PROPOSED REMEDIAL ACTION PLAN

Former Munsey Cleaners
Operable Unit Number: 02
State Superfund Project
Port Washington, Nassau County
Site No. 130081
February 2012

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 resulted in threats to public health and the environment that were addressed by actions known as interim remedial measures (IRMs), which were undertaken at the site. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the remedial investigation (RI) or feasibility study (FS). The IRMs undertaken at this site are discussed in Section 6.2.

Based on the implementation of the IRM(s), the findings of the RI indicate that the site no longer poses a threat to human health or the environment; therefore No Further Action is the remedy proposed by this Proposed Remedial Action Plan (PRAP). A No Further Action remedy may include site management, which will include continued operation of any remedial system installed during the IRM and the implementation of any prescribed institutional controls/engineering controls (ICs/ECs) that have been identified as being part of the proposed remedy for the site.

The IRM(s) conducted at the site attained the remediation objectives identified for this site, which are presented in the attached exhibits, for the protection of public health and the environment. This PRAP identifies the IRM(s) conducted and discusses the basis for No Further Action.

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 repository:

Port Washington Public Library
1 Library Drive
Port Washington, NY 11050
Phone: 516-883-4400

A public comment period has been set from:

2/27/2012 to 3/28/2012

A public meeting is scheduled for the following date:

3/13/2012 at 6:30 PM

Public meeting location:

Parish Hall at St. Stephens Church 9 Carlton Avenue, Port Washington, NY 11050

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 3/28/2012 to:

Vivek Nattanmai
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
vrnattan@gw.dec.state.ny.us

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

Site Location: The site is located in an urban area of Nassau County, NY and is approximately 5 miles north of the Long Island Expressway in Port Washington. It is located near the intersection of Main Street and Port Washington Blvd.

Site Features: The site (OU1) is located in a one-story retail shopping plaza and the first floor of the site is currently occupied by a Real Estate company and the basement is vacant. A sub-slab depressurization system is located in the basement area of the site (OU1). Another site, Plaza Cleaners, is located across from Munsey site and OU2 for both sites addresses the co-mingled groundwater plume from both sites and the soil vapor intrusion study.

Current Zoning: The site (OU1) is zoned commercial. The off-site area (OU2) is mixed residential/commercial.

Historic Uses: The site (OU1) is a commercial building constructed in 1947 and was used for dry cleaning operations until 1994. Tetrachloroethlyene (PCE) was used during dry cleaning operations and appears to have been disposed of in the basement. A soil sample taken by the NYSDEC from a basement sump during the summer of 1994 revealed contamination by the dry cleaning solvent tetrachloroethlyene. A follow-up site inspection and sampling visit by the Nassau County Department of Health confirmed the disposal of tetrachloroethlyene. Samples from the basement's dirt floor, floor drain and the sump were found to contain tetrachloroethlyene as high as 2,200 parts per million (ppm).

Operable Units: The site was divided into two Operable Units to facilitate remediation. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

OU1 consists of a building located in a shopping complex where the dry cleaning operations were conducted.

OU2 is the area beyond the dry cleaner property where contaminants have migrated from the site. The area consists of the commercial properties and residences extending from the site along the direction of Main Street to the bay. Residual contamination remains in the off-site groundwater, surface water and off-site soil vapor.

Site Geology and Hydrogeology: The site is situated at an elevation of approximately 125-feet above mean sea level in the Town of North Hempstead in northern Nassau County, Long Island

on Manhasset Neck. Manhasset Neck is a 13.4 square mile peninsula that is bounded on the west, north and east by Manhasset Harbor, Long Island Sound and Hempstead Harbor. Regional topography irregularly slopes towards these bodies of water from the higher inland areas, but gently slopes away from the site to the west and more steeply upward from the site to the east. Surface run-off is controlled by gently sloping pavement towards on-site storm drains.

The local potable water supply is the underlying groundwater, which is supplied by the Port Washington Water District. Most active public supply wells extract water from deeper aquifers below silt and clay units. There are no existing drinking water supply wells at the site, nor is groundwater used for any purpose at the site. Public water supply wells exists approximately 3000 feet downgradient of the site, but have not been impacted by the site-related contaminants.

Operable Unit (OU) Number 02 is the subject of this document.

A Record of Decision was issued previously for OU 01 in November 2005.

A site location map is attached as Figure 1. The layout of the site is shown in Figure 2.

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.

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, documented to date, include:

Montfort Trust / API Management Co.

Montford trust has declined to enter into an agreement to clean up the off-site roundwater contaminatiom and conduct a soil vapor intrusion study.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

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

The following general activities are conducted during an RI:

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

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 Information

The analytical data collected on this site includes data for:

- groundwater
- surface water
- soil vapor
- indoor air

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/are:

Tetrachloroethylene (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 IRM(s) described in Section 6.2. More complete information can be found in the RI Report and the IRM Construction Completion Report.

6.2: Interim Remedial Measures

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

The following IRM has been completed at off-site based on conditions observed during the RI.

IRM - Indoor Air Sampling and Mitigation

More than eight soil vapor intrusion sampling events have been conducted off-site at or in the vicinity of the Munsey and Plaza Cleaners sites since 2002. The investigation area of each successive sampling event was extended so that property owners in all areas above the PCE plume were notified of the opportunity to have indoor air and sub-slab samples collected and analyzed.

Based on the results of the indoor air and sub-slab vapor sampling effort, sub-slab depressurization systems (SSDS) were installed at six locations in Port Washington between 2008 and 2009. One to five sub-slab vapor extraction points were installed in each building. A centrifugal in-line fan was installed to provide sub-slab ventilation. Before leaving each property following installation, the installation contractor explained the system operation to the property owner. Vacuum gauges and labels were installed on each fan system. Occupants were reminded to check these periodically for proper fan operation.

Pressure monitoring points were installed in structures with SSD systems to verify the effectiveness of the systems. A digital micro-manometer, capable of measuring the sub-slab to indoor air differential pressure to 0.001 of an inch of water column, was used as part of each communication test. The sub-slab vacuum was measured at three test points at each location. The measured pressures indicated that the SSD systems were providing adequate sub-slab influence for the structures in which they were installed. Five of the six locations in which a SSD system was installed had an adjoining building or structure next to them. Based on physical communication tests at these five locations, the SSD systems were mitigating vapors from adjoining structures in addition to vapors at the location where the systems were installed.

Indoor air and sub-slab vapor samples were collected by Malcolm Pirnie from 21 additional properties between January 26 and 29, 2010. Based on the data, annual monitoring was recommended at nine of the properties and no further actions were warranted at the remaining 12 properties.

6.3: 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.*

Measures are in place to control the potential for coming into contact with residual subsurface soil contamination remaining on the site. People are not drinking the contaminated groundwater because the area is served by a public water supply that has not been affected by this contamination. People may have incidental contact with surface water contaminants found in Baxter Brook. Volatile organic compounds in contaminated groundwater or soil may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect 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. Based on environmental sampling (both on and off-site), sub-slab depressurization systems (systems that ventilate/remove the air beneath a building) have been installed in the on-site building and in six off-site locations to prevent the indoor air quality from being affected by the contamination in soil vapor beneath the buildings. The potential exists for inhaling site-related contaminants via soil vapor intrusion at additional off-site locations, however, these locations are being currently monitored to determine if additional actions are needed to prevent soil vapor intrusion into these buildings.

6.4: 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.

The Fish and Wildlife Resources Impact Analysis (FWRIA) for OU 02, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

Nature and extent of contamination

Operable Unit 1 (OU1)
The primary contaminant of concern at the site and off-site is tetrachloroethlyene (PCE) which is a compound used in dry cleaning operation. The site is divided into two operable units (OUs). OU1 is for on-site contamination and OU2 focuses on off-site contamination. Based on the investigations conducted at the site, a no further action ROD was completed for OU1 in November 2005. The interim remedial measures (IRM) completed for OU1 includes the removal of contaminated soil, installation of a soil vapor extraction (SVE) system and sub-slab depressurization (SSD) system. The SVE and SSD systems are operated, maintained and groundwater is monitored as part of OU1.

Operable Unit 2 (OU2)

The groundwater contamination originates from OU1 extends from the site into off-site areas. The groundwater plume from the nearby Plaza Cleaners site is also extending off-site and co-mingling with the Munsey groundwater plume.

The last groundwater samples collected in October 2010 from several off-site monitoring wells show that the PCE concentration in shallow wells ranged from non-detect (ND) to 240 micrograms per liter (µg/L), the intermediate wells from ND to 410 µg/L and the deep wells from ND to 290 µg/L. The highest PCE concentration was detected at shallow monitoring well MC-3 which is located approximately 800 feet northwest of the site and the highest concentration detected in intermediate and deep wells in MC-7 which is located approximately 1500 feet south west of the site.

The dissolved-phase VOC concentrations of primarily PCE and TCE vary spatially both horizontally and vertically, with a general trend of decreasing concentrations with increasing distance or depth from the site. An underlying, low permeability zone was tentatively identified at well locations across the investigation likely limits deeper downward migration of groundwater contamination.

