# 148 WEST STREET

**BROOKLYN, NEW YORK**

# Remedial Action Work Plan

**NYC VCP Project Number 15CVCP168K**
**OER Project Number 15EHAZ541K**

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# LIST OF ACRONYMS

| Acronym | Definition |
|---|---|
| AOC | Area of Concern |
| AS/SVE | Air Sparging/Soil Vapor Extraction |
| BOA | Brownfield Opportunity Area |
| CAMP | Community Air Monitoring Plan |
| C&D | Construction and Demolition |
| CEQR | City Environmental Quality Review |
| CFR | Code of Federal Regulations |
| CHASP | Construction Health and Safety Plan |
| COC | Certificate of Completion |
| CQAP | Construction Quality Assurance Plan |
| CSOP | Contractors Site Operation Plan |
| DCR | Declaration of Covenants and Restrictions |
| ECs/ICs | Engineering Controls and Institutional Controls |
| ELAP | Environmental Laboratory Accreditation Program |
| HASP | Health and Safety Plan |
| HAZWOPER | Hazardous Waste Operations Emergency Response |
| IRM | Interim Remedial Measure |
| MNA | Monitored Natural Attenuation |
| NOC | Notice of Completion |
| NYS DEC | New York State Department of Environmental Conservation |
| NYC DEP | New York City Department of Environmental Protection |
| NYC DOHMH | New York State Department of Health and Mental Hygiene |
| NYC OER | New York City Office of Environmental Remediation |
| NYC VCP | New York City Voluntary Cleanup Program |
| NYCRR | New York Codes Rules and Regulations |
| NYS DEC | New York State Department of Environmental Conservation |
| NYS DEC DER | New York State Department of Environmental Conservation Division of |

| | |
|---|---|
| | Environmental Remediation |
| NYS DOH | New York State Department of Health |
| NYS DOT | New York State Department of Transportation |
| ORC | Oxygen-Release Compound |
| OSHA | United States Occupational Health and Safety Administration |
| PCBs | Polychlorinated Biphenyls |
| PE | Professional Engineer |
| PID | Photo Ionization Detector |
| 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 |
| RD | Remedial Design |
| RI | Remedial Investigation |
| RMZ | Residual Management Zone |
| SCOs | Soil Cleanup Objectives |
| SCG | Standards, Criteria and Guidance |
| SMP | Site Management Plan |
| SPDES | State Pollutant Discharge Elimination System |
| SSDS | Sub-Slab Depressurization System |
| SVOC | Semi-Volatile Organic Compound |
| TAL | Target Analyte List |
| TCL | Target Compound List |
| USGS | United States Geological Survey |
| UST | Underground Storage Tank |
| VCA | Voluntary Cleanup Agreement |
| VOC | Volatile Organic Compound |

# CERTIFICATION

I, Reza Sharif, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the 148 West Street site, site number 15CVCP168K. I certify to the following:

- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Remedial Action Work Plan and are of sufficient detail to enable proper construction.
- 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

_____
PE License Number

_____
Signature

_____
Date

PE Stamp

I, William Silveri, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the 148 West Street site, site number 15CVCP168K. I certify to the following:

- 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.

_____
QEP Name

_____
QEP Signature

_____
Date

# EXECUTIVE SUMMARY

148 West Villa LLC is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a 2,500-square foot site located at 148 West Street in Brooklyn, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

## Site Location and Background

The Site is located at 148 West Street in the Greenpoint section in Brooklyn, New York and is identified as Block 2531 and Lot 3 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,500-square feet and is bounded by vacant lots to the north and to the south, a 3-story residential building to the east, and a construction site across West Street to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant and contains a 3-story residential building with a full basement and rear yard.

## Summary of Redevelopment Plan

The proposed future use of the Site will consist of a 5-story residential building with a basement. The total gross square footage of the proposed building will be approximately 6,715 square feet. The basement will be utilized for accessory to the 1$^{st}$ floor apartment, storage, gas room and elevator service room, and the floors above (1$^{st}$ through 5$^{th}$) will be utilized as residential apartments. There will also be a lobby located on the 1$^{st}$ floor. The existing basement is approximately 950 square feet and it will be expanded to 1,625 square feet. Partial excavation of soils to approximately 9-10 feet below grade surface (bgs) will be required for the expansion of the existing basement. Approximately 315 cubic yards of soil will be generated during the construction. The water table is at 7.5 to 8.5 feet bgs; therefore a local dewatering maybe required during the excavation. Layout of the proposed site development is presented in Figure 3. The current zoning designation is R6A/M1-2. The proposed use is consistent with existing zoning for the property.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

## Summary of Surrounding Property

The Site is located within a primarily mixed use residential and commercial area of Brooklyn, New York. The Site is bounded by two vacant lots to the north and south, a 3-story residential building to the east and West Street to the west.

According to the OER Searchable Property Environmental E-Database (SPEED), there are no sensitive receptors (such as schools, hospitals and day-care facilities) within a 500-foot radius of the Site.

## Summary of Past Site Uses and Areas of Concern

Based upon the review of the Phase I Environmental Site Assessment (ESA) Report prepared by AA Soil & Concrete Testing in May 2015, the Site history was established.

The Site consists of a 2,500 square-foot that is currently developed with a 3-story residential building. Historic Sanborn Maps how the Site as developed with a 3-story dwelling in 1887. This is consistent with the current on Site building.

There is no area of concern identified for this Site.

## Summary of Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a GPR survey;
3. Installed three (3) soil borings across the entire project Site, and collected six (6) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three (3) groundwater monitoring wells throughout the Site to establish groundwater flow and collected three (3) groundwater samples for chemical analysis to evaluate groundwater quality;
5. Installed two (2) soil vapor probes and one (1) sub-slab vapor probe around Site perimeter and collected three (3) samples for chemical analysis.

## Summary of Findings of Remedial Investigation

1. Elevation of the property ranges from 10 to 11 feet.

2. Depth to groundwater ranges from 7.5 to 8.5 feet at the Site.

3. Groundwater flow is generally from east to west beneath the Site.

4. Bedrock was not encountered during the RI.

5. The stratigraphy of the Site, from the surface down, consists of approximately 8 feet of fine grained sand with trace amount of pebbles, underlain by saturated sand.

6. Soil/fill samples collected during the RI were compared to 6NYCRR Part 375-6.8 Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs) and Track 2 Restricted Residential Use SCOs. Soil sampling results showed that there were no detectable pesticides or PCBs in any sample. Only two VOCs, 2-butanone and acetone were detected in the soil samples however none of these VOCs were detected above their respective Unrestricted Use SCOs. It should also be noted that acetone is a common laboratory contaminant. No other VOCs were detected in the soil samples. One (1) Polycyclic Aromatic Hydrocarbon (PAH) SVOC, benzo(a)anthracene (max. of 1.02 ppm) was detected above its Unrestricted Use SCO in one shallow (zero to 2 feet) soil sample. Other PAH SVOCs were detected in the soil samples above their respective method detection limits however none of the SVOCs were detected above their respective Unrestricted Use SCOs. Four (4) metals, including lead (max. of 251 ppm), mercury (max. of 0.95 ppm), selenium (max. of 3.95 ppm), and zinc (max. of 297 ppm) were detected above their respective Unrestricted Use SCOs. Of these metals, mercury also exceeded its respective Restricted Residential Use SCO in one shallow (zero to 2 feet) soil sample.

7. Groundwater samples collected during the RI were compared to NYSDEC 6NYCRR Part 703.5 Groundwater Quality Standards (GQS). No pesticides or PCBs were detected in any of the groundwater samples. One VOC, p-&m-xylenes (7.5 ug/L) was detected in one of the groundwater samples above its respective GQS. No other VOCs were detected above their GQS in groundwater. One SVOC, bis(2-ethylhexyl)phthalate (10.1 ug/L) was detected in one of the groundwater samples above its respective GQS. Several dissolved metals were detected in groundwater samples, however only three (3) of them exceeded

their respective GQS. These dissolved metals included manganese (max. of 3,470 ug/L), selenium (17 ug/L) and sodium (max. of 58,900 ug/L). Overall the results are consistent with concentrations found in groundwater throughout NYC.

8. Soil vapor and sub-slab vapor samples collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Sub-slab vapor and soil vapor results detected elevated levels of petroleum compounds, including BTEX (max. of 3,350 $\mu g/m^3$). Chlorinated VOCs were detected at trace concentrations. Samples did not detect 1,1,1-trichloroethane, carbon tetrachloride, and trichloroethylene (TCE) in any of the sub-slab vapor or soil vapor samples. Tetrachloroethylene (PCE) was detected at a concentration of 19 $\mu g/m^3$ in one of the soil vapor samples. All chlorinated compounds were below the monitoring and mitigation levels established by NYSDOH matrix.

## Summary of the Remedial Action

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 standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance 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 Track 4 Site-specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.

5. Performance of additional site characterization sampling of soil prior to start of construction. This involves installation of one soil boring within the existing building footprint and collection of one shallow soil sample.
6. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
7. Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs. Approximately 25% of the Site will be excavated to a depth of approximately 10 feet below grade to match the depth of the existing cellar for development purposes. A small portion of property will be excavated to the depth of additional 5 feet below grade for elevator pit, and the rear landscaped area will be excavated to a depth of 2 feet bgs. Approximately 315 cubic yards of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.
8. 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.
9. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10. Removal of 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.
11. Transportation and off-Site disposal of all soil/fill material at licensed or 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. Appropriate segregation of excavated media on-Site.
12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
13. Demarcation of residual soil/fill in landscaped areas.
14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.

15. Construction of an engineered composite cover consisting of a 4-inch thick concrete building slab with an 6-inch clean granular sub-base beneath all building areas, and two feet of clean soil in all open space and landscaped areas.
16. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of new sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a 20-mil vapor barrier manufactured by Raven Industries and model Vapor Block Plus 20 below the slab throughout the full building area and outside new sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. The vapor barrier system is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the vapor barrier system was designed and properly installed to mitigate soil vapor migration into the building.
17. Groundwater table is at 7 feet depths and excavation for cellar will extend to 10 feet below grade. Therefore, dewatering is required. Dewatering in compliance with city, state, and federal laws and regulations. Extracted groundwater will either be containerized for off-site licensed or permitted disposal or will be treated under a permit from New York City Department of Environmental Protection (NYCDEP) to meet pretreatment requirements prior to discharge to the sewer system.
18. Since excavation extends below water table, installation of and SSDS is not feasible. If development plans changes, active SSDS will be required.
19. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
20. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
21. 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 Engineering and Institutional Controls to be implemented at the Site.

22. Submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
23. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include 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

The NYC Office of Environmental Remediation (OER) provides governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan ("cleanup plan") describes the findings of prior environmental studies, shows the location of identified 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.

## Project Information:

- Site Name: 148 West Street
- Site Address: 148 West Street, Brooklyn, NY 11222
- NYC Voluntary Cleanup Program Project Number: 15CVCP168K

## Project Contacts:

- OER Project Manager: Sarah Pong, 212-788-8841
- Site Project Manager: Reported to OER prior to start of construction
- Site Safety Officer: Reported to OER prior to start of construction
- Online Document Repository: http://www.nyc.gov/html/oer/html/repository/RBrooklyn.shtml

**Remedial Investigation and Cleanup Plan:** Under the oversight of the NYC OER, a thorough study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and to identify

contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

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

**Qualitative Human Health Exposure Assessment:** An important part of the cleanup planning for the Site is 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 RAWP are in compliance with applicable safety requirements of the United States Occupational Safety and Health Administration (OSHA). This RAWP includes many protective elements including those discussed below.

**Site Safety Coordinator:** This project has a designated Site safety coordinator to implement the CHASP. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is identified at the beginning of this Community Protection Statement.

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

**Community Air Monitoring Plan:** Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. 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 applicable NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager or NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document.

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

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

**Hours of Operation:** The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances

issued by that agency. For this cleanup project, the hours of operation will conform to requirements of the NYC Department of Buildings.

**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 Voluntary Cleanup Program and provides project contact names and numbers, and a link to the document repository 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 or the NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

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

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

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

**Stockpile Management:** Soil stockpiles will be kept covered with tarps to prevent dust, odor 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. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with applicable 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 the 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 the Remedial Action Report) that will be available for public review online. A link to the online document repository and the public library with Internet access nearest the Site are listed on the first page of this Community Protection Statement document

**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 Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined either in the property's deed or established through a city environmental designation registered with the Department of Buildings. 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 Project Background

148 West Villa LLC is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program and in the "E" Designation Program to investigate and remediate a property located at 148 West Street in the Greenpoint section of Brooklyn, New York (the "Site"). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial 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 Background

The Site is located at 148 West Street in the Greenpoint section of Brooklyn, New York and is identified as Block 2531 and Lot 3 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,500-square feet and is bounded by vacant lots to the north and to the south, a 3-story residential building to the east, and a construction site across West Street to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant and contains a 3-story residential building with a full basement and rear yard.

## 1.2 Redevelopment Plan

The proposed future use of the Site will consist of a 5-story residential building with a basement. The total gross square footage of the proposed building will be approximately 6,715 square feet. The basement will be utilized for accessory to the 1$^{st}$ floor apartment, storage, gas room and elevator service room, and the floors above (1$^{st}$ through 5$^{th}$) will be utilized as residential apartments. There will also be a lobby located on the 1$^{st}$ floor. The existing basement is approximately 950 square feet and it will be expanded to 1,625 square feet. Partial excavation of soils to approximately 9-10 feet below grade surface (bgs) will be required for the expansion of

the existing basement. The rear yard will be excavated to a depth of 2 feet bgs. Approximately 315cubic yards of soil will be generated during the construction. The water table is at 7.5 to 8.5 feet bgs; therefore a local dewatering maybe required during the excavation. Layout of the proposed site development is presented in Figure 3. The current zoning designation is R6A/M1-2. The proposed use is consistent with existing zoning for the property.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

## 1.3 Description of Surrounding Property

The Site is located within a primarily mixed use residential and commercial area of Brooklyn, New York. The Site is bounded by two vacant lots to the north and south, a 3-story residential building to the east and a construction site across West Street to the west.

According to the OER Searchable Property Environmental E-Database (SPEED), there are no sensitive receptors (such as schools, hospitals and day-care facilities) within a 500-foot radius of the Site.

Figure 2 shows the surrounding land usage.

## 1.4 Summary of Past Site Uses and Areas of Concern

Based upon the review of the Phase I Environmental Site Assessment (ESA) Report prepared by AA Soil & Concrete Testing in May 2015, the Site history was established.

The Site consists of a 2,500 square-foot lot that is currently developed with a 3-story residential building. Historic Sanborn Maps show the Site as developed with a 3-story dwelling in 1887. This is consistent with the current on Site building.

There is no area of concern identified for this Site.

## 1.5 Summary of Work Performed under the Remedial Investigation

The scope of work implemented in June of 2015 by Athenica included:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a GPR survey;
3. Installed three (3) soil borings across the entire project Site, and collected six (6) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three (3) groundwater monitoring wells throughout the Site to establish groundwater flow and collected three (3) groundwater samples for chemical analysis to evaluate groundwater quality;
5. Installed two (2) soil vapor probes and one (1) sub-slab vapor probe around Site perimeter and collected three (3) samples for chemical analysis.

## 1.6 Summary of Findings of Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called "Remedial Investigation Report, 148 West Street", dated June 2015 (RIR).

1. Elevation of the property ranges from 10 to 11 feet.
2. Depth to groundwater ranges from 7.5 to 8.5 feet at the Site.
3. Groundwater flow is generally from east to west beneath the Site.
4. Bedrock was not encountered during the RI.
5. The stratigraphy of the Site, from the surface down, consists of approximately 8 feet of fine grained sand with trace amount of pebbles, underlain by saturated sand.
6. Soil/fill samples collected during the RI were compared to 6NYCRR Part 375-6.8 Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs) and Track 2 Restricted Residential Use SCOs. Soil sampling results showed no detectable concentration of pesticides or PCBs in any sample. Only two VOCs, 2-butanone and acetone were detected in the soil samples however none of these VOCs were detected above their respective Unrestricted Use SCOs. It should also be noted that acetone is a common laboratory contaminant. No other VOCs were detected in the soil samples. One (1) Polycyclic Aromatic Hydrocarbon

(PAH) SVOC, benzo(a)anthracene (max. of 1.02 ppm) was detected above its Unrestricted Use SCO in one shallow (zero to 2 feet) soil sample. Other PAH SVOCs were detected in the soil samples above their respective method detection limits however none of the SVOCs were detected above their respective Unrestricted Use SCOs. Four (4) metals, including lead (max. of 251 ppm), mercury (max. of 0.95 ppm), selenium (max. of 3.95 ppm), and zinc (max. of 297 ppm) were detected above their respective Unrestricted Use SCOs. Of these metals, only mercury exceeded its respective Restricted Residential Use SCO in one shallow (zero to 2 feet) soil sample.

7. Groundwater samples collected during the RI were compared to NYSDEC 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). No pesticides or PCBs were detected in any of the groundwater samples. One VOC, p-&m-xylenes (7.5 ug/L) was detected in one of the groundwater samples above its respective GQS. No other VOCs were detected above their GQS in groundwater. One SVOC, bis(2-ethylhexyl)phthalate (max. of 10.1 ug/L) was detected in one of the groundwater samples above its respective GQS. Several dissolved metals were detected in groundwater samples, however only three (3) of them exceeded their respective GQS. These dissolved metals included manganese (max. of 3,470 ug/L), selenium (17 ug/L) and sodium (max. of 58,900 ug/L). Overall the results are consistent with concentrations found in groundwater throughout NYC.

8. Soil vapor and sub-slab vapor samples collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Sub-slab vapor and soil vapor results detected elevated levels of petroleum compounds, including BTEX (max. of 3,350 $\mu g/m^3$). Chlorinated VOCs were detected at trace concentrations. Samples did not detect 1,1,1-trichloroethane, carbon tetrachloride, and trichloroethylene (TCE) in any of the sub-slab vapor or soil vapor samples. Tetrachloroethylene (PCE) was detected at a concentration of 19 $\mu g/m^3$ in one of the soil vapor samples. All chlorinated compounds were below the monitoring and mitigation levels established by NYSDOH matrix.

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:

**Soil**

- Prevent direct contact with contaminated soil.

**Groundwater**

- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

**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 standards, criteria and guidance values (SCGs). Remedial alternatives are then developed and evaluated based on the following ten criteria:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community acceptance;
- Land use; and
- Sustainability.

As required, a Track 1 Unrestricted Use scenario is evaluated for the remedial action. 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 Remedial Investigation, it is expected that this alternative would be achieved by excavating the entire Site to a depth of approximately to 8 feet below grade to remove all historic fill. 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 would be performed to ensure complete removal of soil/ fill that does not meet Track 1 Unrestricted Use SCOs; and

- No Engineering or Institutional Controls are required for a Track 1 cleanup. As part of development, a vapor barrier would be installed to prevent potential exposures from soil vapor in the future.

**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 end point sampling. Based on the results of the Remedial Investigation, it is expected that SCOs would be achieved by excavating the top 2 feet of the Site. As part of development for expansion of the new building's cellar level, soils to a depth of approximately 10 feet to the east of the existing cellar will be removed as well as the top 2 feet of the rear landscaped area. 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 composite cover system over the entire Site to prevent exposure to remaining soil/fill;
- Installation of a waterproofing/vapor barrier system beneath the building slab and along new foundation side walls to prevent potential exposures from soil vapor;
- Under the current development plans, installation of a SSDS is not feasible due to the shallow groundwater table and therefore will not be installed as part of construction;
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of restricted 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 Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls 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 Buildings Department.

## 3.1 Threshold Criteria

### Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of Engineering Controls or Institutional Controls. 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 all soil/fill exceeding Track 1 Unrestricted Use SCO's and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contaminants leaching into groundwater.

Alternative 2 would achieve comparable protections of human health and the environment by excavation and removal of most of the historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCO's, as well as by placement of Institutional and Engineering Controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing Institutional Controls including a Site Management Plan and continuing the E-designation would ensure that the composite cover system remains intact and protective of public health. Establishment of Track 4 Site-Specific SCO's 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 Construction Health and Safety Plan, an approved Soil/Materials Management Plan, and Community Air Monitoring Plan (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 vapor barrier below the building slab and outside foundations walls below grade.

## 3.2 Balancing Criteria

### Compliance with Standards, Criteria and Guidance (SCGs)

This evaluation criterion assesses the ability of the alternative to achieve applicable standards, criteria and guidance.

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 SCO's and Protection of Groundwater SCO's. 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 outside of new subgrade foundation walls, as part of development.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCG's and RAOs for soil through removal of soil to meet Track 4 Site-Specific SCO's. Compliance with SCG's 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 outside of new subgrade foundation walls. A Site Management Plan would ensure that these controls remained protective for the long term.

Health and safety measures contained in the CHASP and Community Air Monitoring Plan (CAMP) will 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 short term effects during the remedial action on public health and the environment during implementation of the remedial action, including protection of the community, protection of onsite workers and environmental impacts.

Both Alternative 1 and 2 have similar short-term effectiveness during their implementation, 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 could potentially be higher for Alternative 1 since excavation of greater amounts of historical fill material would take place. However, focused attention to means and methods during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize 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. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flag persons will be used to protect pedestrians at Site entrances and exits.

The potential adverse impact to the community, workers and the environment for both alternatives would be minimized through implementation of control plans including a Construction Health and Safety Plan, a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), 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 Construction Health and Safety Plan (CHASP) would provide protection from on-Site contaminants by using personal protective equipment 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 Engineering Controls/Institutional Controls (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 SCO's. Removal of on-Site contaminant sources will also prevent future groundwater contamination.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs; installing a composite cover system across the Site; maintaining use restrictions; establishing an SMP to ensure long-term management of ICs and ECs; and maintaining registration as an E-designated property to memorialize these controls for the long term. 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 continue to provide the required level of protection.

## 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 soil in excess of Track 1 Unrestricted Use SCO's.

Alternative 2 would remove most of the historic fill at the Site, and all remaining on-Site soil/fill beneath the new building will meet Track 4 Site-Specific SCO's.

Alternative 1 would remove a greater total mass of contaminants from the Site. The partial removal of soil to 10 feet for the new development in both scenarios would lessen the difference in contaminant mass removal between these two alternatives.

## 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 Alternatives 1 and 2 are readily available and have been proven to be effective in remediating the contaminants present on the Site. They use standard equipment and technologies that are well established in the industry. 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, and disposal costs, engineering expenses) and site

management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Since historic fill at the Site was found to extend to a depth of up to 1 foot below grade during the RI, and the new building requires excavation of 25% of the Site to a depth of 10 feet and the rear landscaped areas to a depth of 2 feet bgs, the costs associated with both Alternative 1 and Alternative 2 will likely be comparable. However with Alternative 1, soils in the eastern portion of the Site will also have to be excavated to at least 8 feet bgs therefore costs associated with Alternative 1 would be higher than Alternative 2. Additional costs would include installation of additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on implementation of a Site Management Plan as part of Alternative 2.
The remedial plan would couple the remedial action with the redevelopment of the Site, lowering total costs. The remedial plan will also consider the selection of the most appropriate disposal facilities to reduce transportation and disposal costs during cleanup and redevelopment of the Site.

## 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.

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 2. Observations here will be supplemented by public comment received on the RAWP. Under both alternatives, the overall goals of the remedial program, to protect public health and the environment and eliminate potential contaminant exposures, have been broadly supported by citizens in NYC communities.

## 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 Institutional Controls 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 future use of the Site includes a 5-story residential building with a full cellar. The new maximum height of the new building will be 70 feet. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 4 Site-Specific SCOs, both of which are protective of public health and the environment for its planned residential use. The proposed use is compliant with the property's zoning and is consistent with recent development patterns. The areas surrounding the site consists of predominantly mixed residential and commercial buildings in zoning districts designated for commercial and residential uses. The development would remediate a vacant building and provide a modern residential building. The proposed development would clean up the property and make it safer, create new employment opportunities, and other economic benefits from land revitalization.

Temporary short-term project impacts are being mitigated through site management controls and truck traffic controls during remediation activities. Following remediation, the Site will meet either Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs, both of which are protective of public health and the environmental for its planned use.

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, wildlife refuges, wetlands, or critical habitats of endangered or threatened species. The Site is located in an urban area and not in proximity to fish or wildlife and neither alternative would result in any potential exposure pathways of contaminant migration affecting fish or wildlife. The remedial action is also protective of groundwater natural resources. The Site lies 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 considered in this plan are consistent with the City's goals for cleanup of contaminated land.

## 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 for either alternative 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 New York City Clean Soil Bank program is available for reuse of any clean native soils under either alternative. A complete list of green remedial activities considered as part of the NYC VCP is included in a Sustainability Statement.

# 4.0 Remedial Action

## 4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is Alternative 2, the Track 4 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action 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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance 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 Track 4 Site-specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Performance of additional site characterization sampling of soil prior to start of construction. This involves installation of one soil boring within the existing building footprint and collection of one shallow soil sample.
6. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
7. Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs. Approximately 25% of the Site will be excavated to a depth of approximately 10 feet below grade to match the depth of the existing cellar for development purposes. A small portion of property will be excavated to the depth of additional 5 feet below grade for elevator pit, and the rear landscaped area will be excavated to a depth of 2

feet bgs. Approximately 315 cubic yards of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.

8. 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.
9. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10. Removal of 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.
11. Transportation and off-Site disposal of all soil/fill material at licensed or 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. Appropriate segregation of excavated media on-Site.
12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
13. Demarcation of residual soil/fill in landscaped areas.
14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
15. Construction of an engineered composite cover consisting of a 4-inch thick concrete building slab with an 6-inch clean granular sub-base beneath all building areas, and two feet of clean soil in all open space and landscaped areas.
16. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of new sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a 20-mil vapor barrier manufactured by Raven Industries and model Vapor Block Plus 20 below the slab throughout the full building area and outside new sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. The vapor barrier system is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that

the vapor barrier system was designed and properly installed to mitigate soil vapor migration into the building.

17. Groundwater table is at 7 feet depths and excavation for cellar will extend to 10 feet below grade. Therefore, dewatering is required. Dewatering in compliance with city, state, and federal laws and regulations. Extracted groundwater will either be containerized for off-site licensed or permitted disposal or will be treated under a permit from New York City Department of Environmental Protection (NYCDEP) to meet pretreatment requirements prior to discharge to the sewer system.
18. Since excavation extends below water table, installation of and SSDS is not feasible. If development plans changes, active SSDS will be required.
19. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
20. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
21. 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 Engineering and Institutional Controls to be implemented at the Site.
22. Submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
23. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

## 4.2 Soil Cleanup Objectives and Soil/ Fill Management

The following Track 4 Site-Specific SCO's will be utilized for this project:

| Contaminant | Site-Specific SCO's |
|---|---|
| Total SVOCs | 100 ppm |
| Lead | 800 ppm |
| Mercury | 1.5 ppm |

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix 4. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

### Soil/Fill Excavation and Removal

For extension of the existing on-Site cellar, excavation will occur over an approximately 675 square foot area to a depth of approximately 10 feet bgs. The rear landscaped area will also be excavated 2 feet bgs. The location of planned excavations is shown in Figure 4. The total quantity of soil/fill expected to be excavated and disposed off-Site is 470-475 tons. For each disposal facility to be used in the remedial action, a letter from the developer/QEP to the receiving facility requesting approval for disposal and a letter back to the developer/QEP providing approval for disposal will be submitted to OER prior to any transport and disposal of soil at a facility.

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

### End-point Sampling

End-point samples will be analyzed for compounds and elements as described below utilizing the following methodology:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;

- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs performing end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. Proposed end-point sampling locations are shown in Figure 5.

## Confirmation End-point Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Three (3) confirmation samples will be collected from the base of the excavation at locations to be determined by OER. To evaluate attainment of Track 4 Site-specific SCOs, analytes will include those for which SCOs have been developed, including SVOCs and TAL Metals according to analytical methods described above. If Track 1 Unrestricted Use SCOs are pursued, samples will be analyzed for VOCs, SVOCs, pesticides, PCBs and metals according to analytical methods described above.

## Hotspot End-point Sampling

For any hotspots identified during this remedial program, including any hotspots identified during the remedial action, hotspot removal actions will be performed to ensure that hotspots are fully removed and end-point samples will be collected at the following frequency:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
    - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
    - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.

3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

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.

If either LNAPL and/or 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

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol.
The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

One blind duplicate sample for every 20 samples collected will be submitted to the approved laboratory for analysis of the same parameters. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. One trip blank will be submitted to the laboratory with each shipment of soil samples. Trip blanks will not be used for samples to be analyzed for metals, SVOCs or pesticides.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or “cold-paks” to maintain a temperature of 4oC.

Dedicated disposable sampling materials will be used for the collection endpoint samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected. Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash with alconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Field blanks will be prepared by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

## Import of Soils

Import of soils onto the property will be performed in conformance with the Soil/Materials Management Plan in Appendix4. Imported soil will meet the lower of:

- Track 2 Restricted Residential Use SCO’s, and
- Groundwater Protection Standards in Part 375-6.8.

The estimated quantity of soil to be imported into the Site for backfill and cover soil is 70 tons. A map of soil backfill placement locations is shown in Figure 6.

## Reuse of Onsite Soils

Soil reuse is not planned on this project.

## 4.3 Engineering Controls

The excavation required for the proposed Site development will achieve Site Specific Track 4 SCOs. Engineering Controls will be employed in the remedial action to address residual contamination remaining at the site. The Site has two (2) primary Engineering Control Systems. These are:

(1) Composite Cover System
(2) Soil Vapor Barrier 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 will be comprised of consisting of a 4-inch thick concrete building slab with an 6-inch clean granular sub-base beneath all building areas, and 2 feet of clean soil in all open space and landscaped areas.

Figure 6 shows the typical design for each remedial cover type used on this Site. Figure 6 also shows the location of each cover type built at the Site.

The composite cover system will be a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan 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 Site Management Plan in the Remedial Action Report.

### Vapor Barrier System

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will consist of a 20-mil vapor barrier manufactured by Raven Industries, Inc. model number Vapor Block Plus 20. Penetrations will be grouted if the penetration is not stable, and the membrane will be fitted tight to the penetration. Vertical and horizontal overlaps will be 3 inches. Where applicable, overlap of

horizontal and vertical membranes at corners will be 4 inches. Mechanical fastening of overlaps will be in accordance with the manufacturer installation diagram and specifications. The vapor barrier will extend throughout the area occupied by the footprint of the new building and up the new foundation sidewalls and will be installed in accordance with manufacturer specifications. A cross-section showing the location of the proposed vapor barrier system is provided in Figure 7. Typical design sections for the vapor barrier on slab and sidewalls are provided in Figure 7. Product specification sheets are provided in Appendix 6.

The Remedial Action Report will include a PE-certified letter (on company letterhead) from the primary contractor responsible for installation oversight and field inspections and a copy of the manufacturer's certificate of warranty.

The Vapor Barrier System is a permanent engineering control and will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying vapor barrier system is disturbed after the remedial action is complete. Maintenance of these systems will be described in the Site Management Plan in the Remedial Action Report.

## 4.4 Institutional Controls

A series of Institutional Controls (IC's) are required under this Remedial Action to assure permanent protection of public health by elimination of exposure to residual materials. These IC's define the program to operate, maintain, inspect and certify the performance of Engineering Controls and Institutional Controls on this property. Institutional Controls would be implemented in accordance with a Site Management Plan included in the final Remedial Action Report (RAR). Institutional Controls would be:

- Continued registration of the E-Designation for the property. 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, inspection, and certification of ECs and IC's. 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 determine by OER in the SMP and will comply with RCNY §43-1407(l)(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;
- The Site will be used for residential 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 Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan 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 Site Management Plan are implemented.

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

Site management activities and EC/IC certification will be scheduled by OER on a periodic basis to be established in the RAR and the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by July 30 of the year following the reporting period.

## 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.

Data and information reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA) for this project. 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 under current and future conditions 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 Contaminant Sources

No historic fill was identified during the remedial investigation. Based on the results of the RIR, the contaminants of concern are:

Soil:

- SVOC (PAHs) benz(a)anthracene exceeding Restricted Residential Use SCOs.

- Metals including lead, mercury, selenium and zinc were identified but only mercury exceeded Restricted Residential Use SCOs.

Groundwater:

- VOC, p-&m-xylenes exceeding its GQS
- SVOC bis(2-ethylhexyl)phthalate exceeding its GQS
- Three dissolved metals including: manganese, selenium and sodium exceeding GQS

Soil Vapor:

- Elevated levels of petroleum-related hydrocarbons including BTEX compounds in sub-slab and soil vapor samples
- Low level PCE detected in one sample below NYS DOH Soil Vapor Matrix

## Nature, Extent, Fate and Transport of Contaminants

There were no detectable pesticides or PCBs in any soil or groundwater samples. VOCs were detected below Unrestricted Use SCOs. One Polycyclic Aromatic Hydrocarbon (PAH) SVOC, benzo(a)anthracene, was detected in one shallow (zero to 2 feet) soil sample above Restricted Residnetial Use SCO. Four (4) metals, including lead, mercury, selenium and zinc (max. of 297 ppm) were detected above their respective Unrestricted Use SCOs in shallow (zero to 2 feet) samples. Of these metals, mercury also exceeded its respective Restricted Residential Use SCO in one shallow (zero to 2 feet) soil sample. Zinc was detected above its Unrestricted Use SCOs in two deep (6 to 8 feet) samples. One VOC, p-&m-xylenes was detected in one of the groundwater samples above its respective GQS. No other VOCs were detected above their GQS. One SVOC, bis(2-ethylhexyl)phthalate was detected in one of the groundwater samples above its respective GQS. Three dissolved metals exceeded their respective GQS. These dissolved metals included manganese, selenium and sodium. Metals detected in soils were not detected in dissolved water. Soil vapor samples exhibited elevated levels of BTEX compounds.

## Receptor Populations

On-Site Receptors: The site is currently vacant and access to the Site is restricted by a locked door. Onsite receptors are limited to trespassers, site representatives and visitors granted access to the property. During construction, potential on-site receptors include construction workers,

site representatives, and visitors. Under proposed future conditions, potential on-site receptors include adult and child building residents, workers and visitors.

Off-Site Receptors: Potential off-site receptors within a 500 foot radius of the Site include adult and child residents; commercial and construction workers; pedestrians; and trespassers based on the following land uses within 500 feet of the Site:

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

## Potential Routes of Exposure

Three potential primary routes exist by which chemicals can enter the body: ingestion, inhalation, and dermal absorption. Exposure can occur based on the following potential media:

- Ingestion of groundwater or fill/ soil;
- Inhalation of vapors or particulates; and
- Dermal absorption of groundwater or fill/ soil.

## Potential Exposure Points

*Current Conditions*: The site is currently capped with concrete except for the backyard. The only potential exposure pathway for ingestion, inhalation, or dermal absorption of soil/ fill is through the backyard. Groundwater is not exposed at the site. The site is served by the public water supply and groundwater is not used at the site for potable supply and there is no potential for exposure. Because the site is currently developed with a building and backyard, there is potential for exposure to soil vapor and potential for soil vapor to accumulate on site.

*Construction/ Remediation Conditions*: During the remedial action, onsite workers will come into direct contact with surface and subsurface soils as a result of on-Site construction and excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with exposed impacted soil and fill. Similarly, off-Site receptors could be

exposed to dust and vapors from on-Site activities. Due to the depth of groundwater, direct contact with groundwater is expected. During construction, on-Site and 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 Community Air-Monitoring Program and a Construction Health and Safety Plan.

*Proposed Future Conditions*: Under future remediated conditions, all soils in excess of Track 4 SCOs will be removed. The site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and engineering controls (vapor barrier) will prevent any potential exposure due to inhalation by preventing soil vapor intrusion. The site is served by the public water supply, and groundwater is not used at the site. There are no plausible off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

## Overall Human Health Exposure Assessment

There are potential complete exposure pathways for the current site condition. There are potential complete exposure pathways that require mitigation during implementation of the remedy. There are no complete exposure pathways under future conditions after the site is developed. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure, site-wide surface cover, and a subsurface vapor barrier system for the building. Under current conditions, on-Site exposure pathways exist for those with access to the Site and trespassers. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Soil/Materials Management Plan, and a Construction Health and Safety Plan. Potential post-construction use of groundwater is not considered an option because groundwater in this area of New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened.

| **Environmental Media & Exposure Route** | **Human Exposure Assessment for Proposed Remedial Action** |
|---|---|

| | |
|---|---|
| Direct contact with surface and subsurface soils | • There is no direct contact with soil because the site will be completely covered with an engineered composite cover. Future contact with soil will be prevented by the implementation of a Site Management Plan and Soil and Materials Management Plan for any future ground intrusive work |
| Ingestion of groundwater | • The area is served by an upstate water supply and groundwater is not being used for potable water supply. Groundwater use for potable supply onsite is prohibited by municipal law. |
| Direct contact with groundwater | • There is no direct contact with groundwater because the site will be completely covered with an engineered composite cover. Future contact with groundwater will be prevented by the implementation of a Site Management Plan and Soil and Materials Management Plan for any future ground intrusive work |
| Direct contact with soil vapor | • Contact with impacted soil vapor will be prevented by a soil vapor barrier |

# 5.0 Remedial Action Management

## 5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Ezgi Karayel (Project Manager). The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Reza Sharif, P.E, and William Silveri, respectively.

## 5.2 Site Security

Site access will be controlled by DOB approved construction fence. For work areas of limited size, barrier tape will be sufficient to delineate and restrict access.

## 5.3 Work Hours

The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. The hours of operation will be conveyed to OER during the pre-construction meeting.

## 5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix 5. The Site Safety Coordinator will be reported to OER once determined. 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 HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, such as 40-hour hazardous waste operator 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 HASP and will comply with all requirements of 29 CFR 1910.120. 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 location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; 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 volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

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

### VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work.

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

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be 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 (mcg/m3) 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 mcg/m3 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 mcg/m3 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 mcg/m3 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 incompliance with applicable laws and regulations including NYC Building Code to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Mark-Out Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

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

## Dewatering

Dewatering is anticipated during remediation and construction.
Dewatering will be performed in order to excavate soil and fill material below the water table (expected to be eight to ten feet below grade). Dewatering for this site will be determined at a later time and OER will be notified once the system is designed. All required permits will be obtained from NYCDEP prior to any discharge of groundwater into the sewer system.

## 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 pads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

## Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and clean 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 excavated areas, 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;  stormwater 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 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. Stormwater 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 offsite areas may require characterization based on site conditions, at the discretion of OER. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYS DEC’s spill hotline at DEC 800-457-7362 within statutory defined timelines. 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 site inspection. An inspection report established by OER is available on OER's website (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, 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 onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; 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 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 along West Street, onto India Street to McGuiness Boulevard and onto I-278 W.

## 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 business day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of excavation and other remedial 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 results noting all excursions. CAMP data may be reported;
- 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 Remedial Action Report.

### 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, and approved by, the OER Project Manager and will be documented in daily reports and reported in the Remedial Action Report. 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 with basis that the remedial action with the deviation(s) is protective of public health and the environment.

# 6.0 Remedial Action Report

A Remedial Action Report (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;
- Text description with thorough detail of all engineering and institutional controls (if Track 1 remedial action is not achieved)
- As-built drawings for all constructed remedial elements;
- Manifests for al soil or fill disposal;
- Photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 remedial action 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 (including all soil test results from the remedial investigation for soil that will remain on site) and all soil/fill waste characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all soil or fill material removed from the Site including a map showing the location of these excavations and hotspots, tanks or other contaminant source areas;
- Full accounting 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;
- Continue registration of the property with an E-Designation by the NYC Department of Buildings (if Track 1 remedial action is not achieved);
- The RAWP and Remedial Investigation Report will be included as appendices to the RAR;
- Reports and supporting material will be submitted in digital form and final PDF’s will include bookmarks for each appendix.

## Remedial Action Report Certification

I, [name], am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the 148 West Street site, site number 15CVCP168K. I certify to the following:

- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.
- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The OER-approved Remedial Action Work Plan dated [date] and Stipulations in a letter dated [date] 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.

Name

PE License Number

Signature

Date

PE Stamp

I, [name], am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the 148 West Street\ site, site number 15CVCP168K. I certify to the following:

- The OER-approved Remedial Action Work Plan dated August 15, 2012 and Stipulations in a letter dated September 10, 2014 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.

QEP Name

QEP Signature

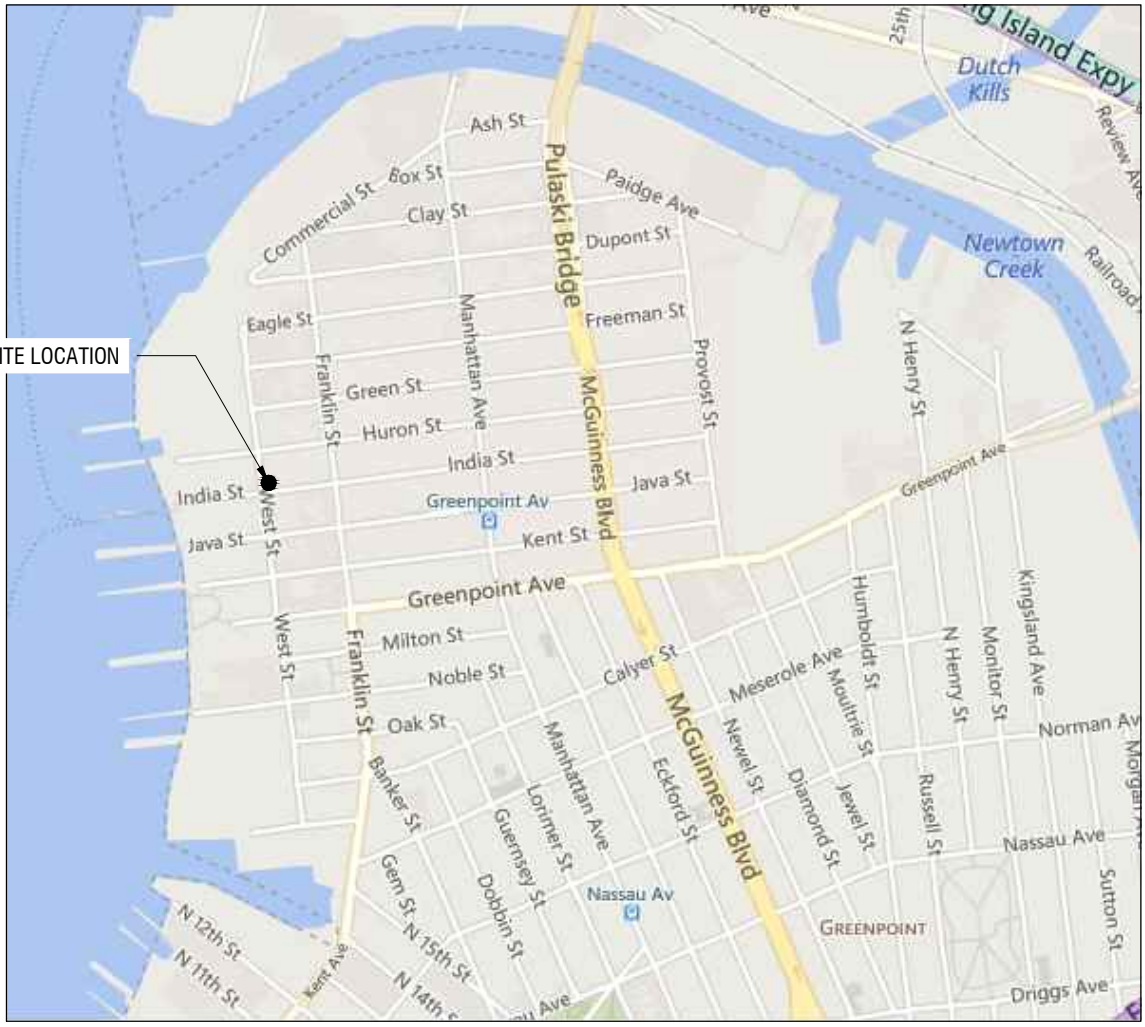
Date

## 7.0 Schedule

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 3 month remediation period is anticipated.

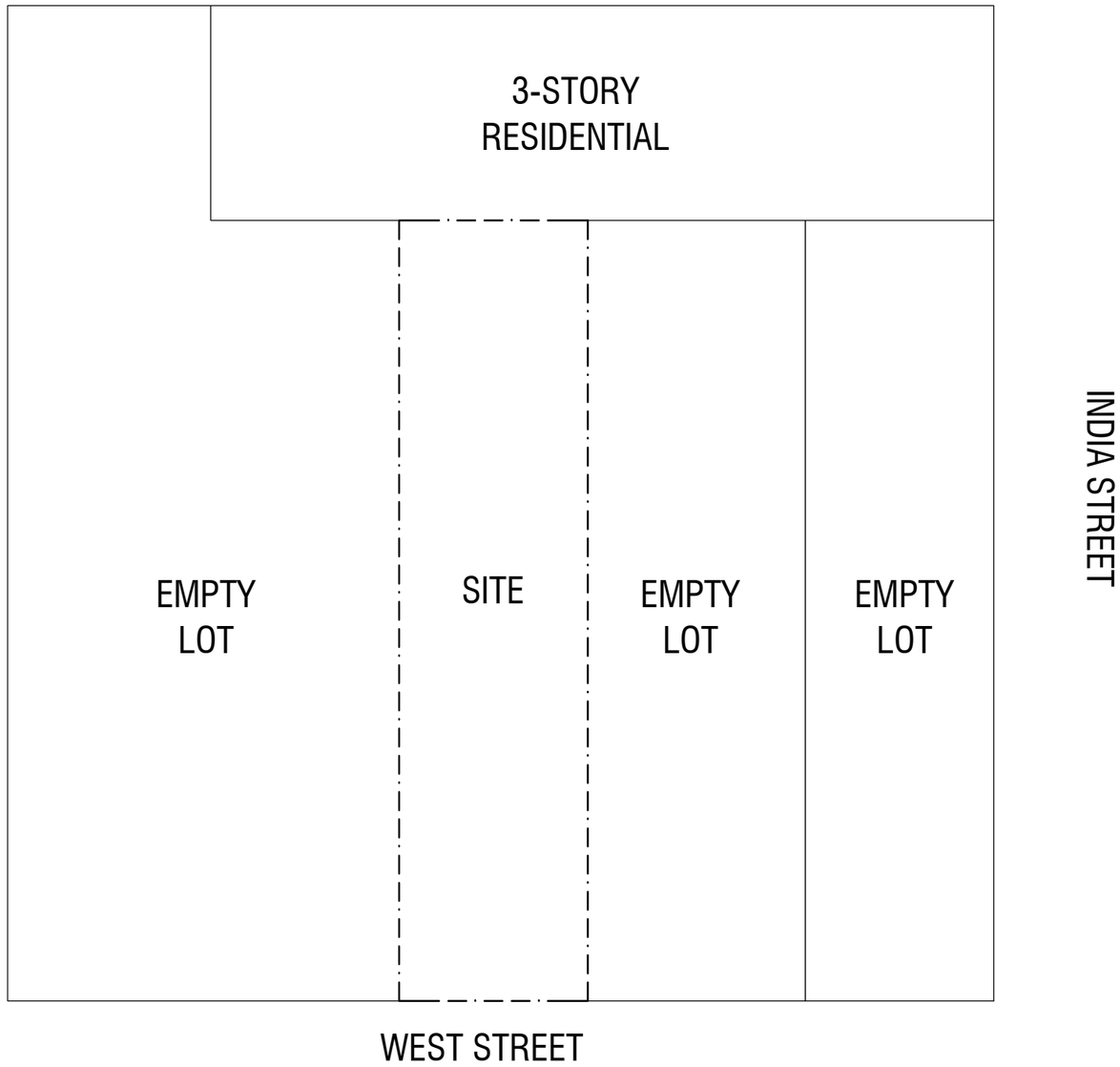
| **Schedule Milestone** | **Weeks from Remedial Action Start** | **Duration (weeks)** |
|---|---|---|
| OER Approval of RAWP | 0 | - |
| Fact Sheet 2 announcing start of remedy | 0 | - |
| Mobilization | 1 | 1 |
| Remedial Excavation | 1 | 2 |
| Demobilization | 1 | 3 |
| Submit Remedial Action Report | 3 | 6 |

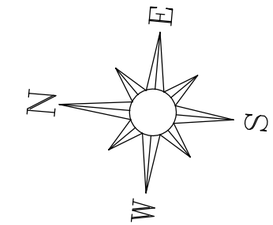
# FIGURES




Scale: 1000 ft

| | | |
|---|---|---|
| ATHENICA ENVIRONMENTAL SERVICES, INC. Environmental Consultants | Drawn by: ANASTASIA KAKOURI | Site Plan: 148 WEST STREET, BROOKLYN, NEW YORK 11222 |
| | Checked by: ETHAN RAINEY | |
| | Drawing Scale: AS NOTED | |
| | Project No: 15-133-0578 | Figure: FIGURE 1 |
| | Date: JUNE 26, 2015 | Title: REMEDIAL ACTION WORK PLAN SITE LOCATION MAP |




Legend:

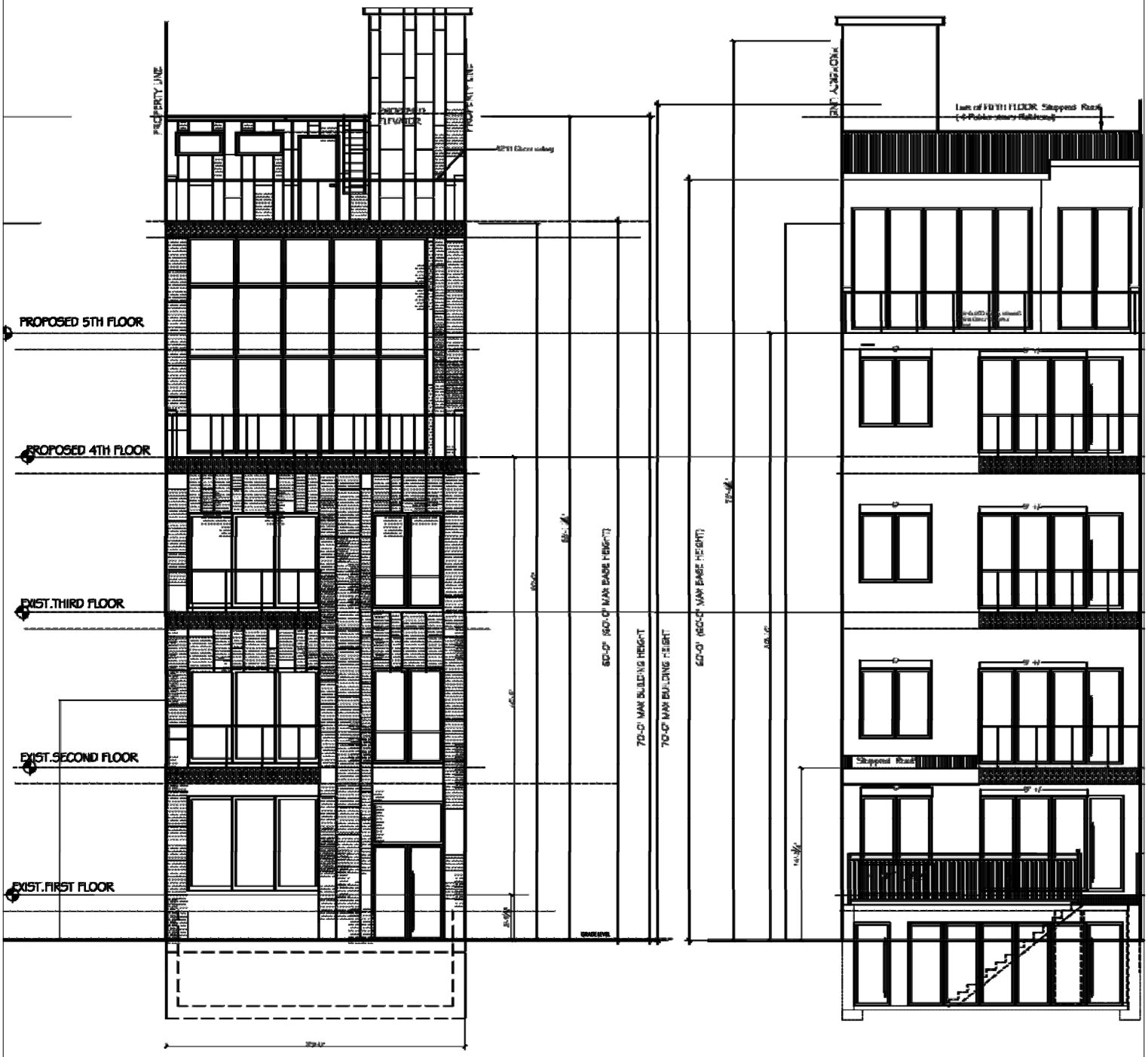
— — · — SITE BOUNDARY

Scale:

Not to Scale

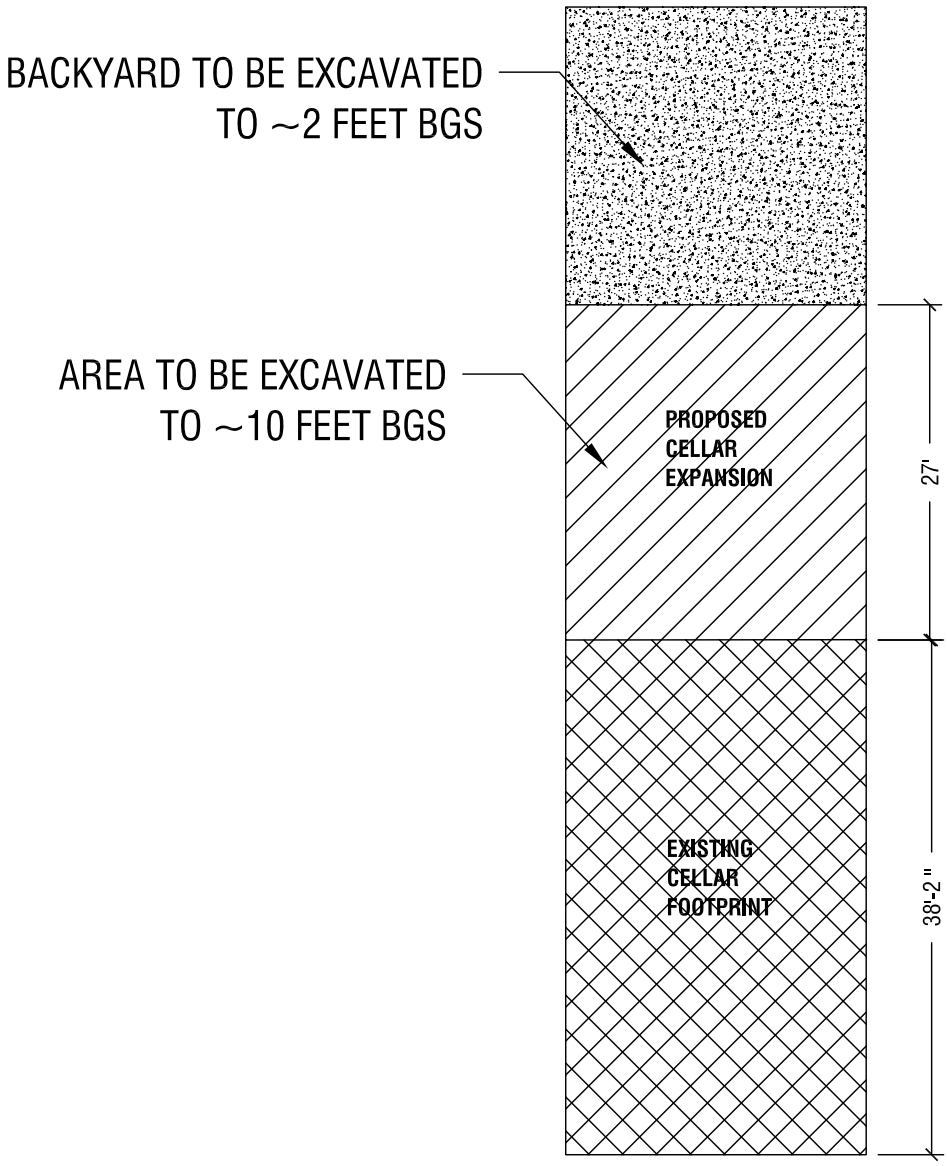
ATHENICA
ENVIRONMENTAL
SERVICES, INC,
Environmental Consultants

| | |
|---|---|
| Site map: | 148 WEST STREET, BROOKLYN NY 11222 |
| Figure:<br>Title: | 2<br>REMEDIAL ACTION WORK PLAN<br>SITE BOUNDARY MAP |
| Date: | JUNE 23, 2015 |
| Drawn by: | ANASTASIA KAKOURI |
| Checked by: | ETHAN RAINEY |
| Drawing Scale: | N.T.S. |
| Project No.: | 15-133-0578 |




ATHENICA ENVIRONMENTAL SERVICES, INC,
Environmental Consultants

| | |
|---|---|
| Site map: | 148 WEST STREET, BROOKLYN, NY 11222 |
| Figure: | 3 |
| Title: | PROPOSED REDEVELOPMENT PLAN |
| Date: | JUNE 29, 2015 |
| Drawn by: | ANASTASIA KAKOURI |
| Checked by: | MICHAEL MANDAC |
| Drawing Scale: | N.T.S. |
| Project No.: | 15-133-0578 |




Legend:

- Proposed rear yard to be excavated 2 feet below grade surface
- Existing building/cellar footprint
- Proposed cellar expansion to be excavated 10 feet below grade surface

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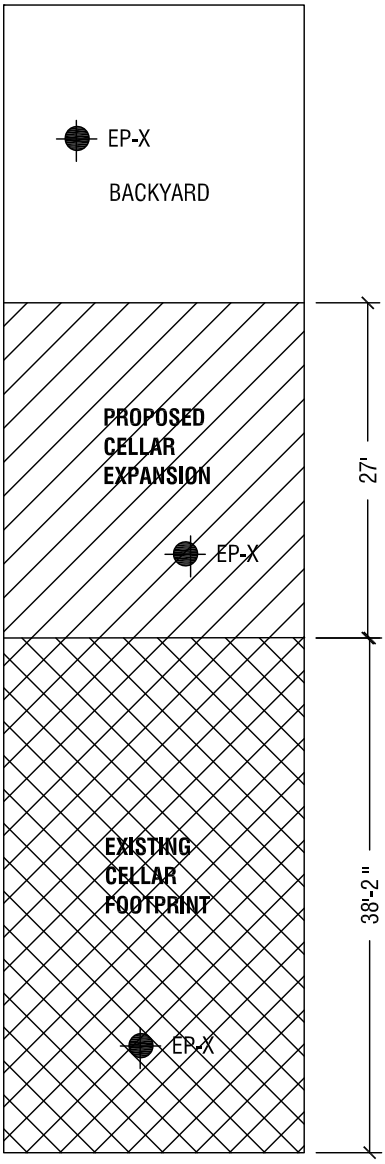
ENVIRONMENTAL
SERVICES, INC,
Environmental Consultants

| | |
|---|---|
| Site map: | 148 WEST STREET<br>BROOKLYN, NY 11222 |
| Figure:<br>Title: | 4<br>PROPOSED EXCAVATION PLAN |
| Date: | JUNE 26, 2015 |
| Drawn by: | ANASTASIA KAKOURI |
| Checked by: | ETHAN RAINEY |
| Drawing Scale: | N.T.S |
| Project No.: | 15-133-0578 |




Legend:

EP-X Proposed end-point sampling location

Existing building/cellar footprint

Proposed cellar expansion

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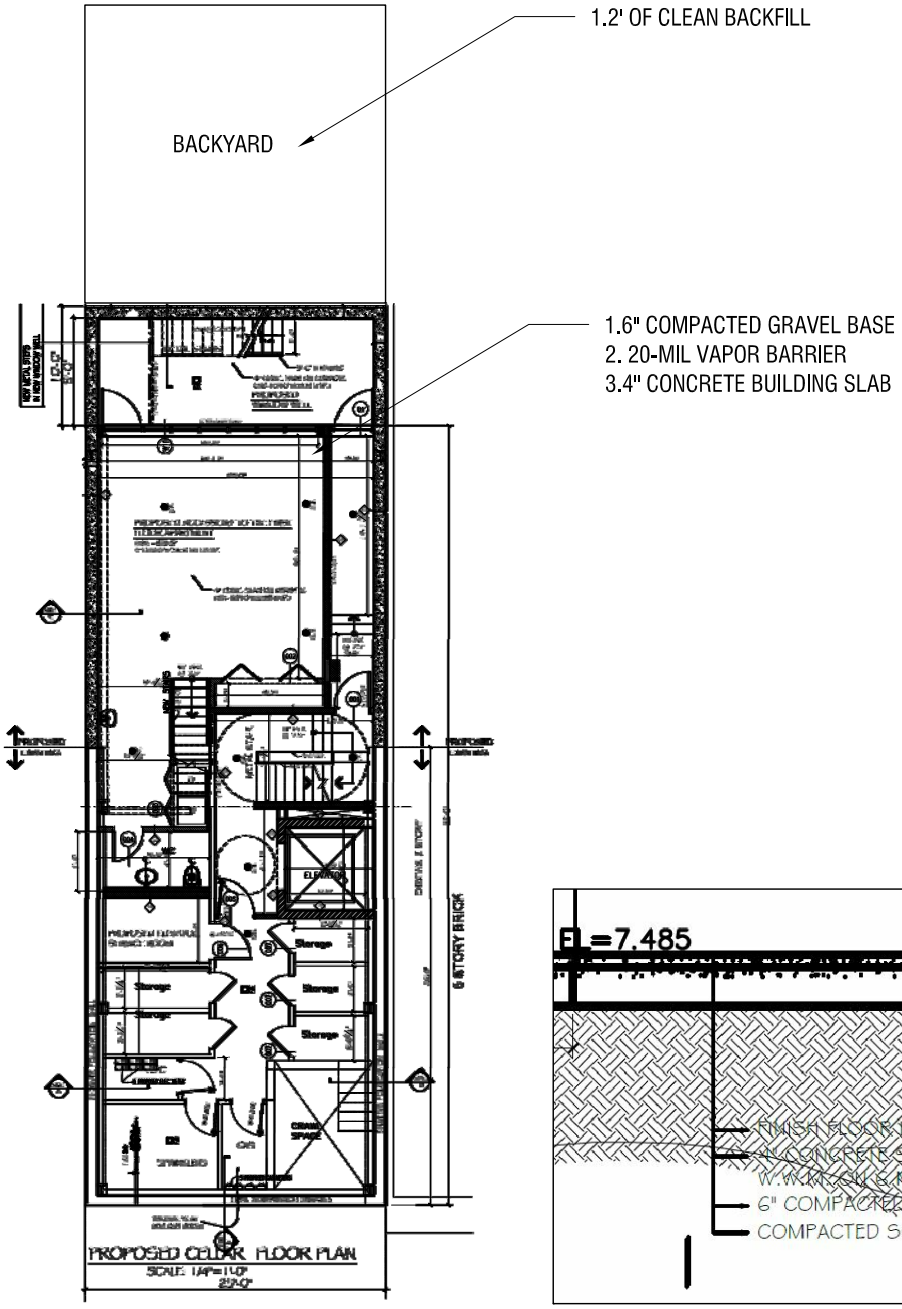
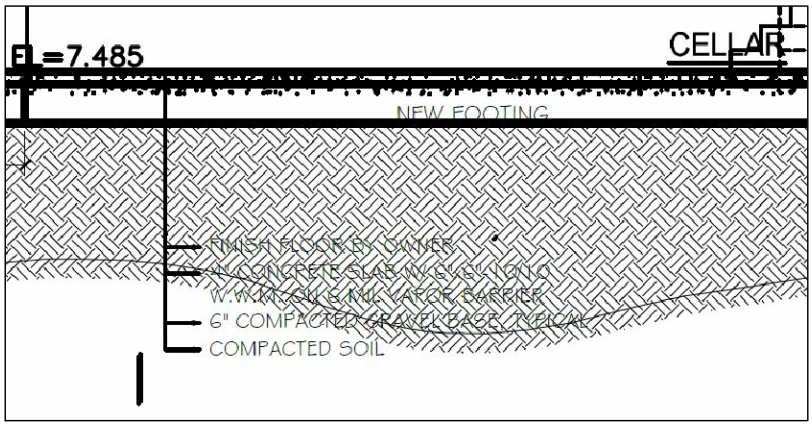
Environmental Consultants

| | |
|---|---|
| Site map: | 148 WEST STREET<br>BROOKLYN, NY 11222 |
| Figure:<br>Title: | 5<br>END-POINT SAMPLING LOCATIONS |
| Date: | JUNE 26, 2015 |
| Drawn by: | ANASTASIA KAKOURI |
| Checked by: | ETHAN RAINEY |
| Drawing Scale: | N.T.S |
| Project No.: | 15-133-0578 |



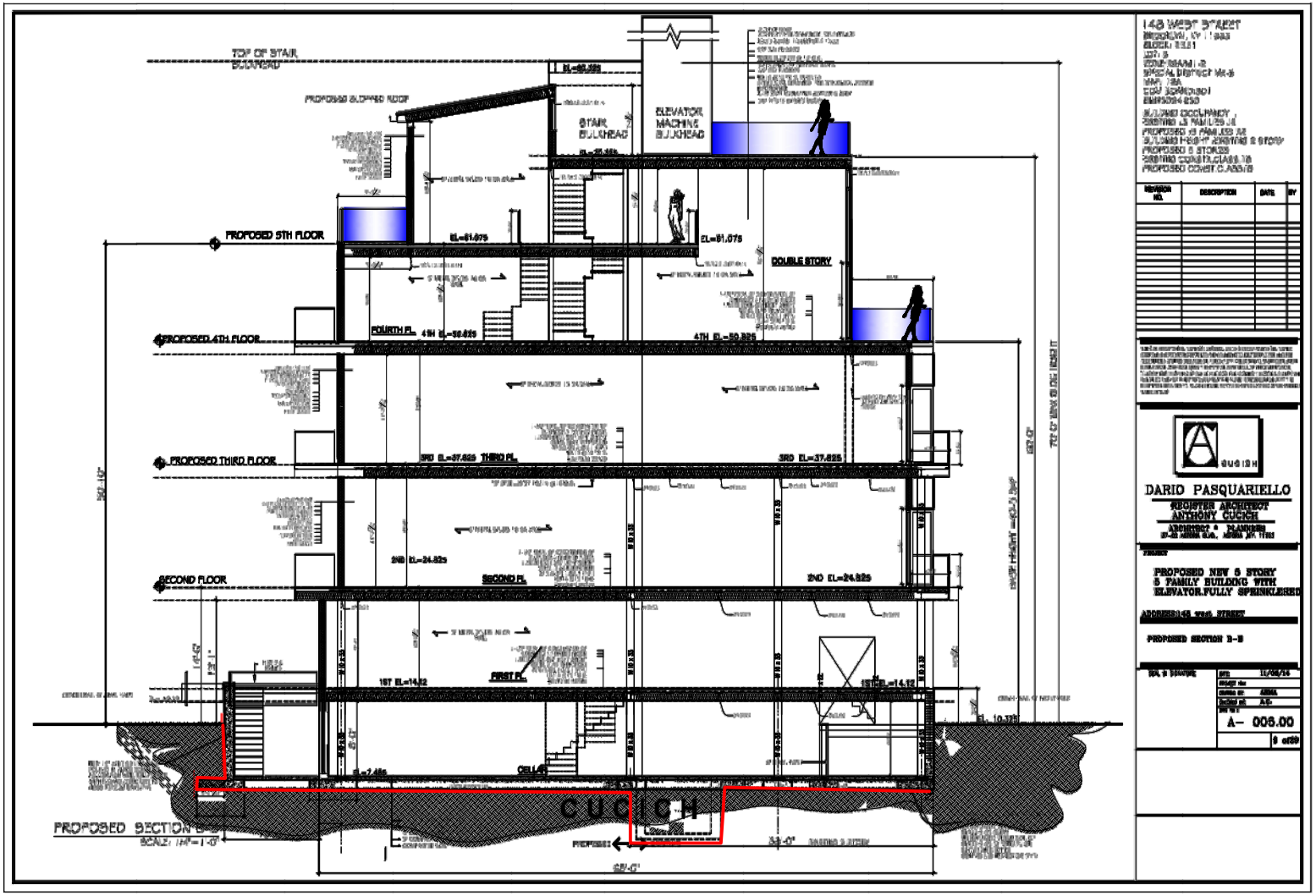




A MINIMUM 20-MIL VAPOR BARRIER WILL BE INSTALLED UNDER THE NEW BUILDING SLAB

Legend:

ATHENICA ENVIRONMENTAL SERVICES, INC,
Environmental Consultants

| | |
|---|---|
| Site map: | 148 WEST STREET<br>BROOKLYN, NY 11222 |
| Figure:<br>Title: | 6<br>SITE WIDE COVER PLAN |
| Date: | JUNE 26, 2015 |
| Drawn by: | ANASTASIA KAKOURI |
| Checked by: | ETHAN RAINEY |
| Drawing Scale: | $\frac{1}{16}$"=1'-0" |
| Project No.: | 15-133-0578 |




NOTES:

Minimum 20-mil thick vapor barrier/waterproofing will be installed beneath the new building slab and along new foundation walls

ATHENICA ENVIRONMENTAL SERVICES, INC,
Environmental Consultants

| | |
|---|---|
| Site map: | 148 WEST STREET, BROOKLYN, NY 11222 |
| Figure: | 7 |
| Title: | VAPOR BARRIER DIAGRAM |
| Date: | JUNE 25, 2015 |
| Drawn by: | ANASTASIA KAKOURI |
| Checked by: | EZGI KARAYEL |
| Drawing Scale: | N.T.S. |
| Project No.: | 15-133-0578 |

# APPENDICES

# APPENDIX 1

# PROPOSED DEVELOPMENT PLANS

# APPENDIX 2

# CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and 148 West Villa LLC have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, 148 West Villa LLC will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Sarah Pong, 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 Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the

Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. 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.

**Repositories**: A document repository is maintained online. Internet access to view OER's document repositories is available at public libraries. 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. The library nearest the Site is:

Brooklyn Public Library
107 Norman Ave. at Leonard St. Brooklyn, NY 11222
(718) 349-8504
Mon 10:00 am - 6:00 pm
Tue 10:00 am - 8:00 pm
Wed 10:00 am - 8:00 pm
Thu 10:00 am - 8:00 pm
Fri 10:00 am - 6:00 pm
Sat 10:00 am - 5:00 pm

**Digital Documentation**: NYC OER requires the use of digital documents in our repository as a means of minimizing paper use while also increasing convenience in access and ease of use.

**Issues of Public Concern**: 148 West Villa LLC 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. This section should list any site-specific issues of public concern and the method that they will be used resolved them. If needed, contact OER for additional guidance on how to identify issues of public concern.

**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 reviewed and approved by OER prior to distribution and mailed by the Enrollee. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

**Citizen Participation Milestones**: Public notice and public comment activities occur at several steps during a typical NYC VCP project. These steps include:

- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.
- **Public Notice announcing the approval of the RAWP and the start of remediation:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.
- **Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.

# APPENDIX 3

# SUSTAINABILITY STATEMENT

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

**Reuse of Clean, Recyclable Materials and Reduced Consumption of Non-Renewable Resources**: 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.

**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.

Natural gas will be utilized for fuel in the new building.

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

**Recontamination Control**: Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site.
An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

**Stormwater Retention**: Stormwater retention improves water quality by lowering the rate of combined stormwater and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.
An estimate of the enhanced stormwater retention capability of the redevelopment project will be included in the RAR.

**Linkage with Green Building**: Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use.
The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

**Paperless Voluntary Cleanup Program**: 148 West Villa LLC is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

**Low-Energy Project Management Program**: 148 West Villa LLC is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and

teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

**Trees and Plantings**: Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.
An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

# APPENDIX 4

# SOIL/MATERIALS MANAGEMENT PLAN

## 1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the final remedial report. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of final signoff by OER.

## 1.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

## 1.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

## 1.4 Materials Excavation, Load-Out, and Departure

The PE/QEP overseeing the remedial action will:

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

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

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

## 1.5 Off-Site Materials Transport

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

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

## 1.6 Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York City under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the final remedial report.

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

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

If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), including transport to a Part 360-16 Registration Facility, a formal request will be made for approval by OER with an associated plan compliant with 6NYCRR Part 360-16. This request and plan will include the location, volume and a description of the material to be recycled, including verification that the material is not impacted by site uses and that the material complies with receipt requirements for recycling under 6NYCRR Part 360. This material will be appropriately handled on-Site to prevent mixing with impacted material.

## 1.7 Materials Reuse On-Site

Soil and fill that is derived from the property that meets the Soil Cleanup Objectives (SCOs) established in this plan may be reused on-Site. The SCOs for on-Site reuse are listed in Section 4.2 of this cleanup plan. 'Reuse on-Site' means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on land with comparable levels of contaminants in soil/fill material, compliant with applicable laws and regulations, and addressed pursuant to the NYC VCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this remedial plan are followed. The expected location for placement of reused material is shown in Section 4.2.

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

## 1.8 Demarcation

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent

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

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

## 1.9 Import of Backfill Soil From Off-Site Sources

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives are listed in Section 4.2. Imported soils will not exceed groundwater protection standards established in Part 375. Imported soils for Track 1 remedial action projects will not exceed Track 1 SCO's.

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 remedial plan. The final remedial report will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.
- All material will be subject to source screening and chemical testing.
- Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:
- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.
Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the final remedial report. 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

New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

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

## 1.11 Stormwater Pollution Prevention

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

## 1.12 Contingency Plan for Unknown Contamination Sources

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings

will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

## 1.13 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 this remedial plan.

### 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 this remedial plan.

## 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 5

# CONSTRUCTION HEALTH AND SAFETY PLAN

# CONSTRUCTION HEALTH & SAFETY PLAN

# 148 WEST STREET
# BROOKLYN, NEW YORK

# PREPARED FOR:
# 148 WEST VILLA LLC
# 124-04 METROPOLITAN AVENUE, KEW GARDENS, NY 11415

Prepared by:

ATHENICA ENVIRONMENTAL SERVICES, INC.
Environmental Consultants

45-09 GREENPOINT AVENUE
LONG ISLAND CITY, NY 11104

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# 1.0 *GLOSSARY OF TERMS*

| | |
|---|---|
| AHA: | Activity Hazard Analysis |
| BZ: | Breathing Zone |
| C: | Ceiling Limit |
| CNS | Central Nervous System |
| CTPV: | Coal tar pitch volatiles |
| CRZ: | Contamination Reduction Zone |
| CSP: | Construction Superintendent |
| CZ: | Clean Zone |
| dBA: | Decibels Adjusted |
| ERCP: | Emergency Response and Contingency Plan |
| EZ: | Exclusion Zone |
| FDNY: | New York City Fire Department |
| GI: | Gastrointestinal |
| HSO: | Health & Safety Officer |
| IP: | Ionization Potential |
| $Mg/m^3$: | Micrograms per cubic meter |
| MPH: | Miles per hour |

| | |
|---|---|
| NIOSH: | National Institute for Occupational Safety and Health |
| OSHA: | Occupational Health and Safety Administration |
| Owner: | Crescent Owners, LLC |
| PAHs: | Poly aromatic hydrocarbons |
| PEL: | Permissible Exposure Limit |
| PM: | Project Manager |
| PPE: | Personal Protective Equipment |
| PPM: | Parts per Million |
| PSM: | Project Safety Manager |
| SHASP: | Site-Specific Health and Safety Plan: |
| SITE: | 40-05 Crescent Street, Queens, NY |
| STEL: | Short-term exposure limit (15 minutes) |
| SZ: | Support Zone |
| TLV: | Threshold Limit Value |
| TWA: | Time-weighted average (8 hours) |
| USEPA: | United States Environmental Protection Agency |
| VP: | Vapor Pressure at approximately 68 F$^{o}$ in mm Hg |

# 2.0 *INTRODUCTION*

The Site is located at 148 West Street, Brooklyn, New York (the "Site"). The Site is approximately 2,500-square feet. Currently, The Site contains one 2-story building with full basement. A map of the site boundary is shown in Figure 2-1.

This Site-Specific Construction Health and Safety Plan (CHASP) has been developed by Athenica Environmental Services ("Athenica") for specific activities associated with the construction of a new residential building at the Site.

This CHASP documents the policies and procedures which will protect workers from potential chemical hazards associated with the soils and/or fill at this Site. Other plans and documentation will establish the policies and procedures that will protect workers from potential physical hazards associated with traditional demolition and construction activities at the Site.

This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise during the disturbance of soil/fill at the Site. This CHASP was prepared by the general contractor's Environmental Consultant, Athenica Environmental Services (Athenica). The general contractor and its subcontractors will be required to utilize this plan when working at the site.

Although this plan focuses on the specific work activities planned for this site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations may arise that require modifications from the original plan. Therefore, Athenica only makes representations or warranties as to the adequacy of this CHASP for currently anticipated activities and conditions. This flexibility allows modification by authorized personnel, e.g. Project Manager, Project Safety Manager. All changes to procedures in this plan will be documented in writing using the form provided in Appendix B.

Refusal or failure to comply with this CHASP or violation of any safety procedures by field personnel and/or subcontractors may result in immediate removal from the Site following consultation with the Project Safety Manager (PSM) and the Project Manager (PM).

It is expected that this CHASP will be implemented at a multi-employer work site. Information and references within this plan shall in no way imply or alleviate any other Site contractor from their responsibility to comply with any and all applicable State or Federal statutes or regulations regarding the completion of this project. It is the responsibility of each employer to communicate and coordinate work planning so as to prevent their work activities from becoming

a potential hazard to other workers at the project site. Failure to communicate will not alter an employer's responsibilities or obligations for any resulting injuries to their employees.

## 2.1 SITE HISTORY

The Site consists of a 2,500 square-foot that is currently developed with a 3-story residential building. Historic Sanborn Maps how the Site as developed with a 3-story dwelling in 1887. This is consistent with the current on Site building.

Summary of work performed under the Remedial Investigation is as follows:

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

2. Performed a GPR survey;

3. Installed three (3) soil borings across the entire project Site, and collected six (6) soil samples for chemical analysis from the soil borings to evaluate soil quality;

4. Installed three (3) groundwater monitoring wells throughout the Site to establish groundwater flow and collected three (3) groundwater samples for chemical analysis to evaluate groundwater quality;

5. Installed two (2) soil vapor probes and one (1) sub-slab vapor probe around Site perimeter and collected three (3) samples for chemical analysis.

## 2.2 SCOPE OF WORK

Although the construction of the new residential and commercial mix use building involves many different activities, only those activities associated with the disturbance and handling of urban fill are addressed in this CHASP.

The principal tasks covered in this HASP include the following:

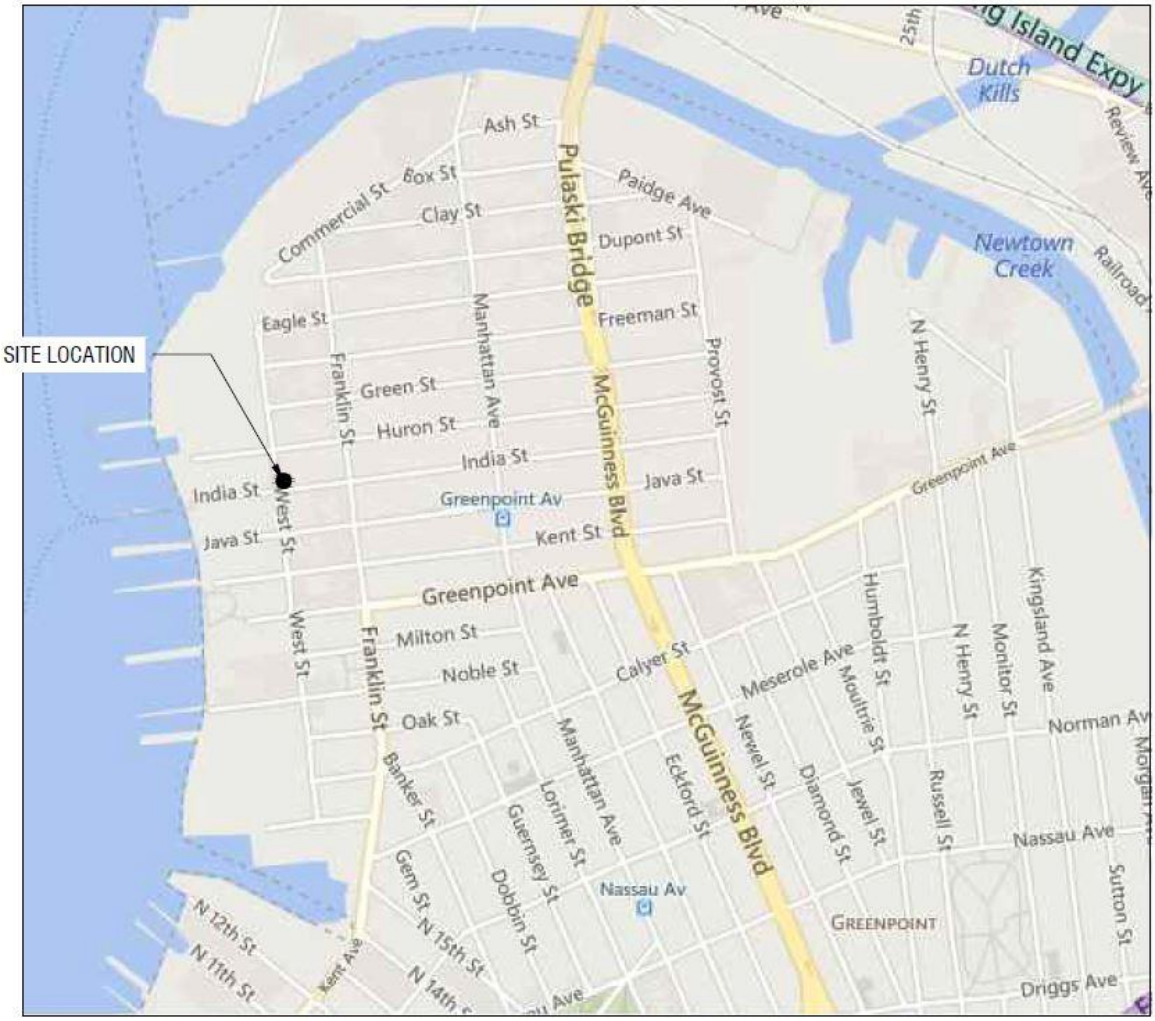
- Mobilization/demobilization,
- Sheeting and shoring,
- Excavation of urban fill and/or soil,
- Loading of urban fill into trucks for disposal,
- Installation of footings for new building, and

- Heavy equipment decontamination

Activity Hazard Analyses for these tasks are provided in Section 4.5.

This CHASP has been prepared and approved for the above scope of work. In order to remain approved, any changes to the scope of work will require amendment of the plan. The Site Health and Safety Amendment Documentation form (Appendix B) will be used for all revisions/amendments to this plan.

**FIGURE 2-1**
**SITE LOCATION MAP**




# 3.0 *KEY PERSONNEL*

The Project Manager (PM), Construction Superintendent (CS), Health & Safety Officer (HSO), and Project Safety Manager (PSM) all share responsibilities for formulating and enforcing health and safety requirements, and assuring that the CHASP is implemented as intended. This section outlines the responsibilities for each of these positions. Responsibilities for site employees and subcontractor personnel are also outlined in this section. The General Contractor and/or other authorized personnel may also be involved and identified in future CHASP documents, as appropriate.

## 3.1 PROJECT MANAGER (PM)

The PM has the overall responsibility for the project and to assure that the requirements of the contract are attained in a manner consistent with the CHASP requirements. The PM will coordinate with the CS and the HSO to assure that the work is completed in a manner consistent with the HASP. The PM will supervise the allocation of resources and staffing to implement specific aspects of the HASP and may delegate authority to expedite and facilitate any application of the program. This role will be filled by the General Contractor or Excavation Subcontractor. OER will be notified in the future who the PM will be for this project.

## 3.2 CONSTRUCTION SUPERINTENDENT (CS)

The CS is responsible for field implementation of the CHASP and Site Emergency Response and Contingency Plan and will act as the HSO in his/her absence. This role will be filled by the general contractor or primary subcontractor. OER will be notified in the future who the CS will be for this project.

Specific responsibilities for the CS include:

- Ensures that the CHASP is implemented;
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the PSM is informed of project changes which require modifications to the CHASP;
- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the daily site safety briefing;
- Reports to PSM to provide summaries of field operations and progress; and
- Acts as Emergency Coordinator.

## 3.3 HEALTH AND SAFETY OFFICER (HSO)

The HSO is authorized to administer the HASP. The HSO's primary operational responsibilities include personal and environmental monitoring, selection and monitoring of personal protective equipment, assignment of protection levels, coordination/review of work permits and observation of work activities. The HSO is authorized to stop work when an imminent health or safety risk exists. The HSO will review the essential safety requirements with all on-site personnel and will facilitate the daily safety meetings. OER will be notified in the future who the HSO will be for this project.

Specific responsibilities for HSO performance include:

- Monitoring workers for signs of stress, such as cold stress, heat stress, and fatigue. Reevaluating site conditions on an on-going basis.
- Coordinating protective measures including engineering controls, work practices and personal protective equipment.
- Assisting the CS in the preparation, presentation and documentation of daily safety meetings.
- Conducting and preparing reports of daily safety inspections of work processes, site conditions, and equipment conditions. Discussing any necessary corrective actions with the CS and reviewing new procedures.
- Initiating revisions of the CHASP as necessary for new tasks or modifications of existing operations and submitting to the Project Safety Manager for approval (see Appendix B).
- Performing air monitoring as required by the CHASP.
- Assisting the PM and CS in incident investigations.
- Preparing permits for special operations, e.g., hot work, confined spaces, line breaking, etc.
- Maintaining site safety records.
- Conducting inspections of all fire extinguishers, first-aid kits and eye washes on a regular basis.
- Informing subcontractors of the elements of the CHASP.

## 3.4 PROJECT SAFETY MANAGER (PSM)

The Project Safety Manager (PSM) is responsible for developing/reviewing the CHASP and ensuring that it is complete and accurate. The PSM provides technical and administrative support and will be available for consultation when required. If necessary, the PSM will direct modifications (Appendix B) to specific aspects of the HASP to adjust for on-site changes that affect safety. The HSO will coordinate with the PSM on necessary modifications to the HASP. The PSM may make periodic visits to the project site to review implementation of this HASP. This role is role will be filled by the General Contractor's representative.

## 3.5 EMPLOYEE SAFETY RESPONSIBILITIES

Each employee is responsible for personal safety as well as the safety of others in the work area and is expected to participate fully in the site safety and health program. Employees will use all equipment provided in a safe and responsible manner as directed by the CS. Employees shall report any hazardous conditions which might affect the health and safety of site personnel to the

CS and/or HSO. To protect the health and safety of all personnel, site employees that knowingly disregard safety policies/procedures will be subject to removal.

Specific requirements include:

- Reading the CHASP and any amendments prior to the start of on-site work.
- Providing documentation of any applicable medical surveillance and training to the CS/HSO prior to the start of work.
- Attending the pre-entry briefing prior to beginning on-site work as well as other scheduled safety meetings.
- Asking any questions or reporting concerns regarding the content of the CHASP to the CS/HSO prior to the start of work.
- Reporting all potentially dangerous situations, incidents, injuries, and illnesses, regardless of their severity, to the CS/HSO.
- Complying with the requirements of this CHASP and the requests of the CS/HSO.

# 4.0 *ACTIVITY HAZARD ANALYSIS*

This section outlines the potential chemical and physical hazards which workers may be exposed to during work on this project. The assessment of chemical hazards in this section is based on the results provided on the Remedial Investigation by Athenica for the Site. This is a representative list of contaminants that have been identified through extensive soil and groundwater testing at this site.

## 4.1 CHEMICAL HAZARDS

Based on review of the Remedial Investigation, workers at this Site have the potential to be exposed to chemicals in soil including PAH benzo(a)anthracene and metals including lead, mercury, selenium and zinc and. All listed compounds will be considered as potential contaminants of concern.

Potential exposure to the contaminants of concern may occur during intrusive soil activities or where direct contact with the contaminated soil takes place. Metals and PAHs are primarily inhalation hazards and exposure can be minimized with simple dust control measures. A summary of hazard information is listed in Table 4-1

**TABLE 4-1**
**CHEMICAL DATA**

| COMPOUND | ACGIH TLV | OSHA PEL | ROUTE OF EXPOSURE | SYMPTOMS OF EXPOSURE | TARGET ORGANS | PHYSICAL DATA |
|---|---|---|---|---|---|---|
| PAHs | 0.2 $mg/m^3$ | 0.2 $mg/m^3$ | Inhalation<br>Ingestion<br>Skin contact | Headache, nausea, vomiting, and diaphoresis | Genitourinary system, Hematopoietic system, GI Tract, Respiratory system, eyes, skin | Liquid, gas and solid, can be combustible |
| Lead | 0.05 $mg/m^3$ | 0.05 $mg/m^3$ | Inhalation<br>Ingestion<br>Skin contact | Weakness, lassitude, insomnia; facial pallor; eye irritation, anorexia, low-weight, malnutrition; constipation; abdominal pain; colic; hypertension, anemia; gingival lead line; tremors; paralysis of wrist, ankles; encephalopathy; neuropathy | GI Tract, CNS, kidneys, blood, gingival tissue | Noncombustible Solid |
| Zinc | Not Established | Not Established | Inhalation<br>Ingestion<br>Skin contract | Nausea and vomiting, chills and fever, muscular aches and pains, and weakness if inhaled; skin irritant | Respiratory system, eyes, skin | Non-combustible solid |
| Mercury | 0.25 g/m3 | 0.1 $mg/m^3$ | Inhalation<br>Ingestion<br>Skin contact | Inflammation of eyes and skin; coughing; choking; shortness of breath; death | Blood, kidneys, liver, brain, peripheral nervous system, CNS | Non-combustible Liquid |

Abbreviations

ACGIH = American Conference of Governmental Industrial Hygienists
C = Ceiling Unit
CNS = Central Nervous System
CVS = Cardiovascular System
GI = Gastrointestinal
TLV = Threshold Level Value
$mg/m^3$= milligrams per cubic meter
OSHA = Occupational Safety and Health Administration
PNS = Peripheral Nervous System
ppm = parts per million
PEL – Permissible Exposure Level

The following general symptoms may indicate exposure to a hazardous material. Personnel will be removed from the work site and provided immediate medical attention should any of the following symptoms occur:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria
- Chest pains and coughing
- Rashes or burns

## 4.2 PHYSICAL HAZARDS

To minimize physical hazards, standard safety protocols will be followed at all times. Failure to follow safety protocols may result in removal of the employee from the site. All personnel shall be familiar with the physical hazards presented by each of the tasks they perform. Task specific hazard analyses are provided in Section 4.5. These hazard analyses shall be reviewed prior to beginning each task and periodically throughout the task. It must be noted that these activity hazard analyses are general in nature. It is the responsibility of the CS to revise and adapt them as necessary to reflect site-specific conditions.

The CS and HSO will observe the general work practices of each crew member and enforce safe procedures. Work areas will be inspected by the crew leaders, CS and HSO. All hazards will be corrected in a timely manner. A variety of physical hazards may be encountered during work activities at this site. Activity Hazard Analyses will be developed for each principal activity and will identify all major hazards to which employees may be exposed. Hard hats, safety glasses, and steel-toe safety boots are required in all work areas of the site. Site-specific hazards and all necessary precautions will be discussed at the daily safety meetings. The General Contractor's Safety Manual will be maintained at the project site as a reference document.

## 4.3 ENVIRONMENTAL HAZARDS

Environmental factors such as weather, wild animals, insects, and irritant plants may pose a hazard when performing outdoor tasks. The HSO and CS will take necessary actions to alleviate these hazards should they arise.

### 4.3.1 *Heat Stress*

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. Heat stress disorders include:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

This information will be reviewed during safety meetings. Workers are encouraged to increase consumption of water and electrolyte-containing beverages, e.g. Gatorade™. Heat stress can be prevented by assuring an adequate work/rest schedule. Guidelines are presented below.

The CS and HSO will determine the specific work-rest schedule based on project specific conditions. In addition, workers are encouraged to take rests and report symptoms whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased based on worker recommendation to the HSO and CS. The CS and HSO will determine the specific work-rest schedule based on project specific conditions. In addition, workers are encouraged to take rests and report symptoms whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased based on worker recommendation to the HSO and CS.

Heat stress can be prevented by assuring an adequate work/rest schedule and adequate fluid consumption. A guide for work-rest schedules for various protection levels (defined in Section 5.0) is given below. The number of hours before a work-rest period is based on experience with similar work. The time periods should be considered maximum. It must also be remembered that individual physical variability and differences in physical work activities may require revisions to site plans. This table should be used as a guide. Professional judgment (evaluation of individual work load, ambient weather conditions, worker acclimatization and PPE levels) of the CS and HSO is necessary to assure a fully protective plan to prevent heat stress disorders.

| GUIDELINES FOR WORK-REST PERIODS FOR VARIOUS PROTECTION LEVELS (A-D) NUMBER OF HOURS BEFORE REST PERIOD | | | | |
|---|---|---|---|---|
| **Temperature** | **Level D** | **Level C** | **Level B** | **Level A** |
| 90+ F* | 2.0 | 1.5 | 1.0 | 0.5 |
| 87.5 F | 2.5 | 2.0 | 1.5 | 1.0 |
| 82.5 F | 3.0 | 2.5 | 2.0 | 1.5 |
| 77.5 F | 3.5 | 3.0 | 2.5 | 1.5 |
| 72.5 | 4.0 | 3.5 | 2.5 | 1.5 |

**Work above 100 F will be reviewed with the Project Safety Manager to determine specific requirements.*

Alternately the work/rest schedule can be calculated based on heat stress monitoring results. Monitoring consists of taking the radial pulse of a worker for 30 seconds immediately after exiting the work area. The frequency of monitoring is described below.

If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by 1/3 and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, increase the following rest period by 1/3. The initial rest period should be at least 5 minutes.

Body temperature, measured orally or through the ear canal, may also be monitored to assess heat stress. Workers should not be permitted to continue work when their body temperature exceeds 100.4 F (38C). Monitoring should be conducted at the beginning of each break period as noted above.

Monitoring for heat stress will begin when the ambient temperature reaches or exceeds 72.5 degrees Fahrenheit when wearing chemical protective clothing (Level C, B, A), or 80 degrees Fahrenheit for site activities performed with no chemical protective clothing (Level D). Monitoring should include pulse rate, weight loss, oral/ or ear canal temperature, signs and symptoms of heat stress and fluid intake.

An additional measure that can be employed to minimize heat stress is through the utilization of Heat Stress Relief Stations. A Heat Stress Relief Station (HSRS) is a location inside the exclusion zone where workers can partially remove their personal protective equipment, rest and take in fluids. Since the HSRS is established inside the exclusion zone, it is imperative that its use be closely monitored and controlled to ensure that workers do not ingest contamination during use.

The following is a detailed description of the Heat Stress Relief Station:

- Location- The HSRS should be located in an area of the exclusion zone where it will be predominantly upwind of site activities. This can typically be adjacent to the contamination reduction zone.
- Delineation- The HSRS must be separated from the exclusion zone by temporary fencing and must be labeled as “Heat Stress Relief Station”.
- Elements- The HSRS contains several elements:
    - A tarp or tent for shade;
    - A bench or chairs for workers to sit on;
    - A wash station;
    - A table for fluids, cups and clean personal protective equipment (PPE); and
    - A trash can for contaminated PPE.
- Set-Up- Proper set up of the HSRS is imperative its successful use.

- In the Support Zone, prepare the water cooler with ice and water or Gatorade.
- The person bringing the items to the HSRS must don the appropriate PPE required for the Exclusion Zone.
- Bring the following items to the HSRS:
  - Cooler;
  - Clean disposable cups;
  - Disinfectant wipes;
  - A clean trash bag;
  - Surgical gloves; and
  - Duct tape.
- Ensure the wash station has clean water and paper towels for drying hands/face.

- Procedure for Use- In order for the HSRS to be effective, it must be properly used. It is imperative that workers decontaminate properly before drinking fluids so that ingestion of site contaminants does not take place. The following are the steps to properly use the HSRS:
  - Upon entering the HSRS:
    - If wearing a Tyvek, remove duct tape on wrists and unzip and tie around waist;
    - Remove your outer gloves and surgical gloves; set outer gloves aside and throw surgical gloves into trash;
    - Wash hands and/or face at Wash Station;
    - Use disinfectant wipe on hands;
    - Get drink and/or rest on bench/chair.
  - Before re-entering the Exclusion Zone:
    - Dispose of cups in trash;
    - Put on a clean pair of surgical gloves;
    - If wearing a Tyvek, pull up and rezip;
    - Re-apply duct tape to wrists;
    - Put on outer gloves.
- Monitoring- The CS and HSO are both responsible for monitoring the use of the Heat Stress Relief Station. The HSO should review the procedures for use of the HSRS with the workers before its use begins to ensure that everyone understands the parameters for proper use.

### 4.3.2 *Exposure to Cold*

With outdoor work in the winter months, the potential exists for hypothermia and frostbite. Several forms of cold stress as well as preventative measures are described in this section of the HASP.

#### 4.3.2.1 *Cold Stress Conditions and Symptoms*

Typical cold stress conditions are included in the tables below, including symptoms and first aid precautions. If cold stress conditions develop, professional medical attention will be sought.

| TABLE 4.3.2A<br>COLD WEATHER INJURIES | | |
|---|---|---|
| **Cause** | **Symptoms** | **First Aid** |
| **Frostbite** | | |
| Freezing of tissue, normally due to exposure below 32°F | Numbness in affected area. Tingling, blistered, swollen or tender areas. Pale, yellowish waxy-looking skin. | Warm affected area with direct body heat. Consult with medical personnel ASAP. **Do not** thaw frozen area if treatment will be delayed. **Do not** massage or rub affected area. **Do not** wet area or rub with snow or ice. |
| **Chilblain** | | |
| Repeated exposure of bare skin for prolonged periods to temperatures 20° to 60°F (for those not acclimated to cold weather). | Swollen, red skin. Tender, hot skin, usually accompanied by itching. | Warm affected area with direct body heat. **Do not** massage or rub. **Do not** wet area or rub with snow or ice. Do not expose affected area to open fire, stove or any other intense heat source. |
| **Immersion Foot (Trench Foot)** | | |
| Prolonged exposure of the feet to wet conditions at temperatures between 32° to 50°F. Inactivity and damp socks (or tightly laced boots that impair circulation) speed onset and severity. | Cold numb feet may progress to hot with shooting pains. Swelling redness and bleeding. | Rewarm feet by exposing them to warm air. Evacuate victim to a medical facility. **Do not** massage, rub, moisten or expose affected area to extreme heat source. |
| **Dehydration** | | |
| Depletion of body fluids. | Dizziness. Weakness. | Replace lost water. Water should be sipped not gulped. Get medical treatment. |
| **Hypothermia** | | |
| Prolonged cold exposure and body heat loss. May occur at well above freezing, especially when a person is immersed in water. | Lack of shivering. Drowsiness, mental slowness, lack of coordination. Can progress to unconsciousness, irregular heartbeat and death. | Strip off clothing and wrap victim in blankets or a sleeping bag. Get victim to a heated location and medical treatment as soon as possible. |

In cold weather, the potential for frostbite exists, especially in body extremities. Personnel will be instructed to pay particular attention to hands, feet, and any exposed skin when dressing. Personnel will be advised to obtain more clothing if they begin to experience loss of sensation due to cold exposure.

**4.3.2.2** *Monitoring and Preventative Actions*

Typical cold stress monitoring procedures are included in the tables below, including temperatures to initiate monitoring, protective clothing uses and administrative practices to prevent or reduce the potential for cold stress related injury/illness. For weather conditions below -43 °C or -45 °F with no wind and/or similar conditions (see Work/Warm-up Table) all work will cease.

**TABLE 4.3.2B**
**COLD STRESS PREVENTION***

| | Temperature | Preventative Action |
|---|---|---|
| 1 | <61°F | Use thermometer to measure ambient temperature. |
| 2 | <40°F | Cold weather protective clothing available; check core body temperature at breaks using oral or ear canal thermometer. Maintain core body temperature above 96.8°F to avoid hypothermia. |
| 3 | <30°F | Record ambient temperature and wind speed every 4 hours; compare to wind chill chart when below 19.4°F. |
| 4 | <19°F | Provide and use heated warming shelters for work breaks and when cold stress symptoms appear. |
| 5 | <10°F | Constant observation of workers, i.e. "buddy system"; rest in heated shelters (see work-rest schedule); dry clothing available for change-out; acclimate new workers. |
| 6 | <0°F/ >5 mph winds | Obtain medical certification for workers subject to hypothermia risk. |

** Based on "2009 ACGIH Threshold Limit Values... for Physical Agents."*
*Note: refer to wind-chill and work-warmup charts in Table 4.3.2E*

**TABLE 4.3.2C**
**COLD WEATHER CLOTHING REQUIREMENTS**

| | |
|---|---|
| 1 | If wind chill is a factor at a work location, the cooling effect of the wind shall be reduced by shielding the work area or providing employees an outer windbreak layer garment. |
| 2 | Extremities, ears, toes, and nose shall be protected from extreme cold by protective clothing. |
| 3 | Employees performing light work whose clothing may become wet shall wear an outer layer of clothing which is impermeable to water. |
| 4 | Employees performing moderate to heavy work whose clothing may become wet shall wear an outer layer of clothing which is impermeable to water. |
| 5 | Outer garments must provide for ventilation to prevent wetting of inner clothing by sweat, or if not possible, a heated shelter for warming/drying clothing, or a change of clothing, shall be provided prior to returning to work in a cold environment. |

Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

Employees will be instructed to use heated shelters on site, at regular intervals, depending upon the severity of ambient temperatures. Symptoms of cold stress, including heavy shivering, excessive fatigue, drowsiness, irritability, or euphoria necessitate immediate return to the shelter.

**TABLE 4.3.2D**
**COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS EQUIVALENT TEMPERATURE** *(under calm conditions)**

| | **Actual Temperature Reading ( F)** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Estimated Wind Speed (in MPH)** | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| | **Equivalent Chill Temperature (F)** | | | | | | | | | | | |
| Calm | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| 5 | 48 | 37 | 27 | 16 | 6 | -5 | -15 | -26 | -36 | -47 | -57 | -68 |
| 10 | 40 | 28 | 16 | 4 | -9 | -24 | -33 | -46 | -58 | -70 | -83 | -95 |
| 15 | 36 | 22 | 9 | -5 | -18 | -32 | -45 | -58 | -72 | -85 | -99 | -112 |
| 20 | 32 | 18 | 4 | -10 | -25 | -39 | -53 | -67 | -82 | -96 | -110 | -121 |
| 25 | 30 | 16 | 0 | -15 | -29 | -44 | -59 | -74 | -88 | -104 | -118 | -133 |
| 30 | 28 | 13 | -2 | -18 | -33 | -48 | -63 | -79 | -94 | -109 | -125 | -140 |
| 35 | 27 | 11 | -4 | -20 | -35 | -51 | -67 | -82 | -98 | -113 | -129 | -145 |
| 40 | 26 | 10 | -6 | -21 | -37 | -53 | -69 | -85 | -100 | -116 | -132 | -148 |
| (Wind Speeds greater than 40 mph have little additional effect.) | ***Little Danger*** In < hr with dry skin. Maximum danger of false sense of security | | | | ***Increasing Danger*** Danger of freezing of exposed flesh within one minute. | | | | ***Great Danger*** Flesh may freeze within 30 seconds. | | | |
| | Trench foot and immersion foot may occur at any point on this chart. | | | | | | | | | | | |

**Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA. (Shaded area) Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36 C (98.6 F) per cold stress TLV.*

**TABLE 4.3.2E**
**TLV WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT***

| **Air Temperature – Sunny Sky** | | **No Noticeable Wind** | | **5 mph wind** | | **10 mph wind** | | **15 mph wind** | | **20 mph wind** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **C (appx.)** | **F (appx.)** | **Max. Work Period** | **No. of Breaks** | **Max. Work Period** | **No. of Breaks** | **Max. Work Period** | **No. of Breaks** | **Max. Work Period** | **No. of Breaks** | **Max. Work Period** | **No. of Breaks** |
| -26 to -28 | -15 to -19 | Normal | 1 | Normal | 1 | 75 min | 2 | 55 min | 3 | 40 min | 4 |
| -29 to -31 | -20 to -24 | Normal | 1 | 75 min | 2 | 55 min | 3 | 40 min | 4 | 30 min | 5 |
| -32 to – 34 | -25 to -29 | 75 min | 2 | 55 min | 3 | 40 min | 4 | 30 min | 5 | Non-Emergency work should cease | |
| -35 to – 37 | -30 to -34 | 55 min | 3 | 40 min | 4 | 30 min | 5 | Non-emergency work should cease | | | |
| -38 to – 39 | -35 to -39 | 40 min | 4 | 30 min | 5 | Non-emergency work should cease | | | | | |
| -40 to – 42 | -40 to -44 | 30 min | 5 | Non-emergency work should | | | | | | | |

| TABLE 4.3.2E<br>TLV WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Air Temperature – Sunny Sky** | **No Noticeable Wind** | | **5 mph wind** | | **10 mph wind** | | **15 mph wind** | | **20 mph wind** | |
| **C (appx.) F (appx.)** | **Max. Work Period** | **No. of Breaks** | **Max. Work Period** | **No. of Breaks** | **Max. Work Period** | **No. of Breaks** | **Max. Work Period** | **No. of Breaks** | **Max. Work Period** | **No. of Breaks** |
| < -43 < -45 | Non-emergency work should cease | | cease | | | | | | | |

** Adapted from Occupational Health and Safety Division, Saskatchewan Department of Labor*

### 4.3.3 *Biological Hazards*

The contractor will be required to monitor and control insects, rodents, and other pests identified on site. Standing water will not be allowed on-site, in an effort to control insects. Pest control procedures used by the contractor will include bait, trap, spray, or other means to abate pest problems that develop on site during disruption activities.

### 4.3.4 *Noise*

Hearing protection is required for workers operating or working near heavy equipment, where the noise level is greater than 85 dbA (Time Weighted Average) as well as personnel working around heavy equipment. The HSO will determine the need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement. The provisions for noise protection for workers are presented in other safety-related documents for the Site.

## 4.4 VEHICLE AND HEAVY EQUIPMENT SAFETY

### 4.4.1 *Vehicle Safety*

Motor vehicle incidents are the number one cause of occupational fatalities, accounting for one in three deaths. The safety provisions for vehicle use at the Site are presented in other safety-related documents for the Site.

### 4.4.2 *Heavy Equipment Safety*

The use of backhoes, front-end loaders, etc. for excavation and other material handling equipment will present various physical hazards. The safety provisions for heavy equipment use at the Site are presented on other safety-related documents for the Site.

## 4.5 TASK-SPECIFIC ACTIVITY HAZARD ANALYSES (AHA)

This section of the HASP provides a breakdown of the hazards and control measures for each principal task. These Activity Hazard Analyses (AHAs) are general in nature and must be made project specific by the Construction Superintendent prior to each task. The AHAs will be field checked by the supervisor on an ongoing basis and revised as necessary. All revisions will be communicated to the work crew.

| **Project Identification**<br>148 West Street | **Location**<br>Brooklyn, NY | **Estimated Dates**<br>June - September 2015 |
|---|---|---|
| **Phase of Work**<br>Mobilization/<br>Demobilization | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Mobilization and demobilization of equipment site tools, personnel.<br>2. Set up/remove staging and decontamination areas. | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Manual lifting/ material handling | • Observe proper lifting techniques<br>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)<br>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads |
| | Temperature extremes | • Drink plenty of fluids<br>• Train personnel of signs/symptoms of cold/heat stress<br>• Monitor air temperatures when extreme weather conditions are present<br>• Stay in visual and verbal contact with your buddy |
| | Hand tool usage | • Daily inspections will be performed<br>• Remove broken or damaged tools from service<br>• Use the tool for its intended purpose<br>• Use in accordance with manufacturer instructions. |
| | Biological hazards | • Be alert to the presence of biological hazards<br>• Wear insect repellent<br>• CS/HSO should be aware of on-site personnel with allergic reactions in insect bites and stings. |

| **Project Identification**<br>148 West Street | **Location**<br>Brooklyn, NY | **Estimated Dates**<br>June - September 2015 |
|---|---|---|
| **Phase of Work**<br>Trenching/Excavation | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Trenching and excavation.<br>2. Install shoring/ sheeting protective system. | Chemical hazards | • Wear appropriate PPE per Section 5.1<br>• Practice contamination avoidance<br>• Conduct real-time air monitoring per section 7.1.1<br>• Follow proper decontamination procedures<br>• Wash hands/face before eating, drinking, smoking |
| | Cave-in | • Do not allow entry into the trench unless approved protective system is in place and has been inspected by the competent person.<br>• Follow OSHA excavation regulations<br>• Place ladder or entry device every 25 feet of lateral travel |
| | Struck By/ Against Motor Vehicles/ Operating Equipment | • Wear reflective warning vests when exposed to vehicular traffic<br>• Isolate potential equipment swing areas<br>• Make eye contact with vehicle operators before approaching/crossing high traffic areas<br>• Understand and review hand signals<br>• Use a spotter to direct equipment movement in high traffic areas<br>• Audible back-up alarms on equipment<br>• Operator inspects equipment daily for safety defects, including the braking system |
| | Slips/trips/falls | • Clear walkways, work areas of equipment and tools<br>• Mark, identify, or barricade other obstructions<br>• Use barricades or fencing for trenches greater than 6 feet deep<br>• Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Electrical hazards | • Maintain 10 foot minimum clearance to any overhead power lines<br>• Call for Utility mark out prior to digging |

| **Project Identification**<br>148 West Street | **Location**<br>Brooklyn, NY | **Estimated Dates**<br>June - September 2015 |
|---|---|---|
| **Phase of Work**<br>Trenching/Excavation | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Trenching and excavation.<br>2. Install shoring/ sheeting protective system. | Hand and power tool usage | • Daily inspections will be performed on tools and cords<br>• Ensure all guards are in place<br>• Remove broken or damaged tools from service<br>• Use the tool for its intended purpose<br>• Use in accordance with manufacturer instructions |
| | Noise | • Hearing protection mandatory at or above 85 dBA.<br>• Instruct personnel how to properly wear hearing protective devices.<br>• Disposable ear plugs or other hearing protection required while around noisy equipment. |
| | Manual lifting/ Material handling | • Observe proper lifting techniques<br>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)<br>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads |
| | Temperature extremes. | • Drink plenty of fluids:<br>• Train personnel of signs/symptoms of cold/heat stress;<br>• Monitor air temperatures when extreme weather conditions are present;<br>• Stay in visual and verbal contact with your buddy; and<br>• Use procedures in Sections 3.3.1 and 3.3.2 |

| **Project Identification**<br>148 West Street | **Location**<br>Brooklyn, NY | **Estimated Dates**<br>June - September 2015 |
|---|---|---|
| **Phase of Work**<br>Loading of Trucks | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Load trucks with contaminated soils.<br>2. Cover and clean trucks. | Chemical hazards | • Wear appropriate PPE per Section 6.1<br>• Practice contamination avoidance<br>• Conduct real-time air monitoring per section 8.1.1<br>• Follow proper decontamination procedures<br>• Wash hands/face before eating, drinking, smoking |
| | Struck By/ Against Motor Vehicles/ Operating Equipment | • Wear reflective warning vests when exposed to vehicular traffic<br>• Isolate potential equipment swing areas<br>• Make eye contact with vehicle operators before approaching/crossing high traffic areas<br>• Understand and review hand signals<br>• Use a spotter to direct equipment movement in high traffic areas<br>• Audible back-up alarms on equipment<br>• Operator inspects equipment daily for safety defects, including the braking system |
| | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Manual lifting/ material handling | • Observe proper lifting techniques<br>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)<br>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads |
| | Temperature extremes | • Drink plenty of fluids<br>• Train personnel of signs/symptoms of cold/heat stress<br>• Monitor air temperatures when extreme weather conditions are present<br>• Stay in visual and verbal contact with your buddy<br>• Use procedures in Sections 4.3.1 and 4.3.2 |
| | Noise | • Hearing protection mandatory at or above 85 dBA.<br>• Instruct personnel how to properly wear hearing protective devices.<br>• Disposable ear plugs or other hearing protection required while around noisy equipment. |

| **Project Identification**<br>148 West Street | **Location**<br>Brooklyn, NY | **Estimated Dates**<br>June - September 2015 |
|---|---|---|
| **Phase of Work**<br>Installation of Footers | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Build forms.<br>2. Pour concrete.<br>3. Remove forms. | Chemical hazards | • Wear appropriate PPE per Section 6.1<br>• Practice contamination avoidance<br>• Conduct real-time air monitoring per section 8.1.1<br>• Follow proper decontamination procedures<br>• Wash hands/face before eating, drinking, smoking |
| | Struck By/ Against Motor Vehicles/ Operating Equipment | • Wear reflective warning vests when exposed to vehicular traffic<br>• Isolate potential equipment swing areas<br>• Make eye contact with vehicle operators before approaching/crossing high traffic areas<br>• Understand and review hand signals<br>• Use a spotter to direct equipment movement in high traffic areas<br>• Audible back-up alarms on equipment<br>• Operator inspects equipment daily for safety defects, including the braking system |
| | Concrete pumper | • Make sure nozzle man has eye contact with pump truck operator.<br>• Ensure steady control over nozzle |
| | Splashing concrete | • Ensure eye protection is worn and other PPE as required by Section 6.1<br>• A portable eyewash will be maintained in the work area |
| | Falls from heights | • Fall protection is required over 6 feet when removing forms<br>• Use PFAS where needed<br>• OSHA required training before use of PFAS, scaffold or lift<br>• Competent person inspects PFAS and scaffold |
| | Sharp Objects | • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects being handled<br>• Maintain all hand and power tools in a safe condition<br>• Keep guards in place during use |

| **Project Identification**<br>148 West Street | **Location**<br>Brooklyn, NY | **Estimated Dates**<br>June - September 2015 |
|---|---|---|
| **Phase of Work**<br>Installation of Footers | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Build forms.<br>2. Pour concrete.<br>3. Remove forms. | Hand and power tool usage | • Daily inspections will be performed on tools and cords<br>• Ensure all guards are in place<br>• Remove broken or damaged tools from service<br>• Use the tool for its intended purpose<br>• Use in accordance with manufacturer instructions |
| | Noise | • Hearing protection mandatory at or above 85 dBA.<br>• Instruct personnel how to properly wear hearing protective devices.<br>• Disposable ear plugs or other hearing protection required while around noisy equipment. |
| | Manual lifting/ material handling | • Observe proper lifting techniques<br>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)<br>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads |
| | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Temperature extremes. | • Drink plenty of fluids:<br>• Train personnel of signs/symptoms of cold/heat stress;<br>• Monitor air temperatures when extreme weather conditions are present;<br>• Stay in visual and verbal contact with your buddy; and<br>• Use procedures in Sections 4.3.1 and 4.3.2 |

| **Project Identification**<br>148 West Street | **Location**<br>Brooklyn, NY | **Estimated Dates**<br>June - September 2015 |
|---|---|---|
| **Phase of Work**<br>Heavy Equipment Decontamination | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Pressure wash or steam clean heavy equipment and vehicles. | Chemical hazards | • Wear appropriate PPE per Section 6.1<br>• Practice contamination avoidance<br>• Conduct real-time air monitoring per section 8.1.1<br>• Follow proper decontamination procedures<br>• Wash hands/face before eating, drinking, smoking |
| | Struck By/ Against Motor Vehicles/ Operating Equipment | • Wear reflective warning vests when exposed to vehicular traffic<br>• Isolate potential equipment swing areas<br>• Make eye contact with vehicle operators before approaching/crossing high traffic areas<br>• Understand and review hand signals<br>• Use a spotter to direct equipment movement in high traffic areas<br>• Audible back-up alarms on equipment<br>• Operator inspects equipment daily for safety defects, including the braking system |
| | Steam/heat/ splashing | • Wear face shield + safety glasses<br>• Stay out of splash radius to minimize exposure<br>• Do not direct steam/spray at anyone |
| | Hand and power tool usage | • Daily inspections will be performed on tools and cords<br>• Ensure all guards are in place<br>• Remove broken or damaged tools from service<br>• Use the tool for its intended purpose<br>• Use in accordance with manufacturer instructions |
| | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Temperature extremes | • Drink plenty of fluids<br>• Train personnel of signs/symptoms of cold/heat stress<br>• Monitor air temperatures when extreme weather conditions are present<br>• Stay in visual and verbal contact with your buddy<br>• Use procedures in Sections 4.3.1 and 4.3.2 |

# 5.0 *WORK AND SUPPORT AREAS*

To prevent migration of contamination from personnel and equipment, work areas will be clearly specified as designated below prior to beginning operations. Each work area will be clearly identified using signs or physical barriers.

## 5.1 EXCLUSION ZONE (EZ)

The EZ is the area suspected of contamination and presents the greatest potential for worker exposure. Personnel entering the area must wear the mandated level of protection for that area. In certain instances, different levels of protection will be required depending on the tasks and monitoring performed within that zone. The EZ for this project will include the excavation areas, any stockpiling/staging areas, and areas where disturbance of urban fill is likely occurring.

## 5.2 CONTAMINATION - REDUCTION ZONE (CRZ)

The CRZ or transition zone will be established between the EZ and support zone (SZ). In this area, personnel will begin the sequential decontamination process required to exit the EZ. To prevent off-site migration of contamination and for personnel accountability, all personnel will enter and exit the EZ through the CRZ. The CRZ for this project will be the access/egress routes to/from the EZ and the personnel and equipment decontamination stations.

## 5.3 SUPPORT ZONE (SZ)

The SZ serves as a clean, control area. Operational support facilities are located within the SZ. Normal work clothing and support equipment are appropriate in this zone. Contaminated equipment or clothing will not be allowed in the SZ. There will be a clearly marked controlled access point from the SZ into the CRZ and EZ that is monitored closely by the HSO and the CS to ensure proper safety protocols are followed. The SZ will be any office areas/trailers and the parking and visitor access ways to the project site.

## 5.4 SITE CONTROL LOG

A log of all personnel visiting, entering or working on the site shall be maintained in the main office location. The log will record the date, name, company or agency, and time entering or exiting the site.

No visitor will be allowed in the EZ without showing proof of training and compliance with applicable medical monitoring requirements. Visitors will supply their own protective equipment, including hard hat, boots and respiratory equipment, if required. Visitors will attend a site orientation given by the HSO and sign the HASP.

## 5.5 GENERAL

The following items are requirements to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the site.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the EZ and CRZs.
- Hands and face must be washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco and smoking or other activities which may result in ingestion of contamination.
- During site operations, each worker will consider himself as a safety backup to his partner. All personnel will be aware of dangerous situations that may develop.
- Visual contact will be maintained between workers on site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any site personnel, who do not comply with safety policy, as established by the HSO or the CS, will be dismissed from the site.
- Proper decontamination procedures must be followed before leaving the site.
- All site workers are authorized to stop work if they observe unsafe actions of workers or other unsafe conditions on site which may cause an imminent danger.
- All workers and visitors must sign in and out of the site.

# 6.0 *PROTECTIVE EQUIPMENT*

This section specifies the levels of personal protective equipment (PPE) which are or may be required for each principal activity performed at this site. All site personnel must be trained in the use of all PPE utilized.

## 6.1 ANTICIPATED PROTECTION LEVELS

The following protection levels have been established for the site work activities based on site information concerning the levels of contaminants and the scope of work. Results of site air monitoring and visual inspection of the work activities may indicate the need for changes in final PPE level(s). Changes in the initial PPE Levels prescribed in the Table below require completion of the HASP amendment form in Appendix B.

| Task | Initial PPE Level | Upgrade/ Downgrade PPE Level | Skin Protection | Respiratory Protection | Other PPE |
|---|---|---|---|---|---|
| General Support Zone Activities | Level D | — | Generally none | None | Hard-hat, Steel-toe work boots, safety glasses, safety vests. Leather work gloves as needed. Hearing protection when >85 dBA. |
| Mobilization/ Demobilization | Level D | — | Generally none | None | Hard-hat, Steel-toe work boots, safety glasses, safety vests. Leather work gloves as needed. Hearing protection when >85 dBA. |
| Excavation, Loading of Trucks with Contaminated Soil/Fill, Equipment Decont-amination | Level D | | Generally none, | Initial: None (See Section 7) | Hard-hat, Steel-toe work boots, safety glasses, leather work gloves for material handling, hearing protection >85 dBA |

## 6.2 PROTECTION LEVEL DESCRIPTIONS

This section lists the minimum requirements for each protection level. Modification to these requirements may have been noted in the Table shown above.

### 6.2.1 *Level D*

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work clothing as prescribed by weather
- Leather work gloves when material handling

# 7.0 *DECONTAMINATION PROCEDURES*

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

## 7.1 PERSONNEL DECONTAMINATION

Decontamination procedures will ensure that material which workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the site. This sequence describes the general decontamination procedures for Level D. The specific stages will vary depending on the site, the task, the protection level, etc. Dry decontamination may be used if there is insufficient space to support a full decontamination station as delineated with the steps below and approved by the HSO. The CS and the HSO will ensure that the decontamination procedures are adequate.

*Level D Decontamination*

1. Go to end of EZ
2. Cross into CRZ
3. Wash face and hands

### 7.1.1 *Suspected Contamination*

Any employee suspected of sustaining skin contact with chemical materials will first use the emergency shower. Following a thorough drenching, the worker will proceed to the decontamination area. Here the worker will remove clothing and don clean clothing. Medical attention will be provided as determined by the degree of injury.

### 7.1.2 *Personal Hygiene*

Personnel will wash hands, arms, neck and face, following decontamination and before any eating, smoking, or drinking.

## 7.2 EQUIPMENT DECONTAMINATION

Heavy equipment and other vehicles operated within the EZ will be decontaminated before being removed from the site. Workers operating the equipment/vehicles will move the equipment to a gross decontamination location near the exit of the EZ. Following gross decontamination the equipment/vehicle will be moved to the decontamination pad. Equipment decontamination will be performed on the pad until the equipment is visually clean. Following decontamination

activities equipment will be inspected by the HSO or CS prior to leaving the site. Once the equipment is inspected it will be removed from the site.

*Heavy Equipment / Vehicle Decontamination*

1. Equipment operator will move the heavy equipment / vehicle to a position near the EZ / CRZ interchange
2. Worker will use manual equipment (shovel, track spade) to remove gross contamination from tracks, bucket, dump box, and vehicle undercarriage (as required)
3. Following removal of gross decontamination equipment will be moved onto the decontamination pad and pressure washed / steam cleaned until equipment / vehicle is visually clean.
4. Equipment / vehicle decontaminated for removal from the site will be moved to a clean area for the HSO / CS inspection.
5. Once the equipment / vehicle is inspected and approved it will be removed from the site. Vehicles that fail inspection will be returned to the decontamination pad for further cleaning and re-inspected.

## 7.3 DISPOSAL OF WASTES

Wastes will be disposed according to applicable Local, State and Federal regulations.

## 7.4 DUST /EROSION CONTROL

The contractor will control dust and implement erosion control measures to be protective of nearby ecologically sensitive areas and sensitive receptors.

# 8.0 *AIR MONITORING*

Air monitoring will be conducted in order to characterize personnel exposures and fugitive emissions from site contaminants. Principal contaminants of concern are listed in Section 4.0 of this HASP. The target compounds selected for air monitoring purposes for this site include particulates. Results of air monitoring will be used to ensure the proper selection of protective clothing and equipment, including respiratory protection, to protect on-site personnel and off-site receptors from exposure to unacceptable levels of site contaminants. Descriptions of air monitoring strategies, procedures and equipment are provided below. Modification of this plan, including additional monitoring, may be considered as judged necessary by the PSM, in conjunction with the HSO.

## 8.1 WORK AREA AIR MONITORING

Work area air monitoring will include direct reading methods and personal exposure monitoring. Air monitoring will be conducted during soil/waste excavation, transportation, relocation and/or staging, and any other intrusive activities.

### 8.1.1 *Direct Reading Air Monitoring*

During active sifting operations, direct reading air monitoring will be performed to determine the potential for worker exposure to airborne hazards. A summary of air monitoring information is provided in section 8.1.5. Real-time air samples will be taken at least four times each 8-hour worker shift in the workers breathing zone (BZ).

### 8.1.2 *Instrumentation*

The following is a description of the air monitoring equipment to be used:

- MIE PDR-1000 Personal DataRAM, Dust trak or equivalent unit for real-time measuring particulates.

### 8.1.3 *Use And Maintenance Of Survey Equipment*

All personnel using field survey equipment must have training in its operation, limitations, and maintenance. Maintenance and internal or electronic calibration will be performed in accordance with manufacturer recommendations by individuals familiar with the devices before their use on site. Repairs, maintenance, and internal or electronic calibration of these devices will be recorded in an equipment maintenance logbook. The equipment maintenance logbook for each instrument will be kept in that instrument's case. For rented monitoring equipment, repairs and

maintenance will be conducted by the rental company. Daily calibration records will be documented on a log sheet found in Appendix D.

Air monitoring equipment will be calibrated before work begins. Only basic maintenance (such as changing batteries) will be performed by on-site personnel. Any additional maintenance or repairs will be performed by a trained service technician.

### 8.1.4 *Air Monitoring Recordkeeping*

The HSO will ensure that all air-monitoring data is recorded on a data sheet found in Appendix D. The PSM may periodically review this data.

### 8.1.5 *Action Levels*

During soil/waste excavation, transportation, relocation and/or staging or any intrusive activities, direct reading air monitoring will be performed in the EZ to determine exposure to workers. A summary of air monitoring information is provided in the table below.

| Monitoring Device | Monitoring Location/ Personnel | Monitoring Frequency | Action Level | Action |
|---|---|---|---|---|
| pDr-1000 (Dust) | Soil excavation areas/laborers, technicians, equipment operators | Four times every 8-hour shift during soil disturbance activities | <5.0 mg/m$^3$ *<br><br>≥5.0 mg/m$^3$ * | Level D<br><br>Stop work; notify PSM<br><br>Implement dust suppression measures and resume work after dust levels are below action level |

** Sustained levels in the breathing zone for 5 minutes*

As indicated by the below calculations, the action level for PAHs and the metals of concern was selecting based on the OSHA PEL for respirable dust, which was found to be significantly lower than the calculated actions levels for PAHs and copper, lead, mercury, and zinc based on utilizing the highest concentrations of these contaminants found in soil.

- OSHA PEL for respirable dust: 5 mg/m$^3$,
- Maximum concentration of PAHs found in soil is 1.02 ppm or 0.000102%.
    - 5.0 mg/m$^3$ multiplied by 0.000102% = 0.0000051 mg/m$^3$
    - OSHA PEL for PAHs is 0.2 mg/m$^3$
- Maximum concentration of Lead found in soil is 251 ppm or 0.0251%.
    - 5.0 mg/m$^3$ multiplied by 0.0251% = 0.001255 mg/m$^3$

    - OSHA PEL for PAHs is 0.05 $mg/m^3$
- Maximum concentration of Zinc found in soil is 297 ppm or 0.0297%.
    - 5.0 $mg/m^3$ multiplied by 0.0297% = 0.001485 $mg/m^3$
    - OSHA PEL for Zinc not established.
- Maximum concentration of Mercury found in soil is 0.95 ppm or 0.000095%.
    - 5.0 $mg/m^3$ multiplied by 0.000095% = 0.0000047 $mg/m^3$
    - OSHA PEL for PAHs is 0.1 $mg/m^3$

# 9.0 *EMERGENCY RESPONSE AND CONTINGENCY PLAN (ERCP)*

## 9.1 PRE-EMERGENCY PLANNING

Prior to engaging in construction/remediation activities at the site, the CS will plan for possible emergency situations and have adequate supplies and manpower to respond. In addition, site personnel will be briefed on proper emergency response procedures during the site orientation.

The following situations would warrant implementation of the emergency plan:

| | |
|---|---|
| Fire/Explosion | • The potential for human injury exists.<br>• Toxic fumes or vapors are released.<br>• The fire could spread on site or off site and possibly ignite other flammable materials or cause heat-induced explosions.<br>• The use of water and/or chemical fire suppressants could result in contaminated run-off.<br>• An imminent danger of explosion exists. |
| Spill or Release of Hazardous Materials | • The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.<br>• The spill could cause the release of toxic liquids or fumes in sufficient quantities or in a manner that is hazardous to or could endanger human health. |
| Natural Disaster | • A rain storm exceeds the flash flood level.<br>• The facility is in a projected tornado path or a tornado has damaged facility property.<br>• Severe wind gusts are forecasted or have occurred and have caused damage to the facility. |
| Medical Emergency | • Overexposure to hazardous materials.<br>• Trauma injuries (broken bones, severe lacerations/ bleeding, burns).<br>• Eye/skin contact with hazardous materials.<br>• Medical Conditions e.g., loss of consciousness, heat stress (heat stroke), heart attack, respiratory failure, allergic reaction. |

The following measures will be taken to assure the availability of adequate equipment and manpower resources:

- Sufficient equipment and materials will be kept on site and dedicated for emergencies only. The inventory will be replenished after each use.

- It will be the responsibility of the CS/HSO to brief on site personnel on anticipated hazards at the site. The CS/HSO shall also be responsible for anticipating and requesting equipment that will be needed for response activities.

Communications will be established prior to commencement of any activities at the remediation site. Communication will be established so that all responders on site have availability to all pertinent information to allow them to conduct their activities in a safe and healthful manner. A telephone will be available to summon assistance in an emergency.

Primary communication with local responders in the event of an emergency will be accomplished using commercial telephone lines.

## 9.2 EMERGENCY RECOGNITION AND PREVENTION

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the CS and Health & Safety Officer (HSO), through daily site inspections and employee feedback to recognize and identify hazards that are found at the site. These may include:

| | | |
|---|---|---|
| Chemical Hazards | • Materials at the site<br>• Materials brought to the site | |
| Physical Hazards | • Fire/explosion<br>• Slip/trip/fall<br>• Electrocution | • Confined space<br>• IDLH atmospheres<br>• Excessive noise |
| Mechanical Hazards | • Heavy equipment<br>• Stored energy system<br>• Pinch points | • Electrical equipment<br>• Vehicle traffic |
| Environmental Hazards | • Electrical Storms<br>• High winds<br>• Heavy Rain/Snow | • Heat Stress<br>• Vehicle traffic |

## 9.3 EMERGENCY TELEPHONE NUMBERS

Emergency telephone numbers can be found in Table 9-1. The emergency numbers will be posted in all site trailers.

Figure 9-1 is the Hospital Route Map with directions to the nearest hospital. Only in a non-emergency situation are personnel to be transported to the hospital by site representatives.

**FIGURE 9-1**

***TABLE 9-1***
***EMERGENCY TELEPHONE NUMBERS***

| | |
|---|---|
| Emergency Medical Service……... | 911 |
| Police: New York City Police Department (NYPD)……..... | 911 |
| Hospital: Mount Sinai Queens……..…… | (718) 932-1000 |
| Fire: New York City Fire Department (FDNY)……. | 911 |
| New York City Office of Emergency Management……... | 911 |
| National Response Center…….. | (800) 424-8802 |
| Poison Control Center……..... | (800) 222-1222 |
| Chemtrec……. | (800) 262-8200 |
| Center for Disease Control……. | (800) 311-3435 |
| USEPA( Region II)……. | (212) 637-5000 |
| NYSDEC Emergency Spill Response…….…… | (800) 457-7362 |

## DIRECTIONS AND HOSPITAL ROUTE MAP

***FIGURE 1 – HOSPITAL ROUTE PLAN***

**Site Location:** 148 West Street, Brooklyn, New York 11222
**Hospital Location:** Mount Sinai Queens, 25-10 30th Avenue, Long Island City, NY 11102
**Information Line:** (718) 934-1000

via 21st St — 20 min

14 min without traffic · Show traffic — 3.7 miles

**148 West St**
Brooklyn, NY 11222

Follow India St to McGuinness Blvd

3 min (0.4 mi)

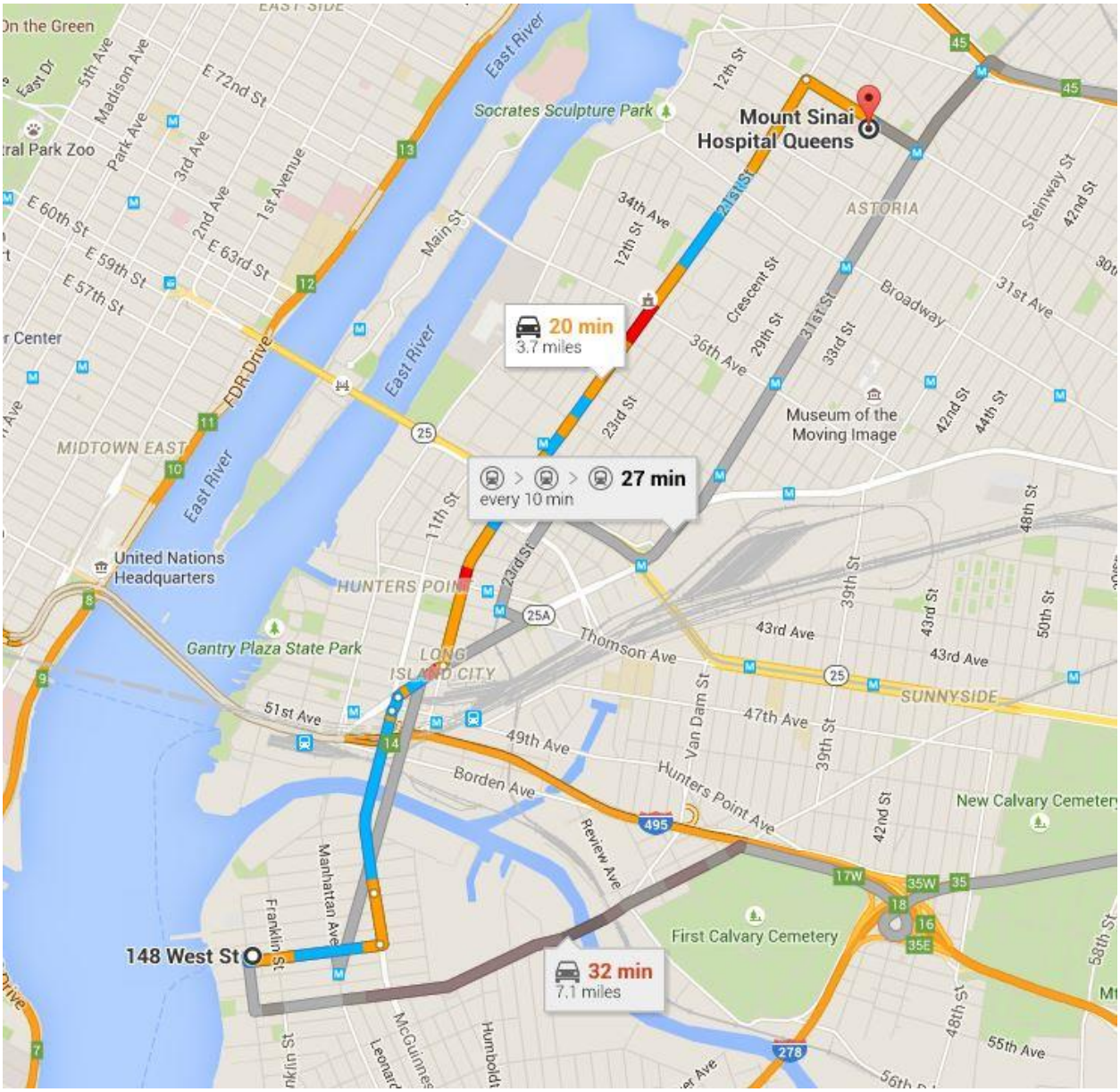
- Head south on West St toward India St
  95 ft
- Turn left at the 1st cross street onto India St
  0.4 mi

Take Pulaski Bridge and 21st St to 30th Ave in Queens

15 min (3.2 mi)

- Turn left at the 3rd cross street onto McGuinness Blvd
  0.2 mi
- Continue straight onto Pulaski Bridge
  0.6 mi
- Slight right onto 11th St
  259 ft
- Turn right onto Jackson Ave
  0.2 mi
- Turn left onto 21st St
  2.1 mi
- Turn right onto 30th Ave
  Destination will be on the right
  0.2 mi

**Mount Sinai Hospital Queens**
25-10 30th Avenue, Astoria, NY 11102




Once a hazard has been recognized, the CS and/or the HSO will take immediate action to prevent the hazard from becoming an emergency. This may be accomplished by the following:

- Daily safety meeting
- Task-specific training prior to commencement of activity
- Personal Protective Equipment (PPE) selection/use

- Written and approved permits for hot work, confined space
- Trenching/shoring procedure
- Air monitoring
- Following all standard operating procedures

## 9.4 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS

This section of the ERCP describes the various roles, responsibilities, and communication procedures that will be followed by personnel involved in emergency responses.

The primary emergency coordinator for this site is the CS. In the event an emergency occurs and the emergency coordinator is not on site, the HSO will serve as the emergency coordinator until the CS arrives. The emergency coordinator will determine the nature of the emergency and take appropriate action as defined by this ERCP.

The emergency coordinator will implement the ERCP immediately as required. The decision to implement the plan will depend upon whether the actual incident threatens human health or the environment.

Immediately after being notified of an emergency incident, the emergency coordinator or his designee will evaluate the situation to determine the appropriate action.

### 9.4.1 *Responsibilities and Duties*

This section describes the responsibilities and duties assigned to the emergency coordinator.

It is recognized that the structure of the "Incident Command System" will change as additional response organizations are added. Personnel will follow procedures as directed by the fire department, LEPC, State and Federal Agencies as required.

### 9.4.2 *On-Site Emergency Coordinator Duties*

The on-site emergency coordinator is responsible for implementing and directing the emergency procedures. All emergency personnel and their communications will be coordinated through the emergency coordinator. Specific duties are as follows:

- Identify the source and character of the incident, type and quantity of any release. Assess possible hazards to human health or the environment that may result directly from the problem or its control.
- Discontinue operations in the vicinity of the incident if necessary to ensure that fires, explosions, or spills do not recur or spread to other parts of the site. While operations are

dormant, monitor for leaks, pressure build-up, gas generation, or ruptures in valves, pipes, or other equipment, where safe and appropriate.

- Notify the Client Representative and local Emergency Response Teams if their help is necessary to control the incident. Table 9-1 provides telephone numbers for emergency assistance.
- Direct on-site personnel to control the incident until, if necessary, outside help arrives. Specifically: Ensure that the building or area where the incident occurred and the surrounding area are evacuated and shut off possible ignition sources, if safe and appropriate. The Emergency Response Coordinator is responsible for directing site personnel such that they avoid the area of the incident and leave emergency control procedures unobstructed.
- If fire or explosion is involved, notify local Fire Department.
- Have protected personnel, in appropriate PPE, on standby for rescue.

If the incident may threaten human health or the environment outside of the site, the emergency coordinator should immediately determine whether evacuation of area outside of the site may be necessary and, if so, notify the Police Department and the Office of Emergency Management.

When required, notify the National Response Center. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility.

The emergency telephone number for the National Response Center is 800-424-8802.

If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained.
- Containers of waste are removed or isolated from the immediate site of the emergency.
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.
- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.

- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.
- Notify the USEPA Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility. The USEPA Regional Administrator's telephone number is included in the Emergency Contacts.
- Record date, time, details of the incident, and submit a written report to the USEPA Regional Administrator. The report is due to the USEPA within 15 days of the incident.

## 9.5 SAFE DISTANCES AND PLACES OF REFUGE

The emergency coordinator for all activities will be the CS. No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies which could occur. Safe distances can only be determined at the time of an emergency based on a combination of site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), workers in the affected area will report initially to the contamination reduction zone. Small spills or leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent of the release and potential hazards, the emergency coordinator or his designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to secure the boundaries.

If a major incident may threaten the health or safety of the surrounding community, the public will be informed and, if necessary, evacuated from the area. The emergency coordinator, or his designee will inform the proper agencies in the event that this is necessary. Telephone numbers are listed in Table 9-1.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incidents:

- Chemical release
- Fire/explosion
- Power loss
- Medical emergency
- Hazardous weather

In general, evacuation will be made to the site entrance, unless the emergency coordinator determines otherwise. It is the responsibility of the emergency coordinator to determine when it is necessary to evacuate personnel to off-site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the site until a head count establishes that all are present and accounted for. No one is to leave the site without notifying the emergency coordinator.

## 9.6 EVACUATION ROUTES AND PROCEDURES

All emergencies require prompt and deliberate action. In the event of an emergency, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible. However, in specific emergency situations, the emergency coordinator may deviate from the procedures to provide a more effective plan for bringing the situation under control. The emergency coordinator is responsible for determining which situations require site evacuation.

### 9.6.1 *Evacuation Signals and Routes*

Two-way radio communication or equivalent will be used to notify employees of the necessity to evacuate an area or building involved in a release/spill of a hazardous material. As necessary, each crew supervisor will have a two-way radio. Total site evacuation will be initiated only by the emergency coordinator, however, in his absence, decision to preserve the health and safety of employees will take precedence.

### 9.6.2 *Evacuation Procedures*

In the event evacuation is necessary the following actions will be taken:

- The emergency signal will be activated.
- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the site will cease in order to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery if safe to do so.
- ALL on-site personnel, visitors, and contractors in the support zone will assemble at the entrance to the site for a head count and await further instruction from the emergency coordinator.
- ALL persons in the exclusion zone and contamination reduction zone will be accounted for by their immediate crew leaders. Leaders will determine the safest exits for employees and will also choose an alternate exit if the first choice is inaccessible.

- During exit, the crew leader should try to keep the group together. Immediately upon exit, the crew leader will account for all employees in his crew.
- Upon completion of the head count, the crew leader will provide the information to the emergency coordinator.
- Contract personnel and visitors will also be accounted for.
- The names of emergency response team members involved will be reported to the emergency coordinator.
- A final tally of persons will be made by the emergency coordinator or designee. No attempt to find persons not accounted for will involve endangering lives of site personnel by re-entry into emergency areas.
- In all questions of accountability, immediate crew leaders will be held responsible for those persons reporting to them. Visitors will be the responsibility of those employees they are seeing. Contractors and truck drivers are the responsibility of the Construction Superintendent.
- Personnel will be assigned by the emergency coordinator to be available at the main gate to direct and brief emergency responders.
- Re-entry into the site will be made only after clearance is given by the emergency coordinator. At his direction, a signal or other notification will be given for re-entry into the facility.

## 9.7 EMERGENCY SPILL RESPONSE PROCEDURES AND EQUIPMENT

In the event of an emergency involving a hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation. Emergency contacts found in Table 9-1 provide a quick reference guide to follow in the event of a major spill.

### 9.7.1 *Notification Procedures*

If an employee discovers a chemical spill or process upset resulting in a vapor or material release, he or she will immediately notify the on-site emergency coordinator.

On-site Emergency Coordinator will obtain information pertaining to the following:

- The material spilled or released.
- Location of the release or spillage of hazardous material.
- An estimate of quantity released and the rate at which it is being released.
- The direction in which the spill, vapor or smoke release is heading.

- Any injuries involved.
- Fire and/or explosion or possibility of these events.
- The area and materials involved and the intensity of the fire or explosion.

This information will help the on-site emergency coordinator to assess the magnitude and potential seriousness of the spill or release.

### 9.7.2 *Procedure for Containing/Collecting Spills*

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If for some reason a chemical spill is not contained within a dike or sump area, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and involves a tank or a pipeline rupture, an initial isolation of at least 100 ft. in all directions will be used. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe will require evacuation of at least 50 ft. in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be necessary. In general an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. (Consult the DOT Emergency Response Guide for isolation distances for listed hazardous materials.)

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The on-site emergency coordinator will inform the proper agencies in the event this is necessary. (Refer to Table 9-1)

As called for in regulations developed under the Comprehensive Environmental Response Compensation Liability Act of 1980 (Superfund), a spill of a pound or more of any hazardous material for which a reportable quantity has not been established and which is listed under the Solid Waste Disposal Act, Clean Air Act, Clean Water Act, or TSCA shall be reported.

Clean up personnel will take the following measures:

- Make sure all unnecessary persons are removed from the hazard area.

- Put on protective clothing and equipment.
- If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material.
- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.
- If wastes reach a storm sewer, try to dam the outfall by using sand, earth, sandbags, etc. If this is done, pump this material out into a temporary holding tank or drums as soon as possible.
- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site.
- Spray the spill area with foam, if available, if volatile emissions may occur.
- Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids.

For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.

### 9.7.3 *Emergency Response Equipment*

The following equipment will be staged in the support zone and throughout the site, as needed, to provide for safety and first aid during emergency responses.

- ABC-type fire extinguisher
- First-aid kit, industrial size
- Portable eyewash

### 9.7.4 *Emergency Spill Response Clean-Up Materials and Equipment*

A sufficient supply of appropriate emergency response clean-up and personal protective equipment will be available as needed.

The materials listed below may be kept on site for spill control, depending on the types of hazardous materials present on site. The majority of this material will be located in the support zone, in a supply trailer or storage area. Small amounts, as necessary, will be placed on pallets and located in the active work areas.

- Sand or clay to solidify/absorb liquid spills.

* **Note: All contaminated soils, absorbent materials, solvents and other materials resulting from the clean-up of spilled or discharged substances shall be properly stored, labeled, and disposed of off-site.**

## 9.8 EMERGENCY CONTINGENCY PLAN

This section of the ERCP details the contingency measures the Site Contractor will take to prepare for and respond to fires, explosions, spills and releases of hazardous materials, hazardous weather, and medical emergencies.

## 9.9 MEDICAL EMERGENCY CONTINGENCY MEASURES

The procedures listed below will be used to respond to medical emergencies. A minimum of one First-Aid/CPR trained personnel should be available on site.

### 9.9.1 *Response*

The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The work crew supervisor will be summoned.

The work crew supervisor will immediately make radio contact with the on-site emergency coordinator to alert him of a medical emergency situation. The supervisor will advise the following information:

- Location of the victim at the work site
- Nature of the emergency
- Whether the victim is conscious
- Specific conditions contributing to the emergency, if known

The Emergency Coordinator will notify the Health & Safety Officer. The following actions will then be taken depending on the severity of the incident:

- *Life-Threatening Incident* – If an apparent life-threatening condition exists, the crew supervisor will inform the emergency coordinator by radio, and the local Emergency Response Services (EMS) will be immediately called. An on-site person will be appointed who will meet the EMS and have him/her quickly taken to the victim. Any injury within the EZ will be evacuated by personnel to a clean area for treatment by EMS personnel. No one will be able to enter the EZ without showing proof of training, medical surveillance and site orientation.
- *Non Life-Threatening Incident* – If it is determined that no threat to life is present, the Health & Safety Officer will direct the injured person through decontamination

procedures (see below) appropriate to the nature of the illness or accident. Appropriate first aid or medical attention will then be administered.

* **Note: The area surrounding an accident site must not be disturbed until the scene has been cleared by the Health & Safety Officer.**

Any personnel requiring emergency medical attention will be evacuated from exclusion and contamination reduction zones if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving first aid. Decontamination will be performed if it does not interfere with essential treatment.

If decontamination can be performed, observe the following procedures:

- Wash external clothing and cut it away.

If decontamination cannot be performed, observe the following procedures:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel.
- Alert emergency and off-site medical personnel to potential contamination, instruct them about specific decontamination procedures.
- Send site personnel familiar with the incident and chemical safety information, e.g. MSDS, with the affected person.

All injuries, no matter how small, will be reported to the HSO or the CS. An accident/injury/illness report will be completely and properly filled out and submitted to the Corporate Health and Safety Manager.

A list of emergency telephone numbers is given in Table 9.1.

### 9.9.2 *Notification*

The following personnel/agencies will be notified in the event of a medical emergency:

- Local Fire Department or EMS
- On-site Emergency Coordinator
- Workers in the affected areas
- Client Representative

## 9.10 FIRE CONTINGENCY MEASURES

Because flammable/combustible materials are present at this site, fire is an ever-present hazard. Safety personnel are not trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the emergency coordinator by radio and vacate the structure or area. The emergency coordinator will immediately notify the local Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.
- The air will be monitored for explosivity before and during hot work and periodically where flammable materials are present. Hot work permits will be required for all such work.
- "No smoking" signs will be conspicuously posted in areas where flammable materials are present.
- Fire extinguishers will be placed in all areas where a fire hazard may exist.
- Before workers begin operations in an area the foreman will give instruction on egress procedures and assembly points. Egress routes will be posted in work areas and exit points clearly marked.

### 9.10.1 *Response*

The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify their supervisor who will then contact the Emergency Coordinator by radio. The emergency coordinator will activate the emergency air horns and contact the local Fire Department.
- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.
- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at a predetermined rally point for a head count.
- When a small fire has been extinguished by a worker, the emergency coordinator will be notified.

## 9.11 HAZARDOUS WEATHER CONTINGENCY MEASURES

Operations outside will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains/Snow
- High Winds

### 9.11.1 *Response*

- Excavation/soil stock piles will be covered with plastic liner.
- All equipment will be shut down and secured to prevent damage.
- Personnel will be moved to safe refuge. The emergency coordinator will determine when it is necessary to evacuate personnel to off-site locations and will coordinate efforts with fire, police and other agencies.

### 9.11.2 *Notification*

The emergency coordinator will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. Notifications will include:

- Site workers and subcontractors
- Client Representative
- Local Emergency Management Agency

## 9.12 SPILL/RELEASE CONTINGENCY MEASURES

In the event of release or spill of a hazardous material the following measures will be taken:

### 9.12.1 *Response*

Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.

First aid will be administered to injured/contaminated personnel. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons. Attempt to stop the spill at the source, if possible. Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as uprighting a drum, closing a valve or temporarily sealing a hole with a plug.

The emergency coordinator will be notified of the spill/release, including information on material spilled, quantity, personnel injuries and immediate life threatening hazards. Air monitoring will be implemented by the emergency coordinator and HSO to determine the potential impact on the surrounding community. Notification procedures will be followed to inform on-site personnel and off-site agencies. The emergency coordinator will make a rapid assessment of the spill/release and direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include:

- Construction of a temporary containment berm utilizing on-site clay absorbent earth
- Digging a sump, installing a polyethylene liner and
- Diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground
- Transferring the material from its original container to another container

The emergency coordinator will notify the Client Representative of the spill and steps taken to institute clean-up. Emergency response personnel will clean-up all spills following the spill clean-up plan developed by the emergency coordinator. Supplies necessary to clean up a spill may include, but are not limited to:

- Shovel, rake
- Clay absorbent
- Polyethylene liner
- Personal safety equipment
- Steel drums
- Pumps and miscellaneous hand tools

The emergency coordinator will inspect the spill site to determine that the spill has been cleaned up to the satisfaction of the Client Representative. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort. The emergency coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is prevented. The emergency coordinator will review the cause with the Client Representative and obtain his concurrence with the remedial action plan.

# 10.0 *TRAINING REQUIREMENTS*

All personnel entering the exclusion zone will be trained in the provisions of this site safety plan and be required to sign the CHASP Acknowledgment form in Appendix A.

## 10.1 SITE-SPECIFIC TRAINING ORIENTATION

Outlines of the orientation for site workers, subcontractor personnel and visitors are presented below:

| CONTRACTOR WORKERS | VISITORS |
|---|---|
| • HASP sign off<br>• Sign in/out procedures<br>• Site background/characterization<br>• Chain of command<br>• Rules and regulations<br>• Hours of work<br>• Absences<br>• Personal Protective Equipment/respirator fit test (if applicable)<br>• Emergency Information<br>  • Emergency signal<br>  • Gathering point<br>  • Responsibilities/roles<br>  • Emergency phone numbers<br>• Site Control/Work Zones<br>• Hazards/AHAs<br>• Air Monitoring Program<br>• Forms, site-specific<br>• Incident Reporting<br>• Lead Awareness (Appendix C) | • Sign in/out procedures<br>• Site Background/ Characterization<br>• Review of Site map<br>• Work Zones in progress<br>• Emergency plan/signals<br>• Training/medical requirements<br>• Zones/areas open to visitors |

## 10.2 DAILY SAFETY MEETINGS

A safety meeting will be conducted by the CS and the HSO 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.

## APPENDIX A

- ***HEALTH AND SAFETY PLAN CERTIFICATION***
- ***GENERAL/SUB-CONTRACTOR HEALTH & SAFETY PLAN ACKNOWLEDGEMENT***
- ***NOTICE OF SAFETY VIOLATION***
- ***PRE-JOB SAFETY CHECKLIST***

**HEALTH AND SAFETY PLAN CERTIFICATION**

By signing this document, I am stating that I have read and understand the site health and safety plan for _____ (Contractor) personnel, subcontractors and visitors entering the site.

| COMPANY NAME | NAME (PRINT) | SIGNATURE | DATE |
|---|---|---|---|
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**NOTICE OF SAFETY VIOLATION**

**TO:** _____(Name of Contractor/Subcontractor Supervisor)
**FROM:** _____(Name of Owner/Contractor's Project Manager)
**DATE:** _____
**SUBJECT:** ***Notice of Safety Violations***

The following Safety Violations were observed at the Name of Site/Project on Date.

1. _____
2. _____
3. _____
4. _____
5. _____

You are requested to take the necessary corrective action to alleviate these safety violations by _____ (Date).

Please notify _____(Name of Contractor/Subcontractor's Project Manager) when you have completed this corrective action.

Thank you in advance for your cooperation in this effort.

CONTRACTOR/SUBCONTRACTOR
PRE-JOB SAFETY CHECKLIST

JOB: SUBCONTRACTOR:

LOCATION: PROJECT NO.

| | | Yes | No |
|---|---|---|---|
| 1. | Standard emergency signals fully understood? | ☐ | ☐ |
| 2. | Subcontractor responsibility in time of emergency understood? | ☐ | ☐ |
| 3. | Fire and ambulance telephone numbers known? | ☐ | ☐ |
| 4. | Areas for possible evacuation designated? | ☐ | ☐ |
| 5. | Special safety rules for the plant or area known? | ☐ | ☐ |
| 6. | Nature of Chemical or special hazards for area reviewed with safety officer? | ☐ | ☐ |
| 7. | Special safety equipment for the area of job known? | ☐ | ☐ |
| 8. | Safety shower and eye wash locations known? | ☐ | ☐ |
| 9. | Smoking area designated? | ☐ | ☐ |
| 10. | Have you been advised of potential hazards, protective Measures and availability of hazard information? e.g. Health & Safety Plan | ☐ | ☐ |
| 11. | Do you understand you are required to provide your employees with the information in (10) above? | ☐ | ☐ |
| 12. | Have you provided MSDSs to Athenica for any hazardous material you intend to bring on site? | ☐ | ☐ |
| 13. | Have you submitted training/medical certification records? | ☐ | ☐ |
| 14. | Are your subcontractors aware of the above rules? | ☐ | ☐ |

Remarks: (Explain all No Answers) _____

_____

_____

_____ _____

Subcontractor's Supervisor Date

_____ _____

Contractor's Project Manager Date

_____

_____

Contractor's Project Supervisor Date

_____

_____

Health & Safety Officer Date

## APPENDIX B

### *HEALTH AND SAFETY PLAN AMENDMENTS AND DOCUMENTATION FORM*

**SITE-SPECIFIC HEALTH AND SAFETY PLAN**
**AMENDMENT DOCUMENTATION**

**Project Name:** _____ **Project No.:** _____

**Amendment No.:** _____ **Date:** _____

**Amendment Page(s)***:* **Revises:** _____ **Section(s):** _____

**Task(s) Amendment Affects:*** _____

_____

**(Attach new/revised Job Safety Analyses)*

**Reason For Amendment:**

_____

_____

_____

**Amendment:** *(Attach separate sheet(s) as necessary)*

_____

_____

_____

_____

_____

_____

**Completed by:** _____ **Approved by:** _____

**SITE-SPECIFIC HEALTH AND SAFETY PLAN**
**AMENDMENT DOCUMENTATION**

**Project Name:** _____ **Project No.:** _____

**Amendment No.:** _____ **Date:** _____

**Amendment Page(s)***:* **Revises:** _____ **Section(s):** _____

**SITE-SPECIFIC HEALTH AND SAFETY PLAN**
**AMENDMENT DOCUMENTATION**

**Project Name:** _____ **Project No.:** _____

**Amendment No.:** _____ **Date:** _____

**Amendment Page:** **Revises:** _____ **Section:** _____

**Task(s) Amendment Affects:*** _____

_____

**(Attach new/revised Job Safety Analyses)*

**Reason For Amendment:**

_____

_____

_____

**Amendment:** *(Attach separate sheet(s) as necessary)*

_____

_____

_____

_____

_____

_____

**Completed by:** _____ **Approved by:** _____

## APPENDIX C

***DAILY SAFETY REPORT FORM***

***AIR MONITORING FORMS***

## DAILY SAFETY REPORT

| Date: | Site Name: | Site Location: |
|---|---|---|

| Time | Temp. | Wind Dir | Wind Spd | Conditions |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

| Activity | PPE Worn |
|---|---|
| | |
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| Time | Observations/Actions |
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Notes Taken By: _____

## DAILY SAFETY REPORT

| Date: | Site Name: | Site Location: |
|---|---|---|

| Time | Observations/Actions |
|---|---|
| | |
| | |
| | |

# AIR MONITORING RECORD

| Site Name: | Site Location: | Date: |
|---|---|---|

| Time | Respirable Particulates ($mg/m^3$) | Location | Activity | Init |
|---|---|---|---|---|
| | | | | |
| | | | | |
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|---|---|---|---|---|
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**EQUIPMENT CALIBRATION RECORD**

| **Site Name:** | **Site Location:** |
|---|---|

| **Date** | **Instrument** | **S/N** | **Battery** | **Zero** | **Init. Rdg.** | **Adjustments** | **Initials** |
|---|---|---|---|---|---|---|---|
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
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| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
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| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |

Calibration gases: 1. 100 ppm isobutylene, 2. 50% LEL methane, 3. 50 ppm CO, 4. 25 ppm $H_2S$

## APPENDIX D

### *TAILGATE SAFETY MEETING FORM*

**Daily Safety Meeting Report**

Project Name:
Location:
Date:

Today's Tasks/Activities:

_____
_____
_____
_____
_____
_____
_____

Potential Chemical/Physical Hazards:

_____
_____
_____
_____
_____
_____

Personal Protective Equipment:

_____
_____
_____
_____
_____
_____

Attendees:

| | |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

HSO: _____ _____ Const. Supt:
_____ **(Signature)**
**(Signature)**

---

# APPENDIX 6

# VAPOR BARRIER SPECIFICATIONS AND COMPATIBILITY LETTER

June 25, 2015

Ezgi Karayel
Athenica Environmental Services, Inc.
45-09 Greenpoint Avenue
Long Island City, NY 11104

Dear Ms. Karayel,

I have reviewed the Remedial Investigation Report (Athenica Environmental Services, June 2015) for the remediation/construction project located at 148 West Street, Brooklyn, NY and noted the contaminants specifically described on the following pages:

Table 2—VOCs in Soil Samples
Table 3—SVOCs in Soil Samples
Table 4—Pesticides and PCBs in Soil Samples
Table 5—TAL Metals in Soil Samples
Table 6—VOCs in Groundwater Samples
Table 7—SVOCs in Groundwater Samples
Table 8—PCBs and Pesticides in Groundwater Samples
Table 9—Total Metals in Groundwater Samples
Table 10—Dissolved Metals in Groundwater Samples
Table 11—VOCs in Sub-Slab Vapor Samples

The identified contaminants at the levels reported will not have an adverse effect on the intended performance of VaporBlock Plus VBP20 as a vapor barrier, provided standard design and application procedures are followed. Standard installation instructions and details can be found on our website at www.ravenefd.com. If you have any questions or concerns, please feel free to call or send an e-mail.

Sincerely,

Erika Arens
Product Development Specialist
Engineered Films Division
Raven Industries, Inc.
(605) 357-0453
Erika.Arens@ravenind.com

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# VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

RAVEN INDUSTRIES

## Product Description

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

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

## Product Use

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

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

## Size & Packaging

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

Under-Slab Vapor/Gas Retarder

| Product | Part # |
|---|---|
| VaporBlock Plus 20 | VBP 20 |

## APPLICATIONS

- Radon Barrier
- Methane Barrier
- VOC Barrier
- Under-Slab Vapor Retarder
- Foundation Wall Vapor Retarder

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

# VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

ISO 9001:2008
CERTIFIED MANAGEMENT SYSTEM

| | | VAPORBLOCK PLUS 20 | |
|---|---|---|---|
| **PROPERTIES** | **TEST METHOD** | **IMPERIAL** | **METRIC** |
| **APPEARANCE** | | White/Gold | |
| **THICKNESS, NOMINAL** | | 20 mil | 0.51 mm |
| **WEIGHT** | | 102 lbs/MSF | 498 g/m² |
| **CLASSIFICATION** | ASTM E 1745 | CLASS A, B & C | |
| **TENSILE STRENGTH LBF/IN (N/CM) AVERAGE MD & TD (NEW MATERIAL)** | ASTM E 154 Section 9 (D-882) | 58 lbf | 102 N |
| **IMPACT RESISTANCE** | ASTM D 1709 | 2600 g | |
| **MAXIMUM USE TEMPERATURE** | | 180° F | 82° C |
| **MINIMUM USE TEMPERATURE** | | -70° F | -57° C |
| **PERMEANCE (NEW MATERIAL)** | ASTM E 154 Section 7<br>ASTM E 96 Procedure B | 0.0051 Perms grains/(ft²·hr·in·Hg) | 0.0034 Perms g/(24hr·m²·mm Hg) |
| **RADON DIFFUSION COEFFIECIENT** | K124/02/95 | < 1.1 x $10^{-13}$ m²/s | |
| **METHANE PERMEANCE** | ASTM D 1434 | < 1.7 x $10^{-10}$ m²/d• atm<br>0.32 GTR (Gas Transmission Rate) ml/m²•D•ATM | |

**VaporBlock® Plus™ Placement**

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

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

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

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

RAVEN INDUSTRIES

**Engineered Films Division**
P.O. Box 5107
Sioux Falls, SD 57117-5107
Ph: (605) 335-0174 • Fx: (605) 331-0333

Toll Free: **800-635-3456**
Email: **efdsales@ravenind.com**
**www.ravenefd.com**

Limited Warranty available at www.RavenEFD.com

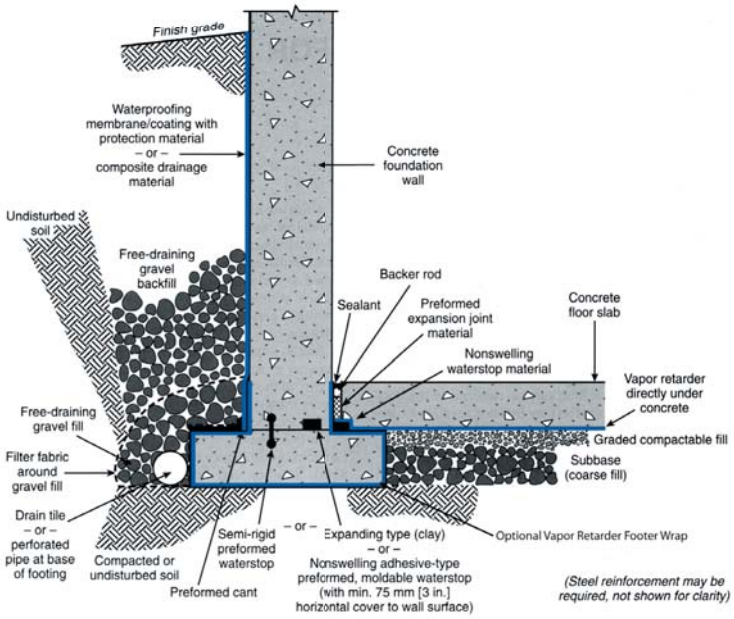
# UNDERSLAB VAPOR / GAS BARRIERS
# INSTALLATION GUIDELINES

Visit our website for current technical data sheets as well as detailed installation guidelines at www.vaporblock.com and click on the appropriate link under the left menu.

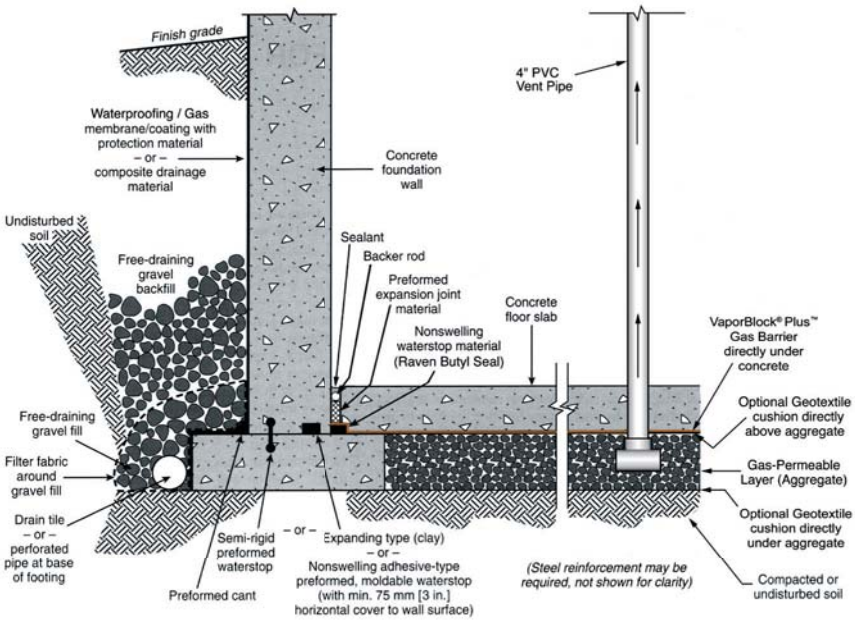
Note: Please refer to ASTM E 1643 (Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs) and the appendixes that accompany this standard to provide additional installation information.

Please follow all architectural drawings/instructions and conform to all applicable local, state and federal regulations and laws pertaining to residential and commercial building construction.

## UNDERSLAB VAPOR RETARDER/BARRIER




## UNDERSLAB MOISTURE AND GAS BARRIER

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Reference: Kanare, Howard M., Concrete Floors and Moisture, EB119, Portland Cement Association, Skokie, Illinois, and National Ready Mixed Concrete Association, Silver Spring, Maryland, USA, 2008, 176 pages.