

# **SOUTH BRONX CHARTER SCHOOL**

**611 EAST 133<sup>RD</sup> STREET**

**BRONX, NEW YORK**

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## **Remedial Action Work Plan**

**NYC OER Project Number: 13RHAZ408X**

**VCP Site # 13CVCP132X**

### **Prepared for:**

South Bronx Charter School

577 East 139 Street

Bronx, NY 10454

### **Prepared by:**

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**MAY 2013**

# **REMEDIAL ACTION WORK PLAN**

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## LIST OF ACRONYMS

<b>Acronym</b>	<b>Definition</b>
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, James A. Venture, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the South Bronx Charter School Site 13CVCP132X.

I, Christopher B. Brown, CPG am a Qualified Environmental Professional as defined in §43-140. I have primary direct responsibility for implementation of the remedial action for the South Bronx Charter School for International Culture and the Arts (SBCS)

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.

James A. Venture

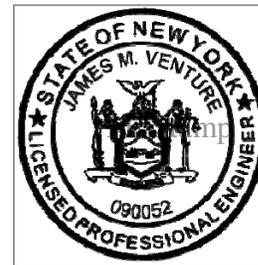
Name

090052

NYS PE License Number



Signature



May 4, 2013

Date

Christopher B. Brown, CPG

QEP Name



QEP Signature

May 4, 2013

Date

## **EXECUTIVE SUMMARY**

The South Bronx Charter School for International Culture and Arts (SBCS) has enrolled in the New York City Voluntary Brownfield Cleanup Program (NYC VCP) to investigate and remediate a 8,000-square foot site located at 611 East 133<sup>rd</sup> Street in the Bronx, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

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

The Site is located at 611 East 133<sup>rd</sup> Street in the Port Morris section in the Bronx, New York and is identified as Block 2546 and Lot 27 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 8,772-square feet and is bounded by Cypress Place to the north, East 133<sup>rd</sup> Street to the south, Cypress Place to the east, and Cypress Place to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant but was most recently used as an adult entertainment establishment and contains a two-story 16,000 square foot building with a partial basement.

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

The proposed future use of the Site will consist of complete demolition of this building for the construction of a new charter school. The new school will cover the entire building lot. The total square footage of the future school will be 39,000 square feet and will consist of five floors with no grade-level open spaces. A 1,000 square foot basement and mechanical room will be located sub-grade along the north-central portion of the proposed building. Excavation depths will range from 2 feet to approximately 16.5 feet (into bedrock). The estimated volume of excavated materials will be 62,000 cubic feet (2,295 cubic yards). Layout of the proposed site development is presented in Figure 4. Excavation below the watertable is not anticipated. The current zoning designation is MX-1 (special mixed use district). The proposed use is consistent with the zoning

variance granted by the New York City Board of Standards and Appeals in 2008 and subsequently extended in 2013.

### **Summary of the Remedy**

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and implementation of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establish Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Excavation and removal of soil/fill exceeding SCOs. Excavation for development purposes to a depth of approximately 2 feet to 16.5 feet into bedrock over the entire footprint of the property.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations.
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and

this plan. Sampling and analysis of excavated media as required by disposal facilities.  
Appropriate segregation of excavated media onsite.

9. Collection and analysis of end-point samples, if unconsolidated material remains on site above bedrock, to determine the performance of the remedy with respect to attainment of SCOs.
10. Installation of orange fence as an demarcation layer for residual soil/fill, if Track 1 is not achieved.
11. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
12. As part of development, installation of a vapor barrier system beneath the building slab and behind foundation sidewalls below grade. The Land Science Technologies™ GeoSeal™ system has been selected as the vapor barrier. This barrier consists of a 60-mil, spray-applied, rubberized asphalt between two 18-mil HDPE geo-textile layers.
13. As part of development, installation and operation of a sub-slab depressurization system.
14. As part of development, construction and maintenance of an engineered composite cover consisting of 6-inch thick structural concrete slab beneath the building and concrete sidewalk to prevent human exposure to residual soil/fill remaining under the Site. The entire property will be covered with concrete building slab.
15. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
16. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
17. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and if Track 1 SCOs are not achieved, describes all Engineering and Institutional Controls to be implemented at the Site.

18. If Track 1 SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
  
19. If Track 1 SCOs are not achieved, continued registration of the property with a Restrictive Declaration; establishment of Engineering Controls and Institutional Controls; a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

## COMMUNITY PROTECTION STATEMENT

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

This cleanup plan provides a very high level of protection for neighboring communities. 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 VCP, a thorough cleanup study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

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

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

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

**Health and Safety Manager and Site Safety Coordinator.** This project has designated a Health and Safety Manager (HSM) and Site Safety Coordinator (SSC) to implement the Health and Safety Plan. The HSM has prepared the CHASP for this project. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies and reports to the HSM. The HSM is Gerard Baril and can be reached at (212) 682-2001.

**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 onsite Project Manager Timothy Pagano at (845) 702-0786 or NYC Office of Environmental Remediation Project Manager Rebecca Bub at (212) 341-2073.

