DECISION DOCUMENT

50 Commercial Street Development
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224278
February 2024

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

DECLARATION STATEMENT - DECISION DOCUMENT

50 Commercial Street Development
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224278
February 2024

Statement of Purpose and Basis

This document presents the remedy for the 50 Commercial Street Development 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 (NYSDEC) for the 50 Commercial Street Development site and the public's input to the proposed remedy presented by NYSDEC.

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;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- 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

The existing on-site buildings will be demolished and materials which cannot be beneficially reused on site will be taken off-site for proper disposal in order to implement the remedy.

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

- 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.

On the eastern approximately two-thirds of the site, all soils in the upper two feet which exceed Restricted Residential SCOs (approximately 600 cubic yards) will be excavated and transported off-site for disposal. An additional approximately 1,900 cubic yards of source soil will be excavated to the water table (approximately 10 feet below grade) in the western portion of the site, including soils that exceed the Protection of Groundwater SCOs.

Approximately 2,500 cubic yards of contaminated soil will be removed from the site in total.

Collection and analysis of confirmation and documentation samples at the remedial excavation depths 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 DEC, submit the sample results and, in consultation with DEC, 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. Cover System

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

5. Permeable Reactive Barrier

Installation of a permeable reactive barrier (PRB) at the upgradient (eastern) side of the site to prevent re-contamination of the site groundwater from off-site groundwater contaminant sources. The PRB will consist of injected Provect-IR® (zero-valent iron). The area of the PRB is approximately 133 linear feet by 15 feet wide (2,000 square feet) and will include 24 temporary, direct push injection points spaced 12 feet apart. The PRB will be installed to a depth of approximately 42 feet below grade surface (bgs) where it will tie into the confining silt layer. The targeted vertical zone is 8 to 42 feet bgs.

6. In-Situ Chemical Oxidation and Reduction

In-situ chemical oxidation (ISCO) will be implemented to treat contaminants in groundwater. Provect-OX2® will be injected into the subsurface to destroy the contaminants in an approximately 5,500 square foot area located in the western portion of the site where petroleum-related compounds were elevated in the groundwater via 30 shallow (10-30 feet bgs) and 30 deep (30-42 feet bgs) temporary, direct push injection points spaced 15-20 feet apart.

In-situ chemical reduction (ISCR) will be implemented to treat contaminants in groundwater. Provect-IR60® will be injected into the subsurface to destroy the contaminants in an approximately 1,500 square foot area located in the eastern portion of the site where chlorinated volatile organic compounds were elevated in the groundwater via 15 shallow (10-30 feet bgs) and 15 deep (30-42 feet bgs) temporary, direct push injection points spaced 12 feet apart.

Monitoring will be required up-gradient, down-gradient and within the treatment zones. Monitoring will be conducted for petroleum-related and chlorinated VOCs upgradient and downgradient of the treatment zones. The treatment zones will also be monitored for dissolved oxygen and oxidation/reduction potential.

7. Vapor Mitigation

Any on-site buildings will be required to have a sub-slab depressurization system (SSDS), or other acceptable measures, to mitigate the migration of vapors into the building from the subsurface.

8. 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 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 restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOHMH; and
- require compliance with the NYSDEC approved Site Management Plan.

9. 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 8.
   - Engineering controls: the Cover System, Groundwater Cut-off Wall/Permeable Reactive Barrier, and SSDS discussed in paragraphs 4, 5 and 7.

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;
- 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 two feet 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 to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the NYSDEC.

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 SSDS. 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 NYSDEC notification; and
- providing the NYSDEC 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.

February 8, 2024

Date

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

DECISION DOCUMENT

50 Commercial Street Development
Brooklyn, Kings County
Site No. C224278
February 2024

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (NYSDEC), 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.

NYSDEC 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

NYSDEC 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 NYSDEC 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=C224278

Brooklyn Public Library
Greenpoint Library Env. Education Center
107 Norman Avenue
Brooklyn, NY 11222
Phone: (718) 389-4394

Brooklyn Community Board 1
435 Graham Avenue
Brooklyn, NY 11222
Phone: (718) 389-0009
BK01@db.nyc.gov

Receive Site Citizen Participation Information By Email

Please note that NYSDEC'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 approximate 0.283-acre site is located at 50 Commercial Street in the Greenpoint section of Brooklyn, Kings County, New York, and is identified as Block 2482 Lots 1, 7 and 8 on the New York City tax map. The site is bounded by Commercial Street to the north, Clay Street to the south followed by Former NuHart East Site (NYS BCP Site #C224287) and Former NuHart Plastic Manufacturing (NYSDEC Superfund Site #224136), an industrial warehouse (Clay Properties LLC Site, NYS BCP Site ID #C224390) and residential buildings to the east, and the intersection of Commercial and Clay Street to the west.

Site Features:
The Site is developed with a one-story industrial warehouse on Lot 7, a small shed and vacant land on Lot 8, and an asphalt-paved storage yard at Lot 1. The site is currently vacant.

Current Zoning and Land Use:
The site is currently zoned as M1-2/R6 for industrial and manufacturing use. The site is currently vacant. The surrounding parcels are currently used for a combination of residential, commercial, and light industrial. There two playgrounds located within a 0.125-mile radius of the subject property. the two playgrounds are identified as Greenpoint Playground and Newtown Barge Playground.

Past Use of the Site:
The western portion of the site (Lot 1) is currently occupied by a vacant lot use for truck parking, historically this portion of the site was operating as a gasoline filling station, auto repair and junk storage. Historical use for the eastern portion (Lot 7 and 8) of the site includes iron and steel work operations, lumber and building material warehouse.

Site Geology and Hydrogeology:
Soil borings completed at the site identified urban fill materials consisting of brown silty-sand matrix from ground surface to about 2 feet below grade surface (bgs), underlain by native soil consist of brown silty sand. Groundwater is present at a depth of approximately 8 feet bgs and generally flows in a westerly direction.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

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

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

SECTION 5: ENFORCEMENT STATUS

The Applicant under the Brownfield Cleanup Agreement is a Volunteer. The Applicant does not have an obligation to address off-site contamination. However, the Department, in consultation with NYSDOH on November 21, 2023, has determined that this site poses a significant threat to public health or the environment; accordingly, an enforcement action is necessary.

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

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

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

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

The RI is intended to identify the nature (or type) of contamination which may be present at a

site and the extent of that contamination in the environment on the site, or leaving the site. The RI reports on data gathered to determine if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. Monitoring wells are installed to assess groundwater and soil borings or test pits are installed to sample soil and/or waste(s) identified. If other natural resources are present, such as surface water bodies or wetlands, the water and sediment may be sampled as well. Based on the presence of contaminants in soil and groundwater, soil vapor will also be sampled for the presence of contamination. Data collected in the RI influence the development of remedial alternatives. The RI report is available for review in the site document repository and the results are summarized in section 6.3.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil 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. NYSDEC 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:

trichloroethene (TCE)	trans-1,2-dichloroethene
lead	benzo(a)anthracene
cis-1,2-dichloroethene	benzo(a)pyrene
1,2,4-trimethylbenzene	benzo(k)fluoranthene
xylene (mixed)	barium
toluene	lead
vinyl chloride	mercury

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

- groundwater
- soil

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), pesticides and per- and polyfluoroalkyl substances (PFAS). Soil vapor was analyzed for VOCs. Based on investigations conducted to date at the subject property, the primary contaminants of concern for the site are trichloroethylene (TCE) and petroleum VOCs in soil, groundwater and soil vapor; and metals and SVOCs in soil.

Soil - VOCs detected at concentrations exceeding the protection of groundwater soil cleanup objectives (PGSCOs) include TCE at a maximum concentration of 5.1 parts per million (ppm) compared to the PGSCO of 0.47 ppm, 1,2,4-trimethylbenzene at a maximum concentration of 4.2 ppm (PGSCO of 3.6 ppm), and xylenes at a maximum concentration of 13 ppm (PGSCO of 1.6 ppm).

Several SVOCS were detected in soil exceeding the restricted residential use soil cleanup objectives (RRSCOs), including benzo(a)anthracene at a maximum concentration of 8.3 ppm; benzo(a)pyrene with a maximum concentration of 7.48 ppm; benzo(b)fluoranthene with a maximum concentration of 7.15 ppm. The RRSCO for these compounds is 1 ppm.

The following metals were detected in soil exceeding the RRSCOs: mercury at a maximum concentration of 1.28 ppm (RRSCO is 0.81), barium at a maximum concentration of 1,390 ppm (RRSCO is 400 ppm); and lead at a maximum concentration of 2,750 ppm (RRSCO is 400 ppm). No PCBs or pesticides was detected above the RRSCOs. No per- or polyfluoroalkyl substances (PFAS) were detected in soil above restricted residential guidance values.

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

Groundwater - Groundwater sample results were compared to the NYS Ambient Water Quality Standards and Guidance Values (AWQSGVs). VOCs detected in groundwater include TCE at a maximum concentration of 130,000 parts per billion (ppb), cis-1,2-dichloroethene at a maximum concentration of 1700 ppb, vinyl chloride at a maximum concentration of 81 ppb, 1,1-dichloroethene at a maximum concentration of 12 ppb, trans-1,2-dichloroethene at a maximum concentration of 6,500 ppb, toluene at a maximum concentration of 8 ppb, isopropylbenzene at a maximum concentration of 63 ppb, and p-isopropyltoluene at a maximum concertation of 11 ppb. The AWQSGV for each of these compounds is 5 ppb with the exception of vinyl chloride (AWQSGV of 2 ppb).

Perfluorooctanoic acid (PFOA) was detected at a maximum concentration of 927 parts per trillion (ppt) compared to the AWQSGV of 6.7 ppt, and perfluorooctanesulfonic acid (PFOS) was detected at a maximum concentration of 92.4 ppt (AWQSGV is 2.7 ppt). No SVOCs, pesticides, PCBs or metals were detected above the AWQS.

Data does not indicate any off-site impacts in groundwater related to the site.

Soil Vapor - TCE was detected at up to 1410 micrograms per cubic meter (ug/m3), 1,2,4-trimethylbenzene was detected at up to ug/m3, cis-1,2-dichloroethene was detected at up to 35 ug/m3, toluene was detected at up to 120 ug/m3 and total xylenes were detected at up to 740 ug/3.

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

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.*

Access is restricted by a fence. People who enter the site may come into contact with site-related soil and groundwater contamination if they dig below the surface. 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 in 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. The site is vacant so inhalation of site contaminants in indoor air via soil vapor intrusion is not a current concern. However, the potential exists for inhalation of site contaminants for any future on-site development. In addition, environmental sampling indicates soil vapor intrusion from site contamination is not likely 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 Residential use with site-specific soil cleanup objectives remedy.

The selected remedy is referred to as the Excavation, Cover System, 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;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- 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

The existing on-site buildings will be demolished and materials which cannot be beneficially reused on site will be taken off-site for proper disposal in order to implement the remedy.

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

- 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.

On the eastern approximately two-thirds of the site, all soils in the upper two feet which exceed Restricted Residential SCOs (approximately 600 cubic yards) will be excavated and transported off-site for disposal. An additional approximately 1,900 cubic yards of source soil will be excavated to the water table (approximately 10 feet below grade) in the western portion of the site, including soils that exceed the Protection of Groundwater SCOs.

Approximately 2,500 cubic yards of contaminated soil will be removed from the site in total.

Collection and analysis of confirmation and documentation samples at the remedial excavation depths 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 DEC, submit the sample results and, in consultation with DEC, 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. Cover System

A site cover will be required to allow for restricted residential use where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the

tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

5. Permeable Reactive Barrier

Installation of a permeable reactive barrier (PRB) at the upgradient (eastern) side of the site to prevent re-contamination of the site groundwater from off-site groundwater contaminant sources. This PRB will consist of Provect-IR® (zero-valent iron) injected. The area of the PRB is approximately 133 linear feet by 15 feet wide (2,000 square feet) and will include 24 temporary, direct push injection points spaced 12 feet apart. The PRB will be installed to a depth of approximately 42 feet below grade surface (bgs) where it will tie into the confining silt layer. The targeted vertical zone is 8 to 42 feet bgs.

6. In-Situ Chemical Oxidation and Reduction

In-situ chemical oxidation (ISCO) will be implemented to treat contaminants in groundwater. Provect-OX2® will be injected into the subsurface to destroy the contaminants in an approximately 5,500 square foot area located in the western portion of the site where petroleum-related compounds were elevated in the groundwater via 30 shallow (10-30 feet bgs) and 30 deep (30-42 feet bgs) temporary, direct push injection points spaced 15-20 feet apart.

In-situ chemical reduction (ISCR) will be implemented to treat contaminants in groundwater. Provect-IR60® will be injected into the subsurface to destroy the contaminants in an approximately 1,500 square foot area located in the eastern portion of the site where chlorinated volatile organic compounds were elevated in the groundwater via 15 shallow (10-30 feet bgs) and 15 deep (30-42 feet bgs) temporary, direct push injection points spaced 12 feet apart.

Monitoring will be required up-gradient, down-gradient and within the treatment zones. Monitoring will be conducted for petroleum-related and chlorinated VOCs upgradient and downgradient of the treatment zones. The treatment zones will also be monitored for dissolved oxygen and oxidation/reduction potential.

7. Vapor Mitigation

Any on-site buildings will be required to have a sub-slab depressurization system (SSDS), or other acceptable measures, to mitigate the migration of vapors into the building from the subsurface.

8. 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 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 restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOHMH; and

- require compliance with the NYSDEC approved Site Management Plan.

9. 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 8.
   - Engineering controls: the Cover System, Permeable Reactive Barrier, and SSDS discussed in paragraphs 4, 5 and 7.

This plan includes, but may not be limited to:

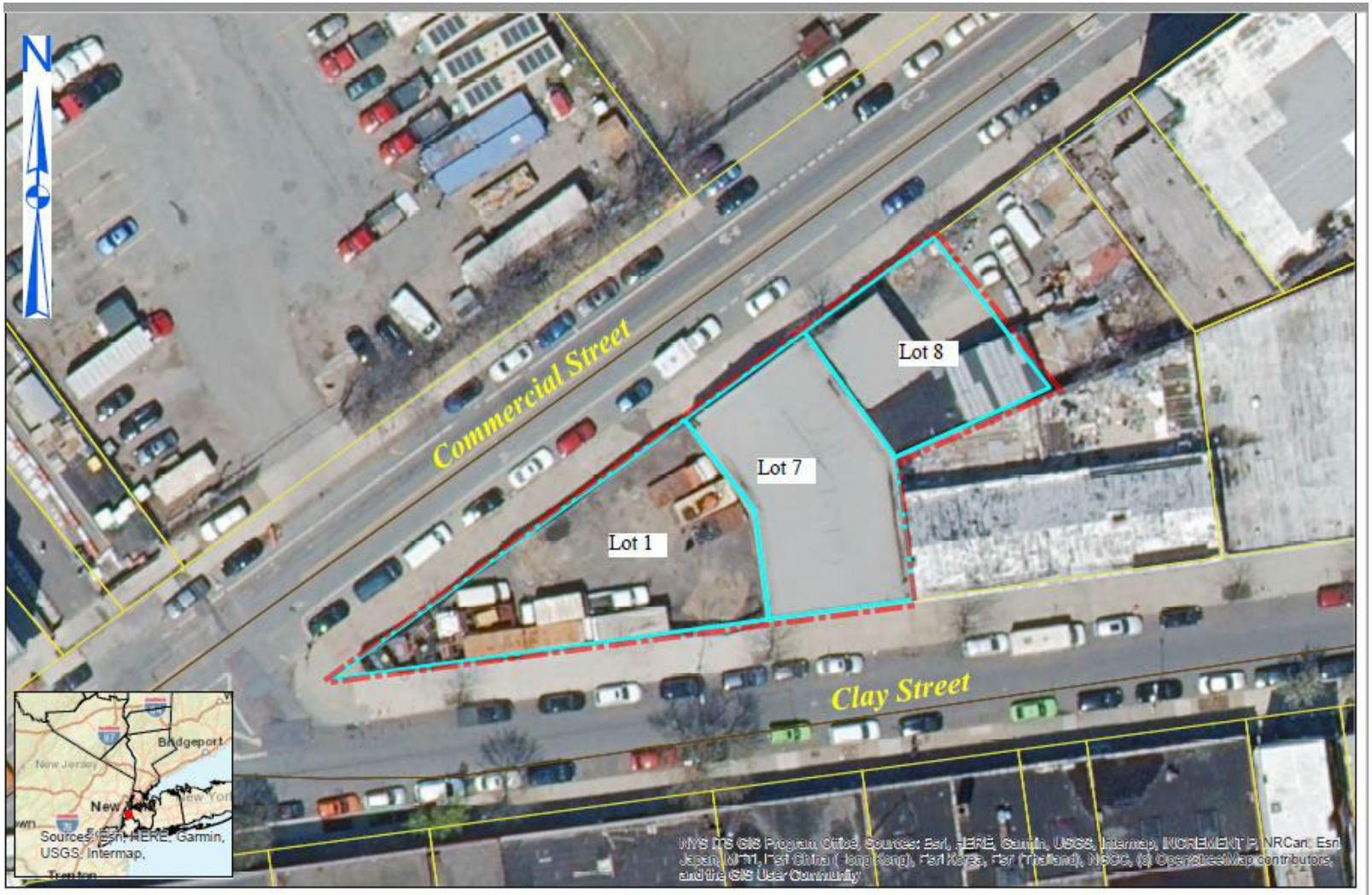
- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- a provision that should a building foundation or building 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 two feet 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 to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the NYSDEC.

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 SSDS. 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 NYSDEC notification; and
- providing the NYSDEC access to the site and O&M records.

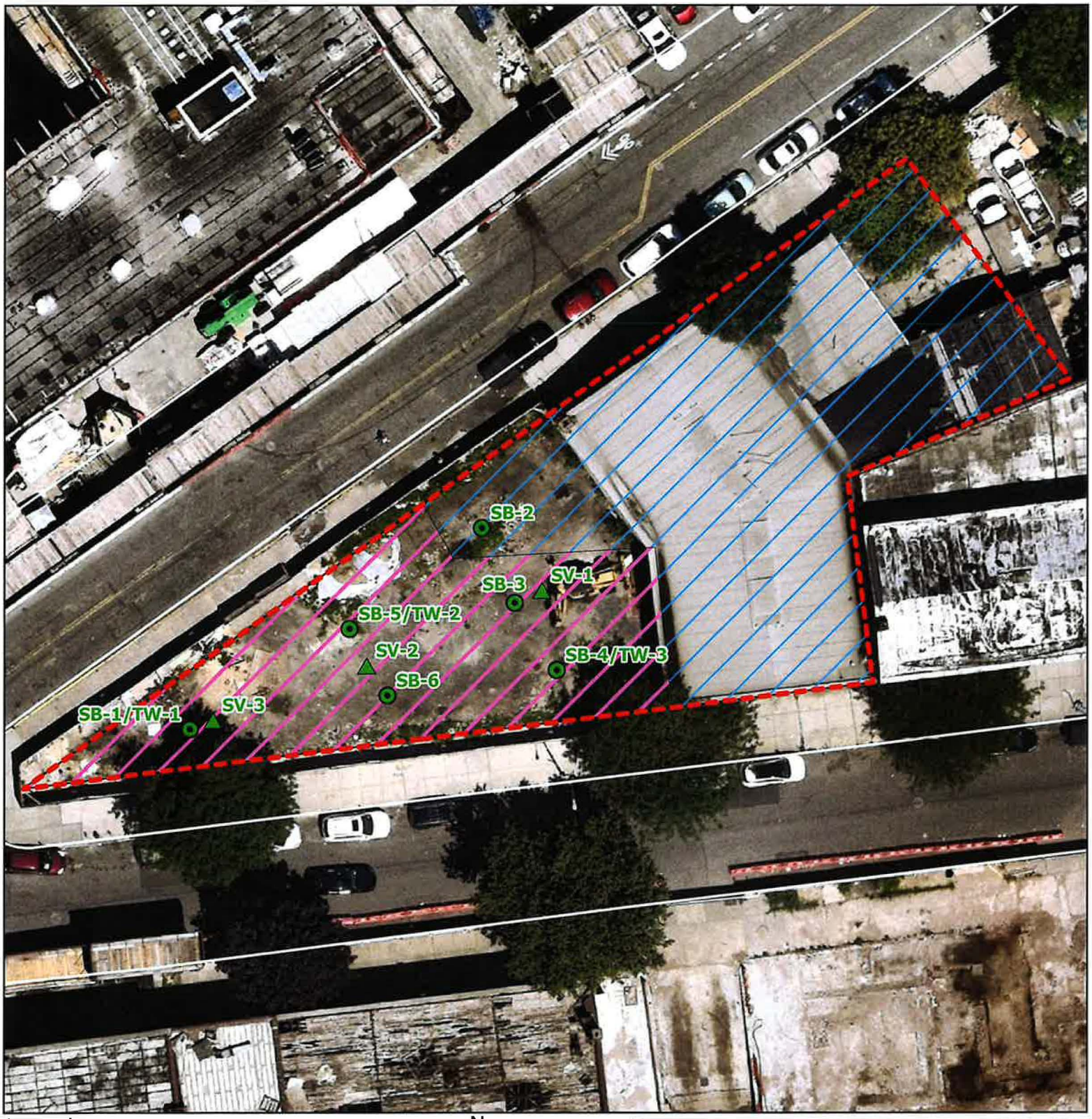


NEW YORK STATE | Department of Environmental Conservation

Figure 1 - Site Location Map
50 Commercial Street Development
Site No. C224278

Legend

0 20 40 80
Feet



Legend

- Brownfield Cleanup Program Site Boundary
- Soil Boring / Temporary Well Point - January 2018 Sampling Event
- Soil Vapor - January 2018 Sampling Event

Excavation Areas

- To be Excavated to 2 ft bgs
- To be Excavated to the Groundwater Table*

Notes:
1. ft bgs - feet below ground surface
2. * Groundwater table anticipated to be at 10 ft bgs.

0 15 30 60 US Feet

N

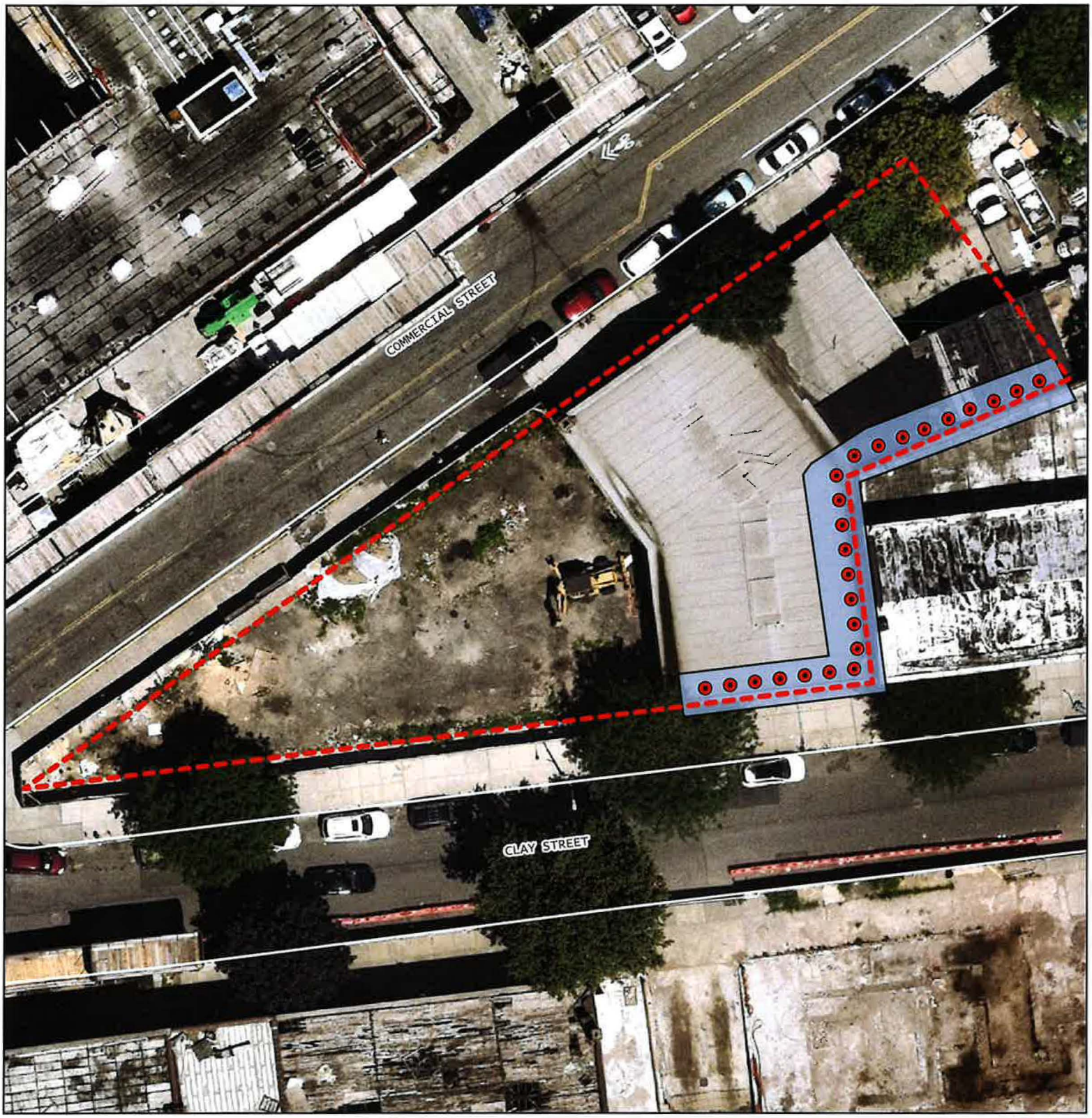
ENGINEER SEAL: STATE OF NEW YORK — ERNEST ROYAL HANNO — No. 65440 — LICENSED PROFESSIONAL ENGINEER

50 COMMERCIAL STREET DEVELOPMENT
50 COMMERCIAL STREET
BROOKLYN, NEW YORK, DEC SITE NO: C224278

EXCAVATION PLAN - ALTERNATIVE 2

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com	PREPARED FOR: RIMANI REALTY LLC

PROJ MGR: RLJ	REVIEWED BY: KF	CHECKED BY: RLJ	FIG	
DESIGNED BY: MB	DRAWN BY: MB	SCALE: 1:360		2
DATE: 02/07/2024	PROJECT NO: 12.0077448.00	REVISION NO:		



Legend

- Brownfield Cleanup Program Site Boundary
- Zero Valent Iron (ZVI) Wall
- Direct Push Injection Point

Notes:

1. The permeable reactive barrier will be approximately 133 linear feet with a vertical target interval from 8 to 42 feet below ground surface placed through 24 direct push injection points.

0 15 30 60 US Feet

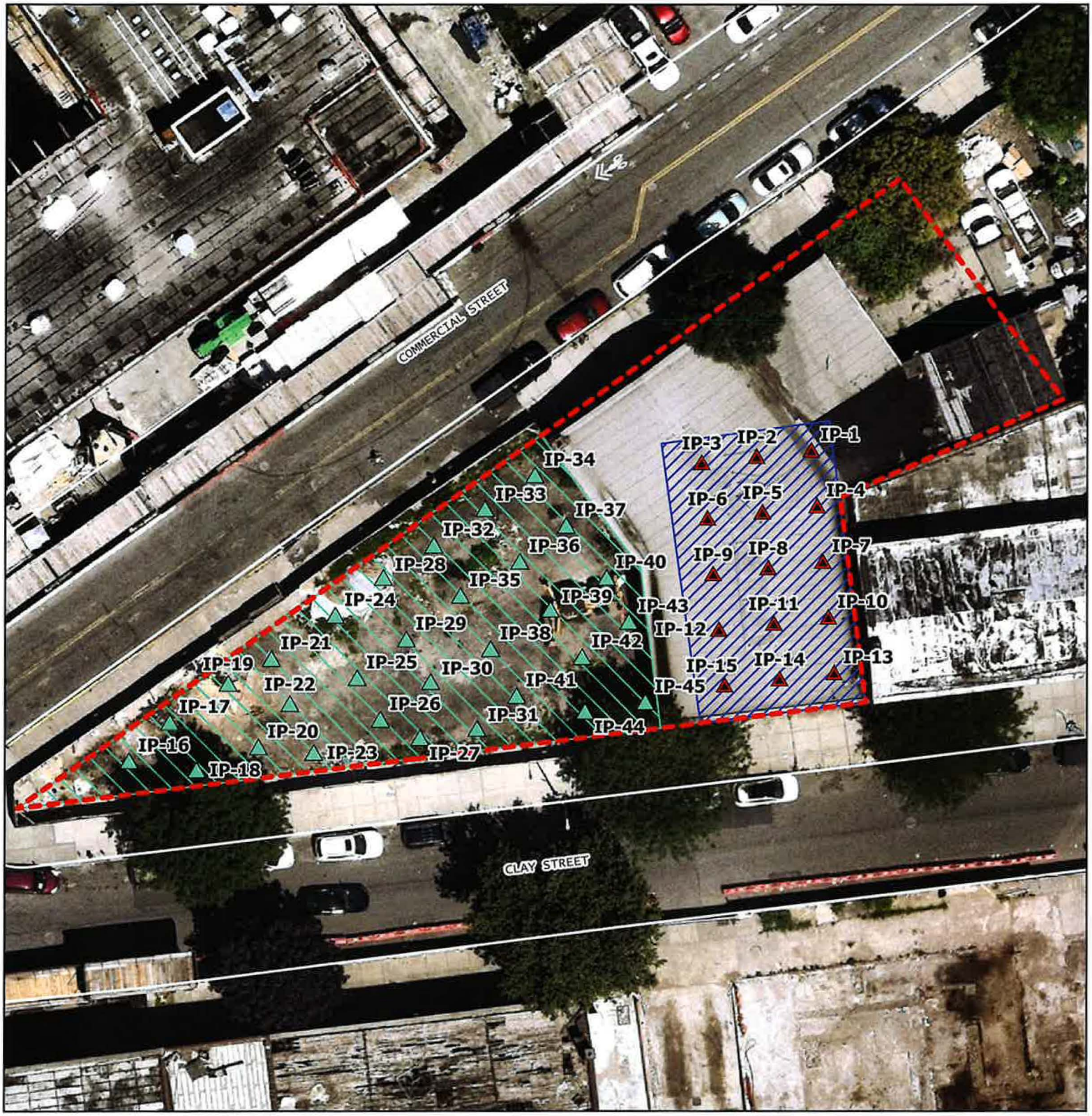
N

ENGINEER SEAL

STATE OF NEW YORK
ERNEST ROYAL HANNA
No. 85440
LICENSED PROFESSIONAL ENGINEER

50 COMMERCIAL STREET DEVELOPMENT
50 COMMERCIAL STREET
BROOKLYN, NEW YORK, DEC SITE NO: C224278
PERMEABLE REACTIVE BARRIER WALL

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: RIMANI REALTY LLC	
PROJ MGR: RLJ	REVIEWED BY: KF	CHECKED BY: RLJ	FIG 3
DESIGNED BY: MB	DRAWN BY: MB	SCALE: 1:360	
DATE: 02/07/2024	PROJECT NO: 12.0077448.00	REVISION NO:	



Legend

- Brownfield Cleanup Program Site Boundary
- Provect OX2 Treatment Area
- Provect IR60 Treatment Area

Proposed Injection Point

- Provect-IR60 Treatment
- Provect-OX2 Treatment

Note:
1. There will be shallow and deep direct injection at each target location targeting the 8-42 feet below ground surface interval.

0 15 30 60 US Feet

N

ENGINEER SEAL: NEW YORK STATE, ERNEST ROYAL HANNA, LICENSED PROFESSIONAL ENGINEER, No. 85440

50 COMMERCIAL STREET DEVELOPMENT
50 COMMERCIAL STREET
BROOKLYN, NEW YORK, DEC SITE NO: C224278
PROPOSED GROUNDWATER TREATMENT AREA

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com		PREPARED FOR: RIMANI REALTY LLC	
PROJ MGR: RLJ	REVIEWED BY: KF	CHECKED BY: RLJ	FIG 4
DESIGNED BY: MB	DRAWN BY: MB	SCALE: 1:360	
DATE: 02/07/2024	PROJECT NO. 12.0077448.00	REVISION NO:	

Legend

- Brownfield Cleanup Program Site Boundary

Proposed Monitoring Well

- Deep Monitoring Well Location
- Shallow Monitoring Well Location

N

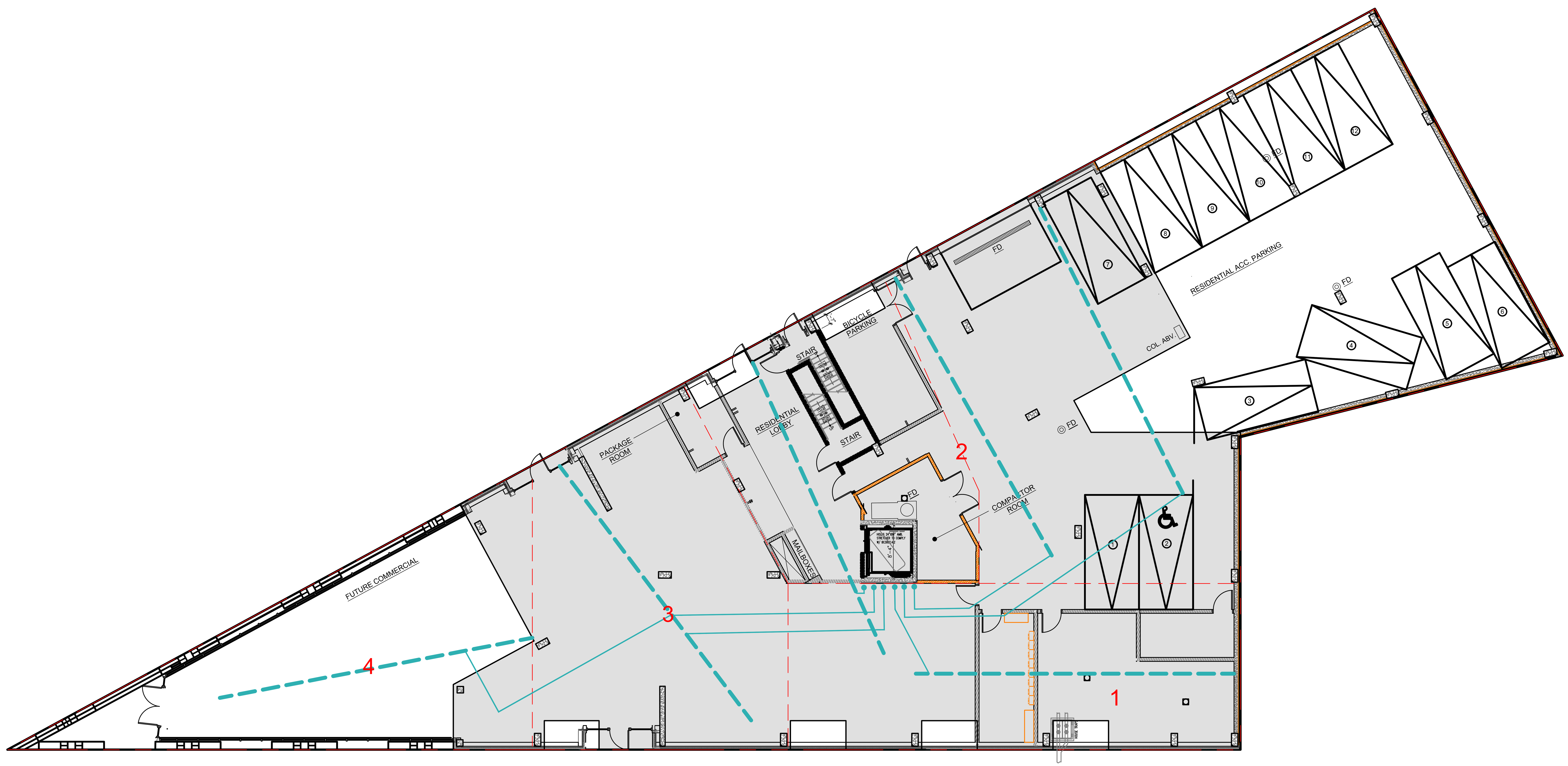
0 15 30 60 US Feet

ENGINEER SEAL: NEW YORK STATE ERNEST ROYAL HAVNA No. 65440 LICENSED PROFESSIONAL ENGINEER

50 COMMERCIAL STREET DEVELOPMENT
50 COMMERCIAL STREET
BROOKLYN, NEW YORK, DEC SITE NO: C224278
PROPOSED GROUNDWATER MONITORING PLAN

PREPARED BY:	PREPARED FOR:
GZA GeoEnvironmental, Inc. www.gza.com	RIMANI REALTY LLC

PROJ MGR: RLJ	REVIEWED BY: KF	CHECKED BY: RLJ	FIG
DESIGNED BY: MB	DRAWN BY: MB	SCALE: 1:360	5
DATE: 02/07/2024	PROJECT NO: 12.0077448.00	REVISION NO:	



LEGEND

BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY

TREATMENT ZONE BOUNDARY

EXTRACTION TRENCH - SLOTTED

EXTRACTION TRENCH - SOLID

VERTICAL RISER

GENERAL NOTES

1. VERTICAL AND/OR HORIZONTAL LATERAL TO BE CONNECTED BETWEEN THE SOIL VAPOR EXTRACTION (SVE) PIPE AND VENT TO BE FINALIZED BY THE PROJECT ARCHITECT. VENT PIPES TO EXIT THROUGH ROOF WITH GOOSE NECK ON TOP. LATERALS TO BE CONSTRUCTED OF SOLID 4" SCHEDULE 40 PVC CASING.
2. SLOTTED SVE PIPING TO BE CONSTRUCTED OF 4" SCHEDULE 40 PVC SCREEN WITH SLOT SIZE OF 0.02" AND TO BE PLACED APPROXIMATELY 50-FEET APART AS SHOWN ON PLANS. SOLID SVE PIPING TO BE CONSTRUCTED OF 4" SCHEDULE 40 PVC SCREEN.
3. FIELD LOCATE EXISTING UNDERGROUND UTILITIES, PIPING, ETC. PRIOR TO PLACEMENT OF FOUNDATIONS, NOTIFY ENGINEER OF ANY INTERFERENCES WHICH MIGHT REQUIRE RELOCATION AND/OR MODIFICATIONS OF FOUNDATIONS.
4. PROVIDE SLEEVE THROUGH CONCRETE FOUNDATION WALL OR SLAB FOR SVE PVC PIPING.
5. PITCH SVE LINES TO THE LATERALS TO PROVIDE A 0.05% SLOPE.
6. REFER TO SUB-SLAB DEPRESSURIZATION SYSTEM DETAIL SHEET FOR DETAILS ON THE VAPOR BARRIER.
7. THE PROPOSED SVE WILL BE AN ACTIVE VENTING SYSTEM
8. MITIGATION BLOWER TO BE SIZED BASED UPON TEST CONDUCTED AFTER BUILDING INFRASTRUCTURE CONSTRUCTION COMPLETE.
9. THE PARKING AREA WILL NOT INCLUDE SSDS PIPING LAYOUT. THE VAPORS IN THIS AREA WILL BE CONTROLLED BY AIR EXCHANGE OCCURRING NATURALLY.

N W E S

0 5' 10' 20' 30'
SCALE IN FEET 1" = 10'

NO.	ISSUE/DESCRIPTION	BY	DATE

50 COMMERCIAL STREET DEVELOPMENT
50 COMMERCIAL STREET
BROOKLYN, NY, DEC SITE NO: C224278

APPROVED:

STATE OF NEW YORK ERNEST ROYAL HANNA LICENSED PROFESSIONAL ENGINEER No. 65440

SSDS LAYOUT

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com

PREPARED FOR: RIMANI REALTY LLC

PROJ MGR: RJ	REVIEWED BY: KF	CHECKED BY: RJ	FIGURE 6
DESIGNED BY: MB	DRAWN BY: MB	SCALE: 1"=10'	
DATE: OCT 2023	PROJECT NO. 12.0077448.00	REVISION NO.	