

**BP Moby Holdings LLC**

**Periodic Review Report**

25 Melville Park Road  
Melville, New York  
NYSDEC Site No. V00128

November 13, 2015



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### Periodic Review Report

25 Melville Park Road Site  
Melville, New York  
NYSDEC Site No. V00128

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**1. Executive Summary**

Arcadis of New York, Inc. (Arcadis), on behalf of BP Moby Holdings LLC (BP Moby), has prepared this Periodic Review Report (PRR) for the 25 Melville Park Road Site (hereinafter referred to as the "Site") in Melville, New York. The Site is being remediated in accordance with the Voluntary Cleanup Agreement (VCA) Index # W1-0778-96-11, Site # 1-52-169, Voluntary Cleanup Site V00128-1, which was issued on January 13, 1998, and the Record of Decision (ROD), which was issued on March 29, 2004.

Several remedial action objectives (RAOs) have been established for protection of both human health and the environment at the Site. The following remedial actions have been implemented at the Site to meet the RAOs.

- Enhanced Reductive Dechlorination (ERD) to remediate chlorinated volatile organic compound (CVOC) impacts in groundwater;
- Non-aqueous phase liquid (NAPL) recovery;
- Operation of a vapor control system (VCS) to prevent vapor intrusion; and,
- Implementation of institutional controls and engineering controls (ICs/ECs).

The following conclusions and recommendations are made based on results provided within this PRR:

- The requirements of each remedy component and/or plan were met during the reporting period as follows:
  - Each engineering control (e.g., active remedial component) resulted in achievement of their respective RAOs;
  - The periodic review inspection and executed IC/EC forms confirm that all ICs remain in place and effective; and,
  - All monitoring and operation and maintenance (O&M) activities were completed in accordance with the requirements provided in the Site Management Plan (SMP).

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- Each remedy component performed as designed and has mitigated the identified risks to human health and the environment.
- As part of the optimized ERD program, a revised groundwater monitoring program has been implemented which is sufficient for evaluating performance of the current IRZs.
- Based upon the findings herein and the future anticipated site activities, it is recommended that the current periodic review period (annual) be continued.

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## 2. Site Overview

The following subsections provide a site overview including a site description, current CSM, RAOs, and description of the main components of the remedy.

### 2.1 Site Description

The Site is located at 25 Melville Park Road in Suffolk County, New York and is identified as District 0400, Section 268, Block 01, Lot 04. The Site is located slightly south and east of the intersection of Broadhollow Road (Route 110) and the Long Island Expressway (Route 495) in the Village of Melville. The approximately 6-acre Site is located in an industrial and commercial area and is bounded to the south by Melville Park Road and to the west, north, and east by adjoining properties. The Site is presently occupied by a two-story office building and parking facilities. Figure 1 (Site Plan) shows the Site features and layout.

### 2.2 Conceptual Site Model

There are two primary impacted zones at the Site. The shallow aquifer zone extends from approximately 45 to 70 feet below land surface (ft bls) and the intermediate aquifer zone extends from approximately 70 to 100 ft bls. The most likely source of impacts is a historical release(s) from the former manufacturing operations, whereby NAPL migrated vertically through the vadose zone to the aquifers described above; the exact release mechanism(s) is unknown. The on-site dissolved-phase volatile organic compound (VOC) plume currently extends from the source area beneath the northeast portion of the building to the general vicinity of monitoring wells MW-29 in the shallow zone and MW-23 in the intermediate zone. The dissolved-phase VOC plume in the source area is present to a depth of approximately 90 ft bls. The non-aqueous phase liquid (NAPL) extent has been defined and generally extends from the vicinity of angle wells IW-27 and IW-25 to the loading dock area.

In 2013 Arcadis completed a supplemental source area investigation to refine the CSM and further delineate source area NAPL and groundwater impacts. A detailed summary of the current CSM is provided in Progress Report 79 (Arcadis 2013). Figures 2 and 3 show the distribution of total CVOCs in the shallow and intermediate aquifer zones, respectively, for the June 2003 (pre-remediation) and December 2014 groundwater sampling events.



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**2.3 Remedial Action Objectives**

RAOs for public health protection include eliminating or reducing to the extent practicable:

- Exposures of persons at or around the Site to chlorinated solvents and petroleum in the underlying groundwater;
- The migration of chlorinated solvents from groundwater into indoor air through soil vapors; and,
- The migration of on-site groundwater contamination to off-site where additional exposures to contaminated groundwater are possible.

RAOs for environmental protection include attaining to the extent practicable:

- Elimination of VOC source areas in groundwater, thereby removing the source of the dissolved groundwater plume;
- Ambient groundwater quality standards to be met at the downgradient property boundary, thereby preventing further impacts to off-site groundwater; and,
- Ensure that indoor air quality continues to meet New York State Department of Health (NYSDOH) guidance values.

**2.4 Remedial Program Elements**

The following are the primary components of the selected remedy:

- The operation and maintenance of downgradient and source area IRZs by periodic injection of organic carbon to the subsurface until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible;
- NAPL bailing in productive wells until NAPL recovery is no longer productive;
- Operation of the VCS in the northeast portion of the building;

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- Operation of the heating, ventilation, and air conditioning (HVAC) system to maintain a positive pressure within the building to help prevent the potential migration of vapors into indoor air;
- Execution and recording of an Environmental Easement (EE) to restrict land use and prevent future exposure to any contamination remaining at the Site;
- Development and implementation of a SMP for long term management of remaining contamination as required by the EE, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance, and (4) reporting;
- Periodic certification of the institutional and engineering controls listed above.

There have not been any significant changes made to the selected remedy since remedy selection. In 2013 and 2014 Arcadis completed a feasibility evaluation for alternate source area remedial technologies and has implemented an optimized ERD program. The optimized ERD program was initially proposed in the 2014 PRR (Arcadis 2014) and is discussed in more detail in Section 6. A detailed history of the injection activities completed as part of the ERD remedy is included in Appendix A.

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**3. Evaluation of Remedy Performance, Effectiveness, and Protectiveness**

The selected remedy was effective at achieving each of the RAOs during the reporting period. Table 1 provides a summary of how each RAO was achieved through operation of its respective remedy component. Supporting data in the form of tables and graphs are provided in the remaining sections of this PRR.

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**4. IC/EC Plan Compliance Report**

ICs and ECs have been implemented at the Site to ensure achievement of the RAOs described in Section 2.3. The Site has three primary ECs. The ECs consist of the following:

- Downgradient and source area IRZs that involve the delivery of organic carbon to the subsurface through a network of injection wells;
- NAPL recovery that involves the manual removal of NAPL from the monitoring well network by hand bailing; and,
- A VCS in the northeast portion of the building consisting of extraction points VCS-1 and VCS-2 and induced vacuum monitoring points MP-1 through MP-6. In addition to the VCS, the HVAC system is operated to maintain a positive pressure within the building to help prevent the potential migration of vapors into indoor air.

Table 1 provides a summary of how each EC is used in achievement of the RAOs.

A series of ICs are used to implement, maintain, and monitor the ECs. The EE requires compliance with these ICs. The ICs consist of the following:

- All ECs must be operated and maintained as specified in the SMP;
- All ECs on the Site must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, NAPL, sub-slab soil vapor, and indoor air monitoring must be performed as defined in the SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner defined in the SMP; and,
- On-site environmental monitoring devices, including but not limited to, injection wells, groundwater monitoring wells, VCS extraction and monitoring points, and soil vapor probes, must be protected and replaced, as necessary, or

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properly abandoned, as directed by the NYSDEC, to ensure continued functioning in the manner specified in the SMP.

In addition to the ICs referenced above, additional ICs have been implemented in the form of site restrictions. Site restrictions that apply to the Site consist of the following:

- Require compliance with the approved SMP;
- Restrict the use of groundwater beneath the Site as a source of potable or process water, without necessary water quality treatment as determined by the Suffolk County Department of Health Services (SCDHS);
- Limit the use and development of the property to commercial or industrial uses only; and,
- Require the property owner to complete and submit to the NYSDEC an annual certification to ensure that the ICs are still in place.

The Site sanitary system was upgraded between October 28 and December 12, 2014. The sanitary system work was unrelated to the Site activities that are performed in connection with the operation, maintenance and monitoring of the remedy. In an e-mail dated November 3, 2014, Mr. Scott Furman of Sive, Paget & Riesel P.C. notified the NYSDEC of the sanitary system work that was underway. The NYSDEC indicated that the work needed to be performed in accordance with the requirements set forth in the NYSDEC-approved Soil Management Plan (Attachment C of the Site Management Plan dated August 13, 2010). As discussed with the NYSDEC on November 12, 2014, Arcadis is providing the overall IC/EC certification for the Site (i.e., Box 7 of the NYSDEC Institutional and Engineering Controls Certification Form) with the property owner's representative providing certification confirming that all work has been completed in accordance with the requirements of the Soil Management Plan along with the appropriate backup documentation that confirms compliance.

The annual site inspection was completed on October 20, 2015. No deficiencies were noted during the annual site inspection. As such, all ICs/ECs remain in place and effective in meeting the goals described above. There are no recommended changes at this time.

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The completed site management certification forms executed as part of the annual site inspection and review process are provided in Appendix B.

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**5. Monitoring Plan Compliance Report**

The monitoring plan provided in the SMP (Arcadis 2010) describes the measures for evaluating the performance and effectiveness of the implemented ECs in reducing or mitigating contamination at the Site. The SMP was revised in July 2015 with submittal of a SMP Addendum (Arcadis 2015), which was approved by the NYSDEC in an e-mail dated July 27, 2015. The NYSDEC approved the SMP Addendum in a follow up letter dated August 11, 2015. The monitoring program for the Site includes long-term IRZ performance monitoring, groundwater compliance monitoring, groundwater plume configuration monitoring, water-level measurements, NAPL gauging, indoor air quality (IAQ) monitoring, sub-slab soil vapor monitoring, and VCS monitoring. Figures 4 and 5 show the locations of the monitoring points that are used in the monitoring program. Detailed descriptions of the monitoring program elements are provided in the SMP (Arcadis 2010) and SMP Addendum (Arcadis, 2015).

The monitoring activities that were completed during this PRR reporting period include the following:

- Quarterly IRZ performance monitoring and groundwater compliance monitoring were performed in December 2014, March 2015, June 2015, and September 2015;
- Annual groundwater plume configuration monitoring was performed in December 2014;
- Annual water-level measurements were collected in March 2015;
- Quarterly NAPL gauging was performed in December 2014, March 2015, June 2015, and September 2015;
- Annual IAQ monitoring and sub-slab soil vapor monitoring were performed in March 2015; and,
- Quarterly VCS monitoring was performed in December 2014, March 2015, June 2015, and September 2015.

There are no monitoring deficiencies and the monitoring complied with the monitoring plan. The monitoring that was performed during the PRR reporting period continues to

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demonstrate that the ECs are effective in reducing or mitigating contamination at the Site. Additional evaluation of remedy-specific monitoring data is described below and in Section 6 of this PRR.

**5.1 Groundwater Monitoring**

Tables 2 through 4 provide a summary of the groundwater monitoring data collected during the current reporting period. Figures 2 and 3 show the distribution of total CVOCs in the shallow and intermediate aquifer zones, respectively, for the June 2003 (pre-remediation) and December 2014 groundwater sampling events. Interpretation of the groundwater analytical results with respect to the effectiveness of the remedial actions (specifically the IRZs) is included in Section 6.2.1.

**5.2 Water-Level Measurements**

ARCADIS collected water-level measurements from the hydraulic monitoring well network on March 17 and 18, 2015 (see Table 5). Water-level elevation data indicate that the horizontal direction of shallow groundwater flow is to the south-southeast, which is consistent with data collected during previous monitoring rounds (see Figure 6).

**5.3 NAPL Gauging**

Table 6 provides the NAPL gauging data from December 2014 through September 2015. As of September 2015, NAPL is present (above trace thicknesses) only in well IW-18 although NAPL was also sporadically detected at IW-25. The distribution of drainable NAPL correlates with the source area and there is no evidence, based on the quarterly NAPL gauging data, that there has been a horizontal spread or vertical migration of NAPL from the source area to other areas. There are regions within the source area where NAPL is present as residual NAPL that cannot be recovered from wells.

**5.4 IAQ Monitoring and Sub-Slab Soil Vapor Monitoring**

The annual vapor intrusion monitoring program consists of collecting two (2) indoor air quality samples (SW Office Space and SE Office Space) and two (2) sub-slab soil vapor quality samples (SS-5A and SE SS-A). ARCADIS collected the indoor air quality



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samples and sub-slab soil vapor samples on March 7, 2015. Table 7 presents a summary of the March 2015 analytical data.

The 2015 sub-slab soil vapor sample data were similar to the 2014 sub-slab soil vapor sample data. PCE was detected in the SE SS-A and SS-5A sub-slab soil vapor samples at concentrations of 210 and 88  $\mu\text{g}/\text{m}^3$ , respectively. 1,1,1-trichloroethane (1,1,1-TCA) was detected in the SE SS-A and SS-5A samples at concentrations of 3.1 and 6.6  $\mu\text{g}/\text{m}^3$ , respectively. TCE was detected in the SE SS-A sample at a concentration of 6.4  $\mu\text{g}/\text{m}^3$ .

2-butanone (methyl ethyl ketone) was detected in the SW Office Space indoor air quality sample at a concentration of 2.9 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). PCE was detected in the SW Office Space and SE Office Space indoor air quality samples at concentrations of 0.29 and 0.31  $\mu\text{g}/\text{m}^3$ , respectively.

Evaluating the 2015 sub-slab soil vapor data in conjunction with the 2015 indoor air quality data in the context of the NYSDOH decision matrices indicates that ongoing monitoring is warranted for PCE but that no further action is warranted for TCE and 1,1,1-TCA at the two sampling locations. Nonetheless, the site-related CVOCs will continue to be monitored on an annual basis.

### 5.5 VCS Monitoring

The VCS continued to maintain negative pressure beneath the building within the entire target area (i.e., on both sides of the wall footing). This is evidenced by negative pressure readings at all induced vacuum monitoring points during operation. Photoionization detector (PID) measurements collected from extraction points VCS-1 and VCS-2 were generally non-detect. The VCS operating data for the period of December 2014 through September 2015 are provided in Table 8.

## **6. Operation and Maintenance (O&M) Plan Compliance Report**

The O&M Plan provided in the SMP (Arcadis 2010) and SMP Addendum (Arcadis 2015) describe the activities necessary to implement each of the active remedial components with the ultimate goal of achieving their specific RAOs. As described previously, the active remedial components at the Site include:

- Implementation of the downgradient and source area IRZs;
- NAPL recovery; and,
- Operation of the VCS.

A summary of the O&M methodology and activities completed during the reporting period is provided below.

### **6.1 Operation and Maintenance Methodology and Activities Completed**

The following subsections provide a brief description of the methodology and activities for each of the active remedial components during the reporting period.

#### **6.1.1 Injection Well Installation**

Installation of two new angled injection wells (IW-28 and IW-29) was completed as described in Progress Report 86. The new injection wells were installed beneath the northeast portion of the building for expansion of the source area injection program. The two new injection wells were drilled and installed using sonic drilling techniques. The injection wells are constructed of 2-inch diameter, internally flush threaded, Schedule 40 stainless steel casing and thirty (30) feet of 2-inch diameter, internally flush threaded, 0.020-inch (20 slot) Johnson Screens Muni-Pak™ pre-packed stainless steel well screens. A summary of the well construction details for the revised injection well network is provided in Table 9. The injection well locations are shown on Figure 7.

#### **6.1.2 In-Situ Reactive Zone Activities**

Maintenance of the downgradient and source area IRZs involves the periodic injection of a fermentable organic carbon substrate through a network of injection wells and groundwater monitoring program. The injection of organic carbon drives the

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groundwater geochemistry to strongly reducing conditions that fosters the growth of bacteria capable of completing reductive dechlorination. The organic carbon also promotes enhanced solubilization of NAPL through the generation of mild surfactants, organic acids, and other chemical processes. During the most recent injection event, sulfate was added to the injection solution. Sulfate is expected to react with the reduced (ferrous) iron that is present in the target aquifer to produce reactive iron sulfides for promotion of abiotic degradation of the constituents of concern (COCs).

Two carbon injection events were completed during the current reporting period. A molasses injection was completed during the month of November 2014 and an emulsified vegetable oil (EVO)/sulfate injection was completed during the month of August 2015.

During the November 2014 molasses injection, three downgradient wells (IW-6, IW-11 and IW-15) and two source area wells (IW-24 and IW-27) were used for reagent delivery. This injection event was completed in accordance with the revised methodology approved by the NYSDEC in April 2012.

During the August 2015 EVO/sulfate injection, an expanded network of three downgradient injection wells (IW-6, IW-11 and IW-15) and seven source area injection wells (IW-3, IW-17, IW-20, IW-25, IW-27 and newly installed injection wells IW-28 and IW-29) were used for reagent delivery. This injection event was generally completed in accordance with the optimized ERD methodology proposed in the July 2015 SMP Addendum that was approved by the NYSDEC on August 11, 2015. Approximately 99,327 gallons of solution was injected at an average concentration of 2.7% EVO by volume and 636 milligrams per liter (mg/L) of dissolved sulfate. The total volume added to each well is shown in Appendix C and varied between 5,900 gallons and 15,000 gallons. An underground injection control (UIC) permit application Form 7520-16 (Injection Wells) was filed with the USEPA 30 days prior to implementing the first optimized ERD injection event.

Injection field parameters (water and carbon volume, injection flowrate, injection pressure) were recorded during each injection event to document the activities performed. A summary of the injection field parameters are provided in Appendix C. A bullet summary of the injection methodology history is provided in Appendix A.

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#### 6.1.3 Groundwater Performance Monitoring

The groundwater monitoring program is used to demonstrate that sufficient organic carbon is delivered to the subsurface, confirm reagent distribution, and confirm that conditions conducive for reductive dechlorination are being maintained. Groundwater analytical parameters used to confirm these objectives include VOCs, TOC, methane, ethene, ethane, and the field parameter pH.

Four performance monitoring events were completed during this reporting period. The first three events in December 2014, March 2015 and June 2015 were completed in accordance with the 2010 SMP (Arcadis 2015). The final performance monitoring event in this reporting period was completed in accordance with the revised groundwater monitoring program that was proposed in the SMP Addendum (Arcadis 2015). The revised groundwater monitoring program is shown in Table 10.

#### 6.1.4 NAPL Recovery

NAPL recovery is completed through manual hand-bailing of NAPL from all monitoring wells containing recoverable NAPL. Recovered NAPL is containerized in labeled, sealed 55-gallon drums. The 55-gallon drums are stored in a secure location and are disposed in accordance with applicable local, State, and Federal regulations.

As described previously, NAPL gauging and recovery events were completed on a quarterly basis in December 2014, March 2015, June 2015, and September 2015. A summary of the gauging and recovery data are provided in Tables 6 and 11.

#### 6.1.5 Vapor Control System

Maintenance of the VCS included quarterly site visits to:

- Periodic site inspections to ensure the system is running properly;
- The collection of meteorological and system operating parameters on a quarterly basis including:
  - Barometric pressure, ambient temperature and atmospheric conditions. In addition, it will be noted if the barometric pressure is rising or falling;

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- Induced vacuum readings at all monitoring points;
  - Recovery vacuum and flow rate at each recovery well; and,
  - PID readings from each recovery well to confirm vapor treatment is not required (NYSDEC 2007).
- Maintenance of system equipment (i.e., blower maintenance), as necessary during the site inspections.

The VCS operated continuously during the reporting period. Site inspections were completed during each scheduled quarterly VCS monitoring event, during each groundwater and NAPL monitoring event, and during each reagent injection event. Quarterly site visits for the collection of system operating parameters were completed in December 2014, March 2015, June 2015, and September 2015.

## **6.2 Evaluation of Remedial Systems**

The following subsections evaluate the ability of each of the active remedial components to perform as designed based upon the O&M activities completed during the reporting period.

### **6.2.1 Downgradient and Source Area In-Situ Reactive Zones**

O&M activities completed during the reporting period resulted in operation of the IRZs in accordance with their design objectives. The design objectives are to achieve the RAOs for groundwater identified in Section 2 of this PRR. Key analytical and field parameter data that support this conclusion includes:

- The target injection volumes for each injection event were achieved. These data indicate that sufficient carbon solution and supplemental sulfate was injected to achieve the desired injection radius. A summary of the field parameters recorded during each injection event are provided in Appendix C.
- TOC provides a direct measurement of the residual electron donor available for microbial utilization and fermentation to generate dissolved hydrogen for dechlorination. Generally, a TOC concentration of greater than 20 mg/L at monitoring wells located within 60 to 100 days hydraulically downgradient of

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the injection wells is considered optimal for ERD. A summary of the area with TOC greater than 20 mg/L during the December 2014 sampling event is provided on Figure 8. The extent of TOC exceeding 20 mg/L is generally consistent with the extent of the CVOC plume in groundwater in both the shallow and intermediate zones, which indicates adequate TOC has been distributed to the aquifer to maintain reducing conditions and drive the ERD process. TOC concentrations in portions of the source zone did not have sufficient TOC to sustain ERD, however, installation of the new source area injection wells and the subsequent EVO injection in August 2015 is expected to supply the excess TOC. A summary of the TOC analytical data collected during the reporting period is provided in Table 3. It should be noted that the concentration of TOC was less than 20 mg/L at injection well IW-11 during the December 2014 monitoring event. Subsequent TOC sample concentrations for samples collected from IW-11 between March 2015 and September 2015 were well above 20 mg/L.