**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 am to 5 PM Monday through Friday.

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

**Complaint Management.** The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager Richard Conrad at (917) 302-4738, the NYC Office of Environmental Remediation Project Manager Rebecca Bub at (212) 341-2073., or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

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

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

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

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

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

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

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

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

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

**Final Report.** The results of all cleanup work will be fully documented in a final report (called a Remedial Action Report) that will be available for you to review in the public document repositories located at the New York Public Library, Mott Haven Branch, 321 East 140<sup>th</sup> Street, Bronx, NY 10454. (718)665-4878.

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

# **REMEDIAL ACTION WORK PLAN**

## **1.0 SITE BACKGROUND**

The South Bronx Charter School has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 611 East 133<sup>rd</sup> Street in the Port Morris section of the Bronx, New York (the “Site”). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

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

The Site is located at 611 East 133<sup>rd</sup> Street in the Port Morris section in the Bronx, New York and is identified as Block 2546 and Lot 27 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 8,772-square feet and is bounded by Cypress Place to the north, East 133<sup>rd</sup> Street to the south, Cypress Place to the east, and Cypress Place to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant but was most recently used as an adult entertainment establishment and contains a two-story 16,000 square foot building with a partial basement.

## **1.2 PROPOSED REDEVELOPMENT PLAN**

The proposed future use of the Site will consist of complete demolition of the current building for the construction of a new charter school. The new school will cover the entire building lot. The total square footage of the future school will be 39,000 square feet and will consist of five floors with no grade-level open spaces. A 1,000 square foot basement and mechanical room will be located sub-grade along the north-central portion of the proposed building. Excavation depths

will range from 2 feet to approximately 16.5 feet (into bedrock). The estimated volume of excavated materials is approximately 62,000 cubic feet (2,295 cubic yards). Layout of the proposed site development is presented in Figure 4. Excavation is not anticipated below the elevation of groundwater. The current zoning designation is MX-1 (special mixed use district). The proposed use is consistent with the zoning variance granted by the New York City Board of Standards and Appeals in 2008 and subsequently extended in 2013.

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

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

Figures 1 and 3 depict the surrounding land usage. The surrounding properties consist of light industrial and commercial uses, including construction supply, warehousing and light manufacturing. Some playgrounds/parks are present within the 500-foot radius from the subject property. No schools, hospitals, or day care facilities were identified within 500 feet of the subject property.

### **1.4 REMEDIAL INVESTIGATION**

A remedial investigation was performed and the results are documented in a companion document called "*Remedial Investigation Report, South Bronx Charter School*", dated May 2013(RIR).

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

Historically the Site has been operated as a retail gasoline station, automotive repair facility, and for various industrial purposes. Currently the Site is vacant but was most recently used as an adult entertainment establishment and contains one two-story 16,000 square foot building.

The AOCs identified for this site include:

1. Gasoline/filling stations (two)
2. Manufacturing and vehicle service building (differing uses based on time)
3. Underground Gasoline tanks (six)

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

In 2008 and 2013, Conrad Geoscience/PVE Sheffler performed the following scope of work for the enrollee, South Bronx Charter School:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed seven soil borings across the entire project Site, and collected seven soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed four temporary groundwater monitoring wells throughout the Site and collected four groundwater samples for chemical analysis to evaluate groundwater quality; (the elevations of the wells were not surveyed so groundwater flow direction was not established);
4. Installed four sub-slab vapor sampling ports beneath the slab of the on-site building and collected one sample from each, plus one indoor air sample, for chemical analysis.

### **Summary of Environmental Findings**

1. Elevation of the property ranges from approximately 18 to 20 feet.
2. Depth to groundwater ranges from 8 to 15 feet at the Site.
3. Groundwater flow direction beneath the Site is unknown.
4. Depth to bedrock ranges from 0 to 6 feet at the Site.
5. The stratigraphy of the site, from the surface down, consists of 0 to 6 feet of unconsolidated soil and fill, and at least 21.5 feet of Manhattan Schist.
6. Soil/fill samples collected during the RI showed no SVOCs at concentrations exceeding 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs). Several VOCs were detected at trace levels with the exception of acetone (detected in all samples ranging from 70 to 318 ppb), and was detected above Unrestricted Use SCOs. Five metals (cadmium, chromium, lead, mercury and zinc) exceeded Unrestricted Use SCOs in six out of seven soil samples, and of these cadmium (at 5 ppm in one sample) and lead

(ranging from 3 ppm to 11,200 ppm) were reported above Restricted Residential SCOs. Total PCBs were detected at concentrations exceeding Unrestricted Use SCOs in only one sample (at 0.856 mg/kg). Pesticides including dieldrin (at 5.6 ppm and 29.5 ppm) and 4,4'-DDE (at 9.47 ppm) were detected at concentrations exceeding Unrestricted Use SCOs in two out of seven soil samples. From this data, lead contamination is concentrated in the central-western portion of the property.

