

**24-19 JACKSON AVENUE
QUEENS, NEW YORK**

Remedial Action Work Plan

**LIC COURT SQUARE DEVELOPMENT
24-19 Jackson Avenue
Queens, New York
Block 80, Lot 4
OER Project Number #23TMP0452Q**

Prepared For:

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REMEDIAL ACTION WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C&D	Construction and Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering Controls and Institutional Controls
ELAP	Environmental Laboratory Accreditation Program
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IRM	Interim Remedial Measure
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYS DEC	New York State Department of Environmental Conservation
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYC VCP	New York City Voluntary Cleanup Program
NYCRR	New York Codes Rules and Regulations
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DOH	New York State Department of Health

NYS DOT	New York State Department of Transportation
ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
RI	Remedial Investigation
RMZ	Residual Management Zone
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
USGS	United States Geological Survey
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VOC	Volatile Organic Compound

CERTIFICATION

I, Xin Yuan, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the 24-19 Jackson Avenue, Queens, NY, OER Project Number 23TMP0452Q. I certify under the appropriate standard of care to the following:

- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Remedial Action Work Plan and are of sufficient detail to enable proper construction.
- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of remediation-related soil, fill and fluids removed from the property in accordance with applicable City, State and Federal laws and regulations. The RAWP also has a plan for importation of all soil, fill and other material from off-Site in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Xin Yuan
Name

096444
PE License Number

Signature

December ??, 2022
Date

I, Greg Chicas Mendez, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the 24-19 Jackson Avenue, Queens, NY site, OER site number 23TMP0452Q. I certify under the appropriate standard of care to the following:

- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of remediation-related soil, fill and fluids removed from the property in accordance with applicable City, State and Federal laws and regulations. The RAWP also has a plan for importation of all soil, fill and other material from off-Site in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Greg Chicas Mendez
QEP Name



QEP Signature

December ??, 2022
Date

EXECUTIVE SUMMARY

Court Square 45th Ave, LLC is working with the NYC Office of Environmental Remediation (OER) to fulfill the requirements of the hazardous materials E-Designation with consideration for participation in the New York City Voluntary Cleanup Program to investigate and remediate a 17,820-square foot (0.41 acres) Site located at 24-19 Jackson Avenue in Queens, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Background

The Site is located at 24-19 Jackson Avenue in the Long Island City neighborhood of Queens, New York and is identified as Block 80 and Lot 4 on the New York City Tax Map. The Site consists of a single undeveloped parcel bordered on the east by an existing two and three-story building identified as 24-23 and 24-29 Jackson Avenue, to the south by Jackson Avenue, to the southwest by a staircase entry into the Court Square New York City Transit Authority (TA) station, to the northwest by 23rd Street and overhead "7" train line running northeast-southwest above 23rd Street, and to the north-northeast by an open lot at 23-14 45th Avenue. Additionally, the TA "G" subway line is oriented northeast-southwest below Jackson Avenue to the south. Lot 4 will be modified from its' current layout to a lot covering about 20,250-square-feet in footprint area with apportionment of Lot 9 (originally 17,859 sf before apportionment). Due to the apportionment, the NYC OER E-Designation assigned to 23-14 45th Avenue, Lot 9, contiguous to the north, will apply to Lot 4.

The Site is relatively level and the elevations referenced in this report refer to the North American Vertical Datum of 1988 (NAVD88). Ground surface elevations across the project site range from about El. +15 to +16, and from about El. +15 to +16.5 along the sidewalks along 23rd Street, the Court Square TA station, and Jackson Avenue. The average depth to groundwater measured during the previous remedial investigation is 13 feet, and the range in depth is 11.59 to 15.49 feet bgs. There is a possibility that groundwater may be encountered during redevelopment.

Summary of Redevelopment Plan

Court Square 45th Ave, LLC intends to develop two new mixed-use 54-story residential towers totaling approximately 705,00 gross square feet (GSF). The project is currently designed as two separate buildings (“north” on Lot 9 and “south” on Lot 4). The new building will be interconnected but considered separate and have two separate NYCDOB filings. The two mixed-use buildings will each contain a residential tower with first floor lobby and retail and commercial uses in the base (first and third through sixth floors). The parking level is on the second floor with attendants on the first floor (ground level). The residential portion (seventh through 54th floors) will contain 10% market rate residential condominiums and 90% mixed-income rentals subdivided into 75% market rate and 25% affordable units as required by Mandatory Inclusionary Housing. The two buildings will contain a total of approximately 94,000 ZSF of commercial uses on the first five floors and 447,000 ZSF of rental apartments and condominiums above. The northern building on Lot 9 will contain 25,000 ZSF of commercial uses and 220,000 ZSF of residential uses yielding approximately 285 residential units. The southern building on Lot 4 will contain 69,000 ZSF of commercial uses and 227,000 ZSF of residential uses yielding approximately 285 residential units. The buildings will share utility services. There will be no subgrade cellar level or outdoor ground level space.

Bottom of foundation for the buildings will be at about 4-feet below the average sidewalk levels around the site, i.e., about El. +11, and locally deeper within the building’s interior core up to 12.5-feet below grade (fbg) to accommodate a 6-foot-thick mat slab, detention tanks and mechanical/elevator pits.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

Summary of Surrounding Property

The Site and surrounding area are located in an urban setting that is zoned as C4-4D, Commercial District. An NYC IRT elevated subway line runs northeast-southwest above 23rd Street. Land use surrounding the Site is urban and characterized by commercial use. The Site is bordered to the northeast by an open lot at 23-14 45th Avenue. Additionally, the TA “G” subway line runs northeast-southwest below Jackson Avenue to the south.

The Site is located within the “Mckenna Triangle” greenspace and is directly bordered to the north by 45th Avenue, to the west by retail/commercial establishments including Teso Life department store and

southwest by Maya Assurance Insurance company. The Site is further bordered to the east by Jackson Avenue and Court Square Park, to the south by Jackson Avenue, Bank of America Financial, Pantry Market and Brooks 1890 eatery. The nearest ecological receptor is the East River, which is located more than 0.3 mile west from the Site.

Summary of Past Site Uses and Areas of Concern

According to available historical records, the Subject Property was developed as early as 1898 with several 2-and-4-story dwellings, stores, and mixed-use structures. Usage prior to 1898 is unknown. According to Sanborn Fire Insurance Maps, usage of the Site buildings was consistently non-descript commercial up until sometime between 2008 and 2010, at which point the buildings on the eastern portion of the property were demolished. The remaining buildings on the western portion of the Site were demolished circa 2015. The Site has remained undeveloped and unoccupied since then. Upgradient properties with a potential for contaminant migration onto the subsurface of the Site were also identified.

One (1) closed NYSDEC Spill case is listed at the property. Spill Case #0904201 was activated on August 2, 2007, when contamination was detected during a tank cleaning/removal. According to the NYSDEC Memo, the contaminated soil was excavated, and clean samples were received and reported in a Remedial Action Report. The Spill was subsequently closed on May 04, 2011 by the NYSDEC.

The AOCs identified for this site include:

1. The presence of urban fill containing heavy metals and polyaromatic hydrocarbons (PAHs).
2. Construction Debris on-Site.
3. Dark fill material layer previously identified in the *Galli Remedial Action Report (RAR) dated April 29, 2011* which is detailed in the RIR. This fill was identified at 7-9 fbg and was reportedly composed of construction and demolition debris.

Summary of Work Performed under the Remedial Investigation

IEC proposed the investigation of soil, groundwater and soil vapor in a Remedial Investigation Work Plan (RIWP) dated September 2022 which was subsequently approved by OER. Investigation was performed to properly characterize the Site for potential environmental impacts from historic on-site and off-site uses, operations, etc. Proposed sampling targeted specific areas and/or features identified as RECs or

BERs in previous reports and provided general horizontal and vertical characterization for development purposes.

The following elements were included:

1. A geophysical survey to identify anomalies indicative of USTs and associated piping and clear boring locations from physical and/or subsurface utilities and structures;
2. Installation of eight (8) soil borings (B-1 through B-8) and collection of 16 soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installation of three (3) permanent groundwater monitoring wells (MW-1 through MW-3) to establish groundwater depth and collect three (3) groundwater samples for chemical analysis to evaluate groundwater quality; and,
4. Installation of six (6) soil vapor implants (SV-1 through SV-6) and collection soil vapor samples for vapor analysis to evaluate soil vapor conditions at proposed slab-on grade locations and/or the water table surface. Samples were collected to assess subsurface conditions at the proposed buildings core where detention tanks and elevator will be installed.

Soil, groundwater and soil vapor samples were submitted to Phoenix Environmental Laboratories (Phoenix) of Manchester, Connecticut, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301).

Soil samples were analyzed for the following full analysis:

- NYCRR Part 375 List Volatile organic compounds (VOCs) via EPA Method 8260;
- NYCRR Part 375 List Semi-volatile organic compounds (SVOCs) via EPA Method 8270;
- NYCRR Part 375 List Pesticides via EPA Method 8081;
- Polychlorinated biphenyls (PCBs) via EPA Method 8082A;
- Target Analyte List (TAL) Metals via EPA Method 6010; and,
- PFOA/PFAS (NYSDEC list) via EPA 537.1 and 1,4-dioxane via EPA Method 8270 SIM **four (4) select soil samples only.*

Groundwater samples were analyzed for the following Full analysis:

- Target Compound List (TCL) VOCs via EPA Method 8260;
- TCL SVOCs via EPA Method 8270;

- TCL Pesticides Method 8081;
- PCBs via EPA 8082A;
- Target Analyte List (TAL) Metals List (filtered and total) via EPA Method 6010; and,
- PFOA/PFAS (NYSDEC list) via EPA 537.1 and 1,4-dioxane via EPA Method 8270 SIM **three (3) select groundwater samples only.*

Soil vapor samples were submitted to an ELAP certified Environmental Laboratory and analyzed for:

- VOCs in accordance with the USEPA Compendium Method TO-15.

