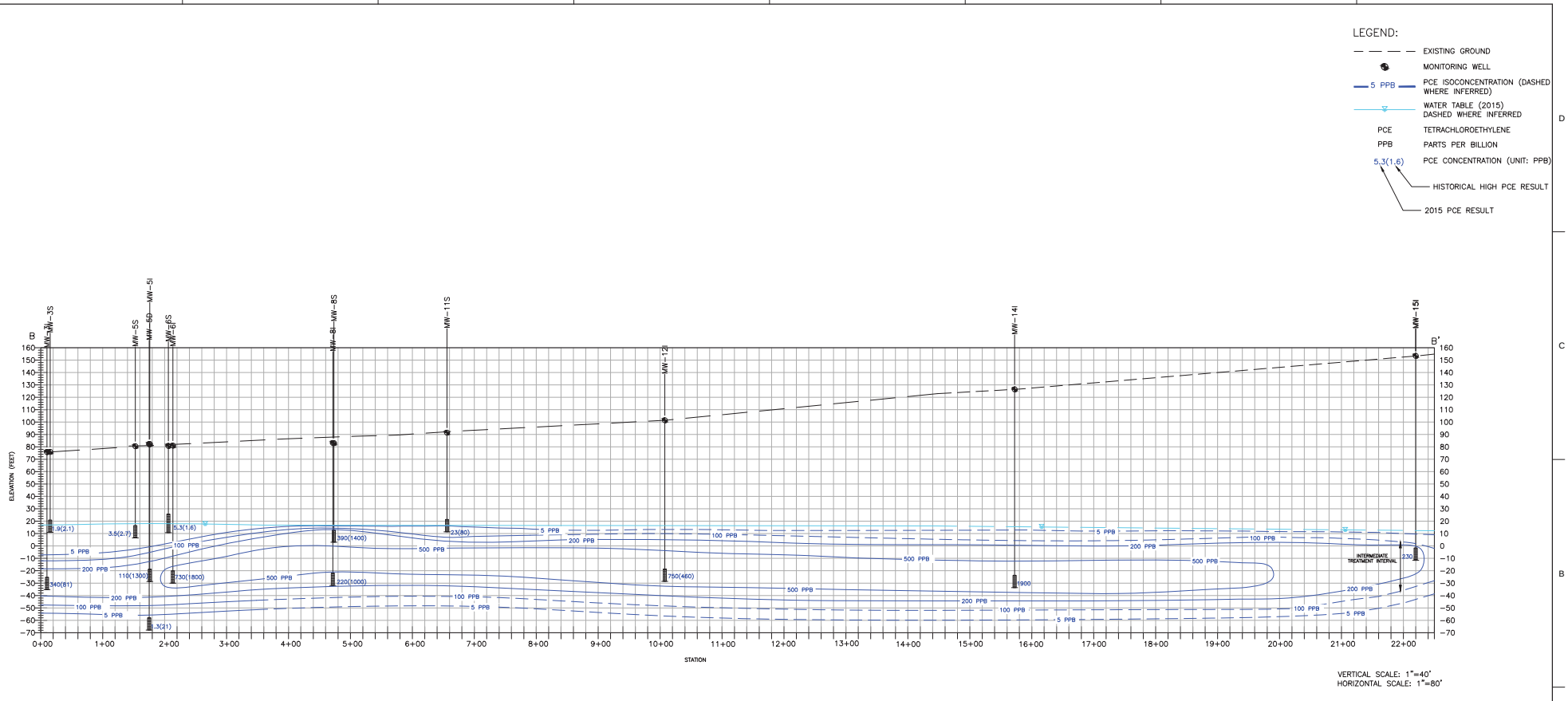
DRAFT

75-09 WOODHAVEN BOULEVARD OU2 SITE FS
(OFF-SITE GROUNDWATER)
NYSDEC SITE NO. 241036
REGO PARK - QUEENS, NEW YORK

CROSS SECTIONS A-A'

FILENAME
SCALE

SHEET
Figure 3B



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REGO PARK - QUEENS, NEW YORK

CROSS SECTIONS B-B'

0

FILENAME

SCALE

SHEET

Figure 3C

	SG-34S	SG-34I	SG-34D
1,1,1 - TCA	2.9	3.2	5.2
Cis 1,2 - DCE	0.44	1.4	0.58
PCE	2200	1900	230
TCE	33	20	21
Trans 1,2 DCE	ND	ND	0.41

	SG-22S	SG-22I	SG-22D
1,1,1 - TCA	0.96	2.5	4.1
PCE	280	10	4.7
TCE	ND	1.2	1.1

GRAPHIC SCALE

0 200 400 800

(IN FEET)

1 inch = 400 ft.

NOTES:

1. BASE AERIAL PHOTOGRAPHY PROVIDED BY THE NYSDEC.
2. SOIL VAPOR SAMPLE LOCATIONS BASED ON A FIELD SURVEY UPDATED BY YEC, INC., JUNE 23, 2014.
3. SAMPLES COLLECTED MARCH 10, 2014 AND ANALYZED FOR TO-15 VOCS.
4. ONLY SIGNIFICANT cVOC CONCENTRATIONS ARE DISPLAYED.
5. BTEX COMPOUNDS ALSO DETECTED AT SEVERAL POINTS.
6. ALL SAMPLE RESULTS ARE REPORTED IN ug/m^3.

HDR

SOIL VAPOR POINT SAMPLING LOCATIONS AND 2014 SAMPLING RESULTS

75-09 Woodhaven Boulevard Off-Site RI
NYSDEC Site #241036
Rego Park – Queens, New York

DATE
09-12-14

FIGURE
4

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

HDR

ISSUE	DATE	DESCRIPTION
	FEBRUARY 2019	

PROJECT MANAGER A. PATEL

PROJECT NUMBER 147 - 268913

DRAFT

75-09 WOODHAVEN BOULEVARD
(HOME DEPOT OFF-SITE)
NYSDEC SITE NO. 241036
REGO PARK - QUEENS, NEW YORK

ALTERNATIVE G2
LIMITED ISCO WITH SM

0 100 200

FILENAME

SCALE 1"=100'

Figure 5