7. Pesticides and PCBs were not detected in any of the groundwater samples collected at the site. VOCs including Ethylbenzene (23.6 ug/L), m,p-Xylene (36.6 ug/L), n-Propylbenzene (45.3 ug/L), and 1,2,4-Trimethylbenzene (222 ug/L) were detected at concentrations exceeding NYSDEC GQS in one sample. The only SVOCs detected above GQS, was Napthalene detected at 18.0 ug/L. The dissolved concentrations of the metals arsenic, iron, nickel and thallium were detected slightly above NYSDEC GQS in groundwater samples.
  
8. Trace concentrations of chlorinated and petroleum-related VOCs were detected in soil vapor samples. All VOC compounds were detected at a concentrations less than 10  $\mu\text{g}/\text{m}^3$  with the exception of acetone, which was detected in all samples ranging from 39 to 140  $\mu\text{g}/\text{m}^3$ . Tetrachloroethene (PCE) was identified in all four samples at a concentration ranging from 0.97 to 5.9  $\mu\text{g}/\text{m}^3$ . Trichloroethene (TCE) was detected in one sample at 1.2  $\mu\text{g}/\text{m}^3$ . 1,1,1-Trichloroethane (TCA) was detected in one sample at 1.9  $\mu\text{g}/\text{m}^3$ . Indoor air sample detected trace levels of acetone and PCE. These concentrations are all below the monitoring level ranges established within the DOH soil Vapor guidance matrix.

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

## **2.0 REMEDIAL ACTION OBJECTIVES**

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

### **Groundwater**

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

### **Soil**

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

### **Soil Vapor**

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

### 3.0 REMEDIAL ALTERNATIVES ANALYSIS

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

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

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. As required, a minimum of two remedial alternative scenarios (including a Track 1 scenario) are evaluated, as follows:

#### **Alternative 1 involves**

- Establishment of Track 1 Unrestricted Use Soil Cleanup Objectives.
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling unless unconsolidated material has been excavated to bedrock. Based on the results of the remedial investigation, it is expected that this alternative would require excavation to a depth of 0 to 6 feet to remove all unconsolidated

material beneath the current building and within the western parking area. Excavation for development purposes would take place to a depth of between 2 and 16.5 feet across the entire site for construction therefore, it is anticipated that all unconsolidated material would be removed. However, if soil/fill containing analytes at concentrations above Track 1 Unrestricted Use SCOs are still present at the base of the excavation after removal of all soil required for construction, additional excavation would be performed to ensure complete removal of soil that does not meet Track 1 Unrestricted Use SCOs.

- No Engineering or Institutional Controls can be utilized in a Track 1 cleanup, but placement of a vapor barrier across the footprint of the proposed building area as well as a waterproofing membrane on the basement sidewalls as part of construction to prevent exposures from on- and off-site soil vapor.
- As part of development of a new school, installation and operation of a Sub Slab depressurization system (SSDS). Post excavation vapor sampling will determine operation of system as passive versus active. Active SSDS systems don't achieve Track 1 Cleanup due to continued need for operation and monitoring.

#### **Alternative 2 involves**

- Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 has been achieved with post-excavation endpoint sampling. Based on the results of the remedial investigation, it is expected that this alternative would require excavation to a depth of between 0 to 6 feet beneath the current building and western parking area. Excavation for development purposes would take place to a depth of between 2 and 16.5 feet across the entire site for construction, therefore, it is anticipated that all unconsolidated material would be removed across the site. However, if soil/fill containing analytes at concentrations above Track 4 Site Specific SCOs are still present at the base of the excavation after removal of all material required for construction, additional excavation would be performed to ensure complete removal of unconsolidated material that does not meet Track 4 Site Specific SCOs;
- Placement of a final cover over the entire Site to eliminate exposure to remaining soil/fill;

- Installation of a vapor barrier across the footprint of the proposed foundation, as well as a waterproofing membrane on the basement sidewalls as part of construction to prevent exposures from on and off-site soil vapor.
- Installation and operation of an active SSDS system.
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site and prohibitions on sensitive site uses, such as farming or vegetable gardening, to eliminate future exposure pathways;
- Establishment of an approved Site Management Plan to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended; and
- The property will continue to be registered with a Restrictive Declaration Restrictive Declaration by the NYC Buildings Department. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the Site Management Plan which will note that the property owner and property owner's successors and assigns must comply with the approved SMP

### **3.1 THRESHOLD CRITERIA**

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

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

**Alternative 1** would be protective of human health and the environment by removing unconsolidated material and historic fill exceeding Track 1 Unrestricted Use SCOs and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/ fill once construction is complete and eliminating the risk of contamination leaching into groundwater. Potential exposure to contaminated soils or groundwater during construction would be minimized by implementing an approved Soil / Materials Management Plan and Community

Air Monitoring Plan (CAMP). There would be minimal potential for contact with contaminated groundwater after remediation is complete as it is neither used nor anticipated to be accessible after the remedial action. Potential migration of soil vapors into the new building would be prevented by installing a vapor barrier and active venting system across the footprint of the proposed foundation and waterproofing membrane on the basement sidewalls as part of construction to prevent exposures from on and off-site soil vapor.