- Optimal reductive dechlorination rates are generally achieved at pH values greater than 5 SU, depending on the extent and distribution of subsurface biomass. The pH at all monitoring wells remained greater than 5 SU, the lower limit for achieving optimal reductive dechlorination. A summary of the pH data collected during the reporting period is provided in Table 3.
- The presence of elevated dissolved methane relative to baseline conditions provides a positive indication that the strongly reducing conditions required for complete reductive dechlorination have been established. A summary of the methane analytical data collected during the reporting period is provided in Table 3. Trend plots that include the concentration of methane versus time for the downgradient monitoring wells that are part of the revised annual (Quarter 4) monitoring program for light hydrocarbons are provided in Appendix D. These select IRZ monitoring wells (MW-28M and MW-31 in the shallow zone and IW-18, MW-23 and MW-34 in the intermediate zone) will be considered the key monitoring wells for performance evaluation. Results indicate the concentration of methane is generally elevated at each of these key monitoring wells.
- Ethene and ethane are the primary end products of reductive dechlorination. The presence of ethene and ethane demonstrates that the necessary microorganisms for complete transformation of chlorinated VOCs are both

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present and active within the subsurface and confirms that COCs are undergoing complete reductive dechlorination through a biologically mediated pathway. Ethane and ethene detections were widespread during monitoring activities conducted during this reporting period. These data corroborate TOC data and indicate that complete reductive dechlorination is occurring within the IRZs. A summary of the ethene and ethane analytical data collected during the reporting period is provided in Table 3. Trend plots that include the concentration of ethene and ethane versus time for key monitoring wells (MW-28M and MW-31 in the shallow zone and IW-18, MW-23 and MW-34 in the intermediate zone) are provided in Appendix D.

- The concentrations of CVOCs are below SGVs at the downgradient property boundary wells for which data is available for the current reporting period which indicates that the downgradient IRZ is achieving its respective RAO.
- The concentration of CVOCs have decreased by between 78% and 100% within source area monitoring wells IW-22, IW-23, MW-13, and MW-13D when comparing December 2014 data to baseline data (May 2005). Conversely, CVOCs are significantly above baseline conditions at source area monitoring wells IW-17 and IW-18 which were targeted for enhanced NAPL dissolution as part of the mol-whey pilot test. These data indicate that enhanced NAPL dissolution and complete reductive dechlorination are occurring in the source area. A summary of the VOC analytical data collected during the reporting period is provided in Tables 2 and 4.

In summary, the downgradient and source area IRZs were operated and maintained as designed and resulted in achievement of the RAOs for groundwater during the reporting period; optimization of the ERD system was implemented beginning in August 2015 based upon the results of the supplemental investigation.

#### 6.2.2 NAPL Recovery

NAPL gauging and recovery data collected during each NAPL gauging and recovery event indicate that the quarterly frequency is appropriate for achieving the RAOs. Approximately 12 gallons of NAPL/water mixture was removed from Site monitoring wells during the reporting period. A summary of NAPL recovery during the reporting period is provided in Table 11.

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### 6.2.3 Vapor Control System

A summary of the field parameters collected during the reporting period are provided in Table 8. Field parameter data and indoor air quality analytical data collected during the reporting period indicate that the O&M activities completed resulted in operation of the VCS in accordance with its design objectives. Specifically:

- An induced vacuum was measured at all induced vacuum measuring points during each quarterly site visit. The induced vacuum was greater than -0.035 inches of water (iwc) at the majority of measuring points, which is the industry standard for the control of soil vapor (USEPA 1993); and,
- As described in Section 5.4, 2-butanone and PCE were detected at low-level concentrations in the indoor air quality samples collected from the southeastern (PCE) and southwestern (2-butanone and PCE) portions of the building. The detected PCE concentrations ( $0.31 \mu\text{g}/\text{m}^3$  and  $0.29 \mu\text{g}/\text{m}^3$ ) are well below the NYSDOH guideline for PCE ( $30 \mu\text{g}/\text{m}^3$ ).

Combined, the data indicate that the VCS is preventing the migration of chlorinated solvents from groundwater into indoor air through soil vapors and is ensuring that indoor air quality continues to meet NYSDOH guidance values.

### 6.3 Operation and Maintenance Deficiencies

No deficiencies or deviations from the planned O&M activities were noted for the reporting period.

### 6.4 Conclusions and Recommendations for Improvements

O&M activities for each of the active remedial components resulted in the achievement of the RAOs.



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**7. Overall PRR Conclusions and Recommendations**

The following conclusions and recommendations are made based on results provided within this PRR:

- The requirements of each remedy component and/or plan were met during the reporting period as follows:
  - As shown in Table 1, each engineering control (e.g., active remedial component) resulted in achievement of their respective RAOs.
  - The periodic review inspection and executed IC/EC forms confirm that all ICs remain in place and effective; and,
  - All monitoring and O&M activities were completed in accordance with the requirements provided in the SMP.
- Each remedy component performed as designed and has mitigated the identified risks to human health and the environment as documented in Table 1 and discussed in Sections 5 and 6 herein.
- Based upon the findings herein and the future anticipated site activities, it is recommended that the current periodic review period (annual) be continued.

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25 Melville Park Road Site  
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**8. References**

- ARCADIS of New York, Inc. 2010. Site Management Plan, 25 Melville Park Road Site, Melville, New York. August 13, 2010.
- ARCADIS of New York, Inc. 2013. Progress Report 79, 25 Melville Park Road Site, Melville, New York. October 31, 2013.
- ARCADIS of New York, Inc. 2014. Periodic Review Report, 25 Melville Park Road Site, Melville, New York. October 31, 2014.
- ARCADIS of New York, Inc. 2015. Site Management Plan Addendum, 25 Melville Park Road Site, Melville, New York. July 24, 2015.
- Department of Defense (DOD), 2006. Protocol for Enhanced In-Situ Bioremediation Using Emulsified Edible Oil. May 2006.
- New York State Department of Environmental Conservation. 2007. Letter Re: Proposed Changes to Vapor Control System Monitoring, 25 Melville Park Road, V00128. April 9, 2007.
- New York State Department of Environmental Conservation. 2012. E-mail Re: Proposed Injection Modifications Response to Comments - 25 Melville Park Road. April 23, 2012.
- United States Environmental Protection Agency (USEPA), 1993, Radon Reduction Techniques for Existing Detached Houses: Technical Guidance (Third Edition) for Active Depressurization Systems, October 1993.

## Tables



Table 1. Remedy Effectiveness Summary for the Periodic Review Period of October 2014 to September 2015, 25 Melville Park Road, Melville, New York.

Remedial Action Objective	RAO Achieved during Reporting Period?	Rationale
Public health protection. Eliminating or reducing to the extent practicable:		
Exposures of persons at or around the Site to chlorinated solvents and petroleum in the underlying groundwater;	Yes	<ul style="list-style-type: none"><li>- Prevention of contact with contaminated groundwater through implementation of the ICs and EC recorded in the EE.</li><li>- No changes to institutional or engineering controls during the reporting period as documented through IC/EC certifications.</li><li>- Remediation of contaminated groundwater toward the remediation goals as documented in Sections 5 and 6 of this PRR. Specifically,<ul style="list-style-type: none"><li>o Operation of the downgradient IRZ is preventing the off-site migration of dissolved phase chlorinated solvents.</li><li>o Operation of the source area IRZ is enhancing the removal of NAPL and treating dissolved phase chlorinated solvents.</li><li>o NAPL hand-bailing is physically removing NAPL, where present within existing monitoring wells.</li></ul></li></ul>
The migration of chlorinated solvents from groundwater into indoor air through soil vapors; and,	Yes	<ul style="list-style-type: none"><li>- Operation of the VCS in accordance with its design objectives. Supporting data provided in Sections 5 and 6 of this PRR.</li><li>- Remediation of contaminated groundwater, which is the source of soil vapors, as described in Sections 5 and 6 of this PRR. Specifically,<ul style="list-style-type: none"><li>o Operation of the source area IRZ is enhancing the removal of NAPL and treating dissolved phase chlorinated solvents.</li><li>o NAPL hand-bailing is physically removing NAPL, where present within existing monitoring wells.</li></ul></li></ul>
The migration of on-site groundwater contamination to off-site where additional exposures to contaminated groundwater are possible.	Yes	<ul style="list-style-type: none"><li>- Operation of the downgradient IRZ is preventing the off-site migration of contaminated groundwater. Concentrations are currently below SGVs at the downgradient property boundary as documented in Sections 5 and 6 of this PRR.</li></ul>
Environmental protection. Attaining to the extent practicable:		
Elimination of VOC source areas in groundwater, thereby removing the source of the dissolved groundwater plume;	Yes	<ul style="list-style-type: none"><li>- Operation of the source area IRZ has resulted in complete reductive dechlorination of CVOCs and has enhanced NAPL dissolution as documented in Sections 5 and 6 of this PRR.</li><li>- NAPL handbailing removed all recoverable NAPL as documented in Sections 5 and 6 of this PRR.</li></ul>
Ambient groundwater quality standards to be met at the downgradient property boundary, thereby preventing further impacts to off-site groundwater; and,	Yes	<ul style="list-style-type: none"><li>- Operation of the downgradient IRZ is preventing the off-site migration of contaminated groundwater. Concentrations are currently below SGVs at the downgradient property boundary as documented in Sections 5 and 6 of this PRR.</li></ul>
Ensure that indoor air quality continues to meet New York State Department of Health NYSDOH guidance values.	Yes	<ul style="list-style-type: none"><li>- The VCS operated continuously and in accordance with its design objectives during the reporting period. Supporting data provided in Sections 5 and 6 of this PRR.</li></ul>

Abbreviations

RAO - Remedial action objective	NAPL - Non aqueous phase liquid
ICs - Institutional controls	VCS - Vapor control system
ECs - Engineering controls	PRR - Periodic review report
EE - Environmental easement	CVOCs - Chlorinated volatile organic compounds
IRZ - In-situ Reactive Zone	SGVs - Standards and Guidance Values

Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Shallow and Intermediate Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: Sample Date: Zone:	MW-15 12/11/14 Shallow	IW-22 12/11/14 Shallow	IW-17 12/11/14 Shallow	MW-17 12/11/14 Shallow
Chloromethane	-		<5	<b>2.3 J</b>	<1000	<5
Bromomethane	5		<5	<5	<1000	<5
Vinyl Chloride	2	<b>0.37 J</b>		<b>490 D</b>	<b>620</b>	<1
Chloroethane	5		<5	<5	<1000	<5
Methylene Chloride	5		<5	<5	<1000	<5
Acetone	50		<10	<10	<2000	<10
Carbon Disulfide	60		<5	<5	<1000	<5
1,1-Dichloroethene	5		<5	<b>0.6 J</b>	<b>71 J</b>	<5
1,1-Dichloroethane	5		<5	<b>3 J</b>	<b>110 J</b>	<5
trans-1,2-Dichloroethene	5		<5	<b>2.1 J</b>	<1000	<5
cis-1,2-Dichloroethene	5	<b>3 J</b>		<b>580 D</b>	<b>43000</b>	<b>0.43 J</b>
Chloroform	7		<5	<5	<1000	<5
1,2-Dichloroethane	0.6		<5	<5	<1000	<5
Methyl Ethyl Ketone	50		<10	<10	<2000	<10
1,1,1-Trichloroethane	5		<5	<5	<b>210 J</b>	<5
Carbon Tetrachloride	5		<5	<5	<1000	<5
Bromodichloromethane	50		<5	<5	<1000	<5
1,2-Dichloropropane	1		<5	<5	<1000	<5
cis-1,3-Dichloropropene	0.4		<5	<5	<1000	<5
Trichloroethene	5	<b>0.49 J</b>		<b>0.2 J</b>	<b>700 J</b>	<5
Dibromochloromethane	50		<5	<5	<1000	<5
1,1,2-Trichloroethane	1		<5	<5	<1000	<5
Benzene	1		<5	<5	<1000	<5
trans-1,3-Dichloropropene	0.4		<5	<5	<1000	<5
Bromoform	50		<5	<5	<1000	<5
Methyl Isobutyl Ketone	-		<10	<10	<2000	<10
2-Hexanone	50		<10	<10	<2000	<10
Tetrachloroethene	5	<b>1.5 J</b>		<5	<b>1600</b>	<b>0.15 J</b>
1,1,2,2-Tetrachloroethane	5		<5	<5	<1000	<5
Toluene	5		<b>11</b>	<b>4.5 J</b>	<1000	<5
Chlorobenzene	5		<5	<5	<1000	<5
Ethylbenzene	5		<5	<b>0.14 J</b>	<1000	<5
Styrene	5		<5	<5	<1000	<5
Xylenes, Total	5		<5	<b>1.3 J</b>	<1000	<5

ug/L Micrograms per liter.  
D Detected at secondary dilution.  
J Estimated value.  
NYSDEC New York State Department of Environmental Conservation.  
TOGS Technical and Operational Guidance Series.  
SGV Ambient Water Quality Standards and Guidance Values.  
- Not available.  
**Bold** Indicates detection above laboratory Method Detection Limit.  
**11** Compound concentration equal to or exceeds SGV.  
1 Well MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.

Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Shallow and Intermediate Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: Sample Date: Zone:	MW-13 12/11/14 Shallow	MW-14 12/11/14 Shallow	MW-7 12/11/14 Shallow	MW-7 6/15/15 Shallow
Chloromethane	-		<b>0.8 J</b>	<5	<10	<100
Bromomethane	5		<5	<5	<10	<100
Vinyl Chloride	2		<b>200</b>	<b>24</b>	<b>4300 DJ</b>	<b>12000 D</b>
Chloroethane	5		<5	<5	<b>7.1 J</b>	<100
Methylene Chloride	5		<5	<5	<10	<100
Acetone	50		<10	<10	<20	<200
Carbon Disulfide	60		<5	<5	<10	<100
1,1-Dichloroethene	5		<b>2.5 J</b>	<5	<b>50 J</b>	<b>28 J</b>
1,1-Dichloroethane	5		<b>2.9 J</b>	<b>0.14 J</b>	<b>9.8 J</b>	<100
trans-1,2-Dichloroethene	5		<b>1.6 J</b>	<b>0.47 J</b>	<b>150 J</b>	<b>150</b>
cis-1,2-Dichloroethene	5		<b>430</b>	<b>1.8 J</b>	<b>30000 D</b>	<b>30000 D</b>
Chloroform	7		<5	<5	<10	<100
1,2-Dichloroethane	0.6		<5	<5	<10	<100
Methyl Ethyl Ketone	50		<10	<10	<20	<200
1,1,1-Trichloroethane	5		<5	<5	<10	<100
Carbon Tetrachloride	5		<5	<5	<10	<100
Bromodichloromethane	50		<5	<5	<10	<100
1,2-Dichloropropane	1		<5	<5	<10	<100
cis-1,3-Dichloropropene	0.4		<5	<5	<10	<100
Trichloroethene	5		<b>81</b>	<5	<b>1.1 J</b>	<100
Dibromochloromethane	50		<5	<5	<10	<100
1,1,2-Trichloroethane	1		<5	<5	<10	<100
Benzene	1		<5	<5	<10	<100
trans-1,3-Dichloropropene	0.4		<5	<5	<10	<100
Bromoform	50		<5	<5	<10	<100
Methyl Isobutyl Ketone	-		<10	<10	<20	<200
2-Hexanone	50		<10	<10	<20	<200
Tetrachloroethene	5		<b>2.3 J</b>	<5	<b>0.29 J</b>	<100
1,1,2,2-Tetrachloroethane	5		<5	<5	<10	<100
Toluene	5		<b>0.94 J</b>	<b>1 J</b>	<b>27 J</b>	<b>13 J</b>
Chlorobenzene	5		<5	<5	<10	<100
Ethylbenzene	5		<b>0.35 J</b>	<5	<b>3.5 J</b>	<100
Styrene	5		<5	<5	<10	<100
Xylenes, Total	5		<b>3 J</b>	<5	<b>26 J</b>	<b>9.4 J</b>

ug/L Micrograms per liter.  
D Detected at secondary dilution.  
J Estimated value.  
NYSDEC New York State Department of Environmental Conservation.  
TOGS Technical and Operational Guidance Series.  
SGV Ambient Water Quality Standards and Guidance Values.  
- Not available.  
**Bold** Indicates detection above laboratory Method Detection Limit.  
 Compound concentration equal to or exceeds SGV.

1 Well MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.

Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Shallow and Intermediate Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: Sample Date: Zone:	MW-9 12/11/14 Shallow	MW-27M <sup>1</sup> 12/11/14 Shallow	MW-28M <sup>1</sup> 12/11/14 Shallow	MW-28M <sup>1</sup> 3/17/15 Shallow
Chloromethane	-		<5	<5	<5	<5
Bromomethane	5		<5	<5	<5	<5
Vinyl Chloride	2		<b>0.45 J</b>	<b>710 D</b>	<b>0.24 J</b>	<b>11</b>
Chloroethane	5		<5	<5	<5	<b>7.6</b>
Methylene Chloride	5		<5	<5	<5	<5
Acetone	50		<10	<10	<10	<10
Carbon Disulfide	60		<5	<5	<5	<5
1,1-Dichloroethene	5		<5	<b>1.9 J</b>	<5	<5
1,1-Dichloroethane	5		<b>0.79 J</b>	<b>2.8 J</b>	<b>2.4 J</b>	<b>5.7</b>
trans-1,2-Dichloroethene	5		<b>0.34 J</b>	<b>8.5</b>	<b>0.23 J</b>	<b>1.1 J</b>
cis-1,2-Dichloroethene	5		<b>1.2 J</b>	<b>450</b>	<b>0.7 J</b>	<b>2.6 J</b>
Chloroform	7		<5	<5	<5	<5
1,2-Dichloroethane	0.6		<5	<5	<5	<5
Methyl Ethyl Ketone	50		<10	<10	<10	<10
1,1,1-Trichloroethane	5		<5	<5	<5	<5
Carbon Tetrachloride	5		<5	<5	<5	<5
Bromodichloromethane	50		<5	<5	<5	<5
1,2-Dichloropropane	1		<5	<5	<5	<5
cis-1,3-Dichloropropene	0.4		<5	<5	<5	<5
Trichloroethene	5		<5	<b>0.3 J</b>	<5	<5
Dibromochloromethane	50		<5	<5	<5	<5
1,1,2-Trichloroethane	1		<5	<5	<5	<5
Benzene	1		<5	<5	<5	<5
trans-1,3-Dichloropropene	0.4		<5	<5	<5	<5
Bromoform	50		<5	<5	<5	<5
Methyl Isobutyl Ketone	-		<10	<10	<10	<10
2-Hexanone	50		<10	<10	<10	<10
Tetrachloroethene	5		<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	5		<5	<5	<5	<5
Toluene	5		<b>1.8 J</b>	<b>3.4 J</b>	<b>1.3 J</b>	<b>6.2</b>
Chlorobenzene	5		<5	<5	<5	<5
Ethylbenzene	5		<b>0.35 J</b>	<b>0.34 J</b>	<b>1 J</b>	<b>3.2 J</b>
Styrene	5		<5	<5	<5	<5
Xylenes, Total	5		<b>2.5 J</b>	<b>1.9 J</b>	<b>9</b>	<b>30</b>

ug/L Micrograms per liter.  
D Detected at secondary dilution.  
J Estimated value.  
NYSDEC New York State Department of Environmental Conservation.  
TOGS Technical and Operational Guidance Series.  
SGV Ambient Water Quality Standards and Guidance Values.  
- Not available.  
**Bold** Indicates detection above laboratory Method Detection Limit.  
**710 D** Compound concentration equal to or exceeds SGV.

<sup>1</sup> Well MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.

Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Shallow and Intermediate Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: MW-28M <sup>1</sup>		MW-28M <sup>1</sup>		MW-3	MW-29
		Sample Date: 6/15/15		9/17/15		12/11/14	12/11/14
		Zone: Shallow		Shallow		Shallow	Shallow
Chloromethane	-	<5		<5		<5	<5
Bromomethane	5	<5		<5		<5	<5
Vinyl Chloride	2	<b>0.75 J</b>		<b>0.73 J</b>		<b>0.43 J</b>	<b>88</b>
Chloroethane	5	<b>13</b>		<b>12</b>		<5	<b>3 J</b>
Methylene Chloride	5	<b>0.34 J</b>		<5		<5	<5
Acetone	50	<10		<10		<10	<10
Carbon Disulfide	60	<5		<5		<5	<5
1,1-Dichloroethene	5	<5		<5		<5	<5
1,1-Dichloroethane	5	<b>7</b>		<b>7.9</b>		<b>0.15 J</b>	<b>4.2 J</b>
trans-1,2-Dichloroethene	5	<b>2.8 J</b>		<b>3.5 J</b>		<5	<b>3.9 J</b>
cis-1,2-Dichloroethene	5	<b>3.6 J</b>		<b>1.6 J</b>		<b>0.66 J</b>	<b>65</b>
Chloroform	7	<5		<5		<5	<5
1,2-Dichloroethane	0.6	<5		<5		<5	<5
Methyl Ethyl Ketone	50	<10		<10		<10	<10
1,1,1-Trichloroethane	5	<5		<5		<5	<5
Carbon Tetrachloride	5	<5		<5		<5	<5
Bromodichloromethane	50	<5		<5		<5	<5
1,2-Dichloropropane	1	<5		<5		<5	<5
cis-1,3-Dichloropropene	0.4	<5		<5		<5	<5
Trichloroethene	5	<5		<b>4.9 J</b>		<b>0.28 J</b>	<b>0.23 J</b>
Dibromochloromethane	50	<5		<5		<5	<5
1,1,2-Trichloroethane	1	<5		<5		<5	<5
Benzene	1	<5		<b>0.12 J</b>		<5	<b>0.091 J</b>
trans-1,3-Dichloropropene	0.4	<5		<5		<5	<5
Bromoform	50	<5		<5		<5	<5
Methyl Isobutyl Ketone	-	<10		<10		<10	<10
2-Hexanone	50	<10		<10		<10	<10
Tetrachloroethene	5	<5		<5		<5	<5
1,1,2,2-Tetrachloroethane	5	<5		<5		<5	<5
Toluene	5	<b>1.8 J</b>		<b>8.6</b>		<5	<b>6.1</b>
Chlorobenzene	5	<5		<5		<5	<5
Ethylbenzene	5	<b>2.4 J</b>		<b>2.4 J</b>		<5	<b>0.44 J</b>
Styrene	5	<5		<5		<5	<5
Xylenes, Total	5	<b>23</b>		<b>25</b>		<5	<b>3 J</b>

ug/L Micrograms per liter.  
D Detected at secondary dilution.  
J Estimated value.  
NYSDEC New York State Department of Environmental Conservation.  
TOGS Technical and Operational Guidance Series.  
SGV Ambient Water Quality Standards and Guidance Values.  
- Not available.  
**Bold** Indicates detection above laboratory Method Detection Limit.  
**88** Compound concentration equal to or exceeds SGV.