Summary of Findings of Remedial Investigation

1. Site elevations range from about el +15 to el +16.
2. Bedrock was not encountered during this RI. Depth to bedrock is anticipated to be greater than 100 feet at the Site.
3. The stratigraphy of the site, from the surface down, consists of fill material from surface grade to depths of about 7-10 feet bgs, and composed with brown fine to medium sand with concrete, brick and gravel. The fill layer was underlain by a native sand layer consisting of brown, fine to medium sand and some gravel.
4. Soil/fill samples were collected during IEC's RI and results were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCO) as presented in 6NYCRR Part 375-6.8 and CP51. Soil/fill samples showed the following:
 - Volatile Organic Compounds (VOCs): Acetone was detected below UUSCOs and RRSCO at 32 microgram per kilogram ($\mu\text{g}/\text{kg}$) in sample IEC-B3 (4'-6') and at 43 $\mu\text{g}/\text{kg}$ in sample boring B5 (4'-6'). Naphthalene was detected below the UUSCOs and RRSCO at 1.6 ($\mu\text{g}/\text{kg}$) in sample IEC-B6 (12'-14').
 - Polychlorinated Biphenyls (PCBs): PCB 1260 was detected above the UUSCOs at 140 $\mu\text{g}/\text{kg}$ in sample B5 (4'-6') and at 130 $\mu\text{g}/\text{kg}$ in sample B7 (0'-2').
 - Semi-Volatile Organic Compounds (SVOCs): Benzo(a)pyrene (1,200 $\mu\text{g}/\text{kg}$) and Indeno(1,2,3-cd)pyrene (1,100 $\mu\text{g}/\text{kg}$) was detected above UUSCOs and RRSCO in soil sample IEC-B1 (0'-2'). Indeno(1,2,3-cd)pyrene (690 $\mu\text{g}/\text{kg}$) was detected above UUSCOs and RRSCO in soil sample IEC-B1 (4'-6'). Benzo(a)pyrene (17,000 $\mu\text{g}/\text{kg}$), benzo(b)fluoranthene

- (14,000 µg/kg), benzo(k)fluoranthene (14,000 µg/kg), chrysene (19,000 µg/kg), dibenzo(ah)anthracene (1,700 µg/kg) and indeno(1,2,3-cd)pyrene (9,500 µg/kg) was detected above the UUSCOs and RRSCOs in soil sample IEC-B2 (0'-2'). Benzo(a)pyrene (1,400 µg/kg), benzo(b)fluoranthene (1,200 µg/kg), benzo(k)fluoranthene (890 µg/kg) and indeno(1,2,3-cd)pyrene (1,100 µg/kg) was detected above the UUSCOs and RRSCOs in soil sample IEC-B3 (0'-2'). Benzo(a)pyrene (1,400 µg/kg), benzo(a)anthracene (1,300 µg/kg), benzo(k)fluoranthene (1,200 µg/kg), benzo(b)fluoranthene (1,300 µg/kg), chrysene (1,500 µg/kg) and indeno(1,2,3-cd)pyrene (1,000 µg/kg) was detected above the UUSCOs and RRSCOs in soil sample IEC-B6 (0'-2') and chrysene (1,100 µg/kg) and indeno(1,2,3-cd)pyrene (550 µg/kg) was detected above the UUSCOs and RRSCOs in soil sample IEC-B7 (0'-2'). Indeno(1,2,3-cd)pyrene (550 µg/kg) was detected above the UUSCOs and RRSCOs in soil sample IEC-B7 (4'-6'). Benzo(a)pyrene (11,000 µg/kg), benzo(b)fluoranthene (9,400 µg/kg), benzo(k)fluoranthene (4,500 µg/kg), chrysene (12,000 µg/kg), dibenzo(ah)anthracene (1,900 µg/kg) and indeno(1,2,3-cd)pyrene (7,000 µg/kg) was detected above the UUSCOs and RRSCOs in soil sample IEC-B8 (0'-2').
- Metals: including hexavalent chromium (max. of 0.75 mg/kg in IEC-B2-0'-2'), cadmium (max. of 2.65 mg/kg), copper (max. of 535 mg/kg), barium (max. of 1,230 mg/kg), lead (max. of 5,190 mg/kg), mercury (max. of 1.03 mg/kg), and zinc (max. of 820 mg/kg) exceeded UUSCOs. Of these metals, copper, lead and mercury also exceeded RRSCOs in shallow soil samples IEC-B1 (0'-2') and IEC-B2 (0'-2').
 - Pesticides: 4,4-DDD (max. of 3.7 µg/kg), 4,4-DDE (max. of 38 µg/kg), 4,4-DDT (max. of 230 µg/kg), a-chlordane (max. of 170 µg/kg), aldrin (max. of 17 µg/kg) and dieldrin (max. of 25 µg/kg) exceeded UUSCOs in samples IEC-B1 (0'-2'), IEC-B2 (0'-2'), IEC-B1(4'-6'), IEC-B5 (4'-6') and IEC-B7 (0'-2').
 - Total Emerging Contaminants: Perfluorooctanesulfonic Acid (PFOS) and N-EtFOSAA was detected at a concentration of 1.40 µg/kg *dry* and 0.746 µg/kg *dry*, respectively in soil sample B4-(0'-2'), and at a concentration of 0.912 µg/kg *dry* and 0.251 µg/kg *dry*, respectively, in soil sample B6-(12'14').
5. Groundwater samples were collected during the October 10, 2022 Investigation and results were compared to NYSDEC TOGS Ambient Water Quality Standards (AWQS). Groundwater samples showed the following:

- Volatile Organic Compounds (VOCs): VOCs were not detected above the AWQS in any of the ground water samples collected during this RI.
 - Polychlorinated Biphenyls (PCBs): PCBs were not detected in any groundwater sample collected during this RI.
 - Semi-Volatile Organic Compounds (SVOCs): Benz(a)anthracene (max of 0.03 µg/L in MW 1), benzo(b)fluoranthene (max of 0.02 µg/L in GW 1), chrysene (max. of 0.02 µg/L in MW 1) and indeno(1,2,3-cd)pyrene (max of 0.04 µg/L in MW 1) exceeded the AWQS.
 - Metals (total): Aluminum (max of 18.8 mg/L), chromium (max of 0.055 mg/L), iron (max of 33.3 mg/L), lead (max of 0.041 mg/L), magnesium (max of 36.7 mg/L), manganese (max of 2.74 mg/L), selenium (max of 0.015 mg/L), sodium (max of 152 mg/L) and thallium LDL (max of 0.001 mg/L) exceeded the AWQS in one or more of the wells MW-1 through MW-3.
 - Metals (dissolved): Manganese (max of 1.15 mg/L), and/or sodium (max of 152 mg/L) exceeded the AWQS in groundwater samples (MW-1 and MW-2).
 - Pesticides: Chlordane (max of 0.079 µg/L in MW-1) and dieldrin (max of 0.005 µg/L in MW-1) exceeded the AWQS.
 - Total Emerging Contaminants: Detections of these compounds were present in all three samples collected as part of the RI. The highest concentrations included Perfluorooctanesulfonic Acid (PFOS) at 11.1 nanogram per liter (ng/L), Perfluorohexanoic acid (PFHxA) at 52.7 ng/L, Perfluoroheptanoic acid (PFHpA) at 37.7 ng/L, Perfluorohexanesulfonic acid (PFHxS) at 28.6 ng/L, Perfluorooctanoic acid (PFOA) at 232 ng/L, Perfluorooctanesulfonic acid (PFOS) at 70.4 ng/L, Perfluorononanoic acid (PFNA) at 4.39 ng/L, Perfluorodecanoic acid (PFDA) at 2.67 ng/L, Perfluoropentanoic acid (PFPeA) at 59.3 ng/L, Perfluoro-1-heptanesulfonic acid (PFHpS) at 3.02 ng/L and Perfluoro-n-butanoic acid (PFBA) at 28.6 ng/L.
6. Soil vapor results determined during the October 10, 2022 investigation were compared to the compounds listed in Table 3.1 Air Guidance Values derived by the New York State Department of Health (NYSDOH) located in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006 and the revised NYSDOH Decision Matrices dated May 2017. Results showed the following:
- Petroleum-related VOCs: Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) were not detected above regulatory criteria in any of the vapor samples collected during this RI.

- Chlorinated-VOCs: 1,1,1-Trichloroethane (1,1,1-TCA) was reported as not detected up to 31 microgram per cubic meter ($\mu\text{g}/\text{m}^3$), 1,1-Dichloroethene (1,1-DCA) was reported as not detected up to $0.54 \mu\text{g}/\text{m}^3$, Carbon Tetrachloride was reported as not detected up to $0.27 \mu\text{g}/\text{m}^3$, Cis-1,2-Dichloroethene was reported as not detected up to $1.83 \mu\text{g}/\text{m}^3$, Methylene Chloride was reported as not detected up to $4.86 \mu\text{g}/\text{m}^3$, Tetrachloroethene (PCE) was detected from $47 \mu\text{g}/\text{m}^3$ to $281 \mu\text{g}/\text{m}^3$, Trichloroethene (TCE) was detected $0.26 \mu\text{g}/\text{m}^3$ to $10.9 \mu\text{g}/\text{m}^3$, Vinyl Chloride was not detected above laboratory method detection limits.

Summary of the Remedial Action

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

The preferred remedial action alternative is the Track 4 remedial action with the alternative for Track 2. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.

2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Restricted Residential (Track 2 or Track 4) Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Performance of additional site characterization sampling of soil through the collection of up to four (4) soil samples.
6. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
7. Excavation and removal of soil/fill exceeding Restricted Residential Track 4 Site specific SCOs which would be achieved by excavating two hot spots to a depth of about 8 fbg. As an alternative to the Track 4 remedial action, removal of soil exceeding the Track 2 Restricted Residential SCOs by excavating approximately 8 fbg across the area of Site outside of the building's inner core excavation to 12.5 fbg. The entire footprint of the building area (about 75% of the property will be excavated to a depth of approximately 4 fbg and 25% to a depth of approximately 12.5 fbg) for development purposes. A small portion of property will be excavated to depths ranging from 6 up to approximately 13 fbg for elevator pits. Approximately 5800 cubic yards (yd³) of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.
8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
9. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.