**Alternative 2** would achieve comparable protections of human health and the environment by excavating unconsolidated materials and historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCOs as well as by placement of institutional and engineering controls, including a composite cover system (the building foundation and concrete sidewalks). The composite cover system would prevent direct contact with any remaining on-Site soil/ fill. Implementing institutional controls including a deed notice and a Site Management Plan would ensure that the composite cover system remains intact and protective. Establishment of Track 4 Site-Specific SCOs would minimize the risk of contamination leaching into groundwater. Potential exposure to contaminated soils or groundwater during construction would be minimized by implementing an approved Soil/ Materials Management Plan and Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be eliminated as it would be prohibited by city laws and regulations. Potential migration of soil vapors into the new building would be prevented by installing a vapor barrier and active venting system across the footprint of the proposed foundation and waterproofing membrane on the basement sidewalls as part of construction.

### **3.2. BALANCING CRITERIA**

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

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

Alternative #1 will achieve compliance with the remedial goals, SCGs and RAOs for soil through removal of soil/fill in excess of the NYSDEC Part 375 Unrestricted Use SCOs and groundwater protection standards.. All soil/fill excavated from the Site would be managed and disposed of in

accordance with all applicable regulations. 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. Compliance with SCGs for soil vapor will also be achieved by installation of a vapor barrier across the footprint of the proposed foundation and waterproofing membrane on the basement sidewalls as part of construction. As an added protection against the potential for future soil vapor intrusion, an active SSDS system will be installed.

Alternative #2 will achieve compliance with the remedial goals, SCGs and RAOs for soil through removal of soil to meet Track 4 Site-Specific SCOs. Compliance with SCGs for soil vapor would also be achieved by installation of an active SSDS system and installation of a vapor barrier across the footprint of the proposed foundation and waterproofing membrane on the basement sidewalls as part of construction. A Site Management Plan under Alternative 2 would ensure that these Engineering Controls remain protective for the long term. Similar to the Track 1 alternative, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs.

### **Short-term effectiveness and impacts**

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

Both alternatives #1 and #2 have similar-short term effectiveness during their respective implementations, as each requires excavation of all or most historic fill material. Short term impacts would be higher for the Alternative 1 due to excavation of greater amounts of soil to achieve Track 1 Unrestricted Use SCOs. The duration of short-term exposures to site contaminants would be extended during Alternative #1 due to the need for additional excavation

to achieve Track 1. All potential exposure pathways for site-derived contaminants would be eliminated following construction and development of the Site.

Both Alternatives would both employ appropriate measures to prevent short term impacts, including a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would effectively prevent the release of significant contaminants into the environment. Both alternatives provide short term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a Health and Safety Plan (CHASP) will be protected from on-Site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones).

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

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of 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.

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

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs, establishing a composite cover system across the Site, establishing use restrictions, establishing a Site Management Plan to ensure long-term management of Institutional Controls (ICs) and Engineering Controls (ECs), and placing a deed restriction to memorialize these controls for the long term. Establishment of an SMP and a deed restriction will ensure that this protection remains effective for the long-term. The SMP will ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and

certification that these controls and use restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy will provide continued high level of protection in perpetuity.

### **Reduction of toxicity, mobility, or volume of contaminated material**

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

Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing all soil in excess of Track 1 Unrestricted Use SCOs. The remedy will also achieve Groundwater Protection Standards and will eliminate future groundwater contamination.

Alternative 2 will remove most of the impacted soil present on the Site and any remaining soil beneath the new building will meet Track 4 Site-Specific SCOs. Since all soil and unconsolidated material to a minimum depth of 2 feet to 16.5 feet will be removed under either alternative, Alternative 1 would eliminate only a marginally greater total mass of contaminants on Site.

### **Implementability**

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

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

### **Cost effectiveness**

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action. The remedial plan creates an approach that combines the remedial action with the redevelopment of the Site, including the construction of the building foundation and subgrade structures. The remedial plan is also cost effective in that it will take into consideration the selection of the closest and most appropriate disposal facilities to reduce transportation and disposal costs during the excavation of historic fill and other soils during the redevelopment of the Site.

Excavation to depths ranging from 2 to 16.5 feet below grade is required for the construction of the proposed building. Costs associated with the Alternative #1 (Track 1 SCOs) could be higher than Alternative #2 if unconsolidated material with elevated contaminants is encountered in the western portion of the property at a depth greater than the depth required for construction. In addition, long-term costs for Alternative #2 are likely to be higher than Alternative #1 based on implementation of a Site Management Plan and placement of a deed restriction as part of Alternative #2, as well as maintenance of active vapor mitigation systems. In both cases, appropriate public health and environmental protections are achieved. Costs associated with Alternative #1 are estimated at approximately \$175,000. This cost estimate includes the following elements and assumptions:

- Excavate to a depth ranging between 2 and 16.5 ft for construction of the proposed foundation which would achieve Unrestricted Use SCOs;
- Disposal of approximately 650 yd<sup>3</sup> (1000 tons) of excavated soil as non-hazardous regulated solid waste;

- Installation of a vapor barrier and active venting system beneath the foundation, as well as a waterproofing membrane on the sidewalls of the basement as a part of construction;
- HASP and CAMP monitoring for the duration of the remedial activities.

