REMEDIAL ACTION WORK PLAN

For

LONG ISLAND CITY CENTER
43-02 to 43-40 24th Street
Long Island City, New York

NYSDEC BCP Site No. C241189

Prepared For:

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Acronym	Definition
AOC	Area of Concern
AGV	Air Guidance Value
ASP	Analytical Services Protocol
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BGS	Below Grade Surface
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CPP	Citizens Participation Plan
DEP	Department of Environmental Protection
DER	Division of Environmental Remediation
DMM	Division of Materials Management
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Approval Program
FAR	Floor Area Ratio
FER	Final Engineering Report
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
IC	Institutional Control
$\mu g/m^3$	Micrograms per Cubic Meter
MSDS	Material Safety Data Sheets
NAPL	Non-Aqueous Phase Liquid
NAVD88	North American Vertical Datum of 1988
NYC	New York City
NYCRR	New York Codes, Rules and Regulations

Acronym	Definition
NYCT	New York City Transit
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyls
PFC	Perfluorinated Chemicals
PID	Photoionization Detector
PPE	Personal Protective Equipment
PPM	Parts per Million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
RE	Remedial Engineer
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RR	Restricted Use Restricted-Residential
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SEQRA	State Environmental Quality Review Act
SMP	Site Management Plan
SMMP	Soil/Materials Management Plan
SPDES	State Pollutant Discharge Elimination System
SSI	Subsurface Site Investigation
SVOC	Semivolatile Organic Compound
SWPPP	Stormwater Pollution and Prevention Plan

Acronym	Definition
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UU	Unrestricted Use
VOC	Volatile Organic Compound
WCI	Waste Characterization Investigation

CERTIFICATION

I, Jason Hayes, P.E. certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

7-16-2019

NYS Professional Engineer # 089491 | Date | Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, and New York State Education Law.

EXECUTIVE SUMMARY

This Remedial Action Work Plan (RAWP) was prepared on behalf of LICCD LLC, Long Island City Center LLC, and Long Island City Center II LLC (collectively the Volunteer) for Long Island City Center at 43-02 to 43-40 24th Street in Long Island City, New York (the site). The Volunteer entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on December 8, 2016 and Brownfield Cleanup Program (BCP) Site No. C241189 was assigned to the site by NYSDEC. The Volunteer proposes to remediate the site for residential and commercial use.

This RAWP summarizes the nature and extent of contamination as determined from data gathered during the May 2016 Subsurface Investigation (SI) and Waste Characterization Investigation (WCI) and the Remedial Investigation (RI) performed between June 26 and July 26, 2017. The RI Report (RIR) was submitted to the NYSDEC in April 2018 and was approved on May 15, 2018. This RAWP identifies and evaluates remedial action alternatives, including a Track 1 remediation, a Track 4 remediation, and a recommended Track 2 cleanup, including their associated costs. The remedy described in this document is consistent with the procedures defined in Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375-3.8 and Division of Environmental Remediation (DER)-10, and complies with applicable federal, state, and local standards, criteria, guidance, laws, regulations and requirements.

The NYSDEC and New York State Department of Health (NYSDOH) have determined that the site does not poses a significant threat to human health and the environment. The RI did not identify impacts to fish and wildlife resources.

Site Description/Physical Setting/Site History

The site is located at 43-02 to 43-40 24th Street in the Long Island City neighborhood of Queens, New York and is identified as Block 436, Lot 1 on the New York City (NYC) Queens Borough Tax Map. The about 56,500-square-foot site was formerly identified as Lots 1 and 21 prior to apportionment of the southern portion of Lot 21. The site was formerly improved by a two-story warehouse building on Lot 1 that was operated as a production warehouse for a department store, and a one-story parking garage on former Lot 21. The parking garage was demolished in August 2016 and the warehouse building was demolished in April 2017. The site surface is currently covered by the former building concrete foundation slabs. The site is bound to the north by Block 436, Lot 21 (a five-story office building occupied by Sungard Availability Services) and Block 436, Lot 10 (a construction site that will contain a two-story office building with a basement), to the west by 23rd Street, to the south by 44th Road, and to the east by 24th Street.

The elevated NYC Transit (NYCT) No. 7 subway structure runs along 23rd Street. The NYCT subway E/M lines are located about 280 feet south of the site running under 44th Drive.

The site was improved with a single-story shipping and loading building constructed at former Lot 21 in 1948, and a two-story warehouse building constructed at former Lot 1 in 1963. The building at Lot 21 was used by Goldsmith Bros. and Volunteers of America between 1948 and at least 1990, and was most recently used as a parking garage. The building at Lot 1 was used by Panasonic for electronic parts and service from 1963 until at least 1986. The current owner (and Volunteer) operated the site as parking and warehouse space since 2001, prior to demolishing both buildings in April 2017.

The site is located in an urban setting that is characterized by residential, commercial and industrial buildings, which is summarized in the following table:

Direction	Adjoining Properties			Surrounding Properties
	Block No.	Lot No.	Description	
East	24th Street			
	435	1	16-story commercial office building	Multiple-story commercial, residential, and industrial buildings and parking lots and garages
		13	41-story mixed-use commercial/residential building	
West	23rd Street and NYCT No. 7 overhead subway line			
	440	1	6-story industrial building	Multiple-story commercial and industrial buildings and parking lots and garages
	439	1	2-story industrial building	
	439	39	5-story industrial building	
North	436	10	2-story office building (under construction)	Multiple-story commercial, residential, and industrial buildings, parking lots, and the NYCT No. R subway line
	436	21	5-story office building occupied by Sungard Availability Services, construction site and 43rd Avenue	
South	44th Road			
	437	15	1-story industrial building	Multiple-story residential and commercial buildings, vacant lots, and the NYCT Nos. E/M line
		20	Vacant lot	

Summary of the Remedial Investigation

RI findings and conclusions are as follows:

1. Stratigraphy: Fill material was encountered to depths of about 9 to 17 feet below ground surface (bgs) across the majority of the site footprint, with the exception of the southwestern corner of the site, where it ranged in depth from about 0.5 to 2 feet bgs. The fill was predominantly characterized as brown to black, fine- to medium-grained sand and silt with varying amounts of gravel, brick, concrete, asphalt, slag, coal, ash, and glass. Native soil encountered below the fill layer predominantly consisted of alternating layers of brown to black sand and silt with varying amounts of sand and gravel. Pockets of organic silt, silty clays, and peat are intermixed within the native soil near the northern portion of the site. Bedrock was not encountered during the RI; however, competent bedrock was encountered at depths ranging from about 10 to 50 feet bgs during Langan's June 2016 geotechnical investigation.
2. Hydrogeology: Synoptic groundwater measurements were collected on July 26, 2017 from six on-site groundwater monitoring wells. Based on the gauging event, groundwater depth ranged from 11.64 feet bgs (MW09) to 16.34 feet bgs (MW06), and groundwater elevation ranged from el 0.08 (MW06) to el 4.65[1] (MW09). Inferred groundwater flow is to the west toward the East River.
3. Fill Material: Laboratory analytical results indicated that the fill material contains volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, pesticides, and polychlorinated biphenyls (PCBs) at concentrations above the NYSDEC Part 375-6.8(a) Unrestricted Use (UU) and/or Part 375-6.8(b) Restricted Use – Restricted Residential Use (RRU) Soil Cleanup Objectives (SCOs), with the deepest exceedance found at 13 feet bgs in the northern part of the site. Hazardous concentrations of lead were also detected in the fill layer in six areas of the site. Creosote-impacted wood was also observed in the 3- to 4-foot depth interval of boring SB11, advanced in the northern part of the site.
4. Native Soil: Metals (arsenic, cadmium, copper, lead, mercury, nickel and zinc) were detected at concentrations above the UU and/or RRU SCOs in samples of native soil collected from six borings (SB08, SB10, SB12, SB13, EB12, and EB16), with the deepest

[1] Elevations herein are referenced to the North American Vertical Datum of 1988 (NAVD88)

exceedance found at about 26 feet bgs, near the center of the site. VOC, SVOC, pesticide, and PCB concentrations did not exceed the Part 375 UU SCOs in native soil samples.

5. Groundwater: Chlorinated VOCs, including 1,1,1-trichloroethane (TCA), cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride, were detected at concentrations above the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (SGV) in four groundwater samples collected during the SI. During the RI, the chlorinated VOC concentrations were below the SGVs in all groundwater samples. Chlorinated solvent impacts to groundwater appear to be generally confined to the center of the site. In addition, three SVOCs (bis[2-ethylhexyl]phthalate, benzo[b]fluoranthene, and chrysene) and multiple total and dissolved metals were detected at concentrations above the SGVs in groundwater samples collected from across the site footprint. SVOC concentrations are likely related to entrained sediments that may be related to on-site fill material or well installation materials. Total metals concentrations may also be related to entrained sediments or may be attributable to regional groundwater conditions (or a combination of the two). Dissolved metals concentrations detected above the SGVs are attributable to regional groundwater conditions and are not considered indicative of a release.
6. Soil Vapor: Petroleum-related VOCs were detected in soil vapor at concentrations of up to three orders of magnitude above those detected in the ambient air sample. TCE was detected at a concentration of 31 micrograms per cubic meter ($\mu g/m^3$) in the soil vapor sample collected from SV02, and when applied to the New York State Department of Health (NYSDOH) decision matrix, the recommendation ranges from no further action to mitigate. Two additional chlorinated VOCs, PCE and 1,1,1-TCA, were detected in soil vapor samples collected from across the site footprint; however, when such concentrations are applied to the NYSDOH decision matrices, the recommendation is no further action.
7. Sufficient analytical data were gathered during the RI to establish site-specific soil cleanup levels and to develop a remedy for the site.

Qualitative Human Health Exposure Assessment

Based upon the conceptual site model and the review of environmental data, in the absence of a Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP), and remediation, complete on-site exposure pathways appear to be present in current, construction and remediation, and future conditions. The complete exposure pathways indicate there is a risk of exposure to humans from site contaminants via exposure to soil, groundwater, and soil vapor if

not addressed by protective measures and remediation. The following conclusions were developed from this human health exposure assessment:

1. Human exposure to site contaminants is limited under current conditions due to the surface cover, and access is limited to investigation workers and authorized guests. The primary exposure pathways are dermal contact, ingestion, and inhalation of soil, groundwater, or soil vapor by site investigation workers and, to a lesser extent, the nearby public. The exposure risks can be avoided or minimized by following the appropriate HASP and vapor and dust suppression measures, and by implementing a CAMP during investigation activities.
2. In the absence of mitigation and controls, there is potential for exposure during the construction-phase activities. The primary exposure pathways are:
    a. Dermal contact, ingestion, and inhalation of contaminated soil, groundwater, or soil vapor by construction workers.
    b. Dermal contact, ingestion, and inhalation of soil (dust) and inhalation of soil vapor by the community in the vicinity of the site.

    These can be avoided or minimized by implementing CAMP and by following the appropriate HASP, vapor and dust suppression, site security measures, and following a NYSDEC-approved RAWP.
3. The existence of a complete exposure pathway for site contaminants to human receptors during proposed future conditions is unlikely, as all or the majority of impacted soil will be excavated and transported to an off-site disposal facility and residual soil will be capped, if required, with an impermeable cover or 2 feet of clean soil. Regional groundwater is not used as a potable water source in this part of Queens. The potential pathway for soil vapor intrusion into the building would be addressed by installation of a vapor barrier/waterproofing membrane, which will minimize soil vapor infiltration.
4. It is possible that a complete exposure pathway exists for the migration of site contaminants to off-site human receptors during current, construction-phase, and future conditions. Monitoring and control measures have been and will continue to be used during investigation and construction to prevent completion of this pathway. Under future conditions, the site will be remediated and engineering and institutional controls will be implemented, if necessary, to prevent completion of this pathway.

Summary of the Remedy

The selected remedy is Track 2 RRU and will include the following:

- Construction of the support of excavation (SOE) system to facilitate the excavation of historic fill and native soil exceeding RRU SCO
- Excavation, stockpiling, off-site transport, and disposal of contaminated historic fill and native soil exceeding RRU SCOs to a maximum depth of 15 feet bgs, and any source material below 15 feet bgs
- Collection and analysis of bottom confirmation and/or documentation soil samples to confirm RRU SCOs are achieved and/or to evaluate soil to remain in place after the remedy
- Dewatering and treatment, as necessary, of impacted groundwater to accommodate the removal of material that exceeds RRU SCOs and to facilitate SOE installation and foundation construction
- Completion of a topographic survey of either the confirmation sample locations or final excavation sub-grade
- Backfilling of remediated areas to development grade with imported clean material (i.e., material meeting RRU SCOs), virgin stone, or recycled concrete aggregate (RCA)
- Reuse of site soil meeting RRU SCOs
- Installation of a vapor barrier/waterproofing membrane for the proposed building
- Development and implementation of a HASP and CAMP for the protection of on-site workers, the community, and the environment during the remediation phase
- Recording of an Environmental Easement (EE) to memorialize institutional controls and require future owners of the site to continue to maintain these controls

Remedial activities will be performed in accordance with this RAWP and the Department-issued Decision Document. Deviations from the RAWP and/or Decision Document will be promptly reported to the NYSDEC for approval and explained in the Final Engineering Report (FER).

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) was prepared on behalf of LICCD LLC, Long Island City Center LLC, and Long Island City Center II LLC (collectively the Volunteer) for Long Island City Center at 43-02 to 43-40 24th Street in Long Island City, New York (the site). The Volunteer entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on December 8, 2016 and Brownfield Cleanup Program (BCP) Site No. C241189 was assigned to the site by NYSDEC. The Volunteer proposes to remediate the site for residential and commercial use in conjunction with redevelopment.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the May 2016 Subsurface Investigation (SI) and Waste Characterization Investigation (WCI) and the Remedial Investigation (RI) performed between June 26 and July 26, 2017. The RI Report (RIR) was submitted to the NYSDEC in April 2018 and was approved on May 15, 2018. This RAWP identifies and evaluates remedial action alternatives, including a Track 1 remediation, a Track 4 remediation, and a recommended Track 2 cleanup, including their associated costs. The remedy described in this document is consistent with the procedures defined in Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375-3.8 and Division of Environmental Remediation (DER)-10, and complies with applicable federal, state, and local standards, criteria, guidance, laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have determined that the site does not poses a significant threat to human health and the environment. The RI did not identify impacts to fish and wildlife resources.

1.1 Site Location and Description

The site is located at 43-02 to 43-40 24th Street in the Long Island City neighborhood of Queens, New York and is identified as Block 436, Lot 1 on the New York City (NYC) Queens Borough Tax Map. The approximately 56,500-square-foot site was formerly identified as Lots 1 and 21 prior to apportionment of the southern portion of Lot 21. The site was formerly improved by a two-story warehouse building on Lot 1 that was operated as a production warehouse for a department store, and a one-story parking garage on former Lot 21. The parking garage was demolished in August 2016 and the warehouse building was demolished in April 2017. The site surface is currently covered by the former buildings' concrete foundation slabs. Access to the site is currently restricted via construction fencing with locked gates.

The site is bound to the north by Block 436, Lot 21 (a five-story office building occupied by Sungard Availability Services) and Block 436, Lot 10 (a construction site that will contain a two-

story office building with a basement), to the west by 23rd Street, to the south by 44th Road, and to the east by 24th Street. The elevated NYC Transit (NYCT) No. 7 subway structure runs along 23rd Street. The NYCT subway E/M lines are located about 280 feet south of the site running under 44th Drive.

A Site Location Map, which includes a United States Geological Survey (USGS) topographical quadrangle map, is included as Figure 1 and a Site Plan is included as Figure 2. The metes and bounds of the site are detailed on the survey included in Appendix A.

1.2 Redevelopment Plan

The proposed remedy is intended to make the site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this assessment; however, the proposed remedy may be implemented independent of the proposed redevelopment plan.

Redevelopment plans include demolition of the existing concrete building slabs and construction of a 69-story residential and commercial building with a footprint area of about 56,500 square feet. Development will include excavation to depths of about 12 to 22 feet below ground surface (bgs) (about el. 4.25 feet[1] to -5.25 feet, respectively) to accommodate a cellar level and foundation components. The cellar will include parking, storage, employee offices, and mechanical and amenity space. The ground floor will include a residential lobby, library, parking access, and retail and residential amenity space. Paved driveways and walkways, and landscaped areas are planned for exterior portions of the ground floor (above the cellar level). The second floor will include parking and storage, and the third floor will include retail amenity and mechanical space. Floors 4 through 66 will include residential apartments. Floors 67 through 69 will include utility and mechanical rooms.

Proposed development plans are provided in Appendix B.

1.3 Description of Surrounding Properties

The site is located in an urban area, primarily characterized by residential, commercial and industrial buildings. According to the NYC Planning Commission Zoning Map 9b, the site is located in the special purpose Long Island City Mixed Use District with a R10 – Residential zone

[1] Elevations are relative to the North American Vertical Datum of 1988 (NAVD88)

and a M1-6 manufacturing overlay, which is predominately industrial in character and allows a maximum commercial floor area ratio (FAR) of 10.0. Adjoining and surrounding property use is summarized in the following table:

Direction	Adjoining Properties			Surrounding Properties
	Block No.	Lot No.	Description	
East	24th Street			
	435	1	16-story commercial office building	Multiple-story commercial, residential, and industrial buildings and parking lots and garages
		13	41-story mixed-use commercial/residential building	
West	23rd Street and NYCT No. 7 overhead subway line			
	440	1	6-story industrial building.	Multiple-story commercial and industrial buildings and parking lots and garages
	439	1	2-story industrial building	
	439	39	5-story industrial building	
North	436	10	2-story office building (under construction)	Multiple-story commercial, residential, and industrial buildings, parking lots, and the NYCT No. R subway line
	436	21	5-story office building occupied by Sungard Availability Services, construction site and 43rd Avenue	
South	44th Road			
	437	15	1-story industrial building	Multiple-story residential and commercial buildings, vacant lots, and the NYCT Nos. E/M line
		20	Vacant lot	

Land use within a half mile of the site is urban and includes residential, commercial, and industrial buildings, government buildings, school facilities, and major infrastructure including elevated and underground subway lines, underground utility lines, storm drains, and sewers.

The nearest ecological receptors are the East River and Newtown Creek, which are located about 0.5 miles west and 0.75 miles south, respectively. Sensitive receptors (e.g., schools and daycare centers) located within a half mile of the site are listed in the table below:

Number	Name (Approximate distance from Site)	Address
1	Information Technology High School (about 600 feet southwest)	21-02 44 Road Queens, NY 11101
2	Bard High School Early College Queens Academy-Finance & Enterprise High School of Applied Communication (about 0.4 miles southeast)	30-20 Thomson Avenue Queens, NY 11101
3	Academy of American Studies Newcomers High School (about 0.4 miles north)	40-11 28th Street Queens, NY 11101
4	Growing Up Green Charter School (about 0.5 miles north)	39-42 40th Avenue Queens, NY 11101
5	Evangel Christian School (about 0.5 miles north)	39-21 Crescent Street Queens, NY 11101

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The RI was completed in accordance with the NYSDEC-approved July 18, 2017 Remedial Investigation Work Plan (RIWP). The investigation was completed between June 26 and July 26, 2017 to investigate AOCs and to determine, to the extent practical, the nature and extent of contamination in soil, groundwater, and soil vapor at the site. The RI Report (RIR) was submitted to the NYSDEC in April 2018 and was approved on May 15, 2018.

2.1 Summary of Remedial Investigations Performed

The RI consisted of the following:

- A geophysical survey to clear soil boring, monitoring well, and soil vapor probe locations and to identify unidentified underground storage tanks (UST), physical obstructions, and subsurface utilities
- Advancement of 14 soil borings (SB01 through SB14) to depths ranging from 13 to 40 feet bgs and collection and analysis of 45 soil samples (including three duplicate samples)
- Advancement of 28 delineation soil borings at locations corresponding with previous detections of hazardous concentrations of lead, to horizontally and vertically delineate the extent of hazardous or potentially hazardous lead-impacted soil and collection and analysis of 22 soil samples (including 2 duplicate samples)
- Installation of six groundwater monitoring wells (MW03, MW06, MW07, MW08, MW09, and MW13) and collection and analysis of seven groundwater samples (including one duplicate sample)
- Installation of two soil vapor probes (SV01 and SV02) to a depth of about 14 feet bgs and collection and analysis of three soil vapor samples (including one duplicate sample) and one ambient air sample

2.1.1 Geophysical Survey

Prior to initiating intrusive RI subsurface activities, the New York One Call Center was contacted for Code 753 utility mark-outs. On June 26, 2017, a Langan field engineer documented the geophysical survey performed by NOVA Geophysical & Environmental, Inc. (NOVA) of Douglaston, New York. The survey was completed using electromagnetic and utility line locator instruments, a magnetometer, and ground penetrating radar (GPR) to identify potential subsurface utilities, USTs, and other buried structures across the site and to clear boring, monitoring well, and soil vapor probe locations.

The geophysical survey identified scattered anomalies across the site. The anomalies were inconsistent with USTs and were likely associated with debris observed throughout the fill layer. Buried utility lines extending onto the site from 23rd and 24th Streets were also identified.

2.1.2 Soil Investigation

Fourteen site-wide soil borings (SB01 through SB14) and 28 lead delineation soil borings (SB15 through SB18 and 24 step-out borings) were advanced during the RI by AARCO Environmental Services, Inc. (AARCO) of Lindenhurst, New York. Soil borings were advanced using a Geoprobe® 7822DT direct-push drill rig to depths ranging from 9 to 40 feet bgs. Langan documented boring activities and collected samples.

Soil was recovered continuously from grade surface to the termination depth of each soil boring. Samples were collected into 4-foot-long, 2-inch-diameter Macro-Core® sample barrels equipped with dedicated acetate liners. Soil samples retrieved from each boring were visually classified for soil type, grain size, color and texture. Each sample was screened for visual, olfactory and instrumental evidence of anthropogenic impacts. Instrument screening for the presence of organic vapors was performed using a photoionization detector (PID) equipped with an 11.7 electron volt (eV) lamp.

2.1.3 Groundwater Investigation

Six of the soil borings were converted in to permanent monitoring wells (SB/MW03, SB/MW06, SB/MW07, SB/MW08, SB/MW09, and SB/MW13). The monitoring wells were constructed using 2-inch diameter polyvinyl chloride (PVC) riser pipe with, 0.02-inch slotted PVC screens. Five of the wells (MW03, MW06, MW07, MW09, and MW13) were installed with 10-foot long well screens straddling the observed groundwater table, from about 11 to 16 feet bgs. The annulus of each well was filled with No. 2 sand to a depth of at least 5 feet above the top of the screen followed by an at least 2-foot-thick bentonite seal. The remainder of the annulus was filled with soil cuttings that did not display evidence of environmental impacts or clean sand.

Monitoring well MW08 was installed to investigate the potential for deeper chlorinated impacts and potential dense non-aqueous phase liquid (NAPL). MW08 was constructed by inserting a 5-foot screen placed between 31.5 to 36.5 feet bgs with a 2-foot sump at the bottom, attached to PVC riser to grade. The annulus was filled with clean sand to a depth of about 1 foot above the top of the screen followed by a 3-foot-thick bentonite seal. The remainder of the annulus was filled with soil cuttings that did not display evidence of environmental impacts.

Monitoring wells were finished with a flush-mount, steel well cover set into concrete for protection. After installation, groundwater monitoring wells were developed via check valve

surge block across the well screen to agitate and remove fine particles. The surge block was surged across the well screen in 2- to 3-foot increments for approximately 2 minutes per increment. After surging, the well was be purged via pumping until the water becomes clear or the well was purged dry. Wells MW03 and MW08 ran dry during purging.

2.1.4 Soil Vapor Investigation

Two soil vapor probes (SV01 and SV02) were installed by AARCO using a Geoprobe® 7822DT drill rig to a depth of about 15 feet bgs. Langan documented installation activities and collected vapor samples. Soil vapor probes consisted of polyethylene implants (1/2-inch diameter and about 1-7/8-inch in length) threaded into 3/16-inch-diameter polyethylene tubing. About 1 foot of No. 2 sand was backfilled around the implant followed by a 2-foot-thick bentonite seal. The remaining annular space was backfilled to grade with soil cuttings that did not display evidence of environmental impacts or No.2 sand.

2.1.5 Samples Collected

Forty-five soil samples, including three duplicate samples, were collected for laboratory analysis. With the exception of four borings (SB01, SB06, SB11, and SB14), samples were collected from 0 to 2 feet bgs (i.e., shallow fill), the bottom of the fill layer, and the proposed development depth in each boring. Only two samples (0 to 2 feet bgs and the proposed development depth) were collected from borings SB01 and SB06 because fill was not observed below 2 feet bgs and evidence of impacts was not observed in native soil. In boring SB11, samples were collected from 0 to 2 feet bgs, the interval exhibiting evidence of impacts (9 to 10 feet bgs), and the proposed development depth. In boring SB14, samples were collected from 4 to 6 feet bgs (because a crawl space was encountered from 0 to 4 feet bgs), the bottom of the fill layer (12 to 13 feet bgs), and the proposed development depth. Additional samples of presumed impacted material were collected from 33 to 34 feet bgs in SB08 and 2 to 3 feet bgs in lead delineation boring SB16E1.

Twenty-two soil samples, including two field duplicate samples, were collected and analyzed from borings SB15 through SB18 and the associated step out borings, to delineate hazardous lead impacts.

Seven groundwater samples, including one field duplicate sample, were collected about one week following well development. Samples were collected in accordance with the United States Environmental Protection Agency's (USEPA) low-flow groundwater sampling procedure ("Low Stress [low-flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", dated July 30, 1996 and revised January 19, 2010) to allow for collection of representative samples. With the exception of monitoring well MW08, samples were

collected from each well using a peristaltic pump and dedicated tubing. A submersible bladder pump and dedicated tubing were used to collect the groundwater sample from MW08.

Three soil vapor samples, including one duplicate sample, were collected into laboratory-supplied, batch-certified, 6-Liter Summa® canisters that were calibrated for a sampling rate of about 0.05 liters per minute (L/min) over about 120 minutes of sampling. For QA/QC purposes, one outdoor ambient air sample was collected from the northeastern part of the site at the breathing zone (at least 3.5 feet above grade).

All soil, groundwater, and soil vapor samples were submitted for laboratory analysis to Test America Inc., an NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory located in Edison, New Jersey.

2.1.6 Chemical Analysis

The laboratory analyses performed on the soil, groundwater, soil vapor, and ambient air samples collected are summarized below by media.

Soil samples were analyzed for one or more of the following parameters:

- Part 375/Target Compound List (TCL) volatile organic compounds (VOCs) via USEPA Method 8260C
- Part 375/TCL semivolatile organic compounds (SVOCs) via USEPA Method 8270D
- TCL Polychlorinated biphenyls (PCBs) via USEPA Method 8082A
- Part 375/TCL pesticides via USEPA Method 8081B
- Part 375/Target Analyte List (TAL) metals via USEPA Methods 6010C, 7471B, and 7196A
- Total cyanide via USEPA Method 9012B
- Toxicity characteristic leaching procedure (TCLP) lead via USEPA Method 6010C

Groundwater samples were analyzed for one or more of the following parameters:

- TCL VOCs via USEPA Method 8260C
- 1,4-dioxane via USEPA Method 8270-SIM
- TCL SVOCs via USEPA Method 8270D
- TCL PCBs via USEPA Method 8082A
- TCL Pesticides via USEPA Method 8081B

- TAL metals (total and dissolved) via USEPA Methods 6020A and 7470A
- Total cyanide via USEPA 9012B
- Perfluorinated chemicals (PFCs) via USEPA Method 537-M

Soil vapor and ambient air samples were analyzed for VOCs via USEPA Method TO-15.

2.1.7 Remedial Investigation Findings Summary

The findings summarized herein are based on qualitative data (field observations and instrumental readings) and laboratory soil, groundwater, and soil vapor analytical sample results. Soil sample results are summarized on Figures 3 and 4, groundwater sample results are summarized on Figures 5 and 6, and soil vapor sample results are summarized on Figure 7.

1. Stratigraphy: Fill material was encountered to depths of about 9 to 17 feet below ground surface (bgs) across the majority of the site footprint, with the exception of the southwestern corner of the site, where it ranged in depth from about 0.5 to 2 feet bgs. The fill was predominantly characterized as brown to black, fine- to medium-grained sand and silt with varying amounts of gravel, brick, concrete, asphalt, slag, coal, ash, and glass. Native soil encountered below the fill layer predominantly consisted of alternating layers of brown to black sand and silt with varying amounts of sand and gravel. Pockets of organic silt, silty clays, and peat are intermixed within the native soil near the northern portion of the site. Bedrock was not encountered during the RI; however, competent bedrock was encountered at depths ranging from about 10 to 50 feet bgs during Langan's June 2016 geotechnical investigation.
2. Hydrogeology: Synoptic groundwater measurements were collected on July 26, 2017 from six on-site groundwater monitoring wells. During this gauging event, groundwater depth ranged from 11.64 feet bgs (MW09) to 16.34 feet bgs (MW06), and groundwater elevation ranged from el 0.08 (MW06) to el 4.65[1] (MW09). Inferred groundwater flow is to the west toward the East River.
3. Fill Material: Laboratory analytical results indicated that the fill material contains VOCs, SVOCs, metals, pesticides, and PCBs at concentrations above the NYSDEC Part 375 Unrestricted Use (UU) and/or Restricted Use – Restricted Residential Use (RRU) Soil Cleanup Objectives (SCOs), with the deepest exceedance found at 13 feet bgs in the

[1] Elevations herein are referenced to the North American Vertical Datum of 1988 (NAVD88)

northern part of the site. Hazardous concentrations of lead were also detected in the fill layer in six areas of the site. Creosote-impacted wood was also observed in the 3- to 4-foot depth interval of boring SB11, advanced in the northern part of the site.

4. Native Soil: Metals (arsenic, cadmium, copper, lead, mercury, nickel and zinc) were detected at concentrations above the Part 375 UU and/or RRU SCOs in samples of native soil collected from six borings (SB08, SB10, SB12, SB13, EB12, and EB16), with the deepest exceedance found at about 26 feet bgs, near the center of the site. VOC, SVOC, pesticide, and PCB concentrations did not exceed the Part 375 UU SCOs in native soil samples.

5. Groundwater: Chlorinated VOCs, including 1,1,1-trichloroethane (TCA), cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride, were detected at concentrations above the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (SGV) in groundwater samples collected during the SI. During the RI, the chlorinated VOC concentrations were below the SGVs in all groundwater samples. Chlorinated solvent impacts to groundwater appear to be generally confined to the center of the site. In addition, three SVOCs (bis[2-ethylhexyl]phthalate, benzo[b]-fluoranthene, and chrysene) and multiple total and dissolved metals were detected at concentrations above the TOGS SGV in groundwater samples collected from across the site footprint. SVOC concentrations are likely related to entrained sediments that may be related to on-site fill material, or well installation materials. Total metals concentrations may also be related to entrained sediments or may be attributable to regional groundwater conditions (or a combination of the two). Dissolved metals concentrations detected above the TOGS SGV are attributable to regional groundwater conditions and are not considered indicative of a release.

6. Soil Vapor: Petroleum-related VOCs were detected in soil vapor at concentrations of up to three orders of magnitude above those detected in the ambient air sample. TCE was detected at a concentration of 31 micrograms per cubic meter ($\mu g/m^3$) in the soil vapor sample collected from SV02, and when applied to the New York State Department of Health (NYSDOH) decision matrix, the recommendation ranges from no further action to mitigate. Two additional chlorinated VOCs, PCE and 1,1,1-TCA, were detected in soil vapor samples collected from across the site footprint; however, when such concentrations are applied to the NYSDOH decision matrices, the recommendation is no further action.

2.2 Significant Threat

NYSDEC and NYSDOH have determined that the site does not pose a significant threat.

2.3 Site History

2.3.1 Past Uses and Ownership

Langan reviewed Sanborn Maps to identify historical on-site uses. The one-story building located on former Lot 21 was constructed in 1948, used as a shipping and loading facility by Goldsmith Bros. and Volunteers of America between 1948 and at least 1990, and was most recently used as a parking garage. The two-story building located on former Lot 1 was constructed in 1963 and was historically used as an electronic parts storage and service center by Panasonic from 1963 until at least 1986 and as a production warehouse from 1988 to 2001. From about 2001 to 2016, the Volunteer (current site owner) operated a portion of former Lot 21 as a parking garage, and former Lot 1 as a warehouse.

2.3.2 Previous Environmental Reports

Previous environmental reports were reviewed as part of the RAWP and are summarized in chronological order below. The environmental reports are included in Appendix C.

June 14, 2016 Subsurface Investigation Letter Report, prepared by Langan

Langan implemented an SI to evaluate possible impacts to soil, groundwater, and soil vapor due to historical use of the site and surrounding area. The scope of the SI included:

- A geophysical survey of the site to identify subsurface obstructions or anomalies
- Advancement of eight soil borings to depths ranging from 20 to 27 feet bgs and collection and analysis of 28 soil samples
- Installation of six temporary groundwater monitoring wells to depths of about 25 feet bgs and collection and analysis of six groundwater samples
- Installation of six sub-slab soil vapor probes and collection and analysis of six soil vapor samples and one indoor air sample

Findings of the SI were as follows:

- Soil: Fill material consisting of sand and silt with varying amounts of brick, slag, coal, and glass was identified across the site footprint to a depth of about 14 feet bgs. SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene,

benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, and indeno(1,2,3-cd)pyrene; and metals, including arsenic, barium, cadmium, copper, lead, mercury, nickel, silver, and zinc, exceeded the RRU SCOs.

- Groundwater: Five chlorinated VOCs, including 1,1,1-TCA, cis-1,2-DCE, PCE, TCE, and vinyl chloride; two SVOCs, benzo(b)fluoranthene and chrysene; and five metals, including iron, magnesium, manganese, selenium, and sodium, exceeded the TOGS SGV.
- Soil Vapor: Chlorinated VOCs, including 1,1,1-TCA and PCE, and petroleum-related VOCs, including benzene, ethylbenzene, toluene, and xylenes (BTEX), were detected in soil vapor samples.

