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Feasibility Study

Former Safety Kleen Dry Cleaners

Site # 336078, Vails Gate, Orange County, New York

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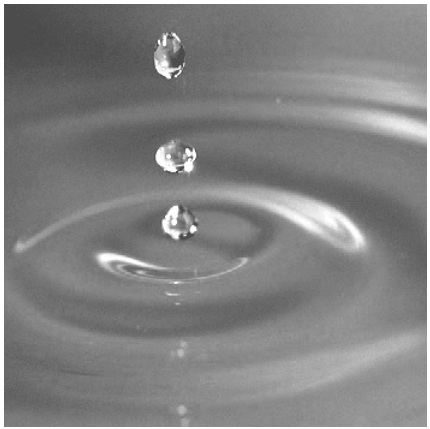

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Professional Engineer Certification

I, Matthew J. O'Neil, certify that I am currently a NYS registered professional engineer and that this Feasibility Study was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

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1. Purpose

1.1 Introduction

This report presents a Feasibility Study (FS) for the Former Safety Kleen Dry Cleaner Site in Vails Gate, Orange County, New York (the Site). The site is subject to an Order on Consent and Administrative Settlement between VGR Associates, LLC and the New York State Department of Environmental Conservation (NYSDEC) dated March 11, 2011 for a dry-cleaning fluids release from Suite 700.

The Site is located in the Price Chopper Shopping Plaza at the corner of Temple Hill Road and Route 94. Temple Hill Road borders the site on the East side, Route 94 on the South side, and undeveloped land borders the site on the North and West sides of the site. The site location is shown on Figure 1.

Site operations began in the early1970s and is continuing through the present day. The specific location of the facilities remain as they were dating back to the 1970s. Multiple Phase II Environmental Site Assessments and subsurface investigations have been performed at the Site in response to NYSDEC directives beginning in 1998. Subsequent investigations from 1998 through 2011 have delineated subsurface impacts at the Site. A Remedial Investigation was conducted in October 2011 to further investigate chlorinated solvent contamination affecting soil, groundwater, and air quality at the Site. A Sub Slab Depressurization System (SSDS) was installed at the site as an Interim Remedial Measure (IRM) in 2013. Sampling of sub-slab soil vapor and indoor air indicate that the SSDS has been effective in reducing the concentrations of the dry-cleaning related chemicals in soil vapor and indoor air.

A *Phase I Environmental Site Assessment Report, Price Chopper Shopping Plaza, Vails Gate, New York (Nova Consulting Group, Inc. 2007)* (Phase I Report) summarizes the findings of the site investigations and recommends further remedial action to eliminate migration pathways and/or eliminate impacts.

1.2 Report Organization

This document has been organized in accordance with *DER-10* Remedy Selection Reporting Requirements Section 4.3(b) and includes the following sections:

- Executive Summary
- Purpose
- Site Description and History
- Summary of Remedial Investigation and Exposure Assessment

- Remedial Goals and Remedial Action Objectives
- General Response Actions
- Identification and Screening of Technologies
- Development and Analysis of Alternatives
- Recommended Remedy

2. Site Description and History

2.1 Site Description

The former Safety Kleen Dry Cleaners is located in Suite 700 at 115 Temple Hill Road in New Windsor, NY. The current tenant of the former Safety Kleen Dry Cleaners is the Vails Gate Laundromat. The remainder of the site is the Price Chopper Shopping Plaza which includes a multi-tenanted retail shopping center. The site is 10.8 acres with a 121,349 square feet building which houses the multi-tenanted retail shopping center. Figure 2 is a site plan including the location of the former Safety Kleen Dry Cleaners.

The FS will be prepared in accordance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (DER-10). It is our understanding that the site is subject to an Order on Consent and Administrative Settlement between VGR Associates, LLC and the NYSDEC dated March 11, 2011 for a dry-cleaning fluids release from Suite 700.

2.2 Site History

The Site consisted of undeveloped woodland or residential areas until approximately 1970 when the existing Site buildings were constructed. Aerial photographs reviewed dating back to 1971 reveal the current retail shopping center and parking lots were in their current location and configuration. As recently as 2007, Suite 700 held tenant Expert Dry Cleaning & Laundry Service, a dry cleaning facility and laundromat. Historical and regulatory information has identified one dry cleaning and laundering facility has operated at the site since 1970. The facility has undergone changes in the tenant's name, including Norgetown Cleaners, Vails Gate Cleaners, and Expert Dry Cleaning and Laundry Service.

The onsite dry cleaning facility formerly known as Vails Gate Cleaners has been the subject of multiple investigations since 1998 with studies performed in accordance with the NYSDEC Voluntary Cleanup Program (VCP) since 1999.

3. Summary of Site Investigations and Exposure Assessment

3.1 Nature and Extent of Contamination

The following sections outline the nature and extent of contamination in each media at the site (soil, groundwater, soil vapor, and indoor air). The data discussed in the sections below are based on the sampling and findings of the following documents reviewed by GEI:

- Phase I Environmental Site Assessment Report, Price Chopper Shopping Plaza prepared by Nova Consulting Group, Inc. (Nova), November 30, 2007.
- Interim Remedial Investigation Report, Revision 1, prepared by Solutech Environmental Consultants (Solutech), May 17 2012.
- Ambient Air Sampling Event Report, prepared by Solutech, June 2015.
- Sub-Slab and Ambient Air Sampling Report Addendum, prepared by Solutech, August 26, 2015.
- Proposed Sub-Slab Depressurization System, Former Safety Kleen Dry Cleaners, prepared by Solutech, December 3, 2012.
- Interim Remedial Investigation Report Response to Comments, Former Safety Kleen Dry Cleaners, prepared by Solutech, June 13, 2013.Interim Remedial Investigation Report Response to Comments, Former Safety Kleen Dry Cleaners, prepared by Solutech, May 23, 2014.
- Sub-Slab and Ambient Air Sampling Event Report Response to Comments, prepared by Solutech, December 31, 2014
- Sub-Slab and Ambient Air Sampling Event Report, prepared by Solutech, June 1, 2015

3.1.1 Subsurface Soil

Seven borings were advanced on the property during in October, 2011 by Solutech during the Interim Remedial Investigation (Interim RI). The boring and sample locations referenced below are depicted on Figure 2. A summary of the analytical detections is presented on Table 1.

Brown, silty clay with rock fragments was observed to a depth of 17 feet where the lithology changed to a dense, gray till. A water saturated (perched) zone consisting of sandy clay was observed between 5 and 9 feet, however the ambient groundwater table was not encountered above the till surface.

Soils were screened with a Photo Ionization Detector (PID) for organic vapors. At boring SB-MW-7, located between Suite 600 and Suite 700, organic vapors were detected in samples collected from depths of 9 to 17 feet with concentrations ranging from 1.6 to more than 15,000 parts per million (ppm). Soil borings SB-5, SB-4, and SB-2 also recorded concentrations above the PID detection limit, ranging from 0.7 to 24.4 ppm, but no recorded concentrations as high as SB-MW-7.

Soil samples which exhibited elevated PID readings from each boring were collected for laboratory analysis according to Environmental Protection Agency (EPA) Method 8260 for volatile organic compounds. All analytical soil samples collected met the New York State Commercial Use Soil Cleanup Objectives (Commercial Use SCOs). Two compounds, Tetrachloroethene (PCE) and acetone, were detected above the New York State Unrestricted Soil Cleanup Objectives (Unrestricted SCOs) of 1,300 micrograms per kilogram (µg/kg) and 50 µg/kg respectively.

Tetrachloroethene (PCE) was detected in soil samples collected from borings SB-2, SB-3, SB-4, SB-5, and SB-MW-7 with the highest concentration detected in the sample from SB-MW-7 (26,900 µg/kg). PCE concentrations detected in the soils samples collected from borings SB-3, SB-5, and SB-MW-7 exceeded the Unrestricted Use SCO of 1,300 µg/kg. However the concentrations detected in the soil samples collected from these borings met the New York State Commercial Use Soil Cleanup Objective (Commercial Use SCO) of 150,000 µg/kg.

Acetone was detected in soil samples collected from borings SB-2, SB-3, and SB-4 with the highest concentration detected in the sample from SB-2 (57 µg/kg). The acetone concentration detected in the soil sample collected from boring SB-2 exceeded the Unrestricted Use SCO of 50 µg/kg. However the concentrations detected in the soil samples collected from these borings met the Commercial Use SCO of 500,000 µg/kg.

Trichloroethene (TCE) and cis-1,2-Dichloroethene (DCE) were detected in SB-3 and SB-4 at concentrations meeting the Unrestricted Use SCOs.

2-Butanone (Methyl Ethyl Ketone or MEK) was detected in SB-2, SB-3, and SB-4 at concentrations meeting the Unrestricted Use SCOs.

3.1.2 Groundwater

A water saturated (perched) zone consisting of sandy clay was observed between 5 and 9 feet, however the ambient groundwater table was not encountered during previous investigation. During the interim RI, perched water was sampled from six monitoring wells to be analyzed for volatile organics according to EPA method 8260. The well locations and the extent of groundwater impacts above the Ambient Water Quality Standards (AWQS) are presented on Figure 4. A summary of the analytical detections is presented on Table 2.

- PCE was detected in perched water samples collected from MW-7 at a concentration of 127,000 micrograms per liter (µg/L). PCE was also detected in MW-2 (1,650 µg/L), MW-2-2 (duplicate; 1,270 µg/L), and MW-1R (22.8 µg/L). These concentrations exceed the New York State Ambient Water Quality Standards for GA groundwater (AWQS) of 5 µg/L.

- TCE was detected in MW-7 (151 µg/L), MW-2 (25.1 µg/L), and in MW-2-2 (28.6 µg/L) at concentrations greater than the AWQS of 5 µg/L.

- DCE was detected in samples collected from MW-2 (37.5 µg/L) and MW-2-2 (46.7 µg/L) at concentrations greater than the AWQS of 5 µg/L.

- Vinyl Chloride (VC) was detected in sampled collected from MW-2 (151 µg/L) and MW-2-2 (17.8 µg/L) at concentrations greater than the AWQS of 2 µg/L.

- Xylene and 1,1,1-Trichloroethane were detected in MW-7 at concentrations of 5.3 and 57.7 µg/L, respectively. These concentrations are greater than their AWQS of 5 µg/L.

The highest concentration of dry cleaning related chemicals in soil (i.e. PCE and associated breakdown products) were found in monitoring well MW-7 (located to the west of Suite 700) and MW-2 (located to the north of Suite 700).

3.1.3 Soil Vapor

Sub-slab vapor points were installed in several of the suites between 2012 and 2015. The vapor monitoring point locations are presented on Figure 2.

Soil Vapor Monitoring Point ID	Suite Number	Business Name
VP-1	Suite 600	Bluepers Billiards Hall
VP-2	Suite 700	Former Dry Cleaners
VP-3	Suite 800	Overtones Salon
VP-4	Suite 400	Price Choppers
VP-5	Suite 400	Price Choppers
VP-6	Suite 900	Marcella Pizza
VP-7	Suite 1000	Vacant Space
VP-8	Suite 600	Bluepers Billiards Hall
VP-9	Suite 1100	Radio Shack
SSVP-1	Suite 1200	Chinese Restaurant
SSVP-2	Suite 1300	Dollar Tree

Sub-slab vapor samples were collected and were analyzed for EPA TO-15 compounds. A summary of the analytical detections is presented on Table 3. PCE was detected in the sub-slab vapor samples collected from 10 of the 11 sample locations from 2011 to 2014. The pre- and post-SSDS sampling at many of the locations show significant reductions in the sub-slab soil vapor concentrations of PCE. As noted below, the reductions at the locations closest to the former dry cleaner release have decreased over 95% since the SSDS was implemented.

Soil Vapor Monitoring Point ID	Initial Concentration ($\mu g/m^3$)	2014/2015 Concentration ($\mu g/m^3$)	Percent Reduction
VP-1	2,280	90.2	96.04%
VP-2	1,480,000	2,350	99.84%
VP-3	90,800	386	99.57%
VP-6	63,700	329	99.62%
VP-7	26	7.6	70.77%
VP-8	27	11	59.26%
VP-9	9,090	132	96.04%

3.1.4 Indoor Air

Indoor air samples were collected in several of the suites between 2012 and 2015 and north of Suite 700 representative of ambient background air. The indoor air sampling locations are presented on Figure 2. A summary of the analytical detections is presented on Table 4. PCE,

TCE, and DCE were detected in indoor air at concentrations greater than the 95th Percentile New York State Department of Health Background Indoor Air Concentrations.

The pre- and post-SSDS sampling at many of the locations show significant reductions in the indoor air concentrations of PCE. As noted below, the reductions at the locations east of the former dry cleaner release have decreased over 94% since the SSDS was implemented.

Soil Vapor Monitoring Point ID	Maximum Concentration (µg/m³)	2014/2015 Concentration (µg/m³)	Percent Reduction
Suite 600	12	8	32.50%
Suite 900	1,260	13	98.97%
Suite 1000	2,260	Not Detected	100%
Suite 1100	182	10.5	94.23%

The low levels of PCE in indoor air have persisted in Suite 600 west of the initial release.

3.2 Sub-Slab Depressurization System Interim Remedial Measure

An Interim Remedial Measure (IRM) was implemented at the site in 2013. The approximate locations of the system components are shown on Figure 5. The IRM consisted of the installation of two Sub-Slab Depressurization Systems (SSDS) intended to reduce the potential for soil vapor intrusion into the buildings. The blower for the first system is located on the northern with sub-slab vacuum extraction points located in Suite 700, Suite 900, and Suite 1000. The blower for the second system is mounted on the outside of the western wall of Suite 600 (Bluepers Billiards) with one sub-slab vacuum extraction point in Suite 600. The blowers are mounted above grade on equipment racks with a sheet metal cover to protect the equipment. The systems operate approximately 12 hours per day during the overnight period to reduce the noise of the blowers during operations of the retail businesses. Vacuum monitoring points are located in Suites 600 (VP-1), 700 (VP-2), 800 (VP-3), and 900 (VP-6) in the vicinity of the vacuum extraction points. Additional vacuum monitoring points are located in Suite 1000 (VP-7). Suite 1100 (VP-9), Suite 1200 (VP-10) and Suite 1300 (VP-11). Vacuum readings of 0.1 inches of water or greater have been measured at all but two locations (VP-10 and VP-11). These locations are the furthest from a vacuum extraction point.

The first system was activated on January 29, 2013 with a single vacuum extraction point located in Suite 700. As a result of the initial vacuum measurements, the additional vacuum extraction system pointed were installed in Suites 800 and 1000 and the second system was installed at Suite 600.

3.3 Summary of Impacted Media and Contaminants of Concern

Based on the findings of the remedial investigations, the impacted media requiring remedial action are subsurface soil, perched groundwater, and soil vapor/indoor air. There is limited potential human exposure to contaminants present in soil and groundwater under the current site use. The potential exposure to subsurface soil and groundwater is only anticipated to occur for potential future construction at the site. However, these media are the source of soil vapor and indoor air contamination identified at the site. As a result, these media require mitigation via remedial action. There are no potential ecological exposures of significance.

Contaminants of concern are the dry cleaner related volatile organic compounds PCE, TCE, and DCE.

4. Remedial Goals and Remedial Action Objectives

4.1 Remedial Goals

The NYSDEC's Remedy Selection guidance puts forth the following remedial goals:

- Restoration of the site to pre-disposal/pre-release conditions, to the extent feasible and authorized by law.
- At a minimum, to eliminate or mitigate all significant threats to public health and the environment presented by the contaminants disposed at the site through the proper application of scientific and engineering principles.
- Where an identifiable source of contamination exists at a site, it should be removed or eliminated, to the extent feasible, regardless of presumed risk or intended use of the site.

Restoration to pre-disposal/pre-release conditions may not be feasible without demolition of the existing buildings at the site. A remedial alternative to achieve this level of remediation will be analyzed in this FS to provide a sense of the scale of such an undertaking and the detrimental effects such an alternative would have on the existing businesses at the property.

The Site Remedial Goals, therefore, are (1) eliminate or mitigate all significant threats to public health and the environment; and, (2) remove or eliminate, to the extent feasible, identifiable sources of contamination, regardless of intended use of the site or presumed risk.

