DECISION DOCUMENT

990-1026 Rossville Avenue
Brownfield Cleanup Program
Staten Island, Richmond County
Site No. C243043
October 2023

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

DECLARATION STATEMENT - DECISION DOCUMENT

990-1026 Rossville Avenue
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Site No. C243043
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Statement of Purpose and Basis

This document presents the remedy for the 990-1026 Rossville Avenue 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 990-1026 Rossville Avenue 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.
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code

of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial design program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise™ (available in the Sustainable Remediation Forum [SURF] library) or similar NYSDEC accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial design program, as appropriate. The project design specifications will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the goals established during the remedial design program.

Additionally, the remedial design program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress and drought), flooding, and sea level rise will be identified, and the remedial design program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Excavation

Excavation and off-site disposal of contaminant source areas, including:

- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u); and
- 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.

Approximately 40 cubic yards of contaminated soil will be removed from the site. Collection and analysis of confirmation samples at the remedial excavation depth will be used to verify that SCOs for the site have been achieved. If confirmation sampling indicates that SCOs were not achieved at the stated remedial depth, the Applicant must notify the Department, submit the sample results and, in consultation with the Department, determine if further remedial excavation is necessary. Further excavation for development will proceed after confirmation samples demonstrate that SCOs for the site have been achieved.

To ensure proper handling and disposal of excavated material, waste characterization sampling will be completed for all identified contaminated site material. Waste characterization sampling will be performed exclusively for the purposes of off-site disposal in a manner suitable to receiving facilities and in conformance with applicable federal, state, and local laws, rules, and regulations and facility-specific permits.

3. Backfill

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.

4. Enhanced Bioremediation

In-situ enhanced biodegradation will be employed to treat chlorinated volatile organic compounds (VOCs) in groundwater in the source area and downgradient of the source area both on-site and off-site. Zero valent iron (ZVI), carbon substrate, sulfate, and ferrous iron salt and bioaugmentation culture will be used to enhance biological reductive dechlorination of chlorinated VOCs.

Monitoring wells will be required up-gradient, down-gradient, and within the treatment zone. Monitoring will be conducted for contaminants of concern as well as water quality parameters (pH, temperature, dissolved oxygen, oxidation reduction potential, and conductivity), total and dissolved metals (iron, calcium, magnesium, and manganese), anions (chloride, sulfate, and nitrate), and total organic carbon (TOC) for enhanced bioremediation.

5. 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 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).

6. Institutional Controls

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 NYSDEC 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 New York City Department of Health and Mental Hygiene (NYCDOHMH); and
- require compliance with the NYSDEC approved Site Management Plan.

7. 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 6.
   - Engineering Controls: The Cover System described in Paragraph 5and the SSDS previously installed as an IRM as described in Section 6.2.

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 under the former dry cleaner if and when the building is demolished or becomes vacant;
- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 6 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 NYSDEC notification; and
- 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:
   - monitoring of groundwater, soil vapor, and indoor air to assess the performance and effectiveness of the remedy;
   - schedule of monitoring and frequency of submittals to the NYSDEC; and
   - 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, inspection, and reporting of any mechanical or physical components of the active vapor mitigation system. The plan includes, but is not limited to
   - procedures for operating and maintaining the system; and
   - compliance inspection of the system 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.

October 25, 2023

Date

Jane H. O'Connell
Regional Remediation Engineer, Region 2

DECISION DOCUMENT

990-1026 Rossville Avenue
Staten Island, Richmond County
Site No. C243043
October 2023

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, where a contaminant is present at levels exceeding the soil cleanup objectives or other health-based or environmental standards, criteria or guidance, based on the reasonably anticipated use of the property.

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:

DECInfo Locator - Web Application
https://gisservices.dec.ny.gov/gis/dil/index.html?rs=C243043

New York Public Library
Huguenot Park Branch
830 Huguenot Avenue
Staten Island, NY 10312
Phone: (718) 984-4636

Staten Island Community Board 3
1243 Woodrow Road, 2nd Floor
Staten Island, NY 10309
Phone: (718) 356-7900

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 site is located at 990-1026 Rossville Avenue in Staten Island, NY. The 1.53-acre site is identified as Block 7054 lot 518 on the New York City Tax Map. The site is bounded to the north by three two-story residential buildings, to the east by Rossville Avenue followed by a two-story mixed use residential/commercial building and a two-story residential building, to the south by three two-story townhouse buildings associated with the Woodbrooke Estates residential community, and to the west by asphalt paved tennis courts that are part of the Woodbrooke Estates residential community.

Site Features:
The site is currently occupied by an approximately 25,800 square foot one-story shopping center building that was constructed in 1990 and is currently occupied by a dry cleaner, liquor store, beauty salon, karate studio, ice cream parlor, grocery store, Chinese restaurant, bagel shop, laundromat, pizzeria, and a vacant former restaurant. A cellar exists beneath the grocery store in the northwestern corner of the shopping center. The site also consists of an asphalt paved parking lot in the southeastern portion of the site and an access road for deliveries along the western and northern perimeters of the site.

Current Zoning and Land Use:
The site is located in a R3-2 residential district with a C1-2 commercial overlay. The adjoining parcels and surrounding area are used for residential and commercial purposes.

Past Use of the Site:
According to Sanborn Fire Insurance maps, historical operations at the site include a two-story residential building from 1917 through 1937 and the existing one-story shopping center, which was constructed circa 1990. The site was predominantly vacant prior between 1937 and 1990. A dry-cleaning facility has operated at the site for approximately 30 years. Kariss French Cleaners, the dry-cleaning facility currently located at the site, was identified in City Directory records from 1995 through 2014. The dry cleaner mostly operated as a conditionally exempt small quantity

generator (CESQG) and occasionally operated as a small quantity generator (SQG) of hazardous waste under EPA ID number NYD986987139. Manifests indicate that the primary waste stream is F002 (spent halogenated solvents including tetrachloroethylene).

