

761-775 EAST 233RD STREET

BRONX, NEW YORK

Remedial Action Report

NYC VCP Project Number: 20CVCP015X

NYC OER Project Number: 17EH-N278X

E-Designation Number: E-279

CEQR Number: 11DCP148X

Williamsbridge/Baychester Rezoning Action

Prepared For:

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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
SCG	Standards, Criteria and Guidance
SCO	Soil Cleanup Objective
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SVOCs	Semi-Volatile Organic Compounds
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

CERTIFICATION

I, Tarek Z. Khouri, 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 761-775 East 233rd St, Bronx, NY site, site number 20CVCP015X.
- 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 could not be observed by me or by a person under my direct supervision due to the mandatory closures ordered by the NYS Governor's Executive Order, New York City Department of Buildings (NYCDOB) Guidance on enforcement of Essential vs. Nonessential construction due to Covid-19. However, the Engineering Control design established in the Remedial action Work Plan were installed by BE Bronx Builders, LLC and are reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The NYC OER-approved Remedial Action Work Plan dated September 2019 and Stipulations in a letter dated October 2019 were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquid or other material from the property was taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Name: Tarek Z. Khouri, P.E.

PE License Number : 086611

Signature 



Date 6/23/2021

EXECUTIVE SUMMARY

BE Bronx Builders, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 761-775 East 233rd Street in the Williamsbridge section of Bronx, 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 dated September 2019 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 761 – 775 East 233rd Street in the Williamsbridge section in Bronx, New York and identified as Block 4997 and previously identified Lot(s) 1, 2, 3, 6 and 8 on the New York City Tax Map. The Site is 28,650-square feet and is bounded by residential buildings to the north, East 233rd Street and mixed-use buildings to the south, Barnes Avenue and a residential building to the east, and a commercial building to the west. Previously, the Subject Property was used for residential commercial use and consisted of one 2-story residential building, two temporary trailers both utilized as offices, and the remaining vacant portions were utilized as parking. The building at the Subject Property was demolished and the site was vacant prior development.

Summary of Redevelopment Plan

As part of the redevelopment, all five lots have been merged to a singular lot and the Site is now identified as Block 4997 and Lot 1. The redevelopment plan consists of a new 7-story residential building with a gross construction area of approximately 97,355-square feet. The residential building includes a partial basement for mechanical rooms and tenant storage, a first floor with indoor parking, residential lobby, 2 recreational rooms, laundry room, compactor room and bicycle room, floors second through seven containing

116 residential apartments, paved areas for outdoor parking and rear yard and roof terrace. Footprint of new building is 103,174 sf with 5,214 sf of cellar. Outdoor parking area is 6,069 sf for 61 cars and rear yard is 5,269 sf. The current zoning designation is R6A with commercial overlay C2-4. The proposed use is consistent with existing zoning for the property.

Summary of Description of Surrounding Property

The Site is located within a primarily mixed use, residential and commercial, area of the Bronx, New York. The Site is bounded by residential buildings to the north, East 233rd Street and mixed-use buildings to the south, Barnes Avenue and a 3-story mixed use building to the east, and a Fire House to the west. According to the NYC OER Searchable Property Environmental E-Database (SPEED), there is no sensitive receptor (i.e. schools, hospitals and day-care facilities) within a 500-foot radius of the Site.

Summary of Past Site Uses and Areas of Concern

The Site was previously owned by Ralph Iodice and his family. No prior owners or occupants of potential environmental concern in the property records obtained from the New York City Department of Finance. Past use of the property has been mixed-use with commercial and residential tenants. No AOCs were identified for the Site during the RI

Summary of the Work Performed under the Remedial Investigation

Castleton Environmental scope of work dated May 2017:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a geophysical survey prior to the RI;
3. Installed nine soil borings across the entire project Site, and collected eighteen soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed seven soil vapor probes around Site perimeter and collected seven samples for chemical analysis.
5. Installed one sub-slab vapor within the basement of the residential building and collected one sample for chemical analysis.

HydroTech Environmental Engineering and Geology, DPC (HydroTech) scope of work dated May 2019:

1. Performed a geophysical survey in the proposed partial basement area.
2. Installed two soil borings in the proposed partial basement area and collected four soil samples for chemical analysis from the soil borings to evaluate soil quality.

Summary of Findings of Remedial Investigation

Castleton Environmental and HydroTech Environmental Engineering and Geology, DPC reported following findings of site investigation in remedial investigation report dated May 2017 and remedial investigation addendum dated July 2019:

1. Elevation of the property ranges from 193 to 199 feet msl.
2. Groundwater monitoring wells were not installed during the RI.
3. Groundwater flow is assumed to be towards Bronx River to the west.
4. Bedrock was not identified during the RI. Remnants of the former on-site residential building foundation was identified at approximately 2 feet below grade surface in the northwestern portion of the Site.
5. The stratigraphy of the site, from the surface down, consists of 10 feet of brown, silty, fine sand with trace gravel.
6. Soil/fill samples collected during the RI were compared to 6NYCRR Part 375-6.8 Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs) and Track 2 Restricted Residential Use SCOs. Results indicated:
 - a. Two VOCs: 2-butanone and acetone were detected in the soil samples exceeding their method detection limits (MDLs) but well below their respective Unrestricted Use SCOs. Acetone is a common laboratory contaminant. HydroTech investigation confirmed that all VOCs were below Unrestricted Use SCOs.
 - b. Several SVOCs, consisting of polycyclic aromatic hydrocarbons (PAHs), were detected in the soil samples exceeding their respective MDLs; but all were well

below their respective Unrestricted Use SCOs. HydroTech investigation detected SVOCs including Benzo(a)anthracene (at 1.070 mg/kg) and Indeno(1,2,3-cd) pyrene (at 0.602 mg/kg) at concentrations exceeding their respective Unrestricted Use SCOs in SB-10 [0-2'], surface soil sample.

- c. No pesticides or PCBs were detected above their MDLs in both investigations.
- d. Five metals; lead (max 436 mg/kg), selenium (4 mg/kg), zinc (max 161 mg/kg), mercury (0.441 mg/kg), and trivalent chromium (max 44.7 mg/kg) were detected in five out of eighteen soil samples exceeding their respective Unrestricted Use SCOs, but well below Restricted Residential Use SCOs. HydroTech investigation detected four metals including Chromium trivalent (max. of 31.60 mg/kg), Copper (at 74 mg/kg), Lead (at 99.20 mg/kg) and Zinc (at 157 mg/kg) in SB-10 [0-2'] at concentrations exceeding their respective Unrestricted Use SCOs.

7. Soil vapor samples collected during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values (AGV) derived by the New York State Department of Health (NYSDOH) located in the New York State NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor results reported trace levels of petroleum related compounds (1,2,4-trimethylbenzene, 1,3-butadiene, benzene, carbon disulfide, ethylbenzene, xylenes, p-ethyltoluene, propylene and toluene) at concentrations ranging from 3.7 ug/m³ to 480 ug/m³. The results reported trace levels of VOCs typically associated with solvents (1,1,1-trichloroethane, 1,2,4-trichlorobenzene, 2-butanone, 2-hexanone, chloroform, chloromethane, hexachlorobutadiene, isopropanol, n- heptane, n-hexane, tetrachloroethene, tetrachloroethylene, and trichloroethylene) at concentrations ranging from 3.5 ug/m³ to 340 ug/m³. Trichloroethene (max 8.4 ug/m³) was the only compound detected exceeding its respective NYSDOH AGV of 2 ug/m³ in three out of eight samples. Dichlorodifluoromethane, commonly associated with refrigerants, were reported at concentrations ranging from 70 ug/m³ to 4,400 ug/m³. Acetone, which may be associated with solvents or fill materials and is also a common laboratory contaminant was reported at concentrations ranging from 19 ug/m³ to 5,500 ug/m³.

Summary of the Remedial Action

The Remedial Action was performed in accordance with an NYC OER-approved RAWP 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 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:

- An RI was performed in May 2017 by Castleton Environmental and in May 2019 by HydroTech.
- A RI Report dated May 2017 and RI addendum dated May 2019 were prepared to evaluate data and information necessary to develop a RAWP.
- A Site Contact List was established.
- A RAWP was prepared and released with a Fact Sheet on 10/10/2019 for a 30-day public comment period.
- OER briefed NYSDEC and NYCDOHMH on June 15, 2017.
- The RAWP dated September 2019 and Stipulation List dated October 2019 were approved by the NYC OER.
- A Pre-Construction meeting was held in November 2019.
- The remedial action began in January 2020 and was completed in April 2021.

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 (January 2020); completed utility mark outs; and marked and staked excavation areas.
3. Performed Waste Characterization Study prior to excavation activities. The entire site was designated as three (3) grids WC-A, WC-B and WC-C. A total of three (3) grab samples, three (3) five-point composite samples and one (1) site grab

sample were collected on November 27, 2019. Waste characterization samples were collected at a frequency dictated by disposal facility(s).

4. Excavated and removed soil/fill exceeding Track 2 Restricted Residential SCOs.

Following excavation was performed for development purposes:

- To a depth of approximately 10 feet bgs for partial basement.
- To a depth of approximately 6 feet bgs in the building footprint area
- To a depth of approximately 4 feet bgs in the open areas for the outdoor parking and rear yard
- A small portion of the property was excavated to the depth of 15 feet bgs for the elevator pit.

5. Performed a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds. CAMP was performed from January to February 2020. No elevated PID or dust readings exceeding the CAMP action levels were recorded during Site remedial excavation.

6. Established Track 2 Restricted Residential Soil Cleanup Objectives (SCOs).

7. Transported and disposed of approximately 9,254.2 tons excavated soil/fill material at permitted facilities in accordance with all applicable laws and regulations for handling, transporting, and disposing, and per the RAWP.

Following soil/fill removal was performed:

- a. Excavated 5,539.56 tons of non-hazardous soil/fill and transported it to P Park, 100 Planten Avenue, Prospect Park, NJ 07508.
- b. Excavated 3,714.64 tons of non-hazardous soil/fill and transported it to Logan Facility, Logan Township, NJ 08085.

8. 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.

9. Collected and analyzed six (6) post excavation confirmation samples for VOCs, SVOCs, PCBs, Pesticides and Metals to determine attainment of Track 2 Restricted Residential Soil Cleanup Objectives (SCOs). Based on the post excavation confirmation sample results and in-situ RI data, the Site has achieved Track 2 restricted residential Soil Cleanup Objectives (SCOs).

10. As part of new development, constructed an engineered Composite Cover System consisting of a minimum 4-inch thick concrete slab beneath all the building areas and minimum 3-inch binder coarse asphalt, item #4 and 2-inch finish asphalt in open areas such as outdoor parking and rear yard across the Site to prevent human exposure to residual soil/fill remaining under the Site. Item #4 is a NYSDOT term which is a processed material that binds and is a solid base for the asphalt pavement. The contractor for the Composite Cover System was BE Bronx Builders, LLC.
11. As part of new development, installed a vapor barrier system consisting of 20-mil Vapor Block Plus beneath the building slab, elevator pit and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system consisting of a 20-mil Raven Industries Vapor Block Plus was installed throughout the full building area and outside all sub-grade foundation sidewalls on a geotextile fabric (filter fabric) placed over 6" layer of ¾" crushed stone. All penetrations through the slab for utility lines were properly sealed utilizing Vapor Block Plus Tape. All welds, seams and penetrations were properly sealed to prevent preferential pathways for vapor migration. The contractor for the Vapor Barrier System was BE Bronx Builders, LLC.
12. Imported approximately 266 cubic yards of ¾" crushed stone from Thalle Industries located at 51 Route 100, Briarcliff, NY and placed in the building footprint and partial basement areas
13. No USTs were encountered and no spill was required to call in.
14. Performed all activities required for the Remedial Action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
16. Daily reports dated Jan - Feb 2020 and April 2021 were submitted. Three (3) monthly reports dated March 2020, April 2020, May 2020 and a summary report dated June - April 2021 for the ongoing construction were submitted.

17. Submitted a Sustainability Report.
18. Submitted a Remedial Action Report that describes the Remedial Action, certifies that the remedial requirements defined in the RAWP have been achieved; defines the Site boundaries; describes all Engineering and Institutional Controls applicable to the Site; and describes any changes from the RAWP.
19. This Site has achieved Track 2 Restricted Residential remedy. Site Management plan is not required.
20. 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 residential/commercial uses addressed by this remedial action without prior notification and approval by NYC OER.

REMEDIAL ACTION REPORT

1.0 SITE BACKGROUND

BE Bronx Builders, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 761-775 East 233rd Street in the Williamsbridge section of Bronx, 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 NYC OER-approved RAWP dated September 2019 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.

1.1 SITE LOCATION AND BACKGROUND

The Site is located at 761 – 775 East 233rd Street in the Williamsbridge section in Bronx, New York and identified as Block 4997 and previously identified Lot(s) 1, 2, 3, 6 and 8 on the New York City Tax Map. **Figure 1** shows the Site location. The Site is 28,650-square feet and is bounded by residential buildings to the north, East 233rd Street and mixed-use buildings to the south, Barnes Avenue and a residential building to the east, and a commercial building to the west. A map of the site boundary is shown in **Figure 2**. Previously, the Subject Property was used for residential commercial use and consisted of one 2-story residential building, two temporary trailers both utilized as offices, and the remaining vacant portions were utilized as parking. The building at the Subject Property was demolished and the site was vacant prior development.

1.2 REDEVELOPMENT PLAN

As part of the redevelopment, all five lots have been merged to a singular lot and the Site is now identified as Block 4997 and Lot 1. The redevelopment plan consists of a new 7-story residential building with a gross construction area of approximately 97,355-square feet. The residential building includes a partial basement for mechanical rooms and

tenant storage, a first floor with indoor parking, residential lobby, 2 recreational rooms, laundry room, compactor room and bicycle room, floors second through seven containing 116 residential apartments, paved areas for outdoor parking and rear yard and roof terrace. Footprint of new building is 103,174 sf with 5,214 sf of cellar. Outdoor parking area is 6,069 sf for 61 of cars and rear yard is 5,269 sf. No other open or landscaped areas are planned for this development. The current zoning designation is R6A with commercial overlay C2-4. The proposed use is consistent with existing zoning for the property. Layout of the proposed site development is presented in **Figure 3**.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located within a primarily mixed use, residential and commercial, area of the Bronx, New York. The Site is bounded by residential buildings to the north, East 233rd Street and mixed-use buildings to the south, Barnes Avenue and a 3-story mixed use building to the east, and a Fire House to the west. According to the NYC OER Searchable Property Environmental E-Database (SPEED), there is no sensitive receptor (i.e. schools, hospitals and day-care facilities) within a 500-foot radius of the Site. **Figure 4** shows the surrounding land usage.

1.4 SUMMARY OF PAST SITE USES AND AREAS OF CONCERN

The Site was previously owned by Ralph Iodice and his family. No prior owners or occupants of potential environmental concern in the property records obtained from the New York City Department of Finance. Past use of the property has been mixed-use with commercial and residential tenants. No AOCs were identified for the Site during the RI.

