

DECISION DOCUMENT

Former Watermark Designs Facility
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224139
May 2017



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

DECLARATION STATEMENT - DECISION DOCUMENT

Former Watermark Designs Facility
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224139
May 2017

Statement of Purpose and Basis

This document presents the remedy for the Former Watermark Designs Facility 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 Watermark Designs Facility 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:

- a. Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- b. Reducing direct and indirect greenhouse gases and other emissions;
- c. Increasing energy efficiency and minimizing use of non-renewable energy;
- d. Conserving and efficiently managing resources and materials;
- e. Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- f. Maximizing habitat value and creating habitat when possible;
- g. Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- h. Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Air Sparge with Soil Vapor Extraction

The air sparging and soil vapor extraction IRM will continue to be implemented to address the soil and groundwater plume contaminated by volatile organic compounds (VOCs). VOCs are 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 volatilizes and transfers 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 removes the injected air. The SVE system applies 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 is treated as necessary prior to being discharged to the atmosphere. At this site, eight air injection wells are installed across the western side of the site building where the source of VOC contamination is present, to depths of 26 to 32 feet, which is about 16 to 22 feet below the water table. To capture the volatilized contaminants, twelve SVE wells were installed in the vadose zone at depths of approximately 9 to 10 below ground surface. The air containing VOCs extracted from the SVE wells is treated by passing the air stream through activated carbon which removes the VOCs from the air prior to being discharged to the atmosphere.

3. Cover System

A site cover currently exists consisting of the building over the entire site 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 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).

4. Institutional Control

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

- a. 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);
- b. 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;
- c. 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
- d. Require compliance with the Department approved Site Management Plan.

5. Site Management Plan

- a. 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 4 above.

Engineering Controls: The site cover discussed in Paragraph 3 and the air sparging/soil vapor extraction system discussed in Paragraph 2 above.

This plan includes, but may not be limited to:

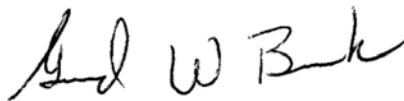
- i. an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
 - ii. a provision for demolition of the site building if and when it becomes unsafe or inactive or vacant;
 - iii. a provision for removal or treatment of the source area located under the building if and when the building is demolished or becomes vacant;
 - iv. descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
 - v. a provision for evaluation of the potential for soil vapor intrusion for the existing on-site building upon re-occupancy and any future buildings developed on the site, including a provision for implementing actions recommended to address exposures related to soil vapor intrusion ;
 - vi. a provision that, should property owners of buildings located off-site and downgradient of the site previously offered soil vapor intrusion sampling and refusing, request to have their properties sampled in the future (sub-slab and indoor air), the NYSDEC, in consultation with the NYSDOH, shall determine whether soil vapor intrusion sampling is still appropriate. Where necessary, actions recommended to address exposures related to soil vapor intrusion will be implemented.
 - vii. 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 one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);
 - viii. provisions for the management and inspection of the identified engineering controls;
 - ix. maintaining site access controls and Department notification; and
 - x. the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
- b. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
- i. monitoring of groundwater and soil vapor to assess the performance and effectiveness of the remedy;
 - ii. a schedule of monitoring and frequency of submittals to the Department; and
 - iii. monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.
- c. 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:
- i. procedures for operating and maintaining the remedy;

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

6/1/2017



Date

Gerard Burke, Director
Remedial Bureau B

DECISION DOCUMENT

Former Watermark Designs Facility
Brooklyn, Kings County
Site No. C224139
April 2017

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:

Brooklyn Public Library-New Lots Branch
665 New Lots Ave. at Barbery St.
Brooklyn, NY 11207
Phone: 718-649-0311

Brooklyn Community Board 5
Attn: AT Mitchell, Chair
404 Pine Street, 3rd Floor
Brooklyn, NY 11208
Phone: 929-221-8261

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

Site Location:

The Former Watermark Designs Facility (site) is located at 491 Wortman Avenue in Brooklyn, Kings County. It is identified as block 4384, lots 31 and 36 on the Kings County Tax Maps and is approximately 0.44 acres in size. It is bounded by a one-story building to the north, Wortman Avenue to the south, Essex Street to the east, and Linwood Street to the west. The nearest body of water is Hendrix Creek, which is about 0.5 miles southwest of the site.

Site Features:

The site consists of a one story brick and steel building, with a partial basement, that occupies the entire area of the property. The majority of the building, except for the partial basement, rests on concrete slab. The interior of the building is divided by a wall into east and west areas. No exposed soil or vegetation is present on the subject property.

Current Zoning and Land Use:

The vacant site is located in an urban setting characterized by industrial buildings to the north, east, and south and residential buildings to the west. Land use within a half mile of the site is primarily industrial and residential, but also includes public parks, public institutions, day care centers, and school facilities. The site is zoned for industrial/manufacturing uses. There is no current plan for redevelopment of the site.

Past Use of the Site:

US Tube and Foundry Company, Inc. operated at the site between 1945 and 1973. The National Hanger Company, Inc. operated at the site in 1976. J and H Holding Company, LLC has owned the property since 1983 and manufacturing activities continued until 2007. The site previously manufactured, stored, packaged, and shipped decorative fixtures and hardware for bathrooms and kitchens. Processes involved cleaning, painting, plating, etching, polishing, and specific machining of metals and metal products. A cleaning and degreasing area was located along the west side of the building. Chlorinated solvents, specifically trichloroethylene (TCE) and tetrachloroethylene (PCE) were used in the manufacturing process to clean various products. Currently, the western portion of the site building is used as a warehouse to store sound equipment, and the eastern portion is unoccupied.

Site Geology and Hydrogeology:

The soil profile at the site generally consists of 2 to 5 feet of miscellaneous uncontrolled fill underlain by medium to fine sand with some gravel. The estimated depth to groundwater is about 10 feet below grade surface (bgs). Based on local topography, groundwater is expected to flow to the southwest towards Hendrix Creek.

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 that restrict the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) were 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 Participant. The Applicant has an obligation to address on-site and off-site contamination. Accordingly, no enforcement actions are necessary.

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:

- 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 contaminant(s) of concern identified at this site is/are:

- tetrachloroethene (PCE)
- trichloroethene (TCE)
- arsenic
- lead
- mercury

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) have been completed at this site based on conditions observed during the RI. The Construction Completion Report (CCR) for this IRM was approved by the Department in August 2016.

Air Sparging and Soil Vapor Extraction

In 2015, a full-scale air sparging (AS) and soil vapor extraction (SVE) system was installed within the western portion of the site building (warehouse area) to remove the source of contamination and address soil vapor intrusion into the site building. The AS system is comprised of process equipment that directs pressurized air into the impacted groundwater zone via a pipe network connected to eight sparging wells distributed across the warehouse. The SVE system is comprised of process equipment that exerts a vacuum across the treatment area via a pipe network connected to 12 extraction wells distributed across the warehouse. The vacuum captures and removes vapors from the subsurface (including vapors generated by AS). The vapors are then treated prior to being released to the air. A concrete cap spans the footprint of the warehouse and prevents short-circuiting of the AS and SVE system.

The AS and SVE system has been operational since October 2015, with quarterly monitoring being conducted to assess its performance and effectiveness. Five piezometers are used to measure the groundwater elevation, collect groundwater samples, and if necessary, act as a passive pathway to mitigate injected air buildup. Seven vapor probes are used to monitor the vacuum influence and collect soil vapor samples. Eleven groundwater monitoring wells are used to collect groundwater samples for analysis. Two vent wells are used to regulate the vacuum pressure in the SVE system, provide a relief conduit for vacuum buildup, and mitigate low air-flow conditions. This system will operate until site remedial objectives have been met or until NYSDEC in consultation with the NYSDOH determines that continued operation is technically impracticable or not feasible.

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 upon investigations and an interim remedial measure (IRM) conducted to date, the primary contaminants of concern include trichloroethene (TCE) and tetrachloroethene (PCE) in groundwater, sub-surface soil and soil vapor at the site and at some near-field off-site locations.

An off-site investigation conducted further downgradient of the site determined that VOC contamination in groundwater and soil vapor in the far-field locations is not related to the site. (A characterization of the far-field contamination is currently being conducted by the Department as part of a separate remedial program.)

Soil:

In 2013, site-wide soil sampling was completed. The maximum concentration of TCE was detected at 12,000 parts per million (ppm) at one location from within the truck scale pit area, at a depth of 0 to 2.5 feet. This exceeded the TCE commercial use soil cleanup objective (SCO) of 200 ppm. Arsenic, lead and mercury also exceeded the commercial use SCOs in samples collected from the pit area samples at 0 to 2 feet deep. All other contaminants were below the commercial use SCOs. No impacts to off-site soils were detected.

Groundwater:

In 2015, the highest concentrations of TCE (1,800 ppb) and PCE (750 ppb) were detected at two shallow wells near the truck scale pit area. At the near-field off-site wells, which are both shallow wells, the maximum concentration of TCE was 780 ppb and PCE was 710 ppb. Concentrations of PCE and TCE have decreased at all other on-site and near-field monitoring wells since implementation of the AS/SVE system. Adjustments were made to the AS/SVE system to address these concentrations of TCE and PCE at the near-field off-site wells. As of January 2017, the maximum PCE and TCE concentrations in groundwater at the site were 19 ppb and 10 ppb, respectively.

Soil Vapor, Sub-Slab Vapor and Indoor Air:

Prior to the implementation of the IRM in 2015, at on-site locations, the maximum PCE and TCE concentrations in sub-slab samples were 9,200 $\mu\text{g}/\text{m}^3$ at SV-3 and 2,300,000 $\mu\text{g}/\text{m}^3$ at SV-2, respectively. The maximum PCE and TCE concentrations in indoor air samples were 10.3 $\mu\text{g}/\text{m}^3$ at IA-003 and 214 $\mu\text{g}/\text{m}^3$ at IA-002, respectively. The indoor air result at IA-002 for TCE was above the NYSDOH Guideline Value of 2 $\mu\text{g}/\text{m}^3$. In addition, at the off-site near-field locations, the maximum TCE concentration in soil vapor was 72,000 $\mu\text{g}/\text{m}^3$ and PCE was 32,000 $\mu\text{g}/\text{m}^3$, both at location SV-8. Access was not granted to any off-site buildings for sub-slab and indoor air sampling.

After implementation of the IRM, sub-slab and soil vapor samples were collected at on-site and near-field locations, respectively. In July 2016, the maximum PCE and TCE concentrations in sub-slab samples were 1,400 $\mu\text{g}/\text{m}^3$ at VP-6 and 11,000 $\mu\text{g}/\text{m}^3$ at VP-3, respectively. Indoor air samples were not collected since the building was vacant and there were no plans for redevelopment. However, the SMP has a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including a provision for implementing actions recommended to address exposures related to soil vapor intrusion. To date, the AS/SVE system is effectively decreasing concentrations of chlorinated VOCs in groundwater and soil vapor.

In 2013, based on initial investigations and data, NYSDEC and NYSDOH determined that the site presented a significant threat to public 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 the soil if they dig below the buildings. People are not drinking contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn 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 have been recommended to address soil vapor intrusion in the on-site structure in the event that the building is routinely occupied. Soil vapor intrusion is a concern for off-site structures. However, access to investigate has been denied at off-site structures.

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.
- 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 the 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 soil cleanup objectives remedy.

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

The elements of the selected remedy, as shown in Figures 2A and 2B, 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:

- a. Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- b. Reducing direct and indirect greenhouse gases and other emissions;
- c. Increasing energy efficiency and minimizing use of non-renewable energy;
- d. Conserving and efficiently managing resources and materials;
- e. Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- f. Maximizing habitat value and creating habitat when possible;
- g. Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- h. Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Air Sparge with Soil Vapor Extraction

The air sparging and soil vapor extraction IRM will continue to be implemented to address the soil and groundwater plume contaminated by volatile organic compounds (VOCs). VOCs are 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

volatilizes and transfers 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 removes the injected air. The SVE system applies 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 is treated as necessary prior to being discharged to the atmosphere. At this site, eight air injection wells are installed across the western side of the site building where the source of VOC contamination is present, to depths of 26 to 32 feet, which is about 16 to 22 feet below the water table. To capture the volatilized contaminants, twelve SVE wells were installed in the vadose zone at depths of approximately 9 to 10 below ground surface. The air containing VOCs extracted from the SVE wells is treated by passing the air stream through activated carbon which removes the VOCs from the air prior to being discharged to the atmosphere.

3. Cover System

A site cover currently exists consisting of the building over the entire site 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 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).

4. Institutional Control

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

- a. 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);
- b. 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;
- c. 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
- d. Require compliance with the Department approved Site Management Plan.

5. Site Management Plan

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

- a. 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:

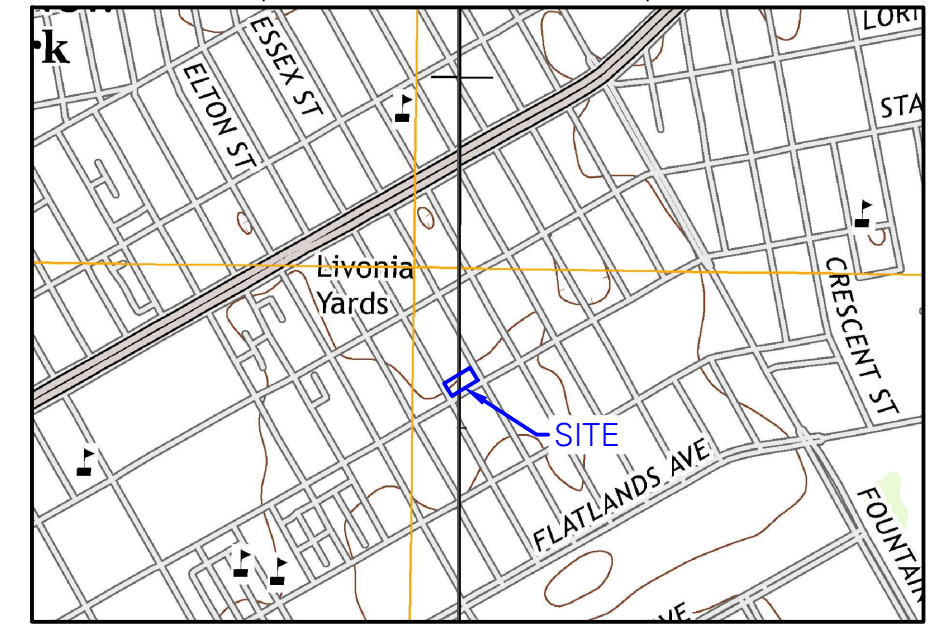
Institutional Controls: The Environmental Easement discussed in Paragraph 4 above.

Engineering Controls: The site cover discussed in Paragraph 3 and the air sparging/soil vapor extraction system discussed in Paragraph 2 above.

This plan includes, but may not be limited to:

- i. an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
 - ii. a provision for demolition of the site building if and when it becomes unsafe or inactive or vacant;
 - iii. a provision for removal or treatment of the source area located under the building if and when the building is demolished or becomes vacant;
 - iv. descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
 - v. a provision for evaluation of the potential for soil vapor intrusion for the existing on-site building upon re-occupancy and any future buildings developed on the site, including a provision for implementing actions recommended to address exposures related to soil vapor intrusion ;
 - vi. a provision that, should property owners of buildings located off-site and downgradient of the site previously offered soil vapor intrusion sampling and refusing, request to have their properties sampled in the future (sub-slab and indoor air) , the NYSDEC, in consultation with the NYSDOH, shall determine whether soil vapor intrusion sampling is still appropriate. Where necessary, actions recommended to address exposures related to soil vapor intrusion will be implemented.
 - vii. 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 one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);
 - viii. provisions for the management and inspection of the identified engineering controls;
 - ix. maintaining site access controls and Department notification; and
 - x. the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
- b. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
- i. monitoring of groundwater and soil vapor to assess the performance and effectiveness of the remedy;
 - ii. a schedule of monitoring and frequency of submittals to the Department; and
 - iii. monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.
- c. 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:
- i. procedures for operating and maintaining the remedy;
 - ii. compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
 - iii. maintaining site access controls and Department notification; and
 - iv. providing the Department access to the site and O&M records.

FIGURE 1 - SITE LOCATION



SITE LOCATION MAP

(MAP REFERENCED FROM USGS TOPOGRAPHIC QUADRANGLE MAPS FOR BROOKLYN AND JAMAICA)

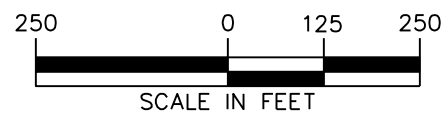
LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE WAREHOUSE BOUNDARY

NOTES:

1. BASE MAP IS REFERENCED FROM MICROSOFT BING MAPS, ACCESSED ON JANUARY 26, 2016.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.



LANGAN

21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
Langan Engineering and Environmental Services, Inc.
Langan CT, Inc.
Langan International LLC
Collectively known as Langan

Project

491 WORTMAN AVENUE

BLOCK No. 4384, LOT Nos. 31 & 36
BROOKLYN

KINGS

NEW YORK

Figure Title

SITE LOCATION PLAN

Project No.
170329301

Date
8/23/2016

Scale
1" = 250'

Drawn By
KDC

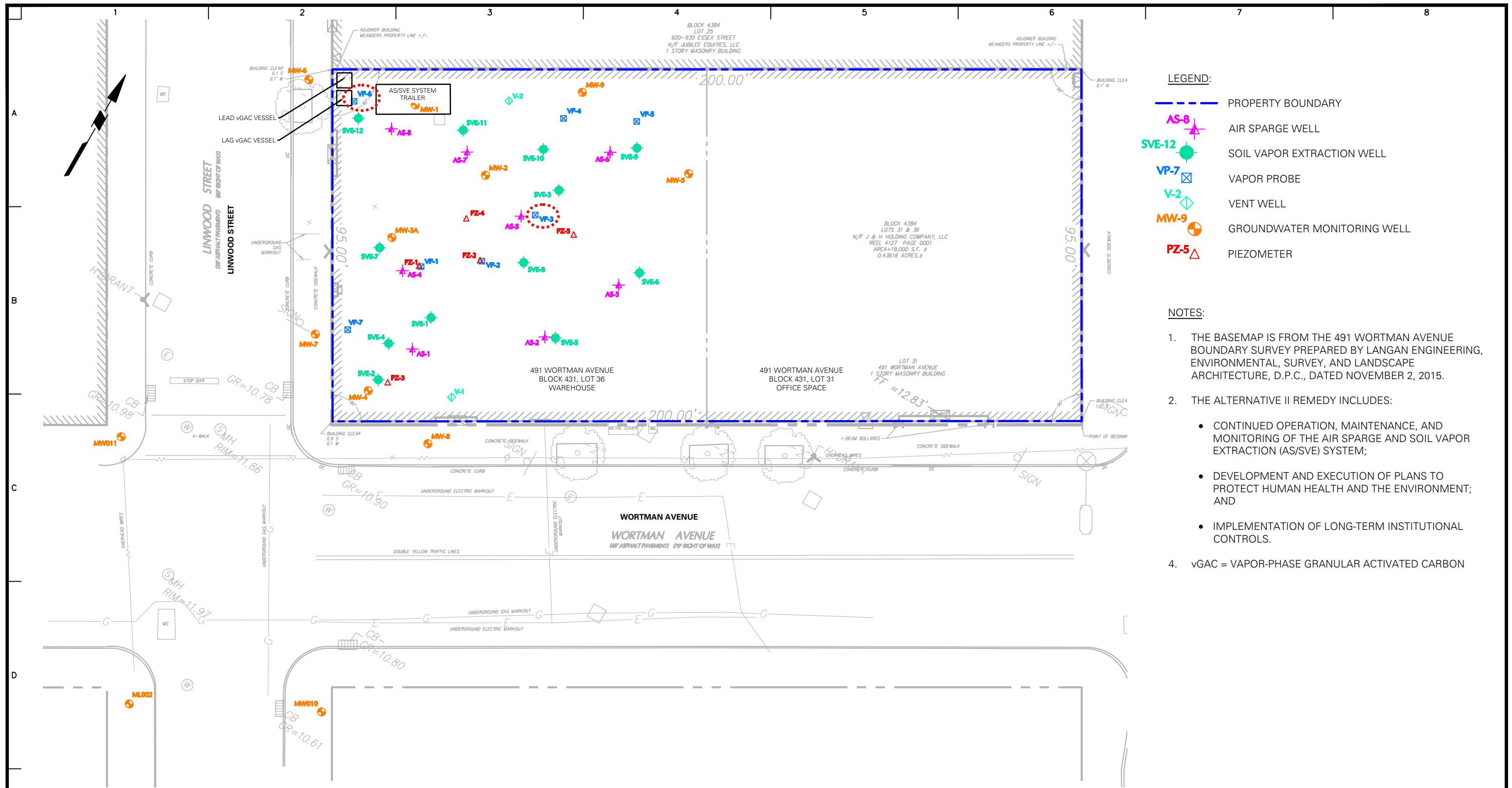
Checked By
MLR

Submission Date

Figure

Sheet 1 of 17

FIGURE 2A - SELECTED REMEDY



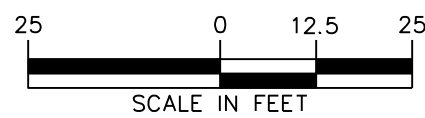
LEGEND:

- PROPERTY BOUNDARY
- + AS-8 AIR SPARGE WELL
- SVE-12 SOIL VAPOR EXTRACTION WELL
- ⊠ VP-7 VAPOR PROBE
- ◇ V-2 VENT WELL
- ⊕ MW-9 GROUNDWATER MONITORING WELL
- △ PZ-5 PIEZOMETER

NOTES:

1. THE BASEMAP IS FROM THE 491 WORTMAN AVENUE BOUNDARY SURVEY PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, AND LANDSCAPE ARCHITECTURE, D.P.C., DATED NOVEMBER 2, 2015.
2. THE ALTERNATIVE II REMEDY INCLUDES:
 - CONTINUED OPERATION, MAINTENANCE, AND MONITORING OF THE AIR SPARGE AND SOIL VAPOR EXTRACTION (AS/SVE) SYSTEM;
 - DEVELOPMENT AND EXECUTION OF PLANS TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT; AND
 - IMPLEMENTATION OF LONG-TERM INSTITUTIONAL CONTROLS.
4. vGAC = VAPOR-PHASE GRANULAR ACTIVATED CARBON

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.



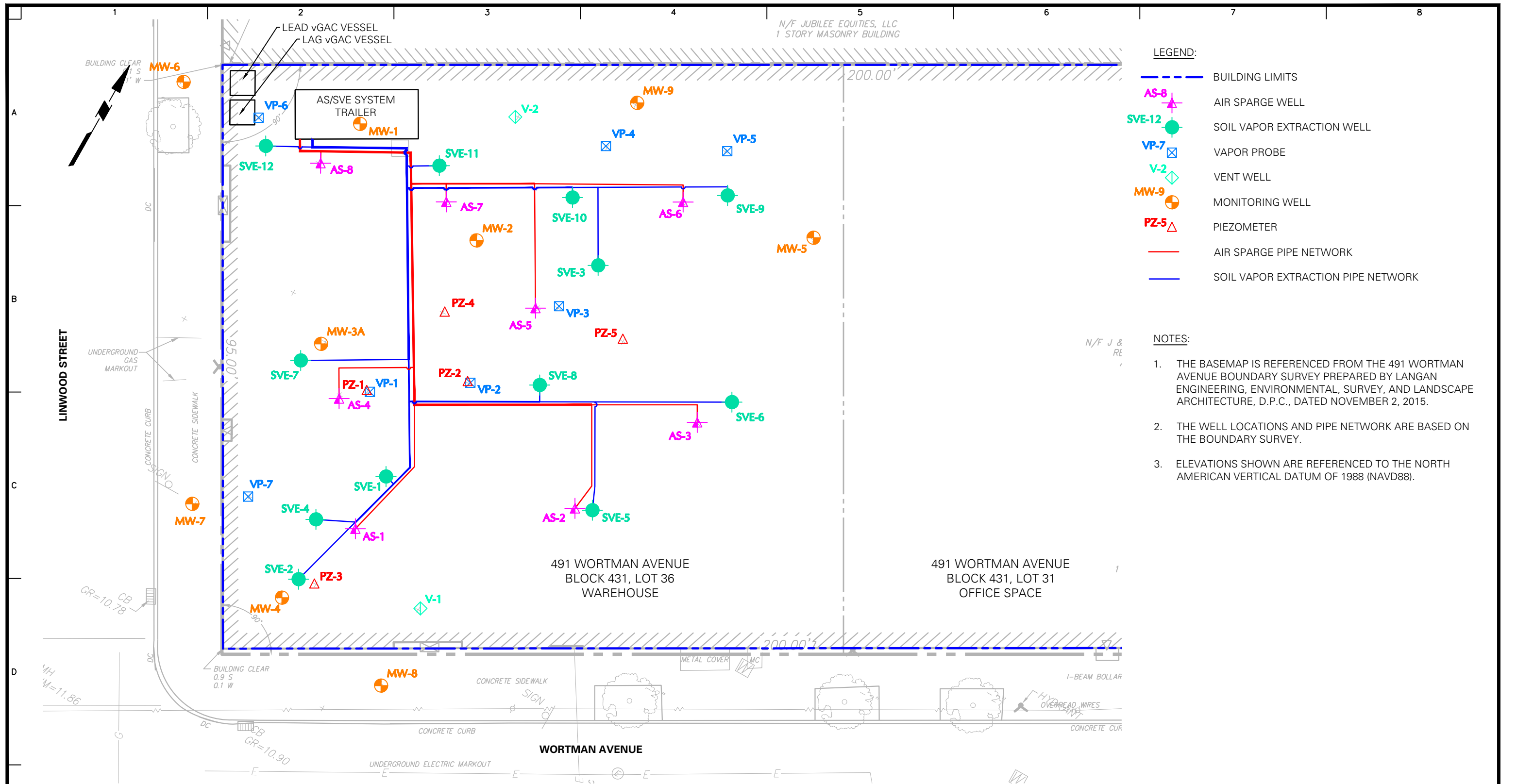
LANGAN
 21 Penn Plaza, 360 West 31st Street, 8th Floor
 New York, NY 10001
 T: 212.479.5400 F: 212.479.5444 www.langan.com
 Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
 Langan Engineering and Environmental Services, Inc.
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Project
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Figure Title
EXTENT OF REMEDIATION - ALTERNATIVE II

Project No. 170329301	Figure
Date 11/29/2016	
Scale AS SHOWN	
Drawn By MLR	Checked By GN
Submission Date	
Sheet 16 of 17	

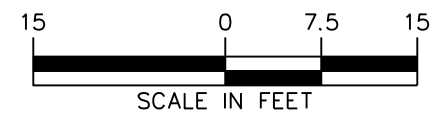
FIGURE 2B - AIR SPARGING & SOIL VAPOR EXTRACTION



- LEGEND:**
- BUILDING LIMITS
 - ▲ AS-8 AIR SPARGE WELL
 - SVE-12 SOIL VAPOR EXTRACTION WELL
 - ⊠ VP-7 VAPOR PROBE
 - ◇ V-2 VENT WELL
 - ⊕ MW-9 MONITORING WELL
 - △ PZ-5 PIEZOMETER
 - AIR SPARGE PIPE NETWORK
 - SOIL VAPOR EXTRACTION PIPE NETWORK

- NOTES:**
1. THE BASEMAP IS REFERENCED FROM THE 491 WORTMAN AVENUE BOUNDARY SURVEY PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEY, AND LANDSCAPE ARCHITECTURE, D.P.C., DATED NOVEMBER 2, 2015.
 2. THE WELL LOCATIONS AND PIPE NETWORK ARE BASED ON THE BOUNDARY SURVEY.
 3. ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

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Figure Title
AS/SVE SYSTEM PIPE NETWORK AND WELL LOCATION PLAN

Project No. 170329301	Figure
Date 01/21/2016	
Scale AS SHOWN	
Drawn By TCS	Checked By GN
Submission Date	
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