Site Geology and Hydrogeology:
Based on observations made during the investigations, subsurface conditions consist of an approximately 0- to 5-foot-thick fill layer of fine to coarse sand with varying amounts of gravel. The fill layer is underlain by an approximately 5- to 25-foot-thick layer of alternating clay and dense silty sands with lenses of sand, silt and/or gravel throughout. The clay/silty sand unit is underlain by an approximately 0.5- to 15-foot-thick layer of sand, followed by clays, silts, and sands. Deep ground moraine material consisting of clay extends to between 37 and 40 feet bgs, followed by a 10- to 13-feet-thick sand layer encountered between 37 and 40 feet bgs, followed by a 20- to-25-feet thick clay layer encountered between 45 to 75 feet bgs, and a 20-feet-thick sand layer encountered between 70 to 90 feet bgs. The ground moraine continues to approximately 90 feet bgs, where clay identified as the Raritan Formation was encountered and observed to continue to a depth of 120 feet bgs. The deep ground moraine material consisting of clay extending to between 37 and 40 feet bgs is identified as the upper confining layer associated with the upper groundwater aquifer, and the underlying 10- to 13-feet-thick sand layer encountered starting between 37 and 40 feet bgs is identified as the lower groundwater aquifer.

Groundwater was measured between 3.68 and 6.82 feet bgs in shallow groundwater monitoring wells within the upper groundwater aquifer and between 7.31 and 23.29 feet bgs in deep groundwater monitoring wells in the lower aquifer. Based on measured groundwater elevations, groundwater flow in the upper aquifer is to the northwest towards the Arthur Kill and to the west northwest in the lower aquifer. The clays associated with the upper confining aquifer account for the differing groundwater flow directions observed within each aquifer, as evidenced by the irregular groundwater flow directions and mounding observed at shallow monitoring wells installed near the western site boundary. Localized groundwater flow is also influenced by silty sands with lenses of sand, silt and/or gravel identified within the shallow clay material.

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 commercial use (which allows for 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 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.

The Applicant under the Brownfield Cleanup Agreement is a Participant. NYSDEC, in consultation with NYSDOH, has determined that this site poses a significant threat to public health or the environment. However, since the Applicant has an obligation to address on-site and off-site contamination, 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:

cis-1,2-dichloroethene	barium
tetrachloroethene (PCE)	lead
trichloroethene (TCE)	1,4-dioxane
vinyl chloride	perfluorooctane sulfonic acid
indeno(1,2,3-cd)pyrene	perfluorooctanoic acid
phenol	1,1,1-trichloroethane
antimony	1,1 dichloroethene

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.

Sub-Slab Depressurization System
A sub-slab depressurization system (SSDS) was installed in the western portion of the onsite building to mitigate the migration of vapors into the building from the subsurface. The SSDS installation and startup was documented in a Construction Completion Report that was approved by NYSDEC in June 2023.

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.

Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), per- and polyfluoroalkyl substances (PFAS), and pesticides. Soil vapor was analyzed for VOCs. Based on the investigations conducted to date, the primary contaminants of concern are VOCs in soil; VOCs, SVOCs, metals, and PFAS in groundwater; and VOCs in soil vapor.

Soil - VOCs were found at concentrations exceeding the applicable commercial use soil cleanup objectives (CUSCOs) and protection of groundwater soil cleanup objectives (PGWSCOs) including tetrachloroethene (PCE) at a maximum concentration of 2,300 parts per million, or ppm (CUSCO is 150 ppm, PGSCO is 1.3 ppm), trichloroethene (TCE) at 38 ppm (PGWSCO is 0.47 ppm), cis 1,2 dichloroethene (cis-DCE) at 120 ppm (PGWSCO is 0.25 ppm), and vinyl chloride at 24 ppm (CUSCO is 13 ppm, PGSCO is 0.02 ppm). These contaminants were detected in soil borings located in the west portion of the site downgradient of the former drycleaner.

PFAS compounds were detected at trace concentrations below protection of groundwater guidance values. PFAS compounds detected included perfluorooctanoic acid (PFOA) at a maximum concentration of 0.383 parts per billion, or ppb (PGWSCO is 1.1 ppb). Data does not indicate any off-site impacts in soil related to this site.

No SVOCs, metals, PCBs or pesticides were detected at concentrations exceeding the commercial use SCOs.

Data does not indicate any off-site impacts in soil related to this site.

Groundwater - Exceedances of the ambient water quality standards and guidance values (AWQSGVs) for VOCs included maximum concentrations of PCE at 24,000 ppb (AWQSGV is 5 ppb), TCE at 1,900 ppb (AWQSGV is 5 ppb), cis-DCE at 16,000 ppb (AWQSGV is 5 ppb), and vinyl chloride at 2,500 ppb (AWQSGV is 2 ppb). These VOCs were detected in groundwater samples near the former dry cleaner and in off-site wells immediately to the west of the site.

SVOCs detected in exceedance of AWQSGVs include maximum concentrations of indeno(1,2,3 cd)pyrene at 0.06 ppb (AWQSGV is 0.002 ppb) and phenol at 120 ppb (AWQSGV is 0.002 ppb).

Dissolved metals in exceedance of AWQSGVs include maximum concentrations of antimony at 10.52 ppb (AWQSGV is 3 ppb), barium at 1,274 ppb (AWQSGV is 1,000 ppb), lead at 91.53 ppb (AWQSGV is 25 ppb), and nickel at 188.7 ppb (AWQSGV is 100 ppb).

Emerging contaminants in exceedance of AWQSGV include maximum concentrations of 1,4 dioxane at 3.2 ppb compared to the AWQSGV of 0.35 ppb, perfluorooctanoic acid (PFOA) at 176 parts per trillion, or ppt (AWQSGV is 6.7 ppt), and perfluorooctanesulfonic acid (PFOS) at 65.7 ppt (AWQSGV is 2.7 ppt) in monitoring wells throughout the site. The highest detections of emerging contaminants were found in proximity to the highest detections of chlorinated VOCs.

Data indicates that there are off-site VOC impacts in groundwater related to this site. Exceedances of AWQSGVs were found in one well west of the site. These exceedances include maximum concentrations of PCE at 210 ppb, TCE at 18 ppb, cis-DCE at 140 ppb, and vinyl chloride at 2.1 ppb. There are no public water supply wells within a half a mile and there is a municipal prohibition for use of groundwater at the site.