<sup>1</sup> Well MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.



Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Shallow and Intermediate Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: Sample Date: Zone:	MW-4 12/11/14 Shallow	MW-31 12/11/14 Shallow	MW-31 6/15/15 Shallow	IW-23 12/11/14 Intermediate
Chloromethane	-		<5	<5	<5	<5
Bromomethane	5		<5	<5	<5	<5
Vinyl Chloride	2		<1	<1	<b>0.72 J</b>	<b>360</b>
Chloroethane	5		<5	<5	<b>2.2 J</b>	<b>2.2 J</b>
Methylene Chloride	5		<5	<5	<5	<b>0.26 J</b>
Acetone	50		<10	<10	<10	<10
Carbon Disulfide	60		<5	<5	<5	<5
1,1-Dichloroethene	5		<5	<5	<5	<b>0.21 J</b>
1,1-Dichloroethane	5		<5	<5	<b>2.4 J</b>	<b>17</b>
trans-1,2-Dichloroethene	5		<5	<5	<b>9</b>	<b>56</b>
cis-1,2-Dichloroethene	5		<5	<5	<b>1.2 J</b>	<b>300</b>
Chloroform	7		<5	<5	<5	<5
1,2-Dichloroethane	0.6		<5	<5	<5	<5
Methyl Ethyl Ketone	50		<10	<10	<10	<10
1,1,1-Trichloroethane	5		<5	<5	<5	<b>2.5 J</b>
Carbon Tetrachloride	5		<5	<5	<5	<5
Bromodichloromethane	50		<5	<5	<5	<5
1,2-Dichloropropane	1		<5	<5	<5	<5
cis-1,3-Dichloropropene	0.4		<5	<5	<5	<5
Trichloroethene	5		<5	<5	<5	<b>0.41 J</b>
Dibromochloromethane	50		<5	<5	<5	<5
1,1,2-Trichloroethane	1		<5	<5	<5	<5
Benzene	1		<5	<5	<5	<b>0.094 J</b>
trans-1,3-Dichloropropene	0.4		<5	<5	<5	<5
Bromoform	50		<5	<5	<5	<5
Methyl Isobutyl Ketone	-		<10	<10	<10	<10
2-Hexanone	50		<10	<10	<10	<10
Tetrachloroethene	5		<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	5		<5	<5	<5	<5
Toluene	5		<5	<5	<5	<b>5.2</b>
Chlorobenzene	5		<5	<5	<5	<5
Ethylbenzene	5		<5	<5	<5	<b>1.5 J</b>
Styrene	5		<5	<5	<5	<5
Xylenes, Total	5		<5	<5	<5	<b>15</b>

ug/L Micrograms per liter.  
D Detected at secondary dilution.  
J Estimated value.  
NYSDEC New York State Department of Environmental Conservation.  
TOGS Technical and Operational Guidance Series.  
SGV Ambient Water Quality Standards and Guidance Values.  
- Not available.  
**Bold** Indicates detection above laboratory Method Detection Limit.  
**5.2** Compound concentration equal to or exceeds SGV.  
1 Well MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.

Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Shallow and Intermediate Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: Sample Date: Zone:	IW-18 12/11/14 Intermediate	MW-13D 12/11/14 Intermediate	MW-23 3/17/15 Intermediate	MW-23 6/15/15 Intermediate
Chloromethane	-		<2500	<5	<5	<5
Bromomethane	5		<2500	<5	<5	<5
Vinyl Chloride	2		<b>1500</b>	<b>2.8</b>	<b>0.78 J</b>	<b>0.64 J</b>
Chloroethane	5		<2500	<5	<b>1.8 J</b>	<b>1.6 J</b>
Methylene Chloride	5		<2500	<5	<5	<5
Acetone	50		<5000	<10	<10	<10
Carbon Disulfide	60		<2500	<5	<5	<5
1,1-Dichloroethene	5		<b>240 J</b>	<5	<5	<5
1,1-Dichloroethane	5		<b>360 J</b>	<5	<b>1.7 J</b>	<b>1.1 J</b>
trans-1,2-Dichloroethene	5		<b>79 J</b>	<b>1.3 J</b>	<b>6.9</b>	<b>8.5</b>
cis-1,2-Dichloroethene	5		<b>180000</b>	<b>3.5 J</b>	<b>0.91 J</b>	<b>0.88 J</b>
Chloroform	7		<2500	<5	<5	<5
1,2-Dichloroethane	0.6		<2500	<5	<5	<5
Methyl Ethyl Ketone	50		<5000	<10	<10	<10
1,1,1-Trichloroethane	5		<b>1700 J</b>	<5	<5	<5
Carbon Tetrachloride	5		<b>270 J</b>	<5	<5	<5
Bromodichloromethane	50		<2500	<5	<5	<5
1,2-Dichloropropane	1		<2500	<5	<5	<5
cis-1,3-Dichloropropene	0.4		<2500	<5	<5	<5
Trichloroethene	5		<b>5000</b>	<b>0.26 J</b>	<5	<5
Dibromochloromethane	50		<2500	<5	<5	<5
1,1,2-Trichloroethane	1		<2500	<5	<5	<5
Benzene	1		<2500	<5	<5	<5
trans-1,3-Dichloropropene	0.4		<2500	<5	<5	<5
Bromoform	50		<2500	<5	<5	<5
Methyl Isobutyl Ketone	-		<5000	<10	<10	<10
2-Hexanone	50		<5000	<10	<10	<10
Tetrachloroethene	5		<b>62000</b>	<5	<5	<5
1,1,2,2-Tetrachloroethane	5		<2500	<5	<5	<5
Toluene	5		<b>89 J</b>	<5	<b>6.9</b>	<b>5.5</b>
Chlorobenzene	5		<2500	<5	<5	<5
Ethylbenzene	5		<2500	<b>0.22 J</b>	<b>0.71 J</b>	<5
Styrene	5		<2500	<5	<5	<5
Xylenes, Total	5		<b>490 J</b>	<b>0.83 J</b>	<b>9.3</b>	<b>3.6 J</b>

ug/L Micrograms per liter.  
D Detected at secondary dilution.  
J Estimated value.  
NYSDEC New York State Department of Environmental Conservation.  
TOGS Technical and Operational Guidance Series.  
SGV Ambient Water Quality Standards and Guidance Values.  
- Not available.  
**Bold** Indicates detection above laboratory Method Detection Limit.  
 Compound concentration equal to or exceeds SGV.  
1 Well MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.

Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Shallow and Intermediate Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: Sample Date: Zone:	MW-23 9/17/15 Intermediate	MW-30 12/11/14 Intermediate	MW-16D 12/11/14 Intermediate	MW-34 12/11/14 Intermediate
Chloromethane	-		<5	<5	<5	<5
Bromomethane	5		<5	<5	<5	<5
Vinyl Chloride	2		<b>0.47 J</b>	<b>0.42 J</b>	<1	<b>0.17 J</b>
Chloroethane	5		<b>2.8 J</b>	<5	<5	<5
Methylene Chloride	5		<5	<5	<b>0.23 J</b>	<5
Acetone	50		<10	<10	<10	<10
Carbon Disulfide	60		<5	<5	<5	<5
1,1-Dichloroethene	5		<5	<5	<5	<5
1,1-Dichloroethane	5		<b>2.2 J</b>	<b>0.25 J</b>	<5	<b>0.24 J</b>
trans-1,2-Dichloroethene	5		<b>16</b>	<b>3.2 J</b>	<b>3 J</b>	<b>2.6 J</b>
cis-1,2-Dichloroethene	5		<b>0.72 J</b>	<b>0.92 J</b>	<5	<b>0.28 J</b>
Chloroform	7		<5	<5	<5	<5
1,2-Dichloroethane	0.6		<5	<5	<5	<5
Methyl Ethyl Ketone	50		<b>14</b>	<10	<10	<10
1,1,1-Trichloroethane	5		<5	<5	<5	<5
Carbon Tetrachloride	5		<5	<5	<5	<5
Bromodichloromethane	50		<5	<5	<5	<5
1,2-Dichloropropane	1		<5	<5	<5	<5
cis-1,3-Dichloropropene	0.4		<5	<5	<5	<5
Trichloroethene	5		<b>2 J</b>	<b>0.13 J</b>	<b>0.18 J</b>	<5
Dibromochloromethane	50		<5	<5	<5	<5
1,1,2-Trichloroethane	1		<5	<5	<5	<5
Benzene	1		<5	<5	<5	<5
trans-1,3-Dichloropropene	0.4		<5	<5	<5	<5
Bromoform	50		<5	<5	<5	<5
Methyl Isobutyl Ketone	-		<10	<10	<10	<10
2-Hexanone	50		<10	<10	<10	<10
Tetrachloroethene	5		<5	<5	<b>0.13 J</b>	<5
1,1,2,2-Tetrachloroethane	5		<5	<5	<5	<5
Toluene	5		<b>18</b>	<5	<5	<5
Chlorobenzene	5		<5	<5	<5	<5
Ethylbenzene	5		<b>0.4 J</b>	<b>0.12 J</b>	<5	<b>0.12 J</b>
Styrene	5		<5	<5	<5	<5
Xylenes, Total	5		<b>3.6 J</b>	<b>0.5 J</b>	<5	<5

ug/L Micrograms per liter.  
D Detected at secondary dilution.  
J Estimated value.  
NYSDEC New York State Department of Environmental Conservation.  
TOGS Technical and Operational Guidance Series.  
SGV Ambient Water Quality Standards and Guidance Values.  
- Not available.  
**Bold** Indicates detection above laboratory Method Detection Limit.  
**18** Compound concentration equal to or exceeds SGV.  
1 Well MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.

Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Shallow and Intermediate Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: Sample Date: Zone:	MW-34 6/15/15 Intermediate	MW-35 12/11/14 Intermediate
Chloromethane	-		<5	<5
Bromomethane	5		<5	<5
Vinyl Chloride	2		<b>0.74 J</b>	<b>0.96 J</b>
Chloroethane	5		<5	<5
Methylene Chloride	5		<5	<b>0.22 J</b>
Acetone	50		<10	<10
Carbon Disulfide	60		<5	<5
1,1-Dichloroethene	5		<5	<5
1,1-Dichloroethane	5		<5	<5
trans-1,2-Dichloroethene	5		<b>5.3</b>	<b>0.48 J</b>
cis-1,2-Dichloroethene	5		<b>1.3 J</b>	<b>1.6 J</b>
Chloroform	7		<5	<5
1,2-Dichloroethane	0.6		<5	<5
Methyl Ethyl Ketone	50		<10	<10
1,1,1-Trichloroethane	5		<5	<5
Carbon Tetrachloride	5		<5	<5
Bromodichloromethane	50		<5	<5
1,2-Dichloropropane	1		<5	<5
cis-1,3-Dichloropropene	0.4		<5	<5
Trichloroethene	5		<5	<5
Dibromochloromethane	50		<5	<5
1,1,2-Trichloroethane	1		<5	<5
Benzene	1		<5	<5
trans-1,3-Dichloropropene	0.4		<5	<5
Bromoform	50		<5	<5
Methyl Isobutyl Ketone	-		<10	<10
2-Hexanone	50		<10	<10
Tetrachloroethene	5		<5	<5
1,1,2,2-Tetrachloroethane	5		<5	<5
Toluene	5		<b>0.5 J</b>	<5
Chlorobenzene	5		<5	<5
Ethylbenzene	5		<5	<5
Styrene	5		<5	<5
Xylenes, Total	5		<5	<5

ug/L Micrograms per liter.

D Detected at secondary dilution.

J Estimated value.

NYSDEC New York State Department of Environmental Conservation.

TOGS Technical and Operational Guidance Series.

SGV Ambient Water Quality Standards and Guidance Values.

- Not available.

**Bold** Indicates detection above laboratory Method Detection Limit.

**5.3** Compound concentration equal to or exceeds SGV.

1 Well MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.

Table 3. Concentrations of TOC, VOCs, and Light Hydrocarbons in Groundwater Samples, 25 Melville Park Road Site, Melville, New York.

Parameters	Sample ID:	IW-1	IW-4	IW-6	IW-6	IW-6	IW-3	IW-24	IW-22
	Sample Date:	3/17/15	3/17/15	12/13/14	3/17/15	6/15/15	9/18/15	12/13/14	12/11/14
	Zone:	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow	Shallow
UNITS									
CLASSICAL CHEMISTRY ANALYTES									
Total Organic Carbon	mg/L	1450	88.9	828	41.9	26.7	1110	2050	74.5
VOCs									
Tetrachloroethene	ug/L	--	--	--	--	--	--	--	<5
Trichloroethene	ug/L	--	--	--	--	--	--	--	0.2 J
cis-1,2-Dichloroethene	ug/L	--	--	--	--	--	--	--	580 D
Vinyl Chloride	ug/L	--	--	--	--	--	--	--	490 D
LIGHT HYDROCARBONS									
Ethane	ug/L	--	--	--	--	--	--	--	--
Ethene	ug/L	--	--	--	--	--	--	--	--
Methane	ug/L	--	--	--	--	--	--	--	--
FIELD PARAMETERS									
pH	Standard Units	5.44	6.21	5.10	5.61	5.62	5.24	4.68	6.40

See footnotes on last page.

Table 3. Concentrations of TOC, VOCs, and Light Hydrocarbons in Groundwater Samples, 25 Melville Park Road Site, Melville, New York.

Parameters	Sample ID: Sample Date: Zone:	IW-17 12/11/14 Shallow	IW-17 03/17/15 Shallow	IW-17 06/15/15 Shallow	IW-17 09/18/15 Shallow	IW-19 3/17/15 Shallow	IW-2 12/13/14 Shallow	MW-13 12/11/14 Shallow	MW-13 3/17/15 Shallow
<u>UNITS</u>									
<u>CLASSICAL CHEMISTRY ANALYTES</u>									
Total Organic Carbon	mg/L	2190	2330	2540	611	259	11.4	54.6	7.6
<u>VOCs</u>									
Tetrachloroethene	ug/L	1600	--	--	--	--	--	2.3 J	--
Trichloroethene	ug/L	700 J	--	--	--	--	--	81	--
cis-1,2-Dichloroethene	ug/L	43000	--	--	--	--	--	430	--
Vinyl Chloride	ug/L	620	--	--	--	--	--	200	--
<u>LIGHT HYDROCARBONS</u>									
Ethane	ug/L	170	--	--	--	--	--	--	--
Ethene	ug/L	230	--	--	--	--	--	--	--
Methane	ug/L	16000	--	--	--	--	--	--	--
<u>FIELD PARAMETERS</u>									
pH	Standard Units	5.37	5.29	5.22	5.40	5.93	6.24	6.15	6.35

See footnotes on last page.

Table 3. Concentrations of TOC, VOCs, and Light Hydrocarbons in Groundwater Samples, 25 Melville Park Road Site, Melville, New York.

Parameters	Sample ID: Sample Date: Zone:	MW-7 12/11/14 Shallow	MW-7 6/15/15 Shallow	MW-28M 12/11/14 Shallow	MW-28M 3/17/15 Shallow	MW-28M 6/15/15 Shallow	MW-28M 9/17/15 Shallow	MW-3 12/11/14 Shallow	MW-4 12/11/14 Shallow
<u>UNITS</u>									
<u>CLASSICAL CHEMISTRY ANALYTES</u>									
Total Organic Carbon	mg/L	221	66.2	17.6	134	107	68.2	10.8	1
<u>VOCs</u>									
Tetrachloroethene	ug/L	0.29 J	<100	<5	<5	<5	<5	<5	<5
Trichloroethene	ug/L	1.1 J	<100	<5	<5	<5	4.9 J	0.28 J	<5
cis-1,2-Dichloroethene	ug/L	30000 D	30000 D	0.7 J	2.6 J	3.6 J	1.6 J	0.66 J	<5
Vinyl Chloride	ug/L	4300 DJ	12000 D	0.24 J	11	0.75 J	0.73 J	0.43 J	<1
<u>LIGHT HYDROCARBONS</u>									
Ethane	ug/L	--	--	--	53	44	48	--	--
Ethene	ug/L	--	--	--	6.7	0.061 J	0.31	--	--
Methane	ug/L	--	--	--	11000	12000	13000	--	--
<u>FIELD PARAMETERS</u>									
pH	Standard Units	5.51	5.66	6.37	6.37	6.37	6.38	6.71	6.42

See footnotes on last page.

Table 3. Concentrations of TOC, VOCs, and Light Hydrocarbons in Groundwater Samples, 25 Melville Park Road Site, Melville, New York.

Parameters	Sample ID:	MW-31	MW-31
	Sample Date:	12/11/14	6/15/15
	Zone:	Shallow	Shallow
<hr/>			
	<u>UNITS</u>		
<u>CLASSICAL CHEMISTRY ANALYTES</u>			
Total Organic Carbon	mg/L	2.4	9.6
<u>VOCs</u>			
Tetrachloroethene	ug/L	<5	<5
Trichloroethene	ug/L	<5	<5
cis-1,2-Dichloroethene	ug/L	<5	1.2 J
Vinyl Chloride	ug/L	<1	0.72 J
<u>LIGHT HYDROCARBONS</u>			
Ethane	ug/L	0.061 J	200
Ethene	ug/L	0.010 J	0.76
Methane	ug/L	3.7	7600
<u>FIELD PARAMETERS</u>			
pH	Standard Units	6.58	6.91

See footnotes on last page.



Table 3. Concentrations of TOC, VOCs, and Light Hydrocarbons in Groundwater Samples, 25 Melville Park Road Site, Melville, New York.

Parameters	Sample ID:	IW-10	IW-11	IW-11	IW-11	IW-11	IW-12	IW-12	IW-27
	Sample Date:	12/13/14	12/13/14	3/17/15	6/15/15	9/18/15	12/13/14	3/17/15	12/13/14
	Zone:	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate
UNITS									
CLASSICAL CHEMISTRY ANALYTES									
Total Organic Carbon	mg/L	35.9	2.5	339	553	96.8	341	66.1	497
VOCs									
Tetrachloroethene	ug/L	--	--	--	--	--	--	--	--
Trichloroethene	ug/L	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	ug/L	--	--	--	--	--	--	--	--
Vinyl Chloride	ug/L	--	--	--	--	--	--	--	--
LIGHT HYDROCARBONS									
Ethane	ug/L	--	--	--	--	--	--	--	--
Ethene	ug/L	--	--	--	--	--	--	--	--
Methane	ug/L	--	--	--	--	--	--	--	--
FIELD PARAMETERS									
pH	Standard Units	6.28	6.01	4.80	4.63	5.19	5.67	6.03	4.49

See footnotes on last page.

Table 3. Concentrations of TOC, VOCs, and Light Hydrocarbons in Groundwater Samples, 25 Melville Park Road Site, Melville, New York.

Parameters	Sample ID:	IW-27	IW-27	IW-27	IW-23	IW-18	IW-18	IW-18	IW-18
	Sample Date:	3/17/15	6/15/15	9/18/15	12/11/14	12/13/14	3/17/15	6/15/15	9/18/15
	Zone:	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate
UNITS									
CLASSICAL CHEMISTRY ANALYTES									
Total Organic Carbon	mg/L	155	1080	814	43.4	780	1580	1110	1110
VOCs									
Tetrachloroethene	ug/L	--	--	--	<5	62000	--	--	--
Trichloroethene	ug/L	--	--	--	0.41 J	5000	--	--	--
cis-1,2-Dichloroethene	ug/L	--	--	--	300	180000	--	--	--
Vinyl Chloride	ug/L	--	--	--	360	1500	--	--	--
LIGHT HYDROCARBONS									
Ethane	ug/L	--	--	--	--	470	--	--	--
Ethene	ug/L	--	--	--	--	1100	--	--	--
Methane	ug/L	--	--	--	--	18000	--	--	--
FIELD PARAMETERS									
pH	Standard Units	5.69	4.68	4.50	6.38	5.93	5.46	5.32	5.24

See footnotes on last page.

Table 3. Concentrations of TOC, VOCs, and Light Hydrocarbons in Groundwater Samples, 25 Melville Park Road Site, Melville, New York.

Parameters		Sample ID:	IW-8	MW-13D	MW-23	MW-23	MW-23	MW-16D	MW-34	MW-34
		Sample Date:	12/13/14	12/11/14	3/17/15	6/15/15	9/17/15	12/11/14	12/11/14	6/15/15
		Zone:	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate
<u>UNITS</u>										
<u>CLASSICAL CHEMISTRY ANALYTES</u>										
Total Organic Carbon	mg/L		6.3	18.8	249	286	179	2.8	8.5	36.3
<u>VOCs</u>										
Tetrachloroethene	ug/L		--	<5	<5	<5	<5	0.13 J	<5	<5
Trichloroethene	ug/L		--	0.26 J	<5	<5	2 J	0.18 J	<5	<5
cis-1,2-Dichloroethene	ug/L		--	3.5 J	0.91 J	0.88 J	0.72 J	<5	0.28 J	1.3 J
Vinyl Chloride	ug/L		--	2.8	0.78 J	0.64 J	0.47 J	<1	0.17 J	0.74 J
<u>LIGHT HYDROCARBONS</u>										
Ethane	ug/L		--	--	39	28	47	--	41	53
Ethene	ug/L		--	--	0.19	0.067 J	0.31	--	<0.20	0.036 J
Methane	ug/L		--	--	26000	17000	23000	--	17000	19000
<u>FIELD PARAMETERS</u>										
pH	Standard Units		6.14	6.56	6.40	6.34	7.89	6.74	6.59	6.41

See footnotes on last page.

Table 3. Concentrations of TOC, VOCs, and Light Hydrocarbons in Groundwater Samples, 25 Melville Park Road Site, Melville, New York.