10. Removal of all UST's that are encountered during soil/fill removal actions. Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
11. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
13. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
14. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
15. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
16. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and lists any changes from this RAWP.
17. As part of development, construction of a composite cover consisting of 6-inches of compacted gravel base and an 18-inch foundation slab across the Site except for outside of the new building core area including the detention tanks and elevator pit, which will have the gravel sub base and 6-foot-thick mat slab.
18. As part of development, installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a 20-mil Stego Wrap vapor barrier or equivalent below the slab throughout the full building area and a 20-mil adhesive-coated HDPE composite Stego Wrap sheets or equivalent outside all

sub-grade foundation sidewalls up to grade. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.

19. As part of development, a passive sub-slab depressurization system (SSDS) will be installed and operated beneath the slab on grade portion of the building to allow for the lateral movement, collection and venting of vapor from below the Site building. The passive SSDS will consist of a network of horizontal pipes set in the middle of a 12-inch thick and deep trench surrounded by gas permeable aggregate that is in contact with the 6-inch gravel base layer immediately beneath the vapor barrier system and the slab on grade portion of the building. The horizontal piping will consist of fabric wrapped, perforated 4-inch diameter schedule 40 PVC pipe that is set at a 1% slope away from the riser stub up locations that penetrate the first-floor slab. The vertical 4-inch steel riser pipe penetrates and travels through floors 1 through 6 to 3 feet above the finished roof of the 6th floor stair bulkhead. The riser pipe will be completed with a 6-inch stainless steel chimney cap with ½-inch mesh or equivalent. The passive SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the passive SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building.
20. If Track 4 SCOs are met, an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) will be submitted for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
21. If Track 4 SCOs are met, a Declaration of Covenants and Restrictions will be recorded that includes a listing of Engineering Controls and Institutional Controls and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it

is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

The NYC Office of Environmental Remediation (OER) provides governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan (“cleanup plan”) describes the findings of prior environmental studies, shows the location of identified contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

This cleanup plan provides a very high level of protection for neighboring communities and also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Project Information:

- Site Name: LIC Court Square Development
- Site Address: 24-19 Jackson Avenue, Queens, NY
- OER Project Number: 23TMP0452Q

Project Contacts:

- OER Project Manager: Shirley Chen, 212-788-8841
- IEC Site Project Manager: Greg Chicas-Mendez, 631-269-8800
- IEC Site Safety Officer: Chris Evertz, 631-269-8800
- Online Document Repository: <https://a002-epic.nyc.gov/app/workspace/33812/docrepository>

Remedial Investigation and Cleanup Plan: Under the oversight of the NYC OER, a thorough study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and to identify

contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

Identification of Sensitive Land Uses: Prior to selecting a cleanup, the neighborhood was evaluated to identify sensitive land uses nearby, such as schools, day care facilities, hospitals and residential areas. The cleanup program was then tailored to address the special conditions of this community.

Qualitative Human Health Exposure Assessment: An important part of the cleanup planning for the Site is a study to find all of the ways that people might come in contact with contaminants at the Site now or in the future. This study is called a Qualitative Human Health Exposure Assessment (QHHEA). A QHHEA was performed for this project. This assessment has considered all known contamination at the Site and evaluated the potential for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

Health and Safety Plan: This cleanup plan includes a Construction Health and Safety Plan (CHASP) that is designed to protect community residents and on-Site workers. The elements of this RAWP are in compliance with applicable safety requirements of the United States Occupational Safety and Health Administration (OSHA). This RAWP includes many protective elements including those discussed below.

Site Safety Coordinator: This project has a designated Site safety coordinator to implement the CHASP. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is identified at the beginning of this Community Protection Statement.

Worker Training: Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take

annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan: Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a 'Contingency Plan').

Odor, Dust and Noise Control: This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with applicable NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager or NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document.

Quality Assurance: This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report. This report will be submitted to the NYC Office of Environmental Remediation and will be thoroughly reviewed.

Stormwater Management: To limit the potential for soil erosion and discharge, this cleanup plan has provisions for stormwater management. The main elements of the stormwater management include physical barriers such as tarp covers and erosion fencing, and a program for frequent inspection.

Hours of Operation: The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation will conform to requirements of the NYC Department of Buildings.

Signage: While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC Voluntary Cleanup Program and provides project contact names and numbers, and a link to the document repository where project documents can be viewed.

Complaint Management: The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager or the NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

Utility Mark-outs: To promote safety during excavation in this cleanup, the contractor is required to first identify all utilities and must perform all excavation and construction work in compliance with NYC Department of Buildings regulations.

Soil and Liquid Disposal: All soil and liquid material removed from the Site as part of the cleanup will be transported and disposed of in accordance with all applicable City, State and Federal regulations, and required permits will be obtained.

Soil Chemical Testing and Screening: All excavations will be supervised by a trained and properly qualified environmental professional. In addition to extensive sampling and chemical testing of soils on the Site, excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection.

Stockpile Management: Soil stockpiles will be kept covered with tarps to prevent dust, odor and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed, to protect storm water catch basins and other discharge points.

Trucks and Covers: Loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with applicable laws and regulations.

Imported Material: All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on the Site. Waste materials will not be brought onto the Site. Trucks entering the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

Equipment Decontamination: All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

Housekeeping: Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

Truck Routing: Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

Final Report: The results of all cleanup work will be fully documented in a final report (called the Remedial Action Report) that will be available for public review online. A link to the online document repository and the public library with Internet access nearest the Site are listed on the first page of this Community Protection Statement document.

Long-Term Site Management: If long-term protection is needed after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined either in the property's deed or established through a city environmental designation registered with the Department of Buildings. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 Project Background

Court Square 45th Ave, LLC is working with the NYC Office of Environmental Remediation (OER) to fulfill the requirements of the hazardous materials E-Designation with consideration for participation in the New York City Voluntary Cleanup Program to investigate and remediate a property located at 24-19 Jackson Avenue in the Long Island City section of Queens, New York (the "Site"). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Background

The Site is located at 24-19 Jackson Avenue in the Long Island City neighborhood of Queens, New York and is identified as Block 80 and Lot 4 on the New York City Tax Map. **Figure 1** shows the Site location.

The Site consists of a single undeveloped parcel bordered on the east by an existing two and three-story building identified as 24-23 and 24-29 Jackson Avenue, to the south by Jackson Avenue, to the southwest by a staircase entry into the Court Square New York City Transit Authority (TA) station, to the northwest by 23rd Street and overhead "7" train line running northeast-southwest above 23rd Street, and to the north-northeast by an open lot at 23-14 45th Avenue. Additionally, the TA "G" subway line is oriented northeast-southwest below Jackson Avenue to the south. Lot 4 will be modified from its' current layout to a lot covering about 20,250-square-feet in footprint area with apportionment of Lot 9 (originally 17,859 sf before apportionment). Due to the apportionment, the NYC OER E-Designation assigned to 23-14 45th Avenue, Lot 9, contiguous to the north, will apply to Lot 4.

The Site is relatively level and the elevations referenced in this report refer to the North American Vertical Datum of 1988 (NAVD88). Ground surface elevations across the project site range from about El. +15 to +16, and from about El. +15 to +16.5 along the sidewalks along 23rd Street, the Court Square TA station, and Jackson Avenue. The average depth to groundwater measured during the previous remedial investigation is 13 feet, and the range in depth is 11.59 to 15.49 feet bgs, as per previous investigative

activities described herein. There is a possibility that groundwater may be encountered during redevelopment.

1.2 Redevelopment Plan

Court Square 45th Ave, LLC intends to develop two new mixed-use 54-story residential towers totaling approximately 705,000 gross square feet (GSF). The project is currently designed as two separate buildings (“north” on Lot 9 and “south” on Lot 4). The new building will be interconnected but considered separate and have two separate NYCDOB filings. The two mixed-use buildings will each contain a residential tower with first floor lobby and retail and commercial uses in the base (first and third through sixth floors). The parking level is on the second floor with attendants on the first floor (ground level). The residential portion (seventh through 54th floors) will contain 10% market rate residential condominiums and 90% mixed-income rentals subdivided into 75% market rate and 25% affordable units as required by Mandatory Inclusionary Housing. The two buildings will contain a total of approximately 94,000 ZSF of commercial uses on the first five floors and 447,000 ZSF of rental apartments and condominiums above. The northern building on Lot 9 will contain 25,000 ZSF of commercial uses and 220,000 ZSF of residential uses yielding approximately 285 residential units. The southern building on Lot 4 will contain 69,000 ZSF of commercial uses and 227,000 ZSF of residential uses yielding approximately 285 residential units. The buildings will share utility services. There will be no subgrade cellar level or outdoor ground level space.

Bottom of foundation for the buildings will be at about 4-feet below the average sidewalk levels around the site, i.e., about El. +11, and locally deeper within the building’s interior core up to 12.5-feet below grade (fbg) to accommodate a 6-foot-thick mat slab, detention tanks and mechanical/elevator pits. Proposed development plans are included as **Appendix 1**.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

1.3 Description of Surrounding Property

The Site and surrounding area are located in an urban setting that is zoned as C4-4D, Commercial District. An NYC IRT elevated subway line runs northeast-southwest above 23rd Street. Land use surrounding the Site is urban and characterized by commercial use. The Site is bordered to the

northeast by an open lot at 23-14 45th Avenue. Additionally, the TA “G” subway line runs northeast-southwest below Jackson Avenue to the south.

The Site is located within the “Mckenna Triangle” greenspace and is directly bordered to the north by 45th Avenue, to the west by retail/commercial establishments including Teso Life department store and southwest by Maya Assurance Insurance company. The Site is further bordered to the east by Jackson Avenue and Court Square Park, to the south by Jackson Avenue, Bank of America Financial, Pantry Market and Brooks 1890 eatery. The nearest ecological receptor is the East River, which is located more than 0.3 mile west from the Site. Surrounding land use features are summarized below:

Direction	Land Use
North	Vacant parcel, possible redevelopment construction site, followed by 45 th Avenue
East	Office and bank building followed by Jackson Avenue
South	Jackson Avenue followed by mixed-use commercial and residential buildings
West	23 rd Street and the #7 Route Metro Line, followed by mixed-use commercial and residential buildings

Figure 3 shows the surrounding land usage.