Costs associated with Alternative #2 are estimated at approximately \$225,000. This cost estimate includes the following elements and assumptions:

- Excavate to a depth ranging between 2 and 16.5 ft for construction of the proposed foundation which would achieve Track 4 Site-specific Use SCOs;
- Disposal of approximately 650 yd<sup>3</sup> (1000 tons) of excavated soil as non-hazardous, regulated solid waste;
- Installation of a vapor barrier in the existing basement area, as well as a waterproofing membrane on the sidewalls of the basement as a part of construction;
- HASP and CAMP monitoring for the duration of the remedial activities.
- Implementation of a Site Management Plan (SMP).
- Operation of the active venting system in accordance with the SMP

### **Community Acceptance**

This evaluation criterion addresses community opinion and support for the remedial action.

Observations here will be supplemented by public comment received on the RAWP.

Based on the overall goals of the remedial program and initial permitting associated with the proposed site development, no adverse community opinion is anticipated for either alternative. This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in Attachment B.

### **Land use**

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general

municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

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

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

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

The remedial plan would take into consideration the shortest trucking routes during off-site disposal of historic fill and other soils, which would reduce greenhouse gas emissions and conserve energy used to fuel trucks. New York City Clean Soil Bank program will be utilized for reuse of native soils. To the extent practicable, energy efficient building materials, appliances,

and equipment will be utilized to complete the development. While Alternative #2 would result in lower energy use due to reduced transportation costs if less soil is transported off-site. Both remedial alternatives are comparable with respect to the opportunity to achieve sustainable remedial action. A complete list of green remedial activities considered as part of the NYC VCP is included in the Sustainability Statement, included as Appendix 2.

## **4.0 REMEDIAL ACTION**

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

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and implementation of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establish Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Excavation and removal of soil/fill exceeding SCOs. Excavation for development purposes to a depth of approximately 2 feet to 16.5 feet into bedrock over the entire footprint of the property.

6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations.
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media onsite.
9. Collection and analysis of end-point samples, if unconsolidated material remains on site above bedrock, to determine the performance of the remedy with respect to attainment of SCOs.
10. Installation of orange fence as an demarcation layer for residual soil/fill, if Track 1 is not achieved.
11. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
12. As part of development, installation of a vapor barrier system beneath the building slab and behind foundation sidewalls below grade. The Land Science Technologies™ GeoSeal™ system has been selected as the vapor barrier. This barrier consists of a 60-mil, spray-applied, rubberized asphalt between two 18-mil HDPE geo-textile layers.
13. As part of development, installation and operation of a sub-slab depressurization system.
14. As part of development, construction and maintenance of an engineered composite cover consisting of 6-inch thick structural concrete slab beneath the building and concrete sidewalk to prevent human exposure to residual soil/fill remaining under the Site. The entire property will be covered with concrete building slab.
15. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.

16. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
17. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and if Track 1 SCOs are not achieved, describes all Engineering and Institutional Controls to be implemented at the Site.
18. If Track 1 SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
19. If Track 1 SCOs are not achieved, continued registration of the property with a Restrictive Declaration; establishment of Engineering Controls and Institutional Controls; a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

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

Track 1 Soil Cleanup Objectives (SCOs) are proposed for this project. If Track 1 is not achieved, the following Track 4 Site-Specific SCOs will be used:

<u>CONTAMINANT</u>	<u>TRACK 4 SCOs</u>
Total SVOCs	250 ppm
Lead	1,200 ppm
Mercury	1.5 ppm

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix 3. The location of planned excavations is shown in Figure 6.

In addition to known lead hotspot at SB-7, any 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/bedrock expected to be excavated and disposed off-Site is approximately 1,000 tons. Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

### **End-Point Sampling**

Removal actions for development purposes under this plan will be performed in conjunction with confirmation soil sampling. Depth to bedrock across the site is estimated to range from 0 to 6 feet below grade (deepening from east to west). The proposed remedy includes excavation of all unconsolidated material over bedrock for construction of the foundation for the proposed building. We do not anticipate unconsolidated soil above bedrock to remain on site. Based on soil borings completed in 2008, the only area where unconsolidated soil may remain is restricted to the western parking area. To evaluate attainment of Track 1 Unrestricted Use SCOs, endpoint samples will be analyzed for VOCs, SVOC, pesticides, and metals. For comparison to Track 4 SCOs, analytes will only include trigger compounds and elements established on the Track 4 SCO list. A maximum of 8 confirmation samples (Figure 5) will be collected from the perimeter and base of the excavation at locations to be determined by OER. The end-point sampling and testing will be performed promptly following excavation and be completed prior to any Site development activities.

