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745-751 EAST 133RD STREET

BRONX, NEW YORK

Remedial Action Report

NYC VCP Project Number 13CVCP140X
E-Designation Project Number 13EH-N194X

Prepared For:

Markland 745, LLC
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Prepared By:

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MARCH 2018

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LIST OF ACRONYMS

Acronym	Definition
CAMP	Community Air Monitoring Plan
CEC	Clean Earth, Carteret
CENJ	Clean Earth, North Jersey
DER-10	NYS DEC Division of Environmental Remediation Technical Guidance Manual 10
EC	Engineering Control
HASP	Health and Safety Plan
IC	Institutional Control
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York City Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
ORC	Oxygen Release Compound
PID	Photoionization Detector
QA/QC	Quality Assurance/Quality Control
QEP	Qualified Environmental Professional
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan
SCG	Standards, Criteria and Guidance
SCO	Soil Cleanup Objective
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SVOCs	Semi-Volatile Organic Compounds
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

CERTIFICATION

I, Tarek Z. Khouri, P.E. certify the following:

- I am currently a registered professional engineer licensed by the State of New York.
- I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the 745 East 133rd Street site, site number 13CVCP140X.
- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.
- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial Action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The OER-approved Remedial Action Work Plan dated October 2015 and Stipulations in a letter dated November 9, 2015 were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquid or other material from the property was taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Name: Tarek Z. Khouri

NYS PE License Number: 086611

Signature:

Date: 3/23/2018

I, Mark E. Robbins, certify the following:

- I am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the 745-751 East 133rd Street site, site number 13CVCP140X.
- The OER-approved Remedial Action Work Plan dated October 2015 and Stipulations in a letter dated November 9, 2015 were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquid or other material from the property was taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

QEP Name: Mark E. Robbins

QEP Signature:

Date: 03/23/2018

EXECUTIVE SUMMARY

Markland 745, LLC enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 745 East 133rd Street in the Port Morris section of Bronx, New York. The boundary of the property subject to this Remedial Action is shown in **Figure 1** and includes, in its entirety, Bronx Block 2562 and Lots 65, 66, 67 and 68. The Remedial Action was performed pursuant to the OER-approved RAWP in a manner that has rendered the property protective of public health and the environment consistent with its intended use. This RAR describes the Remedial Action performed under the RAWP. The remedial action described in this document provides for the protection of public health and the environment and complies with applicable environmental standards, criteria and guidance (SCGs) and applicable laws and regulations.

Site Location and Background

The Site is located at 745-751 East 133rd in the Port Morris section in Bronx, New York and is identified as Block 2562 and Lots 65, 66, 67 and 68 on the New York City Tax Map. **Figure 1** shows the Site Boundary Map. The Site is 6,700-square feet and is bounded by 134th Street to the north, 133rd Street to the south, Willow Avenue to the east, and Cypress Avenue to the west. Currently, the Site is constructed with three (3) 4-story residential buildings. The Site Location Map is shown in **Figure 2.**

Summary of Redevelopment Plan

The redevelopment of the former vacant 6,700 square foot lot now consists of three (3) 4-story residential buildings. The residential buildings contain a total of sixteen (16) residential units which includes a mixture of one, three and four (penthouse) bedroom units. The first floor of each building is occupied by the first floor of a three-bedroom unit as well as associated residential uses including a lobby, mechanical space, hallways, living rooms and kitchens. The entire area of the property is approximately 6,700 square feet and each building has a footprint of 1,446.25 feet. More specifically, the dimensions of each building are 22’3” x 65’ and front East 133rd Street with no setbacks. The three buildings occupy a combined 4,338.75 square feet totaling approximately 65 percent of the lot area. The entire property was excavated to 4 feet

below grade for development, and additional excavation was performed to 5 feet below grade in two areas for the remediation of hotspots. The remaining portion of the lot is a combination of demarked and concrete capped rear yard area. Each building has a rear yard located in the northern portion of the lot. The rear yard consists of an approximately 333.75 square foot concrete patio and a 778.75 square foot gravel capped area. The gravel capped area is approximately 4 feet thick and consists of a demarcation barrier overlain by 18" of clean top soil which is overlain by 2.5' of gravel. The total area of the rear yard is approximately 1,112.5 square feet.

A map showing the building location, basement location and open space location is shown in the Development Plan in **Figure 3**.

Summary of Description of Surrounding Property

The Site is located in the southwest portion of the Bronx within the Port Morris section of the borough. Port Morris is a mixed-use district, which includes residential, commercial and manufacturing zoning designations. The Site and block are part of a greater rezoning approved by the New York Department of City Planning (DCP) in March of 2005, where Port Morris' mixed-use district was extended to eleven surrounding blocks. The rezoned area is generally bounded by Park Avenue to the west, Willow Avenue to the east, East 134th Street to the north and the Harlem River/Harlem River Yards to the south. This mixed-use district will continue to allow light manufacturing, industrial, and commercial uses but would also allow for the development of residential uses and community facilities, ultimately helping to transform Port Morris into a true gateway into the Bronx.

The Site is located along 133rd Street (address: 745-751 133rd Street) in the center of the block bounded by 134th Street to the north, 133rd Street to the south, Willow Avenue to the east, and Cypress Avenue to the to the west. This block is southeast of the Major Deegan and Bruckner Expressways. Manufacturing/industrial uses are located to the north of the site and multi-family residential uses are located immediately east and west of the project site. Industrial/manufacturing and transportation/utility uses are located to the south of the site, across of East 133rd Street. The site and block are currently zoned M 1-2/R-6. The west end of the block consists of mainly residential uses with a few

commercial and industrial uses peppered within whereas the majority of the eastern portion of the block contains industrial uses with a few scattered multifamily residential buildings.

Summary of the Work Performed under the Remedial Investigation

Taylord Environment, Inc. performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed six soil borings across the entire project Site, and collected eight soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Groundwater monitoring wells were not installed at the Site. Groundwater was not encountered during the RI conducted on January 15, 2013. Depth to bedrock over the Site is six feet;
4. Installed three soil vapor probes around Site perimeter and collected three samples for chemical analysis

Summary of Findings of Remedial Investigation

1. The elevation of the property is 19 feet.
2. The results of the GPR survey did not identify any anomalies at the Site.
3. Groundwater was not encountered during the January 15, 2013 remedial investigation.
4. The groundwater flow direction was not established at the Site.
5. Bedrock was encountered at 6 feet below grade surface throughout the Site.
6. The stratigraphy of the site, from the surface down, consists of four feet of historic urban fill underlain by two feet of brown medium sand loam. Bedrock was encountered throughout the Site at 6 feet bgs.
7. Soil/fill samples collected during the RI showed that no VOCs were present at detectable concentrations, with the exception of methylene chloride (1.5 ppm in

one sample). Six SVOCs were detected in one shallow soil sampling location at concentrations above Restricted Residential SCOs and included benzo(a)anthracene (1.5ppm), benzo(a)pyrene (11ppm), benzo(a)fluoranthene (9.3ppm), benzo(k)fluoranthene (12 ppm), chrysene (3.4 ppm), and dibenzo(k)anthracene (11 ppm). These SVOCs are attributed to PAHs typically found in historic fill material. Five pesticides including 4,4,4-DDD (maximum 0.053ppm), 4,4,4-DDE (maximum 0.037 ppm), 4,4,4-DDT (maximum 0.18 ppm), chlordane (maximum 0.45 ppm), and dieldrin (maximum 0.075 ppm) were detected above Unrestricted Use SCOs. Total PCBs were identified in concentrations exceeding their UUSCOs. Eight Metals including barium (maximum 1,730 ppm), mercury (maximum 1.05 ppm), and lead (maximum 2,880 ppm) were detected above RRSCOs. Hotspots were detected for lead and barium at boring locations SB-1 and SB-6. Cadmium, chromium, copper, nickel, and zinc were also detected in the samples at levels exceeding UUSCOs.

8. Soil vapor samples collected during the RI indicated low-level VOCs in all samples. PCE and TCE were detected in the samples at trace levels.

For more detailed results, consult the RI report. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste is not suspected at this site. **Appendix 1** includes the RIR.

Summary of the Remedial Action

The Remedial Action achieved protection of public health and the environment for the intended use of the property. The Remedial Action achieved all of the Remedial Action Objectives established for the project; addressed applicable standards, criteria, and guidance; reduced mobility, toxicity and volume of contaminants; was cost effective and implementable; and used standard methods that are well established in the industry. The remedial action is effective in the short-term and long-term.

A summary of the milestones achieved in the Remedial Action is as follows:

- A Pre-Application Meeting was held on November 21, 2012.

- A Remedial Investigation (RI) was performed in January 2013. A RI Report was prepared to evaluate data and information necessary to develop a Remedial Action Work Plan (RAWP).
- A Site Contact List was established. A RAWP was prepared and released with a Fact Sheet in November 2015 for a 30-day public comment period.
- The RAWP and Stipulation List dated November 9, 2015 was approved by the New York City Office of Environmental Remediation (OER) on November 17, 2015.
- OER briefed New York State Department of Environmental Conservation (NYSDEC) and NYC Department of Health (NYCDOHMH) on September 16, 2013.
- A Pre-Construction meeting was held on November 20, 2015.
- A Fact Sheet providing notice of the start of the remedial action December 2015 for this project.
- The remedial action was begun on March 21, 2016 and completed on February 30, 2017.

Appendix 2 includes the RAWP.

The remedial action consisted of the following tasks:

1) Prepared a Community Protection Statement and performed all required NYC VCP Citizen Participation activities in accordance with the approved Citizen Participation Plan.
2) Mobilized in November 2015, which involved Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
3) Performed Waste Characterization Study prior to excavation activities. Two (2) waste characterization soil samples were collected on December 23, 2015. Waste characterization samples were collected at a frequency dictated by disposal facilities.
4) Performed a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds. CAMP was performed from March 21, 2016 to May 4, 2016. No CAMP exceedances, excessive dust, odors, or PID readings were recorded throughout the excavation.

5) Established Track 4 Site Specific Soil Cleanup Objectives (SCOs). The following Track 4 SCOs were utilized: 750 ppm for barium, 1,000 ppm for lead and 1.5 ppm for mercury.
6) The following excavations were performed: soil was removed to a depth of 4 feet over the entirety of the Site. Additional excavation was performed to a depth of 5 feet in the areas of two hotspots in the south and southwest sections of the site. Lead hazardous soil was removed from WC-1. A total of 527.56 tons of soil was generated during the remediation.
7) Transported and disposed of non-hazardous soil/fill and characteristic hazardous lead fill at permitted facilities in accordance with all applicable laws and regulations for handling, transporting, and disposing, and the RAWP. The following materials were excavated and disposed as:
    i. excavated 369.28 tons of non-hazardous soil/fill and transported it to Clean Earth, Carteret located at 24 Middlesex Avenue, Carteret, NJ 07008 and;
    ii. excavated 158.28 tons of hazardous characteristic soil/fill and transported to Clean Earth, North Jersey located at 115 Jacobus Avenue, Kearny, NY 07032.
8) Screened excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
9) Conducted materials management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10) Collected and analyzed seven (7) end-point samples to determine attainment of SCOs. The results of the sampling indicated metals, specifically lead and barium still exceeding their site-specific SCOs in EP-6 and EP-7 located in the western portion of the Site. Additional excavation was performed in these areas, but endpoints were not met. OER approved of management in place of the remaining contaminated soils on May 3rd, 2016.
11) Constructed an engineered Composite Cover System consisting of 4 inches of concrete slab underlain by approximately 3 feet of RCA material in building

areas. The open yard is partially capped with a 5-inch concrete slab that serves as a patio immediately to the east of the buildings. The remaining open yard has the native material demarcated with a geosynthetic barrier and is overlain by 18 inches of clean top soil and 2.5 feet of bluestone gravel. The composite cover system is in place to prevent human exposure to residual soil/fill remaining under the Site. The contractor for the cover construction was Eurocraft Contracting.

12) Installed a Vapor Barrier System that consisted of a 20-mil Raven Industries Vapor Block Plus- 20 liner beneath the building slab. The contractor for the Vapor Barrier System construction was Eurocraft Contracting Inc.
13) Residual soil is present beneath the cover layer and will be subject to Site Management under this Remedial Action. Residual soil was demarcated using geosynthetic material placed beneath the cover layer and will be subject to Site Management under this Remedial Action.
14) Performed all activities required for the Remedial Action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15) Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
16) Imported 56 tons of clean soil and 356 tons of RCA material to be used for backfill and cover in compliance with the Remedial Action Work Plan and in accordance with applicable laws and regulations.
17) Submitted daily reports during construction oversight activities. Daily reports were submitted from March 21, 2016 to May 4, 2016.
18) Submitted a Sustainability Report.
19) Submitted this Remedial Action Report (RAR) that describes the Remedial Action, certifies that the remedial requirements defined in the Remedial Action Work Plan have been achieved; defines the Site boundaries; describes all Engineering and Institutional Controls applicable to the Site; and describes any changes from the RAWP.
20) Submitted a Site Management Plan (SMP) in this RAR for long-term management of residual soil, including plans for operation, maintenance,

inspection and certification of the performance of Engineering Controls and Institutional Controls. Inspections will be performed annually. Inspection and Certification reports will be submitted by July 30, 2019 (for the reporting period calendar year 2018-2019), July 30, 2020 (for the reporting period calendar years 2019-2020) and every 5 years thereafter (for the reporting period consisting of the 5 prior calendar years). Inspection and Certification Reports will cover all calendar years since the prior reporting period.

21) The property will continue to be registered with an E-Designation by the NYC Department of Buildings. Engineering Controls and Institutional Controls will be managed in compliance with the SMP. Institutional Controls will include prohibition of the following: (1) prohibition of vegetable gardening and farming in residual soil; (2) prohibition of the use of groundwater beneath the site without treatment rendering it safe for the intended use; (3) prohibition of disturbance of residual soil material unless it is conducted in accordance with the SMP; and (4) prohibition of higher levels of land usage than the restricted residential uses addressed by this remedial action without prior notification and approval by OER.

REMEDIAL ACTION REPORT

1.0 SITE BACKGROUND

Markland 745, LLC enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 745 East 133rd Street in the Port Morris section of Bronx, New York. The boundary of the property subject to this Remedial Action is shown in **Figure 1** and includes, in its entirety, Bronx Block 2562 and Lots 65, 66, 67 and 68. The Remedial Action was performed pursuant to the OER-approved RAWP in a manner that has rendered the property protective of public health and the environment consistent with its intended use. This RAR describes the Remedial Action performed under the RAWP. The remedial action described in this document provides for the protection of public health and the environment and complies with applicable environmental standards, criteria and guidance (SCGs) and applicable laws and regulations.

1.1 SITE LOCATION AND BACKGROUND

The Site is located at 745-751 East 133rd in the Port Morris section in Bronx, New York and is identified as Block 2562 and Lots 65, 66, 67 and 68 on the New York City Tax Map. **Figure 1** shows the Site Boundary Map. The Site is 6,700-square feet and is bounded by 134th Street to the north, 133rd Street to the south, Willow Avenue to the east, and Cypress Avenue to the west. Currently, the Site is constructed with three (3) 4-story residential buildings. The Site Location Map is shown in **Figure 2**.

1.2 REDEVELOPMENT PLAN

The redevelopment of the former vacant 6,700 square foot lot now consists of three (3) 4-story residential buildings. The residential buildings contain a total of sixteen (16) residential units which includes a mixture of one, three and four (penthouse) bedroom units. The first floor of each building is occupied by the first floor of a three-bedroom unit as well as associated residential uses including a lobby, mechanical space, hallways, living rooms and kitchens. The entire area of the property is approximately 6,700 square

feet and each building has a footprint of 1,446.25 feet. More specifically, the dimensions of each building are 22'3" x 65' and front East 133rd Street with no setbacks. The three buildings occupy a combined 4,338.75 square feet totaling approximately 65 percent of the lot area. The entire property was excavated to 4 feet below grade for development, and additional excavation was performed to 5 feet below grade in two areas for the remediation of hotspots. The remaining portion of the lot is a combination of demarked and concrete capped rear yard area. Each building has a rear yard located in the northern portion of the lot. The rear yard consists of an approximately 333.75 square foot concrete patio and a 778.75 square foot gravel capped area. The gravel capped area is approximately 4 feet thick and consists of a demarcation barrier overlain by 18" of clean top soil which is overlain by 2.5' of gravel. The total area of the rear yard is approximately 1,112.5 square feet.

A map showing the building location, basement location and open space location is shown in the Development Plan in **Figure 3**.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located in the southwest portion of the Bronx within the Port Morris section of the borough. Port Morris is a mixed-use district, which includes residential, commercial and manufacturing zoning designations. The Site and block are part of a greater rezoning approved by the New York Department of City Planning (DCP) in March of 2005, where Port Morris' mixed-use district was extended to eleven surrounding blocks. The rezoned area is generally bounded by Park Avenue to the west, Willow Avenue to the east, East 134th Street to the north and the Harlem River/Harlem River Yards to the south. This mixed-use district will continue to allow light manufacturing, industrial, and commercial uses but would also allow for the development of residential uses and community facilities, ultimately helping to transform Port Morris into a true gateway into the Bronx.

The Site is located along 133rd Street (address: 745-751 133rd Street) in the center of the block bounded by 134th Street to the north, 133rd Street to the south, Willow Avenue to the east, and Cypress Avenue to the to the west. This block is southeast of the Major

Deegan and Bruckner Expressways. Manufacturing/industrial uses are located to the north of the site and multi-family residential uses are located immediately east and west of the project site. Industrial/manufacturing and transportation/utility uses are located to the south of the site, across of East 133rd Street. The site and block are currently zoned M 1-2/R-6. The west end of the block consists of mainly residential uses with a few commercial and industrial uses peppered within whereas the majority of the eastern portion of the block contains industrial uses with a few scattered multifamily residential buildings.

1.4 SUMMARY OF PAST SITE USES AND AREAS OF CONCERN

The following environmental work plans and reports were developed for the Site:

- *Phase I Environmental Site Assessment*, June 2011, prepared by Omega Environmental Services, Inc.
- *Underground Storage Tank Investigation*, February 2013, prepared by Utility Detection, Inc.

The Phase I report was prepared in June 2011 by Omega Environmental Services, Inc. for Frank Mizerik of Miller Druck Specialty Contracting. Inc. Below is a brief summary of the Phase I findings:

1. The site was not identified on any of the databases searched.
2. Regulatory issues were reviewed within the ASTM radii (up to one-mile) of the subject Property (Site). Twenty-three (23) NY Spills sites, twelve (12) SWF sites, thirty-three (33) LTANKS sites, and 2 DRYCLEANERS, as well several other sites were identified within one mile of the property. Many of the listed sites are related to oil in the nearby manholes.
3. No unusual surface conditions (such as would indicate settling) were observed during the site investigation. The property and surrounding area are generally level with a slight slope to the south.
4. According to the US EPA, the Radon Zone for the Bronx is Zone 3 - low potential for radon levels above the 4 picoCurie/liter standard.
5. There were no visual signs of significant staining or spills around the exterior of the site. The entire site is covered with concrete slabs.

6. It is the opinion of Omega Environmental Services that the environmental risk associated with the subject property is moderate, as is typical for the surrounding area.
7. Based on the industrial history of the surrounding area, general shallow contamination of soils and shallow groundwater is likely (off-site sources).
8. Lots 65, 66, 67, and 68 consisted of residential development prior to 1977.

The Ground-Penetrating Radar (GPR) investigation conducted by Utility Detection, Inc. during February 2013 indicated that there is no evidence of the existence of any underground storage tanks within the accessible areas on the property.

1.5 SUMMARY OF WORK PERFORMED UNDER THE REMEDIAL INVESTIGATION

Taylord Environment, Inc. performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed six soil borings across the entire project Site, and collected eight soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Groundwater monitoring wells were not installed at the Site. Groundwater was not encountered during the RI conducted on January 15, 2013. Depth to bedrock over the Site is six feet;
4. Installed three soil vapor probes around Site perimeter and collected three samples for chemical analysis

1.6 SUMMARY OF FINDINGS OF REMEDIAL INVESTIGATION

1. The elevation of the property is 19 feet.
2. The results of the GPR survey did not identify any anomalies at the Site.

3. Groundwater was not encountered during the January 15, 2013 remedial investigation.

4. The groundwater flow direction was not established at the Site.

5. Bedrock was encountered at 6 feet below grade surface throughout the Site.

6. The stratigraphy of the site, from the surface down, consists of four feet of historic urban fill underlain by two feet of brown medium sand loam. Bedrock was encountered throughout the Site at 6 feet bgs.

7. Soil/fill samples collected during the RI showed that no VOCs were present at detectable concentrations, with the exception of methylene chloride (1.5 ppm in one sample). Six SVOCs were detected in one shallow soil sampling location at concentrations above Restricted Residential SCOs and included benzo(a)anthracene (1.5ppm), benzo(a)pyrene (11ppm), benzo(a)fluoranthene (9.3ppm), benzo(k)fluoranthene (12 ppm), chrysene (3.4 ppm), and dibenzo(k)anthracene (11 ppm). These SVOCs are attributed to PAHs typically found in historic fill material. Five pesticides including 4,4,4-DDD (maximum 0.053ppm), 4,4,4-DDE (maximum 0.037 ppm), 4,4,4-DDT (maximum 0.18 ppm), chlordane (maximum 0.45 ppm), and dieldrin (maximum 0.075 ppm) were detected above Unrestricted Use SCOs. Total PCBs were identified in concentrations exceeding their UUSCOs. Eight Metals including barium (maximum 1,730 ppm), mercury (maximum 1.05 ppm), and lead (maximum 2,880 ppm) were detected above RRSCOs. Hotspots were detected for lead and barium at boring locations SB-1 and SB-6. Cadmium, chromium, copper, nickel, and zinc were also detected in the samples at levels exceeding UUSCOs.

8. Groundwater was not sampled.

9. Soil vapor samples collected during the RI indicated low-level VOCs in all samples. PCE and TCE were detected in the samples at trace levels.

For more detailed results, consult the RI report.

Appendix 1 includes the RIR.

2.0 DESCRIPTION OF REMEDIAL ACTIONS

The Remedial Action was performed in accordance with an OER-approved Remedial Action Work Plan and achieved the Remedial Action Objectives established for the project. The Remedial Action was evaluated in an alternatives analysis and was determined to be protective of human health and the environment, compliant with standards, criteria, and guidelines (SCGs), effective in the short-term, effective in the long-term, capable of attaining appropriate levels of reduction of toxicity, mobility, or volume of contaminated material, implementable, cost effective, acceptable to the community, consistent with land uses, and sustainable.

A summary of the milestones achieved in the Remedial Action is as follows:

- A Pre-Application Meeting was held on November 21, 2012.
- A Remedial Investigation (RI) was performed in January 2013. A RI Report was prepared to evaluate data and information necessary to develop a Remedial Action Work Plan (RAWP).
- A Site Contact List was established. A RAWP was prepared and released with a Fact Sheet in November 2015 for a 30-day public comment period.
- The RAWP and Stipulation List dated November 9, 2015 was approved by the New York City Office of Environmental Remediation (OER) on November 17, 2015.
- OER briefed New York State Department of Environmental Conservation (NYSDEC) and NYC Department of Health (NYCDOHMH) on September 16, 2013.
- A Pre-Construction meeting was held on November 20, 2015.
- A Fact Sheet providing notice of the start of the remedial action was issued in December 2015 for this project.
- The remedial action was begun on March 21, 2016 and completed on February 30, 2017.

Appendix 2 includes the RAWP.

The remedial action consisted of the following tasks:

1) Prepared a Community Protection Statement and performed all required NYC VCP Citizen Participation activities in accordance with the approved Citizen Participation Plan.
2) Mobilized in November 2015, which involved Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
3) Performed Waste Characterization Study prior to excavation activities. Two (2) waste characterization soil samples were collected on December 23, 2015. Waste characterization samples were collected at a frequency dictated by disposal facilities.
4) Performed a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds. CAMP was performed from March 21, 2016 to May 4, 2016. No CAMP exceedances, excessive dust, odors, or PID readings were recorded throughout the excavation.
5) Established Track 4 Site Specific Soil Cleanup Objectives (SCOs). The following Track 4 SCOs were utilized: 750 ppm for barium, 1,000 ppm for lead and 1.5 ppm for mercury.
6) The following excavations were performed: soil was removed to a depth of 4 feet over the entirety of the Site. Additional excavation was performed to a depth of 5 feet in the areas of two hotspots in the south and southwest sections of the site. Lead hazardous soil was removed from WC-1. A total of 527.56 tons of soil was generated during the remediation.
7) Transported and disposed of non-hazardous soil/fill and characteristic hazardous lead fill at permitted facilities in accordance with all applicable laws and regulations for handling, transporting, and disposing, and the RAWP. The following materials were excavated and disposed as:
    i. Excavated 369.28 tons of non-hazardous soil/fill and transported it to Clean Earth, Carteret located at 24 Middlesex Avenue, Carteret, NJ 07008 and
    ii. Excavated 158.28 tons of hazardous characteristic soil/fill and transported to Clean Earth, North Jersey located at 115 Jacobus Avenue, Kearny, NY 07032.

8) Screened excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
9) Conducted materials management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10) Collected and analyzed seven (7) end-point samples to determine attainment of SCOs. The results of the sampling indicated metals, specifically lead and barium still exceeding their site-specific SCOs in EP-6 and EP-7 located in the western portion of the Site. Additional excavation was performed in these areas, but endpoints were not met. OER approved of management in place of the remaining contaminated soils on May 3rd, 2016.
11) Constructed an engineered Composite Cover System consisting of 4 inches of concrete slab underlain by approximately 3 feet of RCA material in building areas. The open yard is partially capped with a 5-inch concrete slab that serves as a patio immediately to the east of the buildings. The remaining open yard has the native material demarcated with a geosynthetic barrier and is overlain by 18 inches of clean top soil and 2.5 feet of bluestone gravel. The composite cover system is in place to prevent human exposure to residual soil/fill remaining under the Site. The contractor for the cover construction was Eurocraft Contracting.
12) Installed a Vapor Barrier System that consisted of a 20-mil Raven Industries Vapor Block Plus- 20 liner beneath the building slab. The contractor for the Vapor Barrier System construction was Eurocraft Contracting Inc.
13) Residual soil is present beneath the cover layer and will be subject to Site Management under this Remedial Action. Residual soil was demarcated using geosynthetic material placed beneath the cover layer and will be subject to Site Management under this Remedial Action.
14) Performed all activities required for the Remedial Action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15) Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.

16) Imported 56 tons of clean soil and 356 tons of RCA material to be used for backfill and cover in compliance with the Remedial Action Work Plan and in accordance with applicable laws and regulations.
17) Submitted daily reports during construction oversight activities. Daily reports were submitted from March 21, 2016 to May 4, 2016.
18) Submitted a Sustainability Report.
19) Submitted this Remedial Action Report (RAR) that describes the Remedial Action, certifies that the remedial requirements defined in the Remedial Action Work Plan have been achieved; defines the Site boundaries; describes all Engineering and Institutional Controls applicable to the Site; and describes any changes from the RAWP.
20) Submitted a Site Management Plan (SMP) in this RAR for long-term management of residual soil, including plans for operation, maintenance, inspection and certification of the performance of Engineering Controls and Institutional Controls. Inspections will be performed annually. Inspection and Certification reports will be submitted by July 30, 2019 (for the reporting period calendar year 2018-2019), July 30, 2020 (for the reporting period calendar years 2019-2020) and every 5 years thereafter (for the reporting period consisting of the 5 prior calendar years). Inspection and Certification Reports will cover all calendar years since the prior reporting period.
21) The property will continue to be registered with an E-Designation by the NYC Department of Buildings. Engineering Controls and Institutional Controls will be managed in compliance with the SMP. Institutional Controls will include prohibition of the following: (1) prohibition of vegetable gardening and farming in residual soil; (2) prohibition of the use of groundwater beneath the site without treatment rendering it safe for the intended use; (3) prohibition of disturbance of residual soil material unless it is conducted in accordance with the SMP; and (4) prohibition of higher levels of land usage than the restricted residential uses addressed by this remedial action without prior notification and approval by OER.

3.0 COMPLIANCE WITH REMEDIAL ACTION WORK PLAN

3.1 CONSTRUCTION HEALTH & SAFETY PLAN

The remedial construction activities performed under this program were in compliance with the Construction Health and Safety Plan and applicable laws and regulations. The Site Safety Coordinators were Erica Johnston and Adam Nasiatka.

3.2 COMMUNITY AIR MONITORING PLAN

The Community Air Monitoring Plan provided for the collection and analysis of air samples during remedial construction activities to ensure proper protections were employed to protect workers and the neighboring community. Monitoring was performed from March 21, 2016 to May 4, 2016 in compliance with the Community Air Monitoring Plan in the approved RAWP. The results of Community Air Monitoring are shown in **Appendix 3**. No CAMP exceedances, excessive dust, odors, or PID readings were recorded throughout the excavation, so no corrective actions were taken.

3.3 SOIL/MATERIALS MANAGEMENT PLAN

The Soil/Materials Management Plan provided detailed plans for managing all soil/materials that were disturbed at the Site, including excavation, handling, storage, transport and disposal. It also included a series of controls to assure effective, nuisance-free remedial activity in compliance with applicable laws and regulations. Remedial construction activities performed under this program were in compliance with the SMMP in the approved RAWP.

3.4 STORM-WATER POLLUTION PREVENTION

Storm water pollution prevention included physical methods and processes to control and/or divert surface water flows and to limit the potential for erosion and migration of Site soils, via wind or water. Remedial construction activities performed under this program were in full compliance with methods and processes defined in the RAWP for

storm water prevention and applicable laws and regulations.

3.5 DEVIATIONS FROM THE REMEDIAL ACTION WORK PLAN

The deviation identified during the remedial actions was the failure to obtain the original site-specific SCOs. As per the original RAWP requirement, the site-specific SCOs were set as 750 ppm for barium, 1,000 ppm for lead and 1.5 ppm for mercury. The actual remedial action was not able to meet these site-specific SCOs for lead and barium in EP-6 and EP-7 and the endpoint samples displayed elevated results for these compounds. This change was accepted by the OER in order to keep the project on schedule and due to the fact that additional excavations have been advanced in the areas where SCO exceedances were identified. Additionally, no further excavation was necessary as part of the development plan.

After careful review of all data and information, it was determined that it would be protective of public health and the environment to manage remaining material in place. The hazardous lead material was removed and remaining fill material would be present under a permanent cover, eliminating any potential for public health exposure. The cover will be inspected and maintained over the long term under a site management plan ensuring that the cover remains intact and functioning as designed. Further, any future excavation on the property would be controlled by continued registration of the E designation and adherence to the soil and materials management plan to ensure safe handling and proper reconstruction of the cover when work was complete. **Appendix 4** provides OER correspondence and approval for this deviation.

Daily and monthly reports were required as a part of the Remedial Action Work Plan. The daily/monthly reports were not submitted from May through July of 2016. The reason for this gap was because work had begun on the building structure above grade therefore CAMP was no longer required. Updates were provided to OER in July 2016.

4.0 REMEDIAL PROGRAM

4.1 PROJECT ORGANIZATION

Principal personnel who will participate in the remedial action include Adam Nasiatka (Project Manager) and Erica Johnston (Project Manager). The Professional Engineer (PE) is Tarek Z. Khouri and Qualified Environmental Professionals (QEP) for this project is Mark E. Robbins.

4.2 SITE CONTROLS

Site Preparation

Site preparation consisted of obtaining utility site clears and the erection of a construction fence. The site was already vacant and mobilization took roughly a day to complete. An OER Project Notice was erected at the project entrance and was in place during all phases of the Remedial Action.

Soil Screening

Visual, olfactory and PID soil screening and assessment was performed under the supervision of a Qualified Environmental Professional and is reported in this RAR. Soil screening was performed during all invasive work performed during the remedy and development phases. Excessive dust, odors, or PID readings were recorded throughout the excavation and soil screening process.

Stockpile Management

Excavated soil from the hazardous lead area was stockpiled separately and was segregated from clean soil and construction materials. Stockpiles were used only when necessary and were removed as soon as practicable. Stockpiles were present on site from March 21, 2016 to April 7, 2016. While stockpiles were in place, they were inspected daily, and before and after every storm event. Results of inspections were recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils were stockpiled on double layers of 8-mil minimum sheeting, were kept covered at all times with appropriately anchored plastic tarps and were routinely inspected. Broken or

ripped tarps were promptly replaced.

All stockpile activities were compliant with applicable laws and regulations. Soil stockpile areas were appropriately graded to control run-off in accordance with applicable laws and regulations.

Truck Inspection

An outbound-truck inspection station was set up immediately at the Site entrance/exit. Before exiting the NYC VCP Site, trucks were required to stop at the truck inspection station and were examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris was removed with a combination of brooms, shovels and potable water. The truck pad consisted of crushed stone and was located in the west-southwestern portion of the Site

Site Security

Site security and access was controlled by a DOB approved construction fence.

Nuisance Controls

Noise control was exercised during the remedial program. All remedial work conformed, at a minimum, to NYC noise control standards.

Rodent control was provided during Site clearing and grubbing, and during the remedial program, as necessary, to prevent nuisances. No complaints or nuisances were observed or reported.

Reporting

Daily reports provided a summary of activities for each day of active (invasive) remedial work were sent to the OER Project Manager by the end of the following day. These reports include:

- Project number and statement of the activities and an update of progress made and locations of work performed;

- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP excursions, if any;
- Photograph of notable Site conditions and activities.

All daily, weekly and monthly reports are included in **Appendix 5**. Digital photographs of the Remedial Action are included in **Appendix 6**. A gap in daily reporting occurred from May 2016 to July 2016 due to work being done on the building structure above grade therefore CAMP was no longer required. Updates were provided to OER in July 2016.

4.3 MATERIALS EXCAVATION AND REMOVAL ACTION

Soil/Fill Excavation and Removal

The excavation for the structural and design elements was to a total depth of 4 feet below grade over the entire Site. Additional excavation was performed in the hotspot areas with endpoint sample exceedances. The depth of excavation in the hotspot areas was 5 feet below grade. A map showing the approximate locations where excavations were performed and approximate thickness of excavated material is shown in **Figure 4**. A total of 527.56 tons of soil were excavated and removed from the property during the Removal Action. Materials removed from the property under this Removal Action is generally classified, as follows: hazardous lead soil, 158.28 tons; non-hazardous soil, 369.28 tons. The quantity of native soil removed from the property is 0 tons. The quantity of native soil recycled using the NYC Clean Soil Bank is 0 tons. The Removal Action was performed under the oversight of Mark E. Robbins (QEP) and Tarek Khouri (PE).
The excavation commenced with the hazardous lead material located in WC-1 being stockpiled on polysheeting in the western portion of the site, while EP samples were collected to show the removal of the hazardous waste as completed. The hazardous material was sent to Clean Earth North Jersey, 115 Jacobus Avenue, Kearny, NJ. Hazardous soil disposal took place on 3/22/2016 and 3/24/2016 with a total of 6 trucks shipped out. Once the EP samples confirmed this, the remainder of WC-1 as well as WC-

2 was disposed of as non-hazardous material. The non-hazardous material was sent to Clean Earth Carteret 24 Middlesex Avenue, Carteret, NJ from April through May 2016.

Onsite Reuse. No onsite soils were reused as part of this remedial project.

Dewatering. Dewatering was not included as part of this remedy and the quantity of fluid dewatered during this project is zero gallons.

Soil Cleanup Objectives

The following Track 4 Site-Specific SCOs were utilized for this project:

Contaminant	Site-Specific SCOs
Barium	750 ppm
Lead	1,000 ppm
Mercury	1.5 ppm

End Point Sample Results

The SCOs for this project were not achieved. Three (3) end point samples were collected from a depth of 2 feet below grade in WC-1 to verify that the hazardous lead material was removed from the Site. These end point samples passed and verified that the hazardous lead material had been removed. EP-4 through EP-7 were collected from a depth of 4 feet below grade in both WC-1 and WC-2 and served as the representative samples for the final depth of excavation. Samples were all collected by hand in pre-cleaned laboratory provided containers. EP-1 through EP-3 were analyzed for TCLP metals only. The remaining EP-4 through EP-7 were analyzed for VOCs in accordance with EPA Method 8260, SVOCs in accordance with EPA Method 8270, Pesticides and PCBs in accordance with EPA Method 8081/8082 and TAL Metals. All end point samples were sent to a NELAP Accredited Laboratory (York Analytical Laboratories) located at 120 Research Drive, Stratford, CT 06615. York Analytical Labs is associated with NELAP #10854 in New York State.

When compared to the site-specific Track 4 SCOs, all end point samples passed for mercury. EP-6 and EP-7 both exceeded the SCOs established for lead (max 1,350 ppm) and barium (max 1,260 ppm). This area is located in the western portion of the Site underneath the constructed building slab. Additional excavation was performed in this area, but it was deemed infeasible to continue excavating to pursue total removal of the hotspot areas**.** Residual concentrations of metals above the Track 4 SCOs established for this property were evaluated to assess the potential for environmental and public health impact. This evaluation shows that the building is protected with an 4-inch building slab and that exceedances in soils were all located underneath the building slab with no potential exposure pathways to occupants of the building. Finally, potential future exposures from soil excavation after the completion of the Remedial Action are addressed by the development and implementation of the Site Management Plan in this RAR. On the basis of this evaluation, management of these soils in place was determined to be protective of public health and the environment.

A map of end-point sample locations is shown in **Figure 5.** A tabular summary of end-point sampling results compared to SCOs is included in **Tables 1** through **5**. Full laboratory reports are included in **Appendix 7**.

The results of the RI conducted by Taylord Environmental, Inc. in September of 2013 provide additional data regarding the soil remaining at the Site. According to the analytical results provided in the RI both SB-1 and SB-2 contained the following TAL metals at concentrations exceeding Track 4-SCOs; barium, chromium, nickel and mercury at depths ranging from 3 to 6 feet below grade. The material between 5 and 6 feet below grade is still present in these areas. The remaining samples collected during the RI are representative of material that has been removed from the Site and is not discussed in further detail. For more information, see previous **Appendix 1** for more information regarding the RI.

4.4 MATERIALS DISPOSAL

Disposal of soil was coordinated with their respective facilities following the collection of the waste characterization samples from the Site. Based upon the analytical results from the waste characterization samples, the facilities selected for disposal were

Clean Earth, North Jersey (CENJ) located at 115 Jacobus Avenue, Kearny, NJ and Clean Earth, Carteret (CEC) located at 24 Middlesex Avenue, Carteret, NJ. The hazardous lead material was shipped to CENJ and the non-hazardous soil/fill was sent to CEC. A total of 158.28 tons of hazardous lead soil was shipped to CENJ and a total of 269.28 tons of non-hazardous soil/fill was shipped to CEC. The soil disposal activity for the hazardous material was conducted between March 22, 2016 and March 24, 2016. The non-hazardous shipment of soil was conducted between April 1, 2016 and April 7, 2016. The type, quantity and disposal location of each material removed and disposed off-Site is presented below:

Disposal Location/Address	Type of Material	Quantity
Clean Earth Carteret 24 Middlesex Avenue, Carteret, NJ	Non-Hazardous Soil	369.28 tons
Clean Earth North Jersey 115 Jacobus Avenue, Kearny, NJ	Characteristic Hazardous Soil	158.28 tons

Letters from Markland 745, LLC to disposal facility providing materials type, source and data, and acceptance letters from disposal facility stating it is approved to accept above materials are attached in **Appendix 8**. Manifests are included in **Appendix 9** Waste characterization report is presented in **Appendix 10**. A breakdown of individual truck transport and material disposal quantities is included in **Appendix 11**.

4.5 BACKFILL IMPORT

Top soil and RCA material were both imported to the Site as part of the redevelopment. Both materials were sourced and obtained from Impact Environmental's Recovery and Reuse Center located at 1000 Page Avenue in Lyndhurst, NJ. The top soils and RCA material were recycled and not native to the facility. Analytical results were obtained from the facility representative of the material destined for the Site. Once verified that the material was acceptable, the results were forwarded to the MOER for their formal approval. No frequency samples were collected as the amount of material

imported was less than 500 cubic yards. The top soil was placed in the rear yard and served as the clean cover which overlays the demarcation barrier. The RCA material was placed between the building foundations and underneath the building slab.

All soil imported to the property achieved the lower of 6NYCRR Part 375-6.8 Groundwater Protection Standards and Restricted Residential Use SCOs.

A table providing the type, quantity and source location of each material relocated on Site is presented below:

Disposal Location/Address	Type of Material	Quantity
Impact Class B Recycling 1000 Page Avenue, Lyndhurst, NJ	RCA	356.590
Impact Class B Recycling 1000 Page Avenue, Lyndhurst, NJ	Clean Top Soil	53.52

Full laboratory reports are included in **Appendix 12**. A map showing backfill placement locations at the Site is shown in **Figure 6**.

4.6 DEMARACTION

Soil below the final cover is residual soil that will be addressed by Site Management under this Remedial Action. Geosynthetic demarcation was used to separate the residual soil at the Site from the clean top soil layer. **Figure 7** provides the location of the demarked area.

5.0 ENGINEERING CONTROLS

Engineering Controls were employed in the Remedial Action to address residual material remaining at the site. The Site has two (2) primary Engineering Control Systems. These are:

(1) Composite Cover System;

(2) Vapor Barrier System.

Composite Cover System

Exposure to residual soil/fill is prevented by an engineered Composite Cover System that has been built on the Site. This Composite Cover System is comprised of 4 inches of concrete slab underlain by approximately 3 feet of RCA material in building areas. The open yard is partially capped with a 5-inch concrete slab that serves as a patio immediately to the east of the buildings. The remaining open yard has the native material demarcated with a geosynthetic barrier and is overlain by 18 inches of clean top soil and 2.5 feet of gravel. The contractor for the Composite Cover System construction was Eurocraft Contracting.

Figure 8 shows the as-built design for each cover type used in the Composite Cover System on this Site. **Figure 7** shows a map of the location of each Composite Cover System type built at the Site. Photographs of construction of the Composite Cover System are included in **Appendix 6**.

Vapor Barrier System

Exposure to soil vapor is prevented by a Vapor Barrier System that has been built on the Site. This Vapor Barrier System consists of a 20-mil Raven Industries Vapor Block Plus- 20 liner beneath the building slab. All penetrations for plumbing, mechanicals and rebar were sealed with the appropriate Vapor Bond Plus Tape. The professional engineer for the Vapor Barrier System was Tarek Khouri. The contractor for the Vapor Barrier System construction was Eurocraft Contracting. **Figure 9**

Figure 10 shows the as-built engineering diagram for the Vapor Barrier System used on this Site. Photographs of installation of the Vapor Barrier System are included in

Appendix 6. A copy of manufacturer's specifications for the Vapor Barrier System is included in **Appendix 13**.

6.0 INSTITUTIONAL CONTROLS

A series of Institutional Controls are required under this Remedial Action to assure permanent protection of public health by elimination of exposure to residual materials. These ICs define the program to operate, maintain, inspect and certify the performance of Engineering Controls and Institutional Controls on this property. These Institutional Controls will be implemented in accordance with the Site Management Plan included in this RAR.

Institutional Controls for this property are:

(1) The property will continue to be registered with an E-Designation by the NYC Department of Buildings. Property owner and property owner's successors and assigns are required to comply with the approved SMP;

(2) Compliance with an OER-approved Site Management Plan including procedures for appropriate operation, maintenance, inspection, and certification of performance of ECs and ICs. The property owner and property owner's successors and assigns will inspect ECs and ICs and submit to OER a written certification that evaluates their performance in a manner and at a frequency to be determined by OER;

(3) Engineering Controls will not be discontinued without prior OER approval;

(4) OER has the right to enter the Site upon notice for the purpose of evaluating the performance of ECs and ICs;

(5) Vegetable gardens and farming in residual soil/fill on the Site are prohibited;

(6) Use of groundwater underlying the Site without treatment rendering it safe for its intended use is prohibited;

(7) All future activities on the Site that will disturb residual soil/fill must be conducted pursuant to the Soil/Materials Management provisions of the SMP, or otherwise approved by OER;

(8) The Site is intended to be used for restricted residential use and will not be used for a higher level of use without prior approval by OER.

7.0 SITE MANAGEMENT PLAN

Site Management is the last phase of the remedial process and begins after the approval of the Remedial Action Report (RAR) and issuance of the Notice of Completion (NOC) by OER. It is the responsibility of the property owner to ensure that all Site Management responsibilities are performed. The penalty for failure to implement the SMP includes revocation of the Notice of Completion and all associated certifications and liability protections providing notice of the revocation to the NYC DOB.

Engineering Controls and Institutional Controls have been incorporated into this Remedial Action to ensure that the site remains protective of public health and the environment. Generally, ECs provide physical protective measures and ICs provide restrictions on Site usage and establish remedial operation, maintenance, inspection and certification measures. This Site Management Plan has been established to govern long-term performance of ECs and ICs for this property.

The SMP provides a detailed description of procedures required to manage residual material at the Site following the completion of remedial construction in accordance with the NYC Voluntary Cleanup Agreement with OER. This includes: (1) operation and maintenance of Engineering Controls; (2) inspection of ECs and ICs; and (3) certification of performance of ECs and ICs.

ENGINEERING CONTROLS

Engineering Controls were employed in the remedial action to address residual materials remaining at the site. The Site has two (2) Engineering Control Systems. Engineering Controls for this property are:

(1) Composite Cover System;

(2) Vapor Barrier System.

Operation and Maintenance of Composite Cover System

Chapter 5 describes the Composite Cover System utilized in this Remedial Action and provides as-built design details and the location of each cover type. The Composite Cover System is a permanent Engineering Control for the Site. The system will be

inspected and its performance certified at specified intervals defined in this SMP. A Soil/Materials Management Plan is included in this Site Management Plan and outlines the procedures to be followed in the event that the composite cover system and underlying residual soil/material must be disturbed after the Remedial Action is complete.

The Composite Cover System does not require any special operation or maintenance activities. If the system is breached during future construction activities [or "normal wear and tear"], the system will be rebuilt by reconstructing the system according to the original design and tying newly constructed cover layers into existing cover layers to form a continuous layer(s).

Operation and Maintenance of Vapor Barrier System

Chapter 5 describes the Vapor Barrier System utilized in this Remedial Action and provides as-built design details and the system location. The Vapor Barrier System is a permanent Engineering Control for the Site. The system will be inspected and its performance certified at specified intervals defined in this SMP.

The Vapor Barrier System does not require any special operation or maintenance activities. If the system is breached during future construction activities, the system will be rebuilt by reconstructing the vapor barrier layers and sealing the newly constructed materials with existing barrier materials in accordance with manufacturer specifications.

INSTITUTIONAL CONTROLS

A series of Institutional Controls are required under this Remedial Action to assure permanent protection of public health by elimination of exposure to residual materials. These ICs define the program to operate, maintain, inspect and certify the performance of Engineering Controls and Institutional Controls on this property. These Institutional Controls will be implemented in accordance with the Site Management Plan included in this RAR.

Institutional Controls are also designed to prevent future exposure to residual soil/materials by controlling disturbances in the subsurface, restricting higher uses of the

property than those addressed by the Remedial Action and establishing restrictions on activities and site usage. Institutional Controls for this property are:

(1) The property will continue to be registered with an E-Designation by the NYC Department of Buildings. Property owner and property owner's successors and assigns are required to comply with the approved SMP;

(2) Compliance with an OER-approved Site Management Plan including procedures for appropriate operation, maintenance, inspection, and certification of performance of ECs and ICs. The property owner and property owner's successors and assigns will inspect ECs and ICs and submit to OER a written certification that evaluates their performance in a manner and at a frequency to be determined by OER;

(3) Engineering Controls will not be discontinued without prior OER approval;

(4) OER has the right to enter the Site upon notice for the purpose of evaluating the performance of ECs and ICs;

(5) Vegetable gardens and farming in residual soil/fill on the Site are prohibited;

(6) Use of groundwater underlying the Site without treatment rendering it safe for its intended use is prohibited;

(7) All future activities on the Site that will disturb residual soil/fill must be conducted pursuant to the Soil/Materials Management provisions of the SMP, or otherwise approved by OER;

(8) The Site is intended to be used for restricted residential use and will not be used for a higher level of use without prior approval by OER.

INSPECTIONS

Engineering Controls and Institutional Controls will be inspected on a periodic basis at a frequency established in this plan. The inspections will evaluate the following:

- If Engineering Controls or Institutional Controls employed at the Site continue to perform as designed and continue to be protective of human health and the environment;

- If anything has occurred that impairs the ability of the Engineering Controls or Institutional Controls to protect public health and the environment;
- If changes are needed to the remedial systems or controls;
- If compliance with this SMP has been maintained;
- If site records are complete and up to date; and
- General Site conditions at the time of inspection.

In addition, if an emergency occurs, such as a natural disaster, or if an unforeseen failure of any of the Engineering Controls occurs, an inspection of the Site will be performed within 30 days to evaluate the Engineering Controls, and a letter report of findings will be submitted to OER.

Inspection of Composite Cover System

- Inspections will include a visual evaluation of all accessible system components. Evidence of active invasive activity through the cover system, or past invasive activity, such as patches and repairs, will be recorded and evaluated. Photographs will be taken and presented in the Report to document findings and evaluate if repairs are necessary.

Inspection of Vapor Barrier System

- Inspections will include a visual evaluation of all accessible system components. Photographs will be taken and presented in the Report to document findings.

Site Use Prohibitions

Inspections to evaluate the status of site use prohibitions will include an evaluation of all of the ICs listed above, including:

- Whether there is vegetable gardening or farming in residual soil/fill;
- Whether groundwater underlying the site has been used without treatment rendering it safe for its intended use;
- Whether activities that have disturbed site soil/fill have been conducted pursuant to the Soil/Material Management provisions of the SMP, or otherwise approved by OER; and

- Whether the site has been used for a higher level of use other than the restricted residential use addressed by the Remedial Action.

INSPECTION AND CERTIFICATION LETTER REPORT

Results of inspections performed during a reporting period and certification of performance of all Engineering Controls and Institutional Controls will be included in an Inspection and Certification Letter Report. Inspections will be performed in 2019, 2020 and every 5 years thereafter. Inspection and Certification Letter Reports will be submitted by July 30, 2019 (for the reporting period calendar years 2018-2019), July 30, 2020 (for the reporting period calendar years 2019-2020) and every 5 years thereafter (for the reporting period consisting of the 5 prior calendar years). Inspection and Certification Reports will cover all calendar years since the prior reporting period. Inspection and Certification Letter Reports will be submitted to OER in digital format. The letter report will utilize a form established by OER. This form includes, at a minimum:

- Date of inspections;
- Personnel conducting inspections;
- Description of the inspection activities performed;
- Observations, conclusions, or recommendations;
- Copy of any monthly inspection forms;
- Photographs; and
- Certification of the performance of Engineering Controls and Institutional Controls executed by the P.E. or QEP responsible for this Inspection and Certification Letter Report, as discussed below.

The certification of the performance of ECs and ICs will establish:

- If Engineering Controls and Institutional Controls employed at the Site continue to be in place, perform as designed and continue to be protective of human health and the environment;
- If anything has occurred that impairs the ability of Engineering Controls or Institutional Controls to protect public health and the environment;

- If changes are needed to the remedial systems or controls;
- If compliance with this Site Management Plan has been maintained;
- If vegetable gardening and farming in residual soils has been prevented;
- If groundwater underlying the Site is being utilized without treatment rendering it safe for the intended purpose has been prevented;
- If activities on the Site that have disturbed residual soil/fill material have been in accordance with the Soil/Materials Management Plan in this SMP;
- If the Site has been used for a higher level of use other than the restricted residential use addressed by the Remedial Action;
- If site records are complete and up to date;
- If the Site continues to be registered as an E-Designated property by the NYC Department of Buildings;

OER may enter the Site upon notice for the purpose of evaluating the performance of ECs and ICs.

NOTIFICATIONS

Notifications will be submitted by the property owner to OER as described below:

- 60-day advance notice of any proposed changes in Site use, such as an upgrade from existing use to commercial use that was not contemplated is the Remedial Action.
- Notice within 30 days of any emergency, such as a fire, flood, or earthquake that has the potential to reduce the effectiveness of Engineering Controls in place at the Site.

SOIL/MATERIALS MANAGEMENT PLAN

Any future intrusive work that will disturb residual soil/fill beneath the property, including modifications or repairs to the existing composite cover system or vapor barrier, will be performed in compliance with this Soil/Materials Management Plan (SMMP). Intrusive work will also be conducted in accordance with the procedures defined in the Community Air Monitoring Plan (CAMP) included in this chapter and a Construction Health and Safety Plan (HASP). The HASP is the responsibility of the property owner and should be in compliance with NYSDEC DER-10 Technical Guide and 29 CFR 1910 and 1926, and all other applicable Federal, State and City regulations. Intrusive construction work should be compliant with this SMMP and described in the next Inspection and Certification Letter Report.

Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional (QEP). Soil screening will be performed during any future intrusive work.

Stockpile Methods

If stockpiles are used to isolate excavated soil they will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 6-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or

equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters, and other discharge points.

Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Excavated soil will only be reused on-site with prior approval by OER.

Materials Excavation, Load-Out and Departure

The PE/QEP overseeing the remedial action will:

- Oversee intrusive work and the excavation and load-out of excavated material;
- Ensure that there is a party responsible for the safe execution of invasive and other work performed under this management plan;
- Ensure that Site maintenance activities and maintenance-related grading cuts will not interfere with, or otherwise impair or compromise the remedial measures established during the remediation construction phase;
- Ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate permits or authorized notifications;
- Ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site; and
- Ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site intrusive work.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible, in order to minimize off Site disturbance.

Outbound truck transport routes are shown on Figure 8. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) an OER Historical Fill Notification Form and letter from the PE/QEP or property owner to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York City under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include, as an

attachment, a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material.

Documentation associated with disposal of all material will include records and approvals for receipt of the material. All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be retained and included in the following Inspection and Certification Report. A manifest system for off-Site transportation of exported materials will be employed. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

Materials Reuse On-Site

All of the non-hazardous soil excavated during any future repair or construction purposes will be placed in the same excavation it was derived from or will be disposed of off-site unless otherwise approved by OER beforehand.

Repair of Remedial Systems

After completion of invasive work, any damage to the engineering controls (composite cover system, vapor barrier, etc.) will be restored to the original condition established during initial construction.

Import of Backfill Soil from Off-Site Sources

In the event that soil importation is needed for the backfilling purposes, this Section presents the requirements for imported fill materials. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives include NYSDEC Part 375 Track 2 Residential SCOs and groundwater protections standards. A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC; and
- Virgin quarried material or other materials with an approved Beneficial Use Determination (BUD) from NYSDEC for reuse as clean fill.
- [Asphalt Millings from approved Park Department facilities?]

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this SMP. The Inspection and Certification Letter Report will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.

Source Screening and Testing

Inspection of imported fill material will include visual, olfactory, and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material from the identified clean soil sources will be taken at a minimum frequency of one sample for every 500 cubic yards of material. One composite sample will be collected form each source of virgin quarried material or other material with an NYSDEC approved BUD, unless otherwise approved by OER. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements, is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) without fines may be imported from facilities permitted or registered by NYSDEC. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA will not be used as cover material.

Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported, and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP

regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. If discharge to the City sewer system is not feasible, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility or some other means compliant with applicable laws and regulations. Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by NYSDEC.

Storm-water Pollution Prevention

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. All existing storm-water systems will be inspected to ensure proper operation.

Odor Control

All necessary means will be employed to prevent on- and off-Site odor 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) use of foams to cover exposed odorous soils. If odors develop and cannot be controlled by these means, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

The odor control plan must be capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP.

Dust Control

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles;
- Use of properly anchored tarps to cover soil/fill stockpiles;
- Exercise extra care during dry and high-wind periods; and
- Use of asphalt millings, gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

If nuisance dust emissions are identified, work will be halted and the source of dust will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEPs.

Noise

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

COMMUNITY AIR MONITORING PLAN

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

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

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the

immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

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

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down.

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

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable

of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

If the downwind PM-10 particulate level is 100 micrograms per cubic meter (µg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 µg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 µg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

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

CONTINGENCY PLAN

This contingency plan is developed for the remedial construction or repair work to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

Emergency Telephone Numbers

In the event of any emergency condition pertaining to these remedial systems, the Owner's representative(s) should contact the appropriate parties from the contact list below. Prompt contact should also be made to Mark E. Robbins. These emergency contact lists must be maintained in an easily accessible location at the Site.

Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center: 3 day notice required for utility mark-out	(800) 272-4480
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

Contact Numbers

Mark E. Robbins (QEP)	(631) 462-5866
Office of Environmental Remediation	(212) 788-8841; 311

8.0 SUSTAINABILITY REPORT

This Remedial Action provided for sustainable remediation through a variety of means that are defined in this Sustainability Report.

Reuse of Clean, Recyclable Materials and Conservation of Natural Resources. Reuse of clean, recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction since these materials can be locally-derived.

Conservation of non-renewable resources was achieved by utilizing recycled materials for backfill. An estimate of the tonnage of recycled material reused on this project is 356.590 tons of RCA and 53.52 tons of recycled top soil.

Conversion to Clean Fuels. Use of clean fuel improves NYC's air quality by reducing harmful emissions. Natural gas is utilized as the principal fuel in the new building.

Recontamination Control. Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later that could impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site. Recontamination controls consisting of the vapor barrier and composite cover system are in place. If recontamination were to occur from off-site sources, these controls would be in place to protect the Site and its future occupants.

The area of the Site that utilizes recontamination controls under this plan is 6,700 square feet.

Storm-water Retention. Storm-water retention improves water quality by lowering the rate of combined storm-water and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters. An estimate of area of the property for which enhanced storm-water retention capability has been established for the redevelopment project is 1,368.375 square feet.

Paperless Brownfield Cleanup Program. Markland 745, LLC participated in OER's paperless Voluntary Cleanup Program. Under this program, submission of electronic documents replaced submission of hard copies for the review of project documents, communications and milestone reports. A best estimate of the mass (pounds) of paper saved under this plan is 20 pounds.

Low-Energy Project Management Program. Markland 745, LLC participated in OER's low-energy project management program. Under this program, whenever possible, meetings were held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation. A gross estimate of the number of miles of personal transportation that was conserved in this process is 700 miles.