



**NYC Office of Environmental  
Remediation**

**110 EAST 149<sup>TH</sup> STREET  
BRONX, NEW YORK**

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## **Remedial Action Work Plan**

**NYC BCP Number: 15CVCP114X**

OER Project Number #14EH-A604X  
E-Designation E-227

**Prepared for:**

River Avenue Management  
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**MARCH 2015**

# 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
CHASP	Construction Health and Safety Plan
COC	Contaminants of Concern
DCR	Declaration of Covenants and Restrictions
Diversified	Diversified Geophysics, Inc.
DNAPL	Dense Non-Aqueous Phase Liquid
DUSR	Data Usability Summary Report
ECs/ICs	Engineering and Institutional Controls
ELAP	Environmental Laboratory Approval Program
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
ft amsl	feet above mean sea level
ft bgs	Feet below ground surface
HAZWOPER	Hazardous Waste Operations and Emergency Response
GPS	Global Positioning Service
GQS	Groundwater Quality Standards
LiRo	LiRo Engineers, Inc.
LNAPL	Light Non-Aqueous Phase Liquid
NOC	Notice of Completion
NYC	New York City
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

<b>Acronym</b>	<b>Definition</b>
NYC OER	New York City Office of Environmental Remediation
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
OSHA	United States Occupational Health and Safety Administration
PCBs	Polychlorinated biphenyls
PE	Professional Engineer
PID	Photo Ionization 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
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RI	Remedial Investigation
RIR	Remedial Investigation Report
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
ug/Kg	Micrograms/Kilograms
ug/L	Micrograms/Liter

<b>Acronym</b>	<b>Definition</b>
ug/m <sup>3</sup>	Micrograms/Cubic Meter
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound

# CERTIFICATION

I, Marty Wesolowski, am a Professional Engineer (PE) licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the 110 East 149<sup>th</sup> Street Site, Site number 15CVCP114X.

I, Steve Frank, am a Qualified Environmental Professional (QEP) as defined in §43-140. I have primary direct responsibility for implementation of the remedial action for the 110 East 149<sup>th</sup> Street 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

\_\_\_\_\_  
NYS PE License Number

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
QEP Name

\_\_\_\_\_  
QEP Signature

\_\_\_\_\_  
Date

# **EXECUTIVE SUMMARY**

River Avenue Management has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a site located at 110 East 149<sup>th</sup> Street in 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). 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 to applicable laws and regulations.

## **Site Location and Current Usage**

The Site is addressed at 110 East 149<sup>th</sup> Street, Bronx, New York (Figure 1). The Site is located in the Concourse Village neighborhood of Bronx and is identified as Block 2351, Lot 25. Recently, the developer requested and obtained New York City Department of Buildings (NYC DOB) approval for the division of the existing single lot into a total of three lots (e.g., 25, 40, and 50). The Site is located at the southeast corner of the East 149<sup>th</sup> Street and Rivera Avenue intersection.

The Site is currently developed with a one and two-story concrete block building with a partial basement which is currently vacant. The building measures 35,698 square feet and is located on the central portion of the Site. The remaining portions of the Site consist of asphalt paved parking.

## **Summary of Proposed Redevelopment Plan**

The proposed redevelopment project consists of demolition of the existing structure and redevelopment of the Site with one affordable housing building (Housing Building A), one moderate income building (Housing Building B/C), a hotel, and a large courtyard/terrace. Underground parking will be located beneath the courtyard/terrace. The hotel and Housing Building B/C will have full or partial basements. The basement levels in Housing Building B/C will be finished at an elevation which is only slightly lower (approximately two feet) than the existing building floor grade. A one story, on-grade parking garage, with 49 spaces will be built as part of residential Building A. The entrance to the parking garage will be through the Exterior

Street building. A landscaped courtyard will be built on the roof of the parking garage with shallow plantings of clean fill. Residents from Building A will gain direct access to the courtyard from the second floor of the building. Residents of Building B/C will not have direct access to the courtyard. The layout of the Proposed Redevelopment Plan is presented in Figure 3. The anticipated maximum depths of excavation are approximately 9 to 15 feet below existing grade for the hotel building, 4 feet below existing grade for Building B/C, and 5 feet below existing grade for the parking garage. Building A is anticipated to be constructed approximately 1 foot higher than the existing grade.

### **Summary of Environmental Findings**

Based on the data collected, the following findings were concluded by LiRo:

1. The elevation of the Site ranges from approximately 10 feet above mean sea level (ft amsl) in the southern portion of the Site to approximately 19.5 ft amsl in the northern portion of the Site;
2. Depth to groundwater at the Site ranges from approximately 9 feet below grade surface (ft bgs) in the southern portion of the Site to 18.5 ft bgs in the northern portion of the site;
3. Apparent groundwater flow is generally to the northwest, west, and southwest;
4. Based on geotechnical borings (conducted by others to support Site redevelopment), bedrock was observed at depths ranging from approximately 35 to 100 ft bgs;
5. The subsurface soils encountered during this Phase II investigation consisted predominantly of gray and brown colored fill material which included fine to medium (minimal coarse) grained sand with some silt and fragmented/blasted rock (schist). Anthropogenic materials (i.e., brick, concrete, gravel, glass, wood, ash, etc.), which are indicative of urban fill, were encountered throughout the Site at depths ranging up to approximately 21 ft bgs. Fine to coarse sand and clayey silt with traces of gravel (interpreted to be glacial till) were noted below 21 ft bgs. Refusal was encountered during the advancement of soil borings SB-01 and SB-04 at 12 ft bgs;
6. Seventeen soil/fill samples results were compared to New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use SCOs and Restricted Residential SCOs as presented in 6NYCRR Part 375-6.8 and CP-51. Soil/fill results showed trace concentrations of acetone and methylene chloride (less than 100

micrograms/kilograms [ug/Kg]) in three soil samples. Six semi-volatile organic compounds (SVOCs), including benzo(a)anthracene (max 9.7 mg/kg), benzo(a)pyrene (max 8.1 mg/kg), benzo(b)fluoranthene (max 8.2 mg/kg), chrysene (max 8.2), dibenzo(a,h)anthracene (1.3 mg/kg), and indeno(1,2,3-cd)pyrene (4.8 mg/kg) exceeded Restricted Residential Use. Metals including mercury (max 29 mg/kg), barium (max 5,500 mg/kg), chromium (max 920 mg/kg), lead (max 7,000 mg/kg), and zinc (max 6,100 mg/kg) exceeded Restricted Residential SCOs within six of the soil samples. Highest concentrations of metals were detected in one shallow soil boring, SB-06 indicating a hotspot area. One pesticide 4,4'-DDT (max 0.017 mg/kg), exceeded Unrestricted Use SCOs. Polychlorinated biphenyls (PCBs) were not detected in any of soil samples.

7. Five groundwater samples results were compared to New York State (NYS) 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS) and CP-51. VOCs, including benzene (max. of 140 micrograms/Liter [ug/L]), ethyl benzene (at 5.3 ug/L), isopropyl benzene (at 110 ug/L), xylenes(m&p) (max. of 73 ug/L), xylene(o) (max. of 6.6 ug/L), and toluene (max. of 9.5 ug/L), were reported at concentrations exceeding their GQSs in two of the five groundwater samples (within MW-02 and MW-03 which are both located within close proximity for the former northwest adjacent gas station). Several metals were identified, but only iron, manganese and sodium were reported at concentrations exceeding their GQSs. PCBs and pesticides were not detected in any of the groundwater samples. As a result of the observation of elevated levels of petroleum-related VOCs at locations MW-02 and MW-03, a spill No. 1407530 was assigned by NYSDEC on October 21, 2014.
8. Seven soil vapor results collected during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values Derived by the New York State Department of Health (NYSDOH) located in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Petroleum related VOCs including 1,2,4-trimethylbenzene (146,000 micrograms/meter cubed [ $\mu\text{g}/\text{m}^3$ ]), 1,2-dichloroethane (6,000  $\mu\text{g}/\text{m}^3$ ), benzene (19,400  $\mu\text{g}/\text{m}^3$ ), ethyl benzene (87,900  $\mu\text{g}/\text{m}^3$ ), methylene chloride (559  $\mu\text{g}/\text{m}^3$ ), toluene (6,580  $\mu\text{g}/\text{m}^3$ ), xylenes(m&p) (103,000  $\mu\text{g}/\text{m}^3$ ), and/or xylenes(o) (2140  $\mu\text{g}/\text{m}^3$ ), were detected in one soil vapor samples (SV-03) collected. Chlorinated VOC, tetrachloroethene (max. of 56  $\mu\text{g}/\text{m}^3$ ) was detected in three soil vapor samples. Concentrations of methylene

chloride exceeds the NYSDOH indoor air guideline value. Elevated levels of petroleum related compound and methylene chloride will require mitigation.

### **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; is effective in both the short-term and long-term and reduces mobility, toxicity, and volume of contaminants; is cost effective and implementable; and, uses standard methods that are well established in the industry.

The preferred remedial action Alternative is Alternative 2, the Track 4 Alternative. The preferred remedial action alternative achieves protection of public health and the environment for the intended use of the property. The preferred remedial action alternative will achieve all of the remedial action objectives established for the project and addresses applicable Standards, Criteria and Guidance (SCGs). The preferred remedial action alternative is effective in both the short-term and long-term and reduces mobility, toxicity, and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standard 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 all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Site Specific (Track 4) Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency specified by disposal

facility. A Waste Characterization Report documenting sample procedures, location, analytical results and disposal facility(s) approval letters will be submitted to NYCOER prior to the start of the remedial action.

6. Excavation and removal of soil/fill exceeding SCOs. For development purposes, the depths of excavation are approximately 9 to 15 feet below existing grade for the hotel building, 4 feet below existing grade for Building B/C, and 5 feet below existing grade for the parking garage. Additional excavation will be conducted in two hotspot areas. Metals hotspot area SB-6 and mercury hotspot at MW-01 (at 14 feet depths). A total of approximately 15,700 tons of soil will be excavated and removed from this Site.
7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
9. Removal of known heating oil tank and other underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations.
10. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities.
11. Collection and analysis of eight end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
12. Installation of a vapor barrier system beneath the building slabs and outside foundation sidewalls below grade.
13. Installation and operation of an active(wind-turbine driven) sub-slab depressurization system.

14. Construction and maintenance of an engineered composite cover consisting of at least 6 inches building slabs, parking lot slabs, and concrete pavement to prevent human exposure to residual soil/fill remaining under the Site.
15. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations. Approximately, 1600 tons of soils will be imported for backfill purposes.
16. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
17. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
18. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all ECs/ICs to be implemented at the Site.
19. 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 ECs/ICs, and reporting at a specified frequency.
20. Continued registration of the property with an E-Designation; establishment of Engineering Controls and Institutional Controls in this RAWP; 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.

## COMMUNITY PROTECTION STATEMENT

NYC OER created the NYC VCP to provide governmental oversight for the cleanup of contaminated property in NYC. 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 and 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.

**Remedial Investigation and Cleanup Plan.** Under the NYC VCP, a thorough cleanup study of this property (called a RI) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and 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 program, 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 Construction Health and Safety Plan (CHASP) 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 CHASP. The Site Safety Coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site Safety Coordinator is to be determined and his/her name and phone number will be provided to OER prior to field activities.

**Worker Training.** Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) 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 or 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 includes 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 NYC noise control standards. If you observe problems in these areas, please contact the on-site Project Manager (to be determined) or NYC OER Project Manager (to be determined).

**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 RAR. This report will be submitted to the NYC OER and will be thoroughly reviewed.

**Storm-Water Management.** To limit the potential for soil erosion and discharge, this cleanup plan has provisions for storm-water management. The main elements of the storm-water 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 DOB construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation will be conveyed to OER before the start of the remedial action.

**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, provides project contact names and numbers, and locations of where project documents can be viewed.

**Complaint Management.** The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager, the NYC OER Project Manager, or call 311 and mention 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 DOB 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 EP. 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 storm-water 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 releases. 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 (NYSDOT). 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 a final report (called a RAR) that will be available for you to review in the public document repositories located at a location to be determined.

**Long-Term Site Management.** 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 or established through a city environmental designation. 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

River Avenue Management has enrolled in the NYC VCP to investigate and remediate a property located at 110 East 149<sup>th</sup> Street in the Concourse Village neighborhood section of Bronx, New York (the “Site”). A RI was performed to compile and evaluate data and information necessary to develop this 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 alternatives 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, and complies with applicable environmental standards, criteria and guidance, and applicable laws and regulations.

### 1.1 Site Location and Current Usage

The Site is located in the Concourse Village neighborhood of Bronx and is identified as Block 2351, Lot 25 on the NYC tax map. Figure 1 is a Site Location Map. The Site is located at the southeast corner of the East 149<sup>th</sup> Street and Rivera Avenue intersection. The Site measures 50,488 square feet and is currently developed with a 35,698 square foot, one and two-story concrete block building with a partial basement. Figure 2 is a Site Plan. Historically, the Site was utilized as a lumber yard from the early 1900s through at least 1947. The existing structure was constructed between 1947 and 1951 and has historically been utilized for warehouse uses from at least 1951 through at least 2005.

### 1.2 Proposed Redevelopment Plan

The proposed redevelopment project consists of demolition of the existing structure and redevelopment of the Site with one affordable housing building (Housing Building A), one moderate income building (Housing Building B/C) with a cellar to be excavated to about 4 feet below grade, a hotel with a full cellar to be excavated to 9-15 feet below grade, and a large

courtyard/terrace. Underground parking will be located beneath the courtyard/terrace and is associated with Building B/C; excavation for the underground parking will be to 2-5 feet below grade. The hotel will have a full basement. The lowest level in Housing Building B/C will be finished at an elevation which is higher than the existing building floor grade. Housing Building B/C will be finished at an elevation which is only slightly lower (approximately two feet) than the existing building floor grade. Housing building A will not have a cellar and will be raised above the current grade by about 1-3 feet. The layout of the Proposed Redevelopment Plan is presented in Figure 3. (Please describe any landscaped or sidewalk areas that are not underlain by parking lot or building slab) The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

### **1.3 Description of Surrounding Properties**

The Site is located along the south side of East 149<sup>th</sup> Street between River Avenue to the west and Gerard Avenue to the east in the Bronx, New York. The Harlem River is located approximately 800 feet west of the Site and Governor Smith Park is located approximately 2,500 feet east of the Site. To the north of the Site is a one-story tire service center and BP Gasoline Station and car wash. A vacant property which is currently under construction is located south of the Site. To the east is a three-story brick building which is utilized by Hostos College. An I-87 off-ramp, NY Recycling, Inc., and tire service center are located west of the Site.

Figure 4 shows the surrounding land use and Figure 5 shows surrounding zoning.

### **1.4 Remedial Investigation**

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report for 110 East 149<sup>th</sup> Street, Bronx, New York*”, dated January 9, 2015 (RIR).

Historically, the Site was utilized as a lumber yard from the early 1900s through at least 1947. The existing structure was constructed between 1947 and 1951 and has historically been utilized as: an outdoor advertising company in 1951; a coffee warehouse from 1977 through 1980; Twinkie Import Company in 2000; and, Metro Beer and Soda, PQS 2, Twinkie Beverage, Inc., and Twinkie Import Company in 2005. The Site was also occupied by the Strauss Meat and Fish

Company; however, the dates of occupancy are not known. A gasoline station has historically been located northwest adjacent to the Site from at least 1935 through at least 1986.

Based on the findings of a Phase I Environmental Site Assessment (ESA) completed at the Site in August 2012, both visual observations and historical Sanborn Maps have identified the Site as including current and/or former USTs. Evidence noted at the time of the Phase I Site inspection included the presence of 11 vent pipes, two suspect fill ports, and a suspect former pump island. NYC DOB records indicate that one 3,000-gallon fuel oil tank was installed at the Site in 1956. In addition, the Sanborn Maps revealed that the northwest adjacent property was utilized as a gasoline station from at least 1935 through at least 1986. Based on the location of ten vent pipes along the west wall of the structure and the adjacent gasoline station, LiRo Engineers, Inc. (LiRo) believes that the vent pipes are associated with the adjacent gasoline station and that the associated tanks are likely located on the adjacent property rather than on the Site.

A geophysical survey was performed across the Site by Diversified Geophysics, Inc. (Diversified) on June 11, 2014 to investigate for the presence of potential USTs that were identified during the Phase I ESA Site reconnaissance and in historic Sanborn maps and municipal records. Based on the results of the geophysical survey, an anomaly consistent with a UST was identified in the northeastern portion of the property. The location is consistent with a vent pipe and reported location of the 3,000-gallon fuel oil tank identified in the Phase I report. The survey was also used to investigate an area identified as a potential fuel dispenser pad. Based on the geophysical testing and further examination, this feature was determined to be a foundation, likely for a former light pole. The geophysical survey was also used to identify locations of utilities. A copy of the geophysical survey report is provided as an attachment to this Phase II ESA report.

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

LiRo performed the following scope of work during the RI:

1. Conducted a Site inspection to identify Areas of Concern (AOCs) and physical obstructions (i.e., structures, buildings, etc.);

2. Installed 11 soil borings (SB-01 through SB-06 and MW-01 through MW-05) across the Site and collected 17 soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Converted five of the soil borings into monitoring wells (MW-01 through MW-05) and collected five groundwater samples for chemical analysis to evaluate groundwater quality; and,
4. Installed seven soil vapor probes around the Site and collected seven soil vapor samples for chemical analysis.

### **Summary of Environmental Findings**

Based on the data collected, the following findings were concluded by LiRo:

1. The elevation of the Site ranges from approximately 10 feet above mean sea level (ft amsl) in the southern portion of the Site to approximately 19.5 ft amsl in the northern portion of the Site;
2. Depth to groundwater at the Site ranges from approximately 9 feet below grade surface (ft bgs) in the southern portion of the Site to 18.5 ft bgs in the northern portion of the site;
3. Apparent groundwater flow is generally to the northwest, west, and southwest;
4. Based on geotechnical borings (conducted by others to support Site redevelopment), bedrock was observed at depths ranging from approximately 35 to 100 ft bgs;
5. The subsurface soils encountered during this Phase II investigation consisted predominantly of gray and brown colored fill material which included fine to medium (minimal coarse) grained sand with some silt and fragmented/blasted rock (schist). Anthropogenic materials (i.e., brick, concrete, gravel, glass, wood, ash, etc.), which are indicative of urban fill, were encountered throughout the Site at depths ranging up to approximately 21 ft bgs. Fine to coarse sand and clayey silt with traces of gravel (interpreted to be glacial till) were noted below 21 ft bgs. Refusal was encountered during the advancement of soil borings SB-01 and SB-04 at 12 ft bgs;
6. Seventeen soil/fill samples results were compared to New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use SCOs and Restricted Residential SCOs as presented in 6NYCRR Part 375-6.8 and CP-51. Soil/fill results

- showed trace concentrations of acetone and methylene chloride (less than 100 micrograms/kilograms [ug/Kg]) in three soil samples. Six semi-volatile organic compounds (SVOCs), including benzo(a)anthracene (max 9.7 mg/kg), benzo(a)pyrene (mx 8.1 mg/kg), benzo(b)fluoranthene (max 8.2 mg/kg), chrysene (max 8.2), dibenzo(a,h)anthracene (1.3 mg/kg), and indeno(1,2,3-cd)pyrene (4.8 mg/kg) exceeded Restricted Residential Use. Metals including mercury (max 29 mg/kg), barium (max 5,500 mg/kg), chromium (max 920 mg/kg), lead (max 7,000 mg/kg), and zinc (max 6,100 mg/kg) exceeded Restricted Residential SCOs within six of the soil samples. Highest concentrations of metals were detected in one shallow soil boring, SB-06 indicating a hotspot area. One pesticide 4,4'-DDT (max 0.017 mg/kg), exceeded Unrestricted Use SCOs. Polychlorinated biphenyls (PCBs) were not detected in any of soil samples.
7. Five groundwater samples results were compared to New York State (NYS) 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS) and CP-51. VOCs, including benzene (max. of 140 micrograms/Liter [ug/L]), ethyl benzene (at 5.3 ug/L), isopropyl benzene (at 110 ug/L), xylenes(m&p) (max. of 73 ug/L), xylene(o) (max. of 6.6 ug/L), and toluene (max. of 9.5 ug/L), were reported at concentrations exceeding their GQSs in two of the five groundwater samples (within MW-02 and MW-03 which are both located within close proximity for the former northwest adjacent gas station). Several metals were identified, but only iron, manganese and sodium were reported at concentrations exceeding their GQSs. PCBs and pesticides were not detected in any of the groundwater samples. As a result of the observation of elevated levels of petroleum-related VOCs at locations MW-02 and MW-03, a spill No. 1407530 was assigned by NYSDEC on October 21, 2014.
  8. Seven soil vapor results collected during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values Derived by the New York State Department of Health (NYSDOH) located in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Petroleum related VOCs including 1,2,4-trimethylbenzene (146,000 micrograms/meter cubed [ $\mu\text{g}/\text{m}^3$ ]), cis 1,2-dichloroethane (6,000  $\mu\text{g}/\text{m}^3$ ), benzene (19,400  $\mu\text{g}/\text{m}^3$ ), ethyl benzene (87,900  $\mu\text{g}/\text{m}^3$ ), methylene chloride (559  $\mu\text{g}/\text{m}^3$ ), toluene (6,580  $\mu\text{g}/\text{m}^3$ ), xylenes(m&p)

(103,000  $\mu\text{g}/\text{m}^3$ ), and/or xylenes(o) (2140  $\mu\text{g}/\text{m}^3$ ), were detected in one soil vapor samples (SV-03) near 149<sup>th</sup> Street. Chlorinated VOC, tetrachloroethene (max. of 56  $\mu\text{g}/\text{m}^3$ ) was detected in three soil vapor samples. Concentrations of methylene chloride exceeds the NYSDOH indoor air guideline value. Elevated levels of petroleum related compound and methylene chloride will require mitigation.

The findings of the investigation indicate that the entire Site is covered with fill that contains elevated concentrations (relative to Part 375 Restricted Residential SCOs) of SVOCs and metals. Elevated levels of petroleum-related VOCs were reported in groundwater and soil vapor in the northwest portion of the Site adjacent to the former gasoline station. This contamination is likely a result of contaminant migration from the adjacent gasoline station. A geophysical anomaly consistent with the reported location of a 3,000-gallon fuel oil tank was observed in the northeastern portion of the Site. There was no evidence of leakage from the fuel oil tank.

For more detailed results, consult the RIR. 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.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

### **Soil**

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from contaminated soil.
- Prevent migration of contaminants that would result in groundwater or surface water contamination.

### **Soil Vapor**

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor into dwelling and other occupied structures.

### **3.0 REMEDIAL ALTERNATIVES ANALYSIS**

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended, and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable SCGs. Remedial alternatives are then developed and evaluated based on the following ten criteria:

1. Protection of human health and the environment;
2. Compliance with SCGs;
3. Short-term effectiveness and impacts;
4. Long-term effectiveness and permanence;
5. Reduction of toxicity, mobility, or volume of contaminated material;
6. Implementability;
7. Cost effectiveness;
8. Community Acceptance;
9. Land use; and,
10. Sustainability.

As required, a minimum of two remedial alternatives (including a Track 1 Unrestricted Use scenario) are evaluated. The following is a detailed description of the alternatives analyzed to address impacted media at the Site:

#### **Alternative 1:**

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the RI, it is expected that this

alternative would be achieved by excavating all known fill material (anticipated to extend to depths up to 21 ft bgs) on the Site. The total volume of soil anticipated for removal to achieve a Track 1 cleanup is 42,462 cubic yards. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building's cellar level is complete, additional excavation will be performed to ensure complete removal of soil that does not meet Track 1 Unrestricted Use SCOs.

- No Engineering or Institutional Controls are required for a Track 1 cleanup, but a vapor barrier/waterproofing membrane would be installed as part of development to prevent potential exposures from soil vapor.
- As part of development, placement of a composite cover over the entire Site.

#### **Alternative 2:**

- Establishment of Site-Specific (Track 4) SCOs.
- Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 Site-Specific SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the RI, it is expected that this alternative would be achieved by the excavation and removal of soil/fill necessary to complete the proposed building and Site reconstruction, which will remove soils exceeding Track 4 Site Specific SCOs. The majority of the Site will be excavated to a depth ranging approximately between 2 and 15 ft bgs for development purposes. The small portion of the property where Track 4 Site Specific SCOs were exceeded in the central area of the Site will be excavated to a depth of approximately 5 ft bgs, which will remove any hotspots where exceedances were found between 2 and 4 ft bgs. Additionally, the second area of the Site where Track 4 Specific SCOs were exceeded in the northeast portion of the Site will be excavated to a depth of approximately 15 ft bgs, which will remove any hotspots where exceedances were found between 14 and 15 ft bgs. Additional excavation may be required to install utilities. Areas of the Site requiring fill (west-southwest portion of the Site) will not re-use soils from excavated

areas of the Site. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation, additional excavation would be performed to meet Track 4 Site-Specific SCOs.

- Placement of a cover system over the entire Site, which may include paving, artificial turf, and/or 2 feet of clean fill to prevent exposure to remaining soil/fill;
- Installation of a minimum thickness of 20 mil waterproofing/vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor;
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of sensitive Site uses such as farming or vegetable gardening to prevent future exposure pathways; and, prohibition of a higher level of land use without OER approval;
- Establishment of an approved SMP to ensure long-term management of these ECs/ICs including the performance of periodic inspections and certification that the controls are performing as they were intended. The SMP will note that the property owner and property owner's successors and assigns must comply with the approved SMP; and,
- The property will continue to be registered with an E-Designation at the NYC DOB.

### **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 ECs/ICs. Protection of public health and the environment must be achieved for all approved remedial actions.

**Alternative 1** would be protective of human health and the environment by removing contaminated soil/fill exceeding Track 1 Unrestricted Use SCOs and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill once

construction is complete and eliminating the risk of contamination leaching into groundwater.

**Alternative 2** would achieve comparable protections of human health and the environment by the excavation and removal of soil/fill necessary to complete the proposed building and Site reconstruction, which will remove soils exceeding Track 4 Site Specific SCOs, as well as by placement of ECs/ICs, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-site soil/fill. Implementing ICs including a SMP and continued “E” designation of property would ensure that the composite cover system remains intact and protective. Establishment of Track 4 Site-Specific SCOs would minimize the risk of contamination leaching into groundwater.

For both Alternatives, potential exposure to contaminated soils or groundwater during construction would be minimized by implementing a CHASP, an approved SMP, and CAMP. Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-site soil vapors into the new building would be prevented by installing a waterproofing/vapor barrier system beneath building slabs and along foundation side walls.

## **3.2 Balancing Criteria**

### **Compliance with Standards, Criteria, and Guidance**

This evaluation criterion assesses the ability of the Alternative to achieve applicable SCGs.

**Alternative 1** would achieve compliance with the remedial goals, chemical-specific SCGs, and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCOs and Protection of Groundwater SCOs. Compliance with SCGs for soil vapor would also be achieved by installing a waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier around foundation walls, as part of development.

**Alternative 2** would achieve compliance with the remedial goals, chemical-specific SCGs, and RAOs for soil by the excavation and removal of soil/fill necessary to complete the proposed building and Site reconstruction, which will remove soils exceeding Track 4 Site Specific SCOs. Compliance with SCGs for soil vapor would also be achieved by installing a

waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier around foundation walls. A SMP would ensure that these controls remained protective for the long term.

Health and safety measures contained in the CHASP and CAMP that comply with the applicable SCGs shall be implemented during Site redevelopment under this RAWP. For both Alternatives, 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. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

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

This evaluation criterion assesses the effects of the Alternative 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.

Both **Alternatives 1 and 2** have similar short-term effectiveness during their respective implementations, as each requires excavation of historic fill material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. Short-term impacts would potentially be higher for Alternative 1 due to the volume of soil needed to be excavated to meet Track 1 Unrestricted Use SCOs and Protection of Groundwater SCOs. 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.

An additional short-term adverse impact and risks to the community associated with both remedial Alternatives is increased truck traffic. Approximately 2,633, 25-ton capacity truck trips would be necessary to transport excavated fill and soil to meet Track 1 Unrestricted Use SCOs and Protection of Groundwater SCOs. While only 629 25-ton capacity truck trips would be necessary to transport excavated fill and soil during site reconstruction, which will remove

soils exceeding Track 4 Site Specific SCOs. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flaggers will be used to protect pedestrians at Site entrances and exits.

The effects of these potential adverse impacts to the community, workers, and the environment would be minimized through implementation of corresponding control plans including a CHASP, a CAMP, and an SMP, during all on-site soil disturbance activities and would minimize the release of contaminants into the environment. Both Alternatives provide short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-site contaminants. Construction workers operating under appropriate management procedures and a CHASP would be protected from on-site contaminants (personal protective equipment [PPE] would be worn consistent with the documented risks within the respective work zones).

### **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 and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.

**Alternative 1** would achieve long-term effectiveness and permanence related to on-site contamination by permanently removing all impacted soil/fill above Track 1 Unrestricted Use SCOs. Removal of on-site contaminant sources will prevent future groundwater contamination.

**Alternative 2** would provide long-term effectiveness by removing most on-site contamination and attaining Track 4 Site-Specific SCOs; a composite cover system across the Site, maintaining use restrictions, establishing an SMP to ensure long-term management of ICs, ECs, and maintaining continued registration as an E-designated property. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy will provide continued high level of

protection in perpetuity.

Both alternatives would result in removal of soil contamination exceeding their respective SCOs, providing the highest level, most effective and permanent remedy over the long-term with respect to a remedy for contaminated soil, which will eliminate any migration to groundwater. Potential sources of soil vapor and groundwater contamination will also be eliminated as part of the remedy.

### **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 of total volume of contaminated media.

**Alternative 1** will permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by removing all of the historic fill at the Site down to approximately 21 ft bgs which would remove all soil in excess of Track 1 Unrestricted Use SCOs.

**Alternative 2** would remove the historic fill at the Site that doesn't meet Track 4 Site-Specific SCOs during Site reconstruction and any remaining on-site soil beneath the new building will meet Track 4 Site-Specific SCOs.

**Alternative 1** would eliminate a greater total mass of contaminants on-site.

### **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 techniques, materials, and equipment to implement both remedial **Alternatives 1 and 2** are readily available and have been proven effective in remediating the contaminants associated with the Site. They use standard materials and services that are well established technology. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

### **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.

Excavation of the site is required to depths of up to 15 feet for the Hotel basement level but is limited to 5 feet or less for the other buildings planned at the site. Based on the RIR, the planned building foundation excavations will be sufficient to achieve Track 4 SCOs. The cost to remove all fill from the site in order to meet Track 1 SCOs would be significantly higher than the cost to remediate soil to meet Track 4 SCOs. The proposed remedial plan creates an approach that combines the remedial action with the redevelopment of the Site, including the construction of the building foundation and subgrade structures.

### **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 permitting associated with the proposed Site development, no adverse community opinion is anticipated for either Alternative. This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial Alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in Appendix A. Observations here will be

supplemented by public comment received on the RAWP.

### **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. The current intended and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. The proposed redevelopment project consists of demolition of the existing structure and redevelopment of the Site with one affordable housing building (Housing Building A), one moderate income building (Housing Building B/C), a hotel, and a large courtyard/terrace. Underground parking will be located beneath the courtyard/terrace. The hotel and Housing Building B/C will have full or partial basements. The basement levels in Housing Building B/C will be finished at an elevation which is only slightly lower (approximately two feet) than the existing building floor grade. A one story, on-grade parking garage, with 49 spaces will be built as part of residential Building A. The entrance to the parking garage will be through the Exterior Street building. A landscaped courtyard will be built on the roof of the parking garage with shallow plantings of clean fill. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 4 Site-Specific SCOs, both of which are appropriate for its planned residential use. The reasonably anticipated future use of the Site and its surroundings will be documented by the applicant in the NYC VCP application, which will include the following conclusions.

The proposed redevelopment of the Site is compatible with its current zoning and is consistent with recent development patterns. The areas surrounding the Site are urban and consist of predominantly mixed residential and commercial buildings in zoning districts designated for

commercial and residential uses. The development would replace an underutilized Site with a hotel and modern residential buildings. The proposed development would create new employment opportunities, living space, and economic and fiscal benefits to the City and State in the form of economic revitalization and tax revenue.

Temporary short-term project impacts are being mitigated through Site management controls and truck traffic controls during remediation activities.

The Site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites, natural resources, waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species. The Site is located in an urban area with limited proximity to fish or wildlife. Both alternatives would prevent any potential exposure pathways of contaminant migration affecting fish or wildlife. Municipal water supply wells are not present in this part of City; therefore, groundwater from the Site cannot affect municipal water supply wells or recharge areas. The Site does not lie in a Federal Emergency Management Agency (FEMA)-designated flood plain. Both alternatives are equally protective of natural resources and cultural resources.

Improvements in the current environmental 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.

### **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.

While **Alternative 2** would potentially result in lower energy usage based on reducing the volume of material transported off-site, both remedial Alternatives are comparable with respect

to the opportunity to achieve sustainable remedial action. The remedial plan would take into consideration the shortest trucking routes during off-site disposal of historic fill and other soils, which would reduce greenhouse gas emissions and conserve energy used to fuel trucks. The NYC Clean Soil Bank program may be utilized for reuse of native soils. To the extent practicable, energy efficient building materials, appliances, and equipment will be utilized to complete the development. A complete list of green remedial activities considered as part of the NYC VCP is included in the Sustainability Statement, included as Appendix B.

## 4.0 REMEDIAL ACTION

### 4.1 Summary of Preferred Remedial Action

The preferred remedial action Alternative is **Alternative 2**, the Track 4 Alternative. The preferred remedial action Alternative achieves protection of public health and the environment for the intended use of the property. The preferred remedial action Alternative will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action Alternative is effective in both the short-term and long-term and reduces mobility, toxicity, and volume of contaminants. The preferred remedial action Alternative is cost effective and implementable and 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 all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Site Specific (Track 4) Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency specified by disposal facility. A Waste Characterization Report documenting sample procedures, location, analytical results and disposal facility(s) approval letters will be submitted to NYCOER prior to the start of the remedial action.
6. Excavation and removal of soil/fill exceeding SCOs. For development purposes, the depths of excavation are approximately 9 to 15 feet below existing grade for the hotel building, 4 feet below existing grade for Building B/C, and 5 feet below existing grade

for the parking garage. Additional excavation will be conducted in two hotspot areas. Metals hotspot area SB-6 and mercury hotspot at MW-01 (at 14 feet depths). A total of approximately 15,700 tons of soil will be excavated and removed from this Site.

7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
9. Removal of known heating oil tank and other underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations.
10. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities.
11. Collection and analysis of eight end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
12. Installation of a vapor barrier system beneath the building slabs and outside foundation sidewalls below grade.
13. Installation and operation of a active (wind-turbine driven) sub-slab depressurization system.
14. Construction and maintenance of an engineered composite cover consisting of at least 6 inches building slabs, parking lot slabs, and concrete pavement to prevent human exposure to residual soil/fill remaining under the Site.
15. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations. Approximately, 1600 tons of soils will be imported for backfill purposes.

16. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
17. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
18. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all ECs/ICs to be implemented at the Site.
19. 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 ECs/ICs, and reporting at a specified frequency.
20. Continued registration of the property with an E-Designation; establishment of Engineering Controls and Institutional Controls in this RAWP; 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**

Track 4 SCOs are proposed for this project. The SCOs for this Site are as follows:

- Total SVOCs – 250 mg/Kg
- Mercury – 2.5 mg/Kg
- Barium – 800 mg/Kg
- Lead – 1,200 mg/Kg

Soil and materials management on and off-site, including excavation, handling, and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix C. The location of planned excavations is shown in Figure 8.

Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by Global Positioning System (GPS) or surveyed. This information will be provided in the RAR.

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

The total quantity of soil/fill expected to be excavated and disposed off-site is 15,702 tons.

Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

### **End-Point Sampling**

Removal actions for development purposes under this plan will be performed in conjunction with confirmation soil sampling. Based on the site investigation data, soil exceeding the Track 4 SCOs is present at MW-01-14-15' (northeast area of the Site) and SB-06-2.0-4.0' (south central area of the Site). These two locations and where the exceedances were found are both within the excavation limits set forth in the proposed redevelopment of the Site. Therefore, eight end point confirmation samples will be collected from the base of the excavation. For comparison to Track 4 SCOs, analytes will only include trigger compounds and elements established on the Track 4 SCO list.

Hot-spot removal actions, whether established under this RAWP or identified during the remedial program, will be performed in conjunction with post remedial end-point samples to ensure that hot-spots are fully removed. Analytes for end-point sampling will be those parameters that are driving the hot-spot removal action and will be approved by OER. For sampling of VOCs, bottom samples should be taken within 24 hours of excavation and should be taken from the 0 to 6-inch interval at the excavation floor. Samples taken after 24 hours should be taken at 6 to 12-inches. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal.

Post-remediation 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.

NYS Environmental Laboratory Approval Program (ELAP) certified labs will be used for all confirmation and end-point sample analyses. Labs performing confirmation and end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all confirmation and end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. End-point samples will be confirmation samples will be analyzed for compounds and elements as described above utilizing the following methodology. Soil analytical methods will include:

- Semi-volatile organic compounds by USEPA Method 8270;
- Metals by USEPA Method 6010 and Mercury by USEPA Method 7471A.

If either Light Non-Aqueous Phase Liquid (LNAPL) and/or Dense Non-Aqueous Phase Liquid (DNAPL) are detected, appropriate samples will be collected for characterization and “finger print analysis” and required regulatory reporting (i.e. spills hotline) will be performed.

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

At least one duplicate sample will be collected for every 20 samples collected and at least one field and lab blank will be included daily with collected samples to assess sampling and lab artifacts.

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

Import of soils onto the property and reuse of soils already on-site will be performed in conformance with the Soil/Materials Management Plan in Appendix C. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 1,664 tons. No on-site soil/fill is expected to be reused/relocated on Site.

### **4.3 Engineering Controls**

The excavation required for the proposed Site development will achieve Track 4 Site Specific SCOs. Engineering Controls (ECs) were employed in the remedial action to address residual contamination remaining at the Site. The Site has 3 primary ECs systems which include:

- composite cover system consisting of concrete covered sidewalks and concrete building slabs of at least six inches thickness;
- soil vapor barrier of at least 20 mil thickness; and,
- active sub-slab depressurization system.

#### **Composite Cover System**

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system is comprised of:

- Concrete covered sidewalks; and,
- Concrete building slabs.

The composite cover system is a permanent ECs for the Site. The system will be inspected and reported at specified intervals as required by this RAWP and the SMP. A Soil/Materials 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**

Migration of soil vapor will be mitigated with a combination of building slab and vapor barrier. In order to prevent subsurface vapors from impacting the interior air of the buildings, a vapor barrier system (VBS) consisting of a (indicate product and product manufacturer) will be installed beneath the slab and outside the perimeter of the foundation sidewalls. Membrane specifications and data sheets will be provided to the OER in the Stipulation List. The installation of the VBS will be described in the RAR. The Remedial Action Report will include

photographs (maximum of two photos per page) of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturers certificate of warranty.

The Remedial Action Report will include photographs (maximum of two photos per page) of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturers certificate of warranty.

### **Vapor Barrier**

Migration of soil vapor will be mitigated with the construction of active sub-slab depressurization systems (SSDS). The layout plans for the SSDS are provided as Figure X. Design details of the SSDS are also provided as Figure X.

PE-certified drawings of the SSDS are provided as Figure X. The Remedial Action Report will include photographs of the installation of SSDS laterals as well as if any deviations have occurred due to construction scope changes. The Remedial Action Report will include PE/RA-certified as-built plans depicting SSDS lateral and riser pipe configurations and locations.

## **4.4 Institutional Controls**

Institutional Controls (ICs) have been incorporated in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. ICs are listed below. Long-term employment of EC/ICs will be implemented under a site-specific SMP that will be included in the RAR.

ICs for this remedial action are:

- The property will continue to be registered with an E-Designation by the NYC DOB. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the SMP which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a SMP in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting, and

certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted at a frequency to be determined by OER in the SMP and will comply with RCNY §43-1407(1)(3).

- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP; and,
- The Site will be used for residential and commercial use and will not be used for a higher level of use without prior approval by OER.

#### **4.5 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 OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the DCR and the SMP are implemented.

## **4.6 Qualitative Human Health Exposure Assessment**

The objective of the qualitative exposure assessment is to identify potential receptors and pathways for human exposure to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Investigations reported in the RIR are sufficient to complete a Qualitative Human Health Exposure Assessment (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 QHHEA 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**

Historic fill material is present at the Site from grade to approximately 21 feet below grade. Fine to coarse sand and clayey silt with traces of gravel (interpreted to be glacial till) were noted below 21 ft bgs. Based on geotechnical borings (conducted by others to support Site redevelopment), bedrock was observed at depths ranging from approximately 35 to 100 ft bgs.

### **Soil**

- SVOCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene exceeded Restricted Residential Use SCOs.
- Metals including mercury, barium, chromium, lead, and zinc exceeded Restricted Residential SCOs within six of the soil samples.
- One pesticide 4,4'-DDT was identified but did not exceed Restricted Residential Use SCOs.

## **Groundwater**

- VOCs, including benzene, ethyl benzene, isopropyl benzene, xylenes(m&p), xylene(o) and toluene exceeding their GQSs.
- Several metals were identified, but only iron, manganese and sodium exceeded their GQSs.

## **Soil Vapor**

- Petroleum related VOCs were detected at elevated concentrations
- Chlorinated VOCs were detected at moderate levels and below the NYSDOH matrix for monitoring.

Based on the findings of the RIR, the entire Site is covered with fill that may contain elevated concentrations (relative to Part 375 Restricted Residential SCOs) of SVOCs and metals. Elevated levels of petroleum-related VOCs were reported in groundwater and soil vapor in the northwest portion of the Site adjacent to the former gasoline station. This contamination is likely a result of contaminant migration from the adjacent former gasoline station. A geophysical anomaly consistent with the reported location of a 3,000-gallon fuel oil tank was observed in the northeastern portion of the Site. There was no evidence of leakage from the fuel oil tank.

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

Based on the analytical results for the soil samples collected at the Site, petroleum-impacts were reported within the deeper soils on the northwest portion of the Site and is attributed to migration of contaminants from the adjacent former gasoline station. Fill which is present across the entire Site contains elevated concentrations of SVOCs, metals, and to a limited extent, one pesticide.

Based on the analytical results for the groundwater samples collected at the Site, petroleum-impacts were reported on the northwest portion of the Site adjacent to the former gasoline station which is consistent with the soil analytical data findings. The distribution of elevated metals concentrations do not suggest an on-site source. Comparison of filtered and unfiltered sample concentrations indicate that most of the unfiltered exceedances are attributable to suspended sediment in the samples. The metals which were reported as exceedances in filtered samples

(iron, manganese, and sodium) are not considered to be a concern as groundwater use is not contemplated at the Site.

Based on the analytical results for soil vapor, VOCs, including 1,2,4-trimethylbenzene, 1,2-dichloroethane, acetone, benzene, carbon disulfide, chloroform, ethyl benzene, methylene chloride, tetrachloroethene, toluene, trichlorofluoromethane, xylenes (m&p), and/or xylenes (o), were detected among the seven soil vapor samples collected. Comparison of the results for the two detected VOCs (methylene chloride and tetrachloroethene) for which NYSDOH has published air guideline values, shows that only the observed methylene chloride concentration at SV-3 exceeds the NYSDOH indoor air guideline value. This result is considered anomalous due to the absence of significant concentrations of methylene chloride in soil or groundwater at the adjacent MW-03 sample location. As previously noted, the laboratory reported an elevated surrogate recovery value for this sample, and therefore, the results may not be representative of Site conditions.

The greatest soil vapor concentrations were reported for petroleum-related compounds in the soil vapor sample SV-2 collected adjacent to the former gasoline station.

### **Potential Routes of Exposure**

The five elements of an exposure pathway are:

- 1) the source of contamination;
- 2) the environmental media and transport mechanisms;
- 3) the point of exposure;
- 4) the route of exposure; and,
- 5) the receptor population.

These elements of an exposure pathway may be based on past, present, or future events. 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.

### **Existence of Human Health Exposure**

*Current Conditions:* There is potential for soil vapors to accumulate beneath the existing buildings and proposed new buildings at the Site. There is no potential for direct exposure and ingestion of water, soil, and fill currently at the Site due to the planned Site redevelopment. Groundwater is not exposed at the Site, and because the Site is served by the public water supply and groundwater use for potable supply is prohibited, groundwater is not used at the Site and there is no potential for exposure.

*Construction/Remediation Activities:* Once redevelopment activities begin, construction workers will come into direct contact with surface and subsurface soils, as a result of on-site construction and excavation activities. Contact with groundwater is not anticipated due to the depth of water. On-site construction workers potentially could ingest, inhale, or have dermal contact with any exposed impacted soil and fill. Similarly, off-site receptors could be exposed to dust and vapors from on-site activities. During construction, on off-site exposures to contaminated dust from on-site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the CAMP and a CHASP.

*Proposed Future Conditions:* Under future remediated conditions, most or all soils in excess of Track 1 SCOs will be removed and the Site will meet, at minimum, Track 4 SCOs. The Site will be fully capped, limiting potential direct exposure to soil and groundwater remaining in place, and ECs including a vapor barrier system and composite cover will prevent potential for inhalation via soil vapor intrusion. The Site is served by a public water supply and groundwater is not used at the Site. There are no plausible off-site pathways for ingestion, inhalation, or dermal exposure to contaminants derived from the Site.

## **Receptor Populations**

*On-Site Receptors:* The Site is currently developed with a one and two-story concrete block building with a partial basement which is currently vacant. The building measures 35,698 square feet and is located on the central portion of the Site. The remaining portions of the Site consist of asphalt paved parking. During construction, on-site receptors will include construction worker and visitors. After construction, on-site receptors will include child and adult residents and occupants of the Site and employees.

*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; students; pedestrians; trespassers; and, cyclists, based on the following:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists– existing and future
5. Schools– existing and future

## **Overall Human Health Exposure Assessment**

There is a potential complete exposure pathway that requires mitigation during implementation of the remedy. During remedial construction, on and off-site exposures to contaminated dust from historic fill material will be addressed through dust controls and through the implementation of the CAMP, the Soil/Materials Management Plan, and a CHASP. There is no complete exposure pathway under future conditions after the Site is developed. The vapor barrier, composite cover, and long-term site management will interrupt any remaining exposure pathways. Continued protection after the remedial action will be achieved by the implementation of site management including periodic inspection and certification of the performance of remedial controls. This assessment takes into consideration the reasonably anticipated use of the Site, which includes one affordable housing building (Housing Building A), one moderate income building (Housing Building B/C), a hotel, and a large courtyard/terrace, composite cover, and a subsurface vapor barrier system for the buildings.

Potential post-construction use of groundwater is not considered an option because groundwater in this area of NYC is not used as a potable water source.

## **5.0 REMEDIAL ACTION MANAGEMENT**

### **5.1 Project Organization and Oversight**

Principal personnel who will participate in the remedial action will be determined at a later date. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are will also be determined at a later date.

### **5.2 Site Security**

Site access will be controlled by fencing, which will be installed around the work area to restrict access to the work area.

### **5.3 Work Hours**

The hours for operation of remedial construction will be from 7:00 AM to 5:00 PM. These hours conform to the NYC DOB construction code requirements.

### **5.4 Construction Health and Safety Plan**

The CHASP is included in Appendix D. The Site Safety Coordinator will be determined at a later date. 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 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 NOC.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, including 40-hour HAZWOPER training and annual 8-hour refresher training. 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 be required to sign a CHASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the Site 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; 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 perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

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

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

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

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

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 re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within  $150 \text{ mcg}/\text{m}^3$  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 remedial construction have been or will be obtained prior to the start of remedial construction. Approval 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**

### **Pre-Construction Meeting**

OER will be invited to attend the pre-construction 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 mark-outs. 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 and off-site structures will be maintained during all invasive, excavation, or other remedial activity performed under the RAWP.

### **Dewatering**

Groundwater is not expected to be encountered during excavation. The depths to groundwater observed are deeper than the planned excavations.

### **Equipment and Material Staging**

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

### **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 NYC VCP 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.

### **Extreme Storm Preparedness and Response Contingency Plan**

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

### **Storm Preparedness**

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from holes, trenches, and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; and, storm-water management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

### **Storm Response**

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A Site Inspection Report will be submitted to OER at the completion of the Site inspection and after the Site security is assessed. Site conditions will be compared to the inventory of Site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Storm-water control systems and structures will be inspected and maintained as necessary. If soil or fill materials are

discharged off-site to adjacent properties, property owners, and OER will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to OER and implemented following approval by OER and granting of Site access by the property owner. Impacted off-site areas may require characterization based on Site conditions, at the discretion of OER. If on-site petroleum spills are identified, a QEP will determine the nature and extent of the spill and report to NYS DEC's spill hotline at 800-457-7362. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

### **Storm Response Reporting**

A Site Inspection Report will be submitted to OER at the completion of the Site inspection. An inspection report established by OER is available on OER's website ([www.nyc.gov/oer](http://www.nyc.gov/oer)) and will be used for this purpose. Site conditions will be compared to the inventory of Site conditions and material performed prior to the storm event and significant differences will be noted. The Site Inspection Report will be sent to the OER Project Manager and will include the Site name, address, tax block and lot, and Site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from the Site was dislocated and whether any of the soil left the Site; estimates of the volume of soil that left the Site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the support of excavation; presence of on or off-site exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; and, schedule for corrective actions. This report should be completed and submitted to OER project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

## **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 depart the Site and turn right onto Exterior Street, then take the ramp on the left to I-87 (Major Deegan Expressway).

## **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.

The frequency of the reporting period may be revised in consultation with 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**

A 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;
- SMP (if Track 1 is not achieved);
- 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.
- Continue registration of the property with an E-Designation by the NYC DOB.

- 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 RAR. The certification will include the following statements:

*I, Martin Wesolowski, 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 110 East 149<sup>th</sup> Street Site.*

*I, Steve Frank, am a Qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the 110 East 149<sup>th</sup> Street Site.*

*I certify that the OER-approved Remedial Action Work Plan dated \_\_\_\_\_ and Stipulations in a letter dated \_\_\_\_\_; if any 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**

Currently, a schedule has not been created and will be determined at a later date.

## **Appendix A**

### **Citizen Participation Plan**

The NYC OER and River Avenue Management have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC VCP. 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, River Avenue Management 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 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, to be determined at a later date, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841.

**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 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. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at [brownfields@cityhall.nyc.gov](mailto:brownfields@cityhall.nyc.gov).

**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. River Avenue Management will inspect the repositories to ensure that they are fully populated with project information. The repository for this project will be determined at a later date.

**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.

**Identify Issues of Public Concern.** River Avenue Management is required to identify whether there are specific issues of concern to stakeholders proximate to the project Site. Such issues include, but are not limited to, interests of Environmental Justice communities. No issues of public concern have been identified.

**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 River Avenue Management and reviewed and approved by OER prior to distribution and mailed by River Avenue Management. Public comment is solicited in public notices for all work plans developed under the NYC VCP. 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 RIR and RAWP and a 30-day public comment period on the RAWP. 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 RIR and RAWP and

the initiation of a 30-day public comment period on the RAWP. 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 ECs/ICs and issuance of the NOC.
- 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 ICs/ECs implemented for to the Site and announcing the issuance of the NOC.

## **Appendix B**

### **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. To the extent feasible clean diesel and low sulfur fuels will be utilized in on-site construction equipment.

**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. Recontamination controls for the Site include the installation of building foundations (and cover soils as needed) and building vapor barriers, which will prevent movement of any residual contaminated soils. An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

**Storm-water Retention.** Storm-water retention improves water quality by lowering the rate of combined storm-water and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters. No storm-water retention measures will be installed at the Site.

**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 Brownfield Cleanup Program.** River Avenue Management is participating in OER's Paperless Brownfield 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.** River Avenue Management 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.

To the extent feasible native plant species will be utilized in any landscaped areas. An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

## **Appendix C**

### **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 QEP 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 NOC.

#### **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; and,
- 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 to exit the Site and turn right onto Exterior Street, then take the I-87 Ramp on the left to the Major Deegan Expressway. 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 River Avenue Management 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 Bronx, 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 River Avenue Management. The letter will include as an attachment: (1) 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 RAR 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**

No soil/fill that is derived from the Site will be re-used on-site.

### **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;
- (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 SMP.

## **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. The backfill and cover soil quality objectives will be determined at a later date.

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.

### **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.

RCA will be imported from facilities permitted or registered by the NYS DEC. 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.

## **1.10 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 NYC sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the NYC sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the NYC 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 State Pollutant Discharge Elimination System (SPDES) permit issued by NYS DEC.

## **1.11 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, 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.

## **1.12 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 Target Analyte List (TAL) metals, Target Compound List (TCL) VOCs and SVOCs, TCL pesticides and PCBs, as appropriate.

## **1.13 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 RAR.

### **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 RAR.

### **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.

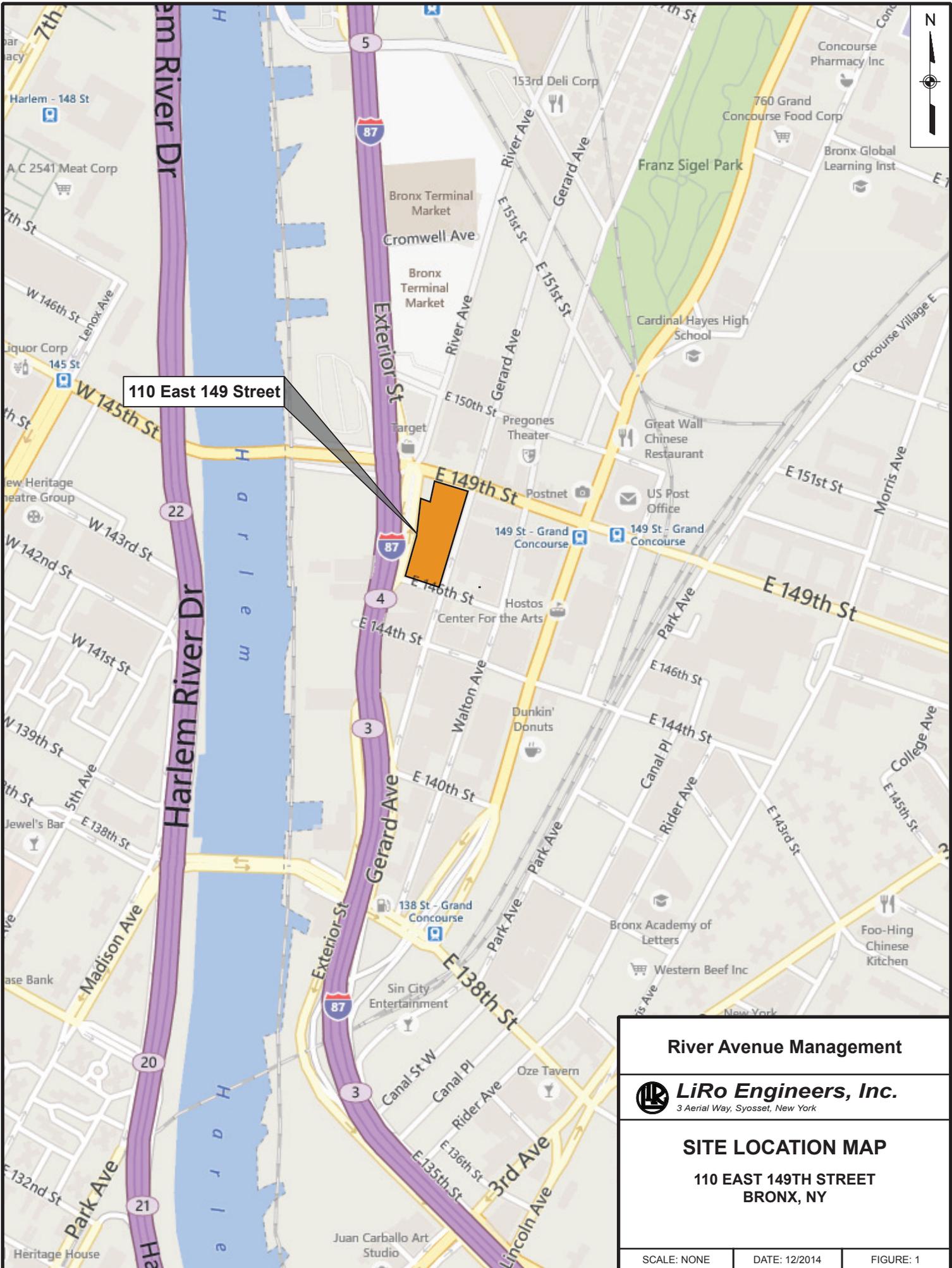
**Appendix D**  
**Construction Health and Safety Plan**

## **APPENDIX E**

# **Design Diagrams and Specifications for Vapor Barrier/Waterproofing Membrane and Sub-Slab Depressurization System**

## **7.0 SCHEDULE**

Currently, a schedule has not been created and will be determined at a later date.



110 East 149 Street

**River Avenue Management**



**LiRo Engineers, Inc.**

3 Aerial Way, Syosset, New York

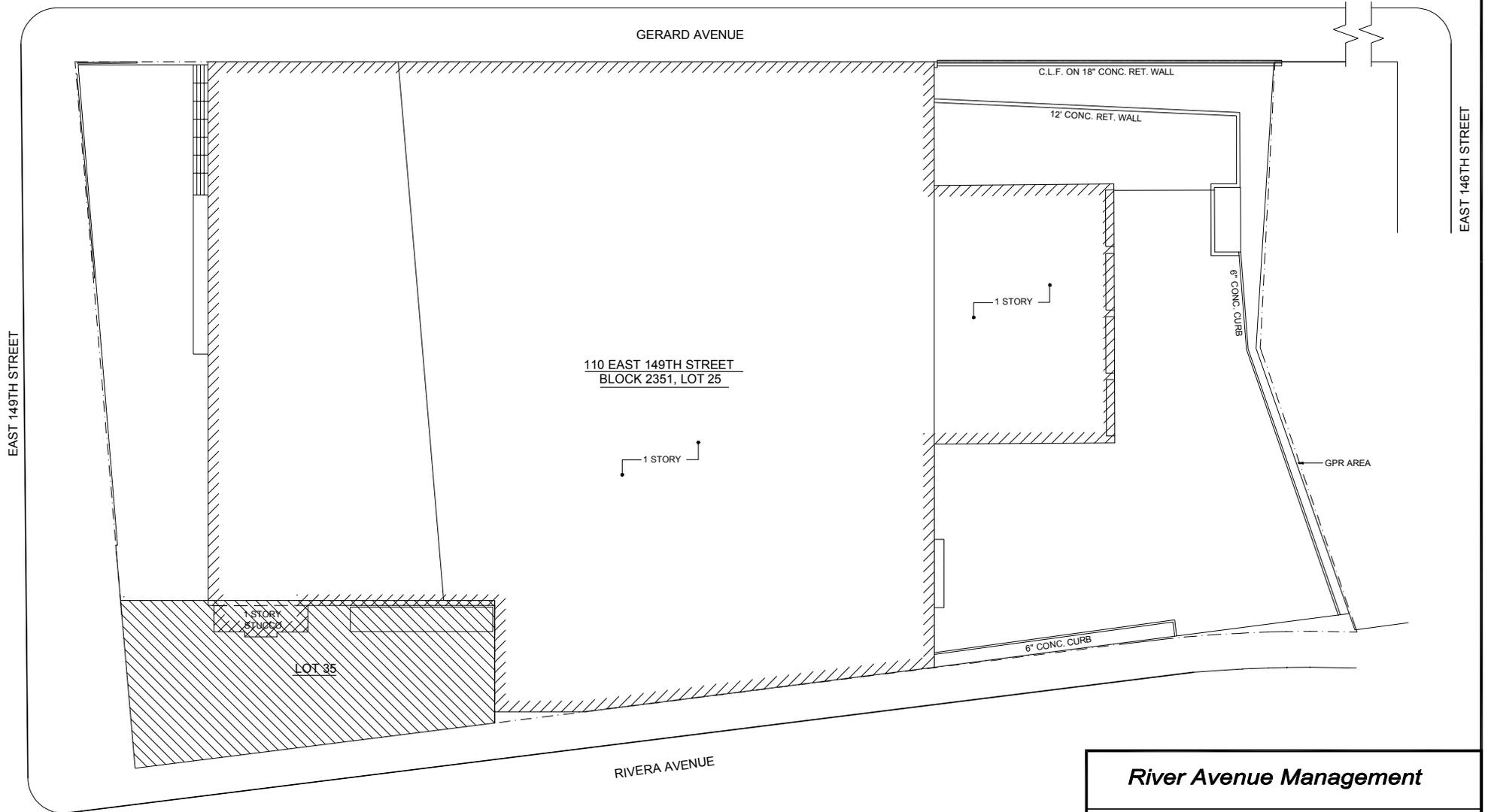
**SITE LOCATION MAP**

**110 EAST 149TH STREET  
BRONX, NY**

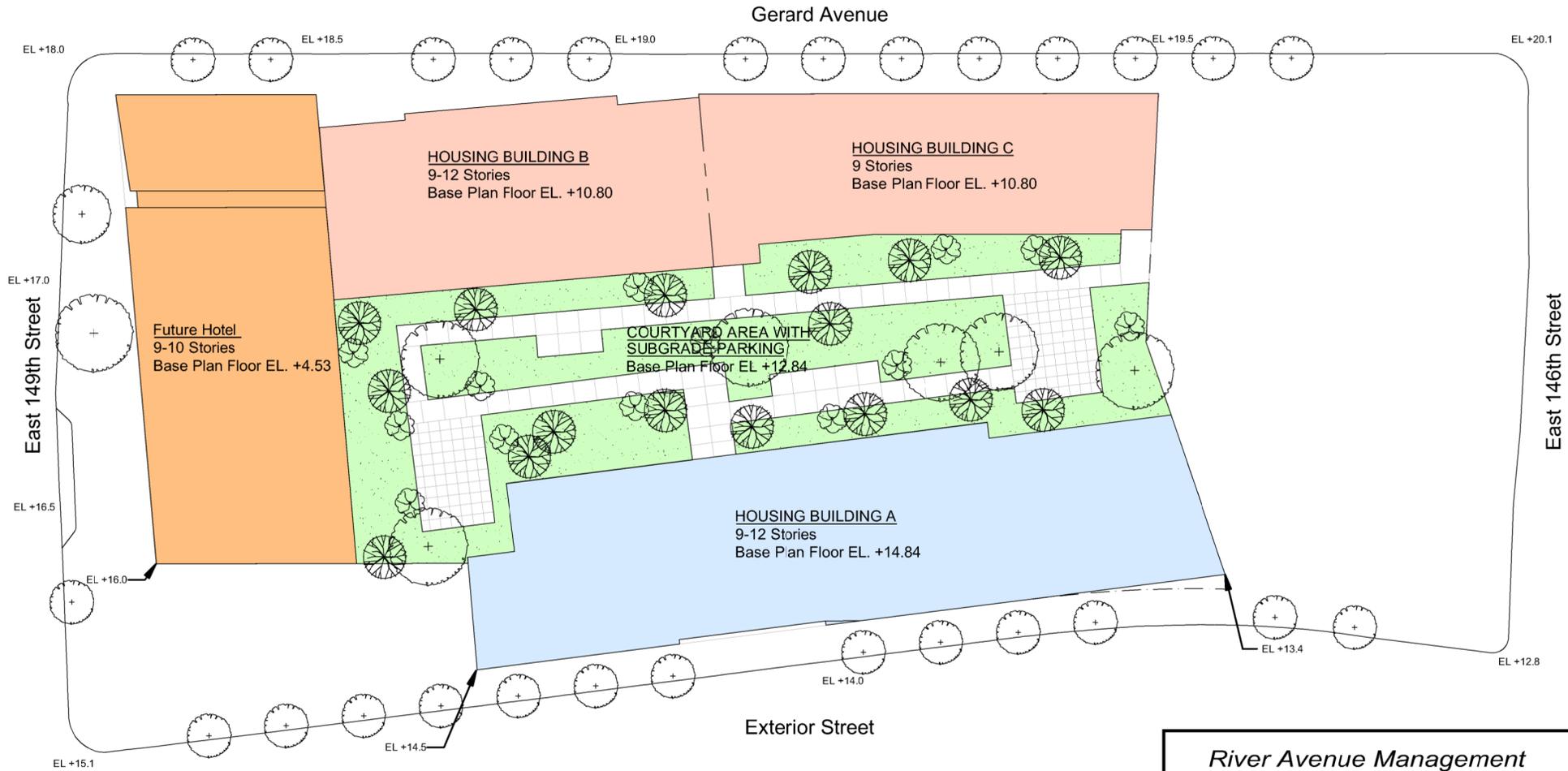
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DATE: 12/2014

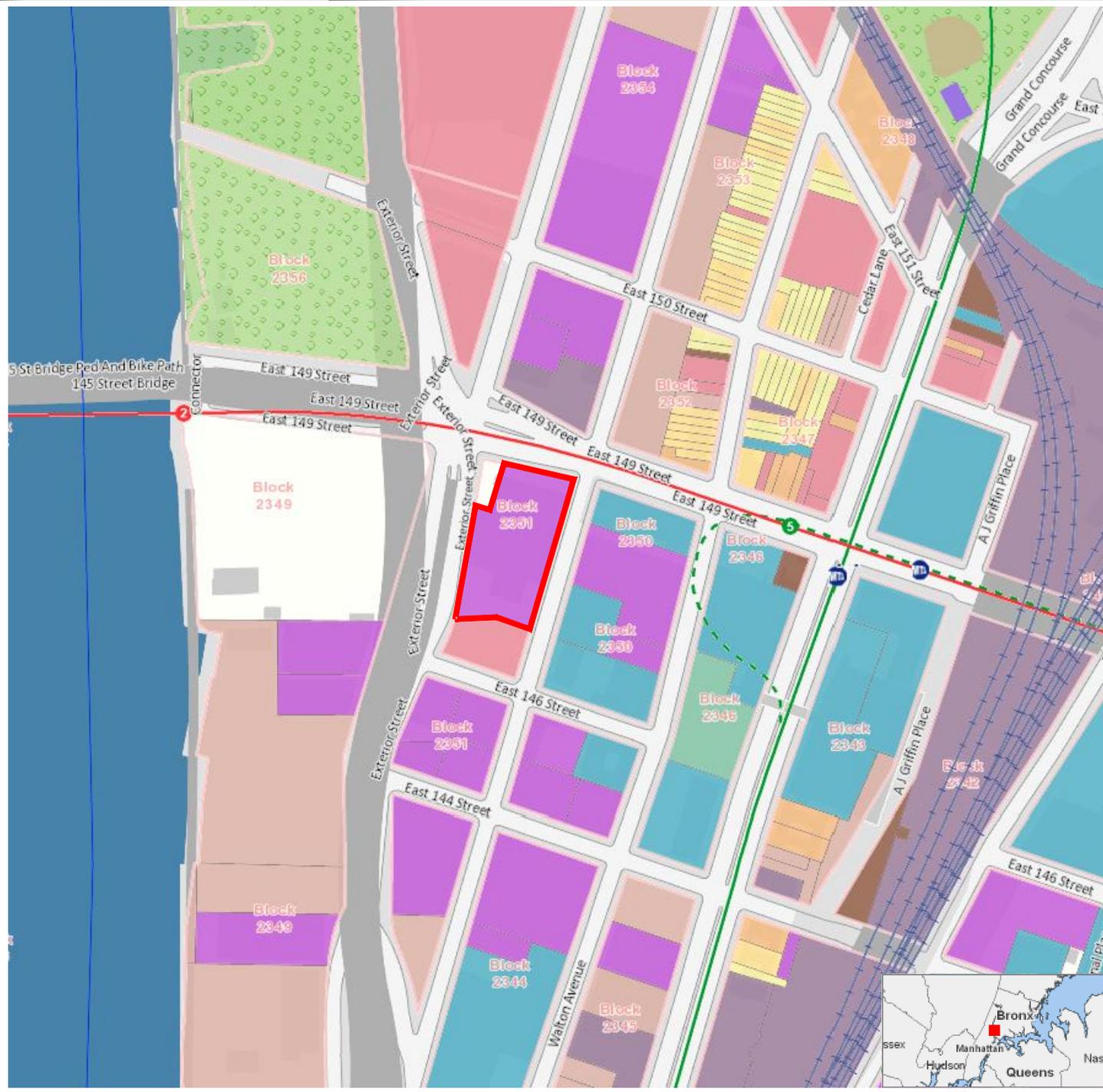
FIGURE: 1



<b>River Avenue Management</b>		
 <b>LiRo Engineers, Inc.</b> 3 Aerial Way, Syosset, New York		
<b>SITE PLAN</b>		
110 EAST 149TH STREET BRONX, NY		
SCALE: AS SHOWN	DATE: 12/2014	FIGURE: 2



<i>River Avenue Management</i>		
 <b>LiRo Engineers, Inc.</b> 3 Aerial Way, Syosset, New York		
<b>REDEVELOPMENT PLAN</b>		
110 EAST 149TH STREET BRONX, NY		
SCALE: AS SHOWN	DATE: 12/2014	FIGURE: 3



- Transit, Roads, Reference Features**
- Roads, ferries, commuter rail, neighborhood names
- Roads**
  - Major Roads
  - Interstate Highways
  - Tunnels
- Neighborhood/Town Labels**
- County Boundaries
- Ferry
- Commuter Rail
- NYC subway routes and stations
- Parks, Playgrounds, & Open Space**
- Parks & Public Lands
- Forested Areas (NJ)
- Community Gardens
- School property with garden
- Playgrounds
- Green Spaces Along Streets
- Golf Courses
- Baseball/Soccer/Football Fields
- Tennis/Basketball/Handball Courts & Tracks
- Cemeteries
- Land Use**
- Block/Lot Boundaries
  - (Building footprints in gray)
- 1 & 2 Family Residential
- Multi-family Residential
- Mixed Use
- Open space & outdoor recreation
- Commercial
- Institutions
- Industrial
- Parking
- Transportation / Utilities
- Vacant Lots

(Not all items in the legend may be visible on the map.)

SITE

*River Avenue Management*

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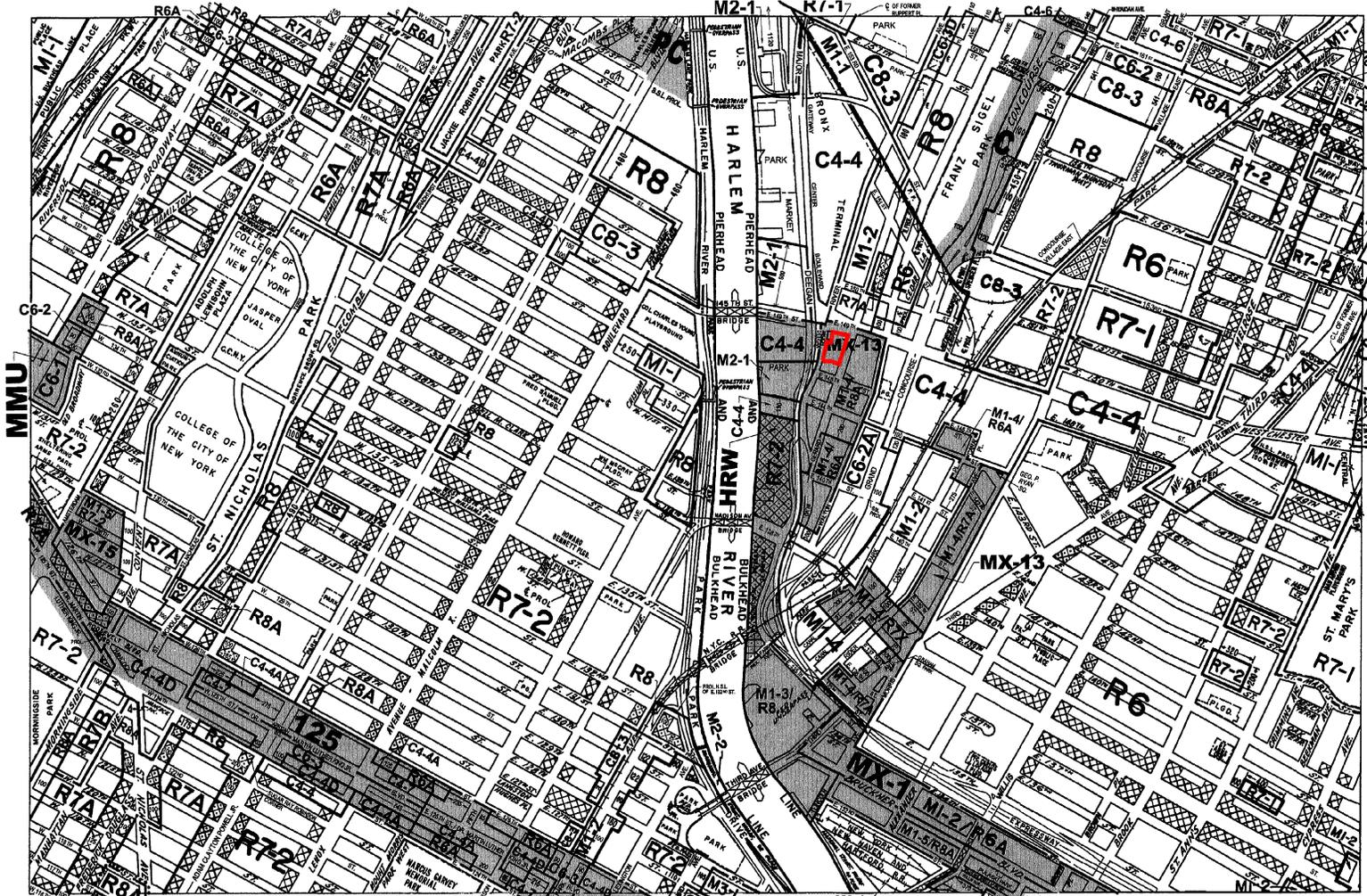
**LiRo Engineers, Inc.**  
3 Aerial Way, Syosset, New York

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**SURROUNDING LAND USE**  
110 EAST 149TH STREET  
BRONX, NY

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SCALE: NONE	DATE: 12/2014	FIGURE: 4
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### ZONING MAP

THE NEW YORK CITY PLANNING COMMISSION

**Major Zoning Classifications:**  
 The number(s) and/or letter(s) that follows an R, C or M District designation indicates use, bulk and other controls as described in the text of the Zoning Resolution.

- R – RESIDENTIAL DISTRICT
- C – COMMERCIAL DISTRICT
- M – MANUFACTURING DISTRICT
- SPECIAL PURPOSE DISTRICT  
The letter(s) within the shaded area designates the special purpose district as described in the text of the Zoning Resolution.
- AREA(S) REZONED

**Effective Date(s) of Rezoning:**  
 06-26-2014 C 140070 ZMM

**Special Requirements:**  
 For a list of lots subject to CEQR environmental requirements, see APPENDIX C.  
 For a list of lots subject to "D" restrictive declarations, see APPENDIX D.  
 For Inclusionary Housing designated areas on this map, see APPENDIX F.

MAP KEY

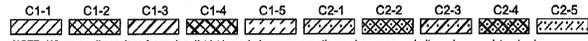
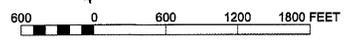
	3b	3d
5c	6a	6c
5d	6b	6d

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ZONING MAP 6a

NOTE: Zoning information as shown on this map is subject to change. For the most up-to-date zoning information for this map, visit the Zoning section of the Department of City Planning website: [www.nyc.gov/dcp/planning](http://www.nyc.gov/dcp/planning) or contact the Zoning Information Desk at (212) 720-3291.

SITE



NOTE: Where no dimensions for zoning district boundaries appear on the zoning maps, such dimensions are determined in Article VII, Chapter 6 (Location of District Boundaries) of the Zoning Resolution.

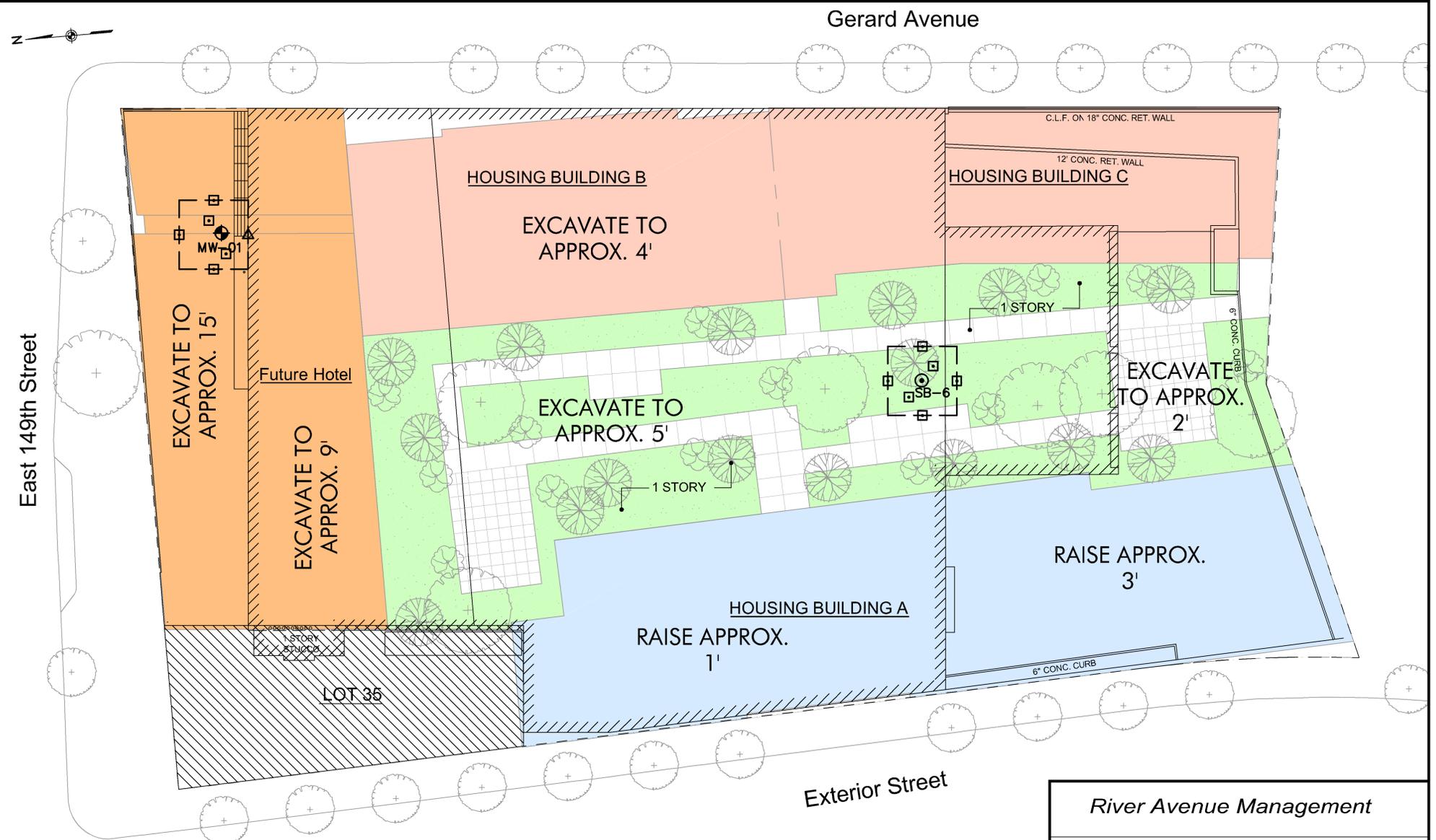
## River Avenue Management

**LiRo Engineers, Inc.**  
 3 Aerial Way, Syosset, New York

### SURROUNDING LAND ZONING

110 EAST 149TH STREET  
 BRONX, NY

SCALE: AS SHOWN	DATE: 12/2014	FIGURE: 5
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- LEGEND**
- TRACK 4 SCO REMEDIAL EXCAVATION AREA
  - SIDEWALL ENDPOINT SAMPLE LOCATION
  - BOTTOM ENDPOINT SAMPLE LOCATION
  - MONITORING WELL
  - SOIL BORING LOCATION



*River Avenue Management*

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**LiRo Engineers, Inc.**  
3 Aerial Way, Syosset, New York

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**SITE REDEVELOPMENT  
SOIL EXCAVATIONS**  
110 EAST 149TH STREET  
BRONX, NY

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SCALE: AS SHOWN	DATE: 12/2014	FIGURE: 6
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Table 1-1 - Soil Analytical Data - VOCs

110 East 149th Street  
Bronx, New York

CLIENT ID:	Part 375 Restricted - Residential	Part 375 Unrestricted	CP-51 Table 2 - Gasoline Contaminated Soils	*SB-01-6.5-7.0'	SB-01-11-12'	SB-02-0-2.0'	SB-02-5.0-7.0'	SB-03-2.0-4.0'	SB-04-11-12'	SB-05-2.0-4.0'	SB-06-2.0-4.0'	MW-01-0-2.0'	MW-01-14-15'	MW-02-15-16'	DUPLICATE-SOIL	*MW-02-18-18.5'	MW-03-3-4'	*MW-03-11-11.5'	MW-04-0-2.0'	MW-04-2.0-4.0'	MW-05-2.0-4.0'
LAB ID:				AC81071-001	AC81071-002	AC81143-002	AC81143-003	AC81143-001	AC81071-005	AC81143-006	AC81143-008	AC81071-003	AC81071-004	AC81154-001	AC81154-003	AC81154-002	AC81144-001	AC81144-002	AC81143-004	AC81143-005	AC81143-007
COLLECTION DATE:				9/24/2014	9/24/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/26/2014	9/25/2014	9/25/2014	9/30/2014	9/30/2014	9/30/2014	9/29/2014	9/29/2014	9/26/2014	9/26/2014	9/26/2014
SAMPLE MATRIX:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE UNITS:				mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Analyte	mg/Kg	mg/Kg	mg/Kg																		
<b>Volatiles</b>																					
1,1,1-Trichloroethane	100	0.68	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,1,2,2-Tetrachloroethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,1,2-Trichloroethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,1-Dichloroethane	26	0.27	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,1-Dichloroethene	100	0.33	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,2,3-Trichlorobenzene	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,2,4-Trichlorobenzene	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,2,4-Trimethylbenzene	52	3.6	3.6	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	0.84	NA	0.54	NA	NA	NA
1,2-Dibromo-3-chloropropane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,2-Dibromoethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,2-Dichlorobenzene	100	1.1	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,2-Dichloroethane	3.1	0.02	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,2-Dichloropropane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,3,5-Trimethylbenzene	52	8.4	8.4	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.18	NA	0.19	NA	NA	NA
1,3-Dichlorobenzene	49	2.4	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,4-Dichlorobenzene	13	1.8	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,4-Dioxane	13	0.1	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2-Butanone	100	0.12	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2-Hexanone	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
4-Isopropyltoluene	NA	NA	10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5	NA	ND	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Acetone	100	0.05	NS	NA	0.023	ND	ND	ND	<b>0.063</b>	ND	ND	<b>0.1</b>	<b>0.061</b>	ND	ND	NA	0.033	NA	ND	ND	ND
Benzene	4.8	0.06	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>0.4</b>	<b>0.17</b>	<b>2.1</b>	ND	<b>0.17</b>	ND	ND	ND	ND
Bromochloromethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Bromodichloromethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Bromoform	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Bromomethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Carbon disulfide	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Carbon tetrachloride	2.4	0.76	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Chlorobenzene	100	1.1	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Chloroethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Chloroform	49	0.37	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Chloromethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
cis-1,2-Dichloroethene	100	0.25	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
cis-1,3-Dichloropropene	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Cyclohexane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.4	3.6	NA	ND	NA	ND	ND	ND
Dibromochloromethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Dichlorodifluoromethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Ethylbenzene	41	1	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>27</b>	<b>36</b>	<b>1.3</b>	0.0039	0.33	ND	ND	ND
Isopropylbenzene	NA	NA	2.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.7	9.5	1.3	0.0014	2.3	ND	ND	ND
m&p-Xylenes	NA	NA	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	43	53	3.5	0.0069	0.81	ND	ND	ND
Methyl Acetate	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Methylcyclohexane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	45	44	NA	ND	NA	ND	ND	ND
Methylene chloride	100	0.05	NS	NA	0.019	0.041	0.012	0.031	0.048	0.029	0.032	0.049	0.024	ND	ND	NA	0.031	NA	0.022	<b>0.068</b>	0.028
Methyl-tert-butyl ether	100	0.93	0.93	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Naphthalene	100	12	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.7	NA	0.68	NA	NA	NA
n-Butylbenzene	100	12	12	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98	NA	7.8	NA	NA	NA
n-Propylbenzene	100	3.9	3.9	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.7	NA	<b>7.6</b>	NA	NA	NA
o-Xylene	NA	NA	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	3.3	0.33	ND	0.26	ND	ND	ND
sec-Butylbenzene	100	11	11	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.53	NA	2.2	NA	NA	NA
Styrene	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
tert-Butylbenzene	100	5.9	5.9	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	0.3	NA	NA	NA
Tetrachloroethene	19	1.3	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Toluene	100	0.7	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.62	0.54	0.69	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	100	0.19	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
trans-1,3-Dichloropropene	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Trichloroethene	21	0.47	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Trichlorofluoromethane	NA	NA	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Vinyl chloride	0.9	0.02	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Xylenes (Total)	100	0.26	0.26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>46</b>	<b>56.3</b>	<b>3.8</b>	0.0069	<b>1.1</b>	ND	ND	ND

**Notes:**  
 Part 375 Restricted - Restricted Residential - New York Department of Environmental Conservation (NYSDEC) 6 NYCRR 375-6 Remedial Program Soil Clean-up Objectives (SCOs), December 14, 2006, Restricted Use - Restricted Residential  
 Part 375 Unrestricted - NYSDEC 6 NYCRR 375-6 Remedial Program SCOs December 14,

Table 1-2 - Soil Analytical Data - SVOCs

110 East 149th Street  
Bronx, New York

CLIENT ID:	LAB ID:	Part 375 Restricted Residential	Part 375 Unrestricted	*SB-01-6.5-7.0'	SB-01-11-12'	SB-02-0-2.0'	SB-02-5.0-7.0'	SB-03-2.0-4.0'	SB-04-11-12'	SB-05-2.0-4.0'	SB-06-2.0-4.0'	MW-01-0-2.0'	MW-01-14-15'	MW-02-15-16'	DUPLICATE-SOIL	*MW-02-18-18.5'	MW-03-3-4'	*MW-03-11-11.5'	MW-04-0-2.0'	MW-04-2.0-4.0'	MW-05-2.0-4.0'
COLLECTION DATE	SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
ANALYTE	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
<b>Analyte</b>																					
<b>SemiVolatiles</b>																					
1,1'-Biphenyl	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2,3,4,6-Tetrachlorophenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2,4,5-Trichlorophenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2,4,6-Trichlorophenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2,4-Dichlorophenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2,4-Dimethylphenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2,4-Dinitrophenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2,4-Dinitrotoluene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2,6-Dinitrotoluene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2-Chloronaphthalene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2-Chlorophenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2-Methylnaphthalene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	7.7	NA	ND	NA	ND	ND	ND
2-Methylphenol	100	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2-Nitroaniline	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
2-Nitrophenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
3&4-Methylphenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
3,3'-Dichlorobenzidine	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
3-Nitroaniline	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
4,6-Dinitro-2-methylphenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
4-Bromophenyl-phenylether	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
4-Chloro-3-methylphenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
4-Chloroaniline	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
4-Chlorophenyl-phenylether	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
4-Nitroaniline	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
4-Nitrophenol	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Acenaphthene	100	20	0.41	0.3	ND	ND	ND	0.39	2	ND	0.29	ND	ND	ND	ND	NA	0.29	NA	ND	ND	1.8
Acenaphthylene	100	100	ND	ND	ND	ND	ND	0.074	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	0.078	ND	ND
Acetophenone	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Anthracene	100	100	1.2	0.82	ND	ND	0.22	0.84	5	ND	0.87	0.071	ND	ND	ND	NA	0.74	NA	0.16	ND	6.2
Atrazine	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Benzaldehyde	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Benzo[a]anthracene	1	1 c	<b>4</b>	<b>3.8</b>	0.83	0.15	0.78	<b>3</b>	<b>9.7</b>	<b>1.8</b>	<b>2.9</b>	0.23	0.28	ND	ND	NA	<b>2.3</b>	NA	0.87	0.16	<b>8.9</b>
Benzo[a]pyrene	1	1 c	<b>3.2</b>	<b>3.3</b>	0.75	0.14	0.74	<b>2.6</b>	<b>8.1</b>	<b>1.8</b>	<b>2.5</b>	0.21	ND	ND	ND	NA	<b>1.9</b>	NA	0.85	0.15	<b>5.9</b>
Benzo[b]fluoranthene	1	1 c	<b>3.9</b>	<b>4</b>	0.92	0.17	0.93	<b>3.1</b>	<b>9.3</b>	<b>2.6</b>	<b>2.9</b>	0.25	0.27	ND	ND	NA	<b>2.3</b>	NA	<b>1.1</b>	0.19	<b>8.2</b>
Benzo[g,h,i]perylene	100	100	2.2	2.4	0.72	0.11	0.57	<b>1.7</b>	<b>5.8</b>	<b>1</b>	<b>1.9</b>	0.16	ND	ND	ND	NA	1.2	NA	0.8	0.12	<b>3</b>
Benzo[k]fluoranthene	3.9	0.8 c	<b>1.1</b>	<b>1.4</b>	0.28	0.054	0.29	<b>0.95</b>	<b>3.3</b>	<b>0.77</b>	<b>1.4</b>	0.074	ND	ND	ND	NA	0.62	NA	0.29	0.069	<b>2.3</b>
bis(2-Chloroethoxy)methane	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
bis(2-Chloroethyl)ether	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
bis(2-Chloroisopropyl)ether	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
bis(2-Ethylhexyl)phthalate	NA	NA	NA	ND	ND	ND	0.065	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	0.097	ND
Butylbenzylphthalate	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Caprolactam	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Carbazole	NA	NA	NA	0.4	ND	ND	ND	0.27	0.95	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	1.4
Chrysene	3.9	1 c	<b>3.3</b>	<b>3.5</b>	0.78	0.14	0.75	<b>2.7</b>	<b>8.2</b>	<b>2.1</b>	<b>2.4</b>	0.19	0.21	ND	ND	NA	<b>1.9</b>	NA	0.75	0.18	<b>7.2</b>
Dibenzo[a,h]anthracene	0.33	0.33 b	<b>0.57</b>	<b>0.56</b>	ND	ND	ND	<b>0.44</b>	<b>1.3</b>	ND	<b>0.45</b>	0.044	0.044	0.062	ND	NA	0.29	NA	0.17	ND	<b>1.1</b>
Dibenzofuran	59	7	NA	0.14	ND	ND	ND	0.16	1	ND	0.14	0.023	0.023	0.062	ND	NA	0.12	NA	0.021	ND	1.2
Diethylphthalate	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Dimethylphthalate	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Di-n-butylphthalate	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	0.043	ND	ND
Di-n-octylphthalate	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Fluoranthene	100	100 a	7.7	7.7	1.2	0.24	1.2	5.9	23	2.4	5.4	0.38	0.58	0.79	ND	NA	4.1	NA	1.4	0.24	21
Fluorene	100	30	ND	0.22	ND	ND	ND	0.26	1.5	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	1.9
Hexachlorobenzene	1.2	0.33 b	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Hexachlorobutadiene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Hexachlorocyclopentadiene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Hexachloroethane	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Indeno[1,2,3-cd]pyrene	0.5	0.5 c	<b>1.7</b>	<b>2</b>	0.47	0.089	0.44	<b>1.5</b>	<b>4.8</b>	<b>0.85</b>	<b>1.6</b>	0.13	ND	ND	ND	NA	<b>1</b>	NA	<b>0.6</b>	0.1	<b>3.1</b>
Isophorone	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Naphthalene	100	12	NA	ND	ND	ND	ND	0.058	0.36	ND	ND	0.025	14	19	ND	NA	0.072	NA	0.032	ND	0.15
Nitrobenzene	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
N-Nitroso-di-n-propylamine	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
N-Nitrosodiphenylamine	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND
Pentachlorophenol	6.7	0.8 b	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	ND	ND

Table 1-3 - Soil Analytical Data - Metals

110 East 149th Street  
Bronx, New York

CLIENT ID:	Part 375 Restricted - Restricted Residential	Part 375 Unrestricted	SB-01-11-12'	SB-02-0-2.0'	SB-02-5.0-7.0'	SB-03-2.0-4.0'	SB-04-11-12'	SB-05-2.0-4.0'	SB-06-2.0-4.0'	MW-01-0-2.0'	MW-01-14-15'	MW-02-15'-16'	DUPLICATE-SOIL	MW-03-3'-4'	MW-04-0-2.0'	MW-04-2.0-4.0'	MW-05-2.0-4.0'	
LAB ID:			AC81071-002	AC81143-002	AC81143-003	AC81143-001	AC81071-005	AC81143-006	AC81143-008	AC81071-003	AC81071-004	AC81154-001	AC81154-003	AC81144-001	AC81143-004	AC81143-005	AC81143-007	
COLLECTION DATE:			9/24/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/26/2014	9/25/2014	9/25/2014	9/30/2014	9/30/2014	9/30/2014	9/29/2014	9/26/2014	9/26/2014	9/26/2014
SAMPLE MATRIX:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg		
<b>Analyte</b>	mg/Kg	mg/Kg																
<b>Metals</b>																		
Mercury	0.81	0.18 c	<b>0.97</b>	<b>0.5</b>	<b>0.6</b>	<b>0.63</b>	<b>0.7</b>	<b>0.21</b>	<b>0.77</b>	<b>0.46</b>	<b>29</b>	<b>2</b>	<b>2.2</b>	<b>0.31</b>	<b>1.6</b>	<b>0.79</b>	<b>0.81</b>	
Aluminum	NA	NA	4,100	6,100	8,300	5,600	6,300	8,000	7,100	13,000	8,400	6,500	7,500	6,100	5,400	5,600	6,600	
Arsenic	16	13	ND	ND	ND	ND	ND	7.9	ND	6.2	ND	ND	ND	ND	4.5	ND	5	
Barium	400	350 c	36	96	57	76	220	48	<b>5,500</b>	160	100	130	180	100	140	63	150	
Calcium	NA	NA	4,500	17,000	7,600	15,000	9,000	22,000	13,000	19,000	19,000	5,400	9,200	11,000	15,000	3,300	18,000	
Chromium	110	30 c	9.5	17	15	16	20	11	<b>920</b>	<b>35</b>	20	25	25	13	19	11	14	
Cobalt	NA	NA	3.5	6	5.2	4.9	5.2	26	19	9.3	8.3	5.3	6.3	5.6	5.1	4.1	24	
Copper	270	50	48	30	22	42	32	<b>64</b>	<b>120</b>	43	32	42	<b>56</b>	24	<b>52</b>	18	37	
Iron	NA	NA	9,600	13,000	13,000	11,000	14,000	15,000	19,000	26,000	17,000	13,000	14,000	12,000	12,000	10,000	15,000	
Lead	400	63 c	<b>240</b>	<b>140</b>	42	<b>280</b>	<b>370</b>	22	<b>7,000</b>	<b>470</b>	<b>140</b>	<b>290</b>	<b>320</b>	<b>86</b>	<b>280</b>	53	<b>220</b>	
Magnesium	NA	NA	3,600	5,300	6,200	5,200	5,500	3,000	6,500	7,900	6,000	3,600	4,100	3,800	2,700	2,400	5,800	
Manganese	2000	1600 c	190	250	330	260	250	330	220	360	1,200	230	270	160	210	320	250	
Nickel	310	30	8.1	15	21	14	13	37	14	24	30	20	25	15	13	9.6	14	
Potassium	NA	NA	630	1,600	930	1,100	1,900	960	2,500	4,200	2,200	970	1,300	2,100	1000	1000	1,200	
Sodium	NA	NA	ND	ND	ND	290	ND	ND	300	ND	ND	ND	ND	ND	360	ND	ND	
Thallium	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	17	21	ND	ND	ND	ND	
Vanadium	NA	NA	14	31	21	26	32	17	27	52	27	120	130	24	28	15	22	
Zinc	10000	109 c	83	<b>110</b>	46	<b>140</b>	<b>120</b>	<b>150</b>	<b>6,100</b>	<b>130</b>	92	ND	ND	37	<b>200</b>	42	<b>200</b>	
Antimony	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34	0.29	ND	ND	ND	ND	
Beryllium	72	7.2	0.23	ND	0.43	0.22	0.28	0.37	0.33	ND	0.34	ND	ND	ND	0.23	0.24	0.28	
Cadmium	4.3	2.5 c	ND	ND	ND	ND	0.74	ND	<b>3.8</b>	ND	ND	ND	ND	ND	0.92	ND	ND	
Selenium	180	3.9 c	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<b>29</b>	ND	ND	ND	ND	
Silver	180	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23	ND	ND	

**Notes:**

Part 375 Restricted - Restricted Residential - New York Department of Environmental Conservation (NYSDEC) 6 NYCRR 375-6 Remedial Program Soil Clean-up Objectives (SCOs), December 14, 2006, Restricted Use - Restricted Residential

Part 375 Unrestricted - NYSDEC 6 NYCRR 375-6 Remedial Program SCOs December 14, 2006, Unrestricted Use

mg/kg - milligrams per kilograms

NA - Not Applicable or Not Analyzed

ND - Non Detect

The duplicate sample was a duplicate of the soil sample collected from MW-02 from 15-16 ft bgs.

Highlighted indicates an exceedance of Part 375 Restricted - Restricted Residential SCOs.

**Bold** indicates an exceedance of Part 375 Unrestricted SCOs.

Table 1-4 - Soil Analytical Data - Pesticides

110 East 149th Street  
Bronx, New York

CLIENT ID:	Part 375 Restricted - Restricted Residential	Part 375 Unrestricted	SB-01-11-12'	SB-02-0-2.0'	SB-02-5.0-7.0'	SB-03-2.0-4.0'	SB-04-11-12'	SB-05-2.0-4.0'	SB-06-2.0-4.0'	MW-01-0-2.0'	MW-01-14-15'	MW-02-15'-16'	DUPLICATE-SOIL	MW-03-3'-4'	MW-04-0-2.0'	MW-04-2.0-4.0'	MW-05-2.0-4.0'	
LAB ID:			AC81071-002	AC81143-002	AC81143-003	AC81143-001	AC81071-005	AC81143-006	AC81143-008	AC81071-003	AC81071-004	AC81154-001	AC81154-003	AC81144-001	AC81143-004	AC81143-005	AC81143-007	
COLLECTION DATE:			9/24/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/26/2014	9/25/2014	9/25/2014	9/30/2014	9/30/2014	9/30/2014	9/29/2014	9/26/2014	9/26/2014	9/26/2014
SAMPLE MATRIX:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg		
Analyte	mg/Kg	mg/Kg																
<b>Pesticides</b>																		
Aldrin	0.097	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Alpha-BHC	0.48	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
beta-BHC	0.36	0.036	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Chlordane	NA	0.094	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
delta-BHC	100	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Dieldrin	0.2	0.005 c	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Endosulfan I	24	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Endosulfan II	24	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Endosulfan Sulfate	24	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Endrin	11	0.014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Endrin Aldehyde	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Endrin Ketone	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
gamma-BHC	1.3	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Heptachlor	2.1	0.042	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Heptachlor Epoxide	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Methoxychlor	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
p,p'-DDD	NA	0.0033 b	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
p,p'-DDE	NA	0.0033 b	ND	ND	ND	ND	ND	ND	<b>0.0049</b>	ND	ND	ND	ND	ND	ND	ND		
p,p'-DDT	NA	0.0033 b	ND	ND	ND	ND	ND	<b>0.0086</b>	<b>0.017</b>	ND	ND	ND	ND	<b>0.0039</b>	<b>0.0054</b>	ND		
Toxaphene	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		

**Notes:**

Part 375 Restricted - Restricted Residential - New York Department of Environmental Conservation (NYSDEC) 6 NYCRR 375-6 Remedial Program Soil Clean-up Objectives (SCOs), December 14, 2006, Restricted Use - Restricted Residential

Part 375 Unrestricted - NYSDEC 6 NYCRR 375-6 Remedial Program SCOs December 14, 2006, Unrestricted Use

mg/kg - milligrams per kilograms

NA - Not Applicable or Not Analyzed

ND - Non Detect

The duplicate sample was a duplicate of the soil sample collected from MW-02 from 15-16 ft bgs.

Highlighted indicates an exceedance of Part 375 Restricted - Restricted Residential SCOs.

Bold indicates an exceedance of Part 375 Unrestricted SCOs.

Table 1-5 - Soil Analytical Data - PCBs

110 East 149th Street  
Bronx, New York

CLIENT ID:	Part 375 Restricted - Restricted Residential	Part 375 Unrestricted	SB-01-11-12'	SB-02-0-2.0'	SB-02-5.0-7.0'	SB-03-2.0-4.0'	SB-04-11-12'	SB-05-2.0-4.0'	SB-06-2.0-4.0'	MW-01-0-2.0'	MW-01-14-15'	MW-02-15'-16'	DUPLICATE-SOIL	MW-03-3'-4'	MW-04-0-2.0'	MW-04-2.0-4.0'	MW-05-2.0-4.0'	
LAB ID:			AC81071-002	AC81143-002	AC81143-003	AC81143-001	AC81071-005	AC81143-006	AC81143-008	AC81071-003	AC81071-004	AC81154-001	AC81154-003	AC81144-001	AC81143-004	AC81143-005	AC81143-007	
COLLECTION DATE:			9/24/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/26/2014	9/25/2014	9/25/2014	9/30/2014	9/30/2014	9/30/2014	9/29/2014	9/26/2014	9/26/2014	9/26/2014
SAMPLE MATRIX:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
SAMPLE UNITS:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg		
Analyte	mg/Kg	mg/Kg																
<b>PCBs</b>																		
Aroclor (Total)	1	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1016	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1221	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1232	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1242	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1248	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1254	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1260	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1262	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aroclor-1268	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		

**Notes:**

Part 375 Restricted - Restricted Residential - New York Department of Environmental Conservation (NYSDEC) 6 NYCRR 375-6 Remedial Program Soil Clean-up Objectives (SCOs), December 14, 2006, Restricted Use - Restricted Residential

Part 375 Unrestricted - NYSDEC 6 NYCRR 375-6 Remedial Program SCOs December 14, 2006, Unrestricted Use

mg/kg - milligrams per kilograms

NA - Not Applicable or Not Analyzed

ND - Non Detect

The duplicate sample was a duplicate of the soil sample collected from MW-02 from 15-16 ft bgs.

Highlighted indicates an exceedance of Part 375 Restricted - Restricted Residential SCOs.

**Bold** indicates an exceedance of Part 375 Unrestricted SCOs.

Table 2-1 - Groundwater Analytical Data - VOCs

110 East 149th Street  
Bronx, New York

CLIENT ID:		MW-01	MW-02	MW-03	MW-04	MW-05	TB 10/2
LAB ID:	NY TOGS Water Quality Standards/Guidance Values - Class GA	AC81399-001	AC81399-003	AC81399-005	AC81399-009	AC81399-007	AC81399-011
COLLECTION DATE:		10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014
SAMPLE MATRIX:		Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
SAMPLE UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte	ug/L						
<b>Volatiles</b>							
1,1,1-Trichloroethane	5	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	5	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	5	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	5	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.04	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NA	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.6	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	1	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND
1,4-Dioxane	NA	ND	ND	ND	ND	ND	ND
2-Butanone	50	ND	ND	ND	ND	ND	ND
2-Hexanone	50	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	NA	ND	ND	ND	ND	ND	ND
Acetone	50	ND	ND	ND	ND	ND	ND
Benzene	1	ND	140	52	ND	ND	ND
Bromochloromethane	5	ND	ND	ND	ND	ND	ND
Bromodichloromethane	50	ND	ND	ND	ND	ND	ND
Bromoform	NA	ND	ND	ND	ND	ND	ND
Bromomethane	5	ND	ND	ND	ND	ND	ND
Carbon disulfide	NA	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND
Chloroethane	5	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND
Chloromethane	5	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	cis+trans = 0.4	ND	ND	ND	ND	ND	ND
Cyclohexane	NA	ND	95	270	ND	ND	ND
Dibromochloromethane	50	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	5.3	ND	ND	ND
Isopropylbenzene	5	ND	ND	110	ND	ND	ND
m&p-Xylenes	5	ND	73	23	ND	ND	ND
Methyl Acetate	NA	ND	ND	ND	ND	ND	ND
Methylcyclohexane	NA	ND	85	540	ND	ND	ND
Methylene chloride	5	ND	ND	ND	ND	ND	ND
Methyl-tert-butyl ether	NA	ND	ND	ND	1.5	ND	ND
o-Xylene	5	ND	6.6	6.1	ND	ND	ND
Styrene	5	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND	ND	ND	ND
Toluene	5	ND	9.5	7.4	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	cis+trans = 0.4	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	5	ND	ND	ND	ND	ND	ND
Vinyl chloride	2	ND	ND	ND	ND	ND	ND
Xylenes (Total)	NA	ND	79.6	29.1	ND	ND	ND

**Notes:**

NY TOGS - New York State Department of Environmental Conservation Division of Water Technical and Operational Guidance Series (1.1.1)

ug/L - micrograms per liter

NA - Not Applicable or Not Analyzed

ND - Non Detect

Highlighted indicates an exceedance of NYSDEC TOGS Water Quality Standards/Guidance Values - Class GA.

Table 2-2 - Groundwater Analytical Data - SVOCs

110 East 149th Street  
Bronx, New York

CLIENT ID:		MW-01	MW-02	MW-03	MW-04	MW-05
LAB ID:	NY TOGS Water Quality Standards/Guidance Values - Class GA	AC81399-001	AC81399-003	AC81399-005	AC81399-009	AC81399-007
COLLECTION DATE:		10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014
SAMPLE MATRIX:		Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
SAMPLE UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L
Analyte	ug/L					
<b>SemiVolatiles</b>						
1,1'-Biphenyl	5	ND	ND	ND	ND	ND
1,2,4,5-Tetrachlorobenzene	5	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	NA	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	1	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	1	ND	ND	ND	ND	ND
2,4-Dichlorophenol	1	ND	ND	ND	ND	ND
2,4-Dimethylphenol	50	ND	2.8	ND	ND	ND
2,4-Dinitrophenol	10	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	5	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	5	ND	ND	ND	ND	ND
2-Chloronaphthalene	10	ND	ND	ND	ND	ND
2-Chlorophenol	1	ND	ND	ND	ND	ND
2-Methylnaphthalene	NA	ND	ND	ND	ND	ND
2-Methylphenol	1	ND	ND	ND	ND	ND
2-Nitroaniline	5	ND	ND	ND	ND	ND
2-Nitrophenol	1	ND	ND	ND	ND	ND
3&4-Methylphenol	NA	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	5	ND	ND	ND	ND	ND
3-Nitroaniline	5	ND	ND	ND	ND	ND
4,6-Dinitro-2-methylphenol	NA	ND	ND	ND	ND	ND
4-Bromophenyl-phenylether	NA	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	NA	ND	ND	ND	ND	ND
4-Chloroaniline	5	ND	ND	ND	ND	ND
4-Chlorophenyl-phenylether	NA	ND	ND	ND	ND	ND
4-Nitroaniline	5	ND	ND	ND	ND	ND
4-Nitrophenol	1	ND	ND	ND	ND	ND
Acenaphthene	20	ND	ND	ND	ND	ND
Acenaphthylene	NA	ND	ND	ND	ND	ND
Acetophenone	NA	ND	ND	ND	ND	ND
Anthracene	50	ND	ND	ND	ND	ND
Atrazine	7.5	ND	ND	ND	ND	ND
Benzaldehyde	NA	ND	ND	ND	ND	ND
Benzo[a]anthracene	NA	ND	ND	ND	ND	ND
Benzo[a]pyrene	ND	ND	ND	ND	ND	ND
Benzo[b]fluoranthene	0.002	ND	ND	ND	ND	ND
Benzo[g,h,i]perylene	NA	ND	ND	ND	ND	ND
Benzo[k]fluoranthene	0.002	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	5	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	1	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	5	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	5	ND	ND	ND	ND	ND
Butylbenzylphthalate	50	ND	ND	ND	ND	ND
Caprolactam	NA	ND	ND	ND	ND	ND
Carbazole	NA	ND	ND	ND	ND	ND
Chrysene	0.002	ND	ND	ND	ND	ND
Dibenzof[a,h]anthracene	NA	ND	ND	ND	ND	ND
Dibenzofuran	NA	ND	ND	ND	ND	ND
Diethylphthalate	NA	ND	ND	ND	ND	ND
Dimethylphthalate	NA	ND	ND	ND	ND	ND
Di-n-butylphthalate	50	ND	ND	ND	ND	ND
Di-n-octylphthalate	50	ND	ND	ND	ND	ND
Fluoranthene	50	ND	ND	ND	ND	ND
Fluorene	50	ND	ND	ND	ND	ND
Hexachlorobenzene	0.04	ND	ND	ND	ND	ND
Hexachlorobutadiene	0.5	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	5	ND	ND	ND	ND	ND
Hexachloroethane	5	ND	ND	ND	ND	ND
Indeno[1,2,3-cd]pyrene	0.002	ND	ND	ND	ND	ND
Isophorone	50	ND	ND	ND	ND	ND
Naphthalene	10	ND	5.2	ND	ND	ND
Nitrobenzene	0.4	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	NA	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	50	ND	ND	ND	ND	ND
Pentachlorophenol	1	ND	ND	ND	ND	ND
Phenanthrene	50	ND	ND	ND	ND	ND
Phenol	1	ND	4.2	ND	ND	ND
Pyrene	50	ND	ND	ND	ND	ND

**Notes:**

NY TOGS - New York State Department of Environmental Conservation Division of Water Technical and Operational Guidance Series (1.1.1)

ug/L - micrograms per liter

NA - Not Applicable or Not Analyzed

ND - Non Detect

Highlighted indicates an exceedance of NYSDEC TOGS Water Quality Standards/Guidance Values - Class GA.

Table 2-3 - Groundwater Analytical Data - Metals

110 East 149th Street  
Bronx, New York

CLIENT ID:	NY TOGS Water Quality Standards/Guidance Values - Class GA	MW-01 Unfiltered	MW-01 Filtered	MW-02 Unfiltered	MW-02 Filtered	MW-03 Unfiltered	MW-03 Filtered	MW-04 Unfiltered	MW-04 Filtered	MW-05 Unfiltered	MW-05 Filtered
LAB ID:		AC81399-001	AC81399-002	AC81399-003	AC81399-004	AC81399-005	AC81399-006	AC81399-009	AC81399-010	AC81399-007	AC81399-008
COLLECTION DATE:		10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014
SAMPLE MATRIX:		Aqueous	Aqueous								
SAMPLE UNITS:		ug/L	ug/L								
Analyte	ug/L										
<b>Metals</b>											
Mercury	0.7	ND	ND								
Aluminum	NA	63,000	ND	220	ND	1,800	ND	500	ND	ND	ND
Barium	1000	440	150	260	64	370	200	310	290	81	70
Calcium	NA	250,000	310,000	300,000	230,000	180,000	170,000	130,000	130,000	150,000	140,000
Chromium	50	240	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	200	270	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	98,000	1,900	22,000	ND	29,000	6,600	4,800	1,600	680	ND
Magnesium	NA	51,000	57,000	55,000	36,000	69,000	64,000	19,000	20,000	52,000	49,000
Manganese	300	1,600	2,300	2,200	800	2,000	1,800	460	470	1,200	1,100
Nickel	100	110	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium	NA	26,000	33,000	31,000	21,000	30,000	27,000	13,000	14,000	6,400	5,800
Silver	50	ND	ND								
Sodium	20,000	280,000	230,000	220,000	360,000	130,000	120,000	260,000	270,000	240,000	230,000
Vanadium	NA	170	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	NA	330	ND	ND	83	63	ND	ND	ND	ND	ND
Antimony	3	ND	ND								
Arsenic	25	19	16	40	2.2	7.4	3.1	7.7	4.4	2.4	ND
Beryllium	3	2.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	5	ND	ND								
Cobalt	NA	32	ND	ND	ND	2.4	ND	ND	ND	ND	ND
Lead	25	240	ND	6.5	ND	78	ND	20	ND	10	ND
Selenium	10	ND	ND								
Thallium	0.5	ND	ND								

**Notes:**

NY TOGS - New York State Department of Environmental Conservation Division of Water Technical and Operational Guidance Series (1.1.1)

ug/L - micrograms per liter

NA - Not Applicable or Not Analyzed

ND - Non Detect

U - Unfiltered

F - Filtered

Highlighted indicates an exceedance of NYSDEC TOGS Water Quality Standards/Guidance Values - Class GA.

Table 2-4 - Groundwater Analytical Data - Pesticides

110 East 149th Street  
Bronx, New York

CLIENT ID:	NY TOGS Water Quality Standards/Guidance Values - Class GA	MW-01	MW-02	MW-03	MW-04	MW-05
LAB ID:		AC81399-001	AC81399-003	AC81399-005	AC81399-009	AC81399-007
COLLECTION DATE:		10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014
SAMPLE MATRIX:		Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
SAMPLE UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L
Analyte	ug/L					
<b>Pesticides</b>						
a-Chlordane	NA	ND	ND	ND	ND	ND
Aldrin	ND	ND	ND	ND	ND	ND
Alpha-BHC	0.01	ND	ND	ND	ND	ND
beta-BHC	0.04	ND	ND	ND	ND	ND
delta-BHC	0.04	ND	ND	ND	ND	ND
Dieldrin	0.004	ND	ND	ND	ND	ND
Endosulfan I	NA	ND	ND	ND	ND	ND
Endosulfan II	NA	ND	ND	ND	ND	ND
Endosulfan Sulfate	NA	ND	ND	ND	ND	ND
Endrin	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	5	ND	ND	ND	ND	ND
Endrin Ketone	5	ND	ND	ND	ND	ND
gamma-BHC	0.05	ND	ND	ND	ND	ND
Heptachlor	0.04	ND	ND	ND	ND	ND
Heptachlor Epoxide	0.03	ND	ND	ND	ND	ND
Methoxychlor	35	ND	ND	ND	ND	ND
p,p'-DDD	0.3	ND	ND	ND	ND	ND
p,p'-DDE	0.2	ND	ND	ND	ND	ND
p,p'-DDT	0.2	ND	ND	ND	ND	ND
Toxaphene	0.06	ND	ND	ND	ND	ND
γ-Chlordane	NA	ND	ND	ND	ND	ND

**Notes:**

NY TOGS - New York State Department of Environmental Conservation Division of Water Technical and Operational Guidance Series (1.1.1)

ug/L - micrograms per liter

NA - Not Applicable or Not Analyzed

ND - Non Detect

U - Unfiltered

F - Filtered

Highlighted indicates an exceedance of NYSDEC TOGS Water Quality Standards/Guidance Values - Class GA.

Table 2-5 - Groundwater Analytical Data - PCBs

110 East 149th Street  
Bronx, New York

CLIENT ID:		MW-01	MW-02	MW-03	MW-04	MW-05
LAB ID:	NY TOGS Water Quality Standards/Guidance Values - Class GA	AC81399-001	AC81399-003	AC81399-005	AC81399-009	AC81399-007
COLLECTION DATE:		10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014
SAMPLE MATRIX:		Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
SAMPLE UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L
Analyte	ug/L					
<b>PCBs</b>						
Aroclor (Total)	0.09	ND	ND	ND	ND	ND
Aroclor-1016	NA	ND	ND	ND	ND	ND
Aroclor-1221	NA	ND	ND	ND	ND	ND
Aroclor-1232	NA	ND	ND	ND	ND	ND
Aroclor-1242	NA	ND	ND	ND	ND	ND
Aroclor-1248	NA	ND	ND	ND	ND	ND
Aroclor-1254	NA	ND	ND	ND	ND	ND
Aroclor-1260	NA	ND	ND	ND	ND	ND
Aroclor-1262	NA	ND	ND	ND	ND	ND
Aroclor-1268	NA	ND	ND	ND	ND	ND

**Notes:**

NY TOGS - New York State Department of Environmental Conservation Division of Water Technical and Operational Guidance Series (1.1.1)

ug/L - micrograms per liter

NA - Not Applicable or Not Analyzed

ND - Non Detect

Highlighted indicates an exceedance of NYSDEC TOGS Water Quality Standards/Guidance Values - Class GA.

**Table 3 - Soil Vapor Analytical Data - VOCs**

**110 East 149th Street  
Bronx, New York**

CLIENT ID:	Air Guideline Values Derived by the NYSDOH	SV-01	SV-02	SV-03	SV-04	SV-05	SV-06	SV-07
LAB ID:		1410994-007	1410994-001	1410994-006	1410994-002	1410994-005	1410994-003	1410994-004
COLLECTION DATE:		10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014	10/13/2014
SAMPLE MATRIX:		Soil Vapor						
SAMPLE UNITS:		ug/m <sup>3</sup>						
Analyte	ug/m <sup>3</sup>							
Volatiles								
1,2,4-Trimethylbenzene	NA	2.95	146,000	ND	ND	ND	ND	ND
1,2-Dichloroethane	NA	ND	6,000	1,380	ND	ND	ND	ND
Acetone	NA	ND	ND	ND	26.6	1.76	ND	3.14
Benzene	NA	3.74	19,400	ND	ND	ND	ND	ND
Carbon disulfide	NA	4.76	ND	ND	13.7	22.8	19	5.11
Chloroform	NA	14.6	ND	ND	ND	21.3	10.4	3.03
Ethylbenzene	NA	ND	87,900	ND	ND	ND	ND	ND
Methylene chloride	60	3.15	ND	559	6.41	2.64	ND	2.56
Tetrachloroethene	100	5.49	ND	ND	ND	56	32.7	ND
Toluene	NA	ND	6,580	ND	ND	ND	ND	ND
Trichloroethene	5,000	ND						
Trichlorofluoromethane	NA	ND	ND	ND	ND	12.1	3.37	17.2
Xylenes (m&p)	NA	ND	103,000	ND	ND	ND	ND	ND
Xylenes (o)	NA	ND	2,140	ND	ND	ND	ND	ND

**Notes:**

The above table includes VOC detections and any parameters with a guideline value.

ug/m<sup>3</sup> = micrograms per cubic meter

NA - Not Applicable or Not Analyzed

ND - Non Detect

All results have a qualifier of D which means the results are for dilution.

**Shaded** - Analyte concentration exceeds Air Guideline Values derived by the NYSDOH.

## **Appendix A**

### **Citizen Participation Plan**

The NYC OER and River Avenue Management have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC VCP. 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, River Avenue Management 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 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, to be determined at a later date, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841.

**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 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. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at [brownfields@cityhall.nyc.gov](mailto:brownfields@cityhall.nyc.gov).

**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. River Avenue Management will inspect the repositories to ensure that they are fully populated with project information. The repository for this project will be determined at a later date.

**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.

**Identify Issues of Public Concern.** River Avenue Management is required to identify whether there are specific issues of concern to stakeholders proximate to the project Site. Such issues include, but are not limited to, interests of Environmental Justice communities. No issues of public concern have been identified.

**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 River Avenue Management and reviewed and approved by OER prior to distribution and mailed by River Avenue Management. Public comment is solicited in public notices for all work plans developed under the NYC VCP. 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 RIR and RAWP and a 30-day public comment period on the RAWP. 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 RIR and RAWP and

the initiation of a 30-day public comment period on the RAWP. 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 ECs/ICs and issuance of the NOC.
- 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 ICs/ECs implemented for to the Site and announcing the issuance of the NOC.

## **Appendix B**

### **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. To the extent feasible clean diesel and low sulfur fuels will be utilized in on-site construction equipment.

**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. Recontamination controls for the Site include the installation of building foundations (and cover soils as needed) and building vapor barriers, which will prevent movement of any residual contaminated soils. An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

**Storm-water Retention.** Storm-water retention improves water quality by lowering the rate of combined storm-water and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters. No storm-water retention measures will be installed at the Site.

**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 Brownfield Cleanup Program.** River Avenue Management is participating in OER's Paperless Brownfield 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.** River Avenue Management 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.

To the extent feasible native plant species will be utilized in any landscaped areas. An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

## **Appendix C**

### **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 QEP 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 NOC.

#### **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; and,
- 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 to exit the Site and turn right onto Exterior Street, then take the I-87 Ramp on the left to the Major Deegan Expressway. 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 River Avenue Management 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 Bronx, 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 River Avenue Management. The letter will include as an attachment: (1) 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 RAR 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**

No soil/fill that is derived from the Site will be re-used on-site.

### **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;
- (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 SMP.

## **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. The backfill and cover soil quality objectives will be determined at a later date.

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.

### **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.

RCA will be imported from facilities permitted or registered by the NYS DEC. 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.

## **1.10 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 NYC sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the NYC sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the NYC 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 State Pollutant Discharge Elimination System (SPDES) permit issued by NYS DEC.

## **1.11 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, 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.

## **1.12 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 Target Analyte List (TAL) metals, Target Compound List (TCL) VOCs and SVOCs, TCL pesticides and PCBs, as appropriate.

## **1.13 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 RAR.

### **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 RAR.

### **Other Nuisances**

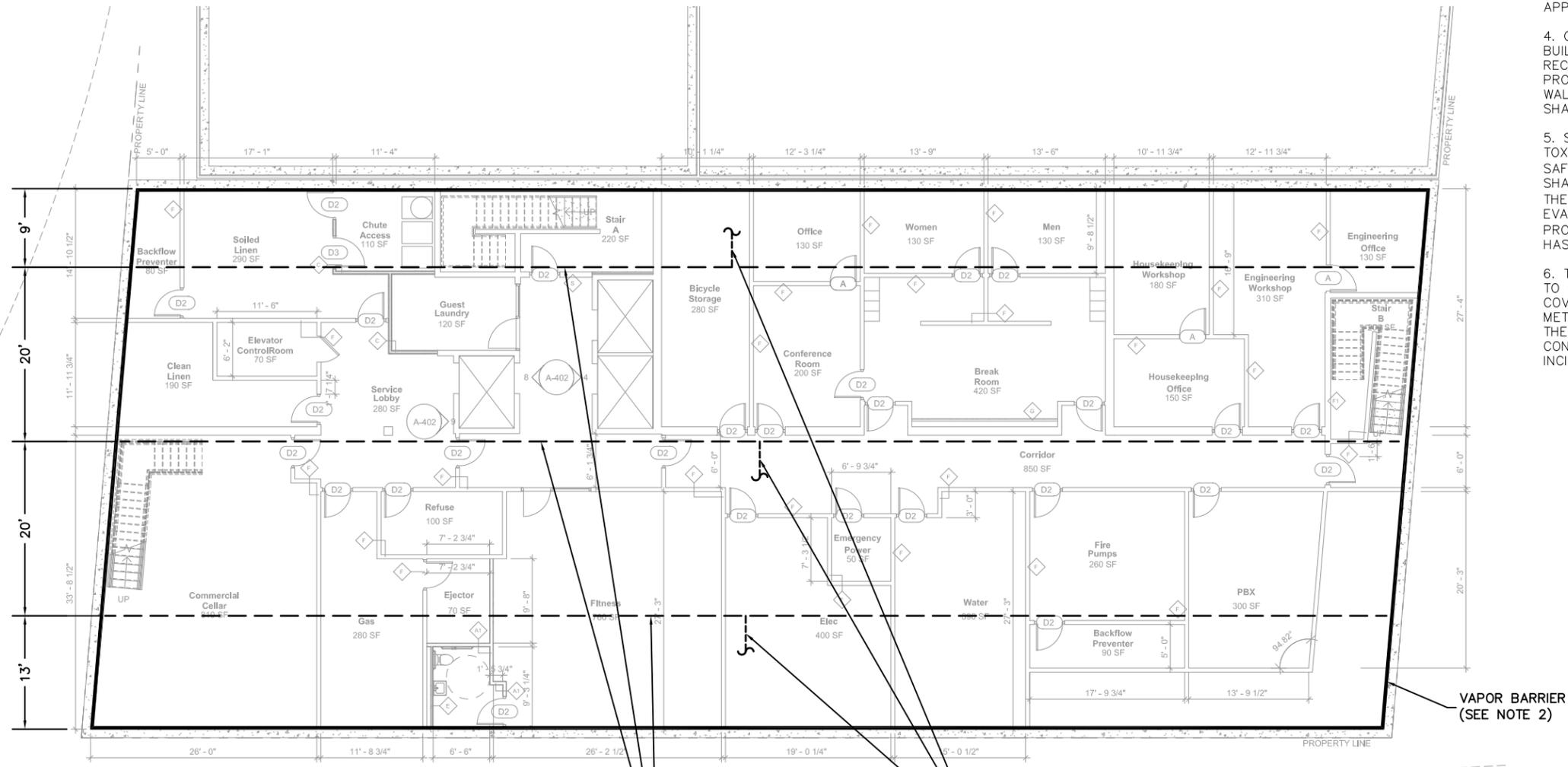
Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

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

**Appendix D**  
**Construction Health and Safety Plan**

## **APPENDIX E**

# **Design Diagrams and Specifications for Vapor Barrier/Waterproofing Membrane and Sub-Slab Depressurization System**

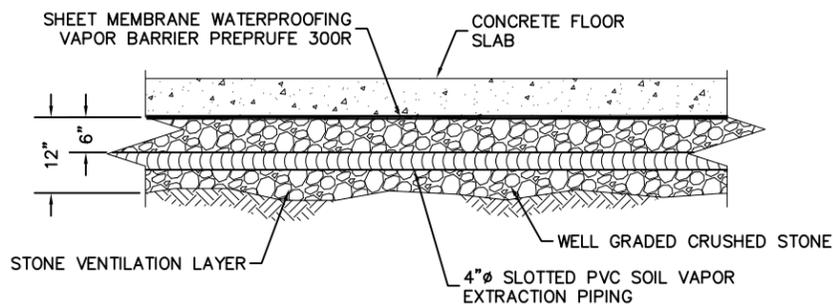


**NOTES:**

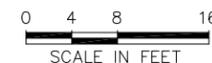
1. BUILDING FOUNDATIONS AND FEATURES ARE SHOWN FOR REFERENCE ONLY.
2. THE CONTRACTOR SHALL INSTALL THE VAPOR BARRIER BENEATH THE ENTIRE FOOTPRINT. VAPOR BARRIER SHALL SEAL TO PERIMETER FOUNDATIONS, AS RECOMMENDED BY THE MANUFACTURER, OR EXTEND BEYOND FOUNDATION LIMITS TO PROVIDE A COMPLETE BARRIER. BARRIER SHALL BE INSTALLED ALONG CELLAR WALLS, CELLAR FLOOR SLAB, ELEVATOR SHAFTS AND ALL SUMPS AND PITS.
3. PIPING LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED AS REQUIRED IN THE FIELD TO AVOID CONFLICT WITH BUILDING FEATURES. FINAL LOCATIONS SHALL BE AS APPROVED BY THE CONSTRUCTION MANAGER.
4. CONTRACTOR SHALL INSTALL THE GAS VAPOR BARRIER BENEATH THE ENTIRE BUILDING FOOTPRINT. VAPOR BARRIER SHALL SEAL TO PERIMETER FOUNDATIONS, AS RECOMMENDED BY THE MANUFACTURER, OR EXTEND BEYOND FOUNDATION LIMITS TO PROVIDE A COMPLETE BARRIER. BARRIER SHALL BE INSTALLED ALONG BASEMENT WALLS, BASEMENT FLOOR SLAB, CRAWL SPACE FLOOR, CRAWL SPACE WALLS, ELEVATOR SHAFT AND FIRST FLOOR SLABS.
5. SITE ACTIVITIES MAY INVOLVE WORKER EXPOSURE TO POTENTIALLY HAZARDOUS OR TOXIC MATERIALS. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT A HEALTH AND SAFETY PLAN (HASP) IN ACCORDANCE WITH THE SPECIFICATIONS. THE CONTRACTOR SHALL PERFORM AIR MONITORING THROUGHOUT SUBSURFACE INTRUSIVE ACTIVITIES AND THE EXCAVATION PROCESS. THE CONTRACTOR'S HEALTH AND SAFETY OFFICER SHALL EVALUATE WORK ACTIVITIES AND DETERMINE APPROPRIATE LEVELS OF WORKER PROTECTION BASED ON PREDETERMINED ACTION LEVELS DETAILED IN THE CONTRACTOR'S HASP.
6. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, EQUIPMENT AND LABOR REQUIRED TO CONTROL VAPOR EMISSION FROM OPEN EXCAVATIONS. THE CONTRACTOR SHALL COVER EXCAVATED AREAS WITH CLEAN EXCAVATION MATERIAL OR OTHER APPROVED METHOD AS NECESSARY TO CONTROL VAPOR EMISSIONS AT NO ADDITIONAL COST TO THE CITY. THE CONTRACTOR SHALL DETAIL HIS PROPOSED METHOD OF EMISSION CONTROL IN THE PLAN OF OPERATIONS. EMISSIONS CONTROL SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT AND INCLUDED IN THE CONTRACTORS BASE BID PRICE.

VERTICALLY INSTALLED 4" SCH 40 PVC EXTRACTION PIPE - SOLID TO ROOF TURBINE UNIT (LOCATION OF VERTICAL RUN TO BE DETERMINED)

4" SCH 40 PVC SOIL VAPOR EXTRACTION PIPING - SLOTTED. INSTALL BENEATH CELLAR FLOOR



**TYPICAL HORIZONTAL SOIL VAPOR BARRIER AND EXTRACTION PIPING**  
NOT TO SCALE



*River Avenue Management*

**LiRo Engineers, Inc.**  
3 Aerial Way, Syosset, New York

**SOIL VAPOR MITIGATION SYSTEM CONCEPTUAL PLAN AND TYPICAL DETAIL**

110 EAST 149TH STREET  
BRONX, NY

SCALE: AS SHOWN

DATE: 2/2015

SV-100.00

EXAMPLE  
SOIL VAPOR MITIGATION SYSTEM  
SPECIFICATIONS\*\*

<u>Section</u>	<u>Page No.</u>
072616 Below-Grade Vapor Retarder	072616-1
13100 Soil Vapor Mitigation System Piping and Fittings	13100-1

\*\*Specifications are provided as examples of typical Soil Vapor Mitigation System specifications that are provided with a system design. Example specifications are for information only and are not to be used for construction.

## **SECTION 072616**

### **EXAMPLE BELOW-GRADE VAPOR RETARDER**

#### **PART 1 GENERAL**

##### **1.1 GENERAL REQUIREMENTS**

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### **1.2 SECTION INCLUDES**

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the sheet membrane waterproofing as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Sheet membrane waterproofing for underslab conditions.
  - 2. Sheet membrane waterproofing, for foundation wall surfaces.

##### **1.3 RELATED SECTIONS**

- A. Concrete
- B. Earthwork

##### **1.4 SUBMITTALS**

- A. Shop Drawings: Typical installation details, showing details at flashings, at terminations, at joints, at intersection of horizontal and vertical surfaces, and at penetrations in membrane system.
- B. Samples - Submit
  - 1. Membrane, 6" x 6" samples of each membrane.
  - 2. 6" x 6" sample of flashing.
  - 3. 6" x 6" sample of drainage board.
- C. Manufacturer's Literature: Submit manufacturer's technical, safety data sheets, and installation literature for all materials of this Section. Submit Independent Test data indicating that membrane meets properties specified herein.
- D. Subcontractor Qualification.

## **1.5 STORAGE OF MATERIALS**

- A. All materials shall be stored in their original tightly sealed containers or unopened packages; shall be clearly labeled with the manufacturer's name, brand name and number, and batch number of the material with expiration date where appropriate.
- B. Materials shall be stored in a neat and safe manner so as not to exceed the allowable live load of the storage area.
- C. Material shall be stored out of the weather in a clean, dry area.
- D. Liquid materials, such as adhesives, thinners and primers, shall be stored in areas away from sparks, open flames and excessive heat.

## **1.6 JOB CONDITIONS**

- A. No application of liquid applied urethane flashing shall commence or proceed during inclement weather, or the threat of imminent precipitation.
- B. All surfaces to receive the system shall be thoroughly dry and free of dew or frost.
- C. Application temperatures are not limited except that materials shall be stored until time of mixing at temperatures above 60 °F. to maintain a consistency suitable for mixing. Do no work below 40 °F.
- D. Prior to and during application, all dirt and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air, or similar methods.
- E. Surfaces not designated to receive the system shall be properly masked or otherwise protected against accidental spillage or application of the material to those areas.

## **1.7 WARRANTY**

- A. The General Contractor shall jointly warrant with the manufacturer the waterproofing system executed under this Section to be watertight and free from defects in materials and workmanship for a period of ten (10) years from date of acceptance of this Contract, and that he, at his own expense, repair and/or replace all other work which may be damaged as a result of such defective work, and which becomes defective during the warranty period.

## **1.8 QUALITY ASSURANCE**

- A. Preinstallation Conference: Approximately 2 weeks prior to scheduled commencement of waterproofing installation, meet at Project site with Waterproofing Installer; preparer of substrate to receive waterproofing; installers of other work in and around waterproofing that must precede, follow, or penetrate waterproofing (including Mechanical and Electrical Installers as applicable); Engineer; Owner; and waterproofing manufacturer's representative to review materials, procedures, schedules, and other requirements and conditions related to installing waterproofing.

## B. Qualifications of Subcontractors

1. Subcontractors: All work of this Section shall be performed by a subcontractor who is approved by the manufacturer of the waterproofing material.
2. Qualifications of Subcontractors: Subcontractors shall submit evidence of being bona fide waterproofing subcontractors, for a period of not less than five (5) years, and that they are approved by the manufacturer of the waterproofing material for the installation of the manufacturer's material in accordance with the requirements of this Section.
  - a. Subcontractor shall submit a letter from manufacturer of waterproofing material stating that subcontractor is approved by the manufacturer for the application of the waterproofing systems specified and accepted for use on the Project.
  - b. Letter shall certify that the subcontractor has previously and satisfactorily applied the waterproofing systems specified herein, under manufacturer's supervision.
  - c. Letter shall be on manufacturer's letterhead and shall be signed by an officer of the company, not by a local sales representative.

## B. Manufacturer's Representative/Contractor's Certification

1. Representative of the waterproofing material manufacturer shall be required to provide field instructions and supervision for the installation of the waterproofing systems at the start of the work of this Section.
2. The manufacturer's representative shall be required to make sure that the workmen for waterproofing systems on the site of the Project are fully instructed and trained in the handling and application of all the materials, and shall see that all the materials are correctly installed.
3. Upon completion of the Installation, submit to the Engineer written certification that the representative of the manufacturer of the waterproofing material has supervised the work of this Section and that all materials were correctly installed.

## 1.9 PROTECTION

- A. Against Loads: Protect work of this Section against concentrated loads and any other loads or equipment that would damage the materials or work.
- B. Against Traffic: Do not permit traffic on horizontally installed work of this Section, except for workmen doing the work, during the installation, and after the installation until membrane systems are covered with protective boards or with the specified finishing materials.
- C. Against Damage: Protect vertically installed work of this section from damage by reinforcing and placement.

1. Take and maintain necessary preventative measures to protect work of this Section from damage until Project is accepted.
2. Rejection of Damaged Work
  - a. Damaged materials or work will be rejected.
  - b. Rejected materials or work must be immediately removed and replaced with new materials.

## **1.10 FIELD QUALITY CONTROL**

### **A. Construction Traffic:**

1. Limit construction traffic over completed membrane.
2. General Contractor shall provide 1/2 in. plywood protection layer, where construction traffic is unavoidable.

### **B. Inform Engineer in writing on a daily basis of any of the following events. State specific location of each occurrence.**

1. Buckling to the Waterproofing and other deformations as a result of ground water events.
2. Leakage through the finished waterproofing installation.
3. Damage by other trades.

### **C. Provide Manufacturer's Representative's report (prior to backfill) stating that the waterproofing has been inspected and is acceptable.**

## **PART 2 PRODUCTS**

### **2.1 WATERPROOFING MEMBRANE**

- A. Trade names used herein for membrane waterproofing are those of W.R. Grace. Other manufacturers noted herein may substitute their equivalent products.
- B. For foundation walls, provide "Bituthene 4000" sheet waterproofing membrane, 60 mils thick, and "Bituthene Liquid Membrane," 60 mils thick, for flashing, as manufactured by W. R. Grace or equal made by Carlisle or Polyguard Products, Inc.
- C. At underslab conditions, provide adhesive coated FIDPE Composite Sheet "Bituthene Preprufe 300R" system by W. R. Grace & Co. or approved equal.
- D. Bituthene Surface Conditioner: Latex/water based primer specifically formulated to provide adhesion of Bituthene Waterproofing Membranes.

- E. Bituthene Elastomeric Mastic: Rubberized asphalt base mastic.
- F. Bitustik Tape: Double sided synthetic adhesive tape.
- G. Protection Board: 1/4" thick semi-rigid protection board, Bituthene Asphaltic Hardboard.
- H. Bituthene Liquid Membrane: Two-component 100% solids trowel grade asphalt modified urethane.
- I. Hydroduct 220 Drainage Board/Composite: Prefabricated dimpled polystyrene drainage core with a non-woven filter fabric on one side and a polymer film on the reverse side.
  - 1. At horizontal applications, use Hydroduct 660.

## **PART 3 EXECUTION**

### **3.1 INSPECTION**

- A. Examine the areas and conditions where membrane waterproofing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### **3.2 PREPARATION OF SURFACES TO RECEIVE WATERPROOFING**

- A. Conform to the requirements of Bituthene Techletter No. BTL 82-02, published by W. R. Grace.
- B. Earth or crushed stone substrates shall be compacted to produce an even, sound substrate. Loose aggregate, sharp protrusions and standing water shall be removed.

### **3.3 INSTALLATION**

- A. General: Conform to recommendations and published specifications of the manufacturer' including environmental requirements.
- B. Foundation Walls
  - 1. General: The membrane, when in place must withstand a minimum static ground water pressure of 150 feet.
  - 2. Priming: Application of primer shall be limited to what can be covered with Bituthene Waterproofing Membrane in a given work day. Primed areas not covered by membrane during the work day will be reprimed. Apply primer by spray, roller or brush at a rate of 250 - 350 sq. ft. per gallon. Roller shall be natural material such as lamb's wool, having a nap of approximately one inch. Primer shall be applied to a clean, dry, frost-free and dust-free surface. Sufficient primer must be used on the day surface to condition it to a dust-free state suitable for the application of Bituthene Waterproofing Membranes.

- a. Bituthene Surface Conditioner should not be applied below 40 deg. F. on vertical surfaces. Allow primer to dry 30 minutes.
3. Membrane Installation: Apply Bituthene Waterproofing Membrane vertically in sections of 8' in length or less. On higher walls apply two or more sections with the upper overlapping the lower by a least 2-1/2". Press all membrane in place with heavy hand pressure or rollers during application.
4. Sealing Edges: Bituthene Waterproofing Membrane shall be applied over the edge of the slab or over the top of the foundation or parapet wall. If the membranes are terminated on the vertical surface, a reglet or counter flashing may be used or the membrane may be terminated directly on the vertical surface by pressing very firmly to the wall. Press edges with a metal or hardwood tool such as a hammer or knife handle. Apply a troweled bead of Bituthene Mastic to all vertical and horizontal terminations. Bituthene Liquid Membrane can be used as an alternative method at the General Contractor's option.
5. Sealing Seams: All edges and end seams must be overlapped at least 2-1/2". Apply succeeding sheets with a minimum 2-1/2" overlap and stagger end laps. Roll or press the entire membrane firmly and completely as soon as possible. Patch misaligned or inadequately lapped seams with Bituthene Membrane. Slit any fish mouths, overlap the flaps, and repair with a patch of Bituthene and press or roll in place. The edges of the patch shall be sealed with a troweling of mastic. Laps within 12" of all corners shall be sealed with a troweling of mastic.
6. Corner Forming: Outside corners must be free of sharp edges. Inside corners shall receive a fillet formed with Liquid Membrane, latex modified cement mortar equal to Daraweld C made by Grace mixed with cement mortar or epoxy mortar. Do not use fiber or wood cants. One of two methods may be used for treating corners at the General Contractor's option:
  - a. Apply Bituthene Liquid Membrane 6" in each direction from the corner and form a fillet with a minimum 3/4" face.
  - b. Install an 11" minimum strip of Bituthene Membrane centered on the corner. Install Bituthene Membrane over the treated inside and outside corners.
7. Over waterproofing, apply drainage composite board by adhering board to cured membrane using tape or adhesive per manufacturer's recommendations.

### **3.4 INSTALLATION OF BELOW GRADE UNDERSLAB WATERPROOFING**

- A. General: Install adhesive coated HDPE composite sheet according to waterproofing manufacturer's written instructions.

## B. Underslab Applications

1. Apply Hydroduct 660 drainage composite board as recommended by manufacturer over the compacted sub-grade.
2. Apply the membrane over the drainage composite board with the HDPE side facing the drainage composite board and the treated white coating surface facing the concrete to be poured. The membrane may be installed at any convenient length. Apply succeeding sheets by overlapping previous sheets 3" along the self-adhesive edge of the membrane. Remove the silicone coated release liner covering the membrane and roll the side lap to assure a tight seal.

### 3.5 SEAM REINFORCEMENT FOR HDPE COMPOSITE SHEETS ONLY

- A. Provide a 6 in. strip of modified bituminous sheet membrane (Bituthene 4000) centered behind all laps.
- B. At locations where a salvage edge is not present and at end laps, lap sheets 6 in. apply a 1/8 in. thick by 6 in. wide application of liquid membrane between sheets, to provide a 6 in. wide seal.
- C. Integration of old onto new pre-applied sheet membrane.
  1. Integration of Sheet Membrane onto Sheet Membrane that has been installed in excess of 30 days prior
    - a. Lap sheets 12 in., apply a 1/8 in. thick by 12 in. wide application of fluid membrane between sheets, to provide a 12 in. wide seal at this location.
    - b. Install Waterproofing Tape centered at edge of lap and roll firmly into place with an approved roller.
    - c. Install additional Waterproofing Tape to cover white film that has been installed over 30 days prior.
  2. Repair of pre-applied sheet membrane
    - a. Scratch on white coating exposing underlying black surfing of Sheet Membrane: Install Waterproofing Tape at areas where the white coating of the membrane is damaged, including boot scuff marks and abrasions by rebar.
    - b. Damage or Puncture of Sheet Membrane: Install Patch of short Membrane set in Liquid Membrane. Patch must extend 3 in. in every direction around extent of damaged area. Install Waterproofing Tape centered over the edge of the patch. If the damaged area does not have 5 in. of sound material around it, inject Liquid Membrane into puncture until Liquid Membrane backs out, and proceed with patch as space allows.

### **3.6 CLEAN-UP**

- A. Upon completion of the waterproofing system, the General Contractor shall remove all equipment, material and debris from the work and storage area, and leave those areas in an undamaged and acceptable condition.

**END OF SECTION**

## **SECTION 13100**

### **EXAMPLE SOIL VAPOR MITIGATION SYSTEM PIPING AND FITTINGS**

#### **PART 1 - GENERAL**

##### **1.01 SCOPE**

- A. This specification relates to installation of soil vapor mitigation system piping beneath the building foundation and vapor barrier. Related work includes excavation, backfilling, and compaction which are governed by the General Specifications.
- B. The Contractor shall provide all materials, pipe, fittings, appurtenances, equipment and labor required for a complete installation.

##### **1.02 SUBMITTALS**

The Contractor shall prepare and submit to the Engineer certificates of compliance on materials furnished and manufacturer's brochures containing complete information and instructions pertaining to the storage, handling, installation, inspection, maintenance, and repair of each type of pipe and pipe fitting furnished.

##### **1.03 STATUTES, REGULATIONS, CODES AND POLICIES**

All work included in this contract shall be conducted in strict compliance with all applicable Federal, State and Local statutes, regulations, codes and policies. Compliance assurance shall be the responsibility of the Contractor.

#### **PART 2 - MATERIALS**

##### **2.01 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS**

- A. All slotted pipe shall be Schedule 40 PVC conforming to ASTM D-1785. Four inch pipe shall have 4 rows of slots spaced 90 degrees apart (on center) as manufactured by Plastinetics, Chemtrol, CertainTeed, or approved equal. Pipe and fittings shall be the product of a single manufacturer. Slot length shall be 2.6 inches minimum, slot width shall be 0.04 inches, and slot spacing of 0.50 inches.
- B. All solid PVC pipe and pipe fittings shall be Schedule 40 PVC conforming to ASTM D-1785 for pipe and ASTM D-2466 for fittings.
- C. PVC pipe and pipe fittings shall be manufactured from a compound which meets the requirements of Type 1, Grade 1 Polyvinyl chloride as outlined in ASTM D-1785. A Type 1, Grade 1 compound is characterized as having the highest

requirements for mechanical properties and chemical resistance. Pipe and pipe fittings shall be manufactured by Plastinetics, Chemtrol, CertainTeed, or approved equal. Compound from which pipe is produced shall have a design stress rating of 2,000 psi at 73 °F, listed by PPI.

- D. Materials from which pipe and pipe fittings are manufactured shall have been tested and approved by the NSF.
- E. Pipe shall conform to the requirements of ASTM D-2241. Pipe shall be homogenous throughout and shall be free from cracks, holes, foreign inclusions, and other defects.

## **2.02 VAPOR EXTRACTION ASSEMBLIES**

The Contractor shall supply and install turbine ventilators for the venting systems. Ventilators shall be installed on piping as shown on the Drawings. The turbine ventilators shall be 4 inch throat diameter by Empire Ventilation Equipment Co., Long Island City, New York, or approved equal.

## **PART 3 - EXECUTION**

### **3.01 PVC PIPE HANDLING**

PVC pipe and pipe fittings shall be handled carefully in loading and unloading. They shall be lifted by hoists and lowered on skidways in such a manner as to avoid shock. Derricks, ropes, or other suitable equipment shall be used for lowering the pipe into the excavation. Pipe and pipe fittings shall not be dropped or dumped.

### **3.02 PVC PIPE INSTALLATION**

- A. PVC pipe installation shall conform to these Specifications, the manufacturer=s recommendations, and as outlined in ASTM D-2774.
- B. Unless otherwise specified, all piping located beneath the building shall be of the slotted PVC type. Piping located outside of the building or located above grade shall be solid PVC.

### **3.03 JOINING OF PVC PIPES**

- A. Joining of pipes shall be in accordance with ASTM D-2855.
- B. All pipe shall be inspected for cuts, scratches, or other damages, prior to installation. Pipe with imperfections shall not be used.

- C. All burrs, chips, etc., shall be removed from pipe interior and exterior.
- D. All loose dirt and moisture shall be wiped from the interior and exterior of pipe ends and the interior of the fitting.
- E. All pipe cuts shall be square, perpendicular to center line of pipe except as noted on the Drawings.
- F. Pipe ends shall be beveled prior to applying primer and solvent cement so that the cement does not get wiped off during insertion into the fitting socket.
- G. A coating of CPS primer as recommended by pipe supplier shall be applied to the entire interior surface of the fitting socket and to an equivalent area on the exterior of the pipe prior to applying solvent cement.
- H. The solvent cement shall comply with the requirements of ASTM D-2564 and shall be applied in strict accordance with manufacturer's specifications.
- I. Except as noted below, pipe shall not be primed or solvent welded when it is raining or when atmospheric temperature is below 40 °F or above 90 °F when under direct exposure to the sun. For solvent welding when the atmospheric temperature is below 40 °F, use RectorSeal Primer, or approved equal, as a primer, and RectorSeal Arctic 616, or approved equal, as the solvent cement. Weld as per manufacturer's recommendations and product data sheets for installation and set times.
- J. After solvent welding, the pipe shall remain undisturbed prior to backfilling until cement has thoroughly set. As a guideline for joint setting time, use 1-hour for ambient temperatures of 60-100 °F, or 2 hours when ambient temperatures are 40-60 °F.
- K. Pipe and pipe fittings shall be selected so that there will be as small a deviation as possible at the joints and so that joints present a smooth surface. Pipe and pipe fittings which do not fit together to form a tight fitting will be rejected.

**END OF SECTION**

## PREPRUFE® 300R & 160R

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

### Description

Preprufe® 300R & 160R membranes are unique composite sheets comprising a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.

Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe bond to concrete prevents ingress or migration of water around the structure.

The Preprufe R System includes:

- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe Tape LT**—for covering cut edges, roll ends, penetrations and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C)).
- **Preprufe Tape HC**—as above for use in Hot Climates (minimum 50°F (10°C)).
- **Bituthene® Liquid Membrane**—for sealing around penetrations, etc.

Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted sand or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene self-adhesive membrane or Procor® fluid applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

### Advantages

- **Forms a unique continuous adhesive bond to concrete poured against it**—prevents water migration and makes it unaffected by ground settlement beneath slabs
- **Fully-adhered watertight laps** and detailing
- **Provides a barrier to water, moisture and gas**—physically isolates the structure from the surrounding ground
- **BBA Certified** for basement Grades 2, 3, & 4 to BS 8102:1990
- **Zero permeance** to moisture

- **Solar reflective**—reduced temperature gain
- **Simple and quick to install**—requiring no priming or fillets
- **Can be applied to permanent formwork**—allows maximum use of confined sites
- **Self protecting**—can be trafficked immediately after application and ready for immediate placing of reinforcement
- **Unaffected by wet conditions**—cannot activate prematurely
- **Inherently waterproof, non-reactive system:**
  - not reliant on confining pressures or hydration
  - unaffected by freeze/thaw, wet/dry cycling
- **Chemical resistant**—effective in most types of soils and waters, protects structure from salt or sulphate attack

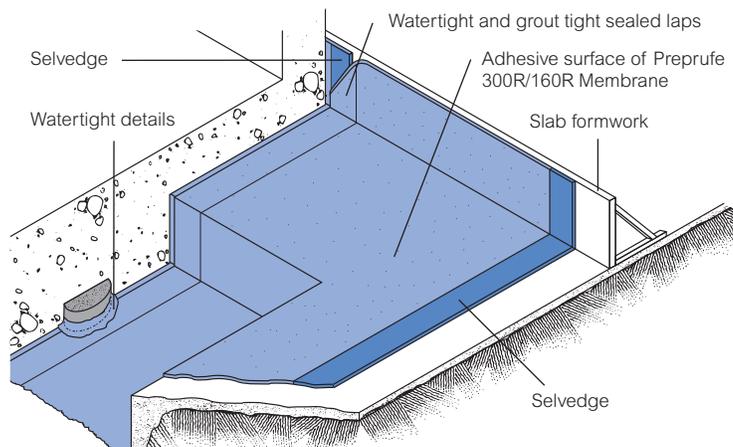
### Installation

The most current application instructions, detail drawings and technical letters can be viewed at [www.graceconstruction.com](http://www.graceconstruction.com). Technical letters are provided for the following subjects to assist in the installation of Preprufe:

- Chemical Resistance
- Minimizing Concrete Shrinkage and Curling
- Rebar Chairs on Preprufe 300R Membrane
- Removal of Formwork Placed Against Preprufe Membranes
- Winter Lap Sealing and the use of Preprufe Tape LT

For other technical information contact your local Grace representative.

Preprufe 300R & 160R membranes are supplied in rolls 4 ft (1.2 m) wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe Membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.



Drawings are for illustration purposes only. Please refer to [www.graceconstruction.com](http://www.graceconstruction.com) for specific application details.

## Substrate Preparation

**All surfaces**—It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability (see Figure 1).

**Horizontal**—The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. The surface does not need to be dry, but standing water must be removed.

**Vertical**—Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 0.5 in. (12 mm) out of alignment.

## Membrane Installation

Preprufe can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe in cold or marginal weather conditions 55°F (<13°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application.

**Horizontal substrates**—Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed (see Figure 2).

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

Refer to Grace Tech Letters for information on suitable rebar chairs for Preprufe.

**Vertical substrates**—Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Secure the top of the membrane using a batten such as a termination bar or similar 2 in. (50 mm) below the top edge (see Figure 3). Fastening can be made through the selvedge so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner. Any additional fasteners must be covered with a patch of Preprufe Tape (see Figure 4).

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal.

**Roll ends and cut edges**—Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap and roll firmly. Immediately remove printed plastic release liner from the tape.

## Details

Refer to Preprufe Field Application Manual, Section V Application Instructions or visit [www.graceconstruction.com](http://www.graceconstruction.com). This Manual gives comprehensive guidance and standard details for:

- internal and external corners
- penetrations
- tiebacks
- columns
- grade beam pilecaps
- tie-ins
- terminations

## Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by jet washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Repair small punctures (0.5 in. (12 mm) or less) and slices by applying Preprufe Tape centered over the damaged area and roll firmly. Remove the release liner from the tape. Repair holes and large punctures by applying a patch of Preprufe membrane, which extends 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with Preprufe Tape, remove the release liner from the tape and roll firmly. Any areas of damaged adhesive should be covered with Preprufe Tape. Remove printed plastic release liner from tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape, rolling firmly. Alternatively, use a hot air gun or similar to activate adhesive and firmly roll lap to achieve continuity.

## Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe R Membrane and Tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

## Removal of Formwork

Preprufe membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems.

A minimum concrete compressive strength of 1500 psi (10 N/mm<sup>2</sup>) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

As a guide, to reach the minimum compressive strength stated above, a structural concrete mix with an ultimate strength of 6000 psi (40 N/mm<sup>2</sup>) will typically require a cure time of approximately 6 days at an average ambient temperature of 25°F (-4°C), or 2 days at 70°F (21°C).

Figure 1



Figure 2

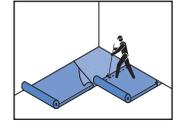
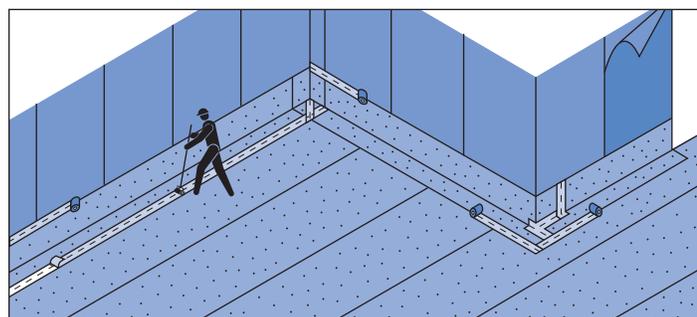
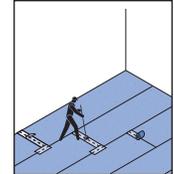


Figure 3



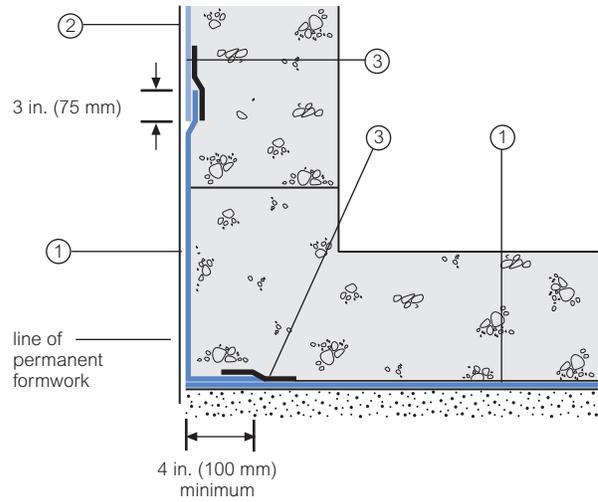
Figure 4



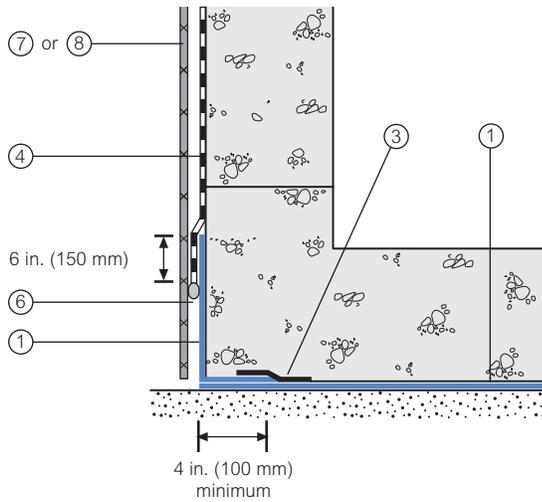
## Detail Drawings

Details shown are typical illustrations and not working details. For a list of the most current details, visit us at [www.graceconstruction.com](http://www.graceconstruction.com). For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

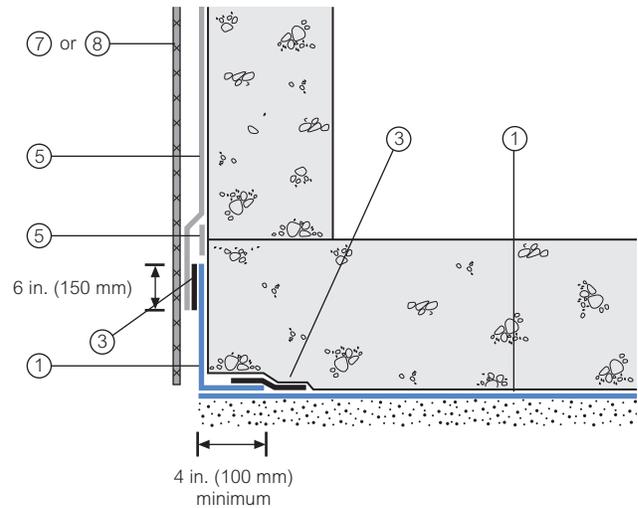
### Wall base detail against permanent shutter



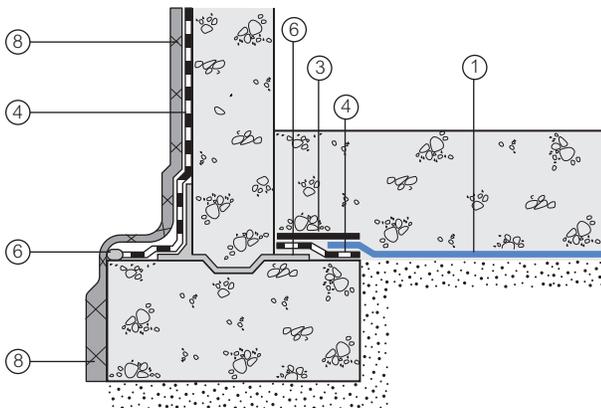
### Bituthene wall base detail (Option 1)



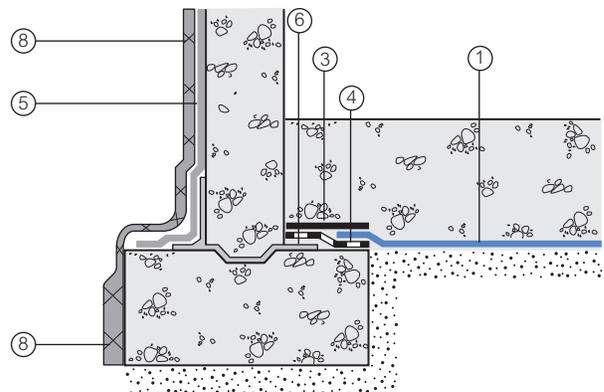
### Procor wall base detail (Option 1)



### Bituthene wall base detail (Option 2)



### Procor wall base detail (Option 2)



1 Preprufe 300R  
2 Preprufe 160R

3 Preprufe Tape  
4 Bituthene

5 Procor  
6 Bituthene Liquid Membrane

7 Protection  
8 Hydroduct®

## Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	4 ft x 98 ft (1.2 m x 30 m)	4 ft x 115 ft (1.2 m x 35 m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	392 ft <sup>2</sup> (36 m <sup>2</sup> )	460 ft <sup>2</sup> (42 m <sup>2</sup> )	
Roll weight	108 lbs (50 kg)	92 lbs (42 kg)	4.3 lbs (2 kg)
Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)	3 in. (75 mm)
* LT denotes Low Temperature (between 25°F (-4°C) and 86°F (+30°C)) HC denotes Hot Climate (50°F (>+10°C))			
<b>Ancillary Products</b>			
Bituthene Liquid Membrane—1.5 US gal (5.7 liter) or 4 US gal (15.1 liter)			

## Physical Properties

Property	Typical Value 300R	Typical Value 160R	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm) nominal	0.032 in. (0.8 mm) nominal	ASTM D3767
Low temperature flexibility	Unaffected at -10°F (-23°C)	Unaffected at -10°F (-23°C)	ASTM D1970
Resistance to hydrostatic head, minimum	231 ft (70 m)	231 ft (70 m)	ASTM D5385, modified <sup>1</sup>
Elongation, minimum	300%	300%	ASTM D412, modified <sup>2</sup>
Tensile strength, film, minimum	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -10°F (-23°C), 100 cycles	Unaffected	Unaffected	ASTM C836
Puncture resistance, minimum	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete, minimum	5.0 lbs/in. (880 N/m) width	5.0 lbs/in. (880 N/m) width	ASTM D903, modified <sup>3</sup>
Lap peel adhesion	2.5 lbs/in. (440 N/m) width	2.5 lbs/in. (440 N/m) width	ASTM D1876, modified <sup>4</sup>
Permeance to water vapor transmission, maximum	0.01 perms (0.6 ng/(Pa × s × m <sup>2</sup> ))	0.01 perms (0.6 ng/(Pa × s × m <sup>2</sup> ))	ASTM E96, method B
Water absorption, maximum	0.5%	0.5%	ASTM D570
Methane permeability	9.1 mls/m <sup>2</sup> /day	N/A	University of London, QMW College <sup>3</sup>
Permeability <sup>5</sup> (hydraulic conductivity)	K=<1.4 × 10 <sup>-11</sup> cm.s <sup>-1</sup>	K=<1.4 × 10 <sup>-11</sup> cm.s <sup>-1</sup>	ASTM D5084-90

### Footnotes:

- Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
- Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
- Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
- The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 2 in. (50 mm) per minute at 25°F (-4°C).
- Result is lower limit of apparatus. Membrane therefore considered impermeable.

### Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe 300R/160R. All Preprufe 300R/160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions.

Specimen performance and formatted clauses are also available.

NOTE: Use Preprufe Tape to tie-in Procor with Preprufe.

### Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be handled by a minimum of two persons.

[www.graceconstruction.com](http://www.graceconstruction.com)

For technical assistance call toll free at 866-333-3SBM (3726)

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