1.5 SUMMARY OF WORK PERFORMED UNDER THE REMEDIAL INVESTIGATION

Castleton Environmental scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a geophysical survey prior to the RI;
3. Installed nine soil borings across the entire project Site, and collected eighteen soil samples for chemical analysis from the soil borings to evaluate soil quality;

4. Installed seven soil vapor probes around Site perimeter and collected seven samples for chemical analysis.
5. Installed one sub-slab vapor within the basement of the residential building and collected one sample for chemical analysis.

HydroTech Environmental Engineering and Geology, DPC (HydroTech) scope of work:

1. Performed a geophysical survey in the proposed partial basement area.
2. Installed two soil borings in the proposed partial basement area and collected four soil samples for chemical analysis from the soil borings to evaluate soil quality.

1.6 SUMMARY OF FINDINGS OF REMEDIAL INVESTIGATION

Castleton Environmental and HydroTech Environmental Engineering and Geology, DPC reported following findings of site investigation:

1. Elevation of the property ranges from 193 to 199 feet msl.
2. Groundwater monitoring wells were not installed during the RI.
3. Groundwater flow is assumed to be towards Bronx River to the west.
4. Bedrock was not identified during the RI. Remnants of the former on-site residential building foundation was identified at approximately 2 feet below grade surface in the northwestern portion of the Site.
5. The stratigraphy of the site, from the surface down, consists of 10 feet of brown, silty, fine sand with trace gravel.
6. Soil/fill samples collected during the RI were compared to 6NYCRR Part 375-6.8 Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs) and Track 2 Restricted Residential Use SCOs. Results indicated:
 - a. Two VOCs; 2-butanone and acetone were detected in the soil samples exceeding their method detection limits (MDLs) but well below their respective Unrestricted Use SCOs. Acetone is a common laboratory contaminant.

HydroTech investigation confirmed that all VOCs were below Unrestricted Use SCOs.

- b. Several SVOCs, consisting of polycyclic aromatic hydrocarbons (PAHs), were detected in the soil samples exceeding their respective MDLs; but all were well below their respective Unrestricted Use SCOs. HydroTech investigation detected SVOCs including Benzo(a)anthracene (at 1.070 mg/kg) and Indeno(1,2,3-cd) pyrene (at 0.602 mg/kg) at concentrations exceeding their respective Unrestricted Use SCOs in SB-10 [0-2'], surface soil sample.
 - c. No pesticides or PCBs were detected above their MDLs in both investigations.
 - d. Five metals; lead (max 436 mg/kg), selenium (4 mg/kg), zinc (max 161 mg/kg), mercury (0.441 mg/kg), and trivalent chromium (max 44.7 mg/kg) were detected in five out of eighteen soil samples exceeding their respective Unrestricted Use SCOs, but well below Restricted Residential Use SCOs. HydroTech investigation detected four metals including Chromium trivalent (max. of 31.60 mg/kg), Copper (at 74 mg/kg), Lead (at 99.20 mg/kg) and Zinc (at 157 mg/kg) in SB-10 [0-2'] at concentrations exceeding their respective Unrestricted Use SCOs.
7. Soil vapor samples collected during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values (AGV) derived by the New York State Department of Health (NYSDOH) located in the New York State NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor results reported trace levels of petroleum related compounds (1,2,4-trimethylbenzene, 1,3-butadiene, benzene, carbon disulfide, ethylbenzene, xylenes, p-ethyltoluene, propylene and toluene) at concentrations ranging from 3.7 ug/m³ to 480 ug/m³. The results reported trace levels of VOCs typically associated with solvents (1,1,1-trichloroethane, 1,2,4-trichlorobenzene, 2-butanone, 2-hexanone, chloroform, chloromethane, hexachlorobutadiene, isopropanol, n- heptane, n-hexane, tetrachloroethene, tetrachloroethylene, and trichloroethylene) at concentrations ranging from 3.5 ug/m³ to 340 ug/m³. Trichloroethene (max 8.4 ug/m³) was the only compound detected exceeding its respective NYSDOH AGV of 2 ug/m³ in three out of eight samples. Dichlorodifluoromethane, commonly associated with refrigerants, were reported at

concentrations ranging from 70 ug/m³ to 4,400 ug/m³. Acetone, which may be associated with solvents or fill materials and is also a common laboratory contaminant was reported at concentrations ranging from 19 ug/m³ to 5,500 ug/m³.

Appendix 1 includes the Remedial Investigation Report prepared by Castleton Environmental and RI Addendum prepared by HydroTech.

2.0 DESCRIPTION OF REMEDIAL ACTIONS

The Remedial Action was performed in accordance with an NYC OER-approved RAWP 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 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 RI was performed in May 2017 by Castleton Environmental and in May 2019 by HydroTech.
- A RI Report dated May 2017 and RI addendum dated May 2019 were prepared to evaluate data and information necessary to develop a RAWP.
- A Site Contact List was established.
- A RAWP was prepared and released with a Fact Sheet on 10/10/2019 for a 30-day public comment period.
- OER briefed NYSDEC and NYCDOHMH on June 15, 2017.
- The RAWP dated September 2019 and Stipulation List dated October 2019 was approved by the NYC OER.
- A Pre-Construction meeting was held in November 2019.
- The remedial action began in January 2020 and was completed in April 2021.

Appendix 2 includes the RAWP and Stipulation List dated October 2019.

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 (January 2020); completed utility mark outs; and marked and staked excavation areas.
3. Performed Waste Characterization Study prior to excavation activities. The entire site was designated as three (3) grids WC-A, WC-B and WC-C. A total of three

(3) grab samples, three (3) five-point composite samples and one (1) site grab sample were collected on November 27, 2019. Waste characterization samples were collected at a frequency dictated by disposal facility(s).

4. Excavated and removed soil/fill exceeding Track 2 Restricted Residential SCOs.

Following excavation was performed for development purposes:

- To a depth of approximately 10 feet bgs for the partial basement.
- To a depth of approximately 6 feet bgs in the building footprint area
- To a depth of approximately 4 feet bgs in open areas such as outdoor parking and rear yard
- A small portion of the property was excavated to the depth of 15 feet bgs for elevator pit.

5. Performed a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds. CAMP was performed from January to February 2020. No elevated PID or dust readings exceeding the CAMP action levels were recorded during Site remedial excavation.

6. Established Track 2 Restricted Residential Soil Cleanup Objectives (SCOs).

7. Transported and disposed approximately 9,254.2 tons of the excavated soil/fill material at permitted facilities in accordance with all applicable laws and regulations for handling, transporting, and disposing, and per the RAWP.

Following soil/fill removal was performed:

- a. Excavated 5,539.56 tons of non-hazardous soil/fill and transported it to P Park, 100 Planten Avenue, Prospect Park, NJ 07508.
- b. Excavated 3,714.64 tons of non-hazardous soil/fill and transported it to Logan Facility, Logan Township, NJ 08085.

8. 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.

9. Collected and analyzed six (6) post excavation confirmation samples for VOCs, SVOCs, PCBs, Pesticides and Metals. Based on the post excavation confirmation sample results and in-situ RI data, the Site has achieved Track 2 restricted residential Soil Cleanup Objectives (SCOs).

10. As part of new development, constructed an engineered Composite Cover System consisting of a minimum 4-inch thick concrete slab beneath all the building areas and minimum 3-inch binder coarse asphalt, item #4 and 2-inch finish asphalt in open areas such as outdoor parking and rear yard across the Site to prevent human exposure to residual soil/fill remaining under the Site. Item #4 is a NYSDOT term which is a processed material that binds and is a solid base for the asphalt pavement. The contractor for the Composite Cover System was BE Bronx Builders, LLC.
11. As part of new development, installed a vapor barrier system consisting of 20-mil Vapor Block Plus beneath the building slab, elevator pit and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system consisting of a 20-mil Raven Industries Vapor Block Plus was installed throughout the full building area and outside all sub-grade foundation sidewalls on a geotextile fabric (filter fabric) placed over 6" layer of ¾" crushed stone. All penetrations through the slab for utility lines were properly sealed utilizing Vapor Block Plus Tape. All welds, seams and penetrations were properly sealed to prevent preferential pathways for vapor migration. The contractor for the Vapor Barrier System was BE Bronx Builders, LLC.
12. Imported approximately 266 cubic yards of ¾" crushed stone from Thalle Industries located at 51 Route 100, Briarcliff, NY and placed in the building footprint and partial basement areas.
13. No USTs were encountered and no spill was required to call in.
14. Performed all activities required for the Remedial Action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
16. Daily reports dated Jan - Feb 2020 and April 2021 were submitted. Three (3) monthly reports dated March 2020, April 2020, May 2020 and a summary report dated June - April 2021 for the ongoing construction were submitted.
17. Submitted a Sustainability Report.

18. Submitted a Remedial Action Report that describes the Remedial Action, certifies that the remedial requirements defined in the RAWP have been achieved; defines the Site boundaries; describes all Engineering and Institutional Controls applicable to the Site; and describes any changes from the RAWP.
19. This Site has achieved Track 2 Restricted Residential remedy. Site Management plan is not required.
20. 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 residential/commercial uses addressed by this remedial action without prior notification and approval by NYC 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 Coordinator was Anusha Agnoor from HydroTech Environmental Engineering and Geology, DPC.

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 in January and February 2020 in compliance with the Community Air Monitoring Plan in the approved RAWP. No elevated PID or dust readings exceeding the CAMP action levels were recorded during Site remedial excavation. The results of Community Air Monitoring are shown in **Appendix 3**. Trucking log sheets are included in **Appendix 4**.

3.3 SOIL/MATERIALS MANAGEMENT PLAN

The Soil/Materials Management Plan (SMMP) 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

1. Due to elevated topography at the Site, the entire building footprint area was excavated down to 6 feet bgs to accommodate foundation slab instead of 4 feet bgs along the perimeter of the building footprint for concrete footings and foundation walls as proposed in the RAWP. Rear yard and outdoor parking areas were excavated down to 4 feet bgs instead of 2 feet bgs. Additional tonnage for this soil disposal was approved by P Park disposal facility located at 100 Planten Avenue, Prospect Park, NJ 07508 and this deviation was reported to the NYC OER.
2. Endpoint samples designated EP-1, EP-2, EP-3 and EP-4 were collected at 4 feet bgs in the outdoor parking and rear yard areas instead of 2 feet bgs due to elevated topography difference as discussed above.
3. A 6" layer of ¾" crushed stone was placed only in the building footprint and partial basement areas. It was not placed in the rear yard and outdoor areas as proposed in the RAWP and this deviation was confirmed by the client. Post the placement of 6" layer of ¾" crushed stone in the building footprint and partial basement areas, filter fabric (geotextile fabric) was placed on top of the ¾" crushed stone prior installing the 20-mil Vapor Block Plus vapor barrier.
4. The vapor barrier system and composite cover system, were installed by BE Bronx Builders LLC during the March, April and May 2020. Due to the mandatory closures ordered by the NYS Governor's Executive Order, New York City Department of Buildings (NYCDOB) Guidance on enforcement of Essential vs. Nonessential construction due to Covid-19, HydroTech was only able to supervise one vapor barrier installation on March 20, 2020. The remaining installation was supervised by the design team as reflected on the enclosed as-built drawings. The vapor barrier system was installed on February 26, 2020, between March 18-30, 2020, between March 30 - April 6, 2020 and on April 16, 2020. Min. 4" concrete slab was poured on April 28 and April 29, 2020. Item #4 and min. 3" binder coarse asphalt was placed at the site during May 12 - May 14, 2020. Item #4 is a NYSDOT term which is a processed material that binds and is a solid base for the asphalt pavement. Photographs of vapor barrier installation and concrete slab pour were

provided to HydroTech for record keeping. Due to HydroTech closure during the above period, monthly reports, instead of dailies, were submitted to OER for the remedial activities based on input and information received from the Client.

5. Soil from the partial basement area at depths (5-10') bgs designated as Grid B in the waste characterization plan was reused for backfilling the foundation walls of the partial basement area and this backfilling was approved by the NYC OER.
6. A 3-inch binder coarse asphalt was placed on top of item #4 in the outdoor parking and rear yard areas. Item #4 was not proposed in the RAWP; however, this deviation was informed to the NYC OER while it was being placed at the site and was mentioned in the monthly report dated May 2020.

NYC OER approval for deviations and respective email correspondences are included in **Appendix 5.**

4.0 REMEDIAL PROGRAM

4.1 PROJECT ORGANIZATION

Principal personnel who participated in the remedial action included Anusha Agnoor (Environmental Engineer), Tarek Z. Khouri, the Professional Engineer (P.E.) and Mark E. Robbins (P.G.), the Qualified Environmental Professional (QEP). The principal contractor involved in the Remedial Action, who was responsible for the installation of the vapor barrier system and composite cover system was BE Bronx Builders, LLC. The principal contractor who oversaw the excavation and foundation work was Jay Martino from the Stagg Group. The developer for the Site is BE Bronx Builders, LLC located at 1763 Pitman Avenue in Bronx, NY 10466.

Remedial activities at the Site were overseen by NYC OER under the E-Designation program in accordance with the September 2019 RAWP addressing the HAZMAT E-designation (E-279; CEQR 11DCP148X) (NYC E-Designation Project Number 17EH-N278X). The NYC OER Project Managers involved in this project included Anna Brooks and Shaminder Chawla.

4.2 SITE CONTROLS

Site Preparation

Prior to, and throughout, the different phases of remedial activities, all necessary construction permits were acquired and maintained on-site as per the New York City Department of Buildings (NYCDOB) and New York City Department of Environmental Protection (NYCDEP) rules and regulations. No site clearing and site grubbing of organic matter (wood, roots, stumps, etc.) or other solid waste was required prior to all remedial work.

A pre-construction meeting was held at the NYC OER office in November 2019. Site mobilization, including utility mark outs, site security setup, and marking and staking excavation areas was performed in January 2020. A meeting between HydroTech, the developer, and the NYC OER was held prior to the start of remediation. An NYC OER

Project Notice was erected at the project entrance and was in place during all phases of the Remedial Action.

Soil Screening

Excavated soil was examined for visual/olfactory evidence of petroleum contamination and for organic vapors utilizing a PID. No organic vapors (<0.1ppm) or visual/olfactory evidence of contamination were identified in the excavated soil.

Stockpile Management

Most of the excavated soil material was live loaded directly onto trucks and transported off-site. When stockpiling was necessary, stockpiles were lined with and covered with polysheeting to prevent erosion and generation of dust. Stockpiles were frequently inspected until the stockpiled material was loaded onto trucks for offsite transport.

Truck Inspection

Truck inspection and cleaning was performed for all trucks prior to exiting the site. The soil that was tracked onto sidewalk and street was immediately swept and cleaned by the site personnel. Trucking pad was established at the site entrance for trucking.

Site Security

Site security was maintained with a locked fence in accordance with NYCDOB code.

Nuisance Controls

All necessary means were employed to prevent on- and off-Site odor nuisances. At a minimum, procedures included: (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. This odor control plan was capable of controlling emissions of nuisance odors. No odors were encountered in the excavation portion of this remedial action.

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

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Exercised extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan was capable of controlling emissions of dust. Nuisance dust emissions were not encountered during the remedial action.

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

Rodent control was provided, during Site clearing and grubbing, and during the remedial program, as necessary, to prevent nuisances.

Reporting

Daily reports providing a general summary of activities for each day of active remedial work were submitted to the NYC OER Project Manager by the end of the following day via EPIC. The daily reports included the following contents:

- Project number and statement of the activities and an update of progress made, and locations of work performed;
- Quantities of material imported and exported from the Site, destination of the soil/fill exported from the Site, and the source of the soil/fill material imported to the Site.
- Status of on-Site soil/fill stockpiles;
- A summary of CAMP observations, including excursions;
- Photograph(s) of notable Site conditions and activities;
- A summary of soil sampling performed during the Site excavation including sampling location, purpose, quantities and analytical parameter.

Daily and monthly reports are included in **Appendix 6**. Digital photographs of the Remedial Action are included in **Appendix 7**.

4.3 MATERIALS EXCAVATION AND REMOVAL ACTION

Soil/Fill Excavation and Removal

The partial basement was excavated down to 10 feet bgs; Due to elevated topography at the Site, outdoor parking and rear yard areas were excavated down to 4 feet bgs. The entire building footprint area was excavated down to 6 feet bgs to accommodate the foundation slab. Additional excavation to 15 feet bgs was performed in the partial basement area for the elevator pit.

A map showing the approximate locations where excavations were performed, and

approximate depths of excavation is shown in **Figure 5**. Approximately, 5,539.56 tons of non-hazardous soil/fill was excavated and transported to P Park, 100 Planten Avenue, Prospect Park, NJ 07508. Approximately, 3,714.64 tons of non-hazardous soil/fill was excavated and transported to Logan Facility, Logan Township, NJ 08085. Soil removal was performed under the oversight of HydroTech.

Onsite Reuse

Soil from the partial basement area at depths (5-10') bgs designated as Grid B in the waste characterization plan was reused for backfilling the foundation walls of the partial basement area and this backfilling was approved by the NYC OER. Email correspondence from the NYC OER for this approval is included in **Appendix 5**. Backfill placement system figure is included in **Figure 12**.

UST Removal

No subsurface anomalies indicative of underground storage tanks (USTs) or other sizable buried structures were identified during remedial investigation or encountered during the site excavation.

NYSDEC Petroleum Spills

No existing spill was found associated with the Subject Property. No spills were reported during the Site excavation.

Dewatering

Dewatering was not performed at this site.

Soil Cleanup Objectives

Track 2 Restricted Residential SCOs are proposed for this project and SCO's are defined in 6 NYCRR Part 375, Table 6.8 Track 2 Restricted Residential Use.

Post Excavation Confirmation Sampling Results

Six (6) post excavation confirmation sampling results from soil/fill excavation and removal were collected on February 21, 2020 from the bottom of the excavation. The samples are designated as EP-1 through EP-6 and were analyzed for VOCs, SVOCs, PCBs, Pesticides and TAL Metals at an ELAP certified laboratory - York Analytical Laboratories Inc. EP-1 through EP-4 were collected at 4 feet bgs; EP-5 and EP-6 were

collected at 10 feet bgs. Analytical results and all these samples were compared to New York State Department of Environmental Conservation (NYSDEC) Part 375 Table 375-6.8 (a) Unrestricted Use SCOs and the restricted residential SCOs.

According to the analytical data, no VOCs and PCBs were detected above the regulatory limits. Three (3) SVOCs identified as Bis(2-ethylhexyl)phthalate, Fluoranthene and Pyrene were detected but below the Unrestricted Use SCOs. One (1) pesticide identified as Aldrin (0.00618 mg/kg) was detected at concentrations exceeding NYSDEC Part 375 Soil Cleanup Objectives for Unrestricted Use. Several metals were detected; of these detected metals, only Chromium Trivalent (maximum 37 mg/kg) was detected at concentrations exceeding NYSDEC Part 375 Soil Cleanup Objectives for Unrestricted Use.

Six (6) *in-situ* RI samples designated as SB-01 (5-7'), SB-02 (5-7'), SB-03 (5-7'), SB-04 (5-7'), SB-08 (5-7'), SB-09 (5-7') collected by Castleton Environmental in May 2017 and one (1) *in-situ* RI sample designated as SB-10 (10-12') collected by HydroTech in May 2019 are representative of material remaining on site. SB-01 and SB-02 borings are located in the rear yard, SB-03 and SB-08 borings are located in the outdoor parking area, SB-04, SB-09 borings are located in the building footprint area and SB-10 boring is located in the partial basement. No VOCs, SVOCs, PCBs and Pesticides were detected at concentrations exceeding their respective Unrestricted Use SCOs. Several metals were detected; of these detected metals, Chromium Trivalent (31 mg/kg in SB-08 (5-7') and 31.6 mg/kg in SB-10 (10-12')) were detected exceeding the Unrestricted Use SCOs.

Based on the post excavation confirmation sample results and *in-situ* RI data, the Site has achieved Track 2 restricted residential Soil Cleanup Objectives (SCOs).

A map of post excavation confirmation sampling plan is shown in **Figure 6**. A map of post excavation sampling results for VOCs is shown in **Figure 7**. A map of post excavation sampling results for SVOCs is shown in **Figure 8**. A map of post excavation sampling results for PCBs and Pesticides is shown in **Figure 9**. A map of post excavation sampling results for Metals is shown in **Figure 10**. A map of soil sampling analytical results for VOCs, SVOCs, Pesticides, PCBs and Metals (*in-Situ* RI Data) is shown in **Figure 11**. A tabular summary of post excavation confirmation sampling results

compared to SCOs is included in **Table 1**. A tabular summary for soil sampling analytical results (in-site RI data) compared to SCOs is included in **Table 2**. Full laboratory reports of post excavation confirmation sampling results are included in **Appendix 8**.

End Point Data Usability Summary

Data Usability Summary Report (DUSR):

A Data Usability Summary Report was not prepared.

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 (Tons)
P Park NJ, LLC 100 Planten Ave, Prospect Park, NJ 07508	Non-Hazardous Soil	5,539.56
Logan Facility, Logan Township, NJ 08085	Non-Hazardous Soil	3,714.64

Letters to and from HydroTech 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 9**. Soil disposal and shipping manifests are included in **Appendix 10**. Waste characterization report is included in **Appendix 11**. A table of individual truck transport and material disposal quantities is included in **Table 3**.

4.5 BACKFILL IMPORT

Approximately 266 cubic yards of ¾" crushed stone was imported from Thalle Industries located at 51 Route 100, Briarcliff, NY and placed in the building footprint and partial basement areas in accordance with all Federal, State and City laws and regulations.

Source/Address	Type of Material	Quantity
Thalle Industries 86 Lavergne Street,	¾" crushed stone	266 Cubic Yards

A table for ¾-inch crushed stone import is included in **Table 4**. A ¾" crushed stone sieve test report and import tickets are included in **Appendix 12**.

4.6 DEMARCATION

Soil below the final cover is residual soil that will be addressed by Site Management under this Remedial Action. No demarcation was required.

5.0 ENGINEERING CONTROLS

This Site has achieved Restricted Residential SCOs. Engineering Controls are not required. However, protective construction elements were employed in the Remedial Action to address residual soil, groundwater, and soil vapor remaining at the site. The Site has two (2) protective Systems. These are:

- (1) Composite Cover System;
- (2) Vapor Barrier System;

Composite Cover System

Exposure to residual soil/fill is prevented by an engineered Composite Cover System that has been built on the Site. This Composite Cover System is comprised of:

- Minimum 4-inch concrete slab on top of 6-inch layer of $\frac{3}{4}$ " crushed stone beneath the partial basement and building footprint area
- Minimum 3-inch binder course asphalt, item #4 and 2-inch finish asphalt in the outdoor parking space and rear yard.

Item #4 is a NYSDOT term which is a processed material that binds and is a solid base for the asphalt pavement. Asphalt was imported from RCA Asphalt Contracting located at 7 Edison Avenue in Mount Vernon, NY 10550. The contractor for composite cover construction was BE Bronx Builders, LLC.

Vapor Barrier System

Exposure to soil vapor is prevented by a Vapor Barrier System that has been built on the Site. Installed a vapor barrier system beneath the building slab, elevator pit and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system consisting of a 20-mil Raven Industries Vapor Block Plus was installed throughout the full building area and outside all sub-grade foundation sidewalls on a geotextile fabric (filter fabric) placed over 6" layer of $\frac{3}{4}$ " crushed stone. All penetrations through the slab for utility lines were properly sealed utilizing Vapor Block Plus Tape. All welds, seams and penetrations were properly sealed to prevent preferential pathways for vapor migration. The contractor for the Vapor Barrier System was BE Bronx Builders, LLC.

Letter from contractor who installed the engineering controls is included in **Appendix 13**. As-builts for the Composite Cover System and Vapor Barrier System are included in **Appendix 14**. Photographs of remedial action are included in **Appendix 7**. A copy of manufacturer's specifications and vapor barrier receipts are included in **Appendix 14**.

6.0 INSTITUTIONAL CONTROLS

This Site has achieved Restricted Residential SCOs. Institutional Controls are not required.

7.0 SITE MANAGEMENT PLAN

This Site has achieved Restricted Residential SCOs. Site Management Plan is not required.

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.

Reuse of Clean, Recyclable Materials and Conservation of Natural Resources.

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

Reduced Energy Consumption and Promotion of Greater Energy Efficiency.

Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, and can lower traffic congestion and provide substantial cost savings.

The following means were used to reduce energy consumption in this project: Efficient loading times of trucks to prevent extensive idling times and consolidating the number of days that soil was shipped from the Site to reduce truck traffic in the neighborhood.

Conversion to Clean Fuels. Use of clean fuel improves NYC's air quality by reducing harmful emissions. Residential units will utilize electricity and commercial space will utilize natural gas for heating 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 method used to provide recontamination controls in the development included:

- The prevention of transport of contamination to the from off-site by ensuring that no unapproved materials were brought to the Site
- The use of natural gas instead of fuel oil to prevent any future leakage into the environment
- The placement of a composite cover under the building area to prevent future spills into the underlying soil.

The area of the Site that utilizes recontamination controls under this plan is 7,443 square feet.

Paperless Brownfield Cleanup Program. BE Bronx Builders, LLC participated in NYC 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 15 pounds.

Low-Energy Project Management Program. BE Bronx Builders, LLC participated in NYC 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 40 miles.