June 14, 2016 Waste Characterization Report, Prepared by Langan

Langan completed a waste characterization investigation in conjunction with the SI detailed above. The scope of the waste characterization included:

- Advancement of 22 soil borings to depths ranging from 15 to 27 feet bgs and collection and analysis of 34 composite soil samples and 39 grab soil samples
- Installation of one temporary groundwater monitoring well to a depth of about 25 feet bgs and collection and analysis of one groundwater sample

Findings of the waste characterization were as follows:

- Soil: In 13 of the 34 composite samples, SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, exceeded RRU SCOs. In 12 of the 34 composite samples, metals, including arsenic, barium, cadmium, copper, lead, mercury, and nickel, exceeded RRU SCOs. Lead was detected in two composite samples exceeding the maximum concentration for the toxicity characteristic (i.e., hazardous lead-impacted soil).
- Groundwater: Two VOCs, 1,1,1-TCA and PCE, exceeded the TOGS SGV. PCE also exceeded the NYC Department of Environmental Protection (DEP) limitation for effluent to the sanitary or combined sewer.

2.4 Geological Conditions

Geologic and hydrogeologic observations are described below. A groundwater contour map is provided as Figure 8. Soil boring logs and subsurface profiles are appended to the RIR (Appendix A).

2.4.1 Historic Fill Material

Fill material of unknown origin was encountered beneath the concrete slab to depths ranging from about 0.5 to 2 feet bgs in the southwestern corner of the site and from about 9 to 17 feet bgs across the remainder of the site, with the deepest fill material in the northwestern portion of the site. Fill material generally consisted of brown to black, fine- to medium-grained sand and silt with varying amounts of gravel, brick, concrete, asphalt, slag, coal, ash, and glass.

2.4.2 Native Soil

Fill material is underlain by native soil typically comprised of brown and black, fine- to coarse-grained sand with varying amounts of silt and fine gravel, or by a brown silt with trace amounts sand and gravel. Pockets of organic silt, silty clays, and peat are intermixed within the native soil in the northern portion of the site. The native soil generally extended to the termination depth of each boring.

2.4.3 Bedrock

Bedrock was not encountered during the RI, SI, or waste characterization; however, competent bedrock was encountered at depths ranging from about 10 to 50 feet bgs during Langan's June 2016 geotechnical investigation.

2.4.4 Hydrogeology

Synoptic groundwater measurements were collected on July 26, 2017 from six on-site groundwater monitoring wells. Depth to groundwater was measured from 11.64 feet (MW09) to 16.34 feet (MW06) below top of casing with corresponding groundwater elevations ranging from el 0.08 (MW06) to el 4.65 (MW09). Inferred groundwater flow is to the west toward the East River. The groundwater elevation measured in well MW08 was lower than that of nearby wells and inconsistent with the general groundwater gradient across the site; therefore, this data was considered anomalous and not included in the model used to determine groundwater contours.

2.5 Contamination Conditions

2.5.1 Conceptual Site Model

A conceptual site model (CSM) has been developed based on the findings of the RI, SI, and waste characterization. The purpose of the CSM is to develop a simplified framework for understanding the distribution of impacted materials, potential migration pathways, and potentially complete exposure pathways.

Potential Sources of Contamination

Potential sources of contamination include fill material, historical site use, and potential off-site sources.

VOCs in soil are likely associated with the presence of historic fill identified across the site. Chlorinated VOC concentrations in groundwater, which appear to be confined to the center of the site, and petroleum-related and chlorinated VOC concentrations detected in soil vapor may be indicative of a chemical release associated with historical site use. Petroleum-related and chlorinated VOC were not detected above applicable criteria in soil and therefore may be related to an off-site source.

SVOCs in soil are likely associated with the presence of historic fill identified across the site. SVOC concentrations detected above the TOGS SGV in groundwater samples collected from the southeastern, central, and northern parts of the site are likely related to entrained sediments related to on-site fill material.

Metals in soil are likely associated with the presence of historic fill identified across the site or may also be related to the site's historical use. The concentrations of some metals (e.g., copper and zinc) detected in native soil samples may also be naturally occurring. Total metals concentrations detected above the TOGS SGV may be related to entrained sediments related to on-site fill material (specifically the lead concentration detected in the groundwater sample collected from MW03) or may be attributable historical site use (or a combination of the two). Dissolved metals concentrations detected above the TOGS SGV are attributable to regional groundwater conditions and are not considered indicative of a release.

Pesticides and PCBs in soil are likely associated with the presence of historic fill identified across the site.

Exposure Media

The impacted media include soil, groundwater, and soil vapor. Analytical data for the contaminants of concern indicate that VOCs, SVOCs, PCBs, and pesticides are limited to the fill layer and metals are ubiquitous throughout fill material and native soil to the proposed development depth. In addition, hazardous concentrations of lead were detected in the fill layer in six areas of the site. Groundwater impacts include VOCs, SVOCs, and metals. Soil vapor is impacted with petroleum-related and chlorinated VOCs.

Receptor Populations

The site is covered by the concrete slabs of the previous on-site buildings. Access to the site is restricted via construction fencing with locked gates. Current receptor populations include authorized visitors to the site associated with pre-development assessment and investigation activities. During site development, human receptors will be limited to construction and remediation workers, authorized guests visiting the site, and the public and pedestrians adjacent to the site. Under future conditions, receptors will include the residential and commercial use occupants, patrons and employees, and the nearby community, including children.

2.5.2 Description of Areas of Concern

This section discusses the results of the RI, SI, and waste characterization with respect to the AOCs.

AOC-1: Fill Material

Fill material located throughout the site contains VOCs, SVOCs, metals, pesticides, and PCBs at concentrations above the Part 375 UU and/or RRU SCOs. Fill material was encountered beneath the concrete slab to depths ranging from about 0.5 to 2 feet bgs in the southwestern corner of the site and from about 9 to 17 feet bgs across the remainder of the site footprint, with the deepest fill material in the northwestern portion of the site. The bottom of the fill layer was encountered beneath the groundwater table (about 11.64 to 15.65 feet bgs and elevation ranged from 4.65 to 0.88) in the northern part of the site. Fill material predominantly consisted of brown to black, fine- to medium-grained sand and silt with varying amounts of gravel, brick, concrete, asphalt, slag, coal, ash, and glass.

Bis(2-ethylhexyl)phthalate was detected at concentrations above the TOGS SGV in groundwater samples collected from RI monitoring wells MW08 and MW13; the SVOC was also detected in samples of fill material collected from the same boreholes, but at concentrations below the Part 375 UU SCO. Benzo(b)fluoranthene and chrysene were detected at concentrations above the TOGS SGV in the groundwater sample collected from SI monitoring well TMW16; both SVOCs were also detected at concentrations above the Part 375 UU and/or RRU SCOs in samples of fill material collected from EB16.

AOC 1 Conclusions

Fill material, which is ubiquitous across the site footprint, was encountered beneath surface cover to depths ranging from about 0.5 to 17 feet bgs. VOCs, SVOCs, metals, pesticides, and PCBs were detected at concentrations above the Part 375 UU and/or RRU SCOs in samples of

fill material, with the deepest exceedance found at 13 feet bgs in the northern part of the site. Metals concentrations above the Part 375 UU and/or RRU SCOs were also detected in samples of native soil collected from six borings (SB08, SB10, SB12, SB13, EB12, EB16), with the deepest exceedance at about 26 feet bgs. This indicates that the fill material may have impacted native material, there may have been co-mingling of slough fill material with native material during borehole advancement, or naturally occurring metals. Metals detected in historic fill and native soil samples may also potentially be related to the historical site use as an electronic parts storage and service center.

SVOC concentrations detected in groundwater are likely related to entrained sediments that may be related to on-site fill material.

The analytical data indicates that the VOC contaminants associated with fill material have not impacted soil vapor beneath the site.

AOC-2: Elevated Lead in Soil Hot Spots

During the RI, four hazardous lead-impacted soil hot spots (Hot Spots 1 through 4) were vertically and horizontally delineated as defined below:

- Hot Spot 1: About 8 feet by 8 feet from about 5 to 9 feet bgs around RI boring SB15
- Hot Spot 2: About 8 feet by 12 feet from about 5 to 10 feet bgs around RI boring SB16
- Hot Spot 3: About 8 feet by 8 feet from about 5 to 10 feet bgs around RI boring SB17
- Hot Spot 4: About 8 feet by 8 feet from about 9 to 10 feet bgs around RI boring SB18. However, removing a 1-foot thick layer of soil is impractical with common excavation methods; therefore, the vertical extents of Hot Spot 4 are considered to be from about 8 to 11 feet bgs.

Two additional areas of hazardous lead-impacted soil were identified during the RI and have not been delineated: the 0- to 2-foot depth interval at boring SB01 (Hot Spot 5) and the 10- to 12-foot depth interval at boring SB10 (Hot Spot 6). The horizontal and vertical extents of Hot Spots 5 and 6 will be delineated as part of proposed remedial action.

AOC 2 Conclusions

The approximate horizontal and vertical extents of four of the six hot spots were delineated as part of the RI. The approximate horizontal and vertical extents of Hot Spots 5 and 6 will be delineated as part of proposed future remediation in the same manner described in the NYSDEC-

approved RIWP. The hazardous concentrations of lead are likely related to the the fill material beneath the site or previous site use (or a combination of the two).

AOC-3: Chlorinated VOCs in Groundwater

Chlorinated VOCs, including 1,1,1-TCA, cis-1,2-DCE, PCE, TCE, and vinyl chloride, were detected above the TOGS SGV in four groundwater samples collected during the SI. The highest concentrations were detected in the groundwater sample collected from TMW12 in the approximate center of the site. Six monitoring wells were installed during the RI to delineate the chlorinated VOC impacts to groundwater. Five of the monitoring wells were screened across the groundwater table (about 11 to 16 feet bgs), and one monitoring well, MW08, was installed in the center of the site and screened across a deeper interval (31.5 to 36.5 feet bgs) to investigate the potential for deep chlorinated VOC impacts and dense non-aqueous phase liquid (DNAPL). During the RI, chlorinated VOCs were either not detected or detected at concentrations below the TOGS SGV. Prior to sampling, a headspace reading of 200 parts per million (ppm) was recorded at MW08; however, DNAPL was not identified in the well.

Chlorinated VOCs were detected in soil vapor during the SI and RI. PCE was detected in soil vapor samples collected from across the site footprint at a maximum concentration of 15.1 µg/m^3. TCE was not detected in soil vapor samples collected during the SI. During the RI, TCE was detected in one soil vapor sample (SV02) at a concentration of 31 µg/m^3. 1,1,1-TCA was detected in two soil vapor samples collected during the SI at a maximum concentration of 4.31 µg/m^3. PCE, TCE, and cis-1,2-DCE were detected in soil samples collected during the RI but at concentrations below the UU SCOs.

AOC 3 Conclusion

Chlorinated VOCs were not detected at concentrations above the TOGS SGV in groundwater samples collected during the RI. Chlorinated solvent impacts to groundwater identified during the SI appear to be confined to the center of the site. Chlorinated VOC concentrations in groundwater may be indicative of a chemical release associated with historical site use, although no on-site source of chlorinated solvents was identified in soil.

When concentrations of PCE and 1,1,1-TCA in soil vapor are applied to the NYSDOH decision matrices, the recommendation is no further action. The maximum concentration of TCE, when compared to the matrices, results in a recommendation ranging from no further action to mitigate.

2.5.3 Nature and Extent of Contamination

Contaminant sources include the fill material, historical site use, and potential off-site sources. This section evaluates the characteristics and extent of soil, groundwater, and soil vapor contamination based upon a combination of field observations and analytical data. Soil sample results are summarized on Figures 3 and 4, groundwater sample results are summarized on Figures 5 and 6, and soil vapor sample results are summarized on Figure 7.

Soil Contamination

Fill material predominantly consisting of brown to black, fine- to medium-grained sand and silt with varying amounts of gravel, asphalt, brick, concrete, slag, coal, and glass was encountered from about 9 to 17 feet bgs across a majority of the site footprint. The fill layer ranged in depth from about 0.5 to 2 feet bgs in the southwestern corner of the site.

PID readings were observed at varying depths in six borings advanced across the site footprint and generally ranged from 11 to 886 ppm. An anomalous PID reading of 2,000 ppm was observed in the 3- to 4-foot depth interval of boring SB11 (northern part of the site) and is associated with creosote-impacted wood.

Petroleum-related VOCs and acetone were detected at concentrations above the Part 375 UU SCOs, but below the RRU SCOs, in one sample of fill material collected from boring SB16E1, advanced in the eastern part of the site. The VOC impacts may be related to the quality of the fill material or the site's historical use as an electronic parts storage and service center (or a combination of the two).

SVOCs were detected at concentrations above the Part 375 UU and/or RRU SCOs in samples of fill material collected from across the site footprint. Pesticides and PCBs were detected at concentrations above the Part 375 UU SCOs, but below the RRU SCOs, in one sample of fill material collected from the 0- to 2-foot depth interval at boring SB12, advanced in the northern part of the site. The SVOC, pesticide, and PCB concentrations are likely related to the quality of the fill material.

Metals, which were detected at concentrations above the Part 375 UU and/or RRU SCOs in samples of fill material and native soil, may be related to the quality of the fill material or the site's historical use (or a combination of the two). The concentrations of some metals (e.g., copper and zinc) detected in native soil samples may also be naturally occurring.

Hazardous concentrations of lead were detected in the fill layer in six areas of the site, and are likely related to the nature of the fill material beneath the site or previous site use (or a

combination of the two). The approximate horizontal and vertical extents of Hot Spots 1 through 4 were delineated as part of the RI and are defined as follows:

- Hot Spot 1: About 8 feet by 8 feet area, at a depth from about 5 to 9 feet bgs around RI boring SB15
- Hot Spot 2: About 8 feet by 12 feet area, at a depth from about 5 to 10 feet bgs around RI boring SB16
- Hot Spot 3: About 8 feet by 8 feet area, at a depth from about 5 to 10 feet bgs around RI boring SB17
- Hot Spot 4: About 8 feet by 8 feet area, at a depth from about 9 to 10 feet bgs around RI boring SB18. However, removing a 1-foot thick layer of soil is impractical with common excavation methods; therefore, the vertical extents of Hot Spot 4 are considered to be from about 8 to 11 feet bgs.

Two additional areas of hazardous lead-impacted soil were identified during the RI and have not been delineated: the 0- to 2-foot depth interval at boring SB01 (Hot Spot 5) and the 10- to 12-foot depth interval at boring SB10 (Hot Spot 6). The horizontal and vertical extents of Hot Spots 5 and 6 will be delineated as part of proposed future remedial action.

Groundwater Contamination

Chlorinated VOCs, including 1,1,1-TCA, cis-1,2-DCE, PCE, TCE, and vinyl chloride, were detected above the TOGS SGV in four SI groundwater samples, but at concentrations below the TOGS SGV in all RI groundwater samples. Chlorinated solvent impacts to groundwater appear to be generally confined to the center of the site. Chlorinated VOC concentrations in groundwater may be indicative of a chemical release associated with historical site use (although these compounds were not detected above applicable criteria in soil).

One SVOC (bis[2-ethylhexyl]phthalate) was detected at concentrations above the TOGS SGV in groundwater samples collected from RI monitoring wells MW08 and MW13, installed in the central and southeastern parts of the site, respectively. Two SVOCs (benzo[b]fluoranthene and chrysene) were detected at concentrations above the TOGS SGV in the groundwater sample collected from SI monitoring well TMW16, installed in the northern part of the site. SVOC concentrations are likely due to entrained sediments related to on-site fill material or well installation materials.

Total and dissolved metals, including aluminum, iron, lead, magnesium, manganese, selenium, and sodium, were detected at concentrations above the TOGS SGV in groundwater samples

collected from across the site footprint. Total metals concentrations are likely due to entrained sediments related to on-site fill material (specifically the lead concentration detected in the groundwater sample collected from MW03) or may be attributable to regional groundwater conditions (or a combination of the two). Dissolved metal concentrations detected above the TOGS SGV are attributable to regional groundwater conditions and are not considered indicative of a release.

Soil Vapor Contamination

Soil vapor samples contained petroleum-related and chlorinated VOCs at concentrations above those detected in the ambient air sample. PCE was detected in soil vapor samples collected from across the site footprint at a maximum concentration of 15.1 µg/m³. TCE was not detected in soil vapor samples collected during the SI. During the RI, TCE was detected in one soil vapor sample (SV02) at a concentration of 31 µg/m³. 1,1,1-TCA was detected in two soil vapor samples collected during the SI at a maximum concentration of 4.31 µg/m³. Petroleum-related and chlorinated VOC concentrations detected in soil vapor may be indicative of a release associated with historical site use (although these compounds were not detected above applicable criteria in soil) or may be related to an off-site source.

2.6 Qualitative Human Health Exposure Assessment

Human health exposure risk was evaluated for both current and future site and off-site conditions, in accordance with DER-10. The assessment includes an evaluation of potential sources and migration pathways of site contamination, potential receptors, exposure media, and receptor intake routes and exposure pathways.

In addition to the human health exposure assessment, DER-10 requires an on-site and off-site Fish and Wildlife Resources Impact Analysis (FWRIA) if certain criteria are met. According to the requirements stipulated in Section 3.10 and Appendix 3C of DER-10, there was no need to prepare a FWRIA for the Site. The same qualitative human health exposure assessment for the site is also presented in the RIR.

2.6.1 Potential Exposure Pathways – On-Site

Current Conditions

The site is covered by an impervious surface (concrete slabs of previous on-site buildings). Human exposure to contaminated soil through dermal absorption, inhalation, and ingestion is minimal and controlled through the presence of the impervious surface. As groundwater in this area of NYC is not used as a potable water source, a complete exposure pathway under current site conditions is unlikely. There is a potential exposure pathway through dermal absorption,

inhalation, and ingestion during sampling associated with site investigation, but it is controlled through implementation of the Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP). A complete exposure pathway for contaminated soil vapor is unlikely.

Construction/Remediation Condition

Construction and remediation may result in potential exposures to site contaminants in the absence of a HASP and CAMP. Construction and remedial activities include demolition of the existing slabs, excavation and off-site disposal of impacted soil, and construction of foundation components. In the absence of a HASP and CAMP, this scenario presents the potential for exposure of soil COCs to construction and remediation workers via dermal absorption, ingestion, and inhalation of particulate matter. This exposure pathway will be minimalized through the implementation of the HASP, CAMP, and vapor and dust suppression techniques.

Groundwater will be encountered during excavation by workers, and there is potential for exposure to groundwater COCs, in the absence of a HASP, to construction workers via dermal absorption or ingestion. This exposure pathway will be marginalized through the implementation of the HASP.

During site development, construction and remediation workers and the surrounding community could be exposed to soil vapor COCs and contaminated soil via inhalation. Exposure to soil vapor and dust will be limited through the implementation of a HASP, CAMP, and dust and vapor suppression techniques.

Proposed Future Conditions

The proposed development is anticipated to include a multi-story residential and commercial building with one cellar level that encompasses the entire site footprint. Upon completion of the new development, the site will be covered by a concrete building slab, with a continuous vapor barrier/waterproofing membrane under the slab and along all subsurface foundation walls. The foundation and cellar slab with vapor barrier/waterproofing membrane will prevent direct human exposure to residual impacted media that may be left in place or may migrate to the site from an off-site location. As such, there is no complete exposure pathway for future users.

There is no pathway for ingesting groundwater COCs, because the site and surrounding area will continue to obtain municipally-supplied drinking water that originates from surface water reservoirs located upstate.

2.6.2 Potential Exposure Pathways – Off-Site

In the absence of a HASP and CAMP, soil has the potential to be transported off-site by wind in the form of dust or on the tires of vehicles or equipment leaving the site during development and remediation activities. This could create a potential exposure pathway to the public adjacent to the site. Groundwater will be removed during construction and will be pre-treated and discharged to the NYC sewer system, per DEP permit requirements, or containerized in a temporary storage tank pending disposal at a permitted off-site facility. Therefore, the potential for public exposure to groundwater on adjacent sites will be minimized. During construction, soil vapor will primarily migrate vertically through the subsurface and will dissipate and dilute with ambient air.

The potential off-site migration of site soil, groundwater, and/or soil vapor contaminants is not expected to result in a complete exposure pathway for current, construction and remediation, or future conditions for the following reasons:

- The site is located in an urban area and is covered with continuous impervious surface material (concrete building slab)
- During site excavation, dewatering, support of excavation (SOE) installation, foundation construction, and remediation the following protective measures will be implemented:
    - Air monitoring will be conducted for particulates (dust) and VOCs during ground-intrusive work as part of a CAMP – Dust and/or vapor suppression techniques will be employed to limit the potential for off-site migration of soil and vapors
    - Vehicle tires and undercarriages will be washed as necessary prior to leaving the site to prevent tracking material off-site
    - A soil erosion/sediment control plan will be implemented during construction to control off-site migration of soil
- The new building will include a vapor barrier/waterproofing membrane to be installed beneath the cellar slab and along the sidewalls to sidewalk grade – A continuous impervious surface covering comprised of the proposed building slab will span the site footprint.
- Groundwater in this part of Queens is not used as a potable water source and the nearest ecological receptors are the East River and Newtown Creek, which are located about 0.5 miles west and 0.75 miles south, respectively.

2.6.3 Evaluation of Human Health Exposure

On the basis of the CSM and the review of environmental data, complete on-site exposure pathways appear to be present, in the absence of mitigation and controls, in current and construction/remediation-phase conditions. The complete exposure pathways indicate there is a potential for exposure to humans from site contaminants via exposure to soil, groundwater, and soil vapor if mitigation and remediation are not implemented.

Complete exposure pathways have the following five elements: 1) a contaminant source; 2) a contaminant release and transport mechanism; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population. A discussion of the five elements comprising a complete pathway as they pertain to the site is provided below.

Current Conditions

Contaminant sources include fill material with varying concentrations of VOCs, SVOCs, metals, pesticides, and PCBs; native soil with varying concentrations of metals; groundwater with varying concentrations of VOCs, SVOCs and metals; and soil vapor with concentrations of VOCs above those detected in ambient air.

Contaminant release and transport mechanisms include potential release and transport during penetration of the site cover for soil, groundwater, and soil vapor sampling. The potential receptor is the on-site sampling personnel and the nearby public. Under current conditions, the likelihood of exposure to humans is limited due to the following:

- The site footprint is covered by continuous concrete building slabs, which prevent contact with soil, groundwater, and soil vapor
- Sampling activities are completed in accordance with a HASP and CAMP that is designed to monitor and prevent exposure to soil, groundwater, and soil vapor contaminants
- Groundwater at the site is not a potable water source

Construction/Remediation Activities

During the excavation and foundation construction stage of redevelopment, which includes remediation, points of exposure include disturbed and exposed soil during excavation, dust and potential organic vapors generated during excavation activities, and contaminated groundwater that may be encountered during excavation and dewatering operations, if performed. Routes of exposure include ingestion and dermal absorption of contaminated soil and groundwater, inhalation of potential organic vapors arising from contaminated soil vapor and groundwater, and

inhalation of dust originating from contaminated soil. The receptor population includes construction and remediation workers and, to a lesser extent, the public adjacent to the site.

The potential for completed exposure pathways is present since all five elements exist; however, the risk can be avoided or minimized by applying appropriate health and safety measures during construction and remediation, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, cleaning truck undercarriages before they leave the site to prevent off-site soil tracking, maintaining site security, and wearing the appropriate personal protective equipment (PPE).

A HASP, this RAWP, and a CAMP include measures such as conducting an air-monitoring program, donning PPE, covering soil stockpiles, altering work sequencing, maintaining a secure construction entrance, proper housekeeping, and applying vapor and dust suppression measures to prevent off-site migration of contaminants during construction will be implemented. Such measures will prevent completion of potential migration pathways for soil, groundwater, and soil vapor.

Proposed Future Conditions

For the proposed future conditions, residual contaminants may remain on-site, depending on the remedy, and would, to a lesser extent, include those listed under current conditions. If residual impacts exist and controls are not implemented, points of exposure could include potential cracks in the foundation of the proposed development, exposure during any future ground-intrusive work, or inhalation of vapors entering the building. The receptor population includes residential and commercial use occupants, patrons, and employees, and the nearby community, including children. The possible routes of exposure can be avoided or mitigated by removal of contaminated soil or construction and maintenance of a site capping system (e.g., concrete building slab or at least 2 feet of clean soil), installation of a vapor barrier/waterproofing membrane, and implementation of a Site Management Plan (SMP), if necessary depending on the remedy.

2.6.4 Human Health Exposure Assessment Conclusions

1. Human exposure to site contaminants is limited under current conditions due to the surface cover, and access is limited to investigation workers and authorized guests. The primary exposure pathways are dermal contact, ingestion, and inhalation of soil, groundwater, or soil vapor by site investigation workers and, to a lesser extent, the nearby public. The exposure risks can be avoided or minimized by following the appropriate HASP and vapor and dust suppression measures, and by implementing a CAMP during investigation activities.

2. In the absence of mitigation and controls, there is potential for exposure during the construction-phase activities. The primary exposure pathways are:

    a. Dermal contact, ingestion, and inhalation of contaminated soil, groundwater, or soil vapor by construction workers

    b. Dermal contact, ingestion, and inhalation of soil (dust) and inhalation of soil vapor by the community in the vicinity of the site

    These can be avoided or minimized by implementing CAMP and by following the appropriate HASP, vapor and dust suppression, site security measures, and following a NYSDEC-approved RAWP.

3. The existence of a complete exposure pathway for site contaminants to human receptors during proposed future redeveloped conditions is unlikely, as all or the majority of impacted soil will be excavated and transported to an off-site disposal facility and residual soil will be capped, if required, with an impermeable cover or 2 feet of clean soil. Regional groundwater is not used as a potable water source in this part of Queens. The potential pathway for soil vapor intrusion into the building would be addressed by installation of a vapor barrier/waterproofing membrane, which will minimize soil vapor intrusion.

4. It is possible that a complete exposure pathway exists for the migration of site contaminants to off-site human receptors during current, construction-phase, and future conditions. Monitoring and control measures have been and will continue to be used during investigation and construction to prevent completion of this pathway. Under future redeveloped conditions, the site will be remediated and engineering and institutional controls will be implemented, if necessary, to prevent completion of this pathway.

2.7 Remedial Action Objectives

On the basis of the RI results, the following remedial action objectives (RAOs) have been identified for this site.

2.7.1 Soil

RAOs for Public Health Protection:

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

RAOs for Environmental Protection:

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

2.7.2 Groundwater

RAOs for Public Health Protection:

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater

RAOs for Environmental Protection:

- Restore the groundwater aquifer, to the extent practicable, to pre-disposal/pre-release conditions
- Remove the source of ground and surface water contamination

2.7.3 Soil Vapor

RAOs for Public Health Protection:

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

3.0 SUMMARY OF REMEDIAL ACTION

This Section presents an analysis of three remedial actions that can potentially be achieved under the BCP. The proposed SCOs will be the Track 1 Part 375 UU SCOs for Alternative I, and Part 375-6.8(b) RRU SCOs for Alternatives II and Alternative III.

3.1 Alternative I – Technical Description

Alternative I, a Track 1 remedy, would include the following tasks:

- Construction of the SOE system to facilitate excavation of historic fill and native soil exceeding UU SCOs
- Excavation, stockpiling, off-site transport, and disposal of historic fill and native soil exceeding UU SCOs
- Collection and analysis of bottom confirmation soil samples to confirm UU SCOs are achieved
- Dewatering and treatment, as necessary, to accommodate the removal of material that exceeds UU SCOs and to facilitate SOE installation and foundation construction
- Backfilling of remediated areas to development grade with certified-clean material (i.e., material meeting UU SCOs), virgin stone, or recycled concrete aggregate (RCA)
- Reuse of site soil meeting UU SCOs
- Development and implementation of a HASP and CAMP for the protection of on-site workers, the community, and the environment during the remediation phase

The requirements for each of the Track 1 tasks are described below.

3.1.1 Historic Fill and Soil Removal

To accommodate the proposed construction (including foundation elements and elevator pits), excavation is required to depths between 12 and 22 feet bgs, as shown on Figure 9. To achieve a Track 1 remedy, remedial soil/fill removal would extend across the entire site footprint, to varying depths from surface grade to about 2 to 28 feet bgs, as shown on Figure 10 and described below:

- Southwestern portion of the site: Excavation to about 2 feet bgs (about el. 14.5)
- Remaining majority of site: Excavation to about 12 to 13 feet bgs (about el. 4.5 to 3.5)
- Around RI boring SB01: Excavation to about 14 feet bgs (about el. 2.5)

- Around RI boring SB12: Excavation to about 20 feet bgs (about el. -3.5)
- Around RI boring SB10: Excavation to about 25 feet bgs (about el. -8.5)
- Around RI boring SB08: Excavation to about 28 feet bgs (about el. -11.5)

The estimated volume of historic fill and native soil requiring removal and off-site disposal for a Track 1 remedy is about 29,000 cubic yards. This estimate is based on vertical excavation limits derived from the laboratory analytical results exceeding the UU SCOs, as presented in the previous environmental reports and the RIR. If contamination could not be delineated vertically based on soil sample results, the terminus of historic fill was used as the vertical limit for this estimate. Although over-excavation beyond the proposed extents is not anticipated, it could be necessary to remove additional soil below the identified depths that does not meet UU SCOs and/or represents a source of groundwater or soil vapor contamination.

Six hazardous lead hot spots were identified within the historic fill. As part of the overall remedial excavation, Hot Spots 1 through 6 would be excavated, segregated, and disposed of concurrently with removal of historic fill and native soil. Excavation extents and depth intervals for Hot Spots 1 through 4 are described below:

- Hot Spot 1: About 8 feet by 8 feet, between about 5 feet bgs and 9 feet bgs around RI boring SB15
- Hot Spot 2: About 8 feet by 12 feet, between about feet bgs 5 and 10 feet bgs around RI boring SB16
- Hot Spot 3: About 8 feet by 8 feet, between about 5 feet bgs and 10 feet bgs around RI boring SB17
- Hot Spot 4: About 8 feet by 8 feet, between about 9 feet bgs and 10 feet bgs around RI boring SB18 – However, removing a one-foot thick layer of soil is impractical with common excavation methods; therefore the vertical extents of Hot Spot 4 are considered to be from about 8 to 11 feet bgs

Two additional areas of hazardous lead-impacted soil were identified during the RI and have not been delineated, the 0- to 2-foot depth interval at boring SB-01 (Hot Spot 5) and the 10- to 12-foot depth interval at boring SB-10 (Hot Spot 6). The horizontal and vertical extents of Hot Spots 5 and 6 would be delineated prior to removal. The hazardous lead hot spot areas, and proposed delineation borings are shown on Figure 11. The estimated total volume of material impacted with hazardous lead to be removed is about 500 cubic yards, of the total remediation excavation volume of 29,000 cubic yards.

3.1.2 Confirmation Soil Sampling

Confirmation soil samples would be collected from the excavation bottom at a frequency of one per 2,000 square feet. Because the perimeter sidewalls, and the sidewalls of the deeper, central core excavation, will be supported by steel sheeting or wood lagging, sidewall samples would not be collected. Sidewall samples will be collected from hot-spot excavations that extend below the depth of the SOE (e.g., if the excavation is sloped) to confirm that SCOs are achieved. For hot-spot areas not excavated to reach development depths, a minimum of one sample for every 30 linear feet of sidewall, and one bottom sample would be collected at a frequency of one per 2,000 square feet. An estimated twenty-eight bottom confirmation samples (including hot-spot excavations), plus required QA/QC samples, would be collected. Confirmation samples would be analyzed for Part 375 VOCs, SVOCs, pesticides, PCBs, and metals. If a confirmation soil sample does not comply with the UU SCOs, over-excavation would be completed as practicable, and additional confirmation samples would be collected, at the frequency of one sample per 2,000 square feet of over-excavation area. No off-site excavation would be required.

3.1.3 Excavation Dewatering and Treatment

Dewatering would be required to lower the groundwater table and reach the proposed excavation depths, and would also act as a method of groundwater remediation in conjunction with source removal. The Contractor would be responsible for dewatering in accordance with NYCDEP, NYSDEC, and other applicable laws and regulations. Treatment of dewatering fluids could be required to reduce contaminant concentrations below NYCDEP and NYSDEC effluent limitations prior to discharge. The dewatering and treatment system would be designed by the Contractor's NYS-licensed Professional Engineer.

3.1.4 Excavation Backfill

After the Track 1 remedial excavation is completed, portions of the site would be backfilled where necessary to restore the site grade to the development elevation needed for foundation construction. About 3,000 cubic yards of backfill material is anticipated to restore the site to construction grade. Excavation backfill would comply with 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10, and Appendix 5.

Imported material would consist of clean fill that meets the UU SCOs or other acceptable fill material such as virgin stone from a permitted quarry/mine or RCA. If RCA is imported to the site, it would come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities would not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and

uncontaminated concrete (less than 10% by weight passing through a No. 10 sieve). RCA is not acceptable for, and would not be used as, site cover or drainage material. If required, a site-specific Beneficial Use Determination (BUD) would be obtained by the NYSDEC for import of RCA.

3.1.5 On-site Worker, Public Health and Environmental Protection

A site-specific HASP is appended to this RAWP (Appendix D) and would be in effect during excavation and foundation construction to protect on-site workers from accidents and acute and chronic exposures from the identified contaminated media. Public health would be protected by implementing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP would include continuous perimeter monitoring of dust and organic vapor utilizing DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. A Langan field representative would monitor site perimeters for visible dust and odors. The environment would be protected by implementing the appropriate soil erosion prevention measures.

3.2 Alternative II – Technical Description

Alternative II, a Track 2 remedy, would include the following tasks:

- Construction of the SOE system to facilitate excavation of historic fill and native soil exceeding RRU SCOs
- Excavation, stockpiling, off-site transport, and disposal of historic fill and native soil exceeding RRU SCOs, and any source material below a depth of 15 feet bgs
- Collection and analysis of bottom confirmation and/or documentation soil samples to confirm RRU SCOs are achieved and/or to evaluate soil to remain in place after the remedy
- Dewatering and treatment, as necessary, of impacted groundwater to accommodate the removal of material that exceeds RRU SCOs and to facilitate SOE installation and foundation construction
- Completion of a topographic survey of either the confirmation sample locations or final excavation sub-grade
- Backfilling of remediated areas to development grade with imported clean material (i.e., material meeting RRU SCOs), virgin stone, or RCA
- Reuse of site soil meeting RRU SCOs
- Installation of a vapor barrier/waterproofing membrane for the proposed building

- Development and implementation of a HASP and CAMP for the protection of on-site workers, the community, and the environment during the remediation phase
- Recording of an Environmental Easement (EE) to memorialize the institutional controls and require future owners of the site to continue to maintain these controls

The Alternative II remedial excavation extent is shown on Figure 12. The requirements for each of the Track 2 tasks are described below.

