

47-27 5TH STREET
QUEENS, NEW YORK

Remedial Action Work Plan

NYC BCP Number: 13CVCP138Q
OER Project Number: 13-EHAZ407Q

Prepared for:

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REMEDIAL ACTION WORK PLAN

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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/Demolition
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering and Institutional Controls
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
BCA	Brownfield Cleanup Agreement
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
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
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
SVOC	Semi-Volatile Organic Compound
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

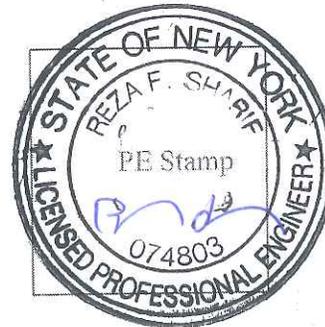
CERTIFICATION

I, Reza Sharif, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the 47-27 5th Street, Queens, New York Site (NYC VCP Site No. 13CVCP138Q and OER project Number 13-EHAZ407Q).

I, William Silveri, am a Qualified Environmental Professional as defined in §43-140. I have primary direct responsibility for implementation of the remedial action for the 47-27 5th Street, Queens, New York Site (NYC VCP Site No. 13CVCP138Q).

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

Reza Sharif, PE
Name
074803
NYS PE License Number
[Signature]
Signature
5-31-13
Date



William Silveri
QEP Name
[Signature]
QEP Signature
5-29-2013
Date

EXECUTIVE SUMMARY

47-27 5th Street LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 2,500-square foot site located at 47-27 5th Street in Queens, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Current Usage

The Site is located at 47-27 5th Street in the Long Island City section in Queens, New York and is identified as Block 30 and Lot 29 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,500-square feet and is bounded by 47th Road to the north, a commercial property to the south, a residential property to the east, and 5th Street to the west. A map of the Site boundary is shown in Figure 2. Currently, the Site is a vacant lot, without any structures, and is enclosed by a chain link perimeter fence to the north and west where it is not bounded by buildings.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 4-story residential apartment building with a full basement, and a side yard to be covered by concrete. Layout of the proposed Site development is presented in Figure 3. The current zoning designation is M1-4/R6A, denoting it as zoned for manufacturing or residential use. The proposed use is consistent with existing zoning for the property.

Based on the current Site development plans prepared by JWC Architect, PLLC dated December 11, 2012, the proposed development of the Site will consist of constructing a new 4-story, residential apartment building with a full basement. The footprint of the new building will cover approximately 80 percent of the Site, and the remaining open area will be a yard occupying the easternmost portion of the Site (i.e. 20 by 25 feet). The net floor area of the first

through fourth floors will be 7,290 square feet, and these floors will consist of eight apartment units. The basement will be utilized for a water meter and sprinkler room, a gas meter room, electrical meter and cable area, and an accessory storage area. Construction of the basement for the new building will require excavation of soils to approximately 10 feet below the grade of 5th Street (i.e. 9 feet to the top of the basement floor, plus another foot for the floor slab). Approximately 1,100 tons of fill material and soils will be excavated for construction of the new building at the Site. Of these 1,100 tons of fill material and native soil, approximately 76 tons at the far eastern portion of the excavation for the building will be disposed of as hazardous due to the presence of a localized area with hazardous levels of leachable lead (i.e. “Hazardous Hot-Spot”) that was identified at the eastern portion of the Site. The eastern portion of the Site outside the eastern boundary of excavation for the building contains the majority of the Hazardous Hot-Spot. Soils at this portion of the Site will be excavated to approximately 9 feet below ground surface (bgs), which will total approximately 250 tons of soil, and will be disposed of as hazardous at an off-site hazardous waste disposal facility. This easternmost portion of the Site outside of the footprint of the building footprint then will be backfilled with clean imported soil and capped with a concrete slab.

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

Summary of the Remedy

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses 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. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Excavation and removal of soil/fill exceeding Track 1 Unrestricted Use SCOs, including excavation of soil/fill to a depth of approximately 11 feet below grade within the footprint of the building, and to a minimum depth of 9 feet below grade in the rear yard area.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
7. 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.
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media onsite.
9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
10. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
11. Installation of a vapor barrier system beneath the 4-inch concrete building slab and outside foundation sidewalls below grade. Vapor barrier manufactured by Grace - Preprufe® 300R 46-mil Membrane will be installed beneath the building basement floor slab, and Preprufe® 160R 32-mil Membrane will be installed along the exterior foundation walls to prevent infiltration of vapor into the structure.

12. Construction and maintenance of an engineered composite cover to prevent human exposure to residual soil/fill remaining under the Site. The composite cover at the eastern portion of the Site covering the side yard will consist of a 4-inch concrete slab over 6 inches of crushed stone. The building floor slab will consist of a 4-inch concrete slab over 2 inches of mud slab over 4 inches of crushed stone.
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15. Submission of a 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 if Track 1 SCOs are not achieved, describes all Engineering and Institutional Controls to be implemented at the Site.
16. If Track 1 SCOs are not achieved, 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.
17. If Track 1 Unrestricted Use SCOs are not achieved, the property will continue to be flagged with an E-Designation by 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 Office of Environmental Remediation created the New York City Voluntary Cleanup Program (NYC VCP) to provide governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan (“cleanup plan”) describes the findings of prior environmental studies that show the location of contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

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

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

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

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

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

Site Safety Coordinator. This project has a designated Site safety coordinator to implement the Health and Safety Plan. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is David Lo and can be reached at (516)829-5883.

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 OER. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a 'Contingency Plan').

Odor, Dust and Noise Control. This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical cover, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager, David Lo, at (516)829-5883, or NYC OER Project Manager, Horace Zhang, at (212) 788-8841.

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.

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

Hours of Operation. The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. The hours of operation for remedial construction will be 7:00 AM to 5:00 PM Monday through Friday.

Signage. While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC Voluntary Cleanup Program, provides project contact names and numbers, and locations of 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, David Lo, at (516)829-5883, the NYC OER Project Manager Horace Zhang, at (212) 788-8841, 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, odors and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed to protect storm water catch basins and other discharge points.

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

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

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

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

Truck Routing. Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

Final Report. The results of all cleanup work will be fully documented in a final report (called a Remedial Action Report) that will be available for you to review in the public document repositories located at Queens Library – Court Square.

Long-Term Site Management. To provide long-term protection after the cleanup is complete, the property owner may 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 OER. Requirements that the property owner must comply with are established through a city environmental designation. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 SITE BACKGROUND

47-27 5th Street LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 47-27 5th Street in the Long Island City section of Queens, 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, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 SITE LOCATION AND CURRENT USAGE

The Site is located at 47-27 5th Street in the Long Island City section in Queens, New York and is identified as Block 30 and Lot 29 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,500-square feet and is bounded by 47th Road to the north, a commercial property to the south, a residential property to the east, and 5th Street to the west. A map of the Site boundary is shown in Figure 2. Currently, the Site is a vacant lot, without any structures, and is enclosed by a chain link perimeter fence to the north and west where it is not bounded by buildings.

1.2 PROPOSED REDEVELOPMENT PLAN

The proposed future use of the Site will consist of a 4-story residential apartment building with a full basement, and a side yard to be covered by concrete. Layout of the proposed Site development is presented in Figure 3. The current zoning designation is M1-4/R6A, denoting it as zoned for manufacturing or residential use. The proposed use is consistent with existing zoning for the property.

Based on the current Site development plans prepared by JWC Architect, PLLC dated December 11, 2012, the proposed development of the Site will consist of constructing a new 4-story, residential apartment building with a full basement. The footprint of the new building will cover approximately 80 percent of the Site, and the remaining open area will be a yard occupying the easternmost portion of the Site (i.e. 20 by 25 feet). The net floor area of the first through fourth floors will be 7,290 square feet, and these floors will consist of eight apartment units. The basement will be utilized for a water meter and sprinkler room, a gas meter room, electrical meter and cable area, and an accessory storage area. Construction of the basement for the new building will require excavation of soils to approximately 10 feet below the grade of 5th Street (i.e. 9 feet to the top of the basement floor, plus another foot for the floor slab). Approximately 1,100 tons of fill material and soils will be excavated for construction of the new building at the Site. Of these 1,100 tons of fill material and native soil, approximately 76 tons at the far eastern portion of the excavation for the building will be disposed of as hazardous due to the presence of a localized area with hazardous levels of leachable lead (i.e. “Hazardous Hot-Spot”) that was identified at the eastern portion of the Site. The eastern portion of the Site outside the eastern boundary of excavation for the building contains the majority of the Hazardous Hot-Spot. Soils at this portion of the Site will be excavated to approximately 9 feet below ground surface (bgs), which will total approximately 250 tons of soil, and will be disposed of as hazardous at an off-site hazardous waste disposal facility. This easternmost portion of the Site outside of the footprint of the building footprint then will be backfilled with clean imported soil and capped with a concrete slab.

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

1.3 DESCRIPTION OF SURROUNDING PROPERTY

According to the OER Searchable Property Environmental E-Database (SPEED), there is one sensitive receptor (such as schools, hospitals, and day-care facilities) within a 500-foot radius of the Site. Public School 078 is located approximately 300 feet south-southwest of the Site. Figure 4 shows the surrounding land usage.

1.4 REMEDIAL INVESTIGATION

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report, 47-27 5th Street, Queens New York*”, dated May 2013 (RIR).

Summary of Past Uses of Site and Areas of Concern

The AOCs identified for this site include:

- The past use of the Site as a machine shop;
- The past use of the adjacent and presumed up-gradient property to the east of the Site as a foundry;
- Historic fill throughout the Site; and
- Area at the east side of the Site which waste characterization soil sampling determined was hazardous for leachable lead.

Summary of the Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a geophysical survey across the entire Site to identify and underground or buried storage tanks (in 2008);
3. Installed four (4) soil borings to 12.5 feet below ground surface (bgs) in 2008 and one (1) soil boring to 12 feet bgs in 2013, and collected two soil samples for chemical analysis from each soil borings to evaluate soil quality;
4. Installed four (4) additional soil borings in 2013 to 9 feet bgs to the north, south, east, and west of the location of the former test pit in which hazardous soils were identified. Four samples were collected from each of these four soil borings and submitted to the laboratory for analysis. Three additional soil borings were installed west of the test pit for contingency analysis in the event that analysis of the boring

immediately west of the test pit exhibited elevated levels of leachable lead, and four soil samples were collected from each of these borings;

5. Installed two (2) groundwater monitoring wells at the Site in 2008 and one (1) groundwater monitoring well at the Site in 2013 and collected four (4) groundwater samples for chemical analysis to evaluate groundwater quality; and
6. Installed three (3) soil vapor probes around Site in 2013 and collected three (3) samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property ranges from 9 feet to 10.42 feet.
2. Depth to groundwater was 8.68 feet at the Site, according to the groundwater measured during this RI performed in 2013.
3. Since no permanent groundwater monitoring wells have been installed, the actual direction of groundwater flow is unknown. The groundwater flow is presumed to be generally from the east to the west beneath the Site, based on United States Geological Survey (USGS) topography maps and the proximity of the nearby East River.
4. According to the USGS Hydrogeologic Investigations Atlas: Hydrogeologic Framework of Long Island, New York (1989), depth to bedrock is approximately 200 feet at the Site. Bedrock was not encountered during any portion of either site investigation.
5. The stratigraphy of the site, from the surface down, consists of approximately 8 feet of urban fill (brick, stone, concrete in a brown fine medium sand matrix), underlain by approximately 192 feet of Upper Glacier Aquifer, which consists of poorly-permeable till composed of clay, sand, gravel, and boulders.
6. No evidence of petroleum staining or odors was observed in any of the soil borings.
7. Historic fill consisting mainly of brick fragments, asphalt pieces, concrete was encountered in most of the borings and extended to approximately 8 feet bgs.
8. Eight (8) soil/fill samples collected during Phase II in 2008 showed no concentrations of volatile organic compounds (VOCs) that were above their corresponding Part 375

Unrestricted Use SCOs. Pesticides and polychlorinated biphenyls (PCBs) were not detected in the soil samples. Several SVOCs were detected above Restricted Residential Use SCOs and included benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and pyrene in two shallow soil samples. Several metals including barium (774 ppm), cadmium (7.6 ppm), copper (5,390 ppm), lead (2,670 ppm), mercury (1.4 ppm), and zinc (3,350 ppm) were detected at concentrations exceeding Restricted Residential SCOs.

Eighteen (18) soil samples were collected during the Remedial Investigation (2013). Several VOCs, including 1,3,5-trimethylbenzene, acetone, benzene, carbon disulfide, and o-xylene, were detected at low concentrations in the deep soil sample collected from one soil boring. Only acetone was detected in the shallow soil sample from same boring. Several SVOCs were detected above Restricted Residential Use SCOs and included benzo(a)anthracene (max. of 10.2 mg/kg or ppm), benzo(a)pyrene (max. of 8.86 ppm), benzo(b)fluoranthene (max. of 10.4 ppm), benzo(k)fluoranthene (max. of 8.25 ppm), and chrysene (max. of 8.84 ppm) in one shallow soil sample. No pesticides or PCBs were detected in the deep soil. One pesticide, 4,4'-DDT (0.0265 ppm) and one PCB, Aroclor 1260 (0.330 ppm) exceeded the Unrestricted Use SCOs in shallow soil. Two metals, barium (1,450 ppm) and lead (1,550 ppm), were detected at concentrations exceeding Restricted Residential SCOs. Toxicity Characteristic Leaching Procedure (TCLP) lead analysis of the samples revealed that all of the samples were below the EPA Hazardous Waste value of 5 mg/L, and are therefore considered to be non-hazardous.

9. 2008 groundwater investigation data showed no detectable concentrations VOCs, SVOCs, pesticides or PCBs in the groundwater. Several metals exceeded Class GA Groundwater Standards (GQS).

2013 Groundwater sample results indicated that no detectable concentrations of SVOCs, pesticides, or PCBs were found in the groundwater samples. Trace levels of acetone and benzene were detected in the groundwater sample. Concentrations of dissolved metals in the groundwater were significantly lower than the total levels of metals in groundwater. Metals including magnesium, manganese, and selenium exceeded GQS.

10. Several petroleum related and chlorinated compounds were detected in soil vapor samples. Most of compounds detected were at concentrations less than 10 ug/m³. Tetrachlorethene (PCE) was detected in all samples ranging from 2.1 to 200 ug/m³. Trichloroethylene (TCE) was detected in one of the three samples, at a concentration of 9.1 ug/m³. 1,1,1-Trichloroethane (TCA) was detected in two samples, at maximum concentrations of 7.7 ug/m³. Carbon tetrachloride was not detected. According to the NYSDOH Matrices, the highest concentrations of PCE and TCE warrant either monitoring or mitigation.

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

2.0 REMEDIAL ACTION OBJECTIVES

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

Groundwater

- Prevent direct exposure to contaminated groundwater.
- Remove contaminant sources causing impact to groundwater.

Soil

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

Soil Vapor

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

3.0 REMEDIAL ALTERNATIVES ANALYSIS

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). A remedy is then developed 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.

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. As required, a minimum of two remedial alternatives (including a Track 1 scenario) are evaluated. Alternative 1 is a Track 1 alternative that involves removal of all soil impacted above Track 1 Unrestricted Use SCOs. Alternative 2 removes all impacted soil above Track 4 Site-Specific SCOs.

Alternative 1 is a Track 1 Alternative and involves:

- Establishment of 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 require excavation to an approximate depth of approximately 9 feet below ground surface across the entire footprint of the Site. However, if soil/fill containing chemical constituents at concentrations above Track 1 Unrestricted Use SCOs are still present at the base of the excavation after removal of all soil required for new construction, additional excavation would be performed to ensure complete removal of soil that does not meet Track 1 Unrestricted Use SCOs;

- No Engineering or Institutional Controls are required in a Track 1 cleanup, but a vapor barrier system/waterproofing membrane will be installed beneath the entire new floor slab and behind new foundation walls part of construction and will prevent exposures from off-Site soil vapor.
- Placement of a final cover over the entire Site as part of construction.

Alternative 2 is a Track 4 alternative and involves:

- Establishment of Site-specific SCOs
- Excavation and removal of all soil/fill exceeding Site-specific SCOs and confirmation that Track 4 has been achieved with post-excavation end-point sampling. Based on the results of the remedial investigation, it is expected that this alternative would require excavation to a depth of 9 feet below ground surface across the entire footprint of the Site.
- Placement of a final cover over the entire Site to eliminate exposure to remaining soil/fill;
- Installation of a vapor barrier system/waterproofing membrane beneath the entire new building floor slab and behind foundation sidewalls as part of construction to prevent exposures from off-Site soil vapor.
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site and prohibitions on sensitive site uses, such as farming or vegetable gardening, to eliminate future exposure pathways.
- Establishment of an approved Site Management Plan 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; and
- Continued registration as an E-designated property to memorialize the remedial action and the Engineering and Institutional Controls required by this RAWP.

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 historic soil/fill exceeding Track 1 SCOs and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contamination leaching into groundwater.

Alternative 2 would achieve comparable protections of human health and the environment by excavating the historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCOs 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 and a Site Management Plan would ensure that the composite cover system remains intact and protective. Establishment of Track 4 Site-Specific SCOs would minimize the risk of contamination leaching into groundwater.

For both remedial 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). There would be minimal potential for contact with contaminated groundwater after remediation is complete as it is neither used nor anticipated to be accessible after the remedial action. Potential future migration of soil vapors from off-Site into the new building would be prevented by installing a vapor barrier system and waterproofing membrane beneath the entire new floor slab and behind foundation sidewalls.

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, SCGs and RAOs for soil through removal of soil to meet Track 1 Unrestricted Use SCOs. Compliance with SCGs for soil vapor would also be achieved by installation of a vapor barrier system / waterproofing membrane beneath the entire floor slab and behind foundation sidewalls as part of development. 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.

Alternative 2 would achieve compliance with the remedial goals, SCGs and RAOs for soil through removal of soil to meet Track 4 Site-specific SCOs. Compliance with SCGs for soil vapor would also be achieved by installation of a vapor barrier system/ waterproofing membrane beneath the entire floor slab and behind foundation sidewalls as part of construction. A Site Management Plan would ensure that these controls remained protective for the long term. Similar to the Track 1 alternative, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs.

Short-term effectiveness and impacts

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

Both Alternatives 1 and 2 have similar-short term effectiveness during their respective implementations, as each requires excavation of historic fill material under the building footprint

and in rear yard areas. Alternative 1 would eliminate and Alternative 2 would reduce exposure to contaminant sources. Short term impacts are likely to be higher for Alternative 1 due to excavation of greater amounts of historical fill material. However, focused attention to means and methods during the remedial action during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize or negate the overall impact of these activities and any differences between these alternatives. Alternatives 1 and 2 would both employ appropriate measures to prevent short term impacts, including a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would effectively prevent the release of significant 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 Health and Safety Plan (CHASP) will be protected from on-Site contaminants (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 Institutional and Engineering Controls that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and Institutional Controls that are designed to eliminate exposures to contaminants, and long-term reliability of Engineering Controls.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all impacted soil/fill and enabling unrestricted usage of the property. Potential sources of soil vapor and groundwater contamination would also be eliminated as part of the Track 1 remedy.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-specific SCOs, establishing a composite cover system across the Site, establishing use restrictions, and establishing a Site Management Plan to ensure long-term management of Engineering and Institutional Controls. Establishment of a Site Management Plan will ensure that this protection remains effective for the long-term. The SMP will ensure long-term effectiveness of all Engineering and Institutional Controls by requiring periodic inspection and certification that these controls and use restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy will provide continued high level of protection in perpetuity.

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 would permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing all soil in excess of Unrestricted Use SCOs.

Alternative 2 would remove most of the impacted soil present on the Site and any remaining soil on-Site would meet Track 4 Site-specific SCOs. The Alternative 1 would eliminate a greater total mass of contaminants on Site.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during

its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

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

Cost effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, 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.

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

Community Acceptance

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

Based on the overall goals of the remedial program and the intended Site use, it is anticipated that both Alternatives 1 and 2 for the Site would be acceptable to the community. Both remedial actions provide for protection of public health and the environment and minimize potential contaminant exposures. This RAWP will be subject to, and undergo public review under the

NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedial action. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in Attachment B.

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 proposed redevelopment of the Site is compatible with its current zoning and is consistent with recent development patterns. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 4 Site-specific SCOs, which is appropriate for its planned residential use. Improvements in the current brownfield condition of the property achieved by both alternatives are also consistent with the City's goals for cleanup of contaminated land and bringing such properties into productive reuse. Both alternatives are equally protective of natural resources and cultural resources.

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 the 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. A complete list of green remedial activities considered as part of the NYC VCP is included in the Sustainability Statement, included as Appendix D.

4.0 REMEDIAL ACTION

4.1 SUMMARY OF PREFERRED REMEDIAL ACTION

The preferred remedial action alternative is Track 1 Alternative. The preferred remedial action alternative achieves protection of public health and the environment for the intended use of the property. The preferred remedial action alternative will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action alternative is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and Performance of all required NYC VCP citizen participation activities according to an approved Citizen Participation Plan.
2. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Excavation and removal of soil/fill exceeding Track 1 Unrestricted Use SCOs, including excavation of soil/fill to a depth of approximately 11 feet below grade within the footprint of the building, and to a minimum depth of 9 feet below grade in the rear yard area.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
7. 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.

8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media onsite.
9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
10. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
11. Installation of a vapor barrier system beneath the 4-inch concrete building slab and outside foundation sidewalls below grade. Vapor barrier manufactured by Grace - Preprufe® 300R 46-mil Membrane will be installed beneath the building basement floor slab, and Preprufe® 160R 32-mil Membrane will be installed along the exterior foundation walls to prevent infiltration of vapor into the structure.
12. Construction and maintenance of an engineered composite cover to prevent human exposure to residual soil/fill remaining under the Site. The composite cover at the eastern portion of the Site covering the side yard will consist of a 4-inch concrete slab over a 2 inches of mud slab over 4 inches of crushed stone. The building floor slab will consist of a 4-inch concrete slab over 6 inches of crushed stone.
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15. Submission of a 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 if Track 1 SCOs are not achieved, describes all Engineering and Institutional Controls to be implemented at the Site.

16. If Track 1 SCOs are not achieved, 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.
17. If Track 1 Unrestricted Use SCOs are not achieved, the property will continue to be flagged with an E-Designation by 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

Track 1 Soil Cleanup Objectives (SCOs) are proposed for this project. If Track 1 is not achieved, Track 4 will consist of Track 2 Restricted Residential SCOs as amended by the following Site-specific SCOs:

Contaminant	Track 4 SCOs
Total SVOCs	250 ppm
Barium	800 ppm
Lead	1,000 ppm
Mercury	2.0 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 3. The location of planned excavations is shown in Figure 5.

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.

E stimated Soil/Fill R emoval Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is 1,361 tons. The total quantity of fill material and native soil expected to be excavated for the new building and disposed off-Site is 1,100 tons and is based on the presumed depth of excavation of 10 feet over the footprint for the new building, which will be 2,000 square feet. Of these 1,100 tons of fill material and native soil, approximately 75 tons at the far eastern portion of the building excavation will be disposed of as hazardous due to the presence of a hot-spot area with hazardous levels of leachable lead that was identified at the east portion of the Site. The eastern portion of the Site outside the eastern boundary of excavation for the building contains the majority of the hot-spot area. Soils in this portion of the Site will be excavated to approximately 9 feet below ground surface, which will total approximately 250 tons of soil and will be disposed of as hazardous. The proposed disposal locations for Site-derived impacted materials are listed below. Additional disposal locations established at a later date will be reported promptly to the OER Project Manager.

<u>Disposal Facility</u>	<u>Waste Type</u>	<u>Estimated Quantities</u>
Clean Earth of Philadelphia	Non-Hazardous Native Soil and Fill Material	1,025 tons
Clean Earth of North Jersey	Non-Hazardous and Hazardous Soils and Fill Material	325 tons

Recognizable and uncontaminated construction demolition debris outside of the Hazardous Hot-Spot area, consisting mainly of masonry and brick fragments, may be segregated at the Site and taken to Crown Container, located at 126-46 34th Street in Flushing, NY 11368, for off-Site re-use.

End-Point Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation soil sampling. Three confirmation samples will be collected from the base of the excavation at locations to be determined by OER. For comparison to Track 1 SCOs, analytes will include VOCs, SVOC, pesticides, PCBs, and metals according to analytical methods described below.

Hot-spot removal actions, whether established under this RAWP or identified during the remedial program, will be performed in conjunction with post remedial end-point samples to ensure that hot-spots are fully removed. Analytes for end-point sampling will be those parameters that are driving the hot-spot removal action and will be approved by OER. Frequency for hot-spot end-point sample collection is as follows:

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.

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

Soil analytical methods will include:

- 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.

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

Quality Assurance/Quality control sampling will consist of collecting blind field duplicates, and field blanks for every 20 end-point soil samples. Athenica Environmental Services, Inc. will perform a completeness check of the analytical data packages and review the QA/QC observations and deficiencies.

The end-point soil samples will be appropriately containerized, labeled and assigned a unique sample identification number along with sampling description, location, and depth. The soil samples will be accompanied by a completed Chain-of-Custody document. Sampling methods, sample preservation requirements, sampling handling times, and decontamination

procedures for field equipment will conform to applicable industry standards and NYSDEC requirements.

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

- Gently tap or scrape to remove adhered soil,
- Rinse with tap water,
- Wash with Alconox detergent solution and scrub,
- Rinse with tap water, and
- Rinse with distilled or deionized water.

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. One blind duplicate sample will be prepared and submitted for analysis for every 20 samples.

Import and Reuse of Soils

Import of soils onto the property and reuse of soils already onsite will be performed in conformance with the Soil/Materials Management Plan in Appendix 3. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 250 tons. No reuse of on-Site soils is anticipated for the Site.

4.3 ENGINEERING CONTROLS

The excavation required for the proposed Site development will achieve Track 1 Unrestricted Use SCOs. No engineering controls will be required to address residual contamination at the Site. As part of development, a vapor and water-proofing membrane will be incorporated into the foundation design. If Track 1 is not achieved, the following two elements will constitute engineering controls that will be employed in the remedial action to address residual contamination:

Composite Cover System

As part of new development, the entire property will be covered by an engineered permanent cover system comprised of a 4 inch concrete building slab beneath the proposed building at the western portion of the Site, and a 4 inch concrete slab covering the undeveloped portion at the east side of the Site. For Track 4 Cleanup (if necessary), exposure to residual soil/fill will be prevented by this engineered, composite cover. Figure number 7 shows the typical design for each remedial cover type used on this Site and the location of each cover type built at the Site.

The composite cover system would serve as a permanent engineering control for the Site if Track 1 Cleanup is not achieved. The system will be inspected and reported at specified intervals as required by this RAWP and the SMP. A Soil Management Plan will be included in the 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 RAR. Figure 7 shows the location of the composite cover.

Vapor Barrier

Migration of soil vapor will be mitigated with a combination of building slab and vapor barrier. The proposed vapor barrier systems will consist of the following, all manufactured by W. R. Grace & Co.:

Building Basement Floor Slab and Foundation Walls Against Adjacent Foundation Wall/underpinning or Against Permanent Formwork or Permanent Shoring (i.e. Blind Pour)

Preprufe® 300R 46-mil Membrane will be installed beneath the building basement floor slab, and Preprufe® 160R 32-mil Membrane will be installed along the exterior foundation walls to prevent infiltration of vapor into the structure. The vapor barrier will be installed over a 2-inch mud slab. Preprufe® Tape (a self-adhesive 4-inch-wide strip) will be used to cover all penetrations. Vertical and horizontal overlaps in succeeding sheets will be 3 inches. All roll ends and cut edges will overlap a minimum of 3 inches and Preprufe® Tape will be applied centered over the lap edges. Overlaps of horizontal and vertical membranes at corners and construction joints, mechanical fastening of overlaps and ancillary products will be in

accordance with the manufacturer installation diagrams and specifications.

Building Basement Floor Slab and Foundation Walls Formed on Both Sides

Preprufe® 300R 46-mil Membrane will be installed beneath the building basement floor slab, and Bituthene® 3000 62-mil Membrane will be installed along the exterior foundation walls to prevent infiltration of vapor into the structure. The vapor barrier will be installed over a 2-inch mud slab. Bituthene Liquid Membrane® 0.1-inch-thick will be applied around all penetrations. Horizontal overlaps in succeeding Preprufe® 300R sheets of will be 3 inches. All Preprufe® 300R roll ends and cut edges will overlap a minimum of 3 inches and Preprufe® Tape will be applied centered over the lap edges. Vertical overlaps in Bituthene® 3000 will be 2 inches minimum. Overlaps of horizontal and vertical membranes at corners and construction joints, mechanical fastening of overlaps and ancillary products will be in accordance with the manufacturer installation diagrams and specifications.

The project's Professional Engineer licensed by the State of New York will have primary direct responsibility for overseen the implementation of the vapor barrier. Figure 7 shows the installation locations and details of the vapor barrier beneath the floor slab and along the exterior foundation walls. Specifications and installation diagrams from the manufacturer are provided in Appendix 5. A Site-specific Chemical Compatibility Letter will be included as a stipulation letter at a later date.

4.4 INSTITUTIONAL CONTROLS

The proposed remedy will achieve Track 1 Unrestricted Use SCOs; therefore, no institutional controls will be required. However, if Track 1 Unrestricted Use SCOs are not achieved, Institutional Controls (IC) will be utilized in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. Long-term employment of EC/ICs will be established and implemented under a Site Management Plan that will be included in the RAR. Institutional Controls are listed below:

- The property will continue to be registered with an E-Designation by the NYC Buildings Department. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the Site Management Plan which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a Site Management Plan in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting and certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) Controls employed at the Site are unchanged from the previous certification or that any changes to the Controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the Controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any Controls. This certification shall be submitted at a frequency to be determine by OER in the SMP and will comply with RCNY §43-1407(1)(3).
- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for residential use and will not be used for a higher level of use without prior approval by OER.

4.5 SITE MANAGEMENT PLAN

Site Management is not required for Track 1 remedial actions. However, if Track 1 SCOs are not achieved, Site Management will be 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 the DCR and 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 DCR and 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 Brownfield Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) implementation of monitoring programs; (3) operation and maintenance of EC's; (4) inspection and certification of EC's; and (5) reporting.

Site management activities, reporting, and EC/IC certification will be scheduled by OER on a periodic basis to be established in 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 March 31 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.

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

Known and Potential Sources

Based on the results of the RIR, historic fill is present at the Site from grade to approximately 8.5 feet below grade. Based on the RIR, the contaminants of concern are as follows:

Soil:

- VOC - benzene slightly exceeded the NYSDEC Part 375 Unrestricted Use SCOs..
- SVOCs including benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and dibenzo(a,h)anthracene exceeded the NYSDEC Part 375 Unrestricted Use SCOs as well as Restricted Residential SCOs.
- Pesticide - 4,4'-DDT exceeded the NYSDEC Part 375 Unrestricted Use SCO but not Restricted Residential SCOs.
- PCB - Aroclor 1260 exceeded the NYSDEC Part 375 Unrestricted Use SCO but not Restricted Residential SCOs.
- The metals arsenic, barium, hexavalent chromium, copper, lead, mercury, nickel, selenium, and zinc exceeded the NYSDEC Part 375 Unrestricted Use SCOs.

Groundwater:

- Metals including magnesium, manganese, and selenium exceeded GQS.
- Groundwater samples collected during the RI showed no detections of SVOCs, Pesticides and PCBs.

Soil vapor:

- Several petroleum related and chlorinated compounds were detected in soil vapor samples. Most of compounds detected were at concentrations less than 10 ug/m³. PCE, TCE, and TCA were detected in soil vapor samples. According to the NYSDOH Matrices, the detected concentrations of PCE and TCE warrant either monitoring or mitigation.

Nature, Extent, Fate and Transport of Contaminants

With the exception of benzene, copper, mercury, and selenium, the SVOCs, pesticides, PCBs, and metals that were detected in the soil were present only in samples collected from the fill material with no contamination found in the underlying natural soil. The concentrations of copper and mercury were shown to generally decrease with depth, and their concentrations in the deep samples were found to just slightly exceed the NYSDEC Part 375 Unrestricted Use SCOs. Benzene and selenium were only detected in one boring, and both compounds were found to increase significantly in concentration with depth, which suggests that their presence in the soil samples is due to groundwater rather than soil. Trace levels of acetone and benzene were detected in the groundwater sample. Concentrations of dissolved metals in the groundwater were significantly lower than the total levels of metals in groundwater. Metals including magnesium, manganese, and selenium exceeded GQS. With the exception of 1,3,5-trimethylbenzene, benzene, carbon disulfide, and o-xylene, the VOCs identified in the soil vapor were not found in any of the on-Site soil samples collected and therefore are more likely due to off-Site or an upgradient/cross-gradient source. None of these compounds that were detected in the soil samples exceeded their respective NYSDEC Part 375 Unrestricted Use SCOs (where criterion values exist) except for a slight exceedence of benzene in one soil sample.

Potential Routes of Exposure

The five elements of an exposure pathway are:

- 1) The source of contamination – urban fill;
- 2) The environmental media - the urban fill; and transport mechanisms - direct contact, ingestion, and inhalation;
- 3) The point of exposure – proximity to exposed urban fill;
- 4) The route of exposure – direct contact with the urban fill or dust resulting from disturbance of the fill material;
- 5) The receptor population – workers involved in the excavation and disturbance of the urban fill material.

An exposure pathway is considered complete when all five elements of an exposure pathway are documented. A potential pathway exists when any one or more of the five elements comprising an exposure pathway cannot be determined. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future. Three potential primary routes exist by which chemicals can enter the body:

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

Existence of Human Health Exposure

Current Conditions: As the Site is vacant and unauthorized entry is prevented by a perimeter fence, there are no potential exposure pathways from soil and fill. Groundwater is not contaminated and is not exposed at the Site, and because the Site is served by the public water supply, groundwater is not used at the Site. There are no structures on Site where soil vapor could accumulate.

Construction/Remediation Activities: During remedial action, worker and community exposure to site constituents in soils, groundwater, and soil vapor will be possible. The potential exposure pathways to onsite contamination are by ingestion, dermal, or inhalation exposure by onsite workers during the remedial action. Similarly, off-Site receptors could be exposed to dust from onsite activities. Excavation will extend into groundwater. During the remedial action, on-site exposure pathways will be eliminated by preventing access to the site, through implementation of soil/ materials management, storm water pollution prevention, and dust controls, employment of a community air monitoring plan, and implementation of a Construction Health and Safety Plan.

Proposed Future Conditions: The proposed Site development includes the removal of existing soil to a depth of approximately 10 feet and construction of a new 4-story building with a full basement floor slab over the 80% of the Site and a concrete slab over imported clean soil at the eastern portion of the Site. In addition, any soils exhibiting VOC contamination encountered

during construction will be excavated and removed from the Site for off-site disposal. These actions will eliminate the potential for direct contact with underlying soil and eliminate the potential for soil in the unsaturated zone to serve as a source of VOCs in soil gas. Any on-Site exposures to residual soil vapor and vapors from off-site sources will be eliminated by installation of a vapor barrier. The site is served by the public water supply; groundwater is not used at the site.

Receptor Populations

On-Site Receptors: The Site is currently vacant and fully enclosed by a perimeter fence to prevent unauthorized entry. Therefore, the only potential on-Site receptors are Site Representatives and trespassers. During redevelopment of the Site, the on-Site potential receptors will include construction workers, site representatives, and visitors. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child building residents, employees, and visitors.

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

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

Overall Human Health Exposure Assessment

Based upon this analysis, complete on-site exposure pathways appear to be present only during the current and construction/ remediation phase. Under current conditions, on-site exposure pathways are minimized by preventing access to the Site. During the remedial action, on-site exposure pathways will be minimized by preventing access to the Site, through implementation of soils/materials management, storm water pollution prevention, dust controls,

employment of a community air monitoring program, and implementation of a construction health and safety plan. After the remedial action is complete, there will be no remaining exposure pathways. If Track 1 remedy is not achieved, continued protection after the remedial action will be achieved by the implementation of site management including periodic inspection and certification of the performance of remedial controls.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 PROJECT ORGANIZATION AND OVERSIGHT

Principal personnel who will participate in the remedial action include Reza Sharif, P.E., and William Silveri, Professional Geologist (PG) and Certified Hazardous Materials Manager (CHMM). The Professional Engineer (PE) and Qualified Environmental Professional (QEP) for this project are Reza Sharif, P.E., and William Silveri, respectively. For the vapor barrier installation, Reza Sharif, P.E., will provide oversight. For the other components of the RAP, William Silveri, the QEP, will provide oversight.

5.2 SITE SECURITY

Site access will be controlled by through gated entrances to the fenced property.

5.3 WORK HOURS

The hours for operation of remedial construction will be from 7:00 am to 5:00 pm. These hours conform to the New York City Department of Buildings construction code requirements.

5.4 CONSTRUCTION HEALTH AND SAFETY PLAN

The Health and Safety Plan is included in Appendix 4. The Site Safety Coordinator will be David Lo. 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, including 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 be required to sign an HASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site 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 HASP. 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 baling/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedences of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

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

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be 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/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other Controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

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

5.6 AGENCY APPROVALS

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

5.7 SITE PREPARATION

Pre-Construction Meeting

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

Mobilization

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

Utility Marker Layouts, Easement Layouts

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

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

Dewatering

In the event that dewatering of groundwater during construction will be necessary, the water will be disposed into the New York City combined sanitary/storm sewer system. A permit to discharge will be obtained from the New York City Department of Environmental Protection (NYCDEP). As part of the permit to discharge, the location of discharge will be based on the Site-Specific requirements of the DEP. The need for pretreatment will be determined by DEP's requirements for the discharge permit. If pretreatment is required by the DEP, it will be performed in accordance with the requirements of the DEP.

Permitting

Prior to initiating site work, all local permitting will be obtained from the NYC DEP. To satisfy state permitting requirements, developer/representative would obtain any required NYSDEC permits.

Equipment and Material Staging

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

Stabilized Construction Entrance

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

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the NYC VCP Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and

debris will be removed. Brooms, shovels and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary.

Extreme Storm Preparedness and Response Contingency Plan

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

Storm Preparedness

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

Storm Response

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to OER at the completion of site inspection and after the site security is assessed. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings,

structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Storm-water control systems and structures will be inspected and maintained as necessary. If soil or fill materials are discharged off site to adjacent properties, property owners and OER will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to OER and implemented following approval by OER and granting of site access by the property owner. Impacted 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. 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 NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is 47th Road.

5.9 DEMOBILIZATION

Demobilization will include:

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

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

5.10 REPORTING AND RECORD KEEPING

Daily Reports

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

- Project number and statement of the activities and an update of progress made and locations of work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP excursions, if any;
- 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 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 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;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 is not achieved);
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results and all material characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action and DUSR;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material.
- Account of the origin and required chemical quality testing for material imported onto the Site.
- Continue registration of the property with an E-Designation by the NYC Department of Buildings.

- Reports and supporting material will be submitted in digital form.

Remedial Action Report Certification

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

I, Reza Sharif am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the vapor barrier required by the remedial program for the 47-27 5th Street, Queens, New York Site (NYC VCP Site No. 13-EHAZ407Q).

I, William Silveri, am a qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the 47-27 5th Street, Queens, New York Site (NYC VCP Site No. 13-EHAZ407Q) and the portions of the remedial program which I oversaw were implemented under the general guidance of the above-referenced P.E.

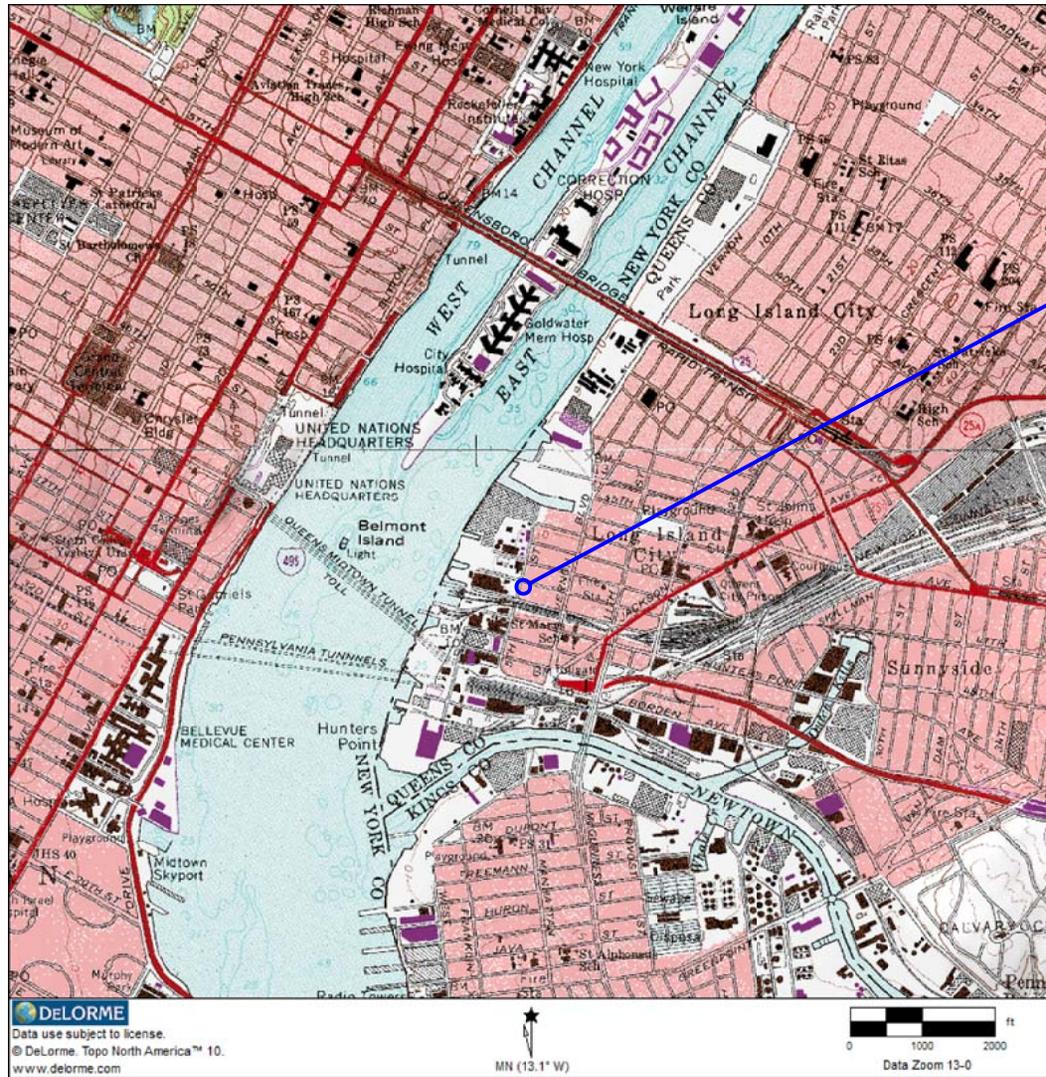
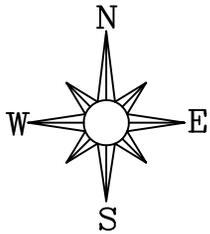
*I, William Silveri, certify that the OER-approved Remedial Action Work Plan dated **month day year** and Stipulations in a letter dated **month day, year; if any** were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill,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

7.0 SCHEDULE

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 2 month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	1 week
Fact Sheet 2 announcing start of remedy	1	1 week
Mobilization	2	2 days
Remedial Excavation	2	1 week
Demobilization	3	2 days
Submit Remedial Action Report	11	2 months

FIGURES



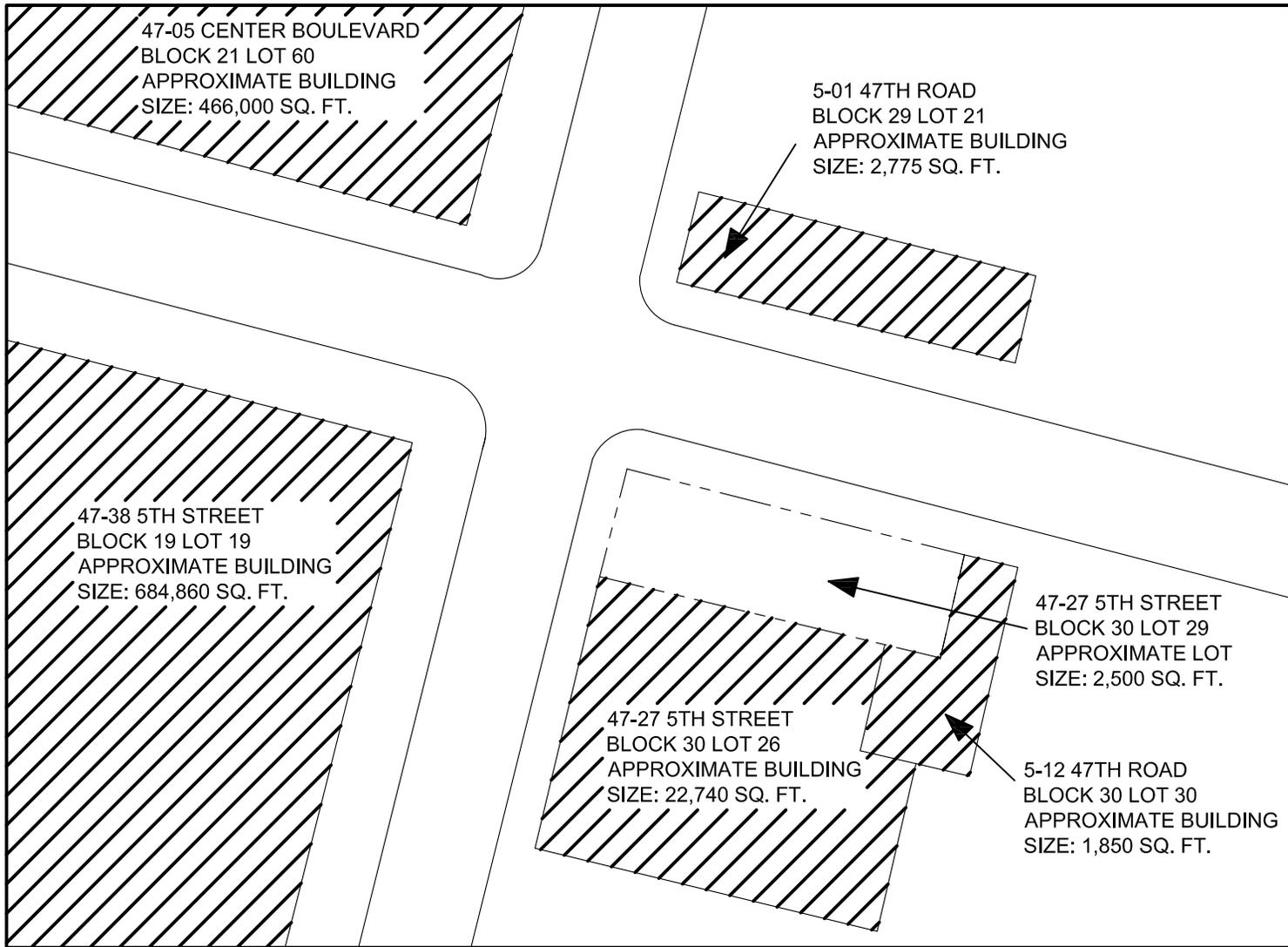
SITE

DELRORME

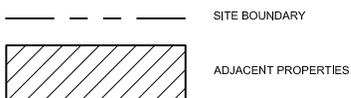
Data use subject to license.
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 www.delorme.com



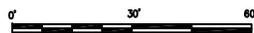
Drawn by:	SHANA HOLBERTON	Site Plan:	REMEDIAL ACTION WORK PLAN
Checked by:	WILLIAM SILVERI		47-27 5TH STREET
Drawing Scale:	AS NOTED		QUEENS, NEW YORK
Project No.:	13-0315	Figure:	FIGURE 1
Date:	MAY 17, 2013	Title:	SITE LOCATION MAP
Sheet in contract:	1		



Legend:



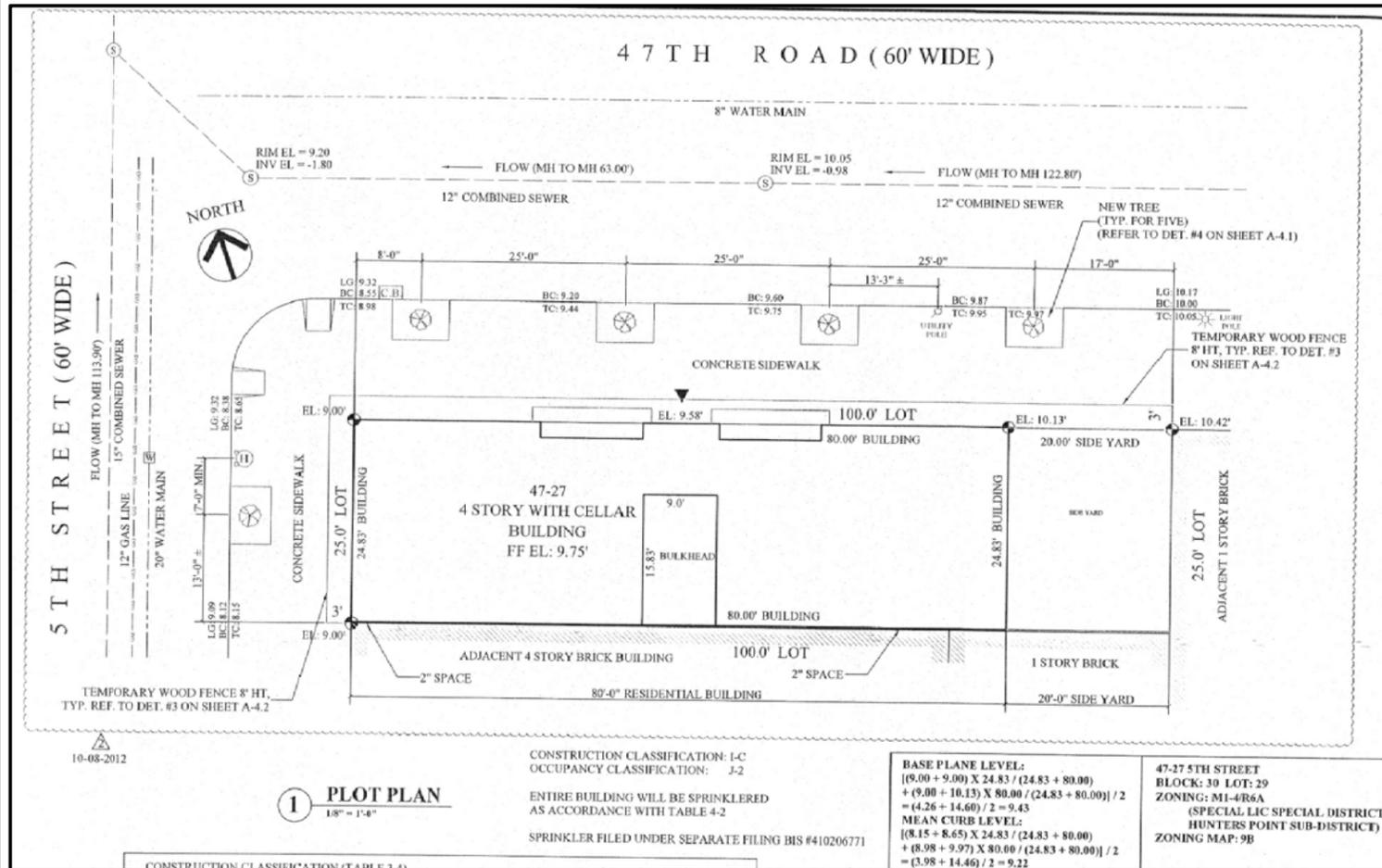
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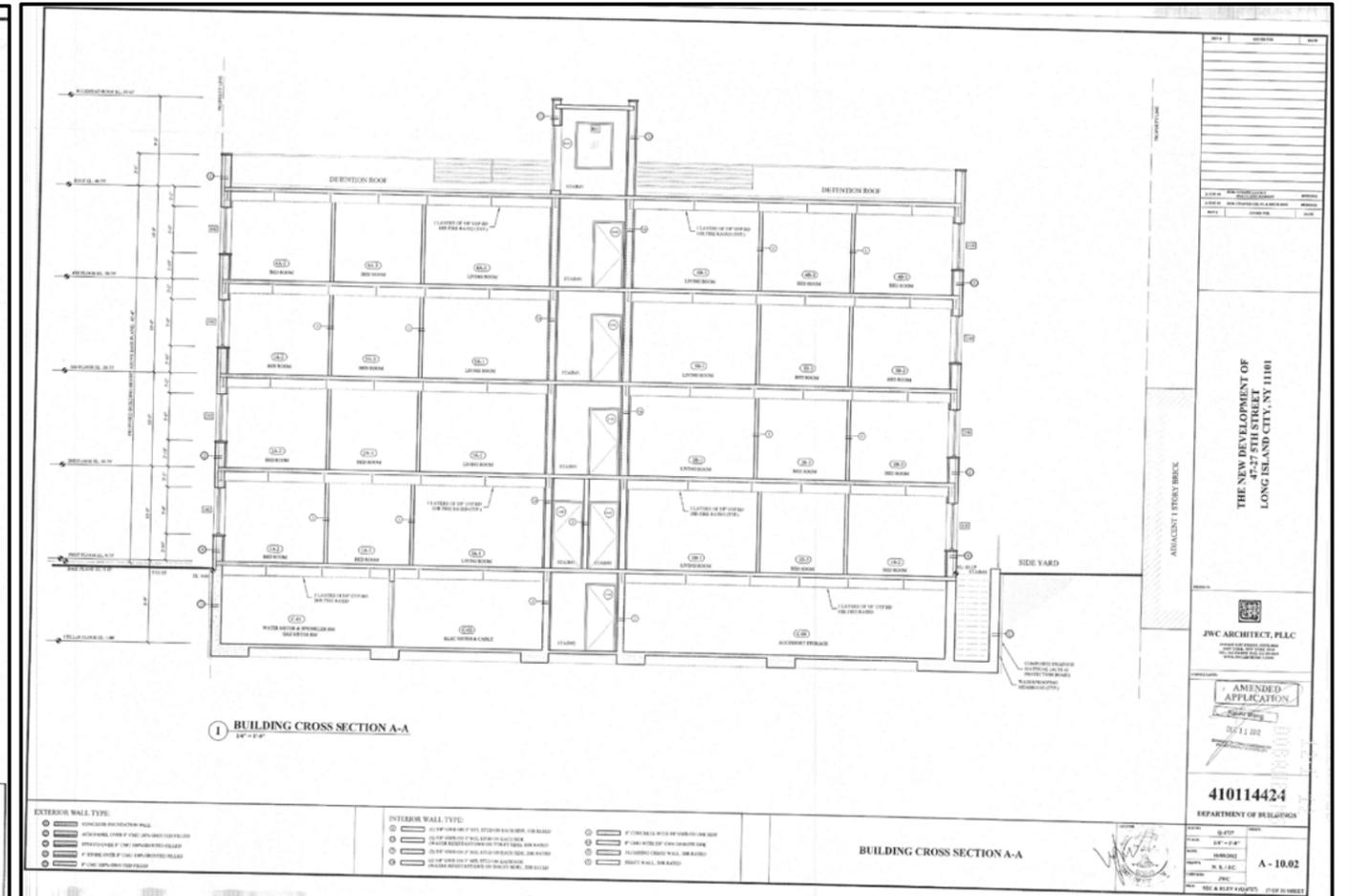
Drawn by:	SHANA HOLBERTON
Checked by:	WILLIAM SILVERI
Drawing Scale:	AS NOTED
Project No:	13-0315
Date:	MAY 17, 2013
Sheet in contract:	1

Site Plan: REMEDIAL ACTION WORK PLAN
47-27 5TH STREET
QUEENS, NEW YORK

Figure: FIGURE 2
Title: SITE MAP



PLOT PLAN



CROSS-SECTION

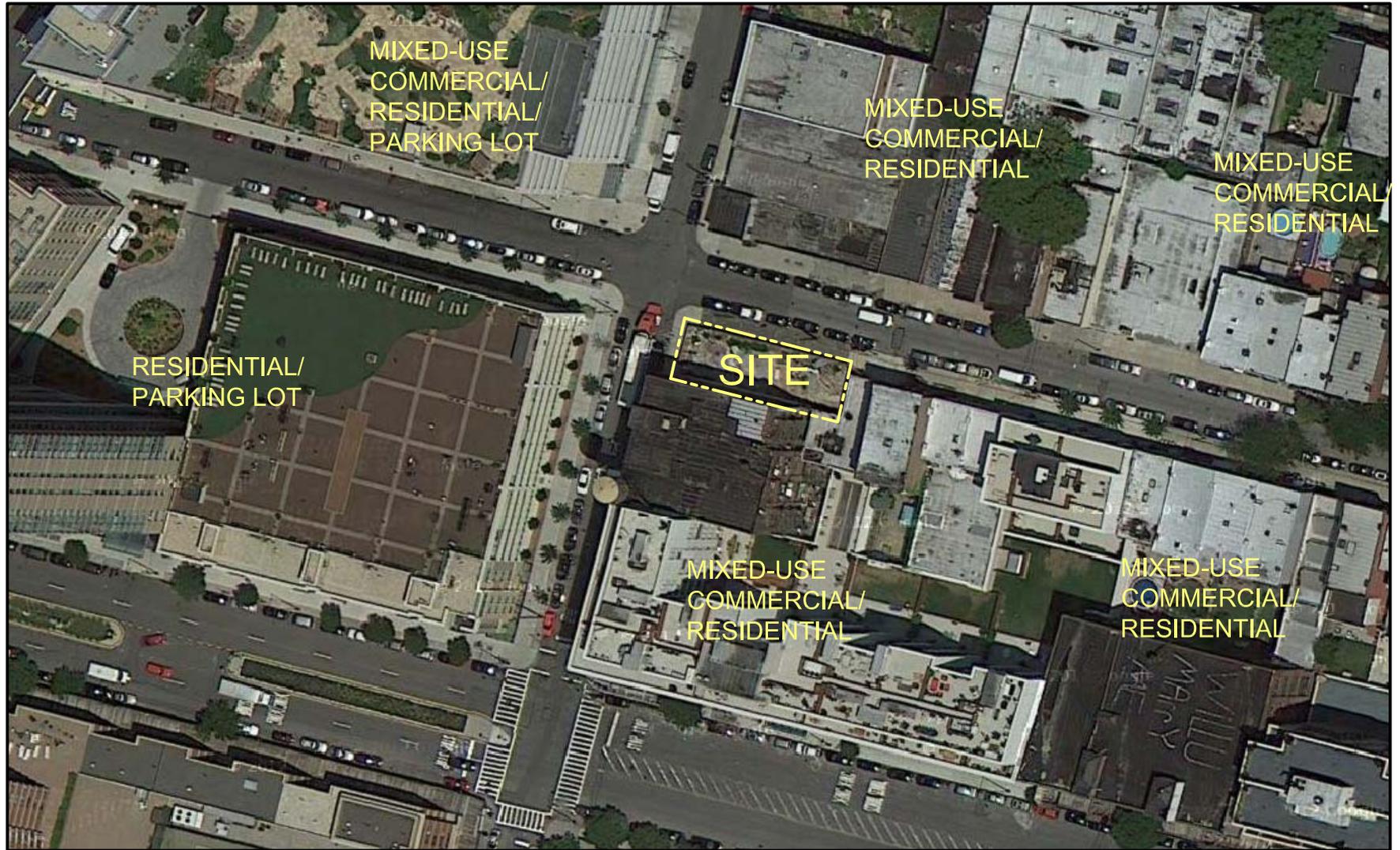
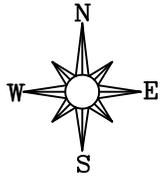
Scale:

AS NOTED



Drawn by: SHANA HOLBERTON
 Checked by: WILLIAM SILVERI
 Drawing Scale: AS NOTED
 Project No: 13-0315
 Date: MAY 17, 2013
 Sheet in contract: 1

Site Plan: REMEDIAL ACTION WORK PLAN
 47-27 5TH STREET
 QUEENS, NEW YORK
 Figure: FIGURE 3
 Title: PROPOSED SITE REDEVELOPMENT PLAN



Legend:

— — — — — SITE BOUNDARY

Scale:

0' 50' 100'



**ATHENICA
ENVIRONMENTAL
SERVICES, INC.**
Environmental Consultants

Drawn by: SHANA HOLBERTON

Checked by: WILLIAM SILVERI

Drawing Scale: AS NOTED

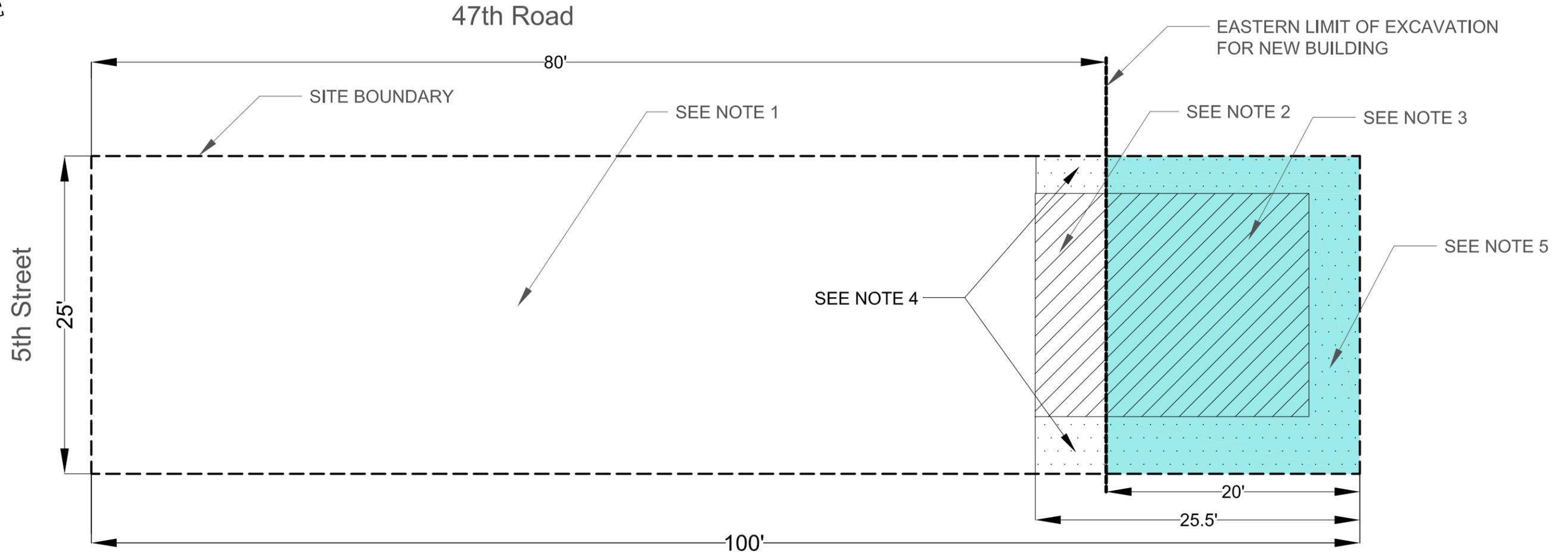
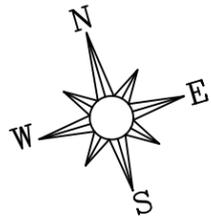
Project No: 13-0315

Date: MAY 17, 2013

Sheet in contract: 1

Site Plan: REMEDIAL ACTION WORK PLAN
47-27 5TH STREET
QUEENS, NEW YORK

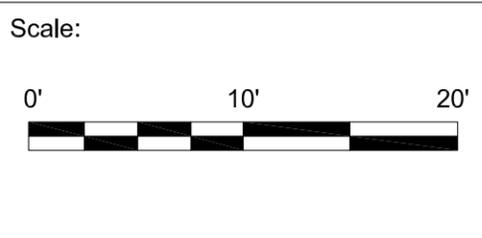
Figure: FIGURE 4
Title: SURROUNDING AREA MAP



NOTES:

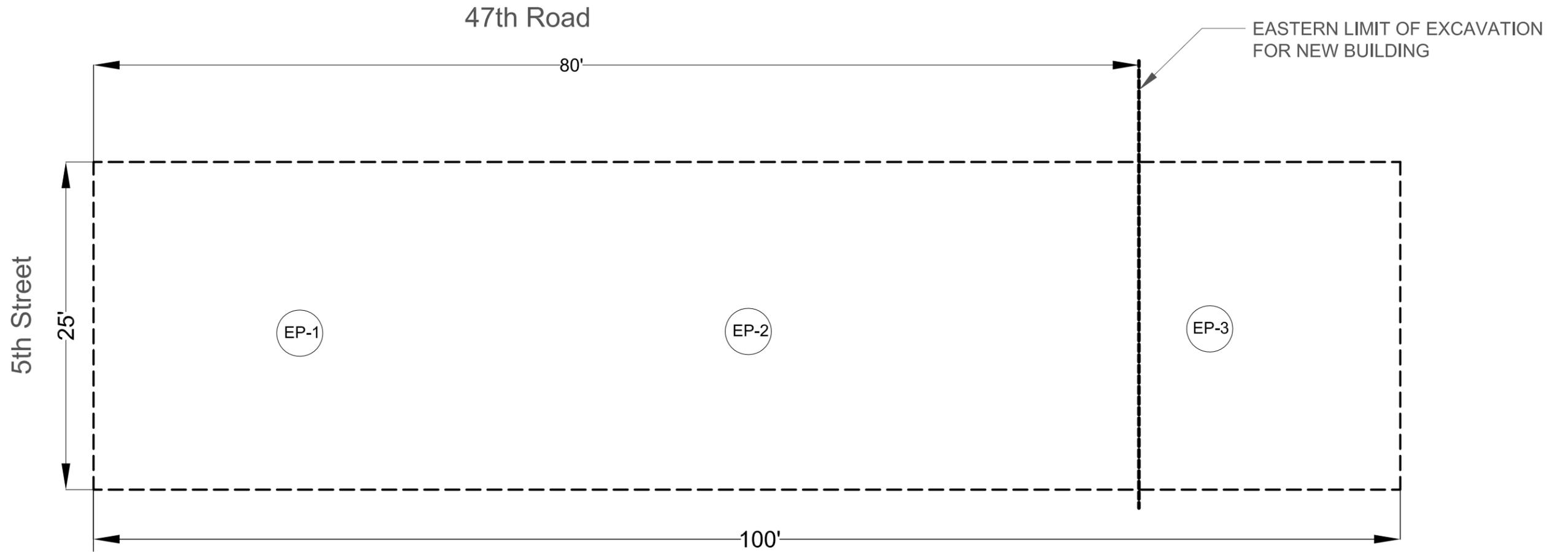
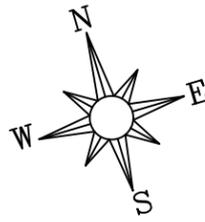
1. SOILS IN THIS AREA OF THE SITE ARE NON-HAZARDOUS TO 12 FEET BGS AND WILL BE EXCAVATED TO 10 FEET BGS FOR THE CONSTRUCTION OF A NEW BUILDING BASEMENT.
2. SOILS IN THIS AREA OF THE SITE ARE HAZARDOUS TO 9 FEET BGS AND WILL BE EXCAVATED TO 10 FEET BGS FOR CONSTRUCTION OF A NEW BUILDING BASEMENT.
3. SOILS IN THIS AREA OF THE SITE ARE HAZARDOUS TO 9 FEET BGS AND WILL BE EXCAVATED TO A MINIMUM OF APPROXIMATELY 9 FEET FOR REMOVAL OF HAZARDOUS SOIL.
4. SOILS IN THIS AREA OF THE SITE ARE NON-HAZARDOUS BUT WILL BE EXCAVATED TO 10 FEET FOR CONSTRUCTION OF THE NEW BUILDING BASEMENT AND DISPOSED OF AS HAZARDOUS.
5. SOILS IN THIS AREA OF THE SITE ARE NON-HAZARDOUS BUT WILL BE EXCAVATED TO A MINIMUM OF 8 FEET BGS FOR REMOVAL OF FILL AND DISPOSED OF AS HAZARDOUS.

Legend:		AREA OF NON-HAZARDOUS SOILS TO BE DISPOSED OF AS NON-HAZARDOUS AND WILL NOT BE BACKFILLED.
		AREA OF HAZARDOUS SOILS TO BE DISPOSED OF AS HAZARDOUS
		AREA OF NON-HAZARDOUS SOILS TO BE DISPOSED OF AS HAZARDOUS
		AREA OF SITE WHICH WILL BE BACKFILLED WITH IMPORTED CLEAN FILL



Date:	MAY 17, 2013
Drawn by:	SHANA HOLBERTON
Checked by:	WILLIAM SILVERI
Drawing Scale:	AS NOTED
Project No.:	13-0315

Site map:	REMEDIALACTION WORK PLAN 47-27 5TH STREET QUEENS, NEW YORK
Figure Title:	5 PLANNED EXCAVATION AND BACKFILL LOCATIONS



Legend:

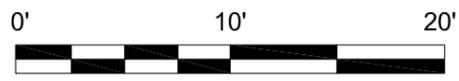


SITE BOUNDARY



PROPOSED ENDPOINT SAMPLING LOCATION AND DESIGNATION NUMBER

Scale:



Date: MAY 17, 2013

Drawn by: SHANA HOLBERTON

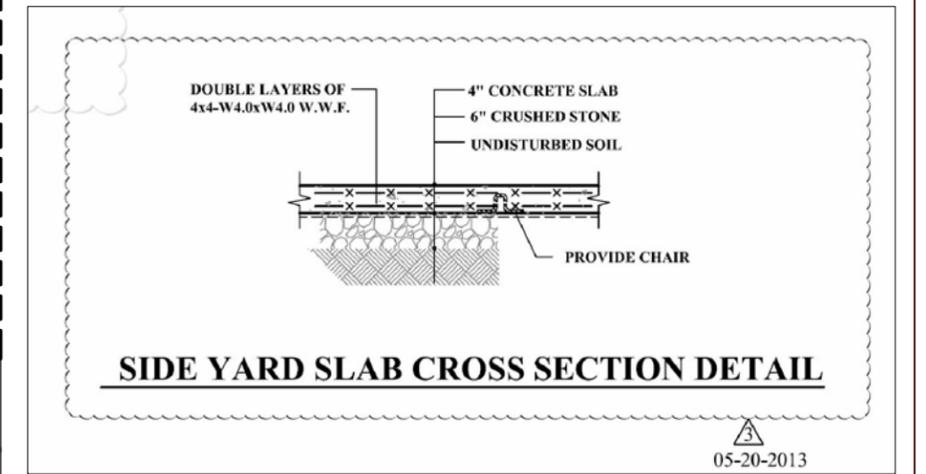
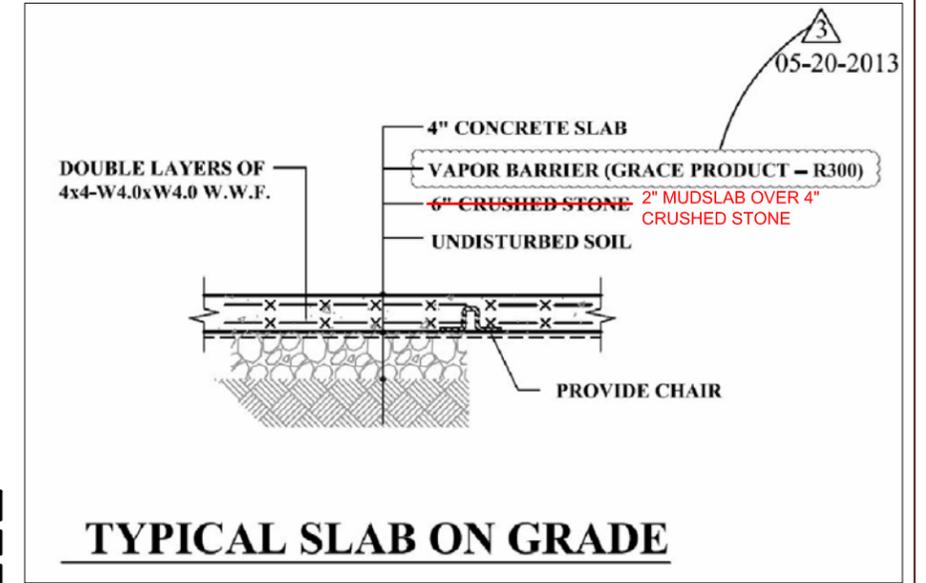
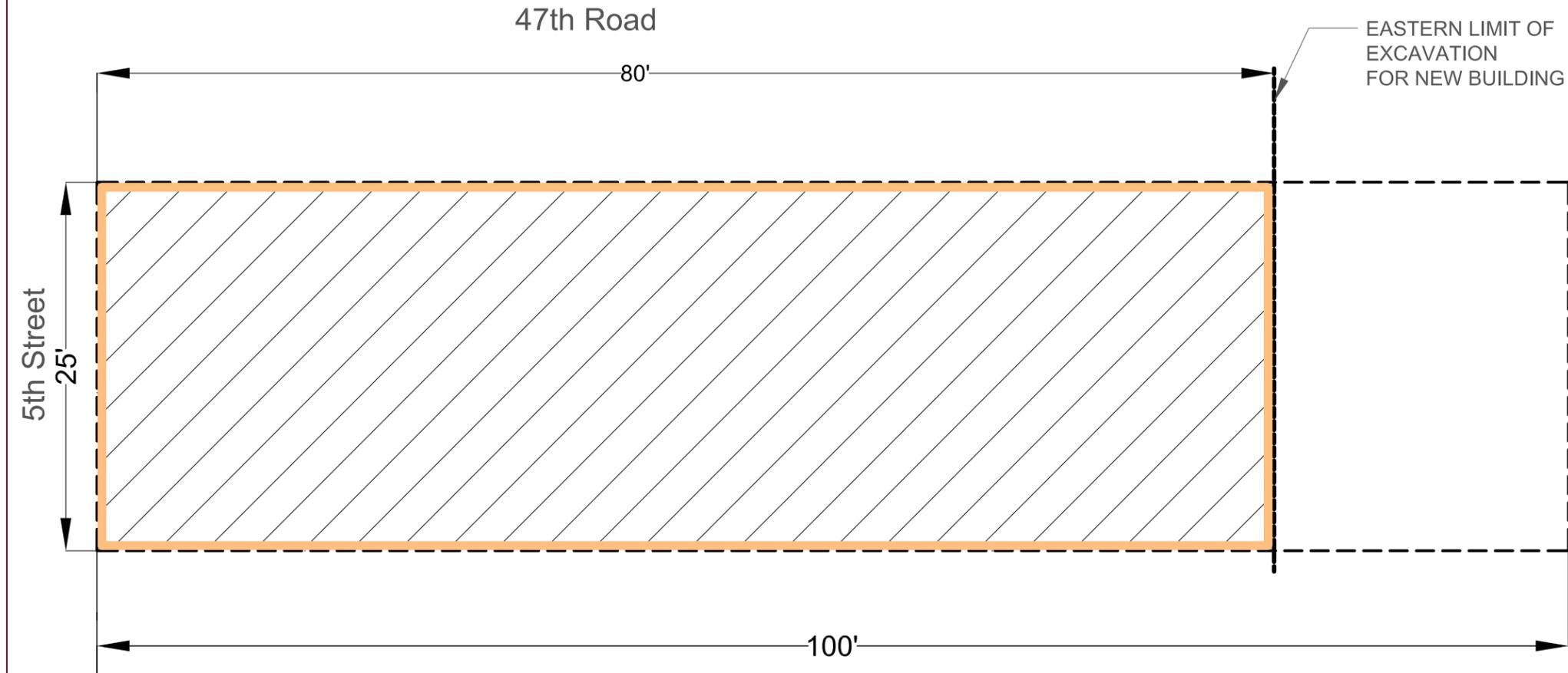
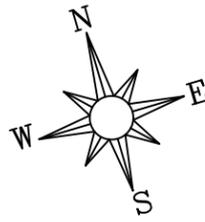
Checked by: WILLIAM SILVERI

Drawing Scale: AS NOTED

Project No.: 13-0315

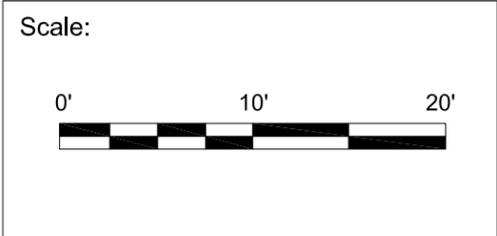
Site map: REMEDIATION WORK PLAN
47-27 5TH STREET
QUEENS, NEW YORK

Figure: 6
Title: PROPOSED ENDPOINT SAMPLING
LOCATIONS



Legend:

	SITE BOUNDARY
	LOCATION OF VAPOR BARRIER ALONG FOUNDATION WALLS OF NEW BUILDING
	4" THICK CONCRETE SLAB UNDERLAIN BY 46-MIL VAPOR BARRIER/WATERPROOFING



Date:	MAY 17, 2013	Site map:	REMEDIALACTION WORK PLAN 47-27 5TH STREET QUEENS, NEW YORK
Drawn by:	SHANA HOLBERTON	Figure:	7
Checked by:	WILLIAM SILVERI	Title:	TYPICAL COVER DETAIL / VAPOR BARRIER DESIGN
Drawing Scale:	AS NOTED		
Project No.:	13-0315		

TABLES

Table 1
Soil Sampling Results
Target Compound List Volatile Organic Compounds
47-27 5th Street
Queens, New York
2008 Sampling Event

SAMPLE NAME LAB SAMPLE ID DEPTH INTERVAL DILUTION FACTOR	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives (mg/Kg)	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential (mg/Kg)	B1-(0.5-2.5')		B1-(10.5-12.5)		B2-(0.5-2.5)		B-2 (10.5-12.5)		B-3 (2.5-4.5')		B-3 (10.5-12.5')		B4 (0.5-2.5')		B4 (10.5-12.5')		FB 6-26-08	
			001 0.5-2.5 foot 1.0 (mg/Kg)	U	002 10.5-12.5 foot 1.0 (mg/Kg)	U	004 0.5-2.5 foot 1.0 (mg/Kg)	U	003 10.5-12.5 foot 1.0 (mg/Kg)	U	005 2.5-4.5 foot 1.0 (mg/Kg)	U	006 10.5-12.5 foot 1.0 (mg/Kg)	U	022 0.5-2.5 foot 1.0 (mg/Kg)	U	024 1.5-12.5 foot 1.0 (mg/Kg)	U	007 1.0 (mg/Kg)	U
Dichlorodifluoromethane			0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Vinyl Chloride	0.02	0.9	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Chloromethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Bromomethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Chloroethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Trichlorofluoromethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Acrolein	NC	NC	0.0850	U	0.220	U	0.0990	U	0.110	U	0.0990	U	0.0950	U	0.0970	U	0.48	U	0.025	U
Acetone	0.05	100	0.0420	U	0.110	U	0.0490	U	0.053	U	0.0500	U	0.0480	U	0.0490	U	0.24	U	0.0508	
1,1-Dichloroethylene	0.33	100	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Iodomethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Carbon disulfide	NC	NC	0.0170	U	0.044	U	0.0200	U	0.021	U	0.0200	U	0.0190	U	0.0190	U	0.097	U	0.005	U
Methylene chloride	0.05	100	0.0340	U	0.089	U	0.0390	U	0.043	U	0.0400	U	0.0380	U	0.0390	U	0.19	U	0.005	U
Acrylonitrile	NC	NC	0.0420	U	0.110	U	0.0490	U	0.053	U	0.0500	U	0.0480	U	0.0490	U	0.24	U	0.025	U
Methyl tert-butyl ether (MTBE)	0.93	100	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
trans-1,2-Dichloroethylene	0.19	100	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
1,1-Dichloroethane	0.27	26	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
2-Butanone (Methyl ethyl ketone)	0.12	100	0.0420	U	0.110	U	0.0490	U	0.053	U	0.0500	U	0.0480	U	0.0490	U	0.24	U	0.025	U
Vinyl Acetate	NC	NC	0.0420	U	0.110	U	0.0490	U	0.053	U	0.0500	U	0.0480	U	0.0490	U	0.24	U	0.025	U
2,2-Dichloropropane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
cis-1,2-Dichloroethene	0.25	100	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Chloroform	0.37	49	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Bromochloromethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
1,1-Dichloropropene	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
1,1,1-Trichloroethane	0.68	100	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Carbon tetrachloride	0.76	2.4	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Benzene	0.06	4.8	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
1,2-Dichloroethane	0.02	3.1	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Trichloroethylene	0.47	21	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
1,2-Dichloropropane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
2-Chloroethyl vinyl ether	NC	NC	0.0420	U	0.110	U	0.0490	U	0.053	U	0.0500	U	0.0480	U	0.0490	U	0.24	U	0.025	U
4-Methyl-2-Pentanone	NC	NC	0.0420	U	0.110	U	0.0490	U	0.053	U	0.0500	U	0.0480	U	0.0490	U	0.24	U	0.025	U
cis-1,3-Dichloropropene	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Toluene	0.7	100	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
t-1,3-Dichloropropene	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Bromodichloromethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
Dibromomethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U
1,1,2-Trichloroethane	NC	NC	0.0085	U	0.022	U	0.0099	U	0.011	U	0.0099	U	0.0095	U	0.0097	U	0.048	U	0.005	U

Table 1
Soil Sampling Results
Target Compound List Volatile Organic Compounds
47-27 5th Street
Queens, New York
2008 Sampling Event

SAMPLE NAME LAB SAMPLE ID DEPTH INTERVAL DATE RECEIVED BY LAB DILUTION FACTOR	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B1-(0.5-2.5') 001 0.5-2.5 foot 11/30/2006 1.0	B1-(10.5-12.5) 002 10.5-12.5 foot 11/30/2006 1.0	B2-(0.5-2.5) 003 0.5-2.5 foot 11/17/2006 1.0	B-2 (10.5-12.5) 004 10.5-12.5 foot 11/17/2006 1.0	B-3 (2.5-4.5') 005 2.5-4.5 foot 11/17/2006 1.0	B-3 (10.5-12.5') 006 10.5-12.5 foot 11/17/2006 1.0	B4 (0.5-2.5') 022 0.5-2.5 foot 11/18/2006 1.0	B4 (10.5-12.5') 024 10.5-12.5 foot 11/18/2006 1.0	FB 6-26-08 007 11/18/2006 1.0
	(mg/kg)	(mg/kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
1,2-Dibromoethane	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
2-Hexanone	NC	NC	0.0420 U	0.110 U	0.0490 U	0.053 U	0.0500 U	0.0480 U	0.0490 U	0.24 U	0.025 U
1,3-Dichloropropane	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Tetrachloroethylene	1.3	19	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Dibromochloromethane	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Chlorobenzene	1.1	100	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,1,2,2-Tetrachloroethane	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Ethyl Benzene	1	41	0.0085 U	0.0416 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
p- & m- Xylenes	0.26	100	0.0170 U	0.0689 U	0.0200 U	0.021 U	0.0200 U	0.0190 U	0.0190 U	0.097 U	0.01 U
o-Xylene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Styrene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Bromoform	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Isopropylbenzene	NC	NC	0.0085 U	0.375 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,1,2,2-Tetrachloroethane	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,2,3-Trichloropropane	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
n-Propylbenzene	3.9	100	0.0085 U	1.15 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
trans-1,4-Dichloro-2-butene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Bromobenzene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
2-Chlorotoluene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,3,5-Trimethylbenzene	8.4	52	0.0085 U	1.19 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
4-Chlorotoluene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
tert-Butylbenzene	5.9	100	0.0085 U	0.0362 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,2,4-Trimethylbenzene	3.6	52	0.0085 U	1.76 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
sec-Butylbenzene	11	100	0.0085 U	0.245 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
4-Isopropyltoluene	NC	NC	0.0085 U	0.253 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,3-Dichlorobenzene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,4-Dichlorobenzene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
n-Butylbenzene	12	100	0.0085 U	0.318 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,2-Dichlorobenzene	1.1	100	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,2-Dibromo-3-Chloropropane	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,2,4-Trichlorobenzene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Hexachlorobutadiene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
Naphthalene	NC	NC	0.0085 U	0.106 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,2,3-Trichlorobenzene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,2-Dichlorobenzene	NC	NC	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,3-Dichlorobenzene	2.4	49	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U
1,4-Dichlorobenzene	1.8	13	0.0085 U	0.022 U	0.0099 U	0.011 U	0.0099 U	0.0095 U	0.0097 U	0.048 U	0.005 U

Legend

ND - Concentration less than the minimum detection limit.

NC - No criterion

U - Concentration less than the minimum detection limit.

Shaded values exceed evaluation criterion (i.e. Part 375 Unrestricted Use Criteria)

Bold shaded values exceed evaluation criterion (i.e. Part 375 Restricted Residential Use Criteria)

Notes

1: Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted and Restricted Residential Use

Table 1
Soil Sampling Results
Target Compound List Semi-volatile Organic Compounds
47-27 5th Street
Queens, New York
2008 Sampling Event

SAMPLE NAME LAB SAMPLE ID DEPTH INTERVAL DILUTION FACTOR	TAGM 4046 RSCOs	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B1-(10.5-12.5') 002 10.5-12.5 foot 1.0		B2-(0.5-2.5') 004 0.5-2.5 foot 1.0		B2-(10.5-12.5') 003 10.5-12.5 foot 1.0		B-3-(2.5-4.5') 005 2.5-4.5 foot 1.0		B-3-(10.5-12.5') 006 10.5-12.5 foot 1.0		B4-(2.5-4.5') 023 2.5-4.5 foot 1.0		B4-(10.5-12.5') 024 10.5-12.5 foot 1.0		FB 008 1.0	
				(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
SEMI-VOLATILE ORGANIC COMPOUNDS	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	
Phenol	0.03	0.33	100	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2-Chlorophenol	0.8	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
1,3-Dichlorobenzene	1.6	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
1,4-Dichlorobenzene	8.5	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
1,2-Dichlorobenzene	7.9	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Benzyl Alcohol	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2,2-oxybis(1-Chloropropane)	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2-Methylphenol	0.1	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Hexachloroethane	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
N-Nitroso-di-n-propylamine	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
3+4-Methylphenols	0.9	NC	NC	0.4	U	0.39	U	0.43	U	0.4	U	0.42	U	0.42	U	1	U	0.01	U
Nitrobenzene	0.2	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Isophorone	4.4	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2-Nitrophenol	0.33	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2,4-Dimethylphenol	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
bis(2-Chloroethoxy)methane	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2,4-Dichlorophenol	0.4	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
1,2,4-Trichlorobenzene	3.4	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Naphthalene	13	12	100	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
4-Chloroaniline	0.22	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Hexachlorobutadiene	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
4-Chloro-3-methylphenol	0.224	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2-Methylnaphthalene	36.4	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Hexachlorocyclopentadiene	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2,4,6-Trichlorophenol	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2,4,5-Trichlorophenol	0.1	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2-Chloronaphthalene	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2-Nitroaniline	0.43	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Acenaphthylene	50	100	100	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	0.43	0.53	U	0.005	U
Dimethylphthalate	2	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2,6-Dinitrotoluene	1	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Acenaphthene	50	20	100	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	0.26	0.53	U	0.005	U
3-Nitroaniline	0.5	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2,4-Dinitrophenol	0.2	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Dibenzofuran	6.2	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
2,4-Dinitrotoluene	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
4-Nitrophenol	0.1	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U

Table 1
Soil Sampling Results
Target Compound List Semi-volatile Organic Compounds
47-27 5th Street
Queens, New York
2008 Sampling Event

SAMPLE NAME LAB SAMPLE ID DEPTH INTERVAL DILUTION FACTOR	TAGM 4046 RSCOs	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B1-(10.5-12.5')	B2-(0.5-2.5')	B2-(10.5-12.5')	B-3-(2.5-4.5')	B-3-(10.5-12.5')	B4-(2.5-4.5')	B4-(10.5-12.5')	FB 008								
				002 10.5-12.5 foot 1.0	004 0.5-2.5 foot 1.0	003 10.5-12.5 foot 1.0	005 2.5-4.5 foot 1.0	006 10.5-12.5 foot 1.0	023 2.5-4.5 foot 1.0	024 10.5-12.5 foot 1.0									
SEMI-VOLATILE ORGANIC COMPOUNDS	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)								
Fluorene	50	30	100	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
4-Chlorophenyl-phenylether	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Diethylphthalate	7.1	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
4-Nitroaniline	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
4,6-Dinitro-2-methylphenol	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
N-Nitrosodiphenylamine	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
4-Bromophenyl-phenylether	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Hexachlorobenzene	0.41	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Pentachlorophenol	1	0.8	6.7	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Phenanthrene	50	100	100	0.21		0.17		0.22	U	0.2	U	0.21	U	3.1		0.53	U	0.005	U
Anthracene	50	100	100	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.91		0.53	U	0.005	U
Carbazole	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.300		0.53	U	0.005	U
Di-n-butylphthalate	8.1	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Fluoranthene	50	100	100	0.23		0.94		0.22	U	0.2	U	0.21	U	7.7		0.53	U	0.005	U
Benzidine	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Pyrene	50	100	100	0.2	U	0.88		0.22	U	0.2	U	0.21	U	7.9		0.53	U	0.005	U
Butylbenzylphthalate	50	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
3,3-Dichlorobenzidine	NC	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Benzo(a)anthracene	0.224	1	1	0.2	U	0.46		0.22	U	0.2	U	0.21	U	2.7		0.53	U	0.005	U
Chrysene	0.4	1	3.9	0.2	U	0.51		0.22	U	0.2	U	0.21	U	2.7		0.53	U	0.005	U
bis(2-Ethylhexyl)phthalate	50	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Di-n-octyl phthalate	50	NC	NC	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.21	U	0.53	U	0.005	U
Indeno(1,2,3-cd)pyrene	3.2	0.5	0.5	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	1.2		0.53	U	0.005	U
Benzo(b)fluoranthene	1.1	1	1	0.2	U	0.45		0.22	U	0.2	U	0.21	U	2.8		0.53	U	0.005	U
Benzo(k)fluoranthene	1.1	0.8	3.9	0.2	U	0.39		0.22	U	0.2	U	0.21	U	2.6		0.53	U	0.005	U
Benzo(a)pyrene	0.061	1	1	0.2	U	0.45		0.22	U	0.2	U	0.21	U	2.9		0.53	U	0.005	U
Dibenz(a,h)anthracene	0.014	0.33	0.33	0.2	U	0.19	U	0.22	U	0.2	U	0.21	U	0.46		0.53	U	0.005	U
Benzo(g,h,i)perylene	50	100	100	0.2	U	0.25		0.22	U	0.2	U	0.21	U	2.3		0.53	U	0.005	U
Total CaPAHs				0		2.51		0		0		0		17.66		0		0.03	
Total SVOCs				0.44		4.50		0		0		0		38.26		0		0.045	

Legend

ND - Concentration less than the minimum detection limit.
NC - No criterion
U - Concentration less than the minimum detection limit.
Shaded values exceed evaluation criterion (i.e. Part 375 Unrestricted Use Criteria)
Bold shaded values exceed evaluation criterion (i.e. Part 375 Restricted Residential Use Criteria)

Notes

1: Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted and Restricted Residential Use

Table 1
Soil Sampling Results
Target Compound List Pesticides and PCB's
47-27 5th Street
Queens, New York
2008 Sampling Event

SAMPLE NAME LAB SAMPLE ID DEPTH INTERVAL DILUTION FACTOR	TAGM 4046 RSCOs	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B1-(10.5-12.5')	B2-(0.5-2.5')	B2-(10.5-12.5')	B-3-(2.5-4.5')	B-3-(10.5-12.5')	B4-(2.5-4.5')	B4-(10.5-12.5')	FB
				002 10.5-12.5 foot 1.0	004 0.5-2.5 foot 1.0	003 10.5-12.5 foot 1.0	005 2.5-4.5 foot 1.0	006 10.5-12.5 foot 1.0	023 2.5-4.5 foot 1.0	024 10.5-12.5 foot 1.0	009 1.0
PESTICIDES	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
alpha-BHC	0.11	0.02	0.48	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
beta-BHC	0.2	0.036	0.36	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
gamma-BHC	0.06	NC	NC	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
delta-BHC	0.3	0.04	100	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Heptachlor	0.1	0.042	2.1	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Heptachlor epoxide	0.02	NC	NC	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Aldrin	0.041	0.005	0.097	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Dieldrin	0.044	0.005	0.2	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Endrin	0.1	0.014	11	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
4,4-DDD	2.9	0.0033	13	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
4,4-DDE	2.1	0.0033	8.9	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
4,4-DDT	2.1	0.0033	7.9	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Endosulfan I	0.9	2.4	24	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Endosulfan II	0.9	2.4	24	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Endosulfan Sulfate	1	2.4	24	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Endrin aldehyde	NC	NC	NC	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Methoxychlor	10	NC	NC	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Endrin ketone	NC	NC	NC	0.002 U	0.0019 U	0.0021 U	0.002 U	0.0021 U	0.0021 U	0.0053 U	0.00005 U
Chlordane	0.54	0.094	4.2	0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Toxaphene	NC	NC	NC	0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
PCB's											
Aroclor-1016	1 (surface), 10 (subsurface)	0.01	1	0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Aroclor-1221				0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Aroclor-1232				0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Aroclor-1242				0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Aroclor-1248				0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Aroclor-1254				0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Aroclor-1260				0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Aroclor-1262				0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U
Aroclor-1268				0.0403 U	0.0384 U	0.0427 U	0.0396 U	0.0412 U	0.0417 U	0.106 U	0.001 U

Legend

ND - Concentration less than the minimum detection limit.

NC - No criterion

U - Concentration less than the minimum detection limit.

Shaded values exceed evaluation criterion (i.e. Part 375 Unrestricted Use Criteria)

Bold shaded values exceed evaluation criterion (i.e. Part 375 Restricted Residential Use Criteria)

Notes

1: Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted and Restricted Residential Use

Table 1
Soil Sampling Results
Target Analyte List Metals
47-27 5th Street
Queens, New York
2008 Sampling Event

SAMPLE NAME LAB SAMPLE ID DEPTH INTERVAL DILUTION FACTOR	TAGM 4046 RSCOs See Note 1	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B1-(10.5-12.5') 002 10.5-12.5 foot 1.0	B2-(0.5-2.5') 004 0.5-2.5 foot 1.0	B2-(10.5-12.5') 003 10.5-12.5 foot 1.0	B-3-(2.5-4.5') 005 2.5-4.5 foot 1.0	B-3-(10.5-12.5') 006 10.5-12.5 foot 1.0	B4-(2.5-4.5') 023 2.5-4.5 foot 1.0	B4-(10.5-12.5') 024 10.5-12.5 foot 1.0	FB 010 1.0
METALS	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
Antimony	NC	NC	NC	8.01 U	8.53 U	7.01 U	8.09 U	6.94 U	0.00839 U	0.017 U	0.05 U
Aluminum	33,000	NC	NC	7,440	6,860	10,000	7,260	7,670	5270	10100	0.543
Arsenic	12	13	16	9.91 U	10.6 U	8.68 U	10 U	12.9 U	15.2	0.021 U	0.05 U
Barium	600	350	400	48.1	208	34.2	14.2	26.1	774	43.6	0.0234
Beryllium	1.75	7.2	72	0.86	0.934	1.01	0.573	0.834	0.713	1.5	0.0025 U
Cadmium	1	2.5	4	0.69	7.65	0.69	0.601 U	0.62	1.18	1.3	0.00312
Chromium	40	NC	NC	12.9	13.5	12.6	10	10.5	21	17.8	0.006 U
Calcium	35,000	NC	NC	1,550	8640	516	807	863	35,200	4,300	1.16
Iron	550,000	NC	NC	14,300	14,600	17,000	13,400	15,400	11500	31,400	3.04
Cobalt	60	NC	NC	6.18	6.97	5.21 U	6.01 U	5.15 U	0.00623 U	0.0126 U	0.05 U
Copper	50	50	270	24.5	5390	82	23.3	14.1	120	23.1	0.0210
Lead	500	63	400	60.2	743	26	16	17.8	2670	50.2	0.0262
Magnesium	5,000	NC	NC	2,580	1,750	3,030	2,670	2,590	3,160	3,390	0.5 U
Manganese	5,000	1,600	2,000	278	201	134	74.1	138	207	474	0.0275
Mercury	0.1	0.18	0.81	0.0421	1.41	0.0459	0.04 U	0.19	0.843	0.000107 U	0.0002 U
Nickel	25	30	310	13.1	37	15	11.3	12.7	14.2	17.2	0.04 U
Vanadium	300	NC	NC	25.5	27.9	27.6	21.5	23.4	21.3	48.1	0.05 U
Selenium	3.9	3.9	180.0	9.12 U	9.72 U	7.99 U	9.22 U	7.9 U	0.00955 U	0.0193 U	0.02 U
Potassium	43,000	NC	NC	1100	1020	1,040	1,050	798	1,100	1,760	0.526
Silver	NC	2	180	0.5 U	1.57	0.43 U	0.5 U	0.43 U	0.00052 U	0.0011 U	0.005 U
Sodium	8,000	NC	NC	296	733	178	309	178	509	551	2 U
Thallium	NC	NC	NC	3.97 U	4.22 U	3.47 U	4.01 U	3.43 U	13.3	0.00841 U	0.02 U
Zinc	50	109	10,000	93.9	3,350	54.4	43.4	39.7	965	52.9	0.0901

Legend

ND - Concentration less than the minimum detection limit.

NC - No criterion

U - Concentration less than the minimum detection limit.

Shaded values exceed evaluation criterion (i.e. Part 375 Unrestricted Use Criteria)

Bold shaded values exceed evaluation criterion (i.e. Part 375 Restricted Residential Use Criteria)

Notes

1: Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted and Restricted Residential Use

Table 2
Summary of Soil Sampling Results
Target Compound List Volatile Organic Compounds
47-27 5th Street
Queens, New York

Sample Name Lab Sample ID Sampling Date DilutionFactor	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B-1 (0'-2') 13D0887-01 4/23/2013 20		B-1 (11.5') 13D0887-02 4/23/2013 5	
	ppm	ppm	ppm		ppm	
1,1,1-Trichloroethane	0.68	100	0.0065	ND	0.010	ND
1,1,2,2-Tetrachloroethane	NC	NC	0.0065	ND	0.010	ND
1,1,2-Trichloroethane	NC	NC	0.0065	ND	0.010	ND
1,1-Dichloroethane	0.27	26	0.0065	ND	0.010	ND
1,1-Dichloroethylene	0.33	100	0.0065	ND	0.010	ND
1,2,4-Trimethylbenzene	3.6	52	0.0065	ND	0.010	ND
1,2-Dibromo-3-chloropropane	NC	NC	0.0065	ND	0.010	ND
1,2-Dibromoethane	NC	NC	0.0065	ND	0.010	ND
1,2-Dichlorobenzene	1.1	100	0.0065	ND	0.010	ND
1,2-Dichloroethane	0.02	3.1	0.0065	ND	0.010	ND
1,2-Dichloropropane	NC	NC	0.0065	ND	0.010	ND
1,3,5-Trimethylbenzene	8.4	52	0.0065	ND	0.028	
1,3-Dichlorobenzene	2.4	49	0.0065	ND	0.010	ND
1,4-Dichlorobenzene	1.8	13	0.0065	ND	0.010	ND
1,4-Dioxane	0.1	13	0.034	ND	0.053	ND
2-Butanone	0.12	100	0.0065	ND	0.010	ND
2-Hexanone	NC	NC	0.0065	ND	0.010	ND
4-Methyl-2-pentanone	NC	NC	0.0065	ND	0.010	ND
Acetone	0.05	100	0.027		0.091	
Benzene	0.06	4.8	0.0065	ND	0.27	
Bromobenzene	NC	NC	0.0065	ND	0.010	ND
Bromochloromethane	NC	NC	0.0065	ND	0.010	ND
Bromodichloromethane	NC	NC	0.0065	ND	0.010	ND
Bromoform	NC	NC	0.0065	ND	0.010	ND
Bromomethane	NC	NC	0.0065	ND	0.010	ND
Carbon disulfide	NC	NC	0.0065	ND	0.027	
Carbon tetrachloride	0.76	2.4	0.0065	ND	0.010	ND
Chlorobenzene	1.1	100	0.0065	ND	0.010	ND
Chloroethane	NC	NC	0.0065	ND	0.010	ND
Chloroform	0.37	49	0.0065	ND	0.010	ND
Chloromethane	NC	NC	0.0065	ND	0.010	ND
cis-1,2-Dichloroethylene	0.25	100	0.0065	ND	0.010	ND
cis-1,3-Dichloropropylene	NC	NC	0.0065	ND	0.010	ND
Dibromochloromethane	NC	NC	0.0065	ND	0.010	ND
Ethyl Benzene	1	41	0.0065	ND	0.010	ND
Methyl tert-butyl ether (MTBE)	0.93	100	0.0065	ND	0.010	ND
Methylene chloride	0.05	100	0.0065	ND	0.010	ND
n-Butylbenzene	12	100	0.0065	ND	0.010	ND
n-Propylbenzene	3.9	100	0.0065	ND	0.010	ND
o-Xylene	NC	NC	0.0065	ND	0.043	
p- & m- Xylenes	0.26	100	0.0065	ND	0.010	ND
sec-Butylbenzene	11	100	0.0065	ND	0.010	ND
Styrene	NC	NC	0.0065	ND	0.010	ND
tert-Butylbenzene	5.9	100	0.0065	ND	0.010	ND
Tetrachloroethylene	1.3	19	0.0065	ND	0.010	ND
Toluene	0.7	100	0.0065	ND	0.010	ND
trans-1,2-Dichloroethylene	0.19	100	0.0065	ND	0.010	ND
trans-1,3-Dichloropropylene	NC	NC	0.0065	ND	0.010	ND
Trichloroethylene	0.47	21	0.0065	ND	0.010	ND
Vinyl Chloride	0.02	0.9	0.0065	ND	0.010	ND

Legend

NC - No criterion for evaluation of analytical parameter

ND - analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

J - Analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated

Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted Use and Restricted Residential Use

Shaded values exceed evaluation criterion (i.e. Part 375 Unrestricted Use Criteria)

Shaded **bold** values exceed evaluation criterion (i.e. Part 375 Restricted Residential Use Criteria)

ppm=mg/kg

Table 2
Summary of Soil Sampling Results
Target Compound List Semi-Volatile Organic Compounds
47-27 5th Street
Queens, New York

Sample Name Lab Sample ID Sampling Date DilutionFactor	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B-1 (0'-2') 13D0887-01 4/23/2013 20		B-1 (11.5') 13D0887-02 4/23/2013 5	
	ppm	ppm	ppm		ppm	
1,2,4-Trichlorobenzene	NC	NC	2.13	ND	0.490	ND
2,4,5-Trichlorophenol	NC	NC	4.56	ND	1.05	ND
2,4,6-Trichlorophenol	NC	NC	2.99	ND	0.688	ND
2,4-Dichlorophenol	NC	NC	4.80	ND	1.11	ND
2,4-Dimethylphenol	NC	NC	4.12	ND	0.948	ND
2,4-Dinitrophenol	NC	NC	4.94	ND	1.14	ND
2,4-Dinitrotoluene	NC	NC	2.60	ND	0.599	ND
2,6-Dinitrotoluene	NC	NC	3.02	ND	0.696	ND
2-Chloronaphthalene	NC	NC	3.18	ND	0.732	ND
2-Chlorophenol	NC	NC	1.94	ND	0.447	ND
2-Methylnaphthalene	NC	NC	4.52	ND	1.04	ND
2-Methylphenol	0.33	100	2.24	ND	0.515	ND
2-Nitroaniline	NC	NC	5.13	ND	1.18	ND
2-Nitrophenol	NC	NC	1.60	ND	0.368	ND
3,3'-Dichlorobenzidine	NC	NC	3.08	ND	0.710	ND
3- & 4-Methylphenols	NC	NC	2.55	ND	0.588	ND
3-Nitroaniline	NC	NC	5.85	ND	1.35	ND
4,6-Dinitro-2-methylphenol	NC	NC	7.41	ND	1.71	ND
4-Bromophenyl phenyl ether	NC	NC	2.84	ND	0.653	ND
4-Chloro-3-methylphenol	NC	NC	3.96	ND	0.913	ND
4-Chloroaniline	NC	NC	1.53	ND	0.352	ND
4-Chlorophenyl phenyl ether	NC	NC	3.45	ND	0.794	ND
4-Nitroaniline	NC	NC	2.44	ND	0.561	ND
4-Nitrophenol	NC	NC	2.21	ND	0.509	ND
Acenaphthene	20	100	4.66	J,D	0.490	ND
Acenaphthylene	100	100	2.82	ND	0.650	ND
Anthracene	100	100	7.28	D	0.740	ND
Benzo(a)anthracene	1	1	10.2	D	0.507	ND
Benzo(a)pyrene	1	1	8.86	D	0.536	ND
Benzo(b)fluoranthene	1	1	10.4	D	1.14	ND
Benzo(g,h,i)perylene	100	100	2.41	J,D	0.450	ND
Benzo(k)fluoranthene	0.8	3.9	8.25	D	1.35	ND
Benzyl butyl phthalate	NC	NC	3.25	ND	0.748	ND
Bis(2-chloroethoxy)methane	NC	NC	2.02	ND	0.466	ND
Bis(2-chloroisopropyl)ether	NC	NC	2.07	ND	0.477	ND
Bis(2-ethylhexyl)phthalate	NC	NC	4.06	ND	0.935	ND
Carbazole	NC	NC	4.07	ND	0.937	ND
Chrysene	1	3.9	8.84	D	0.623	ND
Di-n-butyl phthalate	NC	NC	2.39	ND	0.550	ND
Di-n-octyl phthalate	NC	NC	5.88	ND	1.35	ND
Dibenzo(a,h)anthracene	0.33	0.33	2.36	ND	0.545	ND
Dibenzofuran	7	59	3.58	J,D	0.631	ND
Diethyl phthalate	NC	NC	3.69	ND	0.851	ND
Dimethyl phthalate	NC	NC	2.62	ND	0.604	ND
Fluoranthene	100	100	24.5	D	0.794	ND
Fluorene	30	100	3.61	J,D	0.650	ND
Hexachlorobenzene	0.33	1.2	3.47	ND	0.799	ND
Hexachlorobutadiene	NC	NC	1.99	ND	0.458	ND
Hexachlorocyclopentadiene	NC	NC	4.38	ND	1.01	ND
Hexachloroethane	NC	NC	1.68	ND	0.387	ND
Indeno(1,2,3-cd)pyrene	0.5	0.5	2.68	ND	0.618	ND
Isophorone	NC	NC	2.02	ND	0.466	ND
N-nitroso-di-n-propylamine	NC	NC	1.96	ND	0.452	ND
N-Nitrosodiphenylamine	NC	NC	2.66	ND	0.612	ND
Naphthalene	12	100	4.41	J,D	0.333	ND
Nitrobenzene	NC	NC	1.73	ND	0.398	ND
Pentachlorophenol	0.8	6.7	4.44	ND	1.02	ND
Phenanthrene	100	100	33.8	D	0.707	ND
Phenol	0.33	100	2.54	ND	0.585	ND
Pyrene	100	100	22.2	D	0.553	ND

Legend

NC - No criterion for evaluation of analytical parameter

ND - analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

J - Analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated

Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted Use and Restricted Residential Use

Shaded values exceed evaluation criterion (i.e. Part 375 Unrestricted Use Criteria)

Shaded **bold** values exceed evaluation criterion (i.e. Part 375 Restricted Residential Use Criteria)

ppm=mg/kg

Table 2
Summary of Soil Sampling Results
Target Compound List PCBs and Pesticides
47-27 5th Street
Queens, New York

Sample Name Lab Sample ID Sampling Date DilutionFactor	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B-1 (0'-2') 13D0887-01 4/23/2013 20		B-1 (11.5') 13D0887-02 4/23/2013 5	
	ppm	ppm	ppm		ppm	
Pesticides						
4,4'-DDD	0.0033	13	0.00291	ND	0.0134	ND
4,4'-DDE	0.0033	8.9	0.00291	ND	0.0134	ND
4,4'-DDT	0.0033	7.9	0.0265	D	0.0134	ND
Aldrin	0.005	0.097	0.00291	ND	0.0134	ND
alpha-BHC	0.02	0.48	0.00291	ND	0.0134	ND
beta-BHC	0.036	0.36	0.00291	ND	0.0134	ND
Chlordane, total	NC	4.2	0.0116	ND	0.0536	ND
delta-BHC	0.04	100	0.00291	ND	0.0134	ND
Dieldrin	0.005	0.2	0.00291	ND	0.0134	ND
Endosulfan I	2.4	24	0.00291	ND	0.0134	ND
Endosulfan II	2.4	24	0.00291	ND	0.0134	ND
Endosulfan sulfate	2.4	24	0.00291	ND	0.0134	ND
Endrin	0.014	11	0.00291	ND	0.0134	ND
Endrin aldehyde	NC	NC	0.00291	ND	0.0134	ND
Endrin ketone	NC	NC	0.00291	ND	0.0134	ND
gamma-BHC (Lindane)	0.1	1.3	0.00291	ND	0.0134	ND
Heptachlor	0.042	2.1	0.00291	ND	0.0134	ND
Heptachlor epoxide	NC	NC	0.00291	ND	0.0134	ND
Methoxychlor	NC	NC	0.0146	ND	0.0671	ND
Toxaphene	NC	NC	0.147	ND	0.679	ND
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	NC	NC	0.0300	ND	0.138	ND
Aroclor 1221	NC	NC	0.0300	ND	0.138	ND
Aroclor 1232	NC	NC	0.0300	ND	0.138	ND
Aroclor 1242	NC	NC	0.0300	ND	0.138	ND
Aroclor 1248	NC	NC	0.0300	ND	0.138	ND
Aroclor 1254	NC	NC	0.0300	ND	0.138	ND
Aroclor 1260	NC	NC	0.330	ND	0.138	ND
Total PCBs	0.1	1	0.330		0.0553	ND

Legend

NC - No criterion for evaluation of analytical parameter

ND - analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

J - Analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated

Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted Use and Restricted Residential Use

Shaded values exceed evaluation criterion (i.e. Part 375 Unrestricted Use Criteria)

Shaded **bold** values exceed evaluation criterion (i.e. Part 375 Restricted Residential Use Criteria)

ppm=mg/kg

Table 2
 Summary of Soil Sampling Results
 Target Analyte List Metals
 47-27 5th Street
 Queens, New York

Sample Name Lab Sample ID Sampling Date DilutionFactor	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential	B-1 (0'-2') 13D0887-01 4/23/2013 20		B-1 (11.5') 13D0887-02 4/23/2013 5	
	ppm	ppm	ppm		ppm	
Aluminum	NC	NC	6560		8240	
Antimony	NC	NC	10.4		0.596	ND
Arsenic	13	16	14.9		7.52	
Barium	350	400	1450		17.6	
Beryllium	7.2	72	0.118	ND	0.271	ND
Cadmium	2.5	4.3	2.91		0.271	ND
Calcium	NC	NC	12700		4260	
Chromium, Hexavalent	1	110	41.4		0.948	ND
Chromium	NC	NC	88.4		10.1	
Cobalt	NC	NC	8.38		11.1	
Copper	50	270	188		10.9	
Cyanide, total	27	27	3.88		1.35	ND
Lead	63	400	1550		5.30	
Magnesium	NC	NC	2300		2700	
Manganese	1600	2000	202		747	
Mercury	0.18	0.81	0.111	ND	0.255	ND
Nickel	30	310	18.6		12.4	
Potassium	NC	NC	1040		1090	
Selenium	3.9	180	2.94		6.90	
Silver	2	180	0.118	ND	0.271	ND
Sodium	NC	NC	213		297	
Thallium	NC	NC	0.376	ND	0.867	ND
Vanadium	NC	NC	20.0		20.7	
Zinc	109	10000	1040		41.3	

Legend

NC - No criterion for evaluation of analytical parameter

ND - analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

J - Analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated

Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted Use and Restricted Residential Use

Shaded values exceed evaluation criterion (i.e. Part 375 Unrestricted Use Criteria)

Shaded **bold** values exceed evaluation criterion (i.e. Part 375 Restricted Residential Use Criteria)

ppm=mg/kg

Table 2
Soil Sampling Results
Total and Leachable Lead
47-27 5th Street
Queens, NY

Sample Name Lab Sample ID Sampling Date DilutionFactor	EPA Hazardous Waste Limits	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Residential Use SCOs	B-2 (0'-2') 13D0887-04 4/23/2013 1	B-2 (2'-4') 13D0887-05 4/23/2013 1	B-2 (4'-6') 13D0887-06 4/23/2013 1	B-2 (6'-9') 13D0887-07 4/23/2013 1	B-3 (0'-2') 13D0887-08 4/23/2013 1	B-3 (2'-4') 13D0887-09 4/23/2013 1	B-3 (4'-6') 13D0887-10 4/23/2013 1	B-3 (6'-9') 13D0887-11 4/23/2013 1	B-4 (0'-2') 13D0887-12 4/23/2013 1	B-4 (2'-4') 13D0887-13 4/23/2013 1	B-4 (4'-6') 13D0887-14 4/23/2013 1	B-4 (6'-9') 13D0887-15 4/23/2013 1	B-5 (0'-2') 13D0887-16 4/23/2013 1	B-5 (2'-4') 13D0887-17 4/23/2013 1	B-5 (4'-6') 13D0887-18 4/23/2013 1	B-5 (6'-9') 13D0887-19 4/23/2013 1
Lead by EPA 6010	NC	mg/kg dry 63	mg/kg dry 400	mg/kg dry 166	mg/kg dry 601	mg/kg dry 1080	mg/kg dry 256	mg/kg dry 902	mg/kg dry 425	mg/kg dry 814	mg/kg dry 6.39	mg/kg dry 81.9	mg/kg dry 15.2	mg/kg dry 5770	mg/kg dry 2480	mg/kg dry 1270	mg/kg dry 608	mg/kg dry 3070	mg/kg dry 86.9
Lead TCLP by EPA 6010	mg/L 5	NC	NC	mg/L 0.0278	mg/L 0.330	mg/L 2.27	mg/L 0.280	mg/L 1.07	mg/L 0.00381	mg/L 0.430	mg/L 0.00676	mg/L 0.00331	mg/L 0.00220	mg/L 2.00	mg/L 2.22	mg/L 0.734	mg/L 0.400	mg/L 1.10	mg/L 0.0189

Legend
 NC - No criterion for evaluation of analytical parameter
 ND - analyte not detected at or above the indicated reporting limit
 Evaluation criteria for soil sample results is the NYSDEC Part 375 Values for Unrestricted Use and Restricted Residential Use for Lead and the EPA Hazardous Waste Limits for TCLP Lead

Table 3
Groundwater Sampling Results
Target Compound List VOCs
47-27 5th Street Queens, NY

SAMPLE NAME LAB SAMPLE ID DILUTION FACTOR	TOGS GA Standards	TW-1 (Boring B-1) 1.0	TW-2 (Boring B-4) 1.0	Trip Blank 1.0
VOLATILE ORGANIC COMPOUNDS	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Dichlorodifluoromethane	5	<5.0 U	<5.0 U	<5.0 U
Vinyl Chloride	2	<5.0 U	<5.0 U	<5.0 U
Chloromethane	5	<5.0 U	<5.0 U	<5.0 U
Bromomethane	5	<5.0 U	<5.0 U	<5.0 U
Trichlorofluoromethane	5	<5.0 U	<5.0 U	<5.0 U
Chloroethane	5	<5.0 U	<5.0 U	<5.0 U
Acrolein	5	<25 U	<25 U	<25 U
Acetone	50	<25 U	<25 U	<25 U
Iodomethane	NC	<5.0 U	<5.0 U	<5.0 U
1,1-Dichloroethene	5	<5.0 U	<5.0 U	<5.0 U
Carbon Disulfide	60	<5.0 U	<5.0 U	<5.0 U
Methylene Chloride	5	<5.0 U	<5.0 U	<5.0 U
Acrylonitrile	5	<25 U	<25 U	<25 U
Methyl tert-butyl Ether	10	<5.0 U	<5.0 U	<5.0 U
trans-1,2-Dychloroethylene	5	<5.0 U	<5.0 U	<5.0 U
Vinyl Acetate	NC	<25 U	<25 U	<25 U
cis-1,2-Dichloroethene	5	<5.0 U	<5.0 U	<5.0 U
1,1-Dichloroethane	5	<5.0 U	<5.0 U	<5.0 U
cis-1,2-Dichloroethene	5	<5.0 U	<5.0 U	<5.0 U
2-Butanone	50	<25 U	<25 U	<25 U
2,2-Dichloropropane	5	<5.0 U	<5.0 U	<5.0 U
Chloroform	7	<5.0 U	<5.0 U	<5.0 U
Bromochloromethane	5	<5.0 U	<5.0 U	<5.0 U
1,1-Dichloropropane	5	<5.0 U	<5.0 U	<5.0 U
1,1,1-Trichloroethane	5	<5.0 U	<5.0 U	<5.0 U
Carbon Tetrachloride	5	<5.0 U	<5.0 U	<5.0 U
Benzene	1	<5.0 U	<5.0 U	<5.0 U
1,2-Dichloroethane	0.6	<5.0 U	<5.0 U	<5.0 U
Trichloroethylene	5	<5.0 U	<5.0 U	<5.0 U
1,2-Dichloropropane	1	<5.0 U	<5.0 U	<5.0 U
4-Methyl-2-Pentanone	NC	<25 U	<25 U	<25 U
2-Chloroethyl vinyl ether	NC	<25 U	<25 U	<25 U
1,2-Dibromo-3-Chloropropane	0.04	<5.0 U	<5.0 U	<5.0 U
Toluene	5	<5.0 U	<5.0 U	<5.0 U
cis-1,3-Dichloropropene	0.4	<5.0 U	<5.0 U	<5.0 U
Bromodichloromethane	50	<5.0 U	<5.0 U	<5.0 U
Dibromomethane	5	<5.0 U	<5.0 U	<5.0 U
1,1,2-Trichloroethane	5	<5.0 U	<5.0 U	<5.0 U
2-Hexanone	50	<25 U	<25 U	<25 U
Tetrachloroethene	5	<5.0 U	<5.0 U	<5.0 U
Dibromochloromethane	50	<5.0 U	<5.0 U	<5.0 U
Chlorobenzene	5	<5.0 U	<5.0 U	<5.0 U
Ethylbenzene	5	<5.0 U	<5.0 U	<5.0 U
m/p-Xylenes	5	<10 U	<10 U	<10 U
o-Xylene	5	<5.0 U	<5.0 U	<5.0 U
Styrene	5	<5.0 U	<5.0 U	<5.0 U
Bromoform	50	<5.0 U	<5.0 U	<5.0 U
Isopropylbenzene	5	<5.0 U	<5.0 U	<5.0 U
1,1,2,2-Tetrachloroethane	5	<5.0 U	<5.0 U	<5.0 U
1,2,3 Trichloropropane	0.04	<5.0 U	<5.0 U	<5.0 U
n-Propylbenzene	5	<5.0 U	<5.0 U	<5.0 U
trans-1,4-Dichloro-2-butene	5	<5.0 U	<5.0 U	<5.0 U
Bromobenzene	5	<5.0 U	<5.0 U	<5.0 U
2-Chlorotoluene	5	<5.0 U	<5.0 U	<5.0 U
1,3,5-Trimethylbenzene	5	<5.0 U	<5.0 U	<5.0 U
4-Chlorotoluene	5	<5.0 U	<5.0 U	<5.0 U
tert-Butylbenzene	5	<5.0 U	<5.0 U	<5.0 U
1,2,4-Trimethylbenzene	5	<5.0 U	<5.0 U	<5.0 U
sec-Butylbenzene	5	<5.0 U	<5.0 U	<5.0 U
4-Isopropyltoluene	5	<5.0 U	<5.0 U	<5.0 U
1,3-Dichlorobenzene	3	<5.0 U	<5.0 U	<5.0 U
1,4-Dichlorobenzene	3	<5.0 U	<5.0 U	<5.0 U
n-Butylbenzene	5	<5.0 U	<5.0 U	<5.0 U
1,2-Dichlorobenzene	3	<5.0 U	<5.0 U	<5.0 U
1,2-Dibromo-3-Chloropropane	0.04	<5.0 U	<5.0 U	<5.0 U
1,2,4-Trichlorobenzene	5	<5.0 U	<5.0 U	<5.0 U
Hexachlorbutadiene	0.5	<5.0 U	<5.0 U	<5.0 U
Naphtalene	10	<5.0 U	<5.0 U	<5.0 U
1,2,3-Trichlorobenzene	5	<5.0 U	<5.0 U	<5.0 U

Legend

All results given in ug/L or ppb.

U - Concentration less than the minimum detection limit.

NC - No criterion

Evaluation criteria for groundwater results is New York State Class GA Groundwater Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Gray shaded values signify exceedance of evaluation criteria or detection limit above evaluation criteria

Table 3
Groundwater Sampling Results
Target Compound List SVOCs
47-27 5th Street, Queens, NY

SAMPLE NAME LAB SAMPLE ID DILUTION FACTOR	TOGS GA Standard	TW-1 (Boring B-1) 1.0	TW-2 (Boring B-4) 1.0
	(ug/L)	(ug/L)	(ug/L)
SEMI-VOLATILE ORGANIC COMPOUNDS			
Aniline	5	<5.0 U	<5.0 U
N-Nitrosodimethylamine	5	<5.0 U	<5.0 U
bis(2-Chloroethyl)ether	1	<5.0 U	<5.0 U
Phenol	1	<5.0 U	<5.0 U
2-Chlorophenol	NC	<5.0 U	<5.0 U
1,3-Dichlorobenzene	3	<5.0 U	<5.0 U
1,4-Dichlorobenzene	3	<5.0 U	<5.0 U
1,2-Dichlorobenzene	3	<5.0 U	<5.0 U
Benzyl Alcohol	NC	<5.0 U	<5.0 U
2-2'-oxybis (1-Chloropropane)	5	<5.0 U	<5.0 U
2-Methylphenol	NC	<5.0 U	<5.0 U
Hexachloroethane	5	<5.0 U	<5.0 U
N-Nitroso-di-n-propylamine	NC	<5.0 U	<5.0 U
3+4-Methylphenols	NC	<10 U	<10 U
Nitrobenzene	0.4	<5.0 U	<5.0 U
Isophorone	50	<5.0 U	<5.0 U
2-Nitrophenol	NC	<5.0 U	<5.0 U
2,4-Dimethylphenol	50	<5.0 U	<5.0 U
bis(2-Chloroethoxy)methane	5	<5.0 U	<5.0 U
2,4-Dichlorophenol	5	<5.0 U	<5.0 U
1,2,4-Trichlorobenzene	5	<5.0 U	<5.0 U
Benzoic Acid	NC	<5.0 U	<5.0 U
Naphthalene	10	<5.0 U	<5.0 U
Hexachlorobutadiene	0.5	<5.0 U	<5.0 U
4-Chloroaniline	5	<5.0 U	<5.0 U
4-Chloro-3-methylphenol	NC	<5.0 U	<5.0 U
2-Methylnaphthalene	NC	<5.0 U	<5.0 U
Hexachlorocyclopentadiene	5	<5.0 U	<5.0 U
2,4,6-Trichlorophenol	NC	<5.0 U	<5.0 U
2,4,5-Trichlorophenol	NC	<5.0 U	<5.0 U
2-Chloronaphthalene	10	<5.0 U	<5.0 U
2-Nitroaniline	5	<5.0 U	<5.0 U
Acenaphthylene	NC	<5.0 U	<5.0 U
Dimethyl Phthalate	50	<5.0 U	<5.0 U
2,6-Dinitrotoluene	5	<5.0 U	<5.0 U
Acenaphthene	20	<5.0 U	<5.0 U
3-Nitroaniline	5	<5.0 U	<5.0 U
2,4-Dinitrophenol	10	<5.0 U	<5.0 U
Dibenzofuran	NC	<5.0 U	<5.0 U
2,4-Dinitrotoluene	5	<5.0 U	<5.0 U
4-Nitrophenol	NC	<5.0 U	<5.0 U
Fluorene	50	<5.0 U	<5.0 U
4-Chlorophenyl-phenylether	NC	<5.0 U	<5.0 U
Diethyl Phthalate	50	<5.0 U	<5.0 U
4-Nitroaniline	5	<5.0 U	<5.0 U
4,6-Dinitro-2-methylphenol	NC	<5.0 U	<5.0 U
N-Nitrosodiphenylamine	50	<5.0 U	<5.0 U
4-Bromophenyl-phenylether	NC	<5.0 U	<5.0 U
Hexachlorobenzene	0.04	<5.0 U	<5.0 U
Pentachlorophenol	1	<5.0 U	<5.0 U
Phenanthrene	50	<5.0 U	<5.0 U
Anthracene	50	<5.0 U	<5.0 U
Carbazole	NC	<5.0 U	<5.0 U
Di-n-butylphthalate	50	<5.0 U	<5.0 U
Fluoranthene	50	<5.0 U	<5.0 U
Benzidine	5	<5.0 U	<5.0 U
Pyrene	50	<5.0 U	<5.0 U
Butylbenzylphthalate	50	<5.0 U	<5.0 U
3,3-Dichlorobenzidine	5	<5.0 U	<5.0 U
Benzo(a)anthracene	0.002	<5.0 U	<5.0 U
Chrysene	0.002	<5.0 U	<5.0 U
bis(2-Ethylhexyl)phthalate	5	<5.0 U	<5.0 U
Di-n-octyl phthalate	50	<5.0 U	<5.0 U
Indeno(1,2,3-cd)pyrene	0.002	<5.0 U	<5.0 U
Benzo(b)fluoranthene	0.002	<5.0 U	<5.0 U
Benzo(k)fluoranthene	0.002	<5.0 U	<5.0 U
Benzo(a)pyrene	0.002	<5.0 U	<5.0 U
Dibenz(a,h)anthracene	NC	<5.0 U	<5.0 U
Benzo(g,h,i)perylene	NC	<5.0 U	<5.0 U

Legend

All results given in ug/L or ppb.

U - Concentration less than the minimum detection limit.

NC - No criterion

Evaluation criteria for groundwater results is New York State Class GA Groundwater

Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Gray shaded values exceed criteria

Table 3
 Groundwater Sampling Results
 Target Compound List PCBs and Pesticides
 47-27 5th Street
 Queens, NY

SAMPLE NAME LAB SAMPLE ID DILUTION FACTOR	TOGS GA Standards	TW-1 (Boring B-2) 1.0	TW-2 (Boring B-4) 1.0
	(ug/L)	(ug/L)	(ug/L)
PESTICIDES			
alpha-BHC	0.01	<0.050	<0.050 U
gamma-BHC	0.05	<0.050	<0.050 U
beta-BHC	0.04	<0.050	<0.050 U
Aldrin	ND	<0.050	<0.050 U
Heptachlor	0.04	<0.050	<0.050 U
delta-BHC	0.04	<0.050 U	<0.050 U
Heptachlor epoxide	0.03	<0.050 U	<0.050 U
Endosulfan I	NC	<0.050 U	<0.050 U
4,4-DDE	0.2	<0.050 U	<0.050 U
Dieldrin	0.004	<0.050 U	<0.050 U
Endrin	ND	<0.050 U	<0.050 U
4,4-DDD	0.3	<0.050 U	<0.050 U
Endosulfan II	NC	<0.050 U	<0.050 U
Endrin aldehyde	5	<0.050 U	<0.050 U
4,4-DDT	0.2	<0.050 U	<0.050 U
Endosulfan Sulfate	NC	<0.050 U	<0.050 U
Methoxychlor	35	<0.050 U	<0.050 U
Endrin ketone	5	<0.050 U	<0.050 U
Chlordane	NC	<1.0 U	<1.0 U
Toxaphene	0.06	<1.0 U	<1.0 U
PCB's			
Aroclor-1016	0.09	<1.0 U	<1.0 U
Aroclor-1221	0.09	<1.0 U	<1.0 U
Aroclor-1232	0.09	<1.0 U	<1.0 U
Aroclor-1242	0.09	<1.0 U	<1.0 U
Aroclor-1248	0.09	<1.0 U	<1.0 U
Aroclor-1254	0.09	<1.0 U	<1.0 U
Aroclor-1260		<1.0 U	<1.0 U
Aroclor-1262	0.09	<1.0 U	<1.0 U

Legend

All results given in ug/L or ppb.

U - Concentration less than the minimum detection limit.

NC - No criterion

Evaluation criteria for groundwater results is New York State Class GA Groundwater Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Gray shaded values exceed criteria

Table 3
 Groundwater Sampling Results
 Total Levels of Target Analyte List Metals
 47-27 5th Street
 Queens, NY

SAMPLE NAME LAB SAMPLE ID DILUTION FACTOR	TOGS GA Standard	TW-1 (Boring B-1) 1.0		TW-2 (Boring B-4) 1.0	
METALS	(ug/L)	(ug/L)		(ug/L)	
Aluminum	NC	152,000		61,800	
Antimony	3	<0.025	U	<0.050	U
Barium	1,000	2,560		778	
Arsenic	25	<0.250	U	<0.050	U
Beryllium	3	21.2		7.15	
Cadmium	5	24.1		5.31	
Chromium	50	280		91.4	
Calcium	NC	103,000		210,000	
Copper	200	495		201	
Cobalt	NC	143		<0.050	U
Iron	300	373,000		101,000	
Magnesium	35,000	58,600		40,100	
Lead	25	1,380		1,300	
Manganese	300	8,680		3,030	
Mercury	0.7	1.23		0.535	
Nickel	100	235		89.7	
Potassium	NC	23,900		20,000	
Sodium	20,000	53,700		51,800	
Silver	50	<0.00500	U	<0.0050	U
Selenium	10	<0.100	U	37.2	
Zinc	2,000	1,840		587	
Thallium	0.5	<0.100	U	84	
Vanadium	NC	545		174	

Legend

All results given in ug/L or ppb.

U - Concentration less than the minimum detection limit.

NC - No criterion

Evaluation criteria for groundwater results is New York State Class GA Groundwater Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Gray shaded values exceed criteria

Table 3
 Groundwater Sampling Results
 Dissolved Target Analyte List Metals
 47-27 5th Street
 Queens, NY

SAMPLE NAME LAB SAMPLE ID DILUTION FACTOR	TOGS GA Standard	TW-1 (Boring B-2) 1.0	TW-2 (Boring B-4) 1.0
METALS	(ug/L)	(ug/L)	(ug/L)
Aluminum	NC	198	475
Antimony	3	<0.0100 U	<0.010 U
Barium	1,000	183	190
Arsenic	25	17.70	55.7
Beryllium	3	<0.0025 U	<0.0025 U
Cadmium	5	1.92	<0.00110 U
Chromium	50	<0.0060 U	<0.00600 U
Calcium	NC	62,600	224,000
Copper	200	18.1	<0.00500 U
Cobalt	NC	<0.050 U	<0.050 U
Iron	300	1,120	807
Magnesium	35,000	20,200	30,400
Lead	25	145	44.7
Manganese	300	1,670	1,730
Mercury	0.7	<0.0002 U	<0.0002 U
Nickel	100	<0.040 U	<0.040 U
Potassium	NC	11,300	16,200
Sodium	20,000	56,600	58,100
Silver	50	<0.0050 U	<0.0050 U
Selenium	10	20.8	48.4
Zinc	2,000	198	120
Thallium	0.5	30.9	94.4
Vanadium	NC	<0.050 U	<0.050 U

Legend

All results given in ug/L or ppb.

U - Concentration less than the minimum detection limit

NC - No criterion

Evaluation criteria for groundwater results is New York State Class GA Groundwater

Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Gray shaded values exceed criteria

Table 4
Groundwater Sampling Results
Target Compound List Volatile Organic Compounds
47-27 5th Street
Queens, NY

Sample Name Lab Sample ID Sampling Date Dilution Factor	NYSDEC TOGS Standards and Guidance Values - GA ug/L	MW-1 13D0887-03 4/23/2013 5 ug/L	
1,1,1-Trichloroethane	5	0.024	ND
1,1,2,2-Tetrachloroethane	5	0.17	ND
1,1,2-Trichloroethane	1	0.070	ND
1,1-Dichloroethane	5	0.044	ND
1,1-Dichloroethylene	5	0.044	ND
1,2,4-Trimethylbenzene	5	0.068	ND
1,2-Dibromo-3-chloropropane	0.04	0.46	ND
1,2-Dibromoethane	0.0006	0.15	ND
1,2-Dichlorobenzene	3	0.071	ND
1,2-Dichloroethane	0.6	0.12	ND
1,2-Dichloropropane	1	0.051	ND
1,3,5-Trimethylbenzene	5	0.059	ND
1,3-Dichlorobenzene	3	0.048	ND
1,4-Dichlorobenzene	3	0.048	ND
1,4-Dioxane	NC	4.1	ND
2-Butanone	50	1.0	ND
2-Hexanone	50	0.24	ND
4-Methyl-2-pentanone	NC	0.17	ND
Acetone	50	2.8	
Benzene	1	0.61	
Bromobenzene	5	0.081	ND
Bromochloromethane	5	0.10	ND
Bromodichloromethane	50	0.054	ND
Bromoform	50	0.079	ND
Bromomethane	5	0.20	ND
Carbon disulfide	NC	0.065	ND
Carbon tetrachloride	5	0.085	ND
Chlorobenzene	5	0.063	ND
Chloroethane	5	0.090	ND
Chloroform	7	0.079	ND
Chloromethane	5	0.076	ND
cis-1,2-Dichloroethylene	5	0.069	ND
cis-1,3-Dichloropropylene	0.4	0.067	ND
Dibromochloromethane	50	0.053	ND
Ethyl Benzene	5	0.057	ND
Methyl tert-butyl ether (MTBE)	10	0.48	ND
Methylene chloride	5	0.26	ND
n-Butylbenzene	5	0.083	ND
n-Propylbenzene	5	0.068	ND
o-Xylene	5	0.050	ND
p- & m- Xylenes	5	0.090	ND
sec-Butylbenzene	5	0.050	ND
Styrene	5	0.043	ND
tert-Butylbenzene	5	0.050	ND
Tetrachloroethylene	5	0.070	ND
Toluene	5	0.042	ND
trans-1,2-Dichloroethylene	5	0.085	ND
trans-1,3-Dichloropropylene	0.4	0.060	ND
Trichloroethylene	5	0.071	ND
Vinyl Chloride	2	0.062	ND

Legend

NC - No criterion for evaluation of analytical parameter

ND - analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

Evaluation criteria for groundwater results is New York State Class GA Groundwater Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Shaded values exceed evaluation criterion

ppm=mg/kg

Table 4
Groundwater Sampling Results
Target Compound List Semi-Volatile Organic Compounds
47-27 5th Street
Queens, NY

Sample Name Lab Sample ID Sampling Date Dilution Factor	NYSDEC TOGS Standards and Guidance Values - GA ug/L	MW-1 13D0887-03 4/23/2013 5 ug/L	
1,2,4-Trichlorobenzene	5	2.60	ND
2,4,5-Trichlorophenol	1	2.01	ND
2,4,6-Trichlorophenol	1	1.84	ND
2,4-Dichlorophenol	5	1.99	ND
2,4-Dimethylphenol	50	1.68	ND
2,4-Dinitrophenol	10	2.37	ND
2,4-Dinitrotoluene	5	1.69	ND
2,6-Dinitrotoluene	5	1.69	ND
2-Chloronaphthalene	10	2.32	ND
2-Chlorophenol	1	1.88	ND
2-Methylnaphthalene	NC	0.0457	ND
2-Methylphenol	1	1.22	ND
2-Nitroaniline	5	1.77	ND
2-Nitrophenol	1	2.48	ND
3,3'-Dichlorobenzidine	5	1.34	ND
3- & 4-Methylphenols	NC	1.18	ND
3-Nitroaniline	5	1.77	ND
4,6-Dinitro-2-methylphenol	NC	1.71	ND
4-Bromophenyl phenyl ether	NC	1.40	ND
4-Chloro-3-methylphenol	1	1.99	ND
4-Chloroaniline	5	2.63	ND
4-Chlorophenyl phenyl ether	~	2.58	ND
4-Nitroaniline	5	2.63	ND
4-Nitrophenol	1	1.75	ND
Acenaphthene	20	0.0162	ND
Acenaphthylene	NC	0.0275	ND
Anthracene	50	0.0179	ND
Benzo(a)anthracene	0.002	0.0116	ND
Benzo(a)pyrene	0.002	0.0158	ND
Benzo(b)fluoranthene	0.002	0.0285	ND
Benzo(g,h,i)perylene	NC	0.0116	ND
Benzo(k)fluoranthene	0.002	0.0195	ND
Benzyl butyl phthalate	50	0.897	ND
Bis(2-chloroethoxy)methane	5	1.86	ND
Bis(2-chloroisopropyl)ether	5	2.63	ND
Bis(2-ethylhexyl)phthalate	5	0.496	ND
Carbazole	NC	1.38	ND
Chrysene	0.002	0.0122	ND
Di-n-butyl phthalate	50	2.16	ND
Di-n-octyl phthalate	50	1.18	ND
Dibenzo(a,h)anthracene	NC	0.0418	ND
Dibenzofuran	NC	2.54	ND
Diethyl phthalate	50	2.69	ND
Dimethyl phthalate	50	2.01	ND
Fluoranthene	50	0.0229	ND
Fluorene	50	0.0111	ND
Hexachlorobenzene	0.04	1.34	ND
Hexachlorobutadiene	0.5	2.63	ND
Hexachlorocyclopentadiene	5	2.66	ND
Hexachloroethane	5	2.63	ND
Indeno(1,2,3-cd)pyrene	0.002	0.0142	ND
Isophorone	50	2.63	ND
N-nitroso-di-n-propylamine	NC	2.63	ND
N-Nitrosodiphenylamine	50	2.63	ND
Naphthalene	10	0.00821	ND
Nitrobenzene	0.4	1.78	ND
Pentachlorophenol	1	1.53	ND
Phenanthrene	50	0.0526	ND
Phenol	1	1.16	ND
Pyrene	50	0.0251	ND

Legend

NC - No criterion for evaluation of analytical parameter

ND - analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

Evaluation criteria for groundwater results is New York State Class GA Groundwater Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Shaded values exceed evaluation criterion

ppm=mg/kg

Table 4
Groundwater Sampling Results
Target Compound List PCBs and Pesticides
47-27 5th Street
Queens, NY

Sample Name Lab Sample ID Sampling Date Dilution Factor	NYSDEC TOGS Standards and Guidance Values - GA ug/L	MW-1 13D0887-03 4/23/2013 5 ug/L	
Pesticides			
4,4'-DDD	0.3	0.00103	ND
4,4'-DDE	0.2	0.00103	ND
4,4'-DDT	0.2	0.00103	ND
Aldrin	NC	0.00103	ND
alpha-BHC	0.01	0.00103	ND
beta-BHC	0.04	0.00103	ND
Chlordane, total	0.05	0.00410	ND
delta-BHC	0.04	0.00103	ND
Dieldrin	0.004	0.00103	ND
Endosulfan I	NC	0.00103	ND
Endosulfan II	NC	0.00103	ND
Endosulfan sulfate	NC	0.00103	ND
Endrin	NC	0.00103	ND
Endrin aldehyde	5	0.00103	ND
Endrin ketone	5	0.00103	ND
gamma-BHC (Lindane)	0.05	0.00103	ND
Heptachlor	0.04	0.00103	ND
Heptachlor epoxide	0.03	0.00103	ND
Methoxychlor	35	0.00513	ND
Toxaphene	0.06	0.0513	ND
Polychlorinated Biphenyls (PCBs)			
Aroclor 1016	NC	0.0513	ND
Aroclor 1221	NC	0.0513	ND
Aroclor 1232	NC	0.0513	ND
Aroclor 1242	NC	0.0513	ND
Aroclor 1248	NC	0.0513	ND
Aroclor 1254	NC	0.0513	ND
Aroclor 1260	NC	0.0513	ND
Total PCBs	0.09	0.0513	ND

Legend

NC - No criterion for evaluation of analytical parameter

ND - analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

Evaluation criteria for groundwater results is New York State Class GA Groundwater

Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Shaded values exceed evaluation criterion

ppm=mg/kg

Table 4
Groundwater Sampling Results
Total and Dissolved Target Analyte List Metals
47-27 5th Street
Queens, NY

Sample Name Lab Sample ID Sampling Date Dilution Factor	NYSDEC TOGS Standards and Guidance Values - GA ug/L	MW-1 13D0887-03 4/23/2013 5 ug/L	
Total TAL Metals			
Aluminum	NC	2260	
Antimony	3	3	J
Arsenic	25	4	ND
Barium	1000	163	
Beryllium	3	1	ND
Cadmium	5	2	ND
Calcium	NC	856000	D
Chromium	50	39	
Cobalt	NC	30	
Copper	200	7	
Iron	300	100000	
Lead	25	77	
Magnesium	35000	211000	
Manganese	300	16000	D
Mercury	0.7	0.04	ND
Nickel	100	32	
Potassium	NC	47000	
Selenium	10	19	
Silver	50	2	ND
Sodium	20,000	1260000	D
Thallium	0.5	3	ND
Vanadium	NC	2	ND
Zinc	2,000	1030	
Dissolved TAL Metals			
Aluminum	NC	10	U
Antimony	3	3	U
Arsenic	25	4	U
Barium	1000	131	
Beryllium	3	1	U
Cadmium	5	2	U
Calcium	NC	856000	E
Chromium	50	2	U
Cobalt	NC	31	
Copper	200	2	U
Iron	300	46800	
Lead	25	4	
Magnesium	35000	218000	
Manganese	300	15500	E
Mercury	0.7	0.03900	U
Nickel	100	8	
Potassium	NC	46300	
Selenium	10	19	
Silver	50	2	U
Sodium	20,000	739000	E
Thallium	0.5	3	U
Vanadium	NC	2	U
Zinc	2,000	820	

Legend

NC - No criterion for evaluation of analytical parameter

ND - analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

Evaluation criteria for groundwater results is New York State Class GA Groundwater Standards/Guidance Values presented in Technical and Operational Guidance Series 1.1.1

Shaded values exceed evaluation criterion

ppb=ug/kg

Table 5
Summary of Soil Vapor Sampling Results
TO-15 Volatile Organic Compounds
47-27 5th Street
Queens, New York

Sample Name Lab Sample ID Sampling Date Dilution Factor	NYS DOH Soil Vapor Guideline Values ug/m ³	SV-1 13D0914-01 4/24/2013 2.172 ug/m ³		SV-2 13D0914-02 4/24/2013 2.172 ug/m ³		SV-3 13D0914-03 4/24/2013 2.172 ug/m ³	
1,1,1-Trichloroethane	100	5.4	D	7.7	D	10	ND
1,1,2,2-Tetrachloroethane	NC	1.5	ND	1.5	ND	13	ND
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NC	1.7	ND	1.7	ND	14	ND
1,1,2-Trichloroethane	NC	1.2	ND	1.2	ND	10	ND
1,1-Dichloroethane	NC	0.89	ND	0.88	ND	7.6	ND
1,1-Dichloroethylene	NC	0.88	ND	0.86	ND	7.5	ND
1,2,4-Trichlorobenzene	NC	1.6	ND	1.6	ND	14	ND
1,2,4-Trimethylbenzene	NC	1.1	ND	6.9	ND	19	D
1,2-Dibromoethane	NC	1.7	ND	1.7	ND	14	ND
1,2-Dichlorobenzene	NC	1.3	ND	1.3	ND	11	ND
1,2-Dichloroethane	NC	0.89	ND	0.88	ND	7.6	ND
1,2-Dichloropropane	NC	1.0	ND	1.0	ND	8.7	ND
1,2-Dichlorotetrafluoroethane	NC	1.5	ND	1.5	ND	13	ND
1,3,5-Trimethylbenzene	NC	1.1	ND	1.7	D	31	D
1,3-Butadiene	NC	0.96	ND	0.94	ND	8.2	ND
1,3-Dichlorobenzene	NC	1.3	ND	1.3	ND	11	ND
1,4-Dichlorobenzene	NC	1.3	ND	1.3	ND	11	ND
1,4-Dioxane	NC	0.80	ND	0.78	ND	6.8	ND
2-Butanone	NC	0.65	ND	0.64	ND	27	D
2-Hexanone	NC	0.90	ND	0.89	ND	7.7	ND
4-Methyl-2-pentanone	NC	0.90	ND	1.6	D	7.7	ND
Acetone	NC	210	D,E	190	D,E	100	D
Benzene	NC	0.78	D	2.4	D	270	D
Benzyl chloride	NC	1.1	ND	1.1	ND	9.8	ND
Bromodichloromethane	NC	1.4	ND	1.3	ND	12	ND
Bromoform	NC	2.3	ND	2.2	ND	19	ND
Bromomethane	NC	0.86	ND	0.84	ND	7.3	ND
Carbon disulfide	NC	3.4	D	7.7	D	29	D
Carbon tetrachloride	5	0.69	ND	0.68	ND	5.9	ND
Chlorobenzene	NC	1.0	ND	1.0	ND	8.7	ND
Chloroethane	NC	0.58	ND	0.57	ND	5.0	ND
Chloroform	NC	17	D	1.1	ND	9.2	ND
Chloromethane	NC	0.46	ND	0.45	ND	3.9	ND
cis-1,2-Dichloroethylene	NC	0.88	ND	0.86	ND	7.5	ND
cis-1,3-Dichloropropylene	NC	1.0	ND	0.99	ND	8.6	ND
Cyclohexane	NC	2.4	D	0.75	ND	6.5	ND
Dibromochloromethane	NC	1.8	ND	1.7	ND	15	ND
Dichlorodifluoromethane	NC	7.2	D	3.1	D	9.3	ND
Ethyl acetate	NC	0.80	ND	0.78	ND	6.8	ND
Ethyl Benzene	NC	0.96	ND	2.1	D	290	D
Hexachlorobutadiene	NC	2.4	ND	2.3	ND	20	ND
Isopropanol	NC	0.54	ND	1.3	D	4.6	ND
Methyl Methacrylate	NC	0.90	ND	0.89	ND	7.7	ND
Methyl tert-butyl ether (MTBE)	NC	0.80	ND	0.78	ND	6.8	ND
Methylene chloride	NC	3.1	D	3.3	D	7.9	D
n-Heptane	NC	0.91	ND	1.1	D	15	D
n-Hexane	NC	3.3	D	2.4	D	6.6	ND
o-Xylene	NC	0.96	ND	3.5	D	220	D
p- & m- Xylenes	NC	0.96	ND	12	D	540	D
p-Ethyltoluene	NC	5.4	ND	5.3	ND	57	D
Propylene	NC	0.38	ND	0.37	ND	3.2	ND
Styrene	NC	0.94	ND	0.93	ND	8.0	ND
Tetrachloroethylene	100	2.1	D	200	D	98	D
Tetrahydrofuran	NC	0.65	ND	0.64	ND	5.6	ND
Toluene	NC	1.2	D	8.3	D	570	D
trans-1,2-Dichloroethylene	NC	0.88	ND	0.86	ND	7.5	ND
trans-1,3-Dichloropropylene	NC	1.0	ND	0.99	ND	8.6	ND
Trichloroethylene	5	0.59	ND	0.58	ND	9.1	D
Trichlorofluoromethane (Freon 11)	NC	1.5	D	1.7	D	11	ND
Vinyl acetate	NC	0.78	ND	0.76	ND	6.6	ND
Vinyl Chloride	NC	0.56	ND	0.56	ND	4.8	ND

Legend

NC - No Criterion for evaluation of analytical parameter

ND - Analyte not detected at or above the indicated reporting limit

D - Result is from an analysis that required a dilution

E - Result is estimated and cannot be accurately reported due to levels encountered or interferences

Evaluation criteria for soil vapor is the sub-slab vapor concentration for the Matrix 1 and Matrix 2 compounds presented in the NYSDOH Soil Vapor Intrusion Guidance document dated October 2006

Shaded values exceed evaluation criteria

Table 6
Soil Cleanup Objectives (SCOs)
47-27 5th Street, Queens New York

Contaminant	CAS Number	NYSDEC Part 375-6 SCOs for Unrestricted Use (ppm)
Volatile Organic Compounds		
1,1,1-Trichloroethane	71-55-6	0.68
1,1-Dichloroethane	75-34-3	0.27
1,1-Dichloroethene	75-35-4	0.33
1,2-Dichlorobenzene	95-50-1	1.1
1,2-Dichloroethane	107-06-2	0.02
cis-1,2-Dichloroethene	156-59-2	0.25
trans-1,2-Dichloroethene	156-60-5	0.19
1,3-Dichlorobenzene	541-73-1	2.4
1,4-Dichlorobenzene	106-46-7	1.8
1,4-Dioxane	123-91-1	0.1
Acetone	67-64-1	0.05
Benzene	71-43-2	0.06
Butylbenzene	104-51-8	12
Carbon tetrachloride	56-23-5	0.76
Chlorobenzene	108-90-7	1.1
Chloroform	67-66-3	0.37
Ethylbenzene	100-41-4	1
Hexachlorobenzene	118-74-1	0.33
Methyl ethyl ketone	78-93-3	0.12
Methyl tert-butyl ether	1634-04-4	0.93
Methylene chloride	75-09-2	0.05
n-Propylbenzene	103-65-1	3.9
sec-Butylbenzene	135-98-8	11
tert-Butylbenzene	98-06-6	5.9
Tetrachloroethene	127-18-4	1.3
Toluene	108-88-3	0.7
Trichloroethene	79-01-6	0.47
1,2,4-Trimethylbenzene	95-63-6	3.6
1,3,5-Trimethylbenzene	108-67-8	8.4
Vinyl chloride	75-01-4	0.02
Xylene (mixed)	1330-20-7	0.26
Semivolatile Organic Compounds		
Acenaphthene	83-32-9	20
Acenaphthylene	208-96-8	100
Anthracene	120-12-7	100
Benz(a)anthracene	56-55-3	1
Benzo(a)pyrene	50-32-8	1
Benzo(b)fluoranthene	205-99-2	1
Benzo(g,h,i)perylene	191-24-2	100
Benzo(k)fluoranthene	207-08-9	0.8
Chrysene	218-01-9	1
Dibenz(a,h)anthracene	53-70-3	0.33
Fluoranthene	206-44-0	100
Fluorene	86-73-7	30

Table 6
Soil Cleanup Objectives (SCOs)
47-27 5th Street, Queens New York

Contaminant	CAS Number	NYSDEC Part 375-6 SCOs for Unrestricted Use (ppm)
Ideno(1,2,3-cd)pyrene	193-39-5	0.5
m-Cresol	108-39-4	0.33
Naphthalene	91-20-3	12
o-Cresol	95-48-7	0.33
p-Cresol	106-44-5	0.33
Pentachlorophenol	87-86-5	0.8
Phenanthrene	85-01-8	100
Phenol	108-95-2	0.33
Pyrene	129-00-0	100
Pesticides/PCBs		
2,4,5-TP Acid (Silvex)	93-72-1	3.8
4,4'-DDE	72-55-9	0.0033
4,4'-DDT	50-29-9	0.0033
4,4'-DDD	72-54-8	0.0033
Aldrin	309-00-2	0.005
alpha-BHC	319-84-6	0.02
beta-BHC	319-85-7	0.036
Chlordane (alpha)	5103-71-9	0.094
delta-BHC	319-86-8	0.04
Dibenzofuran	132-64-9	7
Dieldrin	60-57-1	0.005
Endosulfan I	959-98-8	2.4
Endosulfan II	33213-65-9	2.4
Endosulfan sulfate	1031-07-8	2.4
Endrin	72-20-8	0.014
Heptachlor	76-44-8	0.042
Lindane	58-89-9	0.1
Polychlorinated biphenyls	1336-36-3	0.1
Metals		
Arsenic	7440-38-2	13
Barium	7440-39-3	350
Beryllium	7440-41-7	7.2
Cadmium	7440-43-9	2.5
Chromium hexavalent	18540-29-9	1
Chromium trivalent	16065-83-1	30
Copper	7440-50-8	50
Total Cyanide		27
Lead	7439-92-1	63
Manganese	7439-96-5	1600
Total Mercury		0.18
Nickel	7440-02-0	30
Selenium	7782-49-2	3.9
Silver	7440-22-4	2
Zinc	7440-66-6	109

APPENDICES

APPENDIX 1

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and 47-27 5th Street 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, 47-27 5th Street 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, Horace Zhang, 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 in the nearest public library that maintains evening and weekend hours. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. 47-27 5th Street LLC will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

Queens Library
Court Square Branch
25-01 Jackson Avenue,
Long Island City, New York
(718)937-2790

Hours of Operation:
Monday, Thursday, and Friday 11:00 AM – 7:00 PM
Tuesday and Wednesday 1:00 PM – 7:00 PM
Closed Saturday and Sunday

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

Identify Issues of Public Concern. There are no known Site-specific 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 prepared by 47-27 5th Street LLC, reviewed and approved by OER prior to distribution and mailed by 47-27 5th Street LLC. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all

public comments. Approval will not be granted until the public comment period has been completed.

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

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

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

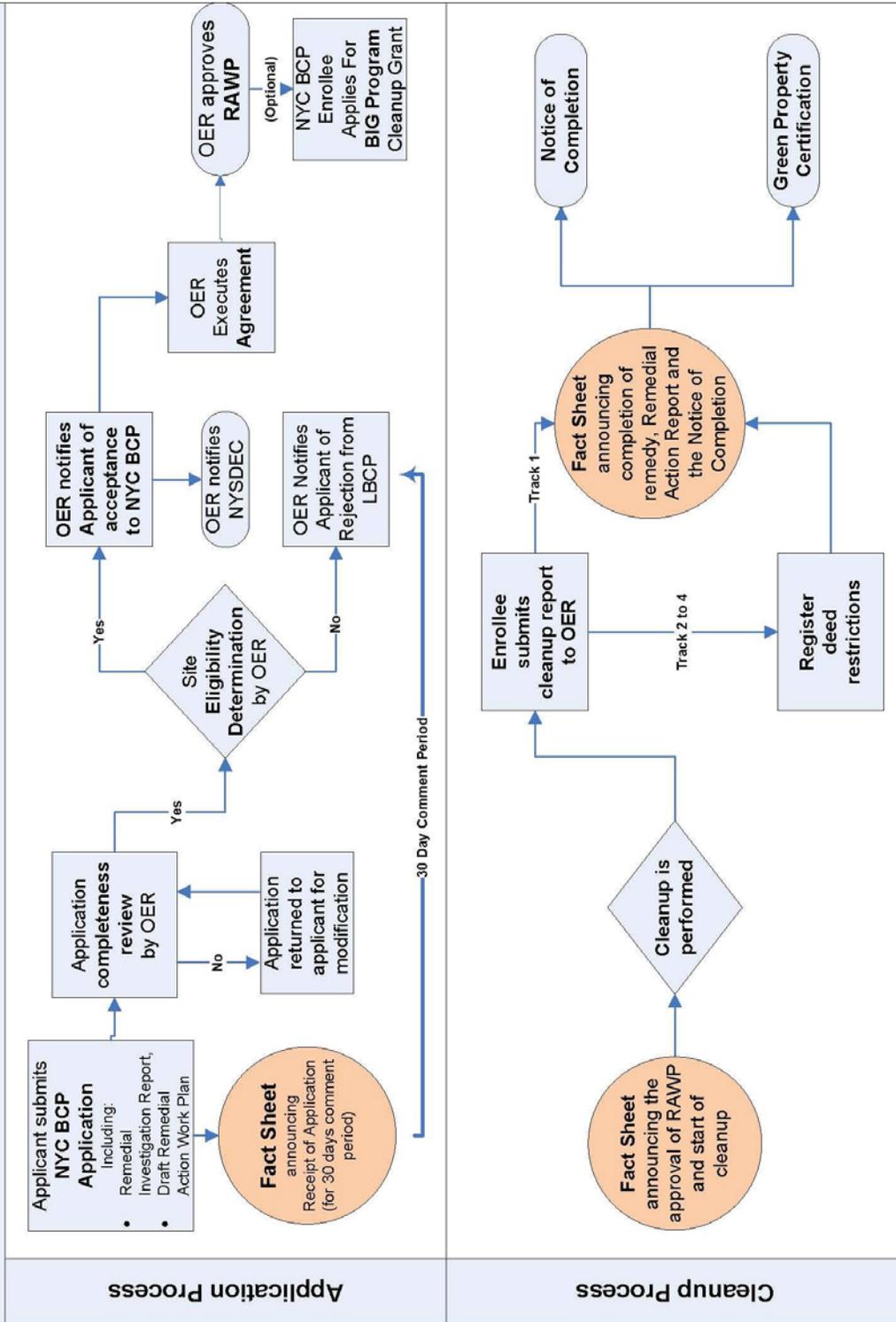
- **Public Notice announcing the approval of the RAWP and the start of remediation**

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

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

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

Flow Chart For NYC Brownfield Cleanup Program (NYC BCP)



APPENDIX 2

SUSTAINABILITY STATEMENT

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

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

Recognizable and uncontaminated construction demolition debris, consisting mainly of masonry and brick fragments, may be segregated at the Site and taken to a local facility for off-site re-use. This project also plans to use locally-derived backfill material. An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

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

This project plans to reduce the consumption of non-renewable resources by avoiding the use of virgin soils and top-soils as backfill of completed excavations.

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

Reduced Energy Consumption and Promotion of Greater Energy Efficiency. Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings.

This project plans to use of locally derived backfill materials, which minimizes truck transport for imported material.

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.

This project plans to select clean diesel and low sulfur fuels.

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

Recontamination Control. Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site.

Under future conditions, vapor intrusion from potential off-Site sources will be prevented through the use of a vapor barrier beneath the building slab and along the exterior foundation walls and from potential on-Site sources by screening of soils' VOC-related contamination during excavation.

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

Paperless Brownfield Cleanup Program. 47-27 5th Street is participating in OER's Paperless Brownfield Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

Low-Energy Project Management Program. 47-27 5th Street 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.

Several new trees will be planted within the sidewalk along 47th Road and 5th Street.

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 3

SOIL/MATERIALS MANAGEMENT PLAN

1.1 SOIL SCREENING METHODS

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

1.2 STOCKPILE METHODS

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

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

1.3 CHARACTERIZATION OF EXCAVATED MATERIALS

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

1.4 MATERIALS EXCAVATION, LOAD-OUT AND DEPARTURE

The PE/QEP overseeing the remedial action will:

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

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

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

1.5 OFF-SITE MATERIALS TRANSPORT

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

The outbound truck transport route for trucks leaving the Site will be via 47th Road. 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 Queens, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RAR.

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

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization

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

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

No soil or fill material is planned for on-Site reuse.

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 Table 5. The backfill locations are shown in Figure 5.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this RAWP. The RAR will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.

Source Screening and Testing

Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

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

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RAR. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.10 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 STORM-WATER POLLUTION PREVENTION

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

1.12 CONTINGENCY PLAN

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER.

Chemical analytical testing will be performed for 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 the Remedial Action Report.

Dust Control

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

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

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and

corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying the Remedial Action Report.

Other Nuisances

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

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

APPENDIX 4
HEALTH AND SAFETY PLAN

HEALTH & SAFETY PLAN

47-27 5TH STREET
QUEENS, NEW YORK

Prepared for:

47-27 5TH STREET LLC
47-61 Pearson Place
Long Island City, New York 11101

Prepared by:



ATHENICA ENVIRONMENTAL
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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:	47-27 5 th Street 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:	47-27 5 th Street, Queens, New York
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° in mm Hg

2.0 INTRODUCTION

The site is located at 47-27 5th Street in the Long Island section of Queens, New York (the “Site”). The Site is identified as Block 30 and Lot 29 on the New York City Tax Map. The Site is 2,500-square feet and is bounded by 47th Road to the north, a commercial property to the south, a residential property to the east, and 5th Street to the west. Currently, the Site is a vacant lot, without any structures, and is enclosed by a chain link perimeter fence to the north and west. Figure 2-1 is a site location map. A map of the Site boundary is shown in Figure 2-2.

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

This HASP 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 HASP 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 HASP 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 HASP 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 HASP 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

Currently, the Site consists of an undeveloped lot. Vegetation and construction debris (i.e., masonry, concrete slab, and brick fragments) were observed at the Site. A Phase I Environmental Site Assessment (Phase I ESA) by Athenica of the Site revealed that the Site was formerly occupied by a residential dwelling from at least 1898 to at least 1936, by "Marine Engineering Rebuilding" in 1947, by a machine shop in 1950, and by a woodworking facility from at least 1970 to at least 1996.

The Phase I ESA identified the following Recognized Environmental Conditions (RECs) associated with the Site:

- The past use of the Site as a machine shop;
- The "E" designation of the Site for potential hazardous materials; and
- The past use of the adjacent and presumed up-gradient property to the east of the Site as a foundry.

As a result of its "E" designation, Athenica prepared a Phase II Work Plan for a subsurface investigation of the Site, and this plan was submitted and approved by the DEP in June 2008. Subsequently, Athenica conducted the Phase II subsurface investigation ("2008 Phase II SI") in general accordance with the approved Work Plan, and this work occurred in July 2008. The initial Phase II SI of the Site occurred in 2008 to evaluate subsurface soil conditions and groundwater on-Site. The Phase II SI included a geophysical survey across the entire Site, installation of four soil borings, the conversion of two of the borings to temporary groundwater monitoring wells, and the collection and analysis of soil and groundwater samples for laboratory analysis. At each boring location, continuous split spoon soil samples were collected to the proposed completion depths and screened by a field geologist for evidence of contamination.

A subsequent subsurface remedial investigation (RI) occurred in April 2013 to further evaluate on-Site conditions and to delineate a limited area of historic fill ("hot spot") at the easternmost portion of the Site that was found to have levels of leachable lead that were hazardous. This RI by Athenica included the installation of one soil borings to a depth of 12 feet below ground surface (bgs) and the installation of 4 soil borings to 9 feet bgs to the north, south, east, and west

of the location of a former test pit in which hazardous soils were identified. Continuous soil sampling was performed at each boring location. A temporary groundwater monitoring well and three soil vapor implants were installed. Representative soil, groundwater, and soil vapor samples were collected for laboratory analysis.

In the soil samples analyzed in 2008 and 2013, the volatile organic compound (VOC) benzene exceeded the NYSDEC Part 375 Unrestricted Use Soil Cleanup Objective (SCO) value in one deep soil sample. This compound was not detected in the shallow sample collected at this boring and was detected in the groundwater sample collected at the same location, which indicates that its presence is due to impacted groundwater rather than soil. The semi-volatile organic compounds (SVOCs) benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and dibenzo(a,h)anthracene exceeded the NYSDEC Part 375 Unrestricted Use SCO values in three shallow soil samples. The concentrations of these SVOCs were well within the published ranges for urban fill, which was observed across the Site from grade to as deep as 8.5' bgs. The pesticide 4,4'-DDT and the total PCB levels in one shallow soil sample exceeded the NYSDEC Part 375 Unrestricted Use SCO values. Concentrations of this pesticide and the total levels of polychlorinated biphenyls (PCBs) decreased significantly with depth, which suggests impacts as a result of the past use of the Site as a machine shop or the presence of historic fill found in the shallow soil. The metals arsenic, barium, hexavalent chromium, copper, lead, mercury, nickel, selenium, and zinc exceeded the NYSDEC Part 375 Unrestricted Use SCO values in seven soil samples. Concentrations of these metals generally decreased significantly with depth, and suggest impacts by past use of the Site as a machine shop or the presence of historic fill found in the shallow soil.

Concentrations of total levels (i.e. non-filtered groundwater samples) of several metals in the groundwater samples exceeded NYSDEC TOGS Standards and Guidance values and likely reflect the turbidity of the groundwater samples. Levels of dissolved metals in the groundwater were significantly lower than the total levels of metals in groundwater. Levels of the following dissolved metals exceeded NYSDEC TOGS Standards and Guidance values in the groundwater: arsenic, iron, lead, magnesium, manganese, selenium, sodium, and thallium.

According to the NYSDOH Matrices, the highest concentrations of Tetrachlorethene (200 ug/m³ at SV-1) and concentrations of Trichloroethene (9.1 ug/m³ at SV-3) detected in the soil vapor samples warrant either monitoring or mitigation if evaluated as a sub-slab vapor sample.

With the exception of the VOC benzene and the metals copper, mercury, and selenium, the SVOCs, pesticides, PCBs, and metals that were detected in the soil were present only in samples collected from the fill material with no contamination found in the underlying natural soil. The concentrations of copper and mercury were shown to generally decrease with depth, and their concentrations in the deep samples were found to just slightly exceed the NYSDEC Part 375

Unrestricted Use SCOs. Benzene and selenium were only detected in one soil boring, and both compounds were found to increase significantly in concentration with depth, which suggests that their presence in the soil samples is due to groundwater rather than soil. With the exception of 1,3,5-trimethylbenzene, benzene, carbon disulfide, and o-xylene, the VOCs identified in the soil vapor were not found in any of the on-Site soil samples collected and therefore are more likely due to off-Site or an upgradient/cross-gradient source. None of these compounds that were detected in the soil vapor and the soil samples exceeded their respective NYSDEC Part 375 Unrestricted Use SCO values (where criterion values exist) except for a slight exceedence of benzene in one soil sample.

The hotspot with hazardous levels of leachable lead at the eastern portion of the Site was found to be approximately 3,385 cubic feet (21.5 feet by 17.5 feet by 9 feet deep). The shot spot and the soils to the north, south, and east of the hot spot (totaling approximately 5,460 cubic feet) will be disposed of as hazardous.

2.2 SCOPE OF WORK

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

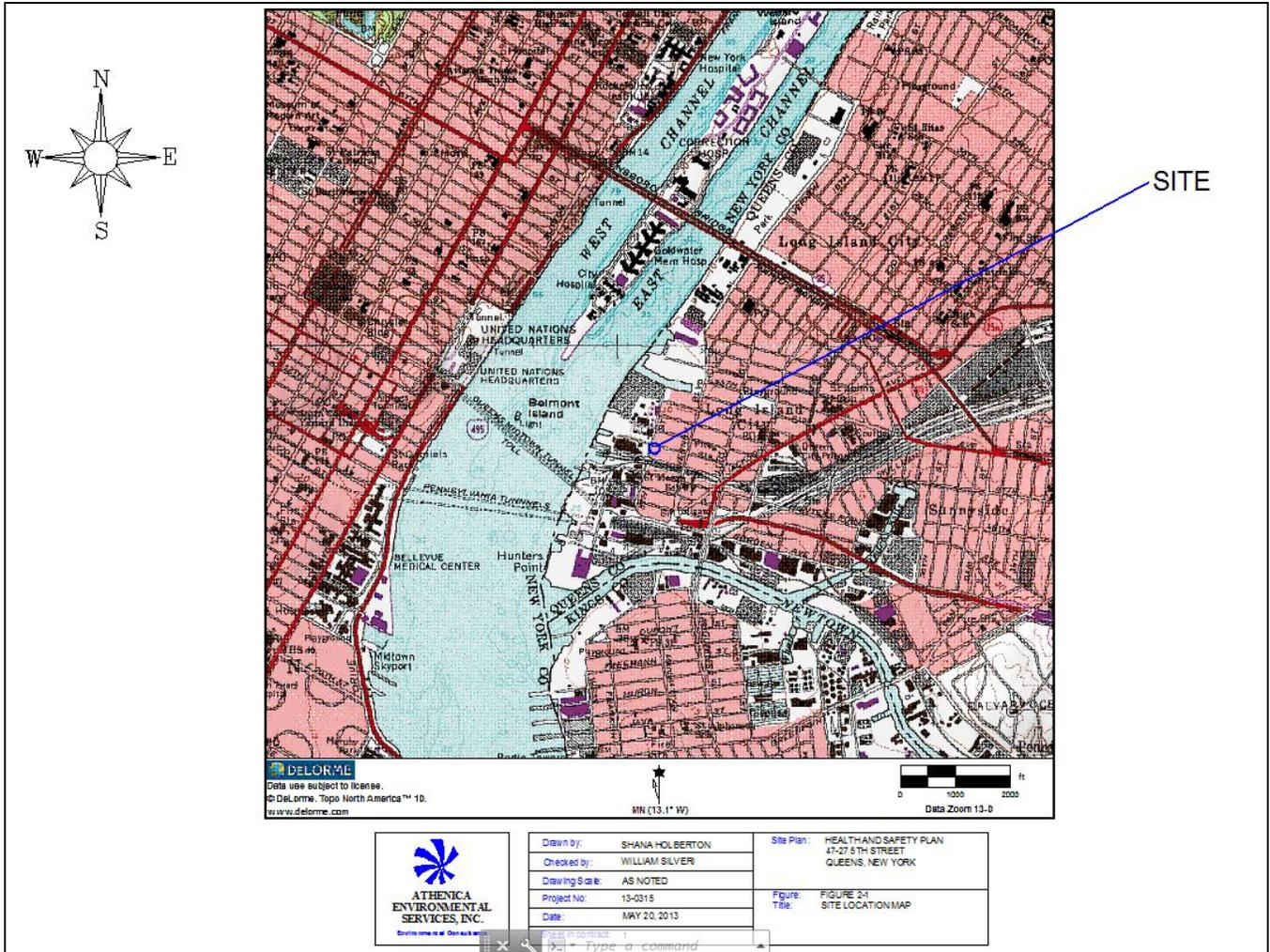
The principal tasks covered in this HASP include the following:

- 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

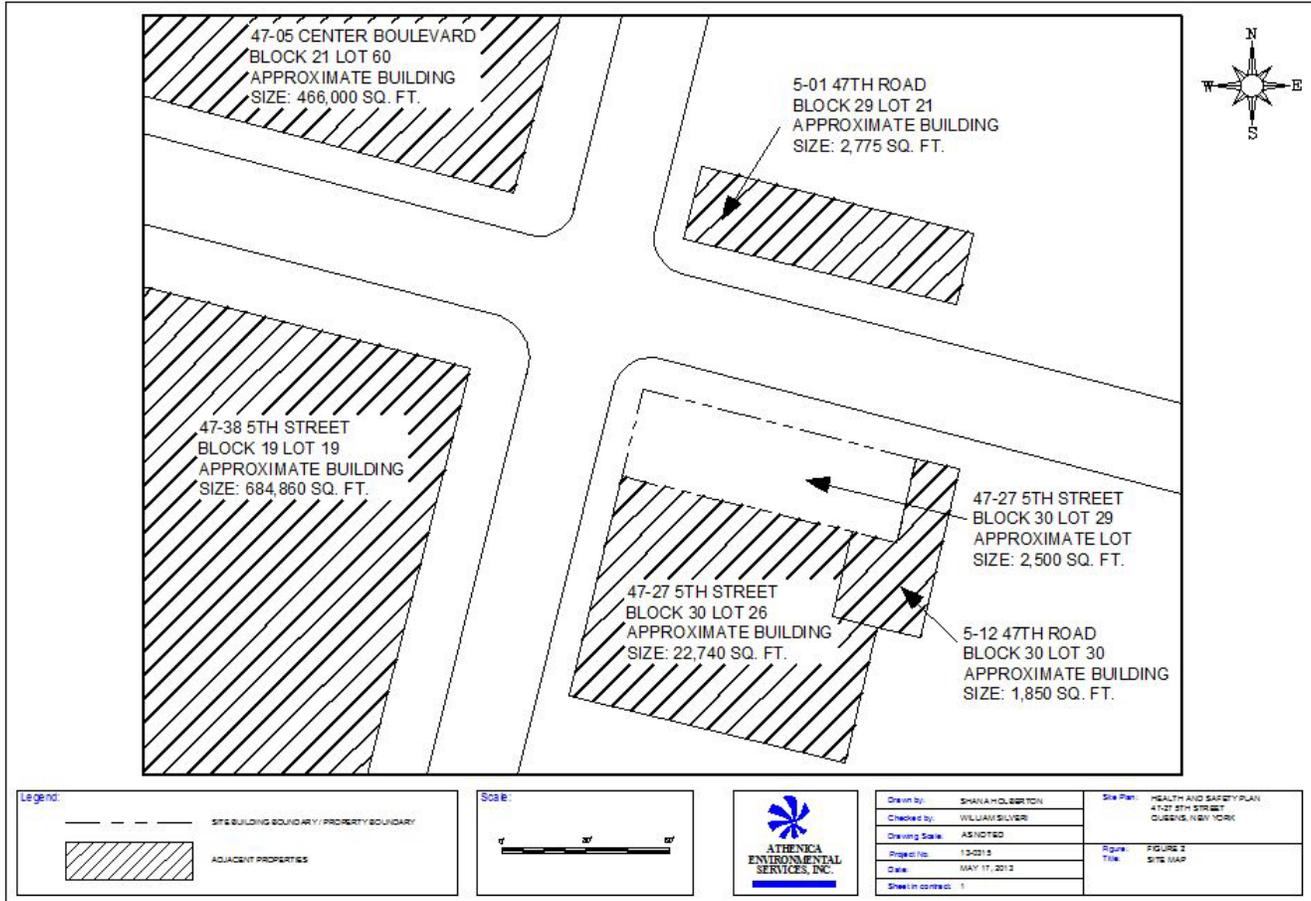
Activity Hazard Analyses for these tasks are provided in Section 4.5.

This HASP 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**



**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 HASP 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 HASP 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 HASP 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. David Lo will serve as the PM for this project.

3.2 CONSTRUCTION SUPERINTENDENT (CS)

The CS is responsible for field implementation of the HASP 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. David Lo will serve as the CS for this project.

Specific responsibilities for the CS include:

- Ensures that the HASP 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 HASP;
- 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. David Lo will serve as the HSO 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 HASP 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 HASP.
- 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 HASP.

3.4 PROJECT SAFETY MANAGER (PSM)

The Project Safety Manager (PSM) is responsible for developing/reviewing the HASP 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 HASP 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 HASP 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 HASP 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 in the Phase II ESA 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 subsurface investigation results, workers at this Site have the potential to be exposed to several poly aromatic hydrocarbons (PAHs), which are semi-volatile organic compounds commonly referred to as coal tar pitch volatiles (CTPV), as well as a limited area of historic fill (“hot spot”), which was found to have levels of leachable lead that were hazardous.

Potential exposure to the contaminants of concern may occur during intrusive soil activities or where direct contact with the contaminated soil takes place. The lead and CTPV 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 as Coal Tar Pitch Volatiles	0.2 mg/m ³	0.2 g/m ³	Inhalation Ingestion Skin contact	Irritant to eyes, swelling, acne Contact dermatitis, chronic bronchitis	Respiratory, CNS, Liver, Kidneys, skin, bladder	Black or dark-brown amorphous residue, faint aromatic odor
Lead	0.05 mg/m ³	0.1 mg/m ³	Inhalation Ingestion 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

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/m³ = 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 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								
-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	
-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		cease	
-40 to -42	-40 to -44	30 min	5	Non-emergency work should		cease		cease		cease	
< -43	< -45	Non-emergency work should		cease		cease		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 47-27 5 th Street	Location Queens, NY	Estimated Dates June - July 2013
Phase of Work Mobilization/ Demobilization		Analysis Approved by William Silveri
TASKS	HAZARDS	CONTROL MEASURES
1. Mobilization and demobilization of equipment site tools, personnel. 2. Set up/remove staging and decontamination areas.	Slips/trips/falls	<ul style="list-style-type: none"> • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Manual lifting/ material handling	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (50 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Temperature extremes	<ul style="list-style-type: none"> • Drink plenty of fluids • Train personnel of signs/symptoms of cold/heat stress • Monitor air temperatures when extreme weather conditions are present • Stay in visual and verbal contact with your buddy
	Hand tool usage	<ul style="list-style-type: none"> • Daily inspections will be performed • Remove broken or damaged tools from service • Use the tool for its intended purpose • Use in accordance with manufacturer instructions.
	Biological hazards	<ul style="list-style-type: none"> • Be alert to the presence of biological hazards • Wear insect repellent • CS/HSO should be aware of on-site personnel with allergic reactions in insect bites and stings.

Project Identification 47-27 5 th Street	Location Queens, NY	Estimated Dates June - July 2013
Phase of Work Trenching/Excavation		Analysis Approved by William Silveri
TASKS	HAZARDS	CONTROL MEASURES
1. Trenching and excavation. 2. Install shoring/ sheeting protective system.	Chemical hazards	<ul style="list-style-type: none"> • Wear appropriate PPE per Section 5.1 • Practice contamination avoidance • Conduct real-time air monitoring per section 7.1.1 • Follow proper decontamination procedures • Wash hands/face before eating, drinking, smoking
	Cave-in	<ul style="list-style-type: none"> • Do not allow entry into the trench unless approved protective system is in place and has been inspected by the competent person. • Follow OSHA excavation regulations • Place ladder or entry device every 25 feet of lateral travel
	Struck By/ Against Motor Vehicles/ Operating Equipment	<ul style="list-style-type: none"> • Wear reflective warning vests when exposed to vehicular traffic • Isolate potential equipment swing areas • Make eye contact with vehicle operators before approaching/crossing high traffic areas • Understand and review hand signals • Use a spotter to direct equipment movement in high traffic areas • Audible back-up alarms on equipment • Operator inspects equipment daily for safety defects, including the braking system
	Slips/trips/falls	<ul style="list-style-type: none"> • Clear walkways, work areas of equipment and tools • Mark, identify, or barricade other obstructions • Use barricades or fencing for trenches greater than 6 feet deep • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Electrical hazards	<ul style="list-style-type: none"> • Maintain 10 foot minimum clearance to any overhead power lines • Call for Utility mark out prior to digging

Project Identification 47-27 5 th Street	Location Queens, NY	Estimated Dates June - July 2013
Phase of Work Trenching/Excavation		Analysis Approved by William Silveri
TASKS	HAZARDS	CONTROL MEASURES
1. Trenching and excavation. 2. Install shoring/ sheeting protective system.	Hand and power tool usage	<ul style="list-style-type: none"> • Daily inspections will be performed on tools and cords • Ensure all guards are in place • Remove broken or damaged tools from service • Use the tool for its intended purpose • Use in accordance with manufacturer instructions
	Noise	<ul style="list-style-type: none"> • Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear hearing protective devices. • Disposable ear plugs or other hearing protection required while around noisy equipment.
	Manual lifting/ Material handling	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (50 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Temperature extremes.	<ul style="list-style-type: none"> • Drink plenty of fluids: • Train personnel of signs/symptoms of cold/heat stress; • Monitor air temperatures when extreme weather conditions are present; • Stay in visual and verbal contact with your buddy; and • Use procedures in Sections 3.3.1 and 3.3.2

Project Identification 47-27 5 th Street	Location Queens, NY	Estimated Dates June - July 2013
Phase of Work Loading of Trucks		Analysis Approved by William Silveri
TASKS	HAZARDS	CONTROL MEASURES
1. Load trucks with contaminated soils. 2. Cover and clean trucks.	Chemical hazards	<ul style="list-style-type: none"> Wear appropriate PPE per Section 6.1 Practice contamination avoidance Conduct real-time air monitoring per section 8.1.1 Follow proper decontamination procedures Wash hands/face before eating, drinking, smoking
	Struck By/ Against Motor Vehicles/ Operating Equipment	<ul style="list-style-type: none"> Wear reflective warning vests when exposed to vehicular traffic Isolate potential equipment swing areas Make eye contact with vehicle operators before approaching/crossing high traffic areas Understand and review hand signals Use a spotter to direct equipment movement in high traffic areas Audible back-up alarms on equipment Operator inspects equipment daily for safety defects, including the braking system
	Slips/trips/falls	<ul style="list-style-type: none"> Maintain alertness to slip/trip/fall hazards Maintain good housekeeping Walk, do not run Wear footwear with soles that grip
	Manual lifting/ material handling	<ul style="list-style-type: none"> Observe proper lifting techniques Obey sensible lifting limits (50 lb. maximum per person manual lifting) Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Temperature extremes	<ul style="list-style-type: none"> Drink plenty of fluids Train personnel of signs/symptoms of cold/heat stress Monitor air temperatures when extreme weather conditions are present Stay in visual and verbal contact with your buddy Use procedures in Sections 4.3.1 and 4.3.2
	Noise	<ul style="list-style-type: none"> Hearing protection mandatory at or above 85 dBA. Instruct personnel how to properly wear hearing protective devices. Disposable ear plugs or other hearing protection required while around noisy equipment.

Project Identification 47-27 5 th Street	Location Queens, NY	Estimated Dates June - July 2013
Phase of Work Installation of Footers		Analysis Approved by William Silveri
TASKS	HAZARDS	CONTROL MEASURES
1. Build forms. 2. Pour concrete. 3. Remove forms.	Chemical hazards	<ul style="list-style-type: none"> • Wear appropriate PPE per Section 6.1 • Practice contamination avoidance • Conduct real-time air monitoring per section 8.1.1 • Follow proper decontamination procedures • Wash hands/face before eating, drinking, smoking
	Struck By/ Against Motor Vehicles/ Operating Equipment	<ul style="list-style-type: none"> • Wear reflective warning vests when exposed to vehicular traffic • Isolate potential equipment swing areas • Make eye contact with vehicle operators before approaching/crossing high traffic areas • Understand and review hand signals • Use a spotter to direct equipment movement in high traffic areas • Audible back-up alarms on equipment • Operator inspects equipment daily for safety defects, including the braking system
	Concrete pumper	<ul style="list-style-type: none"> • Make sure nozzle man has eye contact with pump truck operator. • Ensure steady control over nozzle
	Splashing concrete	<ul style="list-style-type: none"> • Ensure eye protection is worn and other PPE as required by Section 6.1 • A portable eyewash will be maintained in the work area
	Falls from heights	<ul style="list-style-type: none"> • Fall protection is required over 6 feet when removing forms • Use PFAS where needed • OSHA required training before use of PFAS, scaffold or lift • Competent person inspects PFAS and scaffold
	Sharp Objects	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects being handled • Maintain all hand and power tools in a safe condition • Keep guards in place during use

Project Identification 47-27 5 th Street	Location Queens, NY	Estimated Dates June - July 2013
Phase of Work Installation of Footers		Analysis Approved by William Silveri
TASKS	HAZARDS	CONTROL MEASURES
1. Build forms. 2. Pour concrete. 3. Remove forms.	Hand and power tool usage	<ul style="list-style-type: none"> • Daily inspections will be performed on tools and cords • Ensure all guards are in place • Remove broken or damaged tools from service • Use the tool for its intended purpose • Use in accordance with manufacturer instructions
	Noise	<ul style="list-style-type: none"> • Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear hearing protective devices. • Disposable ear plugs or other hearing protection required while around noisy equipment.
	Manual lifting/ material handling	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (50 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Slips/trips/falls	<ul style="list-style-type: none"> • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Temperature extremes.	<ul style="list-style-type: none"> • Drink plenty of fluids; • Train personnel of signs/symptoms of cold/heat stress; • Monitor air temperatures when extreme weather conditions are present; • Stay in visual and verbal contact with your buddy; and • Use procedures in Sections 4.3.1 and 4.3.2

Project Identification 47-27 5 th Street	Location Queens, NY	Estimated Dates June - July 2013
Phase of Work Heavy Equipment Decontamination		Analysis Approved by William Silveri
TASKS	HAZARDS	CONTROL MEASURES
1. Pressure wash or steam clean heavy equipment and vehicles.	Chemical hazards	<ul style="list-style-type: none"> • Wear appropriate PPE per Section 6.1 • Practice contamination avoidance • Conduct real-time air monitoring per section 8.1.1 • Follow proper decontamination procedures • Wash hands/face before eating, drinking, smoking
	Struck By/ Against Motor Vehicles/ Operating Equipment	<ul style="list-style-type: none"> • Wear reflective warning vests when exposed to vehicular traffic • Isolate potential equipment swing areas • Make eye contact with vehicle operators before approaching/crossing high traffic areas • Understand and review hand signals • Use a spotter to direct equipment movement in high traffic areas • Audible back-up alarms on equipment • Operator inspects equipment daily for safety defects, including the braking system
	Steam/heat/ splashing	<ul style="list-style-type: none"> • Wear face shield + safety glasses • Stay out of splash radius to minimize exposure • Do not direct steam/spray at anyone
	Hand and power tool usage	<ul style="list-style-type: none"> • Daily inspections will be performed on tools and cords • Ensure all guards are in place • Remove broken or damaged tools from service • Use the tool for its intended purpose • Use in accordance with manufacturer instructions
	Slips/trips/falls	<ul style="list-style-type: none"> • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Temperature extremes	<ul style="list-style-type: none"> • Drink plenty of fluids • Train personnel of signs/symptoms of cold/heat stress • Monitor air temperatures when extreme weather conditions are present • Stay in visual and verbal contact with your buddy • 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 Decontamination	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 * ≥5.0 mg/m ³ *	Level D Stop work; notify PSM 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 lead, based on utilizing the highest concentrations of these contaminants found in soil.

- OSHA PEL for respirable dust: 5 mg/m³,
- Action Level for PAHs: OSHA PEL for PAHs (0.2 mg/m³) divided by maximum concentration in soil (17.66 ppm or 0.001766%):
 - 0.2 mg/m³/0.001766 = 113.25 mg/m³,
- Action Level for Lead: OSHA PEL for Lead (0.5 mg/m³) divided by maximum concentration of lead found in the soil (5,770 ppm or 0.577%):
 - 0.5 mg/m³ divided by 0.577 = 0.867 mg/m³;

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	<ul style="list-style-type: none"> • The potential for human injury exists. • Toxic fumes or vapors are released. • The fire could spread on site or off site and possibly ignite other flammable materials or cause heat-induced explosions. • The use of water and/or chemical fire suppressants could result in contaminated run-off. • An imminent danger of explosion exists.
Spill or Release of Hazardous Materials	<ul style="list-style-type: none"> • The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard. • 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	<ul style="list-style-type: none"> • A rain storm exceeds the flash flood level. • The facility is in a projected tornado path or a tornado has damaged facility property. • Severe wind gusts are forecasted or have occurred and have caused damage to the facility.
Medical Emergency	<ul style="list-style-type: none"> • Overexposure to hazardous materials. • Trauma injuries (broken bones, severe lacerations/ bleeding, burns). • Eye/skin contact with hazardous materials. • 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	<ul style="list-style-type: none"> • Materials at the site • Materials brought to the site
Physical Hazards	<ul style="list-style-type: none"> • Fire/explosion • Slip/trip/fall • Electrocution • Confined space • IDLH atmospheres • Excessive noise
Mechanical Hazards	<ul style="list-style-type: none"> • Heavy equipment • Stored energy system • Pinch points • Electrical equipment • Vehicle traffic
Environmental Hazards	<ul style="list-style-type: none"> • Electrical Storms • High winds • Heavy Rain/Snow • Heat Stress • 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
<u>Police</u> : New York City Police Department (NYPD).....	911
<u>Hospital</u> : Mount Sinai Center	(718) 932-1000
<u>Fire</u> : 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
Contractor Emergency Numbers.....	(732) 841-0006

DIRECTIONS AND HOSPITAL ROUTE MAP

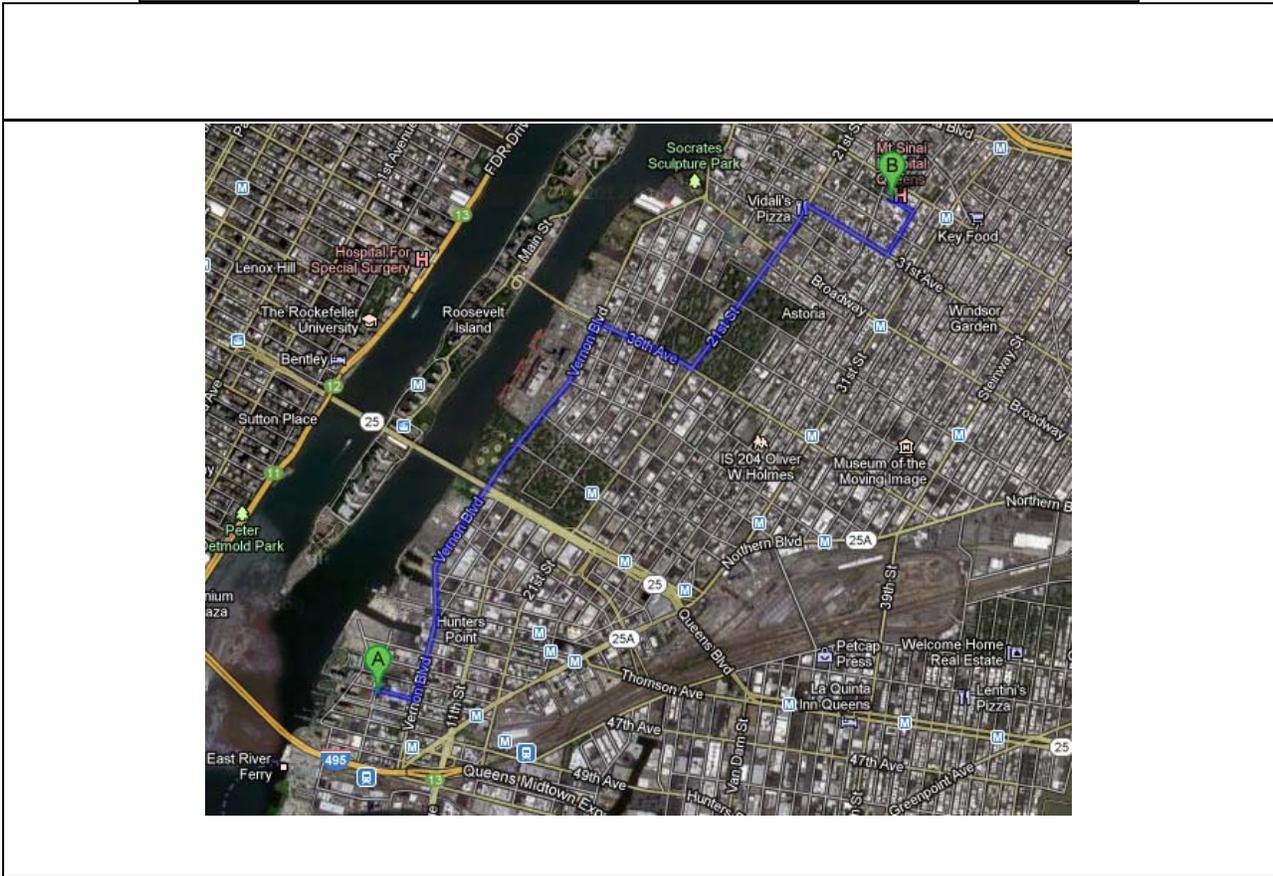
FIGURE 1 – HOSPITAL ROUTE PLAN (Mount Sinai Hospital)

Site Location: 47-27 5th Street

Hospital Location: Mount Sinai Hospital: 25-10 30th Avenue, Astoria NY 11102

Information Line: 718-267-4285

	Steps	Maneuvers	Dist.
	1	Start North on 5th Street toward 47th Road .	50 feet
	2	Turn Right onto 47th Road	0.1 mi
	3	Turn LEFT onto Vernon Boulevard	2.3 mi
	4	Continue onto Main Avenue	220 feet
	5	Turn Right onto 30th Ave	0.5 mi
	6	Follow signs to the Emergency Room	
Total Est. Time: 9 minutes		Total Est. Distance: 3.0 miles	



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 HASP 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
<ul style="list-style-type: none"> • HASP sign off • Sign in/out procedures • Site background/characterization • Chain of command • Rules and regulations • Hours of work • Absences • Personal Protective Equipment/respirator fit test (if applicable) • Emergency Information <ul style="list-style-type: none"> • Emergency signal • Gathering point • Responsibilities/roles • Emergency phone numbers • Site Control/Work Zones • Hazards/AHAs • Air Monitoring Program • Forms, site-specific • Incident Reporting • Lead Awareness (Appendix C) 	<ul style="list-style-type: none"> • Sign in/out procedures • Site Background/ Characterization • Review of Site map • Work Zones in progress • Emergency plan/signals • Training/medical requirements • 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*

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.** _____

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

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

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

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

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

Amendment Revises: Page: _____ **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

EQUIPMENT CALIBRATION RECORD

Site Name: 47-27 5th Street, Queens, NY

Site Location: 47-27 5th Street, Queens, NY

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			
	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			
	pDR-1500, Dusttrack or equivalent			Filter			
	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 H₂S

APPENDIX D

TAILGATE SAFETY MEETING FORM

Daily Safety Meeting Report

Project Name: 47-27 5th Street, Queens, NY

Location: 47-27 5th Street, Queens, NY

Date: _____

Today's Tasks/Activities:

Potential Chemical/Physical Hazards:

Personal Protective Equipment:

Attendees:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

HSO: _____
(Signature)

Const. Supt: _____
(Signature)



APPENDIX 5

DESIGN DIAGRAMS, SPECIFICATIONS AND CHEMICAL COMPATABILITY LETTER FOR VAPOR BARRIER

PREPRUFE® 300R & 160R

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

Description

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

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

The Preprufe R System includes:

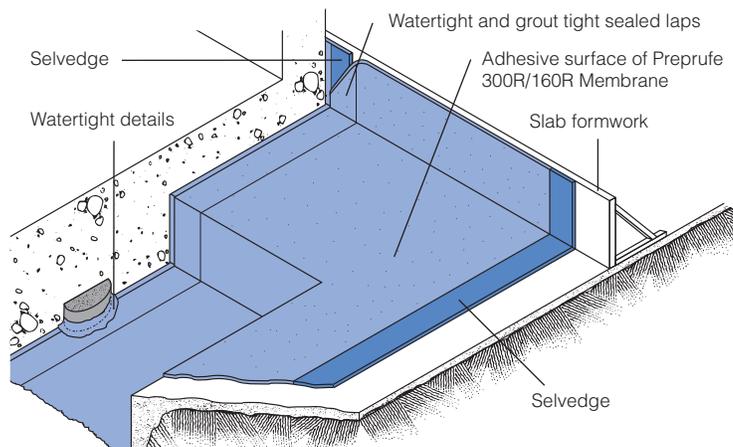
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe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

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

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

Advantages

- **Forms a unique continuous adhesive bond to concrete poured against it**—prevents water migration and makes it unaffected by ground settlement beneath slabs
- **Fully-adhered watertight laps** and detailing
- **Provides a barrier to water, moisture and gas**—physically isolates the structure from the surrounding ground
- **BBA Certified** for basement Grades 2, 3, & 4 to BS 8102:1990
- **Zero permeance** to moisture
- **Solar reflective**—reduced temperature gain
- **Simple and quick to install**—requiring no priming or fillets
- **Can be applied to permanent formwork**—allows maximum use of confined sites
- **Self protecting**—can be trafficked immediately after application and ready for immediate placing of reinforcement
- **Unaffected by wet conditions**—cannot activate prematurely
- **Inherently waterproof, non-reactive system:**
 - not reliant on confining pressures or hydration
 - unaffected by freeze/thaw, wet/dry cycling
- **Chemical resistant**—effective in most types of soils and waters, protects structure from salt or sulphate attack



Drawings are for illustration purposes only. Please refer to graceconstruction.com for specific application details.

Installation

The most current application instructions, detail drawings and technical letters can be viewed at graceconstruction.com. For other technical information contact your local Grace representative.

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

Substrate Preparation

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

Horizontal—The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.

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

Membrane Installation

Preprufe can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe in cold or marginal weather conditions 55°F (<13°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application. Alternatively, Preprufe Low Temperature (LT) is available for low temperature condition applications. Refer to Preprufe LT data sheet for more information.

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

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

Refer to Grace Tech Letter 15 for information on suitable rebar chairs for Preprufe.

Vertical substrates—Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to

overlap. Roll firmly to ensure a watertight seal.

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

Details

Refer to Preprufe Field Application Manual, Section V Application Instructions or visit graceconstruction.com. This manual gives comprehensive guidance and standard details.

Membrane Repair

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

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe membrane and tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Following proper ACI guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

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

A minimum concrete compressive strength of 1500 psi (10 N/mm²) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

Refer to Grace Tech Letter 17 for information on removal of formwork for Preprufe.

Figure 1

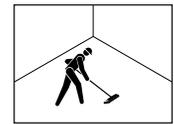


Figure 2

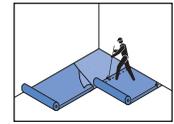
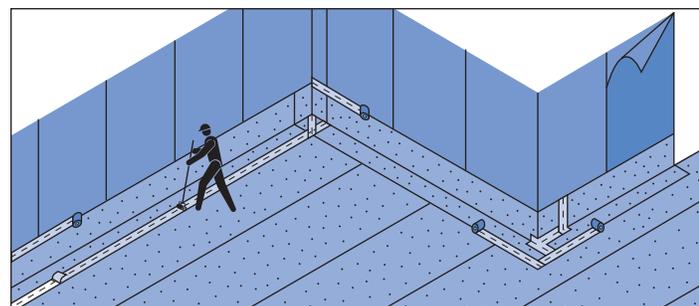
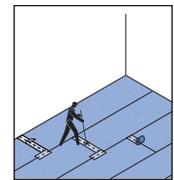


Figure 3

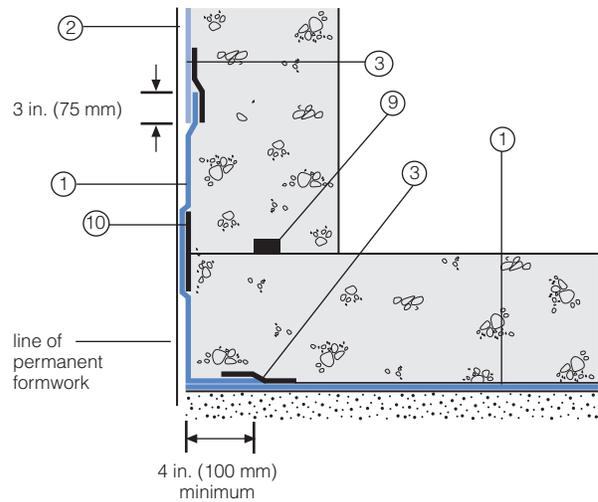


Detail Drawings

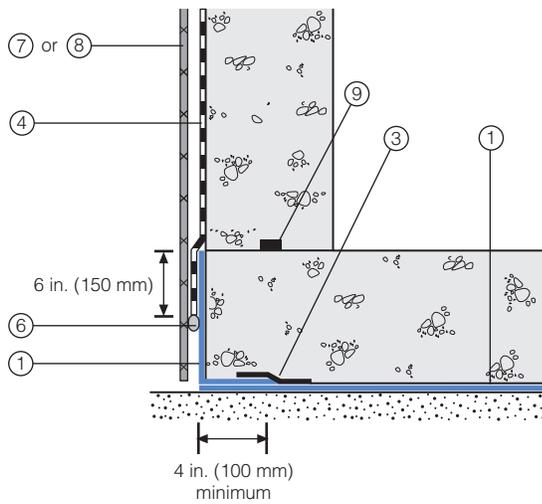
Details shown are typical illustrations and not working details. For a list of the most current details, visit us at graceconstruction.com.

For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

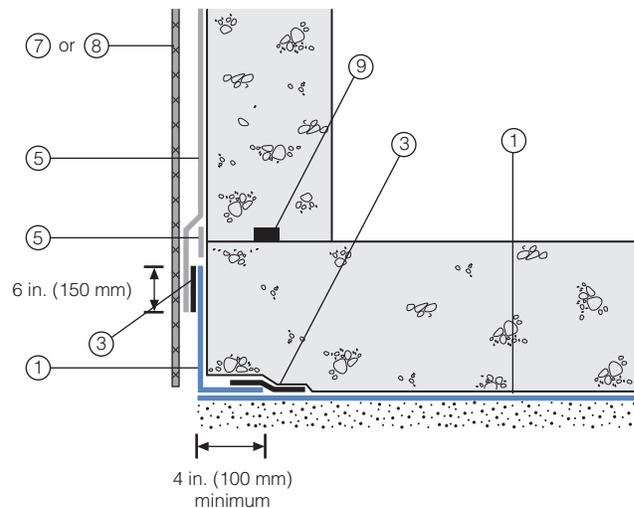
Wall base detail against permanent shutter



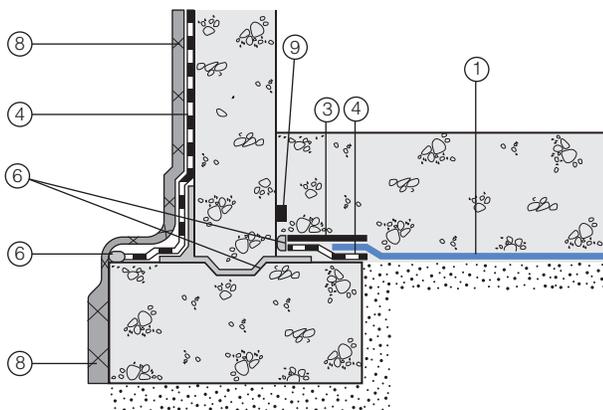
Bituthene wall base detail (Option 1)



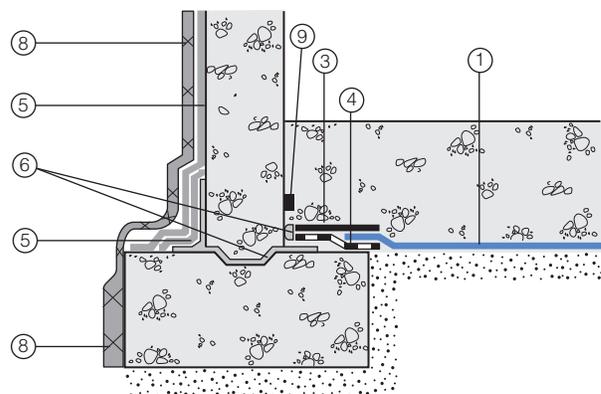
Procor wall base detail (Option 1)



Bituthene wall base detail (Option 2)



Procor wall base detail (Option 2)



- 1 Preprufe 300R
- 2 Preprufe 160R
- 3 Preprufe Tape
- 4 Bituthene

- 5 Procor
- 6 Bituthene Liquid Membrane
- 7 Protection

- 8 Hydroduct®
- 9 Adcor ES
- 10 Preprufe CJ Tape

Supply

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

Physical Properties

Property	Typical Value 300R	Typical Value 160R	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385, modified ¹
Low temperature flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to hydrostatic head	231 ft (71 m)	231 ft (71 m)	ASTM D5385, modified ²
Elongation	500%	500%	ASTM D412, modified ³
Tensile strength, film	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836
Puncture resistance	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903, modified ⁴
Lap peel adhesion	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D1876, modified ⁵
Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa × s × m ²))	0.01 perms (0.6 ng/(Pa × s × m ²))	ASTM E96, method B
Water absorption	0.5%	0.5%	ASTM D570

Footnotes:

- Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
- Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
- Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
- Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
- The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 2 in. (50 mm) per minute.

Specification Clauses

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

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

Health and Safety

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

www.graceconstruction.com

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

Adcor is a trademark and Preprufe, Bituthene and Hydroduct are registered trademarks of W. R. Grace & Co.—Conn. Procor is a U.S. registered trademark of W. R. Grace & Co.—Conn., and is used in Canada under license from PROCOR LIMITED.

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.—Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending.
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FA/PDF

GRACE

BITUTHENE® 3000 AND BITUTHENE LOW TEMPERATURE

Self-adhesive, rubberized asphalt/polyethylene waterproofing membranes for basements and sub-structures

Description

Bituthene® 3000 and Bituthene Low Temperature are self-adhesive, rubberized asphalt/polyethylene waterproofing membranes used in basements and sub-structures.

Advantages

- **Waterproof**—high hydrostatic head resistance
- **Cross laminated film**—provides dimensional stability, high tear strength, puncture and impact resistance
- **Cold applied**—no flame hazard; self-adhesive overlaps ensure continuity
- **Chemically resistant**—provides effective external protection against aggressive soils and ground water
- **Flexible**—accommodates minor settlement and shrinkage movement
- **Controlled thickness**—factory made sheet ensures constant, non-variable site application
- **Wide application window**—
 - **Bituthene Low Temperature** surface and ambient temperatures between 25°F (-4°C) and 60°F (16°C)
 - **Bituthene 3000** surface and ambient temperatures at 40°F (5°C) or above

- **Ripcord® split release on demand**—faster application in the straight-aways, ease of membrane positioning in detailed areas

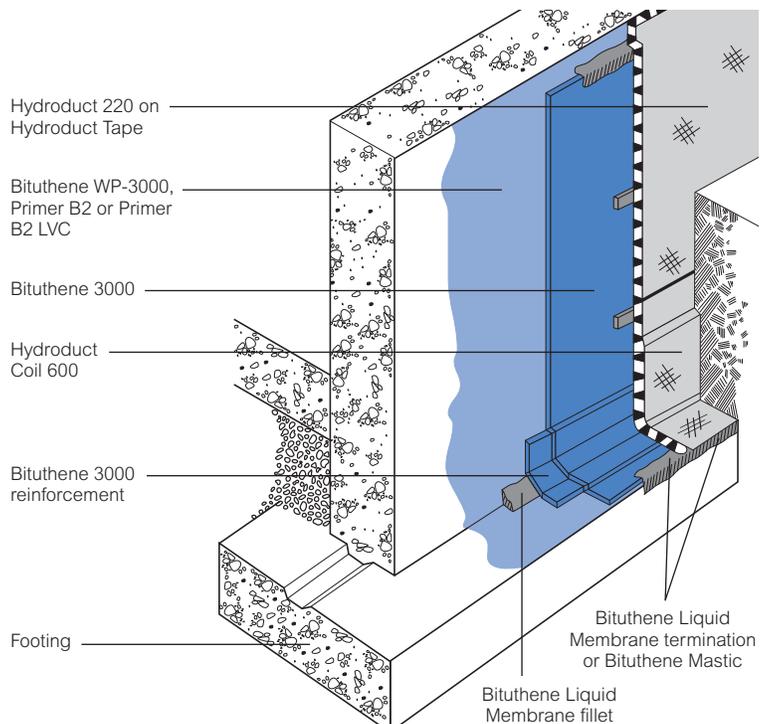
Use

Bituthene is ideal for waterproofing concrete, masonry and wood surfaces where in-service temperatures will not exceed 130°F (54°C). It can be applied to foundation walls, tunnels, earth sheltered structures and split slab construction, both above and below grade. (For above grade applications, see *Above Grade Waterproofing Bituthene 3000 and Bituthene Low Temperature.*)

Bituthene is 1/16 in. (1.5 mm) thick, 3 ft (0.9 m) wide and 66.7 ft (20 m) long and is supplied in rolls. It is unrolled sticky side down onto concrete slabs or applied onto vertical concrete faces primed with Bituthene Primer WP-3000, Primer B2 or Primer B2 LVC. Continuity is achieved by overlapping a minimum 2 in. (50 mm) and firmly rolling the joint.

Product Advantages

- Waterproof
- Cross laminated film
- Cold applied
- Chemically resistant
- Flexible
- Controlled thickness
- Wide application window
- Ripcord split release on demand



Drawings are for illustration purposes only. Please refer to graceconstruction.com for specific application details.

Bituthene is extremely flexible. It is capable of bridging shrinkage cracks in the concrete and will accommodate minor differential movement throughout the service life of the structure.

Application Procedures

Safety, Storage and Handling Information

Bituthene products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at graceconstruction.com and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

Surface Preparation

Surfaces should be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Concrete must be properly dried (minimum 7 days for normal structural concrete and 14 days for lightweight structural concrete).

If time is critical, Bituthene Primer B2 or Bituthene Primer B2 LVC may be used to allow priming and installation of membrane on damp surfaces or green concrete. Priming may begin in this case as soon as the concrete will maintain structural integrity. Use form release agents which will not transfer to the concrete. Remove forms as soon as possible from below horizontal slabs to prevent entrapment of excess moisture. Excess moisture may lead to blistering of the membrane. Cure concrete with clear, resin-based curing compounds which do not contain oil, wax or pigment. Except with Primer B2 or Primer B2 LVC, allow concrete to thoroughly dry following rain. Do not apply any products to frozen concrete.

Repair defects such as spalled or poorly consolidated areas. Remove sharp protrusions and form match lines. On masonry surfaces, apply a parge coat to rough concrete block and brick walls or trowel cut mortar joints flush to the face of the concrete blocks.

Temperature

- Apply Bituthene 3000 Membrane only in dry weather and at air and surface temperatures of 40°F (5°C) and above.
- Apply Bituthene Low Temperature Membrane only in dry weather and when air and surface temperatures are between 25°F (-4°C) and 60°F (16°C).
- Apply Bituthene Primer WP-3000 in dry weather above 40°F (5°C).

- Apply Bituthene Primer B2 in dry weather above 25°F (-4°C). (See separate product information sheet.)

Priming

- Apply Bituthene Primer WP-3000 by spray or roller at a coverage rate of 500–600 ft²/gal (12–15 m²/L). Allow to dry one hour or until concrete returns to original color.
- Apply Bituthene Primer B2 by a lamb's wool roller at a coverage rate of 250–350 ft²/gal (6–8 m²/L). Allow primer to dry one hour or until tack-free.
- Apply Bituthene Primer B2 LVC by a lamb's wool roller at a coverage rate of 325–425 ft²/gal (7.5–10 m²/L). Allow primer to dry one hour or until tack free.
- Dry time may be longer in cold temperatures. Reprime areas if contaminated by dust. If the work area is dusty, apply membrane as soon as the primer is dry.
- **Do not apply any primer to Bituthene membrane.**

Corner Details

The treatment of corners varies depending on the location of the corner. For detailed information on Bituthene Liquid Membrane, see separate product information sheet.

- At wall to footing inside corners—
Option 1: Apply membrane to within 1 in. (25 mm) of base of wall. Treat the inside corner by installing a ¾ in. (20 mm) fillet of Bituthene Liquid Membrane. Extend Bituthene Liquid Membrane at least 2½ in. (65 mm) onto footing, and 2½ in. (65 mm) onto wall membrane.
Option 2: Treat the inside corner by installing a ¾ in. (20 mm) fillet of Bituthene Liquid Membrane. Apply 12 in. (300 mm) wide strip of sheet membrane centered over fillet. Apply wall membrane over inside corner and extend 6 in. (150 mm) onto footing. Apply 1 in. (25 mm) wide troweling of Bituthene Liquid Membrane over all terminations and seams within 12 in. (300 mm) of corner.
- At footings where the elevation of the floor slab is 6 in. (150 mm) or more above the footing, treat the inside corner either by the above two methods or terminate the membrane at the base of the wall. Seal the termination with Bituthene Liquid Membrane.

Joints

Properly seal all joints with waterstop, joint filler and sealant as required. Bituthene membranes are not intended to function as the primary joint seal. Allow sealants to fully cure. Pre-strip all slab and wall cracks over ¼ in. (1.5 mm) wide and all construction and control joints with 9 in. (230 mm) wide sheet membrane strip.

Application on Horizontal Surfaces

(Note: Preprufe® pre-applied membranes are strongly recommended for below slab or for any application where the membrane is applied before concreting. See Preprufe product information sheets.)

Apply membrane from the low point to the high point so that laps shed water. Overlap all seams at least 2 in. (50 mm). Stagger all end laps. Roll the entire membrane firmly and completely as soon as possible. Use a linoleum roller or standard water-filled garden roller less than 30 in. (760 mm) wide, weighing a minimum of 75 lbs (34 kg) when filled. Cover the face of the roller with a resilient material such as a ½ in. (13 mm) plastic foam or two wraps of indoor-outdoor carpet to allow the membrane to fully contact the primed substrate. Seal all T-joints and membrane terminations with Bituthene Liquid Membrane at the end of the day.

Protrusions and Drains

Apply membrane to within 1 in. (25 mm) of the base of the protrusion. Apply Bituthene Liquid Membrane 0.1 in. (2.5 mm) thick around protrusion. Bituthene Liquid Membrane should extend over the membrane a minimum of 2½ in. (65 mm) and up the penetration to just below the finished height of the wearing course.

Vertical Surfaces

Apply membrane in lengths up to 8 ft (2.5 m). Overlap all seams at least 2 in. (50 mm). On higher walls apply membrane in two or more sections with the upper overlapping the lower by at least 2 in. (50 mm). Roll all membrane with a hand roller.

Terminate the membrane at grade level. Press the membrane firmly to the wall with the butt end of a hardwood tool such as a hammer handle or secure into a reglet. Failure to use heavy pressure at terminations can result in a poor seal. A termination bar may be used to ensure a tight seal.

Terminate the membrane at the base of the wall if the bottom of the interior floor slab is at least 6 in. (150 mm) above the footing. Otherwise, use appropriate inside corner detail where the wall and footing meet.

Membrane Repairs

Patch tears and inadequately lapped seams with membrane. Clean membrane with a damp cloth and dry. Slit fishmouths and repair with a patch extending 6 in. (150 mm) in all directions from the slit and seal edges of the patch with Bituthene Liquid Membrane. Inspect the membrane thoroughly before covering and make any repairs.

Drainage

Hydroduct® drainage composites are recommended for both active drainage and protection of the membrane. See Hydroduct product information sheets.

Protection of Membrane

Protect Bituthene membranes to avoid damage from other trades, construction materials or backfill. Place protection immediately in temperatures above 77°F (25°C) to avoid potential for blisters.

- On vertical applications, use Hydroduct 220 Drainage Composite. Adhere Hydroduct 220 Drainage Composite to membrane with Hydroduct Tape. Alternative methods of protection are to use ¼ in. (6 mm) asphalt impregnated board or 1 in. (25 mm) extruded polystyrene. Such alternatives do not provide positive drainage to the system. Adhere protection board with an adhesive or Hydroduct Tape.
- In mud slab waterproofing, or other applications where positive drainage is not desired and where reinforced concrete slabs are placed over the membrane, the use of ¼ in. (6 mm) hardboard or 2 layers of ⅛ in. (3 mm) hardboard is recommended.

Insulation

Always apply Bituthene membrane directly to primed or conditioned structural substrates. Insulation, if used, must be applied over the membrane. Do not apply Bituthene membranes over lightweight insulating concrete.

Backfill

Place backfill as soon as possible. Use care during backfill operation to avoid damage to the waterproofing system. Follow generally accepted practices for backfilling and compaction. Backfill should be added and compacted in 6 in. (150 mm) to 12 in. (300 mm) lifts.

For areas which cannot be fully compacted, a termination bar is recommended across the top termination of the membrane.

Placing Steel

When placing steel over properly protected membrane, use concrete bar supports (dobies) or chairs with plastic tips or rolled feet to prevent damage from sharp edges. Use special care when using wire mesh, especially if the mesh is curled.

Approvals

- City of Los Angeles Research Report RR 24386
- U.S. Department of Housing and Urban Development (HUD) HUD Materials Release 628E

Warranty

Five year material warranties covering Bituthene and Hydroduct products are available upon request. Contact your Grace sales representative for details.

Technical Services

Support is provided by full time, technically trained Grace representatives and technical service personnel, backed by a central research and development staff.

Supply

Bituthene 3000 or Bituthene Low Temperature	3 ft x 66.7 ft roll (200 ft ²) [0.9 m x 20 m (18.6 m ²)]
Roll weight	83 lbs (38 kg) gross
Palletization	25 rolls per pallet
Storage	Store upright in dry conditions below 95°F (+35°C).
Ancillary Products	
Bituthene WP-3000	5 gal (18.9 L) pail/24 pails per pallet
Bituthene Primer B2	5 gal (18.9 L) pail/48 pails per pallet
Bituthene Primer B2 LVC	5 gal (18.9 L) pail/48 pails per pallet
Bituthene Liquid Membrane	1.5 gal (5.7 L) pail/100 pails per pallet or 4 gal (15.1 L) pail/24 pails per pallet
Hydroduct Tape	1 in. x 200 ft (2.5 cm x 61.0 m) roll/6 rolls per carton
Bituthene Mastic	Twelve 30 oz (0.9 L) tubes/carton or 5 gal (18.9 L) pail/36 pails per pallet

Equipment by others: Soft broom, utility knife, brush or roller for priming

Physical Properties for Bituthene Membrane

Property	Typical Value	Test Method
Color	Dark gray-black	
Thickness	1/16 in. (1.5 mm) nominal	ASTM D3767—method A
Flexibility, 180° bend over 1 in. (25 mm) mandrel at -25°F (-32°C)	Unaffected	ASTM D1970
Tensile strength, membrane, die C	325 lbs/in. ² (2240 kPa) minimum	ASTM D412 modified ¹
Tensile strength, film	5,000 lbs/in. ² (34.5 MPa) minimum	ASTM D882 modified ¹
Elongation, ultimate failure of rubberized asphalt	300% minimum	ASTM D412 modified ¹
Crack cycling at -25°F (-32°C), 100 cycles	Unaffected	ASTM C836
Lap adhesion at minimum application temperature	3000: 4 lbs/in. (700 N/m) Low Temp: 5 lbs/in. (880 N/m)	ASTM D1876 modified ²
Peel strength	9 lbs/in. (1576 N/m)	ASTM D903 modified ³
Puncture resistance, membrane	50 lbs (222 N) minimum	ASTM E154
Resistance to hydrostatic head	200 ft (60 m) of water	ASTM D5385
Permeance	0.05 perms (2.9 ng/m ² sPa) maximum	ASTM E96, section 12—water method
Water absorption	0.1% maximum	ASTM D570

Footnotes:

1. The test is run at a rate of 2 in. (50 mm) per minute.
2. The test is conducted 15 minutes after the lap is formed and run at a rate of 2 in. (50 mm) per minute at 40°F (5°C).
3. The 180° peel strength is run at a rate of 12 in. (300 mm) per minute.

www.graceconstruction.com

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

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FA/LVI/1M

GRACE

APPENDIX 6

PROPOSED DEVELOPMENT PLAN

APPENDIX 7

SAMPLE HAZARDOUS OR NON-HAZARDOUS SOIL DISPOSAL MANIFEST



Manifest # _____

GLOBAL JOB NUMBER: _____ FACILITY APPROVAL NUMBER: _____

Please Check One:

- | | | | |
|--|---|--|---|
| <input checked="" type="checkbox"/> Clean Earth of Carteret
24 Middlesex Avenue
Carteret, NJ 07008
Ph: 732-541-8909 | <input type="checkbox"/> Clean Earth of Maryland
1469 Oak Ridge Place
Hagerstown, MD 21740
Ph: 301-791-6220 | <input type="checkbox"/> Clean Earth of New Castle
94 Pyles Lane
New Castle, DE 19720
Ph: 302-427-6633 | <input type="checkbox"/> Other
_____ |
| <input type="checkbox"/> Clean Earth of Philadelphia
3201 S. 61st Street
Philadelphia, PA 19153
Ph: 215-724-5520 | <input type="checkbox"/> Clean Earth of West Virginia
3815 South State Route 2
Friendly, WV 26146
Ph: 304-652-8580 | <input type="checkbox"/> Clean Earth of Southeast Pennsylvania
7 Steel Road East
Morrisville, PA 19067
Ph: 215-428-1700 | _____ |

Non-Hazardous Material Manifest

(Type or Print Clearly)

GENERATOR'S NAME & SITE ADDRESS:	GROSS WEIGHT: <input checked="" type="checkbox"/> Tons <input type="checkbox"/> Yards
	TARE WEIGHT: <input checked="" type="checkbox"/> Tons <input type="checkbox"/> Yards
GENERATOR'S PHONE: _____	NET WEIGHT: <input checked="" type="checkbox"/> Tons <input type="checkbox"/> Yards

DESCRIPTION OF MATERIAL/SAMPLE ID AND LOCATION

Soil

GENERATOR'S CERTIFICATION – Incomplete and/or unsigned manifests will cause the load to be delayed and/or rejected.

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, is not a DOT hazardous substance as defined by 49 CFR Part 172 or any applicable state law, has been fully and accurately described above, classified, packaged and is in proper condition for transportation according to all applicable state and federal regulations.

Name: _____ Title: _____
Signature: _____ Date and Time: _____

TRANSPORTER

Company: _____ Phone Number: _____
Address: _____ Truck # and License Plate: _____
Driver: _____ SW Haulers Permit #: _____
(Type or Print Clearly) (applicable state permit #)

I hereby certify that the above named material was picked up at the site listed above.

Driver Signature: _____ Date and Time: _____

DESTINATION

I hereby certify that the above named material was delivered without incident to the facility noted above.

Driver Signature: _____ Date and Time: _____

I hereby certify that the above named material has been accepted at the above referenced facility.

Authorized Signature: _____ Date and Time: _____

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number		2. Page 1 of		3. Emergency Response Phone		4. Manifest Tracking Number 010558341 JJK			
		5. Generator's Name and Mailing Address						Generator's Site Address (if different than mailing address)			
Generator's Phone:											
6. Transporter 1 Company Name						U.S. EPA ID Number					
7. Transporter 2 Company Name						U.S. EPA ID Number					
8. Designated Facility Name and Site Address						U.S. EPA ID Number					
Facility's Phone:											
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))				10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes	
						No.	Type				
		1.									
		2.									
		3.									
	4.										
14. Special Handling Instructions and Additional Information											
<p>15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.</p>											
Generator's/Offorer's Printed/Typed Name					Signature			Month	Day	Year	
TRANSPORTER INT'L	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____										
	Transporter signature (for exports only):					Date leaving U.S.: _____					
TRANSPORTER	17. Transporter Acknowledgment of Receipt of Materials										
	Transporter 1 Printed/Typed Name					Signature			Month	Day	Year
	Transporter 2 Printed/Typed Name					Signature			Month	Day	Year
DESIGNATED FACILITY	18. Discrepancy										
	18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection										
							Manifest Reference Number:				
	18b. Alternate Facility (or Generator)						U.S. EPA ID Number				
	Facility's Phone:										
18c. Signature of Alternate Facility (or Generator)								Month	Day	Year	
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)											
1.		2.		3.		4.					
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a											
Printed/Typed Name					Signature			Month	Day	Year	