The results of the RI show that the off-site groundwater contaminant concentration is higher closer to the site and tends to drop down in the down-gradient locations. The monitoring wells installed closer to the public supply wells shows contaminant concentration either below the standard or marginally exceeding the standard. The raw water to the public supply wells were sampled two times during the investigation and the site-related contaminants were non-detect in the water. The review of sample results of the raw water to the public supply wells from 2003 through 2011 from the water district show that the site-related contaminants were never detected. Additionally, concentrations of PCE in groundwater monitoring wells installed during the investigation generally show a decreasing trend over time.

Analysis of surface water collected at four locations from Baxter Brook northwest of the site indicates that the surface water quality may be affected by the dissolved-phase VOC plume. Baxter Brook's channel intersects the potentiometric surface of shallow groundwater. This suggests Baxter Brook is receiving groundwater along its course, and that the stream can be a discharge point for VOCs within the upper portion of the water table across the investigation area. The last sampling of surface water samples obtained in October 2010 detected PCE from 5.1 to 6.7 µg/L.

A fish and wildlife impact analysis was conducted by the New York State Department of Environmental Conservation Bureau of Habitat regarding the potential impacts of site-related contamination in Baxter Brook would have on fish and wildlife resources. The Bureau of Habitat determined that the contamination in Baxter Brook is not of a concern for fish and wildlife resources.

PCE, the primary contaminant present in the sub-slab vapor and indoor air samples, was detected in off-site sub-slab vapor samples at concentrations as high as 61,098 micro gram per cubic

meters (µg/m³). The PCE concentration in sub-slab vapor was greater than 1,000 µg/m3 at 14 of the 52 off-site properties where indoor air and/or sub-slab vapor samples were collected. The highest concentrations of PCE were found in sub-slab vapor samples collected from Main Street properties located between Port Washington Boulevard and North Bayles Avenue. This area of Main Street is located west of the site. The concentrations of PCE in indoor air ranged from non-detect to 67 µg/m3 in a sample collected on Port Washington Boulevard during the March 2008 air sampling event.

Post Remediation

The remediation at OU1 is completed and the operation, maintenance and monitoring is in progress.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Surface Water

RAOs for Public Health Protection

- Prevent ingestion of water impacted by contaminants.
- Prevent contact or inhalation of contaminants from impacted water bodies.
- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Restore surface water to ambient water quality criteria for the contaminant of concern.

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 Remedial Investigation conducted at off-site areas and interim remedial measures completed at off-site areas, the NYSDEC concludes that No Further Action with Monitoring is appropriate for off-site groundwater and surface water. Monitoring will include development and implementation of a Site Management Plan (SMP) which includes operation, maintenance and monitoring (OM&M) of the sub-slab depressurization systems is appropriate for off-site soil vapor. The main components of the remedy are:

1. A site Management Plan is required, which includes the following:

a. an Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:
Engineering Controls: Monitoring of the groundwater, surface water and the sub-slab depressurization system.
This plan includes, but may not be limited to:

- 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 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 and surface water to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and

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

- compliance monitoring of sub-slab systems to ensure proper O&M as well as providing the data for review;
- annual monitoring of the nine residential/commercial properties for a period of three years. Based on the data, the State will determine if additional actions are needed to prevent soil vapor intrusion into these buildings or if this monitoring can be discontinued; and
- maintaining site access controls and Department notification.

2. The sub slab depressurization systems will be operated continuously and will be monitored on a periodic basis.

3. Groundwater will be sampled from select monitoring wells, sentinel wells and the public water supply wells every year for a period of five years. Each year the groundwater data obtained will be reviewed to insure that the groundwater concentrations continued the current downward trend and do not impact the groundwater water supply. Every five years the data would be reviewed, evaluated and would be included in a report that makes recommendations for future activities and any necessary actions. At any time during this monitoring and data review, if sentinel wells show an increase in groundwater contamination appropriate measures would be implemented to protect the public supply wells prior to the five year review period. The evaluation of five year review will also include whether to continue or discontinue monitoring. The periodic monitoring of the groundwater will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued monitoring is not needed because the remedial goals were achieved or the concentration of contaminants are asymptotic as referenced in Technical Guidance Document, DER 10, Section 6.6.

4. Surface water samples will be collected periodically for five years and the results will be reviewed and an evaluation will be made whether to continue or discontinue monitoring.

5. Green remediation principals and techniques will be implemented to the extent feasible in the site management of the remedy per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste.

Exhibit A

Nature and Extent of Contamination

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

For each medium, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into volatile organic compounds (VOCs), 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 6.1.1 are also presented.

The groundwater samples collected during the OU2 investigation were analyzed for VOCs, semi-volatile organic compounds (SVOCs) and inorganics. The SVOCs and inorganics were not detected above the groundwater standard. The primary VOCs present in groundwater throughout the dissolved-phase plume are PCE and its breakdown products such as TCE and cis 1,2 DCE and MTBE. As such, the analytical data from various media (i.e. soil vapor, surface water, and groundwater) are discussed herein with specific evaluation of these VOCs. Although MTBE was detected at several locations, this compound is not attributable to the site

Soil Vapor Intrusion Sampling Results

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

The presence of VOCs in soil vapor in OU-1 at the former Munsey Cleaners site indicated the potential for soil vapor intrusion in off-site areas. The soil vapor and indoor air at OU1 were addressed by the installation of the SVE and SSD systems. Since 2006, several soil vapor intrusion sampling events have been conducted at properties located to the west and north of the Munsey and Plaza Cleaners sites.

Indoor air and/or sub-slab vapor samples were collected from approximately 63 properties as shown on Figure 3. Off-site indoor air sampling using “PCE” badges was conducted by the NYSDEC in February 2006 at 16 properties located across from the Munsey Cleaners site. A total of 32 “PCE” badge samples were collected from basements and first floors of the 16 properties. The results of the “PCE” badge analysis ranged from <1.4 to 89 ug/m3 of PCE. Malcolm Pirnie conducted soil vapor intrusion sampling with canisters at a total of 12 properties between March 12 and March 21, 2008 and May 6 and May 7, 2008. EnviroTrac Ltd. collected soil vapor intrusion samples with canisters from 13 properties between February 17 and 20, 2009. Indoor air and sub-slab vapor samples were collected with canisters by Malcolm Pirnie from 21 properties between January 26 and 29, 2010.

Air samples were collected from the following locations: Crawl space air; Sub-slab vapor; Basement air; First floor air; and ambient (outdoor) air.

PCE, the primary VOC present in the sub-slab vapor and indoor air samples, was detected in off-site sub-slab vapor samples at concentrations as high as 61,098 µg/m³. The PCE concentration in sub-slab vapor was greater than 1,000 µg/m^3 was found at 14 of the 46 off-site properties where samples were collected. The highest

concentrations of PCE were found in sub-slab vapor samples collected from Main Street properties located between Port Washington Boulevard and North Bayles Avenue. This area of Main Street is located west of the former Munsey and Plaza Cleaners sites. The concentrations of PCE in indoor air ranged from not detected to 67 µg/m^3 in a sample collected on Port Washington Boulevard during the March 2008 air sampling event.

Based on a comparison of the sub-slab soil vapor concentrations to indoor air concentrations, six SSD systems were installed to address potential for indoor air impacts via soil vapor intrusion. The results also indicated that nine residential/commercial properties will be monitored annually for a period of three years. Based on the results from these sampling events a determination will be made to discontinue sampling or implement remedial measures. The buildings where indoor air and/or sub-slab vapor samples have been collected are shown on Figure 3.

Soil vapor contamination identified during the RI was addressed during the IRM described in Section 6.2.

Potential Source Area Investigations

Previous work completed at the Munsey Cleaners site had identified the former Munsey Cleaners as one potential source area for PCE and TCE contamination. An additional PCE plume has likely originated from the former Plaza Cleaners site. Based on the available information, eight other currently operating or former dry cleaning facilities have been identified within the investigation area. These facilities have been addressed by the County DOH through the Federal Underground Injection Control (UIC) program. At a minimum, the dry wells existed at these sites were removed along with contaminated soil identified in the dry wells area. The residual contamination from these facilities could be contributing contamination to the groundwater.

Delineation of the VOC Plume

Previous investigations conducted at the former Munsey site included limited tasks to define the off-site groundwater contamination. Monitoring wells installed during the OU2 RI were extended to the North Shore confining clay unit and approximately 0.75 miles from the likely sources to areas where groundwater either discharges to surface water bodies or is eventually migrating to off-site areas. Although concentrations of PCE were detected in samples from the boundaries of the investigation area, these observed concentrations are relatively low in magnitude (not detected to 81 µg/l) or are along primary groundwater flow paths that have known surface water bodies or wells, such that delineation can be considered achieved given the context of likely remedial strategies for the dissolved-phase VOC plume. Potentiometric groundwater contours indicate groundwater flow direction is generally toward the north and northwest. Figure 4 shows the locations of the monitoring wells installed and figure 5 shows the results from 2008 and 2010 sampling events.