3.2.1 Historical Fill Material and Soil Removal

To accommodate the proposed construction (including foundation elements and elevator pits), excavation is required to depths between 12 and 22 feet bgs, as shown on Figure 9. To achieve a Track 2 remedy, remedial soil/fill removal would extend across the entire site footprint, to varying depths from surface grade to about 4 to 15 feet bgs, as shown on Figure 12 and described below:

- Southwestern portion of the site: Excavation to about 4 feet bgs (about el. 14.5)
- Remaining majority of site: Excavation to about 12 to 15 feet bgs (about el. 4.5 to 1.5)

The estimated volume of historic fill and native soil requiring removal and off-site disposal for a Track 2 remedy is about 25,000 cubic yards. This estimate is based on vertical excavation limits derived from the laboratory analytical results exceeding the RRU SCOs, as presented in the previous environmental reports and the RIR. If contamination could not be delineated vertically based on soil sample results, the terminus of historic fill was used as the vertical limit for this estimate. Although over-excavation beyond the proposed extents is not anticipated, it could be necessary to remove soil that does not comply with the RRU SCOs (to a maximum of 15 feet bgs) and/or represents a source of groundwater or soil vapor contamination.

Six hazardous lead hot spots were identified within the historic fill. As part of the overall remedial excavation, Hot Spots 1 through 6 would be excavated, segregated, and disposed of concurrently with removal of historic fill and native soil. Excavation extents and depth intervals for Hot Spots 1 through 4 are described below:

- Hot Spot 1: About 8 feet by 8 feet, between about 5 feet bgs and 9 feet bgs around RI boring SB15
- Hot Spot 2: About 8 feet by 12 feet, between about 5 feet bgs and 10 feet bgs around RI boring SB16
- Hot Spot 3: About 8 feet by 8 feet, between about 5 feet bgs and 10 feet bgs around RI boring SB17

- Hot Spot 4: About 8 feet by 8 feet, between about 9 feet bgs and 10 feet bgs around RI boring SB18 – However, removing a one-foot thick layer of soil is impractical with common excavation methods; therefore the vertical extents of Hot Spot 4 are considered to be from about 8 to 11 feet bgs.

Two additional areas of hazardous lead-impacted soil were identified during the RI and have not been delineated, the 0- to 2-foot depth interval at boring SB-01 (Hot Spot 5) and the 10- to 12-foot depth interval at boring SB-10 (Hot Spot 6). The horizontal and vertical extents of Hot Spots 5 and 6 would be delineated prior to removal. The hazardous lead hot spot areas, and proposed delineation borings are shown on Figure 11. The estimated total volume of material impacted with hazardous lead to be removed is about 500 cubic yards, of the total remediation excavation volume of 25,000 cubic yards.

On portions of the site, excavation of will extend below the water table, which would require implementation of a dewatering system.

3.2.2 Confirmation and Documentation Soil Sampling

Confirmation and/or documentation soil samples would be collected from the excavation bottom at a frequency of one sample per 2,000 square feet. Documentation samples would be collected where the remedial excavation extends 15 feet bgs or deeper if source material removal is required; if not, confirmation samples would be collected to confirm that RRU SCOs have been achieved. Because the perimeter sidewalls, and the sidewalls of the deeper, central core excavation, will be supported by steel sheeting or wood lagging, sidewall samples would not be collected. Sidewall samples will be collected from hot-spot excavations that extend below the depth of the SOE (e.g., if the excavation is sloped) to confirm that SCOs are achieved or to document residual contamination. For hot-spot areas, a minimum of one sample for every 30 linear feet of sidewall and one bottom sample per every 2,000 square feet would be collected. Twenty-eight bottom samples (including hot-spot excavations), plus required QA/QC samples, would be collected. Confirmation samples would be analyzed for Part 375 SVOCs and metals. Documentation samples would be analyzed for Part 375 VOCs, SVOCs, PCBs, and metals. If a confirmation soil sample does not comply with the RRU SCOs, over-excavation would be completed as practicable down to 15 feet bgs, and additional confirmation or documentation samples would be collected, at the frequency of one sample per 2,000 square feet of over-excavation area. No off-site excavation would be required.

3.2.3 Excavation Dewatering and Treatment

Dewatering would be required to lower the groundwater table and reach the proposed excavation depths, and would also act as a method of groundwater remediation in conjunction with source

removal. The Contractor would be responsible for dewatering in accordance with NYCDEP, NYSDEC, and other applicable laws and regulations. Treatment of dewatering fluids could be required to reduce contaminant concentrations below NYCDEP and NYSDEC effluent limitations prior to discharge. The dewatering and treatment system would be designed by the Contractor's NYS-licensed Professional Engineer.

3.2.4 Excavation Backfill

After the Track 2 remedial excavation is completed, portions of the site would be backfilled where necessary to restore the site grade to the development elevation needed for foundation construction. About 1,000 cubic yards of backfill material is anticipated to restore the site to construction grade. Excavation backfill would comply with 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10, and Appendix 5.

Imported material would consist of clean fill that meets the RRU SCOs or other acceptable fill material such as virgin stone from a permitted quarry/mine or RCA. If RCA is imported to the site, it would come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities would not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete (less than 10% by weight passing through a No. 10 sieve). RCA is not acceptable for, and would not be used as, site cover or drainage material. If required, a site-specific BUD would be obtained by the NYSDEC for import of RCA.

3.2.5 Vapor Barrier/Waterproofing Membrane

A vapor barrier/waterproofing membrane would be installed to mitigate potential soil vapor intrusion into the building. To mitigate potential exposure, the vapor barrier/waterproofing membrane would be installed under the slab and outside the perimeter sidewalls of the proposed building. The vapor barrier/waterproofing membrane would be a minimum 20-mil thickness and would be compatible with site contaminants of concern.

3.2.6 On-site Worker, Public Health and Environmental Protection

A site-specific HASP is appended to this RAWP (Appendix D) and would be in effect during excavation and foundation construction to protect on-site workers from accidents and acute and chronic exposures from the identified contaminated media. Public health would be protected by implementing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP would include continuous perimeter monitoring of dust and organic vapor utilizing DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute

averages. A Langan field representative would monitor site perimeters for visible dust and odors. The environment would be protected by implementing the appropriate soil erosion prevention measures.

3.2.7 Institutional Controls

An EE would be recorded to impose the ICs that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property. The ICs would restrict the site's use to restricted residential use and would include notice-of-use restrictions of the site's soil.

3.3 Alternative III – Technical Description

Alternative III, a Track 4 remedy, would include all of the elements of Alternative II, with the following modifications:

- Excavation, stockpiling, off-site transport, and disposal of soil to the proposed development depths as shown on Figure 13
- Collection and analysis of documentation soil samples for soil to remain in place after the remedy with respect to RRU SCOs
- Placement of post-excavation demarcation barrier in residual soil areas not covered with impermeable surfaces, if any
- Placement of a composite cover system over the entire site to prevent exposure to residual contamination
- Establishment of an approved Site Management Plan (SMP) to provide for long-term management of institutional controls (IC) engineering controls (EC) and, including the performance of periodic inspections and certification that the controls are performing as they were intended
- Recording of an Environmental Easement (EE) to memorialize the engineering and institutional controls and require future owners of the site to continue to maintain these controls

The Alternative III remedial excavation extent is shown on Figure 13. The requirements for each of the Track 4 tasks are described below.

3.3.1 Historical Fill Material and Soil Removal

To accommodate the proposed construction (including foundation elements and elevator pits), excavation is required to depths between 12 and 22 feet bgs, as shown on Figure 9. To achieve

a Track 4 remedy, excavation would extend across the entire site footprint to depths between 4 and 13 feet bgs, as shown on Figure 13 and described below:

- Southern portion of the site: Excavation to about 4 feet bgs (about el. 14.5)
- Remaining majority of site: Excavation to about 10 to 13 feet bgs (about el. 6.5 to 3.5)

The estimated volume of historic fill and native soil requiring removal and off-site disposal for a Track 4 remedy is about 24,000 cubic yards. Residual contamination would remain in place below the depth required for development.

3.3.2 Documentation Soil Sampling

Documentation soil samples would be collected from the development excavation bottom at a frequency of one sample per 2,000 square feet. Twenty-eight bottom samples (including hot-spot excavations), plus required QA/QC samples, would be collected. Documentation samples would be analyzed for Part 375 VOCs, SVOCs, PCBs, and metals. Documentation soil samples will evaluate soil to remain in place after the development, unless soil represent a source of contamination to groundwater or soil vapor. No off-site excavation would be required.

3.3.3 Excavation Dewatering and Treatment

Dewatering would be required to lower the groundwater table and reach the proposed excavation depths, and would also act as a method of groundwater remediation in conjunction with source removal. The Contractor would be responsible for dewatering in accordance with NYCDEP, NYSDEC, and other applicable laws and regulations. Treatment of dewatering fluids could be required to reduce contaminant concentrations below NYCDEP and NYSDEC effluent limitations prior to discharge. The dewatering and treatment system would be designed by the Contractor's NYS-licensed Professional Engineer.

3.3.4 Demarcation Barrier

After the excavation is complete and prior to any backfilling with clean imported material, a land survey would be performed by a NYS-licensed surveyor. The survey would define the top elevation of residual contaminated soil. In areas that would not be covered with an impermeable surface, a physical demarcation layer, consisting of orange snow fence or equivalent material would be placed on the top of residual contaminated soil to provide a visual reference. This demarcation layer would constitute the top of the zone that requires adherence to special conditions for disturbance of contaminated residual soil defined in an SMP. The survey would measure the grade covered by the demarcation layer before the placement of cover soil, pavement and sub-soil, structures, or other materials. This survey and the demarcation layer placed on this grade surface would constitute the physical and written record of the upper surface

of restricted-use soil in such SMP, and a map showing the survey results would be included in the FER and an SMP.

3.3.5 Excavation Backfill

To the extent backfill is necessary to restore the site grade to the development elevation needed for foundation construction, any imported backfill would comply with 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10, and Appendix 5.

Imported material would consist of clean fill that meets the RRU SCOs or other acceptable fill material such as virgin stone from a permitted quarry/mine or RCA. If RCA is imported to the site, it would come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities would not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete (less than 10% by weight passing through a No. 10 sieve). RCA is not acceptable for, and would not be used as, site cover or drainage material. If required, a site-specific BUD would be obtained by the NYSDEC for import of RCA.

3.3.6 Vapor Barrier/Waterproofing Membrane

A vapor barrier/waterproofing membrane would be installed to mitigate potential soil vapor intrusion into the building. To mitigate potential exposure, the vapor barrier/waterproofing membrane would be installed under the slab and outside the perimeter sidewalls of the proposed building. The vapor barrier/waterproofing membrane would be a minimum 20-mil thickness and would be compatible with site contaminants of concern.

3.3.7 Composite Cover System

A composite cover system consisting 6-, 72-, or 96-inch-thick concrete building slabs will be constructed throughout the site. The cover system will serve as an engineering control for the protection of human health by preventing contact with residual contaminated site soil.

3.3.8 On-site Worker, Public Health and Environmental Protection

A site-specific HASP is appended to this RAWP (Appendix D) and would be in effect during excavation and foundation construction to protect on-site workers from accidents and acute and chronic exposures from the identified contaminated media. Public health would be protected by implementing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP would include continuous perimeter monitoring of dust and organic vapor utilizing DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute

averages. A Langan field representative would monitor site perimeters for visible dust and odors. The environment would be protected by implementing the appropriate soil erosion prevention measures.

3.3.9 Engineering and Institutional Controls

If it is determined that the remedy does not meet the criteria of either a Track 1 or Track 2, an SMP that will provide for long-term management of institutional controls (IC) engineering controls (EC) will be submitted to the Department for approval. The SMP will include protocols for the performance of periodic inspections and certification that the controls are performing as they were intended. In addition, an EE would be recorded to impose the ICs or ECs that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property. The ICs would restrict the site's use to restricted residential use and would include notice-of-use restrictions of the site's soil. The ECs that would be included in the easement will include maintenance of the vapor barrier/waterproofing membrane previously described in this alternative.

3.4 EVALUATION OF REMEDIAL ALTERNATIVES

The following is an evaluation of the proposed remedy based on the BCP remedy evaluation criteria listed below. The first two criteria are considered "threshold criteria" and the remaining criteria are "balancing criteria". A remedial alternative must meet the threshold criteria to be considered and evaluated further under the balancing criteria.

- Protection of human health and the environment
- Compliance with standards, criteria, and guidance (SCG)
- 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

3.4.1 Protection of Human Health and the Environment

Alternative I –Remediating the site to Track 1 standards would result in the removal of all on-site soil that exceeds UU SCOs. On-site sources of groundwater contamination would be removed and residually contaminated groundwater would be treated via dewatering and if needed, ex-situ treatment. Potential exposure pathways for soil vapor that may migrate onto the site would be mitigated by installing a vapor barrier/waterproofing membrane.

The RAOs for public health and environmental protection would be met through the removal of contaminated media at the site, which would eliminate the possibility of ingestion, inhalation or dermal contact. Since no engineering or institutional controls would be required for this remedy to maintain the site in the future, this remedy is the most protective of human health and the environment.

Alternatives II and III – The Track 2 and 4 remedies would provide similar overall protection to public health and the environment to Alternative I. Remediating the site to Track 2 standards would result in the removal of all on-site soil that exceeds RRU SCOs, to a maximum depth of 15 feet bgs. Remediating the site to Track 4 standards would result in the removal of on-site soil that exceeds RRU SCOs to the proposed development depth. On-site sources of groundwater contamination would be removed and residual contaminated groundwater would be treated via dewatering and if needed, ex-situ treatment. In addition, groundwater in this part of NYC is not used as a source of drinking water. Potential exposure pathways for soil vapor that may migrate onto the site would be mitigated by installing a vapor barrier/waterproofing membrane. Under the Track 4 scenario, the potential for contact with residual site soil would be mitigated with a site-wide composite cover system.

Public health would be protected during remediation activities under all three remedial alternatives by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures when needed, as provided in the HASP and CAMP. The environment would be protected by implementing and enforcing soil management controls when needed during site excavation.

3.4.2 Compliance with Standards, Criteria, and Guidance

Each Alternative will be in compliance with all applicable SCGs listed in Section 4.4.1 by removing all or a majority of on-site sources of contamination to achieve the RAOs. While implementing any of the remedies, protection of public health and the environment will be maintained by enforcing a site-specific CHASP and CAMP. Occupational Safety and Health Administration (OSHA) requirements for on-site construction safety will be followed by site contractors performing work. Alternative III requires future site management through an SMP.

3.4.3 Short-Term Effectiveness and Permanence

Alternative I – The most significant short-term adverse impacts and risks to the community would be the potential complications and risk involved with designing and constructing SOE and underpinning for the building and roadways adjoining the site. Truck traffic and operational noise levels would be necessary to haul out the material excavated to achieve Track 1 standards and to haul in the backfill required to bring the site to construction grade. The operation is estimated to require 1,293 25-cubic-yard capacity truck trips to haul soil for disposal and import. Truck traffic would be routed on the most direct course using major thoroughfares where possible and flaggers would be used to protect pedestrians at site entrances and exits. Waiting times associated with analysis of confirmation sampling and resampling may delay construction, leaving soil exposed for a longer time resulting in a potential increase in dust, odors, and/or organic vapor from the excavation and construction-related noise. The effects of these potential adverse impacts to the community, workers, and the environment would be minimized by implementing the respective control plans.

Alternatives II and III – Limiting the required excavation depths based on Track 2 or Track 4 standards would marginally reduce the duration of the excavation and associated risks. Alternative II would require marginally less truck trips than Alternative I (an estimated 1,040 25-cubic-yard capacity truck trips to haul soil for disposal and import) and Alternative III would require less truck trips than Alternatives I and II (an estimated 960 25-cubic-yard capacity truck trips to haul soil for disposal). Excavation activities would have a shorter duration compared to Alternative I, reducing potential exposure to dust, odors, and organic vapor from the excavation and construction-related noise.

Under the three remedial alternatives, dust would be controlled by the application of water spray on the haul roads, and on site, when and where needed. Site work controls, such as slowing the pace of work, applying foam suppressant, or covering portions of the excavation would be used to minimize vapors and suppress odors, if required. Work would be modified or stopped according to the action levels set in the CAMP.

3.4.4 Long-Term Effectiveness and Permanence

Alternative I – The Track 1 remedy would remove all on-site soil exceeding UU SCOs. Residually contaminated groundwater would be treated via dewatering and, if needed, ex-situ treatment. Potential exposure pathways for soil vapor that may migrate onto the site would be mitigated by installing a vapor barrier/waterproofing membrane. Future site use would be unrestricted; therefore, the long-term effectiveness of this remedy would mitigate environmental risks and satisfy the objectives of this criterion.

Alternatives II and III – The risks associated with leaving contaminated soil in place would be minimized because potential exposure pathways to contaminated soil would be eliminated via the Track 2 and 4 remedies. The Track 2 remedy would remove all on-site soil exceeding RRU SCOs, to a maximum depth of 15 feet bgs, and the Track 4 remedy would remove on-site soil exceeding RRU to the development depth. Under the Track 4 remedy, exposure to residual contaminated soil below the development depth would be prevented by the composite cover system. Residual contaminated groundwater would be treated via dewatering and if needed, ex-situ treatment. Potential exposure pathways for soil vapor that may migrate onto the site would be mitigated by installing a vapor barrier/waterproofing membrane. In addition, groundwater in this area of NYC is not used for drinking water. An EE, and for the Alternative III Track 4 remedy, an SMP, would be put in place to prevent exposure to residual impacted soils at the site and, if necessary, ingestion of groundwater, which is also prevented by Article 141 of the NYCDOH code, which prohibits potable use of groundwater without prior approval. The long-term effectiveness of this remedy would mitigate environmental risks and satisfy the objectives of this criterion.

3.4.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

Alternative I – The Track 1 remedy would permanently and significantly reduce the toxicity, mobility, and volume of contamination through excavation and off-site disposal of all soil exceeding UU SCOs and dewatering, treatment (if needed), and discharge or disposal of groundwater. Therefore, this remedy provides the highest level of toxicity, mobility and volume reduction of contaminated material.

Alternatives II and III – The Track 2 and 4 remedies would also significantly reduce the toxicity, mobility, and volume of contaminated material by removing the majority of the contaminated soil exceeding the UU SCOs. Soil exceeding RRU SCOs may remain below 15 feet bgs, and below the development depth, for Alternatives II and III respectively.

3.4.6 Implementability

Alternative I – Implementing a Track 1 remedy would be technically challenging because of dewatering and SOE requirements associated with protection of the neighboring buildings and streets, and it would be necessary to extend SOE about six feet beyond the depth required for construction. This remedy would consist primarily of excavation with standard bucket excavators. The availability of local contractors, personnel, and equipment suitable for working in a structurally challenging environment is difficult due to the frequency of this type of work in the region. Schedule extensions and additional costs associated with the excavation of additional soil and SOE installation, would be necessary; however, this alternative is considered feasible.

Alternatives II and III – The technical feasibility of implementing the Alternative II and III remedies is similar to Alternative I, as significant excavation is still required to achieve the Track 2 SCOs and reach the development depth. These alternatives are also considered feasible.

3.4.7 Cost Effectiveness

Alternative I - Based on the assumptions detailed for Alternative I, the estimated remediation cost of a Track 1 cleanup is $11.3 million. Because the site would be remediated to UU SCOs, there are no long-term operation, maintenance, or monitoring costs associated with the proposed remedy. Table 1 details the individual cost components used to arrive at this cost estimate.

Alternative II - Based on the assumptions detailed for Alternative II, the estimated remediation cost to achieve a Track 2 cleanup is $7.3 million. Alternative II ICs include an EE. Table 2 details the individual cost-components used to arrive at this cost estimate. Alternative II is a more cost effective remedy than Alternative I.

Alternative III - Based on the assumptions detailed for Alternative III, the estimated remediation cost to achieve a Track 4 cleanup is $8.7 million. Alternative III EC/ICs include a composite cover system, a vapor barrier and an EE. In addition, an SMP would be required to assure long-term compliance with the remediation goal and objectives. Table 3 details the individual cost-components used to arrive at this cost estimate. Alternative III is a more cost effective remedy than Alternative I but less cost effective than Alternative II.

3.4.8 Community Acceptance

The three remedial alternatives should be acceptable to the community because the potential exposure pathways to on-site contamination would be addressed upon completion of the respective remedies and the site would be remediated to allow for a higher level use than the current site conditions. The selected remedy is subject to a 45-day public comment period in accordance with the Citizen Participation Plan (CPP), included as Appendix E. Any substantive public comments received would be addressed before the remedy is approved.

3.4.9 Land Use

The current, intended, and reasonably anticipated future mixed residential and commercial land use of the site and its surroundings are compatible with all three remedial alternatives. The proposed development is a 69-story residential and commercial building, which is expected to cover the entire site footprint.

3.5 SELECTION OF PREFERRED REMEDY

All alternatives would be protective of human health and the environment and meet the remedy selection criteria. Alternatives I, II, and III would achieve all of the remedial action goals established for the redevelopment project, and would be effective in the short-term. All alternatives would effectively reduce contaminant mobility, toxicity, and volume, and would be effective in the long-term, because they would accommodate residential land use. The Alternative I proposed excavation depth is greater than Alternatives II and III, and, would therefore be less cost effective to implement than Alternative II and III. Alternative III is less cost effective than Alternative II because of the ECs.

Alternative II is preferred over Alternatives I and III because it can be feasibly and practically implemented at a lower cost while providing similar or greater protection to human health and the environment. Therefore, Alternative II is the recommended remedial alternative for this site.

Figure 12 depicts the Alternative II cleanup plan.

3.5.1 Zoning

The current site use conforms to applicable zoning laws and maps, as does the reasonably anticipated future use of the site.

3.5.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The site is located within the Special Long Island City Mixed Use District – Queens Plaza Subdistrict, which promotes the development and expansion of the longstanding mix of residential and commercial uses. The Queens Plaza Subdistrict encourages the development of high-density towers near subway stations. The proposed development is consistent with the zoning provisions of the Queens Plaza Subdistrict.

3.5.3 Surrounding Property Uses

The current, intended, and reasonably anticipated future land use of the site and its surroundings will be compatible with the selected remedy. The reasonably anticipated future use of the site and the use of its surroundings have been documented by the Volunteer. The proposed use conforms to residential and commercial development patterns in the area.

3.5.4 Citizen Participation

The CPP is discussed in Section 4.1.9.

3.5.5 Environmental Justice Concerns

The site is located in a potential environmental justice area. Because the site is located in an area that has a large Hispanic-American community, all fact sheets will be translated into Spanish.

3.5.6 Land Use Designations

There are no federal or state land designations.

3.5.7 Population Growth Patterns

The population growth patterns and projections support the current and reasonably anticipated future land use.

3.5.8 Accessibility to Existing Infrastructure

The site is accessible to existing infrastructure.

3.5.9 Proximity to Cultural Resources

The site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites.

3.5.10 Proximity to Natural Resources

The site is not located in close proximity to important federal, state, or local natural resources including waterways, wildlife refuges, wetlands, and critical habitats of endangered or threatened species. The nearest ecological receptor is the East River located about 3,000 feet to the west.

3.5.11 Off-site Groundwater Impacts

The RI data does not indicate that site contaminants of concern are migrating off-site. Municipal water supply wells are not present in this area of NYC; therefore, groundwater from the site cannot affect municipal water supply wells or recharge areas.

3.5.12 Proximity to Floodplains

According to the National Flood Insurance Rate Maps (FIRM) for the City of New York published by the Federal Emergency Management Agency (FEMA) (Community Panel No. 3604970202F, dated September 5, 2007), the site is located within Zone X (outside of the 0.2% annual chance floodplain zone).

3.5.13 Geology of the Site

Site geology is described in Section 2.4.

3.5.14 Current Institutional Controls

There are no known ICs in effect at the site.

3.6 SUMMARY OF THE SELECTED REMEDIAL ACTIONS

The selected remedy is Track 2 RRU and will include the following:

- Construction of the SOE system to facilitate excavation of historic fill and native soil exceeding RRU SCOs
- Excavation, stockpiling, off-site transport, and disposal of historic fill and native soil exceeding RRU SCOs to a maximum depth of 15 feet bgs, and any source material below 15 feet bgs
- Collection and analysis of bottom confirmation and/or documentation soil samples to confirm RRU SCOs are achieved and/or to evaluate soil to remain in place after the remedy
- Dewatering and treatment, as necessary, of impacted groundwater to accommodate the removal of material that exceeds RRU SCOs and to facilitate SOE installation and foundation construction
- Completion of a topographic survey of either the confirmation sample locations or final excavation sub-grade
- Backfilling of remediated areas to development grade with imported clean material (i.e., material meeting RRU SCOs), virgin stone, or RCA
- Reuse of site soil meeting RRU SCOs
- Installation of a vapor barrier/waterproofing membrane for the proposed building
- Development and implementation of a HASP and CAMP for the protection of on-site workers, the community, and the environment during the remediation phase
- Recording of an EE to memorialize the ICs to require future owners of the site to continue and maintain these controls

Remedial activities will be performed in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. Deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and explained in the FER.

4.0 REMEDIAL ACTION PROGRAM

4.1 Governing Documents

The primary documents governing the remedial action are summarized in this section. Where referenced, copies of the plans discussed below are provided in the appendices.

4.1.1 Standards, Criteria and Guidance

The following SCGs are typically applicable to Remedial Action projects in New York State, and will be consulted and adhered to as applicable:

- 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Subpart 373-4 – Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Part 376 – Land Disposal Restrictions
- 6 NYCRR Part 750 – State Pollutant Discharge Elimination System (SPDES) Permits
- 12 NYCRR Part 56 – Industrial Code Rule 56 (Asbestos)
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- CP-51 – Soil Cleanup Guidance (2010)
- DER-10 – Technical Guidance for Site Investigation and Remediation (May 3, 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March, 2010)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations

- USEPA OSWER Directive 9200.4-17 – Use of Monitored Natural Attenuation at Superfund, Resource Conservation and Recovery Act (RCRA) Corrective Action, and Underground Storage Tank Sites (December 1997)
- Screening and Assessment of Contaminated Sediment (Division of Fish, Wildlife and Marine Resources, June 2014)

4.1.2 Site-Specific Health & Safety Plan

The Remedial Engineer (RE) prepared a site-specific HASP (Appendix D). The HASP will apply to all remedial and construction-related work on site. The HASP provides a mechanism for establishing on-site safe working conditions, safety organization, procedures, and PPE requirements during implementation of the remedy. The HASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65, respectively). All contractors performing work on the site are required to prepare and adhere to their own HASP that, at a minimum, meets the site-specific HASP prepared by the RE. The HASP includes, but is not limited to, the following components:

- Organization and identification of key personnel
- Training requirements
- Medical surveillance requirements
- List of site hazards
- Excavation safety
- Drill rig safety
- Work zone descriptions and monitoring procedures
- Personal safety equipment and PPE requirements
- Decontamination requirements
- Standard operating procedures
- Protective measure plan
- CAMP
- Safety Data Sheets (SDS)

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work are responsible for the preparation of a HASP and for performance of the work according to the HASP and applicable laws.

The HASP and requirements defined in this RAWP pertain to remedial and ground-intrusive work performed at the site until the issuance of a Certificate of Completion. The Site Safety Coordinator for Langan will be William Bohrer, a resume for whom is included in Appendix F. If required, confined space entry will comply with OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.3 Quality Assurance Project Plan

The RE prepared a Quality Assurance Project Plan (QAPP) that describes the quality control components so that the proposed remedy accomplishes the remedial goals and RAOs, and is completed in accordance with the design specifications. The QAPP is provided as Appendix G and includes:

- Responsibilities of key personnel and their organizations for the proposed remedy
- Qualifications of the quality assurance officer
- Sampling requirements including methodologies, quantity, volume, locations, frequency, acceptance and rejection criteria
- Description of the reporting requirements for quality assurance activities including weekly quality assurance review reports, periodic quality assurance and quality control audits, and other report and data submissions

4.1.4 Construction Quality Assurance Plan

The RE prepared a Construction Quality Assurance Plan (CQAP) that describes the quality control components employed so that the proposed remedy accomplishes the remedial goals and RAOs and is completed in accordance with the design specifications. Because the remedy is being accomplished concurrent with building construction, the Contractor and Construction Manager will have the primary responsibility to provide construction quality. The CQAP procedures are discussed below in Section 4.2.1.

4.1.5 Soil/Materials Management Plan

The RE prepared a Soil/Materials Management Plan (SMMP) that includes detailed plans for managing soil/materials that are disturbed at the site, including excavation, handling, storage, transport, and disposal. The SMMP also includes controls that will be applied to these efforts to facilitate effective, nuisance-free performance in compliance with applicable federal, state, and local laws and regulations (see Section 5.4).

4.1.6 Stormwater Pollution Prevention Plan

Erosion and sediment controls will be implemented as necessary in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Best management practices for soil erosion and sediment control will be selected to minimize erosion and sedimentation off-site from the onset of remediation to the completion of development. Erosion and sediment controls that will be implemented are described in Section 4.3.3 (Erosion and Sedimentation Controls) and 5.4.10 (Stormwater Pollution Prevention). A Stormwater Pollution Prevention Plan (SWPPP) is not necessary because stormwater discharge, as required, will be to a combined sewer in accordance with the NYC SPDES General Permit for Stormwater Discharges from Construction Activities.

4.1.7 Community Air Monitoring Plan

A CAMP was prepared by the RE as discussed in Section 5.4.12 and is included in the HASP (Appendix D).

4.1.8 Contractors Site Operations Plan

The RE will review plans and submittals for this remedial project (including those listed above and contractor and subcontractor document submittals) and will confirm that plans and submittals are in compliance with this RAWP. The RE is responsible to check that all later document submittals for this remedial project, including contractor and subcontractor document submittals, are in compliance with this RAWP. Remedial documents, including contractor and subcontractor document submittals, will be submitted to the NYSDEC and NYSDOH in a timely manner and prior to the start of work associated with the remedial document.

4.1.9 Citizen Participation Plan

Fact Sheets describing the Remedial Action proposed in the RAWP will be distributed through DEC Delivers, the NYSDEC's email listserv service. Additional Fact Sheets will be distributed to announce 1) the completion of the Remedial Action with a summary of the FER and 2) the issuance of the Certificate of Completion for the site.

No changes will be made to the approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing. The approved CPP for this project is included in Appendix E.

Document repositories were established at the following locations and contain all applicable project documents:

Queens Public Library – Court Square
New York Public Library
25-01 Jackson Avenue, Long Island City, NY 11101
(718)-973-2790

Mon	11:00 am - 7:00 pm
Tue	1:00 pm - 6:00 pm
Wed	10:00 am – 6:00 pm
Thu	12:00 pm - 7:00 pm
Fri	10:00 am - 6:00 pm
Sat	Closed
Sun	Closed

Queens Community Board 2
43-22 50th Street, Room 2B, Woodside, New York 11377
Phone: (718) 533-8773

4.2 General Remedial construction information

4.2.1 Project Organization

This section presents the anticipated project organization and associated roles, including key personnel, descriptions of duties, and lines of authority in RAWP management. The resumes of key personnel involved in the Remedial Action are included in Appendix F. Information regarding the organization/personnel and their associated responsibilities is provided below.

Remediation Engineer (RE):	Jason J. Hayes, P.E.
Project Manager:	Ryan Manderbach, CHMM
Langan Health & Safety Manager:	Tony Moffa, CHMM
Health & Safety Officer:	William Bohrer
Qualified Environmental Professional:	Ryan Manderbach, CHMM
Field Team Leader:	Joseph Yanowitz
Quality Assurance Officer:	Michael Burke, P.G, CHMM

A Langan field representative under the direct supervision of the Qualified Environmental Professional (QEP) and the RE will be on-site during implementation of the RAWP to monitor particulates and organic vapor in accordance with the CAMP. CAMP results that exceed specified action levels will be reported to the NYSDEC and NYSDOH in daily reports.

A field representative will meet with the Construction Superintendent on a daily basis to discuss the plans for that day and schedule upcoming activities. The field representative will document remedial activities in the daily report. This document will be forwarded to the Field Team Leader on a daily basis and to the QEP, Project Manager, and the RE on a weekly basis.

A field representative will screen excavations with a PID during ground-intrusive work. PID readings, including specifically elevated readings, will be recorded in the project field book (or on separate logs) and reported to the NYSDEC and NYSDOH in the daily reports. A field representative under the direct supervision of the QEP will collect confirmation and/or documentation samples in accordance with this RAWP.

The project field book will be used to document sampling activities and how they correspond to this RAWP. Field observations and laboratory tests will be recorded in the project field book or on separate logs. Recorded field observations may take the form of notes, charts, sketches, and/or photographs. A photo log will be kept to document construction activities during remediation. The photo log may also be used to document those activities recorded in the daily reports.

The Field Team Leader will maintain the current field book and original field paperwork during performance of the remedy. Remedial activities will be documented in the monthly BCP progress reports. The Project Manager will maintain the field paperwork after completion and will maintain submittal document files.

4.2.2 Remedial Engineer (RE)

The RE for this project will be Jason J. Hayes, P.E. The RE is a registered professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program at the site. The RE will certify in the FER that the remedial activities were observed by trained environmental professionals under his supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved in accordance with this RAWP.

The RE will document the work of other contractors and subcontractors involved in aspects of the remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of backfill, and management of waste transport and disposal. The RE will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review the pre-remedial plans submitted by contractors and subcontractors for compliance with this RAWP and will certify compliance in the FER. The RE will provide the certifications listed below in Section 10.1.

