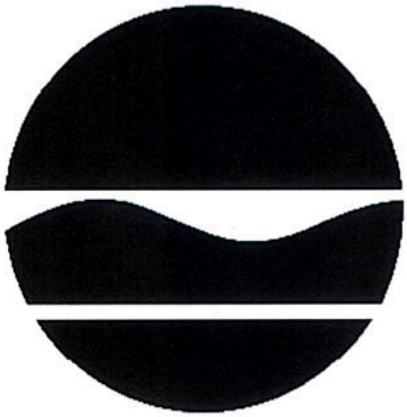
DECISION DOCUMENT

Former Debbie Cleaners
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224237
July 2019



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

DECLARATION STATEMENT - DECISION DOCUMENT

Former Debbie Cleaners
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224237
July 2019

Statement of Purpose and Basis

This document presents the remedy for the Former Debbie 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 Former Debbie 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. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, 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 gases 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;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Excavation and off-site disposal of approximately 55 cubic yards of contaminated soil and contaminant source areas, including:

- on-site soils which exceed restricted-commercial, SCOs, as defined by 6 NYCRR Part 375-6.8 in the upper 15 feet in an area in the driveway adjacent to the strip mall building.
- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- soils which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
- soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

3. Backfill

On-site soil which does not exceed the above excavation criteria may be used below the cover system described in remedy element 4 to backfill the excavation to the extent that a sufficient volume of on-site soil is available and establish the designed grades at the site.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the site. The site will be re-graded to accommodate installation of a cover system as described in remedy element 4.

4. Cover System

A site cover currently exists in areas not occupied by buildings and will be maintained to allow for commercial use of the site. Any site redevelopment will maintain the existing site cover. The site cover may include paved surface parking areas, sidewalks or soil where the upper one foot of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for restricted commercial use. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

5. Air Sparge with Soil Vapor Extraction (SVE)

Air sparging will be implemented to address the groundwater plume contaminated by volatile organic compounds (VOCs). VOCs will be physically removed from the groundwater and soil below the water table (saturated soil) by injecting air into the subsurface. The injected air rising through the groundwater will volatilize and transfer the VOCs from the groundwater and/or soil into the injected air. The VOCs are carried with the injected air into the vadose zone (the area below the ground surface but above the water table) where a soil vapor extraction (SVE) system designed to remove the injected air will be installed. The SVE system will apply a vacuum to wells that have been installed into the vadose zone to remove the VOCs along with the air introduced by the sparging process. The air extracted from the SVE wells will be treated as necessary prior to being discharged to the atmosphere.

At this site it is estimated seven air injection wells will be installed in the area of the site to be treated as depicted on Figures 3A and 3B to a depth of approximately eight feet below the basement slab, which is five feet below the water table. To capture the volatilized contaminants, it is estimated seven SVE wells will be installed in the vadose zone at a depth of approximately three

below ground surface. The air containing VOCs extracted from the SVE wells will be treated by passing the air stream through activated carbon which removes the VOCs from the air prior to it being discharged to the atmosphere.

6. Vapor Mitigation

Any on-site buildings will be required to have a sub-slab depressurization system, or other acceptable measures, to mitigate the migration of vapors into the building from soil and/or groundwater.

7. 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 commercial 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 NYCDOH; and
- require compliance with the Department approved Site Management Plan.

8. 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 7 above.

Engineering Controls: The soil cover discussed in Paragraph 4, the SVE system discussed in Paragraph 5, and the sub-slab depressurization system discussed in Paragraph 6 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- a provision for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible. The nature and extent of contamination in areas where access was previously limited or unavailable will be immediately and thoroughly investigated pursuant to a plan approved by the Department. Based on the investigation results and the Department determination of the need for a remedy, a Remedial Action Work Plan (RAWP) will be developed for the final remedy for the site, including removal and/or treatment of any source areas to the extent

feasible. Citizen Participation Plan (CPP) activities will continue through this process. Any necessary remediation will be completed prior to, or in association with, redevelopment. This includes the building and the driveway that make up the entire site;

- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 4 above will be placed in any areas where the upper one foot of exposed surface soil exceed the applicable soil cleanup objectives (SCOs)
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- 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:

- monitoring of groundwater, indoor air and sub-slab vapor to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and
- 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, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

- procedures for operating and maintaining the remedy;
- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- maintaining site access controls and Department notification; and
- providing the Department access to the site and O&M records.

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 12, 2019
Date

John Grathwol for G. Burke
Gerard Burke, Director
Remedial Bureau B

DECISION DOCUMENT

Former Debbie Cleaners
Brooklyn, Kings County
Site No. C224237
June 2019

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:

Kings Bay Library
3650 Nostrand Avenue
Brooklyn, NY 11229
Phone: 718-368-1709

Brooklyn Community Board 15
Kingsborough Community College
2001 Oriental Blvd, Room C124
Brooklyn, NY 11235
Phone: 718-332-3008

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 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 Former Debbie Cleaners site is within an urban area at 3800-3808 Nostrand Avenue, Brooklyn, between Avenue Y and Avenue Z. The area is characterized by commercial retail properties along Nostrand Avenue with residential homes in the outlying areas. The BCP site is near the north end of the Nostrand Place strip mall and is defined as a portion of the strip mall consisting of four occupied tenant spaces and the driveway behind them. The former location of Debbie Cleaners is presently a bank in the approximate center of the BCP site.

Site Features:
The area of the entire strip mall property is approximately 75,300 square feet and the BCP site is approximately 12,700 square feet. The BCP site is abutted to the north and south by other commercial tenant spaces, to the east by Nostrand Avenue with a retail shopping center beyond and to the west by residential homes along East 29th Street.

Current Zoning and Land Use:
The site is situated within the R4 Residential District with C2-2 Commercial Overlays that include the site. The surrounding parcels to the north, northeast and east are similarly zoned; however, the surrounding parcels to the northwest, west and south are solely zoned R4 Residential.

Past Use of the Site:
From approximately 1959 through 1985, a portion of the site was occupied by Debbie Cleaners; the probable cause of the dry cleaning chlorinated solvent contamination in groundwater and soil vapor.

Site Geology and Hydrogeology:
The site structure's footings and slabs are atop a bedrock shelf from 22 to 24 feet below surface grade. Under the driveway, there is one to two feet of historic fill with fine to coarse sand and some silty sand. Groundwater is present at an average depth of 12 feet below grade and flows in a westerly direction.

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, an alternative that restricts the use of the site to restricted commercial use (which allows for commercial use and industrial use) as described in Part 375-1.8(g) 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 Applicant under the Brownfield Cleanup Agreement is a Volunteer. The Volunteer does not have an obligation to address off-site contamination. The Department has determined that this site poses a significant threat to human health and the environment and there are off-site impacts that require remedial activities; accordingly, enforcement actions are necessary.

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 5.3.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor
- indoor air
- 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 contaminants of concern identified at this site are:

tetrachloroethene (PCE)
trichloroethene (TCE)
cis-1,2-dichloroethene (DCE)

The contaminants of concern exceed the applicable SCGs for:

- groundwater
- soil
- soil vapor intrusion

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.

There were no IRMs performed at this site during the RI.

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.

Nature and Extent of Contamination
Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), and pesticides. Based on investigations conducted to date, the primary contaminants of concern are chlorinated solvents, specifically tetrachloroethylene (PCE) and its degradation products trichloroethene (TCE) and cis-1,2-dichloroethene (cis-1,2-DCE).

Soil
Tetrachloroethene (PCE) was detected in two of the twelve subsurface soil sampling locations. PCE was detected at a maximum concentration of 6.53 parts per million (ppm) immediately under the building slab. This is well below the commercial use soil cleanup objective (SCO) of 150 ppm but in excess of the groundwater protection SCO of 1.3 ppm. However, PCE was observed at 504 ppm in one sample collected from four feet below grade in the parking lot. There are no off-site soil data.

Groundwater
An initial 2013 site investigation conducted in the tenant space formerly occupied by Debbie Cleaners identified dry cleaning related compounds in the groundwater above NYSDEC groundwater standards. As a result of these findings, the identified contamination was reported to DEC and Spill No. 1310667 was assigned to the site and will remain open until the remedy is implemented.

During the remedial investigation (RI) and the supplemental RI, PCE was detected in 19 of 21 groundwater samples at concentrations ranging from 77 parts per billion (ppb) to 1,100 ppb compared to its groundwater standard of 5 ppb. These samples were generally obtained from three to five feet below the basement slab, or 13 to 15 feet below surface grade. TCE was detected above its groundwater standard (5 ppb) at a maximum concentration of 140 ppb. The daughter product of PCE and TCE, cis-1,2-DCE, was also detected above its groundwater standard (5 ppb) in six samples, with a maximum concentration of 250 ppb. The highest concentration for each of the three contaminants of concern was observed in the same location along the western boundary of the site, indicating that these contaminants are likely migrating off site. The site's western boundary abuts small backyards of a line of single-family row houses on East 29th Street. Vinyl chloride was detected in four samples, but below its groundwater standard of 2 ppb. Similar impacts were observed in a groundwater monitoring well immediately off site. Groundwater data are presented in Figures 2A and 2B.

Soil Vapor
A soil vapor intrusion investigation (SVI) conducted in 2013 detected PCE at 120,000 micrograms per cubic meter ($\mu g/m^3$) and TCE at 682 $\mu g/m^3$ in sub slab vapor beneath the site.

More recently, an SVI investigation conducted as part of the remedial investigation included sampling of sub slab vapor, indoor air and soil vapor under the driveway along the west side of the site. Elevated concentrations of PCE, TCE and DCE were detected beneath the basement slabs of the former location of the dry cleaner (a bank) and three other retail spaces, consisting of a military recruiter, a dance studio and a mattress store that make up the indoor portion of the site. The highest sub-slab concentrations of all the site contaminants of concern were detected in a sub-slab sample obtained from near a sump in the former location of Debbie Cleaners. PCE was detected at a maximum concentration of 78,000 $\mu g/m^3$ in the back of the bank basement, near the highest soil contamination. In the same sample, the highest sub slab concentrations of TCE (6,980 $\mu g/m^3$) and DCE (967 $\mu g/m^3$) were observed. The SVI data are presented in Figures 2C and 2D.

Elevated concentrations of PCE and TCE were observed in sub slab vapor samples at both the northern and southern boundaries of the site.

The four indoor air samples each had PCE present up to 9.69 $\mu g/m^3$. TCE (0.68 $\mu g/ m^3$) was present in three sample and DCE (0.27 $\mu g/m^3$) was detected in the fourth sample. The PCE and TCE levels were below their respective NYSDOH air guideline values of 30 and 2 $\mu g/ m^3$.

The highest levels of PCE (67,200 $\mu g/m^3$), TCE (16,500 $\mu g/m^3$) and DCE (13,700 $\mu g/m^3$) were detected in a soil vapor sample obtained from under the driveway along the western boundary of the site. The elevated concentrations of PCE, TCE and DCE in soil vapor beneath the entire site to all site boundaries strongly indicates that off-site migration of soil vapor is occurring, with possible vapor intrusion into off site buildings.

5.4: 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 will not come into contact with contaminated soil since the site is covered with a building and concrete unless they dig below the ground surface. 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 its water from a different source that is not affected by this contamination. Volatile organic compounds in the soil vapor 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 buildings, is referred to as soil vapor intrusion. Actions are recommended to address potential exposures via soil vapor intrusion in the on-site commercial building. Additional investigation is needed to determine whether actions are needed to address soil vapor intrusion in off-site structures.

5.5: 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

- 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: Commercial

The selected remedy is referred to as the Excavation, Cover System, Air Sparging and Soil Vapor Extraction remedy.

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, 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 gases 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;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Excavation and off-site disposal of approximately 55 cubic yards of contaminated soil and contaminant source areas, including:

- on-site soils which exceed restricted-commercial, SCOs, as defined by 6 NYCRR Part 375-6.8 in the upper 15 feet in an area in the driveway adjacent to the strip mall building.
- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- soils which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
- soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

3. Backfill

On-site soil which does not exceed the above excavation criteria may be used below the cover system described in remedy element 4 to backfill the excavation to the extent that a sufficient volume of on-site soil is available and establish the designed grades at the site.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the site. The site will be re-graded to accommodate installation of a cover system as described in remedy element 4.

4. Cover System

A site cover currently exists in areas not occupied by buildings and will be maintained to allow for commercial use of the site. Any site redevelopment will maintain the existing site cover. The site cover may include paved surface parking areas, sidewalks or soil where the upper one foot of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for restricted commercial use. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

5. Air Sparge with Soil Vapor Extraction (SVE)

Air sparging will be implemented to address the groundwater plume contaminated by volatile organic compounds (VOCs). VOCs will be physically removed from the groundwater and soil below the water table (saturated soil) by injecting air into the subsurface. The injected air rising through the groundwater will volatilize and transfer the VOCs from the groundwater and/or soil into the injected air. The VOCs are carried with the injected air into the vadose zone (the area below the ground surface but above the water table) where a soil vapor extraction (SVE) system designed to remove the injected air will be installed. The SVE system will apply a vacuum to wells that have been installed into the vadose zone to remove the VOCs along with the air introduced by the sparging process. The air extracted from the SVE wells will be treated as necessary prior to being discharged to the atmosphere.

At this site it is estimated seven air injection wells will be installed in the area of the site to be treated as depicted on Figures 3A and 3B to a depth of approximately eight feet below the basement slab, which is five feet below the water table. To capture the volatilized contaminants, it is estimated seven SVE wells will be installed in the vadose zone at a depth of approximately three below ground surface. The air containing VOCs extracted from the SVE wells will be treated by passing the air stream through activated carbon which removes the VOCs from the air prior to it being discharged to the atmosphere.

6. Vapor Mitigation

Any on-site buildings will be required to have a sub-slab depressurization system, or other acceptable measures, to mitigate the migration of vapors into the building from soil and/or groundwater.

7. 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 commercial 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 NYCDOH; and
- require compliance with the Department approved Site Management Plan.

8. 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 7 above.

Engineering Controls: The soil cover discussed in Paragraph 4, the SVE system discussed in Paragraph 5, and the sub-slab depressurization system discussed in Paragraph 6 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- a provision for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible. The nature and extent of contamination in areas where access was previously limited or unavailable will be immediately and thoroughly investigated pursuant to a plan approved by the Department. Based on the investigation results and the Department determination of the need for a remedy, a Remedial Action Work Plan (RAWP) will be developed for the final remedy for the site, including removal and/or treatment of any source areas to the extent feasible. Citizen Participation Plan (CPP) activities will continue through this process. Any necessary remediation will be completed prior to, or in association with, redevelopment. This includes the building and the driveway that make up the entire site;
- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 4 above will be placed in any areas where the upper one foot of exposed surface soil exceed the applicable soil cleanup objectives (SCOs)
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- 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:

- monitoring of groundwater, indoor air and sub-slab vapor to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and

- 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, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

- procedures for operating and maintaining the remedy;
- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- maintaining site access controls and Department notification; and
- providing the Department access to the site and O&M records.

