Department of Environmental Conservation

**Division of Environmental Remediation**

# Record of Decision
## Crown Dykman Site

## State Superfund Project
## Glen Cove, Nassau County, New York
## Site Number 130054

## March 2010

New York State Department of Environmental Conservation
DAVID A. PATERSON, *Governor* ALEXANDER B. GRANNIS, *Commissioner*

# DECLARATION STATEMENT - RECORD OF DECISION

## Crown Dykman
## State Superfund Project
## Glen Cove, Nassau County New York
## Site No. 130054

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Crown Dykman site, a Class 2 inactive hazardous waste disposal site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law, 6 NYCRR Part 375, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the Crown Dykman site and the public's input to the Proposed Remedial Action Plan (PRAP) presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

**Description of Selected Remedy**

Based on the results of the remedial investigation/feasibility study (RI/FS) for the Crown Dykman site and the criteria identified for evaluation of alternatives, the Department has selected Source Area In-Situ Chemical Oxidation and Natural Attenuation. The components of the remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Included in the program will be an in-situ chemical oxidation pilot test to determine the necessary injection parameters.

2. Implementation of an in-situ chemical oxidation of the plume area with the highest concentrations of chlorinated VOCs located in the southwestern portion of the site.

3. Implementation of a LNAPL recovery system along the southwestern side of the building and the western property boundary.

4. Continued operation of the soil vapor extraction system/sub-slab depressurization to remediate the remaining soil contamination and mitigate the potential for soil vapor intrusion.

5. Continued operation of the components of the remedy until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible

6. To maximize the net environmental benefit, green remediation and sustainability efforts will be considered in the design and implementation of the remedy to the extent practicable, including;

   - encourage low carbon technologies
   - conserve natural resources

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

   (a) requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3).

   (b) allows the highest use and development of the controlled property (subject to local zoning laws) to be

   □ residential use □ restricted residential use X commercial use □ industrial use

   (c) restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or County DOH;

   (d) prohibits agriculture or vegetable gardens on the controlled property;

   (e) requires compliance with the Department approved Site Management Plan;

8. Since the remedy results in contamination remaining at the site that does not allow for unrestricted use, a Site Management Plan is required, which includes the following:

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

      Institutional Controls: The Environmental Easement discussed in Paragraph 7 above.

      Engineering Controls: The LNAPL recovery system and soil vapor extraction/sub-slab depressurization system discussed in Paragraphs 3 and 4 above.

This plan includes, but may not be limited to:

(i) Soil Management Plan which details the provisions for management of future excavations in areas of remaining contamination;

(ii) descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;

(iii) provisions for the management and inspection of the identified engineering controls;

(iv) maintenance of proper cover;

(v) maintaining site access controls and Department notification; and

(vi) the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

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

(i) monitoring of groundwater and soil vapor to assess the performance and effectiveness of the remedy;

(ii) a schedule of monitoring and frequency of submittals to the Department;

(iii) provision to evaluate the potential for vapor intrusion for any buildings developed or changes to the existing building on the site, including provision for mitigation of any impacts identified; and

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

(i) compliance monitoring of treatment systems to assure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;

(ii) maintaining site access controls and Department notification; and

(iii) providing the Department access to the site and O&M records .

**New York State Department of Health Acceptance**

The New York State Department of Health (NYSDOH) concurs that the remedy selected for this site is protective of human health.

**Declaration**

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

# RECORD OF DECISION
**Crown Dykman**
**State Superfund Project**
**Glen Cove, Nassau County, New York**
**Site No. 130054**
**March 2010**

## SECTION 1: SUMMARY AND PURPOSE OF THE REMEDY

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected this remedy for the above referenced site. The disposal of hazardous waste at the site has resulted in threats to public health and the environment that are addressed by this remedy presented in this Record of Decision (ROD). The disposal of hazardous wastes at this site, as more fully described in Sections 5 of this document, have contaminated various environmental media. The remedy, discussed in detail in Section 8, is intended to attain the remedial action objectives identified for this site in Section 6 for the protection of public health and the environment. This ROD identifies the selected remedy, summarizes the other alternatives considered, and discusses the reasons for the selected remedy. The Department has selected a final remedy for the site after careful consideration of all comments received during the public comment period.

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

The Department has issued this ROD in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, 6 NYCRR Part 375.

## SECTION 2: SITE DESCRIPTION AND HISTORY

### 2.1: Location and Description

The Crown Dykman site is located at 66 Herb Hill Road, Glen Cove, New York (Figures 1 and 2). The site is the former location of Dykman Laundry and Cleaners. The property, approximately 175 by 250 feet in area, contains a one-story cinder block and brick building. The building currently houses two businesses. An auto repair facility is located in the front of the building and a commercial (water-based) cleaner is located in the rear of the building. The site is bordered to the west by the Li Tungsten Parcel B USEPA Superfund site and to the south by the former Li Tungsten Parcel A USEPA Superfund site and the Glen Cove Creek. To the north of the site, within the Konica Minolta property, is the Powers Chemco site.

## 2.2: Operational/Disposal History

The Crown Dykman site was occupied by Dykman Laundry from 1932 thru 1975. Crown Uniform Services (Crown Uniform) utilized the premises to dry clean and service uniforms from 1975 until they went out of business in 1983. Crown Uniform originally used a petroleum based Stoddard solvent to launder the uniforms; however, the Stoddard solvent was later replaced by tetrachloroethene (PCE). Since the closing of Crown Uniform, several other businesses have occupied the building.

## 2.3: Remedial History

In 1987 the site was originally investigated by the Nassau County Department of Health during the excavation of an on-site pit. The sampling event found PCE, 1,1,1-trichloroethane, toluene, and xylene. In the early 1990s, several underground solvent tanks and a gasoline tank were removed. Based on results from samples collected during the tank removal, the Nassau County Department of Health sent a letter of violation to the site owner and requested a remedial investigation. A preliminary investigation was completed in 1992 by the owner of the site, Herb Hill Associates.

In August 1992, the Department first identified the site as Class 2a site. A 2a site is a temporary classification assigned to a site that had inadequate and/or insufficient data for inclusion in any of the other classifications in the Registry of Inactive Hazardous Waste Disposal Sites in New York.

As a result of identified hazardous waste disposal, the Department listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York in November 1992. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

Several investigations and an Interim Remedial Measure (IRM) had been completed by the property owner prior to the completion of the Remedial Investigation and Feasibility Study.

- Preliminary Site Assessment completed in 1991
- Initial RI/FS completed in 1997
- Additional Site Investigations completed in 1999
- Soil removal IRM completed in 2005. This soil removal IRM removed approximately 2,200 tons of contaminated soil from beneath the southeastern portion building slab. Post excavation sampling indicated that residual PCE contamination remained beneath the slab along the footings of the southeastern wall at concentrations ranging from non-detect to 290 parts per million.

## SECTION 3: LAND USE

The Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings when assessing the nature and extent of contamination. For this site, alternatives that may restrict the use of the site, restricted commercial criteria as described in Part 375-1.8 (g) have been evaluated in addition to unrestricted Standards, Criteria and Guidance (SCGs) because the site is currently zoned and used as a commercial facility. Further, the site is surrounded by properties also zoned commercial by the City. Therefore, the Department will include the evaluation of restricted commercial soil cleanup objectives (SCOs) found in Part 375-6.8 (b) in assessing the nature and extent of contamination.

A comparison of the appropriate SCGs for the identified land use against the unrestricted use SCOs for the site contaminants is included in the Tables for the media being evaluated in section 5.1.2.

## SECTION 4: ENFORCEMENT STATUS

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

The PRPs identified for this site include Crown Dykman Uniforms, and Herbhill Associates.

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

After the remedy is selected, the Department will approach the PRPs to implement the selected remedy.

## SECTION 5: SITE CONTAMINATION

A remedial investigation has been conducted to determine the nature and extent of contamination and to evaluate the alternatives for addressing the significant threats to human health and the environment.

### 5.1: Summary of the Remedial Investigation

The purpose of the Remedial Investigation (RI) was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between March 2007 and October 2009. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Soil borings, and monitoring well installations,
- Sampling of surface and subsurface soils, groundwater and soil vapor,
- Sampling of groundwater,
- Ecological and Human Health Exposure Assessments.

### 5.1.1: Standards, Criteria, and Guidance (SCGs)

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

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and surface and subsurface soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in the following Sections list the applicable SCG in the footnotes. For a full listing of all SCGs see:

http://www.dec.ny.gov/regulations/61794.html

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI Report.

### 5.1.2: Nature and Extent of Contamination

This section describes the findings for all environmental media that were evaluated. As described in the RI report, groundwater, soil, and soil vapor intrusion samples were collected to characterize the nature and extent of contamination.

For each media, a table summarizes the findings of the investigation. The table presents the range of contamination found at the site in each media and compare(s) the data with the applicable SCGs for the site. The contaminants are arranged into four categories; volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/ polychlorinated biphenyls (PCBs), and inorganics (metals). For comparison purposes the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCG identified in Section 3 area also presented.

#### Groundwater

Groundwater samples were collected to assess the on-site and off-site conditions. In general, the depth to groundwater ranges from five (5) to ten (10) feet below ground surface (bgs). On-site sampling results indicate that there are chlorinated solvent VOCs (PCE) and its degradation compounds trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE) and vinyl chloride) in the southwest

portion of the site from the water table to depths exceeding 25 feet bgs that exceed their respective SCGs. Off-site sampling results indicated that the chlorinated solvent contamination extends off-site to the south and the west entering the northern portion of the Li Tungsten Parcel A (to the south) and the eastern portion of the Li Tungsten Parcel B (to the west) (Figures 3, 4, 5, and 6). In addition to the chlorinated solvents, benzene, toluene, ethylbenzene, and xylene (BTEX) and other petroleum related compounds were detected in the southern and western portion of the site exceeding their respective SCGs (Figure 7). Measurable amounts of petroleum light non-aqueous phase liquid (LNAPL) was also found in the area of MW-6R and MW-8, indicating a petroleum release at the site.