1.4 Summary of Past Site Uses and Areas of Concern

According to available historical records, the Subject Property was developed as early as 1898 with several 2-and-4-story dwellings, stores, and mixed-use structures. Usage prior to 1898 is unknown. According to Sanborn Fire Insurance Maps, usage of the Site buildings was consistently non-descript commercial up until sometime between 2008 and 2010, at which point the buildings on the eastern portion of the property were demolished. The remaining buildings on the western portion of the Site were demolished circa 2015. The Site has remained undeveloped and unoccupied since then. Upgradient properties with a potential for contaminant migration onto the subsurface of the Site were also identified.

One (1) closed NYSDEC Spill case is listed at the property. Spill Case #0904201 was activated on August 2, 2007, when contamination was detected during a tank cleaning/removal. According to the NYSDEC Memo, the contaminated soil was excavated, and clean samples were received and reported in a Remedial Action Report. The Spill was subsequently closed on May 04, 2011 by the NYSDEC.

The AOCs identified for this site include:

4. The presence of urban fill containing heavy metals and polyaromatic hydrocarbons (PAHs).
5. Construction Debris on-Site.
6. Dark fill material layer previously identified in the *Galli Remedial Action Report (RAR) dated April 29, 2011* which is detailed in the RIR. This fill was identified at 7-9 fbg and was reportedly composed of construction and demolition debris.

1.5 Summary of Work Performed under the Remedial Investigation

IEC proposed the investigation of soil, groundwater and soil vapor in a Remedial Investigation Work Plan (RIWP) dated September 2022 which was subsequently approved by OER. Investigation was performed to properly characterize the Site for potential environmental impacts from historic on-site and off-site uses, operations, etc. Proposed sampling targeted specific areas and/or features identified as RECs or BERs in previous reports and provided general horizontal and vertical characterization for development purposes. The sampling procedures of the investigation were performed in accordance with the following regulatory documents:

- NYSDEC Technical Guidance for Site Investigation and Remediation DER-10;
- NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), January 2021; and,
- Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH) October 2006; updated in May 2017

The following elements were included:

1. A geophysical survey to identify anomalies indicative of USTs and associated piping and clear boring locations from physical and/or subsurface utilities and structures;

2. Installation of eight (8) soil borings (B-1 through B-8) and collection of 16 soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installation of three (3) permanent groundwater monitoring wells (MW-1 through MW-3) to establish groundwater depth and collect three (3) groundwater samples for chemical analysis to evaluate groundwater quality;
4. Installation of six (6) soil vapor implants (SV-1 through SV-6) and collection soil vapor samples for vapor analysis to evaluate soil vapor conditions at proposed slab-on grade locations and/or the water table surface. Samples were collected to assess subsurface conditions at the proposed buildings core where detention tanks and elevator will be installed;

Soil and groundwater samples were analyzed for the following full analysis:

- NYCRR Part 375 Target Compound List (TCL) Volatile organic compounds (VOCs) via EPA Method 8260;
- NYCRR Part 375 TCL Semi-volatile organic compounds (SVOCs) via EPA Method 8270;
- NYCRR Part 375 TCL Pesticides via EPA Method 8081;
- Polychlorinated biphenyls (PCBs) via EPA Method 8082A;
- Target Analyte List (TAL) Metals including Mercury and Hexavalent Chromium via EPA Method 6010, 7471 and 7196A, respectively;
- Total Cyanide via EPA Method 9012B; and
- PFOA/PFAS (NYSDEC list) via EPA 537.1 and 1,4-dioxane via EPA Method 8270 SIM (4 soil samples and 3 groundwater samples only).

Soil vapor samples were submitted to an ELAP certified Environmental Laboratory and analyzed for:

- VOCs in accordance with the USEPA Compendium Method TO-15.

1.6 Summary of Findings of Remedial Investigation

A remedial investigation was performed, and the results are documented in a companion document titled "Remedial Investigation Report, 24-19 Jackson Avenue, Queens, New York", dated November 7, 2022 (RIR). The findings of the Remedial Investigation are summarized as follows:

1. Site elevations range from about el +15 to el +16.

2. Bedrock was not encountered during this RI. Depth to bedrock is anticipated to be greater than 100 feet at the Site.
3. The stratigraphy of the site, from the surface down, consists of fill material from surface grade to depths of about 7-10 feet bgs, and composed with brown fine to medium sand with concrete, brick and gravel. The fill layer was underlain by a native sand layer consisting of brown, fine to medium sand and some gravel.
4. Soil/fill samples were collected during IEC's RI and results were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCO) as presented in 6NYCRR Part 375-6.8 and CP51. Soil/fill samples showed the following:
 - Volatile Organic Compounds (VOCs): Acetone was detected below UUSCOs and RRSCO at 32 microgram per kilogram ($\mu\text{g}/\text{kg}$) in sample IEC-B3 (4'-6') and at 43 $\mu\text{g}/\text{kg}$ in sample boring B5 (4'-6'). Naphthalene was detected below the UUSCOs and RRSCO at 1.6 ($\mu\text{g}/\text{kg}$) in sample IEC-B6 (12'-14').
 - Polychlorinated Biphenyls (PCBs): PCB 1260 was detected above the UUSCOs at 140 $\mu\text{g}/\text{kg}$ in sample B5 (4'-6') and at 130 $\mu\text{g}/\text{kg}$ in sample B7 (0'-2').
 - Semi-Volatile Organic Compounds (SVOCs): Benzo(a)pyrene (1,200 $\mu\text{g}/\text{kg}$) and Indeno(1,2,3-cd)pyrene (1,100 $\mu\text{g}/\text{kg}$) was detected above UUSCOs and RRSCO in soil sample IEC-B1 (0'-2'). Indeno(1,2,3-cd)pyrene (690 $\mu\text{g}/\text{kg}$) was detected above UUSCOs and RRSCO in soil sample IEC-B1 (4'-6'). Benzo(a)pyrene (17,000 $\mu\text{g}/\text{kg}$), benzo(b)fluoranthene (14,000 $\mu\text{g}/\text{kg}$), benzo(k)fluoranthene (14,000 $\mu\text{g}/\text{kg}$), chrysene (19,000 $\mu\text{g}/\text{kg}$), dibenzo(ah)anthracene (1,700 $\mu\text{g}/\text{kg}$) and indeno(1,2,3-cd)pyrene (9,500 $\mu\text{g}/\text{kg}$) was detected above the UUSCOs and RRSCO in soil sample IEC-B2 (0'-2'). Benzo(a)pyrene (1,400 $\mu\text{g}/\text{kg}$), benzo(b)fluoranthene (1,200 $\mu\text{g}/\text{kg}$), benzo(k)fluoranthene (890 $\mu\text{g}/\text{kg}$) and indeno(1,2,3-cd)pyrene (1,100 $\mu\text{g}/\text{kg}$) was detected above the UUSCOs and RRSCO in soil sample IEC-B3 (0'-2'). Benzo(a)pyrene (1,400 $\mu\text{g}/\text{kg}$), benzo(a)anthracene (1,300 $\mu\text{g}/\text{kg}$), benzo(k)fluoranthene (1,200 $\mu\text{g}/\text{kg}$), benzo(b)fluoranthene (1,300 $\mu\text{g}/\text{kg}$), chrysene (1,500 $\mu\text{g}/\text{kg}$) and indeno(1,2,3-cd)pyrene (1,000 $\mu\text{g}/\text{kg}$) was detected above the UUSCOs and RRSCO in soil sample IEC-B6 (0'-2') and chrysene (1,100 $\mu\text{g}/\text{kg}$) and indeno(1,2,3-cd)pyrene (550 $\mu\text{g}/\text{kg}$) was detected above the UUSCOs and RRSCO in soil sample IEC-B7 (0'-2'). Indeno(1,2,3-cd)pyrene (550 $\mu\text{g}/\text{kg}$) was detected above the UUSCOs and RRSCO in soil sample IEC-B7 (4'-6'). Benzo(a)pyrene (11,000 $\mu\text{g}/\text{kg}$), benzo(b)fluoranthene (9,400 $\mu\text{g}/\text{kg}$),

benzo(k)fluoranthene (4,500 µg/kg), chrysene (12,000 µg/kg), dibenzo(ah)anthracene (1,900 µg/kg) and indeno(1,2,3-cd)pyrene (7,000 µg/kg) was detected above the UUSCOs and RRSCOs in soil sample IEC-B8 (0'-2').