Figure 1
Site Location

Former Debbie Cleaners BCP site
approximate site boundary

Debbie Cleaners

Avenue Y

Nostrand Ave

E 29th St

Avenue Z

N

Google earth

© 2018 Google

Imagery Date: 4/19/2016 40°35'26.18" N 73°56'25.32" W elev 9 ft eye alt 703 ft

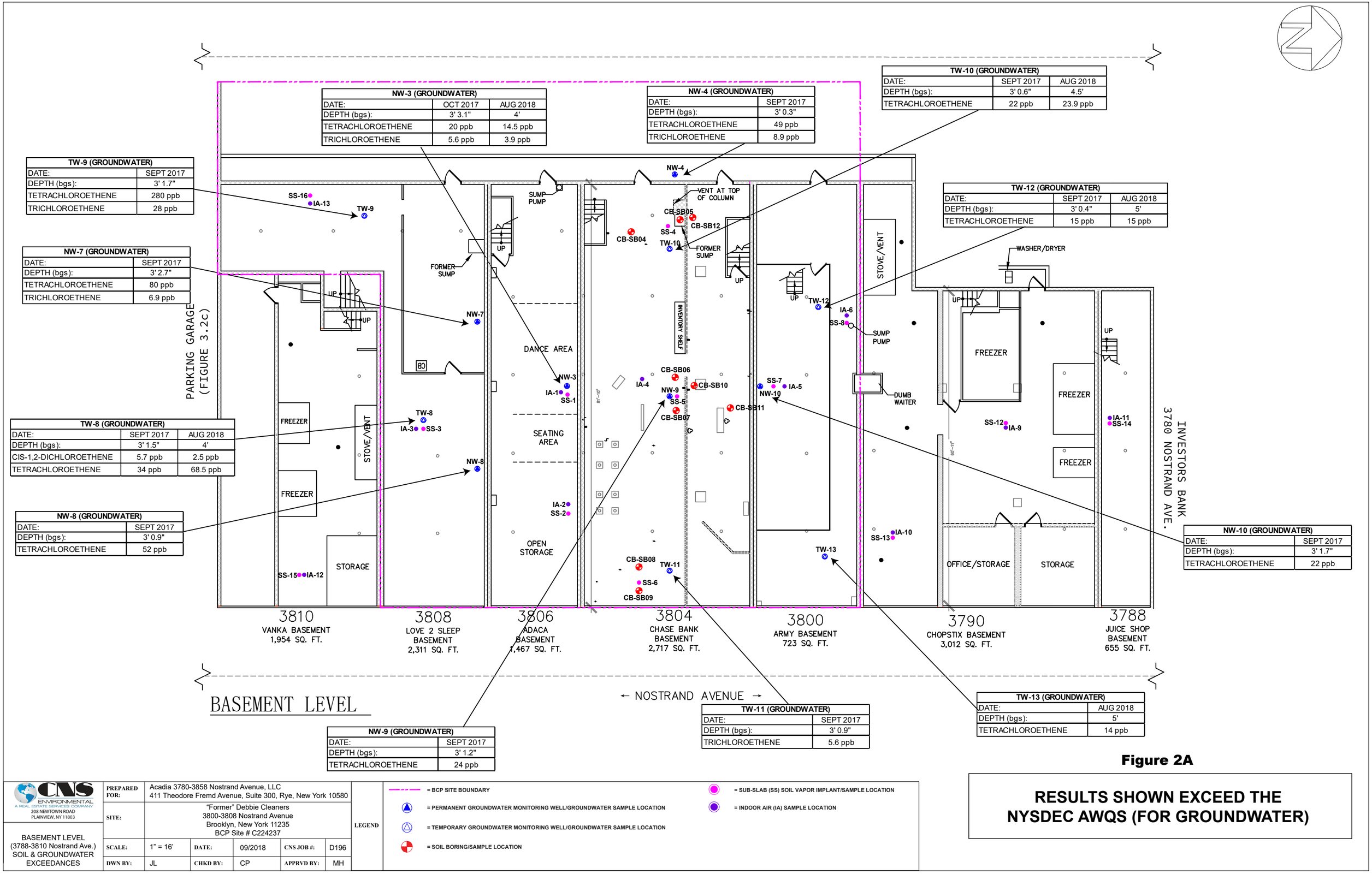


Figure 2A

RESULTS SHOWN EXCEED THE NYSDEC AWQS (FOR GROUNDWATER)

CNS ENVIRONMENTAL, A REAL ESTATE SERVICES COMPANY
208 NEWTOWN ROAD
PLAINVIEW, NY 11803

BASEMENT LEVEL (3788-3810 Nostrand Ave.) SOIL & GROUNDWATER EXCEEDANCES

PREPARED FOR:	Acadia 3780-3858 Nostrand Avenue, LLC 411 Theodore Fremd Avenue, Suite 300, Rye, New York 10580					
SITE:	"Former" Debbie Cleaners 3800-3808 Nostrand Avenue Brooklyn, New York 11235 BCP Site # C224237					
SCALE:	1" = 16'	DATE:	09/2018	CNS JOB #:	D196	
DWN BY:	JL	CHKD BY:	CP	APPRVD BY:	MH	

LEGEND

- = BCP SITE BOUNDARY
- = PERMANENT GROUNDWATER MONITORING WELL/GROUNDWATER SAMPLE LOCATION
- = TEMPORARY GROUNDWATER MONITORING WELL/GROUNDWATER SAMPLE LOCATION
- = SOIL BORING/SAMPLE LOCATION
- = SUB-SLAB (SS) SOIL VAPOR IMPLANT/SAMPLE LOCATION
- = INDOOR AIR (IA) SAMPLE LOCATION

TW-4 (GROUNDWATER)		
DATE:	SEPT 2017	JULY 2018
DEPTH (bgs):	13' 1.6"	16.4'
CIS-1,2-DICHLOROETHENE	65 ppb	5.2 ppb
TETRACHLOROETHENE	25 ppb	78.1 ppb
TRICHLOROETHENE	13 ppb	10.5 ppb

TW-5 (GROUNDWATER)		
DATE:	SEPT 2017	JULY 2018
DEPTH (bgs):	12' 4.7"	15.8'
CIS-1,2-DICHLOROETHENE	60 ppb	12.5 ppb
TETRACHLOROETHENE	320 ppb	121 ppb
TRICHLOROETHENE	40 ppb	17.7 ppb

NW-2 (GROUNDWATER)	
DATE:	SEPT 2017
DEPTH (bgs):	12' 1.5"
CIS-1,2-DICHLOROETHENE	250 ppb
TETRACHLOROETHENE	1,100 ppb
TRICHLOROETHENE	140 ppb

← EAST 29TH STREET →
~118'0" WEST OF PROPERTY LINE

RESIDENTIAL HOME BACKYARDS
(DEPTH = ~ 36'6" WEST OF PROPERTY LINE)

SV-1 TW-4 NW-5 SV-2 TW-5 NW-2 SV-3 TW-6 NW-6 SV-4 TW-7 SV-5 NW-11

CB-SB01 CB-SB02 CB-SB03

TENANT DUMPSTERS

DN GREASE TRAP

ROOF DRAIN PIPE ON FACADE

DRAIN PIPE ON FACADE, 10.8' ABOVE GRADE

AC UNIT ON FACADE, 7.8' ABOVE GRADE

DN PIPE ON GRADE BOLLARD SEALED DOOR

TW-7 (GROUNDWATER)	
DATE:	SEPT 2017
DEPTH (bgs):	11' 4.2"
TETRACHLOROETHENE	7.7 ppb

NW-11 (GROUNDWATER)	
DATE:	SEPT 2017
DEPTH (bgs):	9' 7.9"
TETRACHLOROETHENE	33 ppb

NW-5 (GROUNDWATER)	
DATE:	SEPT 2017
DEPTH (bgs):	12' 8"
CIS-1,2-DICHLOROETHENE	24 ppb
TETRACHLOROETHENE	270 ppb
TRICHLOROETHENE	33 ppb

CB-SB02 (SOIL)	
DATE:	JULY 2018
DEPTH (bgs):	4'
TETRACHLOROETHENE	504 ppm

TW-6 (GROUNDWATER)		
DATE:	SEPT 2017	JULY 2018
DEPTH (bgs):	11' 7.5"	11.5'
CIS-1,2-DICHLOROETHENE	20 ppb	37 ppb
TETRACHLOROETHENE	25 ppb	105 ppb
TRICHLOROETHENE	8.9 ppb	28.5 ppb

TW-17

TW-18 (GROUNDWATER)	
DATE:	JULY 2018
DEPTH (bgs):	14'
CIS-1,2-DICHLOROETHENE	14.7 ppb
TETRACHLOROETHENE	8.3 ppb
TRICHLOROETHENE	5.7 ppb

TW-18

NW-1 (GROUNDWATER)		
DATE:	SEPT 2017	AUG 2018
DEPTH (bgs):	11' 8.8"	15'
CIS-1,2-DICHLOROETHENE	12 ppb	7.9 ppb
TETRACHLOROETHENE	300 ppb	48.4 ppb
TRICHLOROETHENE	14 ppb	6.5 ppb

AVENUE Y

3810 VANKA CAFE
3808 LOVE 2 SLEEP
3806 ADACA NW-1
3804 CHASE BANK
3800 ARMY
3790 CHOPSTIX
3788 JUICE SHOP
3780 INVESTOR'S BANK

← NOSTRAND AVENUE →

STREET LEVEL

Figure 2B

RESULTS SHOWN EXCEED THE NYSDEC COMMERCIAL SCOS (FOR SOIL) OR THE NYSDEC AWQS (FOR GROUNDWATER)

CNS ENVIRONMENTAL
A REAL ESTATE SERVICES COMPANY
208 NEWTOWN ROAD
PLAINVIEW, NY 11803

STREET LEVEL
SOIL & GROUNDWATER
EXCEEDANCES

PREPARED FOR:	Acadia 3780-3858 Nostrand Avenue, LLC 411 Theodore Fremd Avenue, Suite 300, Rye, New York 10580				
SITE:	"Former" Debbie Cleaners 3800-3808 Nostrand Avenue Brooklyn, New York 11235 BCP Site # C224237				
SCALE:	1" = 16'	DATE:	09/2018	CNS JOB #:	D196
DWN BY:	JL	CHKD BY:	CP	APPRVD BY:	MH

LEGEND

= BCP SITE BOUNDARY
= PERMANENT GROUNDWATER MONITORING WELL/GROUNDWATER SAMPLE LOCATION
= TEMPORARY GROUNDWATER MONITORING WELL/GROUNDWATER SAMPLE LOCATION
= SOIL BORING/SAMPLE LOCATION
= SUB-SLAB (SS) SOIL VAPOR IMPLANT/SAMPLE LOCATION

SS-4 (SUB-SLAB SOIL VAPOR)	
DATE:	SEPT 2017
CIS-1,2-DICHLOROETHENE	967 µg/m3
TETRACHLOROETHENE	78,000 µg/m3
TRICHLOROETHENE	6,980 µg/m3

IA-6 (INDOOR AIR)	
DATE:	SEPT 2017
TETRACHLOROETHENE	9.22 µg/m3
TRICHLOROETHENE	0.33 µg/m3

IA-4 (INDOOR AIR)	
DATE:	SEPT 2017
TETRACHLOROETHENE	23.5 µg/m3
TRICHLOROETHENE	0.68 µg/m3

SS-5 (SUB-SLAB SOIL VAPOR)	
DATE:	SEPT 2017
CIS-1,2-DICHLOROETHENE	15.1 µg/m3
TETRACHLOROETHENE	69,800 µg/m3
TRICHLOROETHENE	983 µg/m3

SS-16 (SUB-SLAB SOIL VAPOR)	
DATE:	JULY 2018
TETRACHLOROETHENE	1,220 µg/m3
TRICHLOROETHENE	57.5 µg/m3

IA-13 (INDOOR AIR)	
DATE:	JULY 2018
TETRACHLOROETHENE	12.7 µg/m3
TRICHLOROETHENE	0.34 µg/m3

SS-8 (SUB-SLAB SOIL VAPOR)	
DATE:	SEPT 2017
TETRACHLOROETHENE	4,820 µg/m3
TRICHLOROETHENE	204 µg/m3

SS-7 (SUB-SLAB SOIL VAPOR)	
DATE:	SEPT 2017
TETRACHLOROETHENE	15,700 µg/m3
TRICHLOROETHENE	185 µg/m3

IA-5 (INDOOR AIR)	
DATE:	SEPT 2017
TETRACHLOROETHENE	9.69 µg/m3
TRICHLOROETHENE	0.33 µg/m3

SS-1 (SUB-SLAB SOIL VAPOR)	
DATE:	APRIL 2013
CIS-1,2-DICHLOROETHENE	6.54 µg/m3
TETRACHLOROETHENE	120,000 µg/m3
TRICHLOROETHENE	628 µg/m3

SS-12 (SUB-SLAB SOIL VAPOR)	
DATE:	JULY 2018
TETRACHLOROETHENE	645 µg/m3
TRICHLOROETHENE	43.7 µg/m3

IA-3 (INDOOR AIR)	
DATE:	SEPT 2017
CIS-1,2-DICHLOROETHENE	0.27 µg/m3
TETRACHLOROETHENE	5.27 µg/m3

SS-3 (SUB-SLAB SOIL VAPOR)	
DATE:	SEPT 2017
TETRACHLOROETHENE	48,300 µg/m3
TRICHLOROETHENE	527 µg/m3

SS-14 (SUB-SLAB SOIL VAPOR)	
DATE:	JULY 2018
TETRACHLOROETHENE	1,040 µg/m3
TRICHLOROETHENE	43.5 µg/m3

SS-15 (SUB-SLAB SOIL VAPOR)	
DATE:	JULY 2018
TETRACHLOROETHENE	5,350 µg/m3
TRICHLOROETHENE	286 µg/m3

IA-12 (INDOOR AIR)	
DATE:	JULY 2018
TETRACHLOROETHENE	4.27 µg/m3

SS-2 (SUB-SLAB SOIL VAPOR)	
DATE:	SEPT 2015
TETRACHLOROETHENE	67,800 µg/m3
TRICHLOROETHENE	409 µg/m3

SS-6 (SUB-SLAB SOIL VAPOR)	
DATE:	SEPT 2017
CIS-1,2-DICHLOROETHENE	8.28 µg/m3
TETRACHLOROETHENE	11,100 µg/m3
TRICHLOROETHENE	393 µg/m3

SS-13 (SUB-SLAB SOIL VAPOR)	
DATE:	JULY 2018
TETRACHLOROETHENE	2,030 µg/m3
TRICHLOROETHENE	58.5 µg/m3

IA-10 (INDOOR AIR)	
DATE:	JULY 2018
TETRACHLOROETHENE	6.91 µg/m3
TRICHLOROETHENE	0.33 µg/m3

PARKING GARAGE

DANCE AREA

SEATING AREA

OPEN STORAGE

STORAGE

FREEZER

STOVE/VENT

INVENTORY SHELF

SUMP PUMP

FORMER SUMP

VENT AT TOP OF COLUMN

WASHER/DRYER

DUMB WAITER

OFFICE/STORAGE

INVESTORS BANK
3780 NOSTRAND AVE.

3810
VANKA BASEMENT
1,954 SQ. FT.

3808
LOVE 2 SLEEP
BASEMENT
2,311 SQ. FT.

3806
ADACA
BASEMENT
1,467 SQ. FT.

3804
CHASE BANK
BASEMENT
2,717 SQ. FT.

3800
ARMY BASEMENT
723 SQ. FT.

3790
CHOPSTIX BASEMENT
3,012 SQ. FT.

3788
JUICE SHOP
BASEMENT
655 SQ. FT.

← NOSTRAND AVENUE →

BASEMENT LEVEL

Figure 2C

RESULTS SHOWN EXCEED THE NYSDOH MINIMUM DECISION MATRIX VALUES FOR SOIL VAPOR OR INDOOR AIR

CNS ENVIRONMENTAL
A REAL ESTATE SERVICES COMPANY
208 NEWTOWN ROAD
PLAINVIEW, NY 11803

BASEMENT LEVEL
(3788-3810 Nostrand Ave.)
SOIL VAPOR & INDOOR AIR EXCEEDANCES

PREPARED FOR:	Acadia 3780-3858 Nostrand Avenue, LLC 411 Theodore Fremd Avenue, Suite 300, Rye, New York 10580					
SITE:	"Former" Debbie Cleaners 3800-3808 Nostrand Avenue Brooklyn, New York 11235 BCP Site # C224237					
SCALE:	1" = 16'	DATE:	09/2018	CNS JOB #:	D196	
DWN BY:	JL	CHKD BY:	CP	APPRVD BY:	MH	

LEGEND

- = BCP SITE BOUNDARY
- = PERMANENT GROUNDWATER MONITORING WELL/GROUNDWATER SAMPLE LOCATION
- = TEMPORARY GROUNDWATER MONITORING WELL/GROUNDWATER SAMPLE LOCATION
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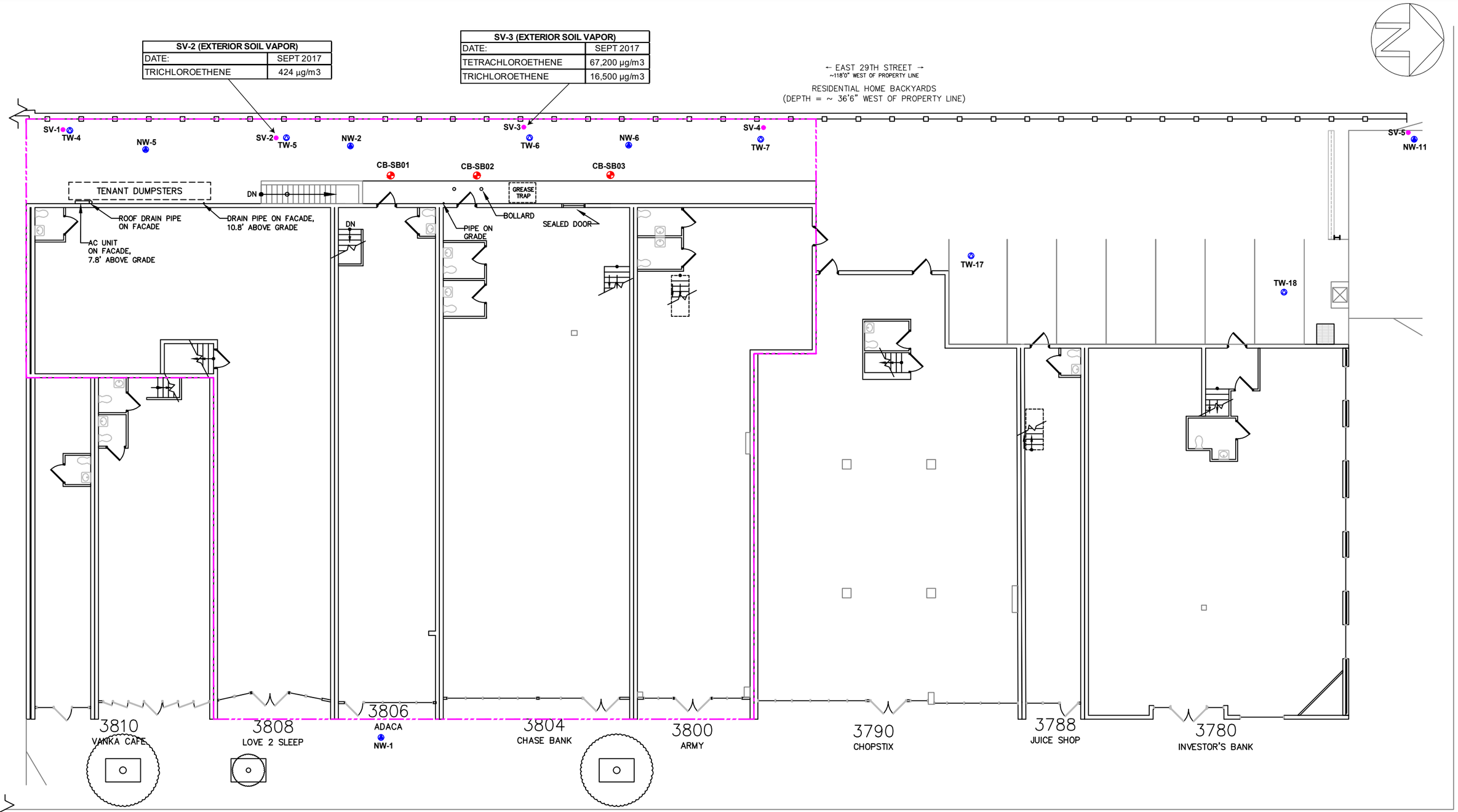
- = SUB-SLAB (SS) SOIL VAPOR IMPLANT/SAMPLE LOCATION
- = INDOOR AIR (IA) SAMPLE LOCATION



STREET LEVEL

Figure 2D

RESULTS SHOWN EXCEED THE NYSDOH MINIMUM DECISION MATRIX VALUES FOR SOIL VAPOR

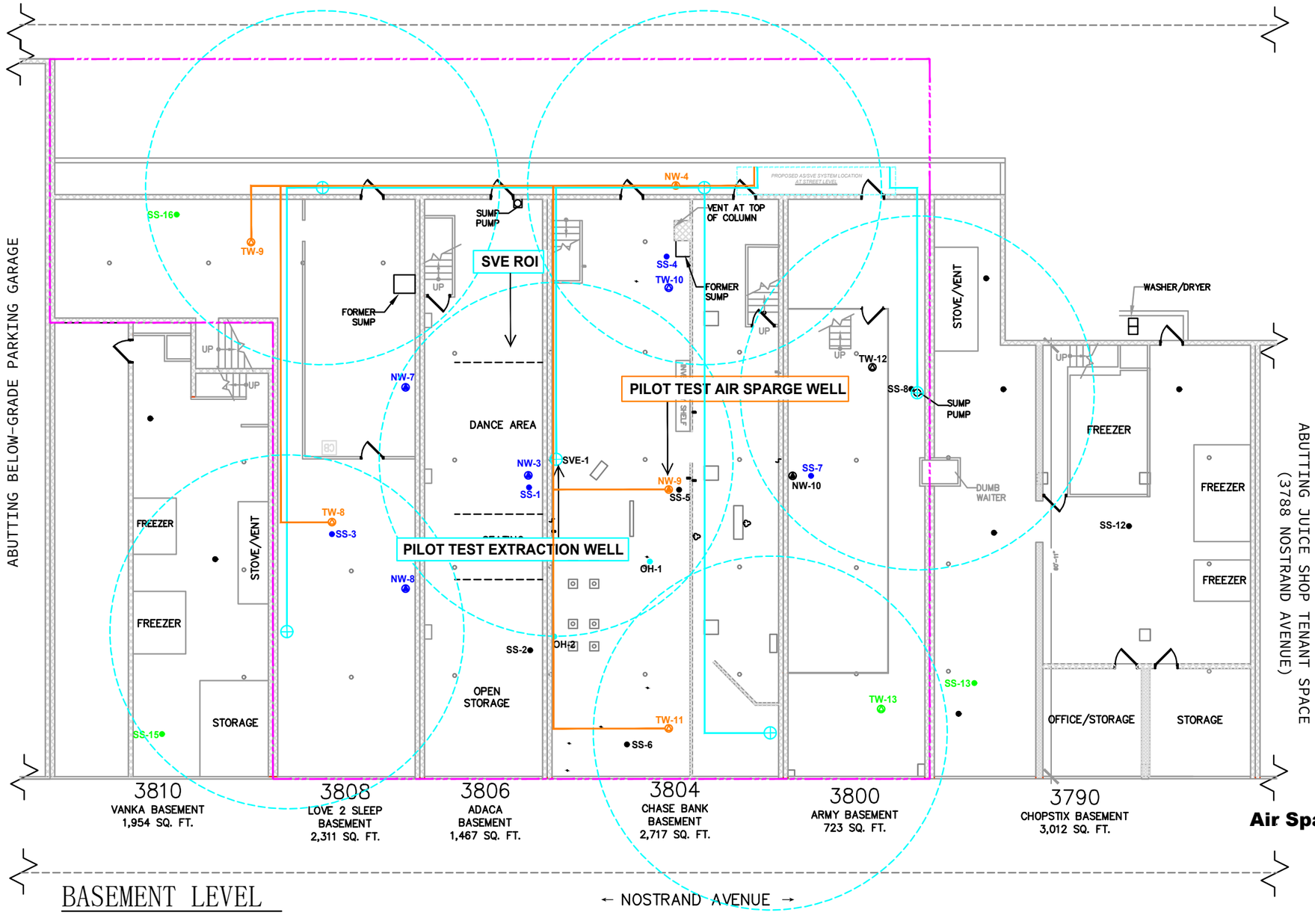
CNS ENVIRONMENTAL
A REAL ESTATE SERVICES COMPANY
208 NEWTOWN ROAD
PLAINVIEW, NY 11803

STREET LEVEL SOIL VAPOR EXCEEDANCES

PREPARED FOR:	Acadia 3780-3858 Nostrand Avenue, LLC 411 Theodore Fremd Avenue, Suite 300, Rye, New York 10580					
SITE:	"Former" Debbie Cleaners 3800-3808 Nostrand Avenue Brooklyn, New York 11235 BCP Site # C224237					
SCALE:	1" = 16'	DATE:	09/2018	CNS JOB #:	D196	
DWN BY:	JL	CHKD BY:	CP	APPRVD BY:	MH	

LEGEND

- = BCP SITE BOUNDARY
- = PERMANENT GROUNDWATER MONITORING WELL/GROUNDWATER SAMPLE LOCATION
- = TEMPORARY GROUNDWATER MONITORING WELL/GROUNDWATER SAMPLE LOCATION
- = SOIL BORING/SAMPLE LOCATION
- = SUB-SLAB (SS) SOIL VAPOR IMPLANT/SAMPLE LOCATION



LEGEND

- = BCP SITE BOUNDARY
- = PROPOSED SOIL EXCAVATION AREA
- = PROPOSED AS/SVE SYSTEM LOCATION
- = PROPOSED SOIL VAPOR EXTRACTION (SVE) WELL
- = PROPOSED SOIL VAPOR EXTRACTION (SVE) PIPING
- = SOIL VAPOR EXTRACTION (SVE) RADIUS OF INFLUENCE (ROI)
- = PROPOSED AIR SPARGING (AS) INJECTION WELL
- = PROPOSED AIR SPARGING (AS) PIPING
- = GROUNDWATER OBSERVATION WELL to be SAMPLED on SEMI-ANNUAL BASIS
- = VAPOR MONITORING POINT to be SAMPLED on SEMI-ANNUAL BASIS
- = GROUNDWATER OBSERVATION WELL to be SAMPLED on BI-ANNUAL BASIS
- = VAPOR MONITORING POINT to be SAMPLED on BI-ANNUAL BASIS
- = GROUNDWATER MONITORING WELL to be ABANDONED

Figure 3A
Proposed Remedy
Air Sparging and Soil Vapor Extraction
Basement Level

DATE	REVISION	BY	APVD

DWN BY: JL | CHKD BY: MH | APVD BY: CP

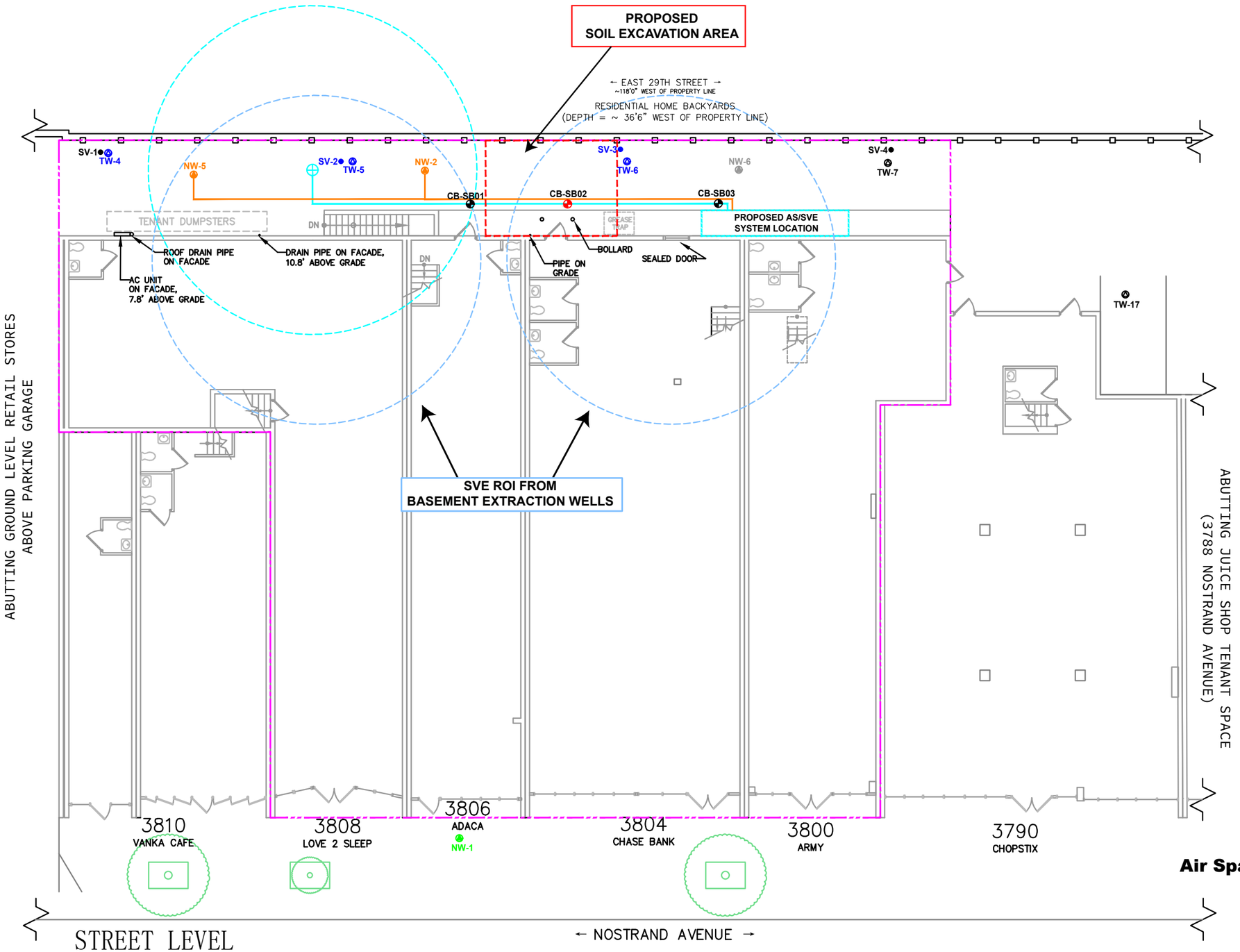
SITE NO. BCP C224237

"FORMER" DEBBIE CLEANERS
3800-3808 NOSTRAND AVENUE
BROOKLYN, NY 11235

PROPOSED REMEDIAL ACITON PLAN
(BASEMENT LEVEL)

CNS ENVIRONMENTAL
A REAL ESTATE SERVICES COMPANY
208 NEWTOWN ROAD
PLAINVIEW, NY 11803
www.cnsenviro.com

DATE JAN 2019
CNS JOB # D196
SCALE 1" = 16'



LEGEND

- = BCP SITE BOUNDARY
- = PROPOSED SOIL EXCAVATION AREA
- = PROPOSED AS/SVE SYSTEM LOCATION
- = PROPOSED SOIL VAPOR EXTRACTION (SVE) WELL
- = PROPOSED SOIL VAPOR EXTRACTION (SVE) PIPING
- = SOIL VAPOR EXTRACTION (SVE) RADIUS OF INFLUENCE (ROI)
- = PROPOSED AIR SPARGING (AS) INJECTION WELL
- = PROPOSED AIR SPARGING (AS) PIPING
- = GROUNDWATER OBSERVATION WELL to be SAMPLED on SEMI-ANNUAL BASIS
- = VAPOR MONITORING POINT to be SAMPLED on SEMI-ANNUAL BASIS
- = GROUNDWATER OBSERVATION WELL to be SAMPLED on BI-ANNUAL BASIS
- = VAPOR MONITORING POINT to be SAMPLED on BI-ANNUAL BASIS
- = GROUNDWATER MONITORING WELL to be ABANDONED

Figure 3A
Proposed Remedy
Air Sparging and Soil Vapor Extraction
Street Level

DATE	REVISION	BY	APVD

DWN BY: JL
CHKD BY: MH
APVD BY: CP

SITE NO. BCP C224237

"FORMER" DEBBIE CLEANERS
3800-3808 NOSTRAND AVENUE
BROOKLYN, NY 11235

PROPOSED REMEDIAL ACITON PLAN
(STREET LEVEL)

CNS ENVIRONMENTAL
A REAL ESTATE SERVICES COMPANY
208 NEWTOWN ROAD
PLAINVIEW, NY 11803
www.cnsenviro.com

DATE: JAN 2019
CNS JOB #: D196
SCALE: 1" = 16'