DECISION DOCUMENT

Gerard Avenue and East 146th Street Site
Brownfield Cleanup Program
Bronx, Bronx County
Site No. C203111
June 2020

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

DECLARATION STATEMENT - DECISION DOCUMENT

Gerard Avenue and East 146th Street Site
Brownfield Cleanup Program
Bronx, Bronx County
Site No. C203111
June 2020

Statement of Purpose and Basis

This document presents the remedy for the Gerard Avenue and East 146th Street Site, a brownfield cleanup site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the Gerard Avenue and East 146th Street 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;
   - 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 will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

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:

a. grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
b. soil exceeding the 6 NYCRR Part 371 hazardous criteria for lead;
c. 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
d. soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

Excavation and removal of oil water separators, underground storage tanks (USTs), fuel dispensers, underground piping or other structures associated with a source of contamination.

All soils in the upper two feet which exceed the restricted residential SCOs will be excavated and transported off-site for disposal.

Approximately 13,000 cubic yards of contaminated soil will be removed from the site.

3. Backfill

On-site soil which does not exceed the above excavation criteria or the protection of groundwater SCOs for any constituent may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the site.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the site.

4. Cover System

A site cover will be required to allow for restricted residential use of the site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. 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. Groundwater Treatment

a. In-Situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat contaminants in groundwater and saturated soil beneath the water table. A chemical oxidant will be injected into the subsurface to destroy the contaminants in an approximately 16,650 square foot area located in the northern portion of the site where gasoline-related compounds are present at elevated concentrations in the groundwater. Two applications of oxidant will be applied directly to the groundwater via approximately 160 temporary injection points or by direct mixing with an excavator, as depicted on Figure 3. The treatment depth will target the approximate depth of contamination impacts, estimated to be about 11 to 20 feet below ground surface (bgs) in the northwestern portion of the site and 18 to 28 feet bgs in the northeastern.

b. Enhanced Bioremediation

In-situ enhanced biodegradation will be employed to treat contaminants in groundwater in the area shown on Figure 3. The biological breakdown of contaminants through aerobic respiration will be enhanced by the placement of an oxygen release compound (ORC), or similar material, into the subsurface. The ORC will be combined with ISCO during the second round of application.

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

- Engineering Controls: The cover system discussed in Paragraph 4 above.

This plan includes, but may not be limited to:
- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- 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 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 Department notification; and
- 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 Department;
   - monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

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.

June 11, 2020 *Gerard Burke*

Date

Gerard Burke, Director
Remedial Bureau B

DECISION DOCUMENT

Gerard Avenue and East 146th Street Site
Bronx, Bronx County
Site No. C203111
June 2020

SECTION 1: SUMMARY AND PURPOSE

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

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

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

SECTION 2: CITIZEN PARTICIPATION

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

DECInfo Locator - Web Application
https://gisservices.dec.ny.gov/gis/dil/index.html?rs=C203111

Mott Haven Library
321 East 140th Street
Bronx, NY 10454
Phone: 718-665-4878

Bronx Community Board 1
3024 Third Avenue
Bronx, NY 10455
Phone: 718-585-7117

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 417 and 445 Gerard Avenue, 404 Exterior Street, and 440 Major Wm Deegan Boulevard in an urban area in the Mott Haven neighborhood of the Bronx, NY. Four tax lots within Block 2351 make up the site: Lots 1, 3, Lot 12 and Lot 20. The site is bounded by East 146th Street to the north, Gerard Avenue to the east, a one-story warehouse and East 144th Street to the south, and Exterior Street to the west.

Site Features
The site encompasses an area of about 38,000 square feet (0.87 acres) and includes a vacant one-story warehouse (Lot 1), a vacant one-story warehouse and parking (Lot 3); a vacant one-story warehouse (Lot 12); and a vacant one-story warehouse with a partial cellar (Lot 20).

Current Zoning and Land Use
The site is located within the Lower Concourse Special Mixed Use Paired District (M1-4/R8A) which allows for residential, commercial, industrial, and cultural uses. The surrounding area is primarily commercial and industrial, but also includes residential buildings, public parks, day care centers, and schools. The Harlem River is located about 450 feet west of the site.

Past Use of the Site
Commercial and industrial facilities have occupied the site since the early 1900s. Lot 1 was occupied by a chemical laboratory/chemical manufacturing facility (1944 to 1951) and unspecified manufacturing from 1951 to 2007; Lot 3 was occupied by a parking garage (1935 to 1977); Lot 12 was occupied by a taxi dispatch center (1930s to 1960s), an auto repair shop (1960s to 1980s), and an unspecified manufacturer (1990s to 2012); and Lot 20 was occupied by a public garage (1935-1951), a fire door manufacturer (1970s), a Con Edison garage (1977 to 1993), and a mirror fabrication facility (1993 to 2015).

Site Geology and Hydrogeology
The site is underlain by fill material, predominantly consisting of brown, fine- to medium-grained sand with varying amounts of silt, gravel, brick, coal, coal ash, slag, concrete, and wood. The fill was observed from surface grade to depths varying between about 2 and 24 feet below grade surface (bgs). Native soil, predominantly consisting of fine- to medium-grained sand with varying amounts of fine gravel and silt, and a clay layer varying in thickness between 1 and 7

feet, was observed below the fill. Decomposed bedrock was encountered from about 63 to 104 feet bgs with the depth increasing from east to west across the site. Groundwater was observed from about 12 to 19 feet bgs across the site. Groundwater generally flows to the west toward the Harlem River.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

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

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

SECTION 5: ENFORCEMENT STATUS

The Applicants under the Brownfield Cleanup Agreement are Volunteers. The Applicants do not have an obligation to address off-site contamination. However, the Department has determined that this site does not pose a significant threat to public health or the environment; accordingly, no enforcement actions are necessary.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

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

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

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

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor
- 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:

1,2,4-TMB	isopropylbenzene
benzene	n-propylbenzene
xylene (mixed)	sec-butylbenzene
benzo(a)anthracene	toluene
benzo(a)pyrene	benzo(k)fluoranthene
benzo(b)fluoranthene	phenol
chrysene	1,2,4,5-tetramethylbenzene
dibenz[a,h]anthracene	carbon tetrachloride
indeno(1,2,3-CD)pyrene	tetrachloroethene
lead	cyclohexane
mercury	heptane
ethylbenzene	n-hexane

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.

Soil and groundwater have been analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, poly-chlorinated biphenyls (PCBs), metals and per- and polyfluoroalkyl substances (PFAS). Soil vapor has been analyzed for VOCs. The primary contaminants of concern are VOCs, SVOCs and metals in site soils, VOCs and SVOCs in groundwater, and VOCs in soil vapor.

Soil: Petroleum-related VOCs detected in soil samples at levels above restricted residential soil cleanup objectives (RRSCOs) and/or protection of groundwater soil cleanup objectives (PGWSCOs) include: 1,2,4-trimethylbenzene (max. 110 parts per million, or ppm), 1,3,5-trimethylbenzene (max. 38 ppm), benzene (max. 9.5 ppm), ethyl benzene (max. 37 ppm), n-propylbenzene (max. 44 ppm), toluene (max. 8.5 ppm), and total xylenes (max. 120 ppm). SVOCs detected in soil samples above RRSCOs and/or PGWSCOs include: benzo(a)anthracene (max. 20 ppm), benzo(a)pyrene (max. 19 ppm), benzo(b)fluoranthene (max. 24 ppm), benzo(k)fluoranthene (max. 8.2 ppm), chrysene (max. 18 ppm), dibenzo(a,h)anthracene (max. 2.8 ppm), and indeno(1,2,3-cd)pyrene (max. 12 ppm). Metals found at levels above the RRSCOs include: arsenic (max. 43.7 ppm), barium (1,460 ppm), cadmium (max. 7.4 ppm), copper (max. 969 ppm), lead (max. 2,940 ppm), mercury (max. 5.62), and nickel (max. 8,770 ppm). Data does not indicate any off-site impacts in soil related to this site.

Groundwater: Seventeen groundwater samples were collected and analyzed. VOCs, SVOCs and metals were detected in groundwater above Ambient Water Quality Standards or Guidance Values (standards). Petroleum-related VOCs exceeding standards include: 1,2,4,5-tetramethylbenzene up to 120 parts per billion (ppb) (standard 5 ppb), 1,2,4-trimethylbenzene up to 13 ppb (standard 5 ppb), 1,3,5-trimethylbenzene up to 210 ppb (standard 5 ppb), acrylonitrile up to 77 ppb (standard 5 ppb), benzene up to 840 ppb (standard 1 ppb), ethylbenzene up to 200 ppb (standard 5 ppb), isopropylbenzene up to 180 ppb (standard 5 ppb), n-butylbenzene up to 40 ppb (standard 5 ppb), n-propylbenzene up to 380 ppb (standard 5 ppb), xylene up to 32 ppb (standard 5 ppb), sec-butylbenzene up to 16 ppb (standard 5 ppb), and toluene up to 48 ppb (standard 5 ppb). SVOCs detected above standards include: acenaphthene up to 33 ppb (standard 20 ppb), benzo(a)anthracene up to 0.3 ppb (standard 0.002 ppb), benzo(a)pyrene up to 0.28 ppb (standard non-detect), benzo(b)fluoranthene up to 0.33 ppb (standard 0.002 ppb),

benzo(k)fluoranthene up to 0.13 ppb (standard 0.002 ppb), chrysene up to 0.31 ppb (standard 0.002 ppb), indeno(1,2,3-cd)pyrene up to 0.31 ppb (standard 0.002 ppb), naphthalene up to 370 ppb (standard 10 ppb), pentachlorophenol up to 9.2 ppb (standard 1 ppb), and phenol up to 9.5 ppb (standard 1 ppb). Dissolved metals detected above standards include iron up to 31,800 ppb (standard 300 ppb), magnesium up to 80,800 ppb (standard 35,000 ppb), manganese up to 2,390 ppb (standard 300 ppb), and sodium up to 517,000 ppb (20,000 ppb). These are naturally occurring metals commonly found in groundwater. Groundwater impacts are not anticipated off-site.

Soil Vapor: Two soil vapor samples, 9 sub-slab vapor samples and 2 ambient air samples were collected on-site and analyzed. Several VOCs were detected in soil vapor samples throughout the site. Notable detections include the chlorinated VOCs carbon tetrachloride (max. 27.2 micrograms per cubic meter (µg/m3)) and tetrachloroethene (PCE) (max. 62.4 µg/m3) and the petroleum-related VOCs benzene (max. 141 µg/m3), cyclohexane (max. 516 µg/m3), heptane (max. 3,500 µg/m3), n-Hexane (max. 6,340 µg/m3), p/m-xylene (267 µg/m3), and toluene (max. 403 µg/m3). Three additional soil vapor samples were collected off-site, in sidewalks adjacent to the site. These samples do not indicate any off-site migration of soil vapor impacts.

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 buildings and pavement. People will not come into contact with site-related soil and groundwater contamination unless they dig below the surface. Contaminated groundwater at the site is not used for drinking as the site is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in soil vapor (air spaces within the soil) may move into 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. Because the site is vacant, the inhalation of site-related contaminants due to soil vapor intrusion does not represent a current concern. Furthermore, environmental sampling indicates soil vapor intrusion 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 groundwater contamination.

Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

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

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

The selected remedy is referred to as the Excavation, Groundwater Treatment and Cover System remedy.

The elements of the selected remedy, as shown in Figures 2 and 3, 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 will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

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:

a. grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
b. soil exceeding the 6 NYCRR Part 371 hazardous criteria for lead;
c. 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
d. soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

All soils in the upper two feet which exceed the restricted residential SCOs will be excavated and transported off-site for disposal. The approximate location for the excavation is depicted on Figure 2.

Approximately 13,000 cubic yards of contaminated soil will be removed from the site. Excavation and removal of oil water separators, underground storage tanks (USTs), fuel dispensers underground piping or other structures associated with a source of contamination.

3. Backfill

On-site soil which does not exceed the above excavation criteria or the protection of groundwater SCOs for any constituent may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the site.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the site.

4. Cover System

A site cover will be required to allow for restricted residential use of the site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. 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. Groundwater Treatment

a. In-Situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat contaminants in groundwater and saturated soil beneath the water table. A chemical oxidant will be injected into the subsurface to destroy the contaminants in an approximately 16,650 square foot area located in the northern portion of the site where gasoline-related compounds are present at elevated concentrations in the groundwater. Two applications of oxidant will be applied directly to the groundwater via approximately 160 temporary injection points or by direct mixing with an excavator, as depicted on Figure 3. The treatment depth will target the approximate depth of contamination impacts, estimated to be about 11 to 20 feet below ground surface (bgs) in the northwestern portion of the site and 18 to 28 feet bgs in the northeastern.

b. Enhanced Bioremediation

In-situ enhanced biodegradation will be employed to treat contaminants in groundwater in the area shown on Figure 3. The biological breakdown of contaminants through aerobic respiration will be enhanced by the placement of an oxygen release compound (ORC), or similar material, into the subsurface. The ORC will be combined with ISCO during the second round of application.

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 Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOH; and
- require compliance with the Department approved Site Management Plan.

7. Site Management Plan

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

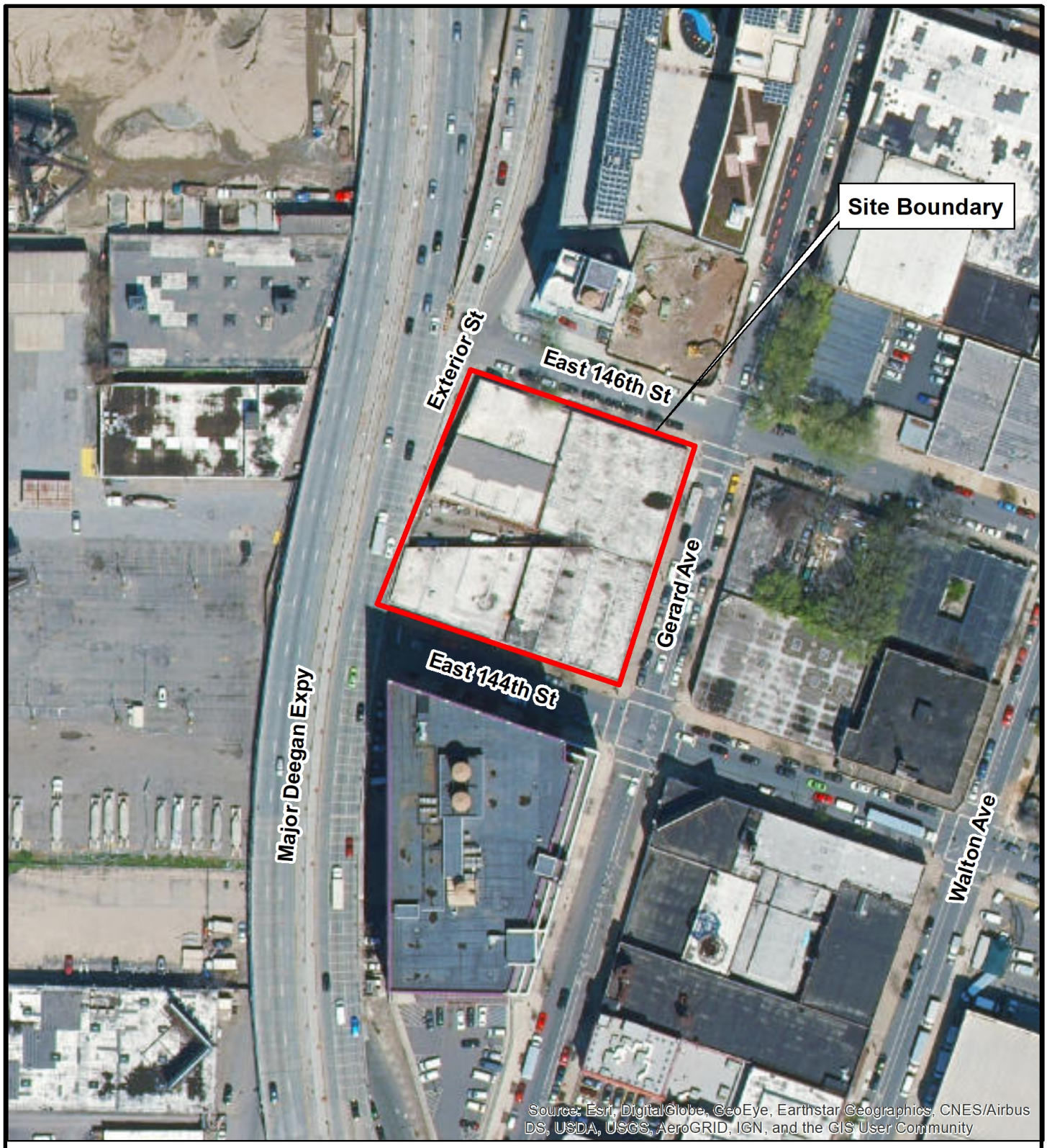
a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

- Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.

- Engineering Controls: The cover system discussed in Paragraph 4 above.

This plan includes, but may not be limited to:
- o an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- o descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- o a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- o a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 4 above will be placed in any areas where the upper two feet of exposed surface soil exceed the applicable soil cleanup objectives (SCOs);
- o provisions for the management and inspection of the identified engineering controls;
- o maintaining site access controls and Department notification; and
- o 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:
- o monitoring of groundwater to assess the performance and effectiveness of the remedy;
- o a schedule of monitoring and frequency of submittals to the Department;
- o monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.



N

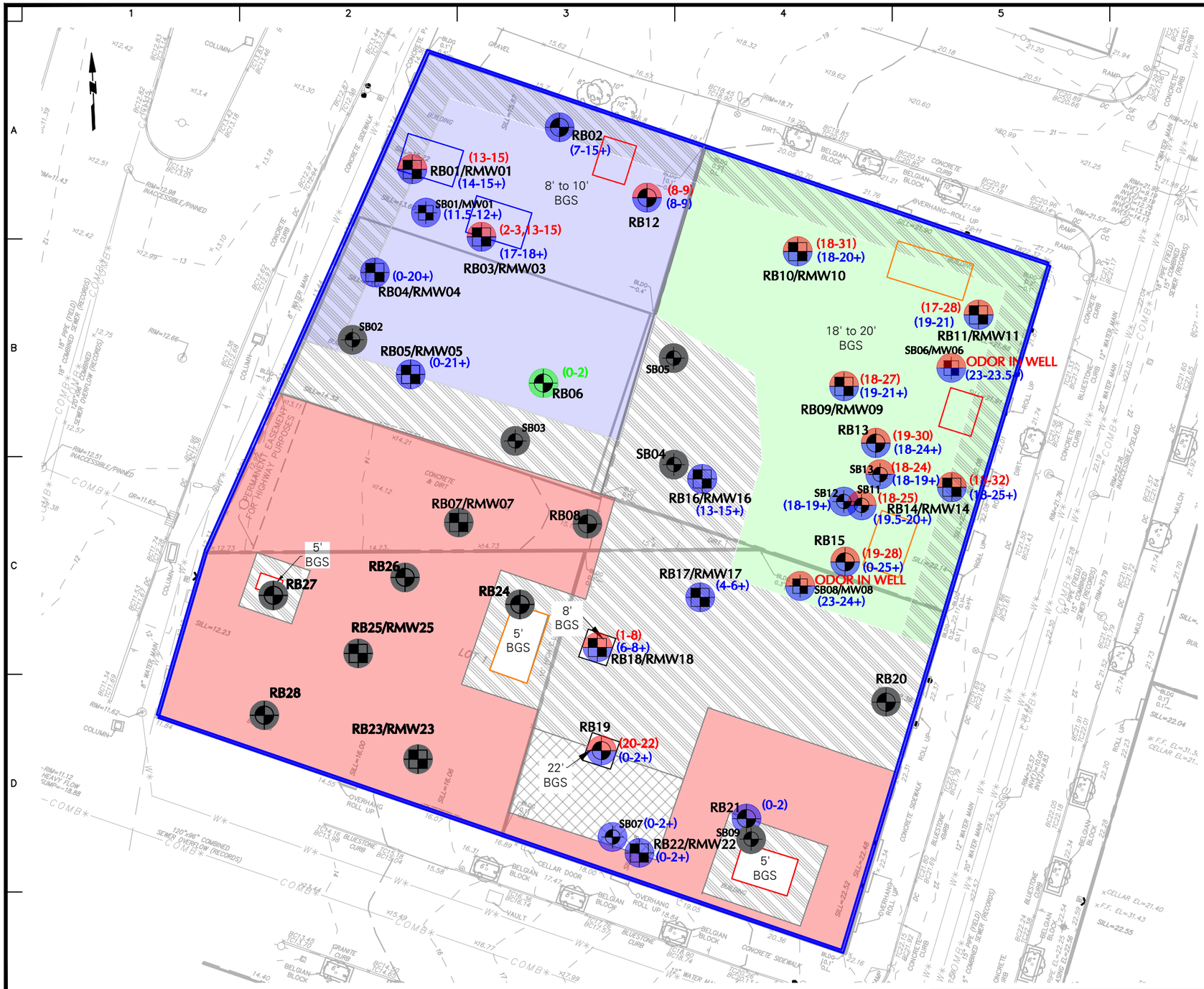
0 75 150

Feet

Figure 1
Site Map

Gerard Avenue and East 146th Street
Bronx, NY
Site No. C203111

NEW YORK STATE OF OPPORTUNITY
Department of Environmental Conservation



30 0 15 30

SCALE: 1 INCH = 30 FEET

LEGEND:

▬	SITE BOUNDARY
RB32	SOIL BORING LOCATION
RB30/RMW30	SOIL BORING/MONITORING WELL LOCATION
🟢 (0-2)	SOIL SAMPLE RESULTS WITH HAZARDOUS LEAD (DEPTH INTERVAL)
🔴 (13-15)	SOIL SAMPLE WITH FIELD EVIDENCE OF PETROLEUM IMPACTS (DEPTH INTERVAL)
🔵 (0-2+)	SOIL SAMPLE RESULTS WITH PGW SCO EXCEEDANCE (DEPTH INTERVAL)
● (19-28) (0-21+)	SOIL SAMPLE WITH FIELD EVIDENCE OF PETROLEUM IMPACTS (DEPTH INTERNVAL) AND RESULTS WITH PGW SCO EXCEEDANCE (DEPTH INTERVAL)
●	NO SOIL SAMPLES WITH WITH FIELD EVIDENCE OF PETROLEUM IMPACTS OR RESULTS WITH PGW SCO EXCEEDANCE
🟧	APPROXIMATE LOCATION OF UNDERGROUND STORAGE TANKS IDENTIFIED DURING THE SEPTEMBER 2017 OR JULY 2019 GEOPHYSICAL SURVEYS
🟥	APPROXIMATE LOCATION OF OIL WATER SEPARATOR IDENTIFIED DURING THE SEPTEMBER 2017 OR JULY 2019 GEOPHYSICAL SURVEYS
🟦	APPROXIMATE LOCATION OF GASOLINE TANKS IDENTIFIED IN THE REVIEW OF THE SANBORN FIRE INSURANCE MAPS
🟪	APPROXIMATE EXTENT OF EXCAVATION TO 8 TO 10 FEET BGS TO REMOVE CONTAMINANT SOURCE AREAS
🟩	APPROXIMATE EXTENT OF EXCAVATION TO 18 TO 20 FEET BGS TO REMOVE CONTAMINANT SOURCE AREAS
🟥	APPROXIMATE EXTENT OF EXCAVATION TO 2 FEET BGS
▨	APPROXIMATE EXTENT OF 2:1 SLOPED EXCAVATION
▩	APPROXIMATE EXTENT OF 1:1 SLOPED EXCAVATION

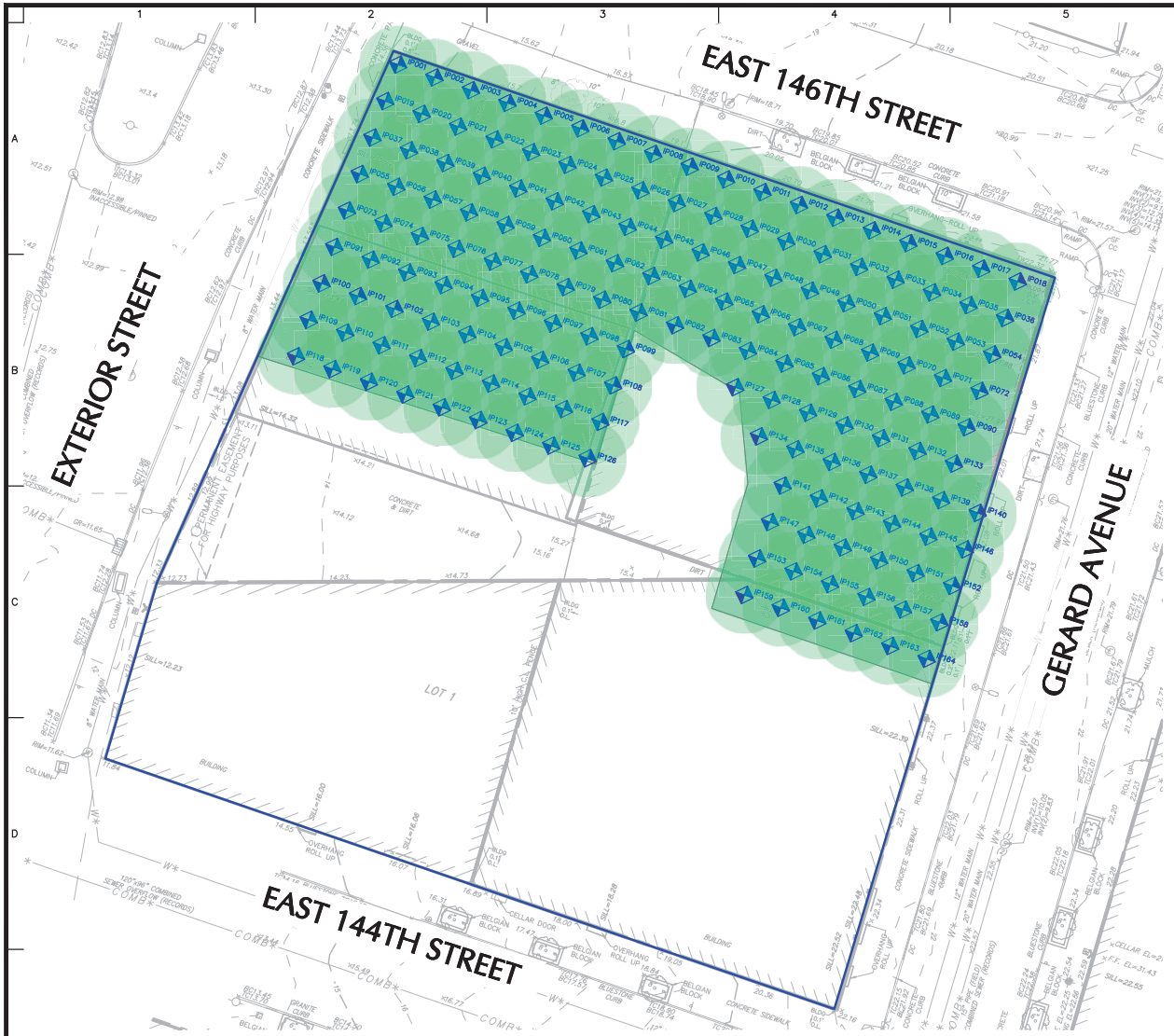
NOTES:

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017
2. PGW SCOs = TITLE 6 NEW YORK CODES, RULES AND REGULATIONS (6 NYCRR) PART 375 PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVES
3. DEPTH INTERVALS ARE IN FEET BELOW GRADE SURFACE (BGS)
4. EVIDENCE OF PETROLEUM IMPACTS INCLUDE ODOR, STAINING, AND ELEVATED PHOTOIONIZATION DETECTOR (PID) READINGS ABOVE BACKGROUND
5. PGW SCOs WERE ONLY APPLIED TO ANALYTES THAT ALSO EXCEEDED GROUNDWATER REGULATORY STANDARDS IN GROUNDWATER SAMPLES COLLECTED FROM THE SITE. THE PGW SCOS ARE APPLICABLE ONLY TO THOSE CONSTITUENTS THAT ARE IN AREAS WHICH COULD BE A SOURCE OF GROUNDWATER CONTAMINATION
6. EXCAVATION DEPTHS ARE HATCHED OR LABELED AS SHOWN
7. PGW SCO EXCEEDANCES IDENTIFIED ON THE FIGURE AT RB16 AND RB17 ARE PLANNED FOR REMOVAL WITH EXCAVATION OF THE SLOPE

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	Figure Title	Project No.	Figure No.
GERARD AVENUE AND EAST 146TH STREET BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20 BRONX NEW YORK	ALTERNATIVE II - TRACK 4 CLEANUP	170487001	9
		Date 02/14/2020	
		Drawn By JG	
		Checked By JL	

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 9 - Track 4 Plan (2).dwg Date: 5/29/2020 Time: 11:29 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- APPROXIMATE SITE BOUNDARY
- IP001 PROPOSED INJECTION POINT LOCATION
- APPROXIMATE RADIUS OF INFLUENCE FOR PERSULFOX AND ORC ADVANCED
- APPROXIMATE EXTENT OF PETROLEUM PLUME

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017.
2. RADIUS OF INFLUENCE CALCULATIONS WERE DETERMINED IN CONSULTATION WITH REMEDIAL CHEMICAL MANUFACTURERS BASED ON SUBSURFACE CONDITIONS AND CONTAMINANT CONCENTRATIONS ENCOUNTERED DURING THE REMEDIAL INVESTIGATION CONDUCTED BY LANGAN BETWEEN DECEMBER 20, 2018 AND JANUARY 17, 2019
3. ALL INJECTION LOCATIONS ARE APPROXIMATE.

30 0 15 30
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	GERARD AVENUE AND EAST 146TH STREET BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20 BRONX NEW YORK
Figure Title	TREATMENT AREA LOCATION PLAN
Project No.	170487001
Date	02/25/20
Drawn By	JG
Checked By	JL
Figure No.	3

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 12 - Treatment Area Location Plan.dwg Date: 2/25/2020 Time: 12:04 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL