DECISION DOCUMENT

Schmuckler's Dry Cleaners
Brownfield Cleanup Program
New Rochelle, Westchester County
Site No. C360088
July 2018

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - DECISION DOCUMENT

Schmuckler's Dry Cleaners
Brownfield Cleanup Program
New Rochelle, Westchester County
Site No. C360088
July 2018

Statement of Purpose and Basis

This document presents the remedy for the Schmuckler's Dry Cleaners site, a brownfield cleanup site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the Schmuckler's Dry Cleaners site and the public's input to the proposed remedy presented by the Department.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. Green Remediation

Green remediation principles and techniques will be implemented to the extent feasible in the implementation and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste

2. Cover System

A site cover will be required to allow for restricted residential use of the site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. The site cover may consist of paved surface parking areas, sidewalks, or a soil cover. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover

material for the restricted residential use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

3. Vapor Mitigation

The combination soil vapor extraction and sub-slab depressurization system installed in the on-site building as an interim remedial measure (section 6.2) will continue and is required to be operated continuously, including during the implementation of the nutrient injections associated with the enhanced bioremediation remedial element. If the SVE/SSDS needs to be shut-down during the nutrient injections, then adequate indoor air monitoring will be required for the duration the system is shut down and until restarted and effectively depressurizing the entire building slab.

4. Enhanced Bioremediation

In-situ enhanced biodegradation will be employed to treat volatile organic compounds and semi-volatile organic compounds in groundwater in the location of the former dry cleaning equipment room in the basement of the on-site building. The biological breakdown of contaminants will be enhanced by injecting nutrients into the subsurface to promote microbe growth. The bacteria and the nutrients will be delivered to the groundwater via five injection wells screened at intervals ranging from two to fifteen feet below ground surface. In addition to contaminant monitoring, anaerobic degradation parameters in the groundwater will be monitored in on- and off-site wells throughout the treatment to ensure remedy effectiveness. If sampling data indicates remedy effectiveness is unsatisfactory, or if parameters measured in groundwater does not indicate an anaerobic environment, an additional carbon source will be injected and remedy effectiveness monitoring will continue. Additional injections of the enhanced biological agents may be necessary, in addition to the maintenance of anerobic conditions, should monitoring indicate degradation is not ocurring.

5. NAPL Recovery

Collection and disposal of non-aqueous phase liquid (NAPL) from wells on the southeastern portion of the site and immediately off-site in the direction of groundwater flow to remove and prevent potentially mobile petroleum in the subsurface from migrating off-site. It is anticipated that petroleum-based light NAPL will be collected from the shallow groundwater approximately ten to twelve feet below ground surface. NAPL will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of NAPL over extended time periods, the Department will require evaluation and implementation of additional remedial actions, such as but not limited to the installation of additional recovery wells, to address NAPL migration. Additional remedial actions may also be required based on performance of the initial wells, new information, or a documented change in conditions.

6. Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a Track 4 restricted residential cleanup at a minimum and will include imposition of a site cover, continuation of the vapor mitigation system and an environmental easement, and site management plan as described below.

A. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

B. Site Management Plan

A Site Management Plan is required, which includes the following:

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

Institutional Controls: The Environmental Easement discussed in Paragraph 5 above.

Engineering Controls: The site cover system discussed in Paragraph 2 above and the NAPL recovery system discussed in Paragraph 5 above.

This plan includes, but may not be limited to:

o an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
o descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
o a provision for evaluation of the potential for soil vapor intrusion in future buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
o a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 3 above will be placed in any areas

where the upper two feet of exposed surface soil exceed the applicable soil cleanup objectives (SCOs)

o provisions for the management and inspection of the identified engineering controls;

o maintaining site access controls and Department notification; and

o the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

o monitoring of NAPL recovery and groundwater bioremediation to assess the performance and effectiveness of the remedy;

o monitoring of groundwater to assess the effectiveness of the remedy in reducing groundwater contaminant levels;

o Reports of the NAPL recovery and bioremediation will be provided annually and contingency remedial actions will be proposed if it appears that NAPL collection and bioremediation are not addressing the contamination;

o a schedule of monitoring and frequency of submittals to the Department;

o monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

3. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of the active vapor mitigation system(s). The plan includes, but is not limited to:

o procedures for operating and maintaining the system(s); and

o compliance inspection of the system(s) to ensure proper O&M as well as providing the data for any necessary reporting.

Declaration

The remedy conforms with promulgated standards and criteria that are directly applicable, or that are relevant and appropriate and takes into consideration Department guidance, as appropriate. The remedy is protective of public health and the environment.

July 11, 2018

Date

George Heitzman, Director
Remedial Bureau C

DECISION DOCUMENT

Schmuckler's Dry Cleaners
New Rochelle, Westchester County
Site No. C360088
May 2018

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Brownfield Cleanup Program (BCP) is a voluntary program. The goal of the BCP is to enhance private-sector cleanups of brownfields and to reduce development pressure on "greenfields." A brownfield site is real property, the redevelopment or reuse of which may be complicated by the presence or potential presence of a contaminant.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

New Rochelle Public Library
Attn: Tom Geoffino
1 Liberty Plaza
New Rochelle, NY 10801
Phone: 914-632-7878

NYSDEC Region 3
Attn: Sarah Shepard
21 S. Putt Corners Rd
New Paltz, NY 12561

Phone: 845-256-3154

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Schmuckler's Dry Cleaners site is located in an urban area located at 358-364 North Avenue in New Rochelle, Westchester County. The site is 0.21 acres, most of which is covered by a two-story row building with a full basement.

Site Features: In addition to the former dry cleaners, historically located on the first floor, the site also includes an enclosed backyard area to the immediate west of the building. The backyard consists of lawn, elevated planting beds, concrete pad, and a paved walkway. The building is currently occupied by six commercial tenants on both the first and second floors including a neighborhood charitable services office, a property management office, a spa/salon, a music studio, a taxi cab service office, and the Volunteer/property owner's office.

Current Zoning/Use(s): The site is commercially zoned. Properties along North Avenue are predominantly zoned for commercial or mixed use, some maintaining residential apartments above. Commercial uses dominate the areas within one block east and west of North Avenue, with the exception of a multi-unit residential building immediately to the west of the site. Drinking water on-site is provided from a municipal source.

Past Uses of the Site: The building on-site was built in 1891, and operated by Schmuckler's Cleaners from 1914 to 2006 on the first floor and basement of the building. Additions were added to the building in 1937, and two in 1987. The site was acquired by the Volunteer, HNJ Realty, LLC, in August 2005, and entered into the Brownfield Cleanup program in June 2006.

Site Geology and Hydrogeology: The site is underlain by fill which is underlain by poorly sorted glacial material (silty-clay with sand and gravel). The highly weathered bedrock surface is between 9 and 13 feet below ground surface at site. Groundwater was encountered between 9 to 12 feet below site. Bedrock groundwater flows to the southeast. Only two overburden wells onsite have produced water, therefore a groundwater flow direction in overburden cannot be determined. It is assumed that it flows in the same basic southeast direction as the bedrock groundwater.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to restricted-residential use (which allows for commercial use and industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the Remedial Investigation (RI) to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is available in the RI Report.

SECTION 5: ENFORCEMENT STATUS

The Department and HNJ Realty, LLC entered into a Brownfield Cleanup Agreement in 2006. HNJ Realty, LLC is a Volunteer and does not have an obligation to address off-site contamination.

The Department will seek to identify any parties (other than the Volunteer(s)) known or suspected to be responsible for contamination at or emanating from the site, referred to as Potentially Responsible Parties (PRPs). The Department will bring an enforcement action against the PRPs. If an enforcement action cannot be brought, or does not result in the initiation of a remedial program by any PRPs, the Department will evaluate the off-site contamination for action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State incurs or has incurred.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A remedial investigation (RI) serves as the mechanism for collecting data to:

- characterize site conditions;
- determine the nature of the contamination; and
- assess risk to human health and the environment.