Shallow Zone Groundwater

The highest concentration of PCE in groundwater collected from the shallow monitoring wells was observed at MC-7A (380 µg/L) in September 2008. Well MC-7A is downgradient from the former Plaza Cleaners site and cross-gradient from the former Munsey Cleaners location. The concentration of PCE (290 µg/L) in the groundwater sample collected from MC-7A in May 2010 was less than the September 2008 sample. The October 2010 groundwater sample collected at this location contained a PCE concentration of 150 µg/L, indicating a decreasing trend in PCE concentrations over time at MC-7A. Groundwater collected in September 2008 from a previously installed shallow well (MC-3) contained a PCE concentration of 670 µg/L; however, these concentrations decreased in subsequent sampling events. Concentrations of PCE in groundwater were greater than NYS standards at six of the shallow monitoring wells (MC-3, MC-5, MC-7A, PC-7A, MC-8A and MC-11A). Three of these wells (MC-3, PC-7A, and MC-7A) are located within 1,000 feet of both the former

Munsey and Plaza Cleaners sites. MC-5 and MC-8A are located within 2,000 feet of both sites, and MC-11A within 3,000 feet.

Concentrations of PCE in shallow groundwater decrease with distance from the former Munsey and Plaza Cleaners sites.

Groundwater collected from shallow-zone monitoring wells also contained concentrations of contaminants including TCE, cis 1,2 DCE and MTBE. The highest concentrations of total VOCs in groundwater collected from the shallow-zone monitoring wells was observed at MC-7A (388.7 µg/L – Sept. 08, 290.66 µg/L – May10 and 150.53 µg/L – Oct. 10) and PC-7A (245.83 µg/L – May 10, 53.83 µg/L – October 2010). PCE was detected in all of the shallow boundary wells (PC-3, PC-4A, PC-6A, PC-8A, PC-9 and PC-11A). With the exclusion of PCE in PC-8A (6.2 µg/L – October 2010), no PCE concentrations in the shallow boundary wells exceeded NYS standards.

The concentration of PCE in groundwater sampled from the shallow zone wells during 2010 decreased, remained the same concentration, or remained undetected in approximately 80 percent of the shallow zone wells. Only 2 of the 17 shallow zone wells show a slight increase in concentrations of PCE from May to October during 2010. The only two off-site wells that showed increasing concentrations of PCE during 2010 were MC-5 (located on North Maryland Avenue) and PC-8, which is located on South Bayles Avenue.

Intermediate Zone

The highest concentration of PCE in groundwater collected from the intermediate wells installed for this remedial investigation was observed at PC-6B (820 µg/l) in May 2010. PC-6B is located approximately 2,550 and 2,600 feet northwest of the former Munsey and Plaza Cleaners sites respectively. The October 2010 sample collected at this location (240 µg/l) showed a significant decrease in PCE. Elevated concentrations of PCE in groundwater were also observed at artesian well, MC-12B. The September 2008, May 2010, and October 2010 groundwater samples collected from intermediate well MC-12B contained concentrations of PCE greater than NYS standards (420 µg/L, 640 µg/L, and 390 µg/L respectively). Monitoring well MC-12B is located approximately 2,450 and 2,400 feet northwest of the former Munsey and Plaza Cleaners sites, respectively. Groundwater collected from intermediate-zone wells located between these wells and the former cleaners sites have concentrations of PCE ranging from non-detect (MC-10B and PC-11B) to 430 µg/L (PC-5B). Monitoring wells PC-5B and MC-10B are screened within zones of overlapping elevations.

Groundwater collected from intermediate-zone groundwater monitoring wells also contained concentrations of other contaminants including TCE, cis 1,2 DCE and MTBE. Intermediate-zone groundwater monitoring wells PC-6B (491 µg/L – September 2008, 680.1 µg/L – May 2010 and 304.8 µg/L – October 2010) and MC-12B (881 µg/L – May 2010 and 443.3 µg/L – October 2010) contained the highest concentrations of total VOCs in groundwater collected, although concentrations of MTBE did not exceed NYS standards at either location.

Similar to shallow zone wells, concentrations of PCE in groundwater samples collected from intermediate wells during 2010 decreased or remained undetected in approximately 80 percent of the intermediate zone wells. Only 2 of the 17 intermediate zone wells showed a slight increase in PCE concentrations from May 2010 to October 2010, while one of the intermediate wells (MC-7B) showed a moderate increase during this time period. Although the concentration of PCE in PC-12B increased from May to October 2010, the concentration is still less than the NYS Standard. The concentration of PCE in groundwater sampled from MC-7 however, increased 150 µg/L from the May 2010 sample (260 µg/L) to the October 2010 sample (410 µg/L). MC-7 is located approximately 650 feet west of the former Plaza Cleaners site.

Deep Zone

The highest concentration of PCE detected in monitoring wells screened in the deep zone was observed at MC-7C (870 µg/L – September 2008, 580 µg/L – May 2010 and 290 µg/L – October 2010). This well is also located approximately 800 feet southwest of the former Munsey Cleaners Site. With the exception of monitoring well PC-12C (1.4 µg/L), PCE was present at levels that exceeded NYS standards in all of the deep-zone boundary wells. PC-5C (390 µg/L – May 2010 and 260 µg/L – October 2010) and MC-12C (170 µg/L – September 2008, 170 µg/L – May 2010 and 130 µg/L – October 2010) also had notable concentrations of PCE detected in groundwater samples. PC-5 is located on Delaware Avenue near Port Washington Boulevard, and MC-12 is located on Overlook Drive near Baxter Estates.

Groundwater collected from deep-zone monitoring wells also contained concentrations of contaminants in addition to PCE, including TCE, cis 1,2 DCE and MTBE. The highest concentrations of total VOCs in groundwater collected from deep-zone monitoring wells occurred at PC-5C (462.2 µg/L – May 2010 and 325.7 µg/L – October 2010) and MC-7C (889.5 µg/L – September 2008, 602.1 µg/L – May 2010 and 313.3 µg/L in October 2010).

Concentrations of PCE in groundwater sampled from deep zone wells during 2010 decreased, remained relatively stable, or remained undetected in all of the deep zone wells. The only two wells which showed slight increases in concentrations of PCE in groundwater collected from the deep zone were MC-8 and MC-9. The concentration of PCE in the groundwater samples collected from MC-8 increased from 17 µg/L (May 2010) to 20 µg/L (October 2010). The concentration of PCE in the groundwater samples collected from MC-9 increased from 30 µg/L (May 2010) to 40 µg/L (October 2010). Seasonal fluctuations of concentrations within these ranges are common.

Public Water Supply

As part of this remedial investigation, groundwater samples were collected from the Port Washington Water District (PWWD) supply wells in the Sandy Hollow Well Field. No PCE was detected in the groundwater samples collected from the Sandy Hollow Well Field. In addition to these samples, the PWWD routinely samples water within its district. PCE was non-detect in the PWWD data obtained from 2003 through 2011.

Off-site Groundwater Contamination and its Impacts

Groundwater in the vicinity of the Munsey and Plaza Cleaners sites generally flows northwest toward Baxter Estates and the Sandy Hollow municipal well field. The water table is influenced by shallow groundwater discharge to Baxter Brook, which flows generally from east to west across the study area. The dissolved-phase VOC plume consists primarily of PCE, TCE, and cis-1,2 DCE. Degradation products of PCE include TCE, cis-1,2 DCE, and vinyl chloride (VC). TCE and cis-1,2 DCE were detected at relatively lower concentrations in groundwater and VC was not detected, indicating that little natural attenuation of PCE is occurring within the aquifer.

The VOC concentrations vary spatially both horizontally and vertically, with a general trend of decreasing concentrations with increasing distance or depth from the former Munsey and Plaza Cleaners sites. One likely factor on the vertical variability in VOC concentrations is the presence of discontinuous silt and clay zones throughout the upper glacial aquifer. VOCs were detected in intermediate- and deep-zone groundwater in the northwestern section of Baxter Estates. This indicates that the VOCs within the plume have not only migrated laterally from the Munsey and Plaza Cleaners sites, but also migrated vertically downwards. An underlying, low permeability zone was tentatively identified at well locations across the investigation area at depths ranging

from 90 to 120 feet bgs and slopes upward to the northwest. This unit likely limits deeper downward migration of groundwater contamination.

The results of the RI shows that the off-site groundwater contaminant concentration is higher closer to the Munsey and Plaza cleaners sites and tends to drop down in the down-gradient locations but it picks up in the locations between the site and the public supply well. This could be attributed to the following:

1. existing geological condition in the vicinity of these sites,
2. removal of source area at Munsey site and continued operation of the soil vapor extraction and sub-slab depressurization systems and,
3. partial removal of the source area at the Plaza site

The wells installed closer to the supply well shows contaminant concentration either below the standard or marginally exceeding the standard. Additionally, concentrations of PCE in groundwater monitoring wells generally show a decreasing trend over time. The last groundwater samples collected in October 2010 from several off-site monitoring wells show that the PCE concentration in shallow wells ranged from non-detect (ND) to 240 µg/L, the intermediate wells from ND to 410 µg/L and the deep wells from ND to 290 µg/L. The municipal supply wells have not been impacted by the site-related contaminants. The raw water to the supply wells were sampled two times during the investigation and the site-related contaminants were non-detect in the water. The review of sample results of raw water from 2003 through 2011 from the water district show that the site-related contaminants were never detected.

