# 504 MYRTLE AVENUE

**BROOKLYN, NEW YORK**

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# Remedial Action Report

**NYC VCP Project Number 13CVCP110K**
**E-Designation Project Number 11EH-N358K**

**Prepared For:**

504 Myrtle Residential Owner, LLC
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**AUGUST 2017**

# REMEDIAL ACTION REPORT

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# LIST OF ACRONYMS

| Acronym | Definition |
|---|---|
| CAMP | Community Air Monitoring Plan |
| 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 |
| RCA | Recycled Concrete Aggregates |
| 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, Shaik A. Saad, 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 504 Myrtle Avenue site, site number 13CVCP110K.
- 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 February 2013 and Stipulations in letters dated June 6, 2013 and January 7, 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 SHAIK SAAD

PE License Number 071078

Signature

Date 8/19/17

PE Stamp

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 504 Myrtle Avenue site, site number 13CVCP110K.
- The OER-approved Remedial Action Work Plan dated February 2013 and Stipulations in a letter dated June 6, 2013 and January 7, 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 8/19/17

# EXECUTIVE SUMMARY

504 Myrtle Residential Owner, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 504 Myrtle Avenue (aka 504-524 Myrtle Avenue) in the Clinton Hill section in Brooklyn, New York. A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop a Remedial Action Work Plan (RAWP). A remedial action was performed pursuant to the OER-approved RAWP in a manner that has rendered the Site protective of public health and the environment consistent with the proposed use of the property. 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 and applicable laws and regulations.

**Site Location and Background**

The Site is located at 504 Myrtle Avenue (aka 504-524 Myrtle Avenue) in the Clinton Hill section in Brooklyn, New York and is identified as Block 1905 and Lot 30 on the New York City Tax Map. This Site was identified as Site B in the OER-approved Remedial Action Work Plan dated February 2013. The Site is 24,500-square feet in size and was developed with a 1-story commercial building with localized partial basements. Six commercial units were located at the Site, of which, three units were vacant and the remaining units were occupied by a dry cleaner, a retail store and a United States Post Office ("USPO"). All units were vacated prior to Site redevelopment. The Site is bounded by Myrtle Avenue to the north, public easements and multi-story mixed commercial and residential buildings to the east and west and a multi-story residential coop to the south.

**Summary of Redevelopment Plan**

The new development at the Site consists of an 8-story mixed commercial-residential use building with a full basement. The ground floor is designed for commercial use and the upper floors consist of 143 residential apartments. The basement

is designated as a below grade parking garage and mechanical rooms. The building is serviced with two elevators located in one elevator bank situated in the north central portion of the Site. This development was identified in the February 2013 RAWP as Site B and is connected on the second floor with the west-adjacent new development, located at 490 Myrtle Avenue, which is identified in the RAWP as Building A or Site A. The two buildings will share a lobby and all building systems. The basement at the Site provides the required parking for Building A.

The entire Site was excavated for the basement layout. Consistent with an east-declining topography of the Site and its vicinity, the western portion of the Site was excavated to the depth of 13 feet 8 inches bgs and the eastern portion was excavated to the depth of 12 feet bgs. Additional localized excavation was performed in the west-adjacent easement to the depth of 3 feet bgs for the layout of footings of building parapet and for the ceiling over the easement. A pit for an elevator bank in the north central portion of the Site was excavated to 17 feet bgs. The basement foundations consisted of 3-foot thick spread footings poured below a layer of backfill consisting of 6-inch RCA beneath the parking space and 6-inch bluestone beneath the elevator bank and mechanical rooms. The backfill was capped with a 6-inch thick mat slab poured across the entire basement floor and on top of the ramp to below grade parking garage. No landscaped or open areas exist on the Site. The building occupies the entire footprint of the lot.

**Summary of Description of Surrounding Property**

The Site is located in a commercial and residential neighborhood. There are no surface water bodies or regulated wetlands on or adjacent to the Site. Myrtle Avenue is located to the north of the Site; a 6-story commercial and residential building is located to the east, a 7-story commercial and residential building is located to the west; and a 16-story residential co-op complex is located to the south.

Within 500 feet radius of the Site, there are a variety of land uses including: commercial, industrial, institutional (Pratt Institute), public park, residential (multi-story residential apartments) and mixed-residential/commercial use. Properties located within

1/4 mile radius of the Site are R5A, R6A, R7A, R7-1 and R8A residential districts with C-2-2 and C2-4, commercial overlay, and M1-2 manufacturing district.

A sensitive receptor identified as a medical office "Olga Badem, MD" exists within 200 feet to the west of Site. The land uses include commercial and residential use.

**Summary of Past Site Uses and Areas of Concern**

Based upon the review of the Fire Insurance Maps and Regulatory Agency documents from the Phase I Environmental Site Assessment (ESA) Reports prepared by Singer Environmental Group, LTD and Hydro Tech Environmental, Corp. in April 2010, July 2012 and November 2012, a Site history was established. The Site was historically developed with 3-stroy residential buildings prior to 1887 and two 1-story commercial buildings since 1950. Commercial uses of environmental concern consisted of drycleaners at 504-510 Myrtle Avenue (western portion of the Site) from approximately 1992 to 2014.

The AOCs identified for this Site include:

- Presence of historic fill material
- historic dry cleaning operations
- Presence of suspect underground storage tanks
- Presence of chlorinated solvents in groundwater
- Presence of potential vapor encroachment conditions

**Summary of the Work Performed under the Remedial Investigation**

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a Ground Penetrating Radar (GPR) survey;
3. Installed ten (10) soil borings at Site B, and collected twelve (12) soil samples for chemical analysis from the soil borings to evaluate soil quality; these included four (4) soil samples collected below the localized basements

floors including samples from zero to 2 feet, 4 to 6 feet, 7 to 8 feet, and 8 to 10 feet and eight (8) samples collected below the slabs on grade including five samples from zero to 2 feet and three samples collected from 9 to 10 feet, 12 to 14 feet and 13 to 14 feet.

4. Installed three (3) off-site groundwater monitoring wells including two wells at Site A to establish groundwater flow and collected four (4) groundwater samples for chemical analysis to evaluate groundwater quality;

5. Installed one (1) sub-slab and three (3) soil vapor probes around the perimeter of Site and collected four (4) samples for chemical analysis.

6. One (1) indoor air and one (1) outdoor air sample was collected at the Site for chemical analysis.

**Summary of Findings of Remedial Investigation**

1. Elevation of the property is approximately 56 feet.
2. Depth to groundwater ranges from 46.9 to 49.9 feet at the Site.
3. The GPR survey identified no UST anomalies across accessible portions in the central and western portions of the Site;
4. Groundwater flow is generally from northeast to southwest beneath the Site.
5. Depth to bedrock is in excess of 70 feet at the Site. Cobbles and boulders were encountered between 20 and 35 feet bgs.
6. The stratigraphy of the Site, from surface down, consists of historic fill ranging in thickness from zero to 9 feet (brown coarse- to fine-grained sand with varying amounts of silt and gravel). The fill layer is underlain by a layer of silt to variable depths ranging from 22 to 25 feet bgs (light brown sand with varying amount of silt). The silt layer is underlain by a layer of sand and gravel to an approximate depth of 72 feet.