4.2.3 Remedial Action Construction Schedule

The remedial action construction schedule is discussed below in Section 11.0. Proposed changes, delays or deviations will be promptly communicated to NYSDEC.

4.2.4 Work Hours

The hours for operation of remedial construction will either conform to the requirements of the NYC Department of Buildings (DOB) construction code or to a site-specific variance issued by the DOB. The NYSDEC will be notified by the Volunteer of any variances issued by the DOB. The NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

The site perimeter will be secured with gated, signed, plywood fencing with restricted points of entry in accordance with DOB and NYC Department of Transportation (DOT) permits and requirements. The purpose of the fencing is to limit site access to authorized personnel, protect pedestrians from site activities, and maintain site security.

4.2.6 Traffic Control

Site traffic will be controlled through designated points of access along 24th Street and/or 23rd Street. Access points will be continuously monitored and if necessary, a flagging system will be used to protect workers, pedestrians and authorized guests. Traffic will also adhere to applicable local, state and federal laws.

4.2.7 Contingency Plan

Contingency plans, as described below, have been developed to effectively address unexpected discoveries of additional contaminated media or USTs.

Discovery of Additional Contaminated Soil

During remediation and construction, soil will be continuously monitored by the RE's field representatives using visual, olfactory, and instrumental field screening techniques (e.g., a PID) to identify additional soil that may not be suitable for disposal at the NYSDEC-approved disposal facility. If such soil is identified, the suspected impacts will be confirmed by collecting and analyzing samples in accordance with the disposal facility's requirements. If the facility is not permitted to receive the impacted soil, the soil will be excavated to the extent practicable and

disposed of off-site at a permitted facility that can receive the material based on the characterization data.

Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive site work will be promptly communicated by phone and email to the NYSDEC Project Manager. These findings will be detailed in the daily reports and the subsequent monthly BCP progress report.

Discovery of USTs

If USTs are encountered during remediation and construction, they will be decommissioned in accordance with 6 NYCRR Part 612.2 and 613.9, and DER-10 Section 5.5. Once the tank, its contents, and associated piping are removed, post-excavation soil samples will be collected per DER-10 requirements. If encountered, petroleum-contaminated soil will be excavated, stockpiled separately, and disposed of off-site at a permitted facility in accordance with applicable regulations. UST closure documentation, including contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, will be included as appendices to the FER. NYSDEC petroleum bulk storage (PBS) registration requirements will be complied with as necessary.

If other previously unidentified contaminant sources are found during on-site remedial excavation or development related construction, sampling will be performed on product, sludge, and surrounding material (e.g., soil, stone, etc.). Chemical analyses will be limited to CP-51 VOCs and SVOCs, and other waste characterization parameters required for disposal approval. Analyses will not be otherwise limited without NYSDEC approval.

If USTs are encountered during ground-intrusive site work, the findings will be promptly communicated by phone to the NYSDEC Project Manager, as well as, detailed in the appropriate daily report. These findings will also be included in the monthly BCP progress reports.

4.2.8 Worker Training and Monitoring

Worker training and monitoring will be conducted in accordance with the HASP, included as Appendix D.

4.2.9 Agency Approvals

There are no New York State Environmental Quality Review Act (SEQRA) requirements for this site. Permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction. The planned end use for the site conforms to current zoning for the site as determined by NYC Department of Planning. A Certificate of

Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

4.2.10 NYSDEC BCP Signage

If required, a project sign will be erected at the main entrance to the site prior to the start of remedial activities. The sign will indicate that the project is being performed under the New York State BCP. The sign will meet the detailed specifications provided by the NYSDEC Project Manager and contained in Appendix H.

4.2.11 Pre-Construction Meeting with NYSDEC

Prior to the start of remedial construction, a meeting will be held between the NYSDEC, RE, Volunteer, Construction Manager, and remediation contractor to discuss project roles, responsibilities, and expectations associated with this RAWP.

4.2.12 Emergency Contact Information

An emergency contact sheet that defines the specific project contacts (with names and phone numbers) for use by NYSDEC and NYSDOH in the case of an emergency (day or night) is included in the HASP (Appendix D).

4.2.13 Remedial Action Costs

The total estimated contractor and engineering cost of the remedial action is $7.3 million. An itemized and detailed summary of estimated costs for the remedy is provided in Table 2.

4.3 Site Preparation

4.3.1 Mobilization

Prior to commencing remedial construction, the Remediation Contractor will mobilize to the site and prepare for remedial activities. Mobilization and site preparation activities may include the following:

- Identifying the location of all aboveground and underground utilities (e.g., power, gas, water, sewer, and telephone), equipment, and structures as necessary to implement the remediation
- Mobilizing necessary remediation personnel, equipment, and materials to the site
- Constructing one or more stabilized construction entrances consisting of non-hazardous material at or near the site exit, which takes into consideration the site setting and site perimeter

- Constructing an equipment decontamination pad for trucks, equipment, and personnel that come into contact with impacted materials during remediation
- Installing erosion and sedimentation control measures, as necessary
- Installing temporary fencing or other temporary barriers to limit unauthorized access to areas where remediation will be conducted

4.3.2 Monitoring Well Decommissioning

Existing groundwater monitoring wells will be properly decommissioned, in accordance with NYSDEC CP-43, when no longer required. The only exception to this is if the full length of the well is to be excavated during remediation and development. If required, well decommissioning will be performed by an experienced driller and logged by the driller and a Langan representative. Decommissioning documentation will be provided in the FER.

4.3.3 Erosion and Sedimentation Controls

Since the planned earthwork activities will be below the adjacent sidewalk grade, full-time erosion and sedimentation measures are not anticipated. Best management practices for soil erosion will be selected and implemented, as needed, to minimize erosion and sedimentation off site.

4.3.4 Temporary Stabilized Construction Entrance(s)

Temporary stabilized construction entrances will be installed at the existing curb cuts along 24th Street and/or 23rd Street. The entrances will be covered with gravel or RCA and graded so that runoff water will be directed to the site. Vehicles exiting construction areas will be cleaned using clean water or dry brushing, as needed, to remove site soil from the tires and undercarriages. The Contractor will protect and maintain the existing sidewalks and roadways at both site access points.

4.3.5 Utility Marker and Easements Layout

The Volunteer and its contractors are solely responsible for the identification of utilities and/or easements that might be affected by work under this RAWP and implementation of the required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Volunteer and its contractors are solely responsible for safe execution of the work performed under this RAWP. The Volunteer and its contractors must obtain the necessary local, state and/or federal permits or approvals that may be required to perform the work detailed in this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

4.3.6 Sheeting and Shoring

Appropriate management of structural stability of on-site or off-site structures during on-site activities is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for the safe execution of the work performed under this RAWP. The Volunteer and its contractors must obtain the necessary local, state and/or federal permits or approvals that may be required to perform the work detailed in this RAWP. Additionally, the Volunteer and its contractors are solely responsible for the implementation of the required, appropriate, or necessary health and safety measures during performance of work completed under this RAWP.

4.3.7 Equipment and Material Staging

The Contractor will notify the RE and Volunteer, in writing with receipt confirmed, at least 30 calendar days in advance of pending site work mobilization. During mobilization, construction equipment will be delivered to the site, temporary facilities constructed, and temporary utilities installed. The Contractor will place and maintain temporary toilet facilities within the work areas for usage by all site personnel.

4.3.8 Decontamination Area

The Contractor will construct equipment decontamination pads to collect wastewater for off-site disposal or treatment and discharge, if generated during decontamination activities. The design will consider adequate space to decontaminate equipment, and sloping and liners to facilitate collection of wastewater. Collected decontamination wastewater will be either discharged in accordance with the Contractor's DEP permit or tested and transported to an off-site disposal facility that is permitted to accept the waste in accordance with applicable city, state, and federal regulations. The location of decontamination pads may change periodically to accommodate the Contractor's sequencing of work.

If the Contractor uses high pressure washing methods, the Contractor shall provide splash protection around the vehicle decontamination facility. Splash protection shall minimize potential contamination from splatter and mist movement off-site during equipment decontamination process. Splash protection shall be temporary and stable and capable of being dismantled in the event of high winds.

Accumulated decontamination materials will be collected and commingled with other waste streams for discharge or disposal, as appropriate. The contractor will maintain the decontamination pad(s) throughout the duration of the remediation. Prior to demobilization, the contractor will deconstruct the pads and dispose of materials as required.

4.3.9 Site Fencing

The site perimeter will be secured with gated, signed, plywood fencing maintained by the Contractor. The purpose of the fencing is to limit site access to authorized personnel, protect pedestrians from site activities, and maintain site security.

4.3.10 Demobilization

After remediation and construction is completed, the Contractor will be responsible for demobilizing labor, equipment, and materials not designated for off-site disposal. The RE will document that the Contractor performs follow-up coordination and maintenance for the following activities:

- Removal of sediment and erosion control measures and disposal of materials in accordance with applicable rules and regulations
- Removal of remaining contaminated material or waste
- Equipment decontamination
- General refuse disposal

4.4 Reporting

Periodic reports and a FER will be required to document the remedial action. The RE responsible for certifying all reports will be an individual licensed to practice engineering in the State of New York; Jason J. Hayes, P.E. of Langan, will have this responsibility. Should Mr. Hayes become unable to fulfill this responsibility, another suitably qualified New York State professional engineer will take his place. Daily and monthly reports will be included as appendices to the FER. In addition to the periodic reports and the FER, copies of all relevant contractor documents will be submitted to the NYSDEC.

4.4.1 Daily Reports

Daily reports will be submitted to the NYSDEC and NYSDOH Project Managers by the end of each week, or at a frequency acceptable to them, following the reporting period and will include:

- An update of progress made during the reporting day including a photograph log
- Locations of work and quantities of material imported and exported from the site
- References to an alpha-numeric map for site activities (Figure 14)
- A summary of complaints with relevant details (names, phone numbers)
- A summary of CAMP finding, including excursions

- An explanation of notable site conditions

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to the NYSDEC Project Manager via personal communication.

4.4.2 Monthly Reports

Monthly reports will be submitted to the NYSDEC and NYSDOH Project Managers by the tenth of the month following the reporting period. The monthly reports will include the following information, as well as, any additional information required by the BCA:

- Activities relative to the site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.)
- Description of approved activity modifications, including changes of work scope and/or schedule
- Sampling results received following internal data review and validation, as applicable
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays

4.4.3 Other Reporting

Photographs of the remediation will be taken and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate remedial program elements and will be of acceptable quality. Representative photos of the site prior to remedial actions will be provided. Field photographs will be included in daily and monthly reports, as necessary, and a photograph log will be included in the FER. Upon request, photographs will be submitted to the NYSDEC and NYSDOH Project Managers on CD or other acceptable electronic media. CDs will have a label and a general file inventory structure that separates photographs into directories and sub-directories according to logical Remedial Action components. A photograph log keyed to photo file ID numbers will be prepared to provide explanation for representative photographs.

Site record keeping for remedial work will be appropriately documented. These records will be maintained on-site at all times during the project and will be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

The management plan for documenting complaints is detailed below.

Item	Description
Approach	Complaints regarding remediation activities/operations to be minimized and mitigation measures implemented to reduce the incidence of complaints.
Objective	Manage environmental complaints from the community regarding remediation.
Implementation Strategy/Mitigation Measures	Complaints will be documented on a complaint register. The register will be maintained as an ongoing record. Each entry will include the following information: • Time, date, and nature of complaint • Type of communication (telephone, letter, personal, etc.) • Name, contact address and contact number • Response and investigation undertaken as a result of the complaint including action taken and signature of the responsible person Each complaint will be investigated as soon as practical in relation to requirements.
Monitoring	A representative from the Volunteer will follow up on the complaint within two weeks of receipt to ensure it is resolved.
Reporting	Upon receipt and following the complaint investigation and resolution, the NYSDEC will be notified. Complaint resolutions will be documented in daily reports and the monthly BCP progress report.
Corrective Action	Should an incident of failure to comply occur in relation to the management of environmental complaints, one or more of the following corrective actions will be undertaken as appropriate: • Conduct additional training of staff to handle environmental complaints • Investigate why the environmental complaint was not addressed within the specified time frame • Investigate complaint and action follow-up according to results of investigation

4.4.5 Deviations from the Remedial Action Work Plan

Necessary deviations from the RAWP will be coordinated with the NYSDEC in advance. Notification will be provided to the NYSDEC by telephone/email for conditions requiring immediate action (e.g., conditions judged to be a danger to the surrounding community). Based on the significance of the deviation, an addendum to this RAWP may be necessary and will include:

- Reasons for deviating from the approved RAWP
- Approval process to be followed for changes/editions to the RAWP
- Effect of the deviations on the overall remedy

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

5.1 Soil Cleanup Objectives

The RRU SCOs listed in Table 3 will be used for this site. Soil and materials management will be conducted in accordance with the SMMP as described below. Soil sample locations and results that exceed the RRU SCOs are shown on Figures 3 and 4. UST closures (if necessary) will, at a minimum, conform to criteria defined in DER-10.

5.2 Remedial Performance Evaluation (Confirmation and Documentation Sampling)

Confirmation and/or documentation soil samples will be collected and analyzed to confirm RRU SCOs are achieved and/or to document soil to remain in place after the remedy.

5.2.1 Soil Sampling Sample Frequency

Confirmation and/or documentation soil samples will be collected from the excavation bottom at a frequency of one sample per 2,000 square feet. Documentation samples will be collected where the remedial excavation extends 15 feet bgs or deeper if source material removal is required; if not, confirmation samples will be collected to confirm that RRU SCOs have been achieved. With the exception of the hot-spot excavations, sidewall samples will not be collected from the site perimeter because SOE (e.g., sheeting, lagging) will preclude access to soil sidewalls. For hot-spot areas, a minimum of one sample for every 30 linear feet of sidewall, and one bottom sample per every 2,000 square feet will be collected. Twenty-eight bottom samples (including hot-spot excavations), plus required QA/QC samples, will be collected. If a confirmation soil sample does not comply with the RRU SCOs, over-excavation will be completed as practicable down to 15 feet bgs, and additional confirmation or documentation samples will be collected, at the frequency of one sample per 2,000 square feet of over-excavation area. No off-site excavation is required. Confirmation sample locations are shown on Figure 15.

5.2.2 Analytical Methods and Reporting

Confirmation and documentation samples will be analyzed by an NYSDOH ELAP-approved laboratory for Part 375 SVOCs and metals. Laboratory analyses will be conducted in accordance with EPA SW-846 methods and results presented in NYSDEC Analytical Services Protocol (ASP) Category B deliverable format.

5.2.3 Quality Assurance and Quality Control

Quality control procedures for confirmation soil sampling are included in the QAPP (refer to Appendix G). Confirmation analytical results will be provided in the NYSDEC's electronic data

deliverable (EDD) format for EQuIS™. Guidance on the sampling frequency is presented in NYSDEC DER-10 Section 5.4.

The QA/QC procedures required by the NYSDEC ASP and SW-846 methods will be followed. This will include instrument calibration, standard compound spikes, surrogate compound spikes, and analysis of quality control samples. The laboratory will provide sample bottles, which are pre-cleaned and preserved. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP shall take precedence.

5.2.4 Data Usability Summary Reports

Data usability summary reports (DUSR) will be prepared by a qualified data validator and the findings will be reported in the FER.

5.2.5 Reporting of Sample Results in the FER

The FER will provide a tabular and map summary of all endpoint sample results and results that exceed RRU SCOs.

5.3 Estimated Material Removal Quantities

The estimated quantity of soil/fill to be removed from the site is about 25,000 cubic yards. The estimated quantity of soil to be imported for backfill is about 1,000 cubic yards.

5.4 Soil/Materials Management Plan

This section presents the approach to management, disposal, and reuse of soil, fill, and materials excavated from the site. This plan is based on the current knowledge of site conditions and will be augmented, as necessary, using additional data collected during remediation. A Langan representative, under the direction of the RE will monitor and document the handling and transport of contaminated material removed from the site for disposal as a regulated solid waste. A field representative, under the direction of the RE, will assist the remediation contractor in identifying impacted materials during remediation, determining materials suitable for direct load out versus temporary on-site stockpiling, selection of samples for waste characterization, if necessary, and determining the proper off-site disposal facility. Separate stockpile areas will be constructed as needed for the various materials to be excavated or generated, with the intent to most efficiently manage and characterize the materials and to avoid comingling impacted materials with non-impacted soil. Hazardous waste will be segregated from historic fill and other material types.

5.4.1 Soil Screening Methods

Visual, olfactory, and instrumental screening (e.g., PID) and assessment will be performed by a field representative under the direction of the RE during remediation and development-related excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the Certificate of Completion.

Resumes will be provided for personnel responsible for field screening (i.e. those representing the RE) the excavation and other ground-intrusive work performed during remediation and development.

5.4.2 Stockpile Methods

Soil stockpiles will be constructed as necessary to separate and stage excavated material pending loading or characterization sampling. Separate stockpile areas will be constructed to avoid comingling materials of differing waste types. Stockpile areas will meet the following minimum requirements:

- Excavated soil will be placed onto a minimum thickness of 6-mil low-permeability liner of sufficient strength and thickness to prevent puncture during use; separate stockpiles will be created where material types are different (e.g., petroleum-impacted material stockpiled in a contaminated soil area). The use of multiple layers of thinner liners is permissible.
- Equipment and procedures will be used to place and remove the soil that will minimize the potential to jeopardize the integrity of the liner.
- Stockpiles will be covered at the designated times (see below) with minimum 6-mil plastic sheeting or tarps which will be securely anchored to the ground. Stockpiles will be routinely inspected and broken sheeting covers will be promptly replaced.
- Stockpiles will be covered upon reaching their capacity (i.e., about 1,000 cubic yards) until ready for loading. Stockpiles that have not reached their capacity, whether active or inactive, will be covered at the end of each workday.
- Soil stockpiles will be encircled with silt fences and hay bales, as needed, to contain and filter particulates from rainwater that has drained off the soil and to mitigate the potential for surface water run-off.

- Stockpiles will be inspected at a minimum of once daily and after every storm event. Results of inspections will be recorded in a logbook, maintained at the site, and made available for inspection by the NYSDEC.

5.4.3 Materials Excavation and Load Out

A field representative under the supervision of the RE will monitor ground-intrusive work and the excavation and load-out of excavated material.

The Volunteer and its contractors are solely responsible for safe execution of ground-intrusive and other remedial work performed under this RAWP. The Volunteer and its contractors are solely responsible for the identification of utilities and/or easements that might be affected by the work conducted under this RAWP.

Loaded vehicles leaving the site will be appropriately lined, securely covered, manifested, and placarded in accordance with the appropriate federal, state, and local requirements, including applicable transportation requirements (i.e., New York State Department of Transportation [NYSDOT] and DOT requirements). Trucks hauling historic fill material will not be lined unless free liquids are present or the material is grossly impacted.

A truck wash will be operated on site (see sections 4.3.4). The RE will be responsible for documenting that outbound trucks will be washed at the truck wash, as necessary, before leaving the site until the remedial construction is complete. Locations where vehicles enter or exit the site will be inspected daily for evidence of off-site sediment tracking.

The RE will be responsible for documenting that egress points for truck and equipment transport from the site will be clean of dirt and other materials derived from the site during remediation and development. The remediation contractor will clean adjacent streets as necessary to maintain a clean condition with respect to site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to New York State, and the parties performing this work, are responsible for the safe performance of ground-intrusive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Volunteer and associated parties will ensure that site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this RAWP.

Mechanical processing of historic fill and contaminated soil on-site is prohibited unless expressly approved by NYSDEC.

Primary contaminant sources (including, but not limited to, hotspots and any tanks that may be discovered) identified during site characterization, the RI, and implementation of the remedy will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be included with the FER. If the primary contaminant sources are removed under Track 2 or Track 4 cleanup, the final excavation subgrade will be surveyed. No survey will be required if a Track 1 cleanup is achieved.

5.4.4 Materials Transport Off-site

Transport of materials will be performed by licensed haulers in accordance with appropriate local, state, and federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded. Truck transport routes are as shown in Figure 16.

Trucks loaded with site materials will exit the vicinity of the site using approved truck routes. These routes take into account:

- Limiting transport through residential areas and past sensitive sites
- Use of city mapped truck routes
- Limiting off-site queuing of trucks entering the facility
- Limiting total distance to major highways
- Promoting safety in access to highways
- Overall safety in transport
- Community input (where necessary)

Trucks will be prohibited from excessive stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

To the extent possible, queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be minimized.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

5.4.5 Materials Disposal Off-site

Disposal facilities will be determined at a later date and will be reported to the NYSDEC Project Manager prior to off-site transport and disposal of excavated material. About 25,000 cubic yards of material that exceeds RRU SCOs is expected to be disposed off-site. Soil/fill/solid waste excavated and removed from the site will be treated as contaminated and regulated material and will be disposed in accordance with all local, state (including 6 NYCRR Part 360) and federal regulations. If disposal of soil/fill from this site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-site management of materials from this site is prohibited without formal NYSDEC approval. Material that does not meet UU SCOs is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the RE for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the site conforms to applicable laws:

- A letter from the RE or Volunteer to the receiving facility describing the material to be disposed of and requesting formal written acceptance of the material. This letter will state that material to be disposed of is contaminated material generated at an environmental remediation site located in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of chemical data for the material being transported (including waste characterization and RI data).
- A letter from each receiving facility stating that it is in receipt of the correspondence (above) and acceptance of the material is approved.

These documents will be included in the FER.

Non-hazardous historic fill and contaminated soil transported off-site will be handled, at a minimum, as a solid waste per 6 NYCRR Part 360. Historic fill material and contaminated soil

excavated from the site are prohibited from being disposed of at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soil that is contaminated but non-hazardous and is removed from the site is considered by the NYSDEC Division of Materials Management (DMM) to be construction and demolition (C&D) materials with contamination not typical of virgin soils. Soil not meeting Unrestricted Use SCOs will be considered a solid waste unless a BUD is processed stating otherwise. This soil may be sent to a permitted Part 360 landfill in New York or other appropriate out-of-state disposal facility permitted to accept contaminated soil from a brownfield site. This soil may be sent to a permitted C&D processing facility without permit modifications only upon prior notification of NYSDEC. This material is prohibited from being sent or redirected to a New York Part 360 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C&D facility that provides a detailed explanation that the material is derived from an NYSDEC DER remediation site, that the material is contaminated, and that the material must not be redirected to on-site or off-site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of chemical data for the material being transported.

The FER will include an accounting of the destination of material removed from the site during implementation of the remedy, including excavated soil, contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of each material type must also include records and approvals for receipt of the material. This information will also be presented in a table to be included in the FER.

A "Bill of Lading" system or equivalent will be used for off-site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER. Hazardous wastes derived from the site, if any, will be stored, transported, and disposed of in compliance with applicable local, state, and federal regulations.

Appropriately licensed and registered haulers, in compliance with applicable local, state, and federal regulations, will be used to transport the material removed from this site.

Waste characterization will be performed for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC results will be reported in the FER. Data available for excavated material to be disposed of at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.4.6 Materials Reuse On-Site

Soil excavated during the remedy may be reused on site if the requirements in this section are met. Grossly-impacted soil will not be reused. Reused soil must be non-hazardous and must meet the RRU SCOs (refer to Table 3). Soil removed during implementation of the remedy or removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site is prohibited for reuse on-site. Reuse of soil will be coordinated in advance with the NYSDEC Project Manager. Material deemed unfit for reuse will be transported for off-site disposal.

5.4.7 Fluids Management

Liquids to be removed from the site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable local, state, and federal regulations.

Dewatered fluids will not be recharged back to the land surface or subsurface, but will be managed off-site and may be discharged to the NYC sewer system, pursuant to a DEP permit. Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

5.4.8 Backfill From Off-site Sources

Imported soil for backfill must meet the requirements of 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10, and Appendix 5. Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the site. The RE will confirm that all materials proposed for import onto the site satisfy these criteria.

The FER will include the following certification by the RE: "I certify that, to the best of my knowledge, all import of soils from off-site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the RAWP".

Backfill material will consist of clean fill (as described in the first paragraph of this section) or other acceptable fill material such as virgin stone from a quarry or recycled concrete aggregate (RCA) from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements. RCA imported from compliant facilities will not require chemical testing, unless required by the NYSDEC under the terms for operation of the facility. RCA imported to the site must be derived from recognizable and uncontaminated concrete, with no more than 10% by weight passing through a No. 10 sieve. RCA is not acceptable for and will not

be used as cover or drainage material. If required, a site-specific BUD will be obtained by the NYSDEC for import of RCA.

Soil that does not meet the requirements of 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10, and Appendix 5 will not be imported onto the site without prior approval by NYSDEC. Nothing in the approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose. Clean fill will be segregated at a source/facility that is free of environmental contaminants. Qualified environmental personnel will collect representative samples at a frequency consistent with NYSDEC CP-51. The samples will be analyzed for Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, cyanide, and metals including trivalent and hexavalent chromium by a NYSDOH ELAP-certified laboratory. Upon meeting these criteria, the certified-clean fill will be transported to the site and segregated from impacted material, as necessary, on plastic sheeting until it is used as backfill.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by the NYSDEC. The contents of this RAWP and NYSDEC approval of this RAWP should not be construed as an approval for this purpose.

Trucks entering the site with imported soils will be secured with tight fitting covers.

5.4.9 Stormwater Pollution Prevention

Silt fence or hay bales will be installed around the perimeter of the remedial construction area, as required. Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook maintained at the site and available for inspection by the NYSDEC. Necessary repairs to silt fence and/or hay bales will be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate materials. Manufacturer's recommendations will be followed for replacing silt fence damaged due to weathering. Erosion and sediment control measures identified in the RAWP will be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they will be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to the sewer system.

5.4.10 Contingency Plan

As discussed above in Section 4.2.7, if USTs or other previously unidentified contaminant sources are found during on-site remedial excavation or development-related construction, sampling will be performed on product, if encountered, and surrounding subsurface materials (e.g., soil, stone,

etc.). Chemical analyses will be for CP-51 VOCs and SVOCs, and other waste characterization parameters required for disposal approval. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive work will be promptly communicated by phone to the NYSDEC Project Manager. These findings will also be detailed in the daily reports and the subsequent monthly BCP progress report.

5.4.11 Community Air Monitoring Plan

Community air monitoring will be conducted in compliance with the NYSDOH Generic CAMP outlined below.

The CAMP includes real-time monitoring for VOCs and particulates at the downwind perimeter of each designated work area when certain activities are in progress. Continuous monitoring is required for all ground intrusive activities and during demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/fill excavation and handling, test pitting and trenching, and the installation of soil borings or monitoring wells. Periodic monitoring for VOCs is required 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 might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location.

CAMP monitoring for VOCs levels will be conducted with PIDs, and monitoring for dust/particulates will be conducted with particulate sensors equipped with filters to detect particulates less than 10 microns in diameter (PM10). Monitoring for VOCs, particulates and odors will be conducted during all ground intrusive activities by the RE's field inspector. The work zone is defined as the general area in which machinery is operating in support of remediation activities. The site perimeter will be visually monitored for fugitive dust emissions.

The following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.

- If total VOC levels at the downwind perimeter of the work zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work will resume provided that the total VOC level 200 feet downwind of the work 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 above background for the 15-minute average.
- If the total VOC level is above 25 ppm at the perimeter of the work zone, activities will be shut down.

The following actions will be taken based on visual dust observations:

- If the downwind particulate level is 100 µg/m³ greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind PM10 levels do not exceed 150 µg/m³ above the background level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 µg/m³ above the background level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.

Sustained concentrations of VOCs or PM10 will be reported to the NYSDEC and NYSDOH Project Managers and included in the daily report. In addition, a map showing the location of the downwind and upwind CAMP stations will be included in the daily report.

5.4.12 Odor, Dust and Nuisance Control Plan

Dust, odor and nuisance control will be accomplished by the Remediation Contractor as described in this section. The FER will include the following certification by the RE: "I certify that ground-intrusive work during the remediation and development-related construction were conducted in accordance with dust and odor suppression methodology defined in the RAWP."

Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off site. Specific odor control methods to be used if needed will include application of foam suppressants or tarps over the odor or VOC source areas. If nuisance odors are identified, work will be halted and the source

of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. The NYSDEC and NYSDOH will be notified of odor events and of other complaints about the project. Implementation of odor controls is the responsibility of the Contractor. Monitoring odor emission, including the halt of work, will be the responsibility of the RE, who is responsible for certifying the FER. Application of odor controls is the responsibility of the remedial contractor.

Necessary means will be employed to prevent on- and off-site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

Dust Control Plan

A dust suppression plan that addresses dust management during ground-intrusive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated water distribution system, on-site water truck for road wetting, or an alternate source with suitable supply and pressure for use in dust control
- Gravel will be used for on-site roads to provide a clean and dust-free road surface
- On-site roads will be limited in total area to minimize the area required for water spraying

Other Nuisances

A plan for rodent control will be developed and utilized by the Contractor during site preparation (including clearing and site grubbing) and during remedial work.

A plan for noise control will be developed and used by the remediation contractor during site preparation and remedial work and will conform, at a minimum, to the NYCDEP noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ONSITE

Because residual contaminated soil, groundwater, and soil vapor may exist beneath the site after the remedy is complete, ICs are required to protect human health and the environment. These ICs are described hereafter.

In the event a Track 4 remedy is implemented, ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The site would have two primary EC systems: (1) a composite cover system consisting of concrete building slabs and (2) a vapor barrier/waterproofing membrane.

The FER will report residual contamination on the site in tabular and map form. This will include presentation of exceedances of both UU and RRU SCOs.

7.0 ENGINEERING CONTROLS

7.1 Vapor Barrier/Waterproofing Membrane

In the event a Track 4 remedy is implemented, exposure to residual contaminated soil vapor will be prevented by an engineered, continuous vapor barrier/waterproofing membrane installed on all subsurface slabs and walls of the proposed building. The barrier will consist of Grace Preprufe 300R (or its approved equivalent) underneath the slab and Grace Preprufe160R or Bituthene (or its approved equivalent) on the subsurface walls. Vapor barrier manufacturer's documentation and specifications are included as Appendix I.

7.2 Composite Cover System

In the event a Track 4 remedy is implemented, exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the site. This composite cover system will be comprised of concrete building slabs, pavement, and/or at least two feet of clean fill in landscaped areas.

A Soil Management Plan will be included in the SMP and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete. Maintenance of this composite cover system will be described in the SMP in the FER.

8.0 CRITERIA FOR COMPLETION OF REMEDIATION/TERMINATION OF REMEDIAL SYSTEMS

8.1 Composite Cover System and Vapor barrier

In the event of a Track 4 remedy, the composite cover system and vapor barrier systems are permanent controls, and the quality and integrity of these systems will be inspected at defined, regular intervals in perpetuity.

9.0 INSTITUTIONAL CONTROLS

After either a Track 2 or Track 4 remedy is complete, the site will have residual contamination remaining in place. ECs for the residual contamination have been incorporated into the Track 4 remedy to render the overall site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an EE, and for a Track 4 remedy, a SMP. These elements are described in this section.

A site-specific EE will be recorded with Queens County Office of the New York City Register to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the EE and the grantor's successors and assigns adhere to ECs/ICs placed on this site in order to ensure the efficacy of this this NYSDEC-approved remedy. ICs provide restrictions on site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. In the event the Track 4 remedy is implemented, a SMP will be prepared that describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the EE, and once the SMP has been approved by the NYSDEC, compliance with the SMP would be required by the grantor of the EE and grantor's successors and assigns.

9.1 Environmental Easement

An EE, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-site after the remedial action is complete. As part of this remedy, an EE approved by NYSDEC will be filed and recorded with the Queens County Office of the New York City Register. The EE will be submitted as part of the FER.

The EE renders the site a Controlled Property. The EE must be recorded with the Queens County Office of the City Register before the Certificate of Completion can be issued by NYSDEC. A series of ICs are required under this remedy to implement, maintain and, if necessary, monitor the EC system(s), and to prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the site to restricted residential use(s) only. These ICs are requirements or restrictions placed on the site that are listed in, and required by, the EE. Institutional Controls can, generally, be subdivided between controls that support ECs, and those that place general restrictions on site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The ICs that support ECs are:

- Compliance with the EE by the Grantee and the Grantee's successors, and adherence of all elements of the SMP, if required for Track 4 cleanup
- All ECs must be operated and maintained as specified in the SMP (Track 4)
- A soil vapor mitigation system consisting of a vapor barrier/waterproofing membrane under all building structures must be inspected, certified, operated and maintained as required by the SMP (Track 4)
- All ECs on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP (Track 4)
- Data and information pertinent to site management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP (Track 4)
- ECs required for a Track 4 cleanup may not be discontinued without an amendment or extinguishment of the EE – The EE may be extinguished only by release by the Commissioner of the NYSDEC, or the Commissioner's designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

The Controlled Property (site) will also have a series of ICs in the form of site restrictions and requirements. The site restrictions that apply to the Controlled Property are:

- Vegetable gardens, in contact with residual site soil, on the Controlled Property are prohibited
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the SMP (Track 4)
- The Controlled Property may be used for restricted residential use only, provided the long-term EC/ICs included in the SMP are employed (Track 4)
- The Controlled Property may not be used for a higher level of use, such as residential use without an amendment or extinguishment of this EE
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the

previous certification or that any changes to the controls were approved by the NYSDEC; 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 (Track 4) – NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This statement must be certified by an expert that the NYSDEC finds acceptable.

9.2 Site Management Plan (Track 4 only)

Site management is the last phase of remediation when residual contamination is left at the site, and begins with the approval of the FER and issuance of the Certificate of Completion for the remedial action. If necessary for a Track 4 cleanup, the SMP submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all site management responsibilities defined in the EE are performed.

A SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the site following completion of the remedial action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all EC/ICs; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

If needed for a Track 4 cleanup, the SMP will be prepared that includes three plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; and (3) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in DER-10 and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually, unless otherwise approved by NYSDEC. The certification period will be based on a calendar year and will be due for submission to NYSDEC three months following the end of the reporting period.

No exclusions for handling of residual contaminated soils will be provided in the SMP. All handling of residual contaminated material will be subject to provisions contained in the SMP.