4.2 Remedial Action Objectives

Remedial Action Objectives (RAOs) are medium-specific or operable-unit specific objectives for the protection of public health and the environment. The RAOs for the Site support and are consistent with the Site Remedial Goals presented above. Based on the findings of the Remedial Investigations, the following Remedial Action Objectives have been developed for the Site:

4.2.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.

- Prevent, to the extent practicable, contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.

- Remove the source of ground or surface water contamination.

4.2.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

- Prevent, to the extent practicable, inhalation exposure to contaminants volatilizing from soil

4.2.3 Soil Vapor

RAOs for Public Health Protection

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

5. General Response Actions

5.1 General Response Actions

General response actions describe those actions that will satisfy the RAOs. General response actions are medium-specific. The general response actions are evaluated in the context of the volume or areas of media to which they might be applied. The general response actions described below include No Action, Excavation, Treatment, Containment, and Institutional Controls.

5.1.1 No Action

In many feasibility studies, the no action response is typically identified and carried through the evaluation process as a point of comparison for other actions.

5.1.2 Excavation

Excavation is applicable to the soil and contaminant source areas at the Site. Excavation of impacted soils, structures, and contaminant source areas in the unsaturated zone would be accomplished using conventional construction equipment and methods. Excavation in the saturated zone would require significant earth support and dewatering systems. Soil or source materials removed by excavation would need to be further remediated by disposal or treatment.

5.1.3 Treatment

Treatment is applicable to the soil, groundwater, and source materials. Treatment alters the physical and/or chemical nature of the media to cause a change in contaminant mass, mobility, or toxicity. Treatment can be accomplished in-situ or ex-situ. Examples of in-situ treatment include chemical oxidation, biological degradation, thermal treatment, and stabilization. Ex-situ treatment technologies include thermal treatment and incineration.

5.1.4 Containment

Containment is applicable to the contaminant sources, groundwater, and soil at the site. For groundwater, containment actions involve isolation of contaminants by constructing and maintaining physical barriers or systems that prevent potential migration. These include sheet pile walls, soil-bentonite cutoff walls, and active hydraulic control. For soil, containment actions include constructing cover systems or other barriers to prevent contact with the soil.

5.1.5 Institutional Controls

Institutional controls are applicable to soil, contaminant sources and groundwater. These actions include access control measures, deed restrictions, and established procedures for managing ground-intrusive work. Specific institutional controls would be tailored to the remedy chosen and the ultimate use of the property. More information on typical institutional controls that may be appropriate for the site is provided below.

Access control measures, such as fencing, security and general monitoring of the site, help to prevent someone who is not knowledgeable of site conditions from performing ground-intrusive work and creating a potential exposure pathway to remaining contaminants.

A deed restriction and/or environmental easement is a legal instrument that would serve to notify any potential future property owners of the environmental conditions and any use restrictions placed on the site, such as a prohibition on using groundwater beneath the site.

Procedures for managing ground-intrusive work include establishing a protocol for overseeing worker and public health and safety and an excavation plan for managing any contaminated soil or groundwater removed during the work.

An important component of any institutional control program is ongoing monitoring of the effectiveness of the controls. This includes annually certifying that the controls are in place and are effective.

6. Identification and Screening of Technologies

6.1 Introduction

This section evaluates potentially applicable technologies to determine those that can be effectively implemented at the Site to achieve the remediation goals. Information presented in the Remedial Investigation on contaminant types, distribution and location and on the Site's physical characteristics are used to screen the technologies to determine which can be successfully implemented and which will not be feasible.

6.2 Technology Identification and Screening

Technology identification and screening involves the following steps:

- Assessment of technical issues posed by the site and the project.
- Identification of potentially applicable technologies.
- Preliminary screening of the technologies with respect to implementability, effectiveness and cost.

6.2.1 Technical Issues

The primary technical issues affecting the implementability and effectiveness of potential technologies at the site are: the location of the impacted soil and groundwater relative to the existing structures, the relatively tight soil matrix, and the current use and anticipated continued use of the property for commercial businesses.

PCE is a man-made chemical that has seen widespread use in dry cleaning facilities. TCE is another chlorinated solvent that along with PCE is used in dry cleaning which adversely affects soil, groundwater, and indoor air quality. These chemicals tend to volatilize and vapors seep into buildings from the source of the contamination, thus affecting the indoor air quality. Remediation of PCE and TCE can difficult even though they are common contaminates that impact many sites across the United States.

Dry cleaners are typically found in commercial areas with other buildings and infrastructure. Remediation systems appropriate for removing contamination in one location may not be a viable option for more commercialized settings. One issue with soil vapor extraction and air sparging systems is the noise component that comes with operating these systems, which may not be publicly acceptable.

The Former Safety Kleen Dry Cleaners is located in the Price Chopper Shopping Plaza. This shopping plaza also contains a strip mall with a mix of retail and commercial spaces. The installation of a remediation system or other alternative would need to be performed with minimal disruption to other businesses located in the shopping plaza. Similar considerations should be made if the selected alternative also requires regular maintenance to the system.

Similarly to limiting the disruption of other businesses near the Former Safety Kleen Dry Cleaners, the choice of remedial alternative is also based on the space available for such an alternative. Location of utilities, availability of parking spaces, and noise production can significantly influence the selection of an alternative. For example, selection of an alternative requiring the demolition of Suite 700 and excavation of all chlorinated solvent contamination would have a significant negative impact on the other businesses located at the property.

The site lithology of the Price Chopper Shopping will also have an influence the selection of the remedial alternative. Seven soil borings were advanced which determined a brown, silty clay with rock fragments to a depth of 17 feet underlain by a dense, gray till. A perched water table zone consisting of sandy clay at a depth of 5 to 7 feet below grade has resulted in a relatively isolated area of chlorinated solvent contamination in groundwater. Remediation using vapor extraction technologies could result in the removal of large amounts of this contamination, as well as limit the potential for vapor intrusion from the contamination without the need for extensive excavation.

6.2.2 Technology Identification

Potential remedial technologies were identified from experience and review of available technical publications. The technologies are categorized according to the general response actions developed in Section 5 and are summarized in Table 5.

6.2.3 Technology Screening

Table 5 also presents a screening evaluation of the technologies, according to the following criteria: effectiveness, implementability, and cost. As shown on Table 5, technologies that are not considered implementable or effective will not be retained for further analysis.

6.3 Summary of Retained Technologies

The technologies retained for further analysis are:

- Excavation
- Off-Site Treatment and Disposal
- Air Sparge/Soil Vapor Extraction
- Sub-Slab Depressurization
- Hydrogen Release Compound (HRC) Injection
- Engineered Cap/Cover System
- Institutional Controls

In the next section, these technologies are combined into comprehensive site-wide alternatives.

7. Development and Analysis of Alternatives

7.1 Introduction

This section assembles retained remedial actions and technologies into a list of site-wide remedial alternatives. These alternatives are then described in detail and then evaluated against seven criteria as specified in DER-10. Lastly, a comparative analysis of the alternatives is presented.

7.2 Remedial Alternatives

In consideration of technological, Site, medium, and contaminant-specific factors, the following alternatives were developed for consideration and evaluation to achieve the NYSDEC's overall remedial goal:

"Where an identifiable source of contamination exists at a site, it should be removed or eliminated, to the extent feasible, regardless of presumed risk or intended use of the site."

The alternatives are developed for consideration and evaluation include the following:

- Alternative 1 includes demolition of existing structures, excavation and offsite disposal/recycling of soil and demolition debris.
- Alternative 2 includes modifying the existing SSDS to 24 hour operation, installation of an air sparge/soil vapor extraction system, and institutional controls.
- Alternative 3 includes modifying the existing SSDS to 24 hour operation, HRC injection, and institutional controls.
- Alternative 4 includes modifying the existing SSDS to 24 hour operation and institutional controls.
- Alternative 5 is the "No Action" alternative. This includes continued overnight operation of the existing SSDS and institutional controls.

For Alternatives 2, 3, 4 and 5, the existing buildings, foundations, and pavement provide an effective composite cover system to prevent direct exposure to soil.

7.3 Description of Alternatives

Each of the four alternatives is described in more detail below, using the context of Section 4.2(a)5(ii) of the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation.

7.3.1 Alternative 1: Demolition and Excavation of All Impacts

As shown on **Figure 6**, Alternative 1 includes demolition and excavation of all impacts which will include the demolition of Suite 700 in the Price Chopper Shopping Plaza as well as portions of the adjacent suites and the excavation of all chlorinated solvent contamination in shallow soils to provide for the unrestricted future use of the site. This alternative would meet the requirements of unrestricted use for the site; but would require the demolition of the existing structures to access soils which do not meet the Unrestricted Use SCOs. Specifically, the following actions will be taken for the site:

This would require demolition of some shopping center facilities to access impacted soils. This excavation will extend to the limits of chlorinated solvent contamination impacted soils. Excavated materials from the site will be properly disposed of at off-site facilities. Excavations will be backfilled to either existing grades with imported clean fill material which meets the requirements for backfill in 6 NYCRR Part 375-6.7(d) or excavated material meeting the Unrestricted Use SCOs. Existing surfaces will be restored to pre-excavation conditions.

In accordance with NYSDEC and NYSDOH requirements, a Community Air Monitoring Plan (CAMP) with perimeter monitoring stations will be implemented at the site as part of this alternative. The objective of the CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors, including residences and businesses and on-site workers not involved with site remedial activities) from potential airborne contaminant releases as a direct result of intrusive remedial activities. The CAMP will include several air monitoring stations at the perimeter of the work area to monitor potential emissions from the site. If during excavations the emission levels approach guidance levels or a nuisance odor is detected, then appropriate additional controls will be implemented to control/manage emissions (cover excavations, odor suppressing foam, etc.). CAMP guidance levels are set well below emission concentrations associated with adverse health effects.

With respect to the guidance, the alternative is described as follows:

- **Size and Configuration.** A major portion of the on-site area will be disturbed to some degree during excavation. Figure 6 depicts the approximate limits of soil impacts based on the current data set. Additional delineation may be necessary to the north, southwest, and west to ensure that all soils above the Unrestricted Use SCOs are removed.

- **Time for Remediation.** Demolition, excavation, and reconstruction of the affected portions of the buildings is estimated to require between 10-14 months to complete.

- **Spatial Requirements.** The alternative will require substantial room for equipment and material storage, access, logistics, and operation. Access to several Suites may be impacted during the remedial construction.

- **Options for Disposal.** Options for disposal of residual materials are readily available off site at a properly permitted, approved facility. However, the volume of material excavated daily may exceed the availability of trucks for transport of impacted materials or disposal facility capabilities during the excavation phase and could result in project delays.

- **Permit Requirements.** No significant technical permit requirements are anticipated that would limit the effectiveness or implementability of this alternative.

- **Limitations.** The ability to completely excavate material to the Unrestricted Use SCOs may be limited to construction and safety constraints. These will include, but are not limited to, right-of-way setback distances, excavation support systems, road closures, and the results of a preconstruction survey of the adjacent structures and appurtenances. Further geotechnical, structural, and excavation evaluation will be required in the design phase to confirm safe setbacks, excavation supports, machine limitations and construction schedules.

- **Ecological Impacts.** This alternative is not anticipated to have any significant beneficial or adverse impacts on fish and wildlife resources.

This remedial alternative is not feasible based on the current and anticipated future land use at the property and will not be evaluated as an alternative possible for implementation.

7.3.2 Alternative 2: Air Sparge/Soil Vapor Extraction System

As shown on **Figure 7**, Alternative 2 is the conversion of the existing sub-slab depressurization system into an Air Sparge/Soil Vapor Extractions (AS/SVE) system (SVE). This technology is the injection of pressurized air into the subsurface below the water table to induce volatilization of dissolved phase contaminants of concern. The vaporized components of the contaminants then migrate will into the vadose zone for subsequent capture by vacuum extraction wells and ultimately ex-situ treatment. This would be an enhancement of the existing system at the site. Sample ports will be installed on the exhaust stack of each system. An hour meter and flow meter will be installed at each system to monitor system operations. The existing SSDS blowers would be relocated or enclosed in a modified

structure which will include weatherproofing insulation to prevent service disruption from weather. An air compressor will be installed either collocated with the blower or on the roof of the structure. Air sparge wells will be installed along the walkway between Suites 600 and 700 adjacent to the initial release location with piping attached to the building façade. The wells will be screened at the elevation of the perched groundwater. Additional soil vapor extraction points will be installed adjacent to Suite 700. Additional horizontal SVE laterals made be required under the existing structures and can be installed with horizontal drilling technologies.

Variable soil permeability and site constraints may restrict implementability of remedy. Injection and extraction points will need to access the source area to achieve optimum effectiveness. A pilot study may be required to determine the spacing of air sparge points and identify the need to additional soil vapor extraction points. Based on the results of the pilot testing, horizontal drilling or angle drilling technology might be required to access locations at depth below the existing buildings. Off-gas treatment may be required, and any related residual liquids from the SVE system may require treatment/disposal. Any spent activated carbon will require regeneration or disposal.

Because this alternative would result in soil containing contaminant concentrations above Unrestricted Use SCOs being left behind, institutional controls would also be required to control potential exposure to residual contamination remaining in groundwater and soil. The proposed institutional controls may include the following:

- An environmental easement/deed restriction on the property dictating future use and development constraints for the site.
- Notification to the NYSDEC prior to intrusive activity.
- Development and approval of a SMP providing requirements for post remediation activities to take place at the site (including provisions for groundwater monitoring, soil management and worker health and safety during intrusive activities).
- A prohibition on the development of water supply or irrigation wells on the site.
- Annual inspection and certification to confirm appropriate use of the site, and to ensure that institutional controls included in this remedy are in place and remain effective to control the identified potential exposures.

With respect to the guidance, the alternative is described as follows:

- **Size and Configuration.** **Figure 7** depicts the conceptual plans for this alternative. The portion of the Site area affected will be the same portion of the site containing the existing SSDS. Additional limited disruption of portions of the property will be required for the installation of the air sparge points, air compressor, and additional soil vapor extraction points as necessary. Based on the result of pilot testing, additional space may be required at the site to house the AS/SVE system.

- **Time for Remediation.** Pilot testing for the system design, including installation of pilot test air sparge locations can be completed in a week. Following design and NYSDEC approval, installation of the system equipment, air sparge points, SVE points, and associated piping and restoration will take approximately 1 month. For the purposed of this FS, we have assumed that the AS/SVE system will operate for a period of 15 years.

- **Spatial Requirements.** The air sparge wells and SVE points can be installed in the space between Suite 700 and Suite 600. Horizontal wells, if necessary, can be installed from the rear parking area. The remaining features will mirror the existing SSDS in order to limit site disturbances to existing business. Based on the result of pilot testing, additional space may be required at the site for a temporary trailer to house the AS/SVE system equipment.

- **Options for Disposal.** Options for disposal of residual materials are readily available off site at a properly permitted, approved facility. Off-gas treatment may be required, and any related residual liquids may require treatment/disposal. Any spent activated carbon will require regeneration or disposal.

- **Permit Requirements.** No significant technical permit requirements are anticipated that would limit the effectiveness or implementability of this alternative.

- **Limitations.** Capital and maintenance costs are medium to high compared to other technologies available. The silty clay soils at the site are not optimal for AS/SVE technologies. AS/SVE works best in soils with higher porosity such as sands or gravels. The soil conditions may require tighter spacing of air sparge points and SVE points in order to ensure that chlorinated compounds volatized by the air sparge system are completely captured.

- **Ecological Impacts.** This alternative is not anticipated to have any significant beneficial or adverse impacts on fish and wildlife resources.

7.3.3 Alternative 3: Hydrogen Release Compound (HRC) Injection and SSDS Modification

As shown on Figure 8, Alternative 3 will include HRC injection and the conversion of the current SSDS system into 24-hour per day operation. Sample ports will be installed on the exhaust stack of each system. An hour meter and flow meter will be installed at each system to monitor system operations. The existing SSDS blowers would be enclosed in a modified structure which will include weatherproofing insulation to prevent service disruption from weather.

HRC injection would be conducted using temporary injection points or permanent injection wells installed at the site within the limits of the perched groundwater impacts. HRC is an engineered, hydrogen release compound designed specifically for enhanced, in situ anaerobic bioremediation of chlorinated compounds in groundwater or highly saturated soils.