Soil Vapor, Sub-Slab Soil Vapor, and Indoor Air - Multiple VOCs were detected in the soil vapor, sub-slab soil vapor and indoor air on-site, and in soil vapor off-site. On-site VOCs detected included maximum concentrations of PCE at 24,800 micrograms per cubic meter (ug/m3) in soil vapor, 2,410 ug/m3 in sub-slab soil vapor, and 4.92 ug/m3 in indoor air; TCE at 709,000 ug/m3 in soil vapor, 2,560 ug/m3 in sub-slab soil vapor, and 0.167 ug/m3 in indoor air; cis-DCE at 4,760,000 ug/m3 in soil vapor, 5 ug/m3 in sub-slab soil vapor, and 131 ug/m3 in indoor air; vinyl chloride at 1,440,000 ug/m3 in soil vapor, 569 ug/m3 in sub-slab soil vapor, and 74.2 ug/m3 in indoor air; 1,1,1-trichloroethane at 202 ug/m3 in sub-slab soil vapor; and 1,1-dichloroethene at 6.98 ug/m3 in soil vapor, 202 ug/m3 in sub-slab soil vapor.

In off-site soil vapor samples, VOCs detected included maximum concentrations of PCE at 8.27 ug/m3, TCE at 3.48 ug/m3, cis-DCE at 1.24 ug/m3, and vinyl chloride at 0.711 ug/m3.

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.*

Direct contact with contaminants in the soil is unlikely because the majority of the site is covered with a building (one story shopping center with a cellar) and pavement. People are not drinking the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds soil vapor (air spaces within the soil) may move into 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. A sub-slab depressurization system was installed on-site to address soil vapor intrusion in the on-site building and is a potential concern for future buildings on-site. Environmental sampling indicates soil vapor intrusion related to site-contamination is not a concern for off-site buildings.

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 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 commercial use with site-specific soil cleanup objectives remedy.

The selected remedy is referred to as the Excavation, In-Situ Groundwater Treatment and Vapor Mitigation remedy.

The elements of the selected remedy, as shown in Figures 2 through 6, 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.
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial design program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise^{TM} (available in the Sustainable Remediation Forum [SURF] library) or similar NYSDEC accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial design program, as appropriate. The project design specifications will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the goals established during the remedial design program.

Additionally, the remedial design program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress and drought), flooding, and sea level rise will be identified, and the remedial design program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Excavation

Excavation and off-site disposal of contaminant source areas, including:

- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u); and
- 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.

Approximately 40 cubic yards of contaminated soil will be removed from the site. Collection and analysis of confirmation samples at the remedial excavation depth will be used to verify that SCOs for the site have been achieved. If confirmation sampling indicates that SCOs were not achieved at the stated remedial depth, the Applicant must notify the Department, submit the sample results and, in consultation with the Department, determine if further remedial excavation is necessary. Further excavation for development will proceed after confirmation samples demonstrate that SCOs for the site have been achieved.

To ensure proper handling and disposal of excavated material, waste characterization sampling will be completed for all identified contaminated site material. Waste characterization sampling will be performed exclusively for the purposes of off-site disposal in a manner suitable to receiving facilities and in conformance with applicable federal, state, and local laws, rules, and regulations and facility-specific permits.

3. Backfill

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.

4. Enhanced Bioremediation

In-situ enhanced biodegradation will be employed to treat chlorinated volatile organic compounds (VOCs) in groundwater in the source area and downgradient of the source area both on-site and off-site. Zero valent iron (ZVI), carbon substrate, sulfate, and ferrous iron salt and bioaugmentation culture will be used to enhance biological reductive dechlorination of chlorinated VOCs.

Monitoring wells will be required up-gradient, down-gradient, and within the treatment zone. Monitoring will be conducted for contaminants of concern as well as water quality parameters (pH, temperature, dissolved oxygen, oxidation reduction potential, and conductivity), total and dissolved metals (iron, calcium, magnesium, and manganese), anions (chloride, sulfate, and nitrate), and total organic carbon (TOC) for enhanced bioremediation.

5. 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 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).

6. Institutional Controls

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 NYSDEC 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 New York City Department of Health and Mental Hygiene (NYCDOHMH); and
- require compliance with the NYSDEC approved Site Management Plan.