The RI is intended to identify the nature (or type) of contamination which may be present at a site and the extent of that contamination in the environment on the site, or leaving the site. The RI reports on data gathered to determine if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. Monitoring wells are installed to assess groundwater and soil borings or test pits are installed to sample soil and/or waste(s) identified. If other natural resources are present, such as surface water bodies or wetlands, the water and sediment may be sampled as well. Based on the presence of contaminants in soil and groundwater, soil vapor will also be sampled for the presence of contamination. Data collected in the RI influence the development of remedial alternatives. The RI report is available for

review in the site document repository and the results are summarized in section 6.3.

The analytical data collected on this site includes data for:

- air
- groundwater
- soil
- soil vapor
- sub-slab vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

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

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a contaminant that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized below. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

tetrachloroethene (PCE)	1,1,2-TCA
trichloroethene (TCE)	1,1-dichloroethane
cis-1,2-dichloroethene	1,1-dichloroethene
vinyl chloride	1,2,4-trimethylbenzene
benzene	1,2-dichlorobenzene
toluene	cymene
isopropylbenzene	trans-1,2-dichloroethene
1,3,5-trimethylbenzene	1,4-dichlorobenzene
xylene (mixed)	acenaphthene
ethylbenzene	anthracene
naphthalene	bis(2-ethylhexyl)phthalate
n-propylbenzene	diethyl phthalate
butylbenzene	fluorine
1,1,2,2-TCA	phenanthrene

The contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil
- soil vapor intrusion
- indoor air

6.2: Interim Remedial Measures

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

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

IRM - soil vapor mitigation system

Based on elevated concentrations of PCE (787,000 ug/m3), TCE (15,200 ug/m3), cis-1,2 DCE (46,000 ug/m3) and vinyl chloride (34 ug/m3) detected in sub-slab soil vapor, a soil vapor mitigation system was installed under the poured concrete slab of the on-site building's basement. The system is a combination sub-slab depressurization system (SSDS) and a soil vapor extraction (SVE) system which addresses both soil vapor intrusion and remediation of contaminated media. The installation, testing, and replacement of the blower for the IRM SVE/SSDS system occurred between late 2008 and 2012. The IRM Construction Completion Report was approved in October 2013.

The SVE/SSDS system consists of horizontal PVC slotted pipes which were installed by trenching one foot below the concrete slab in a gravel-based bed. In addition, three vertical SVE wells were installed within the floor slab of the former dry cleaning equipment room. One exterior SVE well was installed in the footprint of the drywell adjacent to the rear building wall. A vacuum blower is used to draw vapors from the soil beneath the slab and into an air treatment system using vapor phase carbon canisters. The SVE/SSDS operates under a permit issued by the Westchester County Department of Health which requires monthly monitoring, maintenance, and reporting. Monitoring involves collecting a stack emission sample, field instrument readings at all carbon drum unit ports and at each vapor point location, and air flow (vacuum) monitoring at each vapor point location to indicate ongoing slab depressurization and system efficacy. Because this monitoring was required under the County Permit, the Volunteer opted to not perform post-mitigation indoor air monitoring. Maintenance of the system has been ongoing, including several carbon canister change-outs and the repair/replacement of blowers.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

The RI report presents a detailed discussion of any existing and potential impacts from the site to fish and wildlife receptors.

Based on the investigations conducted to date, which included the analysis for volatile organic and semi-volatile organic compounds (VOCs and SVOCs), inorganics, polychlorinated bi-phenols (PCBs) and pesticides in soil and groundwater and VOCs in soil vapor, the primary contaminants of concern at the site are chlorinated volatile organic compounds (VOCs), primarily tetrachloroethylene (PCE) and its breakdown compounds, in soils, groundwater, sub-slab vapor, and soil gas; petroleum-related VOCs in soils, groundwater, sub-slab vapor, and soil gas; and semi-volatile organic compounds (SVOCs) in groundwater.

In August 2015 an in situ pilot test was performed to assess potential remedial effectiveness of an enhanced biological product. Prior to the pilot injection, the test well contained 27,000 parts per billion (ppb) of PCE, 960 ppb of trichloroethylene (TCE), 2,100 ppb of cis-1,2-dichloroethylene (DCE) and 49 ppb of vinyl chloride (VC). Post injection levels after two months were 8,100 ppb of PCE, 11,000 ppb of TCE, 1,500 ppb of cis-1,2-DCE, and 53 ppb of VC. The decrease in PCE concentrations, coupled with the increase in degradation products, indicate that the breakdown of contaminants (dechlorination) is occurring. SVOC concentrations also decreased in the test well after the pilot. For examplephenanthrene levels dropped from 78 ppb to 3.7 ppb two months after the pilot injection.

An expansion of the pilot test using the same enhanced biological product was performed in October 2017. This time, the injections occurred in five wells in the basement and outside the building, while monitoring occurred in six wells located around the site. In July 2017, prior to the expansion of the expanded test, the highest concentration of PCE was 17,000 ppb, TCE was 2,100 ppb, cis-1,2-DCE was 1,600 ppb, and VC was 73. Two months after the injections, in December 2017, the concentrations of contaminants in the same well were: 1,300 ppb PCE, 17,000 ppb TCE, 1,900 ppb cis-1,2-DCE, and 61 ppb VC. The highest concentration of SVOCs during the pilot expansion was phenanthrene which dropped from 2,000 ppb to 540 ppb two months after the injection event. In addition, approximately 40-gallons of LNAPL have been collected to date just off-site in the southeast, downgradient direction using both bailers and a sorbent recovery socks left in the well in between monitoring/bailing events.

Soils: Tetrachloroethylene (PCE), trichloroethene (TCE), and several petroleum related VOCs were detected in on-site soils underneath the building slab. The highest concentration of PCE at 210 parts per million (ppm), which exceeds the 19 ppm restricted residential soil cleanup objectives (SCO), was located underneath the building slab of the former dry cleaning equipment room. Other contaminants detected in soils only exceeded the protection of groundwater SCOs. These exceedances were largely in soils located downgradient of the dry cleaning equipment room and consisted of: TCE at 1.3 ppm, cis-1,2 dichloroethene (cis-1,2-DCE) at 3 ppm, n-propylbenzene at 16 ppm, xylenes at 15 ppm, ethylbenzene at 6.6 ppm, 1,3,5-trimethylbenzene at 63 ppm, and 1,2,4-trimethylbenzene at 99 ppm. There is no indication that this soil contamination has migrated off-site. Surface soils were collected from the small area of exposed soils from the back yard of the building. Surface soils, largely consisting of fill, exceeded the restricted residential SCOs for several constituents, including five SVOCs (benzo(a) anthracene,

benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene) and two metals (lead and mercury).

Groundwater: Petroleum-based floating product (light non-aqueous phase liquid or LNAPL) was observed in groundwater under much of the on-site building slab, a maximum of 6 inches thick under the former dry cleaning equipment room. Very high concentrations of several VOCs were also measured in this area. The maximum detected PCE was 830,000 parts per billion (ppb), and TCE at 58,000 ppb. Twenty-five individual VOCs were also detected in site groundwater samples exceeding NYS Class GA groundwater standards. These include PCE, TCE, as well as breakdown products of PCE with the following maximum concentrations: cis-1,2-DCE at 8,700 ppb, and vinyl chloride at 28 ppb. BTEX was detected, with benzene at 62 ppb, toluene at 130 ppb, ethylbenzene at 150 ppb, m+p xylene at 520 ppb, and o-xylene at 290 ppb. Other significant concentrations of petroleum-related VOCs detected in groundwater include 1,3,5-trimethylbenzene at 890 ppb, and 1,2,4-trimethylbenzene at 840 ppb. Eight SVOCs were detected over groundwater standards in groundwater under the building slab, including napthalene at a concentration of 1300 ppb, phenanthrene at 2400 ppb, acenapthene at 710 ppb, and antracene at 280 ppb.