7. Soil/fill samples collected during the RI showed no PCB contamination in both shallow and deep soil samples at Site. VOCs were detected in shallow and deep soil samples at concentrations that fell below Track 1 Unrestricted Use SCOs. PCE was detected in in 4 of 6 shallow samples (maximum 58 µg/kg). PCE did not occur in any of the 6 deep samples. Acetone was detected in 1 shallow soil sample (39 µg/kg). SVOCs were detected in 5 of 6 shallow samples. SVOCs did not occur in the deep samples. SVOC's including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene were detected 2 of 6 shallow soil samples at concentrations that exceeded the Restricted Use (Track 2) Residential SCOs. Total SVOCs in shallow soils at Site B ranged from none detected to 19,758 µg/kg. The SVOC's are PAH compounds and are attributed to the presence of historic fill material at the property. Pesticides including Endrin (maximum of 1,800 µg/kg), DDD (maximum 5.64 µg/kg), DDE (maximum of 340 µg/kg) and DDT (maximum of 2,900 µg/kg) were detected in 4 of 6 shallow soil samples at Site B and in 2 shallow and 1 deep soil samples at Site A at concentrations above the Track 1 SCOs, with DDT also exceeded the Track 2 Residential SCO in 1 shallow soil sample at Site B. Metals including lead (maximum of 1,960 mg/kg), barium (maximum of 1,270 mg/kg), chromium trivalent (maximum of 48.6 mg/kg), copper (maximum of 132 mg/kg), mercury (maximum of 1.1 mg/kg), nickel (maximum of 38.2 mg/kg) and zinc (maximum of 725 mg/kg) were detected in 5 of 6 shallow soil samples at concentrations above Track 1 SCOs, and of these, barium, chromium, lead and mercury also exceeded the Track 2 Residential SCOs. In deeper soils, nickel (maximum of 39 mg/kg), mercury (maximum of 0.187 mg/kg), chromium trivalent (maximum of 30.6 mg/kg) and manganese (maximum of 5,680 mg/kg) were detected in 2 deep samples at concentrations above Track 1 SCOs, and of these, only manganese exceeded the Track 2 Residential SCOs. Manganese was also detected in 1 deep sample concentration above the Track 2 Residential SCOs.
8. Groundwater samples collected during the RI showed 2 chlorinated VOCs including PCE (maximum of 18 ug/l) and chloroform (maximum of 10.7 ug/l) in

2 of the 3 monitoring wells installed around the Site. PCE was detected in 2 wells and chloroform was detected in 1 well at concentrations exceeding 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). PCE was detected in soil samples on the property and therefore the presence of chlorinated VOCs in groundwater beneath the Site is likely to be attributed to the historic dry cleaning operations at the property. No SVOCs, pesticides or PCBs were detected in groundwater samples. Two dissolved metals including iron and Sodium were detected in groundwater beneath the Site above GQS, which are likely to reflect a regional impact.

9. Sub slab and soil vapor samples collected during the RI showed a wide range of compounds throughout the property including BTEX and associated derivative compounds and chlorinated hydrocarbons. BTEX and associated derivatives were found in all soil vapor samples and included a wide number of compounds. Concentrations of these compounds generally fell below 260 ug/m3. These compounds were not identified in soil or groundwater on the property and are not believed to be associated with an onsite source area. Chlorinated hydrocarbons are also commonly observed in soil vapor samples at high concentrations across the Site. PCE was found in all samples and occurred in high concentrations ranging from 69.8 ug/$m^3$ to a maximum of 4,200 ug/$m^3$. TCE was found in 10 of the 11 vapor samples collected and ranged from 0.59 ug/$m^3$ to a maximum of 29 ug/$m^3$. A variety of other chlorinated hydrocarbon compounds are identified in many soil vapor samples. The most significant concentrations for these compounds occurred for chloroform (maximum 120 ug/$m^3$), and acetone (maximum 161 ug/$m^3$).

10. Indoor air sample collected during the RI identified BTEX and associated compounds and chlorinated hydrocarbons. PCE and TCE were detected in indoor air sample at trace concentrations (maximum of 5 ug/$m^3$) and also occurred in outdoor air at much lower concentrations (maximum 1.5 ug/$m^3$). Acetone was also detected at high concentration with a maximum of 78 ug/$m^3$. The much lower

concentrations of chlorinated hydrocarbons in the outdoor air and their presence in soil vapors would suggest that indoor air concentrations are associated with an on-site source of chlorinated solvents.

**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 in December 2012. A Remedial Investigation (RI) was performed from August 2011 to November 2012. 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 draft RAWP was prepared and released with a Fact Sheet on February 5, 2013 for a 30-day public comment period. The RAWP and Stipulation List dated June 6, 2013 and January 7, 2015, respectively, were approved by the New York City Office of Environmental Remediation (OER) on March 27, 2015. A Pre-Construction Meeting was held on April 29, 2015. A Fact Sheet providing notice of the start of the remedial action was issued on March 2015. The remedial action was begun in May 2015 and completed in June 2016.

The remedial action consisted of the following tasks:

1. Prepared a Community Protection Statement and implemented a Citizen Participation Plan.
2. Mobilized site security and equipment; completed utility mark outs; and marked and staked excavation areas.
3. Performed Waste Characterization Study prior to excavation activities. Ten (10) waste characterization soil samples were collected on January, 29, 2015, May 19 and 28, 2015. In addition, twenty seven (27) waste delineation samples of

hazardous lead hot spot were collected on March 4, 2015. Waste characterization samples were collected at a frequency dictated by disposal facility(s).

4. Performed a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
5. Established Track 4 Site Specific Soil Cleanup Objectives (SCOs). The following Track 4 SCOs were utilized: total SVOC (500 ppm); lead (750 ppm), chromium trivalent (50 ppm), nickel (200 ppm), and mercury (2 ppm).
6. The following excavations were performed: soil was removed to a depth of 13 feet 8 inches bgs in the western portion of the Site and to the depth of 12 feet bgs in the eastern portion, consistent with an east-declining topography of the Site vicinity. A hot spot of hazardous lead contaminated soil was removed from the western portion of the Site within an irregular-shaped area extending in length from the northern to southern Site boundaries and expanding in width between 30 feet to 40 feet. The hazardous lead soil was removed to the depth of 3 feet in the northern and central portions and to the depth of 5 feet bgs in the southern portion. A total of 16,015.06 tons of soil/fill was excavated and removed from the property. In addition, former buildings foundations were removed and disposed of as construction and demolition (C&D) material.
7. Excavated 10,032.22 tons of non-hazardous soil/fill and transported it to PPark NJ, LLC located at 100 Planten Avenue in Prospect Park, New Jersey, excavated 2,780.10 tons of non-hazardous unregulated soil/fill and transported it to Former New Jersey Zinc West Plant located at 1120 Mauch Chunk Road, in Palmerton, Pennsylvania, excavated 1,971.42 tons of non-hazardous regulated soil/fill and transported it to Former New Jersey Zinc West Plant located at 1120 Mauch Chunk Road, in Palmerton, Pennsylvania; excavated 812.39 tons of petroleum contaminated soil/fill and transported it to Bayshore Soil Management LLC located at 75 Crows Mill Road in Keasbey, New Jersey; and excavated 418.93 tons of hazardous characteristic soil/fill and transported it to Republic Environmental Systems Inc. (PA) a Stericycle Environmental Solutions Company located at 2869 Sandstone Drive in Hatfield Pennsylvania.

8. Screened excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. No organic vapors (<0.1 ppm) or visual/olfactory evidence of contamination were identified in the excavated soil at the Site.
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. This task was completed in accordance with the soil material management plan in the RAWP.
10. Appropriately segregated excavated media onsite prior to disposal. Transported and disposed all soil/fill material at permitted facilities in accordance with all applicable laws and regulations for handling, transporting, and disposing, and the RAWP. This task was completed without issues.
11. Collected and analyzed seven (7) end-point samples to determine attainment of Track 4 SCOs for SVOCs and metals. The 7 end-point samples were also analyzed for the full suite of analytical methods of VOCs, SVOCs, Pesticides, PCBs and TAL Metals to determine attainment of Track 2 Restricted Residential SCOs. Track 2 Restricted Residential SCOs were achieved.
12. Removed one (1) 1,080-gallon number 2 fuel oil UST beneath the southeastern portion of the Site during excavation activities in compliance with applicable laws and regulations. A total of 420 gallons of liquid was removed from the UST by a Vacuum Truck and disposed at a licensed facility by Rapid Waste Disposal, Inc. located at 444 Tiffany Avenue in Bronx, NY.
13. Constructed an engineered Composite Cover System consisting of 6 inches of concrete slab installed across the entire basement floor of the building. The 6-inch slab is underlain by 6 inches of ¾-inch RCA beneath the parking space and 6 inches of ¾-inch bluestone below the remaining non-parking slab. The contractor for the Composite Cover System construction was Sky Materials located at 57-00 47$^{th}$ Street in Maspeth, New York.
14. Installed a Vapor Barrier System that consisted of 46-mil thick Grace Preprufe® 300R membrane beneath mat slab across the footprint of the building and a 32-

mil thick Grace Preprufe® 160R membrane and 59-mil Bituthene 4000 on the foundation sidewalls at the property lines. All penetrations through the slab for utility lines were sealed utilizing Grace Liquid Bituthene. The contractor for the Vapor Barrier System construction was Sky Materials located at 57-00 47th Street in Maspeth, New York.