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Tetrachloroethene (PCE)	ND - 870	5	59/121
Cis-1,2 Dichloroethene	ND - 49	5	22/121
Trichloroethene	ND - 47	5	23/121
1,2 - Dichloroethane	ND – 3.6	5	1/121

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).

Based on the findings of the RI, the past disposal of hazardous waste at the site has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: PCE and its breakdown products.

Surface Water

Concentrations of PCE in Baxter Brook were evaluated by surface water sampling at four locations (Figure 4) along its course. All surface water samples contained PCE concentrations that exceeded the NYS Class C surface water standard. The highest concentration of PCE in the surface water samples was observed in the most upgradient surface water sampling location, MC-SFC-1 (15 µg/L). At this sampling location, the stream is discharged from a storm sewer outfall. Although the stream's origin is upgradient of this location, there is no access further upgradient to collect a sample. The concentration of PCE in surface water collected at MC-SFC-2 (12 µg/L) was slightly less than at MC-SFC-1. Surface water concentration of PCE at MC-SFC-3 (2.8 µg/L) was similar to surface water concentrations at MC-SFC-4 (3 µg/L). Two additional surface water sampling

locations were added during the October 2010 sampling event (PC-SFC-1 and PC-SFC-2). PCE was detected in both PC-SFC-01 (5.1 µg/L) and PC-SFC-02 (0.82 µg/L), although only PC-SFC-01 exceeded NYS Standards. In general, the concentrations of PCE in surface water samples decrease in a downgradient direction. This decreasing trend may be a factor of dilution. Figure 4 show the location of the surface water samples obtained.

Table 2 - Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Tetrachloroethene (PCE)	0.82 – 15.0	1	16/17
Cis-1,2 Dichloroethene	ND – 3.7	NS	NA
Trichloroethene	ND – 1.4	40	0/17

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b-SCG: Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1) and 6 NYCRR Part 703: Surface Water and Groundwater Quality Standards.
NS - No Standard; NA - Not Applicable

Based on the findings of the Remedial Investigation, the disposal of hazardous waste at the site has resulted in the contamination of surface water. The site contaminant that is considered to be the primary contaminant of concern which will drive the remediation of surface water to be addressed by the remedy selection process is PCE.

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.

1. No Further Action with Monitoring

A no further action with monitoring alternative would involve no active remediation in the former Munsey OU-2 area, but would monitor the effectiveness of active remediation systems, which are currently operating at the former Munsey Cleaners site (OU1). To address the indoor air contamination at off-site properties several SSD systems were installed as IRMs. This alternative would also include the maintenance of the SSD systems installed as IRMs and continued monitoring of nine residential/commercial properties. If this alternative is selected for implementation, the dissolved-phase CVOC plume would be addressed with natural processes such as dilution, dispersion and natural attenuation.

This alternative would rely on a long-term monitoring program to ensure plume stability and the natural reduction of the CVOC contamination over time. Groundwater samples would be collected annually for 30 years (unless altered based on five-year reviews) from select wells within the plume, two sentinel wells and the public supply wells to assess if groundwater containing site-related compounds is migrating to the public supply wells. The groundwater data obtained from every sampling event would be reviewed. Every five year the data would be reviewed, evaluated and would be included in a report. At any time during this monitoring and data review, if any sentinel well show increase in groundwater contamination appropriate measures would be implemented to protect the public supply wells.

Present Worth: *$538,000*
Capital Cost: *$37,000*
Annual Costs: *$23,000*

2. Targeted In-situ Chemical Oxidation (ISCO)

An oxidant such as sodium permanganate or sodium persulfate would be injected into the subsurface within a localized treatment zone. Groundwater monitoring upgradient, downgradient, and within the treatment area would be required to evaluate the effectiveness of the ISCO injections at reducing contaminant concentrations. ISCO injections would treat the plume as the affected groundwater flows through the treatment area. However, areas of the plume downgradient of the treatment area would continue to migrate toward the Sandy Hollow well field.

Since ISCO relies on direct contact between the oxidant solution and the contaminant, the success of the ISCO treatment would be highly dependent on the ability to effectively distribute the oxidant through the treatment area. If such distribution can be achieved, it is anticipated that the ISCO treatment is capable of meeting the RAOs for targeted areas within the Munsey and Plaza Cleaners investigation area. Multiple injections are required to sustain the oxidants in the subsurface, commonly 3 to 6 months apart. An ISCO pilot study would be conducted to evaluate the implementability, effectiveness, and feasibility of this technology at the Munsey Cleaners investigation area.

Development and implementation of Site Management and Soil Vapor Intrusion Action Plans as well as potential institutional controls would be included in this alterative. The Site Management Plan could mandate the operation and maintenance of engineered mitigation systems. Performance monitoring would be implemented to evaluate treatment effectiveness would involve periodic sampling and analysis of groundwater.

Present Worth: *$1,392,000*
Capital Cost: *$618,000*
Annual Costs: *$36,000*

3. Targeted Enhanced In-situ Bioremediation

This alternative is similar to in-situ chemical oxidation except biostimulants such as emulsified oils, lactate, or molasses would be injected in the targeted areas. Since in-situ bioremediation relies on direct contact between bacteria and the contaminant, the success of the in-situ bioremediation treatment would be highly dependent on the ability to effectively distribute the biostimulant or bacteria through the treatment area. If such distribution can be achieved, it is anticipated that in-situ bioremediation is capable of meeting the RAO. A bioremediation pilot study would be conducted to evaluate the implementability, effectiveness, and feasibility of this technology.

Multiple injections, commonly one to two years apart for emulsified oils or lactate and up to monthly for molasses, are required to sustain anaerobic conditions and microbial populations in the subsurface. Development and implementation of Site Management and Soil Vapor Intrusion Action Plans would be included in this alterative. The Site Management Plan could mandate the operation and maintenance of engineered mitigation systems at the site and off-site.

Groundwater monitoring both upgradient and downgradient from the treatment area would be required to evaluate the effectiveness of the in-situ bioremediation injections at reducing contaminant concentrations and protecting downgradient areas from further dissolved-phase CVOC plume migration.

Present Worth: *$1,269,000*
Capital Cost: *$495,000*
Annual Costs: *$36,000*

4. Restoration to Pre-disposal Conditions

ISCO could be employed to restore the off-site investigation area to pre-disposal conditions by reducing groundwater contaminant concentrations so as to be in compliance with SCGs. Oxidants would be injected over an approximately 2,000,000 square foot area. A series of directionally drilled injection wells could be installed from two locations above the dissolved-phase CVOC plume. Because ISCO injections would be needed directly upgradient of the Sandy Hollow well field, these public water supply wells would need to be deactivated because of the likelihood of reduced water quality at these wells. Given the limited availability of onsite space to stage equipment and materials necessary for ISCO injection wells, access would need to be granted by adjacent landowners. Directionally-drilled injection wells would need to be placed down gradient of existing contamination, with injection depths targeted at the intervals with the known highest concentration of contaminants.

Since ISCO relies on direct contact between the oxidant solution and the contaminant, the success of the ISCO treatment would be highly dependent on the ability to effectively distribute the oxidant through the treatment area. If such distribution can be achieved, it is anticipated that the ISCO treatment is capable of meeting the RAOs for targeted areas within the Munsey and Plaza Cleaners investigation area. Multiple injections are required to sustain the oxidants in the subsurface, commonly 3 to 6 months apart. An ISCO pilot study would be conducted to evaluate the implementability, effectiveness, and feasibility of this technology at the Munsey and Plaza Cleaners investigation area.

Development and implementation of Site Management and Soil Vapor Intrusion Action Plans would be included in this alterative. Groundwater monitoring both upgradient and downgradient from the treatment area would be required to evaluate the effectiveness of the in-situ bioremediation injections at reducing contaminant concentrations and protecting downgradient areas from further dissolved-phase CVOC plume migration.

Present Worth: *$6,770,000*
Capital Cost: *$6,269,000*
Annual Costs: *$23,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1. No Further Action with Monitoring	37,000	23,000	538,000
2. Targeted In-Situ Chemical Oxidation	618,000	36,000	1,392,000
3. Targeted In-Situ Bioremediation	495,000	36,000	1,269,000
4. Restoration to Achieve Pre disposal Conditions	6,269,000	23,000	6,770,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 1, No Further Action with Monitoring as the remedy for this site. Alternative 1 has achieved remediation goals for soil vapor contamination in off-site properties and would achieve the remediation goals for off-site groundwater by collecting groundwater samples from select monitoring wells, sentinel wells and the public water supply wells every year for a period of five years. The groundwater data obtained from every sampling event would be reviewed. Each year the groundwater data obtained will be reviewed to insure that the groundwater concentrations continued the current downward trend and do not impact the groundwater water supply. Every five years the data would be reviewed, evaluated and would be included in a report that makes recommendations for future activities and any necessary actions. At any time during this monitoring and data review, if sentinel wells show an increase in groundwater contamination appropriate measures would be implemented to protect the public supply wells prior to the five year review period. The evaluation of five year review will also include whether to continue or discontinue monitoring. 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.

Alternative1is less protective of human health and the environment compared to Alternatives 2, 3 and 4 because it does not include active groundwater remediation. Alternatives 2, 3 and 4 would be effective at minimizing groundwater VOC concentrations by chemically degrading VOCs to its breakdown products. In addition to that Alternatives 2, 3 and 4 would produce vinyl chloride as a break down product which needs to be carefully monitored because it might be transported downgradient to the public supply wells. Alternatives 2 and 3 would be minimally more protective of human health and the environment relative to alternative 1 because they would treat only a portion of the total volume of the dissolved-phase VOC plume. Alternative 4 has the potential to impact operations or water quality at the Sandy Hollow well field public supply wells and the prohibitively high cost of Alternative 4 it would not be a appropriate remedial alternative at the site.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

Alternative 1 would not actively treat the dissolved-phase contaminant plume and would take significantly longer to be in compliance with SCGs compared to other alternatives. Alternatives 2 and 3 would treat contaminated groundwater in the vicinity of the injection wells. However, these alternatives would treat only a portion of the total volume of the dissolved-phase plume, leaving some of the dissolved-phase plume out of

compliance with SCGs. Alternatives 2 and 4 would be more effective than Alternative 3 at complying with SCGs because ISCO would more quickly degrade the VOCs to non-toxic compounds. Alternative 4 would comply with SCGs for the entire groundwater plume but it has the potential to impact operations or water quality at the Sandy Hollow well field public supply wells. Under Alternatives 1 through 4, the SCGs for surface water would be achieved with the reduction of contaminant concentration in groundwater but the time to achieve the SCGs is not predictable. The most recent sampling of surface water has a maximum concentration of 7.7 ppb which is only slightly above the standard of 1 ppb. At this magnitude of marginal exceedence it is not practical to implement a remedy for concentrations that are continuing to decrease and only marginally exceed the standard. Monitoring is sufficient to verify that the concentrations continue to decrease over time.

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 1 would be effective in the long term if source area remediation and control at OU1are operated and maintained at the site. Alternatives 2, 3 and 4 are considered to be effective in the long-term because VOC concentrations in groundwater would be reduced within the treatment area. Alternatives 2 and 4 would effectively reduce groundwater VOC concentrations quickly. However, additional injection events may be necessary if there is incomplete treatment or to treat upgradient groundwater that flows into the treatment area. If distribution of the biostimulant or bacteria can be achieved, alternative 3 is considered to be effective in the long-term because groundwater VOC concentrations would be reduced within the treatment area as long as subsurface conditions amenable to bioremediation are maintained. To maintain these conditions, multiple injection events would likely be needed.

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 1 would reduce the toxicity and mobility of the dissolved-phase plume with natural processes such as dilution, dispersion and natural attenuation but would take longer to achieve compared to other alternatives. Alternatives 2and 3 would reduce the toxicity and mobility of the plume by treating the groundwater within the treatment area. These alternatives would limit plume migration and reduce contaminant concentrations in the treatment area, thereby reducing the toxicity and mobility of the plume. The toxicity, mobility, and volume of the dissolved-phase VOC plume outside of the treatment area would be reduced at a slow rate as a result of natural processes. Alternative 4 would reduce the mobility, toxicity or volume but has the potential to impact operations or water quality at the Sandy Hollow well field public supply wells. Alternatives 2, 3 and 4 have uncertainties related to the ability to achieve uniform treatment because it is difficult to do injection in the subsurface to distribute the chemical compounds for the treatment of the groundwater throughout the plume area.

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.

There would be no short term impacts to the community associated with alternative 1. Alternatives 2, 3 and 4 have the potential for exposure to construction workers to oxidants and to contaminated soils and groundwater during well and equipment installation but are readily controlled using standard work practices and engineering controls. Air emissions, which could impact the community, during implementation are also monitored and can be controlled within acceptable levels with standard work practices and engineering controls.

Alternative 1 would not have short-term effectiveness compared to other alternative but would be effective on a long-term basis with natural processes such as dilution, dispersion and natural attenuation. Alternative 3 would not be as effective in the short-term as alternatives 2 and 4 because contaminant degradation using enhanced bioremediation is a slower process compared to chemical oxidation.

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.

Alternative 1 is easily implementable and requires periodic groundwater sampling from select wells to monitor the contaminant concentration in groundwater. Alternatives 2, 3 and 4 are all technically feasible and may be affected differently by site-specific geologic and hydrogeologic characteristics. As such, pre-design studies and/or pilot tests are recommended prior to remedy implementation to evaluate the feasibility of alternatives 2, 3 and 4. Obtaining permits and access will be necessary for the implementation of alternatives 2, 3 and 4. Drilling and installing injection or monitoring wells in the road right-of-ways is feasible but would be logistically challenging as the streets located above the dissolved-phase plume are heavily populated and narrow.

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 relative order of probable present value for the four alternatives from least to most expensive are No further action with monitoring, In-situ enhanced bioremediation, ISCO and Restoration to pre-disposal conditions. Alternative 1 would cost significantly less than any of the alternatives. Alternative 4 which is restoration to pre-disposal conditions would be prohibitively expensive.

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

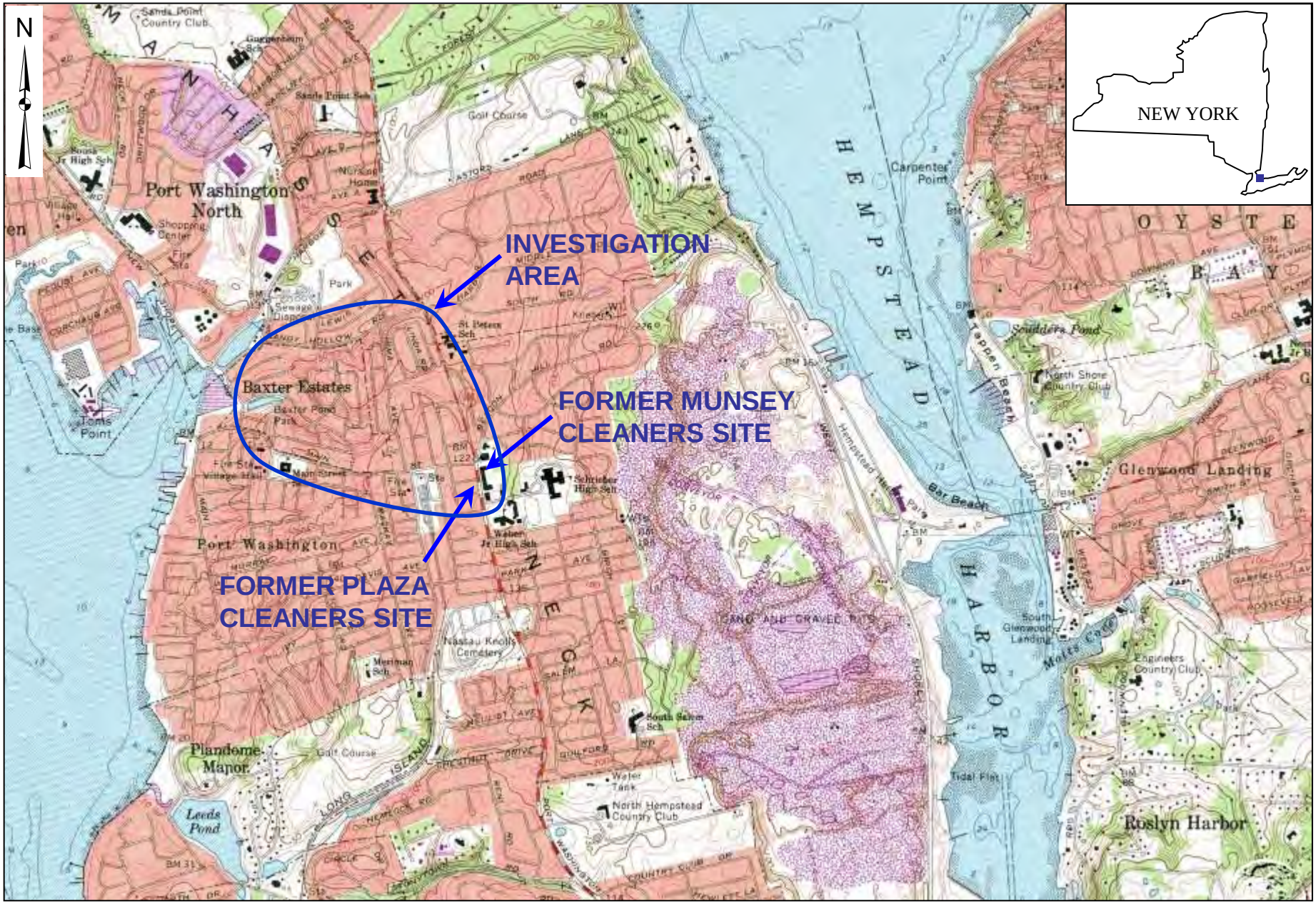
Since the groundwater is not used in this area and public water supply is available the implementation of any of the remedial alternatives would have no impact on the current and future use of the site or the off-site properties. Based on the indoor air sampling conducted six SSD systems were installed to address the contamination in indoor air. The impact on the on the current and future use of the off-site properties from soil vapor intrusion have been addressed with the implementation of the IRMs.

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

Remedial Objectives	Remedial Action
1. Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.	The area is served by a public water supply. Monitoring wells will continue to be sampled to verify that the water supply is unaffected by contamination from the Site.
2. Prevent contact with, or inhalation of volatiles, from contaminated groundwater/surface water.	Off-site properties tested and properties exhibiting vapor intrusion have been mitigated through the installation of sub-slab Depressurization Systems. Additional properties continued to be monitored periodically. The marginal exceedence of surface water will continue to be monitored to verify that concentrations continue to decrease.
3. Restore ground water aquifer and surface water to pre-disposal/pre-release conditions, to the extent practicable.	A Site Management Plan that includes monitoring of groundwater and surface water to insure that contaminant concentration continue to decrease.
4. Prevent discharge of contaminants from groundwater to surface water.	The source at the Site was removed and treatment continues at that location.
5. Remove the source of groundwater or surface water contamination.	Contaminated soil at the source area has been removed and the residual contamination is being removed by soil vapor extraction system operating continuously.
6. Prevent surface water contamination	Contaminated soil at the source area has been removed and the residual contamination is being removed by soil vapor extraction system operating continuously.
7. Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings.	The impacted properties from soil vapor have been mitigated by the installation of sub-slab depressurization systems. Additional properties continued to be monitored periodically.



MAP SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC SERIES, SEA CLIFF QUADRANGLE (PHOTOREVISED 1979)

APPROXIMATE SCALE: 1" = 1500'

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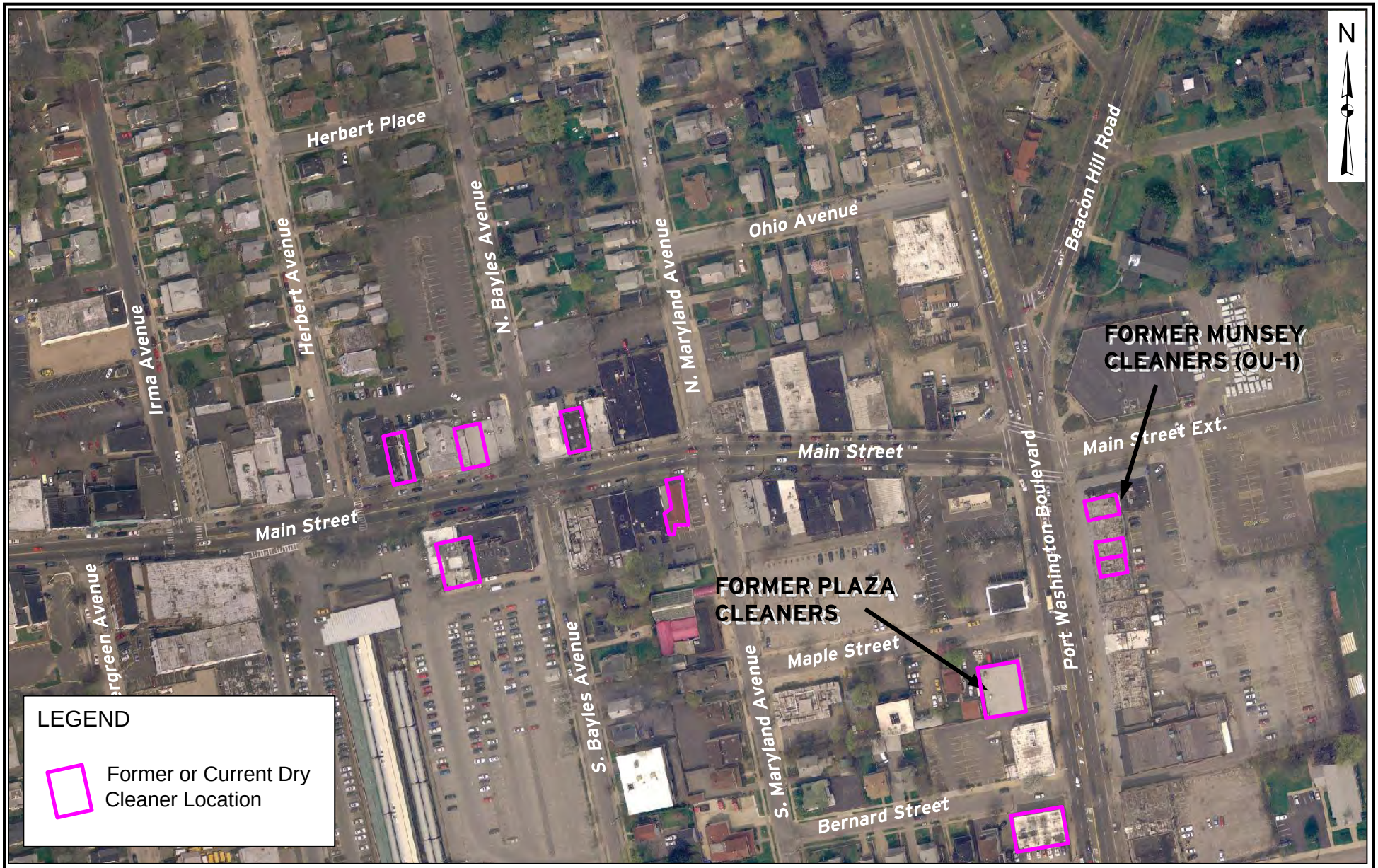
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

MUNSEY AND PLAZA CLEANERS SITES
TOWN OF NORTH HEMPSTEAD, NEW YORK

SITE LOCATION

AUGUST 2011

FIGURE 1



SOURCE: NYSDOP 2-FT Resolution Natural Color Orthoimagery, 2004; New York State GIS Clearinghouse.

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APPROXIMATE SCALE IN FEET

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

MUNSEY AND PLAZA CLEANERS SITES
TOWN OF NORTH HEMPSTEAD, NEW YORK

AERIAL PHOTOGRAPH

AUGUST 2011

FIGURE 2

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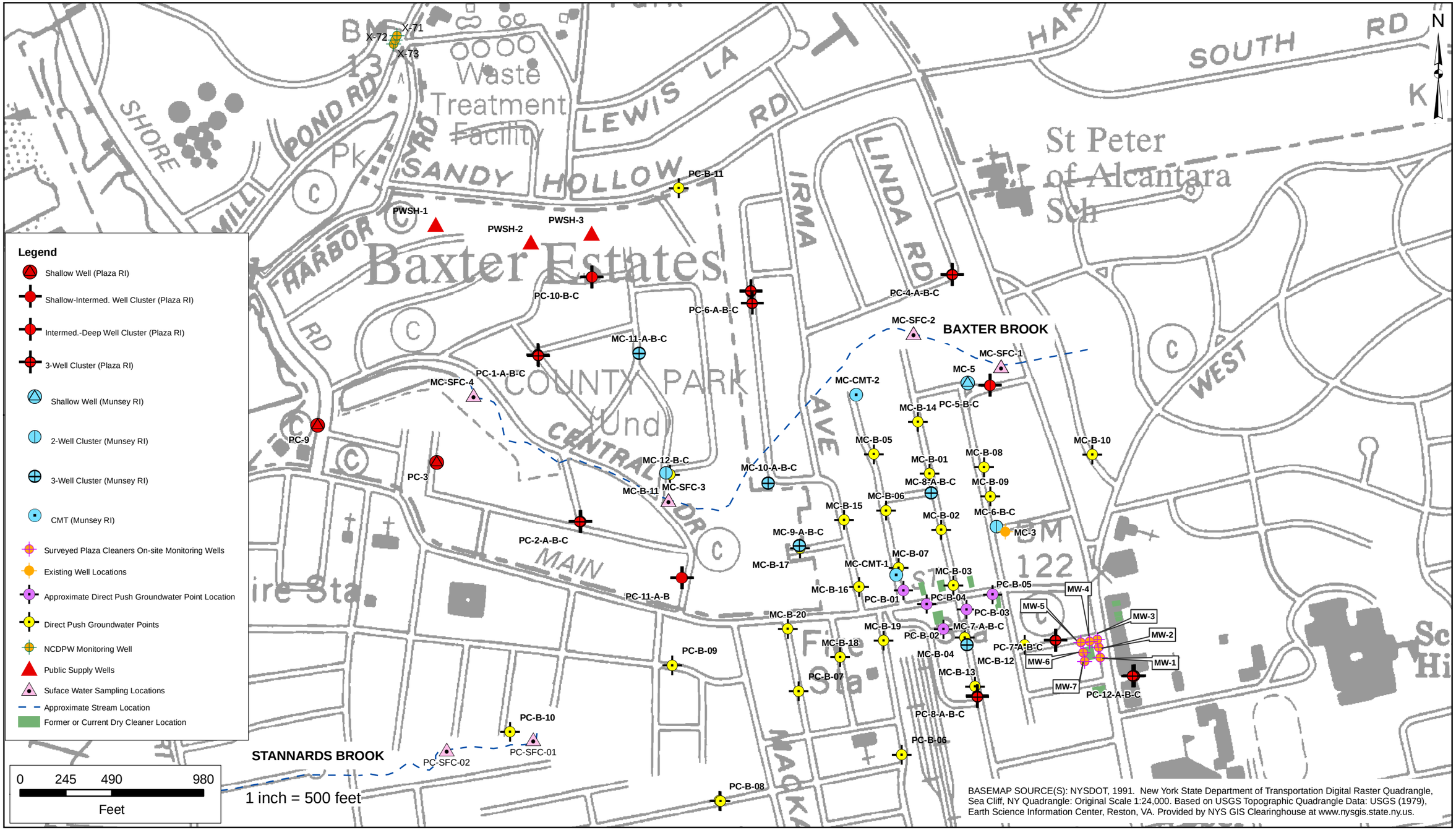
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
MUNSEY AND PLAZA CLEANERS SITES
TOWN OF NORTH HEMPSTEAD, NEW YORK

SOIL VAPOR INTRUSION SAMPLING LOCATIONS

AUGUST 2011

FIGURE 3

M:\GIS\MOD\0266380\Figure - SVI Locations Aerial.mxd



BASEMAP SOURCE(S): NYSDOT, 1991. New York State Department of Transportation Digital Raster Quadrangle, Sea Cliff, NY Quadrangle: Original Scale 1:24,000. Based on USGS Topographic Quadrangle Data: USGS (1979), Earth Science Information Center, Reston, VA. Provided by NYS GIS Clearinghouse at www.nysgis.state.ny.us.

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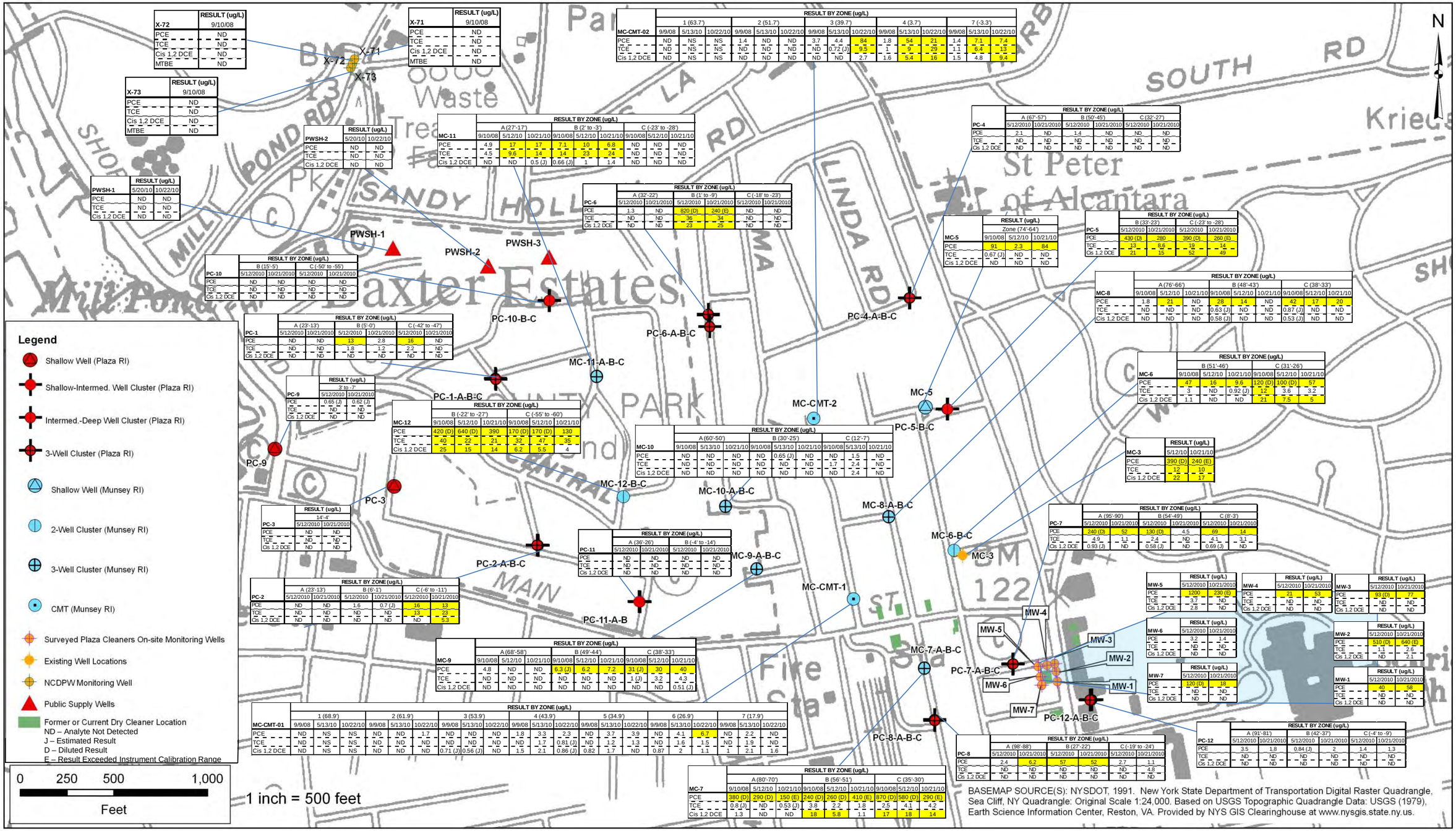
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
MUNSEY AND PLAZA CLEANERS SITES
TOWN OF NORTH HEMPSTEAD, NEW YORK

GROUNDWATER AND SURFACE WATER SAMPLING LOCATIONS

AUGUST 2011

FIGURE 4



X-72	RESULT (ug/L) 9/10/08
PCE	ND
TCE	ND
Cis 1,2 DCE	ND
MTBE	ND

X-71	RESULT (ug/L) 9/10/08
PCE	ND
TCE	ND
Cis 1,2 DCE	ND
MTBE	ND

X-73	RESULT (ug/L) 9/10/08
PCE	ND
TCE	ND
Cis 1,2 DCE	ND
MTBE	ND

PWSH-2	RESULT (ug/L) 5/20/10	10/22/10
PCE	ND	ND
TCE	ND	ND
Cis 1,2 DCE	ND	ND

PWSH-1	RESULT (ug/L) 5/20/10	10/22/10
PCE	ND	ND
TCE	ND	ND
Cis 1,2 DCE	ND	ND

MC-CMT-02	RESULT BY ZONE (ug/L) 1 (63.7')			2 (51.7')			3 (39.7')			4 (3.7')			7 (-3.3')		
	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10
PCE	ND	NS	NS	1.4	ND	ND	3.7	4.4	84	1.8	54	21	1.4	7.1	7.4
TCE	ND	NS	NS	ND	ND	ND	ND	0.72 (J)	9.5	1	9	29	1.1	6.4	13
Cis 1,2 DCE	ND	NS	NS	ND	ND	ND	ND	ND	2.7	1.6	5.4	16	1.5	4.8	9.4

MC-11	RESULT BY ZONE (ug/L) A (27'-17')			B (2' to -3')			C (-23' to -28')		
	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10
PCE	4.9	17	17	7.1	10	6.8	ND	ND	ND
TCE	4.5	9.6	14	14	23	24	ND	ND	ND
Cis 1,2 DCE	ND	ND	0.5 (J)	0.66 (J)	1	1.4	ND	ND	ND

PC-6	RESULT BY ZONE (ug/L) A (32'-22')		B (1' to -9')		C (-18' to -23')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	1.3	ND	820 (D)	240 (E)	ND	ND
TCE	ND	ND	36	34	ND	ND
Cis 1,2 DCE	ND	ND	23	25	ND	ND

PC-4	RESULT BY ZONE (ug/L) A (67'-57')		B (50'-45')		C (32'-27')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	2.1	ND	1.4	ND	ND	ND
TCE	ND	ND	ND	ND	ND	ND
Cis 1,2 DCE	ND	ND	ND	ND	ND	ND