	Sample ID:	MW-35
	Sample Date:	12/11/14
Parameters	Zone:	Intermediate
<hr/>		
	<u>UNITS</u>	
<u>CLASSICAL CHEMISTRY ANALYTES</u>		
Total Organic Carbon	mg/L	2.1
<u>VOCs</u>		
Tetrachloroethene	ug/L	<5
Trichloroethene	ug/L	<5
cis-1,2-Dichloroethene	ug/L	1.6 J
Vinyl Chloride	ug/L	0.96 J
<u>LIGHT HYDROCARBONS</u>		
Ethane	ug/L	--
Ethene	ug/L	--
Methane	ug/L	--
<u>FIELD PARAMETERS</u>		
pH	Standard Units	6.56
<hr/>		
mg/L	Milligrams per liter.	
ug/L	Micrograms per liter.	
--	Not analyzed.	
B	Non-detect due to associated blank contamination.	
D	Detected at secondary dilution.	
J	Estimated value.	

Table 4. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Deep Zone Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: Sample Date:	MW-18D 12/11/14	MW-18D 6/15/15	FDW 12/11/14	MW-36* 12/11/14
Chloromethane	-		<5	<5	<5	<5
Bromomethane	5		<5	<5	<5	<5
Vinyl Chloride	2		<b>7.1</b>	<b>33</b>	<1	<1
Chloroethane	5		<5	<b>0.42 J</b>	<5	<5
Methylene Chloride	5		<5	<b>0.62 J</b>	<5	<b>0.22 J</b>
Acetone	50		<10	<10	<10	<10
Carbon Disulfide	60		<5	<5	<5	<5
1,1-Dichloroethene	5		<5	<b>0.92 J</b>	<5	<5
1,1-Dichloroethane	5		<b>1.3 J</b>	<b>5.7</b>	<5	<5
trans-1,2-Dichloroethene	5		<b>0.66 J</b>	<b>4.2 J</b>	<5	<5
cis-1,2-Dichloroethene	5		<b>19</b>	<b>190</b>	<b>0.24 J</b>	<5
Chloroform	7		<5	<5	<5	<5
1,2-Dichloroethane	0.6		<5	<5	<5	<5
Methyl Ethyl Ketone	50		<10	<10	<10	<10
1,1,1-Trichloroethane	5		<b>0.26 J</b>	<b>2.5 J</b>	<5	<5
Carbon Tetrachloride	5		<5	<5	<5	<5
Bromodichloromethane	50		<5	<5	<5	<5
1,2-Dichloropropane	1		<5	<5	<5	<5
cis-1,3-Dichloropropene	0.4		<5	<5	<5	<5
Trichloroethene	5		<b>2.5 J</b>	<b>8.1</b>	<b>0.32 J</b>	<b>0.14 J</b>
Dibromochloromethane	50		<5	<5	<5	<5
1,1,2-Trichloroethane	1		<5	<5	<5	<5
Benzene	1		<5	<5	<b>0.21 J</b>	<5
trans-1,3-Dichloropropene	0.4		<5	<5	<5	<5
Bromoform	50		<5	<5	<5	<5
Methyl Isobutyl Ketone	-		<10	<10	<10	<10
2-Hexanone	50		<10	<10	<10	<10
Tetrachloroethene	5		<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	5		<5	<5	<5	<5
Toluene	5		<5	<b>0.4 J</b>	<5	<5
Chlorobenzene	5		<5	<5	<5	<5
Ethylbenzene	5		<5	<5	<b>0.11 J</b>	<5
Styrene	5		<5	<5	<5	<5
Xylenes, Total	5		<5	<b>0.74 J</b>	<b>0.43 J</b>	<5

ug/L Micrograms per liter.

J Estimated value.

FDW Former Diffusion Well.

NYSDEC New York State Department of Environmental Conservation.

TOGS Technical and Operational Guidance Series.

SGV Ambient Water Quality Standards and Guidance Values.

- Not available.

\* Groundwater sample collected from 125 feet below land surface.

**Bold** Indicates detection above laboratory Method Detection Limit.

**Blue box** Compound concentration equal to or exceeds SGV.



Table 5. Water-Level Measurements Collected from Monitoring Wells on March 17 and 18, 2015,  
25 Melville Park Road Site, Melville, New York.

Well Designation	Elevation of Measuring Point (feet NGVD 29)	Depth to Water (feet bmp)	Water-Level Elevation (feet NGVD 29)
MW-1	119.15	48.71	70.44
MW-2	117.66	47.32	70.34
MW-3	118.06	47.93	70.13
MW-4	117.98	47.93	70.05
MW-5	118.27	NA	NA
MW-6	119.24	NA	NA
MW-7	117.53	47.31	70.22
MW-9	117.22	47.03	70.19
MW-10	117.68	47.51	70.17
MW-11	118.29	48.15	70.14
MW-13	117.46	47.11	70.35
MW-13D	117.48	47.23	70.25
MW-14	116.13	45.72	70.41
MW-15	116.85	46.49	70.36
MW-16D	117.49	47.69	69.80
MW-18D	118.10	47.84	70.26
MW-19D	117.31	47.16	70.15
MW-20D	117.68	46.99	70.69
MW-29	117.86	47.76	70.10
MW-30	117.67	47.57	70.10
MW-31	117.35	47.31	70.04
MW-32	117.57	47.29	70.28
MW-33	117.60	47.42	70.18
MW-34	118.03	48.07	69.96
MW-35	118.25	48.28	69.97
MW-36	117.39	47.43	69.96

NGVD 29      National Geodetic Vertical Datum of 1929.  
 bmp        Below measuring point.  
 NA         Not accessible.

Table 6. Fluid-Level Gauging Measurements in Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Date	Well ID:			IW-17			IW-18					
	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
12/13/14	49.53	ND	ND	68.00	0.00	0.00	52.59	49.88	ND	89.64	2.71	0.00
3/18/15	49.11	ND	ND	67.95	0.00	0.00	49.56	49.55	ND	89.38	0.01'	0.00
6/15/15	49.82	ND	ND	67.93	0.00	0.00	51.16	50.20	ND	89.41	0.96	0.00
9/22/15	51.10	ND	ND	65.36	0.00	0.00	51.39	51.34	ND	85.93	0.05	0.00

Footnotes on last page.

Table 6. Fluid-Level Gauging Measurements in Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Date	Well ID:			IW-19			IW-20					
	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
12/13/14	49.41	ND	ND	68.08	0.00	0.00	50.39	ND	ND	92.82	0.00	0.00
3/18/15	48.92	ND	ND	68.10	0.00	0.00	49.63	ND	ND	92.70	0.00	0.00
6/15/15	49.63	ND	ND	68.00	0.00	0.00	50.31	ND	ND	92.60	0.00	0.00
9/22/15	50.65	ND	ND	67.90	0.00	0.00	51.29	ND	ND	97.62	0.00	0.00

Footnotes on last page.



Table 6. Fluid-Level Gauging Measurements in Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Date	Well ID:			IW-21			IW-22					
	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
12/13/14	49.61	ND	ND	67.30	0.00	0.00	49.71	ND	ND	68.70	0.00	0.00
3/18/15	49.20	ND	ND	67.12	0.00	0.00	49.29	ND	ND	68.77	0.00	0.00
6/15/15	49.93	ND	ND	67.06	0.00	0.00	50.00	ND	ND	68.65	0.00	0.00
9/22/15	51.08	ND	ND	67.00	0.00	0.00	51.01	ND	ND	68.72	0.00	0.00

Footnotes on last page.

Table 6. Fluid-Level Gauging Measurements in Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Date	Well ID:			IW-23			Former Diffusion Well					
	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
12/13/14	49.50	ND	ND	99.62	0.00	0.00	49.86	ND	NM	NM	0.00	NM
3/18/15	49.09	ND	ND	100.61	0.00	0.00	49.42	ND	NM	NM	0.00	NM
6/15/15	49.98	ND	ND	99.60	0.00	0.00	50.12	ND	NM	NM	0.00	NM
9/22/15	50.88	ND	ND	99.83	0.00	0.00	51.23	ND	NM	NM	0.00	NM

Footnotes on last page.

Table 6. Fluid-Level Gauging Measurements in Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Date	Well ID:			IW-1			IW-9					
	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
12/13/14	49.32	49.31	ND	58.80	0.01	0.00	47.31	ND	ND	89.01	0.00	0.00
3/18/15	48.91	ND	ND	58.82	0.00	0.00	46.91	ND	ND	88.94	0.00	0.00
6/15/15	49.61	ND	ND	58.78	0.00	0.00	47.64	47.63	ND	88.91	0.01	0.00
9/22/15	50.64	ND	ND	58.76	0.00	0.00	48.67	ND	ND	89.00	0.00	0.00

Footnotes on last page.

Table 6. Fluid-Level Gauging Measurements in Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Date	Well ID:			MW-13			IW-3					
	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
12/13/14	47.49	ND	ND	57.92	0.00	0.00	47.14	ND	ND	59.76	0.00	0.00
3/18/15	47.11	ND	ND	57.90	0.00	0.00	46.74	ND	ND	59.78	0.00	0.00
6/15/15	47.79	ND	ND	57.89	0.00	0.00	47.43	ND	ND	59.72	0.00	0.00
9/22/15	48.91	ND	ND	57.90	0.00	0.00	48.51	ND	ND	57.49	0.00	0.00

Footnotes on last page.

Table 6. Fluid-Level Gauging Measurements in Monitoring Wells, 25 Melville Park Road Site, Melville, New York.

Date	Well ID:			MW-15			IW-25					
	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)	Depth to Water (ft btoc)	Depth to LNAPL (ft btoc)	Depth to DNAPL (ft btoc)	Total Depth (ft btoc)	LNAPL Thickness (feet)	DNAPL Thickness (feet)
12/13/14	46.91	ND	ND	54.62	0.00	0.00	52.82	52.38	99.21	100.02	0.44	0.01
3/18/15	46.50	ND	ND	54.62	0.00	0.00	52.32	51.93	99.21	100.02	0.39	0.01
6/15/15	47.18	ND	ND	54.60	0.00	0.00	52.89	52.69	98.52	100.00	0.20	1.20
9/22/15	48.20	ND	ND	54.59	0.00	0.00	53.84	ND	ND	99.67	0.00	0.00

DNAPL Dense Non-Aqueous Phase Liquid.

LNAPL Light Non-Aqueous Phase Liquid.

ft btoc Feet below top of casing.

ND Not detected.

NM Not measured.



Table 7. Concentrations of Volatile Organic Compounds in Generally Co-Located Sub-Slab Soil Vapor Samples and Indoor Air Quality Samples, 25 Melville Park Road Site, Melville, New York.

Compound	Sample ID:	SS-5A	SW Office Space	SE-SS-A	SE Office Space
(Units in ug/m <sup>3</sup> )	Sample Date:	3/7/2015	3/7/2015	3/7/2015	3/7/2015
	Sample Type:	Sub-Slab	Indoor Air	Sub-Slab	Indoor Air
Vinyl chloride		<0.42	<0.048	<0.40	<0.045
cis-1,2-Dichloroethene		<0.65	<0.15	<0.63	<0.14
Trichloroethene		<0.88	<0.20	<b>6.4</b>	<0.19
1,1-Dichloroethene		<0.65	<0.074	<0.63	<0.070
trans-1,2-Dichloroethene		<3.2	<0.74	<3.1	<0.70
1,1,1-Trichloroethane		<b>6.6</b>	<0.20	<b>3.1</b>	<0.19
Tetrachloroethene		<b>88</b>	<b>0.29</b>	<b>210</b>	<b>0.31</b>
1,1-Dichloroethane		<0.66	<0.15	<0.64	<0.14
2-Butanone (Methyl Ethyl Ketone)		<2.4	<b>2.9</b>	<2.3	<2.6

ug/m<sup>3</sup>

Micrograms per cubic meter.

**Bold**

Indicates detection above laboratory Reported Detection Limit.

Table 8. Summary of Vapor Control System Operating Data, 25 Melville Park Road, Melville, New York.

Date	Time	VCS - 1 Extraction Well Parameters						VCS - 2 Extraction Well Parameters					
		Wellhead Vacuum (in.W.C.)	Wellhead Temperature (°F)	Wellhead Rel. Humidity (%)	Air Velocity (fpm)	Air Flow Rate (cfm)	PID Measured Concentration (ppmv)	Wellhead Vacuum (in.W.C.)	Wellhead Temperature (°F)	Wellhead Rel. Humidity (%)	Air Velocity (fpm)	Air Flow Rate (cfm)	PID Measured Concentration (ppmv)
12/23/14	12:15 PM	-10.0	60.4	--	1,561	35.7	0.2	-9.0	61.5	--	2,158	49.4	0.1
3/26/15	3:30 PM	-10.5	68.0	--	1,717	39.3	0.1	-8.7	69.7	--	2,137	48.9	0.0
6/26/15	9:20 AM	-11.0	83.0	--	1,770	40.5	0.1	-9.5	84.1	--	2,125	48.7	0.0
9/29/15	2:12 PM	-11.0	84.6	--	1,450	33.2	0.0	-9.0	86.8	--	1,836	42.0	0.0

#### Notes and Abbreviations:

°F	degrees Fahrenheit
cfm	cubic feet per minute
fpm	feet per minute
ft	feet
in. Hg	inches of mercury
in. W.C	inches of water column
NYSDEC	New York State Department of Environmental Conservation
OM&M	operation, maintenance, and monitoring
PID	photoionization detector
ppmv	parts per million by volume
VCS	Vapor Control System
--	Measurement not taken.

1. The distances provided for MP-1 through MP-4 are relative to VCS-1. The distances provided for MP-5 and MP-6 are relative to VCS-2.
2. Per NYSDEC approval, the vapor phase treatment was bypassed prior to the June 14, 2007 monitoring event.

Table 8. Summary of Vapor Control System Operating Data, 25 Melville Park Road, Melville, New York.

Date	Time	Blower Parameters				Stack Parameters				Induced Vacuum Measurements						Barometric Pressure	
		Influent	Effluent	Blower Eff.	Blower Eff.	Discharge	Air	Air Flow	PID Measured	MP-1 <sup>(1)</sup>	MP-2 <sup>(1)</sup>	MP-3 <sup>(1)</sup>	MP-4 <sup>(1)</sup>	MP-5 <sup>(1)</sup>	MP-6 <sup>(1)</sup>	Ambient	Rise/Fall
		Vacuum (in.W.C.)	Pressure (in.W.C.)	Temperature (°F)	Rel. Humidity (%)	Temperature (°F)	Velocity (fpm)	Rate (cfm)	Concentration <sup>(2)</sup> (ppmv)	(10 ft) (in.W.C.)	(17 ft) (in.W.C.)	(25 ft) (in.W.C.)	(45 ft) (in.W.C.)	(25 ft) (in.W.C.)	(100 ft) (in.W.C.)	(in.Hg)	(+/-)
12/23/14	12:15 PM	-15.0	0.0	--	--	--	--	--	--	-0.40	-0.16	-0.12	-0.05	-0.09	-0.01	30.11	(-)
3/26/15	3:30 PM	-15.0	0.0	--	--	--	--	--	--	-0.42	-0.14	-0.11	-0.06	-0.06	-0.01	29.71	(+)
6/26/15	9:20 AM	-15.0	0.0	--	--	--	--	--	--	-0.44	-0.19	-0.14	-0.08	-0.11	-0.02	29.95	(-)
9/29/15	2:12 PM	-15.0	0.0	--	--	--	--	--	--	-0.45	-0.19	-0.14	-0.05	-0.11	-0.01	30.10	(-)

#### Notes and Abbreviations:

°F	degrees Fahrenheit
cfm	cubic feet per minute
fpm	feet per minute
ft	feet
in. Hg	inches of mercury
in. W.C	inches of water column
NYSDEC	New York State Department of Environmental Conservation
OM&M	operation, maintenance, and monitoring
PID	photoionization detector
ppmv	parts per million by volume
VCS	Vapor Control System
--	Measurement not taken.

1. The distances provided for MP-1 through MP-4 are relative to VCS-1. The distances provided for MP-5 and MP-6 are relative to VCS-2.
2. Per NYSDEC approval, the vapor phase treatment was bypassed prior to the June 14, 2007 monitoring event.



Table 9. Injection Well Network for Optimized ERD Program, 25 Melville Park Road Site, Melville, New York.

Well Designation	Well Diameter (inches)	Screened Interval (feet bls)	Total Depth (feet bls)	Screen Length (feet)	Vertical Zone Designation	Comments
IW-3	2	45 to 60	60	15	Shallow Zone	Existing Well
IW-6	2	45 to 60	60	15	Shallow Zone	Existing Well
IW-11	2	75 to 90	90	15	Intermediate Zone	Existing Well
IW-15	2	60 to 75	75	15	Intermediate Zone	Existing Well
IW-17	2	50 to 70	70	20	Shallow Zone	Existing Well
IW-20	2	70 to 100	100	30	Intermediate Zone	Existing Well
IW-25 <sup>1</sup>	2	77 to 97	97	20	Intermediate Zone	Existing Well
IW-27 <sup>1</sup>	2	77 to 97	97	20	Intermediate Zone	Existing Well
IW-28 <sup>1</sup>	2	69 to 95	95	30	Intermediate Zone	Existing Well
IW-29 <sup>1</sup>	2	68 to 95	95	30	Intermediate Zone	Existing Well

1. Angle well.

bls = below land surface

Table 10. Long-Term Groundwater Monitoring Program, 25 Melville Park Road Site, Melville, New York.

		Well	Analysis/Parameter			
			VOCs	LH	TOC	pH
Quarter 1	S	IW-6	--	--	L	F
		IW-17	--	--	L	F
		MW-28M <sup>1</sup>	L	L	L	F
	I	IW-11	--	--	L	F
		IW-18	--	--	L	F
		IW-27	--	--	L	F
		MW-23	L	L	L	F
		Well	Analysis/Parameter			
			VOCs	LH	TOC	pH
Quarter 2	S	IW-6	--	--	L	F
		IW-17	--	--	L	F
		MW-7	L	--	L	F
		MW-28M <sup>1</sup>	L	L	L	F
		MW-31	L	L	--	--
	I	IW-11	--	--	L	F
		IW-18	--	--	L	F
		IW-27	--	--	L	F
		MW-23	L	L	L	F
		MW-34	L	L	--	--
	D	MW-18D	L	--	--	--
		Well	Analysis/Parameter			
			VOCs	LH	TOC	pH
Quarter 3	S	IW-6	--	--	L	F
		IW-17	--	--	L	F
		MW-28M <sup>1</sup>	L	L	L	F
	I	IW-11	--	--	L	F
		IW-18	--	--	L	F
		IW-27	--	--	L	F
		MW-23	L	L	L	F
		Well	Analysis/Parameter			
			VOCs	LH	TOC	pH
Quarter 4 <sup>4</sup>	S	IW-1	--	--	L	F
		IW-6	--	--	L	F
		IW-17 <sup>2</sup>	L	L	L	F
		IW-22	L	--	L	F
		MW-3	L	--	--	--
		MW-4	L	--	--	--
		MW-7	L	--	L	F
		MW-13	L	--	L	F
		MW-14	L	--	--	--
		MW-15	L	--	--	--
		MW-17	L	--	--	--
		MW-28M <sup>1</sup>	L	L	L	F
		MW-31	L	L	--	--
	I	IW-18	L	L	L	F
		IW-23	L	--	L	F
		IW-28 <sup>2</sup>	L	L	L	F
		IW-29 <sup>2</sup>	L	L	L	F
		MW-13D	L	--	L	F
		MW-16D	L	--	L	F
		MW-23	L	L	L	F
		MW-34	L	L	--	--
	D	MW-35	L	--	--	--
		MW-18D	L	--	--	--
		FDW	L	--	--	--
		MW-36	L	--	--	--
		MW-19D <sup>3</sup>	L	--	--	--
		MW-20D <sup>3</sup>	L	--	--	--

See footnotes on last page.

Table 10. Long-Term Groundwater Monitoring Program, 25 Melville Park Road Site, Melville, New York.

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**Notes:**

VOCs - Volatile Organic Compounds

TOC - Total Organic Carbon

LH - Light Hydrocarbons

L - Laboratory analysis

S - Shallow Zone Injection or Monitoring Well

I - Intermediate Zone Injection or Monitoring Well

D - Deep Zone Monitoring Well

F - Field Measurement using a water quality meter

<sup>1</sup> MW-28D was modified (i.e., lower screen was abandoned) and is now identified as MW-28M.

<sup>2</sup> Well will only be sampled for VOCs and light hydrocarbons during the baseline groundwater monitoring event because they will be used as injection wells.

<sup>3</sup> Well will be sampled and analyzed for VOCs only if increasing trends in VOCs are observed in MW-18D.

<sup>4</sup> The Quarter 4 groundwater monitoring event also generally serves as the baseline groundwater monitoring event for the optimized ERD program.

The agency review team may request additions and/or modifications to a sampling round, as needed, based on the results of previous sampling or NAPL monitoring.



Table 11. Summary of NAPL Recovery Efforts, 25 Melville Park Road Site, Melville, New York.

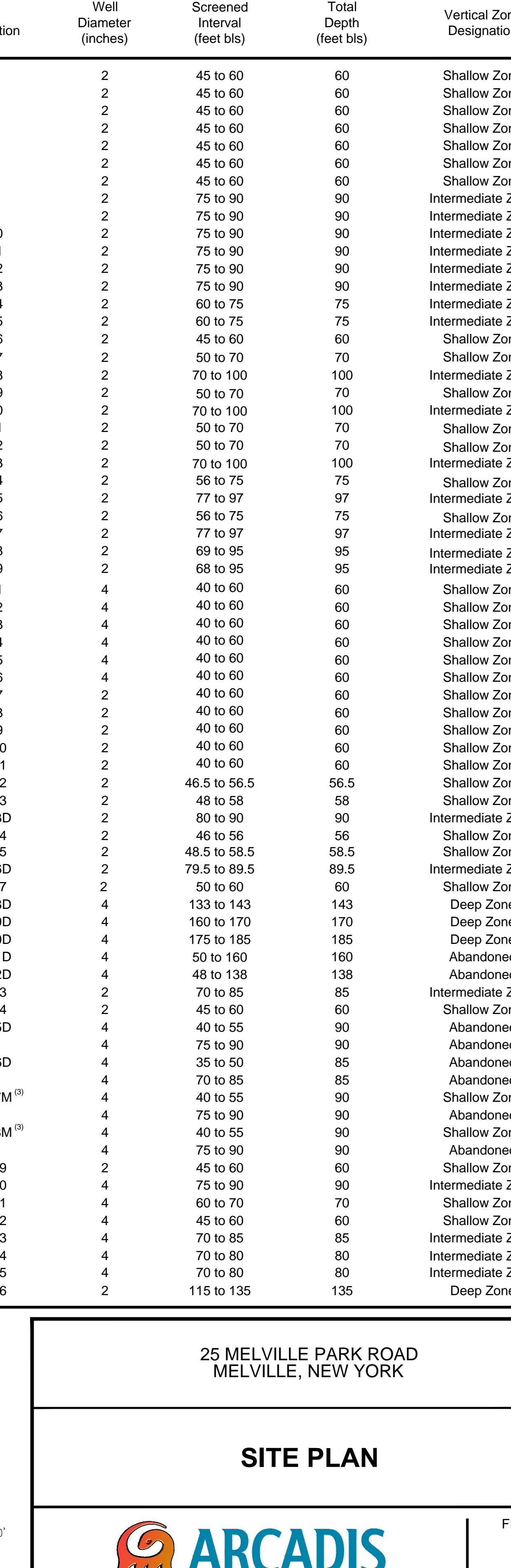
Well ID:	IW-1	IW-3	IW-9	IW-18	IW-19	IW-20	IW-22	IW-25	MW-13	MW-25D	Total Gallons Recovered
NAPL Recovered Between December 2014 and September 2015 (Gallons)	0	0	0	6.45	0	0	0	5.7	0	0	12.15
Total Gallons Recovered Between December 2014 and September 2015											12.15

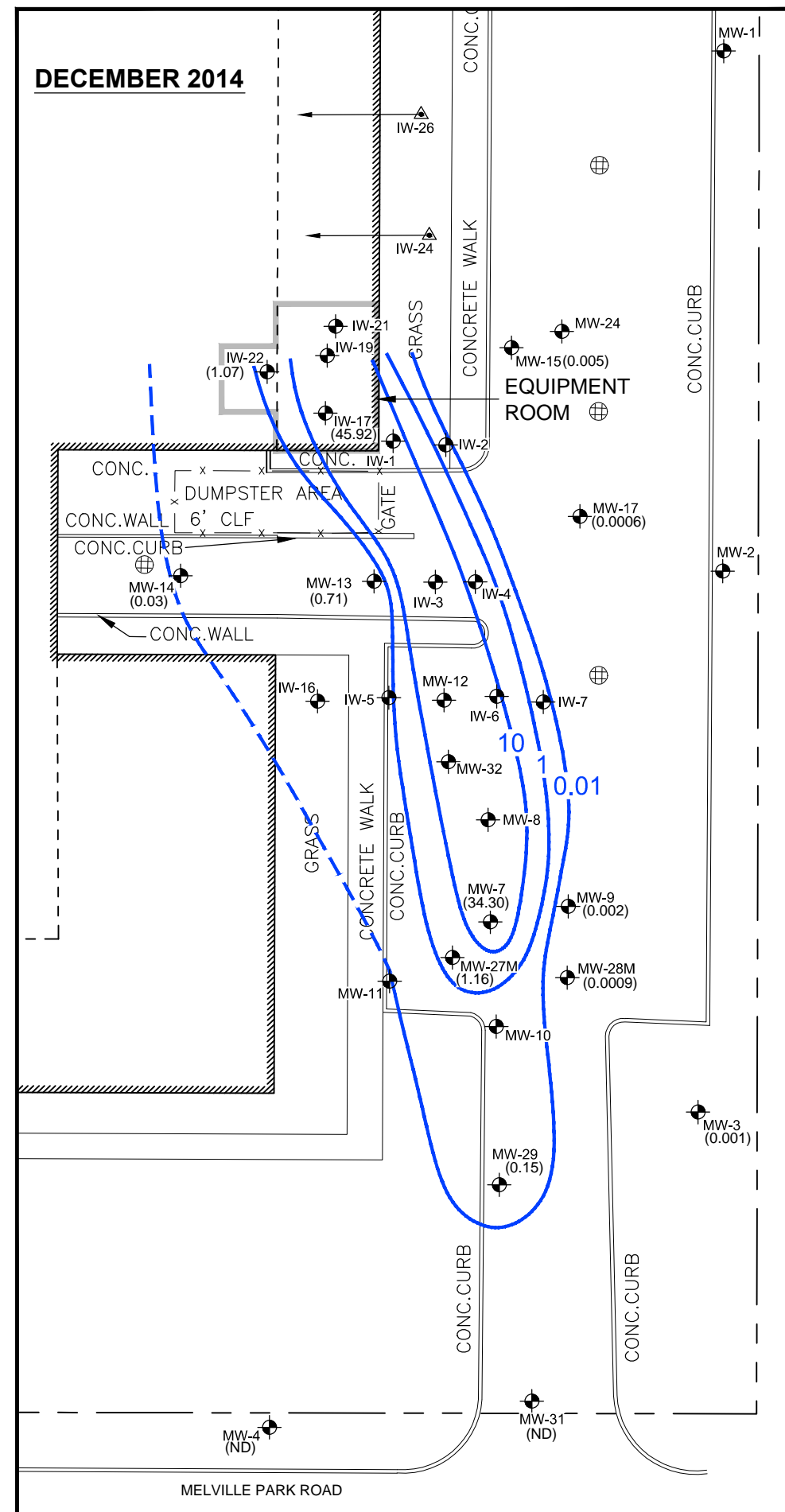
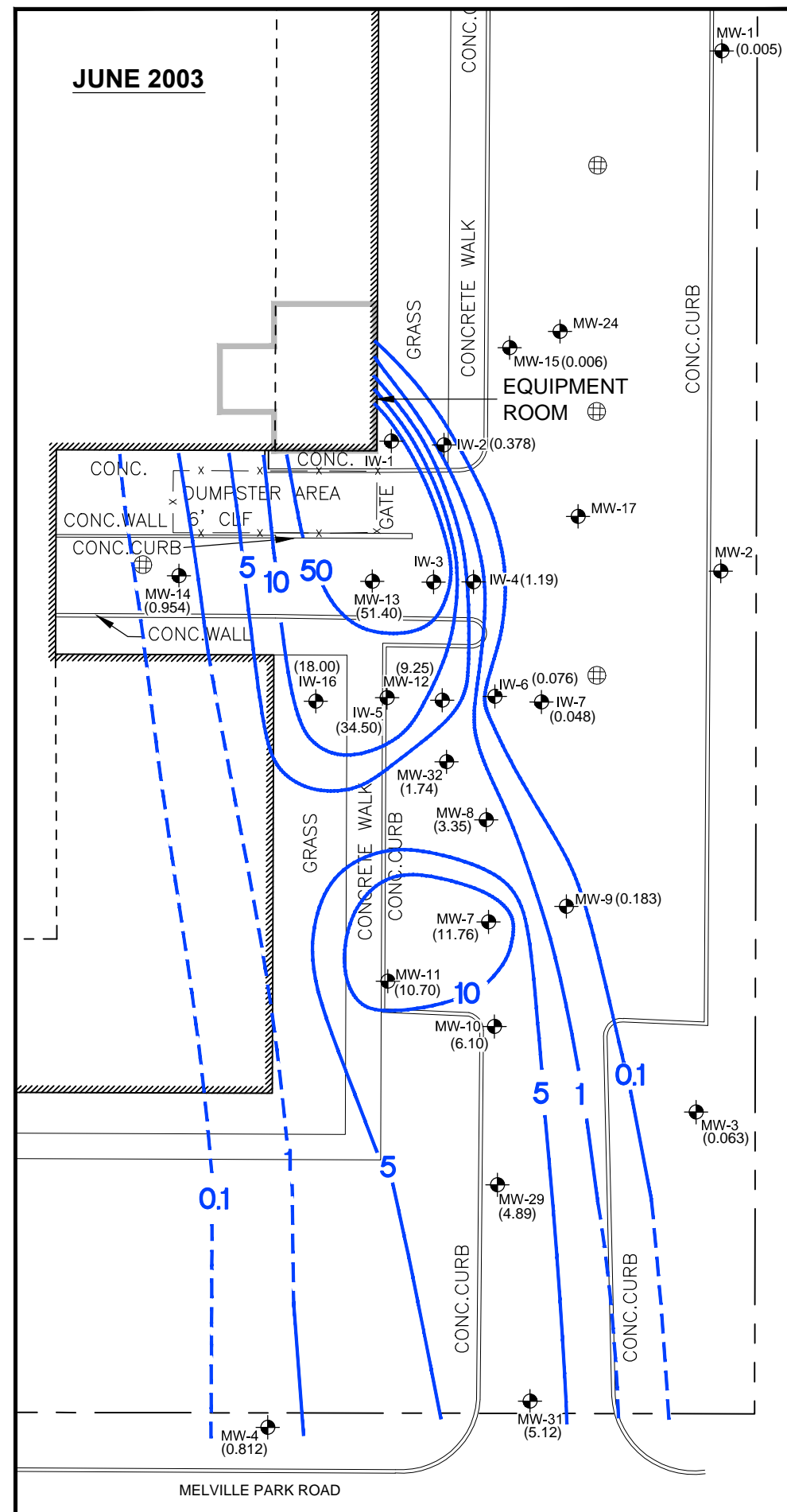
NAPL: Non-Aqueous Phase Liquid.

Notes:





Total Gallons Recovered represents a combination of NAPL and water.

## Figures



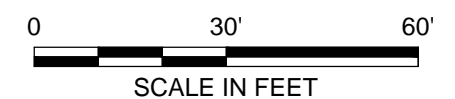


LEGEND:

- MW-7  
(34.30)  LOCATION AND DESIGNATION OF  
MONITORING WELL AND ASSOCIATED  
TOTAL CVOC CONCENTRATION (mg/L)
- IW-24  LOCATION AND DESIGNATION OF ANGLE WELL
-  STORM DRAIN
- 10  LINE OF EQUAL TOTAL CVOC  
CONCENTRATION (mg/L)  
(DASHED WHERE INFERRED)
- ND CVOCs NOT DETECTED ABOVE  
LABORATORY REPORTING LIMIT
- mg/L MILLIGRAMS PER LITER
- CVOC CHLORINATED VOLATILE ORGANIC COMPOUND

NOTE:

1. BASE MAP BY NELSON & POPE, TITLED MONITORING WELL LOCATION PLAN, DATED AUGUST 2003, DRAWING FILE NAME 85049T.
2. TOTAL CVOCs REFERS TO THE SUM OF PCE, TCE, CIS-1,2-DCE, AND VC.
3. WELLS MW-27D AND MW-28D WERE MODIFIED (i.e., LOWER SCREENS WERE ABANDONED) AND ARE NOW IDENTIFIED AS MW-27M AND MW-28M, RESPECTIVELY.



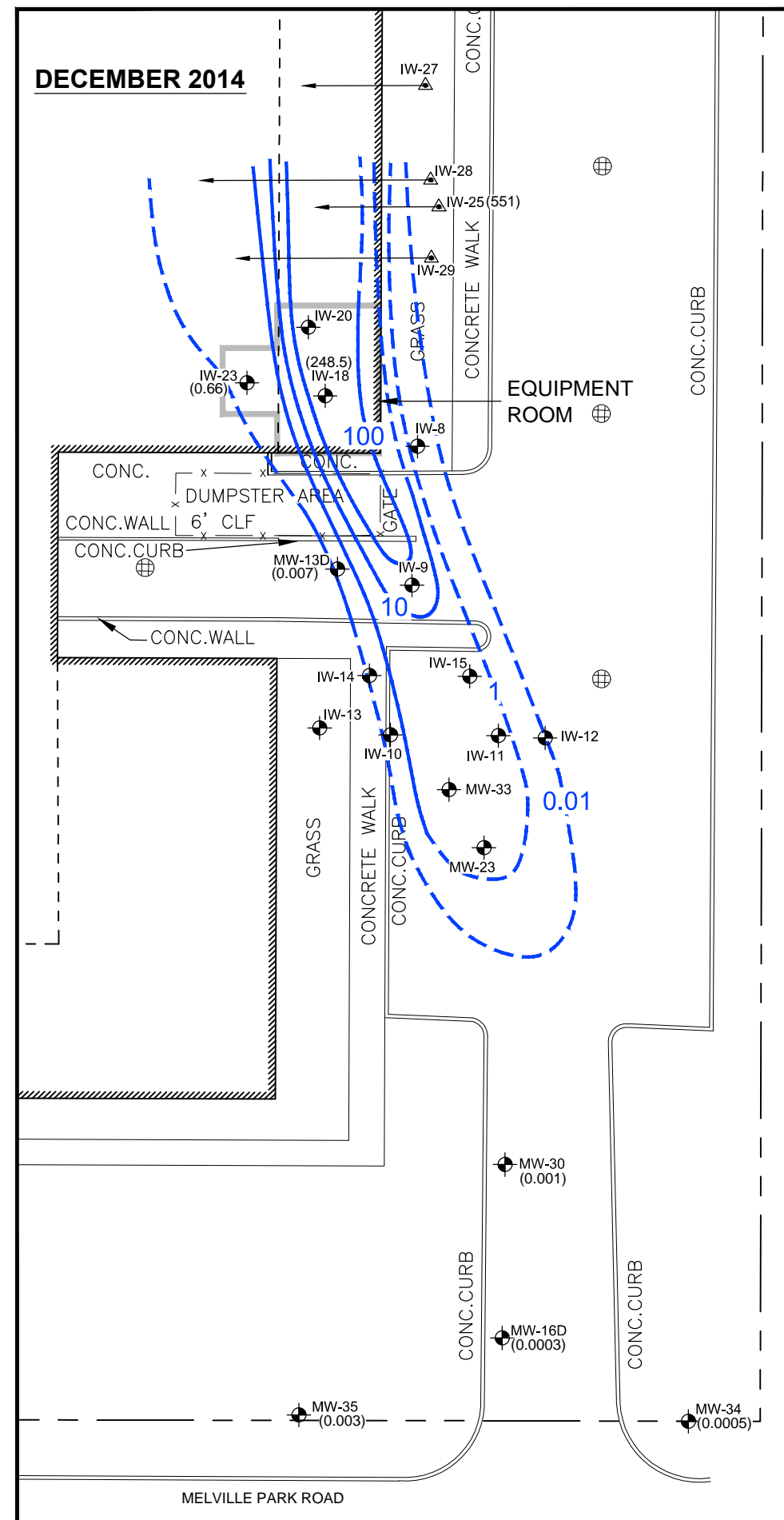
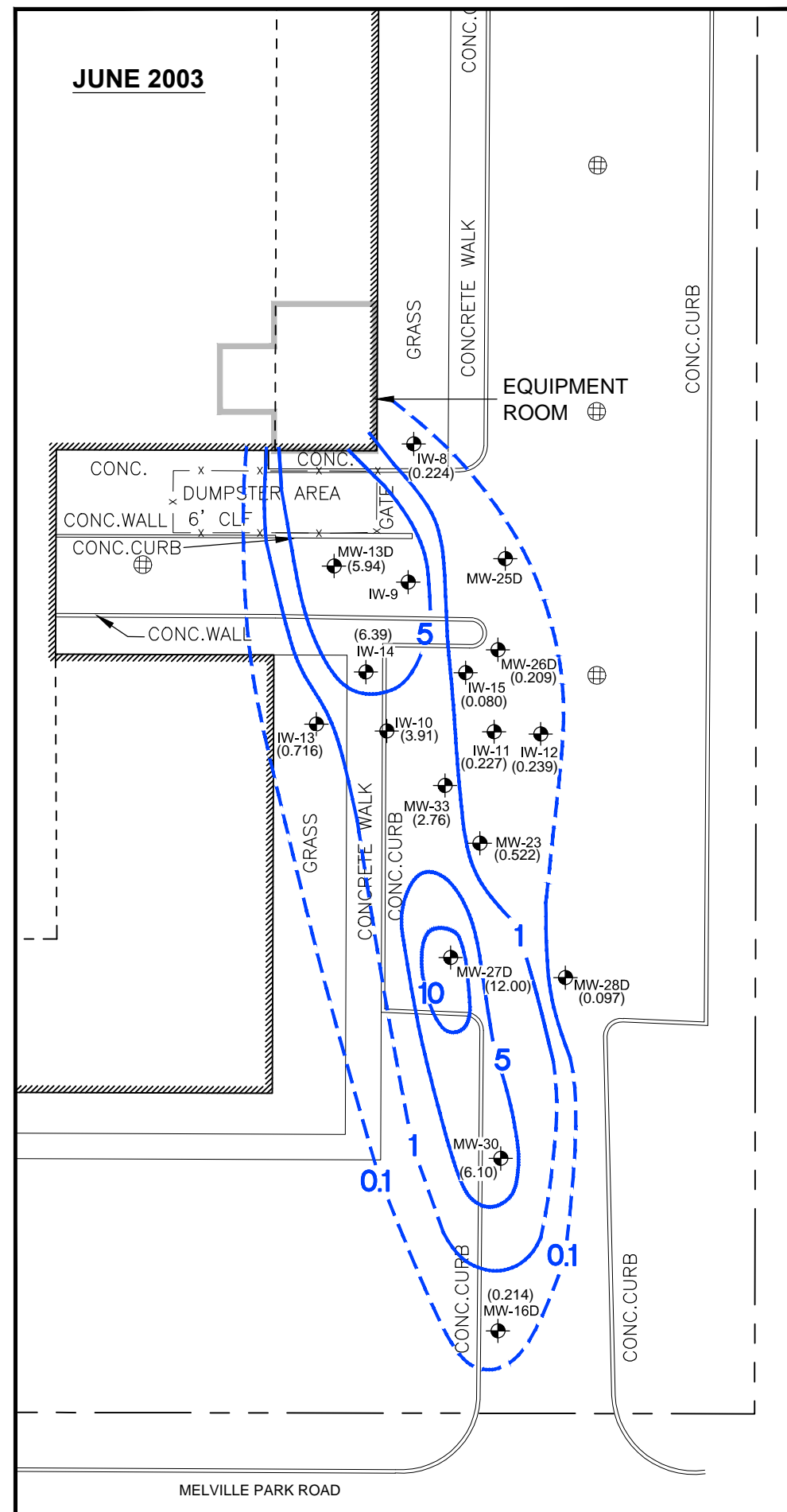
25 MELVILLE PARK ROAD  
MELVILLE, NEW YORK

**DISTRIBUTION OF TOTAL CVOCs  
IN THE SHALLOW AQUIFER ZONE  
(45-70 FT BLS)  
JUNE 2003 VERSUS DECEMBER 2014**







FIGURE



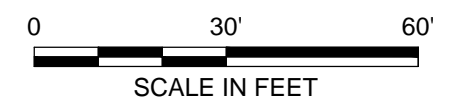


LEGEND:

- |                   |   |  |
|-------------------|---|--|
| MW-13D<br>(0.007) |  | LOCATION AND DESIGNATION OF<br>MONITORING WELL AND ASSOCIATED<br>TOTAL CVOC CONCENTRATION (mg/L) |
| IW-25             |  | LOCATION AND DESIGNATION OF ANGLE WELL   |
|                   |  | STORM DRAIN  |
| 10                |  | LINE OF EQUAL TOTAL CVOC<br>CONCENTRATION (mg/L)<br>(DASHED WHERE INFERRED)                      |
| ND                |   | CVOCs NOT DETECTED ABOVE<br>LABORATORY REPORTING LIMIT   |
| mg/L              |   | MILLIGRAMS PER LITER   |
| CVOC              |   | CHLORINATED VOLATILE ORGANIC COMPOUND  |

NOTE:

1. BASE MAP BY NELSON & POPE, TITLED MONITORING WELL LOCATION PLAN, DATED AUGUST 2003, DRAWING FILE NAME 85049T.
2. NAPL WAS DETECTED ABOVE A TRACE IN WELLS IW-18 AND IW-25 IN DECEMBER 2014.
3. TOTAL CVOCs REFERS TO THE SUM OF PCE, TCE, CIS-1,2-DCE, AND VC.
4. IW-25 DATA WAS COLLECTED IN DECEMBER 2011.



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MELVILLE, NEW YORK

**DISTRIBUTION OF TOTAL CVOCs  
IN THE INTERMEDIATE AQUIFER ZONE  
(70-100 FT BLS)  
JUNE 2003 VERSUS DECEMBER 2014**



FIGURE

3





25 MELVILLE PARK ROAD  
MELVILLE, NEW YORK

---

**GROUNDWATER, NAPL, INDOOR AIR  
QUALITY, AND SUB SLAB SOIL VAPOR  
MONITORING POINT LOCATIONS**

---


 **ARCADIS**

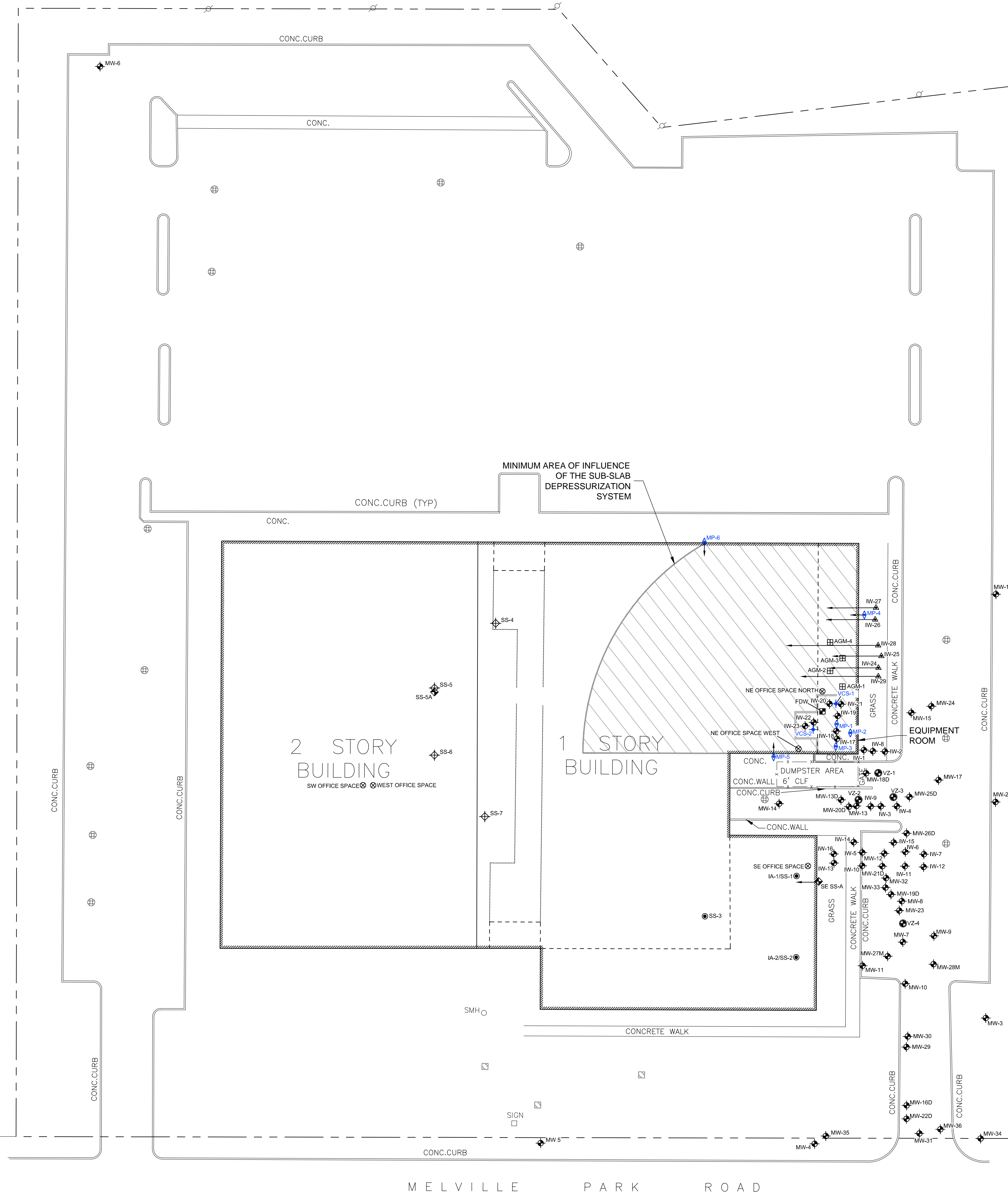
FIGURE 4



- NOTES:
1. BASE MAP BY NELSON & POPE, TITLED MONITORING WELL LOCATION PLAN, DATED AUGUST 2003, DRAWING FILE NAME 85049T.
  2. THE LOCATIONS OF ALL INDOOR AIR QUALITY AND SOIL VAPOR SAMPLES ARE ESTIMATED.
  3. WELLS MW-27D AND MW-28D WERE MODIFIED (i.e., LOWER SCREENS WERE ABANDONED) AND ARE NOW IDENTIFIED AS MW-27M AND MW-28M, RESPECTIVELY.

- LEGEND:
- IW-24 LOCATION AND DESIGNATION OF ANGLE WELL
  - MW-17 LOCATION AND DESIGNATION OF MONITORING WELL
  - VZ-3 LOCATION AND DESIGNATION OF VADOSE ZONE WELL
  - VCS-1 LOCATION AND DESIGNATION OF VCS EXTRACTION POINT
  - MP-1 LOCATION AND DESIGNATION OF VCS MONITORING POINT
  - AGM-1 LOCATION AND DESIGNATION OF GEOPROBE SOIL AND SOIL VAPOR BORING
  - FDW FORMER DIFFUSION WELL
  - NE OFFICE SPACE NORTH LOCATION AND DESIGNATION OF INDOOR AMBIENT AIR QUALITY SAMPLE
  - IA-1/SS-1 LOCATION AND DESIGNATION OF SUB-SLAB SOIL VAPOR AND CO-LOCATED INDOOR AMBIENT AIR QUALITY SAMPLE
  - SS-4 LOCATION AND DESIGNATION OF SUPPLEMENTAL SUB-SLAB SOIL VAPOR SAMPLE
  - SE SS-A LOCATION AND DESIGNATION OF PERMANENT SUB-SLAB SOIL VAPOR PROBE
  - STORM DRAIN
  - bls BELOW LAND SURFACE

BROAD HOLLOW ROAD  
(NYS ROUTE 110)



Well Designation	Well Diameter (inches)	Screened Interval (feet bls)	Total Depth (feet bls)	Vertical Zone Designation
IW-1	2	45 to 60	60	Shallow Zone
IW-2	2	45 to 60	60	Shallow Zone
IW-3	2	45 to 60	60	Shallow Zone
IW-4	2	45 to 60	60	Shallow Zone
IW-5	2	45 to 60	60	Shallow Zone
IW-6	2	45 to 60	60	Shallow Zone
IW-7	2	45 to 60	60	Shallow Zone
IW-8	2	75 to 90	90	Intermediate Zone
IW-9	2	75 to 90	90	Intermediate Zone
IW-10	2	75 to 90	90	Intermediate Zone
IW-11	2	75 to 90	90	Intermediate Zone
IW-12	2	75 to 90	90	Intermediate Zone
IW-13	2	75 to 90	90	Intermediate Zone
IW-14	2	60 to 75	75	Intermediate Zone
IW-15	2	60 to 75	75	Intermediate Zone
IW-16	2	45 to 60	60	Shallow Zone
IW-17	2	50 to 70	70	Shallow Zone
IW-18	2	70 to 100	100	Intermediate Zone
IW-19	2	50 to 70	70	Shallow Zone
IW-20	2	70 to 100	100	Intermediate Zone
IW-21	2	50 to 70	70	Shallow Zone
IW-22	2	50 to 70	70	Shallow Zone
IW-23	2	70 to 100	100	Intermediate Zone
IW-24	2	56 to 75	75	Shallow Zone
IW-25	2	77 to 97	97	Intermediate Zone
IW-26	2	56 to 75	75	Shallow Zone
IW-27	2	77 to 97	97	Intermediate Zone
IW-28	2	69 to 95	95	Intermediate Zone
IW-29	2	68 to 95	95	Intermediate Zone
MW-1	4	40 to 60	60	Shallow Zone
MW-2	4	40 to 60	60	Shallow Zone
MW-3	4	40 to 60	60	Shallow Zone
MW-4	4	40 to 60	60	Shallow Zone
MW-5	4	40 to 60	60	Shallow Zone
MW-6	4	40 to 60	60	Shallow Zone
MW-7	2	40 to 60	60	Shallow Zone
MW-8	2	40 to 60	60	Shallow Zone
MW-9	2	40 to 60	60	Shallow Zone
MW-10	2	40 to 60	60	Shallow Zone
MW-11	2	40 to 60	60	Shallow Zone
MW-12	2	46.5 to 56.5	56.5	Shallow Zone
MW-13	2	48 to 58	58	Shallow Zone
MW-13D	2	80 to 90	90	Intermediate Zone
MW-14	2	46 to 56	56	Shallow Zone
MW-15	2	48.5 to 58.5	58.5	Shallow Zone
MW-16D	2	79.5 to 89.5	89.5	Intermediate Zone
MW-17	2	50 to 60	60	Shallow Zone
MW-18D	4	133 to 143	143	Deep Zone
MW-19D	4	160 to 170	170	Deep Zone
MW-20D	4	175 to 185	185	Deep Zone
MW-21D	4	50 to 160	160	Abandoned
MW-22D	4	48 to 138	138	Abandoned
MW-23	2	70 to 85	85	Intermediate Zone
MW-24	2	45 to 60	60	Shallow Zone
MW-25D	4	40 to 55	90	Abandoned
MW-26D	4	75 to 90	90	Abandoned
MW-26D	4	35 to 50	85	Abandoned
MW-26D	4	70 to 85	85	Abandoned
MW-27M <sup>(3)</sup>	4	40 to 55	90	Shallow Zone
MW-28M <sup>(3)</sup>	4	75 to 90	90	Abandoned
MW-28M <sup>(3)</sup>	4	40 to 55	90	Shallow Zone
MW-28M <sup>(3)</sup>	4	75 to 90	90	Abandoned
MW-29	2	45 to 60	60	Shallow Zone
MW-30	4	75 to 90	90	Intermediate Zone
MW-31	4	60 to 70	70	Shallow Zone
MW-32	4	45 to 60	60	Shallow Zone
MW-33	4	70 to 85	85	Intermediate Zone
MW-34	4	70 to 80	80	Intermediate Zone
MW-35	4	70 to 80	80	Intermediate Zone
MW-36	2	115 to 135	135	Deep Zone

25 MELVILLE PARK ROAD  
MELVILLE, NEW YORK

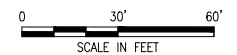
VAPOR RECOVERY WELL  
AND INDUCED VACUUM MONITORING  
POINT LOCATIONS





NOTES:

1. BASE MAP BY NELSON & POPE, TITLED MONITORING WELL LOCATION PLAN, DATED AUGUST 2003, DRAWING FILE NAME 85049T.
2. THE LOCATIONS OF ALL INDOOR AIR QUALITY AND SOIL VAPOR SAMPLES ARE ESTIMATED.
3. ELEVATIONS ARE RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM (NGVD) OF 1929.
4. WELLS MW-27D AND MW-28D WERE MODIFIED (I.E., LOWER SCREENS WERE ABANDONED) AND ARE NOW IDENTIFIED AS MW-27M AND MW-28M, RESPECTIVELY.
5. CONTOUR INTERVAL IS 0.10 FEET.
6. WATER-LEVEL ELEVATIONS MEASURED ON MARCH 17, 2015.

















25 MELVILLE PARK ROAD  
MELVILLE, NEW YORK

## CONFIGURATION OF THE WATER TABLE AND GROUNDWATER FLOW DIRECTION MARCH 2015

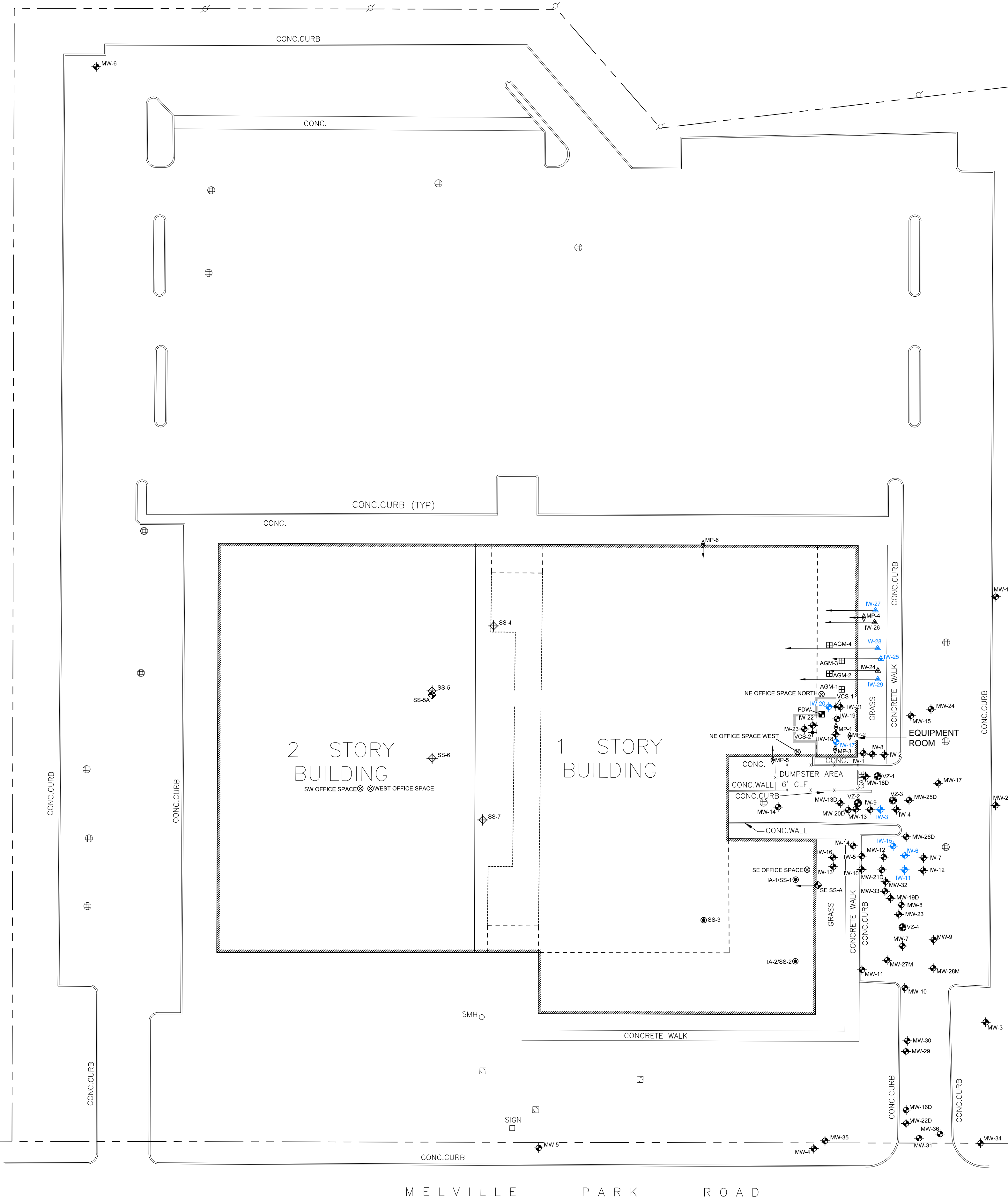




- LEGEND:**
- IW-20  LOCATION AND DESIGNATION OF EMULSIFIED VEGETABLE OIL INJECTION WELL
- IW-24  LOCATION AND DESIGNATION OF ANGLE WELL
- MW-17  LOCATION AND DESIGNATION OF MONITORING WELL
- VZ-3  LOCATION AND DESIGNATION OF VADOSE ZONE WELL
- VCS-1  LOCATION AND DESIGNATION OF VCS EXTRACTION POINT
- MP-1  LOCATION AND DESIGNATION OF VCS MONITORING POINT
- AGM-1  LOCATION AND DESIGNATION OF GEOPROBE SOIL AND SOIL VAPOR BORING
- FDW  FORMER DIFFUSION WELL
- NE OFFICE SPACE NORTH  LOCATION AND DESIGNATION OF INDOOR AIR QUALITY SAMPLE
- IA-1/SS-1  LOCATION AND DESIGNATION OF SUB-SLAB SOIL VAPOR AND CO-LOCATED INDOOR AIR QUALITY SAMPLE
- SS-4  LOCATION AND DESIGNATION OF SUPPLEMENTAL SUB-SLAB SOIL VAPOR SAMPLE
- SE SS-A  LOCATION AND DESIGNATION OF PERMANENT SUB-SLAB SOIL VAPOR PROBE
-  STORM DRAIN
- bls  BELOW LAND SURFACE

- NOTES:**
1. BASE MAP BY NELSON & POPE, TITLED MONITORING WELL LOCATION PLAN, DATED AUGUST 2003, DRAWING FILE NAME 85049T.
2. THE LOCATIONS OF ALL INDOOR AIR QUALITY AND SOIL VAPOR SAMPLES ARE ESTIMATED.
3. WELLS MW-27D AND MW-28D WERE MODIFIED (i.e., LOWER SCREENS WERE ABANDONED) AND ARE NOW IDENTIFIED AS MW-27M AND MW-28M, RESPECTIVELY.

BROAD HOLLOW ROAD  
(NYS ROUTE 110)



Well Designation	Well Diameter (inches)	Screened Interval (feet bls)	Total Depth (feet bls)	Vertical Zone Designation
IW-1	2	45 to 60	60	Shallow Zone
IW-2	2	45 to 60	60	Shallow Zone
IW-3	2	45 to 60	60	Shallow Zone
IW-4	2	45 to 60	60	Shallow Zone
IW-5	2	45 to 60	60	Shallow Zone
IW-6	2	45 to 60	60	Shallow Zone
IW-7	2	45 to 60	60	Shallow Zone
IW-8	2	75 to 90	90	Intermediate Zone
IW-9	2	75 to 90	90	Intermediate Zone
IW-10	2	75 to 90	90	Intermediate Zone
IW-11	2	75 to 90	90	Intermediate Zone
IW-12	2	75 to 90	90	Intermediate Zone
IW-13	2	75 to 90	90	Intermediate Zone
IW-14	2	60 to 75	75	Intermediate Zone
IW-15	2	60 to 75	75	Intermediate Zone
IW-16	2	45 to 60	60	Shallow Zone
IW-17	2	50 to 70	70	Shallow Zone
IW-18	2	70 to 100	100	Intermediate Zone
IW-19	2	50 to 70	70	Shallow Zone
IW-20	2	70 to 100	100	Intermediate Zone
IW-21	2	50 to 70	70	Shallow Zone
IW-22	2	50 to 70	70	Shallow Zone
IW-23	2	70 to 100	100	Intermediate Zone
IW-24	2	56 to 75	75	Shallow Zone
IW-25	2	77 to 97	97	Intermediate Zone
IW-26	2	56 to 75	75	Shallow Zone
IW-27	2	77 to 97	97	Intermediate Zone
IW-28	2	69 to 95	95	Intermediate Zone
IW-29	2	68 to 95	95	Intermediate Zone
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MW-2	4	40 to 60	60	Shallow Zone
MW-3	4	40 to 60	60	Shallow Zone
MW-4	4	40 to 60	60	Shallow Zone
MW-5	4	40 to 60	60	Shallow Zone
MW-6	4	40 to 60	60	Shallow Zone
MW-7	2	40 to 60	60	Shallow Zone
MW-8	2	40 to 60	60	Shallow Zone
MW-9	2	40 to 60	60	Shallow Zone
MW-10	2	40 to 60	60	Shallow Zone
MW-11	2	40 to 60	60	Shallow Zone
MW-12	2	46.5 to 56.5	56.5	Shallow Zone
MW-13	2	48 to 58	58	Shallow Zone
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MW-15	2	48.5 to 58.5	58.5	Shallow Zone
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MW-26D	4	35 to 50	85	Abandoned
MW-26D	4	70 to 85	85	Abandoned
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MW-27M <sup>(3)</sup>	4	75 to 90	90	Abandoned
MW-28M <sup>(3)</sup>	4	40 to 55	90	Shallow Zone
MW-28M <sup>(3)</sup>	4	75 to 90	90	Abandoned
MW-29	2	45 to 60	60	Shallow Zone
MW-30	4	75 to 90	90	Intermediate Zone
MW-31	4	60 to 70	70	Shallow Zone
MW-32	4	45 to 60	60	Shallow Zone
MW-33	4	70 to 85	85	Intermediate Zone
MW-34	4	70 to 80	80	Intermediate Zone
MW-35	4	70 to 80	80	Intermediate Zone
MW-36	2	115 to 135	135	Deep Zone

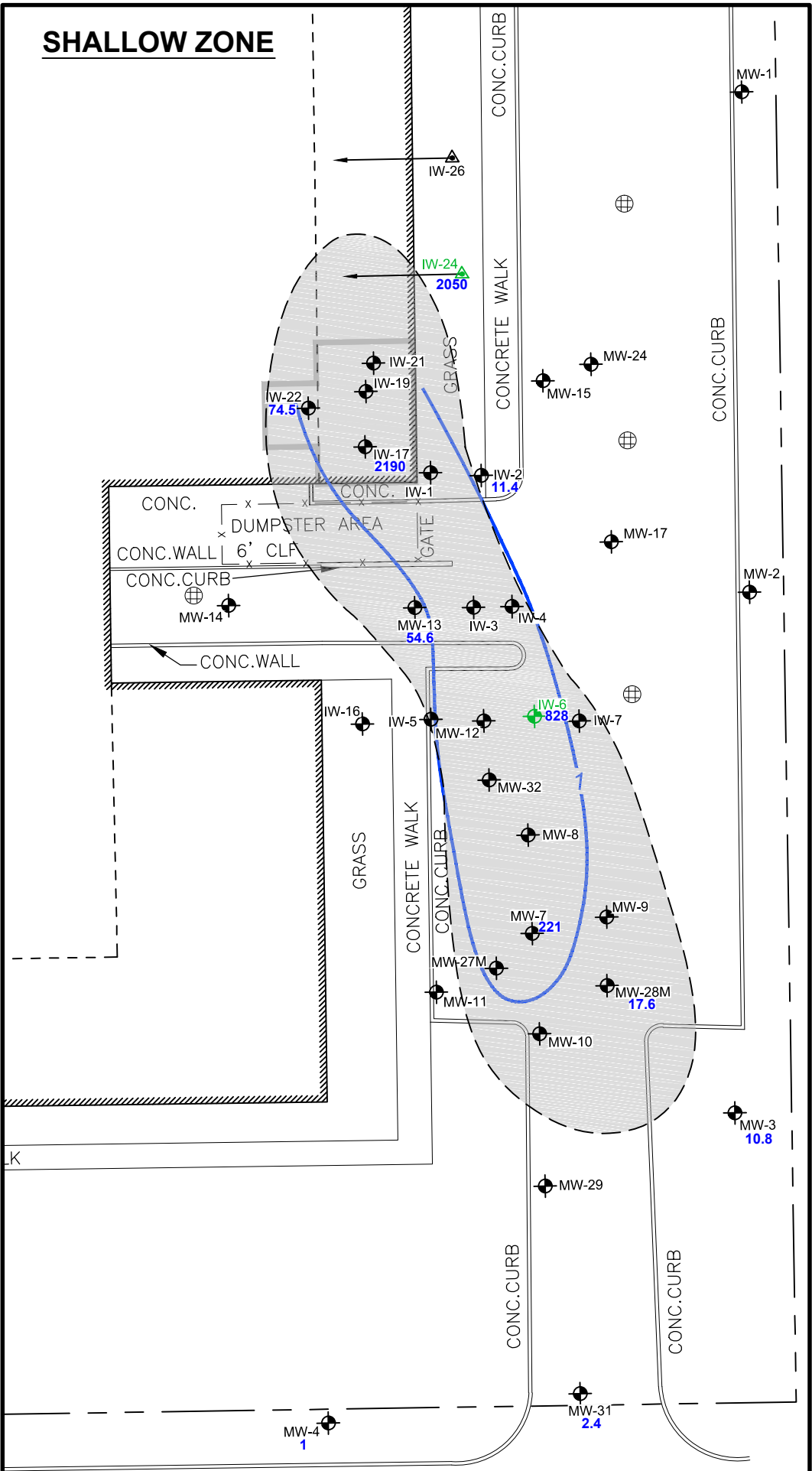
25 MELVILLE PARK ROAD  
MELVILLE, NEW YORK

OPTIMIZED ERD  
INJECTION WELL LOCATIONS

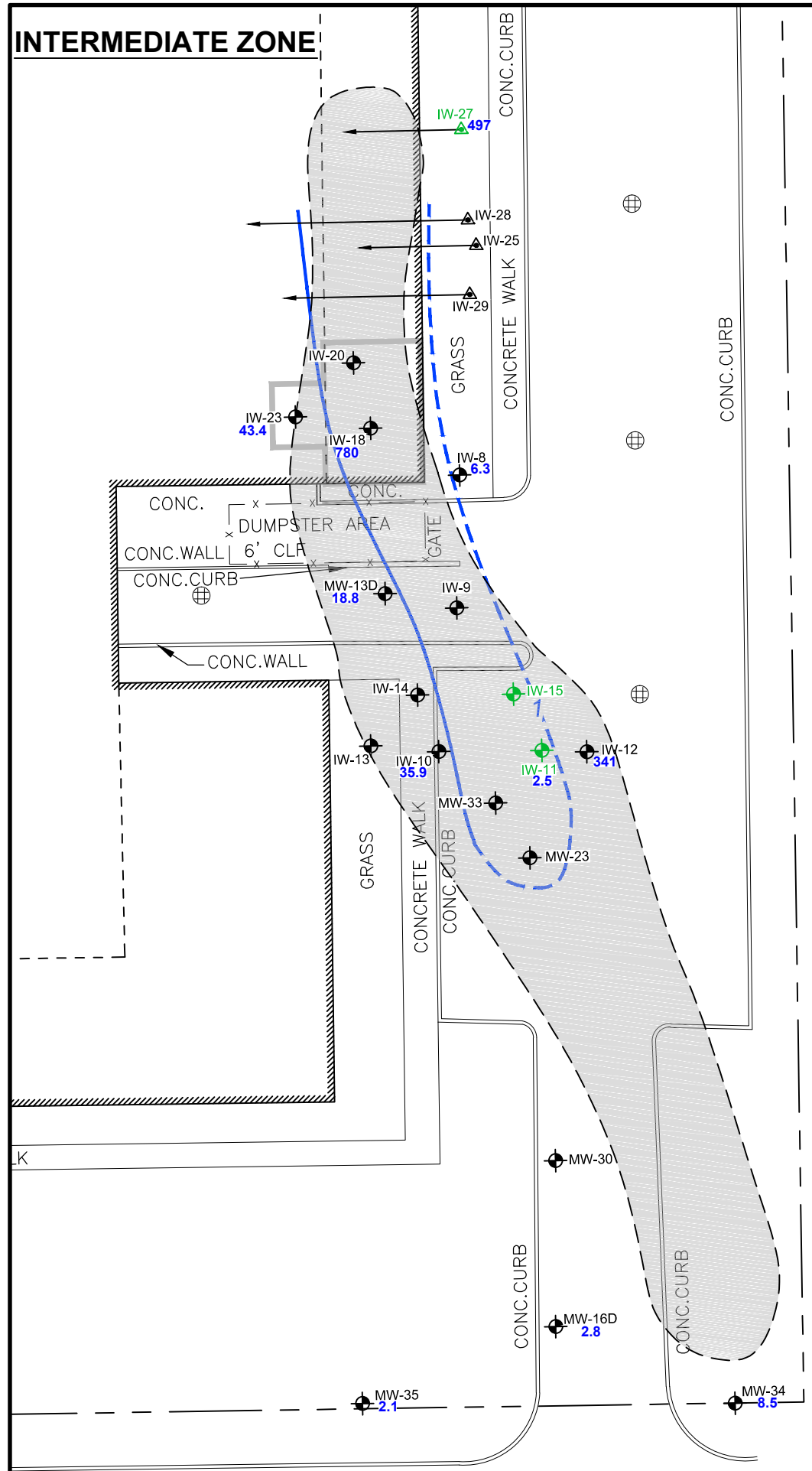


CITY:SYRACUSE-ENV DIV/GROUP-ENV DB:A-SANCHEZ LD:ALS PIC:S.FELDMAN PM:S.FELDMAN TMC:KEEN LVR:Option="OFF=REF"  
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XREFS: IMAGES: PROJECTNAME: ---

SHALLOW ZONE

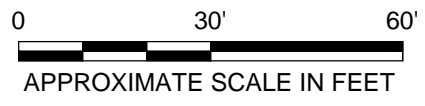


INTERMEDIATE ZONE



LEGEND:

- MW-7 221 LOCATION AND DESIGNATION OF MONITORING WELL AND ASSOCIATED TOC VALUE (mg/L)
- IW-26 LOCATION AND DESIGNATION OF ANGLE WELL
- INJECTION WELL LOCATION AND DESIGNATION OF INJECTION WELL
- STORM DRAIN
- APPROXIMATE FOOTPRINT OF TOC CONCENTRATIONS GREATER THAN 20 mg/L
- mg/L MILLIGRAMS PER LITER
- TOC TOTAL ORGANIC CARBON
- 1 APPROXIMATE EXTENT OF TOTAL CVOC CONCENTRATIONS EXCEEDING 1 mg/L
- CVOC CHLORINATED VOLATILE ORGANIC COMPOUND



25 MELVILLE PARK ROAD  
MELVILLE, NEW YORK

**ESTIMATED TOTAL ORGANIC CARBON  
FOOTPRINT GREATER THAN 20 mg/L  
IN DECEMBER 2014**



## **Appendix A**

Summary of Historic Reagent  
Injection Methodology

## APPENDIX A

### SUMMARY OF HISTORIC REAGENT INJECTION METHODOLOGY

This appendix provides a summary of primary/major injection methodologies implemented since the inception of the IRZ program at the site:

- August 2003 through November 2004 – Injection into downgradient injection wells IW-5, IW-6, IW-10, IW-11, IW-13, IW-14, IW-15, and IW-16. Injections were generally completed using a gravity feed system from an on-site mixing tank or bulk tanker delivery. Injection volumes were typically low and ranged from between 150 gallons to 300 gallons per wells. The injection solution strength typically ranged from 10 to 20 percent by volume. The injection frequency ranged from weekly to monthly. Sodium bicarbonate was occasionally added to the injection solution as a buffering agent.
- December 2004 through March 2005 – Same injection wells as previous operating period; however, the injection methodology is modified with a new strategy aimed at minimizing pH decline through the addition of a more dilute organic carbon solution through larger injection volumes, a decrease in injection solution strength, and a decrease in injection frequency. The use of sodium bicarbonate is discontinued. Injection volumes ranged between 500 and 1500 gallons and the injection solution strength between 2 and 5 percent by volume. Injections were completed bi-monthly.
- May 2005 through October 2005 – The injection methodology was further tailored to reduce pH fluctuations and expand on the concepts that began in December 2004. This involved increasing the injection volumes further and reducing the concentration of molasses. The revised injection volumes ranged between approximately 5,000 to 10,000 gallons per well and the injection concentration ranged between 1 and 2 percent by volume. In addition, injection wells IW-5 and IW-10 were omitted from the injection program due to the larger radius of influence achieved with the revised injection volumes. Finally, the injection methodology was revised to a semi-automated constant feed in-line mixing process to accommodate the larger injection volumes.
- December 2005 through March 2008 – Incorporation of source area injection wells IW-26 and IW-27 at injection volumes of approximately 10,000 gallons per well. The downgradient injection methodology generally stayed the same.
- June 2008 to present – Removal of source area injection well IW-26 and replacement with injection well IW-24 at 10,000 gallons injection volume. The revision was made after data confirmed that the area of aquifer between these two wells was remediated. All other injection methodology generally stayed the same.
- May 2010 – A single injection of a 10 percent by volume molasses/whey blend was completed at injection well IW-20 as a pilot test in an effort to accelerate the rate of remediation within the source area. Specifically, it is believed that the injection of a high concentration, high protein, based electron donor containing cheese whey will enhance the rate of parent compound (PCE) dissolution into the dissolved phase, making it available for treatment in the dissolved phase. The molasses/whey solution pH was neutralized with sodium hydroxide to minimize the decrease in pH that typically accompanies high solution strength injections. The solution was also spiked with



a bromide tracer to track the downgradient migration of the molasses/whey blend. Post injection monitoring of the pilot test is currently on going.

- April 2012 – With NYSDEC approval (NYSDEC 2012), removal of downgradient western injection wells IW-13, IW-14, and IW-16 from the injection program. In addition, it was recommended the injection frequency at source area intermediate injection well IW-27 be reduced to an every six to eight month injection schedule. Results of the May 2010 bromide injection data and VOC data from western downgradient monitoring wells indicated that the injection into the western injection wells were no longer required. Subsequent groundwater monitoring for VOCs at IW-13 and IW-16 indicates that VOCs are at or near MCLs for all compounds and confirms their removal from the injection program. Subsequent TOC monitoring at injection well IW-27 indicated that the proposed reduction to the injection frequency was too long. Injections into IW-27 were returned to every four months beginning in August 2012.
- August 2015 - In accordance with the NYSDEC-approved Site Management Plan (SMP) Addendum (Arcadis 2015), an optimized ERD injection was completed using an approximately 2.7% solution of emulsified vegetable oil that included a sodium bicarbonate buffer. In addition to the sodium bicarbonate buffer, sulfate (in the form of Epsom salts) was also added to the injection solution. As described in the NYSDEC-approved SMP Addendum, two new angle injection wells were installed (IW-28 and IW-29) to improve coverage of the source area that had been identified beneath the northeast portion of the building. An optimized ERD injection network consisting of six additional injection wells (IW-3, IW-17, IW-20, IW-25 and newly installed IW-28 and IW-29) as well as four previous injection wells (IW-6, IW-11, IW-15 and IW-27) were used for the injection. The injection volumes added to each well varied from 5,900 gallons to 15,000 gallons.

Detailed injection logs showing the exact volume, solution strength, and other notable data are provided in Appendix C of the PRR.





## **Appendix B**

Site Management Certification Forms



Enclosure 2  
**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION**  
**Site Management Periodic Review Report Notice**  
**Institutional and Engineering Controls Certification Form**



**Site No.**            **V00128**

**Site Details**

**Box 1**

**Site Name** 25 Melville Park Road

Site Address: 25 Melville Park Road    Zip Code: 11747-  
City/Town: Melville  
County: Suffolk  
Site Acreage: 6.0

Reporting Period: September 23, 2014 to September 23, 2015

- |  | YES                                 | NO                                  |
|--|-------------------------------------|-------------------------------------|
| 1. Is the information above correct?   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| If NO, include handwritten above or on a separate sheet.   |                                     |                                     |
| 2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?                              | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?                      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| <b>If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.</b> |                                     |                                     |
| 5. Is the site currently undergoing development?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

**Box 2**

- |  | YES                                 | NO                       |
|--|-------------------------------------|--------------------------|
| 6. Is the current site use consistent with the use(s) listed below?<br>Commercial and Industrial | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 7. Are all ICs/ECs in place and functioning as designed?   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

**IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and  
DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.**

**A Corrective Measures Work Plan must be submitted along with this form to address these issues.**

\_\_\_\_\_  
Signature of Owner, Remedial Party or Designated Representative

\_\_\_\_\_  
Date

**Description of Institutional Controls**Parcel

268-1-4

Owner

BP Moby Holdings, LLC

Institutional Control

Ground Water Use Restriction  
Soil Management Plan  
Landuse Restriction  
Building Use Restriction  
Monitoring Plan  
Site Management Plan  
O&M Plan  
IC/EC Plan

- Require compliance with the approved Site Management Plan (SMP).
- Restrict the use of groundwater beneath the Site as a source of potable or process water, without necessary water quality treatment as determined by the Suffolk County Department of Health Services (SCDHS).
- Limit the use and development of the property to commercial or industrial uses only.
- Require the property owner to complete and submit to the NYSDEC an annual certification to ensure that the Institutional Controls (ICs) are still in place.
- All Engineering Controls (ECs) must be operated and maintained as specified in the SMP.
- All ECs on the Controlled Property (the Site) must be inspected and certified at a frequency and in a manner defined in the SMP.
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP.
- On-Site environmental monitoring devices, including but not limited to, injection wells, groundwater monitoring wells, VCS extraction and monitoring points, and soil vapor probes, must be protected and replaced, as necessary, or properly abandoned, as directed by the NYSDEC, to ensure continued functioning in the manner specified in the SMP.

**Description of Engineering Controls**Parcel

268-1-4

Engineering Control

Groundwater Treatment System  
Vapor Mitigation  
Cover System

- Downgradient and source area Insitu Reactive Zone (IRZs) that involve the delivery of organic carbon (i.e., dilute molasses solution) to the subsurface through a network of injection wells.
  - Non Aqueous Phase Liquid (NAPL) recovery that involves the manual removal of NAPL from the monitoring well network by hand bailing.
  - A Vapor Control System (VCS) in the northeast portion of the building consisting of extraction points VCS-1 and VCS-2 and induced vacuum monitoring points MP-1 through MP-6.
- In addition to the VCS, the heating, ventilation, and air conditioning (HVAC) system is operated to maintain a positive pressure within the building to help prevent the potential migration of vapors into indoor air.
- Groundwater, NAPL, sub-slab soil vapor, and indoor air monitoring must be performed as defined in the SMP.

**Periodic Review Report (PRR) Certification Statements**

1. I certify by checking "YES" below that:

a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and complete.

YES NO



2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

(d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES NO



**IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and  
DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.**

**A Corrective Measures Work Plan must be submitted along with this form to address these issues.**

\_\_\_\_\_  
Signature of Owner, Remedial Party or Designated Representative

\_\_\_\_\_  
Date

IC CERTIFICATIONS  
SITE NO. V00128

Box 6

**SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE**

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

PHILIPS INTERNATIONAL HOLDING CORP

I RAYMOND SOMMER at 295 MADISON AVE, NY, NY 10017  
print name print business address

am certifying as PROPERTY DIRECTOR / MANAGING AGENT FOR (Owner or Remedial Party)  
OWNER

for the Site named in the Site Details Section of this form.

PHILIPS INTERNATIONAL HOLDING CORP  
AS AGENT FOR BP MARY HOLDINGS LLC

  
Signature of Owner, Remedial Party, or Designated Representative  
Rendering Certification

10-29-15  
Date

IC/EC CERTIFICATIONS

Box 7

Professional Engineer Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

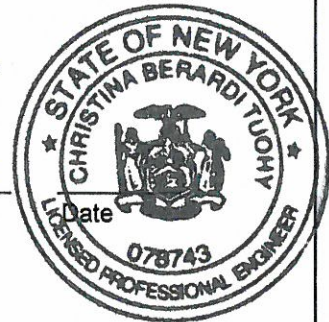
I Christina Berardi Tuohy at 2 Huntington Quadrangle, Suite 1510  
print name print business address Melville, NY 11747

am certifying as a Professional Engineer for the BP Moby Holdings LLC  
(Owner or Remedial Party)

Christina Berardi Tuohy

Signature of Professional Engineer, for the Owner or  
Remedial Party, Rendering Certification

11/12/15  
Stamp  
(Required for PE)





Linda Greenfield  
BP Moby Holdings LLC  
c/o Philips International Holding Corp.  
295 Madison Avenue, 2nd Floor  
New York, NY 10017

Arcadis of New York, Inc.  
Two Huntington Quadrangle  
Suite 1S10  
Melville  
New York 11747  
Tel 631 249 7600  
Fax 631 249 7610  
[www.arcadis.com](http://www.arcadis.com)

Subject:

25 Melville Park Road Heating, Ventilation, and Air Conditioning (HVAC) System  
Certification Statement, 25 Melville Park Road, Melville, New York.

ENVIRONMENT

Dear Ms. Greenfield:

Date:

October 12, 2015

Pursuant to the New York State Department of Environmental Conservation (NYSDEC) approved Site Management Plan for the subject property and the August 10, 2015 letter from the NYSDEC titled *Reminder Notice: Site Management Periodic Review Report and IC/EC Certification Submittal*, certification of the institutional controls (ICs) and engineering controls (ECs) are required to be completed by the property owner, remedial party, or designated representative on an annual basis. Furthermore, all ECs require certification by a professional engineer licensed in New York State.

Contact:

Christina Berardi  
Tuohy, PE  
Phone:  
631.391.5213

Email:

[christinaberardi.tuohy@arcadis.com](mailto:christinaberardi.tuohy@arcadis.com)

Arcadis of New York, Inc. (Arcadis), has agreed to provide the necessary professional engineering services to fulfill the above requirements for the current Periodic Review Report period. However, since Arcadis does not operate or maintain the positive pressure HVAC system, please provide an authorized company signature certifying operation of the HVAC system in accordance with the requirements described below. A certification page is provided on Page 2 of this letter.

Our ref:

NY001332.2012.M0012

Please do not hesitate to contact me with any questions.

Sincerely,

Arcadis of New York, Inc.

Christina Berardi Tuohy, PE  
Senior Engineer

Copies:

Raymond Sohmer, Philips International Holding Corp.  
Scott Furman, Sive Paget & Riesel, P.C.

Imagine the result

# ARCADIS

Linda Greenfield  
October 12, 2015

## Certification Statement

I hereby certify that the HVAC system was operated and maintained in accordance with the requirements set forth in the Record of Decision dated March 31, 2004 during the reporting period. Specifically, the HVAC system:

- Operated to maintain a positive pressure within the building to help prevent the potential migration of vapors into indoor air.
- Remained unchanged since the date the EC was put in-place or was last approved by the NYSDEC.

PHILIPS INTERNATIONAL HOLDING CORP  
AS AGENT FOR BP MOBY HOLDING LLC

BY: RAYMOND SOMMER  
PROPERTY DIRECTOR

~~BP Moby Holdings LLC~~ (Print Name)



BP Moby Holdings LLC (Signature)

10-29-15

Signature Date





Linda Greenfield  
BP Moby Holdings LLC  
c/o Philips International Holding Corp.  
295 Madison Avenue, 2nd Floor  
New York, NY 10017

Subject:

25 Melville Park Road Soil Management Certification Statement, 25 Melville Park Road, Melville, New York.

Dear Ms. Greenfield:

Pursuant to the New York State Department of Environmental Conservation (NYSDEC) approved Site Management Plan for the subject property, certification of the institutional controls (ICs) and engineering controls (ECs) are required to be completed by the property owner, remedial party, or designated representative on an annual basis. Furthermore, all ECs require certification by a professional engineer licensed in New York State.

Arcadis of New York, Inc., (Arcadis) has agreed to provide the necessary professional engineering services to fulfill the above requirements for the current Periodic Review Report period. However, since Arcadis did not design, oversee, or implement the sanitary system upgrades or the removal of the roof drain leaching pool completed in November 2014, please have the engineering design firm that provided oversight of these activities provide certification and signature confirming that all work has been completed in accordance with the requirements described below. The certification must be provided by a New York State professional engineer. A certification page is provided on Page 2 of this letter.

Please do not hesitate to contact me with any questions.

Sincerely,

Arcadis of New York, Inc.

Christina Berardi Tuohy, PE  
Senior Engineer

Copies:

Raymond Sohmer, Philips International Holding Corp.  
Scott Furman, Sive Paget & Riesel, P.C.

Imagine the result

Arcadis of New York, Inc.  
Two Huntington Quadrangle  
Suite 1S10  
Melville  
New York 11747  
Tel 631 249 7600  
Fax 631 249 7610  
[www.arcadis.com](http://www.arcadis.com)

ENVIRONMENT

Date:

October 12, 2015

Contact:

Christina Berardi  
Tuohy, PE  
Phone:  
631.391.5213

Email:

[christinaberardi.tuohy@arcadis.com](mailto:christinaberardi.tuohy@arcadis.com)

Our ref:

NY001332.2012.M0012

Certification Statement

I hereby certify that all work associated with installation of the sanitary system upgrades and the removal of the roof drain leaching pool was completed in accordance with the requirements set forth in the NYSDEC approved Soil Management Plan dated August 13, 2010 (Appendix C of the Site Management Plan).

Michael P. Chiarelli

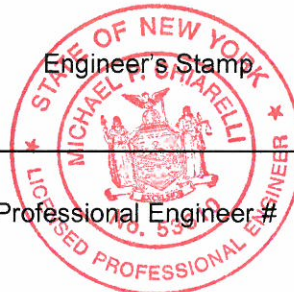
Michael P. Chiarelli Engineer P.C.  
(Print Name)

[Signature]

Michael P. Chiarelli Engineer P.C.  
(Signature)

11/10/15

Signature Date



NYS Professional Engineer #



## **Appendix C**

Injection Logs

## Summary of Reagent Injection Parameters, Injection Well IW-3, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
8/7/2015	1	335	11205	2.9	11540	16	0	40 additional gallons of EVO solution was injected

Summary of Reagent Injection Parameters, Injection Well IW-6, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	Raw Molasses Volume (gallons)	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
11/25/2014	57	100	--	4900	2.00	5000	18	8	
8/7/2015	58	--	400	13380	2.9	13780	13	0	2,280 additional gallons of EVO solution was injected

Summary of Reagent Injection Parameters, Injection Well IW-11, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	Raw Molasses Volume (gallons)	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
11/25/2014	58	146	--	7154	2.00	7300	16	0	6 psi @ start then drop to 0 psi when flow rate was decreased to below 16 gpm
8/12/2015	59	--	261	8739	2.9	9000	20	0	Reagent solution observed in well manhole, well casing turned freely, halted injection. 900 additional gallons of EVO solution was injected

## Summary of Reagent Injection Parameters, Injection Well IW-15, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	Raw Molasses Volume (gallons)	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
11/25/2014	58	100	--	4900	2.00	5000	16	0	Pressure range 0 to 8 psi; average 4 psi; end in vacuum last 2 of 16 measurements
8/6/2015	58	--	235	7865	2.9	8100	17	4	
NM	Not measured.								

## Summary of Reagent Injection Parameters, Injection Well IW-17, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
8/6/2015	1	435	14565	2.9	15000	17	0	Vacuum for most of the injection; last two readings 6 psi and 8 psi. This injection was 400 gallons short of planned EVO solution injection volume.



## Summary of Reagent Injection Parameters, Injection Well IW-20, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
8/5/2015	2 <sup>1</sup>	336	11264	2.9	11600	17	0	

1. A single injection pilot test was completed at well IW-20 on May 28, 2010 in an effort to expedite the remediation at the Site. The pilot test consisted of injecting 10,000 gallons of a 10 percent molasses-whey (mol-whey) solution containing 2,000 milligrams per liter (mg/L) of bromide tracer.

## Summary of Reagent Injection Parameters, Injection Well IW-25, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
8/5/2015	1	194	6506	2.9	6700	17	0	

Summary of Reagent Injection Parameters, Injection Well IW-27, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	Raw Molasses Volume (gallons)	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
11/24/2014	31	190	--	9310	2.00	9500	20	10	Ran out of molasses solution.
8/5/2015	32	--	194	6506	2.9	6700	19	0	

## Summary of Reagent Injection Parameters, Injection Well IW-28, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
8/13/2015	1	319	10688	2.9	11007	23	0	Start @ 10 psi then vacuum; 1,007 additional gallons of EVO solution was injected

## Summary of Reagent Injection Parameters, Injection Well IW-29, 25 Melville Park Road, Melville, New York.

Injection Start Date	Injection No.	EVO/Sulfate Solution Volume (gallons)	Water Volume (gallons)	Solution Strength (%)	Volume Injected (gallons)	Injection Flowrate (gpm)	Injection Pressure (psi)	Notes and Observations
8/6/2015	1	171	5729	2.9	5900	17	5	Pressure range 0 to 9 psi; average 5 psi



## **Appendix D**

IRZ Performance Data Trend Plots

Figure D-1. Degradation Trends for Shallow Zone Monitoring Well MW-28M

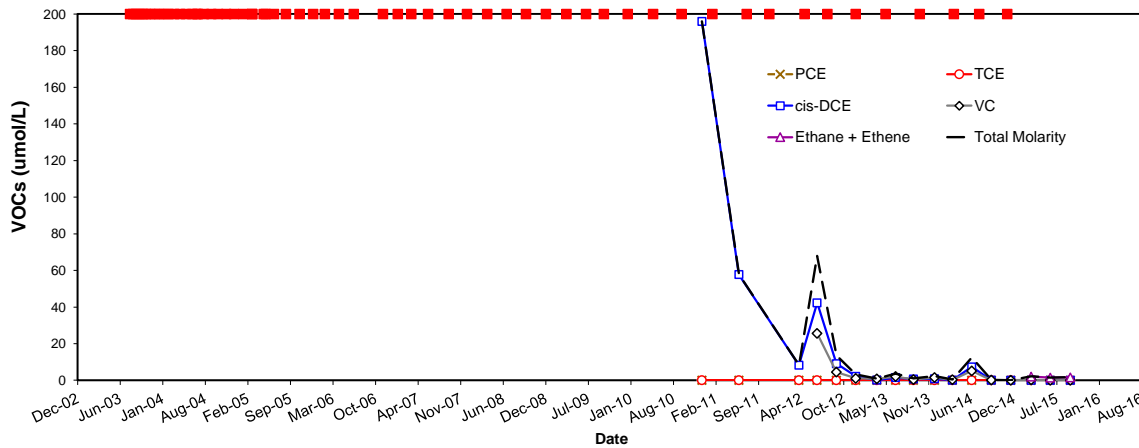
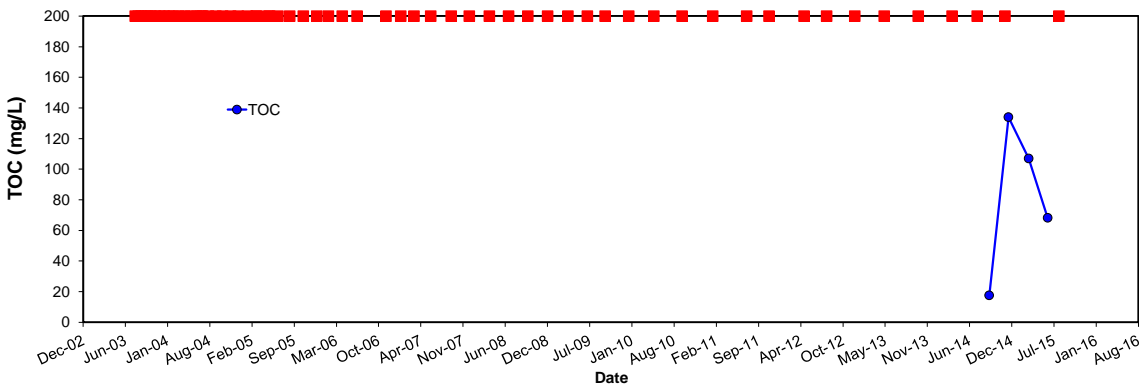
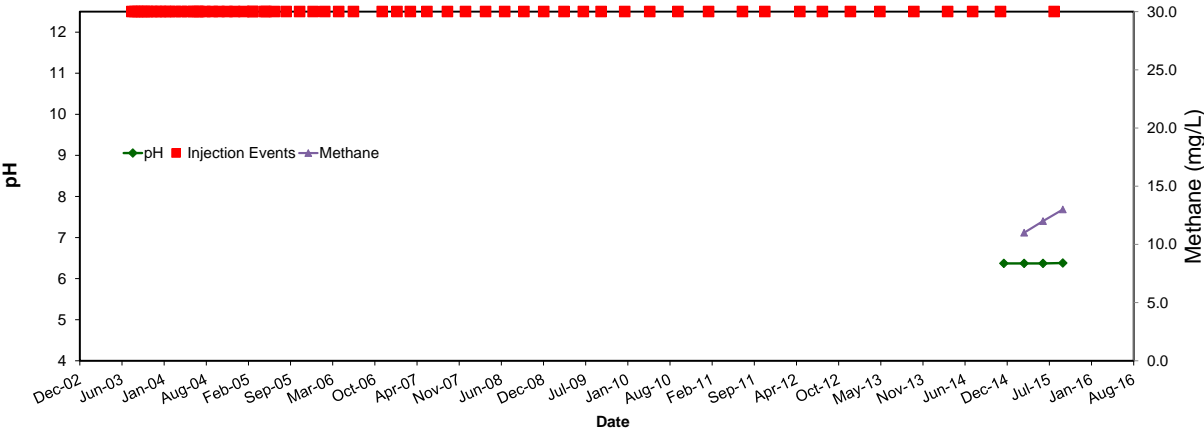


Figure D-2. Degradation Trends for Shallow Zone Downgradient Compliance Monitoring Well MW-31

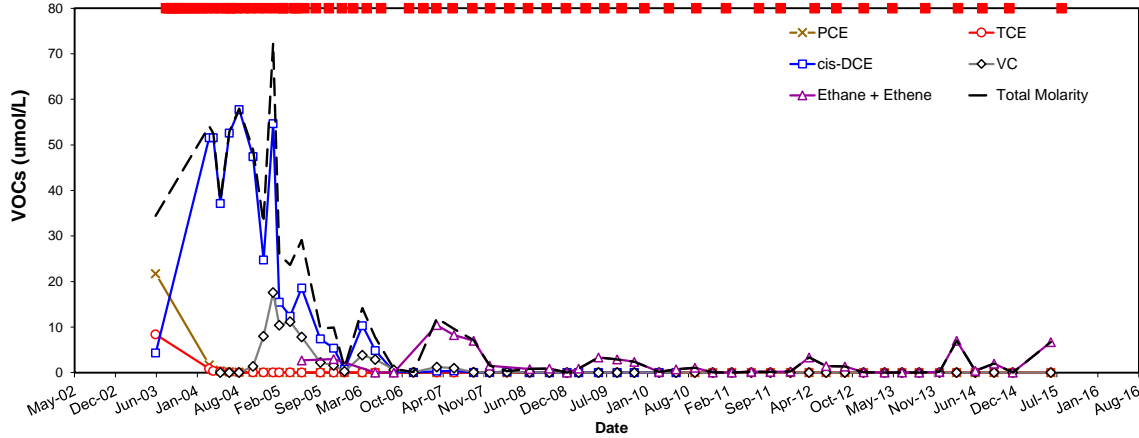
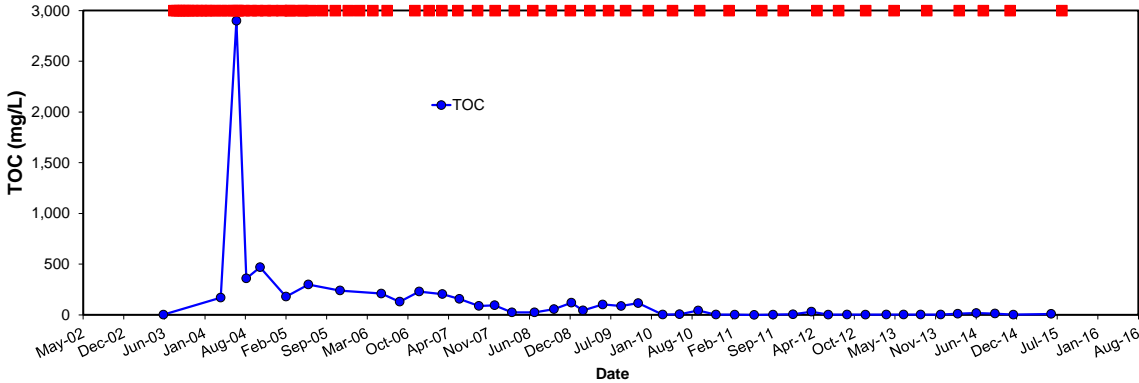
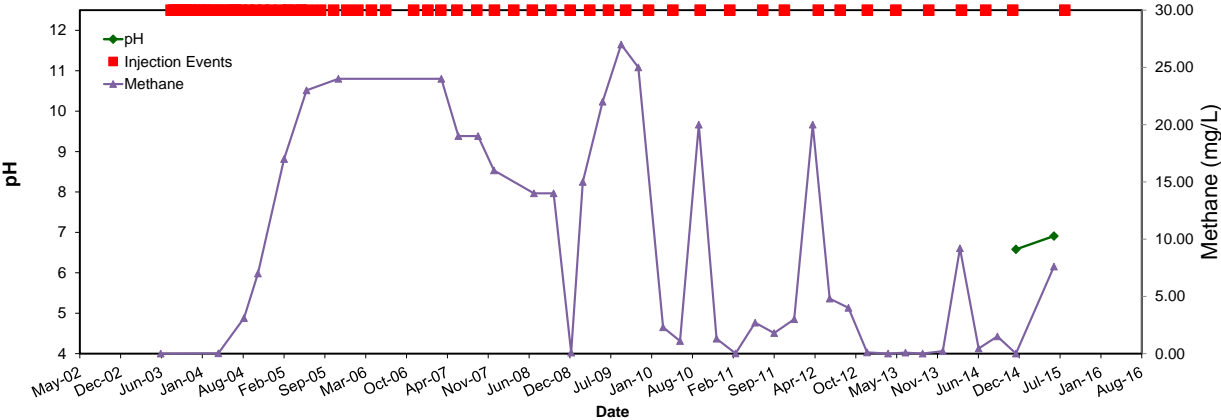




Figure D-3. Degradation Trends for Intermediate Zone Monitoring Well IW-18

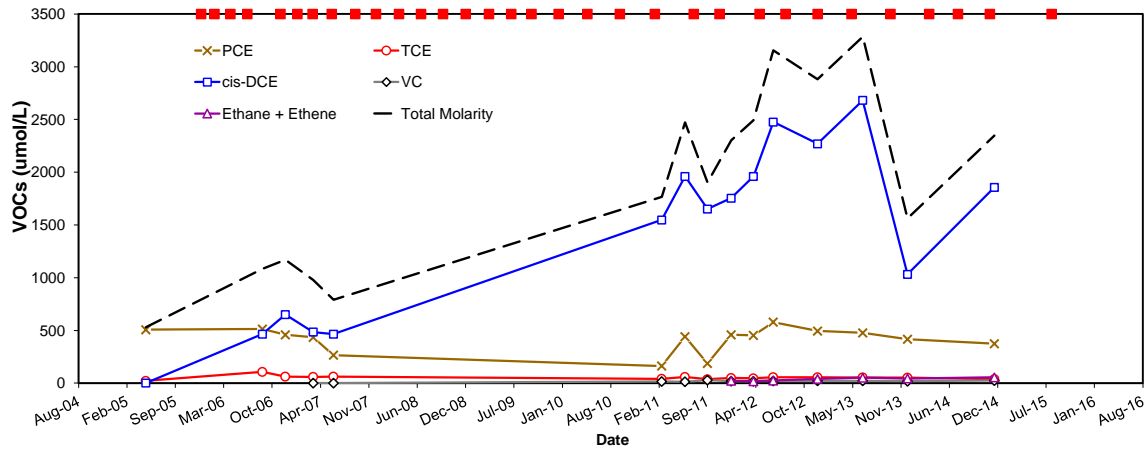
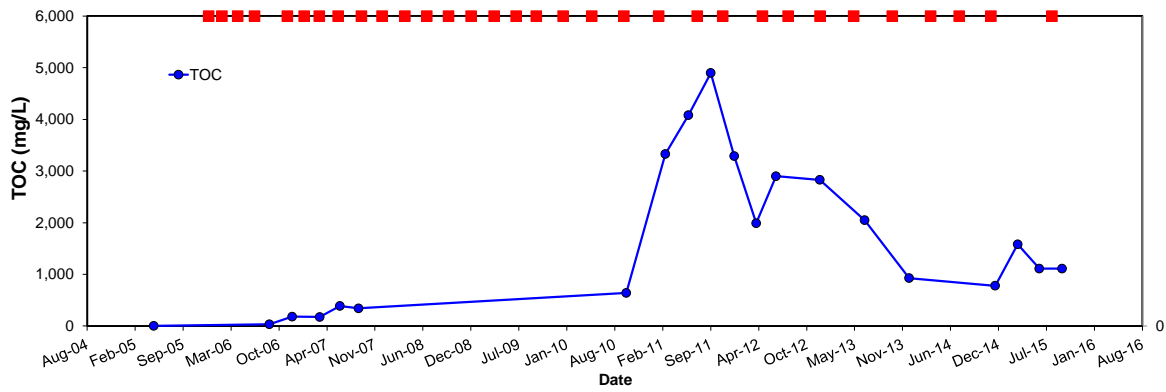
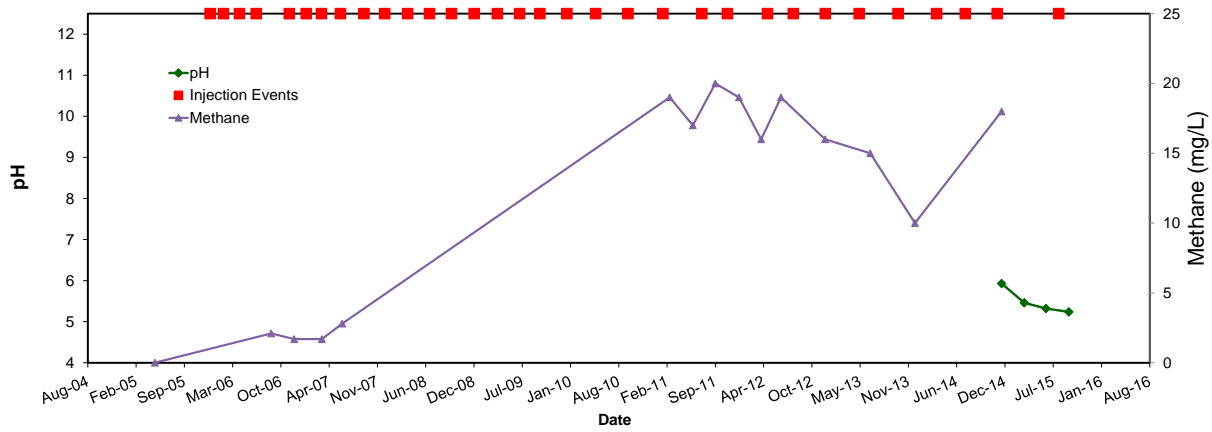


Figure D-4. Degradation Trends for Intermediate Zone Monitoring Well MW-23

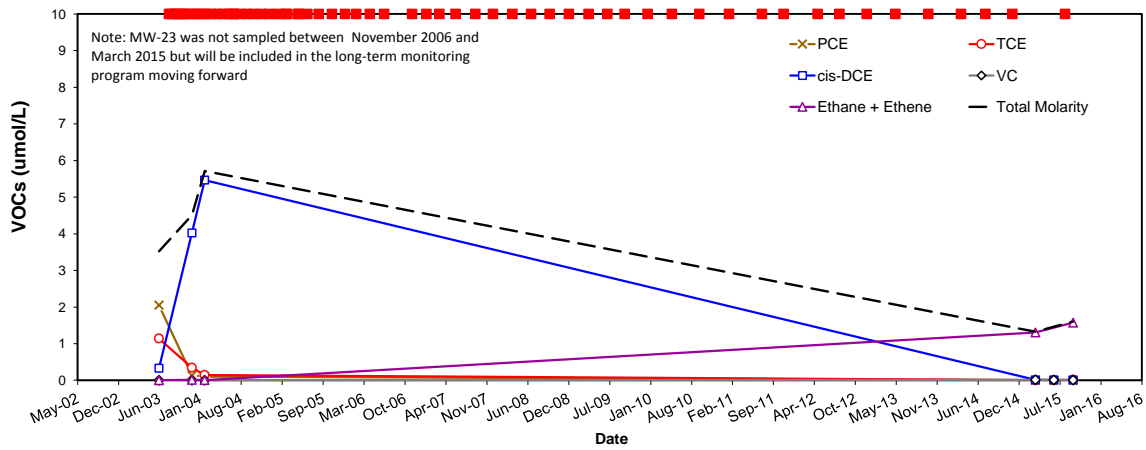
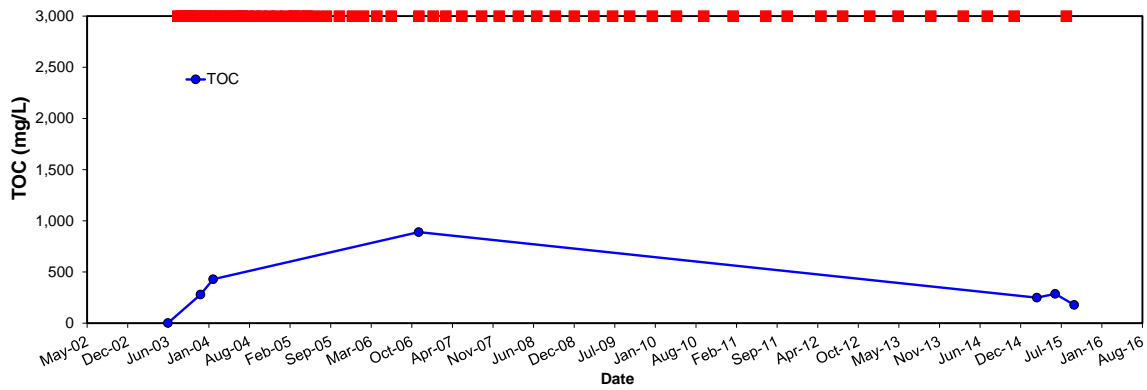
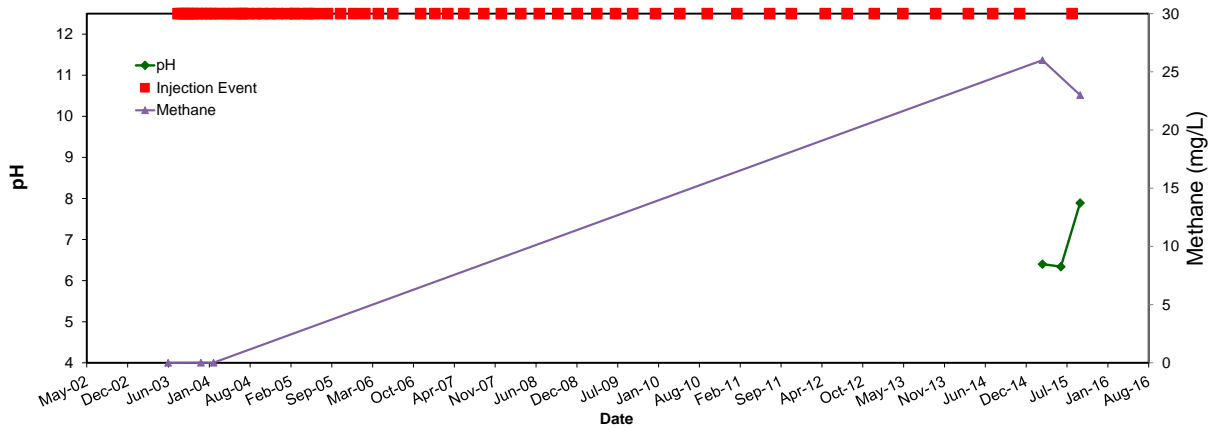


Figure D-5. Degradation Trends for Intermediate Zone Downgradient Compliance Monitoring Well MW-34