15. Installed and operated an active Sub-Slab Depressurization System consisting of a closed loop utilizing fabric wrapped 4-inch Schedule 40 perforated PVC pipes. The perforated PVC pipes are aligned horizontally beneath the slab of mechanical and storage rooms located in the north-central portion of the basement. The horizontal pipes are attached to a common vertical pipe that traverse the building slab, with vapors conveyed via a 4-inch cast iron pipe aligned vertically through the building and vented above the roof of the building. A Radon Away G-501 model fan was installed inline above the roof level. An alarm system, a manometer and two sub-slab vacuum monitoring points were installed in an accessible area in the basement floor to enable measurement of the vacuum pressure established by the system. The contractor for the Active Sub-Slab Depressurization System construction was Sky Materials located at 57-00 47th Street in Maspeth, New York.
16. Installed and operated an air exchange system to provide continuous ventilation of the sub-grade parking area as required by NYC Building Code.
17. Performed all activities required for the Remedial Action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
18. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
19. Imported 476.61 tons of ¾-inch blue stone to be used as backfill behind northern and eastern foundation walls and as a porous substrate beneath the building mat foundation slab in the north central portion of the Site in compliance with a sub-slab vapor mitigation plan in the RAWP and accordance with applicable laws and

regulations. The blue stone was provided by Quality Aggregates in Brooklyn from Rawson Materials - Quarry Plant #5, located at 6 Kennedy Dr. in Putnam Connecticut.

20. Imported 392 cubic yards of processed ¾-inch recycled concrete aggregate to backfill beneath the building slab of the sub-grade parking space at the Site. This material was provided from Evergreen Recycling of Corona located at 125-50 Northern Boulevard in Flushing New York and also from Cons-Trux LLC located at 690 Muncy Street in Lindenhusrt, New York.
21. Submitted daily, weekly and monthly reports during construction oversight activities. Daily reports were submitted from May 26, 2015 to June 30, 2016.
22. Submitted a Sustainability Report.
23. Submitted an 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.
24. Submitted a Site Management Plan (SMP) 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, 2018 (for the reporting period calendar year 2017-2018), July 30, 2019 (for the reporting period calendar years 2018-2019) and every year thereafter (for the reporting period consisting of the prior calendar year). Inspection and Certification Reports will cover all calendar years since the prior reporting period.
25. 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

504 Myrtle Residential Owner, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 504 Myrtle Avenue (aka 504-524 Myrtle Avenue) in the Clinton Hill section of Brooklyn , New York. The boundary of the property subject to this Remedial Action includes, in its entirety, Brooklyn Block 1905 and Lot 30. 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 504 Myrtle Avenue (aka 504-524 Myrtle Avenue) in the Clinton Hill section in Brooklyn, New York and is identified as Block 1905 and Lot 30 on the New York City Tax Map. This Site was identified as Site B in the OER-approved Remedial Action Work Plan dated May 6, 2013. The Site Location Map is shown in Figure 1. The Site is 24,500-square feet in size and prior to development, consisted of a 1-story commercial building with localized partial basements. Six commercial units were located at the Site, of which, three units were vacant and the remaining units were occupied by a dry cleaner, a retail store and a United States Post Office (“USPO”), which were vacated prior to Site redevelopment. The Site is bounded by Myrtle Avenue to the north, public easements and multi-story mixed commercial and residential buildings to the east and west and a multi-story residential coop to the south. The Site Boundary Map is shown in Figure 2.

## 1.2 REDEVELOPMENT PLAN

The new development at the Site consists of an 8-story mixed commercial-residential use building with a full basement. The ground floor is designed for commercial use and the upper floors consist of 143 residential apartments. The basement is designated as a below grade parking garage and mechanical rooms. The building is serviced with two elevators located in one elevator bank situated in the north central portion of the Site. This development was identified in the May 2013 RAWP as Site B and is connected on the second floor with the west-adjacent new development, which is also identified in the RAWP as Building A and located at 490 Myrtle Avenue (Site A). The two buildings will share a lobby and all building systems. The basement at Site B provides the required parking for Building A.

The entire Site was excavated for the basement layout. Consistent with an east-declining topography of the Site vicinity, the western portion of the Site was excavated to the depth of 13 feet 8 inches bgs and the eastern portion was excavated to the depth of 12 feet bgs. This Site excavation was originally proposed in the May 2013 RAWP to the depth of 11 feet bgs and in the Stipulation list dated June 29, 2015 to 11 feet 10 inches bgs. Additional localized excavation was performed in the west-adjacent easement to the depth of 3 feet bgs for the layout of footings of building parapet for the ceiling over the easement. A pit for an elevator bank in the north central portion of the Site was excavated to 17 feet bgs. The basement foundations consisted of 3-foot thick spread footings poured below a layer of backfill consisting of 6-inch RCA beneath the parking space and 6-inch bluestone beneath the elevator bank and mechanical rooms. The backfill was capped with a 6-inch thick mat slab poured across the entire basement floor and on top of the ramp to below grade parking garage. No landscaped or open areas exist on the Site. The building occupies the entire footprint of the lot.

A map showing the new Development Plan is provided in Figure 3.

## 1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located in a commercial and residential neighborhood. There are no surface water bodies or regulated wetlands on or adjacent to the Site. Myrtle Avenue is

located to the north of the Site; a 6-story commercial and residential building is located to the east, a 7-story building commercial and residential building is located to the west; and a 16-story residential co-op complex is located to the south.

Within 500 feet radius of the Site, there are a variety of land uses including: commercial, industrial, institutional (Pratt Institute), public park, residential (multi-story residential apartments) and mixed-residential/commercial use. Properties located within 1/4 mile radius of the Site are R5A, R6A, R7A, R7-1 and R8A residential districts with C-2-2 and C2-4, commercial overlay, and M1-2 manufacturing district.

A sensitive receptor identified as a medical office "Olga Badem, MD" exists within 200 feet to the west of Site. The land uses include commercial and residential use.

## 1.4 SUMMARY OF PAST SITE USES AND AREAS OF CONCERN

Based upon the review of the Fire Insurance Maps and Regulatory Agency documents from the Phase I Environmental Site Assessment (ESA) Reports prepared by Singer Environmental Group, LTD and Hydro Tech Environmental, Corp. in April 2010, July 2012 and November 2012, a Site history was established. The Site was historically developed with 3-stroy residential buildings prior to 1887 and two 1-story commercial buildings since 1950. Commercial uses of environmental concern consisted a drycleaners at 504-510 Myrtle Avenue (western portion of the Site) from approximately 1992 to 2014.

The AOCs identified for this Site include:

- Presence of historic fill material
- historic dry cleaning operations
- Presence of suspect underground storage tanks
- Presence of chlorinated solvents in groundwater
- Presence of potential vapor encroachment conditions

## 1.5 SUMMARY OF WORK PERFORMED UNDER THE REMEDIAL INVESTIGATION

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a Ground Penetrating Radar (GPR) survey;
3. Installed ten (10) soil borings at Site B, and collected twelve (12) soil samples for chemical analysis from the soil borings to evaluate soil quality; these included four (4) soil samples collected below the localized basements floors including samples from zero to 2 feet, 4 to 6 feet, 7 to 8 feet, and 8 to 10 feet and eight (8) samples collected below the slabs on grade including five samples from zero to 2 feet and three samples collected from 9 to 10 feet, 12 to 14 feet and 13 to 14 feet.
4. Installed three (3) off-site groundwater monitoring wells including two wells at Site A to establish groundwater flow and collected four (4) groundwater samples for chemical analysis to evaluate groundwater quality;
5. Installed one (1) sub-slab and three (3) soil vapor probes around the perimeter of Site and collected four (4) samples for chemical analysis.
6. One (1) indoor air and one (1) outdoor air samples were collected at the Site for chemical analysis.