7. Site Management Plan

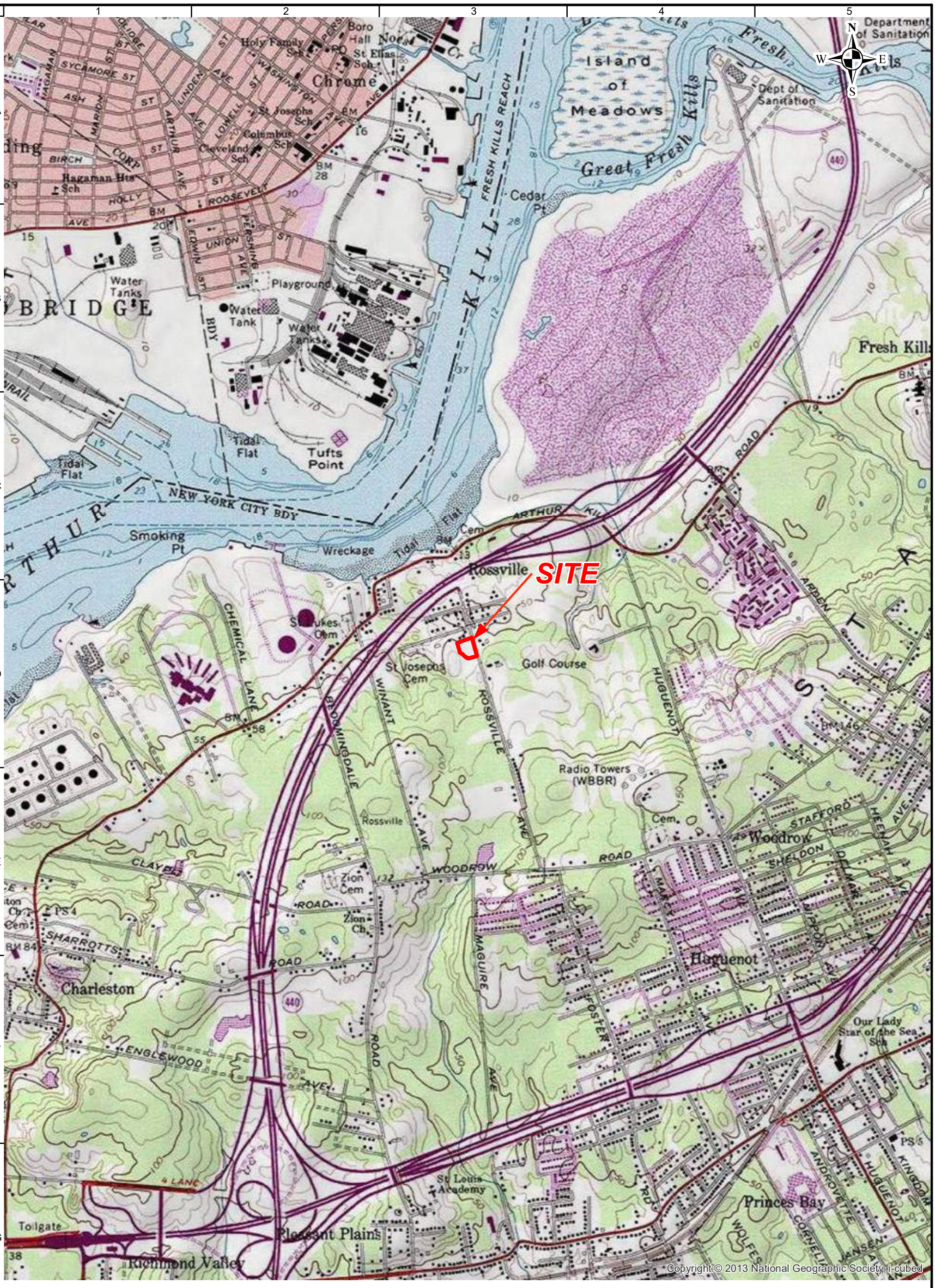
A Site Management Plan is required, which includes the following:

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 6.
   - Engineering Controls: The Cover System described in Paragraph 5and the SSDS previously installed as an IRM as described in Section 6.2.

   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 under the former dry cleaner if and when the building is demolished or becomes vacant;
   - descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
   - a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
   - a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 6 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 NYSDEC notification; and
   - 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:
   - monitoring of groundwater, soil vapor, and indoor air to assess the performance and effectiveness of the remedy;
   - schedule of monitoring and frequency of submittals to the NYSDEC; and
   - 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, inspection, and reporting of any mechanical or physical components of the active vapor mitigation system. The plan includes, but is not limited to
   - procedures for operating and maintaining the system; and
   - compliance inspection of the system to ensure proper O&M as well as providing the data for any necessary reporting.



Notes:
1. USGS Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS Online.
2. Parcel information from MapPLUTO 18v2 copyrighted by the New York City Department of Planning, last updated 2018.

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Collectively known as Langan

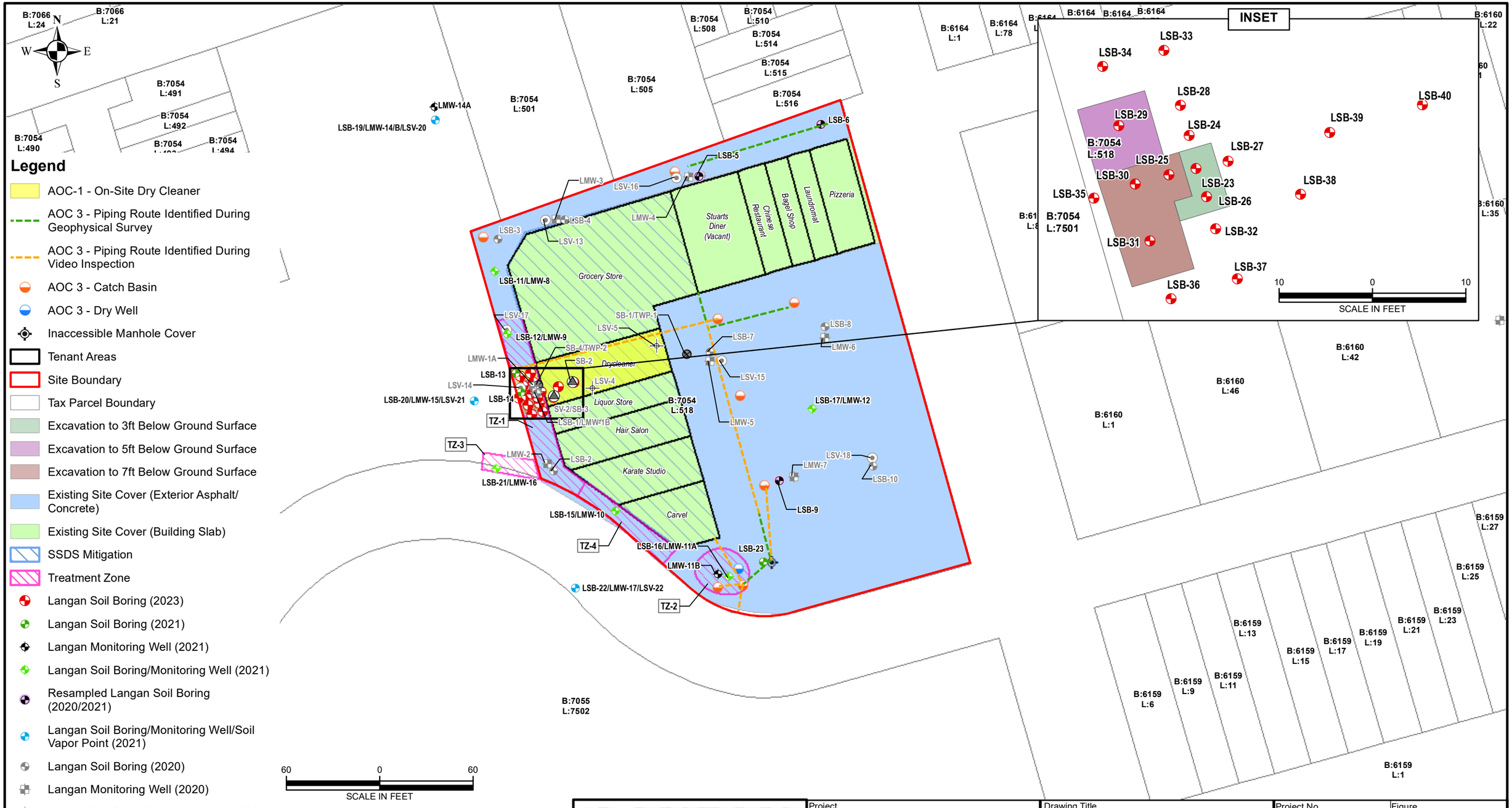
NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project
990-1026
ROSSVILLE AVENUE
BLOCK No. 7054, LOT No. 518
STATEN ISLAND NEW YORK