10.0 FINAL ENGINEERING REPORT

A FER will be submitted to the NYSDEC following implementation of the remedy defined in this RAWP. The FER will be prepared in conformance with NYSDEC DER-10 and will include the following:

- Documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan
- A comprehensive account of the locations and characteristics of material removed from the site including the surveyed map(s) of each source, as necessary
- As-built drawings for constructed elements, certifications, manifests, and bills of lading
- A description of the changes to the remedy from the elements provided in the RAWP and associated design documents, if any
- A tabular summary of performance evaluation sampling results and material characterization results and other sampling and chemical analyses performed as part of the remedy
- Written and photographic documentation of remedial work performed under this remedy
- An itemized tabular description of actual costs incurred during implementation of the remedy
- For a Track 2 remedy, sufficient information to show that remaining soil left on-site meets the RRU SCOs or is located below 15 feet bgs
- If necessary, a thorough summary of remaining contamination that exceeds the RRU SCOs and an explanation for why the material was not removed as part of the remedy - A table and a map that shows remaining contamination in excess of the RRU SCOs will also be included.
- An accounting of the destination of material removed from the site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids - Documentation associated with the disposal of material must also include records and approvals for receipt of the material.
- An accounting of the origin and chemical quality of each material type imported onto the site

Before approval of the FER and issuance of a Certificate of Completion, the daily reports and monthly BCP progress reports must be submitted in digital form on electronic media (i.e., PDF).

10.1 Certifications

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the RE, Jason Hayes, who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

I, _____, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 43-02 to 43-40 24th Street Site (NYSDEC BCA Site No. C241189).

I certify that the site description presented in this FER is identical to the site descriptions presented in the Brownfield Cleanup Agreement for the 43-02 to 43-40 24th Street *site.*

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that the export of contaminated soil, fill, water, or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all federal, state, and local laws.

I certify that import of soils from off-site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that invasive work during remediation and development-related construction was conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State

licensed engineer in accordance with Section 7209(2), Article 130, and New York State Education Law.

11.0 SCHEDULE

Implementation of this RAWP is anticipated to begin in the first quarter 2020. Mobilization is expected to take about one to two weeks. Once mobilization is complete, remediation of the site will continue. The remedy, which will be implemented in accordance with this RAWP, is anticipated to take about 8 months to complete. After completion of the remedy, a FER will be submitted to the NYSDEC for review and approval.

TABLES

Table 1
Alternative I Remedial Cost Estimate - Track 1
Long Island City Center
43-02 to 43-40 24th Street, Long Island City, New York
Langan Project No.: 170362701
BCP Site ID: C241189

Item No.	Description of Environmental Item	Quantity		Premium Unit Price		Estimated Premium
REMEDIAL ACTION CONTRACTOR FEES						
1	Remediation Facilities, Equipment, Mobilization, Demobilization, Permits, and Site Maintenance- Remediation and decontamination facilities include trailer, truck cleaning facilities, etc.	–		Allowance		$100,000
2	Transport and Disposal of Historic Fill - Includes transport vehicles and disposal of soil exceeding Unrestricted Use Soil Cleanup Objectives at a permitted facility.	44,000	Tons	$55	per Ton	$2,420,000
3	Excavate, Transport and Dispose Historic Fill with Hazardous Lead - Includes excavation, transport vehicles and disposal of urban fill with hazardous lead at a permitted facility.	500	Tons	$180	per Ton	$90,000
4	Dust, Odor and Vapor Control - Includes odor, dust, and organic vapor control during remediation of the site. Assumes control measures will include, but not be limited to application of odor suppressant, foam or water.	5	Months	10,000	per Month	$50,000
5	Backfill - Import and placement of clean fill material to bring site to development grade following potential over-excavation. An additional 10% of material is included to account for compaction.	3,000	CY	$35	CY	$105,000
6	Dewatering and Groundwater Treatment - Accounts for the design, installation, and for cost to operate and maintain the dewatering treatment system for 5 months.	–		Lump Sum		$1,000,000
7	Excavation Support - Accounts for SOE installation along the interior and perimeter of the site.	–		Lump Sum		$6,000,000
				REMEDIAL ACTION CONTRACTOR FEES SUBTOTAL		**$9,765,000**
ENGINEERING FEES						
1	Confirmation Sampling - To confirm source material removal (assumes analysis for VOCs, SVOCs, PCBs, pesticides and metals for each sample).	28	Samples	$800	per Sample	$22,400
2	Community Air Monitoring - This cost includes equipment rental fees associated with implementation of CAMP, which will be performed during excavation, backfill, and concrete slab restoration.	8	Months	$3,000	per Month	$24,000
3	BCP Engineering Services - Work Plans, Remedial Investigation, Remedial Design, Remedial Oversight, Closure Reporting	–		Allowance		$500,000
				ENGINEERING FEES SUBTOTAL		**$547,000**
				Remediation Contingency (10% of Contractor Fee Subtotal)		**$977,000**
				Total Estimated Cost		**$11,289,000**
				ESTIMATED REMEDIATION COST - ALTERNATIVE I		**$11.3 MM**

General Assumptions and Conditions:

1. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
2. Excavation depths were calculated using Remedial Investigation soil sample results, field observations, and observed fill depths.
3. If contamination could not be delineated vertically based on soil sample results, it was assumed that contamination extended to the terminus of historic fill.
4. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.
5. A 8 month period is assumed for remediation and soil handling.
6. VOC = volatile organic compound; SVOC = semivolatile organic compound; PCBs = polychlorinated biphenyls

Contractor Cost Assumptions:

RAWP Item No. 2 & 3 - The unit rate provided reflects construction labor to be OSHA certified.
RAWP Item No. 4 - Cost estimate includes application of vapor/odor suppressing foam to open excavations and soil loaded into trucks. Labor provided by excavation, handling, and disposal contractor provided above; this line item estimate reflects material, freight, and equipment costs.
RAWP Item No. 5 - Backfill placement and compaction assumes soil handling and management costs for the New York City area. Backfill assumes that the site will have to be structurally backfilled to sub-grade with material that contains no exceedances of Track 1 Unrestricted Use Soil Cleanup Objectives (6NYCRR-Part 375-6.8(a)). The quantity of soil has been increased by 10% to account for compaction.

Engineering Cost Assumptions:

Engineering Item No. 1 - The assumed duration of the community air monitoring program (CAMP) is 8 months during remediation. CAMP costs include full-time equipment rental to facilitate perimeter dust and VOC monitoring.
Engineering Item No. 2 - The cost assumes collection of 28 samples plus quality assurance/quality control samples. Sample analysis will be for Part 375 parameters. Costs include subcontracted laboratory analysis by a NYSDOH ELAP-certified laboratory.

Table 2
Alternative II Remedial Cost Estimate - Track 2
Long Island City Center
43-02 to 43-40 24th Street, Long Island City, New York
Langan Project No.: 170362701
BCP Site ID: C241189

Item No.	Description of Environmental Item	Quantity		Premium Unit Price		Estimated Premium
REMEDIAL ACTION CONTRACTOR FEES						
1	Remediation Facilities, Equipment, Mobilization, Demobilization, Permits, and Site Maintenance- Remediation and decontamination facilities include trailer, truck cleaning facilities, etc.	--		Allowance		$100,000
2	Transport and Disposal of Historic Fill - Includes transport vehicles and disposal of soil exceeding Restricted Use Restricted Residential Soil Cleanup Objectives at a permitted facility.	37,500	Tons	$55	per Ton	$2,062,500
3	Excavate, Transport and Dispose Historic Fill with Hazardous Lead - Includes excavation, transport vehicles and disposal of urban fill with hazardous lead at a permitted facility.	500	Tons	$180	per Ton	$90,000
4	Dust, Odor and Vapor Control - Includes odor, dust, and organic vapor control during remediation of the site. Assumes control measures will include, but not be limited to application of odor suppressant, foam or water.	5	Months	10,000	per Month	$50,000
5	Backfill - Import and placement of clean fill material to bring site to development grade following potential over-excavation. An additional 10% of material is included to account for compaction.	1,000	CY	$35	CY	$35,000
6	Dewatering and Groundwater Treatment - Accounts for the design, installation, and for cost to operate and maintain the dewatering treatment system for 1 months.	--		Lump Sum		$200,000
7	Excavation Support - Accounts for SOE installation along the perimeter of the site.	--		Lump Sum		$2,800,000
8	Vapor Barrier/Waterproofing Membrane - Includes materials and labor to install a vapor barrier/waterproofing membrane along the base and sidewalls of all development excavations.	68,500	SF	$11	SF	$754,000
				REMEDIAL ACTION CONTRACTOR FEES SUBTOTAL		**$6,092,000**
ENGINEERING FEES						
1	Community Air Monitoring - This cost includes equipment rental fees associated with implementation of CAMP, which will be performed during excavation, backfill, and concrete slab restoration.	8	Months	$3,000	per Month	$24,000
2	Confirmation/Documentation Sampling - To confirm removal of material that exceeds the Track 2 Soil Cleanup Objectives or evaluate soil to remain in place after the development (assumes analysis for SVOCs and metals for each confirmation sample and VOCs, SVOCs, PCBs, pesticides and metals for each documentation sample).	28	Samples	$800	per Sample	$22,400
3	BCP Engineering Services - Work Plans, Remedial Investigation, Remedial Design, Remedial Oversight, Closure Reporting, Environmental Easement, post-excavation survey	--		Allowance		$500,000
				ENGINEERING FEES SUBTOTAL		**$547,000**
				Remediation Contingency (10% of Contractor Fee Subtotal)		**$610,000**
				Total Estimated Cost		**$7,249,000**
				ESTIMATED REMEDIATION COST - ALTERNATIVE II		**$7.3 MM**

General Assumptions and Conditions:

1. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
2. Excavation depths were calculated using subsurface investigation soil sample results, field observations, and observed fill depths.
3. If contamination could not be delineated vertically based on soil sample results, it was assumed that contamination extended to the terminus of historic fill.
4. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.
5. A 8 month period is assumed for remediation and soil handling.
6. VOC = volatile organic compound; SVOC = semivolatile organic compound; PCBs = polychlorinated biphenyls

Contractor Cost Assumptions:

RAWP Item No. 2 & 3 - The unit rate provided reflects construction labor to be OSHA certified.
RAWP Item No. 4 - Cost estimate includes application of vapor/odor suppressing foam to open excavations and soil loaded into trucks. Labor provided by excavation, handling, and disposal contractor provided above; this line item estimate reflects material, freight, and equipment costs.
RAWP Item No. 5 - Backfill placement and compaction assumes soil handling and management costs for the New York City area. Backfill assumes that the site will have to be structurally backfilled to sub-grade with material that contains no exceedances of Track 2 Restricted Use Restricted Residential Soil Cleanup Objectives (6NYCRR-Part 375-6.8(a)). The quantity of soil has been increased by 10% to account for compaction.

Engineering Cost Assumptions:

Engineering Item No. 1 - The assumed duration of the community air monitoring program (CAMP) is 8 months during remediation. CAMP costs include full-time equipment rental to facilitate perimeter dust and VOC monitoring.
Engineering Item No. 2 - The cost assumes collection of 28 samples plus quality assurance/quality control samples. Sample analysis will be for Part 375 parameters. Costs include subcontracted laboratory analysis by a NYSDOH ELAP-certified laboratory.

Table 3
Alternative III Remedial Cost Estimate - Track 4
Long Island City Center
43-02 to 43-40 24th Street, Long Island City, New York
Langan Project No.: 170362701
BCP Site ID: C241189

Item No.	Description of Environmental Item	Quantity		Premium Unit Price		Estimated Premium
REMEDIAL ACTION CONTRACTOR FEES						
1	Remediation Facilities, Equipment, Mobilization, Demobilization, Permits, and Site Maintenance- Remediation and decontamination facilities include trailer, truck cleaning facilities, etc.	--		Allowance		$100,000
2	Transport and Disposal of Historic Fill - Includes transport vehicles and disposal of soil exceeding Track 4 Soil Cleanup Objectives at a permitted facility.	36,000	Tons	$55	per Ton	$1,980,000
3	Excavate, Transport and Dispose Historic Fill with Hazardous Lead - Includes excavation, transport vehicles and disposal of urban fill with hazardous lead at a permitted facility.	500	Tons	$180	per Ton	$90,000
4	Dust, Odor and Vapor Control - Includes odor, dust, and organic vapor control during remediation of the site. Assumes control measures will include, but not be limited to application of odor suppressant, foam or water.	5	Months	10,000	per Month	$50,000
5	Dewatering and Groundwater Treatment - Accounts for the design, installation, and for cost to operate and maintain the dewatering treatment system for 1 months.	--		Lump Sum		$200,000
6	Excavation Support - Accounts for SOE installation along the perimeter of the site.	--		Lump Sum		$2,800,000
7	Vapor Barrier/Waterproofing Membrane - Includes materials and labor to install a vapor barrier/waterproofing membrane along the base and sidewalls of all development excavations.	68,500	SF	$11	SF	$754,000
8	Cover System - Installation of a 6-inch reinforced concrete slab to be poured above the vapor barrier as a cover system.	56,500	SF	$25	SF	$1,413,000
				REMEDIAL ACTION CONTRACTOR FEES SUBTOTAL		**$7,387,000**
ENGINEERING FEES						
1	Community Air Monitoring - This cost includes equipment rental fees associated with implementation of CAMP, which will be performed during excavation, backfill, and concrete slab restoration.	8	Months	$3,000	per Month	$24,000
2	Documentation Sampling - To evaluate soil to remain in place after the development (assumes analysis for VOCs, SVOCs, PCBs, pesticides and metals for each sample).	28	Samples	$800	per Sample	$22,400
3	BCP Engineering Services - Work Plans, Remedial Investigation, Remedial Design, Remedial Oversight, Closure Reporting, Site Management Plan, Environmental Easement, post-excavation survey	--		Allowance		$500,000
4	Institutional and Engineering Control Certification - Accounts for fees associated with annual on-site inspections and preparation and submission of annual Periodic Review Reports for ten years.	10	Years	$5,000	per Year	$50,000
				ENGINEERING FEES SUBTOTAL		**$597,000**
				Remediation Contingency (10% of Contractor Fee Subtotal)		**$739,000**
				Total Estimated Cost		**$8,723,000**
				ESTIMATED REMEDIATION COST - ALTERNATIVE II		**$8.7 MM**

General Assumptions and Conditions:

1. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
2. Excavation depths were calculated using subsurface investigation soil sample results, field observations, and observed fill depths.
3. If contamination could not be delineated vertically based on soil sample results, it was assumed that contamination extended to the terminus of historic fill.
4. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.
5. A 8 month period is assumed for remediation and soil handling.
6. VOC = volatile organic compound; SVOC = semivolatile organic compound; PCBs = polychlorinated biphenyls

Contractor Cost Assumptions:

RAWP Item No. 2 & 3 - The unit rate provided reflects construction labor to be OSHA certified.
RAWP Item No. 4 - Cost estimate includes application of vapor/odor suppressing foam to open excavations and soil loaded into trucks. Labor provided by excavation, handling, and disposal contractor provided above; this line item estimate reflects material, freight, and equipment costs.

Engineering Cost Assumptions:

Engineering Item No. 1 - The assumed duration of the community air monitoring program (CAMP) is 8 months during remediation. CAMP costs include full-time equipment rental to facilitate perimeter dust and VOC monitoring.
Engineering Item No. 2 - The cost assumes collection of 28 samples plus quality assurance/quality control samples. Sample analysis will be for Part 375 parameters. Costs include subcontracted laboratory analysis by a NYSDOH ELAP-certified laboratory.
Engineering Item No. 4 - This task will be completed annually until such a time that the Environmental Easement is extinguished.

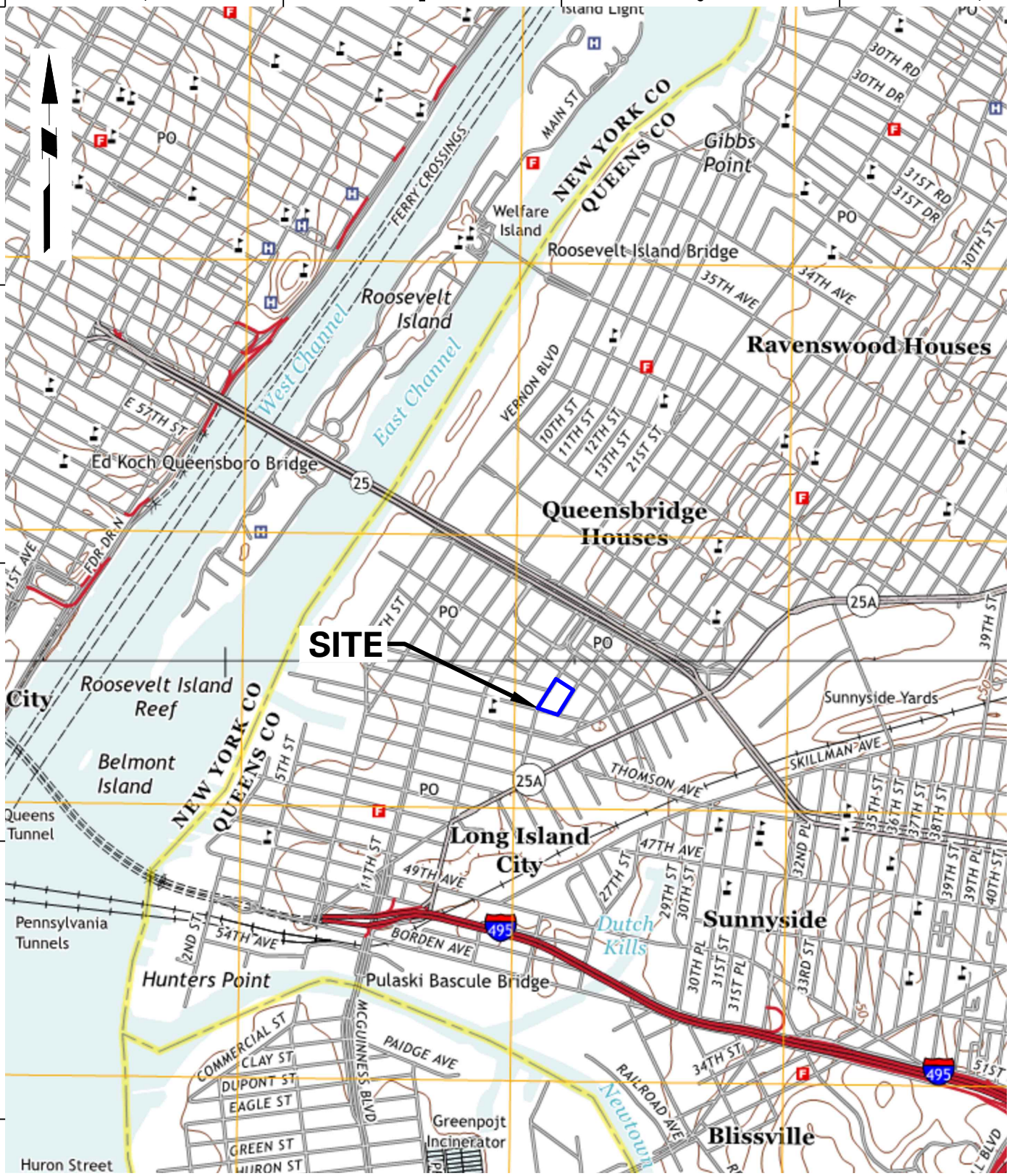
Table 4
Track 2 Restricted Use - Restricted Residential SCOs
Long Island City Center
43-02 to 43-40 24th Street, Long Island City, New York
Langan Project No.: 170362701
BCP Site ID: C241189

Parameter	Track 2 - Restricted Use - Restricted Residential SCO (mg/kg)
VOCs	
1,1,1-Trichloroethane	100
1,1-Dichloroethane	26
1,1-Dichloroethylene	100
1,2,4-Trimethylbenzene	52
1,2-Dichlorobenzene	100
1,2-Dichloroethane	3.1
1,3,5-Trimethylbenzene	52
1,3-Dichlorobenzene	49
1,4-Dichlorobenzene	13
1,4-Dioxane	13
2-Butanone	100
Acetone	100
Benzene	4.8
Carbon tetrachloride	2.4
Chlorobenzene	100
Chloroform	49
cis-1,2-Dichloroethylene	100
Ethyl Benzene	41
Methyl tert-butyl ether (M	100
Methylene chloride	100
Naphthalene	100
n-Butylbenzene	100
n-Propylbenzene	100
o-Xylene	~
p- & m- Xylenes	~
sec-Butylbenzene	100
tert-Butylbenzene	100
Tetrachloroethylene	19
Toluene	100
trans-1,2-Dichloroethylene	100
Trichloroethylene	21
Vinyl Chloride	0.9
Xylenes, Total	100
SVOCs	
2-Methylphenol	100
3- & 4-Methylphenols	~
Acenaphthene	100
Acenaphthylene	100
Anthracene	100
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(g,h,i)perylene	100
Benzo(k)fluoranthene	3.9
Chrysene	3.9
Dibenzo(a,h)anthracene	0.33
Dibenzofuran	59
Fluoranthene	100
Fluorene	100
Hexachlorobenzene	1.2
Indeno(1,2,3-cd)pyrene	0.5
Naphthalene	100
Pentachlorophenol	6.7
Phenanthrene	100
Phenol	100
Pyrene	100

Parameter	Track 2 - Restricted Use - Restricted Residential SCO (mg/kg)
Pesticides	
4,4'-DDD	13
4,4'-DDE	8.9
4,4'-DDT	7.9
Aldrin	0.097
alpha-BHC	0.48
alpha-Chlordane	4.2
beta-BHC	0.36
delta-BHC	100
Dieldrin	0.2
Endosulfan I	24
Endosulfan II	24
Endosulfan sulfate	24
Endrin	11
gamma-BHC (Lindane)	1.3
Heptachlor	2.1
2,4,5-TP (Silvex)	100
Metals	
Arsenic	16
Barium	400
Beryllium	72
Cadmium	4.3
Chromium	~
Copper	270
Lead	400
Manganese	2000
Nickel	310
Selenium	180
Silver	180
Zinc	10000
Mercury	0.81
Chromium, Hexavalent	110
Chromium, Trivalent	180
Cyanide, total	27
PCBs	
Total PCBs	1

Notes:
1. SCO: Soil Cleanup Objective
2. VOC: volatile organic compound
3. SVOC: semivolatile organic compound
4. PCB: polychlorinated biphenyl
5. mg/kg: milligram per kilogram

FIGURES



MAP REFERENCE: USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE of BROOKLYN AND QUEENS, DATED 2016

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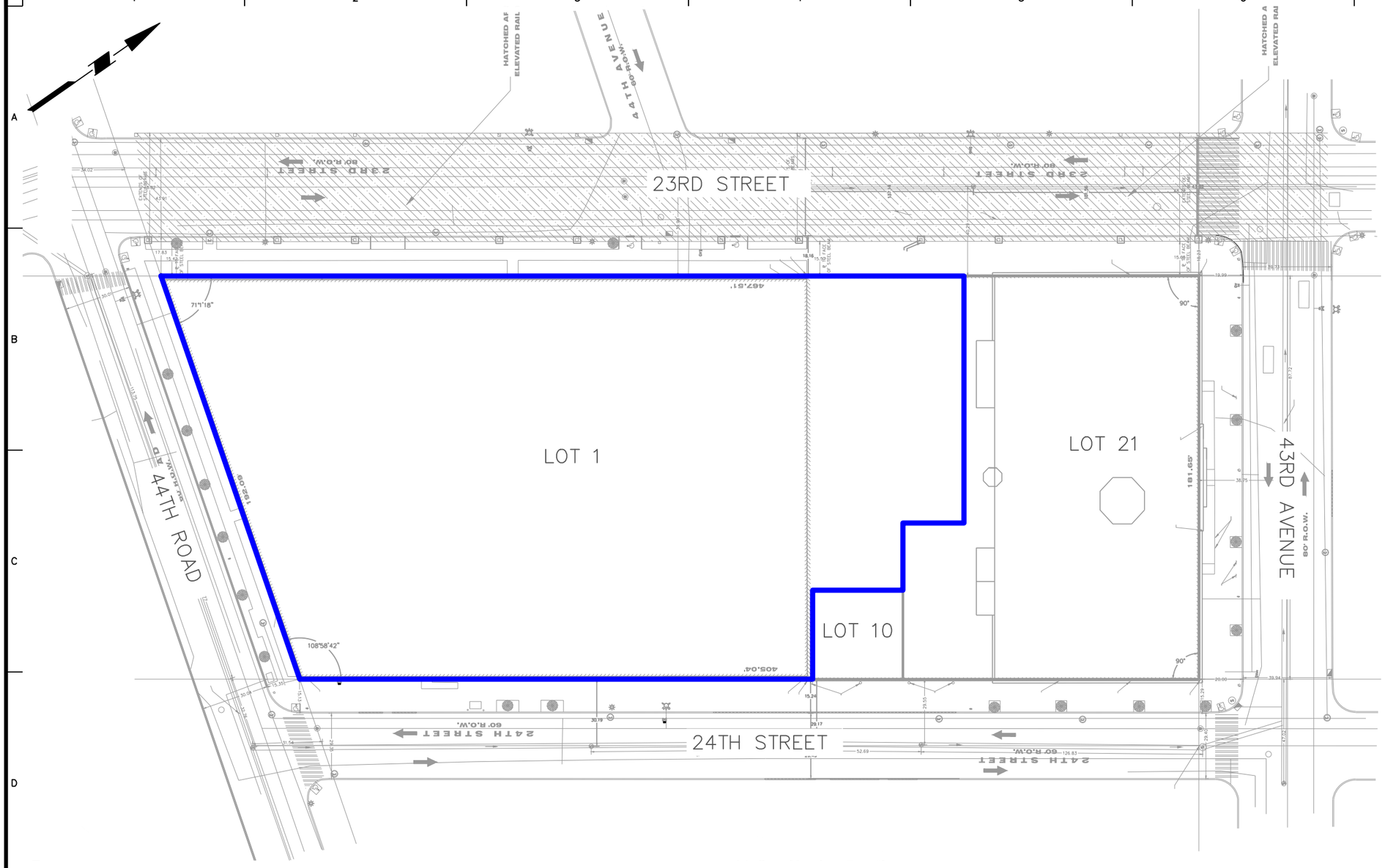
Project	43-02 to 43-40 24TH STREET BLOCK No. 436, LOT No. 1 LONG ISLAND CITY NEW YORK
Figure Title	SITE LOCATION MAP
Project No.	170362701
Figure	1
Date	01/10/2018
Scale	NTS
Drawn By / Checked By	KMS / RM
Submission Date	
Sheet	1 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 1 - Site Location Map USGS.dwg Date: 2/27/2019 Time: 15:31 User: jyanowitz Style Table: Langan.stb Layout: ANSIA-BP



LEGEND:

SITE BOUNDARY

NOTE:

BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.

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43-02 to 43-40 24TH STREET

BLOCK No. 436, LOT No. 1

LONG ISLAND CITY **NEW YORK**

Figure Title

SITE PLAN

Project No. 170362701	Figure No. 2
Date 01/10/2018	
Scale 1"=50'	
Drawn By JFY / Checked By MR	
Submission Date	Sheet 2 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 2 - SiteMap.dwg Date: 2/27/2019 Time: 15:29 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL

Sample ID	SB02_0-2	SB02_10-11	SB02_11-13
Lab Sample ID	460-136321-12	460-136321-13	460-136321-14
Sampling Date	6/29/2017	6/29/2017	6/29/2017
Sample Depth (feet bgs)	0 to 2	10 to 11	11 to 13
VOCs (mg/kg)			
Acetone	ND	**0.085**	ND
SVOCs (mg/kg)			
Benzo(b)fluoranthene	NE	**1.1**	NE
Indeno(1,2,3-cd)pyrene	NE	**0.51**	NE
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Cadmium	**3.3**	NE	NE
Copper	**1180**	**782**	NE
Lead	**773**	**177**	NE
Nickel	NE	**71.8**	NE
Zinc	**1630**	**231**	NE

Sample ID	EB05_1-2	EB05_9-10
Lab Sample ID	L1615306-03	L1615304-01
Sampling Date	5/19/2016	5/19/2016
Sample Depth (feet bgs)	1 to 2	9 to 10
VOCs (mg/kg)	NE	NT
SVOCs (mg/kg)	NT	NE
Herbicides (mg/kg)	NT	ND
Pesticides (mg/kg)	NT	ND
PCBs (mg/kg)	NT	ND
Total Metals (mg/kg)		
Arsenic	NT	**80**
Barium	NT	**380**
Copper	NT	**85**
Lead	NT	**1900**
Mercury	NT	**0.76**
Zinc	NT	**580**

Sample ID	SB03_0-2	SB03_9-10	SB03_21-23
Lab Sample ID	460-136505-4	460-136505-5	460-136505-6
Sampling Date	7/3/2017	7/3/2017	7/3/2017
Sample Depth (feet bgs)	0 to 2	9 to 10	21 to 23
VOCs (mg/kg)			
Acetone	ND	ND	**0.08**
SVOCs (mg/kg)	NE	NE	ND
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Copper	**79.7**	**54.9**	NE
Lead	**140**	NE	NE
Zinc	**246**	NE	NE

Sample ID	SB04_0-2	SB04_10-11.5	SB04_12-14
Lab Sample ID	460-136662-1	460-136662-2	460-136662-3
Sampling Date	7/6/2017	7/6/2017	7/6/2017
Sample Depth (feet bgs)	0 to 2	10 to 11.5	12 to 14
VOCs (mg/kg)			
Acetone	ND	**0.1**	**0.063**
SVOCs (mg/kg)			
Indeno(1,2,3-cd)pyrene	**0.54**	ND	NE
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Arsenic	NE	**49.4**	NE
Chromium, Trivalent	NE	**37.2**	NE
Copper	**127**	**528**	NE
Lead	**333**	**547**	NE
Mercury	**0.46**	**0.56**	NE
Nickel	NE	**30.9**	NE
Silver	NE	**2.1**	NE
Zinc	**323**	**630**	NE

Sample ID	EB07_9-10	EB07_11-12	EB07_16-17	EB07_17-18
Lab Sample ID	L1615474-03	L1615474-05	L1615475-06	L1615474-02
Sampling Date	5/20/2016	5/20/2016	5/20/2016	5/20/2016
Sample Depth (feet bgs)	9 to 10	11 to 12	16 to 17	17 to 18
VOCs (mg/kg)	NT	NE	NE	NT
SVOCs (mg/kg)	ND	NT	NT	ND
Herbicides (mg/kg)	ND	NT	NT	ND
Pesticides (mg/kg)	ND	NT	NT	ND
PCBs (mg/kg)	ND	NT	NT	ND
Total Metals (mg/kg)				
Arsenic	**37**	NT	NT	NE
Barium	**720**	NT	NT	NE
Copper	**930**	NT	NT	NE
Lead	**2600**	NT	NT	NE
Nickel	**44**	NT	NT	NE
Zinc	**1100**	NT	NT	NE

Sample ID	SB05_0-2	DUP03_070617	SB05_9-10	SB05_11-13
Lab Sample ID	460-136662-4	460-136662-10	460-136662-5	460-136662-6
Sampling Date	7/6/2017	7/6/2017	7/6/2017	7/6/2017
Sample Depth (feet bgs)	0 to 2	0 to2	9 to 10	11 to 13
VOCs (mg/kg)	ND	ND	ND	NE
SVOCs (mg/kg)	NE	NE	NE	ND
Pesticides (mg/kg)	ND	ND	ND	ND
PCBs(mg/kg)	NE	ND	ND	ND
Total Metals (mg/kg)				
Arsenic	NE	NE	**14.9**	NE
Chromium, Hexavalent	**1.4**	ND	ND	ND
Copper	NE	NE	**128**	NE
Lead	NE	NE	**836**	NE
Mercury	NE	NE	**0.8**	NE
Zinc	**111**	NE	NE	NE

Sample ID	SB01_0-2	SB01_12-14
Lab Sample ID	460-136321-10	460-136321-11
Sampling Date	6/29/2017	6/29/2017
Sample Depth (feet bgs)	0 to 2	12 to 14
VOCs (mg/kg)	NE	ND
SVOCs (mg/kg)		
Benzo(a)anthracene	**8.1**	ND
Benzo(a)pyrene	**8.5**	ND
Benzo(b)fluoranthene	**11**	ND
Benzo(k)fluoranthene	**3.7**	ND
Chrysene	**9.1**	ND
Dibenzo(a,h)anthracene	**2**	ND
Indeno(1,2,3-cd)pyrene	**7.3**	ND
Pesticides (mg/kg)	ND	ND
PCBs(mg/kg)	ND	ND
Total Metals (mg/kg)		
Cadmium	**13.5**	ND
Copper	**28500**	**191**
Lead	**3360**	NE
Mercury	**0.32**	ND
Nickel	**36.5**	NE
Silver	**2.4**	ND
Zinc	**10900**	NE

Sample ID	SB11_0-2	SB11_9-10	SB11_11-13
Lab Sample ID	460-136662-7	460-136662-8	460-136662-9
Sampling Date	7/6/2017	7/6/2017	7/6/2017
Sample Depth (feet bgs)	0 to 2	9 to 10	11 to 13
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)			
Benzo(a)anthracene	**7.3**	NE	NE
Benzo(a)pyrene	**6.7**	NE	NE
Benzo(b)fluoranthene	**8.5**	NE	NE
Benzo(k)fluoranthene	**3.7**	NE	NE
Chrysene	**7.1**	NE	NE
Dibenzo(a,h)anthracene	**1.1**	ND	NE
Indeno(1,2,3-cd)pyrene	**5.1**	NE	NE
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Copper	NE	**55.6**	**53**
Lead	**1070**	**95.8**	**176**
Mercury	**0.87**	**0.41**	**0.83**
Zinc	**721**	**134**	NE

Sample ID	SB07_0-2	SB07_10.5-11.5	SB07_21-23
Lab Sample ID	460-136321-5	460-136321-6	460-136321-7
Sampling Date	6/29/2017	6/29/2017	6/29/2017
Sample Depth (feet bgs)	0 to 2	10.5 to 11.5	21 to 23
VOCs (mg/kg)	ND	ND	NE
SVOCs (mg/kg)			
Benzo(a)anthracene	NE	**1.1**	ND
Benzo(a)pyrene	NE	**1.1**	ND
Benzo(b)fluoranthene	**1.5**	**1.5**	ND
Chrysene	**1.2**	**1.2**	ND
Indeno(1,2,3-cd)pyrene	**0.64**	**1.1**	ND
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Arsenic	**14.8**	NE	NE
Cadmium	**14.7**	ND	ND
Copper	**6180**	NE	NE
Lead	**1440**	NE	NE
Mercury	**0.66**	NE	ND
Nickel	NE	**38.7**	NE
Zinc	**8310**	NE	NE