## 1.6 SUMMARY OF FINDINGS OF REMEDIAL INVESTIGATION

1. Elevation of the property is approximately 56 feet.
2. Depth to groundwater ranges from 46.9 to 49.9 feet at the Site.
3. The GPR survey identified no UST anomalies across accessible portions in the central and western portions of the Site;
4. Groundwater flow is generally from northeast to southwest beneath the Site.

5. Depth to bedrock is in excess of 70 feet at the Site. Cobbles and boulders were encountered between 20 and 35 feet bgs.

6. The stratigraphy of the Site, from surface down, consists of historic fill ranging in thickness from zero to 9 feet (brown coarse to fine grained sand with varying amounts of silt and gravel). The fill layer is underlain by a layer of silt to variable depths ranging from 22 to 25 feet bgs (light brown sand with varying amount of silt). The silt layer is underlain by a layer of sand and gravel with to approximate depth of 72 feet.

7. Soil/fill samples collected during the RI showed no PCBs contamination in both shallow and deep soil samples at Site. VOCs were detected in shallow and deep soil samples at concentrations that fell below Track 1 Unrestricted Use SCOs. PCE was detected in in 4 of 6 shallow samples (maximum 58 µg/kg). PCE did not occur in any of the 6 deep samples. Acetone was detected in 1 shallow soil sample (39 µg/kg). SVOCs were detected in 5 of 6 shallow samples. SVOCs did not occur in the deep samples. SVOC's including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene were detected 2 of 6 shallow soil samples at concentrations that exceeded the Restricted Use (Track 2) Residential SCOs. Total SVOCs in shallow soils at Site B ranged from none detected to 19,758 µg/kg. The SVOC's are PAH compounds and are attributed to the presence of historic fill material at the property. Pesticides including Endrin (maximum of 1,800 µg/kg), DDD (maximum 5.64 µg/kg), DDE (maximum of 340 µg/kg) and DDT (maximum of 2,900 µg/kg) were detected in 4 of 6 shallow soil samples at Site B and in 2 shallow and 1 deep soil samples at Site A at concentrations above the Track 1 SCOs, with DDT also exceeded the Track 2 Residential SCO in 1 shallow soil sample at Site B. Metals including lead (maximum of 1,960 mg/kg), barium (maximum of 1,270 mg/kg), chromium trivalent (maximum of 48.6 mg/kg), copper (maximum of 132 mg/kg), mercury (maximum of 1.1 mg/kg), nickel (maximum of 38.2 mg/kg) and zinc (maximum of 725 mg/kg) were detected in 5 of 6 shallow soil samples at concentrations above Track 1 SCOs,

and of these, barium, chromium, lead and mercury also exceeded the Track 2 Residential SCOs. In deeper soils, nickel (maximum of 39 mg/kg), mercury (maximum of 0.187 mg/kg), chromium trivalent (maximum of 30.6 mg/kg) and manganese (maximum of 5,680 mg/kg) were detected in 2 deep samples at concentrations above Track 1 SCOs, and of these, only manganese exceeded the Track 2 Residential SCOs. Manganese was also detected in 1 deep sample concentration above the Track 2 Residential SCOs.

8. Groundwater samples collected during the RI showed 2 chlorinated VOCs including PCE (maximum of 18 ug/l) and chloroform (maximum of 10.7 ug/l) in 2 of the 3 monitoring wells installed around the Site. PCE was detected in 2 wells and chloroform was detected in 1 well at concentrations exceeding 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). PCE was detected in soil samples on the property and therefore the presence of chlorinated VOCs in groundwater beneath the Site is likely to be attributed to the historic dry cleaning operations at the property. No SVOCs, pesticides or PCBs were detected in groundwater samples. Two dissolved metals including iron and Sodium were detected in groundwater beneath the Site above GQS, which are likely to reflect a regional impact.

9. Sub slab and soil vapor samples collected during the RI showed a wide range of compounds throughout the property including BTEX and associated derivative compounds and chlorinated hydrocarbons. BTEX and associated derivatives were found in all soil vapor samples and included a wide number of compounds. Concentrations of these compounds generally fell below 260 ug/m3. These compounds were not identified in soil or groundwater on the property and are not believed to be associated with an onsite source area. Chlorinated hydrocarbons are also commonly observed in soil vapor samples at high concentrations across the Site. PCE was found in all samples and occurred in high concentrations ranging from 69.8 ug/$m^3$ to a maximum of 4,200 ug/$m^3$. TCE was found in 10 of the 11 vapor samples collected and ranged from 0.59 ug/$m^3$ to a maximum of 29 ug/$m^3$. A variety of other chlorinated hydrocarbon compounds are identified in many soil

vapor samples. The most significant concentrations for these compounds occurred for chloroform (maximum 120 ug/$m^3$), and acetone (maximum 161 ug/$m^3$).

10. Indoor air sample collected during the RI identified BTEX and associated compounds and chlorinated hydrocarbons. PCE and TCE were detected in indoor air sample at trace concentrations (maximum of 5 ug/$m^3$) and also occurred in outdoor air at much lower concentrations (maximum 1.5 ug/$m^3$). Acetone was also detected at high concentration with a maximum of 78 ug/$m^3$. The much lower concentrations of chlorinated hydrocarbons in the outdoor air and their presence in soil vapors would suggest that indoor air concentrations are associated with an on-site source of PVEC.

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 during December 2012. A Remedial Investigation (RI) was performed between August 2011 and November 2012. 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 on February 5, 2013 for a 30-day public comment period. The RAWP and Stipulation Lists dated June 6, 2013 and January 7, 2015 were approved by the New York City Office of Environmental Remediation (OER) on March 27, 2015. A Pre-Construction meeting was held on April 29, 2015. A Fact Sheet providing notice of the start of the remedial action was issued in March 2015. The remedial action was begun in May 2015 and completed in June 2016. Appendix 2 includes the RAWP.

The remedial action consisted of the following tasks:

1. Prepared a Community Protection Statement and implemented a Citizen Participation Plan.
2. Mobilized site security and equipment; completed utility mark outs; and marked and staked excavation areas.
3. Performed Waste Characterization Study prior to excavation activities. Ten (10) waste characterization soil samples were collected on January, 29, 2015, May 19 and 28, 2015. In addition, twenty seven (27) waste delineation samples of

hazardous lead hot spot were collected on March 4, 2015. Waste characterization samples were collected at a frequency dictated by disposal facility(s).

4. Performed a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
5. Established Track 4 Site Specific Soil Cleanup Objectives (SCOs). The following Track 4 SCOs were utilized: total SVOC (500 ppm); lead (750 ppm), chromium trivalent (50 ppm), nickel (200 ppm), and mercury (2 ppm).
6. The following excavations were performed: soil was removed to a depth of 13 feet 8 inches bgs in the western portion of the Site and to the depth of 12 feet bgs in the eastern portion, consistent with an east-declining topography of the Site vicinity. A hot spot of hazardous lead contaminated soil was removed from the western portion of the Site within an irregular-shaped area extending in length from the northern to southern Site boundaries and expanding in width between 30 feet to 40 feet. The hazardous lead soil was removed to the depth of 3 feet in the northern and central portions and to the depth of 5 feet bgs in the southern portion. A total of 16,015.06 tons of soil/fill was excavated and removed from the property. In addition, former buildings foundations were removed and disposed of as construction and demolition (C&D) material.
7. Excavated 10,032.22 tons of non-hazardous soil/fill and transported it to PPark NJ, LLC located at 100 Planten Avenue in Prospect Park, New Jersey, excavated 2,780.10 tons of non-hazardous unregulated soil/fill and transported it to Former New Jersey Zinc West Plant located at 1120 Mauch Chunk Road, in Palmerton, Pennsylvania, excavated 1,971.42 tons of non-hazardous regulated soil/fill and transported it to Former New Jersey Zinc West Plant located at 1120 Mauch Chunk Road, in Palmerton, Pennsylvania; excavated 812.39 tons of petroleum contaminated soil/fill and transported it to Bayshore Soil Management LLC located at 75 Crows Mill Road in Keasbey, New Jersey; and excavated 418.93 tons of hazardous characteristic soil/fill and transported it to Republic Environmental Systems Inc. (PA) a Stericycle Environmental Solutions Company located at 2869 Sandstone Drive in Hatfield Pennsylvania.

8. Screened excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. No organic vapors (<0.1 ppm) or visual/olfactory evidence of contamination were identified in the excavated soil at the Site.
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. This task was completed in accordance with the soil material management plan in the RAWP.
10. Appropriately segregated excavated media onsite prior to disposal. Transported and disposed all soil/fill material at permitted facilities in accordance with all applicable laws and regulations for handling, transporting, and disposing, and the RAWP. This task was completed without issues.
11. Collected and analyzed seven (7) end-point samples to determine attainment of Track 4 SCOs for SVOCs and metals. The 7 end-point samples were also analyzed for the full suite of analytical methods of VOCs, SVOCs, Pesticides, PCBs and TAL Metals to determine attainment of Track 2 Restricted Residential SCOs. Track 2 Restricted Residential SCOs were achieved.
12. Removed one (1) 1,080-gallon number 2 fuel oil UST beneath the southeastern portion of the Site during excavation activities in compliance with applicable laws and regulations. A total of 420 gallons of liquid was removed from the UST by a Vacuum Truck and disposed at a licensed facility by Rapid Waste Disposal, Inc. located at 444 Tiffany Avenue in Bronx, NY.
13. Constructed an engineered Composite Cover System consisting of 6 inches of concrete slab installed across the entire basement floor of the building. The 6-inch slab is underlain by 6 inches of ¾-inch RCA beneath the parking space and 6 inches of ¾-inch bluestone below the remaining non-parking slab. The contractor for the Composite Cover System construction was Sky Materials located at 57-00 47$^{th}$ Street in Maspeth, New York.
14. Installed a Vapor Barrier System that consisted of 46-mil thick Grace Preprufe® 300R membrane beneath mat slab across the footprint of the building and a 32-

mil thick Grace Preprufe® 160R membrane and 59-mil Bituthene 4000 on the foundation sidewalls at the property lines. All penetrations through the slab for utility lines were sealed utilizing Grace Liquid Bituthene. The contractor for the Vapor Barrier System construction was Sky Materials located at 57-00 47th Street in Maspeth, New York.

15. Installed and operated an active Sub-Slab Depressurization System consisting of a closed loop utilizing fabric wrapped 4-inch Schedule 40 perforated PVC pipes. The perforated PVC pipes are aligned horizontally beneath the slab of mechanical and storage rooms located in the north-central portion of the basement. The horizontal pipes are attached to a common vertical pipe that traverse the building slab, with vapors conveyed via a 4-inch cast iron pipe aligned vertically through the building and vented above the roof of the building. A Radon Away G-501 model fan was installed inline above the roof level. An alarm system, a manometer and two sub-slab vacuum monitoring points were installed in an accessible area in the basement floor to enable measurement of the vacuum pressure established by the system. The contractor for the Active Sub-Slab Depressurization System construction was Sky Materials located at 57-00 47th Street in Maspeth, New York.
16. Installed and operated an air exchange system to provide continuous ventilation of the sub-grade parking area as required by NYC Building Code.
17. Performed all activities required for the Remedial Action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
18. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
19. Imported 476.61 tons of ¾-inch blue stone to be used as backfill behind northern and eastern foundation walls and as a porous substrate beneath the building mat foundation slab in the north central portion of the Site in compliance with a sub-slab vapor mitigation plan in the RAWP and accordance with applicable laws

and regulations. The blue stone was provided by Quality Aggregates in Brooklyn from Rawson Materials - Quarry Plant #5, located at 6 Kennedy Dr. in Putnam Connecticut.

20. Imported 392 cubic yards of processed ¾-inch recycled concrete aggregate to backfill beneath the building slab of the sub-grade parking space at the Site. This material was provided from Evergreen Recycling of Corona located at 125-50 Northern Boulevard in Flushing New York and also from Cons-Trux LLC located at 690 Muncy Street in Lindenhusrt, New York.
21. Submitted daily, weekly and monthly reports during construction oversight activities. Daily reports were submitted from May 26, 2015 to June 30, 2016.
22. Submitted a Sustainability Report.
23. Submitted an 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.
24. Submitted a Site Management Plan (SMP) 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, 2018 (for the reporting period calendar year 2017-2018), July 30, 2019 (for the reporting period calendar years 2018-2019) and every year thereafter (for the reporting period consisting of the prior calendar year). Inspection and Certification Reports will cover all calendar years since the prior reporting period.
25. 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 Paul I. Matli and Frank Maressa.

## 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 May 26, 2015 to March 24, 2016 in compliance with the Community Air Monitoring Plan in the approved RAWP. Action levels for VOCs were not exceeded while performing the CAMP during invasive work at the Site. The results of Community Air Monitoring are shown in Appendix 3.

## 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

Deviations in the remedial activities from the OER approved RAWP, RAWP Stipulation Lists and subsequent communications and approvals by OER took place during Site development as follows:

1. Proposed excavation across the Site was planned to the depth of 11 feet 10 inches. Consistent with an east-declining topography of the Site vicinity, the western portion of the Site was excavated to the depth of 13 feet 8 inches bgs and the eastern portion was excavated to the depth of 12 feet bgs. This deviation was not communicated to OER
2. A localized excavation was performed in the west-adjacent easement to the depth of 3 feet bgs for the layout of footings of building parapet for the ceiling over the easement; this deviation was communicated to OER via deviation via electronic correspondence dated January 27, 2016.
3. Proposed active Sub-Slab Depressurization System (SSDS) beneath areas of the building slab where ventilated sub-grade parking is not present consisted of two sub-slab suction pits. Due to potential miscommunication of the negative pressure between the suction pits and the target area of influence that might be caused by the orientation of the building footings and elevator pit, actual SSDS consisted of a closed loop of fabric wrapped 4-inch Schedule 40 perforated PVC pipes. The loop of perforated PVC pipes was installed horizontally beneath the subject area

and connected through manifolds to an individual riser. This deviation was communicated with OER deviation via electronic correspondence dated August 27, 2015.

4. Remedial objective for this Site consisted of Track 4 Site Specific SCOs. Only one (1) confirmation post-excavation end-point sample showed one individual concentration of nickel detected at 43 ppm which exceeded of Track 1 SCOs of 30 ppm by fell below the Track 2 Restricted Residential SCO of 140 ppm and the Site-specific Track 4 SCO of 200 ppm. This residual concentration of this metal exceeding the Track 1 SCO was evaluated to assess the potential for environmental and public health. This evaluation shows that the new development is protected with a 6-inch slab across the building footprint, which occupies the entire Site perimeter with no potential exposure pathways to occupants of the building. Similarly, despite this elevated metal concentration, groundwater does not exhibit exceedance of Groundwater Quality Standards for this metal and there is no associated public health or environmental exposures. On the basis of this evaluation, the site remediation did achieve the Track 2 Restricted Residential objective for soil. OER approved this deviation via electronic correspondence dated March 6, 2017.

   Appendix 4 provides correspondences with OER regarding approved deviations.

# 4.0 REMEDIAL PROGRAM

## 4.1 PROJECT ORGANIZATION

Principal personnel who participated in the remedial action included Paul I. Matli, Project Geologist and Rachel Ataman, Vice President of Technical Services. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Shaik Saad and Mark E. Robbins, respectively. The General Contractor who was in charge of all phases of Site remedial excavation and construction was Cava Construction and Development, which was then acquired by Omnibuild Construction.

## 4.2 SITE CONTROLS

### Site Preparation

Prior to the start of remedial activities, all necessary construction and dewatering permits were acquired and maintained on-site as per as per the NYCDOB rules and regulations. No site clearing and site grubbing of organic matter (wood, roots, stumps, etc.) or other solid waste were required prior to all remedial work.

Prior to the start of remedial activities, a pre-construction meeting was held with all contractors in April 2015. Fencing around the site perimeter was performed during May 2015. An OER Project Notice was erected at the project entrance and was in place during all phases of the Remedial Action.

### Soil Screening

All excavated soil was examined for visual/olfactory evidence of petroleum contamination and for organic vapors utilizing a PID. No organic vapors or visual/olfactory evidence of contamination were identified in the excavated soil.

### Stockpile Management

Hazardous lead soil delineated as a hot spot at shallow depth in the western portion of the Site was initially excavated and disposed of. Soil screening for hazardous disposal

during excavation required temporary stockpiling in the northeastern portion until loaded onto trucks. Trucks hauling hazardous lead soil were staged on a north-adjacent asphalt paved street running parallel to Myrtle Avenue. Soil stockpiles were placed directly on 6-mil poly-sheeting and covered at all times with appropriately anchored plastic tarps. Former building foundations consisting of bricks were screened on-site from fine debris and were temporarily stockpiled for disposal as C&D. This task was completed in accordance with the soil material management plan in the RAWP.

**Truck Inspection**

Truck inspection and cleaning was performed for all trucks prior to exiting the Site. Where necessary, a tracking pad consisting of minimum 6 inches of RCA aggregates was laid at the entrance to the Site from Myrtle Avenue to the north. Trucks hauling contaminated soil/fill material were inspected prior to leaving the Site for any debris adhering to their surface and a thorough cleaning including brushing and rinsing tires with water was performed when necessary in order to prevent any tracking of soil/fill into surrounding community. Hauling trucks were covered in order to control the generation of fugitive dust and leakage of contaminated material during transport.

**Site Security**

Site security was maintained in accordance to NYCDOB code.

**Nuisance Controls**

All necessary means were employed to prevent dust, odor and vapor nuisances during the remedial excavation, disposal of soil/fill material, and the closure and removal of USTs. Such measures included shrouding stockpiled material with plastic tarp and a supply of water from the nearest fire hydrant for application over dry surfaces to reduce dust generation and for mist applications to suppress potential odor and vapors.

No odors or vapors were generated or identified during remedial work.

**Reporting**

Reports providing a general summary of invasive activities, materials import, soil management (soil stockpiling, removal for disposal, etc.), and inspections conducted during installation of engineering controls were provided to the NYCOER Project

Manager for each day of active remedial work. The daily report frequency was reduced to a weekly report documenting the vapor barrier installation in last quarter of May 2015 and to monthly reporting during June and July 2016 to document the import and placement of backfill around foundation walls. Daily, weekly and monthly daily reports were submitted from May 25, 2015 to July 29, 2016 and excluded days without invasive or remedial activities.

All daily, weekly and monthly reports are included in Appendix 5. Digital photographs of the Remedial Action are included in Appendix 6.

## 4.3 MATERIALS EXCAVATION AND REMOVAL ACTION

### Soil/Fill Excavation and Removal

The soil excavation encompassed the entire Site perimeter and was performed at variable depths: to 13 feet 8 inches from grade in the eastern portion; to 12 feet from grade in the eastern portion and to 17 feet from grade for the elevator pit in the north-central portion. A hazardous lead soil hotspot was removed from the western portion of the Site. This hazardous lead soil hotspot was delineated within an irregular-shaped area pursuant to a focused waste characterization sampling performed around the source of hazardous lead identified in the initial waste characterization sampling. This hot spot extended in length from the northern to southern Site boundaries and expanded in width between 30 feet to 40 feet. The hazardous lead soil was removed to the depth of 3 feet in the northern and central portions of the hot spot area and to the depth of 5 feet bgs in the southern portion. Excavation for localized spread footings was performed to the depth of 3 feet from the bottom of site excavation. Additional excavation was performed in the west-adjacent easement to the depth of 3 feet bgs for the layout of footings of a building parapet over the easement. A total of 16,015.06 tons of soil/fill material was excavated and removed from the property. In addition, a total of thirty five loads of concrete footings of former building at the Site were removed during site excavation activities and disposed of as construction and demolition (C&D) material.

The Site excavation proceeded by first removing the top 3 feet from grade across the eastern portion of the Site May 26, 2015 to July 20, 2015. The hazardous lead hot spot situated in the western portion of the Site was removed to depths of 3 feet and 5 feet from grade from May 27, 2015 to June 24 2015. Deep excavation then proceeded from the western portion of the Site toward the eastern portion from July 23, 2015 to November 6, 2015. An elevator pit was excavated beneath the north-central portion to the depth of 17 feet from grade on October 5, 2015. Additionally, a localized excavation was performed in the west-adjacent easement to the depth of 3 feet bgs for the layout of footings of building parapet extending over this easement on March 24 and 25, 2016. No groundwater was encountered during the Site excavation. End points samples were collected over 24 hours after completing the excavation.

Table 1 provides disposal quantities and disposal facilities. A map showing the location where excavations were performed including the hotspots removed in this Removal Action is shown in Figure 4.

**Onsite Reuse**

No onsite reuse of excavated material occurred during this remedial action.

**UST Removal**

Tank removal at the Site was performed as part of the NYCVCP cleanup activities. One 1,080-gallon UST historically utilized for the storage of number 2 fuel oil was closed and removed on May 28, 2015 during remedial soil excavation activities in the southeastern portion of the Site by Mercury Tank and Pump Service, Inc. located at 233 Nevins Street in Brooklyn, NY. The tank was not registered with the NYSDEC Petroleum Bulk Storage (PBS) unit as it is considered unregulated. An FDNY tank removal affidavit was obtained. The UST was buried in dirt at 3 feet bgs without concrete encasement. The tank contained liquid consisting of number 2 fuel oil mixed with water and two 5-gallon bags of sand. A total 420 gallons of waste liquids were removed by a vacuum truck and properly disposed of at Rapid Waste Disposal, Inc. located at 444 Tiffany Avenue in Bronx, NY in accordance with federal, state and local regulations.

Following content removal, the tank was excavated utilizing the bucket of excavator and placed on poly sheeting and securely covered until disposal. No evidence of leaking petroleum or contamination related to a spill was identified during the removal of the UST. The excavated tank was cut open and cleaned prior to its disposal of as scrap metal at TNT Scrap Metal located at 340 Maspeth Avenue in Brooklyn, NY. At the conclusion of the UST closure activity, four (4) sidewall and one (1) bottom end point soil samples were collected in accordance with NYSDEC DER-10. The endpoint samples were designated as EP-UST1 to EP-UST-5 and were analyzed for VOCs by EPA Method 8260 and SVOCs by EPA Method 8270. No VOCs were detected at elevated concentrations in any end point samples. SVOCs were detected in three sidewall end point samples at concentrations below Track 1 UUSCOs.

The approximate location of the former UST is shown in Figure 4. FDNY tank removal affidavit is included in Appendix 7. Liquid Disposal Manifest is provided in Appendix 8. UST closure end point samples results are provided in Tables 2. Full laboratory reports of UST closure end point samples are included in Appendix 9.

**Dewatering**

Groundwater was not encountered during site remedial excavation and therefore, no dewatering occurred during Site construction

**Soil Cleanup Objectives**

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

| **Contaminant** | **Site-Specific SCOs** |
|---|---|
| Total SVOCs | 500 ppm |
| Lead | 750 ppm |
| Mercury | 2 ppm |
| Chromium trivalent | 50 ppm |
| Nickel | 200 ppm |

**End Point Sample Results**

The SCOs for this project were achieved. Seven (7) end-point samples identified as EP-1 to EP-7 were obtained from the bottom of Site excavation following completion of soil removal. The end point samples were collected at variable depths ranging between 13 feet and 17 feet from grade. In order to evaluate attainment of Track 2 SCOs throughout the site, the 7 end-point samples were analyzed for VOCs by EPA 8260, SVOCs by EPA Method 8270, pesticides by EPA 8081, PCBs by EPA 8082 and Target Analyte List metals, per the January 2015 RAWP Stipulation list.

The RI provided data for five (5) soil samples designated SP-2 to SP-6, which were collected at potential locations around the Site at depth intervals ranging from 12 to 17 feet from grade, consistent with the depth of the final excavation at the Site. These samples were also analyzed for full range of compounds including VOCs, SVOCs, pesticides, PCBs and Target Analyte List metals.

Analytical results for all these listed soil samples were compared to the 6NYCRR Part 375, Table 6.8(b) Track 2 Restricted Residential Use SCOs and the Site-Specific (Track 4) SCOs:

The Track 2 Restricted Residential Use SCOs for this project were achieved as discussed below.

All VOCs, SVOC pesticides, PCBs and metals concentrations in all end point and the RI samples complied with the site-specific Track 4 SCOs. Among these compounds, only one metal, nickel, was detected in one endpoint sample EP-4 collected beneath the elevator pit in the north-central portion of the Site at a concentration 43 ppm that marginally exceeded its Unrestricted Use SCOs of 30 ppm. This detected nickel concentration is below both the Track 2 Restricted residential SCO of 140 ppm and the Site-specific Track 4 SCO of 200 ppm.

The individual residual concentration of nickel exceeding the Unrestricted Use SCOs was evaluated to assess the attainment of Track 2 SCOs at this site. This evaluation shows that the building is protected with a 6-inch mat slab beneath the building and any potential for soil vapor intrusion is being mitigated via a continuous ventilation in the

sub-grade parking and an active SSDS beneath the non-parking basement space with no potential exposure pathways to occupants of the building or other site users. Similarly, despite elevated soil concentrations, groundwater does not exhibit exceedance of Groundwater Quality Standards for these metals and also there is no aqueous phase mobility of these metals and there is no associated public health or environmental exposures. 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 post-excavation end-point sampling results compared to SCOs is included in Table 3. A tabular summary of RI sampling results compared to SCOs is included in Table 4. Full laboratory reports of end point samples are included in Appendix 9.

## 4.4 MATERIALS DISPOSAL

The type, quantity and disposal location of each material removed and disposed off-Site is presented below:

| Disposal Location/Address | Type of Material | Quantity |
|---|---|---|
| PPark NJ, LLC located at 100 Planten Avenue in Prospect park, New Jersey | Non-Hazardous Soil | 10,032.22 tons |
| Former New Jersey Zinc West Plant located at 1120 Mauch Chunk Road, in Palmerton, Pennsylvania | Non-Hazardous Soil - Unregulated | 2,780.10 tons |
| Former New Jersey Zinc West Plant located at 1120 Mauch Chunk Road, in Palmerton, Pennsylvania | Non-Hazardous Soil - Regulated | 1,971.42 tons of non-hazardous |
| Republic Environmental Systems Inc. (PA) a Stericycle Environmental Solutions Company located at 2869 Sandstone Drive in Hatfield Pennsylvania | Characteristic Hazardous Soil | 418.93 tons |

| | | |
|---|---|---|
| Bayshore Soil Management LLC located at 75 Crows Mill Road in Keabey New Jersey | Petroleum Contaminated Soil | 812.39 tons |
| Calverton Industries located at 4331 Middle Country Road, Claverton New York | C&D | 35 loads |

Letters from 504 Myrtle Residential Owner, LLC via Hydro Tech 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 10. Manifests and C&D tickets are included in Appendix 11. A table of individual truck transport and material disposal quantities is included in Table 1.

## 4.5 BACKFILL IMPORT

As part of remedial construction activities a 6-inch layer of ¾-inch aggregate was required beneath building foundations and slab for structural related purposes. This aggregate layer was composed of RCA beneath the sub-grade parking space and ramp and of bluestone beneath the non-parking areas. In addition, ¾-inch bluestone backfill was required behind the foundation walls along Myrtle Avenue to the north and along the west-adjacent easement of the Site.

A total of 476.61 tons of ¾-inch blue stone was brought to the Site for use as backfill behind northern and western foundation walls and also as a porous substrate beneath the building mat foundation slab for the active SSDS. The blue stone was provided by Quality Aggregates in Brooklyn from Rawson Materials - Quarry Plant #5, located at 6 Kennedy Dr. in Putnam Connecticut.

A total of 392 cubic yards of processed ¾-inch RCA was brought to the Site for use as backfill beneath the building slab of the sub-grade parking space. This material was provided from Evergreen Recycling of Corona located at 125-50 Northern Boulevard

in Flushing New York and also from Cons-Trux LLC located at 690 Muncy Street in Lindenhusrt, New York.

A table of all sources of backfill with quantities for each source is shown in Table 5. Appendix 12 provides information on the imported RCA and bluestone backfill.

## 4.6 DEMARACTION

Despite the fact that the Site soil cleanup virtually achieved Track 1 SCOs, overall Site cleanup has achieved the Track 2 SCOs, and as such no engineering cover system or demarcation will be required under this Remedial Action. The achievement of Track 2 SCOs was communicated with OER and is discussed in Section 3.5.

# 5.0 ENGINEERING CONTROLS

Engineering Controls were employed in the Remedial Action to address residual soil vapor remaining at the site. The Site has three (3) primary Engineering Control Systems. These are:

(1) Composite Cover System;

(2) Vapor Barrier System;

(3) Sub-Grade Ventilation System/Active Sub-Slab Depressurization System.

**Composite Cover System**

The Composite Cover System installed as part of development, is comprised of concrete building slabs, which consist of a 6-inch reinforced mat slab foundation poured on top of a 6-inch layer of ¾-inch aggregate placed at the bottom of excavation. The contractor for the Composite Cover System construction was Sky Materials located at 57-00 47th Street in Maspeth, New York.

Photographs of construction of the Composite Cover System are included in Appendix 6. Appendix 13 shows the as-built design for each cover type used in the Composite Cover System on this Site. Figure 6 shows a map of the location of each Composite Cover System type built at the Site.

**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 46-mil thick Grace Preprufe® 300R membrane installed on top of a 6-inch layer of ¾-inch aggregate placed at the bottom of excavation across the basement. Preprufe® 300R membrane was installed under the building spread footings and extended horizontally beyond the mat slab and then one foot up vertically against the exterior side of the foundation walls. The Preprufe® 300R was then extended to grade on the outside perimeter of the foundation walls utilizing 32-mil thick Grace Preprufe® 160R membrane on the sides of foundation walls along the southern and eastern property boundaries and 59-mil Bituthene 4000 along the sides of foundation walls along the northern and western proper boundaries. All penetrations

through the Preprufe membrane were sealed by utilizing Grace Liquid Bituthene and Grace tape. The professional engineer for the Vapor Barrier System was Shaik Saad, P.E. The contractor for the Vapor Barrier System construction was Sky Materials located at 57-00 47th Street in Maspeth, New York .

Photographs of installation of the Vapor Barrier System are included in Appendix 6. Appendix 13 shows the as-built engineering diagram for the Vapor Barrier System used on this Site. A copy of manufacturer's specifications for the Vapor Barrier System is included in Appendix 14.

**Sub-Grade Ventilation System/Active Sub-Slab Depressurization System**

The sub-grade parking garage in the basement at the Site is equipped with an air exchange system to provide continuous ventilation to the sub-grade parking area as required by NYC Building Code ventilation that prevents the buildup of any vapors within the structure.

Exposure to soil vapor is prevented beneath the non-parking space of the basement by a Sub-Slab Depressurization System (SSDS) that has been built on the Site. This SSDS consists of one loop of fabric wrapped schedule 40 perforated 4-inch PVC pipes aligned horizontally beneath the northern area of the building slab where ventilated sub-grade parking is not present. The fabric wrapped schedule 40 perforated 4-inch PVC pipes were embedded within the 6-inch thick layer of ¾-inch blue stone placed at the bottom of excavation. The system loop of perforated pipes was connected to lateral schedule 40 non-perforated 4-inch PVC pipes and then to a vertical riser pipe consisting of 4-inch cast iron. Vapors from beneath the slab are collected in the lateral, perforated pipes and vented via the riser to a Radon Away High Suction In-Line Radon Fans (model GP-501) permanently mounted at a minimum of 10 feet on an exhaust stack above the finished roof of the building. The SSDS piping terminates with a vertical condensate bypass, discharging at least 10 feet from air intakes of HVAC systems or from operable windows. The radon fan on the roof are hardwired to the building electrical system. This system is equipped with a visible and audible Vacuum Monitor/Alarm with electronic light and audio when suction fails (model 28001-2)

indicating loss of system vacuum or malfunctioning and a visible Dwyer Magnehelic dial type vacuum gauge (model 2004-M). The SSDS alarm and gauges are mounted directly on a solid PVC riser protruding from the slab in a storage room in the sub-grade floor of the building. Stickers indicating the content of the riser pipes, purpose of alarm, and in case of emergency contact number for responsible individual for immediate assistance are mounted on the visible portion of the SSD system that consist of 4-inch cast-iron risers extending form from the solid PVC riser in the sub-grade floor of the building up to the rooftop mounted fans. As part of the SSD system installation, two pressure monitoring probes were permanently installed beneath the vapor barrier and were terminated in the slab with limited access manhole cover situated in the two utility rooms in the basement of the building. Each pressure monitoring probe consisted of a 3-inch long stainless steel filter installed in layer of ¾-inch blue stone and connected to the surface via a ¼-inch PVC pipe equipped with a manual shut-off valve.

Prior to SSDS start-up, the PE for the Remedial Action and QEP of Hydro Tech inspected the system for proper functioning and the system has been in full operation since March 4, 2016. Post-system start-up inspection was performed by the PE for the Remedial Action and the QEP of Hydro Tech on October 24, 2016 without the presence of OER representative. During this inspection, the vacuum reading at the visible Dwyer Magnehelic dial type vacuum gauge was measured at -0.2 inches H2O utilizing a digital manometer. The vacuum reading at the two sub-slab pressure test points of the SSD system was -0.01 and -0.009 inches H2O. No organic vapors (0.1 ppm) were detected at the effluent of the active SSDS utilizing a PID.

A Post-Construction Meeting was held at the Site on July 12, 2017 in the presence of OER representatives, representatives of 504 Myrtle Residential Owner, LLC, the QEP of Hydro Tech and the building Superintendent. During this meeting, the components of the SSD system were observed and the proceeding for conducting of monthly inspections of the system was discussed with the building Superintendent.

The design engineer for the Active SSDS is Shaik Saad, P.E.. The contractor for underground piping construction of the active SSDS was Sky Materials located at 57-00 47th Street in Maspeth, New York. The contractor for the construction of aboveground risers and equipment was Omnibuild Construction located at 213 W. 35th Street, 7th Floor New York, NY 10001 .

Figure 6 provides the layout of the engineering controls installed beneath the new development. Appendix 13 provides a certified statement of ECs and certified as-built plans of vapor barrier and active SSDS. Appendix 14 provides contractors installation affidavit and purchase receipts of the installed vapor barrier system active SSDS. Photographs showing the installation of the Active SSDS and vapor barrier are shown in Appendix 6.

# 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 the potential for soil vapor intrusion beneath the Site. The Site has three (3) Engineering Control Systems. Engineering Controls for this property are:

1. Composite Cover System;
2. Vapor Barrier System;
3. Sub-Grade Ventilation System/Active Sub-Slab Depressurization 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. The Site Management Plan outlines the procedures to be followed in the event that the composite cover system 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 due to 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.

**Operation and Maintenance of Sub-Grade Parking Garage Ventilation and Active Sub-Slab Depressurization System**

Section 5 describes the ventilation of the sub-grade parking area and the active Sub-Slab Depressurization System utilized in this Remedial Action and provides as-built design details and the system location. The sub-grade parking garage ventilation and the SSDS are permanent Engineering Control for the Site. These systems will be inspected and their performance certified at specified intervals defined in this SMP.

The Active SSDS will be operated and maintained as prescribed below.

- The sub-grade parking garage ventilation and SSDS should be monitored for physical wear and damage and other operational problems, making component replacements as necessary. Any blockages in riser or discharge piping or vacuum alarm, vacuum gauge tubing or carbon monoxide alarms should be cleared.
- Operation of vacuum alarms/monitors (red and green indicator lights, audible alarm) should be verified by disconnecting tubing from riser pipe and noting that loss of vacuum is detected as indicated by the triggering of the red indicator light and audible alarm.
- Operation of vacuum gauges of the SSDS should be verified by disconnecting tubing from riser pipe and noting if the indicator moves to zero and checking high and low pressure ports to see if they are plugged correctly.
- Proper seal should be maintained in riser pipe penetrations in concrete slab. Riser pipe connections at fan should be free of leaks and fan mounts should be in proper condition. The proper seal around the riser pipe connections and penetrations with slab should be verified utilizing a Smoke-Pen.

Appendix 13 provides certified as-built plans. Appendix 15 provides Operator Manuals of SSDS alarms, gauges and fans and ventilation system components in parking garage.

**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. 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**

Composite cover inspection shall include observations of the conditions of the concrete building slab and the concrete slab in the west-adjacent easement. The composite covers will be inspected for cracks, holes or other openings. Any cracks, holes, openings or other alterations in the composite cover that are observed during the EC inspection will be recommended to be immediately filled and/or sealed as necessary.

**Inspection of Vapor Barrier System**

The Vapor Barrier System is completely enclosed and unless the concrete slab above the vapor barrier is removed, EC inspections of the vapor barrier cannot be made. Observations of the concrete slab will be made to determine if cracks and gaps are visible. The seams and edges of exposed sections of vapor barrier, if any, shall be inspected in addition to the presence of holes in the vapor barrier. Additional vapor barrier tape or sealant will be recommended to repair holes in the vapor barrier or if there is missing sealant along the vapor barrier edges or seams. The concrete slab shall be replaced over the exposed sections of vapor barrier once necessary repairs have been made.

**Inspection of Sub-Grade Parking Garage Ventilation and Active Sub-Slab Depressurization System**

Sub-Grade Parking Garage Ventilation inspection shall include:

- Monitor the air circulation around ventilation ducts in basement as an indicator of proper functioning of the ventilation system
- Monitor the level of carbon monoxide in parking garage
- Verify operation of carbon monoxide alarms installed inside the parking garage
- Inspect ventilation motor for any signs of wear and tear

Active SSDS inspection shall include:

- Observe visible components (fan, vacuum alarm/monitor, vacuum gauge, tubing, riser pipe, etc.) for physical wear, damage and operational issues, and replace as necessary;
- Remove any blockages in vacuum alarm/monitor and gauge tubing and riser pipe taps;
- Verify operation of vacuum alarm/monitor (red and green indicator lights, audible alarm) by disconnecting tubing from riser pipe and noting if the red indicator light and audible alarm turn on;
- Verify operation of vacuum gauge by disconnecting tubing from riser pipe and noting if the indicator moves to zero (check high and low pressure ports to see if they are plugged correctly);
- Inspect riser pipe penetrations in concrete slab for proper seal;
- Inspect riser pipe connections at fan for leaks and tightness;
- Inspect power to fan by operating dedicated switch;
- Inspect fan mounts.

Inspections of the sub-grade ventilation system and the active SSDS will be performed on monthly basis by building superintendent staff. Inspections will be performed to determine that these systems are operating and that there are no obvious signs of damage that would require repair. The QEP will provide training for the building superintendent staff for performance of the monthly inspections and will provide an inspection checklist to be filled out by building superintendent staff during each inspection. These checklists will be maintained on premises as a record of inspection and will be available for OER inspection. Monthly inspection checklists will be compiled and evaluated by the QEP during routine annual inspections for evidence of compliance with these requirements.

Appendix 16 provides the monthly and annual EC inspection checklist.

**Site Use Prohibitions**

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

- Whether groundwater underlying the site has been used without treatment rendering it safe for its intended use;
- 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 2018, 2019 and, every year thereafter. Inspection and Certification Letter Reports will be submitted by July 30, 2018 (for the reporting period calendar years 2017-2018), July 30, 2019 (for the reporting period calendar years 2018-2019) and every year thereafter (for the reporting period consisting of the prior calendar year). 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 groundwater underlying the Site is being utilized without treatment rendering it safe for the intended purpose has been prevented;
- 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 residential 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, 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.

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 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. Exceedences of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

### VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be

performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be 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 ($\mu g/m^3$) 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 $\mu g/m^3$ 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 $\mu g/m^3$ 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 $\mu g/m^3$ 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:<br>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 (Hydro Tech Env. Corp.) | (631) 462-5866 |
| Office of Environmental Remediation | (212) 788-8841; 311 |

# 8.0 SUSTAINABILITY REPORT

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

**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.

The area of the Site that utilizes recontamination controls under this plan is 24,500 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 24,500 square feet.

**Paperless Brownfield Cleanup Program.** 504 Myrtle Residential Owner, 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 150 pounds.

**Low-Energy Project Management Program.** 504 Myrtle Residential Owner, 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 300 miles.

**Trees and Plantings.** Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance. The number of trees planted as part of this redevelopment is 4 trees.