Hot-spot removal actions, whether established under this RAWP or identified during the remedial program, will be performed in conjunction with post remedial end-point samples to ensure that hot-spots are fully removed. Analytes for end-point sampling will be those parameters that are

driving the hot-spot removal action and will be approved by OER. Frequency for hot-spot end-point sample collection is as follows:

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

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

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

guidance values. End-point samples will be Confirmation samples will be analyzed for compounds and elements as described above utilizing the following methodology:

Soil analytical methods will include:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

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

## **Quality Assurance/Quality Control**

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

One duplicate sample for every 20 samples collected will be submitted to the approved laboratory for analysis of the same parameters. One trip blank will be submitted to the laboratory with each shipment of soil samples. .

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

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

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

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. Trip blanks will not be used for samples to be analyzed for metals, SVOCs or pesticides. One blind duplicate sample will be prepared and submitted for analysis every 20 samples.

## **Import and Reuse of Soils**

Import of soils onto the property and reuse of soils already onsite will be performed in conformance with the Soil/Materials Management Plan in **Appendix 3**.

### **4.3 ENGINEERING CONTROLS**

Track 1 remedial actions do not require Engineering Controls. In areas where Track 1 is not achieved, a composite cover with vapor management will constitute an engineering control that will be employed in the remedial action to address residual contamination remaining at the site. As part of construction of the building, where Track 1 will be achieved, the following elements are being built to provide protections against future soil vapor from surrounding properties:

- Composite cover system consisting of asphalt covered roads, concrete covered sidewalks, and concrete building slabs;
- Soil vapor barrier;
- Sub-slab depressurization system.

## Composite Cover System

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

- The future building concrete building slab and foundation
- Concrete covered sidewalks

Figure 7 shows the typical design for each remedial cover type used on this Site. Figure 8 shows the location of each cover type built at the Site.

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

- Vapor Barrier
- Migration of soil vapor will be mitigated with a combination of building slab and vapor barrier.

A vapor barrier will be incorporated into the foundation design to prevent vapors from impacting indoor air. The Land Science Technologies™ GeoSeal™ system has been selected as the vapor barrier. This barrier consists of a 60-mil, spray-applied, rubberized asphalt between two 18-mil HDPE geo-textile layers. The combination creates a chemical and puncture resistant barrier. Specifications and installation details, including chemical compatibility, are presented in product literature provided by the vendor in Appendix 6; drawings depicting the construction of the system are provided in Appendix 6.

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

### **Sub-Slab Depressurization System**

Future migration of soil vapor from offsite will be mitigated with the construction of a (active/passive) sub-slab depressurization system. The SSDS will prevent soil gas from accumulating in the buildings by creating a negative pressure zone beneath the slab.

Details describing the venting system are provided in Appendix 6, and Figures 9 and 10. including materials specifications and location of system components:

- Description of components, materials, thicknesses and layout;
- Location of systems including map;
- Operating conditions;
- Design diagrams;
- System operation maintenance and monitoring.
- For active systems, include operational and other details including the location of exhaust/venting pipes, fan type, flow rate, etc.

## **4.4 INSTITUTIONAL CONTROLS**

Track 1 remedial actions do not require Engineering Controls. Where Track 1 SCOs are not achieved, Institutional Controls (IC) will be utilized in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. Institutional Controls are listed below. Long-term employment of EC/ICs will be implemented under a site-specific Site Management Plan (SMP) that will be included in the RAR. If Track 1 is not achieved for the entire property, the property will continue to be flagged/registered with a Restrictive Declaration by the NYC Buildings Department.

Institutional Controls (if required) for this remedial action are:

- Continued registration of the Restrictive Declaration for the property. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the Site Management Plan which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;

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

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

Site Management is not required for Track 1 remedial actions. However, if Track 1 SCOs are not achieved, Site Management will be the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by the DCR and this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the DCR and the Site Management Plan are implemented.

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

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

## **4.6 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT**

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

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

### **Known and Potential Sources**

Based on the results of the Remedial Investigation Report, the contaminants of concern are:

Soil

- Metals, including cadmium, chromium, lead, mercury and zinc, exceeding Track 1 - Unrestricted Use SCOs; cadmium and lead exceeding Track 2 Restricted Residential SCOs;
- VOCs, acetone exceeding Track 1 Unrestricted Use SCOs (suspected laboratory contaminant);
- One PCB, aroclor 1260 exceeding Track 1 Unrestricted Use SCOs; and
- Two pesticides including dieldrin and 4,4'-DDE exceeding Unrestricted Use SCOs.

#### Groundwater

- VOCs exceeding GQSs, including ethylbenzene, xylene, n-propylbenzene and 1,2,4-trimethylbenzene;
- One SVOC, naphthalene was detected slightly above GQS; and
- Metals, including arsenic, nickel and iron exceeding GQSs.

#### Soil Vapor

- Trace concentrations of VOCs detected and included PCE and TCE. Although not identified during the investigation, there is potential that petroleum-related VOCs and SVOCs related to the potential presence of suspect fuel oil USTs could be encountered.

