PROPOSED REMEDIAL ACTION PLAN
Sharon Cleaners
Saratoga Springs, Saratoga County, New York
Site No. 5-46-052

February 2009

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

Sharon Cleaners
Saratoga Springs, Saratoga County, New York
Site No. 5-46-052
February 2009

SECTION 1: <u>SUMMARY AND PURPOSE OF THE PROPOSED PLAN</u>

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 Sharon Cleaners. 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, site dry cleaning operations prior to 2001 have resulted in the disposal of hazardous wastes, including volatile organic compounds (VOCs), such as tetrachloroethene (PCE). These wastes have contaminated the soil, soil vapor, and groundwater at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to soil vapors.

- a significant environmental threat associated with the current impacts of contaminants to groundwater by tetrachloroethene.

To eliminate or mitigate these threats, the Department proposes installation of sub-slab depressurization systems at structures determined to be impacted by soil vapors.

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 February 2009 Remedial Investigation (RI) Report, and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

- Saratoga Springs Public Library
  49 Henry Street
  Saratoga Springs, NY 12866
  (518) 584-7860
  Hours:
  M-Th 9 a.m. to 9 p.m.
  F 9 a.m. to 6 p.m.
  Sa 9 a.m. to 5 p.m.
  Su 12 p.m. to 5 p.m.

- New York State Department of Environmental Conservation
  625 Broadway, 11th Floor
  Albany, NY 12233-7015
  (518) 402-9620
  Attn: Brian Jankauskas, P.E.
  Hours:
  M-F 8 a.m. to 4 p.m.

The Department seeks input from the community on all PRAPs. A public comment period has been set from February 26 to March 27, 2009 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for Wednesday March 11, 2009 at the third floor Music Hall at Saratoga Springs City Hall at 474 Broadway in Saratoga Springs beginning at 7 p.m.

At the meeting, the results of the RI and alternatives analysis 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. Jankauskas at the above address through March 27, 2009.

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: <u>SITE LOCATION AND DESCRIPTION</u>

The Sharon Cleaners site is located in an urban portion of Saratoga County, New York, See Figure 1, Site Location Plan. The site is located at the southeast corner of the intersection of Lincoln Avenue and Whitney Place. A one-story structure that covers approximately 2,200 square feet is located at the site and presently occupied by AJ's Wash and Dry Cleaners. The surrounding area is mixed commercial and residential. The nearest residential structure is located approximately 25 feet to the east.

Soil borings were conducted during the site characterization and remedial investigation to a maximum depth of 27 feet below ground surface. Site geology consists of approximately 27 feet of brown fine to medium sand. Groundwater was encountered at approximately 16 feet below ground surface and determined to flow in a northeast direction, which is illustrated on Figure 2.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site has been used as a dry cleaning business for over 50 years. During this time Sharon Cleaners was in operation for approximately 22 years. In conducting a site audit for use in selling the property, the site owner discovered chlorinated volatile organic compounds, primarily tetrachloroethene (PCE), in the soil and groundwater in February 2000. Dry cleaning and spot removal processes are believed to have utilized PCE, which is a typical chemical used in the dry cleaning industry. Improper housekeeping is likely the cause of the environmental impacts.

The current owner has been operating as AJ's Wash and Dry Cleaning at the property since 2001. Current dry cleaning equipment utilizes a petroleum based dry cleaning agent, which is different from the chlorinated volatile organic compounds detected in the environment.

3.2: Remedial History

In 2007, 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.

- In February and March 2000, site investigations as part of a property assessment were conducted.
- In 2000, the Sharon Cleaners owner entered into the Voluntary Cleanup Program to investigate and remediate the site.
- In March 2001, the Volunteer, unilaterally installed and operated a soil vapor extraction system to address contamination detected at the site.
- In November 2001, The Volunteer signed an administrative order on consent after the Department reviewed the respondent's financial data. The Department will undertake further remedial activities at the site.
- In December 2001, Department personnel located and sampled two of the five monitoring wells and indicated that the soil vapor extraction system was shutdown.
- In September 2006, a State-funded site characterization was conducted.

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: Mr. James Smalley (Sharon Cleaners)

In November 2001, after review of the PRPs financial data the Department determined that they were not financially viable to implement remedial activities at the site. The remedial activities were conducted with State Superfund money.

SECTION 5: SITE CONTAMINATION

A remedial investigation and alternatives analysis has been conducted to evaluate the alternatives for addressing the significant threats to human health and/or 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 April 2008 and May 2008. The field activities and findings of the investigation are described in the RI report.

Remedial investigation activities included the collection of environmental samples and soil vapor intrusion evaluations. Soil samples collected are illustrated on Figure 3. Groundwater samples collected are illustrated on Figure 4. Soil vapor intrusion evaluations were conducted at the site and at structures located in the vicinity of the site.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil, groundwater, and soil vapor contains 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 "6 NYCRR Part 375 Soil Cleanup Objectives Tables 6.8," dated December 2006.

- 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 for tetrachloroethene using Soil Vapor/Indoor Air Matrix 2.

- Background soil samples were taken from five locations. These locations were within the vicinity of the site, and were unaffected by historic or current site operations. The samples were analyzed for metals. The results of the background sample analysis were compared to relevant RI data to determine appropriate site remediation goals.

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 of the investigation for all environmental media that were investigated.

As described in the RI report, many soil, groundwater and soil vapor samples were collected to characterize the nature and extent of contamination. As seen in Figures 3 and 4 or summarized in Table 1, the main category of site related contaminants that exceed their SCGs are volatile organic compounds (VOCs). 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 3 and 4 and Table 1 summarize the degree of contamination for the contaminants of concern in soil, groundwater and air and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Surface Soil

Seven surface soil samples were collected at the site from 0 to 12 inches below ground surface and analyzed for VOCs. These samples were located in the grassy areas at the north and south portions of the site. Figure 3 presents the analytical results and locations of the soil samples. Based on the analytical results tetrachloroethene was detected up to 0.055 ppm, which is below the unrestricted use cleanup objective of 1.3 ppm. Elevated concentrations of metals were detected in the surface soils above unrestricted use at the site, as shown on Figure 3. Due to the sporadic detections of these metals, the contamination is considered to be representative of background conditions from fill material placed at the site and not a result of the dry cleaning activities conducted at the site since metals are not utilized as part of the dry cleaning process.

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

Subsurface Soil

Nineteen subsurface soil samples were collected at the site and analyzed for VOCs. Thirteen soil borings, identified as B-1 through B-13, were completed to assess site soil conditions south and north of the facility. One soil sample was collected from each boring at depths ranging from 10 to 16 feet below ground surface based on visual observations or depth to groundwater. One shallow soil sample, 1 to 2 feet below ground surface, was collected beneath the pavement, identified as SS-1. Five sub-slab soil samples, identified as SS-6 through SS-10, were collected from 0 to 12 inches beneath the concrete slab in the vicinity of the dry cleaning equipment and former trench. Figure 3 presents the analytical results and locations of the soil samples. Based on the analytical results tetrachloroethene was detected up to 0.170 ppm beneath the structure and up to 0.029 ppm beyond the buildings footprint, which are below the unrestricted use cleanup objective of 1.3 ppm. The greatest concentration of tetrachloroethene was detected at 1.6 ppm beneath the concrete slab during the site characterization in 2006. Tetrachloroethene detections are minimal in concentration and extent, which indicates that a source of tetrachloroethene was not identified during the investigation due to discontinued use of tetrachloroethene at the dry cleaning facility, operation of the soil vapor extraction system under the Voluntary Cleanup Program and natural attenuation of site contaminants over time.

Elevated concentrations of metals were detected in the shallow subsurface soils above unrestricted use at the site, as shown on Figure 3. Due to the sporadic detections of these metals, the contamination is considered to be representative of background conditions from fill material placed at the site and not a result of the dry cleaning activities conducted at the site since metals are not utilized as part of the dry cleaning process.

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

Groundwater

Twelve groundwater samples were collected and analyzed for VOCs. These samples were collected from ten monitoring wells and two temporary wells located within 30 feet of ground surface. Six samples were collected at the site and six samples were collected from off-site locations that are considered either up-gradient, down-gradient or side gradient. Figure 4 presents the analytical results and locations of the groundwater samples. Based on the analytical results tetrachloroethene was detected up to 24 ppb at MW-11, which is above the groundwater standard of 5 ppb. The low level contamination appears to be originating from the site and naturally attenuates within 400 feet of the site.

Groundwater contamination was detected during the RI at concentrations marginally above groundwater standards. Therefore, a groundwater usage restriction is necessary, but an evaluation of groundwater remedial alternatives is not warranted given the low contamination levels and lack of a source area to remediate.

Soil Vapor/Sub-Slab Vapor/Air

Ten structures in the vicinity of the site were evaluated to assess the soil vapor intrusion pathway. An indoor air sample and a sub-slab vapor samples were collected from each structure and analyzed for VOCs. Analytical results were compared to ambient air levels, building questionnaires, and reported background values for residential structures. Table 1 summarizes the detections from each indoor air, sub-slab soil vapor, and ambient air sample. Based on the analytical results tetrachloroethene was detected within the indoor air samples at concentrations up to 7.3 ug/m^3. New York State Department of Health tetrachloroethene factsheet, dated May 2003, indicates that typical background concentrations of tetrachloroethene in residential homes are less than 10 ug/m^3. Elevated tetrachloroethene concentrations were detected in sub-slab soil vapor on-site, identified as structure 9, up to 23,000 ug/m^3, and at four off-site structures, identified as structures 1, 7, 8, and 10, up to 5,000 ug/m^3. Soil vapors impacting sub-slab vapor concentrations appear to be a result of site contamination that emanated from the site or off-gased from groundwater.

Soil vapor contamination identified during the RI will be addressed in the remedy selection process.

5.2: Interim Remedial Measures

There were no IRMs performed at this site during the RI. However, as was noted in Section 3.2, the owner did briefly operate a soil vapor extraction system unilaterally during 2001.

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 2.9 of the RI report. 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.

Elevated levels of tetrachloroethene vapors detected beneath the on-site and adjacent buildings indicate a potential exposure pathway. However, indoor air quality has not been compromised at this time. The remedy for the site will further protect the public by addressing the potential for contaminated sub-slab vapors to enter the structures. The area is served by public water, so people are unlikely to come into contact with the low levels of tetrachloroethene detected in groundwater. Surface soils did not contain contaminants at levels that would present an exposure concern.

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.

Samples from the surface soils, subsurface soils and groundwater did not contain elevated levels of contaminants; therefore a viable exposure pathway to fish and wildlife receptors is not present.

Site contamination has impacted the groundwater resource in the shallow aquifer.

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 tetrachloroethene in soil vapor and sub-slab vapor.

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

- ambient groundwater quality standards.

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 Sharon Cleaners site were identified, screened and evaluated in the Soil Vapor Mitigation Evaluation memo, which compared remedial action alternatives.

Soil vapors and groundwater present the only concern to the environment and/or public health. As a result a focused evaluation of remedial technologies utilizing the Presumptive/Proven Remedial Technologies (DER-15) document, dated February 2007, was performed. Based on DER-15 Section 3.3, two remedial alternatives identified as Soil Vapor Extraction and Vapor Mitigation System, were identified as appropriate actions that would address the soil vapors detected during the investigations.

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 vapor 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 air monitoring at five structures for three years and an institutional control to limit groundwater use at the site, 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.

Present Worth: *$48,000*
Capital Cost: *$20,000*
Annual Costs:
(Years 1-5): *$28,000*
(Years 5-30): *$0*

Alternative 2: Vapor Mitigation System

The Vapor Mitigation System Alternative would be applied to three structures. Two of these structures require significant upgrades to the basements due to the poor condition of the concrete floors prior to installation of the vapor mitigation system. This alternative would repair or replace the concrete floors and seal any cracks and utility penetrations. Vapor mitigation systems are commonly known as sub-slab depressurization systems and is similar to radon systems, which reduce the air pressure beneath the slab and provides a preferential path that draws soil vapors from below the building and vents the vapors through a series of pipes to the atmosphere above the building where it is quickly diluted. The effectiveness of different vapor mitigation systems depends on the building types and equipment utilized. If the property owner approves, a pilot test would be performed to select the appropriate equipment to be utilized (i.e. electric fan or wind driven fan). Otherwise an electric fan would be installed. In buildings with basements or slab-on-grade foundations, sub-slab depressurization is the most common and usually the most reliable mitigation method. In buildings with crawlspaces, sub-membrane depressurization is the most effective mitigation method. Figure 5 presents a general illustration and additional description of a vapor mitigation system. The guidelines for soil vapor intrusion mitigation can be found in NYSDOH's "Guidance for Evaluating Soil Vapor Intrusion in the State of New York." This remedy would be implemented within a short period of time and is assumed to operate for approximately 30 years.

This Alternative also requires continued air monitoring at two off-site structures for three years and an institutional control to limit groundwater use at the site.

Present Worth: *$160,000*
Capital Cost: *$140,000*
Annual Costs:
(Years 1-5): *$13,000*
(Years 5-30): *$7,000*

Alternative 3: Soil Vapor Extraction (SVE)

This technique addresses VOC contamination at sites by removing contamination from soil and reducing soil vapor migration. SVE is an in-situ process which physically removes contaminants from vadose zone soils, soils located above the groundwater, by inducing air flow through the soil matrix. The flowing air strips volatile compounds from the soil and carries them to extraction wells. The recovered vapors may require further treatment prior to being released to the atmosphere. The radius of influence of a SVE system is dependant on site conditions and equipment. The impacted off-site structures would be assessed to determine if the SVE system is addressing the soil vapor contamination beneath the structures. More details on the operation of a SVE system can be found in Appendix I of DER-15. This remedy would require time to conduct a pilot test and design the system prior to operation. An operating duration of 5 years has been estimated for this site.

The limitations of a SVE system is that the influence of the vacuum decreases with the distance from the site. If the SVE system is unable to influence the soil vapor contamination beneath the off-site structures installation of Vapor Mitigation Systems (Alternative 2) would be required at these structures and is identified as "Contingency Cost" presented below.

This Alternative would also require continued air monitoring at two off-site structures for three years and an institutional control to limit groundwater use at the site.

Present Worth: *$370,000*
Capital Cost: *$160,000*
Contingency Cost: *$100,000*
Annual Costs:
(Years 1-5): *$110,000*
(Years 5-30): *$0*

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 Soil Vapor Mitigation Evaluation memo.

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 presented 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, Soil Vapor Mitigation Evaluation memo 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, Vapor Mitigation System as the remedy for this site. The 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 Soil Vapor Mitigation Evaluation memo.

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 reducing the potential exposures to the public health where elevated soil vapors have been detected. Alternative 3 would also comply with the threshold selection criteria but to a lower certainty and additional cost.

Alternative 1 would not satisfy the threshold criteria. Alternative 2 and Alternative 3 would each satisfy the threshold criteria, thus the five balancing criteria are particularly important in selecting a final remedy to address soil vapor at the site and in the vicinity of the site.

Achieving short term effectiveness is best accomplished by Alternative 2, which would require a short duration for implementation of the action. The relative short term impact to structures is high and would require proper coordination with the occupants. Alternative 3 would require sufficient time to properly design and install a remedial system at the site, but would only impact operations at the site. The final construction of Alternative 2 would have minimal impacts on daily activities; where as Alternative 3 would require a portion of the site to be occupied by remedial equipment.

Achieving long-term effectiveness and performance is best accomplished by Alternative 2 since a source of contamination was not identified during the investigation, the alternative is more than capable of addressing detected soil vapor contamination that poses a potential threat to the structures at the site as well as off-site, and requires minimal site controls to confirm operation of the system. Alternative 3 would address any contamination not encountered during the investigation at the site, but may not be capable of addressing contamination at off-site structures and requires additional maintenance activities to confirm site controls are operational. The off-site portion of Alternative 2 would be required as a contingency for Alternative 3, in case the operation of Alternative 3 is unable to obtain the desire effect at the off-site structures. The duration of operation for Alternative 2 is anticipated to be significantly longer than Alternative 3. An environmental easement would be required for both alternatives that limit the use of on-site groundwater.

Alternative 2 is favorable in that it is readily implementable. Alternative 3 would require a pilot test to be performed so the radius of influence of the system can be determined prior to implementation.

The cost of the alternatives varies significantly. Alternative 2 is less expensive than Alternative 3. Alternative 3 is a permanent remedy that would likely eliminate most of the continuing source of soil vapor contamination, but off-site influence of the Alterative is uncertain.

The estimated present worth cost to implement the remedy is $160,000. The cost to construct the remedy is estimated to be $140,000 and the estimated average annual costs for 30 years is $500.

The elements of the proposed remedy are as follows:

1. A remedial program would be implemented to perform the necessary construction, operation, maintenance, and monitoring activities required for the installation of three Vapor Mitigation Systems (one on-site and two-off site). Basement conditions will be upgraded at two off-site structures to address cracks.

2. Imposition of an institutional control in the form of an environmental easement that would require (a) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (b) the site property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

3. Development of a site management plan which would include the following institutional and engineering controls: (a) monitoring of sub-slab soil vapor and indoor concentrations at two additional structures, identified as AS-1 and AS-10, which had levels that did not warrant mitigation will be monitored for a minimum of three years; and (b) provisions for the continued proper operation and maintenance of the components of the remedy.

4. The site 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. 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 unless otherwise approved by the Department.

Table 1
TETRACHLOROETHENE SUB-SLAB SOIL VAPOR AND INDOOR AIR CONCENTRATIONS DETECTED AND APPROPRIATE ACTION
March to May 2008

Structure Identification	PCE Sub-Slab Soil Vapor Concentration Detected (μg/m³)[a]	PCE Indoor Air Concentration Detected (μg/m³)[a]	SCG[b, c]
1	98	4.6	Monitor
3	9.4	1.3	No Further Action
4	1.2	1.3	No Further Action
5	2.5	ND	No Further Action
6	6.9	2.0	No Further Action
7	3,000	2.2	Mitigate
8	5,000	7.3	Mitigate
9	23,000	4.6	Mitigate
10	740	1.5	Monitor
11	52	ND	No Further Action

[a] ug/m³ = micrograms per cubic meter

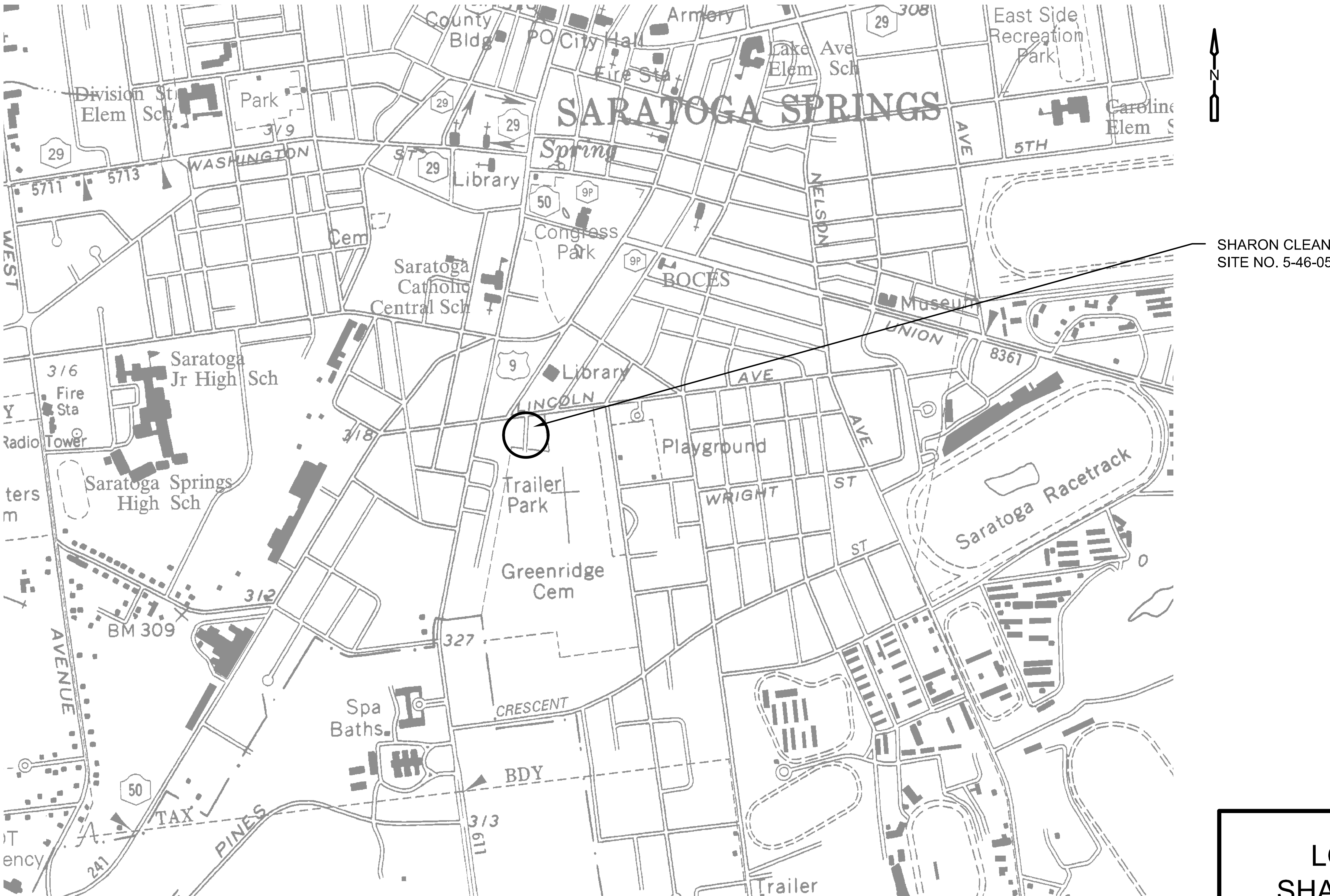
[b] SCG = standards, criteria, and guidance values;

[c] SCG = New York State Department of Health Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006, Matrix 1 and Matrix 2 requires both sub-slab soil vapor and indoor air concentrations of volatile organic compounds to determine the appropriate action. Tetrachloroethene concentrations are applied to Matrix 2.

ND = Not Detected

Table 2
REMEDIAL ALTERNATIVE COSTS

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Action	$20,000	$28,000	$48,000
Vapor Mitigation System	$140,000	$20,000	$160,000
Soil Vapor Extraction	$260,000	$110,000	$370,000



LOCATION MAP

PLAN

NOT TO SCALE

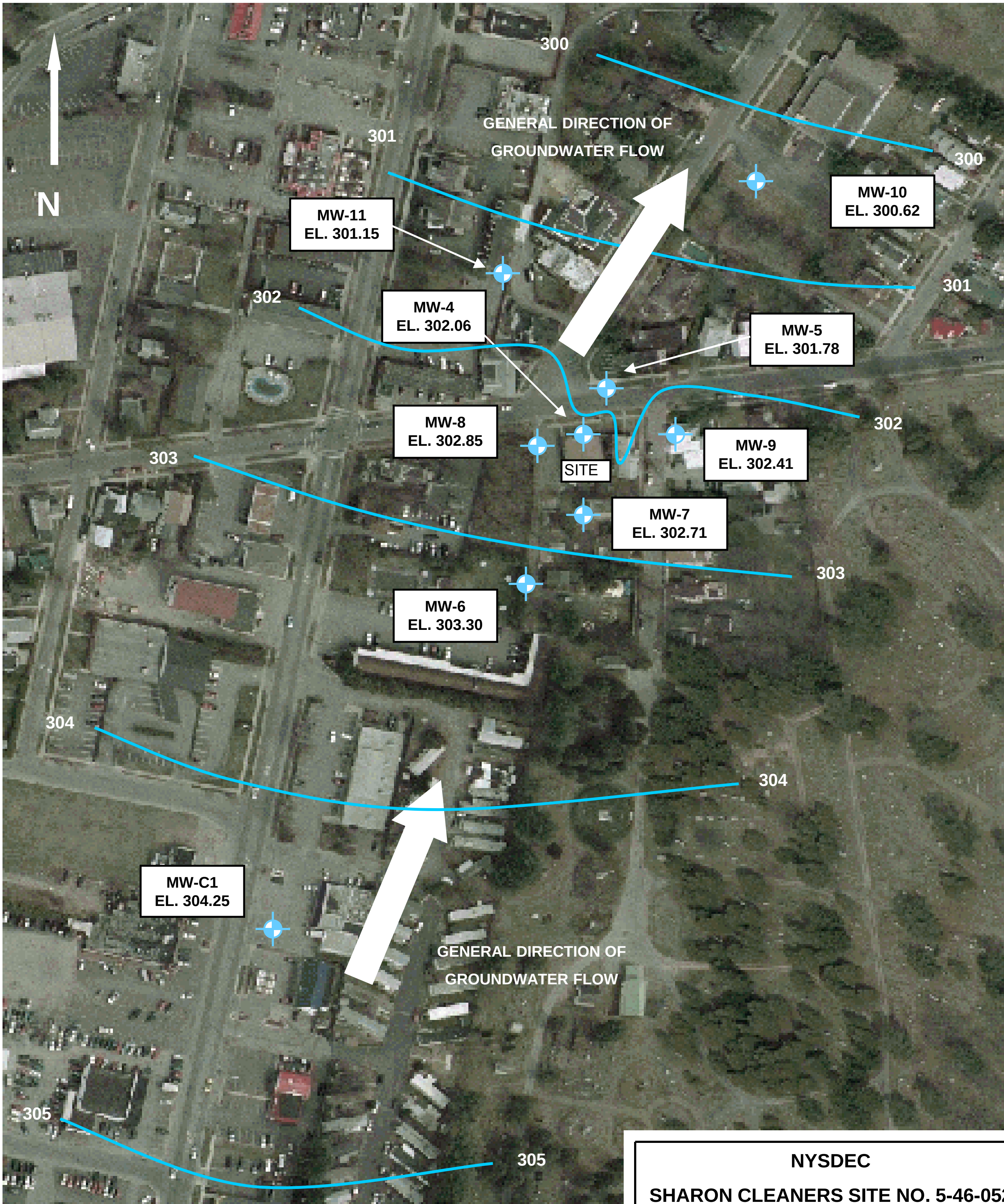
LOCATION MAP
SHARON CLEANERS

FIGURE NO.

1

CDM Camp Dresser & McKee Inc.

L:\0897\52454\grap\ 22X34_2 11/17/06 15:26 koskiar XREFS: 48 Lincoln Ave2, CDM_2234



NOTES:

1. FIGURE NOT TO SCALE. WELL LOCATIONS ARE APPROXIMATE. SEE FIGURE 3 FOR SURVEYED INFORMATION.
2. ELEVATIONS (FT AMSL) ARE TIED INTO THE UTM ZONE 18N COORDINATE SYSTEM.
3. STATIC WATER LEVELS ARE FROM 5/5-7/08 EVENT.

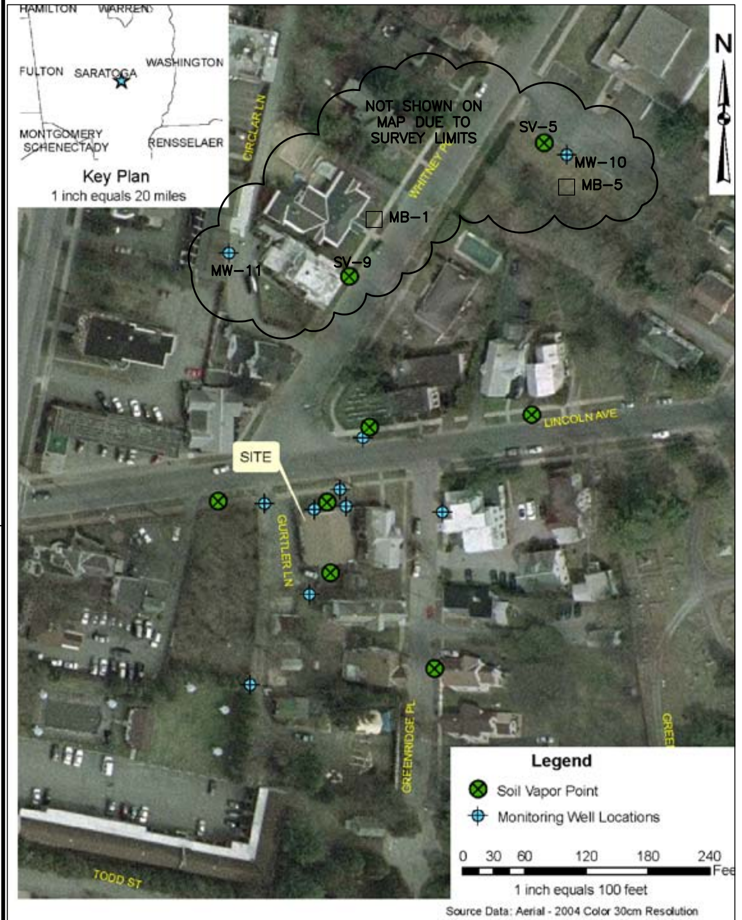
NYSDEC

SHARON CLEANERS SITE NO. 5-46-052

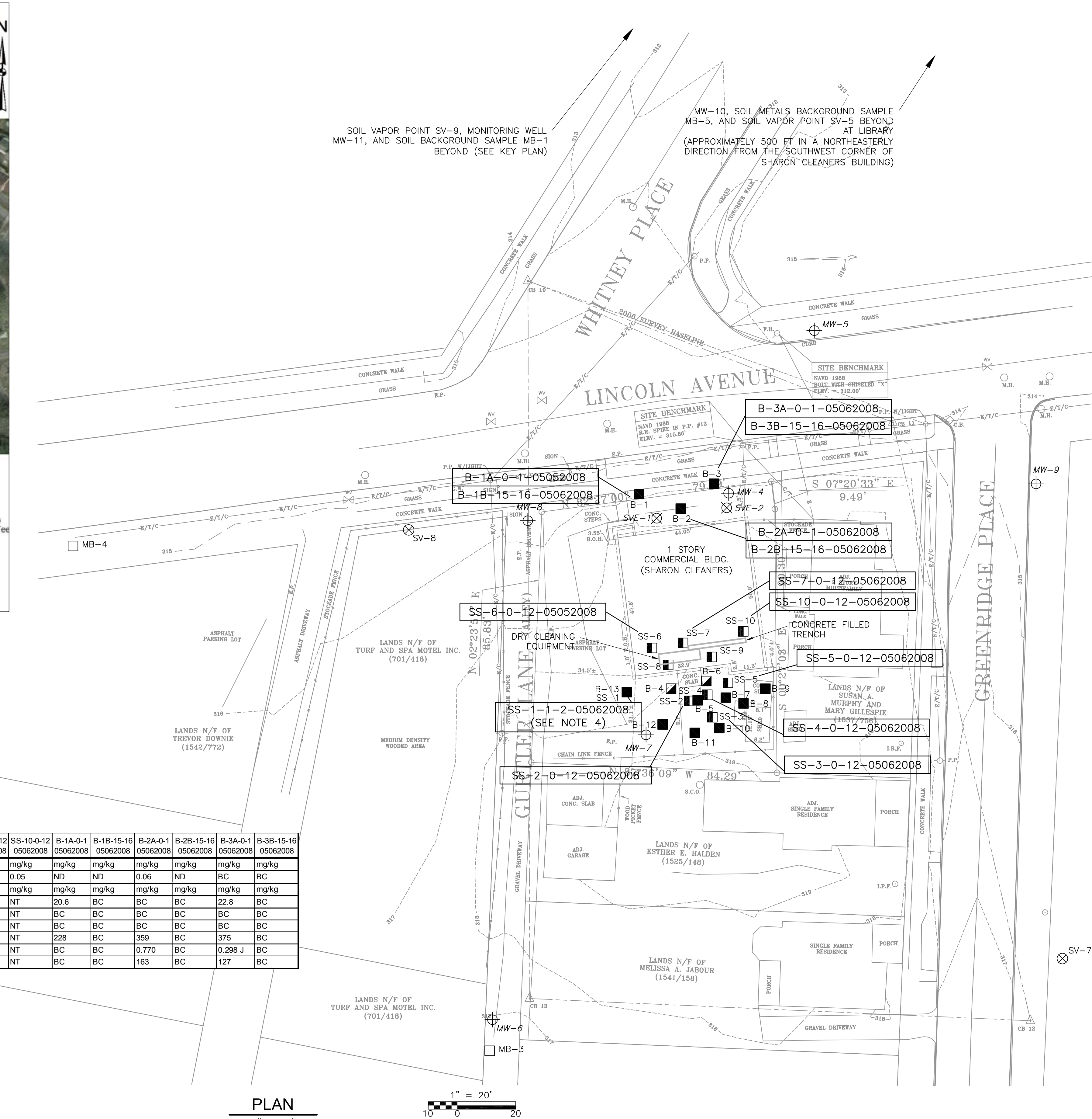
GROUNDWATER FLOW MAP

CDM

Figure 2



SAMPLE LOCATION PLAN
SHARON CLEANERS SITE NO. 5-46-052
SARATOGA SPRINGS, SARATOGA COUNTY, NEW YORK



LEGEND

- MW-5 — MONITORING WELL
- SV-7 — PERMANENT SOIL VAPOR POINT
- SVE-2 — SOIL VAPOR EXTRACTION WELL
- B-1 — SOIL BORING
- BP-5 — SOIL BORING/PIEZOMETER
- MB-1 — SOIL METALS BACKGROUND SAMPLE
- SS-1 — SOIL SAMPLE

SV-6 MB-2 SV-7

Sample ID		Part 375 Standard	SS-1-1-2 05062008	SS-2-0-12 05062008	SS-3-0-12 05062008	SS-4-0-12 05062008	SS-5-0-12 05062008	SS-6-0-12 05052008	SS-7-0-12 05062008	SS-10-0-12 05062008	B-1A-0-1 05062008	B-1B-15-16 05062008	B-2A-0-1 05062008	B-2B-15-16 05062008	B-3A-0-1 05062008	B-3B-15-16 05062008
Compound Name	CAS #															
VOC's		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Methylene Chloride	75-09-2	0.05	0.066	ND	ND	ND	ND	ND	0.051	0.05	ND	ND	0.06	ND	BC	BC
Metals		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Arsenic	7440-38-2	13	BC	BC	BC	BC	BC	BC	BC	NT	20.6	BC	BC	BC	22.8	BC
Chromium	7440-47-3	30	BC	BC	BC	193	BC	BC	BC	NT	BC	BC	BC	BC	BC	BC
Copper	7440-50-8	50	71.2	BC	BC	BC	BC	BC	BC	NT	BC	BC	BC	BC	BC	BC
Lead	7439-92-1	63	1100	189	168	963	119	BC	227	NT	228	BC	359	BC	375	BC
Mercury	7439-97-6	0.18	0.492	0.354	BC	0.188	BC	BC	0.291	NT	BC	BC	0.770	BC	0.298 J	BC
Zinc	7440-66-6	109	370	199	183	624	477	BC	256	NT	BC	BC	163	BC	127	BC

NOTE:

1. SITE BACKROUND FOR LEAD WAS 148mg/Kg AND MERCURY WAS 0.229mg/Kg

B – BORING
D – DILUTION
J – ESTIMATED VALUE
ND – NON DETECT
SS – SURFACE SOIL OR SUB SLAB
BC – BELOW CLEANUP OBJECTIVES
NT – NO TEST

NOTES:

1. REFERENCE SURVEY MAP BY S.Y. KIM LAND SURVEYOR, P.C., 592 NEW LOUDON ROAD, LATHAM, N.Y. 12110. HORIZONTAL AND VERTICAL POSITIONS TIED INTO NAD 1983 AND UTM ZONE 18N COORDINATE SYSTEM. NEW POINTS BASED ON MEASUREMENTS MADE IN THE FIELD.
2. SOME POINTS ARE ONLY REFERENCED, AND NOT SHOWN ON THE MAP DUE TO THE LIMITS OF THE CURRENT SURVEY. SEE NYSDEC FIGURE INSERT FOR COMPLETE MAP.
3. SOIL CONCENTRATIONS ARE IN mg/kg.
4. SOIL SAMPLE SS-1 WAS COLLECTED BENEATH THE PAVEMENT.
5. SEVERAL ADDITIONAL SAMPLES WERE TAKEN, BUT WERE NOT DETECTED ABOVE THE UNRESTRICTED USE SOIL CLEANUP OBJECTIVES. THE FOLLOWING SUMMARIZES THE SAMPLES THAT WERE TAKEN, TESTED AND HAD RESULTS BELOW THE CLEANUP OBJECTIVES. THE SUB-SLAB SAMPLES SS-8, SS-9 AND SS-10 WERE TESTED FOR VOC'S AND THE RESULTS WERE UNDER THE CLEANUP OBJECTIVES (THESE SAMPLES WERE NOT TESTED FOR METALS). THE SURFACE SOIL SAMPLE B-2A WAS TESTED FOR VOC'S AND METALS AND THE RESULTS WERE BELOW THE CLEANUP OBJECTIVES. DEEP (15-16 FEET BELOW THE GROUND SURFACE) SOIL SAMPLES WERE TAKEN AT B-1B AND B-2B, WERE TESTED FOR VOC'S AND METALS, AND HAD RESULTS BELOW CLEANUP OBJECTIVES. DEEP SAMPLES B-4, B-5, B-6, B-7, B-8, B-9, B-10, B-11, B-12 AND B-13, RANGING FROM 10-16 FEET BELOW GROUND SURFACE, WERE TESTED FOR VOC'S AND FOUND TO BE BELOW CLEANUP OBJECTIVES (THESE SAMPLES WERE NOT TESTED FOR METALS).

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L LIVERMORE
DRAWN BY: M KOSKI
SHEET CHK'D BY: L LIVERMORE
CROSS CHK'D BY: M MILLIAS
APPROVED BY:
DATE: FEBRUARY 2009

CDM
Camp Dresser & McKee
Salina Industrial Powerpark
One General Motors Drive
Syracuse, NY 13206
Tel: (315) 434-3200
consulting • engineering • construction • operations

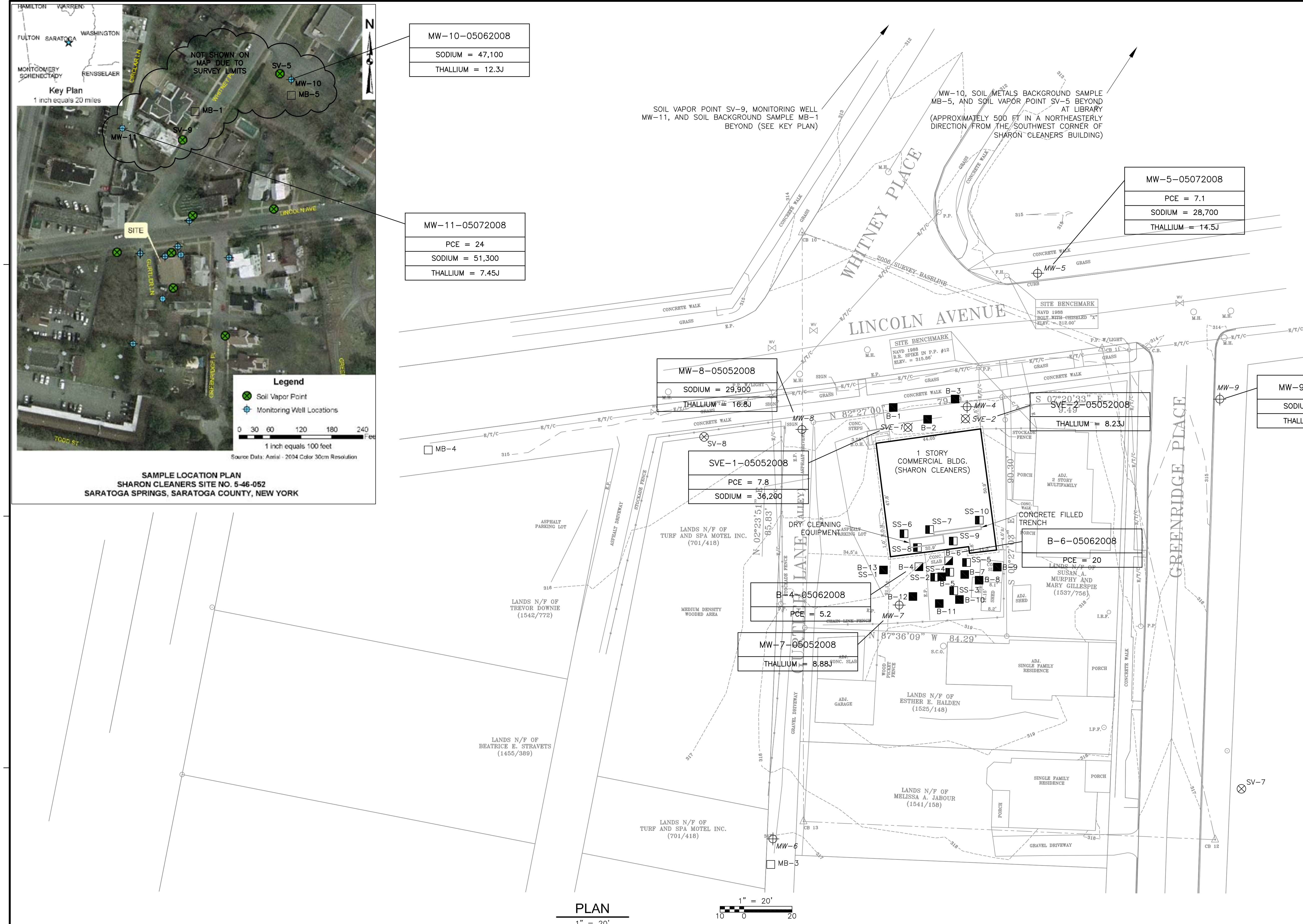
NYSDEC

SHARON CLEANERS SITE NO. 5-46-052

SOIL INVESTIGATION EXCEEDANCES OF UNRESTRICTED USE SOIL CLEANUP OBJECTIVES FOR VOC'S AND METALS - MAY 2008

PROJECT NO. 0897-62894
FILE NAME: FIG 6.DWG
SHEET NO. 3

C:\CAD\0897\62894\dwg\ fig 6 02/12/09 08:15 koskiar XREFS: 48 Lincoln Ave2, CDM_2234



LEGEND

MW-5	MONITORING WELL
SV-7	PERMANENT SOIL VAPOR POINT
SVE-2	SOIL VAPOR EXTRACTION WELL
B-1	SOIL BORING
BP-5	SOIL BORING/PIEZOMETER
MB-1	SOIL METALS BACKGROUND SAMPLE
SS-1	SOIL SAMPLE

NOTES:

1. REFERENCE SURVEY MAP BY S.Y. KIM LAND SURVEYOR, P.C., 592 NEW LOUDON ROAD, LATHAM, N.Y. 12110. HORIZONTAL AND VERTICAL POSITIONS TIED INTO NAD 1983 AND UTM ZONE 18N COORDINATE SYSTEM. NEW POINTS BASED ON MEASUREMENTS MADE IN THE FIELD.
2. SOME POINTS ARE ONLY REFERENCED, AND NOT SHOWN ON THE MAP DUE TO THE LIMITS OF THE CURRENT SURVEY. SEE NYSDEC FIGURE INSERT FOR COMPLETE MAP.
3. GROUNDWATER CONCENTRATIONS ARE IN ug/L. "J" AFTER CONCENTRATIONS MEANS AN ESTIMATED VALUE.
4. CONCENTRATIONS CALLED OUT ON THIS DRAWING ARE ABOVE THE STANDARD LEVELS PUT FORTH IN THE AWQS.
5. GROUNDWATER STANDARDS ARE AS FOLLOWS:
   IRON = 600 ug/L
   SODIUM = 20,000 ug/L
   THALLIUM = 0.5 ug/L
   PCE = 5 ug/L

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L CROCKER
DRAWN BY: M KOSKI
SHEET CHK'D BY: L CROCKER
CROSS CHK'D BY: M MILLIAS
APPROVED BY:
DATE: FEBRUARY 2009

CDM
Camp Dresser & McKee
Salina Industrial Powerpark
One General Motors Drive
Syracuse, NY 13206
Tel: (315) 434-3200
consulting • engineering • construction • operations

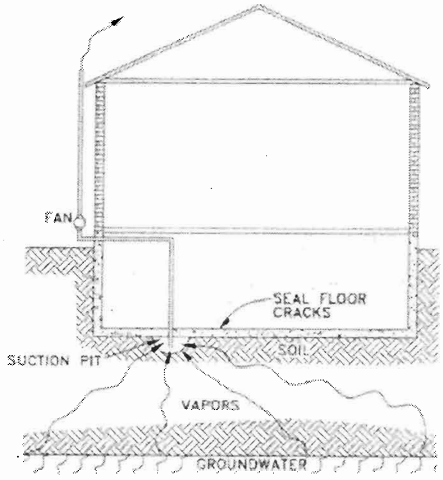
NYSDEC

SHARON CLEANERS SITE NO. 5-46-052

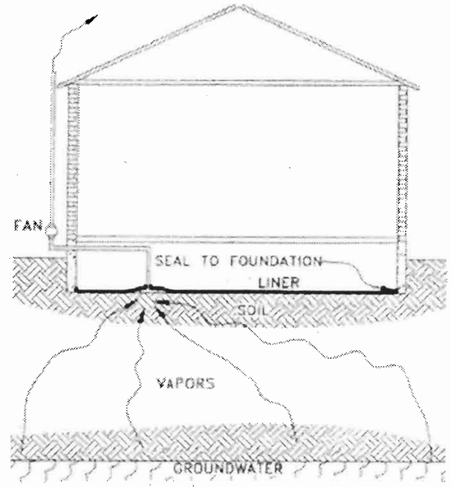
GROUNDWATER INVESTIGATION EXCEEDANCES FOR VOC'S AND METALS - MAY 2008

PROJECT NO. 0897-62894
FILE NAME: FIG 5.DWG
SHEET NO. 4

C:\CAD\0897\62894\dwg\ fig 5 02/12/09 08:08 koskiar XREFS: 48 Lincoln Ave2, CDM_2234



SUB-SLAB DEPRESSURIZATION



SUB-MEMBRANE DEPRESSURIZATION

Source: Folkes, D.J. and Kurz, D.W.. Proceedings: Indoor Air 2002

Operation Principles

A) Sub-slab depressurization - Suction pits are created below the concrete floor slabs by drilling a hole through the slab, ideally but not necessarily located near the middle of the slab. The hole is then hand-excavated to form a void in the soil to increase the effectiveness of the depressurization system. A PVC pipe from the suction side of the fan is inserted in the hole. The annular space between the pipe and the slab, and any visible cracks and joints in the floor, is sealed with acrylic latex caulk or some compound that is impermeable to air. In most single family homes, one suction point should be sufficient to depressurize the floor area. According to NYSDOH guidelines, to avoid entry of subsurface vapors into the building, the vent pipe's exhaust must be above the roof (preferably, above the highest eave of the building at least 12 inches above the surface of the roof), at least 10 feet above ground level, at least 10 feet away from any opening that is less than 2 feet below the exhaust point, and 10 feet from any adjoining or adjacent buildings, or HVAC intakes or supply registers.

B) Sub-membrane depressurization - In homes with a crawl space, a cross-laminated polyethylene membrane or liner is placed over the dirt floor and sealed to the concrete foundation walls using acrylic latex adhesive. The end of the pipe from the suction side of the fan is inserted through a hole cut in the liner. The liner is sealed to the pipe at the penetration hole using vinyl tape to prevent loss of vacuum. When concrete footings divide the crawl space, a separate suction point is generally installed in each separate area between the footings. The fan is installed outside the house and the pipe is routed up the outside wall to exhaust above the roof line.

SHARON CLEANERS SITE NO. 5-46-052	
SCHEMATICS OF A VAPOR MITIGATION SYSTEM	Figure 5