Sample ID	EB16_4-5	EB16_7-8	EB16_17-18	EB16_8-9
Lab Sample ID	L1615475-10	L1615474-05	L1615474-04	L1615475-11
Sampling Date	5/20/2016	5/20/2016	5/20/2016	5/20/2016
Sample Depth (feet bgs)	4 to 5	7 to 8	17 to 18	8 to 5
VOCs (mg/kg)	NE	NT	NE	NE
SVOCs (mg/kg)				
Benzo(a)anthracene	NT	**2.7**	NE	NT
Benzo(a)pyrene	NT	**2.5**	NE	NT
Benzo(b)fluoranthene	NT	**3**	NE	NT
Benzo(k)fluoranthene	NT	**1.3**	NE	NT
Chrysene	NT	**2.7**	NE	NT
Dibenzo(a,h)anthracene	NT	**0.42**	NE	NT
Indeno(1,2,3-cd)pyrene	NT	**1.6**	NE	NT
Herbicides (mg/kg)	NT	ND	ND	NT
Pesticides (mg/kg)	NT	ND	ND	NT
PCBs (mg/kg)	NT	ND	ND	NT
Total Metals (mg/kg)				
Arsenic	NT	NE	**33**	NT
Cadmium	NT	NE	**36**	NT
Copper	NT	**110**	**21000**	NT
Lead	NT	**580**	**3000**	NT
Mercury	NT	**1.1**	**0.94**	NT
Nickel	NT	NE	**460**	NT
Silver	NT	ND	**2.1**	NT
Zinc	NT	**310**	**12000**	NT

Sample ID	SB08_0-2	DUP01_070517	SB08_18-20
Lab Sample ID	460-136546-1	460-136546-6	460-136546-2
Sampling Date	7/5/2017	7/5/2017	7/5/2017
Sample Depth (feet bgs)	0 to 2	0 to2	18 to 20
VOCs (mg/kg)	ND	NE	NE
SVOCs (mg/kg)	NE	NE	ND
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Chromium, Trivalent	ND	**32.2**	NE
Chromium, Hexavalent	**2.2**	**1.9**	ND
Zinc	NE	**214**	NE

Sample ID	SB12_0-2	SB12_6-8	SB12_18-20
Lab Sample ID	460-136662-11	460-136662-12	460-136662-13
Sampling Date	7/6/2017	7/6/2017	7/6/2017
Sample Depth (feet bgs)	0 to 2	6 to 8	18 to 20
VOCs (mg/kg)	NE	NE	ND
SVOCs (mg/kg)			
Indeno(1,2,3-cd)pyrene	**0.83**	ND	NE
Pesticides (mg/kg)			
4,4'-DDE	**0.011**	ND	ND
4,4'-DDT	**0.0047**	ND	ND
PCBs(mg/kg)			
Total PCBs	**0.23**	ND	ND
Total Metals (mg/kg)			
Copper	**179**	NE	NE
Lead	**544**	**65.8**	NE
Mercury	NE	**1.4**	ND
Zinc	**563**	NE	NE

Sample ID	SB10-0-2	SB10-10-12	SB10-21-23
Lab Sample ID	460-136258-1	460-136258-2	460-136258-3
Sampling Date	6/28/2017	6/28/2017	6/28/2017
Sample Depth (feet bgs)	0 to 2	10 to 12	21 to 23
VOCs (mg/kg)			
Acetone	ND	ND	**0.16**
SVOCs (mg/kg)	NE	NE	ND
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Cadmium	NE	**42.1**	NE
Copper	NE	**11300**	**62.9**
Lead	**176**	**2180**	NE
Nickel	NE	**93.8**	NE
Zinc	NE	**14700**	**261**

Sample ID	SB08_0-2	SB08_7-8	SB08_24-26	SB08_33-34
Lab Sample ID	460-136321-1	460-136321-2	460-136321-3	460-136321-4
Sampling Date	6/29/2017 0:00	6/29/2017	6/29/2017	6/29/2017
Sample Depth (feet bgs)	0 to 2	7 to 8	24 to 26	33 to 34
VOCs (mg/kg)				
Acetone	ND	**0.11**	ND	ND
SVOCs (mg/kg)	NE	NE	NE	NT
Pesticides (mg/kg)	ND	ND	ND	NT
PCBs(mg/kg)	ND	ND	ND	NT
Total Metals (mg/kg)				
Cadmium	NE	**3**	NE	NT
Copper	**71**	**134**	**61.4**	NT
Lead	**1290**	**315**	NE	NT
Mercury	**0.4**	**0.54**	**0.83**	NT
Zinc	**241**	**376**	**175**	NT

Sample ID	SB16E1_2-3
Lab Sample ID	460-136157-20
Sampling Date	6/27/2017
Sample Depth (feet bgs)	2 to 3
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	**28**
1,3,5-Trimethylbenzene	**15**
2-Butanone (MEK)	**0.31**
Acetone	**15**
n-Butylbenzene	**15**
SVOCs (mg/kg)	NT
Pesticides (mg/kg)	NT
PCBs(mg/kg)	NT
Total Metals (mg/kg)	NT

Sample ID	EB20_10-11	EB20_13-14	EB20_13-14
Lab Sample ID	L1614927-30	L1614927-06	L1614927-06
Sampling Date	5/17/2016	5/17/2016	5/17/2016
Sample Depth (feet bgs)	10 to 11	13 to 14	13 to 14
VOCs (mg/kg)	NT	NE	NT
SVOCs (mg/kg)			
Benzo(a)anthracene	**1.6**	NT	ND
Benzo(a)pyrene	**1.8**	NT	ND
Benzo(b)fluoranthene	**2.3**	NT	ND
Chrysene	**1.5**	NT	ND
Indeno(1,2,3-cd)pyrene	**1.2**	NT	ND
Herbicides (mg/kg)	ND	NT	ND
Pesticides (mg/kg)	ND	NT	ND
PCBs (mg/kg)	ND	NT	ND
Total Metals (mg/kg)			
Copper	**140**	NT	NE
Lead	**91**	NT	ND
Mercury	**1**	NT	ND
Zinc	**360**	NT	NE

Sample ID	EB12_1-2	EB12_9-10	EB12_12-13	EB12_16-17
Lab Sample ID	L1615306-10	L1615304-02	L1615306-12	L1615304-03
Sampling Date	5/19/2016	5/19/2016	5/19/2016	5/19/2016
Sample Depth (feet bgs)	1 to 2	9 to 10	12 to 13	16 to 17
VOCs (mg/kg)	NE	NT	NE	NT
SVOCs (mg/kg)	NT	NE	NT	NE
Herbicides (mg/kg)	NT	ND	NT	ND
Pesticides (mg/kg)	NT	ND	NT	ND
PCBs (mg/kg)	NT	ND	NT	ND
Total Metals (mg/kg)				
Copper	NT	**190**	NT	**310**
Lead	NT	**140**	NT	**84**
Mercury	NT	**0.24**	NT	NE
Zinc	NT	**240**	NT	**260**

Sample ID	EB21_3-4	EB21_9-10	EB21_11-12	EB21_13-14
Lab Sample ID	L1615110-10	L1615110-09	L1615110-08	L1615109-04
Sampling Date	5/18/2016	5/18/2016	5/18/2016	5/18/2016
Sample Depth (feet bgs)	3 to 4	9 to 10	11 to 12	13 to 14
VOCs (mg/kg)	NE	NE	NE	NT
SVOCs (mg/kg)	NT	NE	NT	ND
Herbicides (mg/kg)	NT	ND	NT	NE
Pesticides (mg/kg)	NT	ND	NT	NE
PCBs (mg/kg)	NT	ND	NT	NE
Total Metals (mg/kg)				
Arsenic	NT	**41**	NT	NE
Barium	NT	**1000**	NT	NE
Cadmium	NT	**25**	NT	ND
Copper	NT	**16000**	NT	ND
Lead	NT	**12000**	NT	ND
Nickel	NT	**210**	NT	NE
Silver	NT	**2.4**	NT	ND
Zinc	NT	**13000**	NT	NE

Sample ID	SB09_0-2	SB09_11-12	SB09_21-23
Lab Sample ID	460-136505-1	460-136505-2	460-136505-3
Sampling Date	7/3/2017	7/3/2017	7/3/2017
Sample Depth (feet bgs)	0 to 2	11 to 12	21 to 23
VOCs (mg/kg)			
Acetone	ND	**0.18**	ND
SVOCs (mg/kg)			
Benzo(b)fluoranthene	**1.6**	NE	ND
Chrysene	**1.1**	NE	ND
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Copper	**64**	NE	NE
Lead	**140**	**89.6**	NE
Zinc	**124**	**203**	NE

Sample ID	SB14_4-6	SB14_12-13	SB14_13-14
Lab Sample ID	460-136546-10	460-136546-11	460-136546-12
Sampling Date	7/5/2017	7/5/2017	7/5/2017
Sample Depth (feet bgs)	4 to 6	12 to 13	13 to 14
VOCs (mg/kg)	ND	NE	NE
SVOCs (mg/kg)			
Benzo(a)anthracene	**1.5**	NE	ND
Benzo(a)pyrene	**1.6**	NE	NE
Benzo(b)fluoranthene	**1.9**	NE	NE
Chrysene	**1.7**	NE	NE
Dibenzo(a,h)anthracene	**0.39**	ND	ND
Indeno(1,2,3-cd)pyrene	**1.3**	ND	ND
Pesticides (mg/kg)	ND	ND	ND
PCBs(mg/kg)	ND	ND	ND
Total Metals (mg/kg)			
Barium	NE	**1040**	NE
Cadmium	NE	**17.3**	NE
Chromium, Trivalent	**52.7**	NE	NE
Copper	**249**	**5850**	NE
Lead	**297**	**778**	NE
Mercury	**0.48**	NE	ND
Nickel	NE	**319**	NE
Zinc	**403**	**9060**	NE

Analytes	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Restricted Residential SCOs
VOCs (mg/kg)		
1,2,4-Trimethylbenzene	3.6	52
1,3,5-Trimethylbenzene	8.4	~
2-Butanone (MEK)	0.12	~
Acetone	0.05	100
n-Butylbenzene	12	100
SVOCs (mg/kg)		
Benzo(a)anthracene	1	1
Benzo(a)pyrene	1	1
Benzo(b)fluoranthene	1	1
Benzo(k)fluoranthene	0.8	3.9
Chrysene	1	3.9
Dibenzo(a,h)anthracene	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.5	0.5
Pesticides (mg/kg)		
4,4'-DDE	0.0033	8.9
4,4'-DDT	0.0033	7.9
PCBs (mg/kg)		
Total PCBs	0.1	1
Total Metals (mg/kg)		
Arsenic	13	16
Barium	350	400
Cadmium	2.5	4.3
Chromium, Trivalent	30	180
Chromium, Hexavalent	1	110
Copper	50	270
Lead	63	400
Mercury	0.18	0.81
Nickel	30	310
Silver	2	180
Zinc	109	10000

LEGEND:

- SITE BOUNDARY
- SB01 — RI SOIL BORING
- SB/MW02 — RI SOIL BORING AND MONITORING WELL
- EB–5 — PREVIOUS SOIL BORING (LANGAN, JUNE 2016)
- EB/TMW–1 — PREVIOUS SOIL BORING AND TEMPORARY MONITORING WELL (LANGAN, JUNE 2016)
- SB16E1 — RI LEAD DELINEATION BORING

NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO TITLE 6 OF THE NEW YORK CODES, RULES AND REGULATIONS (NYCRR) PART 375 UNRESTRICTED USE (UU) SOIL CLEANUP OBJECTIVES (SCOs) AND RESTRICTED USE RESTRICTED-RESIDENTIAL (RRU) SCOs.
3. CONCENTRATIONS EXCEEDING UU SCOs ARE BOLDED.
4. CONCENTRATIONS EXCEEDING RRU SCOs ARE SHADED AND BOLDED.
5. BORING LOCATIONS ARE BASED ON FIELD MEASUREMENTS.
6. mg/kg = MILLIGRAMS PER KILOGRAM
7. bgs = BELOW GRADE SURFACE
8. VOCs = VOLATILE ORGANIC COMPOUNDS
9. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
10. PCBs = POLYCHLORINATED BIPHENYLS
11. NT = NOT TESTED
12. NE = NO EXCEEDANCE
13. ND= NOT DETECTED
14. RI = REMEDIAL INVESTIGATION
15. ~ = CRITERION DOES NOT EXIST

30 0 15 30
SCALE IN FEET

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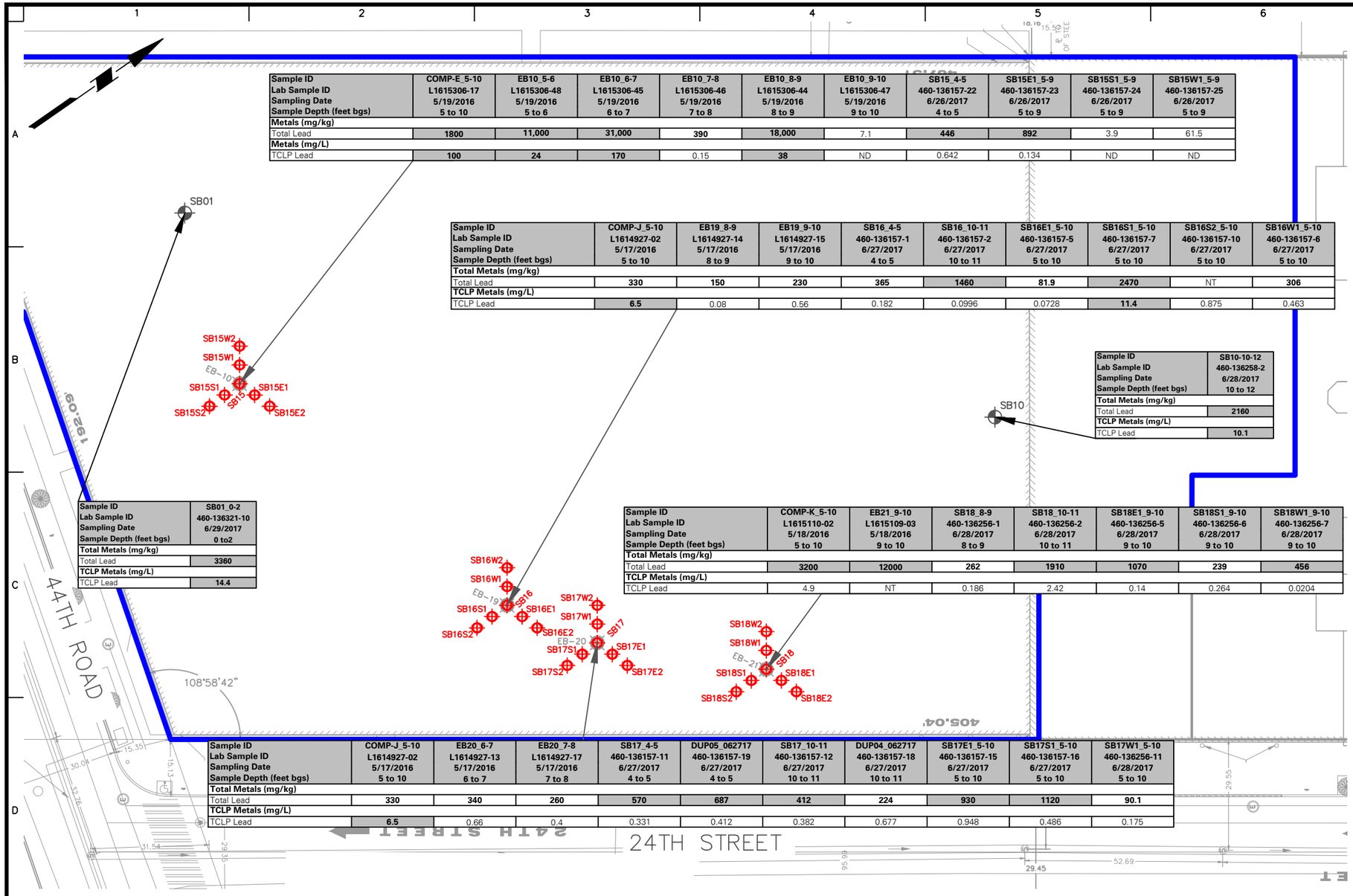
Langan CT, Inc.
Langan International LLC
Collectively known as Langan

Project: 43-02 to 43-40 24TH STREET
BLOCK No. 436, LOT No. 1
LONG ISLAND CITY NEW YORK

Figure Title: SITE WIDE SOIL SAMPLE LOCATION AND RESULTS MAP

Project No. 170362701
Figure No. 3
Date 01/10/2018
Scale 1"=30'
Drawn By KMS
Checked By RM
Submission Date
Sheet 3 of 16

LANGAN
SUBMISSION DATE: ####
PROJECT NO. ####



Sample ID	COMP-E_5-10	EB10_5-6	EB10_6-7	EB10_7-8	EB10_8-9	EB10_9-10	SB15_4-5	SB15E1_5-9	SB15S1_5-9	SB15W1_5-9
Lab Sample ID	L1615306-17	L1615306-48	L1615306-45	L1615306-46	L1615306-44	L1615306-47	460-136157-22	460-136157-23	460-136157-24	460-136157-25
Sampling Date	5/19/2016	5/19/2016	5/19/2016	5/19/2016	5/19/2016	5/19/2016	6/26/2017	6/26/2017	6/26/2017	6/26/2017
Sample Depth (feet bgs)	5 to 10	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	4 to 5	5 to 9	5 to 9	5 to 9
Metals (mg/kg)										
Total Lead	**1800**	**11,000**	**31,000**	**390**	**18,000**	7.1	**446**	**892**	3.9	61.5
Metals (mg/L)										
TCLP Lead	**100**	**24**	**170**	0.15	**38**	ND	0.642	0.134	ND	ND

Sample ID	COMP-J_5-10	EB19_8-9	EB19_9-10	SB16_4-5	SB16_10-11	SB16E1_5-10	SB16S1_5-10	SB16S2_5-10	SB16W1_5-10
Lab Sample ID	L1614927-02	L1614927-14	L1614927-15	460-136157-1	460-136157-2	460-136157-5	460-136157-7	460-136157-10	460-136157-6
Sampling Date	5/17/2016	5/17/2016	5/17/2016	6/27/2017	6/27/2017	6/27/2017	6/27/2017	6/27/2017	6/27/2017
Sample Depth (feet bgs)	5 to 10	8 to 9	9 to 10	4 to 5	10 to 11	5 to 10	5 to 10	5 to 10	5 to 10
Total Metals (mg/kg)									
Total Lead	**330**	**150**	**230**	**365**	**1460**	**81.9**	**2470**	NT	**306**
TCLP Metals (mg/L)									
TCLP Lead	**6.5**	0.08	0.56	0.182	0.0996	0.0728	**11.4**	0.875	0.463

Sample ID	SB10-10-12
Lab Sample ID	460-136258-2
Sampling Date	6/28/2017
Sample Depth (feet bgs)	10 to 12
Total Metals (mg/kg)	
Total Lead	**2160**
TCLP Metals (mg/L)	
TCLP Lead	**10.1**

Sample ID	SB01_0-2
Lab Sample ID	460-136321-10
Sampling Date	6/29/2017
Sample Depth (feet bgs)	0 to2
Total Metals (mg/kg)	
Total Lead	**3360**
TCLP Metals (mg/L)	
TCLP Lead	**14.4**

Sample ID	COMP-K_5-10	EB21_9-10	SB18_8-9	SB18_10-11	SB18E1_9-10	SB18S1_9-10	SB18W1_9-10
Lab Sample ID	L1615110-02	L1615109-03	460-136256-1	460-136256-2	460-136256-5	460-136256-6	460-136256-7
Sampling Date	5/18/2016	5/18/2016	6/28/2017	6/28/2017	6/28/2017	6/28/2017	6/28/2017
Sample Depth (feet bgs)	5 to 10	9 to 10	8 to 9	10 to 11	9 to 10	9 to 10	9 to 10
Total Metals (mg/kg)							
Total Lead	**3200**	**12000**	**262**	**1910**	**1070**	**239**	**456**
TCLP Metals (mg/L)							
TCLP Lead	4.9	NT	0.186	2.42	0.14	0.264	0.0204

Sample ID	COMP-J_5-10	EB20_6-7	EB20_7-8	SB17_4-5	DUP05_062717	SB17_10-11	DUP04_062717	SB17E1_5-10	SB17S1_5-10	SB17W1_5-10
Lab Sample ID	L1614927-02	L1614927-13	L1614927-17	460-136157-11	460-136157-19	460-136157-12	460-136157-18	460-136157-15	460-136157-16	460-136256-11
Sampling Date	5/17/2016	5/17/2016	5/17/2016	6/27/2017	6/27/2017	6/27/2017	6/27/2017	6/27/2017	6/27/2017	6/28/2017
Sample Depth (feet bgs)	5 to 10	6 to 7	7 to 8	4 to 5	4 to 5	10 to 11	10 to 11	5 to 10	5 to 10	5 to 10
Total Metals (mg/kg)										
Total Lead	**330**	**340**	**260**	**570**	**687**	**412**	**224**	**930**	**1120**	**90.1**
TCLP Metals (mg/L)										
TCLP Lead	**6.5**	0.66	0.4	0.331	0.412	0.382	0.677	0.948	0.486	0.175

LEGEND:

- SITE BOUNDARY
- SB01 — RI SOIL BORING
- SB16 — RI LEAD DELINEATION BORING
- EB–20 — PREVIOUS SOIL BORING (LANGAN, JUNE 2016)

GENERAL NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. SOIL SAMPLE RESULTS ARE COMPARED TO TITLE 6 OF THE NEW YORK CODES, RULES AND REGULATIONS (NYCRR) PART 375 UNRESTRICTED (UU) SOIL CLEANUP OBJECTIVES (SCOs) AND RESTRICTED USE RESTRICTED-RESIDENTIAL (RRU) SCOs AND TABLE 1 OF 40 CFR 61.24 - MAXIMUM CONCENTRATION OF CONTAMINANTS FOR TOXICITY CHARACTERISTICS.
3. RESULTS EXCEEDING UU SCOs ARE BOLDED.
4. RESULTS EXCEEDING RRU SCOs OR THE MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC ARE SHADED AND BOLD.
5. BORING LOCATIONS ARE ARE BASED ON FIELD MEASUREMENTS.
6. mg/kg = MILLIGRAMS PER KILOGRAM
7. mg/L = MILLIGRAMS PER LITER
8. bgs = BELOW GRADE SURFACE
9. SCO = SOIL CLEANUP OBJECTIVE
10. TCLP = TOXICITY CHARACTERISTIC LEACHING PROCEDURE
11. NT= NOT TESTED
12. ND = NOT DETECTED
13. RI = REMEDIAL INVESTIGATION

Analytes	Maximum Concentrations of Contaminants for the Toxicity Characteristic	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Restricted Residential SCOs
Total Metals (mg/kg)			
Total Lead	~	63	400
TCLP Metals (mg/l)			
TCLP Lead	5	~	~

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Langan International LLC
Collectively known as Langan

Project
43-02 to 43-40 24TH STREET
BLOCK No. 436, LOT No. 1
LONG ISLAND CITY NEW YORK

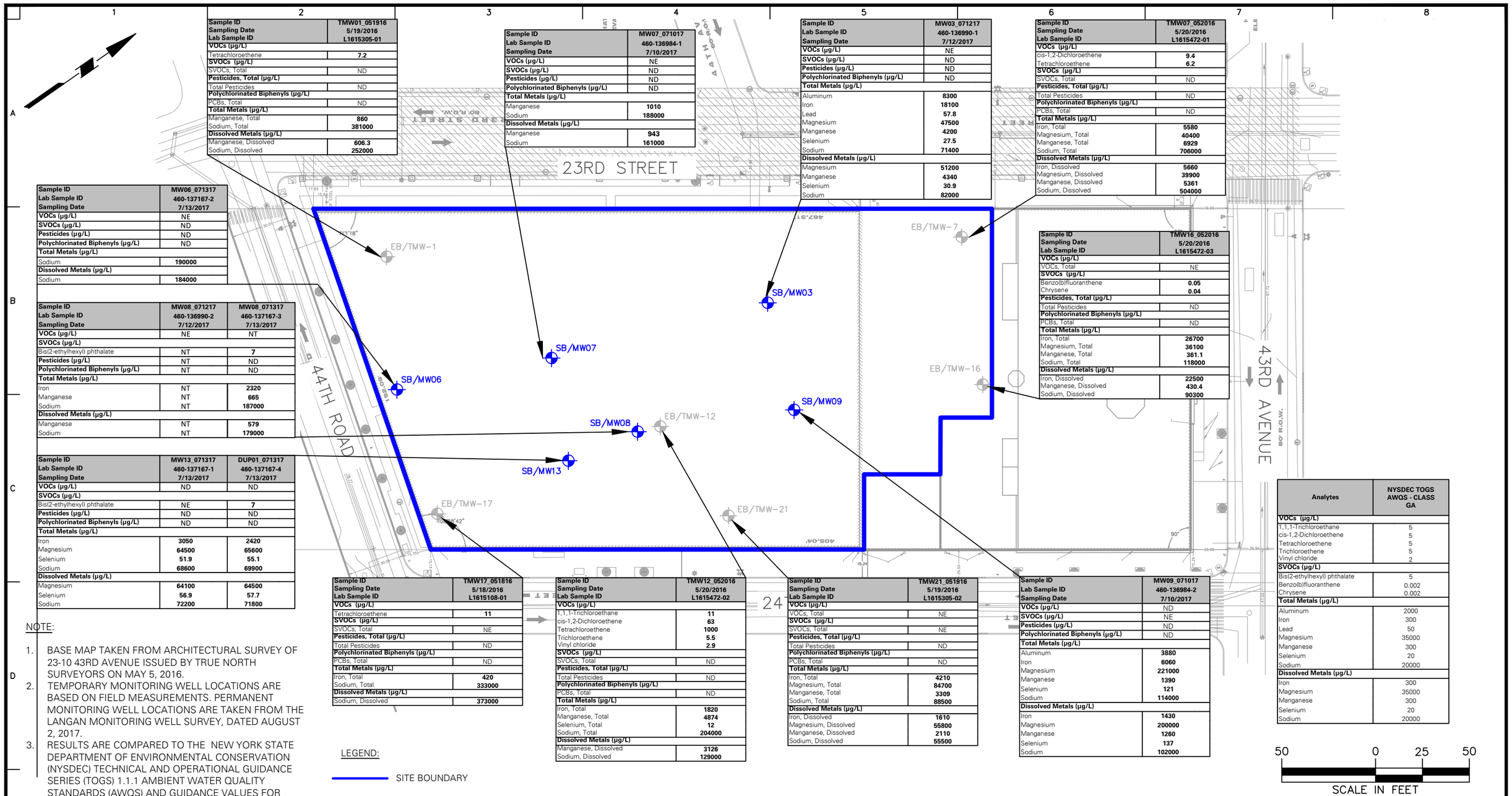
Figure Title
LEAD DELINEATION SOIL SAMPLE LOCATION AND RESULTS MAP

Project No. 170362701
Date 01/10/2017
Scale 1"=30'
Drawn By JFY | Checked By KS
Submission Date

Figure No. 4

Sheet 4 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 4 - Lead Delination Soil Sample location and Results Map.dwg Date: 2/27/2019 Time: 15:28 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



Sample ID	TMW01_051916
Sampling Date	5/19/2016
Lab Sample ID	L1615305-01
VOCs (µg/L)	
Tetrachloroethene	**7.2**
SVOCs (µg/L)	
SVOCs, Total	ND
Pesticides, Total (µg/L)	
Total Pesticides	ND
Polychlorinated Biphenyls (µg/L)	
PCBs, Total	ND
Total Metals (µg/L)	
Manganese, Total	**860**
Sodium, Total	**381000**
Dissolved Metals (µg/L)	
Manganese, Dissolved	**606.3**
Sodium, Dissolved	**252000**

Sample ID	MW07_071017
Lab Sample ID	460-136984-1
Sampling Date	7/10/2017
VOCs (µg/L)	NE
SVOCs (µg/L)	ND
Pesticides (µg/L)	ND
Polychlorinated Biphenyls (µg/L)	ND
Total Metals (µg/L)	
Manganese	**1010**
Sodium	**188000**
Dissolved Metals (µg/L)	
Manganese	**943**
Sodium	**161000**

Sample ID	MW03_071217
Lab Sample ID	460-136990-1
Sampling Date	7/12/2017
VOCs (µg/L)	NE
SVOCs (µg/L)	ND
Pesticides (µg/L)	ND
Polychlorinated Biphenyls (µg/L)	ND
Total Metals (µg/L)	
Aluminum	**8300**
Iron	**18100**
Lead	**57.8**
Magnesium	**47500**
Manganese	**4200**
Selenium	**27.5**
Sodium	**71400**
Dissolved Metals (µg/L)	
Magnesium	**51200**
Manganese	**4340**
Selenium	**30.9**
Sodium	**82000**

Sample ID	TMW07_052016
Sampling Date	5/20/2016
Lab Sample ID	L1615472-01
VOCs (µg/L)	
cis-1,2-Dichloroethene	**9.4**
Tetrachloroethene	**6.2**
SVOCs (µg/L)	
SVOCs, Total	ND
Pesticides, Total (µg/L)	
Total Pesticides	ND
Polychlorinated Biphenyls (µg/L)	
PCBs, Total	ND
Total Metals (µg/L)	
Iron, Total	**5580**
Magnesium, Total	**40400**
Manganese, Total	**6929**
Sodium, Total	**706000**
Dissolved Metals (µg/L)	
Iron, Dissolved	**5660**
Magnesium, Dissolved	**39900**
Manganese, Dissolved	**5361**
Sodium, Dissolved	**504000**

Sample ID	MW06_071317
Lab Sample ID	460-137167-2
Sampling Date	7/13/2017
VOCs (µg/L)	NE
SVOCs (µg/L)	ND
Pesticides (µg/L)	ND
Polychlorinated Biphenyls (µg/L)	ND
Total Metals (µg/L)	
Sodium	**190000**
Dissolved Metals (µg/L)	
Sodium	**184000**

Sample ID	MW08_071217	MW08_071317
Lab Sample ID	460-136990-2	460-137167-3
Sampling Date	7/12/2017	7/13/2017
VOCs (µg/L)	NE	NT
SVOCs (µg/L)		
Bis(2-ethylhexyl) phthalate	NT	**7**
Pesticides (µg/L)	NT	ND
Polychlorinated Biphenyls (µg/L)	NT	ND
Total Metals (µg/L)		
Iron	NT	**2320**
Manganese	NT	**665**
Sodium	NT	**187000**
Dissolved Metals (µg/L)		
Manganese	NT	**579**
Sodium	NT	**179000**

Sample ID	MW13_071317	DUP01_071317
Lab Sample ID	460-137167-1	460-137167-4
Sampling Date	7/13/2017	7/13/2017
VOCs (µg/L)	ND	ND
SVOCs (µg/L)		
Bis(2-ethylhexyl) phthalate	NE	**7**
Pesticides (µg/L)	ND	ND
Polychlorinated Biphenyls (µg/L)	ND	ND
Total Metals (µg/L)		
Iron	**3050**	**2420**
Magnesium	**64500**	**65600**
Selenium	**51.9**	**55.1**
Sodium	**68600**	**69900**
Dissolved Metals (µg/L)		
Magnesium	**64100**	**64500**
Selenium	**56.9**	**57.7**
Sodium	**72200**	**71800**

Sample ID	TMW16_052016
Sampling Date	5/20/2016
Lab Sample ID	L1615472-03
VOCs (µg/L)	
VOCs, Total	NE
SVOCs (µg/L)	
Benzo(b)fluoranthene	**0.05**
Chrysene	**0.04**
Pesticides, Total (µg/L)	
Total Pesticides	ND
Polychlorinated Biphenyls (µg/L)	
PCBs, Total	ND
Total Metals (µg/L)	
Iron, Total	**26700**
Magnesium, Total	**36100**
Manganese, Total	**361.1**
Sodium, Total	**118000**
Dissolved Metals (µg/L)	
Iron, Dissolved	**22500**
Manganese, Dissolved	**430.4**
Sodium, Dissolved	**90300**

Sample ID	TMW17_051816
Sampling Date	5/18/2016
Lab Sample ID	L1615108-01
VOCs (µg/L)	
Tetrachloroethene	**11**
SVOCs (µg/L)	
SVOCs, Total	NE
Pesticides, Total (µg/L)	
Total Pesticides	ND
Polychlorinated Biphenyls (µg/L)	
PCBs, Total	ND
Total Metals (µg/L)	
Iron, Total	**420**
Sodium, Total	**333000**
Dissolved Metals (µg/L)	
Sodium, Dissolved	**373000**

Sample ID	TMW12_052016
Sampling Date	5/20/2016
Lab Sample ID	L1615472-02
VOCs (µg/L)	
1,1,1-Trichloroethane	**11**
cis-1,2-Dichloroethene	**63**
Tetrachloroethene	**1000**
Trichloroethene	**5.5**
Vinyl chloride	**2.9**
SVOCs (µg/L)	
SVOCs, Total	ND
Pesticides, Total (µg/L)	
Total Pesticides	ND
Polychlorinated Biphenyls (µg/L)	
PCBs, Total	ND
Total Metals (µg/L)	
Iron, Total	**1820**
Manganese, Total	**4874**
Selenium, Total	**12**
Sodium, Total	**204000**
Dissolved Metals (µg/L)	
Manganese, Dissolved	**3126**
Sodium, Dissolved	**129000**

