

**2477 THIRD AVENUE SITES A & B**  
**BRONX, NEW YORK**

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**Remedial Action Work Plan**

**NYC BCP Site Numbers: 11CBCP009X & 11CBCP010X**  
**E-Designation Project Number: 10EHAZ276X**

**Prepared for:**

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**MARCH 2011**

# **REMEDIAL ACTION WORK PLAN**

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## **EXECUTIVE SUMMARY**

Jiten LLC has enrolled in the New York City Brownfield Cleanup Program (NYC BCP) to investigate and remediate two sites located at 2477 Third Avenue in the Bronx, New York including 11,250 square foot site (Site A) and 2,300 square foot site (Site B). 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 Sites are located at 2477 Third Avenue in the Mott Haven section of the Bronx, New York and are currently identified as Block 2320 and a portion of Lot 11 on the New York City Tax Map. Figure 1 shows the Site locations. The Sites were formerly described as Lots 5, 7, 8, 9 and 10; however, Tax Lots 7, 8, 9, 10 and 11 were merged by the owner in 2009 during site development permitting and planning. For clarity, this RAWP describes the Site using the old lot numbers. Site A consists of Lots 7, 8, 9, 10 and a portion of Lot 11 and is approximately 11,250 square feet and is currently undeveloped. Site B consists of Lot 5 and is approximately 2,250-square feet and is currently undeveloped. The Sites are located in a commercial and industrial area that is characterized by a variety of warehouse, trucking, auto repair, and manufacturing businesses. The Sites are bound to the northeast by East 136th Street, to the southeast by vacant land (former gasoline station on adjacent Lot 11), to the southwest by East 135th Street and the Major Deegan Expressway, and to the northwest by Rider Avenue. A site plan showing the site boundaries and old tax lots is provided on Figure 2.

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

The proposed future use of the Sites will consist of a four-story hotel and associated parking over Site A (old Lots 7 through 11) and at grade paved parking on Site B (Lot 5). The current zoning designation is MX-13 (mixed use). The proposed use is consistent with existing zoning

for the property. The entire two Sites are vacant; therefore, no demolition will be required for construction. Although remedial actions for old Lot 11 are not addressed in this RAWP because they are being addressed under a separate plan under the NYS BCP, they are discussed here for clarity about the development project as a whole. The layout of the proposed site development is presented in Appendix 5, which also identified the old lot lines. The proposed development will comprise the entire footprint of old Lots 7 through 11 of the Site. Development of Site B will not include excavation or the construction of any structures/buildings. Site B would be paved, potentially for hotel parking.

The proposed development of Site A would include a subgrade level on Tax Lots 7, 8, 9 and a portion of Lot 10. The subgrade level will encompass approximately 8,500 square feet of space, including meeting rooms, fitness room, laundry room, break room, locker room, compactor room, storage room and mechanical rooms. The first floor will comprise approximately 3,000 square feet of hotel lobby space (approximately 50% over Lot 10 and 50% over Lot 11), including offices, seating areas, the registration desk, an elevator, and two stairwells. Approximately 70% of the eastern portion of this lobby will be constructed on a slab-on-grade (no subgrade level). The remainder of the first floor will encompass approximately 15,000 square feet of parking areas that will be open to the exterior. The overhanging second through fourth floors will comprise the hotel guest rooms. The proposed development of Site B is paved at-grade parking.

The development of Site A would involve excavation of the entire old Lots 7 through Lot 10 to approximately 12 feet below existing grade for the construction of the subgrade level. The proposed development will also include planting 15 trees along the sidewalks surrounding the hotel property. The trees will be planted in approximately 25-square foot openings in the sidewalk.

Lot 11, currently in the state BCP and not addressed in this RAWP, would be excavated to approximately four feet below grade for construction of the foundation and installation of utilities. No subgrade levels will be constructed on Lot 11.

**The development of Site B to create an at grade parking lot will not require excavation on this property.****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 SCGs; 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 for Site A will consist of:

1. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan (Appendix 1).
2. Perform a community air monitoring program for particulates and volatile organic compounds.
3. Establish Track 1 Soil Cleanup Objectives (SCOs). Excavation and removal of soil/fill exceeding SCOs.
4. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
5. Construction and maintenance of an engineered composite cover consisting of the hotel building, which will cover the entire site, and will prevent human exposure to residual soil/fill remaining under the Site;
6. Installation of a vapor barrier system beneath the building slab and subgrade walls.
7. Installation and operation of a passive sub-slab depressurization system beneath the hotel lobby portion of the site. This system will have the potential to be made active depending on the remedial action determination made on the adjacent parcel managed in the NYS BCP. The subgrade parking area will be ventilated as required by NYC Building Code requirements.
8. Excavation of all soil/fill to 12 feet below grade. Import of materials to be used for backfill and cover in the tree pits along the sidewalks in compliance with this plan and in accordance with applicable laws and regulations. Coordination of any dewatering with

remedial activities to be performed at the adjacent remedial action on Lot 11 with NYS DEC to ensure that contaminants are not drawn from the former gasoline station.

9. 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 on-site.
10. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
11. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
12. Implementation of stormwater pollution prevention measures in compliance with applicable laws and regulations.
13. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements for dewatering, in compliance with applicable laws and regulations.
14. Submission of an RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering Controls to be implemented at the Site, and lists any changes from this RAWP.

The proposed remedial action for Site B will consist of:

1. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan (Appendix 1).
2. Perform a community air monitoring program for particulates and volatile organic compounds.
3. Establish Track 2 Soil Cleanup Objectives (SCOs). Site B already meets Track 2 SCOs and no removal action is required to achieve this cleanup standard.

4. Construction and maintenance of an engineered composite cover consisting of asphalt-paved parking lot at grade, which will cover the entire site, and will prevent human exposure to residual soil/fill remaining under the Site;
5. If materials are required to be disposed offsite due to construction, 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 on-site.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
7. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas, as required.
8. Implementation of stormwater pollution prevention measures in compliance with applicable laws and regulations.
9. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements for dewatering, in compliance with applicable laws and regulations.
10. Submission of an RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering Controls to be implemented at the Site, and lists any changes from this RAWP.
11. Recording of a Declaration of Covenants and Restrictions that includes a full listing of Engineering Controls and Institutional Controls and notice that these controls must be maintained within a Site Management Plan to prevent future exposure to residual soil/fill.
12. Establishment in a recorded Declaration of Covenants and Restrictions, a series of Institutional Controls on the Site, including: (1) compliance with the provisions of the recorded Declaration of Covenants and Restrictions; (2) compliance with provisions of

the approved Site Management Plan; (3) operation and maintenance of Engineering Controls as specified in the Site Management Plan; (4) inspection and certification of all Engineering Controls at a frequency and in a manner defined in the Site Management Plan; (5) performance of environmental and public health monitoring as defined in the Site Management Plan; (6) reporting at a frequency and in a manner defined in the Site Management Plan; (7) protection of on-Site monitoring devices in a manner specified in the SMP; and (8) prohibition of discontinuation of Engineering Controls without an OER-approved amendment or extinguishment of the Declaration of Covenants and Restrictions.

13. Establishment in a recorded Declaration of Covenants and Restrictions, a series of site restriction Institutional Controls on the Site, including: (1) prohibition of vegetable gardening and farming; (2) prohibition of the use of groundwater without treatment rendering it safe for the intended use; (3) prohibition on all disturbance of residual contaminated material unless it is conducted in accordance with the provisions in the Site Management Plan; and (4) prohibition on higher level of land usage without an OER-approved amendment or extinguishment of this Declaration of Covenants and Restrictions.

14. Submission of an approved Site Management Plan in the Remedial Action Report for long-term management of residual soil/fill, including plans for Institutional and Engineering Controls for: (1) inspection and certification, (2) monitoring, (3) operation and maintenance, and (4) reporting.

The remedial actions contemplated under this RAWP is capable of being implemented independently of the proposed redevelopment plan.

## COMMUNITY PROTECTION STATEMENT

The Office of Environmental Remediation created the New York City Brownfield Cleanup Program (NYC BCP) 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 sites, and describes the plans to clean up the sites to protect public health and the environment.

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

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

**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 Sites is the performance of a study to find all of the ways that people might come in contact with contaminants at the Sites 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 Sites and evaluated the potential for people to come in contact with this contamination. All potential public exposures will be addressed under this cleanup plan.

**Health and Safety Plan.** This cleanup plan includes a Health and Safety Plan that is designed to protect community residents and on-Site workers. The elements of this plan are in compliance with safety requirements of the United States Occupational Safety and Health Administration. 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 Axel Schwendt of AKRF and can be reached at (646) 388-9529.

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

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

**Odor, Dust and Noise Control.** This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the on-site Project Manager, Matthew Oleske, at (917) 583-9403 or NYC Office of Environmental Remediation Project Manager, Zach Schreiber, at (212) 788-3056.

**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. For this cleanup project, the hours of operation are 7:00 AM to 5:00 PM.

**Signage.** While the cleanup is in progress, a placard will be prominently posted at the main entrance of the properties with a laminated project Fact Sheet that includes project details, 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 Axel Schwendt of AKRF at (646) 388-9529, the NYC Office of Environmental Remediation Project Manager, Dr. Zach Schreiber, at (212) 788-3056, or call 311 and mention the Site is in the NYC Brownfield 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 Sites 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 Sites. Trucks entering the Sites 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 Sites. Trucks will be cleaned at a truck inspection station on the property before leaving the Sites.

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

**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. Loaded trucks leaving the Sites will not 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 New York Public Library, Mott Haven Branch and online through OER website at <http://www.nyc.gov/html/oer/html/repository/RBronx.shtml>

**Long-Term Site Management.** To provide long-term protection after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined in the property's deed. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

## 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 BCP	New York City Brownfield 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, Michelle Lapin, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the 2477 Third Avenue Lot A and Lot B sites in the Bronx, New York Site (Site number TBD).

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

\_\_\_\_\_  
Name

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

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



# **REMEDIAL ACTION WORK PLAN**

## **1.0 SITE BACKGROUND**

Jiten, LLC has enrolled in the New York City Brownfield Cleanup Program (NYC BCP) to investigate and remediate two properties located at 2477 Third Avenue in the Mott Haven section of the Bronx, New York (the Sites). 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.

The Sites currently comprise Tax Block 2320, Lots 5 and a portion of Lot 11. The Sites were formerly described as Lots 5, 7, 8, 9 and 10; however, Tax Lots 7, 8, 9, 10 and 11 were legally combined into one lot, Lot 11, during site development permitting and planning. Site A consists of Lots 7, 8, 9, 10 and a portion of Lot 11 and is approximately 11,250 square feet and is currently undeveloped. Site B consists of Lot 5 and is approximately 2,250 square feet and is currently undeveloped. This RAWP will describe the property using the old lot numbers since old Tax Lot 11, which is also owned by the applicant, is currently enrolled in the New York State Department of Environmental Conservation (NYSDEC) BCP. This RAWP does not address remedial actions for old Lot 11, which are being addressed in the RAWP already submitted to the NYSDEC as part of the state BCP.

All lots on Block 2320 were assigned E-Designations in June 2009 for hazardous materials (E-277).. It should be noted that Tax Lot 6 on Block 2320 is not owned by the applicant and is, therefore, not included as part of this RAWP.

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

The Sites are located at 2477 Third Avenue in the Mott Haven section of the Bronx, New York and is currently identified as Block 2320 and a portion of Lot 11 on the New York City

Tax Map. Figure 1 shows the Site location. The Sites were formerly described as Lots 5, 7, 8, 9 and 10; however, Tax Lots 7, 8, 9, 10 and 11 were merged by the owner in 2009 during site development permitting and planning. For clarity, this RAWP describes the Site using the old lot numbers. Site A consists of Lots 7, 8, 9, 10 and a portion of Lot 11 and is approximately 11,250 square feet and is currently undeveloped. Site B consists of Lot 5 and is approximately 2,250 square feet and is currently undeveloped. The Sites are located in a commercial and industrial area that is characterized by a variety of warehouse, trucking, auto repair, and manufacturing businesses. The Sites are bound to the northeast by East 136th Street, to the southeast by vacant land (former gasoline station on Lot 11), to the southwest by East 135th Street and the Major Deegan Expressway, and to the northwest by Rider Avenue. A site plan showing the site boundary and old tax lots is provided on Figure 2.

## **1.2 PROPOSED REDEVELOPMENT PLAN**

The proposed future use of the Sites will consist of a four-story hotel and associated parking on Site A (old Lots 7 through 11), and an at grade paved parking lot on Site B (Lot 5). The current zoning designation is MX-13 (mixed use). The proposed use is consistent with existing zoning for the property. The entire two Sites are vacant, therefore, no demolition will be required for construction. Although remedial actions for old Lot 11 are not addressed in this RAWP because that site is enrolled in the NYS BCP, they are discussed here for clarity about the development project as a whole. The layout of the proposed site development is presented in Appendix 5, which also identified the old lot lines. The proposed hotel development on Site A will comprise the entire footprint of old Lots 7 through 11 of the Site. Development of Site B (Lot 5) will not include excavation or the construction of any structures/buildings. Site B would be paved, potentially for hotel parking.

The proposed development on Site A would include a subgrade level on Tax Lots 7, 8, 9 and a portion of Lot 10. The subgrade level will encompass approximately 8,500 square feet of space, including meeting rooms, fitness room, laundry room, break room, locker room, compactor room, storage room and mechanical rooms. The first floor will comprise approximately 3,000 square feet of hotel lobby space (approximately 50% over Lot 10 and 50% over Lot 11), including offices, seating areas, the registration desk, an elevator, and two stairwells. Approximately 70% of the eastern portion of this lobby will be constructed on a slab-

on-grade (no subgrade level). The remainder of the first floor will encompass approximately 15,000 square feet of parking areas that will be open to the exterior. The overhanging second through fourth floors will comprise the hotel guest rooms.

The development at Site A would involve excavation of the entire old Lots 7 through Lot 10 to approximately 12 feet below existing grade for the construction of the subgrade level. The proposed development will also include planting 15 trees along the sidewalks surrounding the hotel property. The trees will be planted in approximately 25-square foot openings in the sidewalk.

The development at Site B would not involve any excavation. Paved parking at grade is proposed.

Lot 11, currently in the state BCP and not addressed in this RAWP, would be excavated to approximately four feet below grade for construction of the foundation and installation of utilities. No subgrade levels will be constructed on Lot 11.

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

The Sites are located in a commercial and industrial area that is characterized by a variety of warehouse, trucking, auto repair, and manufacturing businesses. The Sites are bound to the northeast by East 136<sup>th</sup> Street, to the southeast by Lot 11 and Third Avenue beyond, to the southwest by East 135<sup>th</sup> Street and the Major Deegan Expressway, and to the northwest by Rider Avenue. A New York City Housing complex (multi-level, elevator assisted building) is located two blocks east of the Site.

Information provided by the OER's Searchable Property Environmental E-database (SPEED) website did not identify any sensitive receptors within a 250 to 500-foot radius of the Site. The closest school to the site is Public School 154, Jonathan D Hyatt Elementary School, located over 1,100 feet west-southwest. The nearest daycare facility, Winifred Wheeler Daycare Center, is located at 200 Alexander Avenue, approximately 1,000 feet west-northwest of the Site. The current zoning designation is MX-13 (mixed use). The Harlem River is located approximately 800 feet west/southwest of the Site.

## **1.4 REMEDIAL INVESTIGATION**

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report, 2477 Third Avenue, Bronx, New York*”, dated March 2011 (RIR).

The Remedial Investigation Report (RIR) provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy pursuant to RCNY§ 43-1407(f). The remedial investigation (RI) described in this document is consistent with applicable guidance.

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

AKRF’s 2009 Phase I ESA indicated that the Site was occupied by a Drain Pipes and Fireproof Materials company and was developed with several structures including a store house and stable in 1891. After 1891, Lots 6, 7, 8, 9 and 10 were either vacant or occupied by residential dwellings and Lot 5 was either vacant or occupied by manufacturing facilities. In 1951, Site A contained five dwellings (Lots 6 through 10), and a calcimine bagging manufacturing facility (Lot 5). By 1978, the Property contained two dwellings on Lots 7 and 8 and Lots 5, 6, 9 and 10 were vacant. The dwellings on Lots 7 and 8 were vacant on the 1989 Sanborn fire insurance map. A gasoline station was located east and adjacent to the Site A on Lot 11, as shown on the 1951 through 1989 Sanborn maps. AOCs identified in AKRF’s 2009 Phase I ESA included the following:

1. Historic manufacturing operations (including a calcimine bagging facility on Lot 5).
2. Potential former on-site solvent storage.
3. East-adjacent former gasoline station (Lot 11) with associated documented subsurface contamination.
4. Buried basements and/or urban fill of an unknown origin beneath the Site.

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

AKRF, Inc. (AKRF) performed the following scope of work:

1. Conducted Site inspection to identify AOCs and physical obstructions (i.e., structures, buildings, etc.);
2. Installed 15 soil borings across the entire project Sites, and collected 15 soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed five groundwater monitoring wells from temporary well points installed in their respective soil borings throughout the Sites and collected five groundwater samples for chemical analysis to evaluate groundwater quality;
4. Installed three soil vapor probes at the Sites and collected three samples for chemical analysis.

### **Summary of Environmental Findings**

1. Elevation of the property ranges from approximately 8.5 to 10 feet above the Bronx Topographical Bureau datum.
2. Depth to groundwater ranges from seven to ten feet at the Sites.
3. Groundwater flow is generally from northeast to south-southwest beneath the Sites.
4. Depth to bedrock is approximately 65 to 80 feet below grade at the Sites.
5. The stratigraphy of the sites, from the surface down, consists of urban fill (brick, ash, coal slag, concrete and glass) from the ground surface to approximately eight feet below grade. The urban fill layer is underlain by brown fine sand and silt.
6. Soil/fill samples collected during the RI for Site A and Site B generally did not exceed 6NYCRR Track 2 Restricted Commercial SCOs, with the exception of several SVOCs in several samples and one metal (barium). Soil from Site B did not exceed Track 2 Restricted Commercial SCOs. The findings are consistent with, and attributable to, the presence of historical fill and constitute light to moderate overall impact to onsite soil/fill. No VOCs, pesticides or PCBs exceeded Track 2 Restricted Commercial SCOs. Possible degraded petroleum was identified by specialized testing in one sample on Site A but a groundwater sample at the boring location did not indicate VOCs or SVOCs above Class GA standards.

7. Samples collected during the RI showed no detections of PCBs or pesticides in groundwater. VOCs did not exceed Class GA standards in any groundwater samples. Dissolved metals in groundwater generally were below applicable Class GA standards with the exception of sodium, magnesium, manganese, iron and barium. High concentrations observed for some of these parameters are attributable to saline intrusion or to road-salting. Unfiltered samples have generally higher concentrations of trace metals and may indicate influence of historic fill materials in turbidity in these samples. Two SVOCs exceeded Class GA groundwater standards in one groundwater sample on Site A.
  
8. Soil vapor samples collected during the RI found VOCs detected at generally low concentrations (below 5-10  $\mu\text{g}/\text{m}^3$ ) for a variety of compounds including BTEX and associated compounds. Concentrations greater than the corresponding indoor air background ranges were observed for: 1,3-butadiene, carbon disulfide, freon-114, tetrachloroethylene and trichlorofluoromethane. The detected tetrachloroethylene concentrations were below the NYSDOH Air Guideline Value (AGV) of 100 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). Tetrachloroethylene and most other compounds identified in soil vapor were not observed in soil or groundwater during this investigation of Site A and Site B and are attributed to off-site sources, including the off-site spill on adjacent Lot 11.

## **2.0 REMEDIAL ACTION OBJECTIVES**

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

### **Groundwater**

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

### **Soil**

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from contaminated soil.

### **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**

For these Sites, a Track 1 remedial action alternative is considered in this alternative analysis for Site A and a Track 1 and 2 alternative is considered for Site B. The Track 1 alternative involves complete removal of all soil/fill within the property boundary to 12 feet below grade, which is well below the water table (approximately 7 to 10 feet below grade). On Site A, this involves the excavation and removal of approximately 4,000 cubic yards (approximately 6,000 tons) of soil/fill for construction of a subgrade level, thereby removing all contaminated sources. This alternative for Site A also includes the installation of a vapor/waterproofing membrane beneath the concrete foundation and subgrade walls, a sub-slab depressurization system (SSDS) beneath the hotel lobby portion of the site, which will not include a subgrade level, and ventilation of the parking garage in compliance with the NYC Building Code.

For Site B, the Track 1 alternative involves removal of all historical fill, approximately 500-750 cubic yards of material and replacement with clean backfill. The Track 2 Alternative involves:

- Establishment of approved site-specific Soil Cleanup Objectives (SCOs). Site B already meets Track 2 Commercial SCOs and no removal action is required to achieve this cleanup standard;
- Placement of a final cover including an asphalt paved surface over the entire site to eliminate exposure to remaining soil/fill;
- Establishment of use restrictions including prohibitions on the use of groundwater from the site and prohibitions on other sensitive site uses, such as farming or vegetable gardening, to eliminate potential future exposure pathways;
- Establish a Site Management Plan to ensure long-term management of these Institutional and Engineering Controls including the performance of periodic inspections and certification that the controls are performing as they were intended; and

- Placement of a deed restriction to memorialize the remedial action and the Engineering and Institutional Controls to ensure that future owners of the site continue to maintain these controls as required.

### **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.

The Track 1 alternative for Site A and Site B would result in removal of all soil/fill with contaminant concentration above Track 1 SCOs; the soil was found to contain contaminants at levels typical of urban fill in developed areas of the Bronx. Furthermore, the installation of a vapor barrier and SSDS (beneath the hotel lobby), and ventilation of the subgrade parking garage at Site A would prevent unacceptable exposure to future building users to potential subsurface vapors. As such, this alternative would be consistent with the RAOs and provide overall protection of public health and the environment in consideration of current and potential future land use by:

- Eliminating the potential for direct contact with contaminated on-site soils and groundwater; and
- Eliminating potential sources for on-site production of soil vapors, and preventing the migration of vapors into occupied structures from other sources.