Drawing Title
USGS SITE LOCATION MAP

Project No.	Figure
100849501	1
Date: 5/17/2022	
Scale: 1 " = 2,000 '	
Drawn By: ATR	

Path: \\langan.com\data\PAR\data5\100849501\Project Data\ArcGIS\MXD\Environmental_Figures\2022-05 RAWP\Figure 1 - Site Location Map.mxd Date: 5/17/2022 User: ibaker Time: 2:45:18 PM



Legend

- AOC-1 - On-Site Dry Cleaner
- AOC 3 - Piping Route Identified During Geophysical Survey
- AOC 3 - Piping Route Identified During Video Inspection
- AOC 3 - Catch Basin
- AOC 3 - Dry Well
- Inaccessible Manhole Cover
- Tenant Areas
- Site Boundary
- Tax Parcel Boundary
- Excavation to 3ft Below Ground Surface
- Excavation to 5ft Below Ground Surface
- Excavation to 7ft Below Ground Surface
- Existing Site Cover (Exterior Asphalt/ Concrete)
- Existing Site Cover (Building Slab)
- SSDS Mitigation
- Treatment Zone
- Langan Soil Boring (2023)
- Langan Soil Boring (2021)
- Langan Monitoring Well (2021)
- Langan Soil Boring/Monitoring Well (2021)
- Resampled Langan Soil Boring (2020/2021)
- Langan Soil Boring/Monitoring Well/Soil Vapor Point (2021)
- Langan Soil Boring (2020)
- Langan Monitoring Well (2020)
- Langan Soil Boring/Monitoring Well (2020)
- Langan Exterior Soil Vapor Point (2020)
- Langan Sub-Slab Soil Vapor Point (2020)
- EBI Soil Boring/Monitoring Well (2019)
- EBI Soil Boring/Sub-Slab Soil Vapor Point (2019)

Notes:
1. Aerial imagery provided through Langan's subscription to NearMap, imagery dated September 27, 2019.
2. Parcel information from MapPLUTO 20v1 copyrighted by the New York City Department of Planning.
3. Langan soil boring, 2021 monitoring well, soil vapor point, indoor air/sub-slab soil vapor point, catch basin, dry well, and drainage piping locations are approximate and based on field measurements.
4. Langan 2020 monitoring well locations are based on locations surveyed by a licensed surveyor.
5. EBI sample locations obtained from "Figure 3 - Sample Location Map" provided in the Phase II Environmental Assessment dated 28 October 2019.

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Project
990-1026 ROSSVILLE AVENUE
BLOCK No. 7054, LOT No. 518
STATEN ISLAND NEW YORK

Drawing Title
ALTERNATIVE II - TRACK 4 CLEANUP

Project No.	100849501
Date	1/19/2023
Scale	1 " = 60 '
Drawn By	IHB
Figure	2

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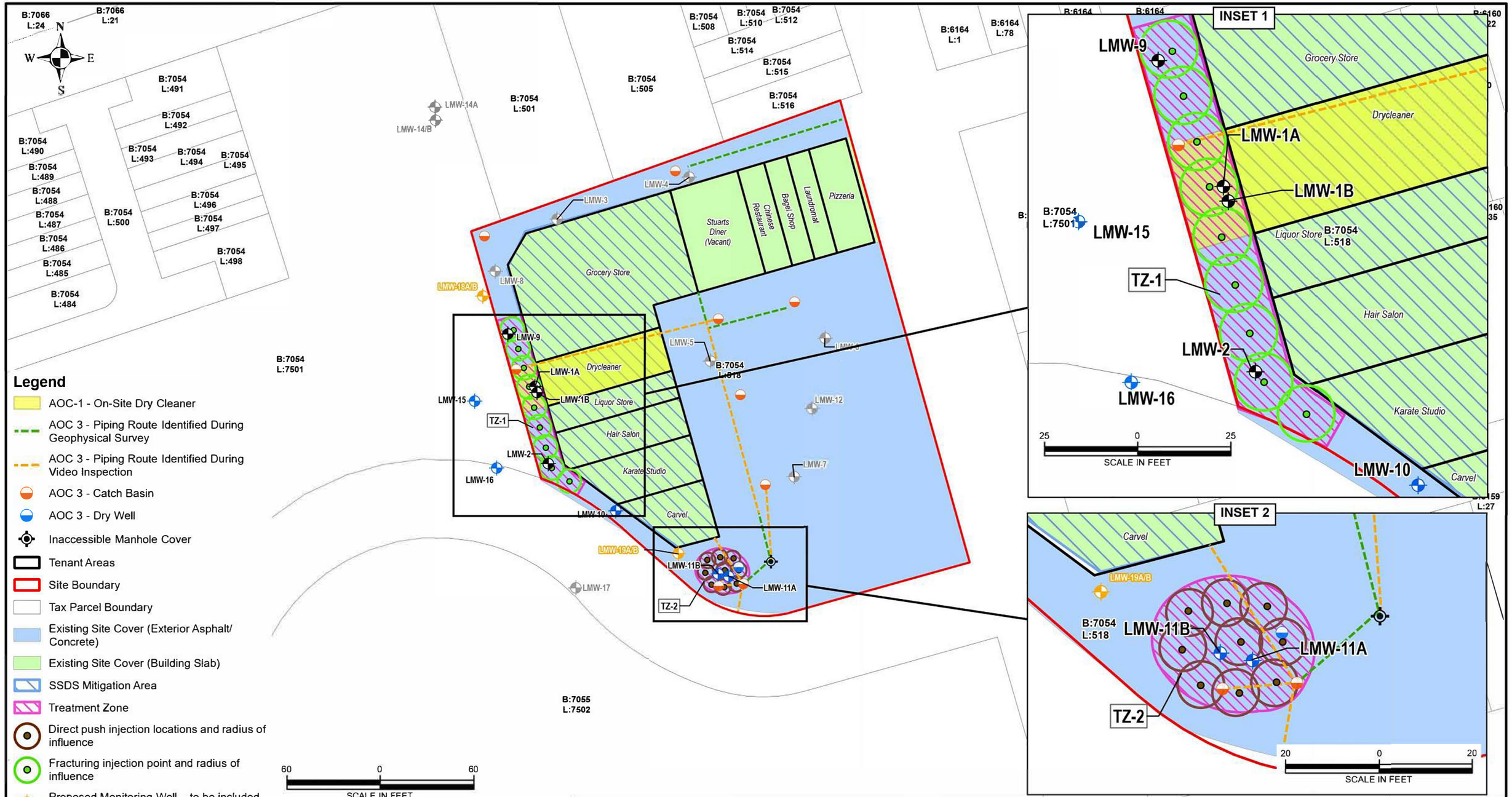