Sample ID	TMW21_051916
Sampling Date	5/19/2016
Lab Sample ID	L1615305-02
VOCs (µg/L)	
VOCs, Total	NE
SVOCs (µg/L)	
SVOCs, Total	NE
Pesticides, Total (µg/L)	
Total Pesticides	ND
Polychlorinated Biphenyls (µg/L)	
PCBs, Total	ND
Total Metals (µg/L)	
Iron, Total	**4210**
Magnesium, Total	**84700**
Manganese, Total	**3309**
Sodium, Total	**88500**
Dissolved Metals (µg/L)	
Iron, Dissolved	**1610**
Magnesium, Dissolved	**55800**
Manganese, Dissolved	**2110**
Sodium, Dissolved	**55500**

Sample ID	MW09_071017
Lab Sample ID	460-136984-2
Sampling Date	7/10/2017
VOCs (µg/L)	ND
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Polychlorinated Biphenyls (µg/L)	ND
Total Metals (µg/L)	
Aluminum	**3880**
Iron	**6060**
Magnesium	**221000**
Manganese	**1390**
Selenium	**121**
Sodium	**114000**
Dissolved Metals (µg/L)	
Iron	**1430**
Magnesium	**200000**
Manganese	**1260**
Selenium	**137**
Sodium	**102000**

Analytes	NYSDEC TOGS AWQS - CLASS GA
VOCs (µg/L)	
1,1,1-Trichloroethane	5
cis-1,2-Dichloroethene	5
Tetrachloroethene	5
Trichloroethene	5
Vinyl chloride	2
SVOCs (µg/L)	
Bis(2-ethylhexyl) phthalate	5
Benzo(b)fluoranthene	0.002
Chrysene	0.002
Total Metals (µg/L)	
Aluminum	2000
Iron	300
Lead	50
Magnesium	35000
Manganese	300
Selenium	20
Sodium	20000
Dissolved Metals (µg/L)	
Iron	300
Magnesium	35000
Manganese	300
Selenium	20
Sodium	20000

NOTE:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. TEMPORARY MONITORING WELL LOCATIONS ARE BASED ON FIELD MEASUREMENTS. PERMANENT MONITORING WELL LOCATIONS ARE TAKEN FROM THE LANGAN MONITORING WELL SURVEY, DATED AUGUST 2, 2017.
3. RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS (AWQS) AND GUIDANCE VALUES FOR CLASS GA GROUNDWATER
4. VALUES THAT EXCEED THEIR RESPECTIVE NYSDEC TOGS AWQS ARE SHOWN IN BOLD
5. µg/L = MICROGRAMS PER LITER
6. VOCs = VOLATILE ORGANIC COMPOUND
7. SVOCs = SEMIVOLATILE ORGANIC COMPOUND
8. NE = RESULT DOES NOT EXCEED THE TOGS AWQS
9. ND= NOT DETECTED
10. NT = NOT TESTED
11. RI = REMEDIAL INVESTIGATION

LEGEND:

SITE BOUNDARY

SB/MW02 — RI SOIL BORING AND PERMANENT MONITORING WELL LOCATION

EB/TMW-1 — PREVIOUS SOIL BORING AND TEMPORARY MONITORING WELL LOCATION (LANGAN, JUNE 2016)

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SCALE IN FEET

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Langan International LLC
Collectively known as Langan

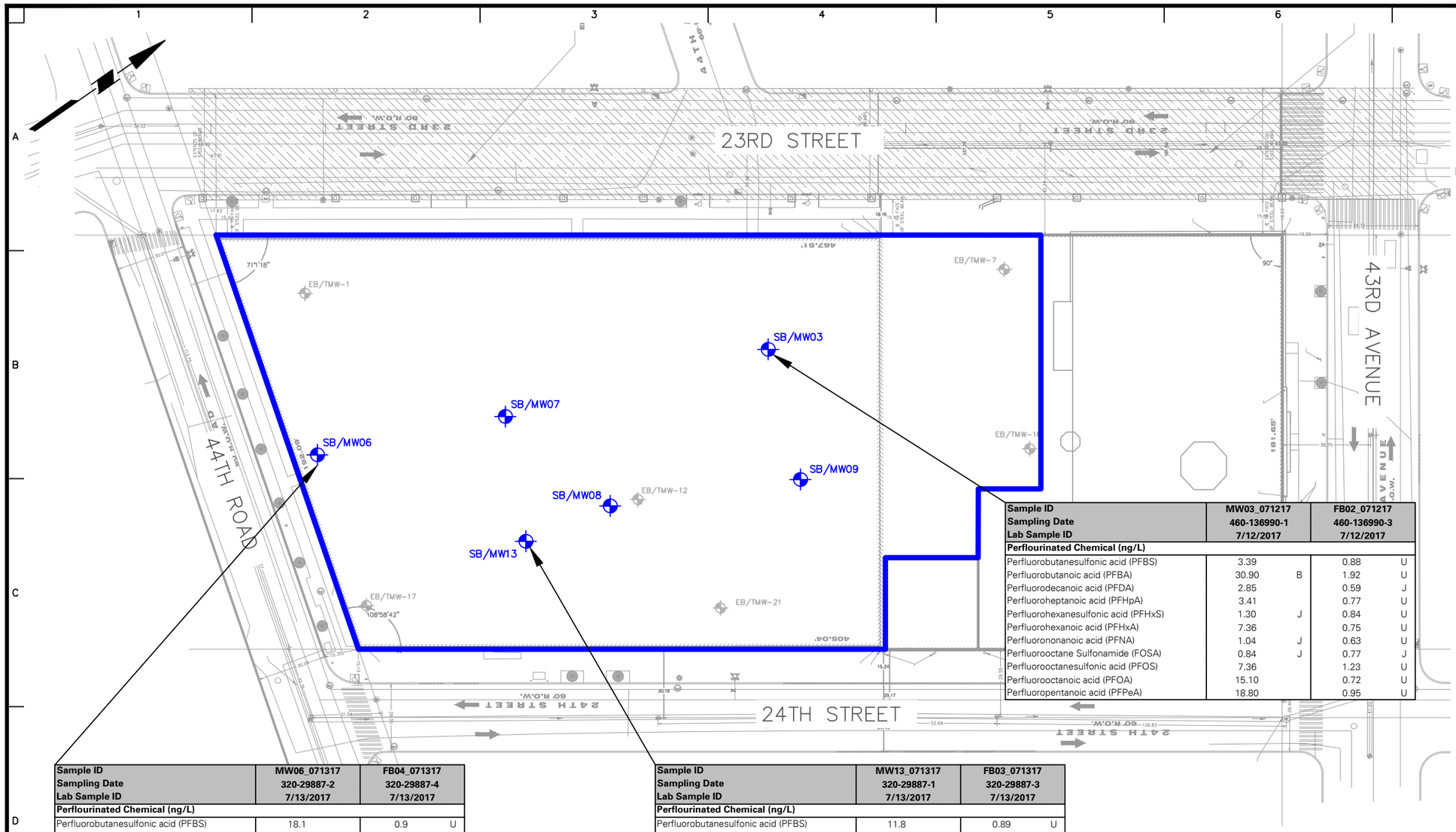
Project
43-02 to 43-40 24TH STREET
BLOCK No. 436, LOT No. 1
LONG ISLAND CITY **NEW YORK**

Figure Title
GROUNDWATER SAMPLE LOCATION AND RESULTS MAP

Project No. 170362701
Date 01/10/2018
Scale 1"=50'
Drawn By JFY | Checked By KS
Submission Date

Figure No. 5
Sheet 5 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 5 - Groundwater Sample Location and Results Map.dwg Date: 2/27/2019 Time: 15:25 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- SITE BOUNDARY
- SB/MW02 — RI SOIL BORING AND PERMANENT MONITORING WELL
- EB/TMW-1 — PREVIOUS SOIL BORING AND TEMPORARY MONITORING WELL (LANGAN, JUNE 2016)

NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. TEMPORARY MONITORING WELL LOCATIONS ARE BASED ON FIELD MEASUREMENTS. PERMANENT MONITORING WELL LOCATIONS ARE TAKEN FROM THE LANGAN MONITORING WELL SURVEY, DATED AUGUST 2, 2017.
3. ONLY DETECTED COMPOUNDS ARE SHOWN.
4. NO REGULATORY CRITERIA EXIST FOR PFCS.
5. ng/L = NANOGRAMS PER LITER
6. J = THE RESULT IS AN ESTIMATE
7. U = THE ANALYTE WAS ANALYZED FOR BUT WAS NOT DETECTED AT A LEVEL AT OR ABOVE THE REPORTING LIMIT.
8. PFCs = PERFLUORINATED CHEMICALS
9. RI = REMEDIAL INVESTIGATION

Sample ID	MW03_071217		FB02_071217	
Sampling Date	460-136990-1		460-136990-3	
Lab Sample ID	7/12/2017		7/12/2017	
Perflourinated Chemical (ng/L)				
Perfluorobutanesulfonic acid (PFBS)	3.39		0.88	U
Perfluorobutanoic acid (PFBA)	30.90	B	1.92	U
Perfluorodecanoic acid (PFDA)	2.85		0.59	J
Perfluoroheptanoic acid (PFHpA)	3.41		0.77	U
Perfluorohexanesulfonic acid (PFHxS)	1.30	J	0.84	U
Perfluorohexanoic acid (PFHxA)	7.36		0.75	U
Perfluorononanoic acid (PFNA)	1.04	J	0.63	U
Perfluorooctane Sulfonamide (FOSA)	0.84	J	0.77	J
Perfluorooctanesulfonic acid (PFOS)	7.36		1.23	U
Perfluorooctanoic acid (PFOA)	15.10		0.72	U
Perfluoropentanoic acid (PFPeA)	18.80		0.95	U

Sample ID	MW06_071317		FB04_071317	
Sampling Date	320-29887-2		320-29887-4	
Lab Sample ID	7/13/2017		7/13/2017	
Perflourinated Chemical (ng/L)				
Perfluorobutanesulfonic acid (PFBS)	18.1		0.9	U
Perfluorobutanoic acid (PFBA)	16.4	B	1.95	U
Perfluoroheptanoic acid (PFHpA)	17.8		0.78	U
Perfluorohexanesulfonic acid (PFHxS)	2.71		0.85	U
Perfluorohexanoic acid (PFHxA)	25.1		0.77	U
Perfluorononanoic acid (PFNA)	3.91		0.64	U
Perfluorooctanesulfonic acid (PFOS)	17.2		1.25	U
Perfluorooctanoic acid (PFOA)	56.5		0.73	U
Perfluoropentanoic acid (PFPeA)	25.7		0.97	U

Sample ID	MW13_071317		FB03_071317	
Sampling Date	320-29887-1		320-29887-3	
Lab Sample ID	7/13/2017		7/13/2017	
Perflourinated Chemical (ng/L)				
Perfluorobutanesulfonic acid (PFBS)	11.8		0.89	U
Perfluorobutanoic acid (PFBA)	16.2	J	1.93	U
Perfluoroheptanoic acid (PFHpA)	13.2		0.77	U
Perfluorohexanesulfonic acid (PFHxS)	5.22		0.84	U
Perfluorohexanoic acid (PFHxA)	13.4		0.76	U
Perfluorooctane Sulfonamide (FOSA)	1.96	J	38.6	U
Perfluorooctanesulfonic acid (PFOS)	1.9		1.23	U
Perfluorooctanoic acid (PFOA)	37.9		0.72	U
Perfluoropentanoic acid (PFPeA)	17		0.96	U

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Collectively known as Langan

Project

43-02 to 43-40 24TH STREET

BLOCK No. 436, LOT No. 1

LONG ISLAND CITY **NEW YORK**

Figure Title

GROUNDWATER SAMPLE LOCATION AND RESULTS MAP - PFCS

Project No. 170362701	Figure No. 6
Date 01/10/2018	
Scale 1"=50'	
Drawn By JFY / Checked By KS	
Submission Date	Sheet 6 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 6 - PFC_Groundwater Sample Location and Results Map.dwg Date: 2/27/2019 Time: 15:24 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL

SAMPLE ID	SSV01_051616
SAMPLING DATE	5/16/2016
LAB SAMPLE ID	L1614773-01
Volatile Organic Compounds (µg/m³)	
1,2,4-Trimethylbenzene	157
1,3,5-Trimethylbenzene	48.8
2-Butanone	30.1
4-Ethyltoluene	78.2
Acetone	82.7
Benzene	249
Cyclohexane	236
Ethylbenzene	621
Heptane	688
n-Hexane	712
o-Xylene	652
p/m-Xylene	2120
Toluene	3380
1,1,1-Trichloroethane	4.31
Tetrachloroethene	3.46

SAMPLE ID	IA01_051616
SAMPLING DATE	5/16/2016
LAB SAMPLE ID	L1614773-06
Volatile Organic Compounds (µg/m³)	
Acetone	16.1
Chloromethane	1.22
Dichlorodifluoromethane	2.22
Ethyl Alcohol	46.2
iso-Propyl Alcohol	1.56
n-Hexane	3.15
o-Xylene	1.11
p/m-Xylene	3
Toluene	1.91
Trichlorofluoromethane	1.28
Carbon tetrachloride	0.421
Tetrachloroethene	0.156

SAMPLE ID	SSV02_051616
SAMPLING DATE	5/16/2016
LAB SAMPLE ID	L1614773-02
Volatile Organic Compounds (µg/m³)	
1,2,4-Trimethylbenzene	155
1,3,5-Trimethylbenzene	50.1
2-Butanone	12.7
4-Ethyltoluene	75.2
Acetone	162
Benzene	69
Carbon disulfide	2.95
Cyclohexane	37.9
Ethyl Alcohol	45
Ethylbenzene	256
Heptane	157
iso-Propyl Alcohol	6.91
n-Hexane	163
o-Xylene	334
p/m-Xylene	1120
Toluene	1130

Sample ID	SV02_063017	
Lab Sample ID	200-39191-1	
Sampling Date	6/30/2017	
Volatile Organic Compounds (µg/m³)		
1,2,4-Trimethylbenzene	12	J
1,3-Butadiene	9.6	J
Acetone	1900	
Benzene	6.5	J
Carbon disulfide	29	J
Ethylbenzene	7.5	J
Freon 22	23	J
Isopropyl alcohol	110	J
m,p-Xylene	24	J
Methyl Butyl Ketone (2-Hexanone)	40	J
Methyl Ethyl Ketone	420	
Methylene Chloride	13	J
n-Butane	45	
n-Heptane	16	J
n-Hexane	17	J
Styrene	5.4	J
Tetrachloroethene	4.7	J
Toluene	26	
Trichloroethene	31	
Trichlorofluoromethane	87	
Xylene (total)	34	J
o-Xylene	10	J

SAMPLE ID	SSV03_051616
SAMPLING DATE	5/16/2016
LAB SAMPLE ID	L1614773-03
Volatile Organic Compounds (µg/m³)	
1,2,4-Trimethylbenzene	1400
1,3,5-Trimethylbenzene	332
2-Butanone	33.9
4-Ethyltoluene	389
Acetone	356
Benzene	195
Carbon disulfide	9
Cyclohexane	160
Ethylbenzene	851
Heptane	529
iso-Propyl Alcohol	14
n-Hexane	508
o-Xylene	1300
p/m-Xylene	4000
Toluene	3460
1,1,1-Trichloroethane	1.8
Tetrachloroethene	15.1

SAMPLE ID	SSV04_051616
SAMPLING DATE	5/16/2016
LAB SAMPLE ID	L1614773-04
Volatile Organic Compounds (µg/m³)	
1,2,4-Trimethylbenzene	190
1,3,5-Trimethylbenzene	56
1,4-Dioxane	4.36
2-Butanone	28.5
2-Hexanone	7.66
4-Ethyltoluene	90
4-Methyl-2-pentanone	10
Acetone	679
Benzene	41.5
Carbon disulfide	7.38
Cyclohexane	16.6
Ethyl Alcohol	44.7
Ethylbenzene	273
Heptane	96.7
iso-Propyl Alcohol	90.7
n-Hexane	78.6
o-Xylene	383
p/m-Xylene	1300
tert-Butyl Alcohol	10.7
Toluene	837
Trichlorofluoromethane	3.09

Sample ID	SV01_063017		DUP01_063017	
Lab Sample ID	200-39191-2		200-39191-3	
Sampling Date	6/30/2017		6/30/2017	
Volatile Organic Compounds (µg/m³)				
1,2,4-Trimethylbenzene	13	J	14	J
1,3-Butadiene	19		22	
1,3-Dichlorobenzene	12	J	11	J
Acetone	1900		1900	
Benzene	5.2	J	5.3	J
Cyclohexane	9.4	J	8.5	J
Ethylbenzene	8.5	J	9	J
Freon 22	340		320	
Isopropyl alcohol	250	J	250	J
m,p-Xylene	28	J	31	J
Methyl Ethyl Ketone	250		480	
Methylene Chloride	13	J	13	J
n-Butane	150		160	
n-Heptane	13	J	13	J
n-Hexane	28		27	
Toluene	39		39	
Xylene (total)	39	J	42	J
o-Xylene	11	J	11	J

SAMPLE ID	SSV06_051616
SAMPLING DATE	5/16/2016
LAB SAMPLE ID	L1614773-05
Volatile Organic Compounds (µg/m³)	
1,2,4-Trimethylbenzene	143
1,3,5-Trimethylbenzene	37.1
2-Butanone	20.3
4-Ethyltoluene	65.4
4-Methyl-2-pentanone	14.9
Acetone	232
Benzene	116
Carbon disulfide	23.8
Cyclohexane	130
Ethyl Alcohol	72.7
Ethylbenzene	465
Heptane	299
iso-Propyl Alcohol	6.49
n-Hexane	321
o-Xylene	452
p/m-Xylene	1650
tert-Butyl Alcohol	5.64
Toluene	1550

SAMPLE ID	SSV07_051616
SAMPLING DATE	5/16/2016
LAB SAMPLE ID	L1614773-07
Volatile Organic Compounds (µg/m³)	
1,2,4-Trimethylbenzene	703
1,3,5-Trimethylbenzene	141
2-Butanone	12.4
4-Ethyltoluene	187
Acetone	141
Benzene	107
Carbon disulfide	4.73
Cyclohexane	90.2
Ethyl Alcohol	46.7
Ethylbenzene	415
Heptane	295
iso-Propyl Alcohol	9.05
n-Hexane	297
o-Xylene	595
p/m-Xylene	1840
Toluene	1740

Sample ID	AA01_063017	
Lab Sample ID	200-39191-4	
Sampling Date	6/30/2017	
Volatile Organic Compounds (µg/m³)		
2,2,4-Trimethylpentane	0.7	J
Acetone	9.5	J
Benzene	0.43	J
Carbon tetrachloride	0.31	
Chloroform	0.13	J
Chloromethane	0.89	J
Cyclohexane	0.26	J
Dichlorodifluoromethane	1.7	J
Ethylbenzene	0.28	J
Freon 22	1.2	J
Freon TF	0.36	J
m,p-Xylene	0.86	J
Methyl Ethyl Ketone	1.3	J
methyl isobutyl ketone	0.36	J
Methylene Chloride	1	J
n-Butane	2.4	
n-Heptane	0.39	J
n-Hexane	0.78	
Tetrachloroethene	0.24	J
Toluene	1.8	
Trichlorofluoromethane	0.89	J
Xylene (total)	1.2	J
o-Xylene	0.29	J

SSV-1
SSV-2
SSV-3
SSV-4
SSV-6
SSV-7
IA_01
SV01
SV02
AA01
23R
44TH ROAD
24TH STREET
43RD AVENUE
44TH AVENUE
HATCHET ELEVATED I
80' R.O.W.

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LEGEND:

- SITE BOUNDARY
- SV01 — RI SOIL VAPOR PROBE
- AA01 — RI AMBIENT AIR SAMPLE
- SSV-6 — PREVIOUS SOIL VAPOR PROBE AND INDOOR AIR AND AMBIENT AIR SAMPLES (LANGAN, JUNE 2016)

NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. BORING LOCATIONS ARE BASED ON FIELD MEASUREMENTS.
3. ONLY DETECTED COMPOUNDS ARE SHOWN.
4. µg/m^3 = MICROGRAMS PER METER CUBED
5. J = THE RESULT IS AN ESTIMATE
6. RI = REMEDIAL INVESTIGATION

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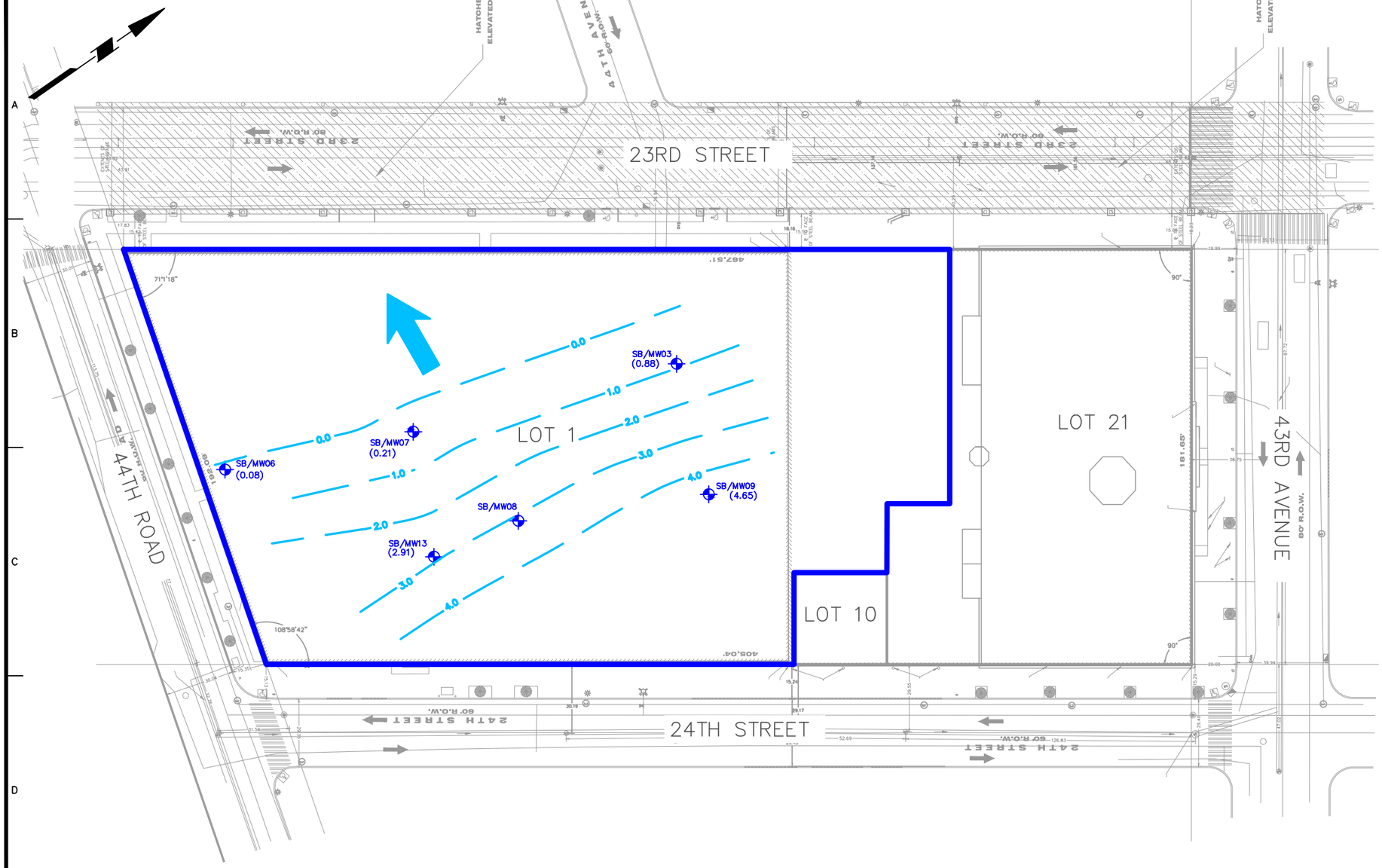
Figure Title
SOIL VAPOR SAMPLE LOCATION AND RESULTS MAP

Project No.	Figure No.
170362701	7
Date: 01/10/2018	
Scale: 1"=50'	
Drawn By: JFY / Checked By: KS	
Submission Date	Sheet 7 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 7 - Soil Vapor Sample Location and Results Map.dwg Date: 2/27/2019 Time: 15:23 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- APPROXIMATE SITE BOUNDARY
- SB/MW03 (0.88) — SOIL BORING AND MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- 1.0 — GROUNDWATER COUNTER WITH ELEVATION
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. WELL LOCATIONS AND TOP OF CASING ELEVATIONS ARE TAKEN FROM THE LANGAN MONITORING WELL SURVEY, DATED AUGUST 2, 2017.
3. ELEVATION REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. ELEVATIONS WERE CALCULATED AS THE DIFFERENCE BETWEEN SURVEYED TOP OF CASING ELEVATIONS AND FIELD DEPTH-TO-GROUNDWATER MEASUREMENTS.
5. SYNOPTIC GROUNDWATER MEASUREMENTS WERE TAKEN BY LANGAN ON JULY 26, 2017.
6. THE ELEVATION FROM THE REMEDIAL INVESTIGATION GROUNDWATER WELL MW08 WAS NOT USED TO DETERMINE GROUNDWATER CONTOURS.

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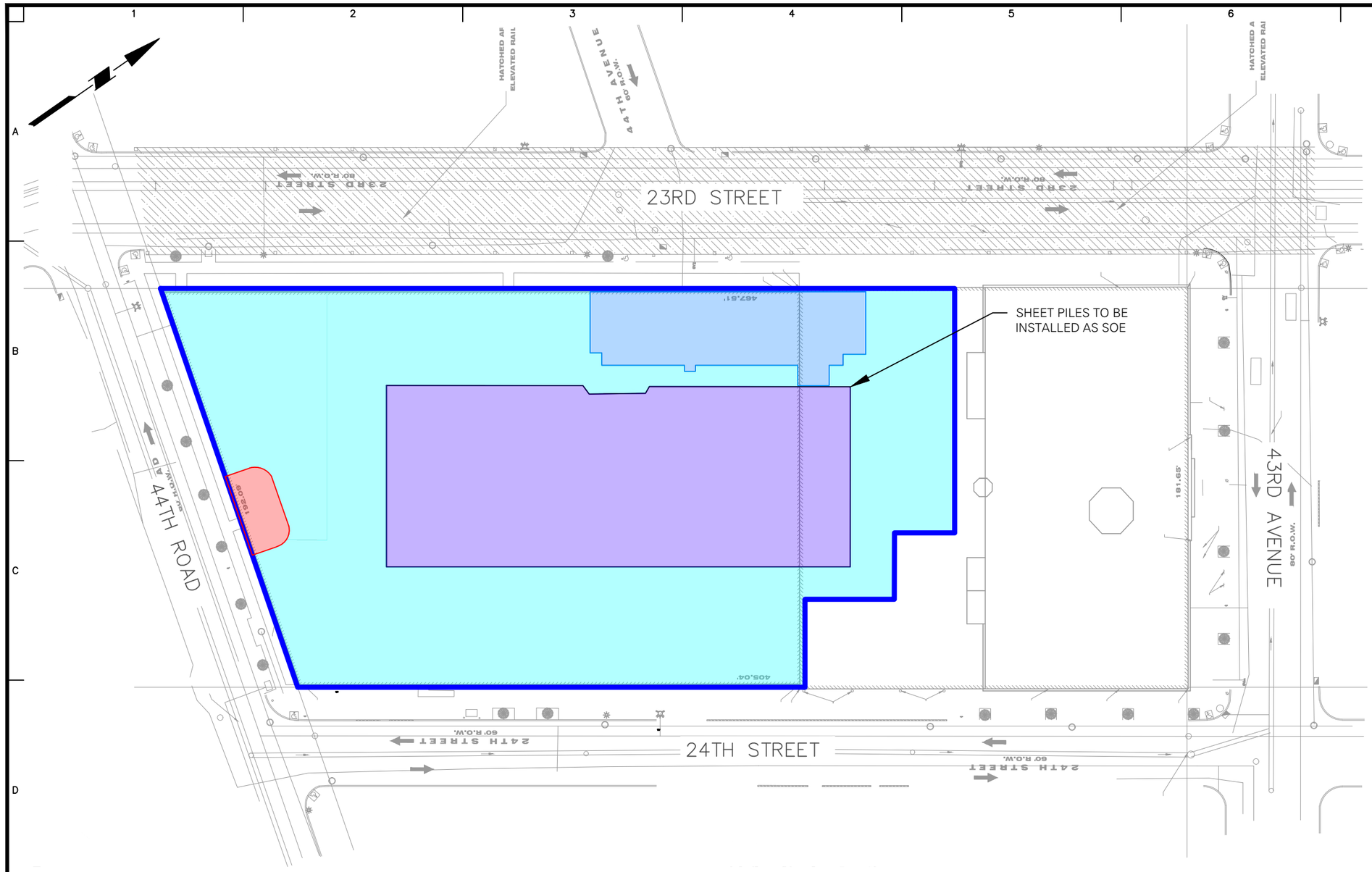
Figure Title
GROUNDWATER ELEVATION CONTOUR MAP

Project No. 170362701	Figure No. 8
Date 01/10/2018	
Scale 1"=50'	
Drawn By JFY / Checked By KS	
Submission Date	Sheet 8 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 8 - GW contour map.dwg Date: 2/27/2019 Time: 15:22 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- SITE BOUNDARY AND SITE PERIMETER SOLIDER PILE AND LAGGING SOE
- DEVELOPMENT DEPTH EXCAVATION TO ABOUT 12 FEET BGS
- DEVELOPMENT DEPTH EXCAVATION TO ABOUT 14 FEET BGS
- DEVELOPMENT DEPTH EXCAVATION TO ABOUT 17 FEET BGS
- DEVELOPMENT DEPTH EXCAVATION TO ABOUT 22 FEET BGS

NOTE:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. DEPTH AND DIMENSION OF DEVELOPMENT EXCAVATION AREAS ARE REFERENCED FROM "SUPPORT OF EXCAVATION PLAN, DRAWING SOE-102.00" BY GOLDSTEIN, HILL & WEST ARCHITECTS, LLP, DATED NOVEMBER 23, 2016
3. BGS = BELOW GROUND SURFACE
4. SOE = SUPPORT OF EXCAVATION

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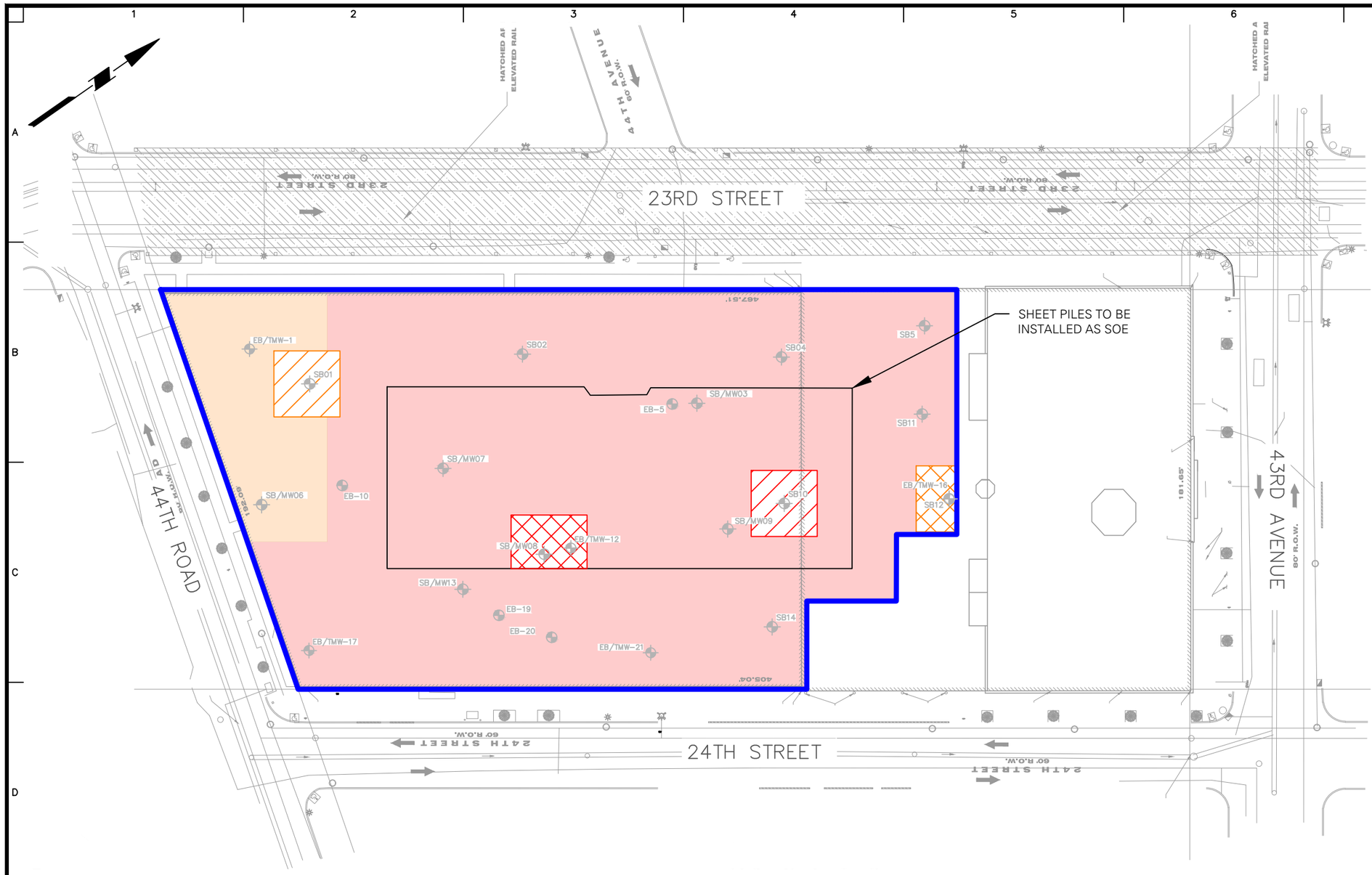
Project	43-02 to 43-40 24TH STREET BLOCK No. 436, LOT No. 1 LONG ISLAND CITY NEW YORK
Figure Title	DEVELOPMENT DEPTH EXCAVATION MAP
Project No.	170362701
Date	01/10/2018
Scale	1"=50'
Drawn By	JFY
Checked By	MR
Submission Date	
Figure No.	9
Sheet	9 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 9 10 12 13- DD AA1 AA2 AA3 excavation map.dwg Date: 4/26/2019 Time: 14:14 User: jyanowitz Style Table: Langan.stb Layout: FIG 9 - DEV EXC