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

Pesticides and metals are present in the historic fill materials throughout the Site at shallow depths. Soil above bedrock ranges from 0 to 6 feet thick. Metals appear to be non-uniform in distribution. Lead was detected at high concentrations (11,200 mg/kg) that were limited in one area (hotspot) along with elevated mercury. Lead was not detected in groundwater. Petroleum related VOCs were detected in groundwater in only one of the four groundwater samples collected. Concentrations slightly exceeded applicable standards.

### **Potential Routes of Exposure**

An exposure route is the mechanism by which a receptor comes into contact with a chemical.

Three potential primary routes exist by which chemicals can enter the body:

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

## **Potential Points of Exposure**

*Current Conditions:* Currently, the site is vacant and there is no potential to exposure of site related contaminants. Groundwater is not exposed at the Site, and because the Site is served by the public water supply, groundwater is not used at the Site. There is potential for soil vapor to accumulate in the existing building.

*Construction/Remediation Activities:* Once redevelopment activities begin, construction workers will come into direct contact with surface and subsurface soils, as a result of on-Site construction and excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with any exposed impacted soil, fill, and potentially groundwater. Similarly, off-site receptors could be exposed to dust and vapors from on-site activities. During construction, on-site and off-site exposures to contaminated dust from on-site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

*Proposed Future Conditions:* Once the remedial actions and redevelopment of the Site has been completed, there will be no potential on-site or off-site exposure pathways. Not only will soil/fill exceeding Unrestricted Use SCOs be removed, but the Site will also be fully capped with the concrete building slab, which will prevent contact with any residual soils. Any exposures to vapors will be prevented by the installation of a vapor barrier, venting system and waterproofing membrane system below the slab and behind the foundation walls, and the application of a concrete sealant to the slab of the existing building.

## **Receptor Populations**

**On-Site Receptors** - The on-Site potential receptors include students, teachers, site workers, construction workers and trespassers. During redevelopment of the Site, the on-Site potential receptors will include construction workers, residents, trespassers and visitors. Once the Site is redeveloped, the on-Site potential receptors will include building occupants and visitors.

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

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

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

Based upon this analysis, complete on-Site exposure pathways appear to be present only during the remedial action phase. Under current conditions, on-Site exposure pathways do not exist. During the remedial action, on-site exposure pathways will be eliminated by preventing access to the Site, through implementation of soil/materials management, stormwater pollution prevention, dust controls, employment of a community air monitoring plan, and implementation of a Construction Health and Safety Plan. After the remedial action is complete, there will be no remaining exposure pathways to on-Site soil/ fill, as all soil that exceeds Track 1 Unrestricted Use SCOs will have been removed, and the vapor barrier, SSDS, and concrete building slab will interrupt potential for soil vapor intrusion.

## **5.0 REMEDIAL ACTION MANAGEMENT**

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

Principal personnel who will participate in the remedial action include

- Stephanie LaRose, Geologist
- Timothy Pagano, Senior Hydrogeologist.

The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are:

- Christopher Brown, CPG, Principal and Senior Hydrogeologist
- James Venture, PE, Principal and Principal Engineer

### **5.2 SITE SECURITY**

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

### **5.3 WORK HOURS**

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

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

The Health and Safety Plan is included in Appendix 4. The Site Safety Coordinator will be Tim Pagano or Stephanie LaRose, depending on staffing of the project. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and

regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, including 40-hour hazardous waste operator training and annual 8-hour refresher training. Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and be required to sign an HASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed.

Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

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

## **5.5 COMMUNITY AIR MONITORING PLAN**

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous

monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedences of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

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

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

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

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

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

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ( $\text{mcg}/\text{m}^3$ ) 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.

## **Equipment and Material Staging**

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

## **Stabilized Construction Entrance**

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

## **Truck Inspection Station**

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

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

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

### **Storm Preparedness**

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to

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

### **Storm Response**

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

characterization based on site conditions, at the discretion of OER. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYS DEC's spill hotline at DEC 800-457-7362. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

### **Storm Response Reporting**

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

## **5.8 TRAFFIC CONTROL**

Drivers of trucks leaving the NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site will be established based on the site control developed by the future construction contractor. We anticipate a gated entrance will be established at the southwestern corner of the site, with the intersection of Cypress Place and Bruckner Boulevard.

## **5.9 DEMOBILIZATION**

Demobilization will include:

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

Equipment will be decontaminated and demobilized at the completion of all field activities.

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

## **5.10 REPORTING AND RECORD KEEPING**

### **DAILY REPORTS**

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

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

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

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

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

### **5.11 COMPLAINT MANAGEMENT**

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

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

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

- Reasons for deviating from the approved RAWP;

- Effect of the deviations on overall remedy; and
- Determination that the remedial action with the deviation(s) is protective of public health and the environment.