Legend

- AOC-1 - On-Site Dry Cleaner
- AOC 3 - Piping Route Identified During Geophysical Survey
- AOC 3 - Piping Route Identified During Video Inspection
- AOC 3 - Catch Basin
- AOC 3 - Dry Well
- Inaccessible Manhole Cover
- Tenant Areas
- Site Boundary
- Tax Parcel Boundary
- Existing Site Cover (Exterior Asphalt/ Concrete)
- Existing Site Cover (Building Slab)
- SSDS Mitigation Area
- Treatment Zone
- Direct push injection locations and radius of influence
- Fracturing injection point and radius of influence
- Proposed Monitoring Well – to be included in monitoring program
- Langan Monitoring Well - to be included in monitoring program
- Langan Monitoring Well - not included in monitoring program
- Langan Monitoring Well - to be abandoned, reinstalled, and included in monitoring program

Notes:
1. Aerial imagery provided through Langan's subscription to NearMap, imagery dated September 27, 2019.
2. Parcel information from MapPLUTO 20v1 copyrighted by the New York City Department of Planning.
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Project
990-1026 ROSSVILLE AVENUE
BLOCK No. 7054, LOT No. 518
STATEN ISLAND NEW YORK

Drawing Title
PHASE 1 INJECTION AREAS

Project No.	Figure
100849501	3
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Drawn By: IHB	

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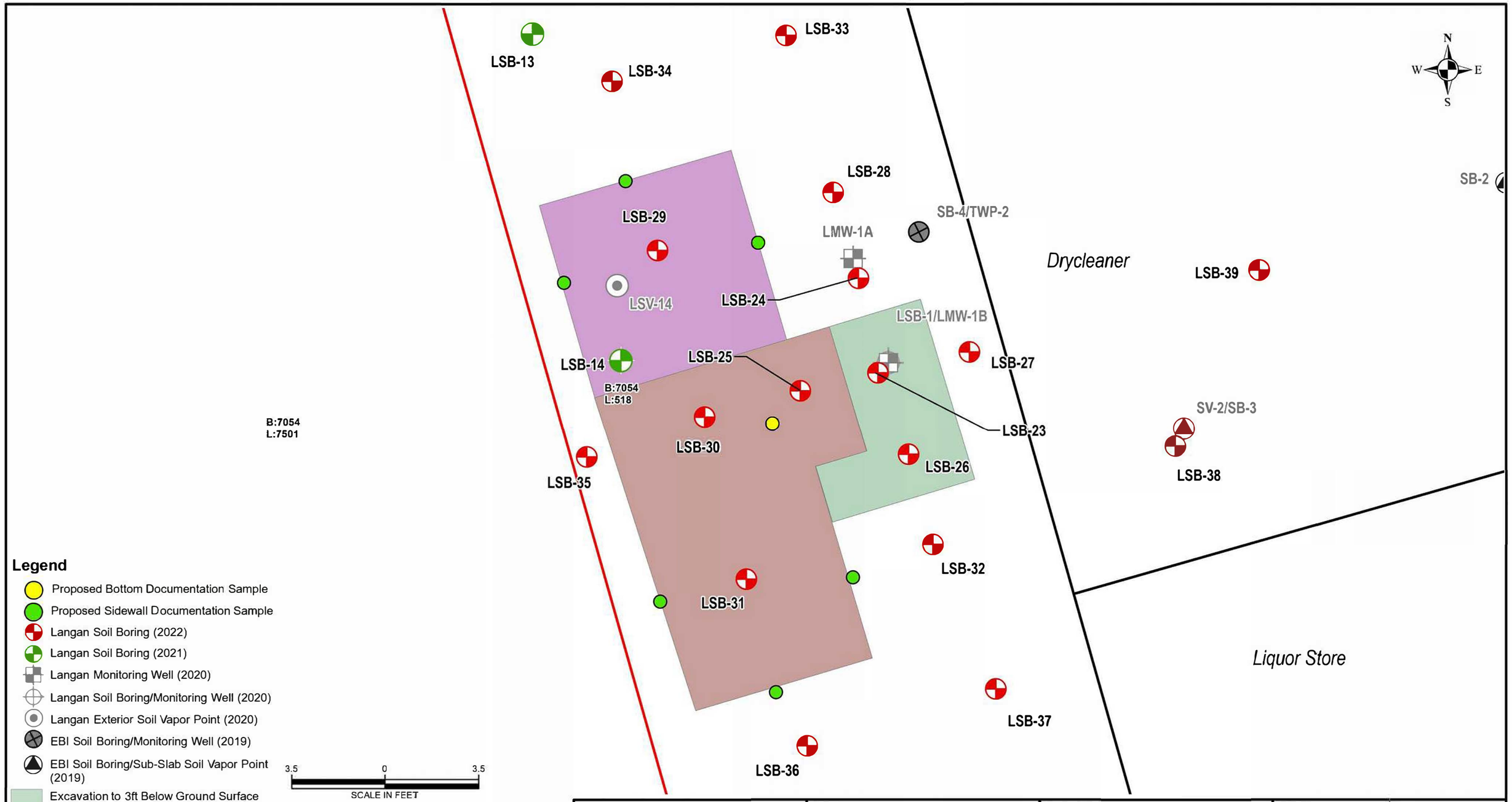

Legend

- Proposed Bottom Documentation Sample
- Proposed Sidewall Documentation Sample
- Langan Soil Boring (2022)
- Langan Soil Boring (2021)
- Langan Monitoring Well (2020)
- Langan Soil Boring/Monitoring Well (2020)
- Langan Exterior Soil Vapor Point (2020)
- EBI Soil Boring/Monitoring Well (2019)
- EBI Soil Boring/Sub-Slab Soil Vapor Point (2019)
- Excavation to 3ft Below Ground Surface
- Excavation to 5ft Below Ground Surface
- Excavation to 7ft Below Ground Surface
- Tenant Areas
- Site Boundary
- Tax Parcel Boundary

3.5 0 3.5
SCALE IN FEET

Notes:
1. Aerial imagery provided through Langan's subscription to NearMap, imagery dated September 27, 2019.
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4. Langan 2020 monitoring well locations are based on locations surveyed by a licensed surveyor.
5. EBI sample locations obtained from "Figure 3 - Sample Location Map" provided in the Phase II Environmental Assessment dated 28 October 2019.

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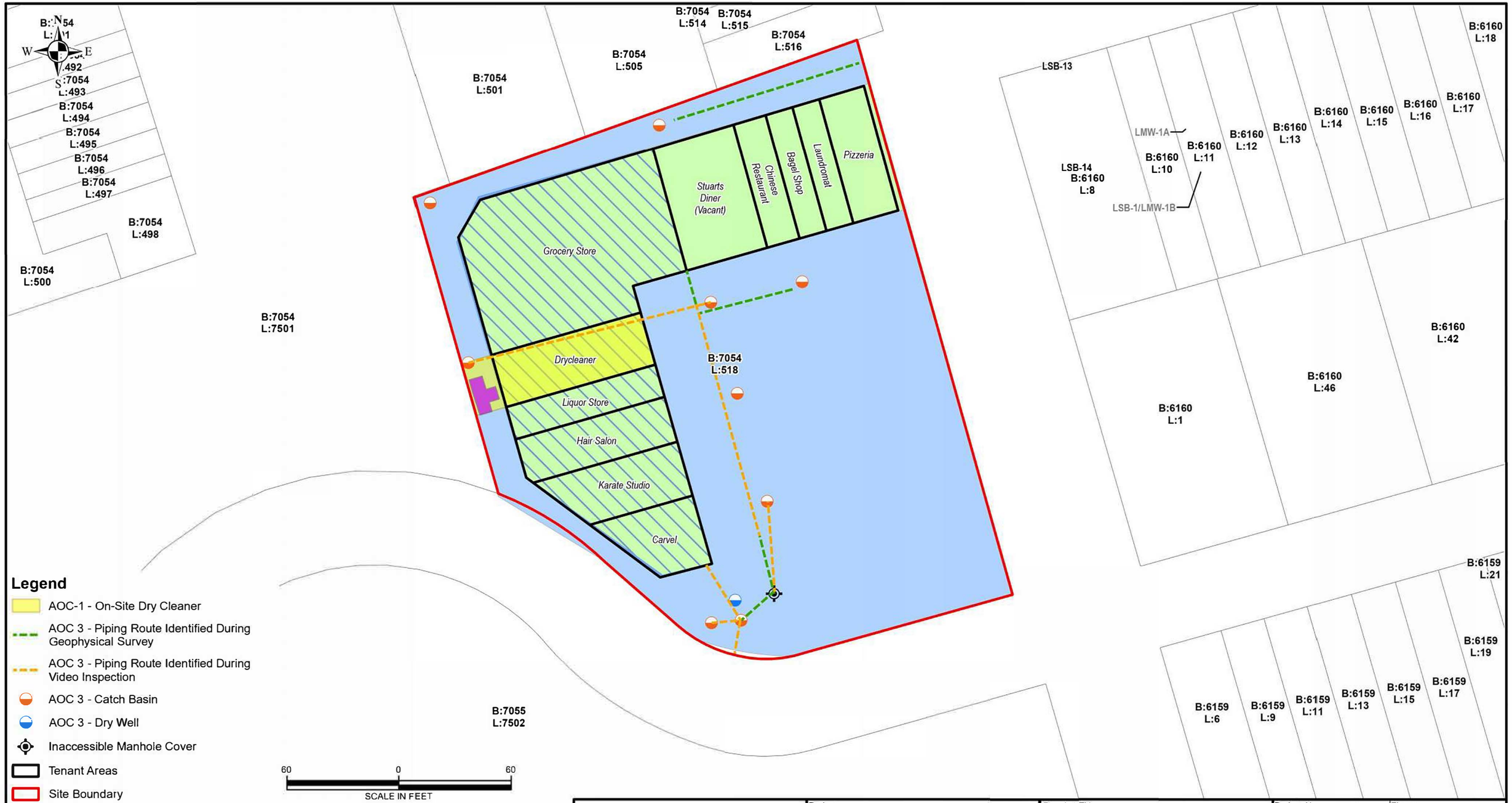
Project
990-1026 ROSSVILLE AVENUE
BLOCK No. 7054, LOT No. 518
STATEN ISLAND NEW YORK

Drawing Title
PROPOSED EXTENT OF TRACK 4 EXCAVATION AND ENDPOINT DOCUMENTATION SAMPLING

Project No.	100849501
Date	6/28/2023
Scale	1" = 3.5'
Drawn By	PDT
Submission Date	

Figure **4**



Legend

- AOC-1 - On-Site Dry Cleaner
- AOC 3 - Piping Route Identified During Geophysical Survey
- AOC 3 - Piping Route Identified During Video Inspection
- AOC 3 - Catch Basin
- AOC 3 - Dry Well
- Inaccessible Manhole Cover
- Tenant Areas
- Site Boundary
- Tax Parcel Boundary
- New Asphalt Cover
- Existing Site Cover (Exterior Asphalt/ Concrete)
- Existing Site Cover (Building Slab)
- SSDS Mitigation Area

Notes:
1. Aerial imagery provided through Langan's subscription to NearMap, imagery dated September 27, 2019.
2. Parcel information from MapPLUTO 20v1 copyrighted by the New York City Department of Planning.
3. Langan soil boring, 2021 monitoring well, soil vapor point, indoor air/sub-slab soil vapor point, catch basin, dry well, and drainage piping locations are approximate and based on field measurements.
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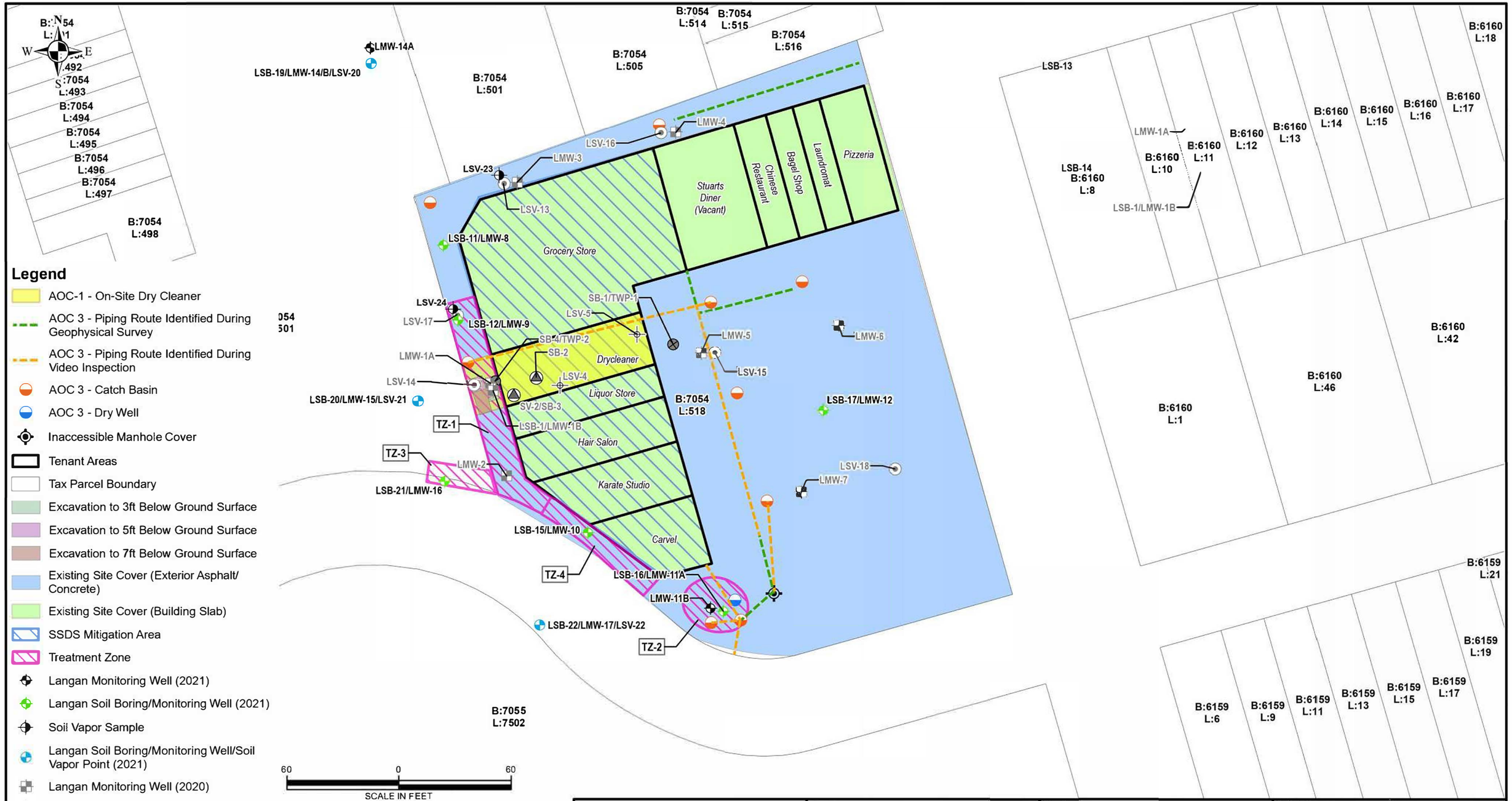
Project
990-1026 ROSSVILLE AVENUE
BLOCK No. 7054, LOT No. 518
STATEN ISLAND NEW YORK

Drawing Title
COMPOSITE COVER SYSTEM

Project No.	100849501
Date	6/29/2023
Scale	1"=50'
Drawn By	PDT
Figure	5



Legend

- AOC-1 - On-Site Dry Cleaner
- AOC 3 - Piping Route Identified During Geophysical Survey
- AOC 3 - Piping Route Identified During Video Inspection
- AOC 3 - Catch Basin
- AOC 3 - Dry Well
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- Tenant Areas
- Tax Parcel Boundary
- Excavation to 3ft Below Ground Surface
- Excavation to 5ft Below Ground Surface
- Excavation to 7ft Below Ground Surface
- Existing Site Cover (Exterior Asphalt/ Concrete)
- Existing Site Cover (Building Slab)
- SSDS Mitigation Area
- Treatment Zone
- Langan Monitoring Well (2021)
- Langan Soil Boring/Monitoring Well (2021)
- Soil Vapor Sample
- Langan Soil Boring/Monitoring Well/Soil Vapor Point (2021)
- Langan Monitoring Well (2020)
- Langan Soil Boring/Monitoring Well (2020)
- Langan Exterior Soil Vapor Point (2020)
- Langan Sub-Slab Soil Vapor Point (2020)
- EBI Soil Boring/Monitoring Well (2019)
- EBI Soil Boring/Sub-Slab Soil Vapor Point (2019)

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Drawing Title: POST-REMEDIATION SOIL VAPOR SAMPLING PLAN

Project No. 100849501
Date 6/29/2023
Scale 1"=60'
Drawn By PDT
Figure 6

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