Bedrock wells were installed off-site in the downgradient, sidegradient, and upgradient directions. Petroleum-based VOCs and SVOCs were detected in the bedrock aquifer at concentrations above groundwater standards. For VOCs, a total maximum BTEX concentration of 722 ppb was detected in a downgradient bedrock well. Eleven individual SVOC contaminants were detected over groundwater standards in the same downgradient off-site bedrock well, including naphthalene at 4100 ppb, phenanthrene at 2800 ppb, acenapthene at 710 ppb, and antracene at 300 ppb.

The extent of groundwater contamination is concentrated underneath the on-site building slab, with petroleum-based VOC and SVOC contaminants and LNAPL extending off-site in the bedrock downgradient or southeast direction.

Soil Gas/Soil Vapor: The high concentrations of PCE (787,000 micrograms per cubic meter, ug/m3), TCE (15,200 ug/m3), cis-1,2-DCE (46,000 ug/m3), and vinyl chloride (34 ug/m3) in soil vapor under the slab of the on-site building required the installation and continuing operation of a combined soil vapor extraction and sub-slab mitigation system during a 2008-2013 Interim Remedial Measure (IRM). PCE (at91 ug/m3) and TCE (13.4 ug/m3) were also detected in soil gas outside of the building near the location of a former drywell. Benzene (37 ug/m3), toluene (126 ug/m3), ethylbenzene (85 ug/m3), xylene (555 ug/m3), 1,3,5-trimethylbenzene (3 ug/m3), and 1,2,4-trimethylbenzene (14 ug/m3) were also detected in sub-slab vapor and soil gas. Because VOC concentrations were so high in sub-slab vapors, the Volunteer agreed to soil vapor intrusion mitigation, and indoor air sampling did not occur at that time. Post mitigation testing was not completed and additional investigations are needed to verify further actions are not needed. Soil vapor contamination may extend off-site and may affect off-site buildings.

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Special Resources Impacted/Threatened: The site is located in an urban area of the City of New Rochelle. There are no special resources identified near the site.

Based on high levels of VOCs and SVOCs found in groundwater, and high levels of VOCs in soil vapor that may extend off-site, the Department has determined that the site poses a significant threat to human health and the environment.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

People may contact contaminants in soil or groundwater if they dig below the surface or contact contaminated groundwater. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in soil vapor (air spaces within the soil) may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of the buildings, is referred to as soil vapor intrusion. A combination soil vapor extraction and sub-slab depressurization system was installed in the on-site building to prevent vapors beneath the slab from entering the building, however additional testing is needed to verify further actions are not needed. There is a potential for inhalation of site contaminants due to soil vapor intrusion at this building when the sub-slab depressurization system is turned off for a period of time during groundwater bioremediation injection treatments. Sampling indicates soil vapor intrusion is a potential concern for off-site buildings and sampling was offered to several owners of off-site buildings on the same city block to start. Only one building owner agreed to the sampling which indicates soil vapor intrusion is not a concern and no further action is recommended for that building. Soil vapor intrusion remains a potential concern for other off-site buildings and repeat or new offers of sampling are recommended.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

- Prevent 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.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

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.

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

The alternatives developed for the site and the evaluation of the remedial criteria are presented in the Alternative Analysis. The remedy is selected pursuant to the remedy selection criteria set forth in DER-10, Technical Guidance for Site Investigation and Remediation and 6 NYCRR Part 375.

The selected remedy is a Track 4: Restricted use with site-specific cleanup objectives.

The selected remedy is referred to as "Product Recovery, Enhanced Bioremediation and Site Cover" remedy.

The elements of the selected remedy, as shown in Figure 2, are as follows:

1. Green Remediation

Green remediation principles and techniques will be implemented to the extent feasible in the implementation and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;

• Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste

2. Cover System

A site cover will be required to allow for restricted residential use of the site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. The site cover may consist of paved surface parking areas, sidewalks, or a soil cover. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the restricted residential use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

3. Vapor Mitigation

The combination soil vapor extraction and sub-slab depressurization system installed in the on-site building as an interim remedial measure (section 6.2) will continue and is required to be operated continuously, including during the implementation of the nutrient injections associated with the enhanced bioremediation remedial element. If the SVE/SSDS needs to be shut-down during the nutrient injections, then adequate indoor air monitoring will be required for the duration the system is shut down and until restarted and effectively depressurizing the entire building slab.

4. Enhanced Bioremediation

In-situ enhanced biodegradation will be employed to treat volatile organic compounds and semi-volatile organic compounds in groundwater in the location of the former dry cleaning equipment room in the basement of the on-site building. The biological breakdown of contaminants will be enhanced by injecting nutrients into the subsurface to promote microbe growth. The bacteria and the nutrients will be delivered to the groundwater via five injection wells screened at intervals ranging from two to fifteen feet below ground surface. In addition to contaminant monitoring, anaerobic degradation parameters in the groundwater will be monitored in on- and off-site wells throughout the treatment to ensure remedy effectiveness. If sampling data indicates remedy effectiveness is unsatisfactory, or if parameters measured in groundwater does not indicate an anaerobic environment, an additional carbon source will be injected and remedy effectiveness monitoring will continue. Additional injections of the enhanced biological agents may be necessary, in addition to the maintenance of anerobic conditionsshould monitoring indicate degradation product concentrations are not increasing.

5. NAPL Recovery

Collection and disposal of non-aqueous phase liquid (NAPL) from wells on the southeastern portion of the site and immediately off-site in the direction of groundwater flow to remove and prevent potentially mobile petroleum in the subsurface from migrating off-site. It is anticipated that petroleum-based light NAPL will be collected from the shallow groundwater approximately ten to twelve feet below ground surface. NAPL will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of NAPL over extended time periods, the Department will require evaluation and implementation of additional remedial actions, such as but not limited to the installation of additional recovery wells, to address NAPL migration. Additional remedial actions may also be required based on performance of the initial wells, new information, or a documented change in conditions.

6. Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a Track 4 restricted residential cleanup at a minimum and will include imposition of a site cover, continuation of the vapor mitigation system and an environmental easement, and site management plan as described below.

C. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

D. Site Management Plan

A Site Management Plan is required, which includes the following:

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

Institutional Controls: The Environmental Easement discussed in Paragraph 5 above.

Engineering Controls: The site cover system discussed in Paragraph 2 above and the NAPL recovery system discussed in Paragraph 4 above.

This plan includes, but may not be limited to:

o an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
o descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
o a provision for evaluation of the potential for soil vapor intrusion in future buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
o a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 3 above will be placed in any areas where the upper two feet of exposed surface soil exceed the applicable soil cleanup objectives (SCOs)
o provisions for the management and inspection of the identified engineering controls;
o maintaining site access controls and Department notification; and
o the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

2. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
o monitoring of NAPL recovery and groundwater bioremediation to assess the performance and effectiveness of the remedy;
o monitoring of groundwater to assess the effectiveness of the remedy in reducing groundwater contaminant levels;
o Reports of the NAPL recovery and bioremediation will be provided annually and contingency remedial actions will be proposed if it appears that NAPL collection and bioremediation are not addressing the contamination;
o a schedule of monitoring and frequency of submittals to the Department;
o monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

3. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of the active vapor mitigation system(s). The plan includes, but is not limited to:
o procedures for operating and maintaining the system(s); and
o compliance inspection of the system(s) to ensure proper O&M as well as providing the data for any necessary reporting.

