

**3560 WEBSTER AVENUE  
BLOCK 3360, LOT 76  
BRONX, NEW YORK**

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## **Remedial Action Work Plan**

**E-Designation E-240  
CEQR No. 09DCP028X  
VCP No. 12CVCP050X  
OER No. 11RA-N212X**

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**APRIL 2012**

# REMEDIAL ACTION WORK PLAN

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## LIST OF ACRONYMS

<b>Acronym</b>	<b>Definition</b>
AOC	Area of Concern
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
DCR	Declaration of Covenants and Restrictions
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DUSR	Data Usability Summary Report
ECs	Engineering Controls
ESA	Environmental Site Assessment
ELAP	Environmental Laboratory Approval Program
GQS	Groundwater Quality Standards
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
ICs	Institutional Controls
mcg/m <sup>3</sup>	Micrograms per cubic meter
MTBE	Methyl tert-butyl ether
NOC	Notice of Completion
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOB	New York City Department of Buildings
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
NYSDEC	New York State Department of Environmental Conservation
NYSDEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
OSHA	United States Occupational Health and Safety Administration

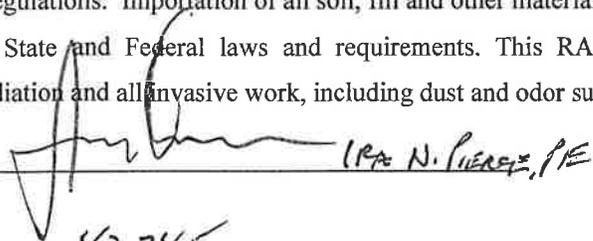
<b>Acronym</b>	<b>Definition</b>
PAHs	Poly-Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PE	Professional Engineer
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts per million
QA/QC	Quality Assurance/Quality Control
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RA	Registered Architect
RAO	Remedial Action Objective
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RCR	Remedial Closure Report
RI	Remedial Investigation
RIR	Remedial Investigation Report
SCO	Soil Cleanup Objective
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SMMP	Soil/Material Management Plan
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TBA	tert-Butyl alcohol
TCE	Trichloroethene
ug/m <sup>3</sup>	Micrograms per Cubic Meter
VBP	VaporBlock Plus
VOC	Volatile Organic Compound

## CERTIFICATION

I, Ira Pierce, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the 3560 Webster Avenue, Lot 76, Bronx, New York Site.

I, Doug Harm am a Qualified Environmental Professional as defined in §43-140. I have primary direct responsibility for implementation of the remedial action for the 3560 Webster Avenue, Lot 76, Bronx, New York Site.

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

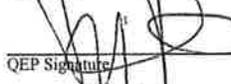
  
Name

42745  
NYS PE License Number

  
Signature

3/25/2012  
Date

  
QEP Name

  
QEP Signature

3/28/12  
Date



## **EXECUTIVE SUMMARY**

Joy Construction Co. has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a one (1)-acre site located at 3560 Webster Avenue, Bronx, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance, and conforms with applicable laws and regulations.

### **Site Location and Current Usage**

The Site is located at 3560 Webster Avenue, Bronx, New York, and identified as Block 3360, Lot 76, on the New York City Tax Map. Refer to Figure 1 - Site Location Map and Figure 2 – Tax Map. The Site is approximately 43,890 square feet and is presently under construction.

### **Summary of Proposed Redevelopment Plan**

The Applicant proposes to construct two (2) buildings identified as Buildings A and B. The subject property includes the development of an eight (8)-story residential unit structure with below grade parking. Commercial space is proposed for the ground floor of building A. A day care center is proposed for this commercial space within building A. No commercial space is proposed for Building B. Apartments are proposed for the first floor of Building B.

No open spaces are proposed for either building other than a common area on the roof over the parking garage. This is proposed for both buildings. This area will consist of concrete, pavers and other impermeable materials. Architectural drawings are provided in Appendix I.

### **Summary of the Remedy**

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

that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan;
2. Performing a Community Air Monitoring Program for particulates and volatile organic carbon compounds during the excavation of material;
3. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs, and marking and staking of excavation areas;
5. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
6. Establishing Track 1 Soil Cleanup Objectives (SCOs) for contaminants of concern;
7. Excavation and removal of soil/fill exceeding the SCOs;
8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a photoionization detector (PID);
9. Transportation and off-Site disposal of all soil/fill material excavated during the installation of the material to allow construction of the mechanical room floor and below grade parking garage in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan, and sampling and analysis of excavated media as required by disposal facilities;
10. Post excavation samples will determine if deep excavation for development achieves Track 1 SCOs for soil;
11. Construction and maintenance of an engineered composite cover consisting of a four (4) to six (6)-inch building slab to prevent human exposure to residual soil/fill remaining under the Site;
12. As part of standard construction practices, the use of a VaporBlock Plus 20-mil vapor/moisture barrier beneath the structure and along the foundation sidewalls will be

installed;

13. Ventilation of the below grade parking area consistent with NYC Building Code. Ventilation will prevent accumulation of vapors within the building;
14. Submission of a Remedial Closure Report (RCR) that describes remedial activities, certifies that the remedial requirements have been achieved, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP;
15. If Track 1 cleanup is not achieved, submission of an approved Site Management Plan (SMP) in the Remedial Action Report (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency;
16. If Track 1 cleanup is not achieved, recording of a Declaration of Covenants and Restrictions (DCR) that includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without New York City Office of Environmental Remediation (NYC OER) approval.

## COMMUNITY PROTECTION STATEMENT

The Office of Environmental Remediation created the NYC VCP to provide governmental oversight for the cleanup of contaminated property in New York City. This RAWP (cleanup plan) describes the findings of prior environmental studies that show the location of contamination at the site and describes the plans to clean up the site to protect public health and the environment.

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

A Citizen Participation Plan and a Sustainability Statement are included in this cleanup plan and are presented in Appendices I and II respectively.

**Remedial Investigation and Cleanup Plan.** Under the NYC VCP, a thorough cleanup study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and to identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

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

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

for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

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

**Site Safety Coordinator.** This project has a designated Site Safety Coordinator to implement the Health and Safety Plan. The Safety Coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site Safety Coordinator is Duane Shinton and can be reached at 732-267-0657 (cell).

**Worker Training.** Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

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

**Odor, Dust and Noise Control.** This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and include steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams, and by a series of other actions (called operational measures). The project is also required to comply with New York City noise control standards. Problems in these areas should be reported to the on-site Project Manager, Mr. Carmen Confrancesco, at 212-337-4512.

**Quality Assurance.** This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report (RAR). This report will be submitted to the NYC OER and will be thoroughly reviewed.

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

**Hours of Operation.** The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation are 7 to 4 PM, Monday through Friday.

**Signage.** While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC VCP and provides project contact names and numbers and the locations of project documents that can be viewed.

**Complaint Management.** The contractor performing this cleanup is required to address all complaints. Any complaints can be reported to the facility Project Manager, Mr. Carmen Confrancesco, at 212-337-4512, or call 311 and mention that the Site is in the NYC VCP.

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

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

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

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

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

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

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

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

**Truck Routing.** Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and, (f) minimize off-Site line-ups (queuing) of trucks entering the

property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

**Final Report.** The results of all cleanup work will be fully documented in the RAR that will be available for review in the public document repositories located at Melrose Public Library, 910 Morris Avenue, Bronx.

**Long-Term Site Management.** Since the remedial plan is designed to achieve Track 1 SCOs, a Long Term SMP may not be required. Should Track I SCOs not be met, a Long Term SMP will be necessary. To provide long-term protection after the cleanup is complete, the property owner will be required to comply with an ongoing SMP that calls for continued inspection of protective controls, such as Site covers. The SMP is evaluated and approved by the NYC OER. Requirements that the property owner must comply with are defined in the property's deed. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

## **REMEDIAL ACTION WORK PLAN**

### **1.0 SITE BACKGROUND**

Joy Construction Co. has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 3560 Webster Avenue, Bronx, New York (the Site). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternative analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, complies with applicable environmental standards, criteria and guidance, and conforms with applicable laws and regulations.

#### **1.1 SITE LOCATION AND CURRENT USAGE**

The Site is located at 3560 Webster Avenue, Bronx, New York, and identified as Block 3360, Lot 76, on the New York City Tax Map. Refer to Figure 1 - Site Location Map and Figure 2 – Tax Map. The Site is approximately 43,890 square feet and is presently under construction.

#### **1.2 PROPOSED REDEVELOPMENT PLAN**

The Applicant proposes to construct two (2) buildings identified as Buildings A and B. The subject property includes the development of an eight (8)-story residential unit structure with below grade parking. Commercial space is proposed for the ground floor of building A. A day care center is proposed for this commercial space within building A. No commercial space is proposed for Building B. Apartments are proposed for the first floor of Building B.

No open spaces are proposed for either building other than a common area on the roof over the parking garage. This is proposed for both buildings. This area will consist concrete, pavers and other impermeable materials. Architectural drawings are provided in Appendix I.

### **1.3 DESCRIPTION OF SURROUNDING PROPERTY**

Based on information contained in the Phase I ESA, the subject site is surrounded by commercial and residential properties to the south, Woodlawn Cemetery to the west, Webster Avenue to the west and north, and railroad tracks to the east.

### **1.4 REMEDIAL INVESTIGATION**

A remedial investigation was performed and the results are documented in a report called *Remedial Investigation Report, 3556 Webster Avenue*, dated March 2012 (RIR).

#### **Summary of Past Uses of Site and Areas of Concern (AOCs)**

Based on information contained in the Phase I ESA, the subject property remained vacant land at least from 1896.

The original Phase I Environmental Site Assessment (ESA) was completed on January 3, 2007, and Phase I ESA Updates were completed on April 8, 2008, July 23, 2010, February 28, 2011, and October 24, 2011. Neither the Phase I ESA nor the Updates identified areas of concern (AOCs) for the subject property.

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

The following work has been performed at the site:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e., structures, buildings, etc.);
2. Installed four (4) soil borings across the entire project Site and collected eight (8) soil samples from the soil borings for chemical analyses to evaluate soil quality;
3. Collected two (2) groundwater samples (TWP-1 and TWP-2) from the subject property to investigate the subsurface groundwater quality at the property; and,
4. Installed four (4) soil vapor sample probes and collected four (4) soil vapor samples for laboratory analysis

#### **Summary of Environmental Findings**

1. The elevation of the subject property changes significantly from west to east. The approximate elevation on the western edge of the property along Webster Avenue is

90 feet above sea level. A significant drop-off toward the east occurs where the approximate elevation above mean sea level is 75 feet at the railroad right of way bordering the eastern edge of the property.

2. Depth to groundwater varies from five (5) to 15 feet at the Site.
3. Groundwater flow is generally toward the southeast beneath the Site, based on topography.
4. The stratigraphy of the site, from the surface down, consists of brown sand and gravel to approximately four (4) feet below grade. Yellowish-brown medium to fine sand with trace gravel is present immediately below four (4) feet throughout the site. Highly weathered bedrock was encountered at some locations at the site at an average depth of 15 to 20 feet below grade.
5. Laboratory analysis of soil samples showed pesticides, such as 4,4'-DDE(p,p'), 4,4'-DDT(p,p'), and metals, such as Copper, Lead, Nickel and Zinc, exceeding the New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use/Track 1 Soil Cleanup Objectives (SCO). Some semi-volatile organic compounds (SVOCs), such as benzo(a)anthracene and benzo(a)pyrene, were detected exceeding both the NYSDEC Unrestricted Use and Restricted-Residential Use SCO in some soil samples.
6. Laboratory analysis of groundwater samples did not detect volatile organic compounds (VOCs), Pesticides, or polychlorinated biphenyls (PCBs) at concentrations exceeding the NYSDEC Groundwater Quality Standards (GQS). Two SVOCs, Benzo(b)fluoranthene and Chrysene, and seven Target Analyte List (TAL) metals, including Iron and Manganese, were detected in groundwater samples at concentrations exceeding their respective NYSDEC GQS.
7. Soil vapor samples were designated SV-1, SV-2, SV-3 and SV-4. No Tetrachloroethene (PCE), Vinyl chloride, or methyl tert-butyl ether (MTBE) was detected in the four soil vapor samples. Trichloroethene (TCE) was detected at 0.65 micrograms per cubic meter ( $\text{ug}/\text{m}^3$ ) in the sample from SV-4. Benzene, Ethylbenzene

and tert-Butyl alcohol (TBA) were detected at concentrations from 0 to 2.9 ug/m<sup>3</sup> in four samples. Total Xylenes were detected at 11 ug/m<sup>3</sup> at SV-1, 6.7 ug/m<sup>3</sup> at SV-2, and 9 ug/m<sup>3</sup> at SV-4. Toluene was detected at 59 ug/m<sup>3</sup> at SV-1, 17 ug/m<sup>3</sup> at SV-2, and 40 ug/m<sup>3</sup> at SV-4.

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

## **2.0 REMEDIAL ACTION OBJECTIVES**

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

### **Groundwater**

- Prevent direct exposure to contaminated groundwater.

### **Soil**

- Prevent direct contact with contaminated soil.

### **Soil Vapor**

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor from off-site sources into dwellings and other occupied structures.

## **3.0 REMEDIAL ALTERNATIVES ANALYSIS**

Track 1 and Track 2 remedial action alternatives are considered in this alternatives analysis for the site. Alternative 1 is Track 1 alternative that involves attainment of Track 1 SCOs and complete removal of all soil and fill material that exceed the unrestricted Track 1 SCOs. Alternative 2 is Track 2 alternative that involves establishment of Track 2 SCOs and removal of the soil and fill material that exceed the unrestricted Track 2 SCOs. Following soil removal, the entire Site will be covered with a cover layer consisting of the building slab. This cover layer will serve as an engineering control to reduce exposure to contaminants in the groundwater and

any residual contaminant in soils. Soil vapors would be managed by the operation of a ventilated parking area under the building. Institutional controls would also include groundwater use restrictions, a deed notice and a SMP.

### **3.1 THRESHOLD CRITERIA**

#### **Protection of Public Health and the Environment**

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

The Track 1 alternative would result in removal of all soil/fill with contaminant concentrations above Track 1 SCOs. As such, this alternative would be consistent with the RAOs and provide overall protection of public health and the environment in consideration of current and potential future land use by:

- Eliminating the potential for direct contact with contaminated on-site soils and groundwater; and,
- Eliminating potential sources for on-site production of soil vapors.

Alternative 2 would achieve comparable protections of human health and the environment and would be consistent with the RAOs and would provide overall protection of public health and the environment in consideration of current and potential future land use by:

- Removing soil/fill with contaminant concentrations above Track 2 SCOs;
- Placement of institutional and engineering controls, including a composite cover system;
- Eliminating the potential for direct contact with contaminated soil or groundwater by placement of composite cover system and via institutional controls;
- Minimizing the potential for migration of soil vapor into occupied structures and

associated inhalation exposures by operation of a ventilated parking garage beneath the building; and,

- Minimizing the potential for direct contact with contaminated on-site soils during the remediation by implementing an approved soil and materials management plan and CAMP.

### **3.2 BALANCING CRITERIA**

#### **Compliance with Standards, Criteria and Guidance (SCG)**

The Track 1 alternative would comply with the SCG, as all soil/fill in excess of Track 1 SCOs would be removed. All soil/fill excavated from the Site would be managed and disposed of in accordance with all applicable regulations.

The Track 2 alternative would address the chemical-specific SCGs for soil, groundwater, and soil vapor by establishment of Track 2 SCOs. Similar to the Track 1 alternative, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs.

#### **Short-Term Effectiveness and Impacts**

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

The Track 1 alternative would provide short-term effectiveness with the removal of all soil/fill above Track 1 SCOs. All potential exposure pathways for site-derived contaminants would be incomplete following construction. Implementation of this RAWP would prevent unacceptable exposure during remediation and construction activities.

The Track 2 alternative would result in fewer short-term impacts associated with excavation, handling, load out of materials, and truck traffic than a Track 1 remediation. However, focused

attention to means and methods during the remedial action during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize or negate the overall impact of these activities.

The Track 1 and Track 2 Alternatives are both considered to be effective in protecting human health and the environment in the short term. These alternatives would involve the removal of on-site contaminated soils and would eliminate (Track 1) or reduce (Track 2) exposure to contaminant sources. The implementation of appropriate measures, including a CAMP and a Soil/Materials Management Plan (SMMP), during all on-site soil disturbance activities will effectively prevent the release of significant contaminants into the environment. Construction workers operating under appropriate management procedures and a Health and Safety Plan (HASP) will be protected from on-site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones). Both alternatives provide short term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-site contaminants. The implementation of a HASP (incorporating a Community Health and Safety Plan) and a CAMP will serve to minimize potential short term impacts to the surrounding community from increased vehicle traffic, dust, vapors, and noise.

### **Long-Term Effectiveness and Permanence**

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls, including the adequacy and suitability of ECs/ICs that may be used to manage contaminant residuals that remain at the Site, assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.

As with the short-term effectiveness, the Track 1 alternative would provide the highest level of long-term effectiveness with the removal of all soil/fill above Track 1 SCOs.

The Track 2 alternative would also be effective over the long-term by attaining Track 2

Restricted-Residential SCOs by placing a concrete slab under the building, establishing use restrictions, establishing an SMP to ensure long-term management of Institutional and Engineering Controls, and placing a deed restriction to memorialize these controls for the long term. Groundwater use restrictions will eliminate potential exposure to groundwater and establishment of an SMP and a deed restriction will ensure that this protection remains effective for the long-term (in perpetuity). The SMP will ensure long-term effectiveness of all Engineering and Institutional Controls by requiring periodic inspection and certification that these controls and use restrictions continue to be in place and functioning as they were intended, assuring that protections designed into the remedy will provide continued high level of protection in perpetuity. Operation of a ventilated parking garage will minimize the potential for accumulation of vapors with the occupied structure and eliminate associated inhalation exposures

### **Reduction of Toxicity, Mobility, or Volume of Contaminated Material**

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

Alternative 1 would permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by removing all soil in excess of unrestricted use SCOs. Removal of soil to a depth of approximately 12 feet would occur. Alternative 2 would greatly reduce the toxicity, mobility, and volume of contaminants from on-site soil because it would include removal of as much as 10 feet of soil/fill for development purposes and will achieve Track 2 Restricted Residential SCOs. Placement of a building slab and ventilated parking below grade will lower toxicity by eliminating potential exposures with remaining soil, groundwater, and vapors. Groundwater use restrictions will reduce toxicity by ensuring that there is no use of on-

Site groundwater for potable purposes.

### **Implementability**

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

The Track 1 alternative is implementable. The remedial methods used are easily implemented using standard construction technologies.

Similarly, the Track 2 alternative is also both feasible and implementable. It uses standard materials and services and well established technology. The reliability of the remedy is also high. There are no special difficulties associated with any of the activities proposed, which utilize standard industry methods.

### **Cost Effectiveness**

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

The capital costs associated with the Track 1 alternative are higher than the Track 2 alternative in that a higher volume of soil/fill will be excavated for off-site disposal to achieve a Track 1 status over the entire site. In both cases, appropriate public health and environmental protections are achieved.

Both alternatives satisfy the threshold balancing criterion and other criterion listed here, and each is fully protective of public health and the environment, will control migration of contaminants, will comply with SCGs, is effective for the short-term and long-term, is implementable, and reduces both mobility and toxicity.

## **Community Acceptance**

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

Based on the overall goals of the remedial program and initial observations by the project team, both of the alternatives are acceptable to the community. This RAWP will be subject to, and undergo public review under, the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedial action. This public comment will be considered by OER prior to approval of this plan.

## **Land Use**

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

Because of the complete soil removal, the Track 1 alternative provides protection of public health and the environment for both the proposed use of the Site and any future use. The Track 1 alternative provides a remedial action that is beneficial to the surrounding community and is consistent with the goals of the City for remediating and redeveloping brownfield sites.

The Track 2 alternative also provides protection for the intended use.

Both alternatives for remedial action at the site are comparable with respect to the proposed use and to land uses in the vicinity of the Site. The proposed use is consistent with the existing

zoning designation for the property and is consistent with recent development patterns. The Site is surrounded by commercial and residential properties and both alternatives provide comprehensive protection of public health and the environment for these uses. Improvements in the current brownfield condition of the property achieved by both alternatives are also consistent with the City's goals for cleanup of contaminated land and bringing such properties into productive reuse. Both alternatives are equally protective of natural resources and cultural resources. This RAWP will be subject to undergo public review under the NYC VCP and will provide the opportunity for detailed public input on the land use factors described in this section. This public comment will be considered by OER prior to approval of this plan.

### **Sustainability of the Remedial Action**

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

Both remedial alternatives are comparable with respect to the opportunity to achieve sustainable remedial action.

## **4.0 REMEDIAL ACTION**

### **4.1 SUMMARY OF PREFERRED REMEDIAL ACTION**

The proposed plan achieves all of the remedial action goals established for the project. The proposed remedial action is effective in both the short term and long term and reduces mobility, toxicity, and volume of contaminants and uses standard methods that are well established in the industry.

1. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan;
2. Performing a Community Air Monitoring Program for particulates and volatile organic carbon compounds during the excavation of material;
3. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs, and marking and staking of excavation areas;
5. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
6. Establishing Track 1 SCOs for contaminants of concern;
7. Excavation and removal of soil/fill exceeding the SCOs;
8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a photoionization detector (PID);
9. Transportation and off-Site disposal of all soil/fill material excavated during the installation of the material to allow construction of the mechanical room floor and below grade parking garage in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan, and sampling and analysis of excavated media as required by disposal facilities;
10. Post excavation samples will determine if deep excavation for development achieves Track 1 SCOs for soil;
11. Construction and maintenance of an engineered composite cover consisting of a four (4) to six (6)-inch building slab to prevent human exposure to residual soil/fill remaining under the Site;
12. As part of standard construction practices, the use of a VaporBlock Plus 20-mil vapor/moisture barrier beneath the structure and along the foundation sidewalls will be installed;

13. Ventilation of the below grade parking area consistent with NYC Building Code. Ventilation will prevent accumulation of vapors within the building;
14. Submission of a Remedial Closure Report (RCR) that describes remedial activities, certifies that the remedial requirements have been achieved, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP;
15. If Track 1 cleanup is not achieved, submission of an approved SMP in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency;
16. If Track 1 cleanup is not achieved, recording of a Declaration of Covenants and Restrictions (DCR) that includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and, (4) higher level of land usage without OER approval.

#### **4.2 SOIL CLEANUP OBJECTIVES AND SOIL/FILL MANAGEMENT**

The proposed remedial action for this project is Alternative 1, the Track 1 remedial action. Based on the development plan, soil/fill at the site will be excavated to a maximum depth of 13 feet below present grade. The SCOs proposed for this project are Track 2 Restricted-Residential SCOs. It is anticipated that Track 1 SCOs may be achievable during the remedial action. End point samples will be used to determine if a Track 1 cleanup is achieved. Soil/fill remaining on site will be documented in the RCR and existing analytical data will be compared to SCOs to determine if soils achieve attainment of Track 1 SCOs.

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix IV.

### **Estimated Soil/Fill Removal Quantities**

The total quantity of soil/fill expected to be excavated and disposed of off-site is about 8,000 cubic yards and will be limited by the presence of bedrock outcropping at the Site. The disposal facility for site-derived impacted materials is listed below. Additional disposal locations established at a later date will be reported promptly to the OER Project Manager.

<b>Disposal Facility</b>	<b>Waste Type</b>	<b>Estimated Quantities</b>
Clean Earth of Carteret	Contaminated Non hazardous	8,000 cubic yards

### **End-Point Sampling**

If hotspots are encountered, hotspot removal actions under this plan will be performed in conjunction with remedial end-point sampling. End-point sampling frequency will consist of the following:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
  - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
  - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples would be taken within 24 hours of excavation, and would be taken from the zero (0) to six (6) -inch interval at the excavation floor. Samples taken after 24 hours would be taken at six (6) to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1 through 3 above.

Hotspot end-point sample locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs for end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. End-point samples will be analyzed for trigger analytes (those for which SCO exceedance is identified)

#### **Quality Assurance/Quality Control**

One duplicate and one matrix spike/matrix spike duplicate will be collected for every 20 samples.

#### **Import and Reuse of Soils**

Import of soils onto the property and reuse of soils already on site is not anticipated. If necessary, import of soil and/or reuse of soils already on site will be performed in conformance with the SMMP in Appendix IV.

### **4.3 ENGINEERING CONTROLS**

ECs are employed in the remedial action to address residual contamination remaining at the site. The Site has 3 primary EC Systems: composite cover system, vapor barrier, and sub-grade ventilated parking.

#### **Composite Cover System**

Exposure to residual soil/fill will be prevented by a concrete building slab to be built on the Site. This composite cover system is comprised of a concrete building slab. This composite cover system is comprised of the four (4) to six (6)-inch concrete building slab with vapor barrier. The development plan includes full build-out with the foundation slab for the building.

The site building slab is a permanent engineering control for the Site. The system will be inspected and reported at specified intervals as required by this RAWP and the SMP. A Soil Management Plan will be included in the SMP and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the SMP in the RAR.

### **Vapor Barrier**

A VaporBlock Plus (VBP) 20-mil vapor barrier, manufactured by Raven Industries, will be installed beneath the structure's slab and along foundation sidewalls. Installation details (penetrations, joints, etc.) with respect to the proposed building foundation, footings, slab, and sidewalls are provided in Appendix V. Product specification sheets are provided in Appendix V. The RCR will include photographs (maximum of two photos per page) of the installation process, Professional Engineer/Registered Architect (PE/RA) certified letter (on company letterhead) from the primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturer's certificate of warranty.

### **Sub-Grade Ventilated Parking**

As part of the development plan for sub-grade parking, a sub-grade ventilation system in the parking cellar will be installed in accordance with the NYC Department of Buildings (DOB) requirements.

## **4.4 SITE MANAGEMENT PLAN**

Site Management is the last phase of remediation and begins with the approval of the RAR and issuance of the Notice of Completion (NOC) for the remedial action. The SMP describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by the DCR and this RAWP. The SMP is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by the OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the DCR and the SMP are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of ECs and ICs; (2) implementation of monitoring programs; (3) operation and maintenance of ECs; (4) inspection and certification of ECs; and, (5) reporting.

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

#### **4.5 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT (QHHEA)**

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

##### **Known and Potential Sources**

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

##### **Soil:**

- Metals, including Copper, Lead, Nickel and Zinc, were detected exceeding the Unrestricted Use/Track 1 SCO;
- Pesticides, including 4,4'-DDD(p,p'), 4,4'-DDE(p,p') and 4,4'-DDT(p,p'), were detected exceeding Track 1 SCOs;
- SVOCs, particularly poly-aromatic hydrocarbons (PAHs), exceeding Track 1 SCOs and Track 2 SCOs.

**Groundwater:**

- SVOCs, including Benzo(b)fluoranthene and Chrysene, were detected exceeding NYSDEC GQS;
- Several metals, including Aluminum, Iron and Manganese, were detected exceeding their respective NYSDEC GQS.

**Soil Vapor:**

- Low levels of VOCs, including Benzene, Ethylbenzene, Xylenes and Toluene, were detected in the soil vapor point samples.

**Nature, Extent, Fate and Transport of Contaminants**

**Soil:**

Metals, Pesticides and SVOCs are present throughout the site. Three metals of concern, copper, lead and nickel, were found in one dissolved groundwater sample above GQS, indicating that the property might be contributing to groundwater standard violation.

**Groundwater:**

No VOCs were identified in any groundwater samples. Soil vapors are not believed to be derived from the site.

**Potential Routes of Exposure**

The five elements of an exposure pathway are: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and, (5) a receptor population. An exposure pathway is considered complete when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway cannot be documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill, or soil;
- Inhalation of vapors and particulates; and,
- Dermal contact with water, fill, soil, or building materials.

## **Receptor Populations**

### *On-Site Receptors*

The Site is currently vacant and secured; therefore, there are no human receptors under current conditions. During construction and remediation activities, receptors will include construction and remediation workers. Under future conditions, receptors will include employees and customers of the proposed commercial establishments.

### *Off-Site Receptors*

Potential off-site receptors within a 0.25-mile radius of the Site include adult and child residents, commercial and construction workers, pedestrians, trespassers, and cyclists, based on the following:

1. Commercial Businesses (up to 0.25 mile) – existing and future
2. Residential Buildings (up to 0.25 mile) – existing and future
3. Building Construction/Renovation (up to 0.25 mile) – existing and future
4. Pedestrians, Trespassers, Cyclists (up to .25 mile) – existing and future
5. Schools (up to .25 mile) – existing and future

## **Existence of Human Health Exposure**

### *Current Conditions*

The site is currently undeveloped with soil exposed at the land surface. In the areas where human exposure to contaminated soil is possible, potential migration pathway is likely complete for dermal absorption, ingestion, and inhalation. However, because the site is vacant and site access is secured, the potential exposure pathways are not complete except for site workers. Groundwater is not exposed at the site and, because the site is served by the public water supply, groundwater is not used at the site.

### *Construction/ Remediation Activities*

The potential exposure pathways to on-site contamination are by ingestion, dermal, or inhalation exposure by on-site workers during the remedial action. During the remedial action, on-site exposure pathways will be eliminated by preventing access to the site and through

implementation of soil/materials management, stormwater pollution prevention, dust controls, employment of a community air monitoring plan, and implementation of a Construction Health and Safety Plan (CHASP).

#### *Proposed Future Conditions*

Under future remediated conditions, the site will be fully capped, limiting potential direct exposure to soil and groundwater remaining in place, and the ventilated parking garage will prevent potential for inhalation via soil vapor intrusion. There are no plausible off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

#### **Overall Human Health Exposure Assessment**

Complete on-site exposure pathways appear to be present only during the construction and remediation phase. During the remedial action, on-site exposure pathways will be eliminated by: preventing access to the site; through implementation of soil/materials management, stormwater pollution prevention, and dust controls; employment of a community air monitoring plan; and, implementation of a CHASP.

## **5.0 REMEDIAL ACTION MANAGEMENT**

### **5.1 PROJECT ORGANIZATION AND OVERSIGHT**

Principal personnel who will participate in the remedial action include Professional Engineer Ira N. Pierce, PE, and Qualified Environmental Professional (QEP) Doug Harm, Registered Professional Geologist.

### **5.2 SITE SECURITY**

Site access will be controlled by a guarded gated entrance and an entirely fenced property.

### **5.3 WORK HOURS**

The hours for operation of remedial construction will be from 7:00 AM to 4:00 PM. These hours conform to the NYC DOB construction code requirements.

#### **5.4 CONSTRUCTION HEALTH AND SAFETY PLAN**

The site-specific CHASP is provided in Appendix VI. Prior to the commencement of the project, a Site Safety Coordinator will be assigned and reported to OER. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and Hazardous Waste Operations and Emergency Response (HAZWOPER) requirements.

Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the CHASP and applicable laws and regulations. The CHASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Satisfaction.

All field personnel involved in remedial activities will participate in training required under 29 CFR (Code of Federal Regulations) 1910.120, including 40-hour Hazardous Waste Operator training and annual eight (8)-hour refresher training. The Site Safety Officer will be responsible for maintaining workers' training records.

Personnel entering any exclusion zone will be trained in the provisions of the CHASP and will be required to sign a CHASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending upon the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental), emergency procedures, personal protective equipment (PPE) levels, and other relevant safety topics. Meetings will be documented in a log book or specific form.

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

#### **5.5 COMMUNITY AIR MONITORING PLAN**

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

### **VOC Monitoring, Response Levels, and Actions**

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.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds five (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 five (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 five (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 five (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 ( $\text{mcg}/\text{m}^3$ ) 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  $150 \text{ mcg}/\text{m}^3$  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  $150 \text{ mcg}/\text{m}^3$  above the upwind level, work will be stopped and a reevaluation 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  $150 \text{ mcg}/\text{m}^3$  of the upwind level and in preventing visible dust migration.

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

## **5.6 AGENCY APPROVALS**

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

## **5.7 SITE PREPARATION**

### **Preconstruction Meeting**

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

### **Mobilization**

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

### **Utility Marker Layouts, Easement Layouts**

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and regulations to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations and a copy of the Markout Ticket will be retained by the Contractor prior to the start of drilling, excavation, or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

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

### **Equipment and Material Staging**

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. The location of proposed equipment and material staging areas, truck inspection station, stockpile areas, and other pertinent remedial management features will be in the center of the property, with access from Webster Avenue.

### **Stabilized Construction Entrance**

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

### **Truck Inspection Station**

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

## **5.8 TRAFFIC CONTROL**

Drivers of trucks leaving the NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is to head south on Webster Avenue. Turn right onto and merge onto I-95 and travel I-95 to the New Jersey Turnpike.

## 5.9 DEMOBILIZATION

Demobilization will include:

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

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

## 5.10 REPORTING AND RECORD KEEPING

### Daily Reports

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

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

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

### **Record Keeping and Photo-Documentation**

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

### **5.11 COMPLAINT MANAGEMENT**

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

### **5.12 DEVIATIONS FROM THE REMEDIAL ACTION WORK PLAN**

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

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and,

- Determination that the remedial action with the deviation(s) is protective of public health and the environment.

### **5.13 DATA USABILITY SUMMARY REPORT**

The primary objective of a Data Usability Summary Report (DUSR) is to determine whether or not data meets the site-specific criteria for data quality and data use. The DUSR provides an evaluation of analytical data without third party data validation. The DUSR for post-remedial samples collected during implementation of this RAWP will be included in the RAR.

## **6.0 REMEDIAL ACTION REPORT**

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

- Information required by this RAWP;
- As-built drawings for all constructed remedial elements, required certifications, manifests, and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan;
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results and all material characterization results, Quality Assurance/Quality Control (QA/QC) results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action and DUSR;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site, including a map showing source areas;

- Account of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;
- Account of the origin and required chemical quality testing for material imported onto the Site;
- Recorded DCR; and,
- Reports and supporting material will be submitted in digital form.

### **Remedial Action Report Certification**

The following certification will appear in front of the Executive Summary of the Remedial Action Report. The certification will include the following statements:

*I, Ira Pierce, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 3560 Webster Avenue Site.*

*I, Doug Harm, am a qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the 3560 Webster Avenue Site.*

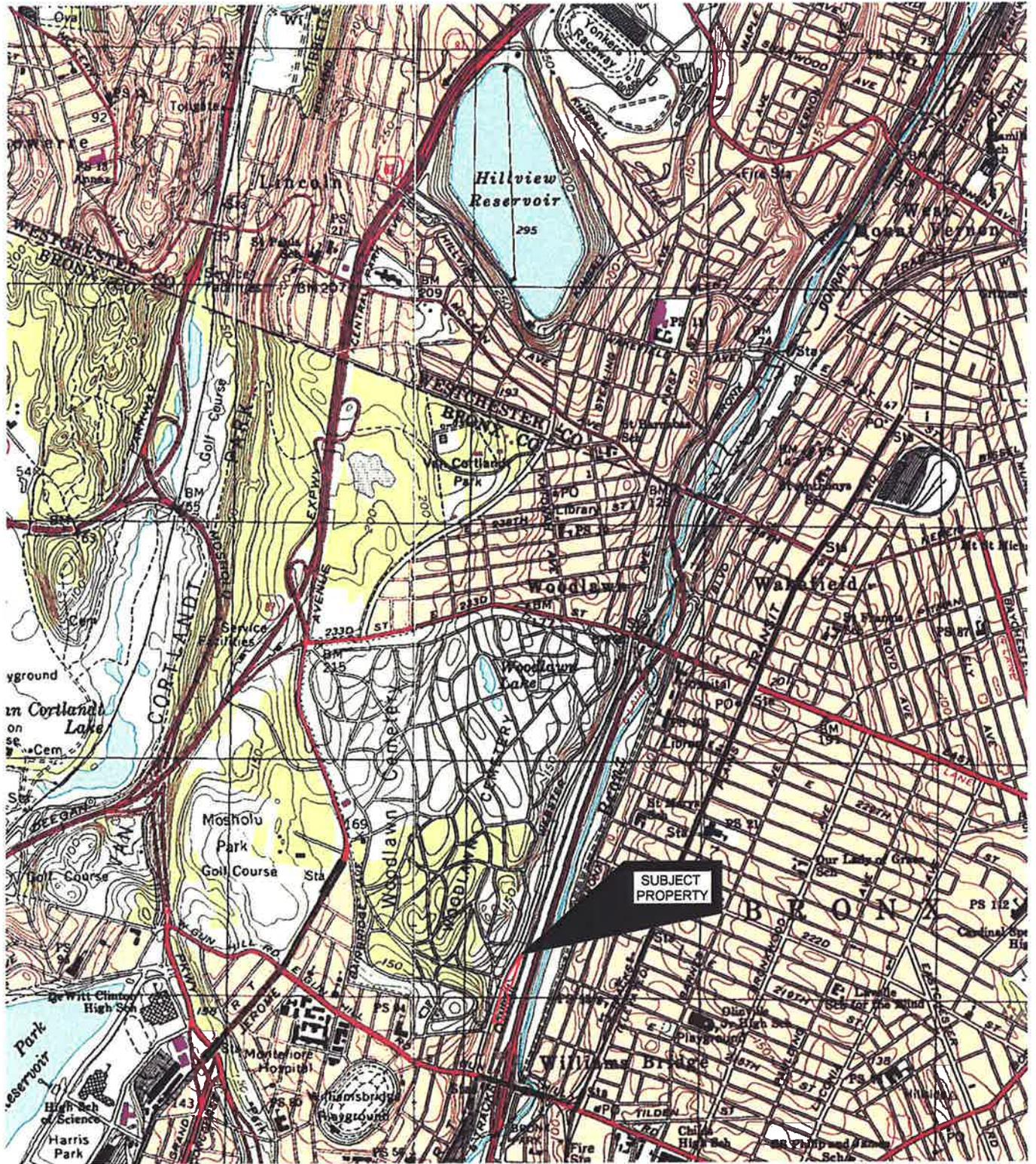
*I certify that the OER-approved Remedial Action Work Plan dated March 2012 and in any Stipulations were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.*

## 7.0 SCHEDULE

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

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	1	1
Mobilization	1	1
Remedial Excavation	16	18
Demobilization	19	1
Submit Remedial Action Report	29	10





SCALE: 1 : 24,000  
 PHOTO REVISED 1995

0' 1000' 2000'  
 SCALE: 1"=2000'

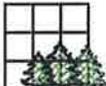
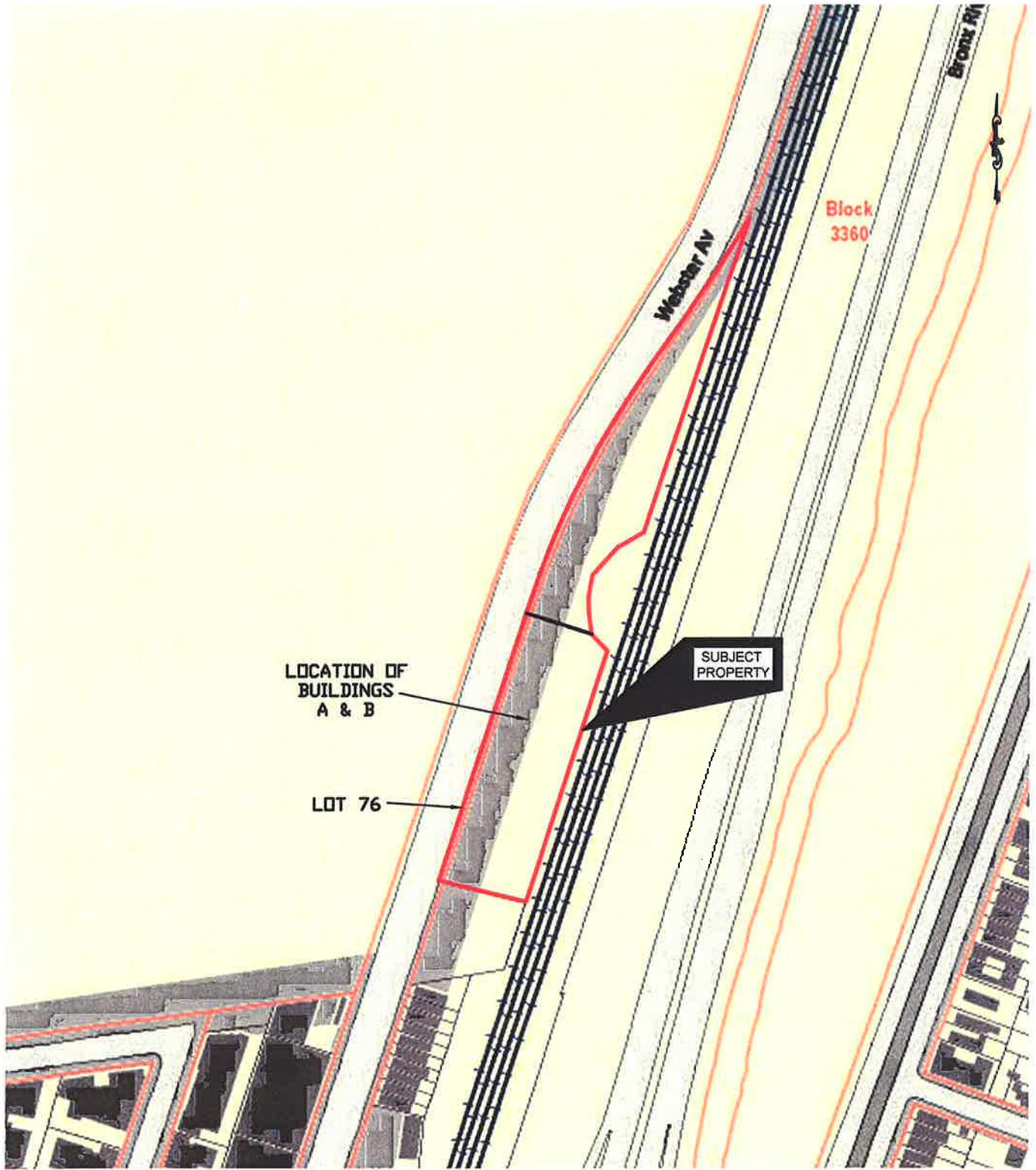
**BRINKERHOFF**   
 ENVIRONMENTAL SERVICES, INC.

FIGURE 1 - SITE LOCATION MAP  
 U.S.G.S. TOPOGRAPHIC MOUNT VERNON, NY QUAD  
 3560 WEBSTER AVENUE  
 BLOCK 3360, LOT 76  
 BRONX, NEW YORK

DATE: 2/10/12	JOB NO.: 06BR424A	SCALE: 1" = 2000'
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0' 100' 200'  
 SCALE: 1" = 200'

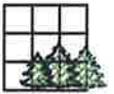
**BRINKERHOFF**   
 ENVIRONMENTAL SERVICES, INC.

FIGURE 2 - TAX MAP

3560 WEBSTER AVENUE  
 BLOCK 3360, LOT 76  
 BRONX, NEW YORK

DATE: 2/10/12

JOB NO.: 06BR424A

SCALE: 1" = 200'



## **APPENDIX I**

### **CITIZEN PARTICIPATION PLAN**

The NYC Office of Environmental Remediation and Joy Construction Co. have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, Joy Construction Co. will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site.

**Project Contact List.** OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager.

**Repositories.** A document repository is maintained in the nearest public library that maintains evening and weekend hours. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including

Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. Joy Construction Co. will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

Melrose Branch Library

910 Morris Avenue, Bronx

718-588-0110

10:00AM to 5:00PM, closed Sunday

**Digital Documentation.** NYC OER strongly encourages the use of digital documents in repositories as a means of minimizing paper use while also increasing convenience in access and ease of use.

**Public Notice and Public Comment.** Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be prepared by Joy Construction Co. reviewed and approved by OER prior to distribution and mailed by Joy Construction Co. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

**Citizen Participation Milestones.** Public notice and public comment activities occur at several steps during a typical NYC VCP project. See flow chart on the following page, which identifies when during the NYC VCP public notices are issued: These steps include:

- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan.**

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.

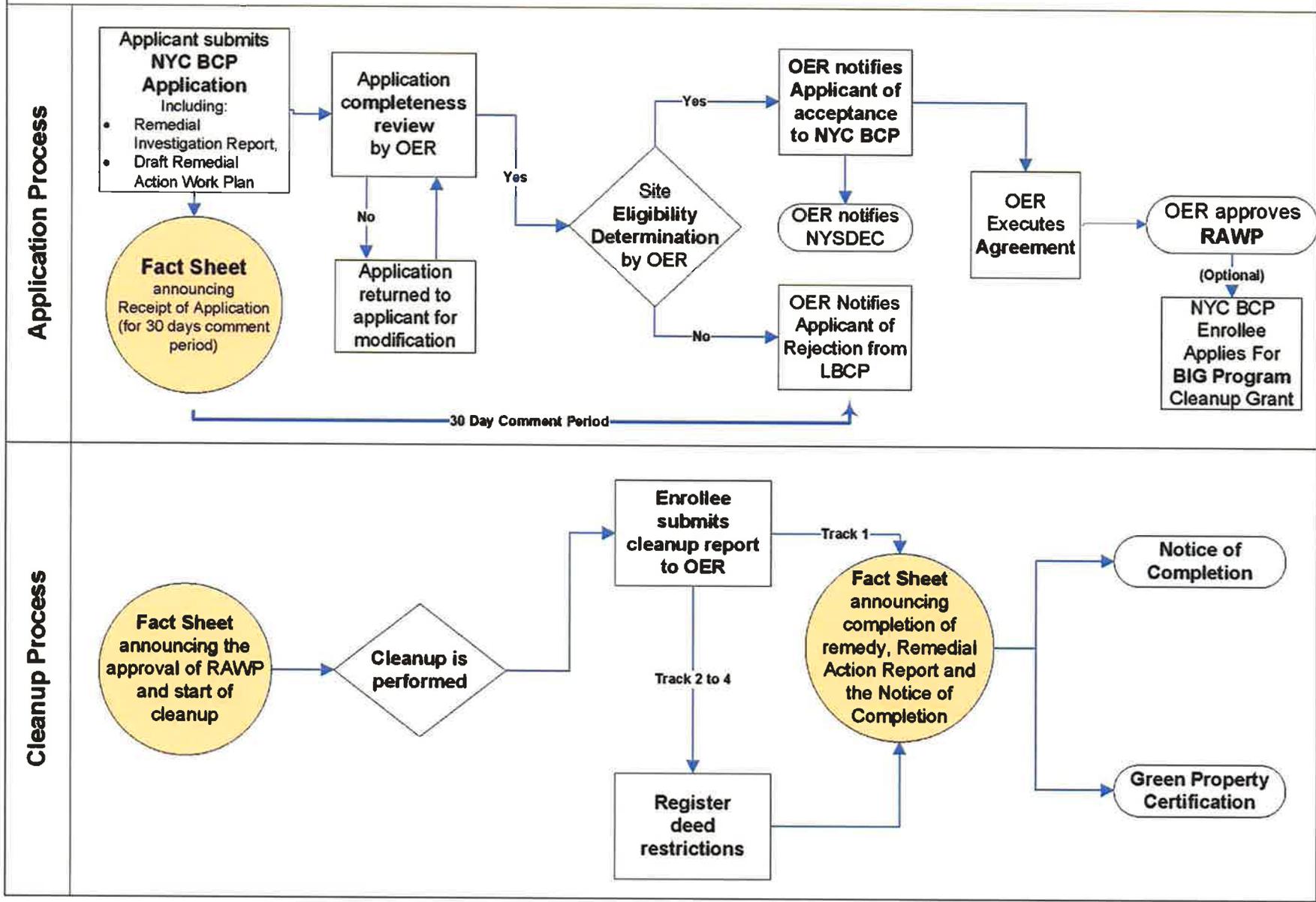
- **Public Notice announcing the approval of the RAWP and the start of remediation**

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.

- **Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion**

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.

## Flow Chart For NYC Brownfield Cleanup Program (NYC BCP)





## APPENDIX II SUSTAINABILITY STATEMENT

This Sustainability Statement documents sustainable activities and green remediation efforts planned under this remedial action.

**Reuse of Clean, Recyclable Materials.** Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction.

An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

**Reduce Consumption of Virgin and Non-Renewable Resources.** Reduced consumption of virgin and non-renewable resources lowers the overall environmental impact of the project on the region by conserving these resources.

An estimate of the quantity (in tons) of virgin and non-renewable resources, the use of which will be avoided under this plan, will be quantified and reported in the RAR.

**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, can lower traffic congestion, and provides substantial cost savings.

Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

**Conversion to Clean Fuels.** Use of clean fuel improves NYC's air quality by reducing harmful emissions.

An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

**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 or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site.

Under future conditions, building recontamination from potential off-site sources will be prevented through the use of a vapor barrier below the buildings slabs and the construction of sub-grade depressurization systems. Current regulations will be met for storage and handling of any materials onsite that may present a potential recontamination threat. If a Track 1 remedy cannot be achieved, long term site management will include periodic site inspection that will identify and correct any new issues of environmental concern.

An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

**Linkage with Green Building.** Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use.

The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

**Paperless Voluntary Cleanup Program.** Joy Construction Co. is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

**Low-Energy Project Management Program.** Joy Construction Co. is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal

transportation.

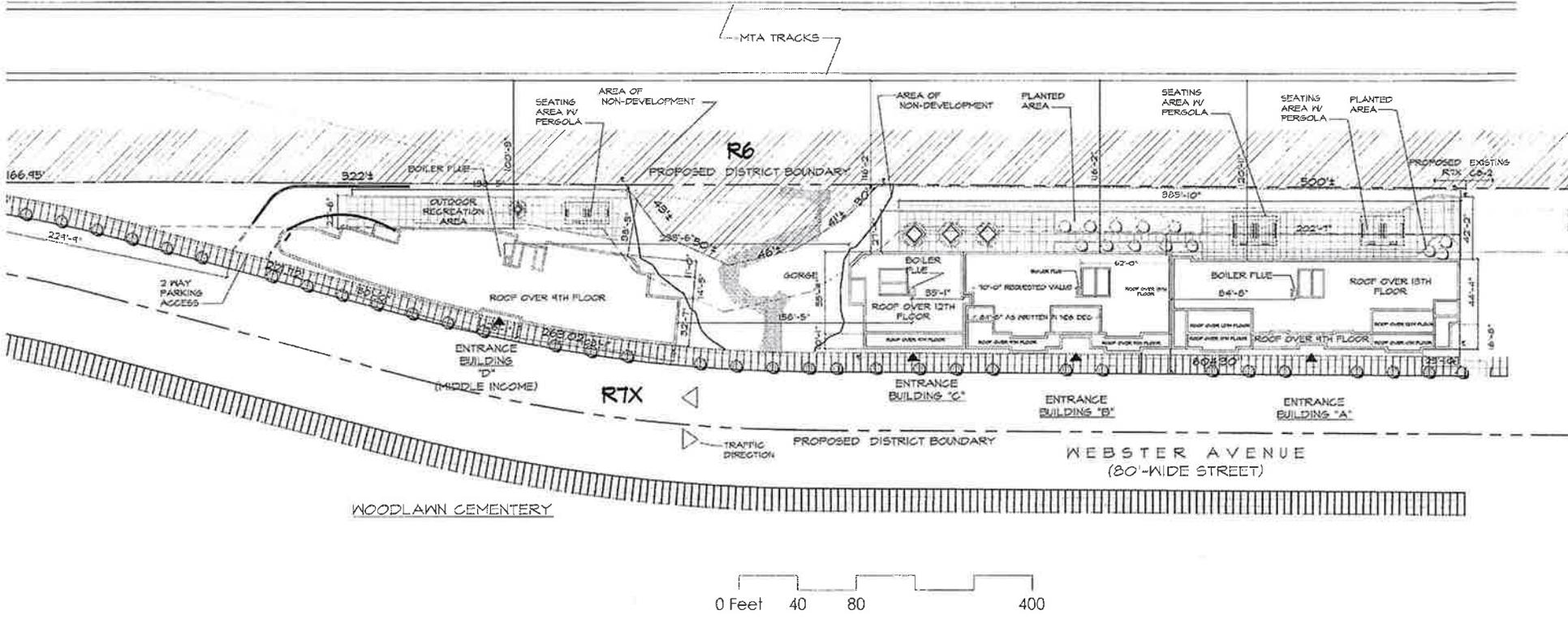
**Trees and Plantings.** Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.

An estimate of the number of trees planted or preserved will be reported in the RAR.



Remedial Action Work Plan  
3560 Webster Avenue, Block 3360, Lot 76, Bronx, New York  
Brinkerhoff Project No. 06BR424

**APPENDIX III**  
**ARCHITECTURAL DRAWINGS**



**HUGO S. SUBOTOVSKY AIA**  
architects llc

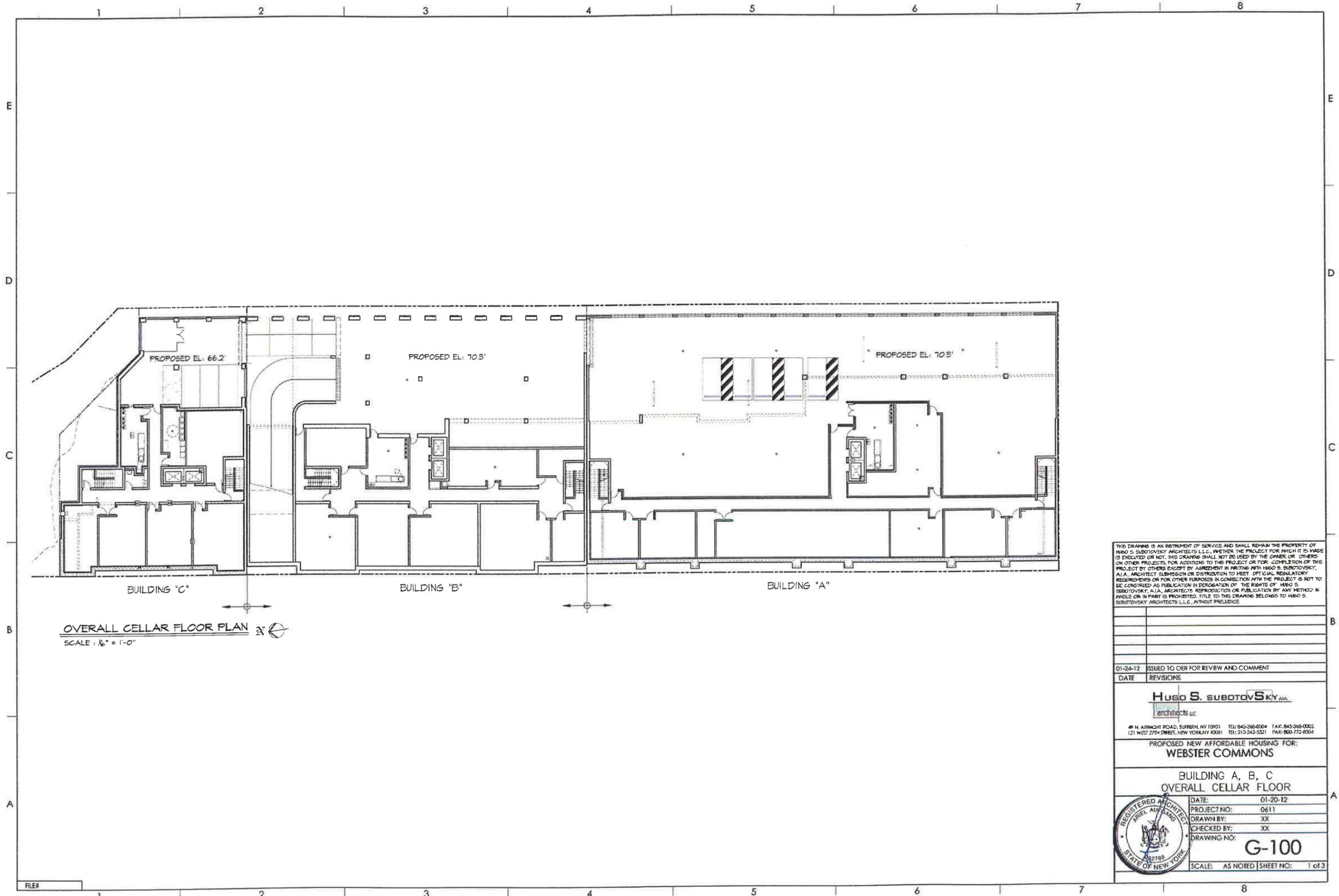
49 N. AIRMONT ROAD, SUFFERN, NY 10901 TEL: 845-368-0004 FAX: 845-368-0005  
121 WEST 27TH STREET, NEW YORK, NY 10001 TEL: 212-242-5321 FAX: 800-772-8304

PROPOSED NEW DEVELOPMENT FOR:  
**WEBSTER COMMONS**  
WEBSTER AVE., BRONX, NY

OVERALL SITE PLAN

DATE:	03-18-11
PROJECT NO:	0611
DRAWN BY:	XX
CHECKED BY:	XX
DRAWING NO:	<b>C-100</b>
SCALE:	AS NOTED
SHEET NO:	1 of 1

NYC DOB NUMBER:



**OVERALL CELLAR FLOOR PLAN**  
 SCALE: 1/8" = 1'-0"

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DATE	REVISIONS
01-24-12	ISSUED TO OER FOR REVIEW AND COMMENT

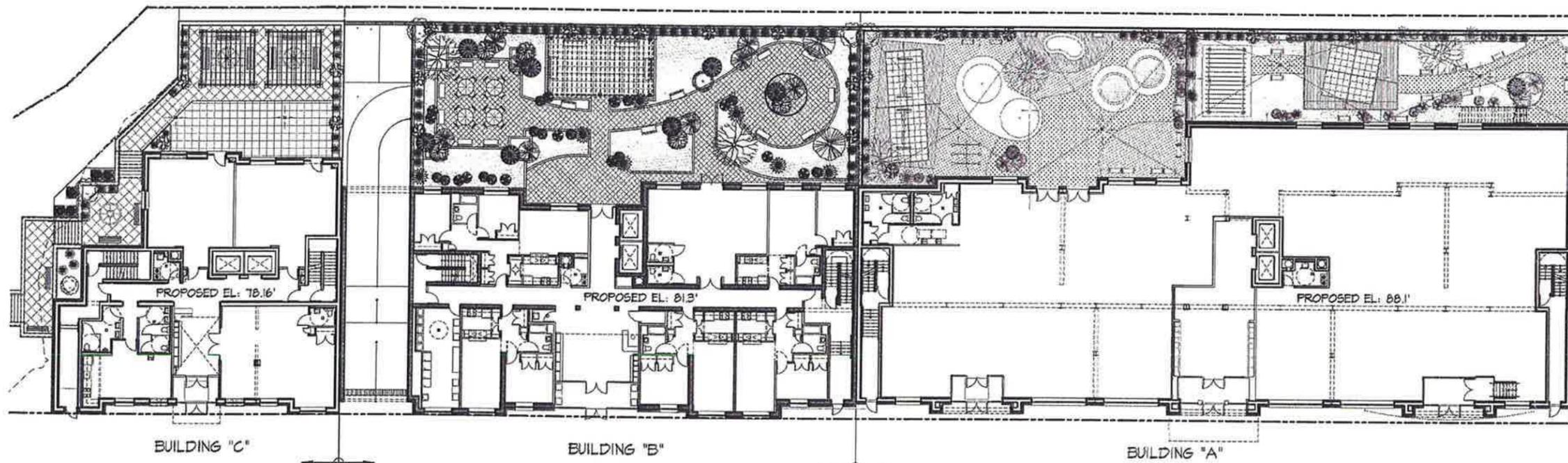
**HUGO S. SUBOTOVSKY**  
 architects llc  
 # N. AIRMONT ROAD, SUFFERN, NY 10901 TEL: 845-368-0004 FAX: 845-368-0005  
 121 WEST 27TH STREET, NEW YORK, NY 10001 TEL: 212-242-5321 FAX: 800-772-8304

PROPOSED NEW AFFORDABLE HOUSING FOR:  
**WEBSTER COMMONS**

BUILDING A, B, C  
 OVERALL CELLAR FLOOR

DATE:	01-20-12
PROJECT NO.:	0611
DRAWN BY:	XX
CHECKED BY:	XX
DRAWING NO.:	<b>G-100</b>
SCALE:	AS NOTED   SHEET NO: 1 of 3





**OVERALL FIRST FLOOR PLAN**  
 SCALE: 1/16" = 1'-0"

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DATE	REVISIONS
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 ARCHITECTS LLC

49 N. AIRMONT ROAD, SUFFERN, NY 10901 TEL: 845-348-0004 FAX: 845-348-0005  
 121 WEST 27TH STREET, NEW YORK, NY 10001 TEL: 212-242-5321 FAX: 800-772-8304

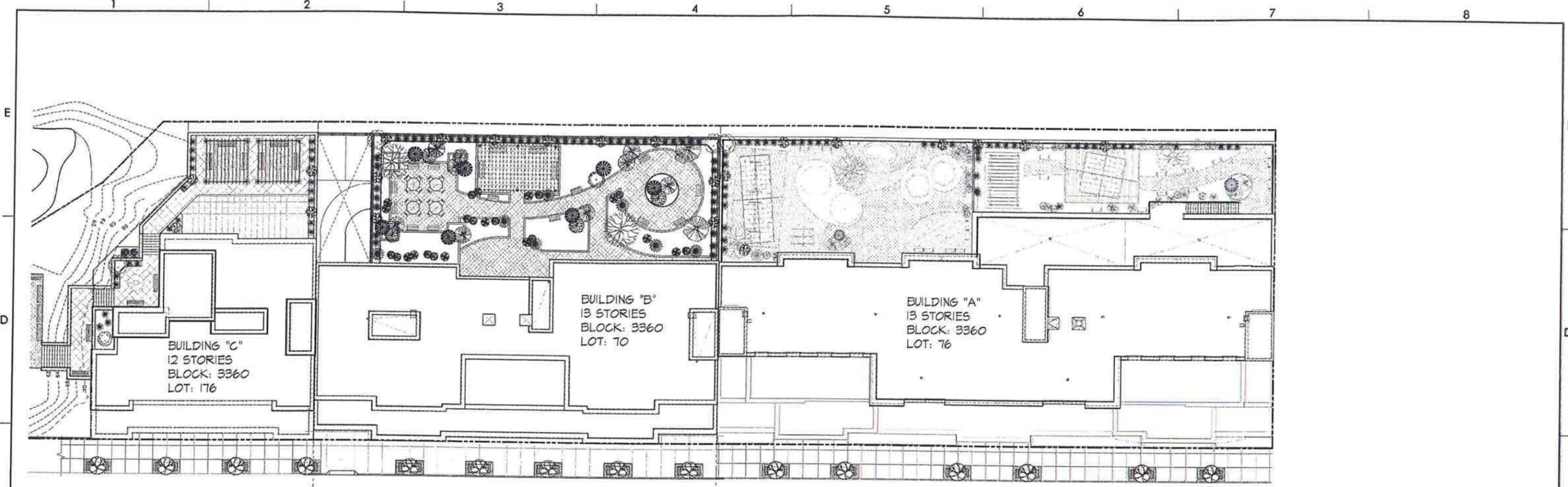
PROPOSED NEW AFFORDABLE HOUSING FOR:  
**WEBSTER COMMONS**

BUILDING A, B, C  
 OVERALL FIRST FLOOR



DATE:	01-20-12
PROJECT NO:	0611
DRAWN BY:	XX
CHECKED BY:	XX
DRAWING NO:	G-101

SCALE: AS NOTED | SHEET NO: 2 of 3



**OVERALL SITE PLAN**  
SCALE: 1/16" = 1'-0"



**OVERALL WEBSTER AVE. ELEVATION**  
SCALE: 1/16" = 1'-0"

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DATE	REVISIONS
01-24-12	ISSUED TO OER FOR REVIEW AND COMMENT

**HUGO S. SUBOTOVSKY** A.I.A.  
ARCHITECTS LLC  
49 N. ANSHUTZ ROAD, SUFFERN, NY 10901 TEL: 845-368-0004 FAX: 845-368-0003  
121 WEST 37TH STREET, NEW YORK, NY 10001 TEL: 212-242-5321 FAX: 800-772-6304

PROPOSED NEW AFFORDABLE HOUSING FOR:  
**WEBSTER COMMONS**

BUILDING A, B, C  
OVERALL SITE PLAN / ELEVATION

DATE:	01-20-12
PROJECT NO.:	0611
DRAWN BY:	XX
CHECKED BY:	XX
DRAWING NO.:	<b>G-102</b>
SCALE:	AS NOTED   SHEET NO: 3 of 3





## **APPENDIX IV**

### **SOIL/MATERIALS MANAGEMENT PLAN**

#### **1.1 SOIL SCREENING METHODS**

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the RAR. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Completion.

#### **1.2 STOCKPILE METHODS**

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and 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 8-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.

#### **1.3 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. Soils proposed for reuse on-Site will be managed as defined in this plan.

## **1.4 MATERIALS EXCAVATION, LOAD-OUT AND DEPARTURE**

The PE/QEP overseeing the remedial action will:

- oversee remedial 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 work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- 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 parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

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.

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior OER approval.

## **1.5 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. Off-Site queuing will be minimized.

Outbound truck transport routes are in the Section 5.8 of the RAWP. 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.

## **1.6 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) a letter from the PE/QEP or Enrollee 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 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. These documents will be included in the RAR.

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the RAR.

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 reported in the RAR. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the RAR. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

## **1.7 MATERIALS REUSE ON-SITE**

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. The soil cleanup objectives for on-Site reuse are listed in the RAWP. “Reuse on-Site” means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to Engineering Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

## **1.8 DEMARCATION**

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all

associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

## **1.9 IMPORT OF BACKFILL SOIL FROM OFF-SITE SOURCES**

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site.

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.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this RAWP. The RAR 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.

## **1.10 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 will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RAR. 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 material is not acceptable for, and will not be used as cover material.

## **1.11 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. Discharge to the New

York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

## **1.12 STORM-WATER POLLUTION PREVENTION**

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAWP (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

## **1.13 CONTINGENCY PLAN**

This contingency plan is developed for the remedial construction 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. These findings will be included in the daily report. 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.

## **1.14 ODOR, DUST AND NUISANCE CONTROL**

### **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 otherwise be controlled, 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.

This odor control plan is 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's certifying the Remedial Action Report.

### **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 stockpiles.
- Exercise 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 is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts 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/QEP's responsible for certifying the Remedial Action Report.

### **Other Nuisances**

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

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

## **1.15 IMPORT OF CLEAN COVER**

No soil is anticipated to be imported to the Site for use as clean cover. In the event that the development plan changes and clean cover is necessary to cap any open space/ residual fill, the following protocol will be used.

All imported soil will be uncontaminated, clean soil that meets the lesser of the appropriate NYSDEC 6 NYCRR Part 375-6.8 Restricted Use Class SCOs and the NYSDEC 6 NYCRR Part 375-6.8 groundwater protection SCO.

The imported uncontaminated, clean soil cover will be from an approved source/facility and will be evaluated by the PE/QEP to ensure:

- 1) That a segregated stockpile is properly maintained at the source and will not be comingled with any other material prior to importing and grading the clean soil material at the Site;
- 2) That the material does not include any solid waste, including construction and demolition material, as it's prohibited;
- 3) That screening for evidence of contamination by visual, olfactory and PID soil screening

practices prior to testing at the source as well as upon importing to the Site for grading is completed; and

- 4) That a maximum five-part composite sample will be collected from the segregated stockpile at the source at a minimum frequency of one sample per 250 cubic yards and analyzed for the following Full List parameters:
- VOCs by EPA Method 8260C (rev. 2006)
  - SVOCs by EPA Method 8270D (rev. 2007)
  - Pesticides by EPA Method 8081B (rev. 2000)
  - PCBs by EPA Method 8082A (rev. 2000)
  - TAL Metals by EPA Method 6010C (rev. 2007)



Remedial Action Work Plan  
3560 Webster Avenue, Block 3360, Lot 76, Bronx, New York  
Brinkerhoff Project No. 06BR424

## **APPENDIX V**

### **VAPOR/MOISTURE BARRIER**

# VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

RAVEN  
INDUSTRIES

## Product Description

VaporBlock® Plus™ 20 is a seven-layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission. VaporBlock® Plus™ 20 is a highly resilient underslab / vertical wall barrier designed to restrict naturally occurring gases such as radon and/or methane from migrating through the ground and concrete slab. VaporBlock® Plus™ 20 is more than 100 times less permeable than typical high-performance polyethylene vapor retarders against Methane, Radon and other harmful VOCs.

VaporBlock® Plus™ 20 is one of the most effective underslab gas barriers in the building industry today far exceeding ASTM E-1745 (Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs) Class A, B and C requirements. Available in a 20 (Class A) mil thicknesses designed to meet the most stringent requirements. VaporBlock® Plus™ 20 is produced within the strict guidelines of our ISO 9001:2008 Certified Management System.

## Product Use

VaporBlock® Plus™ 20 resists gas and moisture migration into the building envelop when properly installed to provide protection from toxic/harmful chemicals. It can be installed as part of a passive or active control system extending across the entire building including floors, walls and crawl spaces. When installed as a passive system it is recommended to also include a ventilated system with sump(s) that could be converted to an active control system with properly designed ventilation fans.

VaporBlock® Plus™ 20 works to protect your flooring and other moisture-sensitive furnishings in the building's interior from moisture and water vapor migration, greatly reducing condensation, mold and degradation.

## Size & Packaging

VaporBlock® Plus™ 20 is available in 10' x 150' rolls to maximize coverage. All rolls are folded on heavy-duty cores for ease in handling and installation. Other custom sizes with factory welded seams are available based on minimum volume requirements. Installation instructions and ASTM E-1745 classifications accompany each roll.



Under-Slab Vapor/Gas Retarder

## Product

## Part #

VaporBlock Plus 20 ..... VBP 20

## APPLICATIONS

Radon Barrier

Under-Slab Vapor Retarder

Methane Barrier

Foundation Wall Vapor Retarder

VOC Barrier

**VaporBlock® Plus™**  
UNDERSLAB VAPOR RETARDER / GAS BARRIER

# VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier



		VAPORBLOCK PLUS 20	
PROPERTIES	TEST METHOD	IMPERIAL	METRIC
APPEARANCE		White/Gold	
THICKNESS, NOMINAL		20 mil	0.51 mm
WEIGHT		102 lbs/MSF	498 g/m <sup>2</sup>
CLASSIFICATION	ASTM E 1745	CLASS A, B & C	
TENSILE STRENGTH LBF/IN (N/CM) AVERAGE MD & TD (NEW MATERIAL)	ASTM E 154 Section 9 (D-882)	58 lbf	102 N
IMPACT RESISTANCE	ASTM D 1709	2600 g	
MAXIMUM USE TEMPERATURE		180° F	82° C
MINIMUM USE TEMPERATURE		-70° F	-57° C
PERMEANCE (NEW MATERIAL)	ASTM E 154 Section 7	0.0051 Perms grains/(ft <sup>2</sup> ·hr·in·Hg)	0.0034 Perms g/(24hr·m <sup>2</sup> ·mm Hg)
RADON DIFFUSION COEFFICIENT	ASTM E 96 Procedure B	< 1.1 x 10 <sup>-13</sup> m <sup>2</sup> /s	
METHANE PERMEANCE	K124/02/95	< 1.7 x 10 <sup>-10</sup> m <sup>3</sup> /d·atm	
	ASTM D 1434	0.32 GTR (Gas Transmission Rate) ml/m <sup>2</sup> ·D·ATM	

## VaporBlock® Plus™ Placement

All instructions on architectural or structural drawings should be reviewed and followed.  
Detailed installation instructions accompany each roll of VaporBlock® Plus™ and can also be located on our website.  
ASTM E-1643 also provides general installation information for vapor retarders.



VaporBlock® Plus™ is a seven-layer co-extruded barrier made using high quality virgin-grade polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission.

Note: To the best of our knowledge, unless otherwise stated, these are typical property values and are intended as guides only, not as specification limits. Chemical resistance as well as other performance criteria is not implied or given and actual testing must be performed for applicability in specific applications and/or conditions. RAVEN INDUSTRIES MAKES NO WARRANTIES AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage.



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10/10 EFD 1125

# VaporBlock<sup>®</sup> Plus<sup>™</sup>

UNDERSLAB VAPOR RETARDER / GAS BARRIER

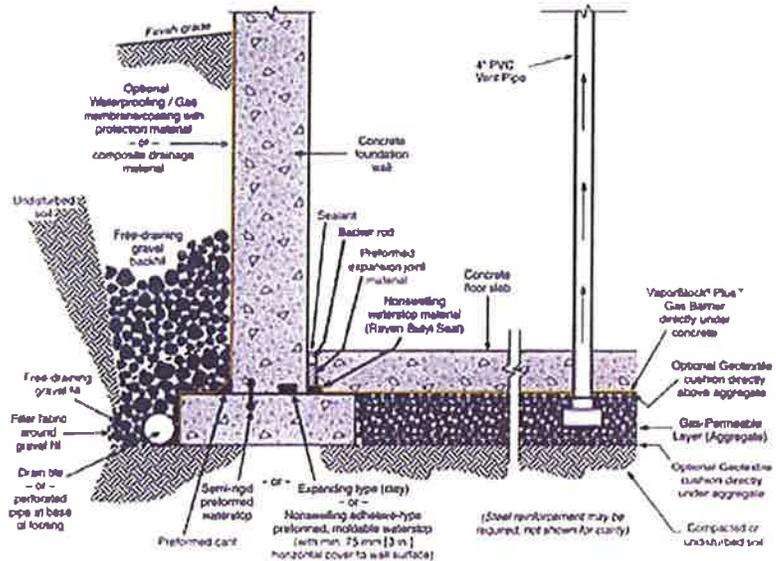
## INSTALLATION GUIDELINES

**Please Note:** Read these instructions thoroughly before installation to ensure proper use of VaporBlock<sup>®</sup> Plus<sup>™</sup>. ASTM E 1465, ASTM E 2121 and, ASTM E 1643 also provide valuable information regarding the installation of vapor / gas barriers. When installing this product, contractors shall conform to all applicable local, state and federal regulations and laws pertaining to residential and commercial building construction.

- When VaporBlock Plus gas barrier is used as part of an active control system for radon or other gas, a ventilation system will be required.
- If designed as a passive system, it is recommended to install a ventilation system that could be converted to an active system if needed.

### Materials List:

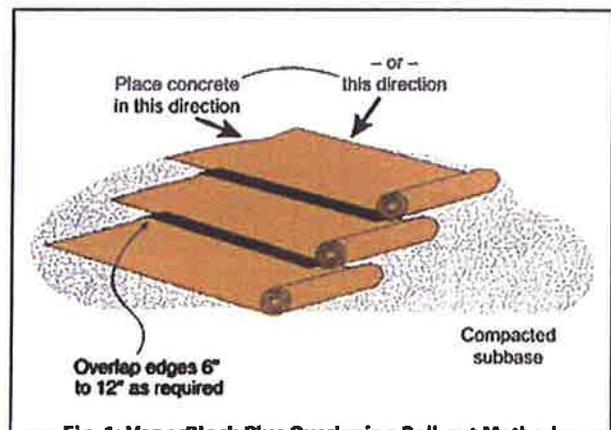
- VaporBlock<sup>®</sup> Plus<sup>™</sup> Vapor / Gas Barrier
- VaporBond Plus 4" Foil Seaming Tape
- Butyl Seal 2-Sided Tape
- VaporBoot Plus Pipe Boots 12/Box (recommended)
- VaporBoot Tape (optional)



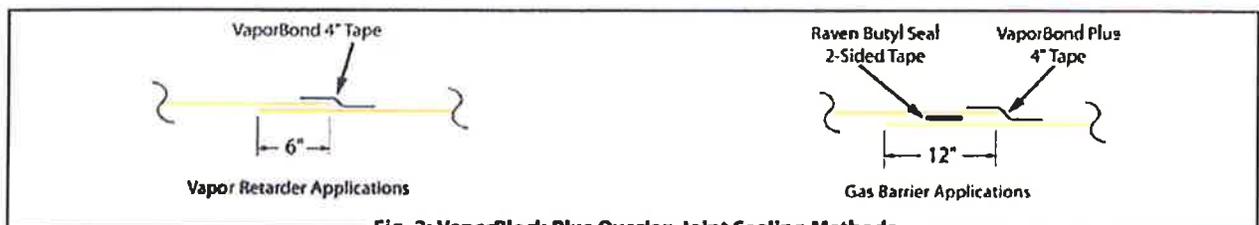
**Elements of a moisture/gas-resistant floor system. General illustration only.**  
(Note: This example shows multiple options for waterstop placement.)

## VAPORBLOCK<sup>®</sup> PLUS<sup>™</sup> PLACEMENT

- 1.1. Level and tamp or roll granular base as specified. A base for a gas-reduction system may require a 4" to 6" gas permeable layer of clean coarse aggregate as specified by your architectural or structural drawings after installation of the recommended gas collection system. In this situation, a cushion layer consisting of a non-woven geotextile fabric placed directly under VaporBlock<sup>®</sup> Plus<sup>™</sup> will help protect the barrier from damage due to possible sharp coarse aggregate.
- 1.2. Unroll VaporBlock Plus running the longest dimension parallel with the direction of the pour and pull open all folds to full width. (Fig. 1)
- 1.3. Lap VaporBlock Plus over the footings and seal with Raven Butyl Seal tape at the footing-wall connection. Prime concrete surfaces and assure they are dry and clean prior to applying Raven Butyl Seal Tape. Apply even and firm pressure with a rubber roller. Overlap joints a minimum of 6" and seal overlap with Raven VaporBond Tape. When used as a gas



**Fig. 1: VaporBlock Plus Overlapping Roll-out Method**



**Fig. 2: VaporBlock Plus Overlap Joint Sealing Methods**

The VaporBlock Plus and VaporBond Plus are registered trademarks of the VaporBlock Plus Corporation. © 2011 VaporBlock Plus Corporation. All rights reserved.

## SINGLE PENETRATION PIPE BOOT INSTALLATION

barrier, overlap joints a minimum of 12" and seal in-between overlap with 2-sided Raven Butyl Seal Tape. Then seal with VaporBond Plus Tape centered on the overlap seam. (Fig. 2)

- 1.4. Seal around all plumbing, conduit, support columns or other penetrations that come through the **VaporBlock Plus** membrane. Pipes four inches or smaller can be sealed with Raven VaporBoot Plus preformed pipe boots. VaporBoot Plus preformed pipe boots are formed in steps for 1", 2", 3" and 4" PVC pipe or IPS size and are sold in units of 12 per box (Fig. 3 & 5).

Pipe boots may also be fabricated from excess **VaporBlock Plus** membrane (Fig. 4 & 6) and sealed with VaporBoot Tape or VaporBond Plus Tape (sold separately).

*Reminder Note: All holes or penetrations through the membrane will need a patch cut to a minimum of 12" from the opening in all directions.*

To fabricate pipe boots from **VaporBlock Plus** excess material (see Fig. 4 & 6 for A-F):

- A) Cut a square large enough to overlap 12" in all directions.
- B) Mark where to cut opening on the center of the square and cut four to eight slices about 3/8" less than the diameter of the pipe.

- C) Force the square over the pipe leaving the tightly stretched cut area around the bottom of the pipe with approximately a 1/2" of the boot material running vertically up the pipe. *(no more than a 1/2" of stretched boot material is recommended)*

- D) Once boot is positioned, seal the perimeter to the membrane by applying 2-sided Raven Butyl Seal Tape in between the two layers. Secure boot down firmly over the membrane taking care not to have any large folds or creases.

- E) Use VaporBoot Tape or VaporBond Plus Tape to secure the boot to the pipe.

VaporBoot Tape (option) – fold tape in half lengthwise, remove half of the release liner and wrap around the pipe allowing 1" extra for overlap sealing. Peel off the second half of the release liner and work the tape outward gradually forming a complete seal.

VaporBond Plus Tape (option) - Tape completely around pipe overlapping the to get a tight seal against the pipe.

- F) Complete the process by taping over the boot perimeter edge with VaporBond Plus Tape to create a monolithic membrane between the surface of the slab and gas/moisture sources below and at the slab perimeter. (Fig. 4 & 6)

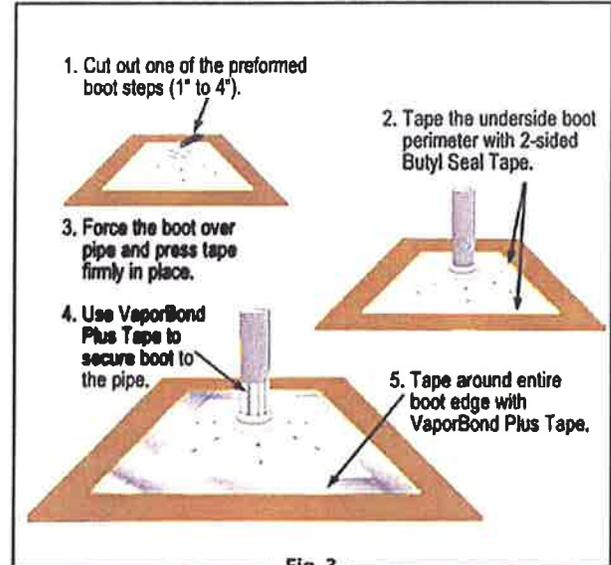


Fig. 3

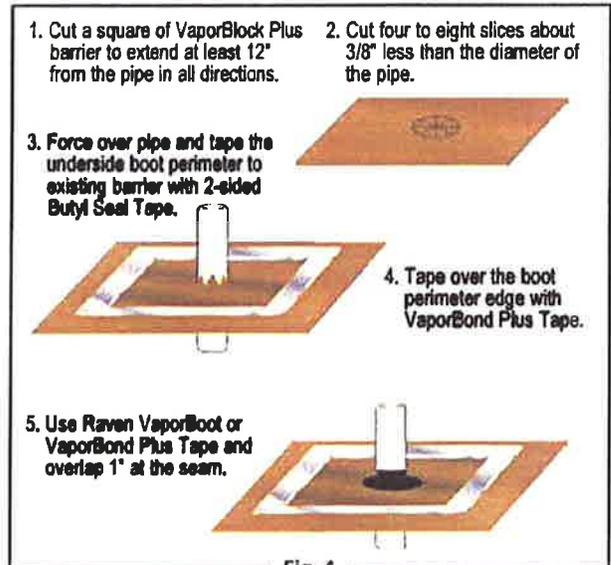


Fig. 4

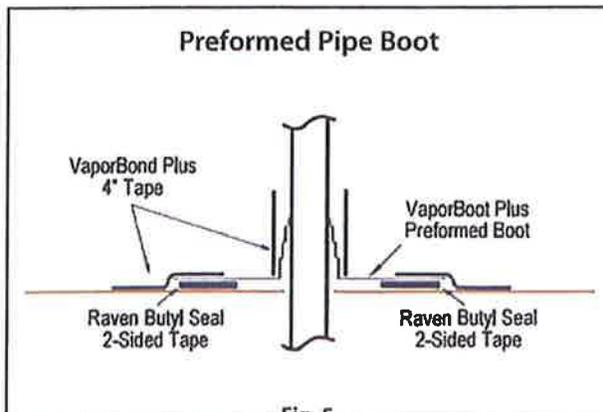


Fig. 5

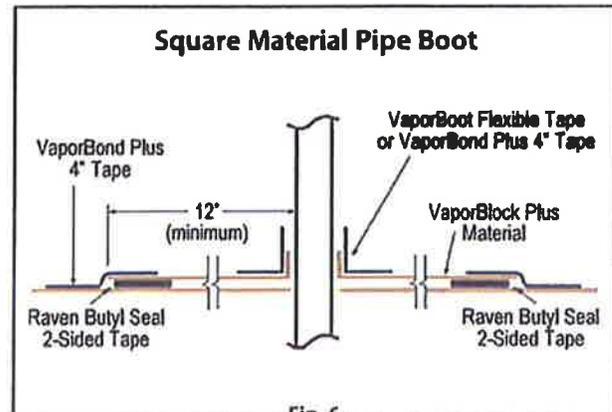


Fig. 6

## MULTIPLE PENETRATION PIPE BOOT INSTALLATION

### 1.5. For side-by-side multiple penetrations;

- A) Cut a patch large enough to overlap 12" in all directions (Fig. 7) of penetrations.
- B) Mark where to cut openings and cut four to eight slices about 3/8" less than the diameter of the penetration for each.
- C) Slide patch material over penetration to achieve a tight fit.
- D) Once patch is positioned, seal the perimeter to the membrane by applying 2-sided Raven Butyl Seal Tape in-between the two layers. (Fig. 8)
- E) After applying Raven Butyl Seal Tape between the patch and membrane, tape around each of the penetrations and the patch with VaporBond Plus 4" foil tape. (Fig. 9) For additional protection apply an acceptable polyurethane elastomeric sealant around the penetrations. (Fig. 10)

- 1.6. Holes or openings through VaporBlock Plus are to be repaired by cutting a piece of VaporBlock Plus 12" larger in all directions from the opening. Seal the patch to the barrier with 2-sided Raven Butyl Seal Tape and seal the edges of the patch with VaporBond Plus Tape.

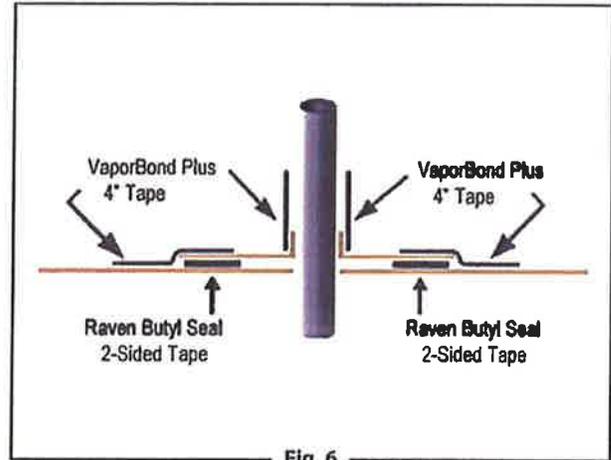


Fig. 6

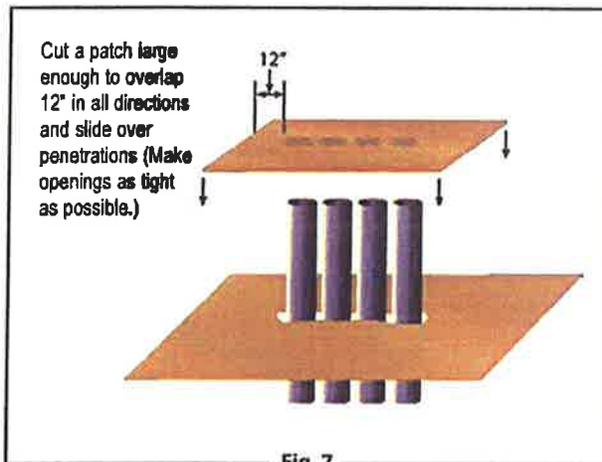


Fig. 7

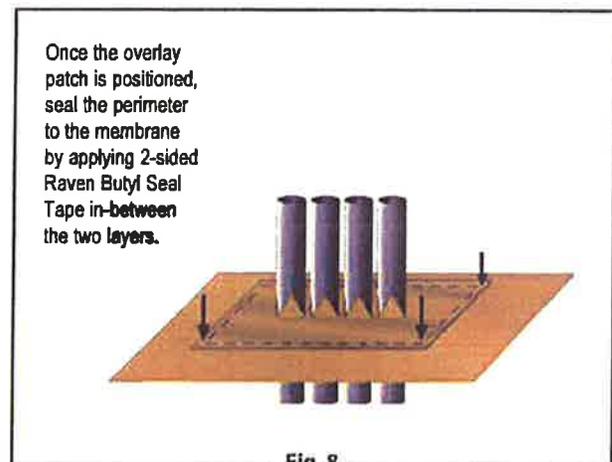


Fig. 8

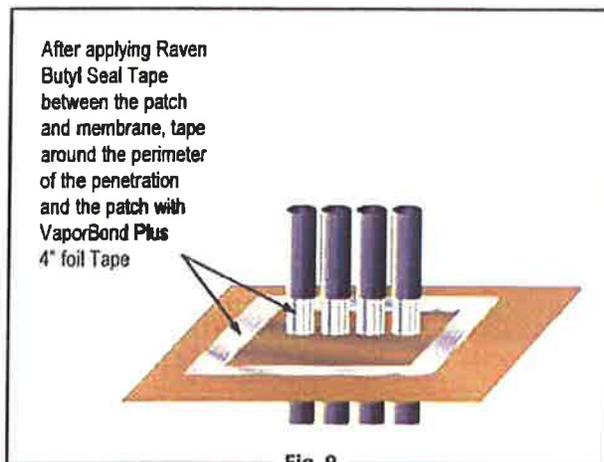


Fig. 9

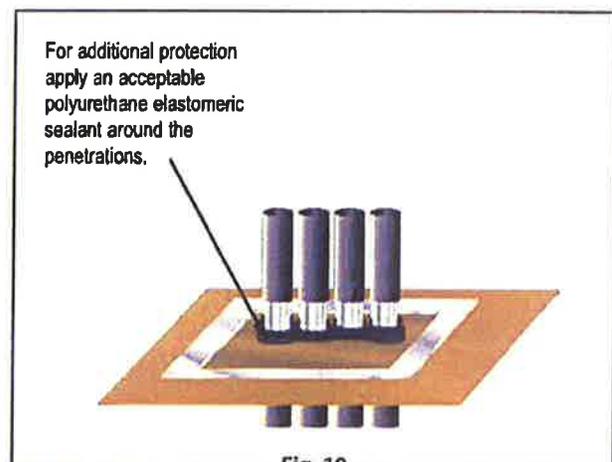


Fig. 10

## VAPORBLOCK® PLUS™ PROTECTION

- 2.1. When installing reinforcing steel and utilities, in addition to the placement of concrete, take precaution to protect **VaporBlock Plus**. Carelessness during installation can damage the most puncture-resistant membrane. Sheets of plywood cushioned with geotextile fabric temporarily placed on **VaporBlock Plus** provide for additional protection in high traffic areas including concrete buggies.
- 2.2. Use only brick-type or chair-type reinforcing bar supports to protect **VaporBlock Plus** from puncture.
- 2.3. Avoid driving stakes through **VaporBlock Plus**. If this cannot be avoided, each individual hole must be repaired per section 1.6.
- 2.4. If a cushion or blotter layer is required in the design between **VaporBlock Plus** and the slab, additional care should be given if sharp crushed rock is used. Washed rock will provide less chance of damage during placement. Care must be taken to protect blotter layer from precipitation before concrete is placed.



**Note:** To the best of our knowledge, these are typical installation procedures and are intended as guidelines only. Architectural or structural drawings must be reviewed and followed as well on a project basis. **NO WARRANTIES ARE MADE AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS OR GUIDELINES REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and we disclaim all liability for resulting loss or damage.**



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