MC-5	RESULT (ug/L) Zone (74'-64')		
	9/10/08	5/12/10	10/21/10
PCE	91	2.3	84
TCE	0.67 (J)	ND	ND
Cis 1,2 DCE	ND	ND	ND

PC-5	RESULT BY ZONE (ug/L) B (33'-23')		C (-23' to -28')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	430 (D)	280	390 (D)	260 (E)
TCE	13	8.6	18	14
Cis 1,2 DCE	21	15	52	49

MC-8	RESULT BY ZONE (ug/L) A (76'-66')			B (48'-43')			C (38'-33')		
	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10
PCE	1.8	21	ND	28	14	ND	42	17	20
TCE	ND	ND	ND	0.63 (J)	ND	ND	0.87 (J)	ND	ND
Cis 1,2 DCE	ND	ND	ND	0.58 (J)	ND	ND	0.53 (J)	ND	ND

MC-6	RESULT BY ZONE (ug/L) B (51'-46')		C (31'-26')	
	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10
PCE	47	16	9.6	120 (D)	100 (D)	57
TCE	3	ND	0.92 (J)	12	3.6	3.2
Cis 1,2 DCE	1.1	ND	ND	21	7.5	5

MC-3	RESULT (ug/L) 5/12/10	10/21/10
PCE	390 (D)	240 (E)
TCE	12	10
Cis 1,2 DCE	22	17

PC-7	RESULT BY ZONE (ug/L) A (95'-90')		B (54'-49')		C (8'-3')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	240 (D)	52	130 (D)	4.5	69	14
TCE	4.9	1.1	2.4	ND	4.1	3.1
Cis 1,2 DCE	0.93 (J)	ND	0.58 (J)	ND	0.69 (J)	ND

MW-5	RESULT (ug/L) 5/12/2010	10/21/2010
PCE	1200	230 (E)
TCE	3.7	ND
Cis 1,2 DCE	2.8	ND

MW-4	RESULT (ug/L) 5/12/2010	10/21/2010
PCE	21	53
TCE	ND	ND
Cis 1,2 DCE	ND	ND

MW-3	RESULT (ug/L) 5/12/2010	10/21/2010
PCE	93 (D)	77
TCE	ND	ND
Cis 1,2 DCE	ND	ND

MW-6	RESULT (ug/L) 5/12/2010	10/21/2010
PCE	3.2	1.4
TCE	ND	ND
Cis 1,2 DCE	ND	ND

MW-2	RESULT (ug/L) 5/12/2010	10/21/2010
PCE	510 (D)	640 (E)
TCE	1.1	2.6
Cis 1,2 DCE	ND	2.1

MW-7	RESULT (ug/L) 5/12/2010	10/21/2010
PCE	120 (D)	18
TCE	ND	ND
Cis 1,2 DCE	ND	ND

MW-1	RESULT (ug/L) 5/12/2010	10/21/2010
PCE	40	58
TCE	ND	ND
Cis 1,2 DCE	ND	ND

PC-8	RESULT BY ZONE (ug/L) A (98'-88')		B (27'-22')		C (-19' to -24')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	2.4	6.2	57	52	2.7	1.1
TCE	ND	ND	ND	ND	ND	4.8
Cis 1,2 DCE	ND	ND	ND	ND	ND	ND

PC-12	RESULT BY ZONE (ug/L) A (91'-81')		B (42'-37')		C (-4' to -9')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	3.5	1.8	0.84 (J)	2	1.4	1.3
TCE	ND	ND	ND	ND	ND	ND
Cis 1,2 DCE	ND	ND	ND	ND	ND	ND

PC-10	RESULT BY ZONE (ug/L) B (15'-5')		C (-50' to -55')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	ND	ND	ND	ND
TCE	ND	ND	ND	ND
Cis 1,2 DCE	ND	ND	ND	ND

PC-1	RESULT BY ZONE (ug/L) A (23'-13')		B (5'-0')		C (-42' to -47')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	ND	ND	13	2.8	16	ND
TCE	ND	ND	1.8	1.2	2.2	ND
Cis 1,2 DCE	ND	ND	ND	ND	ND	ND

PC-9	RESULT (ug/L) 3' to -7'	
	5/12/2010	10/21/2010
PCE	0.65 (J)	0.62 (J)
TCE	ND	ND
Cis 1,2 DCE	ND	ND

MC-12	RESULT BY ZONE (ug/L) B (-22' to -27')			C (-55' to -60')		
	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10
PCE	420 (D)	640 (D)	390	170 (D)	170 (D)	130
TCE	40	22	21	32	47	35
Cis 1,2 DCE	25	15	14	6.2	5.5	4

MC-10	RESULT BY ZONE (ug/L) A (60'-50')			B (30'-25')			C (12'-7')		
	9/10/08	5/13/10	10/21/10	9/10/08	5/13/10	10/21/10	9/10/08	5/13/10	10/21/10
PCE	ND	ND	ND	ND	0.65 (J)	ND	ND	1.5	ND
TCE	ND	ND	ND	ND	ND	ND	1.7	2.4	ND
Cis 1,2 DCE	ND	ND	ND	ND	ND	ND	ND	2.4	ND

PC-3	RESULT (ug/L) 14'-4'	
	5/12/2010	10/21/2010
PCE	ND	ND
TCE	ND	ND
Cis 1,2 DCE	ND	ND

PC-11	RESULT BY ZONE (ug/L) A (36'-26')		B (-4' to -14')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	ND	ND	ND	ND
TCE	ND	ND	ND	ND
Cis 1,2 DCE	ND	ND	ND	ND

PC-2	RESULT BY ZONE (ug/L) A (23'-13')		B (6'-1')		C (-6' to -11')	
	5/12/2010	10/21/2010	5/12/2010	10/21/2010	5/12/2010	10/21/2010
PCE	ND	ND	1.6	0.7 (J)	16	13
TCE	ND	ND	ND	ND	13	23
Cis 1,2 DCE	ND	ND	ND	ND	ND	5.3

MC-9	RESULT BY ZONE (ug/L) A (68'-58')			B (49'-44')			C (38'-33')		
	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10
PCE	4.8	ND	ND	6.3 (J)	6.2	7.2	31 (J)	30	40
TCE	ND	ND	ND	ND	ND	ND	1 (J)	3.2	4.3
Cis 1,2 DCE	ND	ND	ND	ND	ND	ND	ND	ND	0.51 (J)

MC-CMT-01	RESULT BY ZONE (ug/L) 1 (68.9')			2 (61.9')			3 (53.9')			4 (43.9')			5 (34.9')			6 (26.9')			7 (17.9')		
	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10	9/9/08	5/13/10	10/22/10
PCE	ND	NS	NS	ND	ND	1.7	ND	ND	ND	1.8	3.3	2.3	ND	3.7	3.9	ND	4.1	6.7	ND	2.2	ND
TCE	ND	NS	NS	ND	ND	ND	ND	ND	ND	ND	1.7	0.81 (J)	ND	1.2	1.3	ND	1.6	1.5	ND	1.9	ND
Cis 1,2 DCE	ND	NS	NS	ND	ND	ND	0.71 (J)	0.56 (J)	ND	1.5	2.1	0.86 (J)	0.82	1.7	ND	0.87	2	1.1	1	2.1	1.6

MC-7	RESULT BY ZONE (ug/L) A (80'-70')			B (56'-51')			C (35'-30')		
	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10	9/10/08	5/12/10	10/21/10
PCE	380 (D)	290 (D)	150 (E)	240 (D)	260 (D)	410 (E)	870 (D)	580 (D)	290 (E)
TCE	0.8 (J)	ND	0.53 (J)	3.8	2.2	1.8	2.5	4.1	4.2
Cis 1,2 DCE	1.3	ND	ND	18	5.8	1.1	17	18	14

Legend

- Shallow Well (Plaza RI)
- Shallow-Intermed. Well Cluster (Plaza RI)
- Intermed.-Deep Well Cluster (Plaza RI)
- 3-Well Cluster (Plaza RI)
- Shallow Well (Munsey RI)
- 2-Well Cluster (Munsey RI)
- 3-Well Cluster (Munsey RI)
- CMT (Munsey RI)
- Surveyed Plaza Cleaners On-site Monitoring Wells
- Existing Well Locations
- NCDPW Monitoring Well
- Public Supply Wells
- Former or Current Dry Cleaner Location

ND – Analyte Not Detected
J – Estimated Result
D – Diluted Result
E – Result Exceeded Instrument Calibration Range

BASEMAP SOURCE(S): NYSDOT, 1991. New York State Department of Transportation Digital Raster Quadrangle, Sea Cliff, NY Quadrangle: Original Scale 1:24,000. Based on USGS Topographic Quadrangle Data: USGS (1979), Earth Science Information Center, Reston, VA. Provided by NYS GIS Clearinghouse at www.nysgis.state.ny.us.

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
MUNSEY AND PLAZA CLEANERS SITES
TOWN OF NORTH HEMPSTEAD, NEW YORK

SUMMARY OF SELECT VOLATILE ORGANIC COMPOUNDS DETECTED
IN 2008 AND 2010 GROUNDWATER MONITORING WELL SAMPLES

AUGUST 2011

FIGURE 5