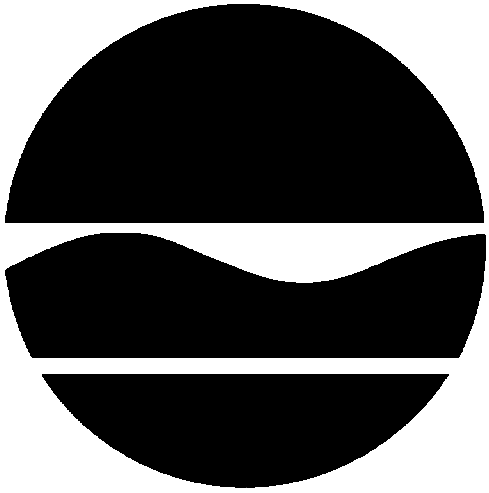
PROPOSED REMEDIAL ACTION PLAN
CARRIAGE CLEANERS - BRIGHTON
Town of Brighton, Monroe County, New York
Site No. 8-28-120

February 2008



Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Carriage Cleaners Site. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, past operations as a dry cleaning establishment have resulted in the disposal of hazardous wastes, including volatile organic compounds (VOCs). These wastes have contaminated the soil, groundwater, and soil vapor at the site, and have resulted in:

- a significant threat to human health associated with current and potential exposure to soil, groundwater, and soil vapor; and
- a significant environmental threat associated with the current and potential impacts of contaminants to soil, groundwater, and soil vapor.

To eliminate or mitigate these threats, the Department proposes to excavate and remove contaminated soil from the site and to treat residual soil and groundwater contamination with the installation and operation of an on-site soil vapor extraction system and groundwater extraction system along with the continued operation of the existing off-site sub-slab depressurization systems and periodic vapor intrusion monitoring.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially 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.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the January 2007 Remedial Investigation (RI) Report, Remedial Investigation/Feasibility Study - Carriage Cleaners Site, the September 2007 Feasibility Study (FS) Report, and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Brighton Memorial Library
2300 Elmwood Avenue
Brighton, N.Y. 14618
(585) 784-5300

By appointment only:
Jason Pelton, Project Manager
NYSDEC Central Office
625 Broadway
Albany, New York 12233-7013
(518) 402-9814
(888) 459-8667

Lisa Silvestri, Citizen Participation Specialist
NYSDEC Region 8 Office
6274 E. Avon-Lima Road
Avon, New York 14414
(585) 226-5350

Project information can also be obtained from the project specific website at the following address:

Carriage Cleaners Website: http://www.dec.ny.gov/chemical/8666.html

The Department seeks input from the community on all PRAPs. A public comment period has been set from March 1, 2008 to March 31, 2008 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for March 13, 2008 at the Town of Brighton Town Hall Auditorium beginning at 7:00 P.M.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Jason Pelton at the above address through March 31, 2008.

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

Carriage Cleaners is an active dry cleaning business located at 2101 Monroe Avenue in the Town of Brighton, Monroe County, New York (Figure 1). The Site is located on an approximate 0.35 acre parcel along the intersection of Brooklawn Drive and Monroe Avenue (New York State Route 31) and is situated on a commercially zoned parcel within a densely populated mixed commercial/residential area. Carriage Cleaners has been the owner/operator over the past 15 years; however, the site has apparently operated as a dry cleaning establishment for more than 25 years. The site is adjacent to a petroleum spill (Spill Number 0306131) that occurred at a former Newcomb Oil/Citgo Gasoline Station located at 2087 Monroe Avenue and within approximately 300 feet of a Class 2 Inactive Hazardous Waste Disposal Site (HW ID No. 8-28-128) identified as the Former Speedy's Cleaners site at 2150 Monroe Avenue. A reference map showing key property locations and roadways discussed in this PRAP is provided as Figure 2.

The geology beneath and near the Carriage Cleaners Site directly influences the distribution and ability for contaminants to migrate from the site. Site geology consists of a thin veneer of sandy glacial till (overburden beneath the site) comprised of loose to dense, fine and medium sand with some silt and gravel overlying a medium dark gray dolomite (bedrock beneath the site) of the Lockport Group. The thickness of overburden ranges from approximately 3 feet to 15 feet. Based on data collected as part of

the RI, three zones can be distinguished within the bedrock unit. These include a weathered bedrock zone immediately below the till deposit ranging from 1 to 3 feet in thickness, a shallow fractured bedrock zone with a thickness of approximately 6 to 15 feet, and a more competent intermediate bedrock zone where fracture frequency decreases with depth. The data suggests that there is a hydraulic connection/communication between the overburden and the shallow bedrock groundwater systems.

The site investigation data suggest that the top of the bedrock surface is highly irregular and exhibits an undulating erosional surface. The presence of a bedrock trough north of the Carriage Cleaners Site, with an approximate northwest to southeast orientation, and a bedrock high northeast of the Former Speedy's Cleaners Site (Figure 2) appears to influence the local groundwater flow direction. The depth to groundwater ranges from approximately 6 feet to 10 feet below grade. In general, groundwater flow is to the northeast, but as previously mentioned, the bedrock surface appears to influence the overall flow of off-site groundwater. A map illustrating the local groundwater flow direction has been included as Figure 3.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site contains a commercial building and has reportedly operated as a dry cleaner for over 25 years. A Town of Brighton sewer inspection suggests that the property may have operated as a dry cleaner in 1959. Town of Brighton records also indicate that the property operated as a beauty parlor in 1963 and then again as a dry cleaner (One Hour Martinizing) in 1975. The current property use as Carriage Cleaners has occurred for over 15 years. Carriage Cleaners currently uses both tetrachloroethene (PCE) and petroleum based dry cleaning solvents in its daily operations.

Data collected as part of the RI suggest that PCE disposal may have occurred at multiple locations at the Carriage Cleaners site. Specifically, a sewer system evaluation adjacent to the west-side of the building documented a failed section of the storm sewer and the presence of PCE contamination in soil near the storm sewer at a concentration of 48 parts per million (ppm). Additional PCE disposal appears to have occurred in a narrow alleyway between the site building and an adjacent residential property (2111 Monroe Avenue). The alleyway currently contains an abandoned 275 gallon above ground storage tank (AST) historically used to store PCE, 55 gallon and 30 gallon drums used to store PCE and a rear entrance/exit to the site building. Soil samples collected from two separate areas within the alleyway contained PCE at concentrations of 1.3 and 1.5 ppm. Data collected during the RI did not provide information on when and for what duration PCE disposal actually occurred at the site. The data does generally show that PCE handling practices over a period of more than 25 years has contributed to the on-site PCE contamination.

3.2: Remedial History

In 2004, the Department listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. 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.

During a series of investigations related to a petroleum spill at the former Newcomb Oil/Citgo Gasoline Station (Figure 2) at 2087 Monroe Avenue, chlorinated solvents were detected in groundwater samples collected downgradient of the Carriage Cleaners Site. The most prevalent chlorinated compound detected was tetrachloroethene (PCE) which is commonly associated with dry cleaning operations. Specifically, the highest PCE concentrations (710 parts per billion (ppb)) were detected in a groundwater sample collected from a shallow bedrock groundwater monitoring well located along the north-side of the Carriage Cleaners property. Given the proximity to the former Newcomb Oil/Citgo

Gasoline Station and the presence of a contaminant (PCE) commonly used in the dry cleaning industry, the Carriage Cleaners property was implicated as the suspected source of chlorinated solvents detected in groundwater.

The owner of Carriage Cleaners subsequently completed a limited Phase II Environmental Site Assessment (Phase II ESA) in 2004. The results of the site assessment reportedly did not identify a source for the PCE, but did indicate that soil and groundwater at the Carriage Cleaners property were contaminated with PCE. The site assessment report concluded that possible breaks in the storm and sanitary sewer lines may represent a potential source for the PCE contamination. During the site assessment, the highest concentration (34.5 ppm) of PCE in soil was detected in a soil boring advanced adjacent to the underground sewer lines servicing the west-side of the Carriage Cleaners building. In groundwater, PCE was detected at a maximum concentration (4,380 ppb) in an overburden monitoring well located near the PCE AST in the alleyway that separates the Carriage Cleaners building from the adjacent residential building located at 2111 Monroe Avenue.

In addition to on-site investigation activities, the Department completed an off-site vapor intrusion program in January of 2004. A total of six vapor intrusion sample sets (sub-slab, indoor air, and ambient air samples) were collected at four residential properties. Three vapor intrusion sample sets were collected at one large apartment complex on Monroe Avenue. Based on this off-site vapor intrusion sampling one basement/crawlspace ventilation system and four sub-slab depressurization systems were installed as part of an interim remedial measure in February 2004.

The data collected as part of these investigation activities led to the listing of the Site as a Class 2 Inactive Hazardous Waste Disposal site in June 2004, the subsequent completion of the Carriage Cleaners RI/FS, and the development of this PRAP.

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 for the site, documented to date, include: M.I.J. Enterprises, Inc.

The PRPs declined to implement the RI/FS at the site 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.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted 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 RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between March 2005 and November 2007. The field activities and findings of the investigation are described in the RI report.

The RI included the following activities:

- environmental samples were collected from the following media and submitted for laboratory analysis: soil vapor, subsurface soil, indoor air, and groundwater;
- ten (10) groundwater monitoring wells were installed;
- evaluation and subsequent repair of an underground storm sewer utility; and
- permeability testing of the newly installed monitoring wells.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil, groundwater, and indoor air contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the Department's Cleanup Objectives ("Technical and Administrative Guidance Memorandum [TAGM] 4046; Determination of Soil Cleanup Objectives and Cleanup Levels.") and 6 NYCRR Subpart 375-6 - Remedial Program Soil Cleanup Objectives.

- Concentrations of VOCs in air were evaluated using the air guidelines provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006. Specifically, the sub-slab and indoor air data were compared to Soil Vapor/Indoor Air Matrix 1 for TCE, carbon tetrachloride, and vinyl chloride and Soil Vapor/Indoor Air Matrix 2 for PCE, 1,1-dichloroethene, cis-1,2-DCE, and 1,1,1-trichloroethane.

- Concentrations of VOCs in air were compared to typical background levels of VOCs in indoor and outdoor air using the background levels provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006. The background levels are not SCGs and are used only as a general tool to assist in data evaluation.

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 which is available at the document repositories.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the RI report, soil, groundwater and soil vapor samples were collected to characterize the nature and extent of contamination. As illustrated in Figures 4, 5, and 6 and summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs). The primary contaminant of concern at the site is PCE, a volatile organic compound, that was used at the site for dry cleaning operations. PCE breakdown products, including TCE, DCE, and vinyl chloride, along with gasoline related VOCs associated with the petroleum spill at the former Newcomb Oil/Citgo Gasoline Station (Spill No. 0306131) were also detected in samples collected as part of the RI. For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for soil. Air samples are reported in micrograms per cubic meter ($\mu g/m^3$).

Figures 4, 5, and 6 and Table 1 summarize the degree of contamination for the contaminants of concern in soil and groundwater and compare the data with the SCGs for the site. Figure 7 illustrates the vapor intrusion sampling locations and the locations where sub-slab depressurization systems are operating to prevent vapor intrusion. The following are the media which were investigated and a summary of the findings of the investigation.

Surface Soil

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

Subsurface Soil

Subsurface soil samples collected during the Phase II Environmental Site Assessment for Carriage Cleaners in 2004 documented the presence of PCE in site subsurface soil. Subsurface soil sampling completed during the Carriage Cleaners RI expanded on this initial sampling. During the RI, a total of 18 soil samples were collected from 18 soil borings installed adjacent to the site building to locate previously unidentified source areas and to better understand the relationship between the storm sewer utility and site contamination. The results from these samples document PCE in site soil at concentrations ranging from 0.008 ppm to 48 ppm and above the SCG of 1.3 ppm for unrestricted use.

During the Carriage Cleaners RI, the highest concentration of PCE (48 ppm) was detected in a soil sample collected from a depth of 12 to 14 feet below ground surface near the storm sewer utility (SB-DEC-7 on Figure 4). Two soil samples collected at a depth of 8 to 10 feet below ground surface from the alleyway where a PCE above ground storage tank, a backdoor to the facility, and drums are stored contained PCE at concentrations of 1.6 ppm and 1.3 ppm from SB-DEC-9 and SB-DEC-29 respectively (Figure 4). Figure 4 illustrates the RI soil sampling locations with corresponding PCE concentrations (concentrations in ppm) and Table 1 includes a summary of the soil samples obtained during the RI. PCE was detected in three (3) site soil samples at concentrations at or above the unrestricted use SCG. Although additional VOCs were detected in soil samples collected at the Carriage Cleaners Site, these VOCs were not detected in site soil at concentrations exceeding the unrestricted use SCGs.

In addition to the 18 subsurface soil samples being collected for VOC laboratory analysis from the Carriage Cleaners Site, a total of three (3) soil samples were additionally analyzed for semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, and inorganic compounds. Based on this sampling and as summarized in Table 1, no SVOCs or PCBs were detected above their respective SCGs in these soil samples. Iron was detected in three (3) and zinc was detected in two (2) of the soil samples at concentrations slightly above the respective SCGs. One pesticide, 4,4'-DDT, was detected in two (2) of the subsurface soil samples at concentrations of 0.0045 ppm and 0.0037 ppm and slightly above the SCG of 0.0033 ppm.

The subsurface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Groundwater

During the RI, groundwater samples were collected from a network of existing monitoring wells installed as part of the former Newcomb Oil/Citgo Gasoline Station spill investigation and from monitoring wells installed as part of the Carriage Cleaners RI during three separate sampling events (July 2005, December 2005, and November 2007).

Figures 5 and 6 illustrate the groundwater sampling results for the July 2005 and December 2005 sampling events respectively. As described in Section 2.0, the monitoring wells are categorized to assess groundwater quality in the overburden, shallow bedrock interface, and the intermediate bedrock.

The following discussion on the nature and extent of groundwater contamination has been divided according to these three categories. It should be noted, and as previously mentioned, that there is an apparent hydraulic connection between the upper two zones (overburden wells and shallow bedrock interface wells) and even some hydraulic connection with the intermediate bedrock at the Carriage Cleaners site.

1) Overburden wells screened in silt and sand, and the top of the underlying till and include MW-1, MW-2, MW-3, MW4, MW-5, and MW-206S on Figures 5 and 6. The overburden wells were installed to depths of approximately 10 to 12 feet below ground surface (bgs).

2) Shallow bedrock interface wells screened in the top of till, weathered bedrock zone, and the upper portion of the underlying fractured bedrock and include HA-104, HA-107 HA-108, HA-109, HA-111, HA-112, HA-113, HA-114, HA-115, HA-117, HA-118, HA-119, HA-122, HA-123, DEC Well, MW-201, MW-202, MW-203S, MW-204S, MW-205S, MW-207S, MW-208S, and MW-209S on Figures 5 and 6. The shallow bedrock interface wells were installed to depths of approximately 15 to 20 feet bgs.

3) Intermediate bedrock wells screened in a slightly more competent and deeper bedrock zone immediately below the upper fractured bedrock zone and include MW-104I, MW-111I, and MW-202I on Figures 5 and 6. The intermediate bedrock wells were installed to depths of approximately 30 to 50 feet bgs.

Overburden Groundwater

Since the occurrence of groundwater in the overburden system is discontinuous, only six (6) wells are constructed in the overburden unit; five (5) of which are located on the Carriage Cleaners property and installed as part of the Carriage Cleaners Phase II ESA (Labella Associates, P.C., July 2005). PCE was the chlorinated volatile organic compound (CVOC) detected at the highest concentration (7,100 ppb in MW-1) and well above the SCG of 5 ppb. As shown in Figures 5 and 6, monitoring well MW-1 is located in the alleyway and near the PCE AST on the Carriage Cleaners property. PCE, along with cis-1,2-Dichloroethene (cis-1,2-DCE) were also detected above the SCG of 5 ppb in monitoring well MW-3. MW-3 is located along the west-side of the Carriage Cleaners building, east of Brooklawn Drive, and in close proximity to the underground sewer utilities servicing the site building. Several gasoline range VOCs were detected in MW-3 above the respective SCGs. These petroleum contaminants are associated with the petroleum spill at the former Newcomb Oil/Citgo Gasoline Station and are being addressed under NYSDEC Petroleum Spill No. 0306131. Based on the discontinuous occurrence of groundwater in the overburden and the presence of CVOCs in only two (2) monitoring wells, the extent of groundwater contamination in the overburden is restricted to the Carriage Cleaners property.

Shallow Bedrock Interface Groundwater

As summarized in Table 1, PCE, TCE, cis-1,2-DCE, and vinyl chloride were detected at concentrations exceeding their respective SCGs in 13 of the shallow bedrock interface groundwater monitoring wells. PCE was detected above the SCG of 5 ppb, at concentrations ranging from 6 ppb at MW-203S and 1,500 ppb at MW-202. Monitoring well MW-202 is located approximately 40 ft downgradient of the former Speedy's Cleaners property (NYSDEC Site 8-28-128 and shown on Figures 5 and 6). TCE was detected in four (4) monitoring wells at concentrations above the SCG of 5 ppb at concentrations ranging from 7.6 ppb at HA-114 to 25 ppb at MW-202. Cis-1,2-DCE was detected above the SCG of 5 ppb in 11 monitoring wells at concentrations ranging from 6.2 ppb in HA-123 to 160 ppb at HA-119. Vinyl chloride was detected within three (3) shallow bedrock interface wells at concentrations above the SCG of 2 ppb at concentrations between 10 ppb at MW-204S and 110 ppb at HA-115.

Similar to the overburden groundwater sample results, petroleum contamination was identified at concentrations exceeding the respective SCGs in 19 of the groundwater samples collected. These

petroleum contaminants are associated with the petroleum spill at the former Newcomb Oil/Citgo Gasoline Station and are being addressed under NYSDEC Petroleum Spill No. 0306131.

As shown on Figures 5 and 6, the highest concentrations of CVOCs have been detected in shallow bedrock interface groundwater immediately downgradient of the former Speedy's Cleaners property, with lesser concentrations beneath the Carriage Cleaners property. Downgradient from these properties, to the northeast and east, CVOC concentrations decline considerably. The concentrations and distribution of PCE and PCE breakdown products suggest limited or slow attenuation near the source areas, but increased natural attenuation as the contaminants migrate horizontally through the shallow bedrock zone.

Intermediate Bedrock Groundwater
PCE, TCE, and cis-1,2-DCE were detected at maximum concentrations of 440 ppb, 18 ppb, and 25 ppb respectively in MW-111I located on the Carriage Cleaners property. Each of these compounds were detected at concentrations exceeding their respective SCGs. MW-111I is paired with shallow bedrock monitoring well HA-111 and based on similarities in groundwater contamination and water levels between the two (2) wells there also appears to be hydraulic communication between the two (2) groundwater zones. No CVOCs were detected within the intermediate bedrock zone at MW-104I and MW-202I at concentrations that exceeded the SCGs. As shown on Figures 5 and 6, MW-104I is located upgradient of Carriage Cleaners and MW-202I is located downgradient of the former Speedy's Cleaners site.

Methyl-tert-butyl ether (MTBE) was detected in MW-104I and MW-202I at maximum concentrations of 95 ppb and 12 ppb respectively. The MTBE is associated with the petroleum spill at the former Newcomb Oil/Citgo Gasoline Station and is being addressed under NYSDEC Petroleum Spill No. 0306131.

Groundwater contamination identified during the RI/FS will be addressed in the remedy selection process.

Surface Water

No site-related surface water contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

No site-related sediment contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for sediment.

Soil Vapor/Sub-Slab Vapor/Air

Since investigation activities associated with the Carriage Cleaners site began in 2004, vapor intrusion (VI) sampling has been completed during four separate events. This sampling has included the collection of sub-slab soil vapor, indoor air, and outdoor air samples to evaluate the potential for exposures via soil vapor intrusion. The first VI sampling event occurred in January 2004 and was completed prior to the start of the Carriage Cleaners RI. The January 2004 sampling event included the collection of soil vapor intrusion samples at six locations. Based on this initial sampling, sub-slab depressurization systems were installed at four locations and a basement ventilation system was installed at one location (Figure 7).

During the Carriage Cleaners RI, vapor intrusion sampling was performed at a total of 45 locations during three (3) separate sampling events. PCE and TCE were the only VOCs detected in indoor air samples at concentrations above the SCGs of 100 $\mu g/m^3$ and 5 $\mu g/m^3$ respectively. Specifically, PCE

was detected in three (3) of the 109 indoor air samples at concentrations above the SCG and TCE was detected in two (2) of the 58 indoor air samples at concentrations above the SCG. The VI sampling locations are shown on Figure 7 and a summary of the VOCs detected in sub-slab vapor and indoor air samples is provided in Table 1.

The following summarizes the evaluation of the vapor intrusion samples relative to Soil Vapor/Indoor Air Matrix 1 and 2 included in the Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006:

- No Further Action is considered appropriate at 37 of the 45 properties. At these locations, detected CVOC concentrations are considered to be associated with indoor and/or outdoor sources rather than vapor intrusion given the concentration detected in the sub-slab samples.
- Additional monitoring is needed at seven (7) residential properties to evaluate whether concentrations change over time and if mitigation is necessary at these locations.
- Mitigation is necessary at one commercial property (former Speedy's Cleaners at 2150 Monroe Avenue) due to the presence of PCE and TCE at elevated concentrations in air samples. Following the vapor intrusion sampling, a mitigation system was installed by the current owner of 2150 Monroe Avenue in 2007.

Other VOCs detected in the vapor intrusion samples mainly included petroleum and refrigerant compounds, many of which were detected in each of the sub-slab, basement air, and first floor air samples. The presence and concentrations of these compounds is consistent with typical background levels of VOCs in indoor and outdoor air. NYSDOH has not established air guidance values for these compounds. It should be noted however, that 11 mitigation systems were installed by Newcomb Oil to address petroleum odors caused by the gasoline spill that occurred on the Former Newcomb Oil/Citgo Gasoline Station property. The locations of these mitigation systems are shown on Figure 7.

Soil vapor and indoor air contamination identified during the RI/FS will be addressed in the remedy selection process.

Soil vapor and indoor air contamination identified prior to the RI/FS was addressed during an IRM implemented in February 2004 and described in Remedial History (Section 3.2).

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 completion of the RI/FS.

As described above, four sub-slab depressurization systems and one basement ventilation system was installed as part of an IRM prior to the start of the Carriage Cleaners RI/FS. Three of the depressurization systems were installed in one large apartment building, one depressurization system was installed in an on-site residential building, and the basement ventilation system was installed in an off-site residential property.

During the Carriage Cleaners RIFS, the depressurization systems were periodically inspected to confirm continued operation. In addition, post mitigation samples were collected at the apartment complex and it was determined that the system is effectively preventing vapor intrusion. The basement ventilation system was also evaluated and the exhaust discharge point was extended from near the ground surface to above the building roof line.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 6.0 of the RI report which is available at the document repositories established for this site. 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.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). 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.

For current use scenarios, there is the potential for exposure to volatile organic compounds via inhalation of vapor, incidental ingestion, or dermal contact with contaminated subsurface soil and groundwater for workers who remove soils onsite and who work on the utility lines off site.

For future use scenarios, there is the potential for exposure to volatile organic compounds via inhalation of vapor, incidental ingestion, or dermal contact with residual contaminated soil and groundwater for workers who work in soils onsite and who work on the utility lines off site.

The potential exists for exposure through inhalation of indoor air which is impacted from contaminated soil vapor through the soil vapor intrusion pathway. Seven (7) homes will be monitored to evaluate whether the concentration of contaminated volatile organic compounds increase in the subslab vapor and/or indoor air over time, and if the installation of sub-slab depressurization systems would be warranted. Exposures to indoor air which was impacted from contaminated soil vapor has been eliminated through the installation of four subslab depressurization systems; three (3) at one apartment complex and one at one home; and one basement ventilation system at one home. These systems will continue to operate until future testing shows that operation is no longer necessary.

Future exposures to indoor air which is impacted from contaminated soil vapor would be addressed in a site management plan and include the continued evaluation of the potential for soil vapor intrusion into any future buildings developed on the site and those off the site and include provisions for mitigation should any impacts be identified.

The entire area is served by a public water supply, therefore exposure to contaminated groundwater is not expected.

5.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

Site contamination has impacted the groundwater resources in the overburden, shallow bedrock, and intermediate bedrock groundwater units. Data collected during the RI indicates that groundwater contamination in the overburden and intermediate bedrock units is generally restricted to the limits of

the Carriage Cleaners site. Groundwater contamination in the shallow bedrock interface groundwater occurs on-site and extends approximately 1,200 feet off-site. However, the area is served by municipal water and sewer. Contaminated groundwater does not discharge to surface water bodies. The contaminated groundwater would be addressed in the proposed remedy.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to PCE, and PCE breakdown products in soil and groundwater;
- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and
- the release of contaminants from subsurface soil beneath basements into indoor air through soil vapor.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards;
- the soil cleanup objectives included in the Technical and Administrative Guidance Memorandum [TAGM] 4046 and 6 NYCRR Subpart 375-6 - Remedial Program Soil Cleanup Objectives; and
- the air guidelines provided in the Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected 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 Carriage Cleaner Site were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

Both the United States Environmental Protection Agency (EPA) and the Department have identified soil vapor extraction (SVE) as a primary presumptive remedy for sites contaminated with volatile organic compounds in soil and groundwater. The NYSDEC DER-15 - Presumptive/Proven Remedial Technologies (NYSDEC 2006) also identifies excavation as a conventional remedial method. The screening of cleanup technologies included in the Carriage Cleaners FS was focused and specifically included both SVE and soil excavation.

In addition to the consideration of a presumptive remedy for the Carriage Cleaners site, site conditions limit the alternatives available for remediation of groundwater at the site. Specifically, the presence of contaminants beneath the currently occupied building and the existence of a separate off-site source of CVOCs at the former Speedy's Cleaners (NYSDEC HW Site ID 8-28-128) may limit the technical practicability of groundwater remediation technologies at this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth 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 potential remedies were considered to address the contaminated soil, groundwater, soil vapor, and air at the site.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

The no further action alternative consists of groundwater monitoring, environmental easements, and five-year reviews. Environmental easements related to indoor air refer to only those systems currently in operation. No new additional sub-slab depressurization systems are proposed under this alternative.

Present Worth: . . . . . *{$980,000}*
Capital Cost: . . . . . *{$180,000}*
Annual Costs:
(Years 1-5): . . . . . *{$70,000}*
(Years 5-30): . . . . . *{$32,000}*

Alternative 2: Presumptive Remedy Combined with Soil Excavation and On-Site Groundwater Extraction and Treatment

Consistent with the Department's and the EPA's presumptive remedy recommendations, Alternative 2 includes soil vapor extraction (SVE) for VOCs in site soil, along with extraction of on-site groundwater, monitored natural attenuation for off-site groundwater, vapor intrusion mitigation and monitoring, and on-site excavation of PCE contaminated soil.

The Carriage Cleaners RI has determined that approximately 635 cubic yards of soil contains PCE contamination exceeding the pre-release conditions at the site. The overall goal of returning the site to pre-release conditions would consist of removal of this 635 cubic yards contaminated soil. Investigation data indicate that the contaminated soil is located adjacent to the current facility and possibly beneath it. The attainment of the pre-release goals through soil excavation is not feasible in this instance as it would involve discontinuing the active business enterprise, removing the physical buildings, and excavation in the area of underground utilities. As part of the remedy evaluation, the cost and time to accomplish pre-release conditions through soil excavation has been determined to not be feasible.

Alternative 2 would include the excavation and off-site disposal of approximately 83 cubic yards of contaminated soil in the area where contaminated soil was identified at concentrations above the unrestricted use soil cleanup objective near the site's underground storm sewer utility. Specifically excavation would occur in an approximate 10 foot by 15 foot area between the Carriage Cleaners building and Brooklawn Drive. As described below, the remaining contaminated soil in the inaccessible portions of the site would be addressed through the installation and operation of a soil vapor extraction system. Following removal of the 83 cubic yards of contaminated soil, the excavation would be

backfilled with clean fill from an approved source. Prior to backfilling the excavation, a membrane would be placed in the excavation to serve as a demarcation between soil left in place and the material used as backfill.

A soil vapor extraction (SVE) system represents the presumptive remedy to remove VOC contamination from site soil, prevent exposures, and eliminate the source area. The SVE system would consist of approximately three (3) extraction wells to recover soil vapor. With SVE, a vacuum would be applied to the extraction wells to draw air through the contaminated soils. The VOCs would vaporize from the soil into the air and the air containing the VOCs would be drawn into the extraction wells. Figure 8 illustrates the areas where soil vapor extraction would occur. If necessary, the recovered soil vapor would be treated by activated granular carbon prior to release to the atmosphere. An SVE pilot study would be completed.

To supplement the SVE system, this alternative would include a groundwater extraction system to collect contaminated on-site bedrock groundwater. Disposal of extracted groundwater would be to the municipal sewer system. It is not anticipated that pre-treatment of recovered groundwater would be required prior to disposal. Extraction of groundwater would also serve to control the off-site migration of contaminated groundwater. Figure 8 illustrates the areas where hydraulic control would be achieved with groundwater extraction as part of Alternative 2. For existing off-site contaminated groundwater, this alternative would utilize natural attenuation mechanisms to achieve off-site groundwater remedial action objectives. Data collected as part of the remedial investigation have shown that breakdown products of PCE exist in the off-site plume suggesting that natural attenuation is occurring. Natural attenuation monitoring would consist of groundwater monitoring at representative wells for natural attenuation parameters. Additionally, this alternative would include groundwater monitoring to assess variations in VOC concentrations in on-site and off-site groundwater over time and to assess any further threat to human health.

Vapor intrusion activities would be completed in accordance with NYSDOH guidance. Based on an evaluation of the RI vapor intrusion sampling results, monitoring for vapor intrusion would occur on periodic basis at up to 10 buildings.

The components are readily implementable and reliable technologies. Upon implementation, Alternative 2 would readily address site contamination and prevent continued off-site migration of contaminants. It is expected that the long-term reduction of compounds in off-site groundwater to the NYS Class GA Ground Water Standards would not be achieved in the foreseeable future. Costs are based on excavation of soil and the installation of the SVE and groundwater extraction systems, followed by continued monitoring over a 30 year period.

Present Worth: . . . . . *{$3,700,000}*
Capital Cost: . . . . . *{$1,080,000}*
Annual Costs:
(Years 1-5): . . . . . *{$180,000}*
(Years 5-30): . . . . . *{$120,000}*

Alternative 3: Presumptive Remedy with On-Site and Off-Site Groundwater Treatment

Similar to Alternative 2, soil vapor extraction (SVE) would be used for VOCs in site soil, contaminated groundwater would be extracted from an on-site recovery system, vapor intrusion mitigation and monitoring would be completed, and site soil excavation would occur. In addition, a groundwater extraction system would be included that would recover the off-site groundwater plume and accelerate the attainment of the remedial action objectives. The extraction wells would be installed to depths up to 50 feet below ground surface in order to contain and recover the existing off-site plume. Disposal of extracted groundwater would be to the municipal sewer system. It is not anticipated that pre-treatment of recovered groundwater would be required prior to disposal. Unlike Alternative 2, Alternative 3 would not include natural attenuation monitoring.

As with Alternative 2, the remedial technologies are reliable and readily implementable. Costs are based on excavation of soil and the installation of the on-site SVE system and the on-site and off-site

groundwater extraction systems, followed by continued monitoring over a 30 year period.

Present Worth: . . . . . *{$4,610,000}*
Capital Cost: . . . . . *{$1,960,000}*
Annual Costs:
(Years 1-5): . . . . . *{$176,000}*
(Years 5-30): . . . . . *{$123,000}*

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs 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 FS report.

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

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

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 five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term 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.

4. 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.

5. 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.

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-Effectivness - 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 included in Section 7.1 (Description of Remedial Alternatives) and summarized in Table 2.

This final criterion 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.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 2, Presumptive Remedy with On-Site Groundwater Extraction and Treatment, as the remedy for this site. The individual elements of this remedy are described at the end of this section. The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

Alternative 2 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing soil that create the most significant threat to public health and the environment, it would greatly reduce the source of contamination to groundwater, and it would create the conditions needed to restore groundwater quality to the extent practicable. Alternative 3 would also comply with the threshold selection criteria but may not be effective for addressing the off-site plume due to an off-site PCE source (former Speedy's Cleaners property located at 2150 Monroe Avenue).

The "no further action" alternative (Alternative 1) would not be protective of human health. Institutional controls alone (i.e., environmental easements) would be protective of on-site workers, but would do nothing to address the contaminated soil and groundwater. Environmental easements include in both Alternative 2 and 3 would provide protection to human health related to potential exposures to indoor air, soil and groundwater. Protection of human health is also afforded by on-site groundwater extraction and treatment. Soil excavation and treatment under Alternatives 2 and 3 also afford protection of human health related to soil exposures. Additional protection to human health and the environment is provided under Alternative 3 through the off-site groundwater extraction and treatment.

Alternative 1 would rely on natural attenuation to achieve groundwater SCGs. Alternative 1 would not be anticipated to achieve NYS Class GA Ground Water Standards in the foreseeable future. SCGs for soil and indoor air would not be achieved for Alternative 1. Alternative 2 would rely on natural attenuation to achieve groundwater SCGs in off-site groundwater, in conjunction with hydraulic control of on-site groundwater. Extraction and treatment of on-site groundwater included in Alternative 2 is not anticipated to achieve NYS Class GA Ground Water Standards in the foreseeable future due to the presence of contaminants in fractured bedrock. SCGs for soil would be addressed through soil treatment and excavation. Through the continued operation of existing sub-slab depressurization systems and periodic vapor intrusion monitoring, the indoor air SCGs would be achieved for affected off-site properties under Alternative 2.

Alternative 3 would rely on groundwater extraction and treatment of both on-site and off-site ground water. Extraction and treatment of groundwater included in Alternative 3 would not be anticipated to achieve NYS Class GA Ground Water Standards in the foreseeable future. SCGs for soil would be addressed through soil treatment and excavation. Indoor air SCGs would be achieved for affected off-site properties under Alternative 3 through the continued operation of the existing vapor intrusion mitigation systems and annual vapor intrusion monitoring.

Because Alternatives 2 and 3 satisfy the threshold criteria, the five (5) balancing criteria are particularly important in selecting a final remedy for the Carriage Cleaners site.

The groundwater treatment alternatives (2 and 3) would be effective in both the short term and long term and would, to various degrees, reduce the toxicity, mobility, and volume of hazardous wastes at the site. They would differ, however, in implementability and cost effectiveness. Alternative 3, with the component to treat off-site groundwater, would be more difficult to implement since it would necessitate a more complex treatment system in the off-site residential area and would require a place to discharge the effluent, probably the local sewer system. Due to the nature of the site's geology (fractured bedrock) and the presence of an off-site source, Alternative 3 could also operate for many years, treating only a small volume of contaminated water, and not necessarily having a noticeable effect on the overall quality of groundwater.

Based on the concentrations of contaminants in existing groundwater, and given that groundwater is not used as a source of supply, any off-site treatment of groundwater would not be cost effective. Groundwater monitoring included in Alternative 2 would allow for the evaluation of residual risks associated with this alternative. Indoor air mitigation and monitoring components included in Alternative 2 would be effective in reducing risks associated with off-site indoor air.

Treatment of the on-site contaminated soil and groundwater is warranted because it is a continuing VOC source to both the on-site and off-site groundwater and to indoor air through soil vapor intrusion. Treatment of the soil and groundwater at this site is best done via soil excavation combined with the presumptive remedy for VOCs.

Alternative 2 would be expected to be implemented quickly and operated until the remedial action objectives are achieved. It has a lower cost to implement and to operate and maintain relative to Alternative 3. Lastly, the on-site soil vapor and groundwater extraction system would not be intrusive to the off-site residential setting of the area. The technology used for soil vapor and groundwater extraction (presumptive remedy) is relatively inexpensive and proven through numerous applications across the country. The estimated present worth cost to implement the remedy is $3,700,000. The cost to construct the remedy is estimated to be $1,080,000 and the estimated average annual cost for the first five (5) years is $180,000, and $120,000 per year for the next 25 years.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Prior to remedial design, pre-design sampling of soil and soil vapor would be undertaken adjacent to the Carriage Cleaners building to refine any areas with high concentrations of VOCs. Additionally, pilot studies/tests would be performed for both the soil vapor and the groundwater extraction systems to optimize the system designs.

2. Excavation of contaminated soil would occur in accessible portions of the site. Excavation areas would remove, to the extent practicable, soil exhibiting concentrations of PCE greater than soil cleanup objectives for unrestricted use (1.3 ppm). It is estimated that approximately 83 cubic yards of soil ranging to a depth of 15 ft below grade exhibit concentrations in excess of the protection of groundwater soil cleanup objective for PCE (Figure 8). Site characteristics, including the presence of underground utilities and the building location relative to adjacent roadways represent physical limitations to the extent of excavation that will be feasible at the site. Following removal of the contaminated soil, the excavation would be backfilled with material from an approved source and a membrane would be placed in the excavation to separate soil left in place from clean fill material used as backfill. During the excavation of contaminated soil, the PCE AST located in the alleyway will be removed from the site and properly disposed of.

3. Soil vapor extraction wells would be installed in the area below ground surface but above the water table (Figure 8 illustrates the areas where soil vapor extraction would occur under Alternative 2). At the Carriage Cleaners site, this zone extends to a depth of approximately 7 to 8 feet below ground surface. If necessary, the contaminated air from the extraction wells would then go through an activated carbon treatment system to remove the volatile contaminants before the air is discharged to the ambient air.

4. The groundwater extraction system would consist of an extraction well/wells installed to collect on-site bedrock groundwater. The recovery well/wells would be designed to optimize the extraction of contaminated groundwater from the Carriage Cleaners site and to prevent the continued off-site migration of contaminants from the site (Figure 8). Disposal of extracted groundwater would be to the municipal sewer system. It is not anticipated that pre-treatment of recovered groundwater would be required prior to disposal.

5. Institutional controls in the form of environmental easements would be used to impose land use restrictions and groundwater use restrictions at the site. Specifically, the environmental easements would require: (a) limiting the use and development of the property to commercial use (which the property is currently zoned), which would also permit industrial use; (b) land use restrictions would require proper worker protections during construction or excavation activities that would potentially cause a worker to contact contaminated soil, groundwater or soil vapor; (c) compliance with the approved site management plan; (d) groundwater use restrictions would preclude the use of groundwater at the Site without prior notification and approval from NYSDEC; (e) restrictions related to soil, groundwater, and soil vapor would be implemented on the site property; and (f) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

6. Development of a site management plan which would include the following institutional and engineering controls: (a) management of site excavation activities to ensure that excavated soil would be tested, properly handled to protect the health and safety of workers and the nearby community, and would be properly managed in a manner acceptable to the Department; (b) continued evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) continued operation and periodic evaluation of the sub-slab depressurization systems at the site (2111 Monroe Avenue) and at off-site properties; (d) monitoring of groundwater and soil vapor; (e) identification of any use restrictions on the site; and (f) provisions for the continued proper operation and maintenance of the components of the remedy.

7. The property owner would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. An environmental easement which will trigger periodic certifications can only be amended or extinguished by the Commissioner. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.

8. The operation of the components of the remedy would continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

9. Since the remedy results in untreated hazardous waste remaining at the site, a long-term monitoring program would be instituted. This program would allow the effectiveness of the soil vapor and groundwater extraction systems to be monitored and would be a component of the long-term management for the site. The groundwater samples would be analyzed for volatile organic compounds and natural attenuation parameters. The long-term monitoring would also include continued soil vapor intrusion monitoring along with continued operation and periodic evaluation of existing sub-slab depressurization systems at off-site properties.

TABLE 1
Nature and Extent of Contamination
March 2006 - November 2007

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	0.0008 - 0.015	0.06	0 of 18
	Carbon Disulfide	0.001 - 0.002	2.7	0 of 18
	Chlorobenzene	ND - 0.0009	1.1	0 of 18
	Cyclohexane	0.002 - 0.010	NS	NA
	Ethylbenzene	0.015 - 0.780	1.0	0 of 18
	Isopropylbenzene	0.002 - 0.140	2.3	0 of 18
	Methyl Ethyl Ketone	ND - 0.017	0.12	0 of 18
	Methyl Tert-Butyl Ether	ND - 0.001	0.93	0 of 18
	Methylcyclohexane	0.001 - 0.570	NS	NA
	Methylene Chloride	0.0008 - 0.018	0.05	0 of 18
	Toluene	0.001 - 0.110	0.7	1 of 18
	Xylenes	0.002 - 3.2	0.26	6 of 18
	Tetrachloroethene	0.008- 48	1.3	3 of 18
	Trichloroethene	0.004- 0.520	0.47	1 of 18
	cis-1,2-Dichloroethene	0.002 - 0.740	0.25	1 of 18
	Vinyl Chloride	ND - 0.001	0.02	0 of 18
Semivolatile Organic Compounds (SVOCs)	Acenaphthylene	ND - .079	100	0 of 3
	Benzo(a)anthracene	0.014 - 0.076	1	0 of 3
	Benzo(a)pyrene	0.011 - 0.110	1.0	0 of 3
	Benzo(b)fluoranthene	0.017 - 0.150	1.0	0 of 3
	Benzo(ghi)perylene	0.010 - 0.280	100	0 of 3
	Benzo(k)fluoranthene	ND - 0.078	0.8	0 of 3
	Bis(2-ethylhexyl)phthalate	ND - 1.9	50	0 of 3
	Chyrsene	0.011 - 0.062	1.0	0 of 3
	Dibenzo(a,h)anthracene	ND - 0.058	0.33	0 of 3
	Fluoranthene	0.038 - 0.120	100	0 of 3
	Indeno(1,2,3-cd)pyrene	0.008 - 0.150	0.5	0 of 3
	Phenanthrene	ND - 0.032	100	0 of 3
	Pyrene	0.013 - 0.090	100	0 of 3

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG (ppm)[a]	Frequency of Exceeding SCG
Pesticides	4,4'-DDD	ND - 0.00063	0.0033	0 of 3
	4,4'-DDE	ND - 0.002	0.0033	0 of 3
	4,4'-DDT	ND - 0.0045	0.0033	2 of 3
	alpha-BHC	ND - 0.0011	0.02	0 of 3
	delta-BHC	ND - 0.0017	0.04	0 of 3
	Dieldrin	ND - 0.00079	0.005	0 of 3
	Endosulfan II	ND - 0.00035	2.4	0 of 3
Inorganic Compounds	Aluminum	4,540 - 11,900	SB	NA
	Arsenic	3.1 - 4.9	13	0 of 3
	Barium	35.3 - 58.4	350	0 of 3
	Beryllium	0.25 - 0.60	7.2	0 of 3
	Calcium	2,470 - 49,900	SB	NA
	Chromium	5.3 - 13.5	30	0 of 3
	Cobalt	3.4 - 7.4	30	0 of 3
	Copper	13.7 - 21.1	50	0 of 3
	Iron	8,300 - 15,600	2,000 or SB	3 of 3
	Lead	15.5 - 51.2	63	0 of 3
	Magnesium	3,130 - 22,300	SB	NA
	Manganese	382 - 644	1,600	0 of 3
	Mercury	0.039 - 0.064	0.18	0 of 3
	Nickel	6.4 - 14.3	30	0 of 3
	Potassium	741 - 1,150	SB	NA
	Sodium	ND - 698	SB	NA
	Vanadium	8.8 - 19.3	150	0 of 3
	Zinc	65.4 - 153	109	2 of 3

TABLE 1
Nature and Extent of Contamination (Continued)

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Acetone	1.0 - 2.0	50	0 of 70
	Benzene	ND - 760	1	16 of 70
	Bromodichloromethane	0.6 - 4.0	50	0 of 70
	Carbon Disulfide	0.5 - 3.0	60	0 of 70
	Chloroform	ND - 22	7	4 of 70
	Cyclohexane	ND - 440	NS	NA
	Ethylbenzene	ND - 2,200	5	12 of 70
	Isopropylbenzene	ND - 78	5	10 of 70
	Methyl Acetate	ND - 3.0	NS	NA
	Methyl Chloride	ND - 5.0	5	0 of 70
	Methyl Ethyl Ketone	ND - 4.0	50	0 of 70
	Methyl Tert-Butyl Ether	ND - 1,500	10	19 - 70
	Methylcyclohexane	ND - 150	NS	NA
	Toluene	ND - 5,900	5	13 of 70
	Xylenes	ND - 14,000	5	14 of 70
	Tetrachloroethene	ND - 7,100	5	26 of 70
	Trichloroethene	ND - 28	5	10 of 70
	cis-1,2 Dichloroethene	ND - 180	5	27 of 70
	trans-1,2 Dichloroethene	ND - 1.0	5	0 of 70
	Vinyl Chloride	ND - 110	2	7 of 70
PCB/Pesticides	Dieldrin	ND - 0.012	0.004	1 of 3
	Endosulfan I	ND - 0.030	0.009	1 of 3
	Heptachlor	ND - 0.012	0.04	0 of 3
Inorganic Compounds	Aluminum	2,300 - 24,000	NS	NA
	Arsenic	ND - 14	25	0 of 3
	Barium	79 - 270	1000	0 of 3
	Cadmium	ND - 1.4	5	0 of 3
	Calcium	59,100 - 142,000	NS	NA
	Chromium	ND - 30	50	0 of 3

TABLE 1
Nature and Extent of Contamination (Continued)

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG (ppb)[a]	Frequency of Exceeding SCG
Inorganic Compounds	Cobalt	ND - 12	5	2 of 3
	Copper	ND - 46	200	0 of 3
	Iron	4,400 - 27,400	300	3 of 3
	Lead	9.3 - 96	25	2 of 3
	Magnesium	20,100 - 67,000	35,000	2 of 3
	Manganese	1,400 - 7,100	300	3 of 3
	Mercury	ND - 0.7	0.7	0 of 3
	Nickel	ND - 28	100	0 of 3
	Potassium	2,500 - 8,000	NS	NA
	Sodium	28,600 - 170,000	20,000	3 of 3
	Vanadium	ND - 43	14	2 of 3
	Zinc	52 - 340	2,000	0 of 3

TABLE 1
Nature and Extent of Contamination (Continued)

SUB-SLAB SOIL VAPOR	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG (µg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,1,1-Trichloroethane	0.22 - 5.5	NS	NA
	1,2,4-Trimethylbenzene	1.8 - 78	NS	NA
	1,2-Dichloroethane	ND - 1.2	NS	NA
	1,3,5-Trimethylbenzene	1.5 - 26	NS	NA
	1,3-Dichlorobenzene	ND - 1.8	NS	NA
	1,4-Dichlorobenzene	0.61 - 0.98	NS	NA
	2,2,4-Trimethylpentane	0.52 - 36	NS	NA
	4-Ethyltoluene	0.6 - 28	NS	NA
	Acetone	20 - 1,600	NS	NA
	Benzene	0.49 - 110	NS	NA
	Bromodichloromethane	0.48 - 12	NS	NA
	Bromoform	ND - 1.3	NS	NA
	Carbon Disulfide	0.38 - 34	NS	NA
	Carbon Tetrachloride	0.26 - 1.2	NS	NA
	Chlorobenzene	0.28 - 0.42	NS	NA
	Chloroform	0.3 - 390	NS	NA
	Chloromethane	0.13 - 1.8	NS	NA
	cis-1,2-Dichloroethene	0.48 - 260	NS	NA
	Cyclohexane	1.1 - 250	NS	NA
	Ethyl Acetate	1.4 - 1.7	NS	NA
	Ethylbenzene	0.71 - 160	NS	NA
	Freon 11	0.97 - 230	NS	NA
	Freon 113	0.39 - 1.2	NS	NA
	Freon 12	1.9 - 71	NS	NA
	Heptane	2.8 - 260	NS	NA
	Hexane	1.3 - 280	NS	NA
	Isopropyl Alcohol	0.35 - 230	NS	NA
	m&p-Xylene	1.4 - 470	NS	NA
	Methyl Butyl Ketone	ND - 1.1	NS	NA

TABLE 1
Nature and Extent of Contamination (Continued)

SUB-SLAB SOIL VAPOR	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG (µg/m^3)[a]	Frequency of Exceeding SCG
	Methyl Ethyl Ketone	1.1 - 6.6	NS	NA
	Methyl Isobutyl Ketone	0.58 - 31	NS	NA
	Methyl Tert-Butyl Ether	1.4 - 130	NS	NA
	Methylene Chloride	0.42 - 290	NS	NA
	o-Xylene	0.53 - 250	NS	NA
	Styrene	0.78 - 36	NS	NA
	Tetrachloroethene	0.69 - 47,000	NS	NA
	Tetrahydrofuran	1.6 - 4.5	NS	NA
	Toluene	6.2 - 300	NS	NA
	trans-1,2-Dichloroethene	0.52 - 21	NS	NA
	trans-1,3-Dichloropropene	0.69 - 1.8	NS	NA
	Trichloroethene	0.22 - 2,100	NS	NA

AIR	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG (µg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,1,1-Trichloroethane	0.39 - 27.2	NS	NA
	1,2,4-Trimethylbenzene	1.05 - 58	NS	NA
	1,3,5-Trimethylbenzene	0.7 - 15	NS	NA
	1,3-Dichlorobenzene	ND - 0.18	NS	NA
	1,4-Dichlorobenzene	0.18 - 34	NS	NA
	2,2,4-Trimethylpentane	0.47 - 10	NS	NA
	4-Ethyltoluene	0.4 - 14	NS	NA
	Acetone	13 - 22,000	NS	NA
	Benzene	0.649 - 14	NS	NA
	Benzyl Chloride	ND - 1.52	NS	NA
	Bromodichloromethane	1 - 1.2	NS	NA
	Carbon Disulfide	0.317 - 12	NS	NA
	Carbon Tetrachloride	0.38 - 1.92	NS	NA
	Chloroform	0.298 - 11	NS	NA
	Chloromethane	0.31 - 46	NS	NA

TABLE 1
Nature and Extent of Contamination (Continued)

AIR	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG (µg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Cyclohexane	0.175 - 23	NS	NA
	Ethyl Acetate	0.879 - 490	NS	NA
	Ethylbenzene	0.53 - 14	NS	NA
	Freon 11	1.26 - 190	NS	NA
	Freon 113	0.31 - 1	NS	NA
	Freon 114	ND - 2.8	NS	NA
	Freon 12	2.11 - 60	NS	NA
	Heptane	0.54 - 22	NS	NA
	Hexane	0.716 - 19	NS	NA
	Isopropyl Alcohol	0.75 - 4,400	NS	NA
	m&p-Xylene	1.32 - 65	NS	NA
	Methyl Ethyl Ketone	1.71 - 300	NS	NA
	Methyl Isobutyl Ketone	1.37 - 34	NS	NA
	Methyl Tert-Butyl Ether	0.92 - 6.7	NS	NA
	Methylene Chloride	0.46 - 69	60	1 of 58
	o-Xylene	0.53 - 18	NS	NA
	Styrene	0.563 - 9.09	NS	NA
	Tetrachloroethene	0.69 - 360	100	3 of 109
	Tetrahydrofuran	0.659 - 6.1	NS	NA
	Toluene	2.91 - 820	NS	NA
	trans-1,3-Dichloropropene	ND - 0.88	NS	NA
	Trichloroethene	0.273 - 36	5	3 of 58
	Vinyl Chloride	ND - 0.36	NS	NA

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values;
1. Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
2. Soil SCGs are based on the Department's Cleanup Objectives ("Technical and Administrative Guidance Memorandum [TAGM] 4046; Determination of Soil Cleanup Objectives and Cleanup Levels.") and 6 NYCRR

TABLE 1
Nature and Extent of Contamination (Continued)

Subpart 375-6 - Remedial Program Soil Cleanup Objectives.

3. Concentrations of VOCs in air were evaluated using the air guidelines provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006. Specifically, the sub-slab and indoor air data were compared to Soil Vapor/Indoor Air Matrix 1 for TCE, carbon tetrachloride, and vinyl chloride and Soil Vapor/Indoor Air Matrix 2 for PCE, 1,1-dichloroethene, cis-1,2-DCE, and 1,1,1-trichloroethane.
4. Concentrations of VOCs in air were compared to typical background levels of VOCs in indoor and outdoor air using the background levels provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006. The background levels are not SCGs and are used only as a general tool to assist in data evaluation.

ND = Not Detected
NS = SCG Not Specified for this compound
NA = Not Applicable
SB = Site Background

Table 2
Remedial Alternative Costs

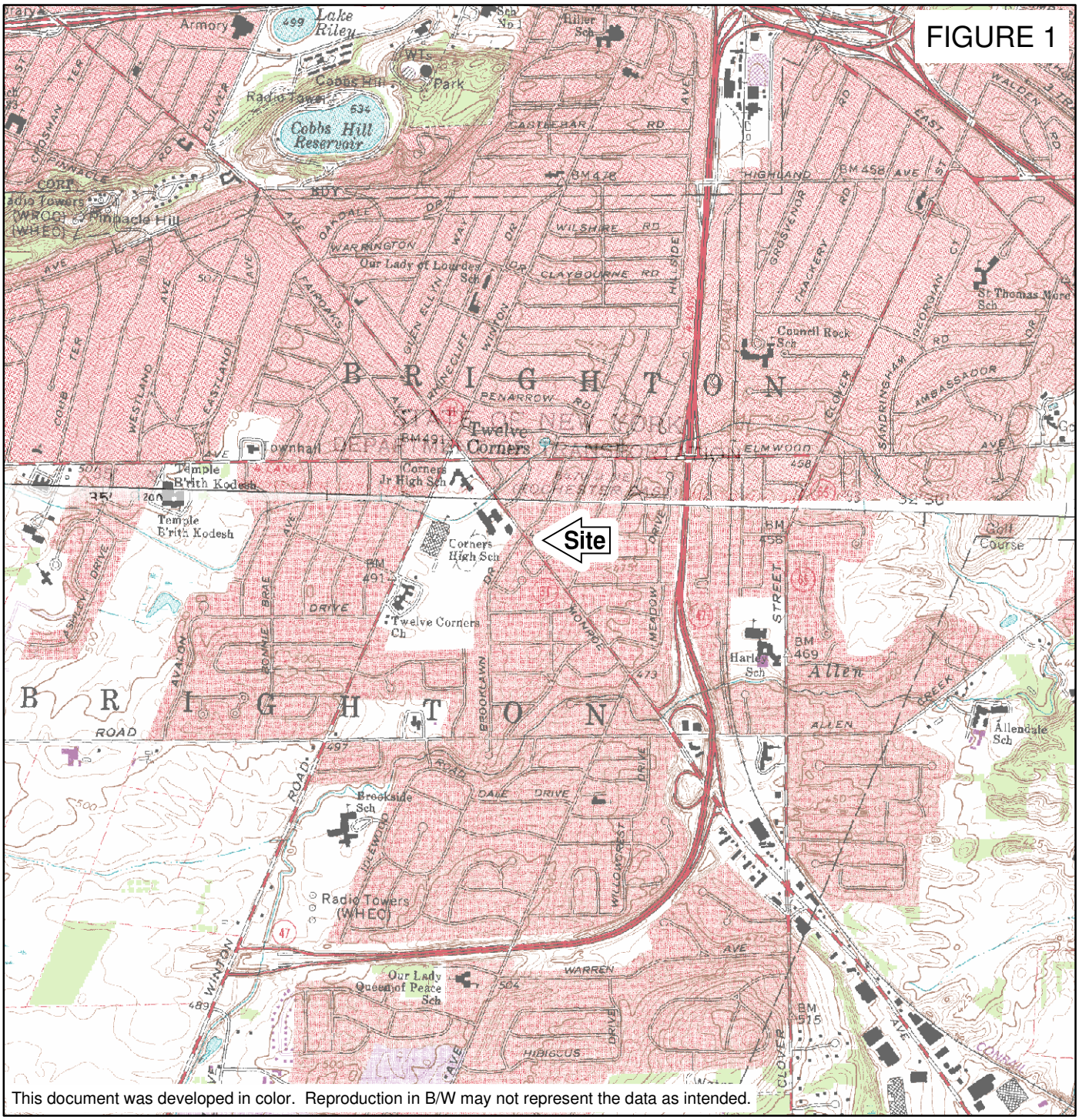
Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Alternative 1 - No Further Action	$180,000	$103,000*	$980,000
Alternative 2 - Presumptive Remedy and Off-Site Monitored Natural Attenuation	$1,080,000	$244,000*	$3,700,000
Alternative 3 - Presumptive Remedy and Off-Site Pump and Treat	$1,960,000	$224,000*	$4,600,000

* Annual operations and maintenance costs vary for each year as a result of different monitoring programs and remedial technologies.

T:\10653_NYSDEC\CARRIAGECLEANERS\MXD\35749\SITE_LOC.MXD

PLOT DATE: 1/30/07

FIGURE 1



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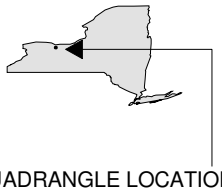
ADAPTED FROM: ROCHESTER EAST AND PITTSFORD, NY USGS QUADRANGLES.



QUADRANGLE LOCATION

NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON
ROCHESTER, NEW YORK

SITE LOCATION

0 1,000 2,000 4,000 6,000 8,000

Feet

1:24,000

10653.35749

JANUARY 2007

O'BRIEN & GERE ENGINEERS, INC.

T:\10653_NYSDEC\CarriageCleaners\mxd\RI_REPORT\REF_MAP.mxd

FIGURE 2

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NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON, NY

INVESTIGATION AREA REFERENCE MAP

0 75 150 300
Feet

FEBRUARY 2007
10653\35749

O'BRIEN & GERE ENGINEERS, INC.

PLOT DATE: 1/30/07

FIGURE 3

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LEGEND

- MONITORING WELL
- GROUND WATER ELEVATION CONTOUR
- HYDRAULIC FLOW POTENTIAL
- 472.52 GROUND WATER ELEVATION

NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON, NY

GROUND WATER ELEVATIONS APRIL 2006

0 75 150 300
Feet

FEBRUARY 2007
10653\35749

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PLOT DATE: 1/30/07

FIGURE 4
SOIL BORING LOCATIONS WITH PCE SOIL SAMPLE RESULTS

Sample Annotation

nd: Indicates compound was analyzed for, but not detected.

Units for soil samples are in parts per million (ppm).

New York State
Department of Environmental Conservation

Division of Environmental Remediation

MAP DETAILS

Created in ArcGIS 9.1
Created By: J. Pelton
Last Revision Date: 2/15/08

Carriage Cleaners
Site # 8-28-120

Monroe County
Town of Brighton

DEC Contact:
J. Pelton

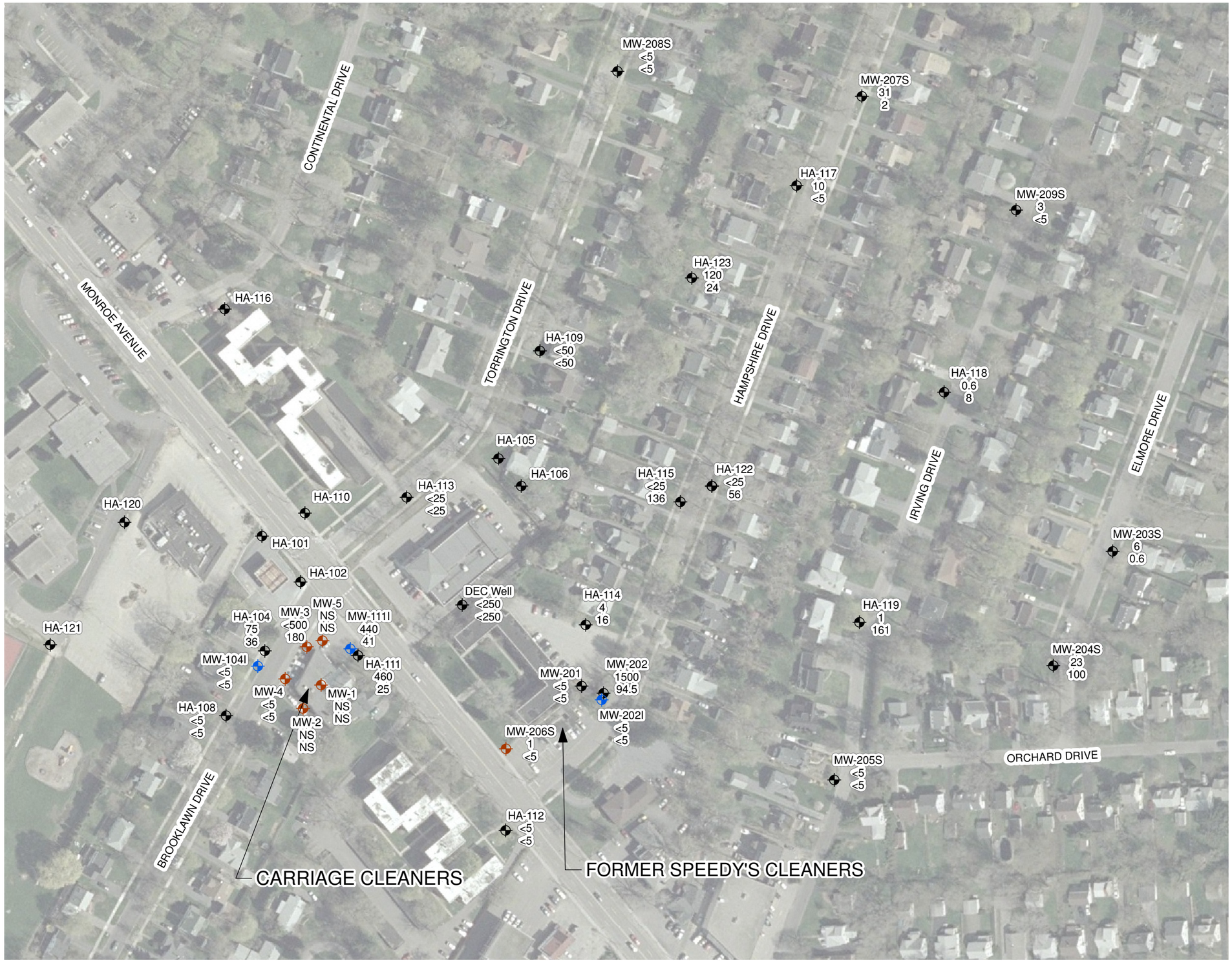
DOH Contact:
D. McNaughton

N
W
E
S

North American Datum 1983
UTM Zone 18N

T:\10653_NYSDEC\CarriageCleaners\mxd\RI_REPORT\NEW_FIGS\PCE_CONC_RND1.mxd

FIGURE 5



LEGEND

- <all other values>
- OVERBURDEN
- SHALLOW BEDROCK INTERFACE
- INTERMEDIATE BEDROCK

HA-123 WELL ID
120 PCE CONCENTRATION (UG/L)
24 TOTAL TCE, CIS-1,2-DCE, TRANS-1,2-DCE, AND VINYL CHLORIDE CONCENTRATIONS (UG/L)
NS NOT SAMPLED

NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON, NY

COC CONCENTRATIONS IN GROUND WATER JULY 2005

0 75 150 300
Feet

FEBRUARY 2007
10653\35749

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PLOT DATE: 1/30/07

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T:\10653_NYSDEC\CarriageCleaners\mxd\RI_REPORT\NEW_FIGS\PCE_CONC_RND2.mxd

FIGURE 6

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PLOT DATE: 1/30/07

LEGEND

- OVERBURDEN
- SHALLOW BEDROCK INTERFACE
- INTERMEDIATE BEDROCK

HA-123 WELL ID
72 PCE CONCENTRATION (UG/L)
11.2 TOTAL TCE, CIS-1,2-DCE, TRANS-1,2-DCE, AND VINYL CHLORIDE CONCENTRATIONS (UG/L)

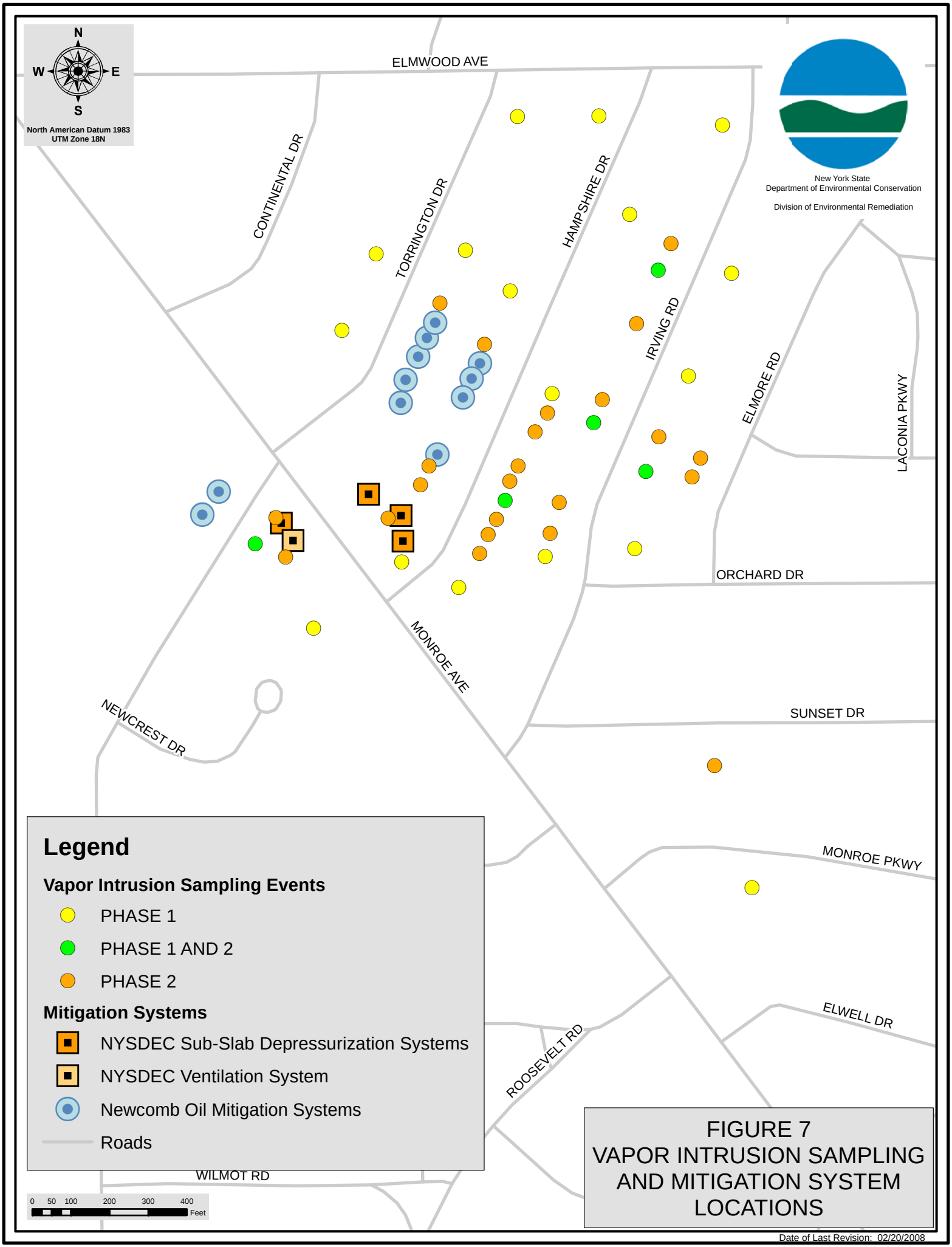
NYSDEC
CARRIAGE CLEANERS
TOWN OF BRIGHTON, NY

COC CONCENTRATIONS IN GROUND WATER DECEMBER 2005

0 75 150 300
Feet

FEBRUARY 2007
10653\35749

O'BRIEN & GERE ENGINEERS, INC.


N
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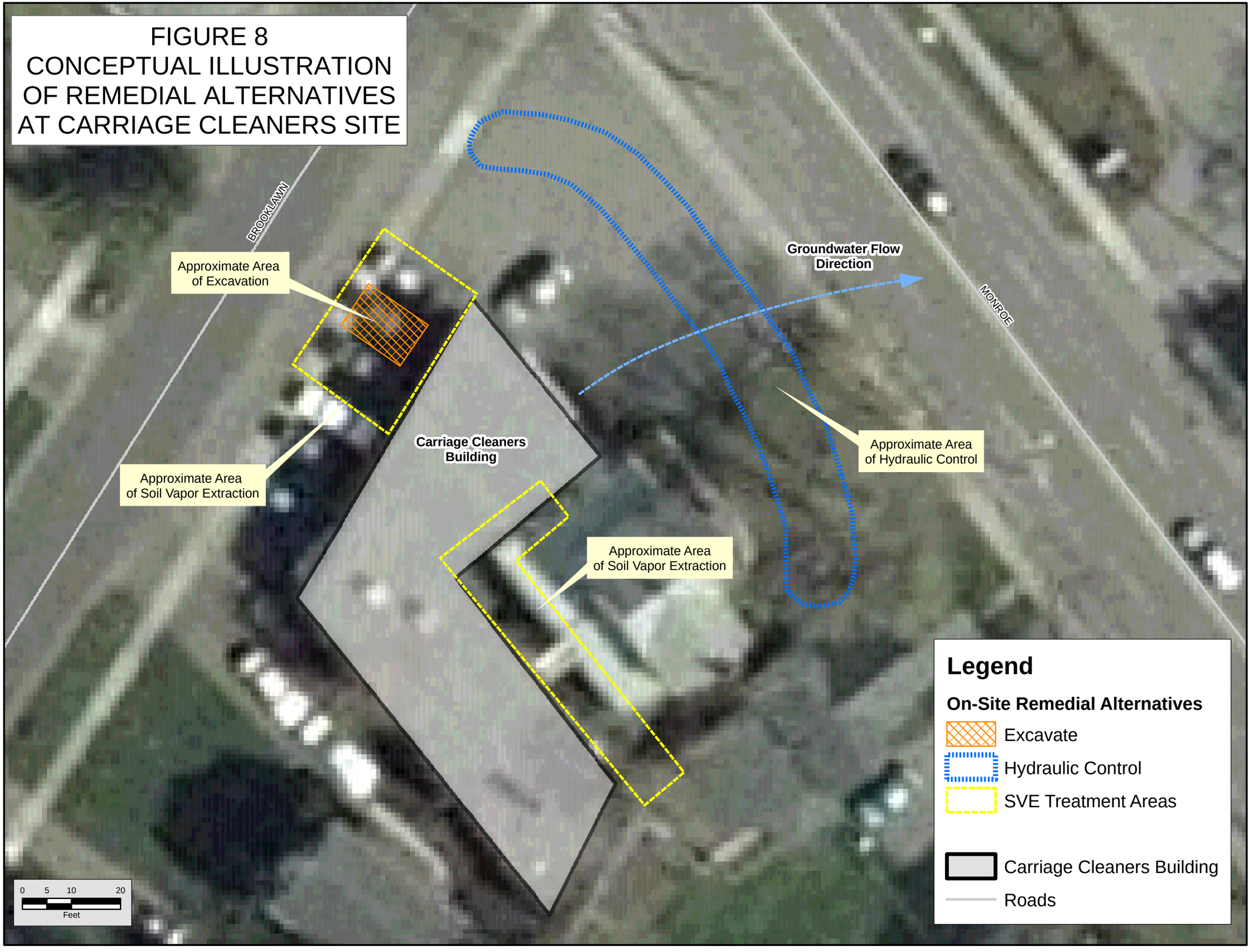
S
North American Datum 1983
UTM Zone 18N
New York State
Department of Environmental Conservation
Division of Environmental Remediation
ELMWOOD AVE
CONTINENTAL DR
TORRINGTON DR
HAMPSHIRE DR
IRVING RD
ELMORE RD
LACONIA PKWY
ORCHARD DR
MONROE AVE
NEWCREST DR
SUNSET DR
MONROE PKWY
ELWELL DR
ROOSEVELT RD
WILMOT RD
Legend
Vapor Intrusion Sampling Events
PHASE 1
PHASE 1 AND 2
PHASE 2
Mitigation Systems
NYSDEC Sub-Slab Depressurization Systems
NYSDEC Ventilation System
Newcomb Oil Mitigation Systems
Roads
0 50 100 200 300 400
Feet
FIGURE 7
VAPOR INTRUSION SAMPLING AND MITIGATION SYSTEM LOCATIONS
Date of Last Revision: 02/20/2008

FIGURE 8
CONCEPTUAL ILLUSTRATION OF REMEDIAL ALTERNATIVES AT CARRIAGE CLEANERS SITE



New York State
Department of Environmental Conservation

Division of Environmental Remediation

MAP DETAILS

Created in ArcGIS 9.1
Created By: J. Pelton
Last Revision Date: 2/1/08

Carriage Cleaners
Site # 8-28-120

Monroe County
Town of Brighton

DEC Contact:
J. Pelton

DOH Contact:
D. McNaughton

Spring 2003
Aerial Photography

N
W E
S

North American Datum 1983
UTM Zone 18N