Upon contact with groundwater, HRC material becomes hydrated and subject to microbial breakdown producing a controlled-release of hydrogen for periods of up to 18-24 months on a single application. HRC enables enhanced anaerobic biodegradation by adding hydrogen to groundwater and/or soil to increase the number and vitality of indigenous microorganisms able to perform the naturally occurring process of enhanced reductive dechlorination. During this process, certain naturally occurring microorganisms replace chlorine atoms on chlorinated contaminants with the newly available hydrogen effectively reducing the contaminant to a less harmful substance.

HRC can provide a range of products, release profiles and applications to suit project specific needs. HRC can be produced in variable viscosity forms in order to limit mobility in the ground where injected into highly targeted areas. HRC can provide the source of long-term staged hydrogen release on the order of 2-5 years from a single application. Aside from the HRC benefits, the application of HRC can be completed with minimal site disruption. HRC does not require routine operations and maintenance and is faster than allowing natural attenuation to remove the chlorinated solvent contamination.

Because this alternative would result in soil containing contaminant concentrations above Unrestricted Use SCOs being left behind, institutional controls would also be required to control potential exposure to residual contamination remaining in groundwater and soil. The proposed institutional controls may include the following:

- An environmental easement/deed restriction on the property dictating future use and development constraints for the site.
- Notification to the NYSDEC prior to intrusive activity.
- Development and approval of a SMP providing requirements for post remediation activities to take place at the site (including provisions for groundwater

monitoring, soil management and worker health and safety during intrusive activities).

- A prohibition on the development of water supply or irrigation wells on the site.

- Annual inspection and certification to confirm appropriate use of the site, and to ensure that institutional controls included in this remedy are in place and remain effective to control the identified potential exposures.

With respect to the guidance identified above, the alternative is described as follows:

- ***Size and configuration***. **Figure 8** depicts the conceptual plans for this alternative. The portion of the Site area affected will be the same portion of the site containing the existing SSDS. Additional limited disruption of portions of the property will be required for the HRC injection points.

- ***Time for Remediation.*** Modifications to the existing SSDS are minimal and can be completed in a few days. Injection of HRC would be conducted over a week timeframe and groundwater monitored on a quarterly basis to determine the effectiveness. Re-injection may be necessary if complete treatment is not achieved.

- ***Spatial Requirements.*** The HRC injection points can be installed in the space between Suite 700 and Suite 600. The remaining features will mirror the existing SSDS in order to limit site disturbances to existing businesses.

- ***Options for Disposal.*** There is no material that will require disposal as part of this remedy.

- ***Permit Requirements.*** No significant technical permit requirements are anticipated that would limit the effectiveness or implementability of this alternative.

- ***Limitations.*** This alternative assumes that baseline conditions pose no unacceptable health or environmental risks. As with all in-situ treatment technologies, the HRC must remain in contact with the impacted zone to allow for optimal continued treatment of the chlorinated compounds. The sandy clay layer containing the perched groundwater at a depth of 5 to 7 with denser silty clay below it is a favorable condition for maintaining contact between the perched groundwater and the injected HRC.

- ***Ecological Impacts.*** This alternative is not anticipated to have any significant beneficial or adverse impacts on fish and wildlife resources.

7.3.4 Alternative 4: SSDS Modification

Alternative 4 will include the conversion of the current SSDS system into 24-hour per day operation. Sample ports will be installed on the exhaust stack of each system. An hour meter and flow meter will be installed at each system to monitor system operations. The existing SSDS blowers would be enclosed in a modified structure which will include weatherproofing insulation to prevent service disruption from weather.

Because this alternative would result in soil containing contaminant concentrations above Unrestricted Use SCOs being left behind, institutional controls would also be required to control potential exposure to residual contamination remaining in groundwater and soil. The proposed institutional controls may include the following:

- An environmental easement/deed restriction on the property dictating future use and development constraints for the site.
- Notification to the NYSDEC prior to intrusive activity.
- Development and approval of an SMP providing requirements for post remediation activities to take place at the site (including provisions for groundwater monitoring, soil management, and worker health and safety during intrusive activities).
- A prohibition on the development of water supply or irrigation wells on the site.
- Annual inspection and certification to confirm appropriate use of the site, and to ensure that institutional controls included in this remedy are in place and remain effective to control the identified potential exposures.

With respect to the guidance identified above, the alternative is described as follows:

- ***Size and configuration***. As no additional remedial actions will be performed, no portion of the Site area will be disturbed.
- ***Time for Remediation.*** Modifications to the existing SSDS are minimal and can be completed in a few days. The SSDS will continue to operate until such time as the chlorinated impacts have been naturally attenuated.
- ***Spatial Requirements.*** As no additional remedial actions will be performed, there is no requirement for access to private properties or large support areas beyond continuing the current monitoring.
- ***Options for Disposal.*** There is no material that will require disposal as part of this remedy.

- ***Permit Requirements.*** No permit requirements are anticipated.

- ***Limitations.*** This alternative assumes that baseline conditions, with the current SSDS, mitigate the sub-slab soil vapor, and the remaining contamination poses no unacceptable health or environmental risks.

- ***Ecological Impacts.*** As no action will be performed, this alternative will not have any ecological impacts, beyond baseline conditions.

7.3.5 Alternative 5: "No Action" Alternative

Alternative 4 is the "No Action" alternative. This alternative assumes that the base conditions existing at the Site will not be addressed through additional remedial actions and the Site property would not be available for unrestricted use. Even though historical investigations have noted chlorinated solvent contamination in shallow soils, this alternative does not address the soil related RAOs. Under the "No Action" alternative, the existing SSDS would continue to operate during overnight periods and continue to be monitored based on the current schedule.

Because this alternative would result in soil containing contaminant concentrations above Unrestricted Use SCOs being left behind, institutional controls would also be required to control potential exposure to residual contamination remaining in groundwater and soil. The proposed institutional controls may include the following:

- An environmental easement/deed restriction on the property dictating future use and development constraints for the site.

- Notification to the NYSDEC prior to intrusive activity.

- Development and approval of a SMP providing requirements for post remediation activities to take place at the site (including provisions for groundwater monitoring, soil management and worker health and safety during intrusive activities).

- A prohibition on the development of water supply or irrigation wells on the site.

- Annual inspection and certification to confirm appropriate use of the site, and to ensure that institutional controls included in this remedy are in place and remain effective to control the identified potential exposures.

With respect to the guidance identified above, the alternative is described as follows:

- ***Size and configuration***. As no additional remedial actions will be performed, no portion of the Site area will be disturbed.

- ***Time for Remediation.*** The alternative does not require any action; therefore, there is no time for active remediation required. The SSDS will continue to operate until such time as the chlorinated impacts have been naturally attenuated.

- ***Spatial Requirements.*** As no additional remedial actions will be performed, there is no requirement for access to private properties or large support areas beyond continuing the current monitoring.

- ***Options for Disposal.*** There is no material that will require disposal as part of this remedy.

- ***Permit Requirements.*** No permit requirements are anticipated.

- ***Limitations.*** This alternative assumes that baseline conditions, with the current SSDS, mitigate the sub-slab soil vapor and the remaining contamination poses no unacceptable health or environmental risks.

- ***Ecological Impacts.*** As no action will be performed, this alternative will not have any ecological impacts, beyond baseline conditions.

7.4 Evaluation Criteria

6 NYCRR Part 375 requires a detailed analysis of remedial alternatives against nine criteria and specifies specific factors to consider for each criterion. The nine criteria are:

Overall Protection of Public Health and the Environment: This criterion is an evaluation of the remedy's ability to protect public health and the environment, assessing how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, engineering controls or institutional controls. The remedy's ability to achieve each of the RAOs is evaluated.

Compliance with Standards, Criteria, and Guidance (SCGs): Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. All SCGs for the site will be listed along with a discussion of whether or not the remedy will achieve compliance. For those SCGs that will not be met, provide a discussion and evaluation of the impacts of each, and whether waivers are necessary.

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

- The magnitude of the remaining risks (i.e., will there be any significant threats, exposure pathways, or risks to the community and environment from the remaining wastes or treated residuals?)

- The adequacy of the engineering and institutional controls intended to limit the risk

- The reliability of these controls

- The ability of the remedy to continue to meet RAOs in the future

Reduction of Toxicity, Mobility or Volume of Contamination with Treatment: The remedy's ability to reduce the toxicity, mobility or volume of site contamination is evaluated. Preference should be given to remedies that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the site.

Short-term Impact and Effectiveness: The potential short-term adverse impacts and risks of the remedy upon the community, the workers, and the environment during the construction and/or implementation are evaluated. A discussion of how the identified adverse impacts and health risks to the community or workers at the site will be controlled, and the effectiveness of the controls, should be presented. Provide a discussion of engineering controls that will be used to mitigate short-term impacts (i.e., dust control measures). The length of time needed to achieve the remedial objectives is also estimated.

Implementability: The technical and administrative feasibility of implementing the remedy is evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Cost Effectiveness: Capital, operation, maintenance and monitoring costs are estimated for the remedy and presented on a present worth basis.

Community Acceptance: This criterion gauges the acceptance of the selected remedial alternative by the community at large. It is not provided in this RAA document. It is evaluated and summarized by the NYSDEC as part of the public participation period which precedes approval of this RAA.

Land Use: The NYSDEC may consider the current, intended, and reasonably anticipated future land uses of the site and its surroundings in the selection of the remedy. There are no plans to change the current land use of the property. It is anticipated that the current land use will continue as the future land use for all alternatives evaluated below.

7.5 Evaluation of Alternatives

7.5.1 Alternative 1: Demolition and Excavation of All Impacts

This alternative is not administratively feasible and therefore will not be evaluated using the evaluation criteria. Demolition of the existing buildings is not an acceptable alternative at this time.

7.5.2 Alternative 2: Air Sparge/Soil Vapor Extraction System

- ***Overall Protection of Public Health and the Environment.*** The alternative eliminates or effectively controls the potential exposure pathways by removing source material and establishing institutional controls to manage future potential exposures. The alternative achieves each RAO as described below:

- *Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards*. The perched water beneath the Site is not currently used for a public or private water supply and institutional controls will prevent its use in the future.

- *Prevent, to the extent practicable, contact with, or inhalation of volatiles from, contaminated groundwater.* Incidental contact during construction would be managed via worker health and safety plans. The engineered air sparge/soil vapor extraction system and institutional controls will achieve this objective.

- *Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.* The AS/SVE system will be effective over time at restoring the perched water beneath the Site to pre-release conditions.

- *Remove the source of ground or surface water contamination.* The removal of the dry cleaning equipment from the site has removed the potential source of future contamination from the site. Impacted soils will remain at depth at the completion of this remedy. The impact are limited to the silty clay material above the glacial till at the site and are not in contact with groundwater.

- *Prevent ingestion/direct contact with contaminated soil.* Direct contact is prevented through surface structures, paving, and institutional controls.

- *Prevent, to the extent practicable, inhalation exposure to contaminants volatilizing from soil.* The AS/SVE system will be effective at reducing the potential for soil vapor intrusion and will achieve this objective.

- *Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.* The AS/SVE system will be effective at reducing the potential for soil vapor intrusion at the site.

- ***Compliance with Standards, Criteria, and Guidelines (SCGs).*** With respect to each SCG:

o At a minimum, to eliminate or mitigate all significant threats to public health and the environment presented by the contaminants disposed at the site through the proper application of scientific and engineering principles. The alternative eliminates or mitigates all potential significant threats.

o Where an identifiable source of contamination exists at a site, it should be removed or eliminated, to the extent feasible, regardless of presumed risk or intended use of the site. Contaminant source in groundwater is addressed and removed over time to the extent practicable with the operation of the AS/SVE system. Contaminants in soil at depth are addressed through institutional controls.

- ***Long-Term Effectiveness and Permanence.*** There will be no significant threats, exposure pathways, or risks to the community and the environment from the remaining contamination. The proposed institutional controls are readily implementable. Once installed, the sub-slab ventilation system should function for the life of the building. The RAOs can continue to be met in the future by maintaining the sub-slab ventilation system, and the institutional controls.

- ***Reduction of Toxicity, Mobility or Volume with Treatment.*** The passive recovery of chlorinated solvent concentration and stabilization will also reduce the toxicity and volume of source material.

- ***Short-Term Effectiveness.*** The installation or modifications to the sub-slab ventilation system will cause short-term disruption to the retail stores.

- ***Implementability.*** The alternative is technically implementable. The technologies are available commercially from multiple sources. The remedy is administratively feasible. The majority of the work will not impact the existing businesses.

- ***Cost.*** The estimated total present value cost for the remedy is approximately $1 million. This includes the estimated cost for operations, maintenance, and monitoring of approximately $556,000. The operations, maintenance, and monitoring costs assume bi-annual sampling of monitoring wells, soil vapor points, and indoor air; routine system maintenance, and regulatory reporting for 15 years at $53,600 per year. The costs are summarized in Table A-1, Appendix A.

7.5.3 Alternative 3: Hydrogen Release Compound (HRC) Injection and SSDS Modification

- ***Overall Protection of Public Health and the Environment.*** The alternative eliminates or effectively controls the potential exposure pathways by removing source material and establishing institutional controls to manage future potential exposures. The alternative achieves each RAO as described below:

o *Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards*. The perched water beneath the Site is not currently used for a public or private water supply and institutional controls will prevent its use in the future.

o *Prevent, to the extent practicable, contact with, or inhalation of, volatiles from contaminated groundwater.* Affected water in the perched water table beneath the Site is not currently used for water supply and institutional controls will prevent its use in the future. Incidental contact during HRC injection would be managed via worker health and safety plans. The SSDS system will mitigate any vapor during treatment and will achieve this objective.

o *Remove the source of ground or surface water contamination.* The HRC injection will reduce the concentrations of contaminants in groundwater to achieve this objective.

o *Prevent ingestion/direct contact with contaminated soil.* Direct contact is prevented through surface structures, paving, and institutional controls.

o *Prevent, to the extent practicable, inhalation exposure to contaminants volatilizing from soil.* The SSDS system has been effective at reducing the potential for soil vapor intrusion and will achieve this objective with the planned modifications.

o *Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.* The SSDS system has been effective at reducing the potential for soil vapor intrusion and will achieve this objective with the planned modifications.

- ***Compliance with Standards, Criteria, and Guidelines (SCGs).*** With respect to each SCG:

o At a minimum, to eliminate or mitigate all significant threats to public health and the environment presented by the contaminants disposed at the site through the proper application of scientific and engineering principles. The alternative eliminates or mitigates all potential significant threats.

- Where an identifiable source of contamination exists at a site, it should be removed or eliminated, to the extent feasible, regardless of presumed risk or intended use of the site. Contaminant source in groundwater is addressed with the HRC and the continued operation of the modified SSDS system. Contaminants in soil at depth are addressed through institutional controls.

    - ***Long-Term Effectiveness and Permanence.*** There will be no significant threats, exposure pathways, or risks to the community and the environment from the remaining contamination. The proposed institutional controls are readily implementable. The implementation of the HRC injection will reduce the source of soil vapor and reduce the time that SSDS will be required to address soil vapor intrusion. The RAOs can continue to be met in the future by maintaining the sub-slab ventilation system and the institutional controls.

    - ***Reduction of Toxicity, Mobility or Volume with Treatment.*** The HRC injection and continued operation of the SSDS will also reduce the toxicity and volume of source material.

    - ***Short-Term Effectiveness.*** The HRC injection and modifications to the SSDS will cause short-term disruption to the retail stores.

    - ***Implementability.*** The alternative is technically implementable. The technologies are available commercially from multiple sources. The ability to obtain short and long-term access from the owner and tenants of the retail stores and other parties affected by institutional controls and/or monitoring is unknown.

    - ***Cost.*** The estimated total present value cost for the remedy is approximately $692,000. This includes the estimated cost for operations, maintenance, and monitoring of approximately $330,000. The operations, maintenance, and monitoring costs assume bi-annual sampling of monitoring wells, soil vapor points, and indoor air and regulatory reporting for 10 years at $42,500 per year. The costs are summarized in Table A-2, Appendix A.

7.5.4 Alternative 4: SSDS Modification

- ***Overall Protection of Public Health and the Environment.*** The alternative controls the potential exposure to contaminants via institutional controls. The alternative achieves each RAO as described below:

- *Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards*. The perched water beneath the Site is not currently used for a public or private water supply and institutional controls will prevent its use in the future.