- Metals: including hexavalent chromium (max. of 0.75 mg/kg in IEC-B2-0'-2'), cadmium (max. of 2.65 mg/kg), copper (max. of 535 mg/kg), barium (max. of 1,230 mg/kg), lead (max. of 5,190 mg/kg), mercury (max. of 1.03 mg/kg), and zinc (max. of 820 mg/kg) exceeded UUSCOs. Of these metals, copper, lead and mercury also exceeded RRSCOs in shallow soil samples IEC-B1 (0'-2') and IEC-B2 (0'-2').
 - Pesticides: 4,4-DDD (max. of 3.7 µg/kg), 4,4-DDE (max. of 38 µg/kg), 4,4-DDT (max. of 230 µg/kg), a-chlordane (max. of 170 µg/kg), aldrin (max. of 17 µg/kg) and dieldrin (max. of 25 µg/kg) exceeded UUSCOs in samples IEC-B1 (0'-2'), IEC-B2 (0'-2'), IEC-B1(4'-6'), IEC-B5 (4'-6') and IEC-B7 (0'-2').
 - Total Emerging Contaminants: Perfluorooctanesulfonic Acid (PFOS) and N-EtFOSAA was detected at a concentration of +/kg *dry* and 0.746 µg/kg *dry*, respectively in soil sample B4-(0'-2'), and at a concentration of 0.912 µg/kg *dry* and 0.251 µg/kg *dry*, respectively, in soil sample B6-(12'14').
5. Groundwater samples were collected during the October 10, 2022 Investigation and results were compared to NYSDEC TOGS Ambient Water Quality Standards (AWQS). Groundwater samples showed the following:
- Volatile Organic Compounds (VOCs): VOCs were not detected above the AWQS in any of the ground water samples collected during this RI.
 - Polychlorinated Biphenyls (PCBs): PCBs were not detected in any groundwater sample collected during this RI.
 - Semi-Volatile Organic Compounds (SVOCs): Benz(a)anthracene (max of 0.03 µg/L in MW 1), benzo(b)fluoranthene (max of 0.02 µg/L in GW 1), chrysene (max. of 0.02 µg/L in MW 1) and indeno(1,2,3-cd)pyrene (max of 0.04 µg/L in MW 1) exceeded the AWQS.
 - Metals (total): Aluminum (max of 18.8 mg/L), chromium (max of 0.055 mg/L), iron (max of 33.3 mg/L), lead (max of 0.041 mg/L), magnesium (max of 36.7 mg/L), manganese (max of 2.74 mg/L), selenium (max of 0.015 mg/L), sodium (max of 152 mg/L) and thallium LDL (max of 0.001 mg/L) exceeded the AWQS in one or more of the wells MW-1 through MW-3.
 - Metals (dissolved): Manganese (max of 1.15 mg/L), and/or sodium (max of 152 mg/L) exceeded the AWQS in groundwater samples (MW-1 and MW-2).

- Pesticides: Chlordane (max of 0.079 µg/L in MW-1) and dieldrin (max of 0.005 µg/L in MW-1) exceeded the AWQS.
 - Total Emerging Contaminants: Detections of these compounds were present in all three samples collected as part of the RI. The highest concentrations included Perfluorooctanesulfonic Acid (PFOS) at 11.1 nanogram per liter (ng/L), Perfluorohexanoic acid (PFHxA) at 52.7 ng/L, Perfluoroheptanoic acid (PFHpA) at 37.7 ng/L, Perfluorohexanesulfonic acid (PFHxS) at 28.6 ng/L, Perfluorooctanoic acid (PFOA) at 232 ng/L, Perfluorooctanesulfonic acid (PFOS) at 70.4 ng/L, Perfluorononanoic acid (PFNA) at 4.39 ng/L, Perfluorodecanoic acid (PFDA) at 2.67 ng/L, Perfluoropentanoic acid (PFPeA) at 59.3 ng/L, Perfluoro-1-heptanesulfonic acid (PFHpS) at 3.02 ng/L and Perfluoro-n-butanoic acid (PFBA) at 28.6 ng/L.
6. Soil vapor results determined during the October 10, 2022 investigation were compared to the compounds listed in Table 3.1 Air Guidance Values derived by the New York State Department of Health (NYSDOH) located in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006 and the revised NYSDOH Decision Matrices dated May 2017. Results showed the following:
- Petroleum-related VOCs: Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) were not detected above regulatory criteria in any of the vapor samples collected during this RI.
 - Chlorinated-VOCs: 1,1,1-Trichloroethane (1,1,1-TCA) was reported as not detected up to 31 microgram per cubic meter (µg/m³), 1,1-Dichloroethene (1,1-DCA) was reported as not detected up to 0.54 µg/m³, Carbon Tetrachloride was reported as not detected up to 0.27 µg/m³, Cis-1,2-Dichloroethene was reported as not detected up to 1.83 µg/m³, Methylene Chloride was reported as not detected up to 4.86 µg/m³, Tetrachloroethene (PCE) was detected from 47 µg/m³ to 281 µg/m³, Trichloroethene (TCE) was detected 0.26 µg/m³ to 10.9 µg/m³, Vinyl Chloride was not detected above laboratory method detection limits.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste is not suspected at this site.

2.0 Remedial Action Objectives

Based on the results of the RI, the following Remedial Action Objectives (RAOs) have been identified for this Site:

Soil

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from contaminated soil.

Groundwater

- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from groundwater.
- Prevent off-Site migration of contaminated groundwater above applicable groundwater standards.

Soil Vapor

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor into dwelling and other occupied structures.

3.0 Remedial Alternatives Analysis

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). Remedial alternatives are then developed and evaluated based on the following ten criteria:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community acceptance;
- Land use; and
- Sustainability.

As required, a Track 1 Unrestricted Use scenario is evaluated for the remedial action. The following is a detailed description of the alternatives analyzed to address impacted media at the Site:

Alternative 1:

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 UU SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved through collection and analysis of post-excavation endpoint samples. Should the endpoint soil/fill samples contain analytes at concentrations exceeding the Track 1 UU SCOs at the terminal excavation depths required for new building foundation elements and construction at the Site, additional excavation will be performed to ensure complete removal of the soil/fill not meeting the Track 1 UU SCOs. Based on the results of the Remedial Investigation, it is expected that this alternative would be achieved by excavation to depths ranging from 6 to 14 fbg to meet UU SCOs. No Engineering or Institutional Controls are required for a Track 1 cleanup. As part of the Site redevelopment building construction, a vapor barrier and a composite cap will be installed to prevent potential

exposures from soil vapor in the future. The composite cover will consist of a 6-inch compacted gravel base and an 18-inch foundation slab across the site except for outside of the new building core area including the detention tanks and elevator pit, which will have the gravel sub base and 6-foot-thick mat slab;

Alternative 2:

- Establishment of Track 4 Site-Specific Soil Cleanup Objectives.
- Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 Site-specific SCOs have been achieved with post-excavation end point sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would be achieved by excavating two hot spots to a depth of about 8 fbg. As part of the building construction, soil beneath most of the site will be removed to a depth of approximately 4 fbg except for the building core area which will be excavated to approximately 12.5 fbg. If soil/fill material contains analytes at concentrations above Track 4 Site-specific SCOs at the base of the construction excavation, additional excavation would be performed to meet Track 4 Site-Specific SCOs.
- Placement of a composite cover system over the entire Site to prevent exposure to remaining soil/fill. The engineered composite cover will consist of a 6-inch compacted gravel base and an 18-inch foundation slab across the site except for outside of the new building core area including the detention tanks and elevator pit, which will have the gravel sub base and 6-foot-thick mat slab;
- Installation of a vapor barrier system beneath the building slab and along foundation side walls up to grade to prevent potential exposures from soil vapor;
- Installation and operation of a passive Sub Slab Depressurization System (SSDS);
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without OER approval will be established;
- Establishment of approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended will be established. The

SMP will note that the property owner and property owner's successors and assigns must comply with the approved SMP; and

- The property will continue to be registered with an E-Designation at the NYC Buildings Department.

3.1 Threshold Criteria

Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of Engineering Controls or Institutional Controls. Protection of public health and the environment must be achieved for all approved remedial actions.

Alternative 1 would be protective of human health and the environment by removing all soil/fill exceeding Track 1 Unrestricted Use SCO's and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contaminants leaching into groundwater.

Alternative 2 would achieve comparable protections of human health and the environment by excavation and removal of most of the historic fill at the Site and by ensuring that remaining soil/fill on-Site meets the Track 4 Site-Specific SCOs, as well as by placement of Institutional and Engineering Controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. If the Track 4 SCOs are achieved, the Institutional Controls including a Site Management Plan will be implemented and continuing the E-designation instituting a deed notice on the property would ensure that the composite cover system remains intact and protective of public health. Establishment of Track 4 Site-Specific SCOs would also minimize the risk of contamination leaching into groundwater.

For both Alternative 1 and Alternative 2, the potential exposure to contaminated soils or groundwater during construction would be minimized by implementing a Construction Health

and Safety Plan, an approved Soil/Materials Management Plan, and Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-Site soil vapors into the new building would be prevented by installing a vapor barrier below the building slab and outside foundations sidewalls up to grade as well as by installation and operation of a passive SSDS under Alternative 2.

3.2 Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

This evaluation criterion assesses the ability of the alternative to achieve applicable standards, criteria and guidance.

Alternative 1 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCOs and Protection of Groundwater SCOs. Compliance with SCGs for soil vapor would also be achieved by installing a waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier outside of foundation sidewalls up to grade, as part of development.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to meet Track 4 Site-Specific SCOs. Compliance with Track 4 SCGs for soil vapor would also be achieved by installing a vapor barrier system below the new building's foundation slab and continuing the vapor barrier outside of foundation sidewalls up to grade. As required, a Site Management Plan would ensure that these controls remained protective for the long term.

Health and safety measures contained in the CHASP and Community Air Monitoring Plan (CAMP) will be implemented during Site redevelopment under this RAWP. For both Alternatives, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

Short-Term Effectiveness and Impacts

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their short-term effects during the remedial action on public health and the environment during implementation of the remedial action, including protection of the community, protection of onsite workers and environmental impacts.

Both Alternative 1 and 2 have similar short-term effectiveness during their implementation, as each requires excavation of historic fill material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. Short-term impacts could potentially be higher for Alternative 1 since excavation of greater amounts of historical fill material would take place. However, focused attention to means and methods during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize the overall impact of these activities.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flag persons will be used to protect pedestrians at Site entrances and exits.

The potential adverse impact to the community, workers and the environment for both alternatives would be minimized through implementation of control plans including a Construction Health and Safety Plan, a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a Construction Health and Safety Plan (CHASP) would provide protection from on-Site contaminants by using personal protective equipment would be worn consistent with the documented risks within the respective work zones.

Long-term Effectiveness and Permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have

been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of Engineering Controls/Institutional Controls (ECs/ICs) that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all impacted soil/fill above Track 1 Unrestricted Use SCOs. Removal of on-Site contaminant sources will also prevent future groundwater contamination.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs and installing a composite cover system across the Site as part of the development. The long-term effectiveness would be provided by maintaining use restrictions, establishing an SMP to ensure long-term management of ICs and ECs, and maintaining registration as an E-designated property to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended, assuring that protections designed into the remedy continue to provide the required level of protection.

Reduction of toxicity, mobility, or volume of contaminated material

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.

Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing all soil in excess of Track 1 Unrestricted Use SCOs.

Alternative 2 would remove most of the historic fill at the Site, and all remaining on-Site soil/fill beneath the new building will meet Track 4 Site-Specific SCOs. Potential future migration of off-Site soil vapors into the new building would be prevented by installing a vapor barrier below the building slab and outside foundations sidewalls up to grade as well as by installation and operation of a passive SSDS.

Alternative 1 would remove a greater total mass of contaminants from the Site. The removal of soil to depths of up to 4 and 13 fbg for the new development in both scenarios would lessen the difference in contaminant mass removal between these two alternatives.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

The techniques, materials and equipment to implement both Alternatives 1 and 2 are readily available and have been proven to be effective in remediating the contaminants present on the Site. They use standard equipment and technologies that are well established in the industry. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

Cost effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Since historic fill at the Site was found to extend to depths of 7 up to 10 feet below grade during the RI, and the new building requires excavation of the entire Site to depths of 4 to 12.5 fbg, the costs associated with both Alternative 1 and Alternative 2 will likely be comparable. Costs associated with Alternative 1 could potentially be higher than Alternative 2 if soil with analytes above Track 1 Unrestricted Use SCOs is encountered below the excavation depth required for development.

Additional costs would include installation of additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on implementation of a Site Management Plan as part of Alternative 2.

The remedial plan would couple the remedial action with the redevelopment of the Site, lowering total costs. The remedial plan will also consider the selection of the most appropriate disposal facilities to reduce transportation and disposal costs during cleanup and redevelopment of the Site.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.

This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in **Appendix 2**. Observations here will be supplemented by public comment received on the RAWP. Under both alternatives, the overall goals of the remedial program, to protect public health and the environment and eliminate potential contaminant exposures, have been broadly supported by citizens in NYC communities.

Land use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. Court Square 45th Ave, LLC intends to develop two new mixed-use 54-story residential towers totaling approximately 705,000 gross square feet (GSF). The project is currently designed as two separate buildings (“north” on Lot 9 and “south” on Lot 4). The new building will be interconnected but considered separate and has two separate NYCDOB filings. The two mixed-use buildings will each contain a residential tower with first floor lobby and retail and commercial uses in the base (first and third through sixth floors). The parking level is on the second floor with attendants on the first floor (ground level). The residential portion (seventh through 54th floors) will contain 10% market rate residential condominiums and 90% mixed-income rentals subdivided into 75% market rate and 25% affordable units as required by Mandatory Inclusionary Housing. The two buildings will contain a total of approximately 94,000 ZSF of commercial uses through the first 5 floors and 447,000 ZSF of rental apartments and condominiums above. The northern building, Lot 9, contains 25,000 ZSF of commercial uses and 220,000 ZSF of residential uses yield approximately 285 residential units. The southern building, Lot 4, contains 69,000 ZSF of commercial uses and 227,000 ZSF of residential uses yield approximately 285 residential units. The buildings will share utility services. There will be no subgrade cellar level or outdoor ground level space.

Following remediation, the Site will meet either Track 1 Unrestricted Use or the Site-Specific SCOs for Track 4 all of which are protective of public health and the environment for its planned residential use. The proposed use is compliant with the property’s zoning and is consistent with recent development patterns. The areas surrounding the Site is urban and consists of predominantly mixed residential and commercial buildings in zoning districts designated for commercial and residential uses. The development would remediate a vacant contaminated lot and provide a modern residential building.

The proposed development would clean up the property and make it safer, create new employment opportunities, living space for affordable and supportive housing and associated societal benefits to the community, and other economic benefits from land revitalization. Temporary short-term project impacts are being mitigated through site management controls and truck traffic controls during remediation activities.

Following remediation, the Site will meet either Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs, all of which are protective of public health and the environment for its planned use.

The Site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites, natural resources, waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species. The Site is located in an urban area and not in proximity to fish or wildlife and neither alternative would result in any potential exposure pathways of contaminant migration affecting fish or wildlife. The remedial action is also protective of groundwater natural resources. The Site does not lie in a Federal Emergency Management Agency (FEMA)-designated flood plain. Both alternatives are equally protective of natural resources and cultural resources. Improvements in the current environmental condition of the property achieved by both alternatives considered in this plan are consistent with the City's goals for cleanup of contaminated land.

Sustainability of the Remedial Action

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in PlaNYC: A Greener, Greater New York. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development.

While Alternative 2 would potentially result in lower energy usage based on reducing the volume of material transported off-Site, both remedial alternatives are comparable with respect to the opportunity to achieve sustainable remedial action. The remedial plan for either alternative would take into consideration the shortest trucking routes during off-Site disposal of historic fill and other soils, which would reduce greenhouse gas emissions and conserve energy used to fuel trucks. The New York City Clean Soil Bank program is available for reuse of any clean native soils under either alternative. A complete list of green remedial activities considered as part of the NYC VCP is included in a Sustainability Statement.

Selection of the Preferred Remedy

The preferred remedy for the site is Alternative 2, Track 4 Site-Specific cleanup.

The Alternative 2 remedy will remove all soil/fill exceeding Site-Specific Use SCOs throughout the Site, which will be confirmed with post-excavation sampling. If soil/fill containing analytes at concentrations above Track 4 Site Specific Use SCOs is still present at the base or walls of the excavation after removal of all soil required for construction of the new building is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Track 4 Site Specific Use SCOs.

Engineering Controls are required for a Track 4 cleanup. A composite cover, comprised of the new building's concrete slab underlain with a vapor barrier membrane would be installed to prevent exposure to any remaining soils left onsite and render the site protective. A passive sub-slab depressurization system (SSDS) will be installed below the building slab to mitigate vapor intrusion of soil vapor contaminants. If the excavation plan is revised to remove all historic fill material, and the laboratory results of the endpoint soil samples indicates Unrestricted Use or Restricted Residential Use SCOs are achieved, then a Track 1 or Track 2 remedy will be implemented. Track 2 Restricted Residential SCOs may be achieved by excavating approximately 8 fbg across the area of Site outside of the building's inner core excavation to 12.5 fbg.

For Track 4 remedy, use restrictions will be imposed on the Site (including prohibitions on any use higher than Restricted Residential), e.g. the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways. The Site would continue to be encumbered with an E-Designation for hazardous material.

4.0 Remedial Action

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is the Track 4 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-Specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
6. Excavation and removal of soil/fill exceeding Track 4 Site specific SCOs. The entire footprint of the building area will be excavated to a depth of approximately 4 fbg, except for 25% of the lot for the building core, which will be excavated to a depth of approximately 12.5 fbg for development purposes. Two areas with elevated SVOCs (B-1 and B-7) will be overexcavated to try to achieve Restricted Residential SCOs. A small area for the house trap will be excavated to a depth of 9.5 fbg and for an elevator pit to 5.5 fbg along 23rd Street. Approximately 5,800 cubic yards (yd³) of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.
7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.

8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
9. Removal of all USTs that are encountered during soil/fill removal actions. Registration of tanks and reporting of any petroleum spills associated with USTs and appropriate closure of these petroleum spills in compliance with applicable local, state and federal laws and regulations.
10. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan.
11. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
13. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Construction of an engineered composite cover consisting of 6-inches of compacted gravel base and an 18-inch foundation slab across the entire building footprint except within the new building core area with detention tanks and elevator pits, which will have the gravel sub base and a 6-foot-thick mat slab.
16. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of foundation sidewalls up to grade to mitigate soil vapor migration into the building. The vapor barrier system will consist of a 20-mil Stego Wrap vapor barrier or equivalent below the slab throughout the full building area and 20-mil adhesive-coated HDPE composite Stego Wrap sheets or equivalent outside all foundation sidewalls up to grade. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.
17. Installation and operation of a passive sub-slab depressurization system (SSDS) beneath the slab on grade portion of the building to allow for the lateral movement, collection and venting of vapor from below the Site building. The passive SSDS will consist of a network of horizontal pipes set in the middle of a 12-inch thick and deep trench surrounded by gas permeable

aggregate that is in contact with the 6-inch gravel base layer immediately beneath the vapor barrier system and the slab on grade portion of the building. The horizontal piping will consist of fabric wrapped, perforated 4-inch diameter schedule 40 PVC pipe that is set at a 1% slope away from the riser stub up locations that penetrate the first-floor slab. The vertical 4-inch steel riser pipe penetrates and travels through floors 1 through 6 to 3 feet above the finished roof of the 6th floor stair bulkhead. The riser pipe will be completed with a 6-inch stainless steel chimney cap with ½-inch mesh or equivalent. The passive SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the passive SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building.

18. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and lists any changes from this RAWP.
21. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) will be submitted for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
22. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives and Soil/ Fill Management

The Soil Cleanup Objectives for this project are Restricted Residential SCOs as defined in 6 NYCRR Part 375, Table 6.8 as amended with Site Specific SCOs for following compounds:

<u>Contaminant</u>	<u>Site-Specific SCO's</u>
Total SVOCs	200 ppm
Lead	1,000 ppm

Mercury	1.5 ppm
Barium	650 ppm

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in **Appendix 4**. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Soil/Fill Excavation and Removal

The location of planned excavation is shown in **Figure 5**. The total quantity of soil/fill expected to be excavated and disposed off-Site is 5,800 yd³. For each disposal facility to be used in the remedial action, a letter from the developer/QEP to the receiving facility requesting approval for disposal and a letter back to the developer/QEP providing approval for disposal will be submitted to OER prior to any transport and disposal of soil at a facility.

Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

End-point Sampling

End-point samples will be analyzed for compounds and elements as described below utilizing the following methodology:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs performing end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values.

Confirmation End-point Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Seven (7) confirmation samples will be collected from the base of the excavation at locations to be determined by OER. To evaluate attainment of Track 4 Site-specific SCOs, analytes will include those for which SCOs have been developed, including SVOCs according to analytical methods described above. To evaluate attainment of Track 2 Restricted Residential SCOs, samples will be analyzed for VOCs, SVOCs, pesticides, PCBs and metals according to analytical methods described above.

Hotspot End-point Sampling

For any hotspots identified during this remedial program, including any hotspots identified during the remedial action, hotspot removal actions will be performed to ensure that hotspots are fully removed and end-point samples will be collected at the following frequency:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
 - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
 - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation end-point sample locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that

other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination.

If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and “finger print analysis” and required regulatory reporting (i.e. spills hotline) will be performed.

Quality Assurance/Quality Control

QA/QC procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for documentation and groundwater sampling. Sampling equipment will be decontaminated by wiping clean, washing with Alconox solution, rinsing with deionized water, and air drying prior to each use in order to ensure that cross-contamination between sampling locations does not occur. Decontamination procedures will be performed in an area segregated from any sampling areas. Each sample will be collected in pre-cleaned, laboratory supplied glassware, appropriately labeled, stored in a cooler with ice to meet 4 degrees celcius, and submitted for analysis under proper chain of custody procedures to a New York State ELAP certified environmental laboratory. The holding times for the required analysis will be reviewed and samples will be submitted within the required hold times. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. Trip blanks will not be used for samples to be analyzed for metals or SVOCs. The data will be evaluated for detection levels and data will be compared to the NYSDEC Part 375 SCOs.

Import of Soils

Import of soils is not anticipated for this project. However, should soil be imported to the Site it will be performed in conformance with the Soil/Materials Management Plan in Appendix 4. Imported soil will meet the lower of:

- Track 2 Residential Use SCO's, and
- Groundwater Protection Standards in Part 375-6.8.

Reuse of Onsite Soils

Soil reuse is not planned on this project.

4.3 Engineering Controls

Engineering Controls will be employed in the remedial action to address residual contamination remaining at the site. The Site has two primary Engineering Control Systems. These are:

- (1) Composite Cover System
- (2) Soil Vapor Barrier System
- (3) Passive Sub-slab Depressurization System

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system will be comprised of 6-inches of compacted gravel base and an 18-inch foundation slab across the entire site except for outside of the new building core area, including the detention tanks and elevator pits, which will have the gravel subbase and a 6-foot-thick mat slab. **Figure 6** shows the location of each cover type built at the Site.

The composite cover system will be a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the Remedial Action Report.

Vapor Barrier System

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will consist of a minimum of 20-mil thick HDPE sheets below the slab throughout the full building area (proposed to be the "Stego Wrap 20-Mil Vapor Barrier" system or equivalent) and adhesive-coated HDPE composite sheets (proposed to be the "Stego Wrap 20-Mil Vapor Barrier" system) outside all foundation sidewalls up to grade. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.

The vapor barrier will extend throughout the area occupied by the footprint of the new building and up the foundation sidewalls to grade and will be installed in accordance with manufacturer specifications.

A plan view showing the location of the proposed vapor barrier system is provided in **Figure 8**. Typical design sections for the vapor barrier on slab and sidewalls are provided in **Figure 7**. Product specification sheets are provided in **Appendix 6**. The Remedial Action Report will include as-built drawings and diagrams; manufacturer documentation; and photographs.

The Vapor Barrier System is a permanent engineering control and will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying vapor barrier system is disturbed after the remedial action is complete. Maintenance of these systems will be described in the Site Management Plan in the Remedial Action Report.

Sub-Slab Depressurization System

Migration of soil vapor into the building will be mitigated with the construction of a passive Sub-Slab Depressurization System (SSDS). As part of development, a passive sub-slab depressurization system (SSDS) will be installed beneath the slab on grade portion of the building to allow for the lateral movement, collection and venting of vapor from below the Site building. The passive SSDS will consist of a network of horizontal pipes set in the middle of a 12-inch thick and deep trench surrounded by gas permeable aggregate that is in contact with the 6-inch gravel base layer immediately beneath the vapor barrier system and the slab on grade portion of the building. The horizontal piping will consist of fabric wrapped, perforated 4-inch diameter schedule 40 PVC pipe that is set at a 1% slope away from the riser stub up locations that penetrate the first-floor slab. The vertical 4-inch steel riser pipe penetrates and travels through floors 1 through 6 to 3 feet above the finished roof of the 6th floor stair bulkhead. The riser pipe will be completed with a 6-inch stainless steel chimney cap with ½-inch mesh or equivalent processes.

The passive SSDS is a permanent engineering control. The location and layout of the SSDS is shown in **Figure 9a**. A typical section of the system is shown in **Figures 9b** and **9d**.

4.4 Institutional Controls

A series of Institutional Controls (IC's) are required under this Remedial Action to assure permanent protection of public health by elimination of exposure to residual materials. These IC's define the program to operate, maintain, inspect and certify the performance of Engineering Controls and

Institutional Controls on this property. Institutional Controls would be implemented in accordance with a Site Management Plan included in the final Remedial Action Report (RAR). Institutional Controls would be:

- Continued registration of the E-Designation for the property. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the SMP which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a SMP in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, inspection, and certification of ECs and IC's. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted at a frequency to be determine by OER in the SMP and will comply with RCNY §43-1407(l)(3).
- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for mixed residential and commercial use and will not be used for a higher level of use without prior approval by OER.

4.5 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until

terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) operation and maintenance of EC's; (3) inspection and certification of IC's and EC's.

Site management activities and EC/IC certification will be scheduled by OER on a periodic basis to be established in the RAR and the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by July 31 of the year following the reporting period.

4.6 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment is to identify potential receptors and pathways for human exposure to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Data and information reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA) for this project. As part of the VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk under current and future conditions by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Contaminant Sources

Based on the results of the RIR, the contaminants of concern are:

1. Soil: Soil/fill samples collected during the Remedial Investigation were compared to the New York State Department of Conservation (NYSDEC) Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Use Soil Cleanup Objectives (RRSCO) as presented in 6 NYCRR Part 375-6.8. The data revealed the following:
 - No VOCs were detected above UUSCOs.
 - The PCB aroclor 1260 was detected above the UU SCOs but below RR SCOs in soil borings B5 (4-6') and B-7 (12-14').
 - SVOCs, specifically PAHs, were detected above the UU and RR SCOs in samples B-1 (0-2'), B-1 (4-6'), B-2 (0-2'), B-3 (0-2'), B-6 (0-2'), B-7 (0-2'), B-7 (4-6') and B-8 (0-2').
 - The following metals: barium in B-2 (0-2), copper in B-2 (0-2), lead in B-8 (0-2), and mercury in B-1 (0-2) and B-8 (0-2) were detected above the UU and RR SCOs. Cadmium in B-1 (0-2), copper in B-1 (0-2) and B-8 (0-2), lead in B-1 (0-2 and (4-6), B-3 (0-2), B-4 (0-2), B-5 (0-2) and (4-6), B-6 (0-2) and B-7 (0-2) and (4-6), mercury B-2 (0-2) and B-7 (0-2), and zinc in B-1 (0-2), B-2 (0-2), B-6 (0-2), B-7 (0-2) and (4-6), and B-8 (0-2) were detected above UU SCOs.
 - Pesticides were detected above the UU SCOs in B-1 (0-2) and (4-6), B-2 (0-2), B-3 (0-2) and (4-6), B-5 (0-2) and (4-6), B-6 (0-2), B-7 (0-2) and (4-6) and B-8 (0-2).
2. Groundwater: Groundwater samples collected during the Remedial Investigation were compared to NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. Ambient Water Quality Standards (AWQS). The data revealed the following:
 - No VOCs were detected above the AWQS in MW-1, MW-2 and MW-3.
 - No PCBs were detected in MW-1, MW-2 and MW-3.
 - SVOCs, specifically PAHs, were detected above the AWQS in MW-1 and MW-2.
 - Total aluminum, iron, manganese and sodium were detected above the AWQS in MW-1, MW-2 and MW-3. Total chromium in MW-2, total lead in MW-2 and MW-3, total magnesium in MW-3 and selenium in MW-1 were detected above the AWQS.
 - Pesticides were detected in MW-1 above the AWQS.
3. Soil Vapor: Soil vapor samples collected during the Remedial Investigation were compared to the compounds listed in Table 3.1 of the Air Guideline Values (AGV) in the New York State Department of Health (NYSDOH).
 - Several VOCs were detected in the Phase II and Supplemental RI soil gas/vapor samples however no concentrations were reported above the NYSDOH AGV.

Nature, Extent, Fate and Transport of Contaminants

Soil: SVOCs, pesticides, metals and PCBs have been detected in the soil/fill at the Site predominantly at the 0-2 and 4-6 fbg intervals extending deeper to approximately 10 fbg at some locations of the Site. Metals and PCBs are present to a lesser extent, and PAHs are at elevated levels throughout the vertical extent of the historic fill layer. The potential transport mechanisms for contaminants of concern in soil are via possible direct contact, inhalation, or ingestion.

Groundwater: Some pesticides, metals and the SVOCs, identified as PAHs, were detected in groundwater beneath Site above the AWQS. Although the concentrations were above the AWQS, groundwater beneath the Site is not utilized as a potable water source. The Site area is provided potable water by the NYCDEP which is sourced outside of NYC from the Delaware, Catskill and Croton watershed reservoirs. There are no complete transport mechanisms for contact or ingestion of contaminated groundwater for the Site other than that of construction dewatering, if necessary for elevator pit excavations where there is the potential for workers to come in contact.

Soil Vapor: Concentrations of petroleum related VOCs (BTEX) and chlorinated VOCs (carbon tetrachloride, TCE, TCE and TCA) were detected in soil vapor beneath the Site. There are no regulatory standards for soil vapor in New York State. No VOCs were detected above the applicable regulatory standards for soil and groundwater for samples collected from beneath the Site; therefore, the VOCs detected are likely related to an off-Site source and/or area wide condition.

Receptor Populations

On-Site Receptors: The site is currently an inactive vacant property that is not capped but is secured by a wood construction perimeter fence and locked gate. Onsite receptors are limited to Site maintenance workers and potential trespassers. During construction, potential on-site receptors will include construction workers, site representatives, and visitors. Under proposed future conditions, potential on-site receptors include retail and commercial workers, parking garage workers, residential lobby workers, adult and child building residents, and visitors.

Off-Site Receptors: Potential off-site receptors within a 500 foot radius of the Site include adult and child residents; commercial and construction workers; pedestrians; and trespassers based on the following land uses within 500 feet of the Site:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/ Renovation – existing and future

4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools – existing and future

Potential Routes of Exposure

Three potential primary routes exist by which chemicals can enter the body: ingestion, inhalation, and dermal absorption. Exposure can occur based on the following potential media:

- Ingestion of groundwater or fill/ soil;
- Inhalation of vapors or particulates; and
- Dermal absorption of groundwater or fill/ soil.

Potential Exposure Points

Current Conditions: The site is currently an inactive vacant property that is not capped but is secured by a wood construction perimeter fence and locked gate. Since the Site is secure, there is limited potential exposure pathways from ingestion, inhalation, or dermal absorption of soil/ fill except for Site maintenance workers and possible trespassers. Groundwater is not exposed at the site. The site is served by the public water supply and groundwater is not used at the site for potable supply and there is no potential for exposure. Because the site is currently undeveloped, there is no potential for soil vapor to accumulate on site.

Construction/ Remediation Conditions: During the remedial action, onsite workers will come into direct contact with surface and subsurface soils as a result of on-Site construction and excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with exposed impacted soil and fill. Similarly, off-Site receptors could be exposed to dust and vapors from on-Site activities. Due to the depth of groundwater, direct contact with groundwater is not expected. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

Proposed Future Conditions: Under future remediated conditions, soils in excess of Track 4 SCOs will be removed. The site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and engineering controls a vapor barrier/passive SSDS will prevent potential exposure due to inhalation by preventing soil vapor intrusion. The site is served by the public water

supply, and groundwater is not used at the site. There are no plausible off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

Overall Human Health Exposure Assessment

There are potential complete exposure pathways for the current site condition. There are potential complete exposure pathways that require mitigation during implementation of the remedy. There are no complete exposure pathways under future conditions after the site is developed. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure, site-wide surface cover, and a subsurface vapor barrier system for the building. Under current conditions, on-Site exposure pathways exist for those with access to the Site and trespassers. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Soil/Materials Management Plan, and a Construction Health and Safety Plan. Potential post-construction use of groundwater is not considered an option because groundwater in this area of New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened.

Environmental Media & Exposure Route	Human Exposure Assessment for Proposed Remedial Action
Direct contact, inhalation, or ingestion of surface and subsurface soils	There is no direct contact, inhalation, or ingestion of soil if Track 1 SCOs are achieved. Regardless the Site will be completely covered with an engineered composite cover. If Track 1 SCOs are not achieved, future contact with soil will be prevented by the implementation of a Site Management Plan and Soil and Materials Management Plan for any future ground intrusive work.
Ingestion of groundwater	The area is served by an upstate water supply and groundwater is not being used for potable water supply. Groundwater use for potable supply on-Site is prohibited by municipal law.
Direct contact with groundwater	There is no direct contact with groundwater because the site will be completely covered with an engineered composite cover. If Track 1 SCOs are not achieved, future contact with groundwater will be prevented by the implementation of a Site Management Plan and Soil and Materials Management Plan for any future ground intrusive work.
Direct contact or inhalation of soil vapor	Contact with or inhalation of soil vapor will be

	prevented by a vapor barrier.
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5.0 Remedial Action Management

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Greg Mendez-Chicas, Senior Project Manager. The Professional Engineer (PE) for this project is Xin Yuan.

5.2 Site Security

Site access will be controlled by wooden construction fence, which will surround the Site with a gated locked entrance.

5.3 Work Hours

The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. The hours of operation will be conveyed to OER during the pre-construction meeting.

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in **Appendix 5**. The Site Safety Coordinator will be Chris Evertz. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, such as 40-hour hazardous waste operator training and annual 8-hour refresher training. Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and will comply with all requirements of 29 CFR 1910.120. Site-specific training will be provided to field personnel. Additional

safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the CHASP. That document will define the specific project contacts for use in case of emergency.

5.5 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedences of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for

the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m³) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not

exceed 150 mcg/m³ above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m³ above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m³ of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for OER personnel to review.

5.6 Agency Approvals

All permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction. Approval of this RAWP by OER does not constitute satisfaction of these requirements and will not be a substitute for any required permit.

5.7 Site Preparation

Pre-Construction Meeting

OER will be invited to attend the pre-construction meeting at the Site with all parties involved in the remedial process prior to the start of remedial construction activities.

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and

regulations including NYC Building Code to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Mark-Out Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

Dewatering

Construction dewatering during the planned excavation and foundation construction is not anticipated with the exception of minimal localized sump pumping of groundwater and/or surface runoff. Pumped groundwater will either be containerized and disposed off-site to permitted facilities or pre-treated and discharged to the existing NYCDEP combined sewer. Required NYCDEP discharge permits will be obtained prior to commencing dewatering activities. If dewatering is required, the method, system design, and disposal/discharge method will be reported to the OER Project Manager and documented in the RAR.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete pads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and clean water will be utilized for the removal of soil from vehicles and equipment, as necessary.

Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from excavated areas, trenches and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

Storm Response

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to OER at the completion of site inspection and after the site security is assessed. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant

differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Stormwater control systems and structures will be inspected and maintained as necessary. If soil or fill materials are discharged off site to adjacent properties, property owners and OER will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to OER and implemented following approval by OER and granting of site access by the property owner. Impacted offsite areas may require characterization based on site conditions, at the discretion of OER. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYS DEC's spill hotline at DEC 800-457-7362 within statutory defined timelines. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

Storm Response Reporting

A site inspection report will be submitted to OER at the completion of site inspection. An inspection report established by OER is available on OER's website (www.nyc.gov/oer) and will be used for this purpose. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be sent to the OER project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or

the construction program, such as damage to the support of excavation; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; schedule for corrective actions. This report should be completed and submitted to OER project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

5.8 Traffic Control

Drivers of trucks leaving the Site with soil/fill will be instructed to proceed without stopping in the vicinity of the Site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is detailed below and shown on **Figure 10**:

- Exit Site Left on 23rd Street
- Make Right on Jackson Avenue
- Make a Left on 11th Street to Pulaski Bridge/McGuinness Boulevard S
- Make Right on Ramp to Brooklyn Queens Expressway (I-278) to Verrazzano-Narrows Bridge
- Continue on Staten Island Expressway to Goethals Bridge to New Jersey.

5.9 Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck

inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

5.10 Reporting and Record Keeping

Daily reports

Daily reports providing a general summary of activities for each day of active remedial work will be emailed to the OER Project Manager by the end of the following business day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of excavation and other remedial work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP results noting all excursions. CAMP data may be reported;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

Record Keeping and Photo Documentation

Job-site record keeping for all remedial work will be performed. These records will be maintained on-Site during the project and will be available for inspection by OER staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas. Photographs will be submitted at the completion of the project in the RAR in digital format (i.e. jpeg files).

5.11 Complaint Management

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.12 Deviations From The Remedial Action Work Plan

All changes to the RAWP will be reported to, and approved by, the OER Project Manager and will be documented in daily reports and reported in the Remedial Action Report. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- Determination with basis that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 Remedial Action Report

A Remedial Action Report (RAR) will be submitted to OER following implementation of the remedial action defined in this RAWP. The RAR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RAR will include:

- Information required by this RAWP;
- Text description with thorough detail of all engineering and institutional controls (if Track 1 remedial action is not achieved)
- As-built drawings for all constructed remedial elements;
- Manifests for all soil or fill disposal;
- Photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 remedial action is not achieved);
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results (including all soil test results from the remedial investigation for soil that will remain on site) and all soil/fill waste characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Test results or other evidence demonstrating that remedial systems are functioning properly;

- Account of the source area locations and characteristics of all soil or fill material removed from the Site including a map showing the location of these excavations and hotspots, tanks or other contaminant source areas;
- Full accounting of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;
- Account of the origin and required chemical quality testing for material imported onto the Site;
- Continue registration of the property with an E-Designation by the NYC Department of Buildings (if Track 1 remedial action is not achieved);
- The RAWP and Remedial Investigation Report will be included as appendices to the RAR;
- Reports and supporting material will be submitted in digital form and final PDF's will include bookmarks for each appendix.

Remedial Action Report Certification

I, Xin Yuan, certify the following:

- I am currently a registered professional engineer licensed by the State of New York.
- I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the 24-19 Jackson Avenue Site, OER site No. 23TMP0452Q. I certify to the following:
- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.

If a Track 1 or a Track 2 Restricted Residential Remedial Action was achieved (without an active SSDS), substitute the following passage for above:

The vapor barrier, passive SSDS, and composite cover system constructed during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.

- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.

If a Track 1 or a Track 2 Restricted Residential Remedial Action was achieved (without an active SSDS), substitute the following passage for above:

The vapor barrier, passive SSDS, composite cover system implemented as part of construction] constructed during this remedial action were professionally observed by me or by a person under my direct supervision are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.

- The OER-approved Remedial Action Work Plan dated [TBD] and Stipulations in a letter dated [TBD] were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquid or other material from the property was taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Name

PE License Number

Signature

Date

PE Stamp

I, Greg Chicas Mendez, certify the following:

- I am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the 24-19 Jackson Avenue Site, OER site number 23TMP0452Q.
- The OER-approved Remedial Action Work Plan dated [TBD] and Stipulations in a letter dated [TBD] were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquid or other material from the property was taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

QEP Name

QEP Signature

Date

7.0 Schedule

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 33-month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	4
Fact Sheet 2 announcing start of remedy	4	4
Mobilization	8	1
Remedial Excavation	9	144
Demobilization	153	1
Submit Remedial Action Report	154	4