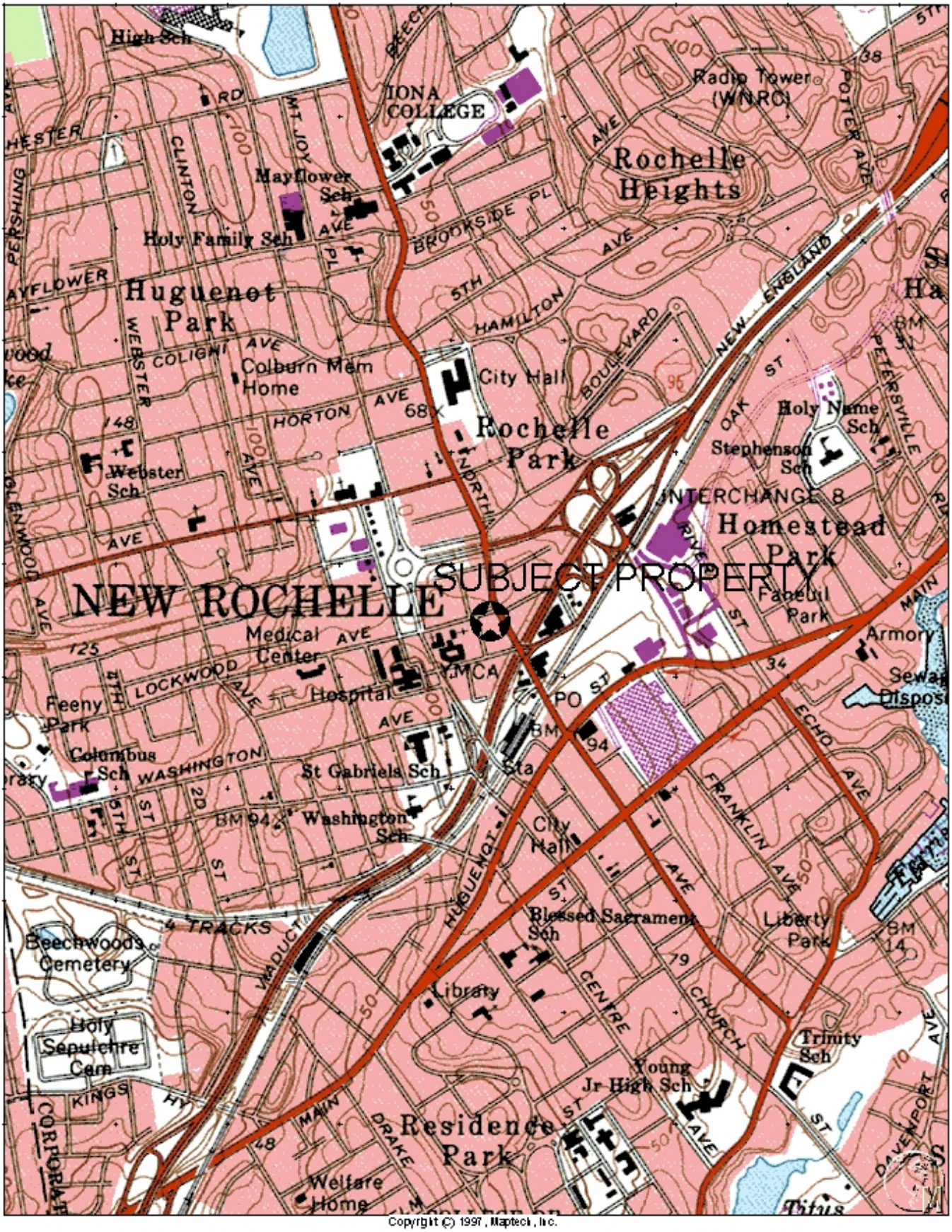

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Figure 1- Site Location	**Schmuklers Cleaners** **358 - 364 North Avenue** **New Rochelle, NY** **Site #C360088** **Index# A3-0542-0306**	John V. Soderberg P.E PO BOX 263 Stony Brook, NY