LEGEND:

- SITE BOUNDARY AND SITE PERIMETER SOLIDER PILE AND LAGGING SOE
- REMEDIAL EXCAVATION FROM ABOUT 0 TO 2 FEET BGS
- REMEDIAL EXCAVATION FROM ABOUT 12 TO 13 FEET BGS
- REMEDIAL EXCAVATION AROUND BORING SB01 FROM ABOUT 14 FEET BGS
- REMEDIAL EXCAVATION AROUND BORING SB12 FROM ABOUT 20 FEET BGS
- REMEDIAL EXCAVATION AROUND BORING SB10 FROM ABOUT 25 FEET BGS
- REMEDIAL EXCAVATION AROUND BORING SB08 FROM ABOUT 28 FEET BGS
- SB/MW02 RI SOIL BORING AND MONITORING WELL
- EB/TMW-1 PREVIOUS SOIL BORING (LANGAN, JUNE 2016)
- EB-5 PREVIOUS SOIL BORING AND TEMPORARY MONITORING WELL (LANGAN, JUNE 2016)

NOTE:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. DEPTH AND DIMENSION OF REMEDIAL EXCAVATION AREAS ARE ESTIMATED BASED ON ANALYTICAL RESULTS EXCEEDING TRACK 1 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES.
3. BGS = BELOW GROUND SURFACE
4. SOE = SUPPORT OF EXCAVATION

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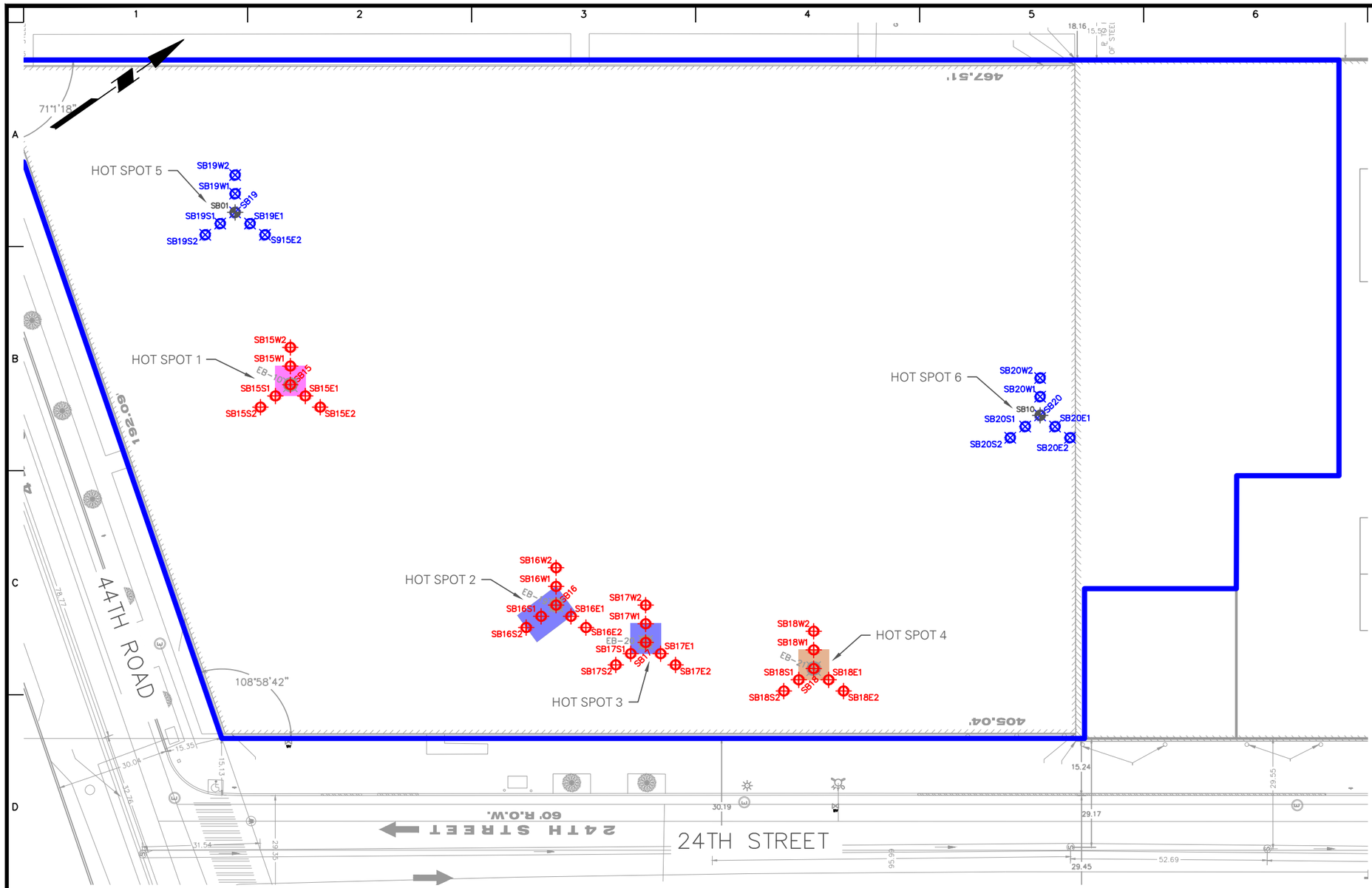
Figure Title
ALTERNATIVE I - TRACK 1 REMEDIAL EXCAVATION MAP

Project No. 170362701	Figure No. 10
Date 12/10/2018	
Scale 1"=50'	
Drawn By JFY / Checked By RM	
Submission Date	Sheet 10 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 9 10 12 13- DD AA1 AA2 AA3 excavation map.dwg Date: 4/26/2019 Time: 14:14 User: jyanowitz Style Table: Langan.stb Layout: FIG 10 - TRACK 1



LEGEND:

- SITE BOUNDARY
- SB16 — RI LEAD DELINEATION BORING
- SB10 — RI BORING
- SB19 — PROPOSED LEAD DELINEATION BORING
- EB–20 — PREVIOUS SOIL BORING LOCATION (LANGAN, JUNE 2016)
- HAZARDOUS LEAD EXCAVATION FROM 5 TO 9 FEET BGS
- HAZARDOUS LEAD EXCAVATION FROM 5 TO 10 FEET BGS
- HAZARDOUS LEAD EXCAVATION FROM 8 TO 11 FEET BGS*

NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. BORING LOCATIONS ARE APPROXIMATE AND BASED ON FIELD MEASUREMENTS.
3. BGS = BELOW GRADE SURFACE
4. THE VERTICAL AND HORIZONTAL EXTENT OF HAZARDOUS LEAD AT BORINGS SB01 AND SB10 (HOT SPOTS 5 AND 6, RESPECTIVELY) WILL BE DELINEATED AS PART OF THE IRM.
5. * = ALTHOUGH HAZARDOUS LEAD WAS DETECTED AT HOT SPOT 4 FROM 9 TO 10 FEET BGS, THE EXCAVATION EXTENTS WERE DESIGNATED AS 8 TO 11 FEET BGS FOR EXCAVATION PRACTICALITY.

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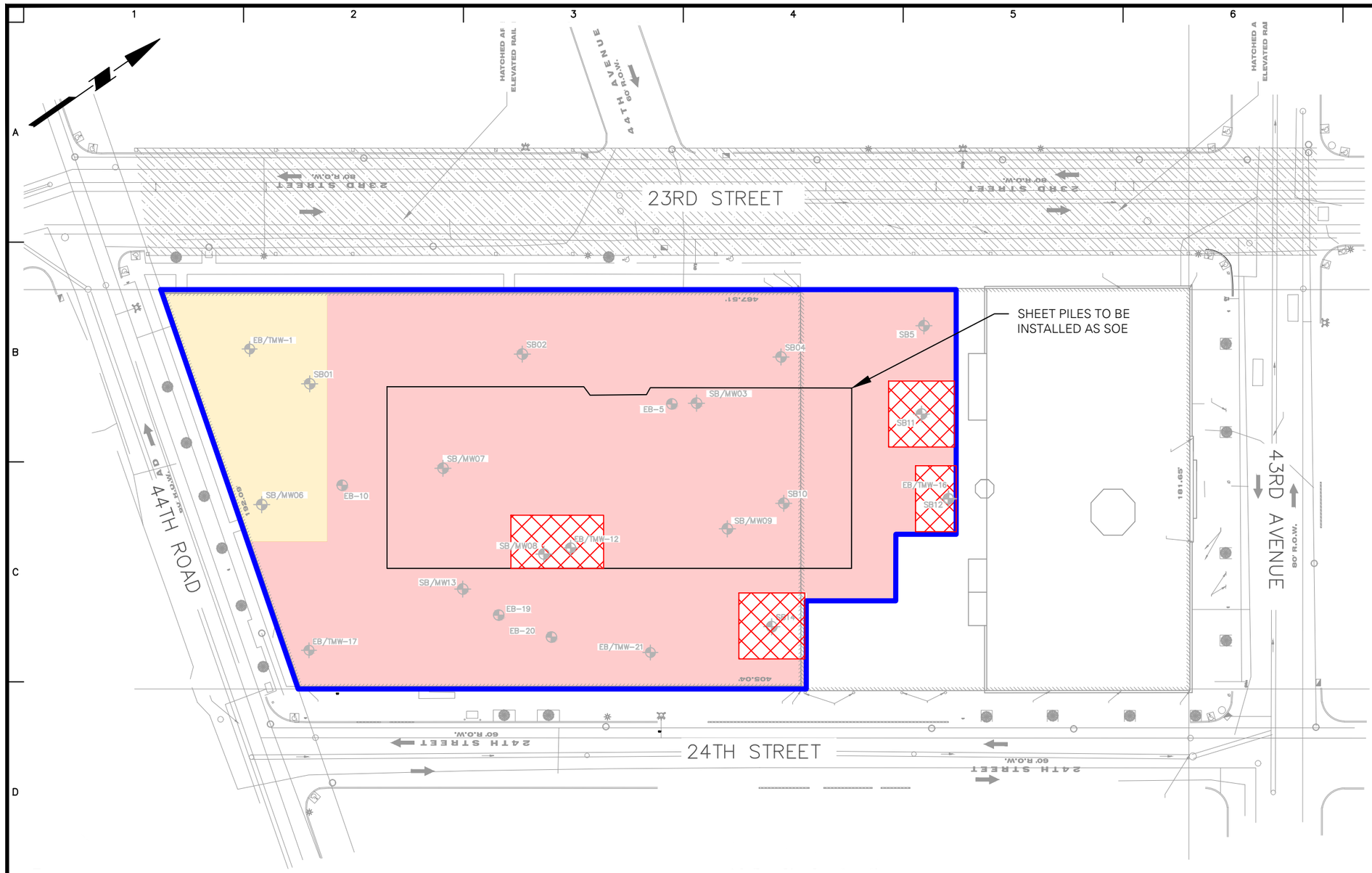
Figure Title
HAZARDOUS LEAD DELINEATION AND EXCAVATION MAP

Project No. 170362701	Figure No. 11
Date 01/10/2018	
Scale 1"=30'	
Drawn By JFY / Checked By MR	
Submission Date	Sheet 11 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 11 - Haz Lead Excavation plan.dwg Date: 2/27/2019 Time: 15:15 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- SITE BOUNDARY AND SITE PERIMETER SOLIDER PILE AND LAGGING SOE
- REMEDIAL EXCAVATION FROM ABOUT 4 FEET BGS
- REMEDIAL EXCAVATION FROM ABOUT 12 TO 13 FEET BGS
- REMEDIAL EXCAVATION TO A MAXIMIUM DEPTH OF 15 FEET BGS
- SB/MW02 — RI SOIL BORING AND MONITORING WELL
- EB/TMW-1 — PREVIOUS SOIL BORING (LANGAN, JUNE 2016)
- EB-5 — PREVIOUS SOIL BORING AND TEMPORARY MONITORING WELL (LANGAN, JUNE 2016)

NOTE:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. DEPTH AND DIMENSION OF REMEDIAL EXCAVATION AREAS ARE ESTIMATED BASED ON ANALYTICAL RESULTS EXCEEDING TRACK 2 RESTRICTED USE RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVES.
3. BGS = BELOW GROUND SURFACE
4. SOE = SUPPORT OF EXCAVATION

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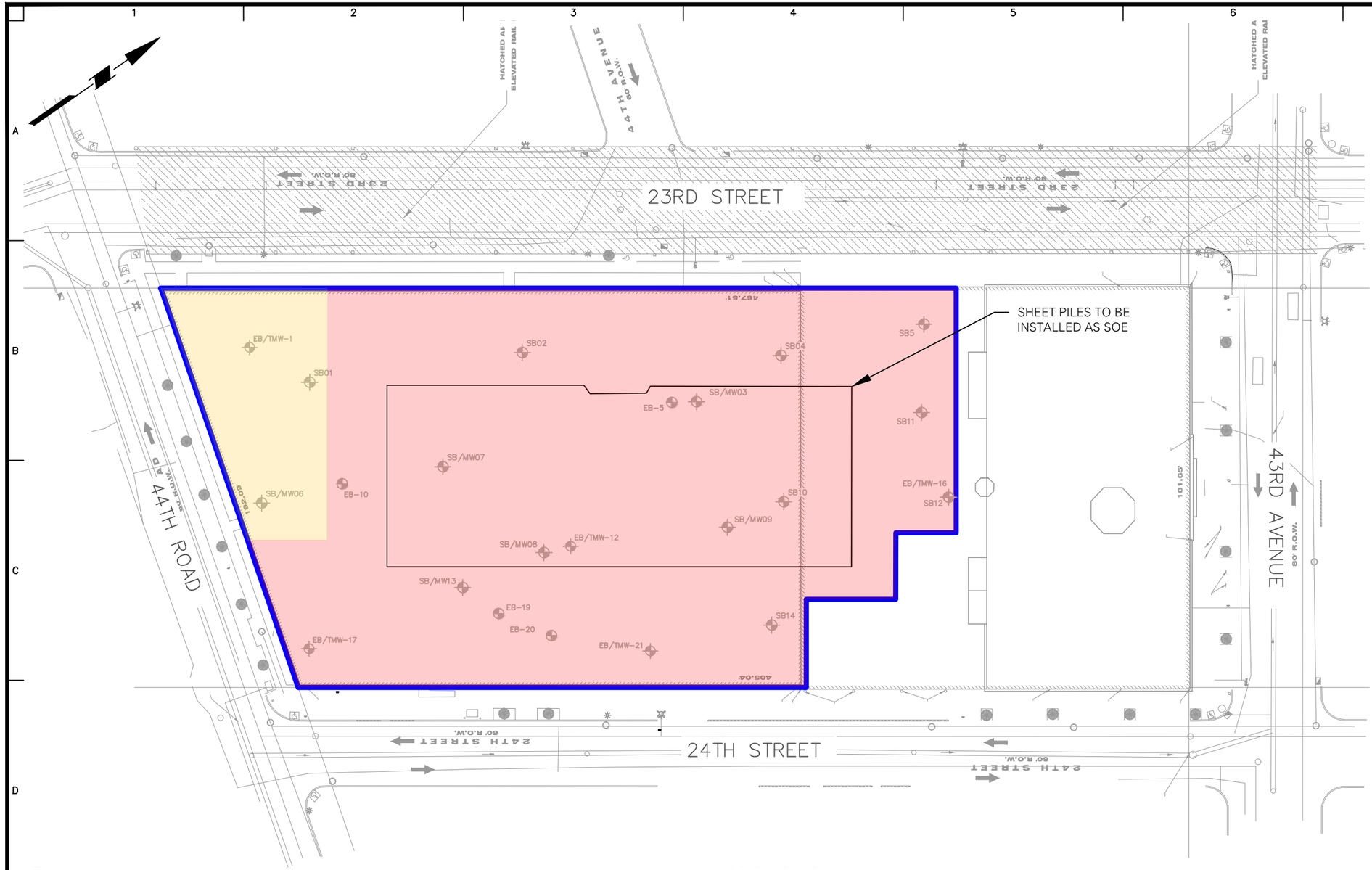
Figure Title
ALTERNATIVE II - TRACK 2 REMEDIAL EXCAVATION MAP

Project No. 170362701	Figure No. 12
Date 12/10/2018	
Scale 1"=50'	
Drawn By JFY / Checked By RM	
Submission Date	Sheet 12 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 9 10 12 13- DD AA1 AA2 AA3 excavation map.dwg Date: 4/26/2019 Time: 14:14 User: jyanowitz Style Table: Langan.stb Layout: FIG 12 - TRACK 2



LEGEND:

- SITE BOUNDARY AND SITE PERIMETER SOLIDER PILE AND LAGGING SOE
- REMEDIAL EXCAVATION FROM ABOUT 4 FEET BGS
- REMEDIAL EXCAVATION FROM ABOUT 12 TO 13 FEET BGS
- SB/MW02 — RI SOIL BORING AND MONITORING WELL
- EB/TMW-1 — PREVIOUS SOIL BORING (LANGAN, JUNE 2016)
- EB-5 — PREVIOUS SOIL BORING AND TEMPORARY MONITORING WELL (LANGAN, JUNE 2016)

NOTE:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. DEPTH AND DIMENSION OF REMEDIAL EXCAVATION AREAS ARE ESTIMATED BASED ON ANALYTICAL RESULTS EXCEEDING TRACK 4 SITE-SPECIFIC SOIL CLEANUP OBJECTIVES.
3. BGS = BELOW GROUND SURFACE
4. SOE = SUPPORT OF EXCAVATION

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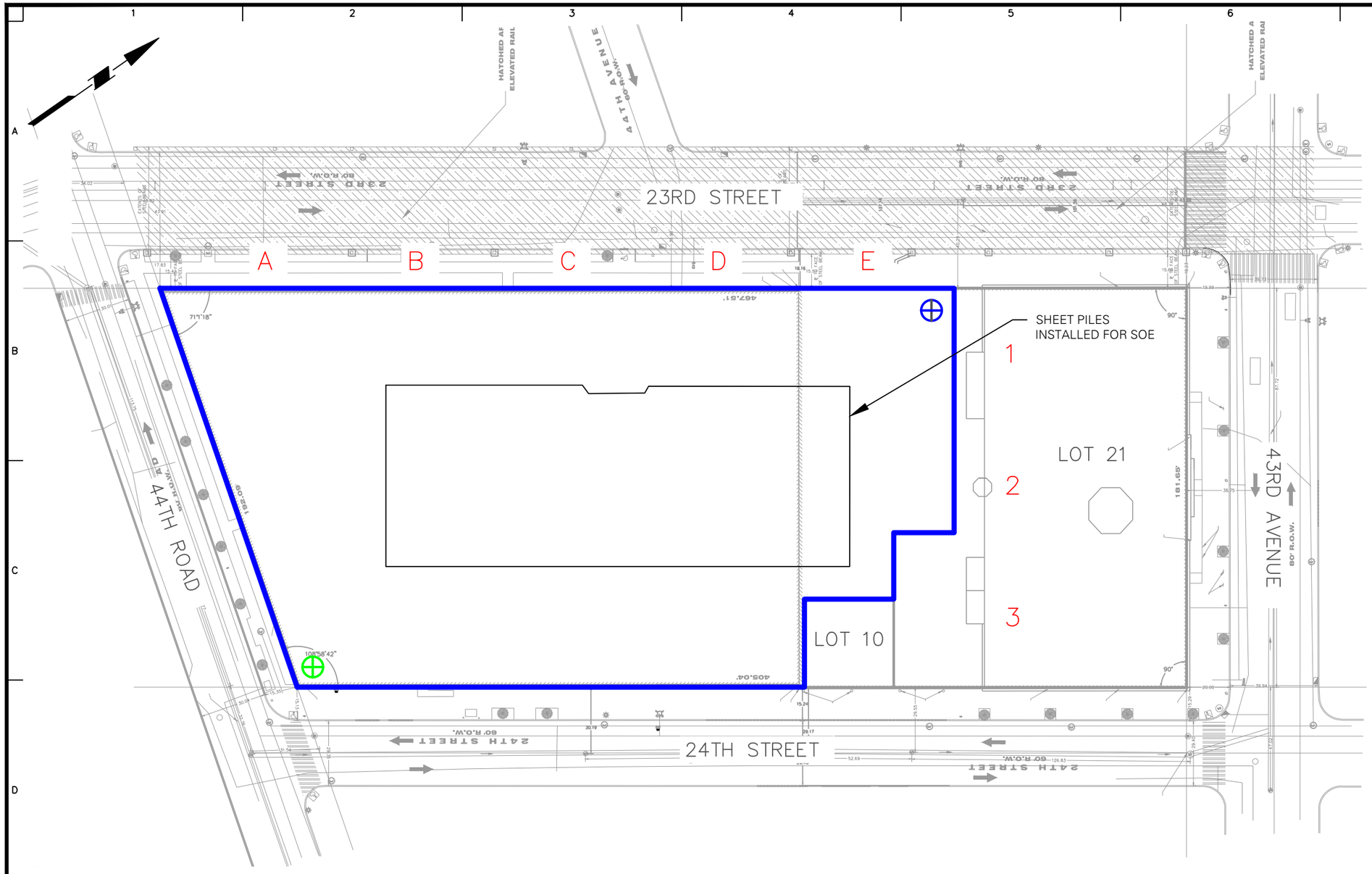
Figure Title
ALTERNATIVE III - TRACK 4 REMEDIAL EXCAVATION MAP

Project No. 170362701	Figure No. 13
Date 02/27/2019	
Scale 1"=50'	
Drawn By JFY / Checked By RM	
Submission Date	Sheet 13 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 9 10 12 13- DD AA1 AA2 AA3 excavation map.dwg Date: 4/26/2019 Time: 14:14 User: jyanowitz Style Table: Langan.stb Layout: FIG 13 - TRACK 4



LEGEND:

- SITE BOUNDARY
- DOWNWIND CAMP STATION
- UPWIND CAMP STATION
- A — DESIGNATED SITE AREA (SOUTH TO NORTH)
- 1 — DESIGNATED SITE AREA (WEST TO EAST)

NOTE:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. CAMP = COMMUNITY AIR MONITORING PLAN
3. SOE = SUPPORT OF EXCAVATION

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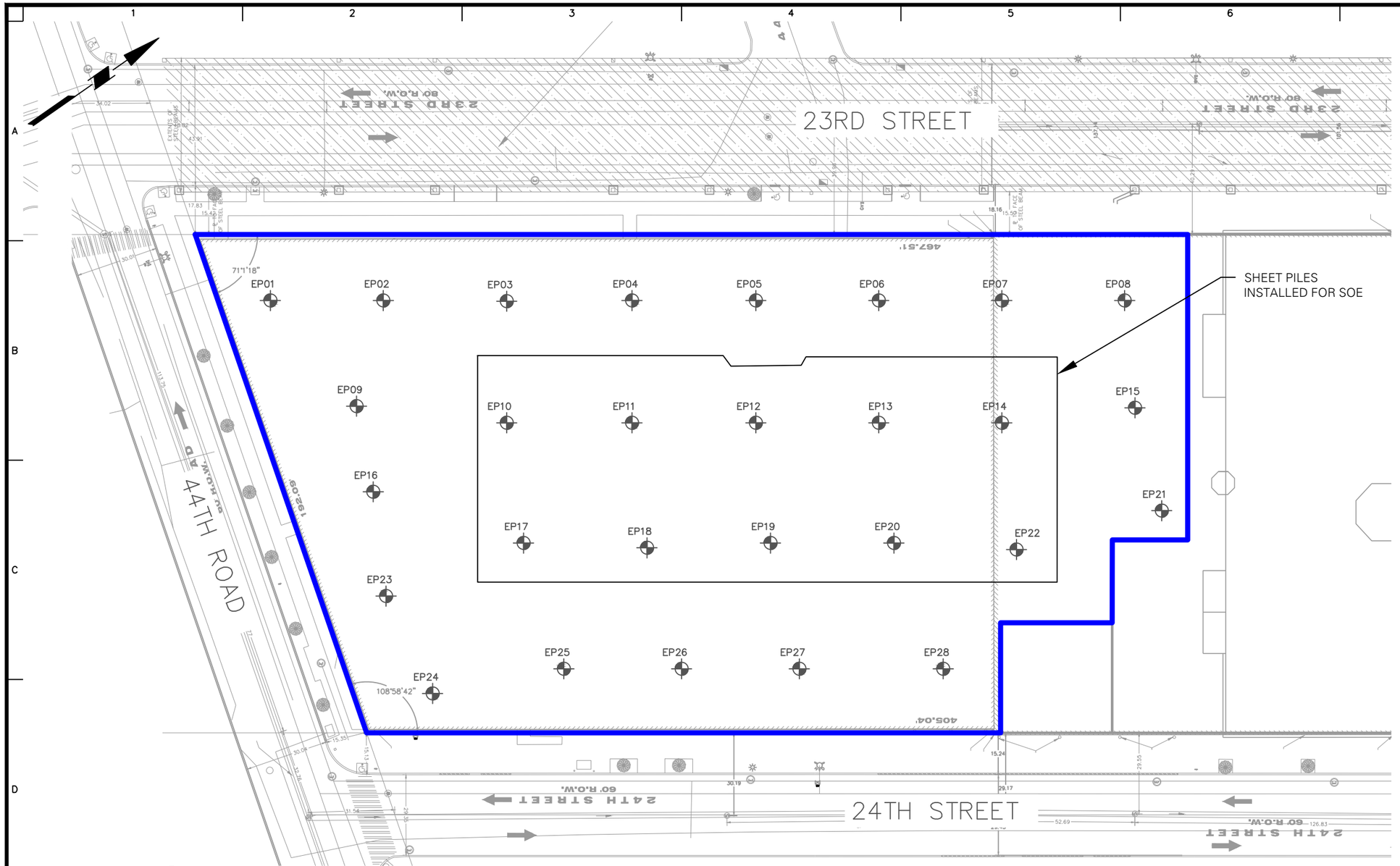
Figure Title
DAILY REPORT SITE MAP

Project No.	Figure No.
170362701	14
Date: 01/10/2018	
Scale: 1"=50'	
Drawn By: JFY / Checked By: RM	
Submission Date	Sheet 14 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 14 - DAILY REPORT MAP.dwg Date: 2/27/2019 Time: 15:19 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

SITE BOUNDARY

EP01 PROPOSED DOCUMENTATION/CONFIRMATION BASE SOIL SAMPLE LOCATION

NOTE:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY OF 23-10 43RD AVENUE ISSUED BY TRUE NORTH SURVEYORS ON MAY 5, 2016.
2. SOE = SUPPORT OF EXCAVATION

40 0 20 40
SCALE IN FEET

LANGAN
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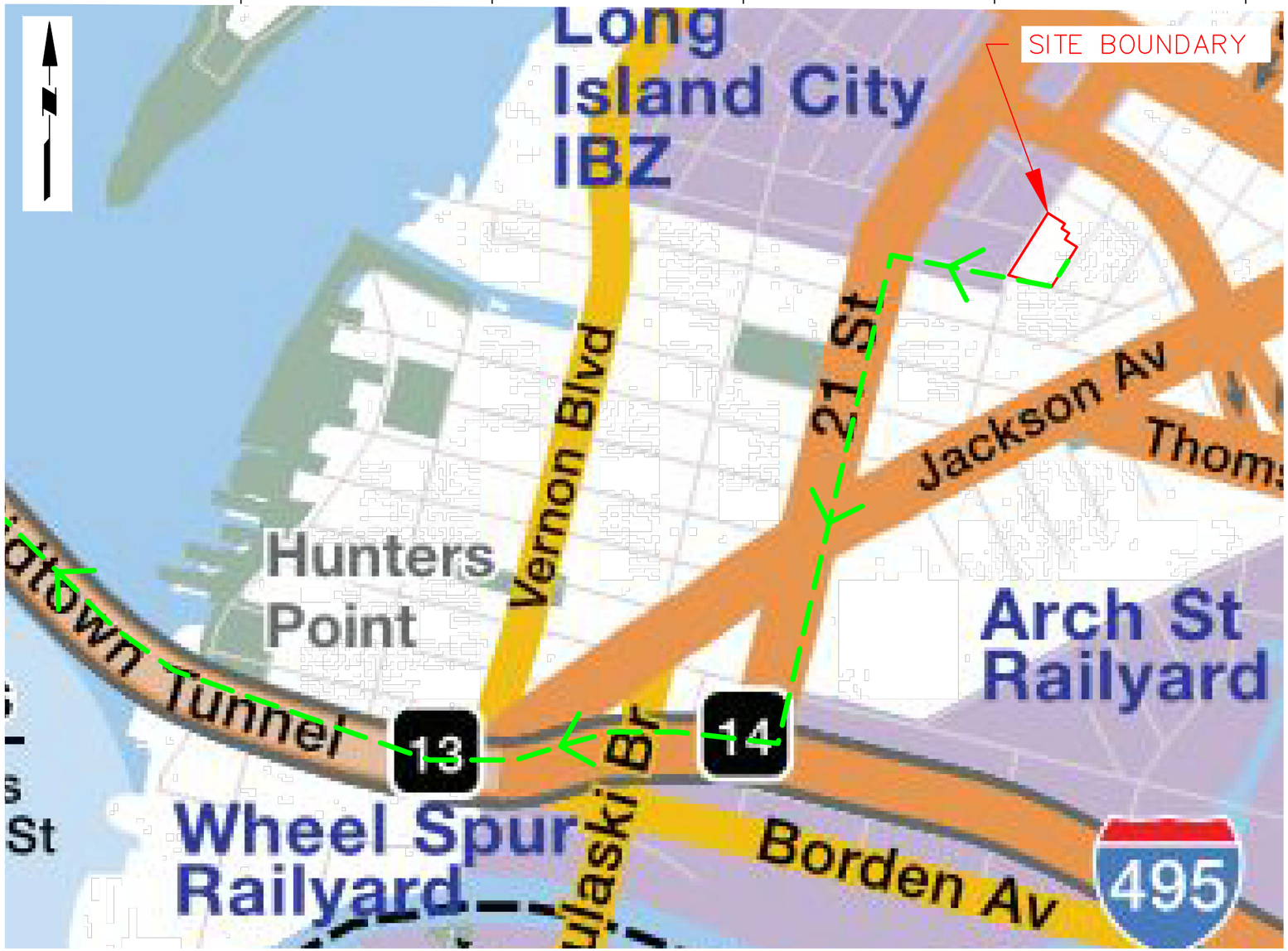
Langan International LLC
Collectively known as Langan

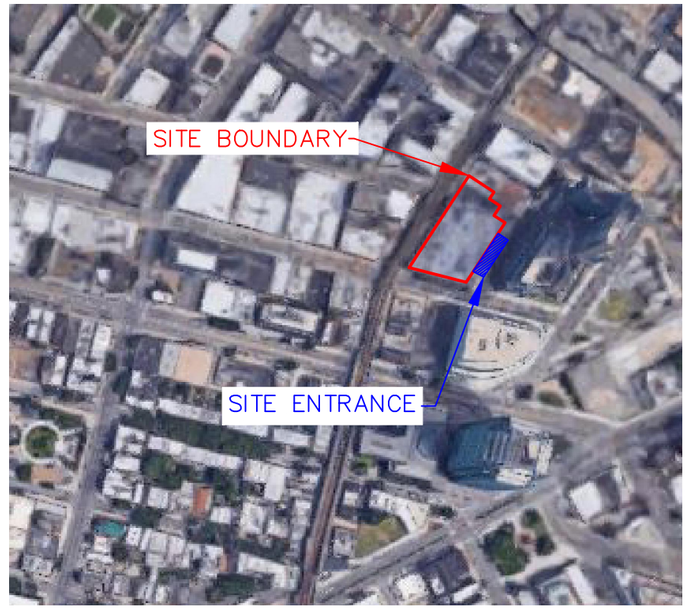
Project
43-02 to 43-40 24TH STREET
BLOCK No. 436, LOT No. 1
LONG ISLAND CITY **NEW YORK**

Figure Title
PROPOSED CONFIRMATION/ DOCUMENTATION SAMPLE LOCATION PLAN

Project No. 170362701	Figure No. 15
Date 01/10/2018	
Scale 1"=40'	
Drawn By JFY / Checked By MR	
Submission Date	Sheet 15 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 15 - End point sampling.dwg Date: 2/27/2019 Time: 15:18 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL





AERIAL REFERENCE

LEGEND:

- SITE BOUNDARY
- PROPOSED TRUCK ROUTE

NOTES:

1. TRUCK ROUTE MAP ADAPTED FROM THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION (NYC DOT) 2015 TRUCK ROUTE MAP.
2. LOCATION OF SITE ACCESS IS SUBJECT TO CHANGE, PENDING CONSTRUCTION LOGISTICS.

Legend

Local Truck Route
Trucks with an origin or destination for the purpose of delivery, loading or servicing within the respective Borough, shall only operate on designated local routes, except that an operator may operate on a non-designated street for the purpose of arriving at his/her destination. This shall be accomplished by leaving a designated truck route at the intersection that is nearest to their destination, proceeding by the most direct route, and then returning to the nearest designated truck route by the most direct route. If the operator has additional destinations in the same general area, he/she may proceed by the most direct route to his/her next destination without returning to a designated truck route, provided that the operator's next destination does not require that he/she cross a designated truck route.

Through Truck Route
Trucks having neither an origin nor a destination within the respective Borough shall restrict the operation of such vehicles to those street segments designated as Through Truck Routes.

Through Truck Route on Expressway

Through Truck Route on Tunnel

Exception 53' Trailers Allowed
For definition see information on reverse side.

Industrial Business Zones (IBZ)

Parks and Open Spaces

29A Highway Exit

Commercial Vehicles Prohibited

Low Vertical Clearance Area

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Figure Title
TRUCK ROUTE MAP

Project No. 170362701	Figure No. 16
Date 01/10/2018	
Scale NTS	
Drawn By JFY / Checked By MR	
Submission Date	Sheet 16 of 16

Filename: \\langan.com\data\NYC\data7\170362701\Cadd Data - 170362701\SheetFiles\Environmental\RAWP\Figure 16 - Truck Map.dwg Date: 2/27/2019 Time: 15:17 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL