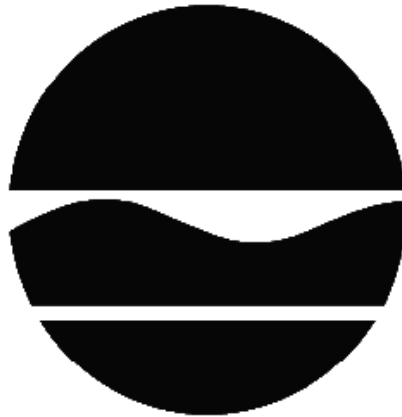


# PROPOSED REMEDIAL ACTION PLAN

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Mayflower Cleaners  
State Superfund Project  
Great Neck, Nassau County  
Site No. 130068  
February 2013



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

# PROPOSED REMEDIAL ACTION PLAN

Mayflower Cleaners  
Great Neck, Nassau County  
Site No. 130068  
February 2013

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## **SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN**

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document 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:

Great Neck Public Library  
159 Bayview Avenue  
Great Neck, NY 11023  
Phone: (516)-466-8055

**A public comment period has been set from:**

**02/11/2013 to 03/12/2013**

**A public meeting is scheduled for the following date:**

**02/25/201 at 7:00 PM**

**Public meeting location:**

**Great Neck Public Library, 159 Bayview Avenue, Great Neck, NY 11023**

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

Written comments may also be sent through 03/12/2013 to:

John Sheehan  
NYS Department of Environmental Conservation  
Division of Environmental Remediation  
SUNY at Stony Brook 50 Circle Road  
Stony Brook, NY 11790-3409  
jcsheeha@gw.dec.state.ny.us

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

### **Receive Site Citizen Participation Information By Email**

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

### **SECTION 3: SITE DESCRIPTION AND HISTORY**

Site Location: The Mayflower Cleaners Site is located at 471-491 Great Neck Road, Great Neck, Nassau County.

Site Features: The Site consists of three multi-tenant adjoining commercial buildings and customer parking lots. The Mayflower Cleaners is an active dry cleaning operation, and is located in the southern corner of one of the buildings at 489 Great Neck Road. The dry cleaner shares the single-story masonry building with another tenant, a bagel shop. The adjoining building to the north is a two story multi-tenant mini mall. The adjoining building to the north of the mini-mall building is a single story building which includes several commercial establishments and a library. The remainder of the site consists of paved parking areas.

Current Zoning and Land Use(s): The property is zoned for commercial use and is currently occupied by several retail establishments.

Past Use of the Site: In December 1992, the Nassau County Department of Health (NCDH) performed an inspection and sampling of two dry wells (UIC structures) located in the basement of the Mayflower Cleaners. The dry wells were crude shallow holes in the concrete basement floor, open to the sub-slab soil. The operator of cleaners has admitted to draining boiler water into the rear dry well each day. Analytical results of soil samples collected in 1995 from the dry wells contained tetrachloroethylene (PCE) at levels of 3.4 Parts Per Million (ppm) and 2.4 ppm. In December 1996, the two dry wells were remediated in accordance with an approved United States Environmental Protection Agency (USEPA) closure plan under the supervision of the NCDH. Soils in the dry wells were excavated to a depth of 2.5 feet below the basement slab.

Site Geology/Hydrogeology: The soils in the area of the site are a mix of sand, silt and clay and fill material. Depth to groundwater at the site is approximately 25 feet below grade. The site-specific groundwater flow direction is to the north-northwest.

A site location map is attached as Figure 1.

#### **SECTION 4: LAND USE AND PHYSICAL SETTING**

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) are/is being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

#### **SECTION 5: ENFORCEMENT STATUS**

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

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

Plymouth Realty Company

The Department and Plymouth Realty Company entered into a Consent Order on May 25, 2007. The Order obligates the responsible parties to implement a RI/FS. After the remedy is selected, the Department will approach the PRPs to implement the selected remedy. 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.

## **SECTION 6: SITE CONTAMINATION**

### **6.1: Summary of the Remedial Investigation**

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

The following general activities are conducted during an RI:

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

The analytical data collected on this site includes data for:

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

#### **6.1.1: Standards, Criteria, and Guidance (SCGs)**

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: <http://www.dec.ny.gov/regulations/61794.html>

### **6.1.2: RI Results**

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

TRICHLOROETHENE (TCE)

TETRACHLOROETHYLENE (PCE)

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

- air
- soil vapor intrusion

### **6.2: Interim Remedial Measures**

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

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

### **6.3: Summary of Environmental Assessment**

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

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OU 01.

Nature and Extent of Contamination: The primary contaminants of concern at the site at this time are associated with chlorinated solvents, specifically PCE and trichloroethene (TCE). Historically, PCE was detected in soil/sediment samples collect from two site dry wells (Class V injection wells) in the basement of the dry cleaners at levels of 3.4 ppm and 2.4 ppm. In 1996, these dry wells were excavated in accordance with a USEPA approved closure plan under the

supervision of the NCDH. The closure plan included the excavation of contaminated soils to a depth of 2.5 feet below the basement floor slab. End point samples were collected and confirmed remedial activities were successful.

The Department's Bureau of Spill Prevention and Response (BSPR) which is managing the investigation and remediation of the Great Neck Amoco Site (NYSDEC Spill # 82-00157) located hydraulically upgradient to the southeast of the site, across Great Neck Road. The results of historical groundwater sampling events at the Amoco Site show the presence of petroleum related hydrocarbons as well as chlorinated constituents in groundwater (i.e., PCE and TCE). It is therefore reasonable to conclude that the presence of chlorinated constituents in on-site groundwater are attributable to the upgradient releases at the Great Neck Amoco Site and not from the Mayflower Cleaners Site. See Figure 3 for groundwater sampling results.

Soil, groundwater and sub-slab soil vapor samples were collected at the Mayflower Cleaners Site as part of the RI, which was conducted between 2009 and 2011. Soil and groundwater samples collected at the site during the RI indicate that the Mayflower Cleaners is currently not a source of the PCE detected in area groundwater and the detections can be attributed to the upgradient Amoco site.

Sub-slab soil vapor samples collected during the RI from the basement of Mayflower Cleaners contained 110,000 ug/m<sup>3</sup> of PCE, as well as detectable concentrations of TCE (170 ug/m<sup>3</sup>), toluene (62 ug/m<sup>3</sup>), and trichlorofluoromethane (110 ug/m<sup>3</sup>). A second sub slab soil sample collected from the eastern portion of the basement of Mayflower Cleaners contained 460,000 ug/m<sup>3</sup> of PCE, as well as detectable concentrations of TCE (190 ug/m<sup>3</sup>), chloroform (53 ug/m<sup>3</sup>) and trichlorofluoromethane (220 ug/m<sup>3</sup>).

Indoor air samples collected in the adjacent bagel shop contained 180 ug/m<sup>3</sup> of PCE and the indoor air sample collected in the mini-mall contained 74 ug/m<sup>3</sup> of PCE.

In an effort to mitigate the elevated levels of VOCs detected in soil vapor beneath the basement slab, which appears to be the result of residual vapors trapped beneath the basement slab, the property owner installed a Sub-Slab Depressurization System (SSDS) in 2010. The system, which is currently operating, was installed without the oversight and /or approval of the Department. The SSDS will be evaluated and upgraded as part of the proposed selected remedy. The results of the RI have determined that the dry wells located in the basement of the Mayflower Cleaners were successfully remediated in 1996 and that there have been no additional VOCs impacts to site soils and/or groundwater since that time.

#### **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*.

Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. A sub slab depressurization system (system that ventilates/removes the air beneath the building) has been installed in the dry cleaning portion of the building to mitigate soil vapor intrusion. However, subsequent evaluations of all on-site buildings show that indoor air is still being impacted and additional measures are necessary to prevent contact with contaminants in indoor air. Sampling indicates soil vapor intrusion is not a concern for off-site buildings.

### **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:

#### **Soil Vapor**

##### **RAOs for Public Health Protection**

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

### **SECTION 7: SUMMARY OF THE PROPOSED REMEDY**

To be selected, the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.



The basis for the Department's proposed remedy is set forth at Exhibit D.

The proposed remedy is referred to as the Vapor Mitigation System remedy.

The estimated present worth cost to implement the remedy is \$150,000. The cost to construct the remedy is estimated to be \$120,000 and the estimated average annual cost is \$2,000.

The elements of the proposed remedy are as follows:

Elements of the Proposed Remedy:

### 1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance and monitoring of the remedial program. Green remediation principals and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy, and generating some renewable energy on site if possible;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which will otherwise be considered a waste.
- Maximizing habitat value and creating habitat when possible.
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. The site is currently completely covered by three adjoining commercial buildings and customer parking lots, and it is anticipated that this cover will stay in place, however, if modified; a site cover will be installed to allow for commercial use of the site. The remedial design will stipulate that the site cover will consist either of the structures such as buildings, pavement and sidewalks currently comprising the site development, or a soil cover will be installed in areas where exposed surface soil are found to exceeds the commercial use soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer. The excavation will be backfilled with soil meeting the backfill material requirements for commercial use as set forth in 6 NYCRR Part 375-6.7(d) with the upper six inches of the soil of sufficient quality to maintain a vegetative layer.

### 3. Sub Slab Depressurization System (SSDS)

Upgrade the existing SSDS to ensure that soil vapor intrusion concerns in on-site buildings will be addressed. The upgrade will include the installation of an appropriate sized blower motor and the connection of an additional suction pit and piping in the adjoining mini-mall to mitigate the potential for soil vapor intrusion to impact the indoor air. Once the upgrade is completed, an evaluation of the SSDS will be conducted in accordance with the NYSDOH Soil Vapor Intrusion Guidance document to determine its mitigation effectiveness. Details of the SSDS is shown on Figure 4.

#### 4. Institutional Control

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

- requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;
- prohibits agriculture or vegetable gardens on the controlled property; and
- requires compliance with the Department approved Site Management Plan.

#### 5. Site Management Plan

A Site Management Plan is required, which includes the following:

a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 4 above.

Engineering Controls: The soil cover system discussed in Paragraph 2 above and the SSDS discussed in Paragraph 3 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any building be developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

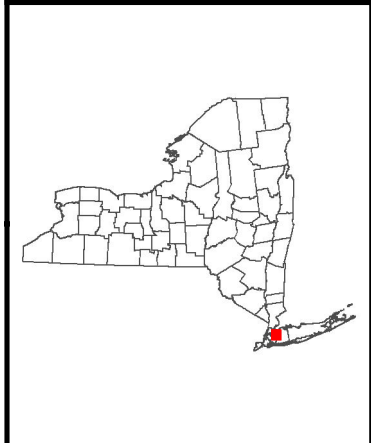
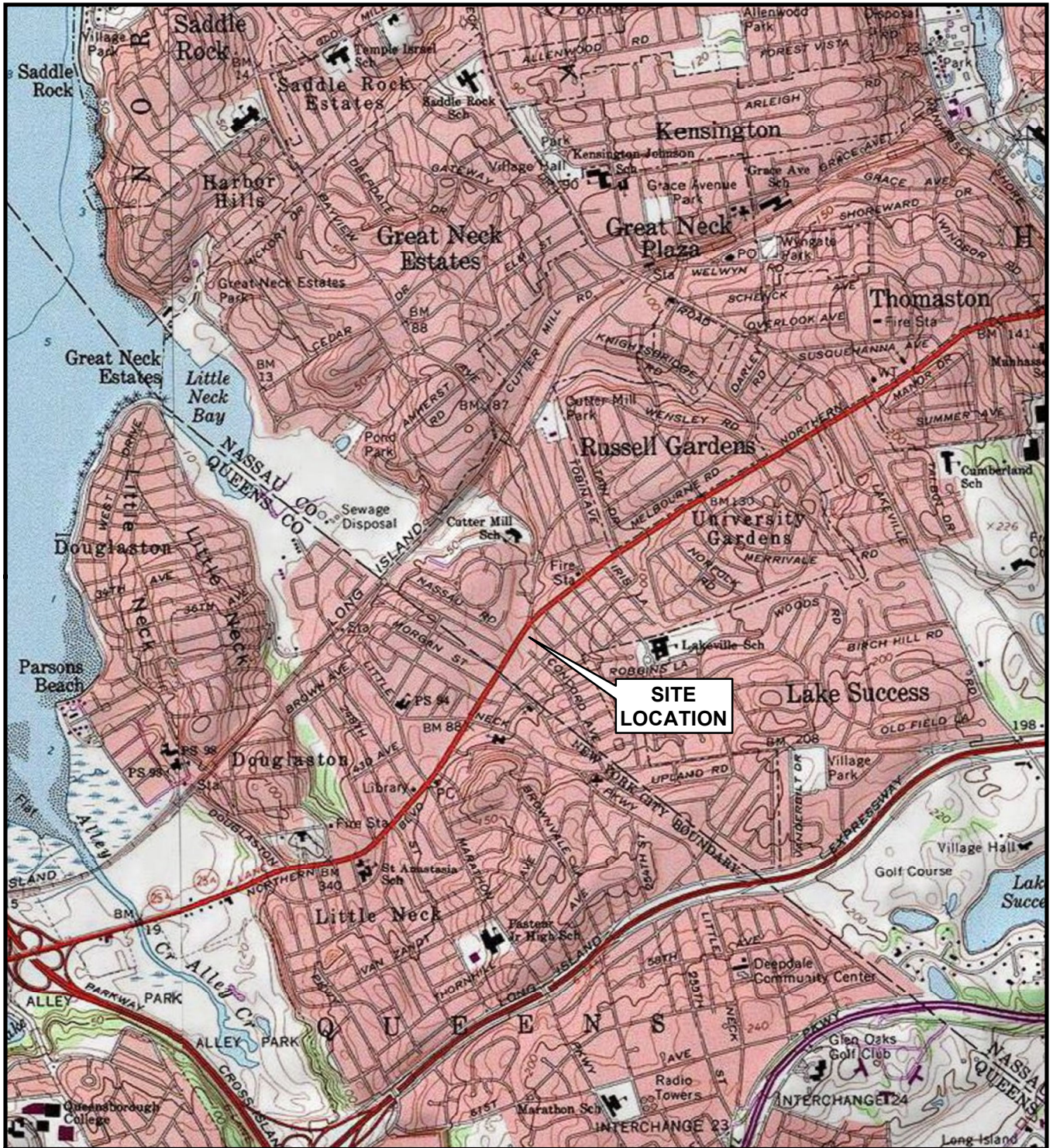
b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of soil vapor/indoor air to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department;

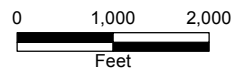
- monitoring for vapor intrusion for any buildings occupied or developed on the site, as may be required by the Institutional and Engineering Control Plan discussed.

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 treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- maintaining site access controls and Department notification; and
- providing the Department access to the site and O&M records.

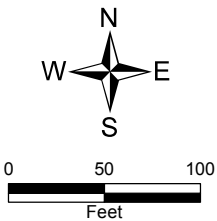


**Figure 1**  
Site Location Map



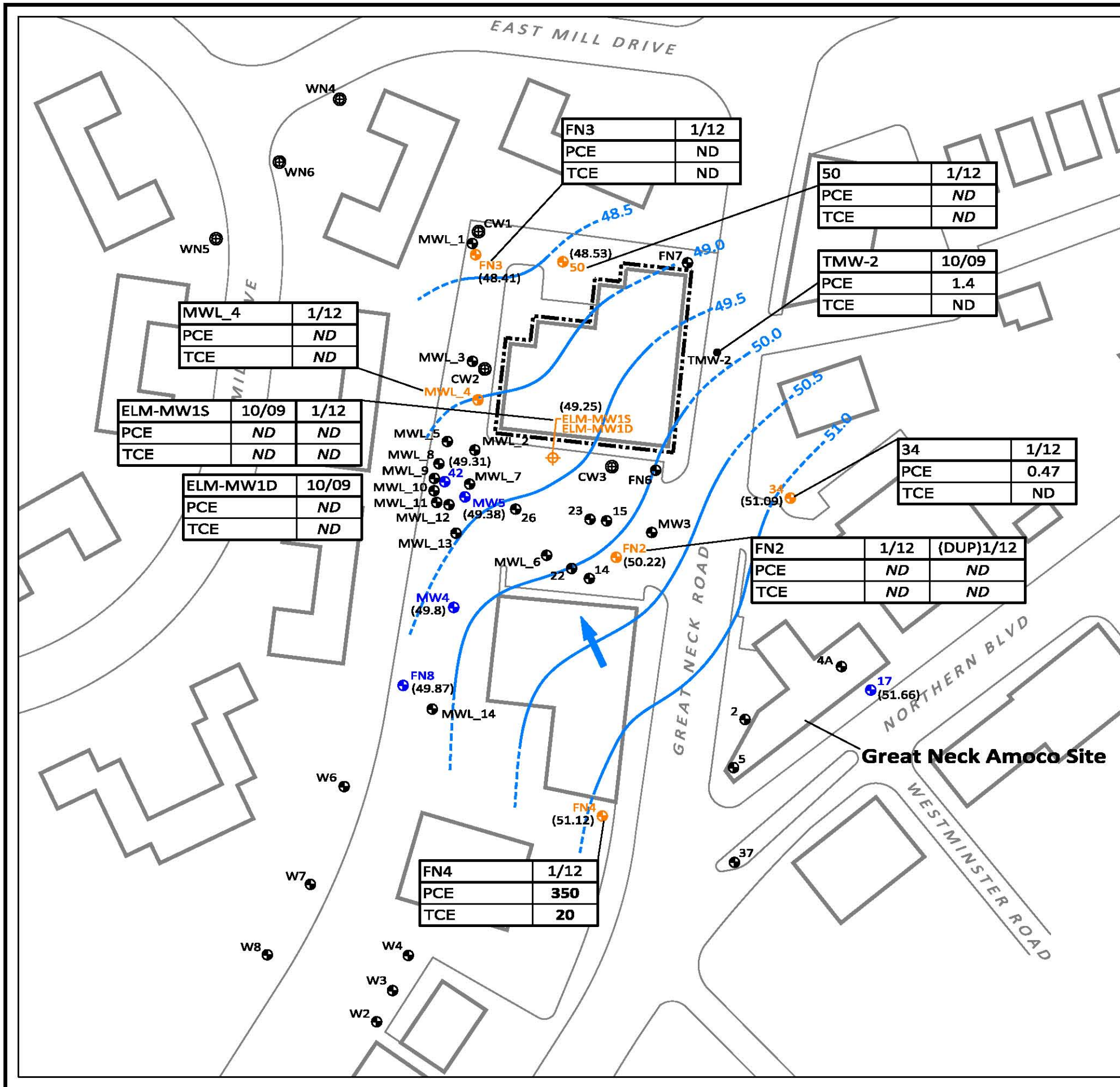
Mayflower Cleaners  
Town of North Hempstead, Nassau County  
Site No. 130068





**Figure 2**  
Site Map  
Mayflower Cleaners  
Town of North Hempstead, Nassau County  
Site No. 130068



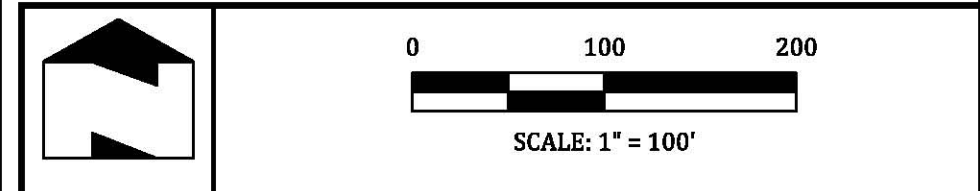


**LEGEND**

- SITE BOUNDARY
  - FN8 MONITORING WELL LOCATION AND ID, AND GROUND WATER ELEVATION COLLECTED DECEMBER 14, 2011
  - FN3 MONITORING WELL LOCATION AND ID, AND GROUND WATER ELEVATION COLLECTED JANUARY 9-10, 2012
  - 17 MONITORING WELL LOCATION AND ID
  - CW1 CLUSTER WELL LOCATION AND ID
  - TMW TEMPORARY WELL LOCATION AND ID
  - (51.12) GROUND WATER ELEVATION (FEET)
  - GROUND WATER ELEVATION CONTOUR (FEET)  
CONTOUR INTERVAL = 0.5 FOOT  
DASHED WHERE INFERRED
  - INTERPRETED GROUND WATER FLOW DIRECTION
- |     |      |  |
|-----|------|--|
| FN2 | 1/12 | SAMPLE ID AND DATE                                 |
| PCE | ND   | TETRACHLOROETHENE RESULT IN ug/L (TOGS = 5)        |
| TCE | ND   | TRICHLOROETHENE RESULT IN ug/L (TOGS = 5)          |
|     |      | ND NOT DETECTED                                    |
|     |      | ND NOT DETECTED/REPORTING LIMIT EXCEEDS TOGS 1.1.1 |

**NOTES:**

1. ALL RESULTS ARE IN ug/L.
2. ONLY COMPOUNDS OF CONCERN ARE SHOWN.
3. **BOLD RESULTS EXCEED APPLICABLE TOGS 1.1.1 STANDARD (SEE LEGEND).**
4. GROUND WATER ELEVATION FOR MWL\_4 IS NOT SHOWN BECAUSE WELL WAS NOT SURVEYED.
5. GROUND WATER CONTOURS WERE DERIVED FROM BOTH THE 12/14/11 AND 1/9-10/12 GAUGING EVENTS.
6. THE HORIZONTAL DATUM IS THE NEW YORK STATE PLANE COORDINATE SYSTEM NAD83 DETERMINED BY DIFFERENTIAL GPS ON 12/20/11. REFERENCE STATION: NYQN.
7. THE VERTICAL DATUM IS THE EXISTING WELL DATUM PROVIDED BY THE ELM GROUP TO BORBAS SURVEYING & MAPPING, LLC. IN A DIGITAL FILE (MAYFLOWER\_SURVEY\_DATA.XLSX) VIA EMAIL ON 12/19/11. BENCHMARK HELD: MARK ON 4" DIAMETER PVC INNER CASING OF FN7=69.83'.
8. THE EXISTING WELL DATUM DIFFERS FROM NAVD88 (NORTH AMERICAN VERTICAL DATUM OF 1988) BY APPROXIMATELY 25 FEET (NAVD88 INNER CASING OF FN7=45.07'±).
9. ALL COORDINATES AND ELEVATIONS SHOWN HEREON ARE IN U.S. SURVEY FEET.



TITLE: **FIGURE 3**  
SGI SAMPLING RESULTS AND GROUND WATER CONTOUR MAP

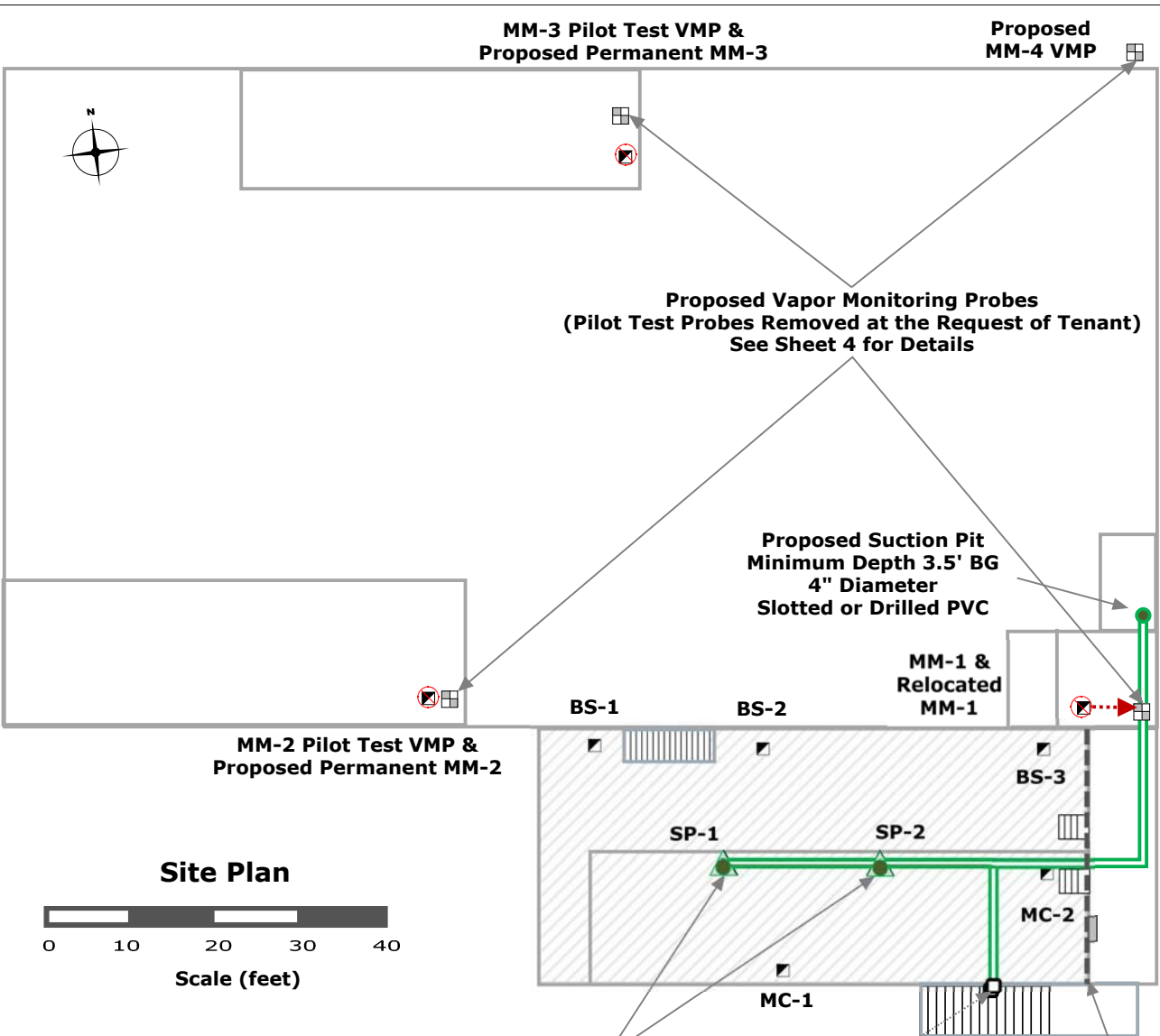
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489 GREAT NECK ROAD  
GREAT NECK, NEW YORK

DATE:  
1/20/12

FILENAME:  
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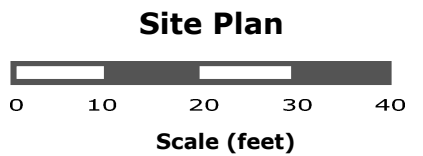
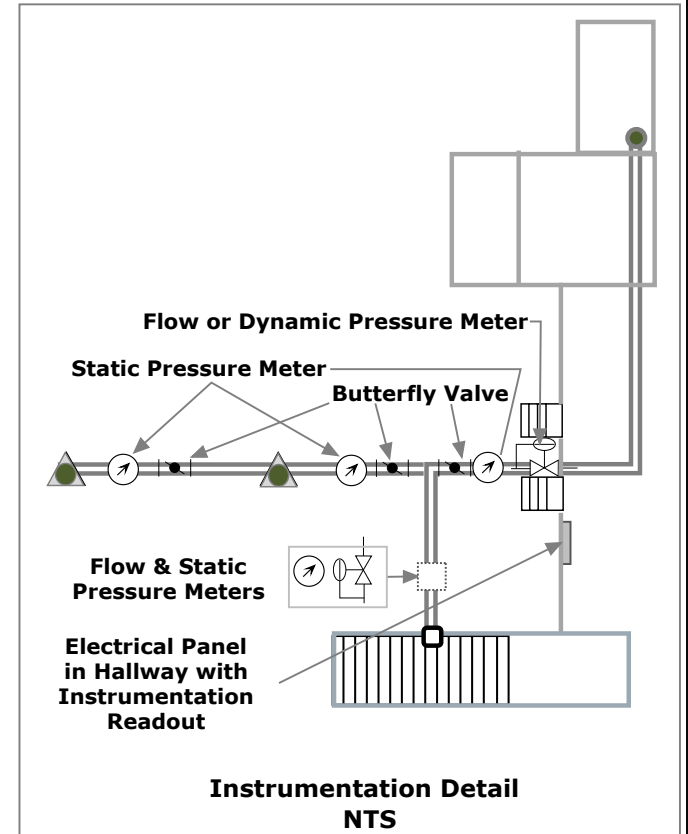
LAYOUT:  
GW DATA

**The EIM Group**  
218 WALL STREET, PRINCETON, NEW JERSEY 08540  
4920 YORK ROAD, SUITE 290, HOLMBOURG, PENNSYLVANIA 18928 612  
MAIN STREET, BOONTON, NEW JERSEY 07005  
267 BROADWAY, FIFTH FLOOR, NEW YORK, NEW YORK 10007  
2475 BAGLYOS CIRCLE, BETHLEHEM, PENNSYLVANIA 18020  
www.ExploreEIM.com



**Notes**

1. Final design and component selection are subject to approval by the environmental engineer.
2. Contractor shall provide all specifications and cut sheets to the environmental engineer for approval prior to installation.
3. Basement wall (3' X 30' with stairway indentations) shall be repaired with concrete filler and sealed with 4Evercrete manufactured by ECI Global Solutions Inc., or equivalent or superior.



- Key**
- ☒ ☐ Vapor Monitoring Probe
  - ▲ Existing Suction Pit
  - Proposed Suction Pit
  - New 4" Laterals
  - New 4" Riser to Replace Existing 3" Riser

Existing Suction Pits 3.5' BG, 3" Diameter Transitioning to New 4" Lateral At Grade

New 4" Riser To Replace Existing 3" Riser (See Sheet 4 for Details)

Wall to be Sealed See Sheet 1

**Piping Layout and VMP Locations**

**Mayflower Cleaners**  
489 Great Neck Road, Great Neck, NY

DRAWN	CHECKED	DATE	DRAWG NO.
Keith P. Brodock, P.E.	Tarek Z. Khouri, P.E.	June 2011	Figure 4

ELM Engineering, P.C.  
*An Affiliate of*

**THE elm GROUP**

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