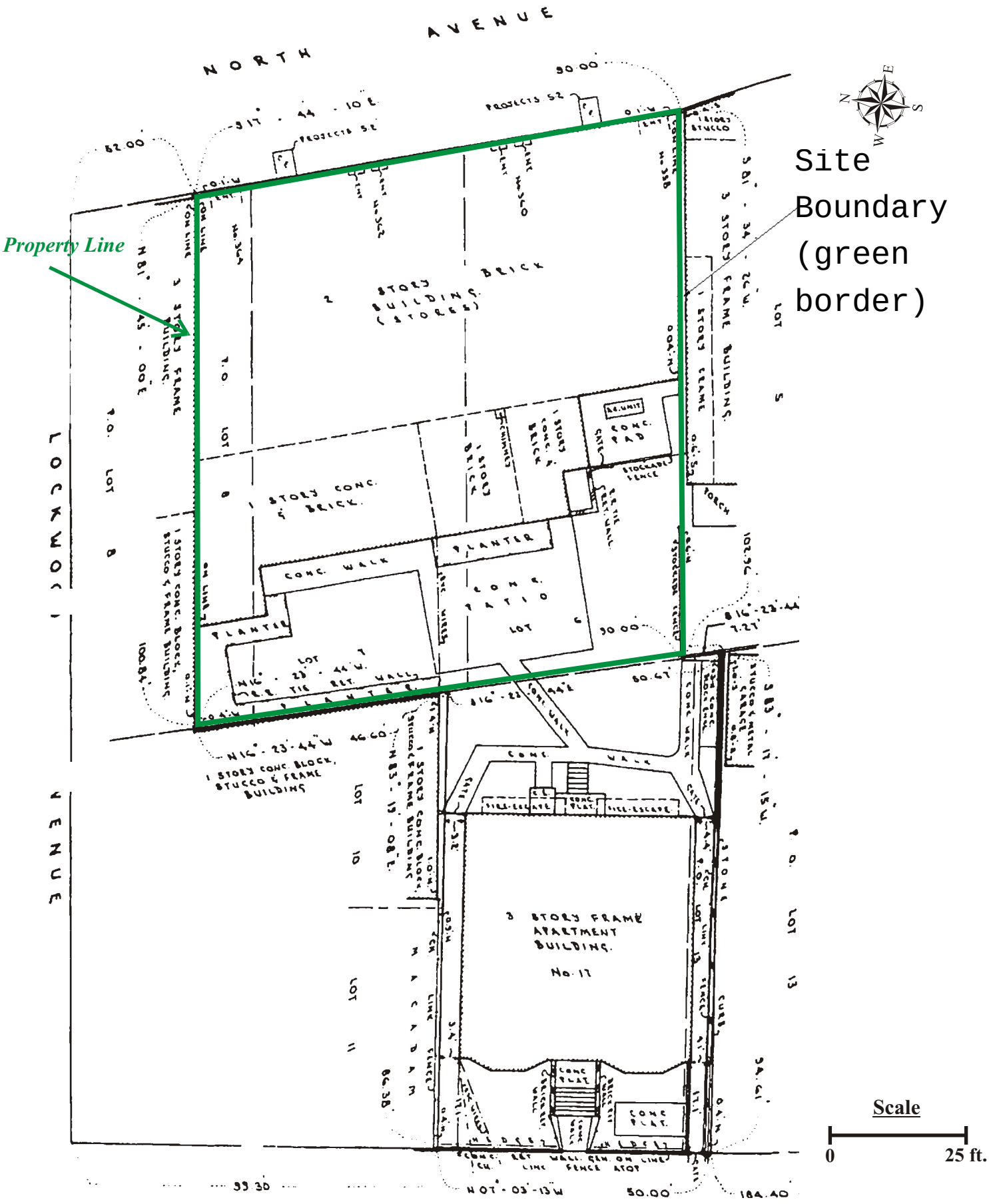

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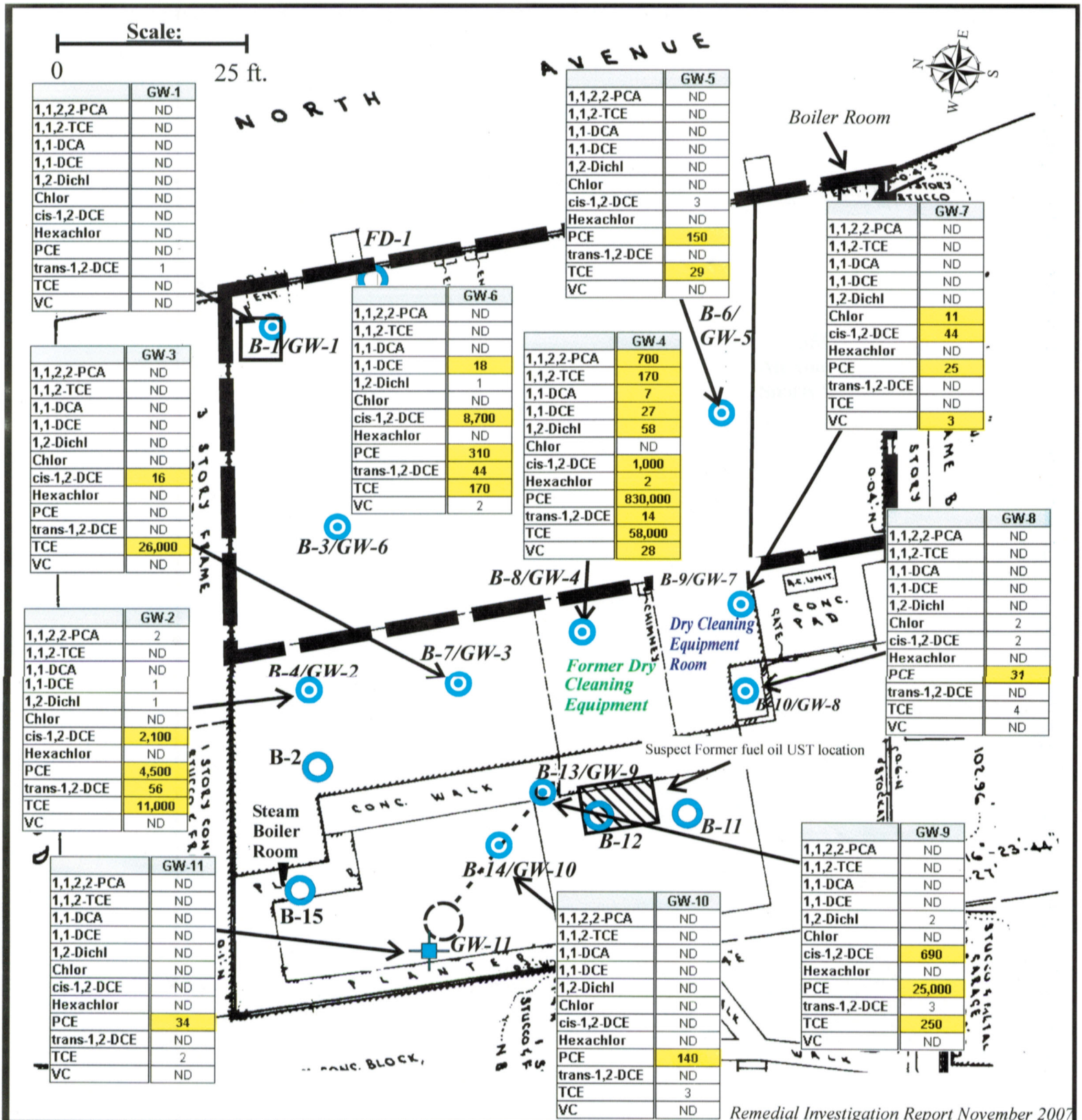
Figure 2 - Site Survey Site Boundary	**Schmuklers Cleaners** **358 - 364 North Avenue** **New Rochelle, NY** **Site #C360088** **Index# A3-0542-0306**	John V. Soderberg P.E PO BOX 263 Stony Brook, NY



	GW-1
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	ND
1,2-Dichl	ND
Chlor	ND
cis-1,2-DCE	ND
Hexachlor	ND
PCE	ND
trans-1,2-DCE	1
TCE	ND
VC	ND

	GW-5
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	ND
1,2-Dichl	ND
Chlor	ND
cis-1,2-DCE	3
Hexachlor	ND
PCE	150
trans-1,2-DCE	ND
TCE	29
VC	ND

	GW-7
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	ND
1,2-Dichl	ND
Chlor	11
cis-1,2-DCE	44
Hexachlor	ND
PCE	25
trans-1,2-DCE	ND
TCE	ND
VC	3

	GW-6
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	18
1,2-Dichl	1
Chlor	ND
cis-1,2-DCE	8,700
Hexachlor	ND
PCE	310
trans-1,2-DCE	44
TCE	170
VC	2

	GW-4
1,1,2,2-PCA	700
1,1,2-TCE	170
1,1-DCA	7
1,1-DCE	27
1,2-Dichl	58
Chlor	ND
cis-1,2-DCE	1,000
Hexachlor	2
PCE	830,000
trans-1,2-DCE	14
TCE	58,000
VC	28

	GW-3
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	ND
1,2-Dichl	ND
Chlor	ND
cis-1,2-DCE	16
Hexachlor	ND
PCE	ND
trans-1,2-DCE	ND
TCE	26,000
VC	ND

	GW-8
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	ND
1,2-Dichl	ND
Chlor	2
cis-1,2-DCE	2
Hexachlor	ND
PCE	31
trans-1,2-DCE	ND
TCE	4
VC	ND

	GW-2
1,1,2,2-PCA	2
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	1
1,2-Dichl	1
Chlor	ND
cis-1,2-DCE	2,100
Hexachlor	ND
PCE	4,500
trans-1,2-DCE	56
TCE	11,000
VC	ND

	GW-9
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	ND
1,2-Dichl	2
Chlor	ND
cis-1,2-DCE	690
Hexachlor	ND
PCE	25,000
trans-1,2-DCE	3
TCE	250
VC	ND

	GW-11
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	ND
1,2-Dichl	ND
Chlor	ND
cis-1,2-DCE	ND
Hexachlor	ND
PCE	34
trans-1,2-DCE	ND
TCE	2
VC	ND

	GW-10
1,1,2,2-PCA	ND
1,1,2-TCE	ND
1,1-DCA	ND
1,1-DCE	ND
1,2-Dichl	ND
Chlor	ND
cis-1,2-DCE	ND
Hexachlor	ND
PCE	140
trans-1,2-DCE	ND
TCE	3
VC	ND

Remedial Investigation Report November 2007

1,1,2,2-PCA- 1,1,2,2-Tetrachloroethane; **1,1,2-TCE**- 1,1,2-Trichloroethene; **1,1 - DCA** - 1,1-Dichloroethane; **1,1-DCE**- 1,1-Dichloroethene; **1,2-Dichl**- 1,2-Dichlorobenzene; **Chlor** - Chloroethene; **cis-1,2-DCE** - cis-1,2-Dichloroethene; **Hexachlor**- Hexachlorobutadine; **PCE**- Tetrachloroethene; **TCE** - Trichloroethene; **VC** - Vinyl chloride

Bolded and highlighted concentrations are indicative of VOC detected at concentration exceeding applicable NYSDEC Class GA Groundwater Standards and/or Guidance Values

- Basement Portion of the Building - Soil Only Sampling Location - Soil and groundwater sampling locations - Groundwater Only Sample Location

Figure 3 - Halogenated VOCs detected in Groundwater Samples in micrograms per liter (ug/L)

Schmuklers Cleaners
358 - 364 North Avenue
New Rochelle, NY
Site #C360088
Index# A3-0542-0306

John V. Soderberg P.E
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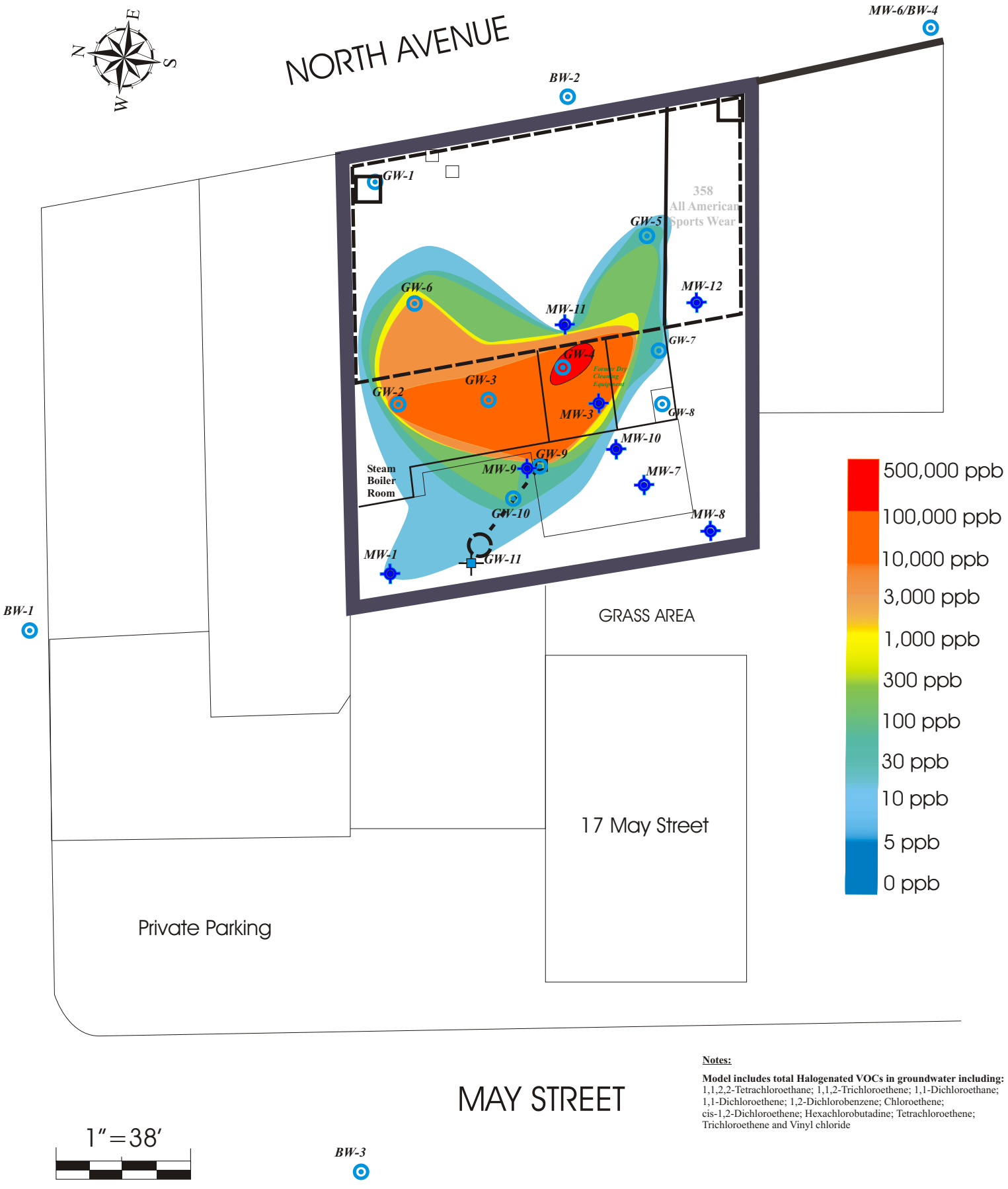
Stony Brook, NY



Notes:

Model includes total Halogenated VOCs in groundwater including: 1,1,2,2-Tetrachloroethane; 1,1,2-Trichloroethene; 1,1-Dichloroethane; 1,1-Dichloroethene; 1,2-Dichlorobenzene; Chloroethene; cis-1,2-Dichloroethene; Hexachlorobutadine; Tetrachloroethene; Trichloroethene and Vinyl chloride

Total Halogenated VOCs in Groundwater
FIGURE-3a

Schmuklers Cleaners
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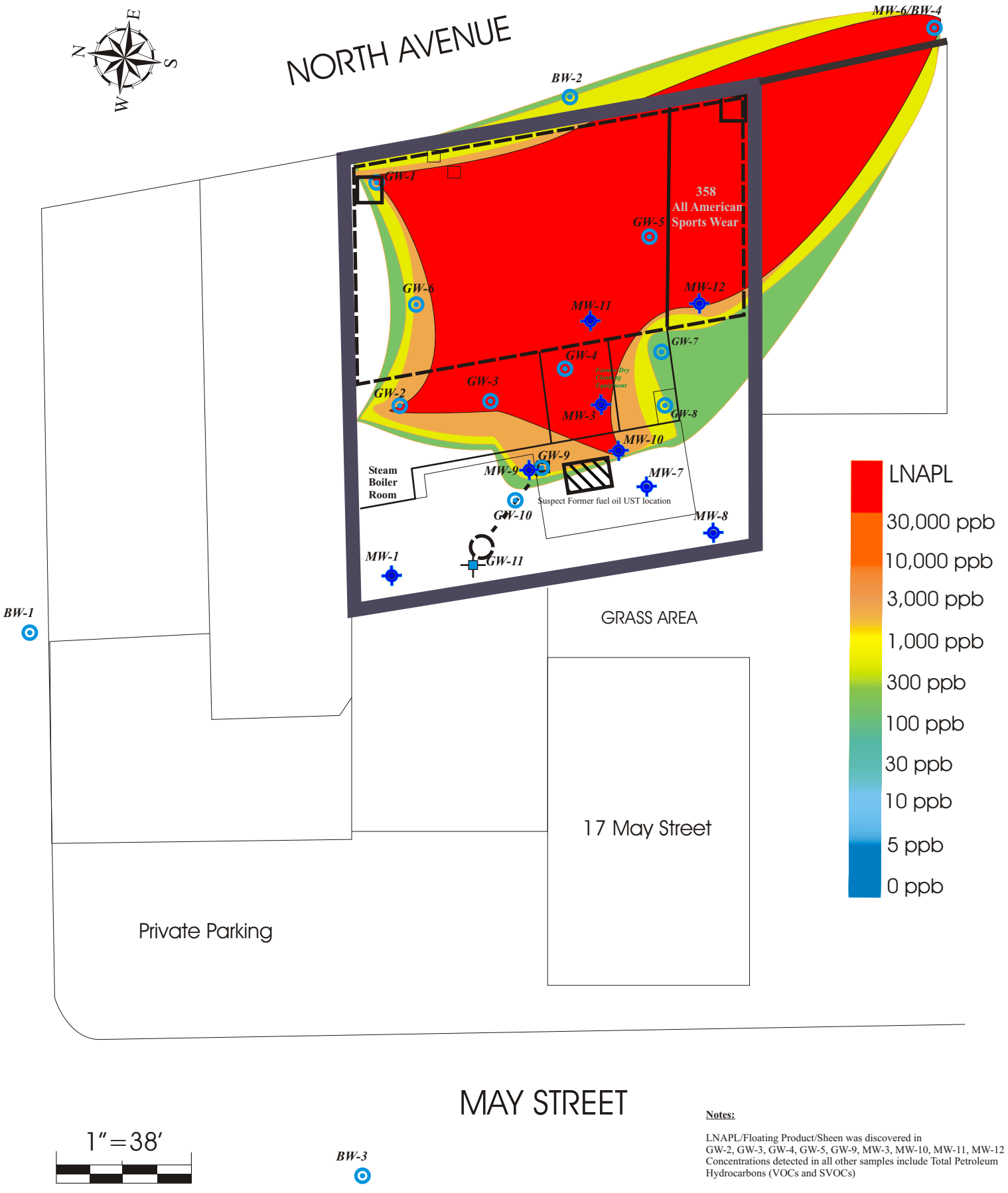

Notes:

LNAPL/Floating Product/Sheen was discovered in GW-2, GW-3, GW-4, GW-5, GW-9, MW-3, MW-10, MW-11, MW-12 Concentrations detected in all other samples include Total Petroleum Hydrocarbons (VOCs and SVOCs)

Total Petroleum Related (VOCs and SVOCs) in Groundwater FIGURE-3b

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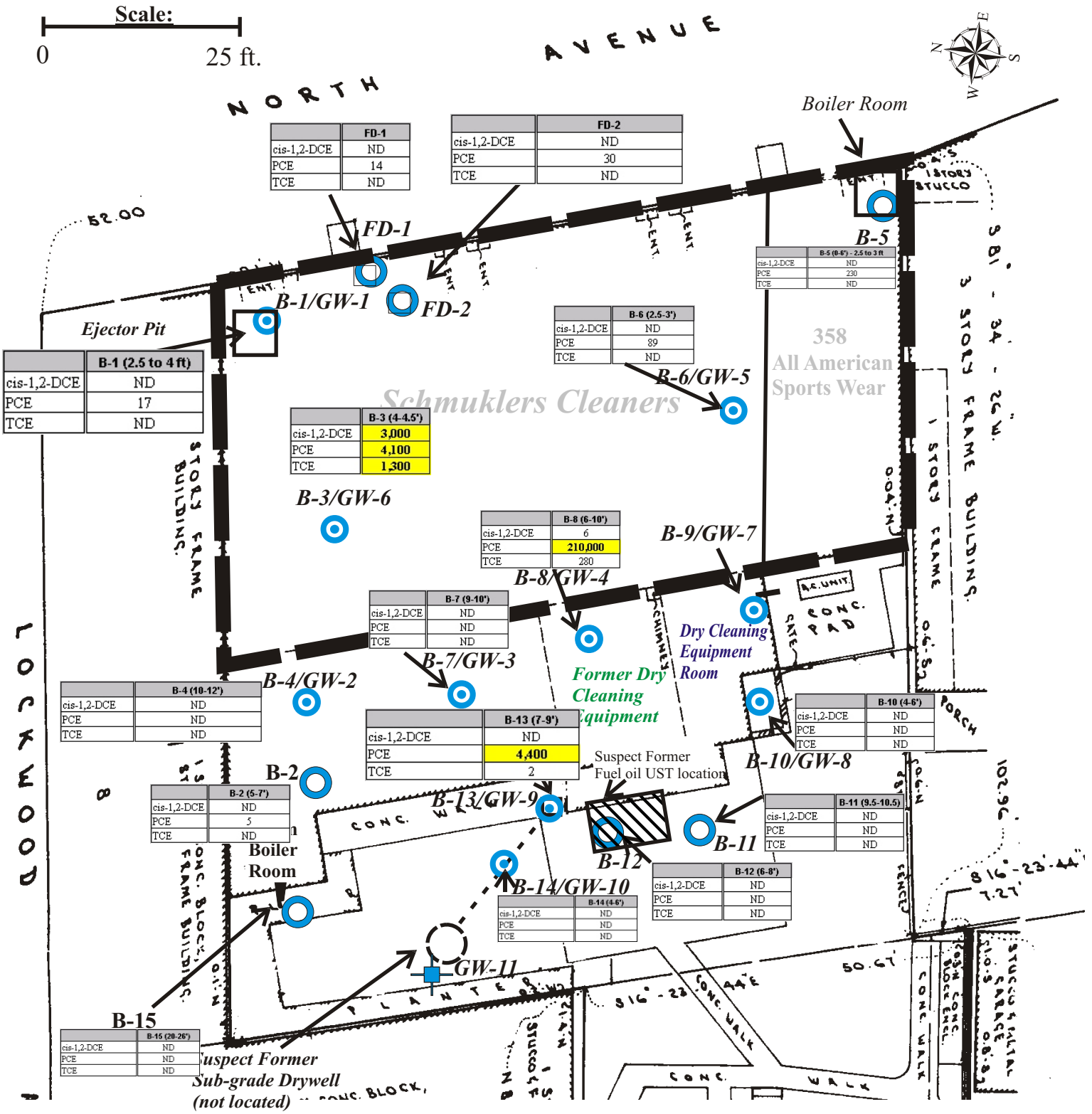

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Cis 1,2-DCE - cis 1,2-Dichloroethene; **PCE -** Tertrachloroethene; **TCE -** Trichloroethene

Bolded and highlighted concentration areindicative of VOC detected at concentration exceeding applicable SCOs

- Basement Portion of the Building - Soil Only Sampling Location - Soil and groundwater sampling locations - Groundwater Only Sample Location

Figure 3c- Halogenated VOCs detected in Soil Samples in micrograms per kilogram (ug/kg)

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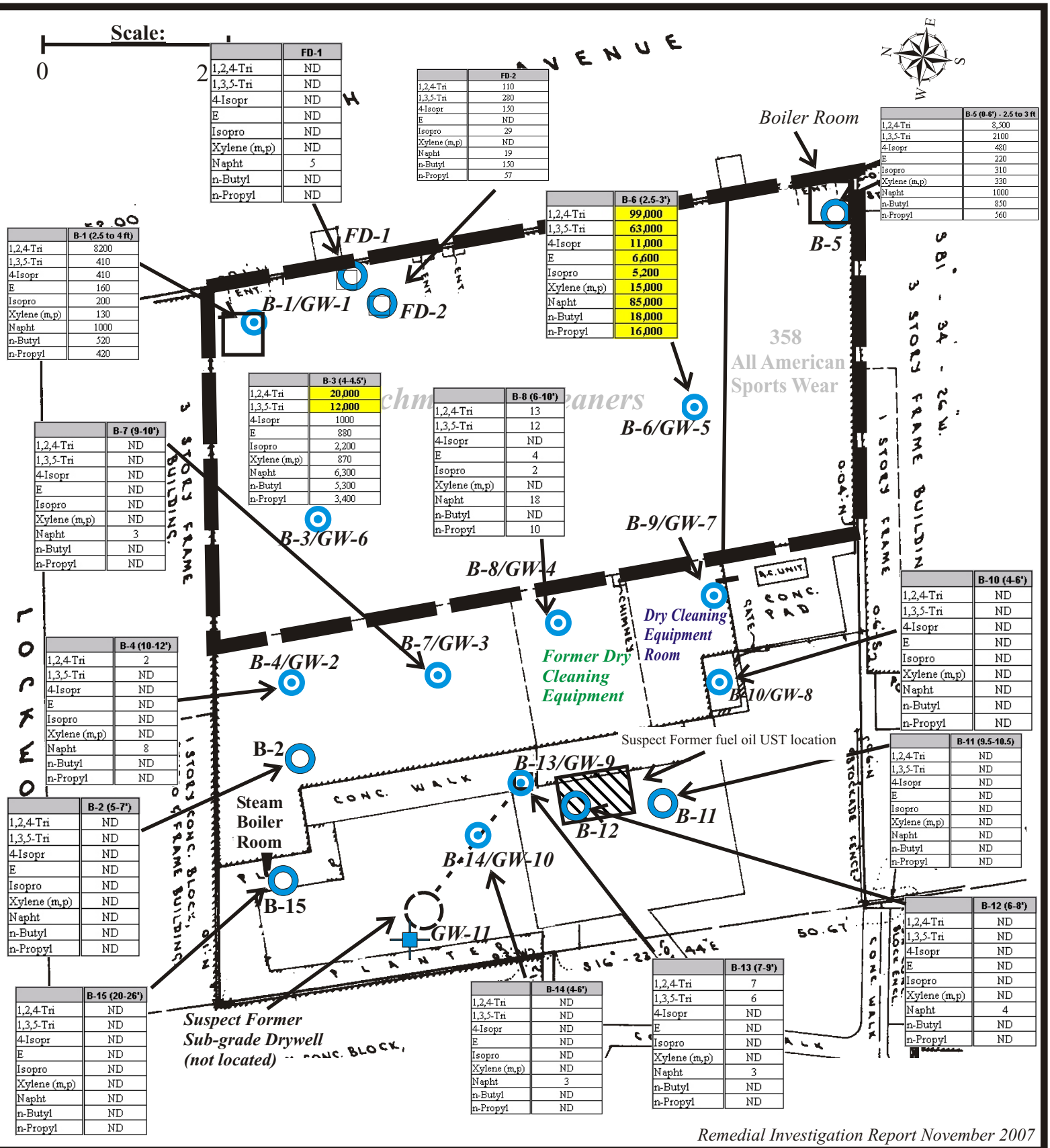

	FD-1
1,2,4-Tri	ND
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	5
n-Butyl	ND
n-Propyl	ND

	FD-2
1,2,4-Tri	110
1,3,5-Tri	280
4-Isopr	150
E	ND
Isopro	29
Xylene (m,p)	ND
Napht	19
n-Butyl	150
n-Propyl	57

	B-1 (2.5 to 4 ft)
1,2,4-Tri	8200
1,3,5-Tri	410
4-Isopr	410
E	160
Isopro	200
Xylene (m,p)	130
Napht	1000
n-Butyl	520
n-Propyl	420

	B-2 (5-7')
1,2,4-Tri	ND
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	ND
n-Butyl	ND
n-Propyl	ND

	B-3 (4-4.5')
1,2,4-Tri	20,000
1,3,5-Tri	12,000
4-Isopr	1000
E	880
Isopro	2,200
Xylene (m,p)	870
Napht	6,300
n-Butyl	5,300
n-Propyl	3,400

	B-4 (10-12')
1,2,4-Tri	2
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	8
n-Butyl	ND
n-Propyl	ND

	B-5 (0-6') - 2.5 to 3 ft
1,2,4-Tri	8,500
1,3,5-Tri	2100
4-Isopr	480
E	220
Isopro	310
Xylene (m,p)	330
Napht	1000
n-Butyl	850
n-Propyl	560

	B-6 (2.5-3')
1,2,4-Tri	**99,000**
1,3,5-Tri	**63,000**
4-Isopr	**11,000**
E	**6,600**
Isopro	**5,200**
Xylene (m,p)	**15,000**
Napht	**85,000**
n-Butyl	**18,000**
n-Propyl	**16,000**

	B-7 (9-10')
1,2,4-Tri	ND
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	3
n-Butyl	ND
n-Propyl	ND

	B-8 (6-10')
1,2,4-Tri	13
1,3,5-Tri	12
4-Isopr	ND
E	4
Isopro	2
Xylene (m,p)	ND
Napht	18
n-Butyl	ND
n-Propyl	10

	B-10 (4-6')
1,2,4-Tri	ND
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	ND
n-Butyl	ND
n-Propyl	ND

	B-11 (9.5-10.5)
1,2,4-Tri	ND
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	ND
n-Butyl	ND
n-Propyl	ND

	B-12 (6-8')
1,2,4-Tri	ND
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	4
n-Butyl	ND
n-Propyl	ND

	B-13 (7-9')
1,2,4-Tri	7
1,3,5-Tri	6
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	3
n-Butyl	ND
n-Propyl	ND

	B-14 (4-6')
1,2,4-Tri	ND
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	3
n-Butyl	ND
n-Propyl	ND

	B-15 (20-26')
1,2,4-Tri	ND
1,3,5-Tri	ND
4-Isopr	ND
E	ND
Isopro	ND
Xylene (m,p)	ND
Napht	ND
n-Butyl	ND
n-Propyl	ND

Remedial Investigation Report November 2007

1,2,4-Tri - 1,2,4-Trimethylbenzene; **1,3,5-Tri** - 1,3,5-Trimethylebenzene; **4-Isopro** - 4-Isopropyltoluene; **E-** Ethylbenzene; **Isopro** - Isopropylbenzene; Xylene (m,p); **Napht-** Naphthalene; **n-Butyl** - N-Butylbenzene; **n-Propyl**- n-Propylbenzene

Bolded and highlighted concentration are indicative of contaminant detected at concentration exceeding applicable SCOs

- Basement Portion of the Building *- Soil Only Sampling Location* *- Soil and groundwater sampling locations* *- Groundwater Only Sample Location*

Figure 3d - Petroleum-Related SVOCs detected in Soil Samples in micrograms per kilogram (ug/kg)

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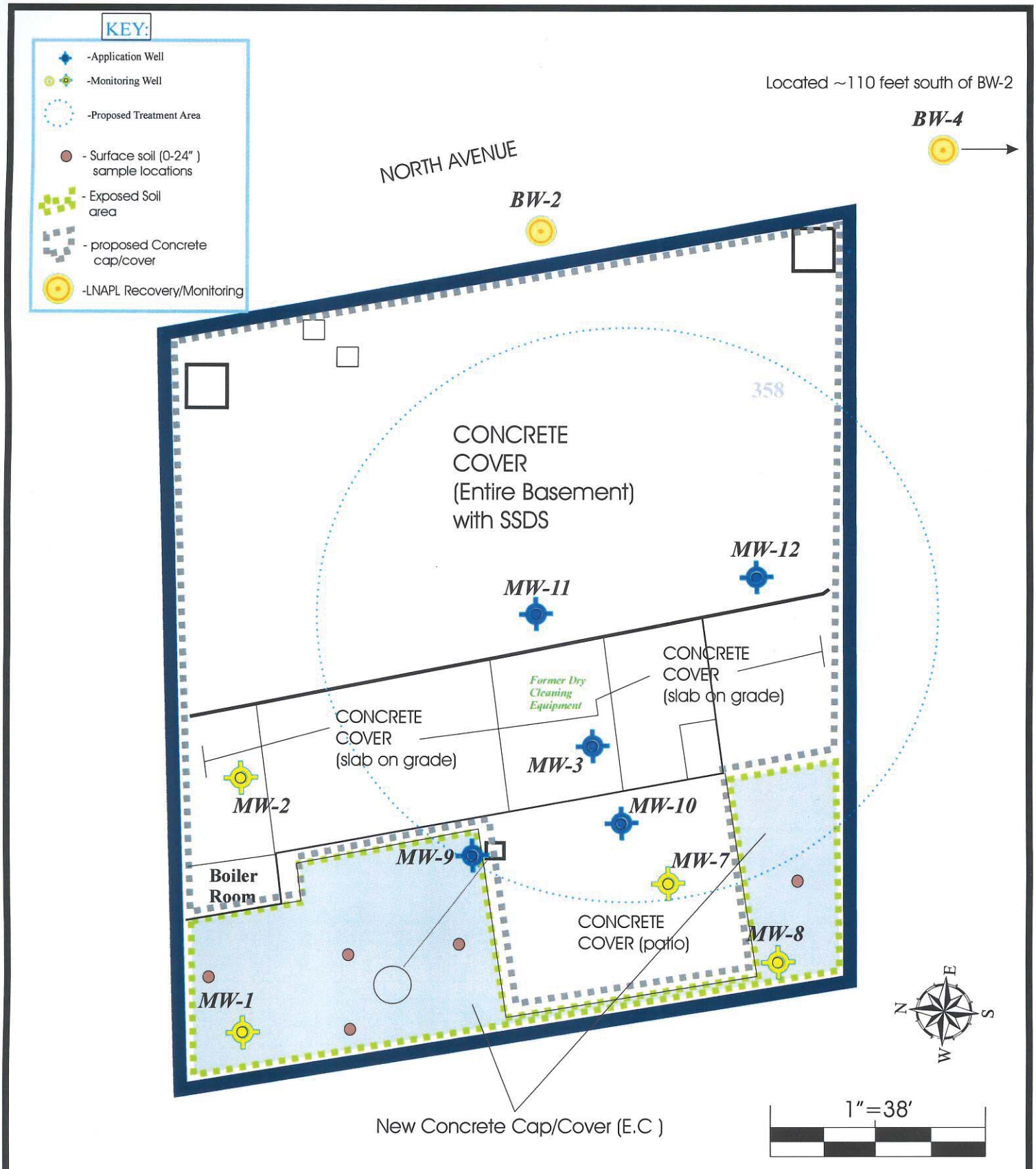

Proposed Remedy

Figure-4

Drawn: JGH

Schmuklers Cleaners
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