DECISION DOCUMENT

Red Hook 4 Properties
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224214
January 2025

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

DECLARATION STATEMENT - DECISION DOCUMENT

Red Hook 4 Properties
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224214
January 2025

Statement of Purpose and Basis

This document presents the remedy for the Red Hook 4 Properties 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 Red Hook 4 Properties site and the public's input to the proposed remedy presented by NYSDEC.

Description of Selected Remedy

The elements of the selected remedy, as shown in Figure 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 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) 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).

3) Petroleum Tar Recovery

Installation and operation of petroleum recovery wells along the southeastern portion of the site to remove potentially mobile petroleum from the subsurface. The number, depth, type and spacing of the recovery wells will be determined during the design phase of the remedy. Petroleum will be collected periodically from each well by automatic or other collection methods.

The operation of this component of the remedy will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

4) Groundwater Remedy

Contaminated groundwater is not currently migrating off-site. Groundwater monitoring will continue throughout the petroleum tar recovery activities discussed in Remedy Element 3. If groundwater contamination becomes mobile and may migrate off-site, active groundwater remediation, such as In-Situ Chemical Oxidation, Enhanced Bioremediation, *etc*. will be evaluated and implemented if required as part of the Site Management Plan discussed in Remedy Element 6.

Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a Track 4 commercial cleanup at a minimum.

5) 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 commercial or industrial 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.

6) 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 Remedy Element 5 above.
- Engineering Controls: The Cover System and the Petroleum Tar Recovery discussed in Remedy Elements 2 and 3 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 Remedy Element 2 above will be placed in any areas where the upper one foot of exposed surface soil exceeds 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 and petroleum tar levels to assess the performance and effectiveness of the remedy;
- a 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, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

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

January 28, 2025

Date

Richard A. Mustico, Director
Remedial Bureau A

DECISION DOCUMENT

Red Hook 4 Properties
Brooklyn, Kings County
Site No. C224214
January 2025

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 repository:

DECInfo Locator - Web Application
https://gisservices.dec.ny.gov/gis/dil/index.html?rs=C224214

Red Hook - Park Slope Library
431 6th Avenue
Brooklyn, NY 11215
Phone: 718-832-1-853

Brooklyn Community Board 6
250 Baltic Avenue
Brooklyn, NY 11201
718-643-3027

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 2.29-acre Red Hook 4 Properties site is located in the Red Hook neighborhood of Brooklyn. The site is Tax Block 514, Lot 1 and 40. The site is bounded by Sullivan Street to the north, Ferris Street to the east, Wolcott Street to the south, and an industrial building followed by Buttermilk Channel to the west.

Site Features: The site is a rectangularly-shaped and is a gravel lot with no buildings.

Current Zoning and Land Use: The site is currently zoned M2-1 for manufacturing which allows manufacturing and certain commercial uses. The site is currently used for parking.

Past Use of the Site: Past uses include an oil refinery, a lubricating oil storage facility, lumber yard, ship repair facility, and a parking lot.

Site Geology and Hydrogeology: The subsurface strata consist of historic fill that extends from ground surface to depths ranging up to 15 feet below ground surface (ft bgs). Historic fill is underlain by apparent native silty sand. Bedrock is estimated to be approximately 110 to 150 ft bgs.

Groundwater depth has been recorded at five to six ft bgs with the groundwater flowing northwest towards Buttermilk Channel.

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, an alternative that restricts the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) was evaluated in addition to an alternative which would allow for unrestricted use

of the site.

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

SECTION 5: ENFORCEMENT STATUS

The Applicants under the Brownfield Cleanup Agreement are Volunteers. The Applicants do not have an obligation to address off-site contamination. However, NYSDEC 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

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:

benzene	toluene
ethylbenzene	xylenes
1,2,4-trimethylbenzene	acenaphthene
fluorene	naphthalene

The contaminants 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.

The following IRMs have been completed at this site based on conditions observed during the RI.

Dense Non-Aqueous Phase Liquid Recovery IRM
Petroleum dense non-aqueous phase liquid (DNAPL) was identified in monitoring wells installed in the southeastern part of the site. Recovery of DNAPL is performed *via* six petroleum product recovery wells. These wells were positioned to optimize recovery of DNAPL, as identified during the Supplemental Remedial Investigation (SRI). DNAPL recovery is being performed between depths of 50 and 73.5 ft bgs. Recovery efforts occur monthly and will continue as a portion of the final remedy.

The DNAPL recovery began on November 9, 2020, and is ongoing.

Light Non-Aqueous Phase Liquid (LNAPL) Soil Excavation IRM
Soil excavation occurred in three separate areas displayed in Figure 4. These areas were identified during the RI to contain petroleum LNAPL. The originally proposed area was expanded after confirmation borings were drilled along the borders of the original excavation, the borings were

stepped out until LNAPL was not detected. The excavations went down to a depth of 15 ft bgs. The LNAPL that was excavated was identified at depths between five to 15 ft bgs. Soil sample results for petroleum-related VOCs and SVOCs were compared to the protection of groundwater soil cleanup objectives (PGSCOs), while the remaining contaminant classes were compared against the commercial soil cleanup objectives (CSCOs) in Section 6.3, Summary of Environmental Assessment, below.

Sheeting was installed to support the LNAPL excavations. Dewatering wells were installed in all three excavation areas since the excavations extended below the water table, which was observed at depths between three to eight ft bgs. Dewatering fluids were treated and discharged into Buttermilk Channel under a NYSDEC-issued permit equivalent or were taken off-site for proper disposal. The contaminated soil removed from the excavations was taken off-site for proper disposal. Clean backfill was imported to the site to fill in the excavation areas.

The on-site soil excavation began on October 21, 2019, and was completed on January 29, 2020. The Construction Completion Report was approved by NYSDEC on February 11, 2022.

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), pesticides and Emerging Contaminants. Soil vapor samples were analyzed for VOCs. Based on the investigations conducted to date, the primary contaminants of concern are the contaminants related to petroleum impacts.

Nature and Extent of Contamination:

Soil - DNAPL was identified in the southern portion at depths between 50 to 73.5 ft bgs. Soil sample results for petroleum-related VOCs and SVOCs were compared to the PGSCOs, while the remaining contaminant classes were compared against the CSCOs. The exceedances of VOCs were at depths between 54 to 69 ft bgs. VOCs found in exceedance were 1,2,4-trimethylbenzene at a maximum concentration of 380 parts per million, or ppm (PGSCO is 3.6 ppm), benzene at 340 ppm (PGSCO is 0.06 ppm), toluene at 1,200 ppm (PGSCO is 0.7 ppm) and total xylenes at 1,400 ppm (PGSCO is 1.6 ppm). SVOCs found in exceedance include acenaphthene at a maximum concentration of 1,200 ppm (PGSCO is 98 ppm), fluorene at 640 ppm (PGSCO is 386 ppm), phenanthrene at 1,800 ppm (PGSCO is 1000 ppm), and naphthalene at 5,900 ppm (PGSCO is 12 ppm). PFAS, PCBs and pesticides had no exceedances in soil. Metal and polycyclic aromatic hydrocarbon (PAH) levels are consistent with historic fill in the area. DNAPL has been identified on the border and off-site under Wolcott Street and Ferris Street. DNAPL was identified between 11 to 20 ft bgs under Wolcott Street and 71.6 to 71.8 ft bgs under Ferris Street.

Data indicates there are minor off-site petroleum impacts in soil related to the site.

Groundwater: Groundwater testing showed exceedances of the NYS Ambient Water Quality Standards and Guidance Values (AWQSGCs) for VOCs, SVOCs, and PFAS. VOC exceedances include ethylbenzene at 1,700 parts per billion, or ppb (AWQSGV is 5 ppb), benzene at 8,300 ppb (AWQSGV is 1 ppb), and toluene at 13,000 ppb (AWQSGV is 5 ppb). SVOCs include acenaphthene at 1,500 ppb (AWQSGV is 20 ppb), benzo(a)pyrene at 1,400 ppb (AWQSGV is 0 ppb), fluorene at 4,700 ppb (AWQSGV is 50 ppb), phenanthrene at 13,000 ppb (AWQSGV is 50 ppb), styrene at 4,000 ppb (AWQSGV is 50 ppb), and naphthalene at 47,000 ppb (AWQSGV is 10 ppb). For PFAS, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were reported at concentrations of up to 110 and 12 parts per trillion (ppt), respectively, exceeding the AWQSGV of 6.7 ppt and 2.7 ppt, respectively.

Data does not indicate potential off-site impacts in groundwater related to this site.

Soil Vapor - Several VOCs were detected in soil vapor throughout the site, including benzene at a maximum concentration of 48 micrograms per cubic meter (µg/m3), toluene (max. 42.3 µg/m3) and total xylene (max. 59 µg/m3).

Data does not indicate potential off-site impacts in soil vapor related to this 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 to the site is restricted by a fence. People may come into contact with contaminated soil or groundwater 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 structures 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 structures, 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 due to soil vapor intrusion for any future on-site development. 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 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 NAPL Recovery 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 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) 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).

3) Petroleum Tar Recovery

Installation and operation of petroleum recovery wells along the southeastern portion of the site to remove potentially mobile petroleum from the subsurface. The number, depth, type and spacing of the recovery wells will be determined during the design phase of the remedy. Petroleum will be collected periodically from each well by automatic or other collection methods.

The operation of this component of the remedy will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

4) Groundwater Remedy

Contaminated groundwater is not currently migrating off-site. Groundwater monitoring will continue throughout the petroleum tar recovery activities discussed in Remedy Element 3. If groundwater contamination becomes mobile and may migrate off-site, active groundwater remediation, such as In-Situ Chemical Oxidation, Enhanced Bioremediation, *etc*. will be evaluated and implemented if required as part of the Site Management Plan discussed in Remedy Element 6.

Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a Track 4 commercial cleanup at a minimum.

5) 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 commercial or industrial 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.

6) 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 Remedy Element 5 above.
- Engineering Controls: The Cover System and the Petroleum Tar Recovery discussed in Remedy Elements 2 and 3 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 Remedy Element 2 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 and petroleum tar levels to assess the performance and effectiveness of the remedy;
- a 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.

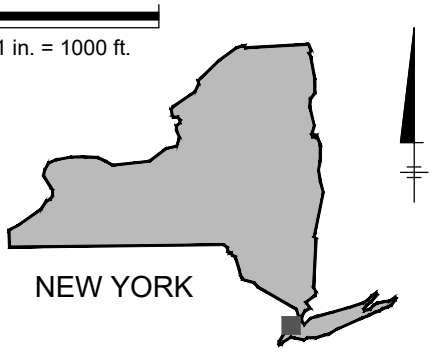
c. An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

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

REFERENCE: BASE MAP USGS 7.5 MIN. TOPO. QUADS., JERSEY CITY, NJ-NY, 2016, AND BROOKLYN, NY, 2016

0 1000' 2000'

Approximate Scale: 1 in. = 1000 ft.



BT RED HOOK, LLC - RED HOOK 4
44 AND 62 FERRIS STREET/219 SULLIVAN STREET
BROOKLYN, NEW YORK
SUPPLEMENTAL REMEDIAL INVESTIGATION

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

LEGEND:

- DNAPL RECOVERY WELL (6-INCH DIAMETER)
- ABANDONED RECOVERY WELL
- SITE BOUNDARY
- FENCE

NOTES:

1. RECOVERY WELL LOCATIONS AND PHYSICAL FEATURES BASED ON SURVEYS CONDUCTED BY DPK LAND SURVEYING, LLC ON JUNE 2, 2022, AND NOVEMBER 2, 2022.
2. PROPERTY BOUNDARIES OBTAINED FROM FIGURE ENTITLED "ALTA/NSPS LAND TITLE SURVEY" (LANGAN APRIL 4, 2017).
3. SITE COVER AND ENVIRONMENTAL EASEMENT COVER ENTIRE PROPERTY.

0 120' 240'

GRAPHIC SCALE

BT RED HOOK, LLC
RED HOOK 4
44 AND 62 FERRIS STREET/219 SULLIVAN STREET
BROOKLYN, NEW YORK

REMEDIAL ACTION WORK PLAN

DNAPL RECOVERY WELL LOCATIONS

ARCADIS

FIGURE
2

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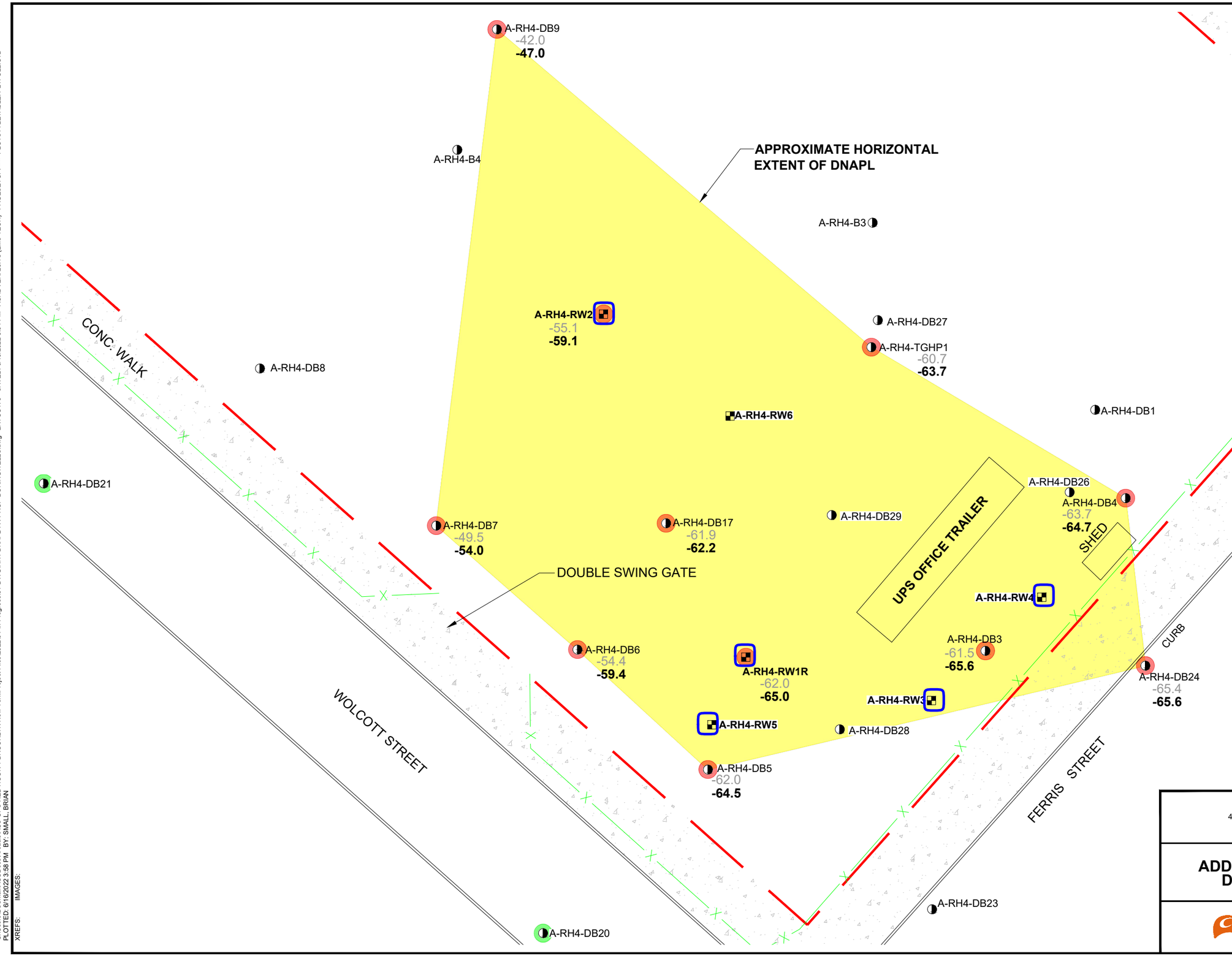


LEGEND:

- DNAPL RECOVERY WELL
- SOIL BORING
- GEOTECHNICAL BORING
- BLOCK/LOT/BROWNFIELD BOUNDARY
- FENCE
- VISIBLE DNAPL SHALLOWER THAN 20 FEET
- VISIBLE DNAPL DEEPER THAN 40 FEET
- -60.7 TOP OF DNAPL ELEVATION
- **-63.7** BOTTOM OF DNAPL ELEVATION/TOP OF DENSER LITHOLOGY

NOTES:

1. BORING/WELL LOCATIONS AND PHYSICAL FEATURES BASED ON SURVEYS CONDUCTED BY DPK LAND SURVEYING, LLC ON OCTOBER 27, 2017, SEPTEMBER 26, 2018 AND AUGUST 5, 2021.
2. PROPERTY BOUNDARIES OBTAINED FROM FIGURE ENTITLED "ALTA/NSPS LAND TITLE SURVEY" (LANGAN APRIL 4, 2017).
3. FIGURE BASED ON DENSE NON-AQUEOUS PHASE LIQUID RECHARGE STUDY AND RECOVERY STUDY - FIGURE 14 DATED 9/9/2021.
4. BORING LOCATIONS SHOWN IN GRAY WERE NOT FIELD LOCATED OR SURVEYED BY ARCADIS AND WERE DIGITIZED FROM FIGURES PROVIDED BY AESI AND LANGAN.
5. DNAPL ELEVATIONS ARE APPROXIMATE AND BASED ON BORING LOGS AND SOIL CORE PHOTOGRAPHS.
6. SOIL BORINGS WITH AN "A-" PREFIX WERE ADVANCED BY ARCADIS.
7. DNAPL - DENSE NON-AQUEOUS PHASE LIQUID
8. ALL LOCATIONS APPROXIMATE.

0 20' 40'

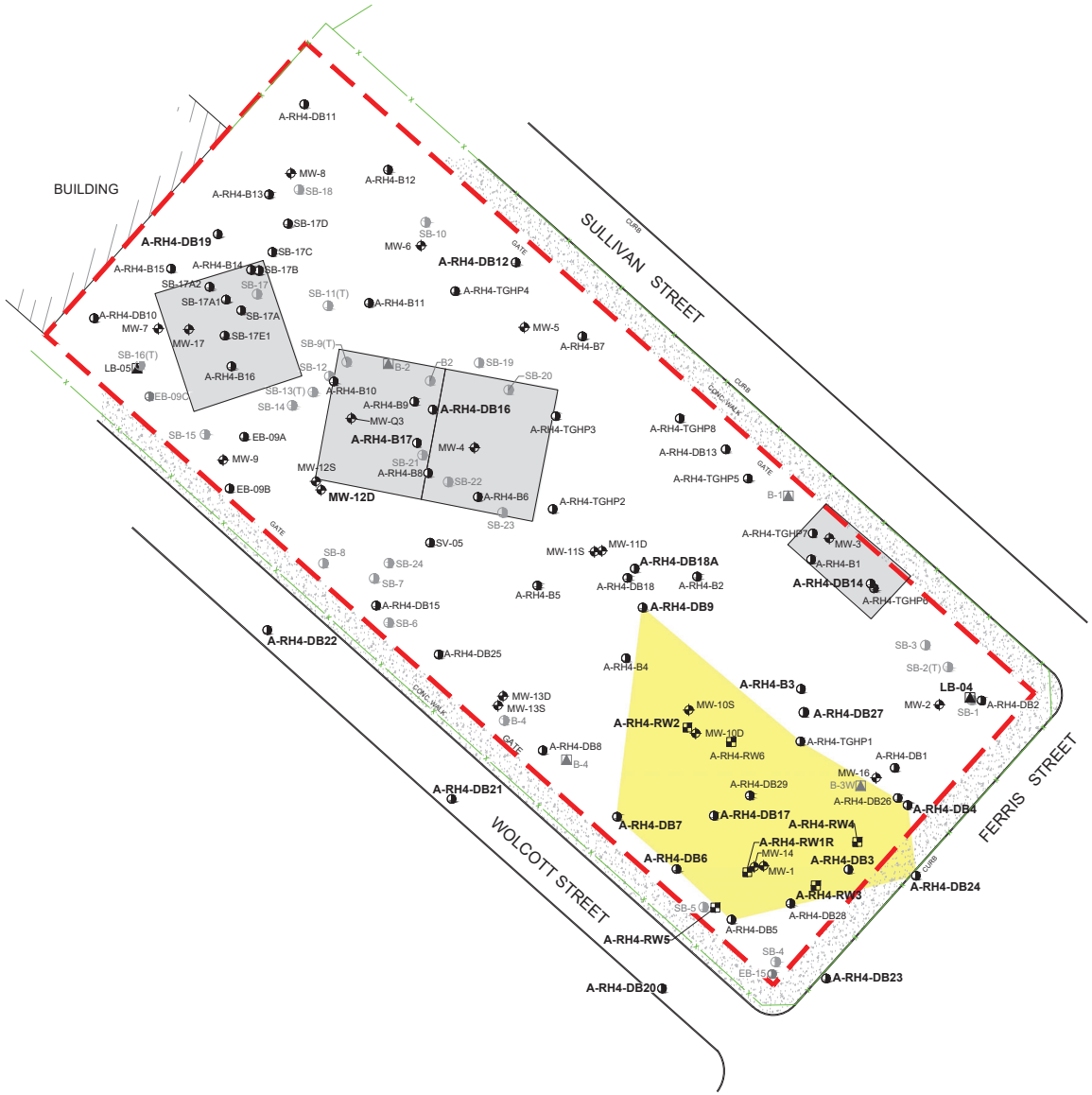
GRAPHIC SCALE

BT RED HOOK, LLC
RED HOOK 4
44 AND 62 FERRIS STREET/219 SULLIVAN STREET
BROOKLYN, NEW YORK
PRE-DESIGN WORK PLAN

ADDITIONAL SOIL BORINGS AND DNAPL RECOVERY WELLS

ARCADIS

FIGURE
3



LEGEND:

- MONITORING WELL (DECOMMISSIONED OR REMOVED)
- DNAPL RECOVERY WELL
- SOIL BORING
- SOIL BORING (NOT SURVEYED)
- GEOTECHNICAL BORING
- GEOTECHNICAL BORING (NOT SURVEYED)
- SITE BOUNDARY
- FENCE
- SURVEYED LIMITS OF INTERIM REMEDIAL MEASURE EXCAVATION AREA, 2020, KENNON SURVEYING SERVICES
- APPROXIMATE HORIZONTAL EXTENT OF DNAPL
- GEOLOGIC CROSS-SECTION TRANSECT

NOTES:

1. BORING/WELL LOCATIONS AND PHYSICAL FEATURES BASED ON SURVEYS CONDUCTED BY DPK LAND SURVEYING, LLC ON OCTOBER 27, 2017, SEPTEMBER 26, 2018, AUGUST 5, 2021 AND JUNE 2, 2022.
2. PROPERTY BOUNDARIES OBTAINED FROM FIGURE ENTITLED "ALTA/NSPS LAND TITLE SURVEY" (LANGAN APRIL 4, 2017).
3. BORING LOCATIONS SHOWN IN GRAY WERE NOT FIELD LOCATED OR SURVEYED BY ARCADIS AND WERE DIGITIZED FROM FIGURES PROVIDED BY AESI AND LANGAN.
4. DNAPL - DENSE NON-AQUEOUS PHASE LIQUID

0 60' 120'

GRAPHIC SCALE

BT RED HOOK, LLC
RED HOOK 4
44 AND 62 FERRIS STREET/219 SULLIVAN STREET
BROOKLYN, NEW YORK
DNAPL RECHARGE STUDY

GEOLOGIC CROSS SECTION LOCATION MAP

ARCADIS

FIGURE
4

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