For Site B, the Track 2 alternative would:

- Establish Track 2 Restricted Commercial SCOs;
- Remove any source exceedence of SCOs to minimize potential sources for on-Site production and migration of contamination. Site B already meets Track 2 Restricted Commercial SCOs and no removal action is required to achieve this cleanup standard;

- Place a final asphalt cover over the entire site to eliminate any potential exposures to remaining soils that do not exceed the site specific SCOs;
- Establish use restrictions to ensure that future ingestion or other exposures to are eliminated, such as prohibition on use of groundwater for potable purposes;
- Establish a Site Management Plan to ensure long term management of Institutional and Engineering Controls to ensure that all Engineering and Institutional controls are inspected periodically and require certification that the remedy continues to perform as it was designed, thus ensuring that the protections achieved for public health and the environment remain in perpetuity;
- Place a deed restriction to memorialize these controls in order to decrease the risk of future exposures with contaminated media consistent with remedial action objectives to memorialize the remedial action and the existence of Engineering and Institutional Controls and will ensure that these controls will be appropriately managed by future owners of the Site.

### **3.2. BALANCING CRITERIA**

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

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

The Track 2 alternative for Site B would address the chemical-specific SCGs for soil, groundwater and soil vapor by establishment of Track 2 Commercial SCOs and attainment of these standards for onsite soil. 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.

The Track 1 alternative for Site A and B would provide short-term effectiveness with the removal of all soil/fill above Track 1 SCOs. On Site A, the Track 1 remedy would also involve the installation of a vapor barrier and SSDS (below hotel lobby) in the new construction, capping of the Site, and operation of a ventilation system for the subgrade parking area. All potential exposure pathways would remain incomplete following construction. Implementation of this RAWP would prevent unacceptable exposure during remediation and construction activities.

The Track 2 alternative for Site B would result in fewer short-term impacts associated with excavation, handling, load out of materials, and truck traffic than a Track 1 remediation. However, focused attention to means and methods during the remedial action during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize or negate the overall impact of these activities.

### **Long-term effectiveness and permanence**

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

As with the short-term effectiveness, the Track 1 alternative for both Site A and Site B would provide long-term effectiveness with the removal of all soil/fill above Track 1 SCOs. For Site A the Track 1 remedy would also include the installation of a vapor barrier and SSDS in the new construction, the capping of the Site and operation of a ventilation system in the subgrade parking area. All potential exposure pathways would remain incomplete following construction.

The Track 2 alternative for Site B would also be effective over the long-term by attaining Track 2 Commercial SCOs, placement of a final asphalt cover over the entire Site, establishment of use restrictions, establishment of a Site Management Plan to ensure long-term management of Institutional and Engineering Controls, and placement of a deed restriction to memorialize these controls for the long term. Although groundwater impacts have not been observed, meeting Track 2 Commercial SCOs would minimize the risk of leaching into groundwater and contact with or exposures to groundwater with contamination derived from on-Site consistent with remedial action objectives. Soil and fill removal would also minimize potential sources for on-Site production of soil vapors, migration of on-Site-derived vapors, and use of sub-slab depressurization would prevent migration of on-Site and off-Site derived vapors into occupied structures and eliminate associated inhalation exposures consistent with remedial action objectives. Groundwater use restrictions will eliminate potential exposure to groundwater and establishment of a SMP and a deed restriction will ensure that this protection remains effective for the long-term (in perpetuity). The SMP will ensure long-term effectiveness of all Engineering and Institutional Controls by requiring periodic inspection and certification that these controls and use restrictions continue to be in place and functioning as they were intended assuring that protections designed into the remedy will provide continued high level of protection in perpetuity.

### **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.

The Track 1 alternative for Site A and Site B would reduce contaminant mobility and volume, as the soil/fill with concentrations exceeding the SCOs would be removed.

The Track 2 alternative for Site B will provide:

- Reduction of toxicity, mobility and volume of contaminated material on-Site by establishing Track 2 Restricted Commercial SCOs and attainment of these SCOs for onsite soil;
- Placement of a asphalt cover over the entire Site that will lower toxicity by eliminating potential contact with remaining soil below the SCOs;
- Groundwater use restrictions will reduce toxicity by ensuring that there is no direct contact with on-Site groundwater in the future;
- Establishment of a Site Management Plan and placement of a deed restriction to memorialize these controls will ensure long-term management of these Engineering and Institutional Controls and provide assurance that protective levels of toxicity and mobility will continue in perpetuity.

### **Implementability**

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

The Track 1 alternative for both Site A and Site B is implementable, as most of the work is required for construction of the subgrade level for parking. The remedial methods used are easily implemented using standard construction technologies. The installation of a vapor barrier and SSDS is a feasible and effective way to prevent vapors from entering the new construction.

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

## **Cost effectiveness**

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, 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 Track 1 alternative for both Site A and Site B are higher than a Track 2 alternative in that a higher volume of soil/fill will be excavated for off-site disposal to achieve a Track 1 status. Excavation of all soil from Lot 10 is not for construction purposes alone and is being conducted here to achieve a Track 1 cleanup standard. Costs are also higher due to the installation of an SSDS. Nonetheless, the more elevated costs on Site A to achieve the Track 1 remedial alternative are acceptable given the existing plan for materials removal for development purposes and to ensure the long term effectiveness of the remedial action. For Site B, appropriate public health and environmental protections are achieved using the Track 2 alternative.

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

## **Community Acceptance**

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

The Track 1 alternative is a stringent remedial approach that protects human health and the environmental and should be acceptable to the surrounding community.

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

## **Land use**

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

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

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

## **Sustainability of the Remedial Action**

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in *PlaNYC: A Greener, Greater New York*. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development. A Sustainability Statement is included in Appendix 2.

The enrollee is going for a LEED certified building. LEED includes sustainable sites (brownfield redevelopment), efficiency in energy usage such as water, electric, gas, etc. The owner will install solar panels on the roof. The project will use recyclable materials, such as wall papers and tiles, and will install energy saving light fixtures and design a HVAC system that better monitors air quality performance and thermal comfort. Once the final specifics of the certification are established, this information will be forwarded to the OER.

## **4.0 REMEDIAL ACTION**

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

The preferred alternative is the Track 1 Alternative for Site A and a Track 2 Alternative for Site B. The preferred remedies achieve protection of public health and the environment for the intended use of the properties. The preferred remedial action alternatives will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action alternatives are effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternatives are cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action for Site A will consist of:

1. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan (Appendix 1).
2. Perform a community air monitoring program for particulates and volatile organic compounds.
3. Establish Track 1 Soil Cleanup Objectives (SCOs). Excavation and removal of soil/fill exceeding SCOs.
4. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
5. Construction and maintenance of an engineered composite cover consisting of the hotel building, which will cover the entire site, and will prevent human exposure to residual soil/fill remaining under the Site;
6. Installation of a vapor barrier system beneath the building slab and subgrade walls.
7. Installation and operation of a passive sub-slab depressurization system beneath the hotel lobby portion of the site. This system will have the potential to be made active depending on the remedial action determination made on the adjacent parcel managed

in the NYS BCP. The subgrade parking area will be ventilated as required by NYC Building Code requirements.

8. Excavation of all soil/fill to 12 feet below grade. Import of materials to be used for backfill and cover in the tree pits along the sidewalks in compliance with this plan and in accordance with applicable laws and regulations. Coordination of any dewatering with remedial activities to be performed at the adjacent remedial action on Lot 11 with NYS DEC to ensure that contaminants are not drawn from the former gasoline station.
9. 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 on-site.
10. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
11. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
12. Implementation of stormwater pollution prevention measures in compliance with applicable laws and regulations.
13. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements for dewatering, in compliance with applicable laws and regulations.
14. Submission of an RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering Controls to be implemented at the Site, and lists any changes from this RAWP.

The proposed remedial action for Site B will consist of:

1. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan (Appendix 1).
2. Perform a community air monitoring program for particulates and volatile organic compounds.
3. Establish Track 2 Soil Cleanup Objectives (SCOs). Site B already meets Track 2 SCOs and no removal action is required to achieve this cleanup standard.
4. Construction and maintenance of an engineered composite cover consisting of asphalt-paved parking lot at grade, which will cover the entire site, and will prevent human exposure to residual soil/fill remaining under the Site;
5. If materials are required to be disposed offsite due to construction, 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 on-site.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
7. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas, as required.
8. Implementation of stormwater pollution prevention measures in compliance with applicable laws and regulations.
9. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements for dewatering, in compliance with applicable laws and regulations.
10. Submission of an RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes

all Engineering Controls to be implemented at the Site, and lists any changes from this RAWP.

11. Recording of a Declaration of Covenants and Restrictions that includes a full listing of Engineering Controls and Institutional Controls and notice that these controls must be maintained within a Site Management Plan to prevent future exposure to residual soil/fill.
12. Establishment in a recorded Declaration of Covenants and Restrictions, a series of Institutional Controls on the Site, including: (1) compliance with the provisions of the recorded Declaration of Covenants and Restrictions; (2) compliance with provisions of the approved Site Management Plan; (3) operation and maintenance of Engineering Controls as specified in the Site Management Plan; (4) inspection and certification of all Engineering Controls at a frequency and in a manner defined in the Site Management Plan; (5) performance of environmental and public health monitoring as defined in the Site Management Plan; (6) reporting at a frequency and in a manner defined in the Site Management Plan; (7) protection of on-Site monitoring devices in a manner specified in the SMP; and (8) prohibition of discontinuation of Engineering Controls without an OER-approved amendment or extinguishment of the Declaration of Covenants and Restrictions.
13. Establishment in a recorded Declaration of Covenants and Restrictions, a series of site restriction Institutional Controls on the Site, including: (1) prohibition of vegetable gardening and farming; (2) prohibition of the use of groundwater without treatment rendering it safe for the intended use; (3) prohibition on all disturbance of residual contaminated material unless it is conducted in accordance with the provisions in the Site Management Plan; and (4) prohibition on higher level of land usage without an OER-approved amendment or extinguishment of this Declaration of Covenants and Restrictions.
14. Submission of an approved Site Management Plan in the Remedial Action Report for long-term management of residual soil/fill, including plans for Institutional and Engineering Controls for: (1) inspection and certification, (2) monitoring, (3) operation and maintenance, and (4) reporting.

## 4.2 SOIL CLEANUP OBJECTIVES AND SOIL/FILL MANAGEMENT

Track 1 Soil Cleanup Objectives (SCOs) are proposed for Site A. Track 2 Restricted Commercial SCOs are proposed for Site B. These SCOs are listed below. 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. For Site A, the entire Site will be excavated to 12 feet below grade. For Site B, no removal action is required to meet the Track 2 Restricted Commercial SCOs. 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.

### Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site for Site A is 6,000 tons.

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.

<b><u>Disposal Facility</u></b>	<b><u>Waste Type</u></b>	<b><u>Estimated Quantities</u></b>
Teterboro Landing, Teterboro, NJ	Historic fill	6,000 tons
Clean Earth, Carteret, NJ	Petroleum contaminated soil (if any)	As necessary

### End-Point Sampling

Removal actions under this plan will be performed in conjunction with remedial end-point sampling. The entire Site will be excavated to 12 feet below grade for construction. The

perimeter of this area is approximately 380 feet. The excavation will encompass a 8,500-square foot area. End-point sampling frequency will consist of the following:

1. 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 (total of 10 soil samples). It should be noted that the entire Site will be excavated to below the water table. Samples for comparison to Track 1 SCOs will be taken at the base of the historical fill layer. Since the western boundary of the Site excavation will be at the boundary of Tax Lot 6, which is not owned by the applicant, no sidewall post-excavation samples will be collected from this portion of the Site. Furthermore, since the northern and southern sides of the Site will be completely excavated to the sidewalks, no sidewall samples will be collected from these portions of the excavation. Only sidewall samples from the eastern property boundary (at old Lot 11) will be collected (a total of 3 sidewall post-excavation samples).
2. 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.
3. 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 sample locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs for end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results.

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**

The soil samples designated for analysis will be collected into laboratory-supplied containers, sealed and labeled, and placed in an ice-filled cooler. The samples will be analyzed in a in a New York State Department of Health Environmental Laboratory Approval Program (NYSDOH-ELAP) laboratory in accordance with NYSDEC requirements.

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

Import of soil onto the property and reuse of soil 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 approximately 40 tons, which would be used along the sidewalks to plant 15 new trees along the perimeter sidewalks. All soil to 12 feet below grade at the Site will be excavated (old Tax Lots 7, 8, 9, and 10). Some of this soil may be used as backfill if it meets Track 1 SCOs. No soil import is anticipated for Site B.

## **4.3 ENGINEERING CONTROLS**

Engineering Controls will be employed in the remedial action of Site A to address residual contamination remaining at the site. The Site has number primary Engineering Control Systems. These are:

- A composite cover system consisting of the new hotel building;
- A sub-slab depressurization system beneath the hotel lobby portion of the Site; and

- A soil vapor barrier beneath the entire foundation and subgrade walls.
- Operation of a ventilation system in the subgrade parking garage in compliance with NYC Building Code.

A sub-slab depressurization system (SSDS) will be installed beneath the 3,000-square foot hotel lobby, which will not have a subgrade level beneath it. This system will be operated passively. However, this aspect of design will be coordinated with the remedial action selected for the lobby on the adjacent NYS DEC site on Lot 11. The SSDS design and vapor barrier specifications are provided in Appendix 6.

As a precaution to prevent potential vapors from entering new construction, a vapor barrier will be installed as part of the waterproofing system beneath the proposed building at the Site. The vapor barrier will consist of Grace Preprufe 300R below the foundation slab. The barrier will be installed in accordance with the manufacturer's specifications, including sealing any penetrations through the foundations.

Engineering Controls were employed in the remedial action of Site B to address residual contamination remaining at the site. The Site has number primary Engineering Control Systems. These are:

- A composite cover system consisting of asphalt paving over the entire site.

### **Composite Cover System**

The entire area of Site A will be covered with the new hotel construction. As part of sidewalk restoration, 15 trees will be planted along the sidewalks surrounding the Site. At least two feet of clean fill will be used in these areas.

The entire area of Site B will be covered with an asphalt pavement.

#### 4.4 INSTITUTIONAL CONTROLS

Institutional Controls (IC) have been incorporated in this remedial action for Site B to manage residual soil/fill and other media and render the Site protective of public health and the environment. Institutional Controls are listed below. Long-term employment of EC/ICs will be established in a Declaration of Covenant and Restrictions (DCR) assigned to the property by the title holder and will be implemented under a site-specific Site Management Plan (SMP) that will be included in the RAR.

Institutional Controls for this remedial action are:

- Recording of an OER-approved Declaration of Covenant and Restrictions (DCR) with the City Register or county clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the Site Management Plan, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded DCR will be submitted in the Remedial Action Report. The DCR will be recorded prior to OER issuance of the Notice of Completion;
- 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 frequency and will comply with RCNY §43-1407(1)(3).
- Vegetable gardens and farming on the Site are prohibited;
- 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 usage type: e.g. residential, commercial, industrial use and will not be used for a higher level of use without prior approval by OER.

#### **4.5 SITE MANAGEMENT PLAN**

Site Management is the last phase of remediation and begins with the approval of the 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 for Site B is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site management for Site A will not be required because it is proposed to achieve Track 1 cleanup. However, inspection of remedial measures proposed for Site A will be included in the plan for Site B. 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 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**

Investigations reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA). Potentially exposed populations

and potential exposure pathways for on-site contamination are evaluated in this section. Exposure can only occur if there is a complete pathway from a specific chemical of concern contained in one of the media to a receptor. The mere presence of a chemical is not in itself evidence that a complete exposure pathway will exist. Based on results from the March 2011 RIR, the contaminated media consist of soil, groundwater, and soil vapor. Exposure could involve accidental ingestion of VOC-contaminated media, inhalation of VOC-containing air, or dermal contact with soil, groundwater, or vapors. Potential receptors include:

- On-site environmental and construction workers, utility workers, and trespassers during development and remedial activities;
- Future occupants of the proposed development;
- Off-site residents, workers and nearby businesses, and trespassers during remedial activities; and
- Off-site maintenance/utility workers.

### **Potential Pathways**

Considering the use limitations already in place at the site and in the surrounding area, the following potential exposure pathways are considered incomplete:

- Groundwater ingestion: New York City Code prohibits the use of groundwater for potable purposes in the Bronx; therefore, this exposure pathway is not complete for any current or future on-site or off-site receptors.
- Soil and groundwater dermal contact/exposure and ingestion by on- and off-site populations: Direct contact with these materials does not currently occur and would not be expected to occur on-site in the future, as the Site will be completely capped with a structure or certified clean fill over the entire site.
- Soil vapor exposure and inhalation by on-site populations: Direct exposure to vapors would not be expected to occur on-site in the future through the implementation of engineering controls (installation of a vapor barrier/SSDS, ventilated parking garage)

during implementation of the chosen remedial alternative on Site A and the use of Site B for paved open space parking.

- Soil vapor exposure and inhalation by off-site populations: The population with the greatest likelihood for exposure off-site would be utility workers; however, such workers have specialized training and internal corporate procedures for handling contaminated materials encountered. Off-site residents, workers, nearby businesses may be exposed to contaminated soil vapor through vapor migration and intrusion. However, the concentrations of VOCs detected by AKRF's March 2011 RIR are not attributable to a source area at the either Site A or Site B. Further, any soil vapor from Site A would be expected to attenuate significantly over time due to full removal of any potential source.

Considering the use limitations already in place at the site and in the surrounding area, the following potential exposure pathways are considered complete:

- Soil, groundwater and soil vapor dermal contact/exposure, ingestion and inhalation by on-site environmental and construction workers and trespassers during remediation and site development: To the extent that proposed remediation would involve excavation in areas of known contamination, this could result in exposure. However, this would be mitigated by implementation of a site-specific construction Health and Safety Plan including addressing potential construction worker exposure.

## **Conclusions**

An exposure via a complete pathway is expected only for personnel on-site during development/construction and remediation of the property. Such exposure would be mitigated or minimized by the implementation of a construction health and safety plan (CHASP) to be approved by the OER. Trespassers, off-site residents and off-site workers/businesses may be exposed to dust and vapors during remediation. However, a Community Air Monitoring Plan (CAMP) will be implemented to minimize or eliminate their exposure.

## **5.0 REMEDIAL ACTION MANAGEMENT**

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

Principal personnel who will participate in the remedial action include Axel Schwendt and Michelle Lapin of AKRF. The Professional Engineer (PE) for this project is Michelle Lapin.

### **5.2 SITE SECURITY**

The Site will be completely closed from public access via secure construction fencing. No unauthorized personnel will be able to access the site. During off hours, the site will be completely enclosed with a locked gate.

### **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 Construction Health and Safety Plan (CHASP) is included in Appendix 4. The Site Safety Coordinator will be Matthew Oleske of AKRF. 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. 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. Exceedences of action levels observed during performance of the community air monitoring 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 periodically at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate

monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ( $\text{mcg}/\text{m}^3$ ) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed  $150 \text{ mcg}/\text{m}^3$  above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than  $150 \text{ mcg}/\text{m}^3$  above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within  $150 \text{ mcg}/\text{m}^3$  of the upwind level and in preventing visible dust migration.

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

## **5.6 AGENCY APPROVALS**

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

## **5.7 SITE PREPARATION**

### **Pre-Construction Meeting**

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

## **Mobilization**

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

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

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

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

## **Dewatering**

Based on proposed excavation depth, dewatering will likely be necessary during project construction. Regulatory protocols may require pretreatment of water pumped from the Site before discharge into the municipal sewer system. Prior to initiating any dewatering activities, a water sample will be analyzed to ensure it meets the New York City Department of Environmental Protection (NYCDEP) criteria for effluent to municipal sewers as part of the application process for the NYCDEP Bureau of Wastewater Treatment (BWT) Wastewater

Quality Control Permit. Any contaminated water generated by construction dewatering will be treated on-site, if necessary, to meet discharge limitations. Following on-site treatment, the water would be discharged to the City sewer with the appropriate permit. All required permits or approvals will be obtained from NYC DEP separately from this RAWP. Approval of this RAWP will not be considered to constitute such approval.

Dewatering will be coordinated with the remedial action on adjacent Lot 11 managed by NYS DEC to ensure that contaminants from that property are not drawn onto the site.

### **Equipment and Material Staging**

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. Staging and storage of equipment and materials will be contained within the secured Site. By the nature of the work involved in this project, equipment and materials will be moved to different areas within the secured Site as work progresses.

### **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 BCP Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary.

## **5.8 TRAFFIC CONTROL**

Drivers of trucks leaving the NYC BCP 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 provided on Figure 3.

## **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. A Citizen Participation Plan is provided in Appendix 1.

### **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;
- 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;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material.
- Account of the origin and required chemical quality testing for material imported onto the Site.
- Recorded Declaration of Covenants and Restrictions.
- 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, Michelle Lapin, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 2477 Third Avenue site in the Bronx, New York (Site number TBD).*

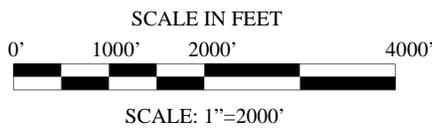
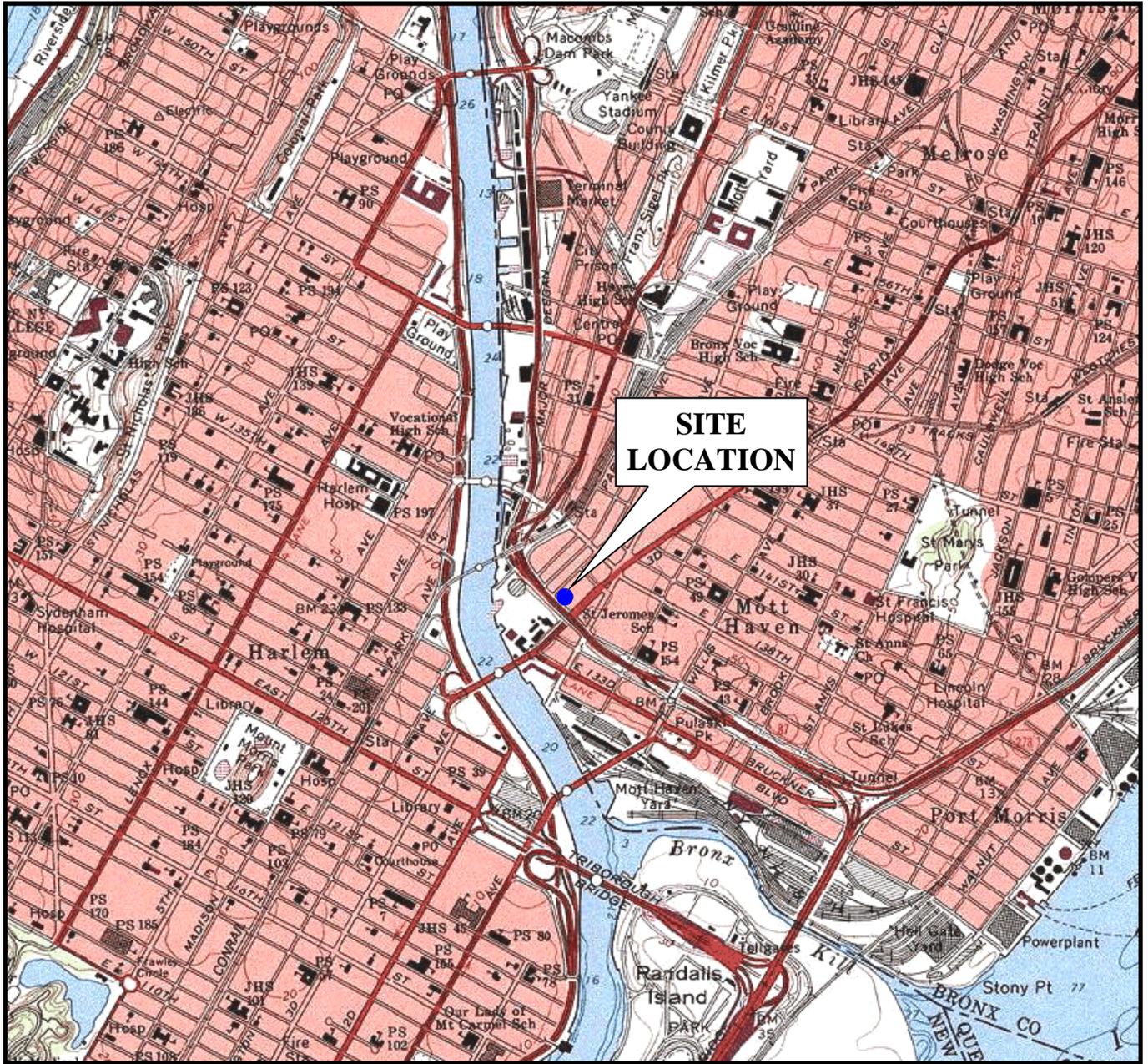
*I certify that the OER-approved Remedial Action Work Plan dated March 2011 and Stipulations in a letter dated TBD; if any were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property 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 four (4) month remediation period is anticipated.

<b>Schedule Milestone</b>	<b>Weeks from Remedial Action Start</b>	<b>Duration (weeks)</b>
OER Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	0	-
Mobilization	1	1
Remedial Excavation	2	14
Demobilization	54	1
Submit Remedial Action Report	50	1

# FIGURES



**SOURCE:**  
7.5 MINUTE SERIES USGS TOPOGRAPHIC MAP  
QUADRANGLE: CENTRAL PARK, NY 1995

**2477 THIRD AVENUE  
BRONX, NEW YORK**

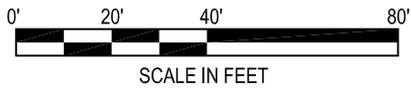
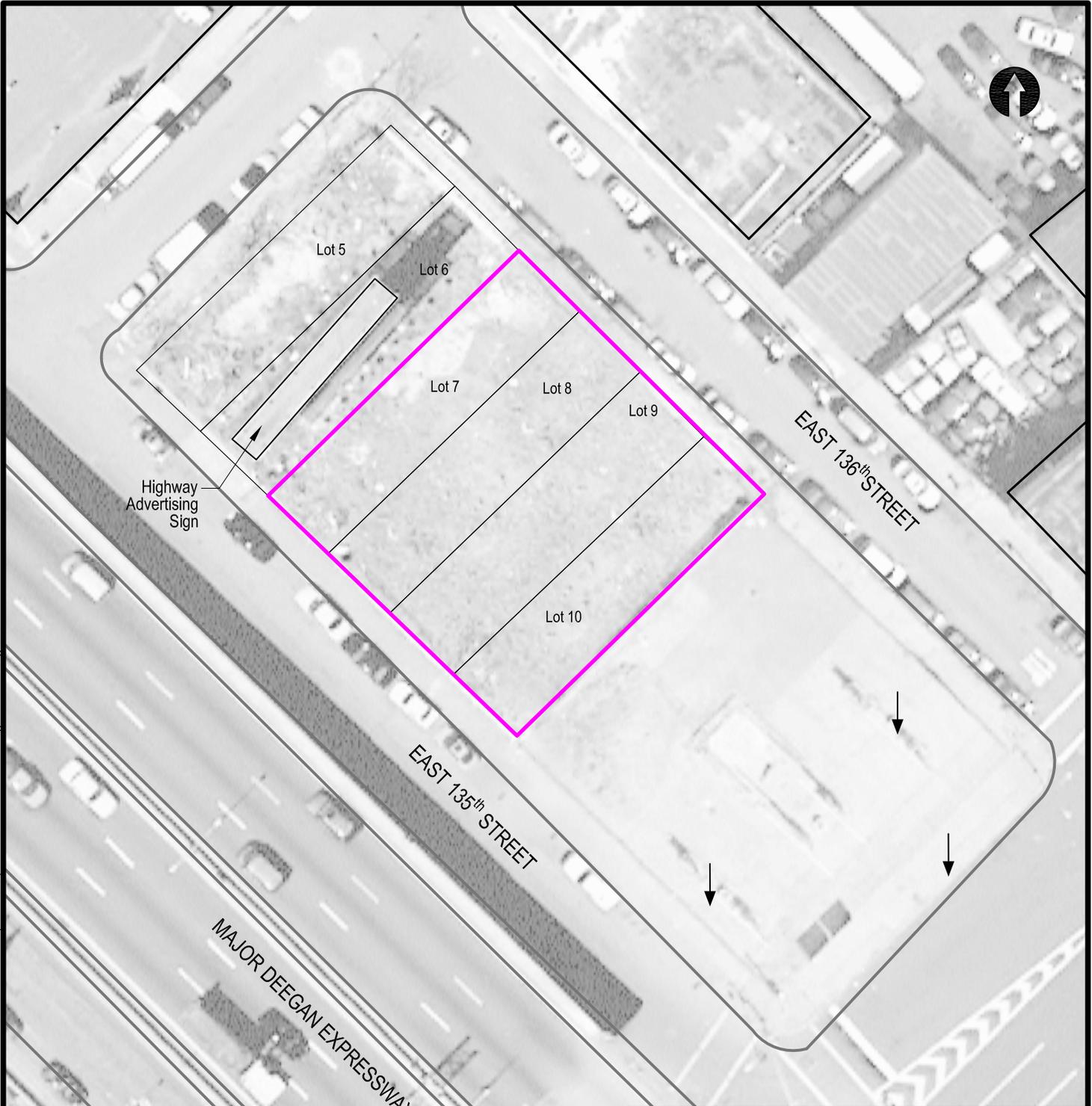
**PROJECT SITE LOCATION**



**Environmental Consultants**  
440 Park Avenue South, New York, N.Y. 10016

DATE <b>7.28.10</b>
PROJECT No. <b>11160</b>
SCALE <b>AS SHOWN</b>
FIGURE <b>1</b>

© 2011 AKRF, Inc. Environmental Consultants. M:\AKRF Project Files\11160 - 2477 Third Avenue Bronx (Jiten LLC)\local BCP - OER\RAWP\Figures\11160 Fig.2 Site Plan RAWP



**LEGEND:**

 PROJECT SITE BOUNDARY

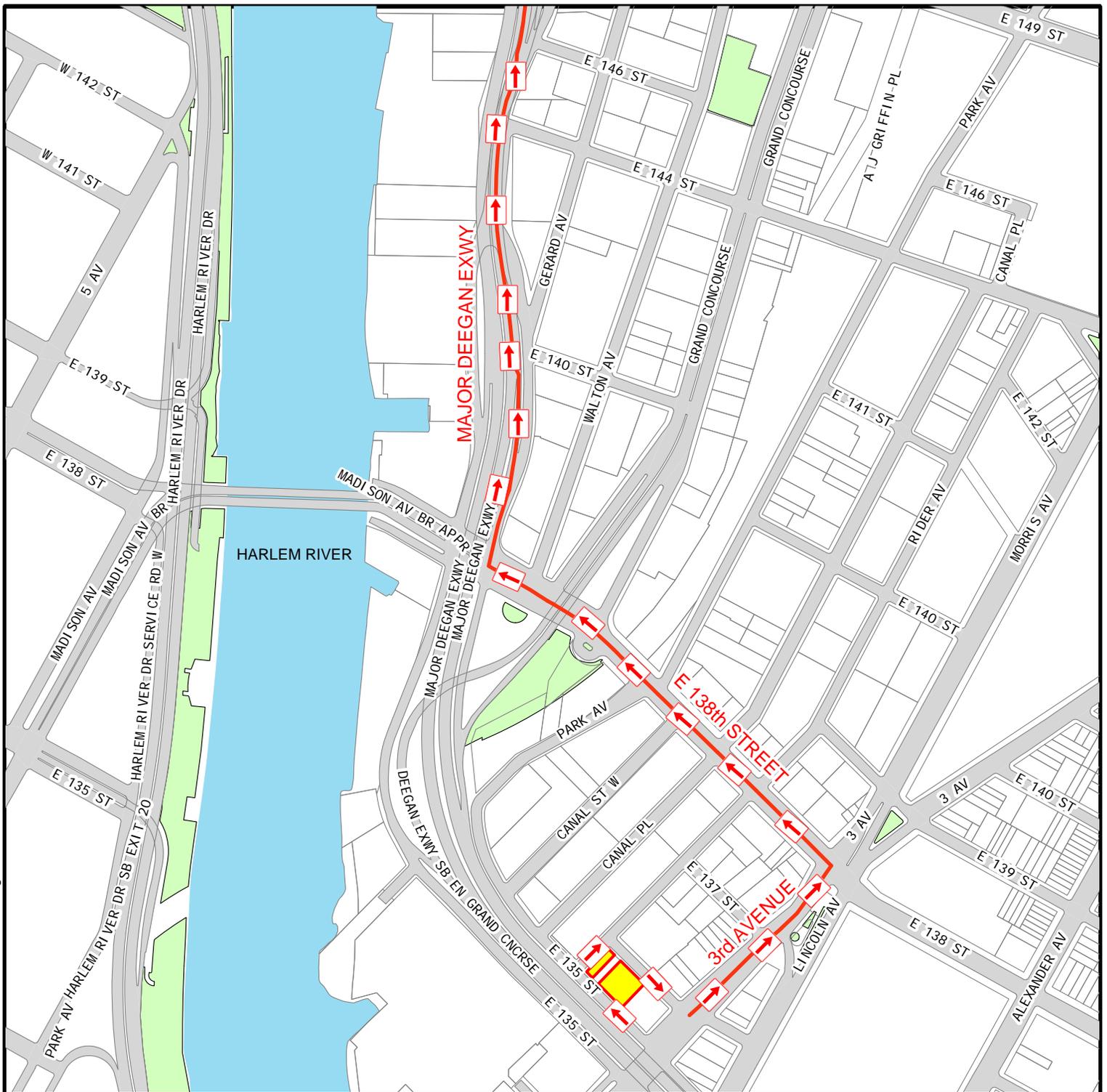
 GROUNDWATER FLOW DIRECTION

**2477 THIRD AVENUE**  
BRONX, NEW YORK

**SITE PLAN**

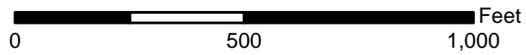
  
**Environmental Consultants**  
440 Park Avenue South, New York, N.Y. 10016

DATE <b>3.15.11</b>
PROJECT No. <b>11160</b>
SCALE <b>as shown</b>
FIGURE <b>2</b>



### Legend

-  Project Site Location
-  Truck Route Direction
-  Truck Route



2477 THIRD AVENUE  
BRONX, NEW YORK



DATE  
**3.14.11**

PROJECT No.  
**11160**

## TRUCK ROUTE MAP

Environmental Consultants  
440 Park Avenue South, New York, N.Y. 10016

FIGURE  
**3**

# APPENDIX 1

## CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and Jiten LLC have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Brownfield 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 BCP, Jiten LLC will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Dr. Zach Schreiber, 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](mailto:brownfields@cityhall.nyc.gov).

**Repositories.** A document repository is maintained in the nearest public library that maintains evening and weekend hours. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. AKRF will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

New York Public Library  
Mott Haven Branch  
321 East 140th Street  
Bronx, NY 10454

Phone: (718) 665-4878

Hours: Mon, Thu: 10AM - 6PM; Tue, Wed: 10AM - 8PM; Fri, Sat: 10AM - 5PM

**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.** The total population of Bronx Community Board 1 based on the Census Data is 82,159. The percent of the population on Income Support rose from 45.2% to 59.2% from 2000 to 2007 and approximately 40% of the people within a quarter-mile radius of the site are below the poverty level. Based on Census Data, 25.9% percent of this population is Black African American and 70.8% is Hispanic. Approximately 65.3% of the total population 5 years old and over is proficient in English and 97.2% of the population speaks Spanish or Spanish Creole at home.

Based on this Census Data, if a public hearing/meeting is required for this project, a Spanish-speaking agent will be made available.

**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 Jiten LLC, reviewed and approved by OER prior to distribution and mailed by Jiten LLC. Public comment is solicited in public notices for all work plans developed under the NYC Brownfield 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 BCP project. See flow chart on the following page, which identifies when during the NYC BCP 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.**

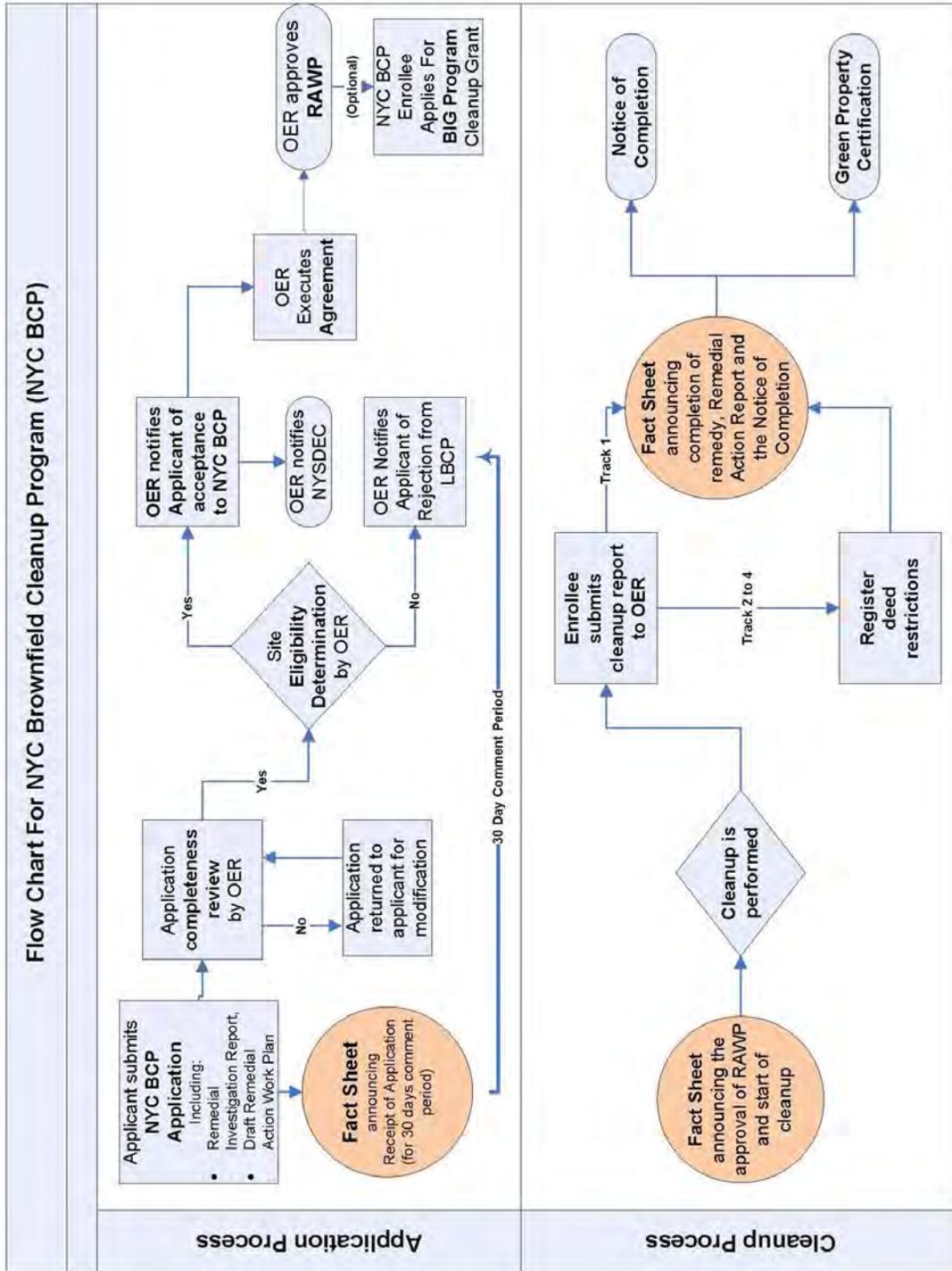
Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes 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.



## APPENDIX 2

### SUSTAINABILITY STATEMENT

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

The Enrollee is going for a LEED certified building. LEED includes sustainable sites (brownfield redevelopment), efficiency in energy usage such as water, electric, gas, etc. The owner will install solar panels on the roof. The project will use recyclable materials, such as wall papers and tiles, and will install energy saving light fixtures and design a HVAC system that better monitors air quality performance and thermal comfort. Once the final specifics of the certification are established, this information will be forwarded to the OER. The following sustainability elements will also be implemented and/or considered:

**Reuse of Clean, Recyclable Materials.** Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction. An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

**Reduced Energy Consumption and Promotion of Greater Energy Efficiency.** Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings. Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

**Conversion to Clean Fuels.** Use of clean fuel improves NYC's air quality by reducing harmful emissions. An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

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

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

**Paperless Brownfield Cleanup Program.** Enrollee 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.** Enrollee 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, and are consistent with the city's goals for planting one million new trees under PlaNYC. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.

Fifteen trees will be planted along the sidewalks surrounding the Site. 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 an Environmental Professional and will be reported in the RAR. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Completion.

#### **1.2 STOCKPILE METHODS**

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

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

#### **1.3 CHARACTERIZATION OF EXCAVATED MATERIALS**

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

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

The PE/QEP overseeing the remedial action will:

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

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

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

## **1.5 OFF-SITE MATERIALS TRANSPORT**

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

Outbound truck transport routes are shown in Figure 3. 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 the Bronx, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RAR.

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

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

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

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

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

Soil and fill that is derived from the property that meets the Track 1 soil cleanup objectives for Site A or Track 4 SCOs for Site B established in this plan may be reused on-Site. ‘Reuse on-Site’ means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to the NYC BCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAWP are followed.

The entire area of Site A will be excavated to 12 feet below grade for construction. No on-site reuse of soil or fill is anticipated. However, clean soil from Site A may be used as backfill for old Lot 11, currently in the NYSDEC BCP and also part of the proposed development, with approval from NYS DEC. Any reuse of soil/fill from old Lots 7 through 10 on old Lot 11 will be done in accordance with the NYSDEC-approved RAWP prepared for Lot 11.

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

## **1.8 DEMARCATION**

On Site B, 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.

## **1.8 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 be approved by OER and meet backfill and cover soil quality objectives for this Site.

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

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

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

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

## **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.

## **1.9 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.

### **1.10 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.

### **1.11 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.

## **1.12 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**

# **CONSTRUCTION HEALTH AND SAFETY PLAN**

**2477 Third Avenue  
Block 2320 Lots 7, 8, 9, and 10**

**BRONX, NEW YORK**

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**Construction Health and Safety Plan**

**E-Designation Number: 227  
OER Tracking Number: 10EHAZ276X  
AKRF Project Number: 11160**

**Prepared for:**

Jiten LLC  
30 Byrd Avenue  
Carle Place, NY 11514

**Prepared by:**



**AKRF Engineering P.C.**  
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**MARCH 2010**

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**FIGURES**

Figure 1 - Hospital Location Map

**APPENDICES**

- Appendix A - Potential Health Effects from On-site Contaminants
- Appendix B - Report Forms
- Appendix C - Emergency Hand Signals

## 1.0 PURPOSE

The purpose of this Construction Phase Environmental Health and Safety Plan (HASP) is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise during construction at the project site. The CHASP is intended to minimize health and safety risks resulting from the known and potential presence of hazardous materials on the site.

This plan is not designed to address potential geotechnical, mechanical, or structural safety concerns, nor to supersede or replace any OSHA regulation and/or local and state construction codes or regulations.

## 2.0 APPLICABILITY

Work subject to this CHASP includes activities that disturb the existing soil or groundwater on-site. The contractors and their subcontractors involved in the construction project will provide a copy of this CHASP to their employees whose work involves any potential exposure to the on-site chemical hazards, and will complete all work in accordance with this CHASP. All work outlined within the CHASP is subject to the Remedial Action Work Plan (RAWP) developed for the site.

## 3.0 SITE DESCRIPTION

### 3.1 General Information

This CHASP has been prepared by AKRF Engineering, P.C. (AKRF) on behalf of Jiten LLC for the project site located at 2477 Third Avenue in the Bronx, New York. The Site is located at 2477 Third Avenue in the Mott Haven section of the Bronx, New York and is currently identified as Block 2320, a portion of Lot 11 on the New York City Tax Map. The Site was formerly described as Lots 7, 8, 9 and 10; however, Tax Lots 7, 8, 9, 10 and 11 were merged by the owner in 2009 during site development permitting and planning. For clarity, this RAWP describes the Site using the old lot numbers. A hazardous materials E-designation (E-227) was assigned to the lots as part of the Lower Concourse Rezoning and this plan is intended to address the requirements of the designation and the Mayor's Office of Environmental Remediation (OER). Lot 11, also owned by Jiten LLC, was entered into the New York State Department of Conservation (NYSDEC) Brownfield Cleanup Program (Site No. C203047) in October 2009 and will be remediate in accordance with a separate NYSDEC-approved RAWP. It should be noted that Tax Block 2320, Lot 6 is not owned by Jiten LLC and is, therefore, not addressed in this CHASP.

The site is located in a commercial and industrial area that is characterized by a variety of warehouse, trucking, auto repair, and manufacturing businesses. The proposed development of the project site would involve excavation of Lots 7 through 10 to approximately 12 feet below existing grade and Lot 11 to approximately four feet below grade for the construction of a four-story hotel plus subgrade parking/basement levels. Given the reported depth to groundwater (approximately 7 to 10 feet below grade), dewatering may be required for the proposed construction. Development of Lot 5 will include paving the entire lot. The site location is shown on Figure 1.

### 3.2 Hazard Potential

Previous investigations at the property identified soil consisting of primarily urban fill (including brick, ash, coal slag, concrete, and glass) from the ground surface to approximately 8 to 12 feet below grade. The urban fill layer was underlain by brown fine sand and silt. The water table was encountered between 7 to 10 feet below grade during the investigations.

Results of the soil sample analyses from the site detected levels of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) with some polycyclic aromatic hydrocarbons (PAHs) at concentrations above the NYSDEC 6 NYCRR Part 375 Remedial Program Soil Cleanup Objectives (SCOs) for Unrestricted or Commercial use. Metals were detected in all of the soil samples analyzed, in some cases at concentrations above their respective Part 375 SCOs and NYSDEC Technical and Administrative Guidance Memorandum No. 4046 (TAGM) Eastern United States background levels. Pesticides were detected in two soil samples at concentrations below their respective Part 375 SCOs and over 40 unknown hydrocarbons were detected in soil samples as Tentatively Identified compounds (TICs). Based on the site history, these volatile and semivolatile organic compounds are likely associated with petroleum contamination in on-site soil or the underlying groundwater, possibly from on-site residential heating oil tanks or from fuel oil possibly used during past on-site manufacturing activities. However, the history of the area surrounding the site suggests that off-site sources cannot be ruled out.

The results of the groundwater sample analyses on Lots 5 through 10 detected VOCs that are typically associated with gasoline and may be attributable to the industrial and manufacturing history of the site and surrounding area, which included auto-related uses. SVOCs were detected in groundwater samples, in some cases at concentrations of above the Class GA standards. Sixteen metals were detected in the groundwater samples in the unfiltered (total) analyses, twelve of which were at concentrations above Class GA standards. In the filtered (dissolved) analyses, only eight metals were detected and six were at concentrations above Class GA standards. These results suggest that a portion of the detections in the total metals analyses were due to suspended sediments in the samples.

Elevated levels of gasoline-related VOCs were detected in the shallow groundwater in the southern half of Lot 11. The VOCs are likely from the past use of Lot 11 as a gasoline station. Soil vapors beneath Lot 11 of the site exhibit elevated levels of the same gasoline-related VOCs as a result of those present in the shallow groundwater. Although low levels of solvent-related VOCs were detected in soil vapor, the concentrations were typical of background levels present in areas of the Bronx with a history of industrial and manufacturing operations and not to an on-site spill or release. Furthermore, no significant on-site source of solvent-related VOCs was identified at the site.

### 3.3 Hazard Evaluation

The most likely routes of exposure are breathing of volatile and semivolatile compounds or particulate-laden air released during soil disturbing activities, dermal contact, and accidental ingestion. Appendix A includes specific health effects from the known on-site chemicals. The remaining sections of this CHASP address procedures (including training, air monitoring, work practices and emergency response) to reduce the potential for unnecessary and unacceptable exposure to these contaminants.

The potential adverse health effects from these detected contaminants are diverse. Many of these compounds are known or suspected to result in chronic illness from long-term exposures.

However, due to the limited nature of the proposed construction, only acute effects are a potential concern.

This CHASP addresses potential environmental hazards from the presence of hazardous materials. It is not intended to address the normal hazards of construction work, which are separately covered by OSHA regulations and/or local and state construction codes and regulations. Although some of the chemicals of concern listed in the sections below were not detected during the Phase II study conducted, they are included here as a precaution.

**3.3.1 Hazards of Concern**

<b>Check all that apply</b>		
<input checked="" type="checkbox"/> Organic Chemicals	<input checked="" type="checkbox"/> Inorganic Chemicals	<input type="checkbox"/> Radiological
<input type="checkbox"/> Biological	<input type="checkbox"/> Explosive/Flammable	<input type="checkbox"/> Oxygen Deficient Atm.
<input checked="" type="checkbox"/> Heat Stress	<input checked="" type="checkbox"/> Cold Stress	<input type="checkbox"/> Other
<b>Comments:</b> No personnel are permitted to enter permit confined spaces		

**3.3.2 Physical Characteristics**

<b>Check all that apply</b>		
<input checked="" type="checkbox"/> Liquid	<input checked="" type="checkbox"/> Solid	<input checked="" type="checkbox"/> Sludge (from USTs)
<input checked="" type="checkbox"/> Vapors	<input checked="" type="checkbox"/> Unknown	<input type="checkbox"/> Other
<b>Comments:</b>		

**3.3.3 Hazardous Materials**

<b>Check all that apply</b>					
<b>Chemicals</b>	<b>Solids</b>	<b>Sludges</b>	<b>Solvents</b>	<b>Oils</b>	<b>Other</b>
<input type="checkbox"/> Acids	<input checked="" type="checkbox"/> Ash	<input type="checkbox"/> Paints	<input type="checkbox"/> Halogens	<input type="checkbox"/> Transformer	<input type="checkbox"/> Lab
<input type="checkbox"/> Caustics	<input type="checkbox"/> Asbestos	<input type="checkbox"/> Metals	<input checked="" type="checkbox"/> Petroleum	<input type="checkbox"/> Other DF	<input type="checkbox"/> Pharm.
<input checked="" type="checkbox"/> Pesticides	<input type="checkbox"/> Tailings	<input type="checkbox"/> POTW	<input type="checkbox"/> Other	<input type="checkbox"/> Motor or Hydraulic Oil	<input type="checkbox"/> Hospital
<input checked="" type="checkbox"/> Petroleum	<input checked="" type="checkbox"/> Other: Fill Material	<input checked="" type="checkbox"/> Other: Petroleum USTs		<input checked="" type="checkbox"/> Gasoline	<input type="checkbox"/> Rad.
<input type="checkbox"/> Inks				<input checked="" type="checkbox"/> Fuel Oil	<input type="checkbox"/> MGP
<input type="checkbox"/> PCBs					<input type="checkbox"/> Mold
<input checked="" type="checkbox"/> Metals					<input type="checkbox"/> Cyanide
<input checked="" type="checkbox"/> Other: VOCs & SVOCs					

### 3.3.4 Known and Suspect Chemicals of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Methyl Tert Butyl Ether (MTBE)	REL = 40 ppm	Headaches, nausea, dizziness, mental confusion, gastrointestinal irritation, liver and kidney damage, and nervous system effects.
Barium	PEL = 0.5 mg/m <sup>3</sup> REL = 0.5 mg/m <sup>3</sup>	Vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness, changes in heart rhythm or paralysis and death.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Fuel Oil	REL = 350 mg/m <sup>3</sup> PEL = 400 ppm	Nausea, irritation – eyes, hypertension, headache, light-headedness, loss of appetite, poor coordination; long-term exposure – kidney damage, blood clotting problems; potential carcinogen.
Polycyclic Aromatic Hydrocarbons (PAHs)	PEL = 5 mg/m <sup>3</sup>	Harmful effects to skin, bodily fluids, and ability to fight disease, reproductive problems; potential carcinogen.
Toluene	REL = 100 ppm PEL = 200 ppm STEL = 300 ppm	Irritation eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage.
Xylenes	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, poor coordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Comments: REL = National Institute for Occupational Safety and Health (“NIOSH”) Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL = OSHA Short Term Exposure Limit		

## 4.0 HEALTH AND SAFETY OFFICER

The contractor or engineer will designate one of its personnel as the Site Safety Officer (SSO). The SSO will be a competent person responsible for the implementation of this plan. The SSO will have completed a 40-hour training course (up-dated by an annual refresher) that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards. The SSO has stop-work authorization, which he/she will execute on his/her determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation. If the SSO must be absent from the site, he/she will designate a suitably qualified replacement that is familiar with the CHASP. If work is stopped for any reason, the OER would be notified immediately.

## 5.0 TRAINING

All those who enter the work area while intrusive activities are being performed must recognize and understand the potential hazards to health and safety. All construction personnel upon entering the site must attend a brief training meeting, its purpose being to:

- Make workers aware of the potential hazards they may encounter;
- Instruct workers on how to identify potential hazards,
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make workers aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the construction crew will be instructed in these objectives before he/she goes onto the site. Construction personnel will be responsible for identifying potential hazards in the work zone. The SSO or other suitably trained individual will be responsible for conducting the training program. Others who enter the site must be accompanied by a suitably-trained construction worker.

## 6.0 GENERAL WORK PRACTICES

To protect the health and safety of the field personnel, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance in contaminated areas.

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the site. These areas will be designated by the SSO.
- Workers must wash their hands and face thoroughly on leaving the work area and before eating, drinking, or any other such activity. The workers should shower as soon as possible after leaving the site.
- Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat stress.

## 7.0 PERSONAL PROTECTIVE EQUIPMENT & AIR MONITORING

### 7.1 Personal Protective Equipment

The personal protection equipment required for various kinds of site investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, “General Description and Discussion of the Levels of Protection and Protective Gear.”

AKRF field personnel and other site personnel will wear, at a minimum, Level D personal protective equipment. The protection will be based on the air monitoring described in Section 7.2.

**Level of Protection Summary**

LEVEL OF PROTECTION & PPE	Excavation	Other Earth Moving Activities
<b>Level D</b> (x) Steel Toe Shoes (x) Hard Hat <b>(within 25 ft of excavator)</b> (x) Work Gloves	(x) Safety Glasses ( ) Face Shield (x) Ear Plugs (within 25 ft of drill rig/excavator) (x) Latex Gloves	Yes
<b>Level D – Modified</b> <b>(in addition to Level D)</b> (x) Tyvek Coveralls	(x) Nitrile Gloves ( ) Overboots ( ) Saranex Coveralls	As Necessary
<b>Level C (in addition to Level D – Modified)</b> ( ) Half-Face Respirator (x) Full Face Respirator ( ) Full-Face PAPR	( ) Particulate Cartridge ( ) Organic Cartridge (x) Dual Organic/Particulate Cartridge	If PID > 10 ppm (breathing zone)
<b>Comments:</b> Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breath or any odors detected).		

**7.2 Work Zone Air Monitoring and Community Air Monitoring**

As outlined in the RAWP, real time air monitoring will be performed with a photoionization detector (PID) and with a particulate air monitor during sampling and excavation work in areas where petroleum or other contamination is encountered. Community air monitoring will be conducted during all intrusive site activities in compliance with the New York State Department of Health (NYSDOH) guidance. The air monitoring protocols and action levels/required responses are provided in the March 2011 RAWP prepared for the site.

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the site for referencing proper operation, maintenance and calibration procedures.

The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork. If an instrument fails calibration, the project manager will be contacted immediately to obtain a replacement instrument and arrange for repairs. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas.

## 8.0 DECONTAMINATION PROCEDURES

### 8.1 Personnel Decontamination

Personnel decontamination (decon), if deemed necessary by the SSO, will take place in a designated decontamination area. This area will be delineated during each stage of work. Personnel decontamination will consist of the following steps:

- Soap and potable water wash and potable water rinse of gloves;
- Coverall removal (if applicable);
- Glove removal;
- Disposable clothing removal; and
- Field wash of hands and face.

### 8.2 Sampling Equipment Decontamination

Any non-disposable sampling equipment for confirmatory sampling or other equipment that is in contact with contaminated materials will be decontaminated in accordance with the following procedure:

- Double wash with solution of Simple Green<sup>®</sup> and clean tap water;
- Double rinse with clean tap water;
- Rinse with clean distilled water; and
- Allow equipment to air dry.

### 8.3 Heavy Equipment Decontamination

If heavy equipment comes in contact with contaminated materials, it will be decontaminated prior to being relocated to a clean area or leaving the site. A designated decontamination pad will be constructed, where soil, dust, or oil will be washed off the exterior, undercarriage, and wheels or tracks of the equipment. Wash water will be collected for treatment and/or disposal.

## 9.0 EMERGENCY RESPONSE

### 9.1 Emergency Procedures

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site; and
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.
- A spill of oil or other hazardous materials.

General emergency procedures, and specific procedures for personal injury, chemical exposure and radiation exposure, are described below. In the event of an accident or emergency, an Incident Report form should be filled out and placed in the project file. An example Weekly

Safety Report Form and Incident Report Form are provided in Appendix B. Information on emergency hand signals is provided in Appendix C.

### **9.1.1 Chemical Exposure**

If a member of the field crew demonstrates symptoms of chemical exposure the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should communicate to the SSO (via voice and hand signals) of the chemical exposure. The SSO should contact the appropriate emergency response agency.
- Precautions should be taken to avoid exposure of other individuals to the chemical.
- If the chemical is on the individual's clothing, the chemical should be neutralized or removed if it is safe to do so.
- If the chemical has contacted the skin, the skin should be washed with copious amounts of water.
- In case of eye contact, an emergency eye wash should be used. Eyes should be washed for at least 15 minutes.
- All chemical exposure incidents must be reported in writing to the SSO. The SSO is responsible for completing the Incident Report Form.

### **9.1.2 Personal Injury**

In case of personal injury at the site, the following procedures should be followed:

- Another team member (buddy) should signal the SSO that an injury has occurred.
- A field team member trained in first aid can administer treatment to an injured worker.
- If deemed necessary, the victim should then be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim.
- The SSO is responsible for making certain that an Incident Report Form is completed. This form is to be submitted to the SSO. Follow-up action should be taken to correct the situation that caused the accident.
- Any incident (near miss, property damage, first aid, medical treatment, etc.) must be reported.

A first-aid kit, eye-wash, and blood-borne pathogens kit will be kept on-site during the field activities.

### **9.1.3 Evacuation Procedures**

- The SSO will initiate evacuation procedures by signaling to leave the site or containment structure;
- All personnel in the work area should evacuate the area and meet in the common designated area;
- All personnel suspected to be in or near the contract work area should be accounted for and the whereabouts or missing persons determined immediately; and

- The SSO will then give further instruction.

#### **9.1.4 Procedures Implemented in the Event of a Major Fire, Explosion, or Emergency**

- Notify the paramedics and/or fire department, as necessary;
- Signal the evacuation procedure previously outlined and implement the entire procedure;
- Isolate the area;
- Stay upwind of any fire;
- Keep the area surrounding the problem source clear after the incident occurs;
- Complete accident report for and distribute to appropriate personnel.

#### **9.1.5 Spill Response**

All personnel must take every precaution to minimize the potential for spills during site operations. Any spill will be reported immediately to the SSO. The SSO will immediately report any spills to the NYSDEC Spill Hotline. The OER will be provided with the spill numbers assigned by the NYSDEC.

Spill control apparatus (sorberent materials) will be located on-site. All materials used for the clean up of spills will be containerized and labeled separately from other wastes. The SSO, in consultation with AKRF's Project Manager, will determine if additional spill response measures are required.

**9.2 Hospital Directions**

The location of the nearest hospital, as shown on Figure 1 Hospital Location Map, is **Lincoln Medical and Mental Health Center**. The address of the hospital is 234 East 149<sup>th</sup> Street, Bronx, New York. Directions to the hospital are provided below.

**Hospital Information and Directions**

<b>Hospital Name:</b>	Lincoln Medical and Mental Health Center
<b>Phone Number:</b>	(718) 579-5000
<b>Address/Location:</b>	234 East 149 <sup>th</sup> Street – Bronx, New York (East 149 <sup>th</sup> Street between Morris Avenue and Park Avenue)
<b>Directions to ER:</b>	Go EAST (RIGHT) on East 136 <sup>th</sup> Street LEFT onto Lincoln Avenue Lincoln Avenue merges with Morris Avenue LEFT onto East 149 <sup>th</sup> Street The hospital will be on the left

**9.3 CHASP Contact Information**

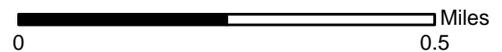
AKRF Project Director – Michelle Lapin.....	(646) 388-9520 (office)
AKRF Project Manager – Axel Schwendt.....	(646) 388-9529 (office)
Site Safety Officer (SSO) – Matt Oleske.....	(917) 583-9403 (cell)
Jiten LLC Project Manager – Daniele Cervino.....	(973) 703-6578 (office)
Lincoln Medical and Mental Health Center.....	(718) 579-5000
Ambulance, Fire and Police Departments.....	911
Local Poison Control .....	(212) 764-7667
	pm/weekend (212) 340-4494
NYSDEC Spill Response Team.....	(800) 457-7362



## FIGURES



Lincoln Medical and Mental Health Center  
 234 East 149th Street  
 Bronx, New York 10451  
 Tel. (718) 579-5000



**2477 THIRD AVENUE**  
 BRONX, NEW YORK



DATE  
**3.03.09**

PROJECT No.  
**11160-005**

**HOSPITAL LOCATION MAP**

Environmental Consultants  
 440 Park Avenue South, New York, N.Y. 10016

FIGURE  
**HASP - 1**

**APPENDIX A**  
**POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS**

This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Tetrachloroethylene is a manufactured chemical used for dry cleaning and metal degreasing. Exposure to very high concentrations of tetrachloroethylene can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Tetrachloroethylene has been found in at least 771 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What is tetrachloroethylene?

(Pronounced tět'rə-klôr' 0-ěth'ə-lēn')

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.

Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part tetrachloroethylene per million parts of air (1 ppm) or more, although some can smell it at even lower levels.

### What happens to tetrachloroethylene when it enters the environment?

- Much of the tetrachloroethylene that gets into water or soil evaporates into the air.
- Microorganisms can break down some of the tetrachloroethylene in soil or underground water.
- In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain.
- It does not appear to collect in fish or other animals that live in water.

### How might I be exposed to tetrachloroethylene?

- When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.
- When you drink water containing tetrachloroethylene, you are exposed to it.

### How can tetrachloroethylene affect my health?

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death.

Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high."

In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known.

Results from some studies suggest that women who work in dry cleaning industries where exposures to tetrachloroethyl-

ToxFAQs Internet home page via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

ene can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. However, it is not known if tetrachloroethylene was responsible for these problems because other possible causes were not considered.

Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

### **How likely is tetrachloroethylene to cause cancer?**

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

### **Is there a medical test to show whether I've been exposed to tetrachloroethylene?**

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath, much the same way breath-alcohol measurements are used to determine the amount of alcohol in the blood.

Because it is stored in the body's fat and slowly released into the bloodstream, tetrachloroethylene can be detected in the breath for weeks following a heavy exposure.

Tetrachloroethylene and trichloroacetic acid (TCA), a breakdown product of tetrachloroethylene, can be detected in the blood. These tests are relatively simple to perform. These tests aren't available at most doctors' offices, but can be per-

formed at special laboratories that have the right equipment.

Because exposure to other chemicals can produce the same breakdown products in the urine and blood, the tests for breakdown products cannot determine if you have been exposed to tetrachloroethylene or the other chemicals.

### **Has the federal government made recommendations to protect human health?**

The EPA maximum contaminant level for the amount of tetrachloroethylene that can be in drinking water is 0.005 milligrams tetrachloroethylene per liter of water (0.005 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and recommends that levels in workplace air should be as low as possible.

### **Glossary**

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

### **References**

This ToxFAQs information is taken from the 1997 Toxicological Profile for Tetrachloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about trichloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Trichloroethylene is a colorless liquid which is used as a solvent for cleaning metal parts. Drinking or breathing high levels of trichloroethylene may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death. Trichloroethylene has been found in at least 852 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What is trichloroethylene?

Trichloroethylene (TCE) is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers.

Trichloroethylene is not thought to occur naturally in the environment. However, it has been found in underground water sources and many surface waters as a result of the manufacture, use, and disposal of the chemical.

### What happens to trichloroethylene when it enters the environment?

- ❑ Trichloroethylene dissolves a little in water, but it can remain in ground water for a long time.
- ❑ Trichloroethylene quickly evaporates from surface water, so it is commonly found as a vapor in the air.
- ❑ Trichloroethylene evaporates less easily from the soil than from surface water. It may stick to particles and remain for a long time.
- ❑ Trichloroethylene may stick to particles in water, which will cause it to eventually settle to the bottom sediment.
- ❑ Trichloroethylene does not build up significantly in

plants and animals.

### How might I be exposed to trichloroethylene?

- ❑ Breathing air in and around the home which has been contaminated with trichloroethylene vapors from shower water or household products such as spot removers and typewriter correction fluid.
- ❑ Drinking, swimming, or showering in water that has been contaminated with trichloroethylene.
- ❑ Contact with soil contaminated with trichloroethylene, such as near a hazardous waste site.
- ❑ Contact with the skin or breathing contaminated air while manufacturing trichloroethylene or using it at work to wash paint or grease from skin or equipment.

### How can trichloroethylene affect my health?

Breathing small amounts may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating.

Breathing large amounts of trichloroethylene may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage.

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Drinking large amounts of trichloroethylene may cause nausea, liver damage, unconsciousness, impaired heart function, or death.

Drinking small amounts of trichloroethylene for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear.

Skin contact with trichloroethylene for short periods may cause skin rashes.

### How likely is trichloroethylene to cause cancer?

Some studies with mice and rats have suggested that high levels of trichloroethylene may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of trichloroethylene in drinking water or in workplace air have found evidence of increased cancer. Although, there are some concerns about the studies of people who were exposed to trichloroethylene, some of the effects found in people were similar to effects in animals.

In its 9<sup>th</sup> Report on Carcinogens, the National Toxicology Program (NTP) determined that trichloroethylene is “reasonably anticipated to be a human carcinogen.” The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is “probably carcinogenic to humans.”

### Is there a medical test to show whether I've been exposed to trichloroethylene?

If you have recently been exposed to trichloroethylene, it can be detected in your breath, blood, or urine. The breath test, if it is performed soon after exposure, can tell if you have been exposed to even a small amount of trichloroethylene.

Exposure to larger amounts is assessed by blood

and urine tests, which can detect trichloroethylene and many of its breakdown products for up to a week after exposure. However, exposure to other similar chemicals can produce the same breakdown products, so their detection is not absolute proof of exposure to trichloroethylene. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

### Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level for trichloroethylene in drinking water at 0.005 milligrams per liter (0.005 mg/L) or 5 parts of TCE per billion parts water.

The EPA has also developed regulations for the handling and disposal of trichloroethylene.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 100 parts of trichloroethylene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

### Glossary

Carcinogenicity: The ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or gas.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

Solvent: A chemical that dissolves other substances.

### References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Trichloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

### What happens to PCBs when they enter the environment?

- PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.
- PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.
- PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.
- PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these

aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

### How might I be exposed to PCBs?

- Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.
- Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.
- Breathing air near hazardous waste sites and drinking contaminated well water.
- In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

### How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

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of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

#### How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

#### How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported. In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

#### How can families reduce the risk of exposure to PCBs?

- You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.
- Children should be told not play with old appliances,

electrical equipment, or transformers, since they may contain PCBs.

- Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.
- If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

#### Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

#### Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

#### References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene happens mostly from breathing air contaminated from the burning of wood, tobacco, or fossil fuels, industrial discharges, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has caused cancer in animals. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene have been found in at least 687, 36, and 412, respectively, of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

### **What are naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?**

Naphthalene is a white solid that evaporates easily. Fuels such as petroleum and coal contain naphthalene. It is also called white tar, and tar camphor, and has been used in mothballs and moth flakes. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell. The major commercial use of naphthalene is in the manufacture of polyvinyl chloride (PVC) plastics. Its major consumer use is in moth repellents and toilet deodorant blocks.

1-Methylnaphthalene and 2-methylnaphthalene are naphthalene-related compounds. 1-Methylnaphthalene is a clear liquid and 2-methylnaphthalene is a solid; both can be smelled in air and in water at very low concentrations.

1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals such as dyes and resins. 2-Methylnaphthalene is also used to make vitamin K.

### **What happens to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene when they enter the environment?**

- Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.
- Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.
- Naphthalene can become weakly attached to soil or pass through soil into underground water.
- In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.
- Naphthalene does not accumulate in the flesh of animals or fish that you might eat.

1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

### **How might I be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?**

- Breathing low levels in outdoor air.
- Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.
- Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.
- Drinking water from contaminated wells.
- Touching fabrics that are treated with moth repellents containing naphthalene.
- Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

### **How can naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene affect my health?**

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene

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causes reproductive effects in animals; most evidence says it does not.

There are no studies of humans exposed to 1-methylnaphthalene or 2-methylnaphthalene.

Mice fed food containing 1-methylnaphthalene and 2-methylnaphthalene for most of their lives had part of their lungs filled with an abnormal material.

### **How likely are naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene to cause cancer?**

There is no direct evidence in humans that naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene cause cancer.

However, cancer from naphthalene exposure has been seen in animal studies. Some female mice that breathed naphthalene vapors daily for a lifetime developed lung tumors. Some male and female rats exposed to naphthalene in a similar manner also developed nose tumors.

Based on the results from animal studies, the Department of Health and Human Services (DHHS) concluded that naphthalene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) concluded that naphthalene is possibly carcinogenic to humans. The EPA determined that naphthalene is a possible human carcinogen (Group C) and that the data are inadequate to assess the human carcinogenic potential of 2-methylnaphthalene.

### **How can naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene affect children?**

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs. Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

There is no information on whether naphthalene has affected development in humans. No developmental abnormalities were observed in the offspring from rats, mice, and rabbits fed naphthalene during pregnancy.

We do not have any information on possible health effects of 1-methylnaphthalene or 2-methylnaphthalene on children.

### **How can families reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?**

Families can reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene by avoiding smoking tobacco, generating smoke during cooking, or using

fireplaces or heating appliances in their homes.

If families use naphthalene-containing moth repellents, the material should be enclosed in containers that prevent vapors from escaping, and kept out of the reach from children.

Blankets and clothing stored with naphthalene moth repellents should be aired outdoors to remove naphthalene odors and washed before they are used.

Families should inform themselves of the contents of air deodorizers that are used in their homes and refrain from using deodorizers with naphthalene.

### **Is there a medical test to determine whether I've been exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?**

Tests are available that measure levels of these chemicals and their breakdown products in samples of urine, feces, blood, maternal milk, or body fat. These tests are not routinely available in a doctor's office because they require special equipment, but samples can be sent to special testing laboratories. These tests cannot determine exactly how much naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene you were exposed to or predict whether harmful effects will occur. If the samples are collected within a day or two of exposure, then the tests can show if you were exposed to a large or small amount of naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene.

### **Has the federal government made recommendations to protect human health?**

The EPA recommends that children not drink water with over 0.5 parts per million (0.5 ppm) naphthalene for more than 10 days or over 0.4 ppm for any longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime (70 years), the EPA suggests that it contain no more than 0.1 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for the level of naphthalene in workplace air during an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) considers more than 500 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to impair a worker's ability to leave a contaminate area and therefore, results in permanent health problems or death.

### **References**

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about methyl *tert*-butyl ether (MTBE). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Methyl *tert*-butyl ether (MTBE) is a flammable liquid which is used as an additive in unleaded gasoline. Drinking or breathing MTBE may cause nausea, nose and throat irritation, and nervous system effects. MTBE has been found in at least 11 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What is methyl *tert*-butyl ether?

(Pronounced məth'əl tūr'shē-ēr'ē byōōt'l ē'thər)

Methyl *tert*-butyl ether (MTBE) is a flammable liquid with a distinctive, disagreeable odor. It is made from blending chemicals such as isobutylene and methanol, and has been used since the 1980s as an additive for unleaded gasolines to achieve more efficient burning.

MTBE is also used to dissolve gallstones. Patients treated in this way have MTBE delivered directly to their gall bladders through special tubes that are surgically inserted.

### What happens to MTBE when it enters the environment?

- MTBE quickly evaporates from open containers and surface water, so it is commonly found as a vapor in the air.
- Small amounts of MTBE may dissolve in water and get into underground water.
- It remains in underground water for a long time.

- MTBE may stick to particles in water, which will cause it to eventually settle to the bottom sediment.
- MTBE may be broken down quickly in the air by sunlight.
- MTBE does not build up significantly in plants and animals.

### How might I be exposed to MTBE?

- Touching the skin or breathing contaminated air while pumping gasoline.
- Breathing exhaust fumes while driving a car.
- Breathing air near highways or in cities.
- Drinking, swimming, or showering in water that has been contaminated with MTBE.
- Receiving MTBE treatment for gallstones.

### How can MTBE affect my health?

Breathing small amounts of MTBE for short periods may cause nose and throat irritation. Some people exposed to MTBE while pumping gasoline, driving their cars, or working

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in gas stations have reported having headaches, nausea, dizziness, and mental confusion. However, the actual levels of exposure in these cases are unknown. In addition, these symptoms may have been caused by exposure to other chemicals.

There are no data on the effects in people of drinking MTBE. Studies with rats and mice suggest that drinking MTBE may cause gastrointestinal irritation, liver and kidney damage, and nervous system effects.

### How likely is MTBE to cause cancer?

There is no evidence that MTBE causes cancer in humans. One study with rats found that breathing high levels of MTBE for long periods may cause kidney cancer. Another study with mice found that breathing high levels of MTBE for long periods may cause liver cancer.

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified MTBE as to its carcinogenicity.

### Is there a medical test to show whether I've been exposed to MTBE?

MTBE and its breakdown product, butyl alcohol, can be detected in your breath, blood, or urine for up to 1 or 2 days after exposure. These tests aren't available at most doctors' offices, but can be done at special laboratories that have the right equipment. There is no other test specific to determining MTBE exposure.

### Has the federal government made recommendations to protect human health?

The EPA has issued guidelines recommending that, to protect children, drinking water levels of MTBE not exceed 4 milligrams per liter of water (4 mg/L) for an exposure of 1-10 days, and 3 mg/L for longer-term exposures.

The American Conference of Governmental Industrial Hygienists (ACGIH) has recommended an exposure limit of 40 parts of MTBE per million parts of air (40 ppm) for an 8-hour workday, 40-hour workweek.

### Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or gas.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

### References

This ToxFAQs information is taken from the 1996 Toxicological Profile for Methyl *tert*-Butyl Ether produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about fuel oils. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**SUMMARY: Fuel oils are liquid mixtures produced from petroleum, and their use mostly involves burning them as fuels. Drinking or breathing fuel oils may cause nausea or nervous system effects. However, exposure under normal use conditions is not likely to be harmful. Fuel oils have been found in at least 26 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What are fuel oils?

(Pronounced fyoo'el oilz)

Fuel oils are a variety of yellowish to light brown liquid mixtures that come from crude petroleum. Some chemicals found in fuel oils may evaporate easily, while others may more easily dissolve in water.

Fuel oils are produced by different petroleum refining processes, depending on their intended uses. Fuel oils may be used as fuel for engines, lamps, heaters, furnaces, and stoves, or as solvents.

Some commonly found fuel oils include kerosene, diesel fuel, jet fuel, range oil, and home heating oil. These fuel oils differ from one another by their hydrocarbon compositions, boiling point ranges, chemical additives, and uses.

## What happens to fuel oils when they enter the environment?

- Some chemicals found in fuel oils may evaporate into the air from open containers or contaminated soil or water.
- Some chemicals found in fuel oils may dissolve in water after spills to surface waters or leaks from underground storage tanks.

- Some chemicals found in fuel oils may stick to particles in water, which will eventually cause them to settle to the bottom sediment.
- Some of the chemicals found in fuel oils may be broken down slowly in air, water, and soil by sunlight or small organisms.
- Some of the chemicals found in fuel oils may build up significantly in plants and animals.

## How might I be exposed to fuel oils?

- Using a home kerosene heater or stove, or using fuel oils at work.
- Breathing air in home or building basements that has been contaminated with fuel oil vapors entering from the soil.
- Drinking or swimming in water that has been contaminated with fuel oils from a spill or a leaking underground storage tank.
- Touching soil contaminated with fuel oils.
- Using fuel oils to wash paint or grease from skin or equipment.

## How can fuel oils affect my health?

Little information is available about the health effects that may be caused by fuel oils. People who use kerosene

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stoves for cooking do not seem to have any health problems related to their exposure.

Breathing some fuel oils for short periods may cause nausea, eye irritation, increased blood pressure, headache, lightheadedness, loss of appetite, poor coordination, and difficulty concentrating. Breathing diesel fuel vapors for long periods may cause kidney damage and lower your blood's ability to clot.

Drinking small amounts of kerosene may cause vomiting, diarrhea, coughing, stomach swelling and cramps, drowsiness, restlessness, painful breathing, irritability, and unconsciousness. Drinking large amounts of kerosene may cause convulsions, coma, or death. Skin contact with kerosene for short periods may cause itchy, red, sore, or peeling skin.

### How likely are fuel oils to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that some fuel oils (heavy) may possibly cause cancer in humans, but for other fuel oils (light) there is not enough information to make a determination. IARC has also determined that occupational exposures to fuel oils during petroleum refining are probably carcinogenic in humans.

Some studies with mice have suggested that repeated contact with fuel oils may cause liver or skin cancer. However, other mouse studies have found this not to be the case. No studies are available in other animals or in people on the carcinogenic effects of fuel oils.

### Is there a medical test to show whether I've been exposed to fuel oils?

There is no medical test that shows if you have been exposed to fuel oils. Tests are available to determine if some of

the chemicals commonly found in fuel oils are in your blood. However, the presence of these chemicals in blood may not necessarily mean that you have been exposed to fuel oils.

### Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) and the Air Force Office of Safety and Health (AFOSH) have set a permissible exposure level (PEL) of 400 parts of petroleum distillates per million parts of air (400 ppm) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that average workplace air levels not exceed 350 milligrams of petroleum distillates per cubic meter of air (350 mg/m<sup>3</sup>) for a 40-hour workweek.

The Department of Transportation (DOT) lists fuel oils as hazardous materials and, therefore, regulates their transportation.

### Glossary

Carcinogenic: Able to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

Hydrocarbon: Any compound made up of hydrogen and carbon.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for fuel oils. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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This fact sheet answers the most frequently asked health questions (FAQs) about xylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What is xylene?

(Pronounced zī'lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

## What happens to xylene when it enters the environment?

- Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- It evaporates quickly from the soil and surface water into the air.

- In the air, it is broken down by sunlight into other less harmful chemicals.
- It is broken down by microorganisms in soil and water.
- Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

## How might I be exposed to xylene?

- Breathing xylene in workplace air or in automobile exhaust.
- Breathing contaminated air.
- Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- Breathing cigarette smoke that has small amounts of xylene in it.
- Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- The amount of xylene in food is likely to be low.

## How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of

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people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

### How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

### Is there a medical test to show whether I've been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

### Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

The EPA requires that spills or accidental releases of xylenes into the environment of 1,000 pounds or more must be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

### Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about toluene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency

### What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

### What happens to toluene when it enters the environment?

Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petroleum products as well as from leaking underground storage tanks at gasoline stations and other facilities.

When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.

Toluene does not usually stay in the environment long.

Toluene does not concentrate or buildup to high levels in animals.

### How might I be exposed to toluene?

Breathing contaminated workplace air or automobile exhaust.

Working with gasoline, kerosene, heating oil, paints, and lacquers.

Drinking contaminated well-water.

Living near uncontrolled hazardous waste sites containing toluene products.

### How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levels can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and

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hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

### **How likely is toluene to cause cancer?**

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

### **How can toluene affect children?**

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults. Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

### **How can families reduce the risk of exposure to toluene?**

- Use toluene-containing products in well-ventilated areas.

- When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

### **Is there a medical test to show whether I've been exposed to toluene?**

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

### **Has the federal government made recommendations to protect human health?**

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

### **References**

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ī-sī'klīk ār'ə-măt'īk hī'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

## What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.

- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

## How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smoke-houses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

- ❑ Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

### How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

### How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

### Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any

health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

### Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air ( $0.2 \text{ mg/m}^3$ ). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is  $5 \text{ mg/m}^3$  averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed  $0.1 \text{ mg/m}^3$  for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

### Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What is ethylbenzene?

(Pronounced ěth' əl bĕn' zĕn')

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

### What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- In soil, it is broken down by soil bacteria.

### How might I be exposed to ethylbenzene?

- Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- Drinking contaminated tap water.
- Working in an industry where ethylbenzene is used or made.
- Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

### How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

### How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classified as to human carcinogenicity.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

### **How can ethylbenzene affect children?**

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

### **How can families reduce the risk of exposure to ethylbenzene?**

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

### **Is there a medical test to show whether I've been exposed to ethylbenzene?**

Ethylbenzene is found in the blood, urine, breath, and

some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

### **Has the federal government made recommendations to protect human health?**

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

### **References**

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What is benzene?

(Pronounced bĕn'zĕn')

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

## What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.

- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

## How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposures is tobacco smoke.

## How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

### **How likely is benzene to cause cancer?**

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

### **Is there a medical test to show whether I've been exposed to benzene?**

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

### **Has the federal government made recommendations to protect human health?**

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mg/L). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

### **Glossary**

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

### **References**

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

### What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

### What happens to barium when it enters the environment?

- Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
- The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
- Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.

Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).

Fish and aquatic organisms can accumulate barium.

### How might I be exposed to barium?

- Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
- Living in areas with unusually high natural levels of barium in the drinking water.
- Working in a job that involves barium production or use.
- Living or working near waste sites where barium has been disposed of.

### How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

### How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

### How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

### How can families reduce the risks of exposure to barium?

The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

### Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.44 µg/g creatinine (measured in urine).

### Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m<sup>3</sup>) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m<sup>3</sup> of total dust and 5 mg/m<sup>3</sup> for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m<sup>3</sup> for soluble barium compounds. The NIOSH has set RELs of 10 mg/m<sup>3</sup> (total dust) for barium sulfate and 5 mg/m<sup>3</sup> (respirable fraction).

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



**APPENDIX B**  
**REPORT FORMS**

## WEEKLY SAFETY REPORT FORM

Week Ending: \_\_\_\_\_ Project Name/Number: \_\_\_\_\_

Report Date: \_\_\_\_\_ Project Manager Name: \_\_\_\_\_

Summary of any violations of procedures occurring that week:

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Summary of any job related injuries, illnesses, or near misses that week:

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Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

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Comments:

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Name: \_\_\_\_\_ Company: \_\_\_\_\_

Signature: \_\_\_\_\_ Title: \_\_\_\_\_



**INJURED - ILL:**

Name: \_\_\_\_\_ SSN: \_\_\_\_\_

Address: \_\_\_\_\_ Age: \_\_\_\_\_

Length of Service: \_\_\_\_\_ Time on Present Job: \_\_\_\_\_

Time/Classification: \_\_\_\_\_

**SEVERITY OF INJURY OR ILLNESS:**

\_\_\_ Disabling                      \_\_\_ Non-disabling                      \_\_\_ Fatality

\_\_\_ Medical Treatment                      \_\_\_ First Aid Only

**ESTIMATED NUMBER OF DAYS AWAY FROM JOB:** \_\_\_\_\_

**NATURE OF INJURY OR ILLNESS:** \_\_\_\_\_

**CLASSIFICATION OF INJURY:**

- |                    |                       |                            |
|--------------------|-----------------------|----------------------------|
| ___ Abrasions      | _____ Dislocations    | _____ Punctures            |
| ___ Bites          | _____ Faint/Dizziness | _____ Radiation Burns      |
| ___ Blisters       | _____ Fractures       | _____ Respiratory Allergy  |
| ___ Bruises        | _____ Frostbite       | _____ Sprains              |
| ___ Chemical Burns | _____ Heat Burns      | _____ Toxic Resp. Exposure |
| ___ Cold Exposure  | _____ Heat Exhaustion | _____ Toxic Ingestion      |
| ___ Concussion     | _____ Heat Stroke     | _____ Dermal Allergy       |
| ___ Lacerations    |                       |                            |

Part of Body Affected: \_\_\_\_\_

Degree of Disability: \_\_\_\_\_

Date Medical Care was Received: \_\_\_\_\_

Where Medical Care was Received: \_\_\_\_\_

Address (if off-site): \_\_\_\_\_

(If two or more injuries, record on separate sheets)

**PROPERTY DAMAGE:**

Description of Damage: \_\_\_\_\_

Cost of Damage:                   \$ \_\_\_\_\_

**ACCIDENT/INCIDENT LOCATION:** \_\_\_\_\_

**ACCIDENT/INCIDENT ANALYSIS:** Causative agent most directly related to accident/incident  
(Object, substance, material, machinery, equipment, conditions)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was weather a factor?: \_\_\_\_\_

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

\_\_\_\_\_  
\_\_\_\_\_

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

\_\_\_\_\_

**ON-SITE ACCIDENTS/INCIDENTS:**

Level of personal protection equipment required in Site Safety Plan:

\_\_\_\_\_

Modifications:

Was injured using required equipment?:

\_\_\_\_\_

If not, how did actual equipment use differ from plan?:

\_\_\_\_\_  
\_\_\_\_\_

**ACTION TAKEN TO PREVENT RECURRENCE:** (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?)

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---

**ACCIDENT/INCIDENT REPORT REVIEWED BY:**

\_\_\_\_\_  
SSO Name Printed

\_\_\_\_\_  
SSO Signature

**OTHERS PARTICIPATING IN INVESTIGATION:**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

**ACCIDENT/INCIDENT FOLLOW-UP:**    Date: \_\_\_\_\_

Outcome of accident/incident: \_\_\_\_\_

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Physician's recommendations: \_\_\_\_\_

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Date injured returned to work: \_\_\_\_\_

Follow-up performed by: \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

**ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM**

**APPENDIX C**  
**EMERGENCY HAND SIGNALS**

## EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communications is not available, the following air-horn and/or hand signals will be used:

### EMERGENCY HAND SIGNALS

**OUT OF AIR, CAN'T BREATHE!**



**Hand gripping throat**

**LEAVE AREA IMMEDIATELY,  
NO DEBATE!**

( No Picture) Grip partner's wrist or place both hands around waist

**NEED ASSISTANCE!**



**Hands on top of head**

**OKAY! – I'M ALL RIGHT!**

**- I UNDERSTAND!**



**Thumbs up**

**NO! - NEGATIVE!**



**Thumbs down**

## **APPENDIX 5**

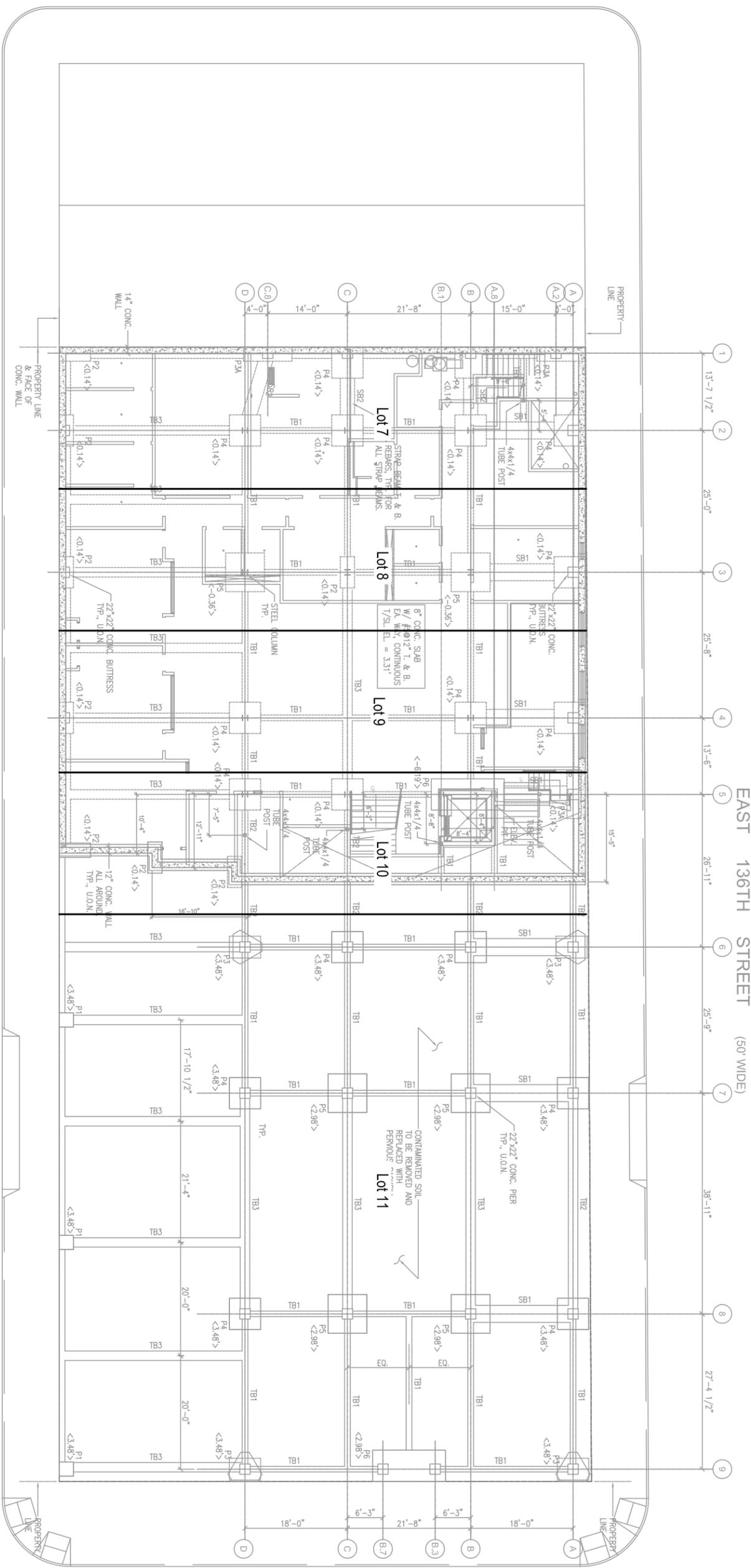
### **PROPOSED DEVELOPMENT PLANS**





AKRF ENGINEERING, P.C.  
 440 PARK AVENUE SOUTH  
 NEW YORK, NY 10016  
 (212) 696-0670 (PHONE)  
 (212) 726-0942 (FAX)

THIRD AVENUE (WIDE)



EAST 135TH STREET (WIDE)

EAST 136TH STREET (50' WIDE)

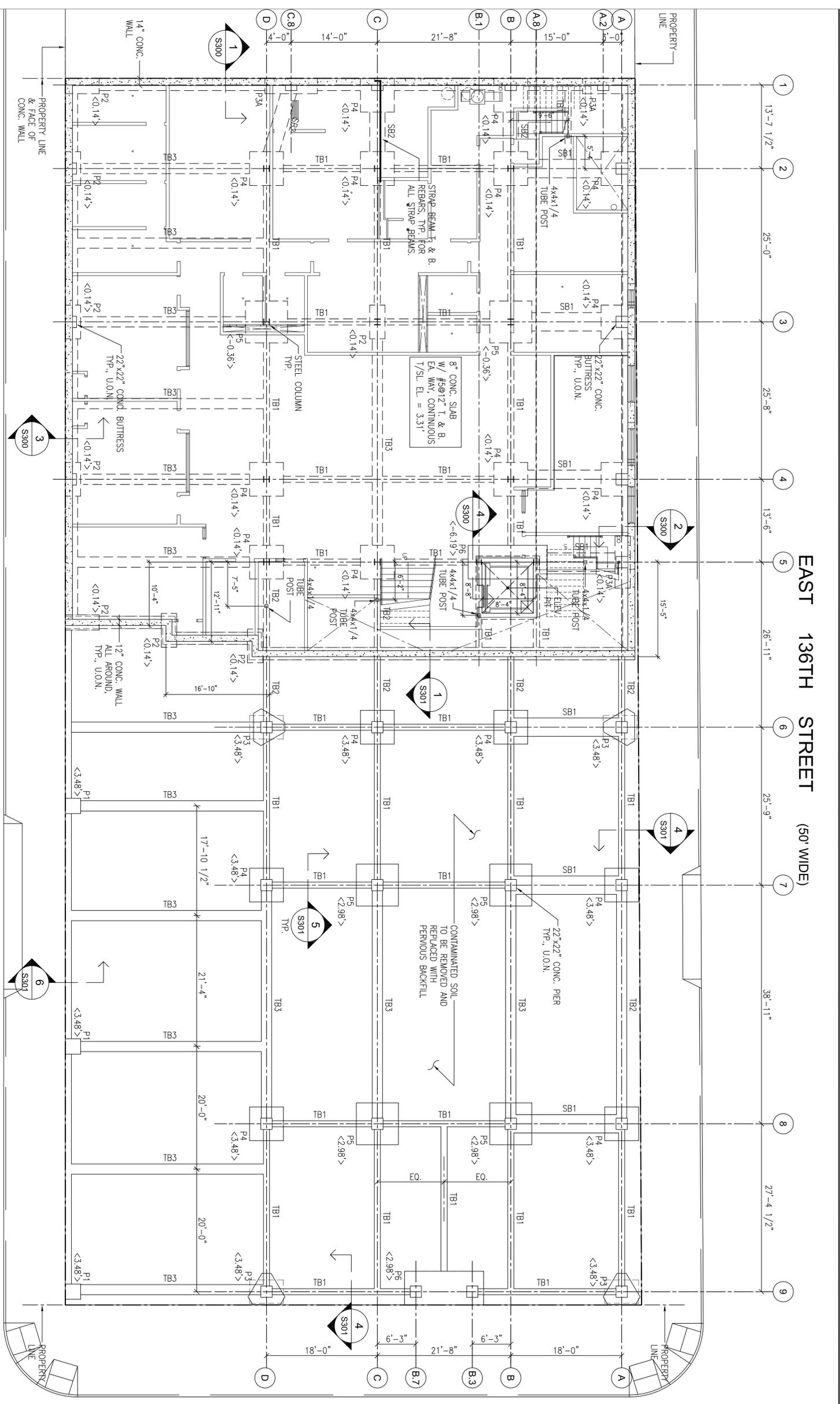


- NOTES:
- ALL PILES SHALL BE 10" ROUND STEEL PIPES (GRADE A58) OF 60-TON CAPACITY (MIN) FILL ALL PILES WITH 4000 PSI CONCRETE AND PROVIDE 1-#11 x 20'-0" REBAR @ TOP OF PILE TYP.
  - ALL CONCRETE SHALL BE NORMAL WEIGHT (WITH TYPE II CEMENT) HAVING A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI @ 28 DAYS. REBARS SHALL BE GRADE 60 EPOXY COATED REBARS CONFORMING TO ASTM-A775.
  - FOR GENERAL NOTES AND TYPICAL DETAILS, SEE DWG. S-200 TO S-204.
  - FOR PILE CAPS DETAILS, SEE DWG. S-201.
  - FOR PILING INFORMATION, CONSULT WITH GEOTECHNICAL ENGINEER AND SEE GENERAL NOTES ON DWG. S-200.
  - < > PILE CAP ELEVATIONS.

- PROJECT NOTES:
- CONTRACTOR MUST SUBMIT THE FOLLOWING SHOP DWGS. TO ENGINEER OF RECORD FOR REVIEW AND APPROVAL. THE ENGINEER OF RECORD WILL NOT BE HELD RESPONSIBLE FOR THE STRUCTURAL INTEGRITY AND STABILITY OF THE BUILDING IF THE OWNER/CONTRACTOR CHOOSES TO PLACE REBARS, POUR CONCRETE AND ERECT STRUCTURAL STEEL PRIOR TO SHOP DRAWING APPROVAL.
    - A. FOUNDATION REBARS DWGS.
    - B. FOUNDATIONAL STEEL (INCLUDING JOB STANDARDS).
    - C. STEEL DECK.
    - D. CONCRETE MIXES.
  - EXCAVATION SHORING SHALL BE CONTRACTOR'S SOLE RESPONSIBILITY. CONTRACTOR SHALL HIRE A NYS LICENSED ENGINEER TO DESIGN THE SHORING SYSTEM AND PREPARE NECESSARY DWGS. ALL FOUNDATION LOADS, SOIL PRESSURES - STATIC AND SEISMIC, ADVACENT BUILDING LOADS AND SURCHARGES SHALL BE CONSIDERED WHEN DESIGNING THE SHORING SYSTEM.
  - PRIOR TO START OF CONSTRUCTION WORK, THE OWNER/ CONTRACTORS SHALL FULLY COORDINATE WITH ALL TRADES : ARCHITECTURAL, STRUCTURAL, MEP AND ELEVATOR. ANY DISCREPANCIES FOUND SHALL BE BROUGHT TO ATTENTION OF THE DESIGN TEAM IMMEDIATELY.

PROJECT	
2477 THIRD AVENUE BRONX, NY	
DRAWN BY	CHECKED BY
JS	AS
SCALE	DATE
APPX. 1" = 20'	03/07/11
SHEET TITLE	
SITE PLAN	
SHEET NO.	
2	

No.	DATE	DESCRIPTION
1	PROGRESS SET,	NOT FOR CONSTRUCTION
	JUL. 23, 2010	



**EAST 135TH STREET (WIDE) CELLAR PLAN**

NOTES:

- ALL PILES SHALL BE 10" ROUND STEEL PIPES (GRADE A36) OF 60-TON CAPACITY (MIN). FILL ALL PIPES WITH 4000 PSI CONCRETE AND PROVIDE 1-#11 x 20'-0" REBAR @ TOP OF PILE, TYP.
- ALL CONCRETE SHALL BE NORMAL WEIGHT (WITH TYPE II CEMENT) HAVING A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI @ 28 DAYS. REBARS FOR PILE CAPS, GRADE BEAMS, AND DOWNELS SHALL BE GRADE 60, EPOXY COATED REBARS CONFORMING TO ASTM-A775.
- FOR GENERAL NOTES AND TYPICAL DETAILS, SEE DWG. S-200 TO S-204.
- FOR PILE CAPS DETAILS, SEE DWG. S-201.
- FOR PILING INFORMATION, CONSULT WITH GEOTECHNICAL ENGINEER AND SEE GENERAL NOTES ON DWG. S-200.
- THUS SHOWN INDICATES BOTTOM OF PILE CAP ELEVATIONS.



**PROJECT NOTES:**

- CONTRACTOR MUST SUBMIT THE FOLLOWING SHOP DWGS. TO ENGINEER OF RECORD FOR REVIEW AND APPROVAL. THE ENGINEER OF RECORD WILL NOT BE HELD RESPONSIBLE FOR THE STRUCTURAL INTEGRITY AND STABILITY OF THE BUILDING IF THE OWNER/CONTRACTOR CHOOSES TO PLACE REBARS, POUR CONCRETE AND ERECT STRUCTURAL STEEL PRIOR TO SHOP DRAWING APPROVAL.
  - FOUNDATION REBARS DWGS.
  - STRUCTURAL STEEL (INCLUDING JOB STANDARDS)
  - STEEL DECK.
  - CONCRETE MIXES.
- EXCAVATION SHORING SHALL BE CONTRACTOR'S SOLE RESPONSIBILITY. CONTRACTOR SHALL HIRE A NYS LICENSED ENGINEER TO DESIGN THE SHORING SYSTEM AND PREPARE NECESSARY DWGS. ALL FOUNDATION LOADS, SOIL PRESSURES - STATIC AND SEISMIC, ADJACENT BUILDING LOADS AND SURCHARGES SHALL BE CONSIDERED WHEN DESIGNING THE SHORING SYSTEM.
- PRIOR TO START OF CONSTRUCTION WORK, THE OWNER/ CONTRACTORS SHALL FULLY COORDINATE WITH ALL TRADES: ARCHITECTURAL, STRUCTURAL, MEP AND ELEVATOR. ANY DISCREPANCIES FOUND SHALL BE BROUGHT TO ATTENTION OF THE DESIGN TEAM IMMEDIATELY.

**THIRD AVENUE (WIDE)**

**WAI-LEUNG NG, P.E.**  
Structural Engineer  
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Tel: (917) 518-3236 Fax: (718) 654-0016  
N.Y.C. DOB. NO. :  
**220041684**

**PROJECT:**  
COMFORT INN & SUITE  
2477 THIRD AVENUE  
BRONX, NY

**CELLAR PLAN**

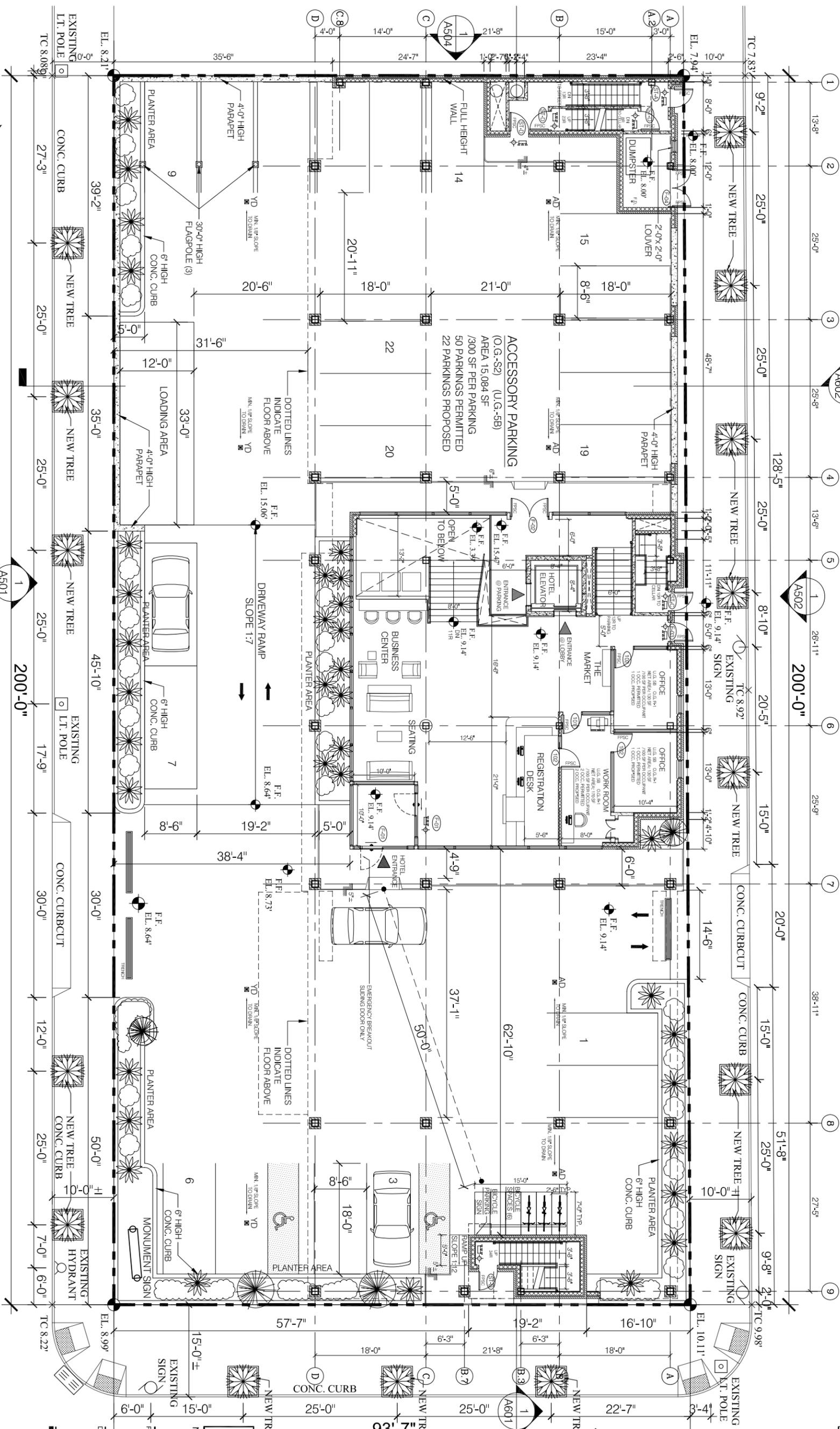
SCALE: 1/8" = 1'-0"

**ARCHITECTS • PLANNERS**  
RAYMOND CHAN  
136-40 38TH AVENUE  
FLUSHING, NEW YORK 11354  
Tel: (718) 445-2345 Fax: (718) 359-8009  
Email: info@raymondchanarchitect.com  
www.raymondchanarchitect.com

DATE: 05/28/2010 DWG. NO.:  
PROJECT NO.: 2896  
PROJECT MANAGER: RN  
DRAWN BY:  
CADD FILE NO.:  
2477 THIRD AVENUE (2848)

**S-101.00**

No.	DATE	DESCRIPTION



EAST 135TH STREET (WIDE)

EAST 136TH STREET (50' WIDE)



THIRD AVENUE (WIDE)

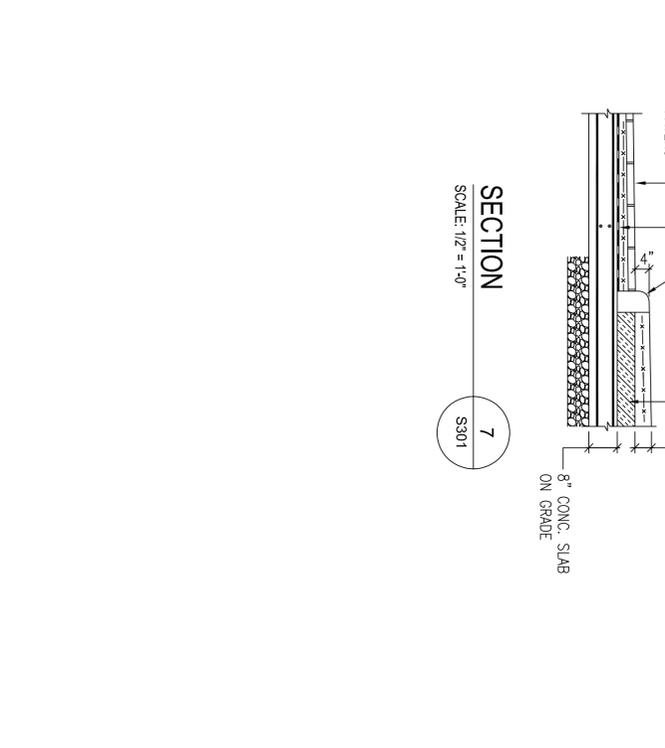
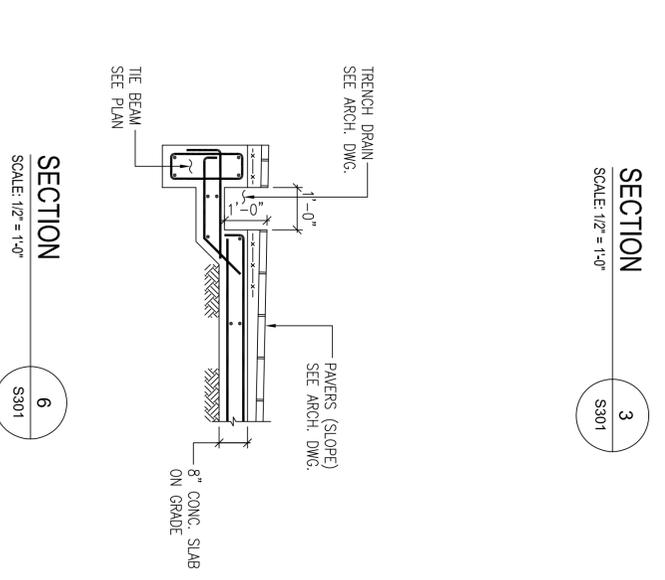
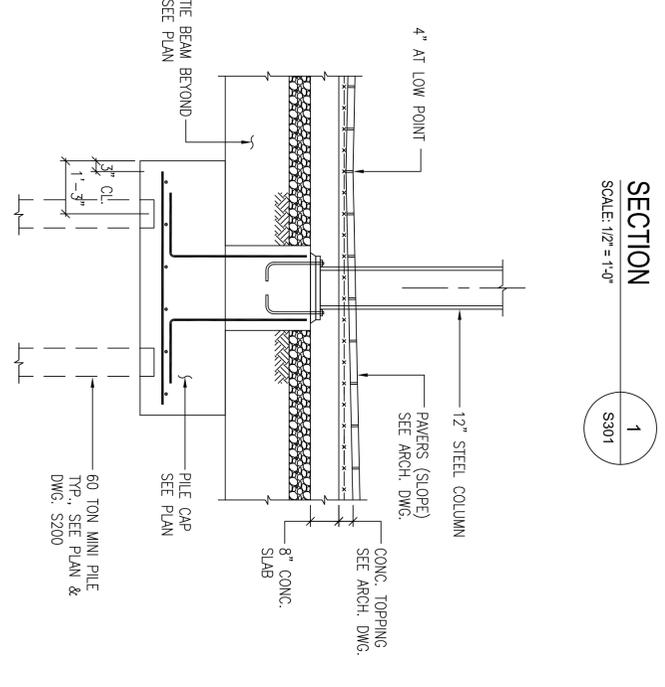
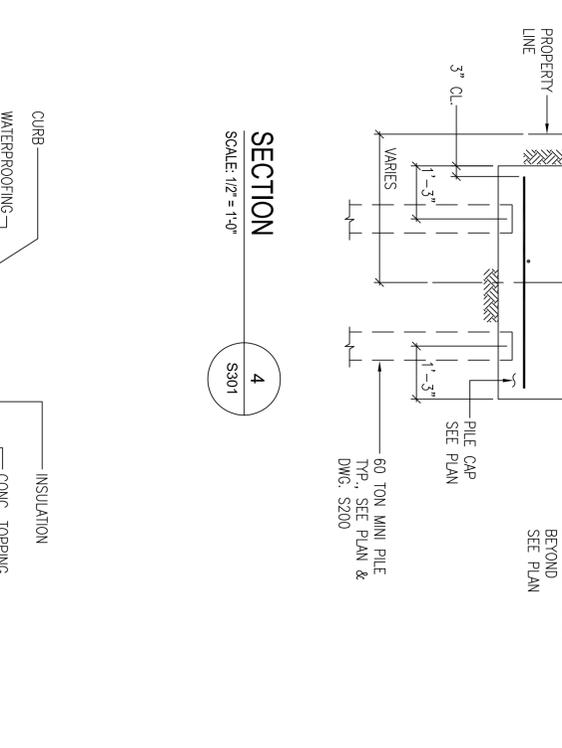
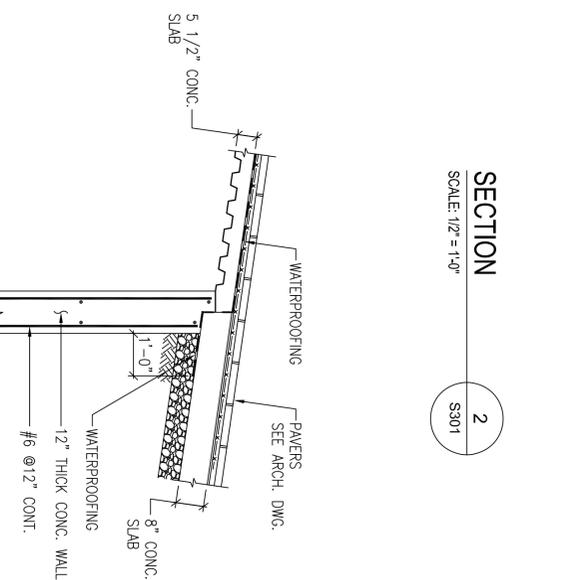
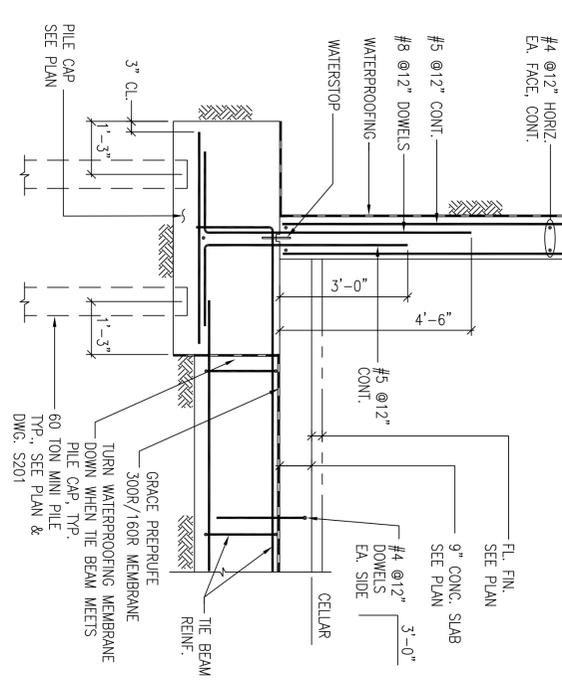
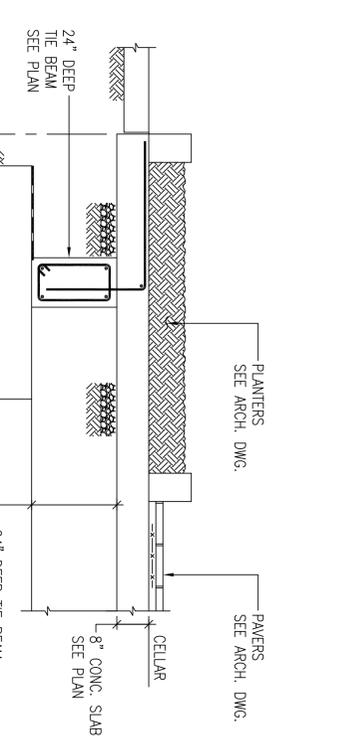
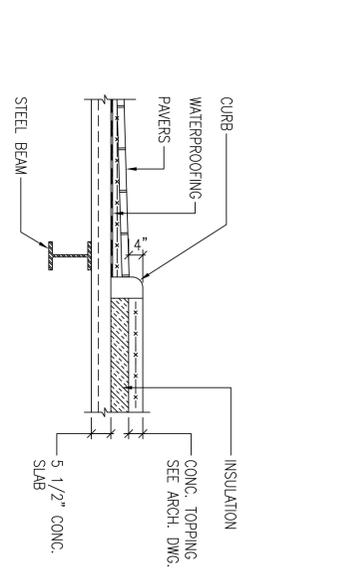
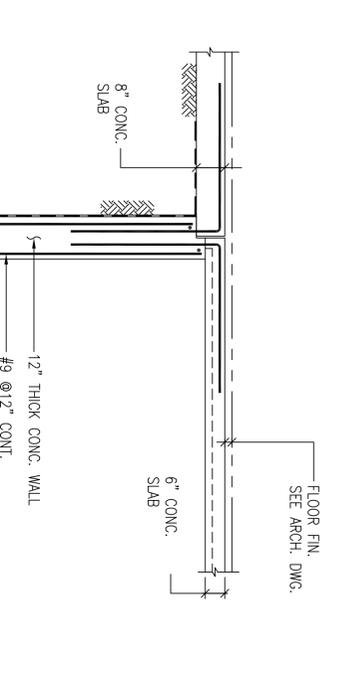
PROJECT:  
COMFORT INN & SUITE  
2477 THIRD AVENUE  
BRONX, NY  
220041684  
N.Y.C. DOB. NO. :  
DATE: 07/22/2010  
PROJECT MANAGER: RCK  
DRAWN BY: A-102.00  
CADD FILE NO.: 09-OF-23

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.

RAYMOND C. HANSEN ARCHITECT

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No.	DATE	DESCRIPTION
PROGRESS SET,		NOT FOR CONSTRUCTION
	JUL. 23, 2010	



SECTION 5  
SCALE: 1/2" = 1'-0"

SECTION 6  
SCALE: 1/2" = 1'-0"

SECTION 7  
SCALE: 1/2" = 1'-0"

SECTION 8  
SCALE: 1/2" = 1'-0"

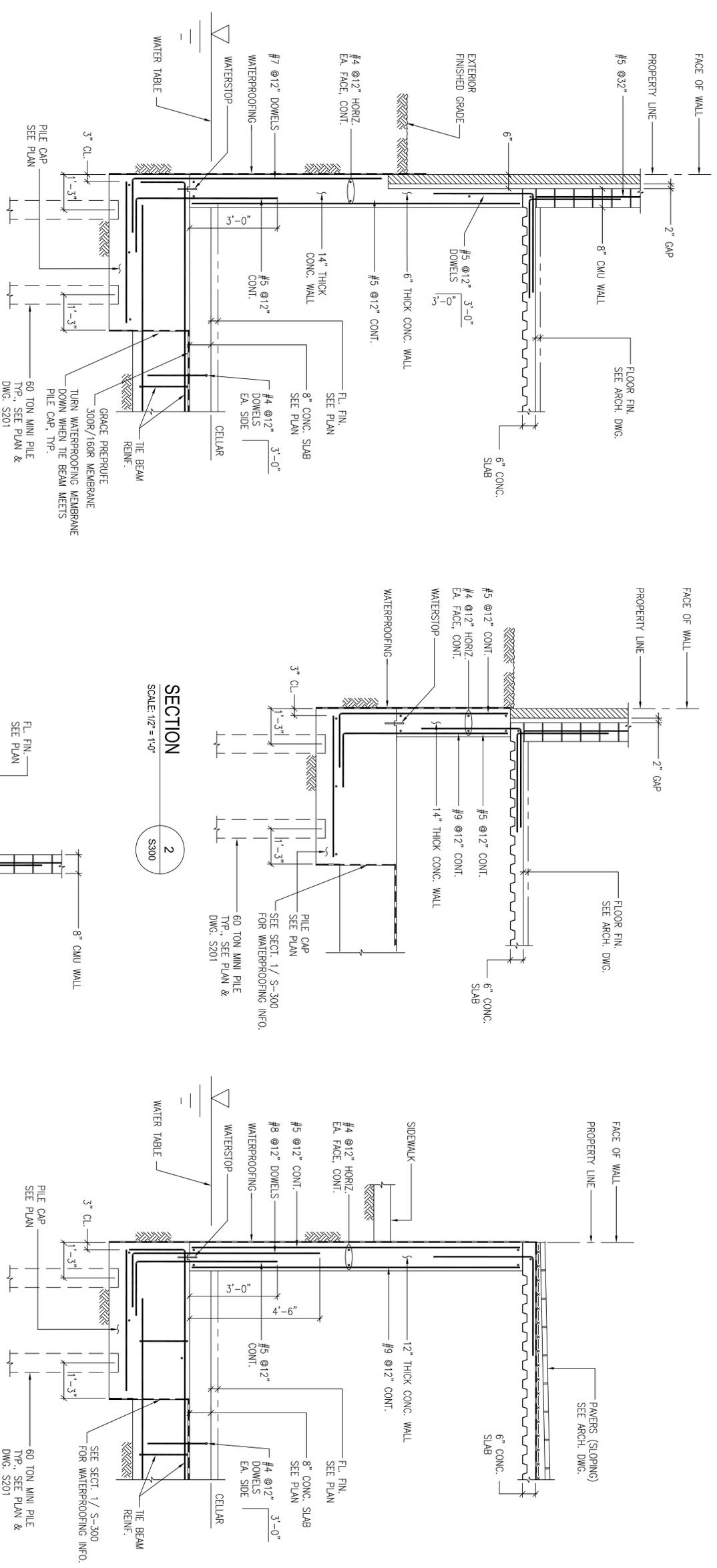
PROJECT: COMFORT INN & SUITE  
2477 THIRD AVENUE  
BRONX, NY

WAI-LEUNG NG, P.E.  
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N.Y.C. D.O.B. NO. : 220041684

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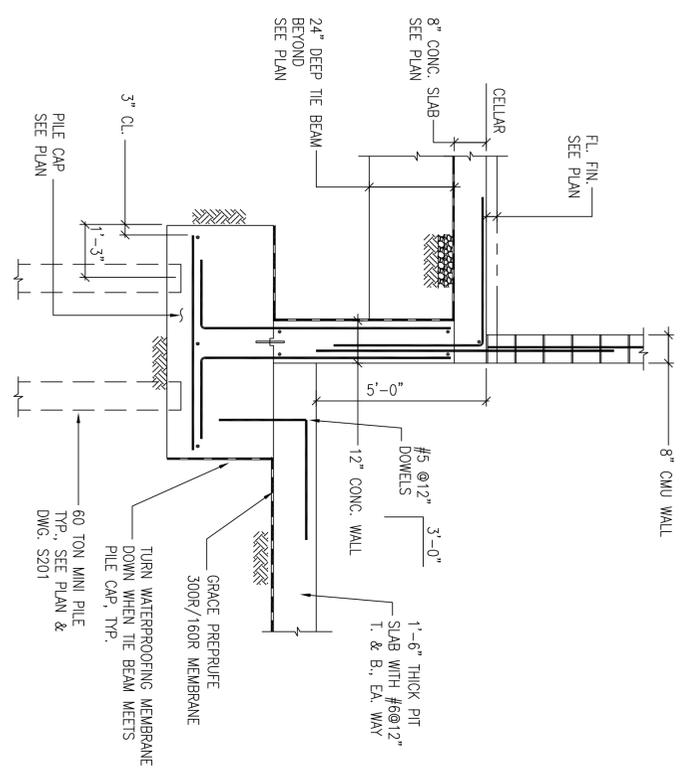
DATE: 05/28/2010 DWG. NO.: S-301.00  
PROJECT NO.: 2896  
PROJECT MANAGER: RN  
DRAWN BY:  
CADD FILE NO.:  
2477 THIRD AVENUE (2848)

No.	DATE	DESCRIPTION
PROGRESS SET,		NOT FOR CONSTRUCTION
	JUL. 23, 2010	

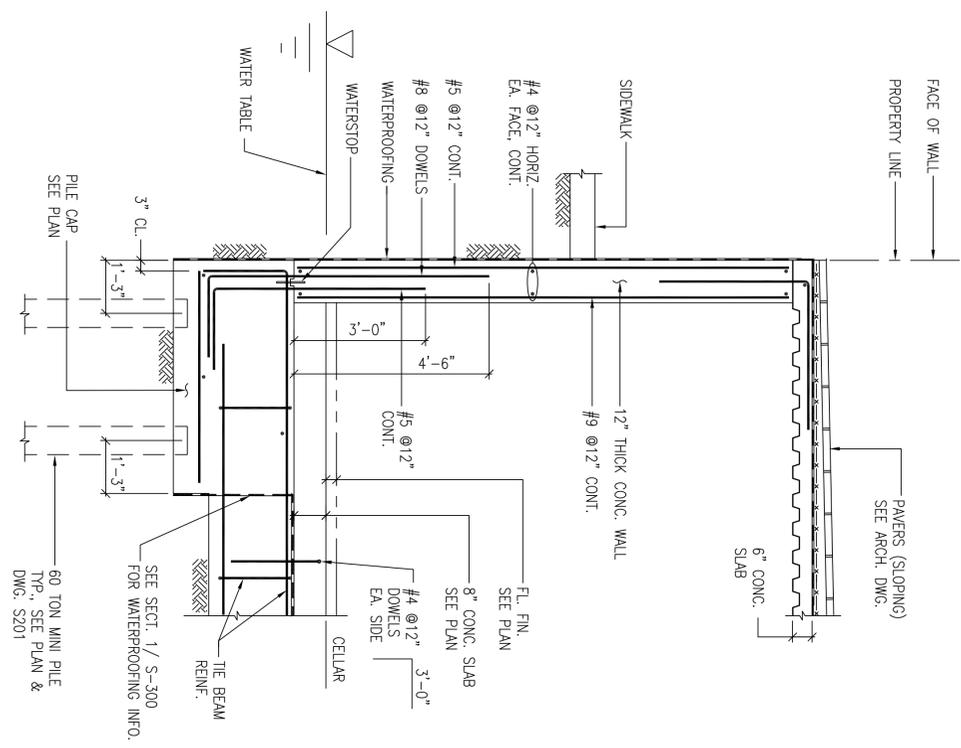


NOTE : WATERPROOFING IS NOT ALLOWED BETWEEN BOTTOM OF CELLAR CONC. SLAB AND TOP OF PILE CAPS/TIE BEAMS.

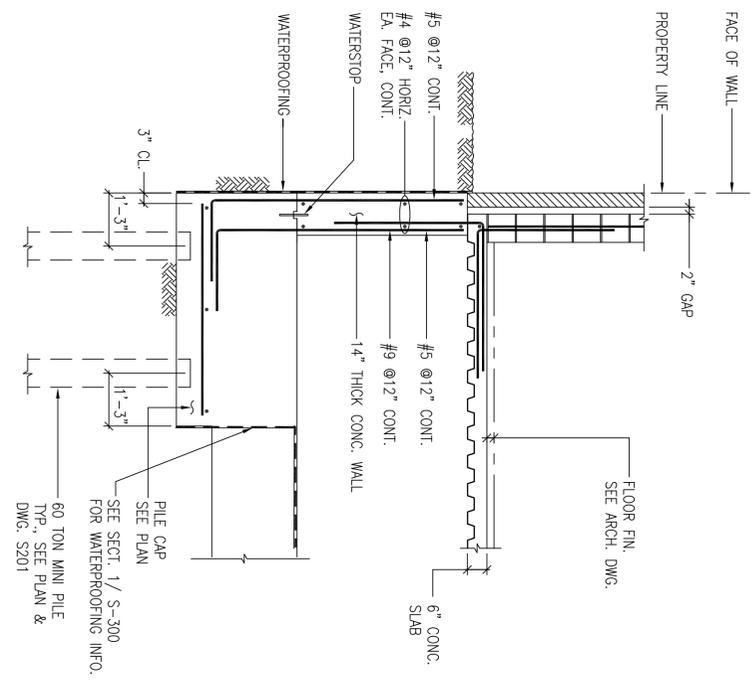
SECTION 4  
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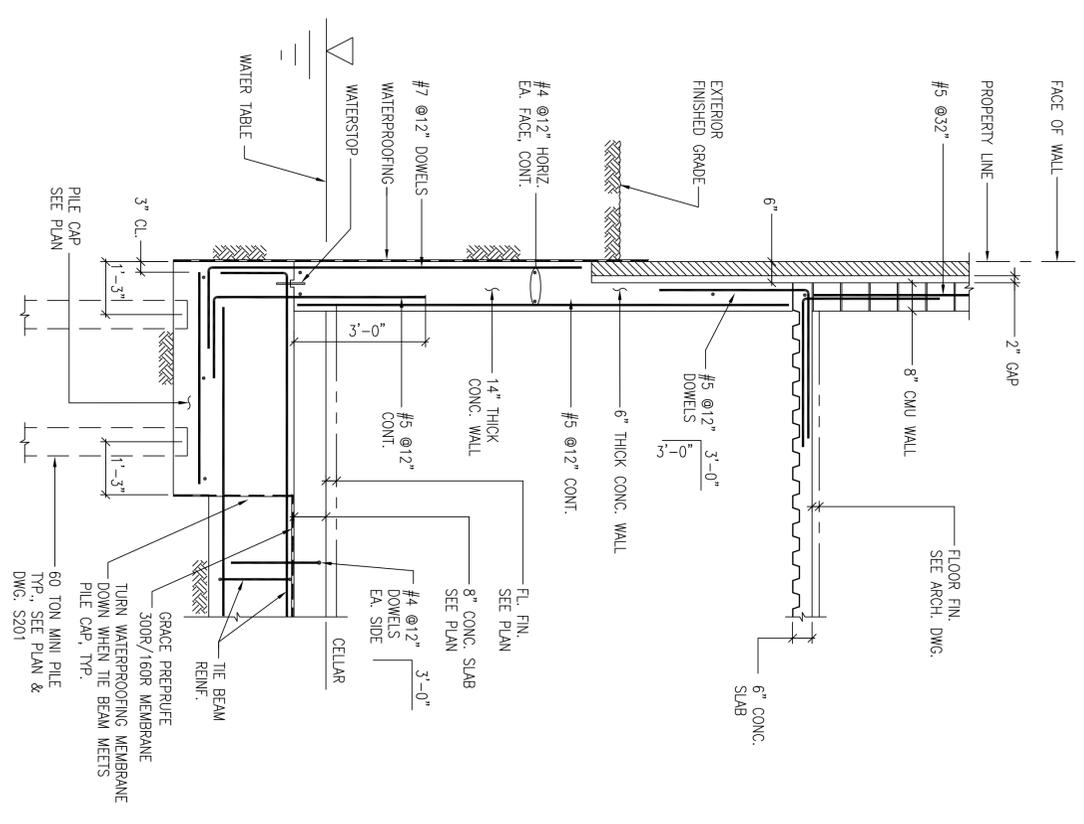
SECTION 3  
SCALE: 1/2" = 1'-0"



SECTION 2  
SCALE: 1/2" = 1'-0"



SECTION 1  
SCALE: 1/2" = 1'-0"



PROJECT:  
**COMFORT INN & SUITE**  
2477 THIRD AVENUE  
BRONX, NY

FOUNDATION SECTIONS 1

WAI-LEUNG NG, P.E.  
Structural Engineer

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N.Y.C. D.O.B. NO. :  
**220041684**

DATE: 05/28/2010  
PROJECT NO.: 2896  
PROJECT MANAGER: RN  
DRAWN BY: S-300.00  
CADD FILE NO.: 2477 THIRD AVENUE (2896)



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**RAYMOND ARCHITECTS PC**

## **APPENDIX 6**

# **DESIGN DIAGRAMS AND SPECIFICATIONS FOR VAPOR BARRIER/WATER PROOFING MEMBRANE AND SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)**

P R O D U C T I N F O R M A T I O N

# Preprufe® 300R & 160R

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

## 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

## 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.

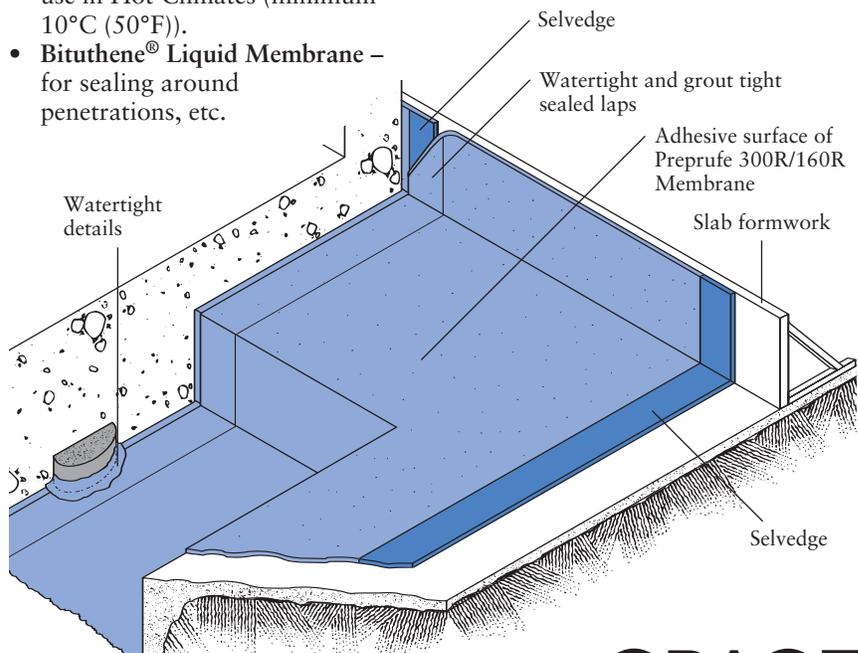
Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe bond to concrete prevents ingress or migration of water around the structure.

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 -4°C (25°F) and +30°C (86°F)).
- **Preprufe Tape HC** – as above for use in Hot Climates (minimum 10°C (50°F)).
- **Bituthene® Liquid Membrane** – for sealing around penetrations, etc.

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

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



## Installation

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

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

For other technical information contact your local Grace representative.

Preprufe 300R & 160R membranes are supplied in rolls 1.2 m (4 ft) 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 12 mm (0.5 in.). Grout around all penetrations such as utility conduits, etc. for stability.

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

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

### Membrane Installation

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

### Horizontal substrates –

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

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

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

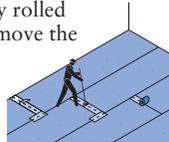
### Vertical substrates –

Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the clear plastic release liner facing towards the concrete pour.

The membrane may be installed in any convenient length. Secure the top of the membrane using a batten such as a termination bar or similar 50 mm (2 in.) below the top edge. Fastening can be made through the selvedge so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner. Any additional fasteners must be covered with a patch of Preprufe Tape.

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



## Details

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

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

## Membrane Repair

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

## Pouring of Concrete

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

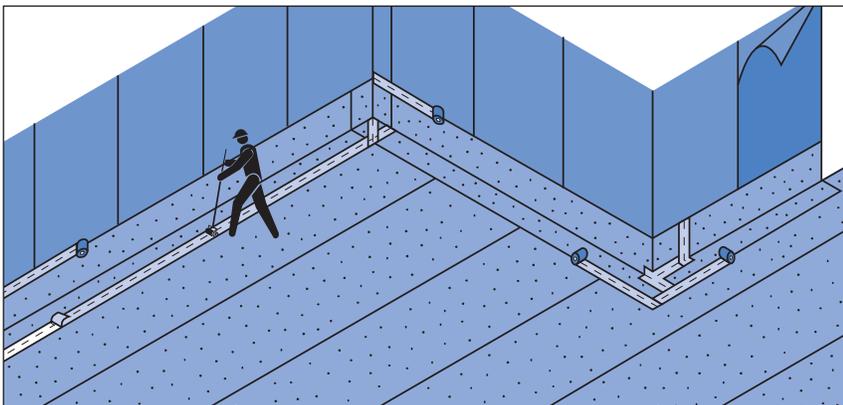
It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

## Removal of Formwork

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

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

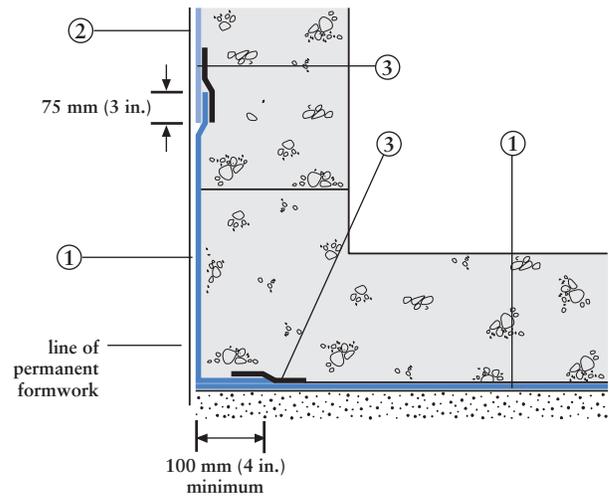
As a guide, to reach the minimum compressive strength stated above, a structural concrete mix with an ultimate strength of 40 N/mm<sup>2</sup> (6000 psi) will typically require a cure time of approximately 6 days at an average ambient temperature of -4°C (25°F), or 2 days at 21°C (70°F).



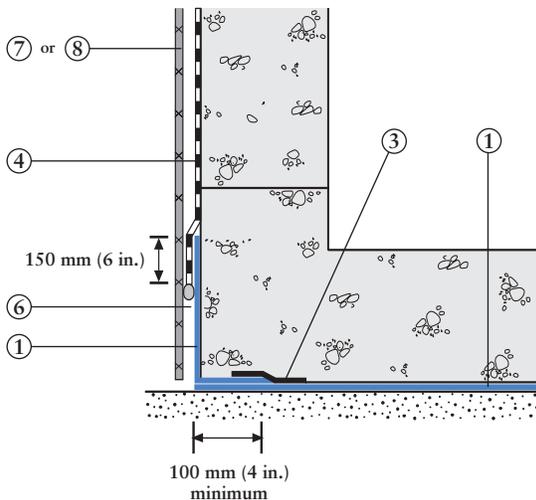
## Detail Drawings

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

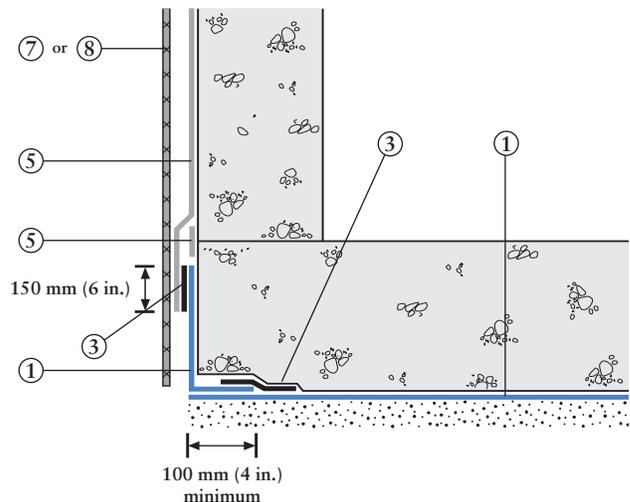
### Wall base detail against permanent shutter



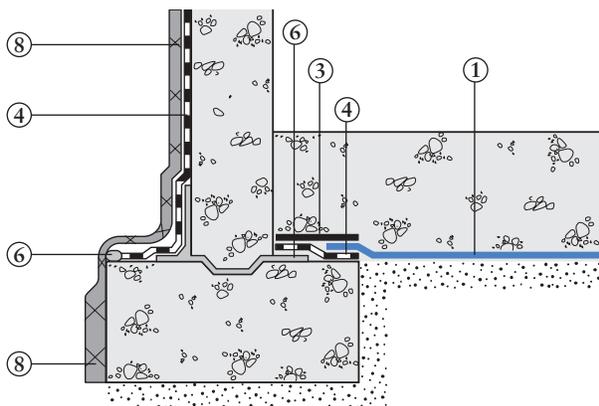
### Bituthene wall base detail (Option 1)



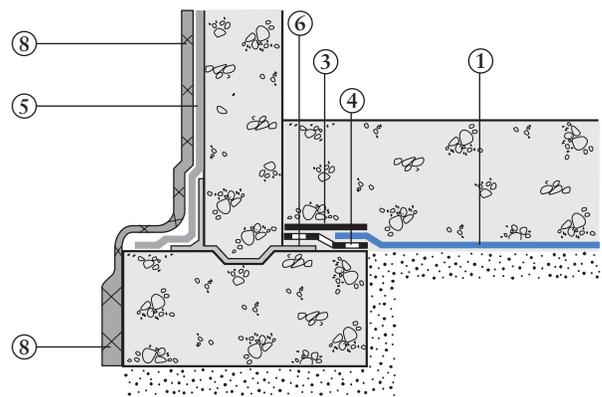
### Procor wall base detail (Option 1)



### Bituthene wall base detail (Option 2)



### Procor wall base detail (Option 2)



1 Preprufe 300R  
2 Preprufe 160R

3 Preprufe Tape  
4 Bituthene

5 Procor  
6 Bituthene Liquid Membrane

7 Protection  
8 Hydroduct®

## Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	1.2 mm (0.046 in.)	0.8 mm (0.032 in.)	
Roll size	1.2 m x 30 m (4 ft x 98 ft)	1.2 m x 35 m (4 ft x 115 ft)	100 mm x 15 m (4 in. x 49 ft)
Roll area	36 m <sup>2</sup> (392 ft <sup>2</sup> )	42 m <sup>2</sup> (460 ft <sup>2</sup> )	
Roll weight	50 kg (108 lbs)	42 kg (92 lbs)	2 kg (4.3 lbs)
Minimum side/end laps	75 mm (3 in.)	75 mm (3 in.)	75 mm (3 in.)

\*LT denotes Low Temperature (between -4°C (25°F) and +30°C (86°F))

HC denotes Hot Climate (>+10°C (50°F))

### Ancillary Products

Bituthene Liquid Membrane – 5.7 liter (1.5 US gal) or 15.1 liter (4 US gal)

## Physical Properties

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

### Footnotes:

- Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 3 mm (0.125 in.) 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 50 mm (2 in.) 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 50 mm (2 in.) 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 50 mm (2 in.) per minute at -4°C (25°F).
- Result is lower limit of apparatus. Membrane therefore considered impermeable.

### Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to

Preprufe 300R/160R. All Preprufe 300R/160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

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

### Health and Safety

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

**For Technical Assistance call toll free at 866-333-3SBM (3726).**

 Visit our web site at [www.graceconstruction.com](http://www.graceconstruction.com)

W. R. Grace & Co.-Conn. 62 Whittemore Avenue Cambridge, MA 02140

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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.

These products may be covered by patents or patents pending.

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FA/LI/4M

**GRACE**  
Construction Products



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 440 PARK AVENUE SOUTH  
 NEW YORK, NY 10016  
 (212) 696-0670 (PHONE)  
 (212) 726-0942 (FAX)

PROJECT  
**2477 THIRD AVENUE**  
**BRONX, NY**

DRAWN BY  
 JS

CHECKED BY  
 AS

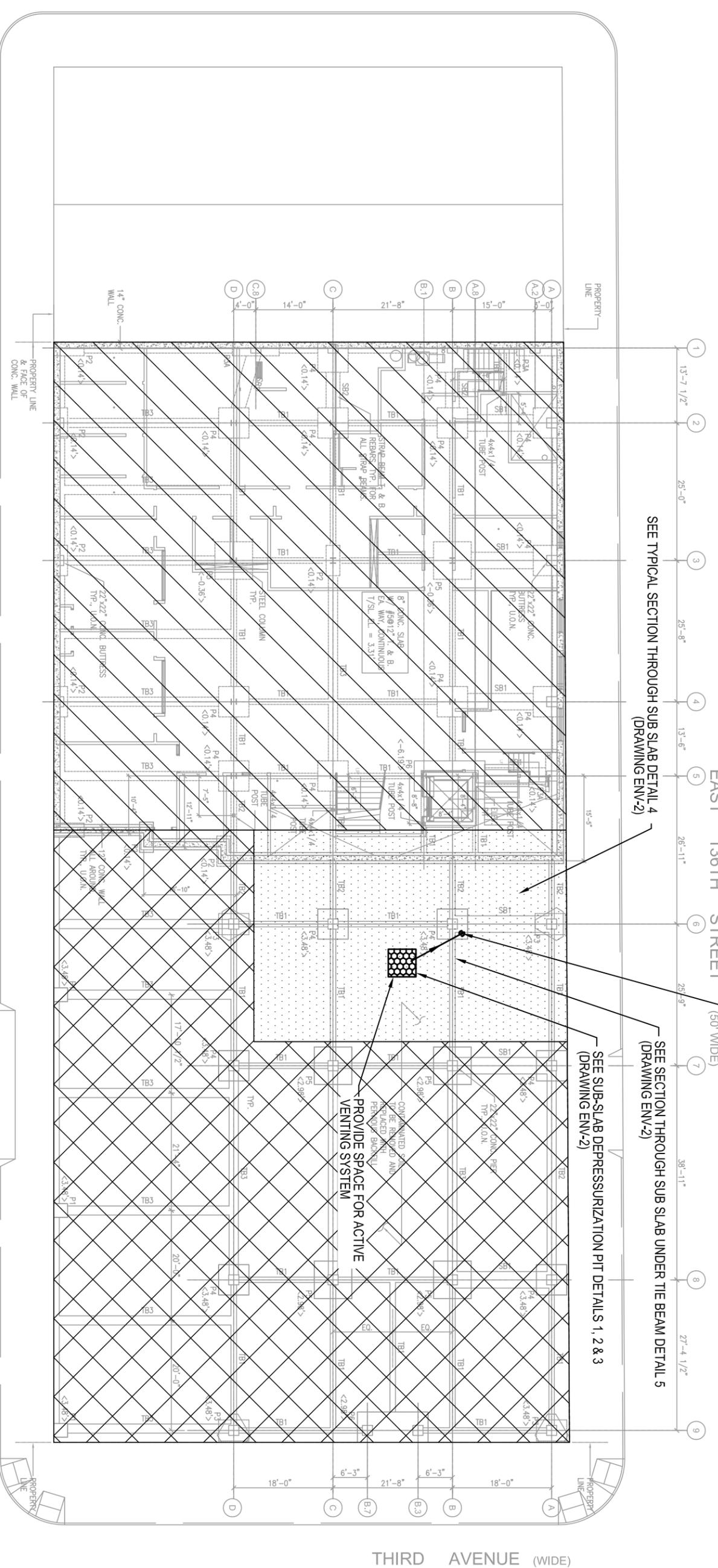
SCALE  
 APPX. 1" = 20'

DATE  
 03/07/11

SHEET TITLE  
**SSDS LAYOUT**

SHEET NO.  
**ENV-1**

SHEET 1 OF 2



- NOTES:**
- ALL PILES SHALL BE 10" ROUND STEEL PIPES (GRADE A53) OF 60-TON CAPACITY (MIN.) FILL ALL PILES WITH 4000 PSI CONCRETE AND PROVIDE 1-#11 x 20'-0" REBAR @ TOP OF PILE. TYP.
  - ALL CONCRETE SHALL BE NORMAL WEIGHT (WITH TYPE II CEMENT) HAVING A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI @ 28 DAYS. REBARS SHALL BE GRADE 60 EPOXY COATED REBARS CONFORMING TO ASTM-A775.
  - FOR GENERAL NOTES AND TYPICAL DETAILS, SEE DWG. S-200 TO S-204.
  - FOR PILE CAPS DETAILS, SEE DWG. S-201.
  - FOR PILING INFORMATION, CONSULT WITH GEOTECHNICAL ENGINEER AND SEE GENERAL NOTES ON DWG. S-200.
  - < > PILE CAP ELEVATIONS.

- PROJECT NOTES:**
- CONTRACTOR MUST SUBMIT THE FOLLOWING SHOP DWGS. TO ENGINEER OF RECORD FOR REVIEW AND APPROVAL. THE ENGINEER OF RECORD WILL NOT BE HELD RESPONSIBLE FOR THE STRUCTURAL INTEGRITY AND STABILITY OF THE BUILDING IF THE OWNER/CONTRACTOR CHOOSES TO PLACE REBARS, POUR CONCRETE AND ERECT STRUCTURAL STEEL PRIOR TO SHOP DRAWING APPROVAL.
  - EXCAVATION SHORING SHALL BE CONTRACTOR'S SOLE RESPONSIBILITY. CONTRACTOR SHALL HIRE A NYS LICENSED ENGINEER TO DESIGN THE SHORING SYSTEM AND PREPARE NECESSARY DWGS. ALL FOUNDATION LOADS, SOIL PRESSURES - STATIC AND SEISMIC, ADJACENT BUILDING LOADS AND SURCHARGES SHALL BE CONSIDERED WHEN DESIGNING THE SHORING SYSTEM.
  - PRIOR TO START OF CONSTRUCTION WORK, THE OWNER/ CONTRACTORS SHALL FULLY COORDINATE WITH ALL TRADES : ARCHITECTURAL, STRUCTURAL, MEP AND ELEVATOR. ANY DISCREPANCIES FOUND SHALL BE BROUGHT TO ATTENTION OF THE DESIGN TEAM IMMEDIATELY.

**LEGEND**

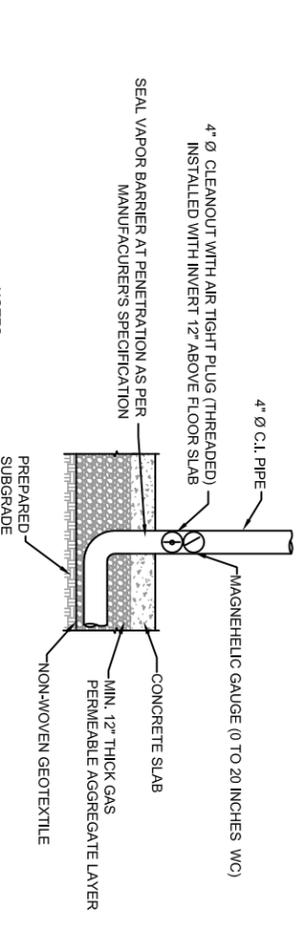
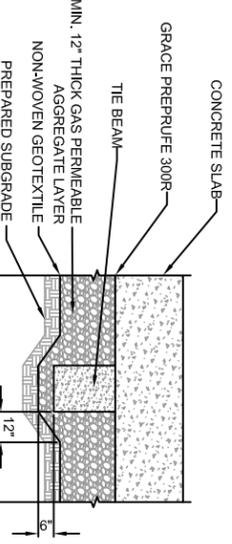
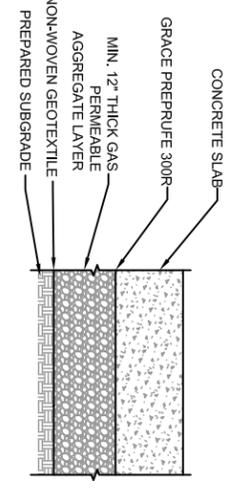
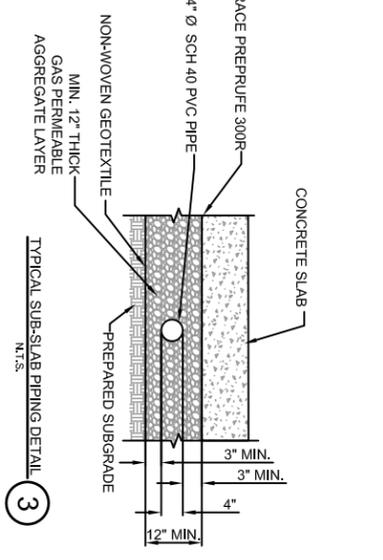
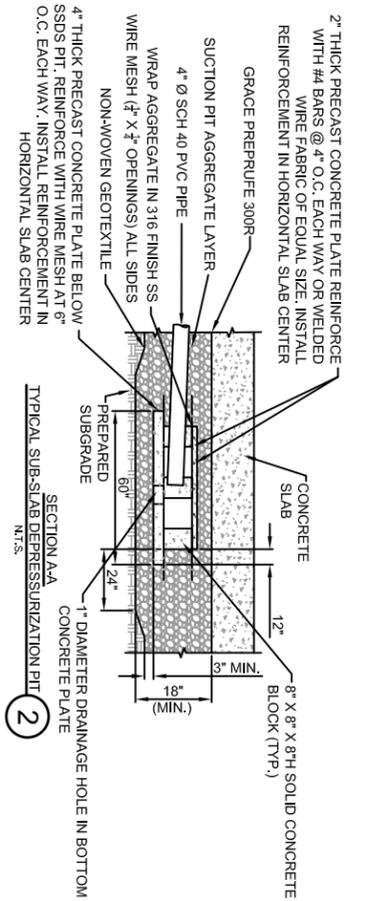
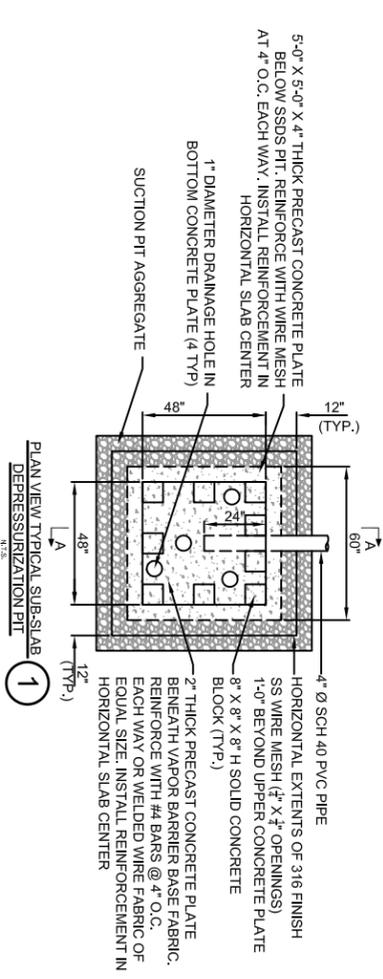
- AREA OF SSDS SYSTEM
- CELLAR SLAB BELOW WATER TABLE
- 1st FLOOR OPEN-AIR PARKING ABOVE



EAST 135TH STREET (WIDE)

EAST 136TH STREET (50' WIDE)

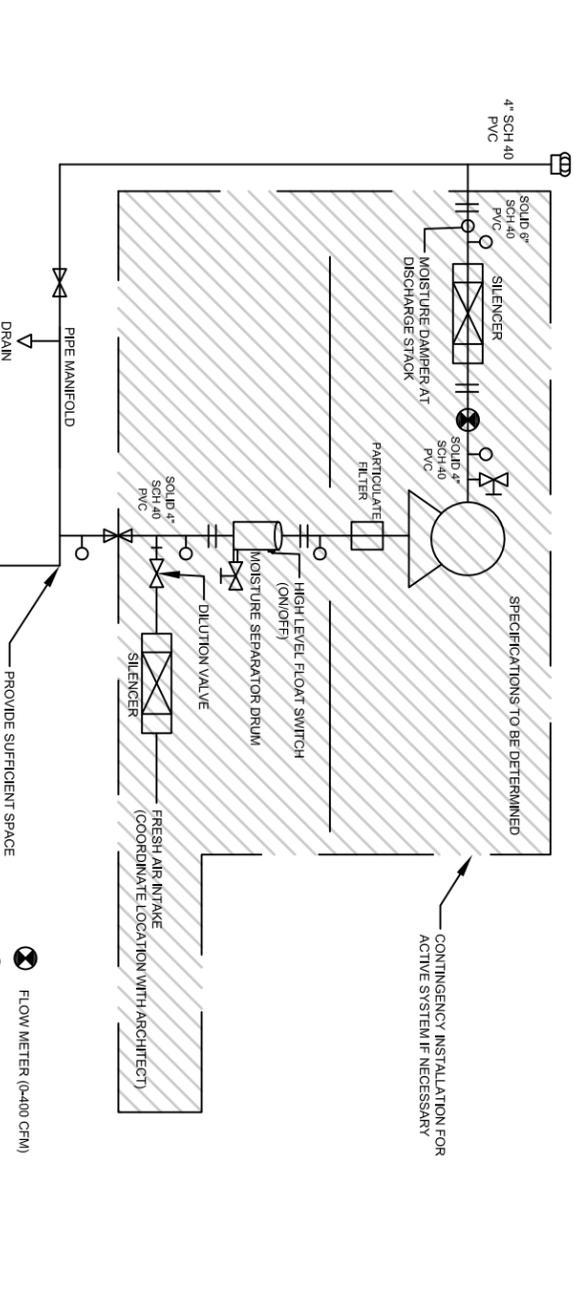
THIRD AVENUE (WIDE)



- NOTES:
1. CONTRACTOR TO SUPPLY SHOP DRAWINGS OF PROPOSED CONSTRUCTION DETAILS FOR APPROVAL. ALL PENETRATIONS SHALL BE CLEANED PER SPECIFICATIONS BEFORE LIQUID BOOT® IS APPLIED.
  2. NOT ALL FITTINGS SHOWN. CONTRACTOR SHALL SUBMIT TO SCALE SKETCH SHOWING PROPOSED PIPE JOINT LOCATIONS. ENGINEER'S APPROVAL OF PIPE JOINT LOCATIONS SHALL BE REQUIRED PRIOR TO CONSTRUCTION.
  3. FURNISH ESCUTCHEONS AS SPECIFIED.
- \* REFER TO SPECIFICATION SECTION 02220 ARTICLE 3.03D(2)

TYPICAL SSDS RISER DETAIL AT FLOOR SLAB

6" WIND-DRIVEN TURBINE  
 EMPIRE MIN TYP66G OR APPROVED EQUAL  
 LOCATED AT LEAST 12" ABOVE ROOF AND 10' FROM ANY OPERABLE OPENINGS OR AIR INTAKE  
 (CONTRACTOR TO COORDINATE LOCATION OF DISCHARGE VENT WITH ARCHITECT)



- FLOW METER (0-400 CFM)
- MAGNETIC PRESSURE GAUGE (0 - 15 IN. H<sub>2</sub>O)
- BUTTERFLY VALVE
- FLANGE
- BALL VALVE / SAMPLE PORT

VENTING SYSTEM FLOW DIAGRAM

N.T.S.

PROJECT	
2477 THIRD AVENUE BRONX, NY	
DRAWN BY	CHECKED BY
JS	AS
SCALE	DATE
NTS	03/07/11
SHEET TITLE	
SSDS DETAILS	
SHEET NO.	
ENV-2	