- *Prevent, to the extent practicable, contact with, or inhalation of volatiles from contaminated groundwater.* Affected water in the perched water table beneath the Site is not currently used for water supply and institutional controls will prevent its use in the future. The modified SSDS system will continue to mitigate soil vapor intrusion and will achieve this objective.

- *Remove the source of ground or surface water contamination.* The modifications to the SSDS and sampling program will allow the calculation of the mass of contaminant removed over time and determine the effectiveness of the existing SSDS as a means of source removal.

- *Prevent ingestion/direct contact with contaminated soil.* Direct contact is prevented through surface structures, paving, and institutional controls.

- *Prevent, to the extent practicable, contact with, or inhalation of volatiles from, contaminated soil.* The modified SSDS system will continue to mitigate soil vapor intrusion and will achieve this objective.

- *Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.* The modified SSDS system will continue to mitigate soil vapor intrusion and will achieve this objective.

  - ***Compliance with Standards, Criteria, and Guidelines (SCGs).*** With respect to each SCG:

- At a minimum, to eliminate or mitigate all significant threats to public health and the environment presented by the contaminants disposed at the site through the proper application of scientific and engineering principles. The alternative mitigates all significant threats.

- Where an identifiable source of contamination exists at a site, it should be removed or eliminated, to the extent feasible, regardless of presumed risk or intended use of the site. The alternative does not remove any sources of contamination in groundwater or soil. Contaminants in groundwater and soil at depth are addressed through institutional controls.

  - ***Long-Term Effectiveness and Permanence.*** The magnitude of the remaining risks is high in comparison to the other evaluated alternatives. The modifications to the SSDS and sampling program will allow the calculation of the mass of contaminant removed over time and determine the effectiveness of the existing SSDS as a means of source removal.

- ***Reduction of Toxicity, Mobility, or Volume with Treatment.*** This alternative will not address the reduction of toxicity, mobility, or volume. The modifications to the SSDS and sampling program will allow the calculation of the mass of contaminant removed over time and determine the effectiveness of the existing SSDS as a means of reduction of volume of source material.

- ***Short-Term Effectiveness.*** The alternative can be readily implemented, and little to no short-term impacts are expected.

- ***Implementability.*** The alternative is technically implementable.

- ***Cost.*** The estimated total present value cost for the remedy is approximately $694,000. This includes the estimated cost for operations, maintenance, and monitoring of approximately $512,000. The operations, maintenance, and monitoring costs assume bi-annual sampling of monitoring wells, soil vapor points, and indoor air and regulatory reporting for 30 years at $33,300 per year. However, if the modified SSDS proved effective at reducing groundwater concentrations, then the time to duration of long term monitoring may be reduced. The costs are summarized in Table A-3, Appendix A.

7.5.5 Alternative 5: No Action

- ***Overall Protection of Public Health and the Environment.*** The alternative controls the potential exposure to contaminants via institutional controls. The alternative achieves each RAO as described below:

o *Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards*. The perched water beneath the Site is not currently used for a public or private water supply and institutional controls will prevent its use in the future.

o *Prevent, to the extent practicable, contact with, or inhalation of volatiles from contaminated groundwater.* Affected water in the perched water table beneath the Site is not currently used for water supply and institutional controls will prevent its use in the future. The SSDS system will continue to mitigate soil vapor intrusion and will achieve this objective.

o *Remove the source of ground or surface water contamination.* No source material is removed.

o *Prevent ingestion/direct contact with contaminated soil.* Direct contact is prevented through surface structures, paving, and institutional controls.

- *Prevent, to the extent practicable, contact with, or inhalation of volatiles from, contaminated soil.* The SSDS system will continue to mitigate soil vapor intrusion and will achieve this objective.

- *Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.* The SSDS system will continue to mitigate soil vapor intrusion and will achieve this objective.

    - ***Compliance with Standards, Criteria, and Guidelines (SCGs).*** With respect to each SCG:

- At a minimum, to eliminate or mitigate all significant threats to public health and the environment presented by the contaminants disposed at the site through the proper application of scientific and engineering principles. The alternative mitigates all significant threats.

- Where an identifiable source of contamination exists at a site, it should be removed or eliminated, to the extent feasible, regardless of presumed risk or intended use of the site. The alternative does not remove any sources of contamination in groundwater or soil. Contaminants in in groundwater and soil at depth are addressed through institutional controls.

    - ***Long-Term Effectiveness and Permanence.*** The magnitude of the remaining risks is high in comparison to the other evaluated alternatives given the lack of source material removal.

    - ***Reduction of Toxicity, Mobility or Volume with Treatment.*** This alternative will not address the reduction of toxicity, mobility, or volume.

    - ***Short-Term Effectiveness.*** The alternative can be readily implemented, and little to no short-term impacts are expected.

    - ***Implementability.*** The alternative is technically implementable.

    - ***Cost.*** The estimated total present value cost for the remedy is approximately $665,000. This includes the estimated cost for operations, maintenance, and monitoring of approximately $512,000. The operations, maintenance, and monitoring costs assume bi-annual sampling of monitoring wells, soil vapor points, and indoor air and regulatory reporting for 30 years at $33,300 per year. The costs are summarized in Table A-4, Appendix A.

7.6 Comparison of Alternatives

Table 6 presents a comparative matrix of the remaining alternatives with the evaluation criteria. A qualitative scoring system has been used to give a general sense of how the alternatives differ in meeting each of the criteria. This scoring system is somewhat subjective, but can provide some insights into the relative strengths and limitations of the alternatives. The main evaluation categories are normalized so that each carries equal weight in the evaluation process. Each of the alternatives satisfies the criteria to some degree. The primary differences between Alternative 2 and Alternative 3 are found in long term effectiveness and permanence, short-term impacts and effectiveness, and cost. The primary between Alternative 4 and Alternatives 2 and 3 is the degree of source removal.

8. Recommended Remedy

Alternative 4 is the recommended remedy. The RAOs are achieved through a combination of engineering controls and institutional controls. The existing SSDS has been effective at mitigating soil vapor intrusion to date.

The recommended alternative will include the following:

- Long term engineering controls will include:

o Continued operation of the modified SSDS.

o The existing composite cover system consisting of a combination of the existing buildings and pavement areas to prevent human exposure to remaining contaminated soils.

- Development and Implementation of a (SMP). The SMP would identify the controls and post-remediation monitoring and inspections required for the site. The SMP would include:

o A soil management plan to manage remaining contaminated soils that may be excavated from the site during future activities, including procedures for soil characterization, handling, health and safety of workers and the community, as well as, disposal/reuse in accordance with applicable NYSDEC regulations and procedures. If the existing building is removed from site additional site investigation may be performed.

o Institutional controls to maintain use restrictions regarding site development or groundwater use identified in the deed restriction.

o Requirements to provide a certification to NYSDEC that remedial controls are in place, as required by regulations, on a periodic basis.

o A monitoring plan to monitor the groundwater for contaminants in the areas downgradient of the area remediated.

- A soil vapor intrusion evaluation will be required prior to the construction of any new buildings located over areas that contain remaining contamination.

Groundwater at the site is not currently used for water supply, and preventing new wells from being installed will ensure that none will be in the future.

The recommended remedy will minimize the short-term impacts for the property owner and will thus be more implementable. Future excavation activity, if necessary, can be controlled through prescribed methods and protocols for managing work, groundwater, and soils.

The SSDS has proven effective at mitigating indoor air contamination at the site. Increasing operation to 24-hour per day will increase the effectiveness of the SSDS. The system modification and sampling program will allow the calculation of the mass of contaminant removed over time and determine the effectiveness of the existing SSDS as a means of reduction of volume of source material. Based on the performance of the system and the results of the groundwater and soil vapor sampling, additional modifications to the system or additional remedial actions may be completed at a later date under the SMP. With proper maintenance of remedial controls, the remedy will continue to support current, intended, and reasonably anticipated future land uses of the property.

9. References

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Tables

Table 1. Summary of Analytical Detections in Soil
Feasibility Study
Former Safety Kleen Dry Cleaners
New Windsor, New York

					Location Name	SB-1-15	SB-2-1	SB-3-0.5	SB-4-1.5	SB-5-11-1	SB-5-11-2 (dup)	SB-MW-1R	SB-MW-7
					Sample Name	SB-1-15	SB-2-1	SB-3-0.5	SB-4-1.5	SB-5-11-1	SB-5-11-2 (dup)	SB-MW-1R	SB-MW-7
					Start Depth	15	1	0.5	1.5	11	11	15	15
					End Depth	15	1	0.5	1.5	11	11	15	15
					Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft
					Sample Date	10/11/2011	10/12/2011	10/12/2011	10/12/2011	10/12/2011	10/12/2011	10/11/2011	10/11/2011
	Units	CAS No.	Unrestricted Use SCOs	Commercial Use SCOs									
VOCs													
Tetrachloroethene (PCE)	µg/kg	127-18-4	1,300	150,000	2.14 U	**475**	**1,490**	**792**	**8,390**	**3,490**	1.97 U	**26,900**
Trichloroethene (TCE)	µg/kg	79-01-6	470	200,000	2.14 U	5.35 U	**4.73**	**17.8**	8.61 U	1.61 U	1.97 U	46.2 U
Cis-1,2-Dichloroethene (DCE)	µg/kg	10061-01-5	250	500,000	2.14 U	5.35 U	**5.92**	**4.1**	8.61 U	1.61 U	1.97 U	46.2 U
2-Butanone (MEK)	µg/kg	78-93-3	120	500,000	2.14 U	**8.35**	**3.55**	**3.87**	8.61 U	1.61 U	1.97 U	46.2 U
Acetone	µg/kg	67-64-1	50	500,000	10.7 U	**57**	**32.1**	**30.1**	43.1 U	8.07 U	9.87 U	231 U

Notes:

µg/kg =microrams/kilogram or parts per billion (ppb)
VOCs = volatile organic compounds
6 NYCRR =New York State Register and Official Compilation of Codes, Rules and Regulations of the State of New York
Comparison of detected results are performed against one or more of the following NYCRR, Chapter IV, Part 375-6 Soil Cleanup Objectives (SCO)s: Unrestricted Use and Commercial,
CAS No. = Chemical Abstracts Service Number
Bold indicates a detected result concentration
Gray shading and bolding indicates that the detected result value exceeds the Unrestricted SCO
Yellow shading and bolding indicates that the detected result value exceeds the Commercial SCO
U = indicates not detected to the reporting limit

Table 2. Summary of Analytical Detections in Groundwater
Feasibility Study
Former Safety Kleen Dry Cleaners
New Windsor, New York

			Location Name	MW-1R	MW-6	MW-3	MW-4	MW-2	MW-2-2 (dup)	MW-7	Trip Blank
			Top of Screen	2	7	5	5	5	5	3	-
			Bottom of Screen	17	17	15	15	15	15	18	-
			Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft
			Sample Date	10/13/2011	10/13/2011	10/13/2011	10/13/2011	10/13/2011	10/13/2011	10/13/2011	10/13/2011
	Units	**CAS No.**	**NYS AWQS**								
Detected VOCs											
Tetrachloroethene (PCE)	µg/L	127-18-4	5	**22.8**	1 U	2 U	2 U	**1,650**	**1,270**	**127,000**	1 U
Trichloroethene (TCE)	µg/L	79-01-6	5	2 U	1 U	2 U	2 U	**25.1**	**28.6**	**151**	1 U
Cis-1,2-Dichloroethene (DCE)	µg/L	156-59-2	5	2 U	1 U	2 U	2 U	**37.5**	**46.7**	**1.39**	1 U
Trans-1,2-Dichloroethene	µg/L	156-60-5	5	2 U	1 U	2 U	2 U	**3.98**	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	75-34-3	5	2 U	1 U	2 U	2 U	**1.11**	1 U	**4.75**	1 U
Vinyl chloride	µg/L	75-01-4	2	2 U	1 U	2 U	2 U	**151**	**17.8**	1 U	1 U
Chloroform	µg/L	67-66-3	7	2 U	1 U	2 U	2 U	1 U	**1.08**	**2.3**	1 U
Methyl ethyl ketone (2-Butanone	µg/L	78-93-3	50*	2 U	1 U	2 U	2 U	1 U	1 U	**7.51**	1 U
Acetone	µg/L	67-64-1	50*	**13.3**	5 U	10 U	10 U	5 U	5 U	**30.4**	5 U
1,1,1-Trichloroethane	µg/L	71-55-6	5	2 U	1 U	2 U	2 U	1 U	1 U	**57.7**	1 U
1,1-Dichloroethene	µg/L	75-35-4	5	2 U	1 U	2 U	2 U	1 U	1 U	**1.86**	1 U
Carbon disulfide	µg/L	75-15-0	60*	2 U	1 U	2 U	2 U	1 U	1 U	**1.53**	1 U
Carbon tetrachloride	µg/L	56-23-5	5	2 U	1 U	2 U	2 U	1 U	1 U	**1.41**	1 U
Chlorobenzene	µg/L	108-90-7	5	2 U	1 U	2 U	2 U	1 U	1 U	**1.98**	1 U
Ethylbenzene	µg/L	100-41-4	5	2 U	1 U	2 U	2 U	1 U	1 U	**2.33**	1 U
Total Xylene	µg/L		5	2 U	1 U	2 U	2 U	1 U	1 U	**5.3**	1 U
Toluene	µg/L	108-99-3	5	2 U	1 U	2 U	2 U	1 U	1 U	**1.23**	1 U

Notes:
µg/L - micrograms per liter or parts per billion (ppb)
VOCs - volatile organic compounds
NYS AWQS - New York State Ambient Water Quality Standards and Guidance Values for GA groundwater
* indicates the value is a guidance value and not a standard
CAS no. - Chemical Abstracts Service number
Bolding indicates a detected concentration
Gray shading indicates that the detected result value exceeds NYS AWQS

Laboratory Qualifiers:
U - Indicates not detected to the reporting limit

Table 3. Summary of Soil Vapor Detections
Feasibility Study
Former Safety Kleen Dry Cleaners
New Windsor, New York

Sample Location ID			VP-1	VP-1	VP-1	VP-1	VP-2	VP-2	VP-2	VP-2	VP-3	VP-3	VP-3
Sample Name			Suite 600 Sub-slab (VP-1)	VP-1 (Suite 600)	Suite 600 (VP-1)	Unit 600 (Billards)	Suite 700 Sub-slab (VP-2)	VP-2 (Suite 700)	Suite 700 (VP-2) Dry Cleaners	Unit 700 (Laundry Mat)	Suite 800 Sub-slab (VP-3)	VP-3 (Suite 800)	Suite 800 (VP-3)
Suite			Suite 600	Suite 600	Billards Hall	Billards Hall	Suite 700	Suite 700	Suite 700	Suite 700	Suite 800	Suite 800	Suite 800
Business			Billards Hall	Billards Hall	Suite 600	Suite 600	Former Dry Cleaners	Former Dry Cleaners	Former Dry Cleaners	Former Dry Cleaners	Overtones Salon	Overtones Salon	Overtones Salon
Sample Date			10/12/2011	11/20/2013	4/28/2014	11/15/2015	10/12/2011	11/20/2013	4/29/2014	11/12/2015	10/12/2011	11/20/2013	4/29/2014
	Units	NYSDOH Background Indoor Air Concentrations 25th - 95th Percentile Range[1]											
Detected VOCs													
Tetrachloroethene (PCE)	µg/m3	0.25 - 4.1	**2,280**	**1,070**	**90.2**	**422**	**1,480,000**	**18,000**	**2,350**	**36**	**90,800**	**1,040**	**386**
Trichloroethene (TCE)	µg/m3	0.25 - 0.8	9.9 U	**2.1**	0.81 U	**3.5**	3,770 U	**4.8**	0.81 U	**2.4**	**272**	**9.1**	**3.2**
trans-1,2-Dichloroethylene	µg/m3	NE	14.5 U	0.23 U	0.52 U	3.2 U	5,560 U	0.23 U	0.52 U	3.2 U	394 U	0.23 U	0.52 U
Cis-1,2-Dichloroethene (DCE)	µg/m3	0.25 - 1.2	16.5 U	0.44 U	0.37 U	3.2 U	5,560 U	0.44 U	0.37 U	3.2 U	347 U	0.44 U	0.37 U
Chloroform	µg/m3	0.25 - 4.6	17.8 U	0.36 U	0.45 U	3.9 U	6,790 U	0.36 U	0.45 U	**12**	425 U	**2.9 J**	0.45 U
Dichlorodifluoromethane (Freon 12)	µg/m3	0.25 - 26	**58**	**2.4 J**	**2.3 J**	**5.9**	6,860 U	**2.6 J**	**2.7**	**2.4 J**	429 U	**2.4 J**	**2.6**

Sample Location ID			VP-4	VP-5	VP-6	VP-6	VP-6	VP-6	VP-7	VP-7	VP-7	VP-7	VP-7
Sample Name			VP-4 (Suite 400)	VP-5 (Suite 400)	VP-6 (Suite 900)	VP-6 (Suite 900)	Suite 900 (VP-6)	Unit 900 (Marvcelinos)	VP-7 (Suite 1000)	VP-7 (Suite 1000)	Suite 1000 (VP-7)	Suite 1000 (VP-7)	Unit 1000 (Vacant)
Suite			Suite 400	Suite 400	Suite 900	Suite 900	Marcella Pizza	Suite 900	Suite 1000	Suite 1000	Vacant Space	Vacant Space	Suite 1000
Business					Marcella Pizza	Marcella Pizza	Suite 900	Marcella Pizza	Vacant Space	Vacant Space	Suite 1000	Suite 1000	Vacant Space
Sample Date			3/20/2013	3/20/2013	3/20/2013	11/20/2013	4/29/2014	11/12/2015	3/20/2013	11/20/2013	4/28/2014	12/2/2014	11/12/2015
	Units	NYSDOH Background Indoor Air Concentrations 25th - 95th Percentile Range[1]											
Detected VOCs													
Tetrachloroethene (PCE)	µg/m3	0.25 - 4.1	0.66 U	**3.7**	**63,700**	**6,450**	**239**	**8.8**	**26**	**26**	**65**	**7.6**	**1350**
Trichloroethene (TCE)	µg/m3	0.25 - 0.8	0.64 U	0.64 U	**3,200**	**118**	0.81 U	0.86 U	0.64 U	**0.91**	0.81 U	0.92 U	**13**
trans-1,2-Dichloroethylene	µg/m3	NE	0.28 U	0.28 U	71 U	**4.8**	0.52 U	3.2 U	0.28 U	0.23 U	0.52 U	3.4 U	3.2 U
Cis-1,2-Dichloroethene (DCE)	µg/m3	0.25 - 1.2	0.31 U	0.31 U	**2,440**	**25**	0.37 U	3.2 U	0.31 U	0.44 U	0.37 U	3.4 U	3.2 U
Chloroform	µg/m3	0.25 - 4.6	0.49 U	**2.0 J**	130 U	**18**	0.45 U	3.9 U	0.49 U	0.36 U	0.45 U	1.8 U	**4**
Dichlorodifluoromethane (Freon 12)	µg/m3	0.25 - 26	0.17 U	**1,230**	42 U	**2.4 J**	**3.1**	**1.4 J**	0.17 U	**2.7 J**	**2.8**	**2.9**	**2.9 J**

Sample Location ID			VP-8	VP-8	VP-9	VP-9	VP-9	VP-9	SSVP-1	VP-10	SSVP-2
Sample Name			VP-8 (Suite 400)	Suite 600 (VP-8)	VP-9 (Suite 1100)	Suite 1100 (VP-9)	Suite 1100 (VP-9)	Suite 1100 (RadioShak)	SSVP-1 (Suite 1200)	Unit 1200 (Great Wall)	SSVP-2 (Suite 1300)
Suite			Suite 600	Billards	Suite 1100	Radio Shack	Radio Shack	Suite 1100	Suite 1200	Suite 1200	Suite 1300
Business				Suite 600	Radio Shack	Suite 1100	Suite 1100	Radio Shack	Chinese Restaurant	Chinese Restaurant	Dollar Tree
Sample Date			11/21/2013	Billards Hall 4/29/2014	11/21/2013	Radio Shack 4/29/2014	Radio Shack 12/2/2014	Radio Shack 11/12/2015	4/21/2015	11/12/2015	4/21/2015
	Units	NYSDOH Background Indoor Air Concentrations 25th - 95th Percentile Range[1]									
Detected VOCs											
Tetrachloroethene (PCE)	µg/m3	0.25 - 4.1	**27**	**11**	**9,090**	**17,000**	**132**	**5320**	1.1 U	**587**	1.1 U
Trichloroethene (TCE)	µg/m3	0.25 - 0.8	**1.4**	0.81 U	**430**	**257**	**144**	**197**	0.81 U	**5.2**	0.81 U
trans-1,2-Dichloroethylene	µg/m3	NE	0.23 U	0.52 U	1.2 U	0.52 U	5.4 U	25 U	0.52 U	3.2 U	0.52 U
Cis-1,2-Dichloroethene (DCE)	µg/m3	0.25 - 1.2	0.44 U	0.37 U	**21**	**14**	**8**	25 U	0.37 U	3.2 U	0.37 U
Chloroform	µg/m3	0.25 - 4.6	0.36 U	0.45 U	**43**	**35**	**30.1**	31 U	**0.93 J**	2.1 U	0.45 U
Dichlorodifluoromethane (Freon 12)	µg/m3	0.25 - 26	**3.2 J**	**2.6**	1.5 U	**2.7**	**2.7**	32 U	**2.6**	**3.0 J**	**2.9**

Table 3. Summary of Soil Vapor Detections
Feasibility Study
Former Safety Kleen Cleaners
New Windsor, New York

Notes:

µg/m3 = micrograms per cubic meter

VOC = Volatile Organic Compound

1 Source: NYSDOH, October 2006. Summary of Indoor and Outdoor Levels of Volatile Organic Compounds from Fuel Oil Heated Homes reported in various locations within sampled homes in NYS, 1997-2003 as presented in Table C1. Background values for naphthalene

NYSDOH - New York State Department of Health

CAS no. - Chemical Abstracts Service number

NE - not established

Bolding indicates a detected result concentration

Shading and bolding indicates that the detected concentration is above the NYSDOH guidance it was compared to

Laboratory Qualifiers:

J - estimated value

U - indicates not detected to the reporting limit

Table 4. Summary of Indoor Air Detections
Feasibility Study
Former Safety Kleen Dry Cleaners
New Windsor, New York

		Sample Location ID	**Suite 600 Indoor**	**Suite 600 Air**	**Suite 600-AAir**	**Suite 600-AAir**	**Vials Gate Laundry**	**AA-4**	**AA-5**	**AA-6**	**Suite 900 Air**	**Suite 900-AAir**	**Suite 900-AAir**	**AA-7**
		Sample Name	**Suite 600 Indoor**	**Suite 600 Air**	**Suite 600-AAir**	**Unit 600 (Billards)**	**Vials Gate Laundry**	**AA-4**	**AA-5**	**AA-6**	**Suite 900 Air**	**Suite 900-AAir**	**Unit 900 (Marcelinos)**	**AA-7**
		Suite	**Suite 600**	**Suite 600**	**Suite 600**	**Suite 600**	**Suite 700**	**Suite 400**	**Suite 400**	**Suite 900**	**Suite 900**	**Suite 900**	**Suite 900**	**Suite 1000**
		Business	**Billards Hall**	**Billards Hall**	**Billards Hall**	**Billards Hall**	**Vails Gate Laudry**			**Marcella Pizza**	**Marcella Pizza**	**Marcella Pizza**	**Marcella Pizza**	**Vacant Space**
		Sample Date	**10/12/2011**	**11/20/2013**	**4/29/2014**	**11/11/2015**	**11/11/2015**	**3/19/2013**	**3/19/2013**	**3/19/2013**	**11/20/2013**	**4/29/2014**	**11/11/2015**	**3/19/2013**
	Units	NYSDOH Background Indoor Air Concentrations 25th - 95th Percentile Range[1]												
Detected VOCs														
Tetrachloroethene (PCE)	µg/m^3	0.25 - 4.1	**7.3**	**12**	**8**	**0.81**	**8.1**	6.6 U	3.3 U	**540**	**1,260**	**13**	**1.6**	**110**
Trichloroethene (TCE)	µg/m^3	0.25 - 0.8	1.5 U	0.42 U	0.81 U	0.21 U	**3**	6.4 U	3.1 U	3.1 U	**11**	0.81 U	**0.54**	3.1 U
trans-1,2-Dichloroethylene	µg/m^3	NE	2.2 U	0.23 U	0.52 U	0.79 U	0.79 U	2.8 U	1.4 U	1.4 U	0.23 U	0.52 U	0.79 U	1.4 U
Cis-1,2-Dichloroethene (DCE)	µg/m^3	0.25 - 1.2	2.2 U	0.44 U	0.37 U	0.79 U	0.79 U	3.1 U	1.5 U	1.5 U	**2.3 J**	0.37 U	0.79 U	1.5 U
Chloroform	µg/m^3	0.25 - 4.6	2.6 U	0.36 U	0.45 U	**0.88 J**	**6.8**	4.9 U	2.5 U	2.5 U	**2.3 J**	**1.3 J**	**4.2**	2.5 U
Dichlorodifluoromethane	µg/m^3	0.25 - 26	**3**	**2.4 J**	**2.8**	**2.6**	**2.6**	1.7 U	0.84 U	0.84 U	**2.4 J**	**3**	**2.4**	**3.0 J**

		Sample Location ID	**Suite 1000 Air**	**Suite 1000-AAir**	**Suite 1000-AAir**	**Suite 1000-AAir**	**Suite 1100 Air**	**Suite 1100-AAir**	**Suite 1100-AAir**	**Suite 1100-AAir**	**Suite 1200-AA-1**	**Suite 1200-AA-1**	**Suite 1300-AA-2**
		Sample Name	**Suite 1000 Air**	**Suite 1000-AAir**	**Suite 1000-AAir**	**Vacant Unit 1000**	**Suite 1100 Air**	**Suite 1100-AAir**	**Suite 1100-AAir**	**Unit 1100 (RadioShak)**	**Suite 1200-AA-1**	**Unit 1200 (Great Wall)**	**Suite 1300-AA-2**
		Suite	**Suite 1000**	**Suite 1000**	**Suite 1000**	**Suite 1000**	**Suite 1100**	**Suite 1100**	**Suite 1100**	**Suite 1100**	**Suite 1200**	**Suite 1200**	**Suite 1300**
		Business	**Vacant Space**	**Vacant Space**	**Vacant Space**	**Vacant Space**	**Radio Shack**	**Radio Shack**	**Radio Shack**	**Radio Shack**	**Chinese Rest.**	**Chinese Rest.**	**Dollar Tree**
		Sample Date	**11/20/2013**	**4/29/2014**	**12/2/2014**	**11/11/2015**	**11/21/2013**	**4/29/2014**	**12/2/2014**	**11/11/2015**	**4/22/2015**	**11/11/2015**	**4/22/2015**
	Units	NYSDOH Background Indoor Air Concentrations 25th - 95th Percentile Range[1]											
Detected VOCs													
Tetrachloroethene (PCE)	µg/m^3	0.25 - 4.1	**2,620**	**210**	4.8 U	**0.68**	**182**	**38**	**10.5**	**2.4**	1.1 U	**1.1**	1.1 U
Trichloroethene (TCE)	µg/m^3	0.25 - 0.8	**14**	0.81 U	0.76 U	0.21 U	**1.2**	0.81 U	**1**	**0.27**	**1.3**	**0.49**	0.81 U
trans-1,2-Dichloroethylene	µg/m^3	NE	1.2 U	0.52 U	2.8 U	0.79 U	0.059 U	0.52 U	3.3 U	0.79 U	0.52 U	0.79 U	0.52 U
Cis-1,2-Dichloroethene (DCE)	µg/m^3	0.25 - 1.2	2.2 U	0.37 U	2.8 U	0.79 U	0.11 U	0.37 U	3.3 U	0.79 U	0.37 U	0.79 U	0.37 U
Chloroform	µg/m^3	0.25 - 4.6	1.8 U	0.45 U	0.69 U	**0.98**	0.093 U	0.45 U	0.71 U	**0.49 J**	0.79	**1.1**	**2.0 J**
Dichlorodifluoromethane	µg/m^3	0.25 - 26	1.5 U	**3**	**3**	**2.4**	**2.3**	**2.1 J**	**2.9**	**2.5**	**2.7**	**2.5**	0.54 U

Table 4. Summary of Indoor Air Detections
Feasibility Study
Former Safety Kleen Cleaners
New Windsor, New York

Notes:

$\mu g/m^3$ = micrograms per cubic meter

VOC = Volatile Organic Compound

1 Source: NYSDOH, October 2006. Summary of Indoor and Outdoor Levels of Volatile Organic Compounds from Fuel Oil Heated Homes reported in various locations within sampled homes in NYS, 1997-2003 as presented in Table C1. Background values for naphthalene

NYSDOH - New York State Department of Health

CAS no. - Chemical Abstracts Service number

NE - not established

Bolding indicates a detected result concentration

Shading and bolding indicates that the detected concentration is above the NYSDOH guidance it was compared to

Laboratory Qualifiers:

J - estimated value

U - indicates not detected to the reporting limit

Table 5. Summary of Remedial Technology Screening
Feasibility Study
Former Safety Kleen Dry Cleaner
New Windsor, New York

Response Action	Technology	Effectiveness	Implementability	Cost	Status for Alternative Development
Excavation	Unsaturated Zone Excavation	Effective in elimination of exposure pathway and providing long-term protection of human health. Involves excavation to depth of about 8 feet in much of the site area. Residual contaminants will not pose future threat to workers. Combined with institutional controls or cap, RAOs can be met.	Technology proven and readily implemented. Large scale removal necessary and will require dust, emissions and odor controls. Significant earth support and underpinning of remaining buildings required.	High relative to other removal options	Retained for alternative development.
Ex-Situ Treatment	Off-site Low Temperature Thermal Desorption	Effective form of treatment of soils with low to high levels of organic contamination. Technology has been used at other similar sites effectively.	Readily implemented. Many permitted facilities can receive waste streams.	Medium compared to other ex situ treatment technologies.	Retained for alternative development.
	Slurry Phase Bioreactors	Technology in developmental stage for MGP waste streams. Effectiveness should be field tested before implementation.	Technology not proven.	Costs may be high compared to other ex-situ technologies.	Not retained.
In Situ Treatment	Steam Assisted Dual Phase Extraction	Effective on small areas.	Readily implemented. May not be effective on some PAHs and source material.	Capital costs may be medium. Operation and maintenance costs may be high when compared to other in situ technologies.	Not retained.
	Air Sparge/Soil Vapor Extraction	Effective in stripping volatile organic compounds from the groundwater and soil. Technology is most effective in sandy materials with higher porosity.	Technology proven and readily implemented; however effectiveness is limited in silt or clay soils.	Capital costs may be medium. Operation and maintenance costs may be high when compared to other in situ technologies.	Retained for alternative development.

Table 5. Summary of Remedial Technology Screening
Feasibility Study
Former Safety Kleen Dry Cleaner
New Windsor, New York

Response Action	Technology	Effectiveness	Implementability	Cost	Status for Alternative Development
	Sub-Slab Depressurization System	Effective in stripping volatile organic compounds from soil and materials immediately below the existing slab and mitigating soil vapor intrusion. Effectiveness is limited on deeper source materials. Effectiveness of the current system can be improved with 24-hour operation.	Technology proven and readily implemented; however effectiveness is limited in silt or clay soils.	Capital costs are low due to existing system. Operation and maintenance costs may be high when compared to other in situ technologies due to the long term nature without additional source removal/treatment.	Retained for alternative development.
	In-Well air stripping	Effective in removing volatile organic compounds.	Limited effectiveness in silt or clay soils.	NA	Not retained.
In Situ Treatment	Hydrogen Release Compound (HRC) Injection	Effective in destroying source material and meeting the RAOs at similar sites. Soil lithology and perched groundwater zone indicates that HRC will remain in contact with contaminated water. Effective technology for reaching contamination with limited access such as beneath buildings and roadways.	Technology proven and readily implemented.	Low to moderate capital costs compared to other alternatives.	Retained for alternative development.
Containment	Engineered cap/cover system	Effective at controlling the pathways for future worker exposure. Current use includes buildings and paved areas which limit contact with impacts soils and groundwater.	Technology proven and readily implemented.	Low compared to other technologies. Buildings and paving are already in place.	Retained for alternative development.
	Vapor Barrier	Effective at preventing soil vapor intrusion into buildings/structures. Barriers can be installed in several ways including removal of the building slab, installation over existing slab, or a combination of the both methods.	Technology proven; however, existing business would be significantly disrupted to install a vapor barrier.	High installation costs based on the costs of the disruption and reconstruction of existing businesses.	Not retained.
	Hydraulic Control in contained areas	Effective in maintaining hydraulic gradient into the contained area. The existing lithology is already effective in maintaining the impacted groundwater to a limited zone.	Technology proven and readily implemented.	Low capital cost, high long-term maintenance cost relative to other technologies.	Not retained.

Table 5. Summary of Remedial Technology Screening
Feasibility Study
Former Safety Kleen Dry Cleaner
New Windsor, New York

Response Action	Technology	Effectiveness	Implementability	Cost	Status for Alternative Development
Institutional Controls	Access Controls Deed Restrictions Health & Safety Plans Long-Term Monitoring Notifications	Effective in preventing risks to future construction workers. Not effective in limiting migration.	Readily implementable.	Low. Monitoring to be performed semi-annually.	Retained for alternative development.

Table 6. Remedial Action Alternatives – Comparative Analysis
Feasibility Study
Former Safety Kleen Dry Cleaners
New Windsor, New York

Criteria	Sub-Criteria	Rating[1] Alt. 2: AS/SVE	Alt. 3: HRC Injection & SSDS Modification	Alt. 4: SSDS Modification	Alt. 5: No Action	Comparison Statement
Overall Protection of Human Health and the Environment		1	1	1	1	All of the alternatives include operation of the SSDS or SVE to protect workers and customers of the businesses at the site.
	Score[2]	**1**	**1**	**1**	**1**	
	Soil	1	1	1	1	Alternatives were ranked based on the volume of source material in soil removed/treated. All three alternatives leave impacts in soil at depth.
	Groundwater	1	1	3	4	Alternatives 2 and 3 target the same quantity of perched groundwater source removal/treatment. Alternatives 4 and 5 do not directly address groundwater contamination. Alternative 4 has higher chance of reducing groundwater contamination than Alternative 4.
	Soil Vapor	1	1	1	4	Alternatives were ranked based on whether they reduced the potential for soil vapor intrusion. Alternatives 2, 3, and 4 include soil vapor extraction and/or 24 hour operation of the existing SSDS. Alternative 5 includes operation of the existing SSDS during overnight periods only.
New York State or Site-Specific SCGs	**Score**	**1.00**	**1.00**	**1.67**	**3.00**	
	Permanence of Remedial Alternative	1	1	1	4	All of the alternatives are expected to be a permanent remedy for the Site; however the alternatives that include the installation of additional equipment and a larger capital investment were ranked higher.
	Magnitude of Remaining Risk	1	1	3	4	All alternatives will leave soil impacts at depth. Alternatives 4 and 5 do not directly address groundwater contamination. Alternative 4 has higher chance of reducing groundwater contamination than Alternative 5.
	Adequacy of Controls	1	1	1	1	All alternatives will provide equal controls.
	Reliability of Controls	1	1	1	1	All alternatives will provide equal controls.
Long-Term Effectiveness and Permanence	**Score**	**1**	**1**	**1.5**	**2.5**	
	Amount of Material Destroyed or Treated	1	1	3	4	Alternatives 2 and 3 are relatively equal in volume of material treated or destroyed. Alternatives 4 and 5 will not destroy any soil or groundwater contamination. Alternative 4 has higher chance of reducing groundwater contamination than Alternative 5.
	Degree of Toxicity, Mobility, or Volume reduced	1	1	3	4	Alternatives 2 and 3 are relatively equal in volume of material treated or destroyed. Alternatives 4 and 5 will not destroy any soil or groundwater contamination. Alternative 4 has higher chance of reducing groundwater contamination than Alternative 5.
	Irreversibility	1	1	1	1	All alternatives are permanent, Alternative 3 can be accomplished in a single injection while Alternative 2 requires installation of additional equipment.
	Residuals Remaining	1	1	3	4	All Alternatives will leave soil contamination at depth. Alternatives 4 and 5 will not destroy any soil or groundwater contamination. Alternative 4 has higher chance of reducing groundwater contamination than Alternative 5.
Reduction of Toxicity, Mobility, and Volume	**Score**	**1**	**1**	**2.5**	**3.25**	

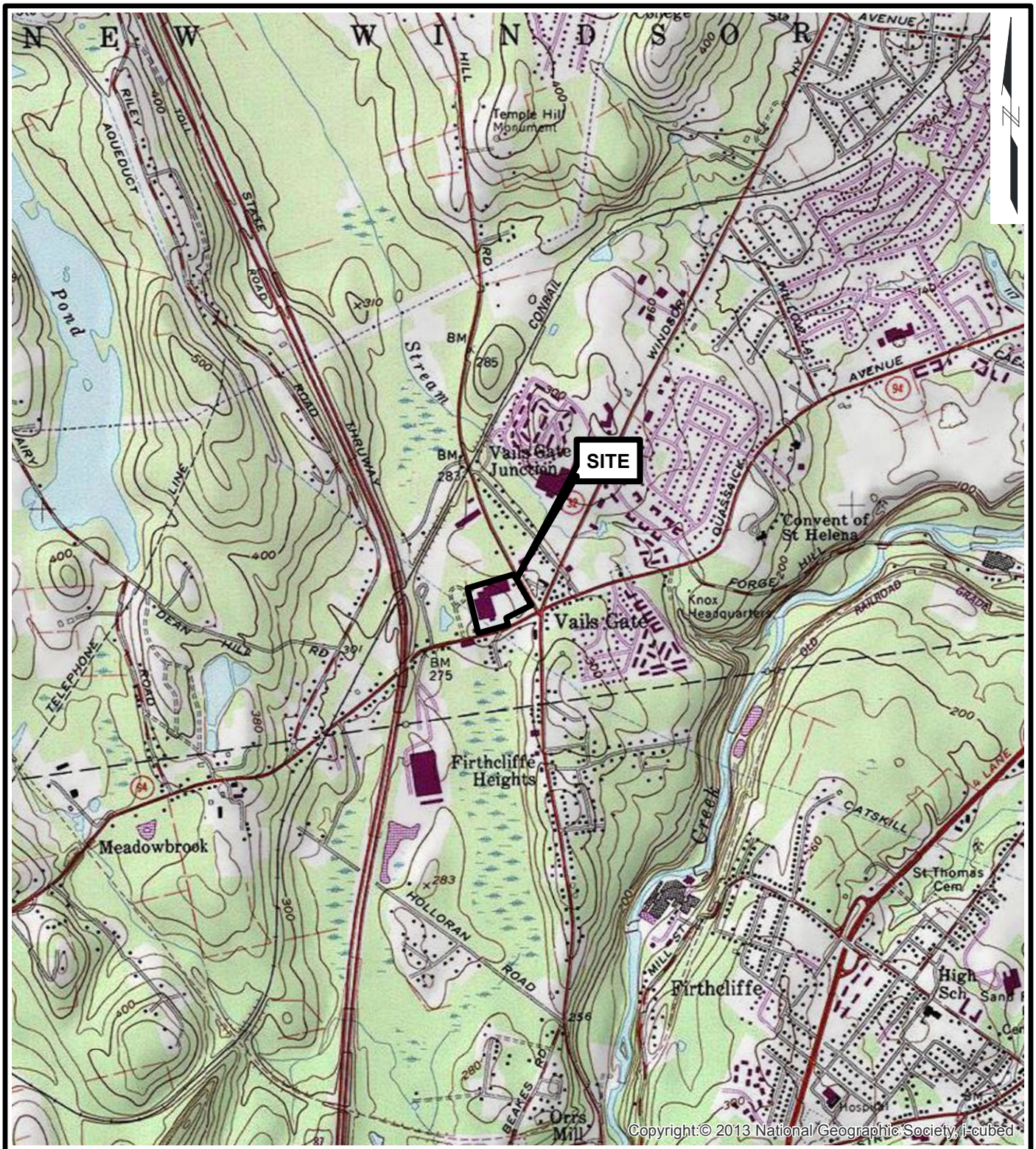
Table 6. Remedial Action Alternatives – Comparative Analysis
Feasibility Study
Former Safety Kleen Dry Cleaners
New Windsor, New York

Criteria	Sub-Criteria	Rating[1]				Comparison Statement
		Alt. 2: AS/SVE	Alt. 3: HRC Injection & SSDS Modification	Alt. 4: SSDS Modification	Alt. 5: No Action	
	Protection of Community during Remedial Action	3	2	1	1	Alternatives 2 and 3 require some degree of intrusive work for well installation and trenching. Shallow impacted materials will be transported off site. Excavation and transporting impacted materials form the site will have potential impact on the community and will require the implementation of appropriate controls during construction (air monitoring, dust suppression, etc.) and times when portions of the parking area will be closed for construction. Alternatives 4 and 5 do not include any additional intrusive work.
	Environmental Impacts	1	1	1	1	There are no foreseeable adverse environmental impacts for any alternative.
	Time Required to Meet Remedial Objectives	2	1	3	4	The physical site work associated with Alternative 3 can be completed much quicker than the work associated with Alternative 2. It is likely that groundwater objectives will be met faster using HRC than AS/SVE, thus the SSDS could be shut down sooner than the AS/SVE system. Alternative 5 will require the longest operation of the existing SSDS.
	Protection of Workers	3	2	1	1	Alternatives 4 and 5 have the least amount of construction activity. Alternative 2 and 3 will require protections during construction
Short-Term Impacts and Effectiveness	**Score**	**2.25**	**1.5**	**1.5**	**1.75**	
	Technical Feasibility	3	3	1	1	All Alternatives are technically feasible. Alternatives 4 and 5 are the least construction intensive alternatives with the highest technical feasibility.
	Administrative Feasibility	3	3	1	1	Alternative 4 and 5 are the least intrusive alternatives.
	Availability of Services	3	3	1	1	The majority of site work will be completed with conventional construction equipment, those alternatives requiring the use of specialized equipment for trenching or permanent well installations may have slightly less available.
Implementability	**Score**	**3**	**3**	**1**	**1**	
	Capital Costs	4	3	1	1	Capital costs for construction dewatering and treatment of impacted soils drive the costs of the remedies. Those alternatives with larger excavation volumes, disposal volumes, and/or dewatering costs have increased associated capital costs.
	O&M costs	4	1	3	3	All alternatives will require similar post remedy monitoring programs. The duration of the programs differentiates the cost of the OM&M. Alternatives 4 and 5 will be active for the longest period. Alternatives 2 and 3 will likely be active for similar periods, but the cost of OM&M of the AS/SVE system is higher.
Costs	**Score**	**4**	**2**	**2**	**2**	
Total Score		**13.25**	**10.50**	**11.17**	**14.50**	

Notes:

1. Sub-criteria score are based on a qualitative forced ranking scale. The alternative with the best rating receives a score of 1, the 2nd best – a score of 2, and so on. If alternatives are equal in rating, ties are included (i.e., if Alternative 1 is the best, it receives a score of 1, but if Alternatives 3 and 4 are the next equal in scale, then they both will receive a score of 2, the next rated Alternative will receive a 4 since it is the fourth rated Alternative). The tie scoring system is used to prevent the last place rated alternative from receiving a score of 2, if all of the other alternatives are justifiably scored with the highest rating.
2. Sub-criteria scores for each major criteria are summed, and then divided by the number of sub-criteria so that the main criteria receive the same overall weighting, regardless of the number of sub-criteria.

Figures



SOURCE:
1. USGS TOPOGRAPHIC MAP ACCESSED VIA ARCGIS ONLINE SERVICES.

0 2,000 4,000
SCALE: 1" = 2000'

Feasibility Study Former Safety Kleen Dry Cleaner 115 Temple Hill Road New Windsor, New York	GEI Consultants	SITE LOCATION MAP
The Rosen Group Claymont, Deleware	Project 1602600	May 2016 Fig. 1

J:\Projects\1602600 The Rosen Group\Former Safety Kleen Dry Cleaner\Site Locus.mxd

LEGEND:

- SUBSLAB
- AMBIENT AIR
- INDOOR
- SOIL BORING
- MONITORING WELL

SOURCE:

1. PLAN OBTAINED FROM SOLUTECH, INC, DATED JANUARY 2012.

0 50 100

SCALE: 1" = 50'

Feasibility Study
Former Safety Kleen Dry Cleaner
115 Temple Hill Road
New Windsor, New York

The Rosen Group
Claymont, Deleware

GEI Consultants

SITE PLAN AND SAMPLE LOCATION MAP

Project 1602600 | May 2016 | Fig. 2

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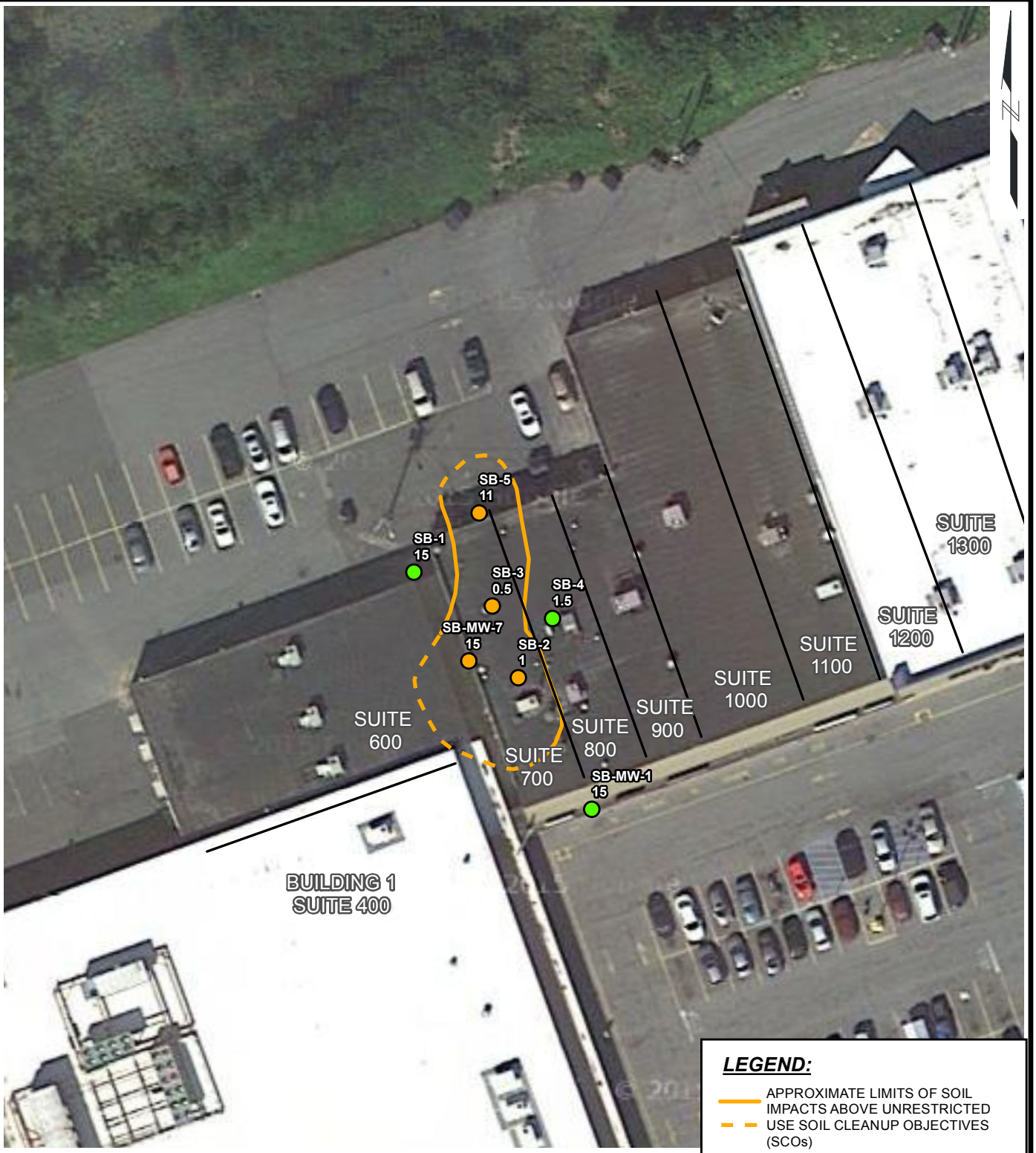

SOURCE:

1. PLAN OBTAINED FROM SOLUTECH, INC, DATED JANUARY 2012.

0 50 100

SCALE: 1" = 50'

LEGEND:

- APPROXIMATE LIMITS OF SOIL IMPACTS ABOVE UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (SCOs)
- SOIL SAMPLE EXCEEDS UNRESTRICTED USE SCOs
- SOIL SAMPLE MEETS UNRESTRICTED USE SCOs
- 15 SOIL SAMPLE DEPTH BELOW GRADE (FEET)

Feasibility Study
Former Safety Kleen Dry Cleaner
115 Temple Hill Road
New Windsor, New York

The Rosen Group
Claymont, Deleware

GEI Consultants

EXTENT OF SOIL IMPACTS

Project 1602600 | May 2016 | Fig. 3

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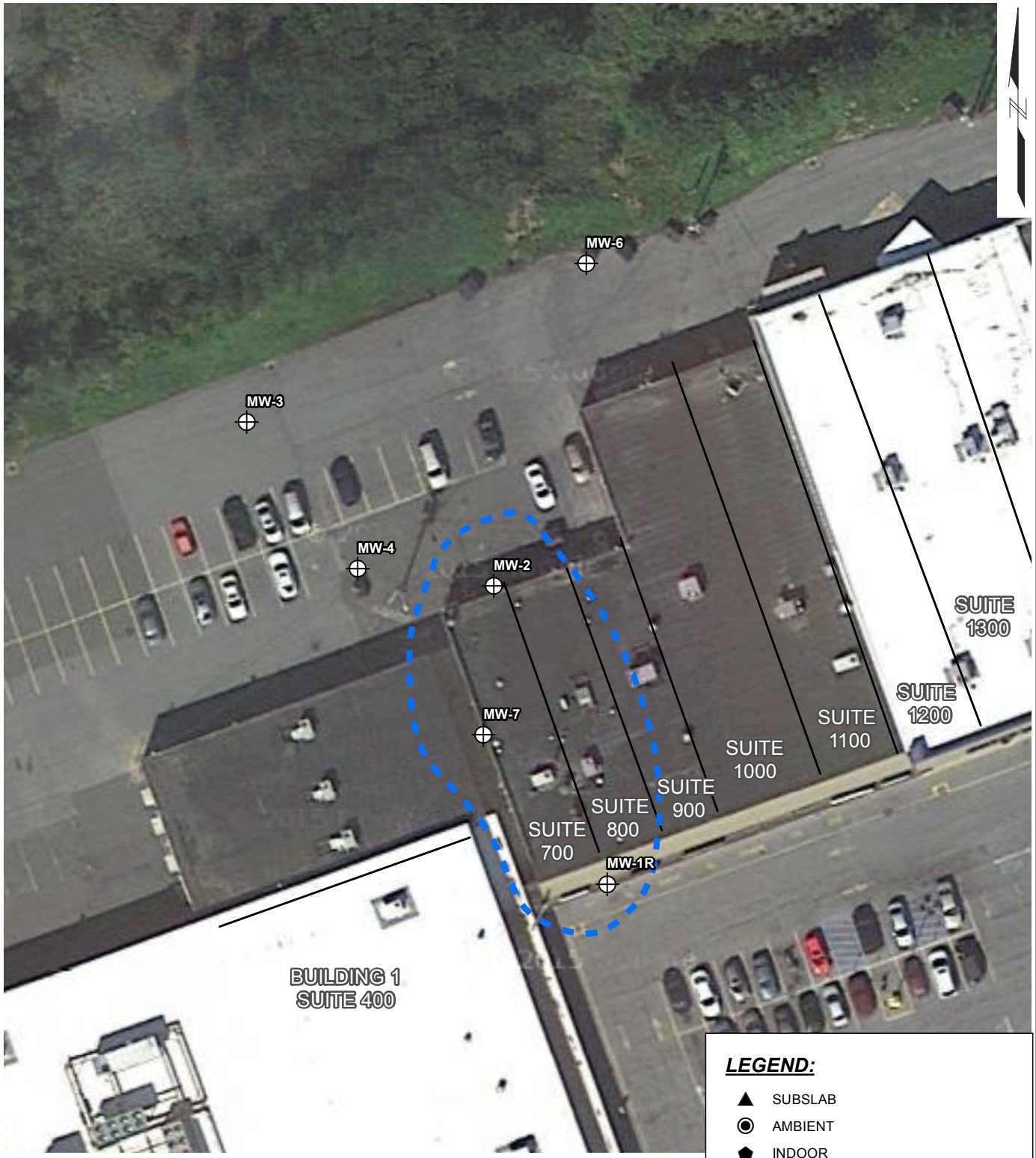

SOURCE:

1. PLAN OBTAINED FROM SOLUTECH, INC, DATED JANUARY 2012.

0 50 100

SCALE: 1" = 50'

Feasibility Study
Former Safety Kleen Dry Cleaner
115 Temple Hill Road
New Windsor, New York

The Rosen Group
Claymont, Deleware

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EXTENT OF GROUNDWATER IMPACTS

Project 1602600 | May 2016 | Fig. 4

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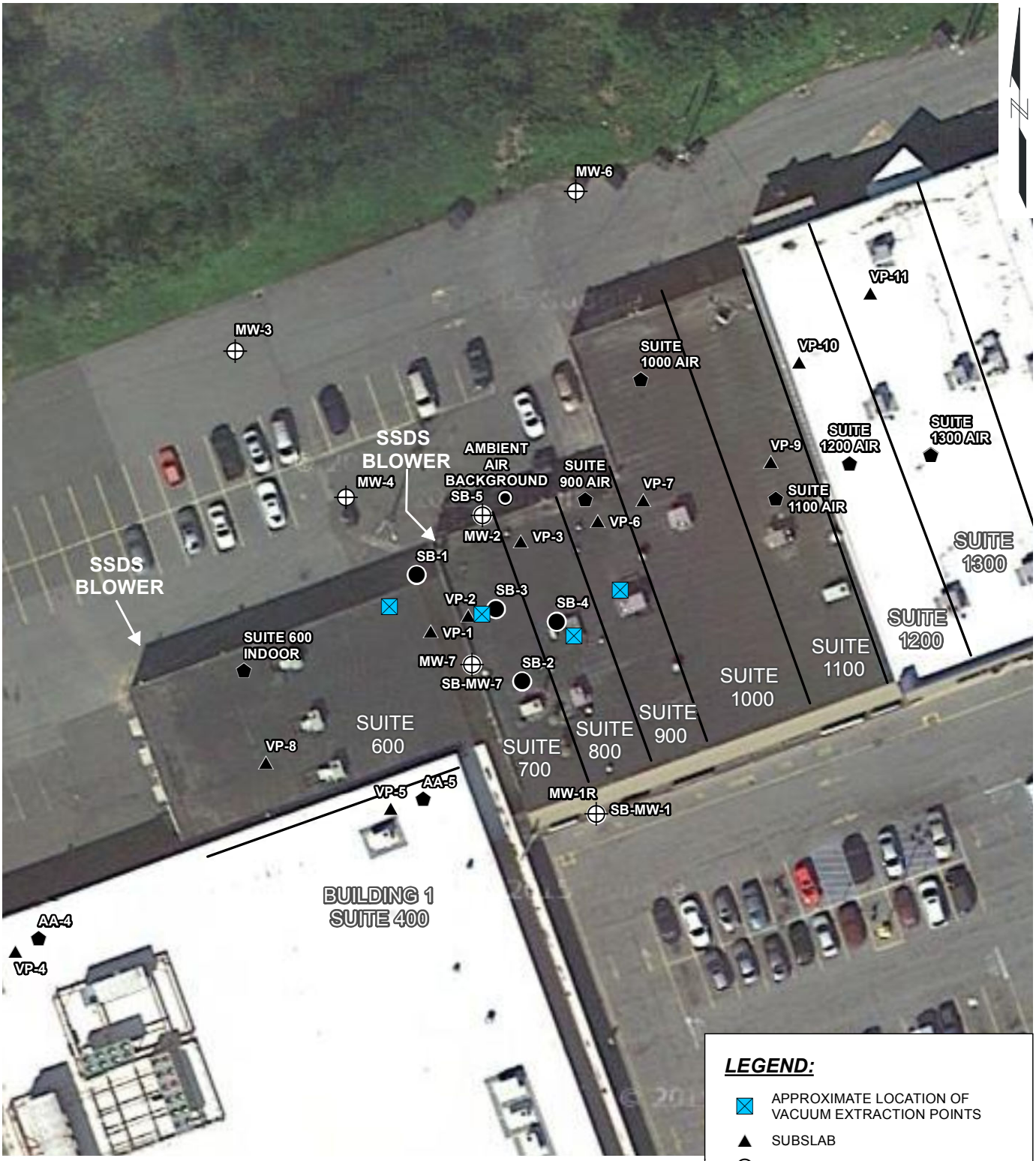

SOURCE:

1. PLAN OBTAINED FROM SOLUTECH, INC, DATED JANUARY 2012.

0 50 100

SCALE: 1" = 50'

LEGEND:

- APPROXIMATE LOCATION OF VACUUM EXTRACTION POINTS
- SUBSLAB
- AMBIENT AIR
- INDOOR
- SOIL BORING
- MONITORING WELL

Feasibility Study
Former Safety Kleen Dry Cleaner
115 Temple Hill Road
New Windsor, New York

The Rosen Group
Claymont, Deleware

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SUB-SLAB DEPRESSURIZATION SYSTEM IRM

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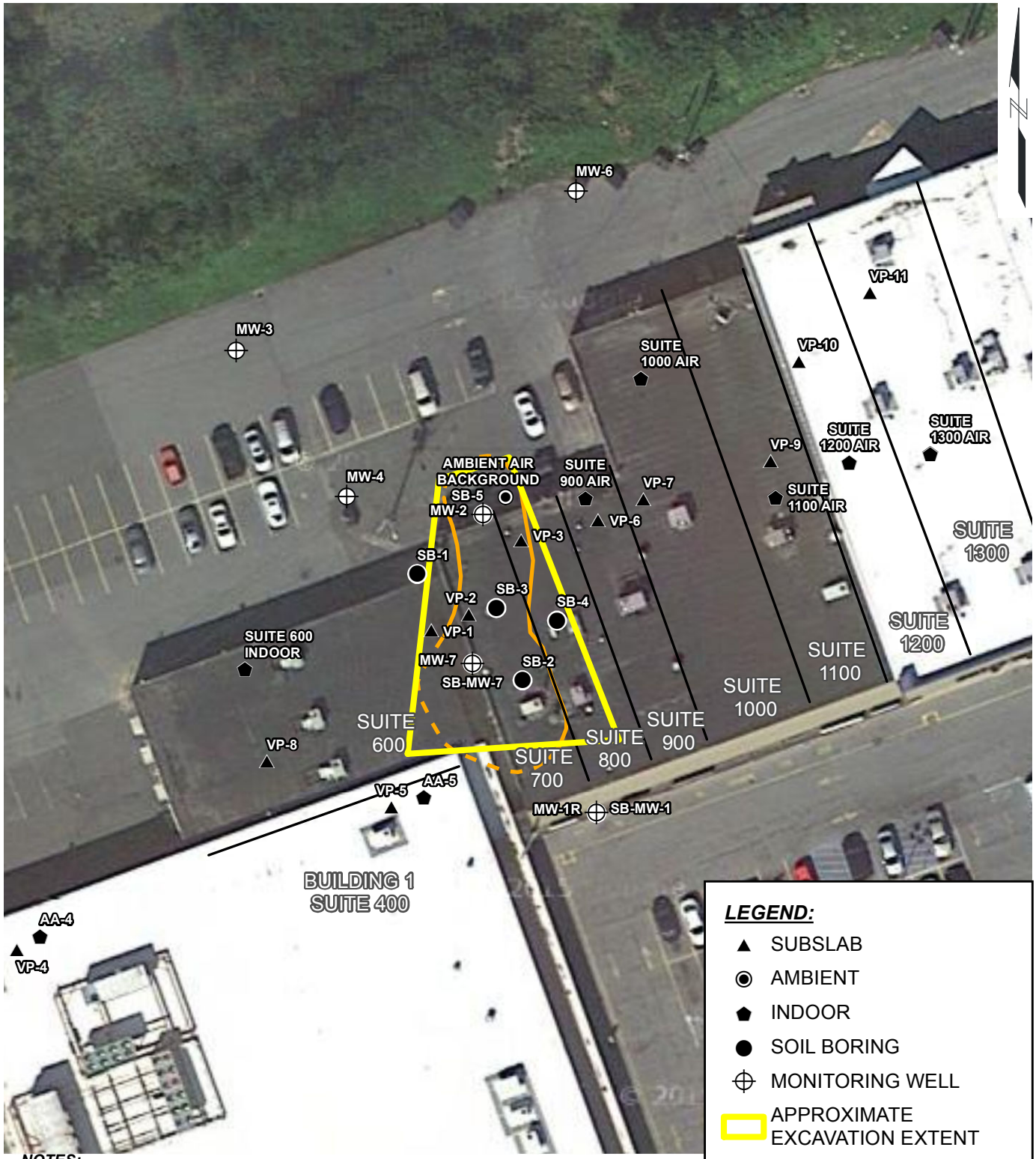

LEGEND:

- SUBSLAB
- AMBIENT
- INDOOR
- SOIL BORING
- MONITORING WELL
- APPROXIMATE EXCAVATION EXTENT
- APPROXIMATE LIMITS OF SOIL IMPACTS ABOVE UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (SCOs)

NOTES:

LOCATIONS ARE APPROXIMATE, EXACT LOCATIONS WILL BE DETERMINED BASED ON FIELD PILOT TEST.

SOURCE:

1. PLAN OBTAINED FROM SOLUTECH, INC, DATED JANUARY 2012.

0 50 100

SCALE: 1" = 50'

Feasibility Study
Former Safety Kleen Dry Cleaner
115 Temple Hill Road
New Windsor, New York

The Rosen Group
Claymont, Deleware

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REMEDIAL ALTERNATIVE 1

Project 1602600 | May 2016 | Fig. 6

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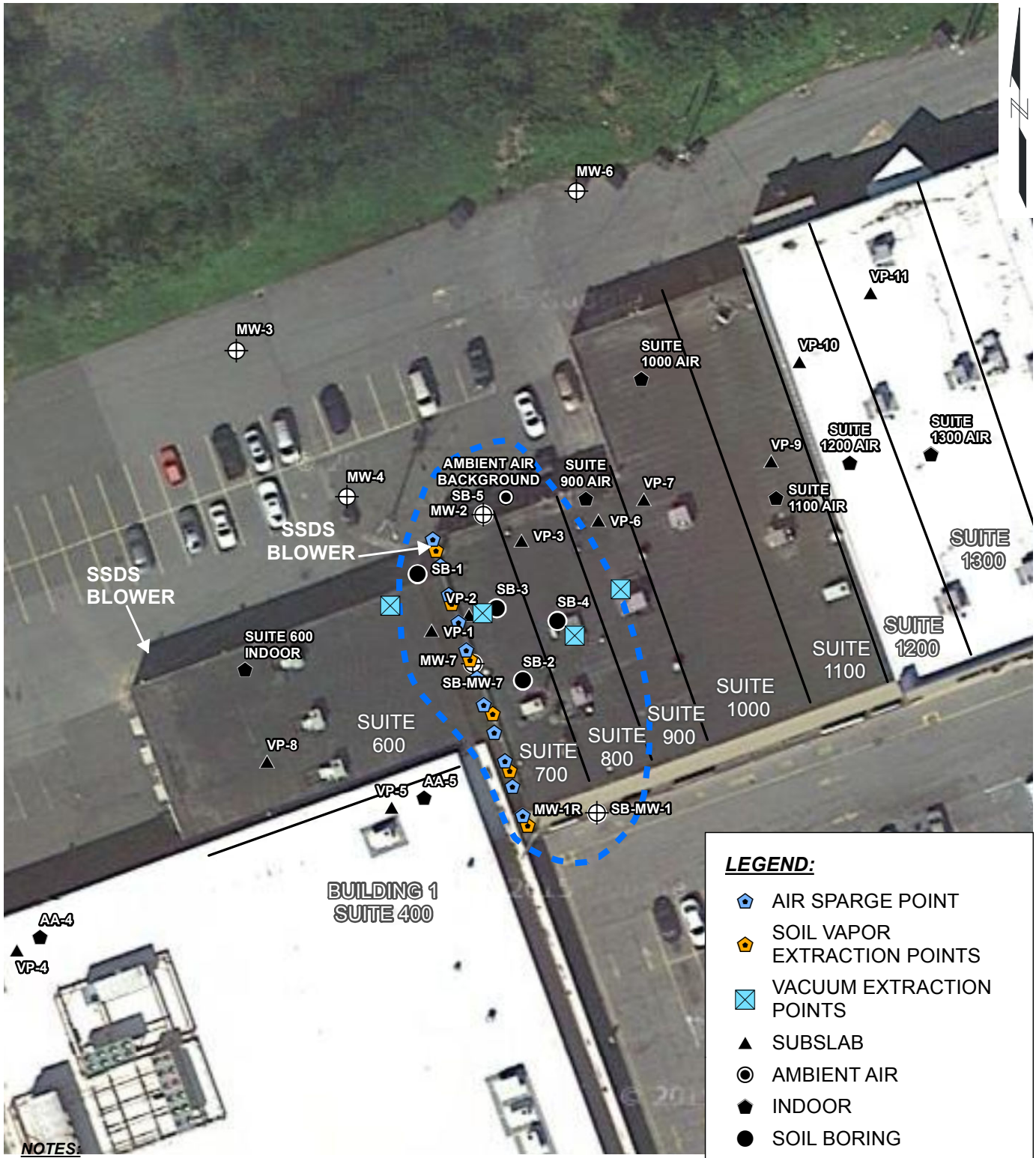

NOTES:
LOCATIONS ARE APPROXIMATE, EXACT LOCATIONS WILL BE DETERMINED BASED ON FIELD PILOT TEST.