**Table 1 - Groundwater**

| Detected Constituents | Concentration Range Detected (ppb)[a] | SCG[b] (ppb) | Frequency of Exceeding SCG |
|---|---|---|---|
| VOCs | | | |
| 1,1,2-Trichloroethane | ND - 69 | 1 | 3 of 58 |
| 1,2,4-Trimethylbenzene | ND – 23,000 | 5 | 5 of 58 |
| 1,3,5-Trimethylbenzene | ND – 7,400 | 5 | 5 of 58 |
| Benzene | ND - 11 | 1 | 5 of 58 |
| cis-1,2-Dichloroethene | ND – 32,000 | 5 | 42 of 58 |
| Ethyl Benzene | ND - 140 | 5 | 3 of 58 |
| Methyl tert-butyl Ether | ND - 51 | 10 | 7 of 58 |
| o-Xylene | ND - 500 | 5 | 3 of 58 |
| Tetrachloroethene | ND – 14,800 | 5 | 34 of 58 |
| Toluene | ND - 94 | 5 | 3 of 58 |
| trans-1,2-Dichloroethene | ND - 170 | 5 | 22 of 58 |
| Trichloroethene | ND – 6,600 | 5 | 36 of 58 |
| Vinyl Chloride | ND – 3,400 | 2 | 36 of 58 |

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1),
ND – Not Detected

The primary groundwater contaminants are PCE, TCE, 1, 2-DCE, and vinyl chloride associated with the former laundry, and benzene, toluene, and xylene (BTX) associated with gasoline and heating fuel used at the site. As noted on Figures 3, 4, 5, 6 and 7, the primary groundwater contamination is located in the southwestern portion of the site.

Based on the findings of the RI, the disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: PCE, TCE, 1, 2-DCE, vinyl chloride, benzene, toluene, and xylene.

## Soil

Previous investigations and the 2005 soil removal IRM (described in Section 2.3) have characterized the soil beneath the southwest corner of the site. Therefore, this area was not further investigated during the RI, as it has been documented that residual PCE contamination (at concentrations ranging from non-detect to 290 parts per million (ppm)) is present near the buildings footing. Additional surface and subsurface soil samples outside of this area were collected during the RI to complete the delineation of soil contamination. With the exception of vinyl chloride detection near the western side of the building, no additional chlorinated VOC soil contamination was noted above their respective SCGs. However, petroleum related compounds were detected in the subsurface soil exceeding their respective SCGs.

**Table 2 - Remedial Investigation Soil Results**

| Detected Constituents | Detected Range (ppm)[a] | Unrestricted SCG[b] (ppm) | Frequency Exceeding Unrestricted | Restricted Commercial SCG[c] (ppm) | Frequency Exceeding Restricted |
|---|---|---|---|---|---|
| VOCs | | | | | |
| 1,2,4-Trimethylbenzene | ND - 49 | 3.6 | 2 of 69 | N/A | --- |
| Acetone | ND - 0.18 | 0.05 | 6 of 69 | N/A | --- |
| n-Propylbenzene | ND - 5 | 3.9 | 1 of 69 | N/A | --- |
| Vinyl Chloride | ND – 0.084 | 0.02 | 2 of 69 | 13 | --- |
| Metals | | | | | |
| Lead | ND – 3,590 | 63 | 11 of 69 | 1000 | 1 of 69 |

a – ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Soil Cleanup Objectives.

Soil contamination identified during the RI is being addressed by the IRM described in Section 5.2.

## Soil Vapor Intrusion

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

Soil vapor samples were collected from the sub-slab of the building on-site. Indoor air and ambient air samples were also collected at this time. The samples were collected to assess the potential for soil vapor intrusion. The results indicate that elevated levels of PCE, TCE, and 1,2-DCE are present in the sub-slab soil vapor and an elevated level of PCE was detected in the indoor air. A comparison

of these results indicate that soil vapor intrusion could be a complete pathway and action to mitigate this pathway (e.g., source removal), thereby mitigating the indoor air quality, was recommended.

Soil Vapor contamination identified during the RI was addressed during the IRM described in Section 5.2.

## 5.2: Interim Remedial Measures

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

Based on the results of the RI it was determined that VOC soil contamination located near the foundation footings and beneath the slab of the building was impacting soil vapor. The following mitigation measures were taken on-site to address potential human exposure (via inhalation) to volatile organic compounds associated with soil vapor intrusion. A soil vapor extraction/sub-slab depressurization system in the south western corner of the site building was completed in 2008/2009.

## 5.3: Summary of Human Exposure Pathways:

This section describes the current or potential human exposures to persons at or around the site that may result from the site contamination. A more detailed discussion of the human exposure pathways can be found in the RI report available at the document repository. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Exposure to contaminated groundwater and residual soil contamination is not expected because public water serves the area and the soils are covered with building or pavement. Operation of a soil vapor extraction system will reduce the potential for exposure from soil vapor intrusion into structures on and near the site.

## 5.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water. The Fish and Wildlife Impact Analysis (FWIA), which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site poses to fish and wildlife receptors.

Glen Cove Creek, which has been channelized and is a potential receptor, is located south of the Site. A private marina in the southwestern portion of Glen Cove Creek and the remainder of the creek is bordered by industry. The majority of Glen Cove Creek's banks have been armored with steel bulkhead.

The FWIA did not identify any current or potential impacts to ecological resources.

Groundwater at the site generally flows south-southwest toward Glen Cove Creek. Depth to groundwater varies at the site ranging five to 10 feet below grade level.

Site related contamination is impacting groundwater. The groundwater is not used as a source of potable water. Protection of the groundwater resource will be addressed in the remedy selection process.

Surface water resources at or near the site include Glen Cove Creek located to the south of the site. The majority of Glen Cove Creek is lined by bulkheaded shoreline and has no intertidal marsh, high marsh or transition zone habitats. Glen Cove Creek consists of a federally maintained navigation channel that extends from Hempstead Harbor eastward to the existing fuel depot located at the eastern terminus of the creek. Historical dredging and shoreline hardening structures have resulted in the elimination of all natural shoreline areas with the exception of a tidal wetland resource located at Captain's Cove. Impacts to surface water were evaluated based on the potential for contaminated groundwater to migrate to the creek. Sediment was not evaluated in the RI.

The remedy must address the potential impact of the site to the surface water resource.

## SECTION 6: SUMMARY OF THE REMEDIATION OBJECTIVES

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

The remedial objectives for this site are:

**Public Health Protection**

*Groundwater*

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

*Soil*

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of contaminant vapors from the soil.

*Soil Vapor*

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

**Environmental Protection**

*Groundwater*

- Restore the groundwater aquifer to meet ambient groundwater quality criteria, to the extent feasible.
- Prevent discharge of contaminated groundwater to surface water.

*Soil*

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

## SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

To be selected the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Site were identified, screened and evaluated in the feasibility study which is available at the document repositories established for this site.

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

## 7.1: Description of Remedial Alternatives

The following alternatives were considered to address the contaminated media identified at the site as describe in Section 5:

### Alternative 1: No Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 5.2. This alternative leaves the site in its present condition and does not provide any additional protection of the environment.

### Alternative 2: In-Situ Chemical Oxidation

This alternative achieves all of the SCGs discussed in Section 5.1.1 and soil meets the unrestricted soil cleanup objectives listed in Part 375-6.8 (a). This alternative would include in-situ chemical oxidation, a LNAPL recovery system, a site management plan and an environmental easement for the continued operation of the SVE/SSDS system.

Under this alternative potential contact with site VOC contaminants would be eliminated by the destruction of the VOCs via chemical oxidation. This alternative would inject an oxidant over the approximately 144,000 square foot area that encompasses the plume to treat the on-site source area and the on-site and off-site plume to achieve the unrestricted SCG's. In addition to chemical oxidation of the chlorinated VOC plume, a LNAPL recovery system would implemented. The LNAPL recovery system would consist of a network of approximately four LNAPL recovery wells screened across the groundwater-LNAPL interface installed in the southwestern portion of the building and along the western side of the property to address the on-going presence of LNAPL. The SVE system would continue operation until all soil contamination has been addressed and soil vapor intrusion is no longer a potential.

To ensure compliance with the objectives of this alternative, an environmental easement would be put in place requiring a site management plan. The site management plan would be developed to: i) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; ii) provide long-term groundwater monitoring; iii) provide operation and maintenance of the soil vapor extraction system; iv) provide groundwater use restrictions; v) evaluate the potential for vapor intrusion for any future buildings developed on the site, including provision for mitigation of any impacts identified; and vi) identify any use restrictions.

*Present Worth:* ..... *$9,000,000*
*Capital Cost:* ..... *$8,700,000*
*Annual Costs (1- 5 years):* ..... *$80,000*

**Alternative** #3**: Source Area In-Situ Chemical Oxidation and Natural Attenuation**

This alternative would include in-situ chemical oxidation, a LNAPL recovery system, continued operation of the SVE system, monitored natural attenuation, a site management plan, and an environmental easement.

Under this alternative potential contact with site contamination would be reduced and/or eliminated by the destruction of the VOCs via in-situ chemical oxidation. To address the primary source of groundwater contamination, the chemical oxidant would be injected into the subsurface in the western and southwestern portion of the site as shown in **Figure 8.** A LNAPL recovery system (as described under Alternative 2) would be installed in the southwestern portion of the building and along the western side of the property to address the LNAPL presence. This alternative would also reduce further contamination of the downgradient groundwater without directly treating the off-site plume (as proposed in Alternative 2).

To reduce and/or eliminate the potential of contact with site contamination in the soil and to mitigate soil vapor intrusion, the current SVE system will remain in operation until it has been determined that the soil contamination has been remediated and mitigation of soil vapor intrusion is no longer necessary.

To ensure compliance with the objectives of this alternative, an environmental easement would be put in place requiring a site management plan. The site management plan would be developed to: i) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; ii) provide long-term groundwater monitoring; iii) provide operation and maintenance of the soil vapor extraction system; iv) provide groundwater use restrictions; v) evaluate the potential for vapor intrusion for any future buildings developed on the site, including provision for mitigation of any impacts identified; and vi) identify any use restrictions.

*Present Worth:* ..... *$1,700,000*
*Capital Cost:* ..... *$1,100,000*
*Annual Costs (1- 10 years):* ..... *$80,000*

**Alternative** #4**: Zero-Valent Iron Permeable Reactive Barrier**

This alternative would include the installation of a zero-valent permeable reactive barrier (PRB), a LNAPL recovery system, continued operation of the SVE system, monitored natural attenuation, a site management plan, and an environmental easement.

Under this alternative potential contact with site contamination would be reduced and/or eliminated by abiotic reduction dehalogenation using a zero-valent iron PRB. To intersect and treat the chlorinated VOC plume the PRB would be installed along the western and southern property boundaries. The PRB would extend from the top of the water table to an average depth of 45 feet below ground surface. A LNAPL recovery system would be installed in the southwestern portion of the building and along the western side of the property to address the LNAPL presence.

To reduce and/or eliminate the potential of contact with site contamination in the soil and to mitigate soil vapor intrusion, the current SVE system will remain in operation until it has been determined that the soil contamination has been remediated and mitigation of soil vapor intrusion is no longer necessary.

To ensure compliance with the objectives of this alternative, an environmental easement would be put in place requiring a site management plan. The site management plan would be developed to: i) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; ii) provide long-term groundwater monitoring iii) provide operation and maintenance of the soil vapor extraction system; iv) provide groundwater use restrictions; v) evaluate the potential for vapor intrusion for any future buildings developed on the site, including provision for mitigation of any impacts identified; and vi) identify any use restrictions.
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*Present Worth:* ..... *$2,100,000*
*Capital Cost:* ..... *$1,400,000*
*Annual Costs (1-10 years)* ..... *$80,000*

## 7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which sets forth the requirements for the remediation of inactive hazardous waste disposal sites in New York. A detailed discussion of the evaluation criteria and comparative analysis is included in the feasibility study.

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

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

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

The next six “primary balancing criteria” are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the

remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

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

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

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

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in the Remedial Alternatives Cost Table 3.

**Table 3**
**Remedial Alternative Costs**

| Remedial Alternative | Capital Cost ($) | Annual Costs ($) | Total Present Worth ($) |
|---|---|---|---|
| **Alternative 1: No Further Action** | 0 | 0 | 0 |
| **Alternative 2: In-Situ Chemical Oxidation** | $8,700,000 | $80,000 | $9,000,000 |
| **Alternative 3: Source Area In-Situ Chemical Oxidation/Natural Attenuation** | $1,100,000 | $80,000 | $1,700,000 |
| **Alternative 4: Zero-Valent Iron Permeable Reactive Barrier** | $1,400,000 | $80,000 | $2,100,000 |

8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible or not cost-effective, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

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

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP have been evaluated. The responsiveness summary (Appendix A) presents public comments received and the manner in which the Department addressed the concerns raised.

In general, the public comments received were supportive of the selected remedy.

## SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the Administrative Record (Appendix B) and the discussion presented below, the Department has selected Alternative 3: Source Area In-Situ Chemical Oxidation and Natural Attenuation as the remedy for this site. The elements of this remedy are described at the end of this section.

### 8.1 Basis for Selection

The selected remedy is based on the results of the RI and the FS evaluation of alternatives.

Alternative 3 has been selected because, as described below, it satisfies the threshold criteria and provides the best balance of the balancing criterion described in Section 7.2. It would achieve the remediation goals for the site by oxidizing the highest concentrations of chlorinated VOCs in the groundwater, while the LNAPL recovery system and SVE system will address the residual site contamination. Alternative 3 addresses the source of groundwater contamination and the highest concentrations of groundwater contamination which are the most significant threat to public health and the environment, and it creates the conditions needed to restore groundwater quality to the extent practical.

Alternative 1 (No Further Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternatives 2 and 3, by oxidizing all the chlorinated VOC groundwater contamination, meet the threshold criterion. Alternative 4 also complies with this criterion but to a lesser degree and with lower certainty. Because Alternatives 2, 3, and 4 satisfy the threshold criterion, the remaining criteria are particularly important in selecting a final remedy for the site.

Alternatives 2 through 4 would all have short-term construction impacts that are easily controlled by standard construction means. However, Alternatives 2 and 4, in comparison to Alternative 3, would have a greater construction impact in the short-term due to space requirements for injection equipment and/or construction. Each of these remaining three remaining alternatives would achieve the remedial action objectives. The means and the time required to reach the remedial objectives, however, is not equal. Based on current site constraints and available data, Alternatives 2 or 3 would achieve the remedial objectives in the shortest period of time.

Alternative 2, 3 and 4 would provide long-term effectiveness through the destruction of the chlorinated VOCs in the groundwater.

Alternatives 2 and 3 are the easiest to implement. However, while Alternative 4 is implementable, it would present more logistical challenges with the placement and construction of the permeable reactive barrier wall.

The reduction of toxicity, mobility, and volume of the on-site contamination by these three alternatives would be through an active treatment (either reduction or oxidation) that is irreversible. However, only Alternative 2 uses an active treatment process (oxidation) for the off-site contamination. Alternatives 3 and 4 use the process of natural attenuation to treat the remaining off-site contamination. While natural attenuation is irreversible, it will require more time to achieve the same level of reduction in toxicity, mobility, and volume.

The costs of the alternatives vary significantly. Table 3 presents the cost of each of the alternatives. As the complexity of the remedy increases, so does the cost. Alternative 2 is the most costly remedy due to the large volume of oxidant that they would be needed to treat the entire plume. Whereas, Alternative 3 will require less oxidant; and is therefore less costly than Alternative 2. Alternative 4 has a greater capital cost than Alternative 3, while its annual costs are similar to Alternative 3.

Since the anticipated use of the site is commercial, Alternatives 2 through 4 would allow for the continued use of the site. However, Alternative 4 would be less desirable because it would restrict the use of the property in the area of the reactive barrier. Whereas, Alternatives 2 and 3 would require additional space for the implementation of the remedy in the short-term, in the long-term they would not hinder future development of the site.

The estimated present worth cost to implement the remedy (Alternative 3) is $1,700,000. The cost to construct the remedy is estimated to be $1,100,000 and the estimated average annual costs for 10 years is $80,000.

## 8.2 **Elements of the Selected Remedy**

The elements of the selected restricted use remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Included in the program will be an in-situ chemical oxidation pilot test to determine the necessary injection parameters.

2. Implementation of an in-situ chemical oxidation of the plume area with the highest concentrations of chlorinated VOCs located in the southwestern portion of the site.

3. Implementation of a LNAPL recovery system along the southwestern side of the building and the western property boundary.

4. Continued operation of the soil vapor extraction system/sub-slab depressurization to remediate the remaining soil contamination and mitigate the potential for soil vapor intrusion.

5. Continued operation of the components of the remedy until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible

6. To maximize the net environmental benefit, green remediation and sustainability efforts will be considered in the design and implementation of the remedy to the extent practicable, including;

   - encourage low carbon technologies
   - conserve natural resources

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

   (a) requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3).

   (b) allows the highest use and development of the controlled property (subject to local zoning laws) to be

   □ residential use □ restricted residential use X commercial use □ industrial use

   (c) restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or County DOH;

   (d) prohibits agriculture or vegetable gardens on the controlled property;

   (e) requires compliance with the Department approved Site Management Plan;

8. Since the remedy results in contamination remaining at the site that does not allow for unrestricted use, a Site Management Plan is required, which includes the following:

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

      Institutional Controls: The Environmental Easement discussed in Paragraph 7 above.

      Engineering Controls: The LNAPL recovery system and soil vapor extraction/sub-slab depressurization system discussed in Paragraphs 3 and 4 above.

This plan includes, but may not be limited to:

(i) Soil Management Plan which details the provisions for management of future excavations in areas of remaining contamination;

(ii) descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;

(iii) provisions for the management and inspection of the identified engineering controls;

(iv) maintenance of proper cover;

(v) maintaining site access controls and Department notification; and

(vi) the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

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

(i) monitoring of groundwater and soil vapor to assess the performance and effectiveness of the remedy;

(ii) a schedule of monitoring and frequency of submittals to the Department;

(iii) provision to evaluate the potential for vapor intrusion for any buildings developed or changes to the existing building on the site, including provision for mitigation of any impacts identified; and

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

(i) compliance monitoring of treatment systems to assure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;

(ii) maintaining site access controls and Department notification; and

(iii) providing the Department access to the site and O&M records.

## SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- Repositories for documents pertaining to the site were established.
- A public contact list, which included nearby property owners, elected officials, local media and other interested parties, was established.
- A public meeting was held on March 3, 2010 to present and receive comment on the PRAP.
- A responsiveness summary (Appendix A) was prepared to address the comments received during the public comment period for the PRAP.

# APPENDIX A

# RESPONSIVENESS SUMMARY

# Responsiveness Summary

**Crown Dykman**
**State Superfund Project**
**Glen Cove, Nassau County New York**
**Site No. 130054**

The Proposed Remedial Action Plan (PRAP) for the Crown Dykman site, was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on January 20, 2010. The PRAP outlined the remedial measure proposed for the contaminated soil, groundwater, and soil vapor at the Crown Dykman site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on March 3, 2010, which included a presentation of the remedial investigation/ feasibility study (RI/FS) for the Crown Dykman Site as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 10, 2010.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

**COMMENT 1:** Is there any groundwater contamination that has migrated off-site?

**RESPONSE 1:** Yes, volatile organic compounds (VOCs) in the groundwater have migrated approximately 135 feet off-site to the south and the southwest.

**COMMENT 2:** When was the groundwater investigation conducted?

**RESPONSE 2:** The Department completed the RI investigation between 2007 and 2009.

**COMMENT 3:** Has it [groundwater plume] moved since then [the start of the remedial investigation]?

**RESPONSE 3:** The groundwater VOC plume has remained stable. During 2007-2008 temporary dewatering activities at the Li Tungsten Parcel B did result in a deflection of the plume toward the west. Dewatering activities at the Li Tungsten Parcel B ceased in 2008.

**COMMENT 4:** Will the presentation be available on the city's website?

**RESPONSE 4:** The Crown Dykman PRAP presentation was provided to the City of Glen Cove on March 3, 2010 following the public meeting. It is the Department's understanding that the presentation is available on the City's website.

**COMMENT 5:** If we did nothing at this site, what would be the timeframe for this material to naturally breakdown? In terms of scale, how much does this proposed cleanup speed up the breakdown process.

**RESPONSE 5:** While there are inherent uncertainties in such a prediction, if no action is taken, it is anticipated that the plume would persist at concentrations greater than the Class GA Groundwater Standards for approximately 30 to 60 years. If the proposed remedy is implemented, it is anticipated that the Class GA Groundwater Standards would be achieved in approximately 15 to 25 years.

**COMMENT 6:** When will we see the conditions return to an acceptable level (i.e. state standards)?

**RESPONSE 6:** See Response 5.

**COMMENT 7:** Are there any restrictions on this property?

**RESPONSE 7:** As presented in the paragraphs 7 and 8 of Section 8.2 of the ROD, an environmental easement will be placed on the site. The easement will require a site management plan (SMP). The SMP will be developed to: i) address residual contaminated soils that may be excavated from the site during future redevelopment; and require soil characterization and, where applicable, disposal/reuse in accordance with Department regulations; ii) provide long-term groundwater monitoring; iii) provide operation and maintenance of the soil vapor extraction/subslab depressurization system; iv) provide groundwater use restrictions; v) evaluate the potential for vapor intrusion for any future buildings developed on the site, including provision for mitigation of any impacts identified; and vi) identify commercial use restrictions.

**COMMENT 8:** Does the groundwater go into the sewer system?

**RESPONSE 8:** No, the groundwater does enter the sewer system.

**COMMENT 9:** How does this contamination impact animals/fish that live in the vicinity of the site and Glen Cove Creek?

**RESPONSE 9:** A fish and wildlife assessment was conducted as part of the Crown Dykman Feasibility Study. The assessment did not identify any current or potential impacts to ecological resources.

**COMMENT 10:** What is the long-term risk to public health from this site?

**RESPONSE 10:** The site poses no long-term risk to public health because residual soil contamination is covered with either a building or pavement so contact is unlikely; public water serves the area so people do not drink contaminated groundwater; and operation of a soil vapor extraction/subslab depressurization system located within the site building mitigates the potential for soil vapor intrusion to impact indoor air quality.

**COMMENT 11:** What is the geology in this area? The plume looks like it has been pretty much contained?

**RESPONSE 11:** The saturated thickness at the site, where the groundwater contamination is found, is comprised of a course sand and silty sand approximately 25 to 30 feet thick. Beneath this layer of sand is a clay layer that is greater than 20 feet thick. The groundwater gradient is the greatest towards the rear of the property, flattening towards Herb Hill Road.

**COMMENT 12:** Is the State working with the USEPA, who manages the Li Tungsten site, to let them know what you are doing?

**RESPONSE 12:** Yes, the Department has provided the Crown Dykman PRAP and Fact Sheet to the USEPA.

**COMMENT 13:** Because of the clay layers in this area is there some prediction on how well the chemical oxidation process will work?

**RESPONSE 13:** The groundwater contamination at the site is found in the course sand and silty sand layer above the clay. Therefore, the clay should not pose a problem with the chemical oxidation remediation.

**COMMENT 14:** What petroleum products are at this site?

**RESPONSE 14:** The petroleum related compounds detected were ethylbenzene, benzene, toluene, o-xylene, methyl tert-butyl ether, and 1,3,5- and 1,2,4-trimethylbenzene.

**COMMENT 15:** Why did the state have to take over this site?

**RESPONSE 15:** The Site was referred to the State-funded Superfund program when the site owner was no longer willing or able to complete the remedial investigation.

**COMMENT 16:** Consideration of two additional remedial action objectives (RAOs) would be consistent with the future redevelopment of the land on the north side of Glen Cove Creek, particularly land adjacent to the Site.

a. With respect to Public Health, an additional RAO that endeavors to mitigate impacts from soil vapor at off-site land would address any contamination (current or future) that would cause vapor impacts to new structures on adjacent properties if monitoring during remedial action indicates off-site volatile organic compounds (VOCs) in ground water could pose a vapor impact.

b. With respect to Environmental Protection, an additional RAO that seeks to restore (to the extent feasible) groundwater quality in areas off-site where contaminants have already migrated, would be consistent with both Public Health and Environmental Protection goals.

**RESPONSE 16:** Section 6 of the ROD addresses the RAOs for the site.

a. The RAOs presented and considered in the ROD do consider potential impacts to public health from soil vapor intrusion. It should also be noted that the institutional and engineering controls that will be required at the Li Tungsten sites to address volatile organic contamination in the groundwater not related to the Crown Dykman site will mitigate the potential for soil vapor intrusion in any future structures on those parcels.

b. The overall goal presented and considered in the ROD is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy will eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

**COMMENT 17:** The remedial alternatives presented in the PRAP and elements of the proposed remedy contemplate future commercial use of the property. NYSDEC [sic] should be aware that the MW-3 Marine Waterfront 3 District Zoning provides for certain Special Permit uses on the north side of Herb Hill Road (immediately adjacent to the proposed 56-acre mixed use redevelopment) including a portion of a Planned Unit Development (PUD) that is approved by the Planning Board. On potential use under a

PUD, subject to approval by the Planning Board, is residential (multiple dwellings, residences, townhouses and/or mixed use). There, the ROD selected remedial alternative should allow for potential future restricted residential use so long at the intended Site Management Plan (SMP) specifies institutional and engineering controls to ensure the protection of public health and the environment for such a use. This will ensure the provisions of the selected remedy will be adequate and avoid any future need to revisit the ROD through and explanation of significant difference (ESD) or other administrative mechanism if the Site is part of a future PUD that might consider restricted residential use.

**RESPONSE 17:** The Crown Dykman site is currently zoned commercial and houses two viable commercial entities. Conversations with the owner have not indicated that the owner is considering requesting a special permit. If in the future the current structure were to be removed and the remaining contamination addressed, eligibility of the site for other uses would be considered and evaluated by the Department.

**COMMENT 18:** The active elements of the proposed remedy will take place on the Site. The nature and extent of contamination identifies Site ground water [sic] has impacted off-site ground water [sic] in the direction of Glen Cove Creek. Only one of the PRAP alternatives indicates remediation or monitoring of groundwater contamination that is present in off-site areas. Since contaminated groundwater from the Site has been observed beneath off-site properties to the south, the ROD should:

a. Identify what, if any, contingent remedial actions might be needed if off-site monitoring indicates the plume is not naturally attenuating; and

b. Define the scope and duration of groundwater monitoring in off-site areas.

Also, as many of the off-properties are in the planning phase for mixed-use redevelopment, it is our understanding that the proposed remedy for the Site does not impose any restrictions on these adjacent properties. (If this understanding is incorrect, please advise the City as soon as possible).

**RESPONSE 18:** The evaluation of the remedy will be an ongoing process. Effectiveness of the treatment will be monitored on-site and off-site. The groundwater monitoring plan will be developed during the remedial design phase and documented in the Site Management Plan. The final determination of the number of injections needed will be determined based on post-injection groundwater monitoring after the first injection. If the implemented remedy is not effective, the Department will consider other remedial measures.

**COMMENT 19:** The City has worked with the NYSDEC [sic] to prepare SMPs for two properties in the area of the Site that are regulated by State Programs. (One SMP was prepared to enable construction of a Ferry Terminal on the eastern portion of the Captain's Cove State Superfund Site. The second SMP for the remainder of the Captain's Cove Superfund has been submitted to NYSDEC for review and approval and is still in draft form). Since the proposed remedy for the Site anticipates a SMP, the City requests that NYSDEC ensure that its elements for the subject Site correspond to those set forth in the other SMPs applicable in the area. This will facilitate a set of efficient and effective common requirements throughout the area that is eventually to be redeveloped.

**RESPONSE 19:** The Crown Dykman Site Management Plan will be prepared consistent with Department requirements.

**COMMENT 20:** The PRAP identifies two groups of contaminants. These are aromatic, petroleum-type compounds and chlorinated volatile organic compounds (cVOCs). The proposed remedy involves two active remedial components. One is the light non-aqueous phase liquids (LNAPL) removal and the other is in-situ chemical oxidation of cVOCs. Technical consultants working with the City have offered the following questions/comments on the proposed remedy with the objective of ensuring its success in meeting the RAOs in a timeframe that does not impede future redevelopment of the Site or adjacent properties:

a. The two contaminant groups (LNAPL and cVOCs) in ground water [sic] may present a challenge to the success of the recommended remedy for the estimated cost. Has the proposed remedy considered the extent to which the petroleum (LNAPL) will compete aggressively for the oxidant that is aimed at the cVOCs? Competition for any oxidant might impede the performance of the on-site application of in situ [sic] chemical oxidants as well as adversely impact further migration of contaminants to off-site areas.

b. The proposed remedy refers to multiple injections of chemical oxidant. Has the feasibility study considered the use of a slow release chemical oxidant (e.g., ReGenesis 3DME or equivalent) to both minimize the number of required injections and promote the anaerobic conditions that are suitable for degradation of cVOCs?

**RESPONSE 20:** With respect to the above suggestions:

a. The FS evaluated the potential for the LNAPL to complicate chemical oxidation at the site. The objective of the remedy is to begin the LNAPL removal prior to the chemical oxidant injection. It should be noted the areal extent of the LNAPL generally does not overlap with the area where cVOC concentrations are the greatest (near MW-10) or with the larger area proposed for chemical oxidation. Thus the LNAPL would not directly complicate the chemical oxidation. It should also be noted, that groundwater sampling in the area proposed for chemical oxidation does not show widespread presence of petroleum compounds in the groundwater at concentrations greater than Class GA Groundwater Standards. Therefore, in the area of proposed injections, dissolved –phase petroleum compounds are not anticipated to be an issue.

b. The FS assumed that multiple (three) injections of permanganate would be conducted during one year. However, the specific oxidant that will be used at the Crown Dykman site and the required number of injections will be evaluated during the remedial design phase. The final determination of the number of injections needed will be determined based on post-injection groundwater monitoring after the first injection. It should be noted that the injection of other materials, such as ReGenensis 3DME, may also require multiple injections. Because ReGenensis is a new product with a limited body of case studies, the required clean-up time and the ability to achieve objectives is not widely established. In addition, since ReGenensis uses reduction dechlorination to treat the cVOCs, the process would have the potential to increase the concentration of less desirable breakdown intermediates, including vinyl chloride, a carcinogen.

**COMMENT 21:** RXR Glen Isle Partners, LLC (RXRGIP) is in the process of preparing a SMP in concert with the NYSDEC and USEPA that includes installing, operating and maintaining a soil vapor mitigation system in all buildings constructed on Li Tungsten property affected by the groundwater contaminated by CD. The O&M cost of this system is directly related to the time it takes for the contaminants to be removed from the groundwater. Especially the groundwater under the RXRGIP property. The FS doesn't address the cleanup time for any of the alternatives. However, Alternative #2, which aggressively addresses cleanup of the offsite portion of the plume would have quicker results than the chosen alternative. A discussion of the timeframes for each alternative to reach the objectives for the offsite portion of the plume would enable a more representative cost/benefit analysis to be performed.

**RESPONSE 21:** It is our understanding that the current site owner, the City of Glen Cove Redevelopment Agency, is working with the USEPA with regards to implementation of the institutional and engineering controls that will be required by the USEPA to address residual contamination related to past Li Tungsten operations and groundwater contamination. It should be noted, as stated in the Crown Dykman Remedial Investigation, that not all volatile organic contamination detected on the Li Tungsten Parcel A site is related to past operations at the Crown Dykman site. The Crown Dykman ROD only addresses contamination directly related to the Crown Dykman Site.

As stated in Responses 6 it is anticipated that the Class GA Groundwater Standards would be achieved in the area of the plume in approximately 15 to 25 years. However, it should be noted that residual permanganate that is not consumed in the area of the injection would also migrate downgradient with groundwater flow and reduce groundwater VOC contamination beyond the injection radius of influence thereby reducing the length of time needed to achieve Class GA Groundwater Standards.

**COMMENT 22:** The Site Cleanup goals (SCGs) for the CD [Crown Dykman] site are based on a future commercial use at the Crown Dykman Site, as determined by the current zoning. However, the Crown Dykman property is located within the MW-3 zone which may in the future be developed similar to the Glen Isle project and include residential uses. Therefore, the FS [feasibility study] should take into account a future residential use when selecting the remediation goals.

**RESPONSE 22:** See Response to Comment 17.

**COMMENT 23:** The RI/FS confirmed that anaerobic biodegradation is occurring in the saturated zone. This process has already reduced the amount of cVOCs in the groundwater. An alternative that stimulates this naturally-occurring process by injecting chemicals that will accelerate the biodegradation was rejected for what appears to be reasons related to conventional experience with that technology. However, the company that supplies the Regenox$^{TM}$ that was evaluated in the In-Situ Chemical Oxidation (ISCO) alternative in the FS, also supplies a recently-developed product that enhances anaerobic biodegradation without the negative effects experienced in the past (product information and case histories attached). They claim that their product, 3-D Microemulsion (3DMe)$^{TM}$, is a long lasting electron donor substance that has rapid results, maintains its electron donor properties for multiple years as it moves downgradient with the groundwater, and needs fewer injections than ISCO. It appears to satisfy the selection criteria for the chosen alternative, which are to limit the number of injections points to onsite locations and rapidly reduce the contaminant level. In addition, this product also seems to enhance the

offsite biodegradation of the plume and may need fewer injections than the chosen alternative.

**RESPONSE 23:** See Response 20b.

**COMMENT 24:** Although the future monitoring well network, sampling frequency and protocols aren't required to be in the PRAP, any monitoring that will be required in the offsite portion of the plume on Li Tungsten property should be coordinated with the Glen Isle development to make sure the well locations do not interfere with proposed buildings, infrastructure, and other construction. In addition, the parties that will be responsible for sampling and maintaining wells on the RXRGIP property, access issues, and costs should also be part of the discussions.

**RESPONSE 24:** The location of monitoring wells and the frequency of sampling will be determined during the remedial design process. The Department will obtain and/or coordinate access to off-site properties as required. To the extent possible, the Department will attempt to utilize any existing monitoring wells that were installed by the USEPA on the Li Tungsten Parcels.

**COMMENT 25:** Although, the remedy calls for monitoring the natural attenuation of contaminants, we feel that annual or more frequent monitoring schedule should be specified in the remedy to ensure that contaminants do not travel beyond the areas identified in tests conducted in 2009. A specific monitoring schedule should also be required in the site-management [sic] plan that is described under the proposed remedy's environmental easement.

**RESPONSE 25:** The location of monitoring wells and the frequency of sampling will be determined during the remedial design process. The monitoring plan will be included in the Site Management Plan. The requirement to follow the Site Management Plan will be documented in the site's Environmental Easement.

# APPENDIX B

## Administrative Record

# Administrative Record

**Crown Dykman**
**State Superfund Project}**
**Glen Cove, Nassau County New York**
**Site No. 130054**

*Proposed Remedial Action Plan for the Crown Dykman site*, dated January 2010 prepared by the Department.

Referral Memorandum dated July 19, 2006 for the completion of Remedial Investigation, completion of the Interim Remedial Measures, and the Development of a Feasibility Study.

1. "Remedial Investigation/Feasibility Study Work Plan", October 1996, Prepared by EEA, Inc.

2. "Results of Remedial Investigation", October 1997, Prepared by EEA Inc.

3. "Supplemental Investigation and Interim Remedial Measures Work Plan", June 2004, Prepared by Walden Associates.

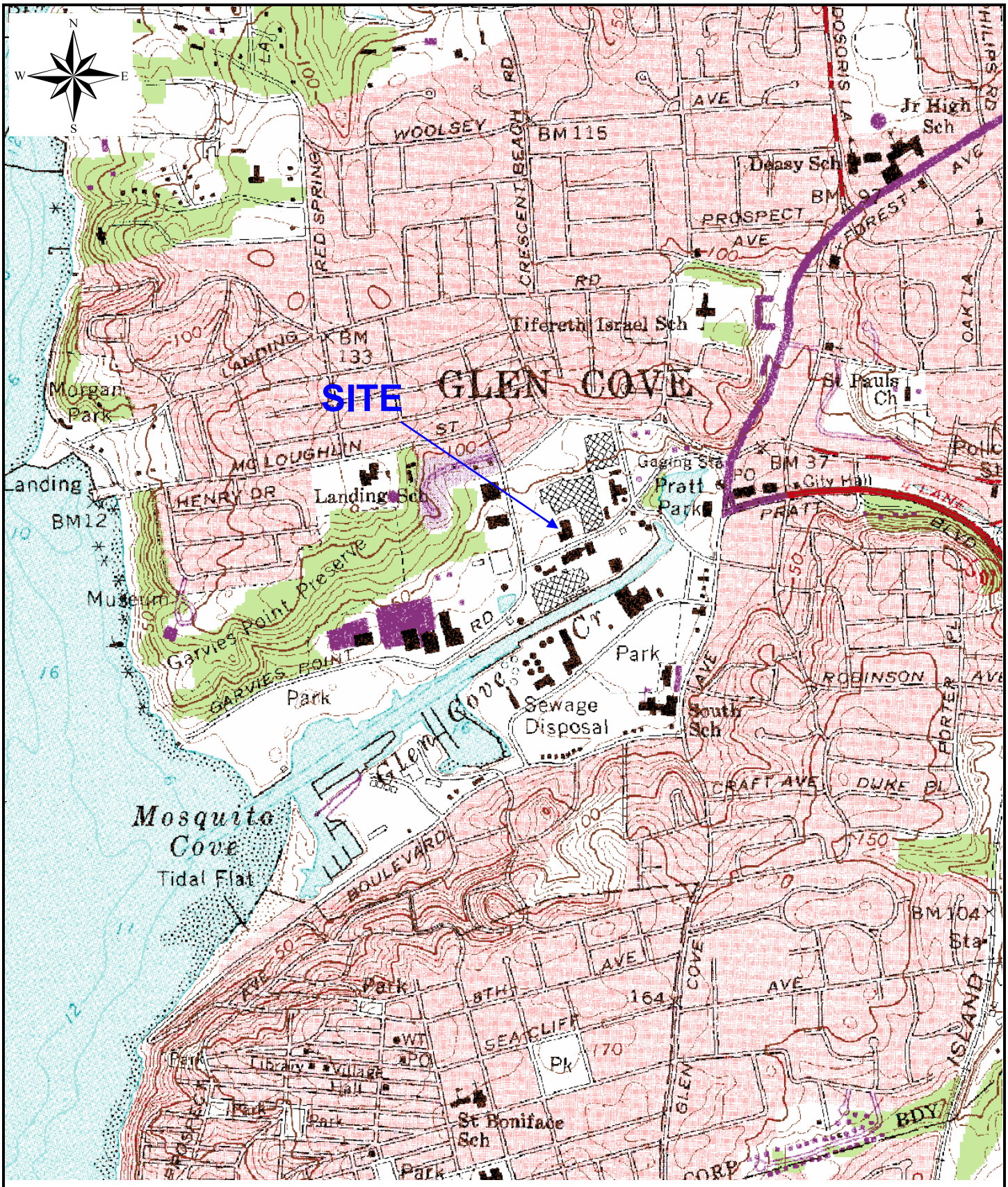
4. "Onsite Source Removal IRM Report", May 2005, Prepared by Walden Associates

5. "Proposed Project Management Work Plan", March 2007, Prepared by Malcolm Pirnie, Inc.

6. "Crown Dykman Remedial Investigation Report", December 2009, Prepared by Malcolm Pirnie Inc.

7. "Crown Dykman Feasibility Report", December 2009, Prepared by Malcolm Pirnie Inc.

8. "Crown Dykman Proposed Remedial Action Plan", January 2010, Prepared by NYSDEC




0 295 590 1,180 1,770 2,360

SCALE IN FEET

MALCOLM PIRNIE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FEASIBILITY STUDY - CROWN DYKMAN (SITE # 1-30-054)
GLEN COVE, NEW YORK

**SITE LOCATION**

**NOVEMBER 2006**

**FIGURE 1**

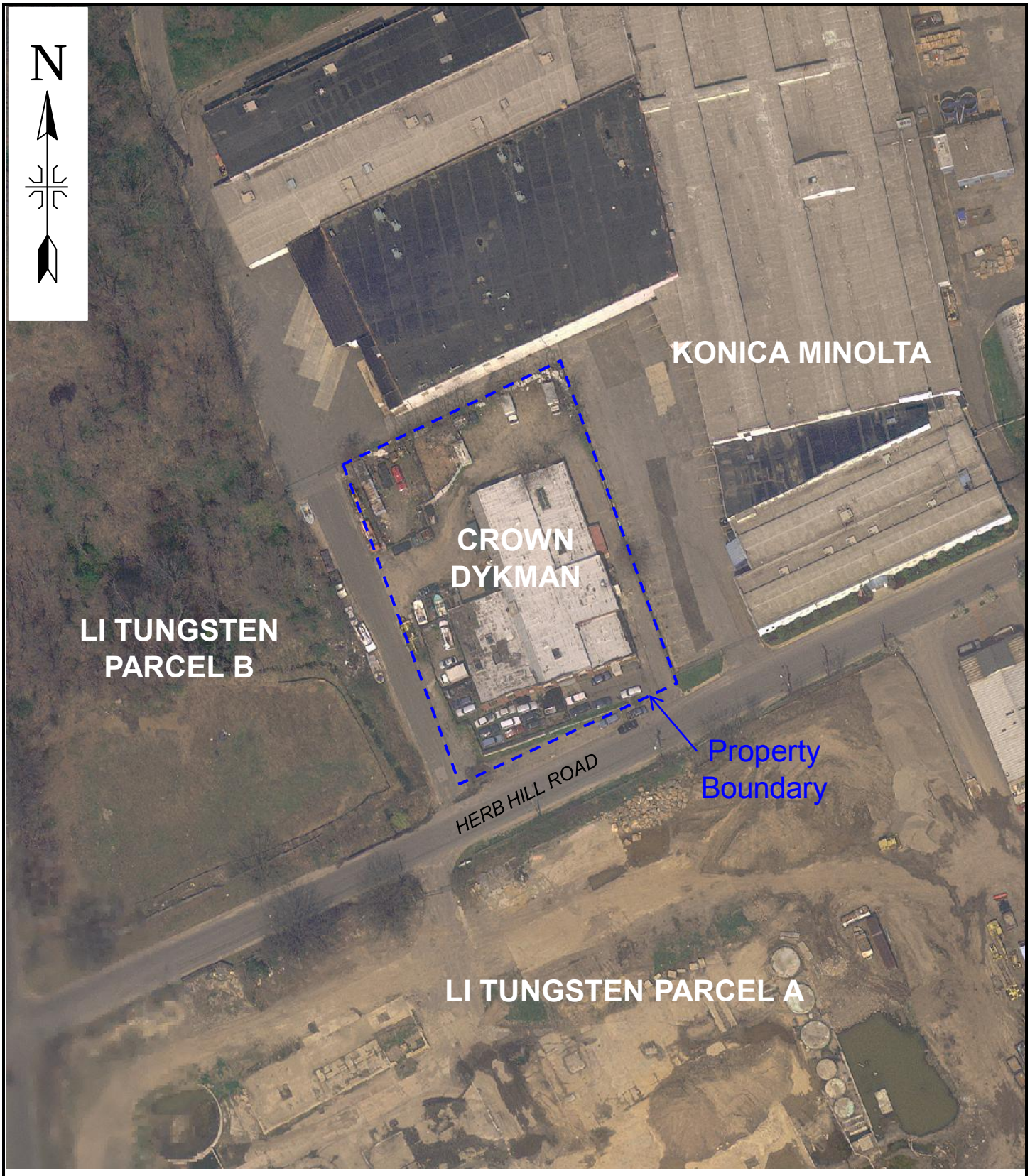



IMAGE SOURCE: NYS OCSCIC. *Nassau County 12-inch Resolution Natural Color Orthoimagery* [image]. August 2001. State Plane Coordinate System 1983 (NAD83). NYS Digital Orthoimagery Program. NYS GIS Clearinghouse http://www.nysgis.state.ny.us/ (6 Sept. 2006)

0 50 100 200

SCALE IN FEET

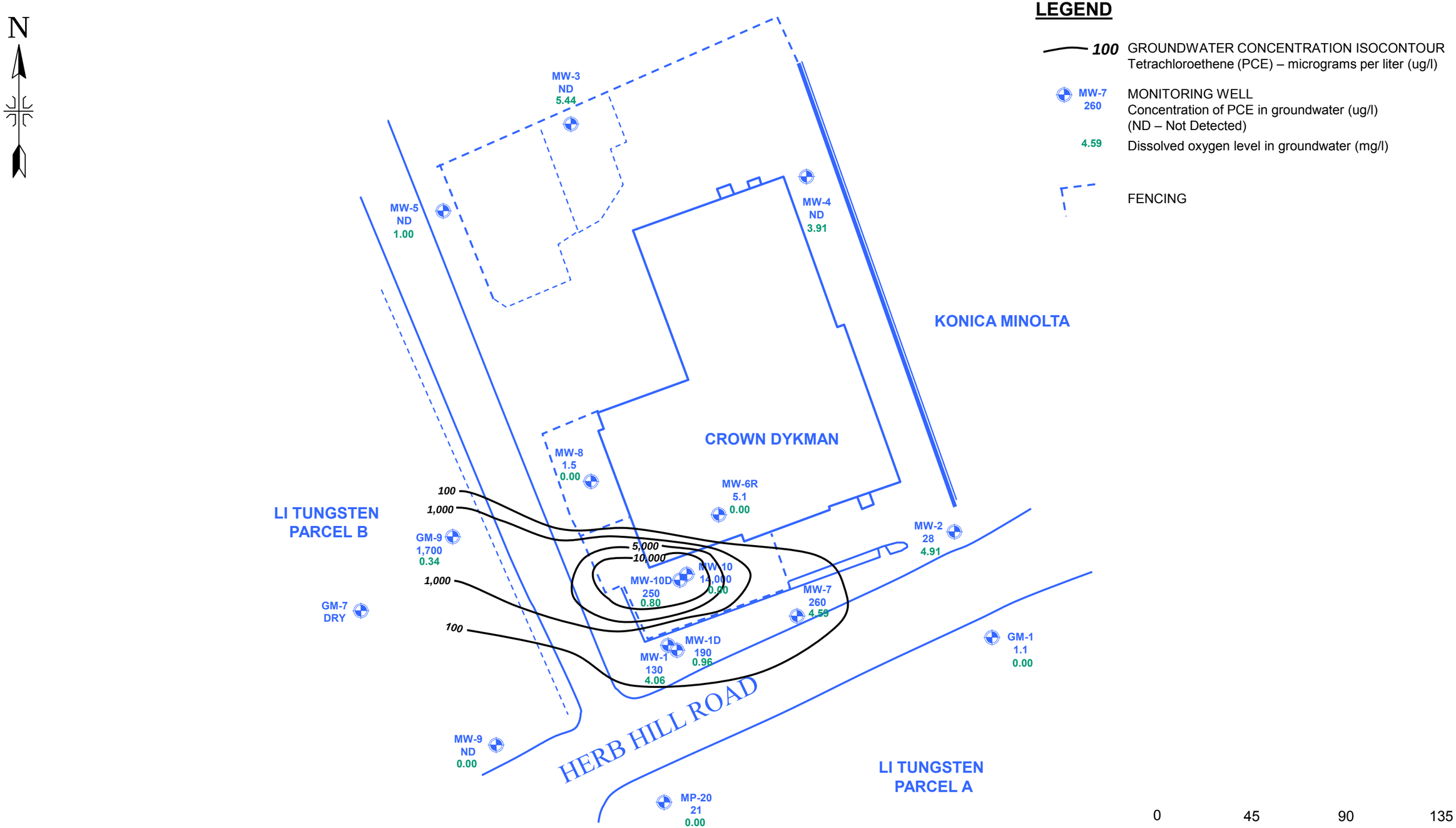
MALCOLM PIRNIE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
REMEDIAL INVESTIGATION - CROWN DYKMAN (SITE # 1-30-054)
GLEN COVE, NEW YORK

**SITE OVERVIEW AND ADJACENT PROPERTIES**

**OCTOBER 2009**

**FIGURE 2**




MALCOLM PIRNIE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
REMEDIAL INVESTIGATION - CROWN DYKMAN (SITE # 1-30-054)
GLEN COVE, NEW YORK

**CONCENTRATION OF TETRACHLOROETHENE (PCE) IN GROUNDWATER SAMPLES (SEPTEMBER 2008)**

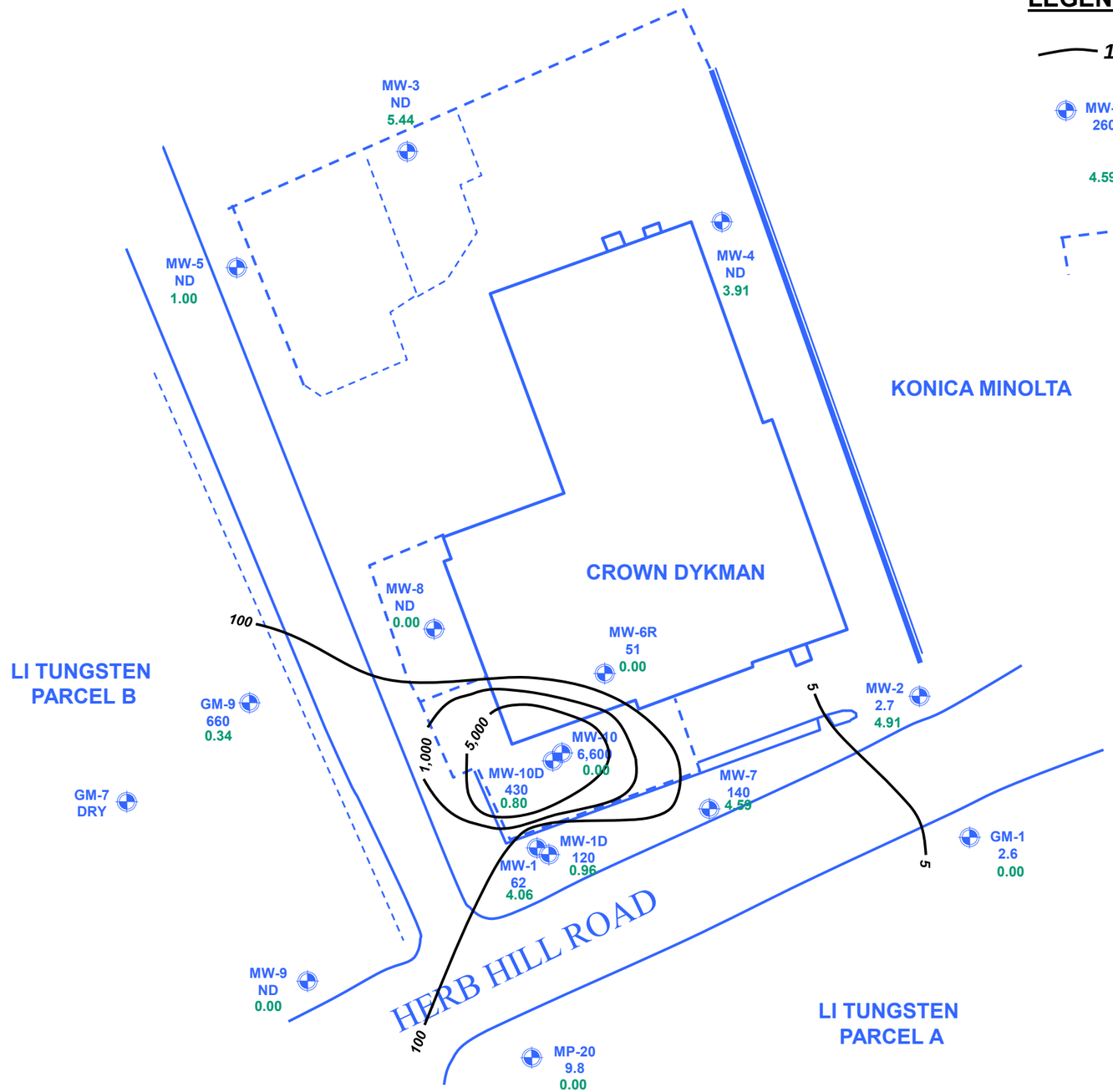
**OCTOBER 2009**

**FIGURE 3**

N

## LEGEND

- 100 — GROUNDWATER CONCENTRATION ISOCONTOUR
  Trichloroethene (TCE) – micrograms per liter (ug/l)
- MW-7 / 260 — MONITORING WELL
  Concentration of TCE in groundwater (ug/l)
  (ND – Not Detected)
- 4.59 — Dissolved oxygen level in groundwater (mg/l)
- FENCING




0 45 90 135

APPROXIMATE SCALE IN FEET

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REMEDIAL INVESTIGATION - CROWN DYKMAN (SITE # 1-30-054)
GLEN COVE, NEW YORK

**CONCENTRATION OF TRICHLOROETHENE (TCE) IN GROUNDWATER SAMPLES (SEPTEMBER 2008)**

**OCTOBER 2009**

**FIGURE 4**

N

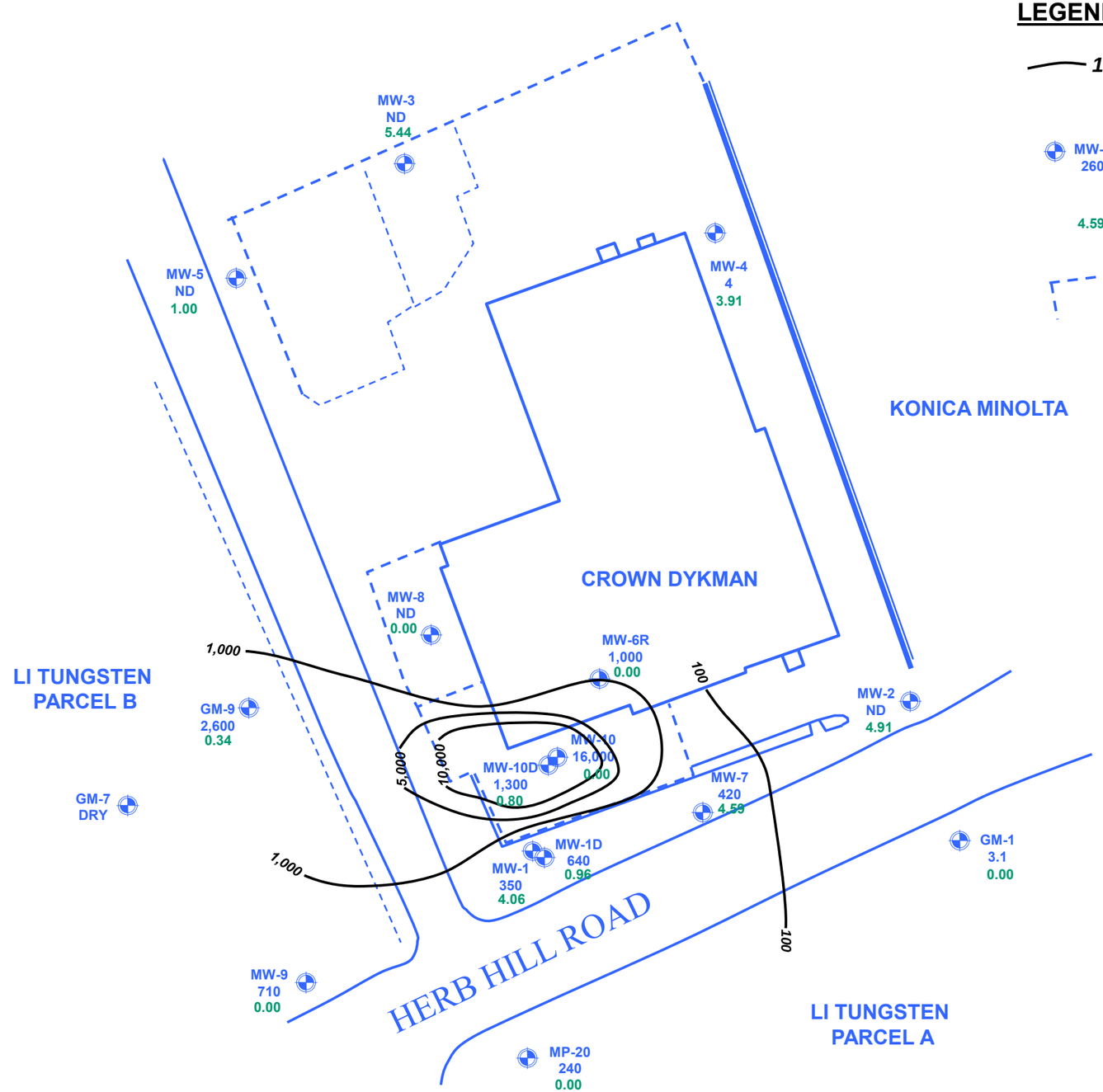
## LEGEND

100 — GROUNDWATER CONCENTRATION ISOCONTOUR
Cis-1,2-Dichloroethene (cis-1,2-DCE) – micrograms per liter (ug/l)

MW-7
260 — MONITORING WELL
Concentration of cis-1,2-DCE in groundwater (ug/l)
(ND – Not Detected)

4.59 — Dissolved oxygen level in groundwater (mg/l)

FENCING




0 45 90 135

APPROXIMATE SCALE IN FEET

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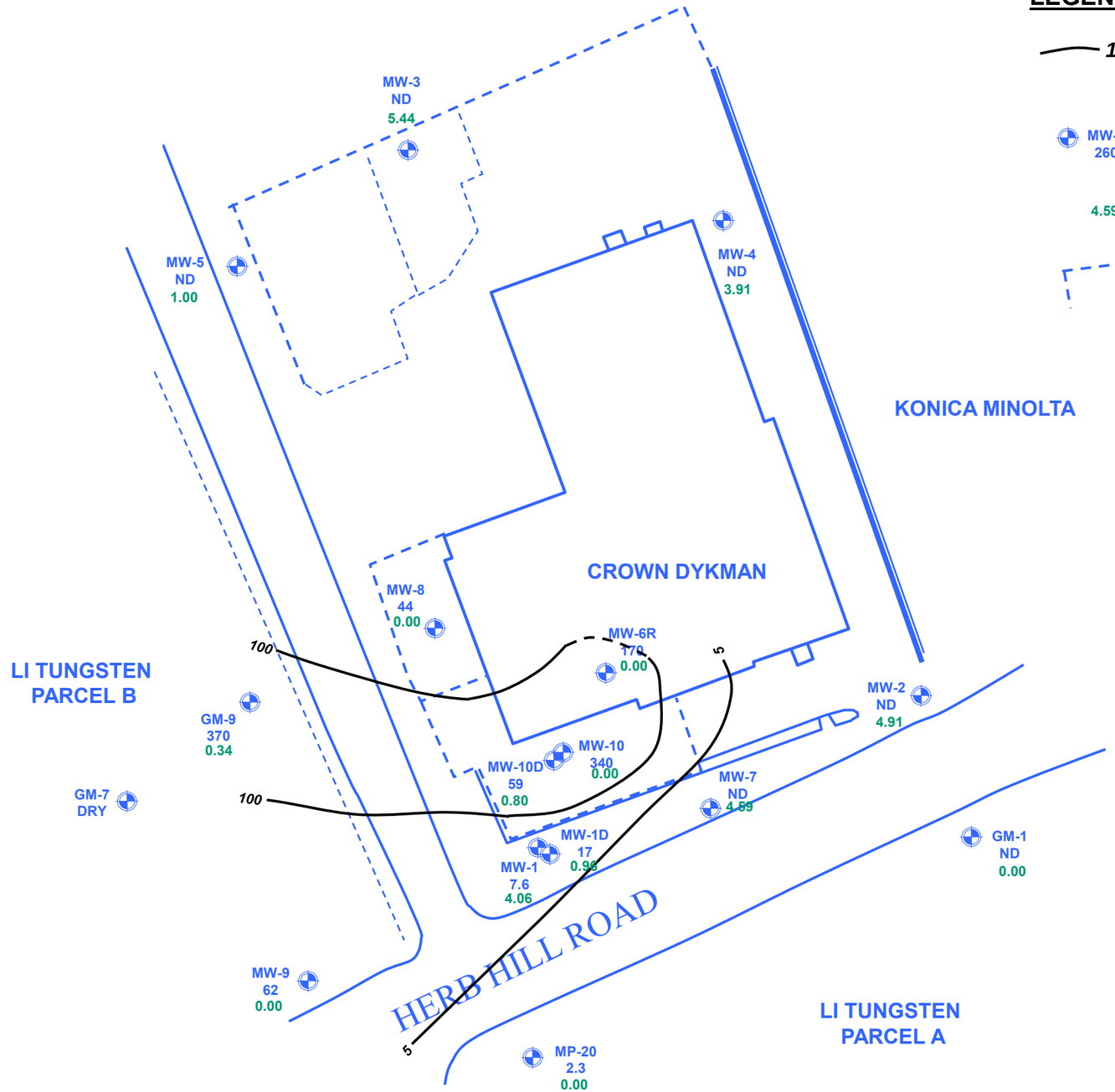
GLEN COVE, NEW YORK

**CONCENTRATION OF cis-1,2-DICHLOROETHENE (cis-1,2-DCE) IN GROUNDWATER SAMPLES (SEPTEMBER 2008)**

**OCTOBER 2009**

**FIGURE 5**

N




## LEGEND

- ***100*** GROUNDWATER CONCENTRATION ISOCONTOUR
  Vinyl Chloride – micrograms per liter (ug/l)
  (Dashed where inferred)
- MW-7 / 260 MONITORING WELL
  Concentration of Vinyl Chloride in groundwater (ug/l)
  (ND – Not Detected)
- 4.59 Dissolved oxygen level in groundwater (mg/l)
- FENCING

0 45 90 135

APPROXIMATE SCALE IN FEET

MALCOLM PIRNIE

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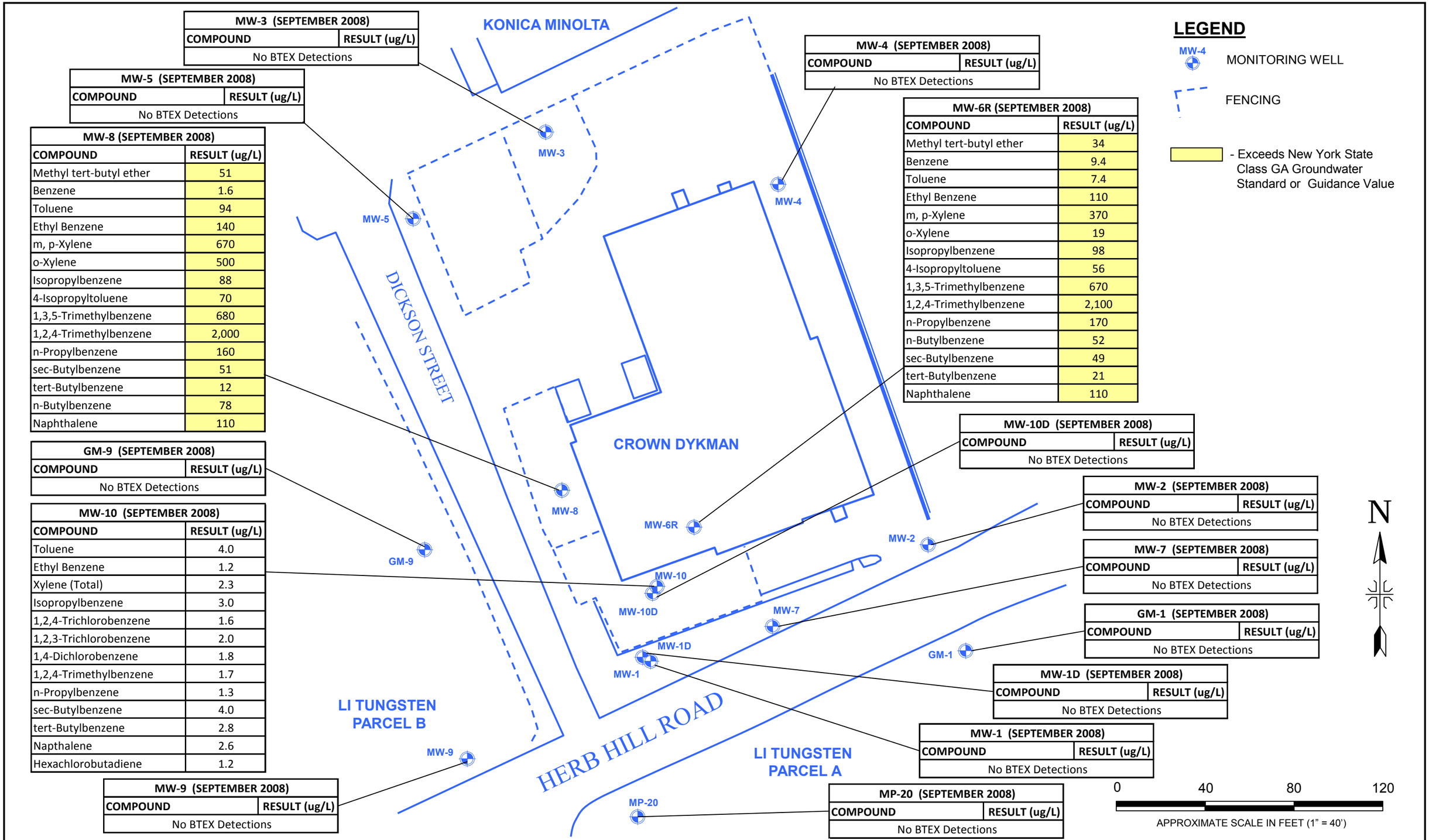
REMEDIAL INVESTIGATION - CROWN DYKMAN (SITE # 1-30-054)
GLEN COVE, NEW YORK

**CONCENTRATION OF VINYL CHLORIDE IN GROUNDWATER SAMPLES (SEPTEMBER 2008)**

**OCTOBER 2009**

**FIGURE 6**




**MW-3 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-5 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-8 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| Methyl tert-butyl ether | 51 |
| Benzene | 1.6 |
| Toluene | 94 |
| Ethyl Benzene | 140 |
| m, p-Xylene | 670 |
| o-Xylene | 500 |
| Isopropylbenzene | 88 |
| 4-Isopropyltoluene | 70 |
| 1,3,5-Trimethylbenzene | 680 |
| 1,2,4-Trimethylbenzene | 2,000 |
| n-Propylbenzene | 160 |
| sec-Butylbenzene | 51 |
| tert-Butylbenzene | 12 |
| n-Butylbenzene | 78 |
| Naphthalene | 110 |

**GM-9 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-10 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| Toluene | 4.0 |
| Ethyl Benzene | 1.2 |
| Xylene (Total) | 2.3 |
| Isopropylbenzene | 3.0 |
| 1,2,4-Trichlorobenzene | 1.6 |
| 1,2,3-Trichlorobenzene | 2.0 |
| 1,4-Dichlorobenzene | 1.8 |
| 1,2,4-Trimethylbenzene | 1.7 |
| n-Propylbenzene | 1.3 |
| sec-Butylbenzene | 4.0 |
| tert-Butylbenzene | 2.8 |
| Napthalene | 2.6 |
| Hexachlorobutadiene | 1.2 |

**MW-9 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-4 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-6R (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| Methyl tert-butyl ether | 34 |
| Benzene | 9.4 |
| Toluene | 7.4 |
| Ethyl Benzene | 110 |
| m, p-Xylene | 370 |
| o-Xylene | 19 |
| Isopropylbenzene | 98 |
| 4-Isopropyltoluene | 56 |
| 1,3,5-Trimethylbenzene | 670 |
| 1,2,4-Trimethylbenzene | 2,100 |
| n-Propylbenzene | 170 |
| n-Butylbenzene | 52 |
| sec-Butylbenzene | 49 |
| tert-Butylbenzene | 21 |
| Naphthalene | 110 |

**MW-10D (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-2 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-7 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**GM-1 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-1D (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MW-1 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

**MP-20 (SEPTEMBER 2008)**

| COMPOUND | RESULT (ug/L) |
|---|---|
| No BTEX Detections | |

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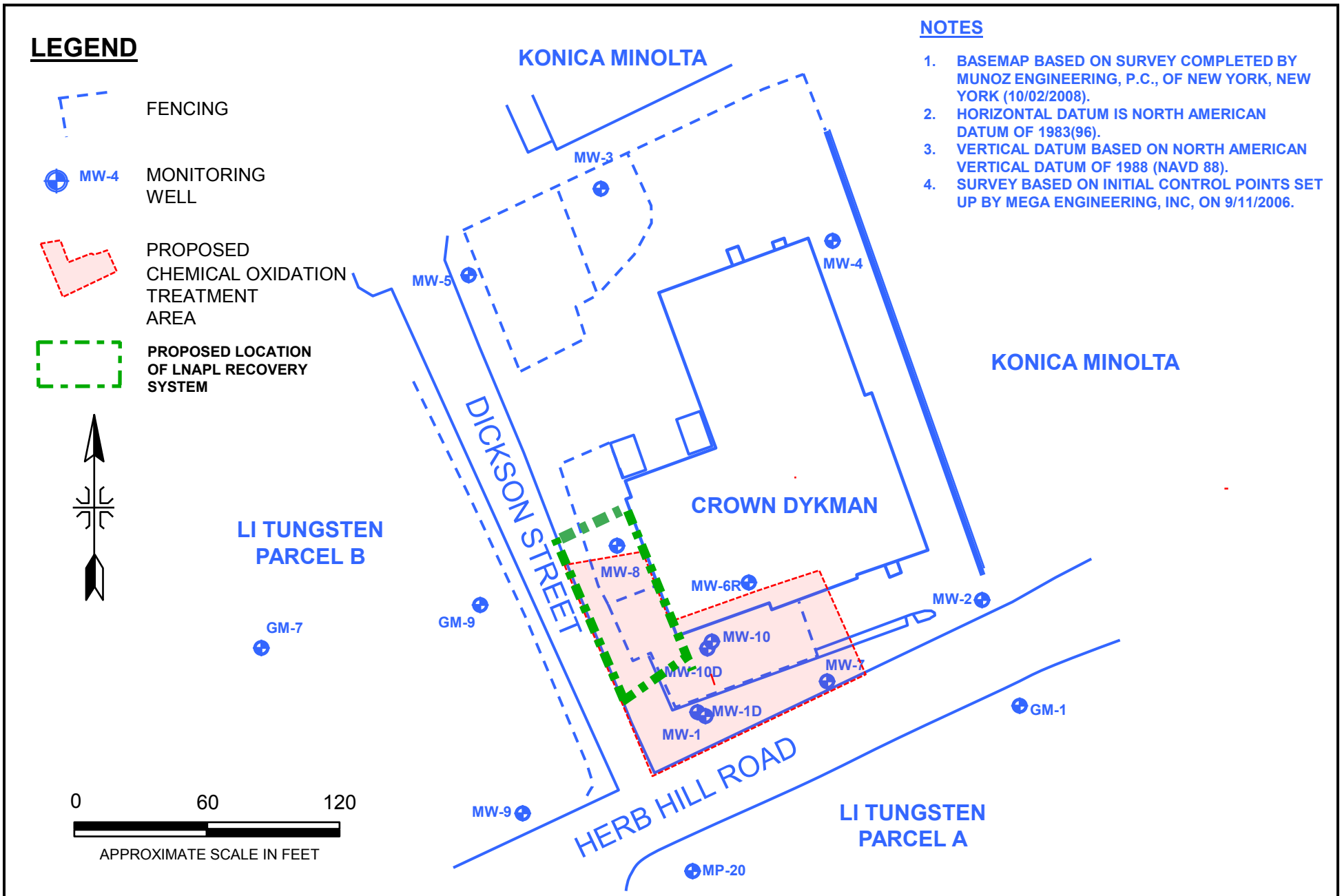
**SUMMARY OF NON-CHLORINATED VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER SAMPLES (SEPTEMBER 2008)**

**OCTOBER 2009**

**FIGURE 7**

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MALCOLM PIRNIE

FEASIBILITY STUDY
CROWN DYKMAN (SITE # 1-30-054)
GLEN COVE, NEW YORK

**PROPOSED SOURCE AREA IN-SITU CHEMICAL OXIDATION AREA (ALTERNATIVE 3)**

JUNE 2009

FIGURE 8