SOURCE:
1. PLAN OBTAINED FROM SOLUTECH, INC, DATED JANUARY 2012.

0 50 100
SCALE: 1" = 50'

Feasibility Study
Former Safety Kleen Dry Cleaner
115 Temple Hill Road
New Windsor, New York

The Rosen Group
Claymont, Deleware

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REMEDIAL ALTERNATIVE 2

Project 1602600 | May 2016 | Fig. 7

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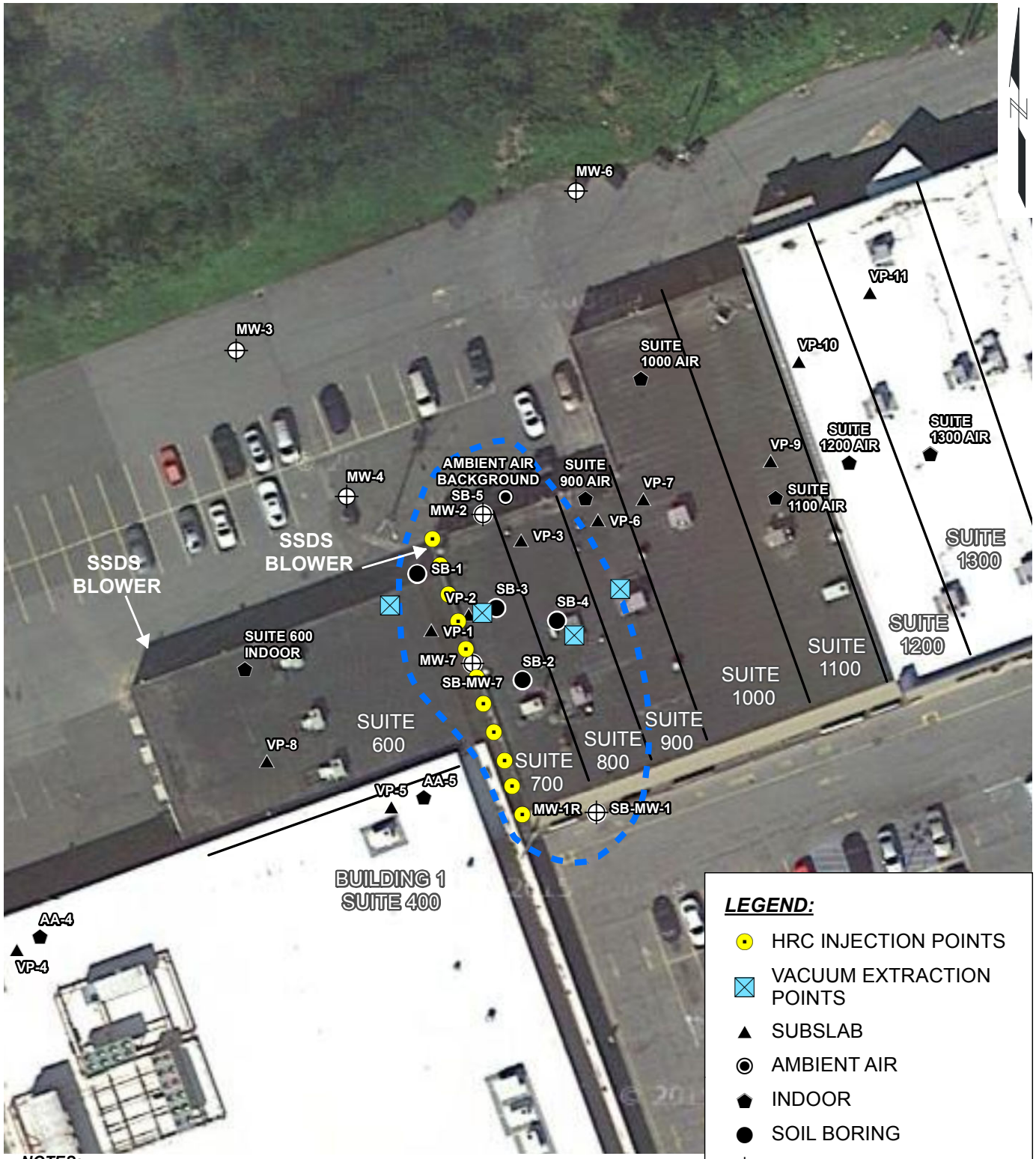

NOTES:

LOCATIONS ARE APPROXIMATE, EXACT LOCATIONS WILL BE DETERMINED BASED ON FIELD PILOT TEST.

SOURCE:

1. PLAN OBTAINED FROM SOLUTECH, INC, DATED JANUARY 2012.

Feasibility Study
Former Safety Kleen Dry Cleaner
115 Temple Hill Road
New Windsor, New York

The Rosen Group
Claymont, Deleware

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REMEDIAL ALTERNATIVE 3

Project 1602600 | May 2016 | Fig. 8

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Appendix A

Remedial Alternative Cost Estimates

Table A-1
Detailed Cost Estimate for Remedial Alternative 2
Former Safety Kleen Dry Cleaners
New Windsor, New York

Remedial Component	Unit	Unit Price	Quantity	Total Cost
COMMON COST COMPONENTS				
Preconstruction				
1 Engineering Design, Plans, Specs, Bid	Lump Sum	$ 12,000	1	$ 12,000
2 Permitting and Regulatory Submittals	Lump Sum	$ 5,000	1	$ 5,000
3 Pilot Test for AS/SVE	Lump Sum	$ 20,000	1	$ 20,000
4 Site Survey (Pre-Construction and Post-Remediation)	Lump Sum	$ 2,800	1	$ 2,800
			Subtotal	$ 39,800
General Conditions				
1 Mobilization/Demobilization	Lump Sum	$ 15,000	1	$ 15,000
2 Construction Oversight	Day	$ 1,250	30	$ 37,500
3 Air Monitoring System during construction	Month	$ 8,140	1	$ 8,140
			Subtotal	$ 39,800
Post Construction Regulatory Reporting				
1 Site Management Plan	Lump Sum	$ 8,000	1	$ 8,000
2 Environmental Easement/Deed Restriction	Lump Sum	$ 12,000	1	$ 12,000
3 Final Engineering Report	Lump Sum	$ 8,000	1	$ 8,000
			Subtotal	$ 28,000
REMEDIAL COMPONENTS				
AS/SVE System				
1 Trailer Mounted AS/SVE System	Lump Sum	$ 75,000	1	$ 75,000
2 Air Sparge Well Installation	Lump Sum	$ 8,500	1	$ 8,500
3 Soil Vapor Extraction Vertical Extraction Wells	Lump Sum	$ 9,300	1	$ 9,300
4 Soil Vapor Extraction Horizontal Extraction Well	Lump Sum	$ 16,200	1	$ 16,200
5 Disposal Costs and Hauling of Bulky Waste	Ton	$ 120	8	$ 925
6 Transport and Disposal of Excavated Material	Ton	$ 150	75	$ 11,250
7 Backfill trench excavations	Cubic Yard	$ 90	50	$ 4,500
8 Restore Surfaces (Does not Include Building Restoration)	Square Feet	$ 30	450	$ 13,500
			Subtotal	$ 139,175
Long term monitoring and maintenance				
1 Periodic Monitoring, Reporting, Disposal and Maintenance	Year	$ 53,600	15	$ 556,350
assume I=5%			**Subtotal**	$556,350
REMEDIAL COST SUMMARY				
Total Capital costs without contingency				**$ 246,775**
Total O&M costs				**$ 556,350**
Total Capital and O&M costs without contingency				$ 803,125
Contingency (25%)			25%	$ 200,781
			TOTAL COST	**$ 1,003,906**

Table A-2
Detailed Cost Estimate for Remedial Alternative 3
Former Safety Kleen Dry Cleaners
New Windsor, New York

Remedial Component	Unit	Unit Price	Quantity	Total Cost
COMMON COST COMPONENTS				
Preconstruction				
1 Engineering Design, Plans, Specs, Bid	Lump Sum	$ 12,000	1	$ 12,000
2 Permitting and Regulatory Submittals	Lump Sum	$ 5,000	1	$ 5,000
3 Pilot Test for Injection	Lump Sum	$ 15,000	1	$ 15,000
4 Site Survey (Pre-Construction and Post-Remediation)	Lump Sum	$ 2,800	1	$ 2,800
			Subtotal	$ 34,800
General Conditions				
1 Mobilization/Demobilization	Lump Sum	$ 15,000	1	$ 15,000
2 Construction Oversight	Day	$ 1,250	20	$ 25,000
3 Air Monitoring System during construction	Month	$ 8,140	1	$ 8,140
			Subtotal	$ 34,800
Post Construction Regulatory Reporting				
1 Site Management Plan	Lump Sum	$ 8,000	1	$ 8,000
2 Environmental Easement/Deed Restriction	Lump Sum	$ 12,000	1	$ 12,000
3 Final Engineering Report	Lump Sum	$ 8,000	1	$ 8,000
			Subtotal	$ 28,000
REMEDIAL COMPONENTS				
HRC Injection				
1 SSDS System Modifications	Lump Sum	$ 15,000	1	$ 15,000
2 Rig and Equipment for HRC Injection	Day	$ 3,500	20	$ 70,000
3 HRC Injections (Includes Initial Injections and 1 Reapplication)	Pounds	$ 10	4,020	$ 38,391
			Subtotal	$ 127,431
Long term monitoring and maintenance				
1 Periodic Monitoring, Reporting, Disposal and Maintenance	Year	$ 42,500	10	$ 328,174
assume I=5%			**Subtotal**	$328,174
REMEDIAL COST SUMMARY				
Total Capital costs without contingency				**$ 225,031**
Total O&M costs				**$ 328,174**
Total Capital and O&M costs without contingency				$ 553,205
Contingency (25%)			25%	$ 138,301
			TOTAL COST	**$ 691,506**

Table A-3
Detailed Cost Estimate for Remedial Alternative 4
Former Safety Kleen Dry Cleaners
New Windsor, New York

Remedial Component	Unit	Unit Price	Quantity	Total Cost
COMMON COST COMPONENTS				
Post Construction Regulatory Reporting				
1 Site Management Plan	Lump Sum	$ 8,000	1	$ 8,000
2 Environmental Easement/Deed Restriction	Lump Sum	$ 12,000	1	$ 12,000
3 Final Engineering Report	Lump Sum	$ 8,000	1	$ 8,000
			Subtotal	$ 28,000
REMEDIAL COMPONENTS				
SSDS Modifications				
1 SSDS System Modifications	Lump Sum	$ 15,000	1	$ 15,000
			Subtotal	$ 15,000
Long term monitoring and maintenance				
1 Periodic Monitoring, Reporting, Disposal and Maintenance	Year	$ 33,300	30	$ 511,903
assume I=5%			**Subtotal**	$511,903
REMEDIAL COST SUMMARY				
Total Capital costs without contingency				**$ 43,000**
Total O&M costs				**$ 511,903**
Total Capital and O&M costs without contingency				$ 554,903
Contingency (25%)			25%	$ 138,726
			TOTAL COST	**$ 693,628**

Table A-4
Detailed Cost Estimate for Remedial Alternative 5
Former Safety Kleen Dry Cleaners
New Windsor, New York

Remedial Component	Unit	Unit Price	Quantity	Total Cost
REMEDIAL COMPONENTS				
No Action				
1 Site Management Plan	Lump Sum	$ 8,000	1	$ 8,000
2 Environmental Easement/Deed Restriction	Lump Sum	$ 12,000	1	$ 12,000
			Subtotal	$ 20,000
Long term monitoring and maintenance				
1 Periodic Monitoring, Reporting, Disposal and Maintenance	Year	$ 33,300	30	$ 511,903
assume I=5%			**Subtotal**	$511,903
REMEDIAL COST SUMMARY				
Total Capital costs without contingency				**$ 20,000**
Total O&M costs				**$ 511,903**
Total Capital and O&M costs without contingency				$ 531,903
Contingency (25%)			25%	$ 132,976
			TOTAL COST	**$ 664,878**

Assumptions for Remedial Alternatives
Former Safety Kleen Dry Cleaners
New Windsor, New York

GEI Consultants, Inc. (GEI) has prepared this remedial estimate of cost for the alternatives presented in the Remedial Action Alternatives Report. GEI's estimate is based on published RS Means Cost Data, Vendor Costs, and on GEI's project experience. In order to prepare this estimate, GEI made basic assumptions as to actual site conditions that should be encountered; specific decisions and costs by other design professionals to be engaged by the contractor; the means, materials, methods of construction, and schedule the contractor will use/determine; and various other factors. An actual contractor's bid price to perform this work may vary from this estimate based on variances in the above-mentioned assumptions.

General
Unit Cost Data from 2016 RS Means Heavy Construction Cost Data, Unit Cost Localization Factor (New York, NY) = 1.170
Design
GEI unit rates were used as typical costs for design, report preparation & oversight costs.
These rates are intended to reflect industry rates and not those of a specific consultant.
Preconstruction
Preparation of 2 local/county permits with 1 revision each.
Construction Management
One construction oversight person on site during all construction activities. (10 hours/day).
Mobilization and Site Preparations
Assume contractor haul distance from Site to Contractor shop was no greater than 75 Miles
Assumed mobilization of one drill rig, one geoprobe rig, backhoe, and no more than three additional pieces of construction equipment
Assumes no temporary construction trailers on site during the work
Alternatives
Costs for Alternatives are based on GEI's previous project experience and contractor estimates.
Restoration
Trenched areas in parking lot or walkway will be restored with a 3-inch-thick RCA base coarse, a binder coarse, and a top coarse.
Buildings repair costs are not included in the cost estimates.
Area will be restored to pre-remedial construction conditions.
Post Remedy Monitoring
Alternative 2 assumes semi-annual sampling and reporting for 15 years for up to 7 MWs, 11 VPs, 3 SVE Off-Gas, 7 Indoor Air.
Alternative 3 assumes semi-annual sampling and reporting for 10 years for up to 7 MWs, 11 VPs, 1 SSDS Off-Gas, 7 Indoor Air.
Alternatives 4 and 5 assume semi-annual sampling and reporting for 30 years for up to 7 MWs, 11 VPs, 1 SSDS Off-Gas, 7 Indoor Air.
Laboratory rates based on current GEI MSAs with local laboratories
Assume one 10 hour work day, one sampling personnel per sampling event
Discount rate of 5% per NYSDEC based on EPA July 2000, A Guide to Developing and Documenting Cost Estimates During the
Feasibility Study (Recommended Rate 7%) and OSWER Directive 9355.3-20 “Revisions to OMB Circular A-94 on
Guidelines and Discount Rates for Benefit-Cost Analysis” (USEPA 1993) (Recommended Rate 7%) and 2009
Discount Rates for OMB Circular No. A-94 (OSWER, 2009) (Recommended Rate 2.7%)