## 6.0 REMEDIAL ACTION REPORT

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

- Information required by this RAWP;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 is not achieved);
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results and all material characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action and DUSR;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material.
- Account of the origin and required chemical quality testing for material imported onto the Site.
- Continue registration of the property with a Restrictive Declaration by the NYC Department of Buildings.

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

### **Remedial Action Report Certification**

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

*I, James M. Venture, 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 South Bronx Charter School Site 13RHAZ408X, VCP Number 13CVCP132X.*

*I, Christopher B. Brown, am a qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the South Bronx Charter School Site 13RHAZ408X, VCP Number 13CVCP132X )*

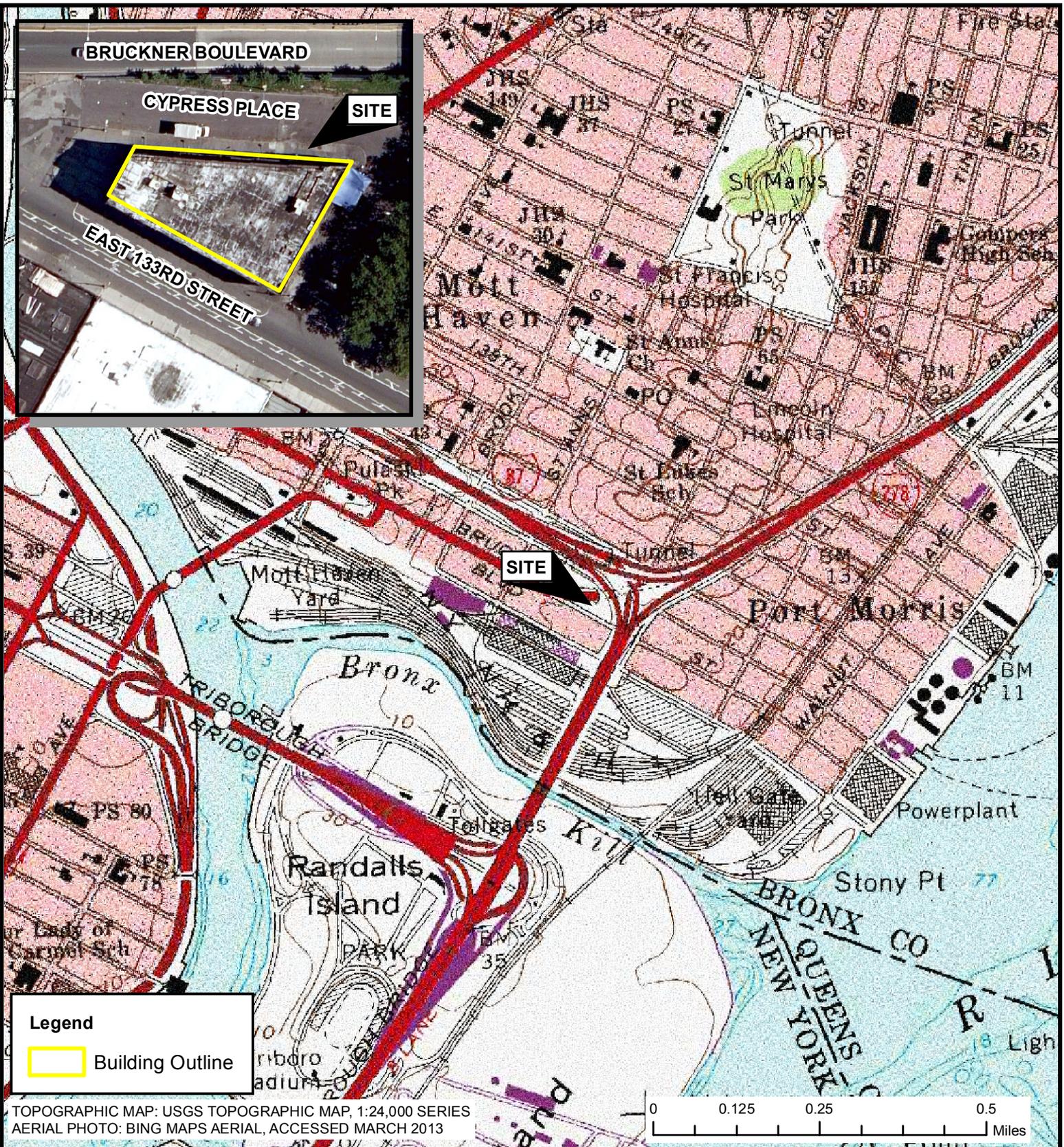
*I certify that the OER-approved Remedial Action Work Plan dated May 2013 and Stipulations in a letter dated \_\_\_\_\_; if any were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.*

## 7.0 SCHEDULE

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 2 month remediation period is anticipated.

<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	0	1
Remedial Excavation	1	8
Demobilization	8	1
Record Declaration of Covenants and Restrictions	16	
Submit Remedial Action Report	18	

**Figure 1**  
**Site Map**



**SITE LOCATION MAP**

**SOUTH BRONX CHARTER SCHOOL**  
 611 EAST 133rd STREET  
 BRONX, NEW YORK

**FIGURE 1**

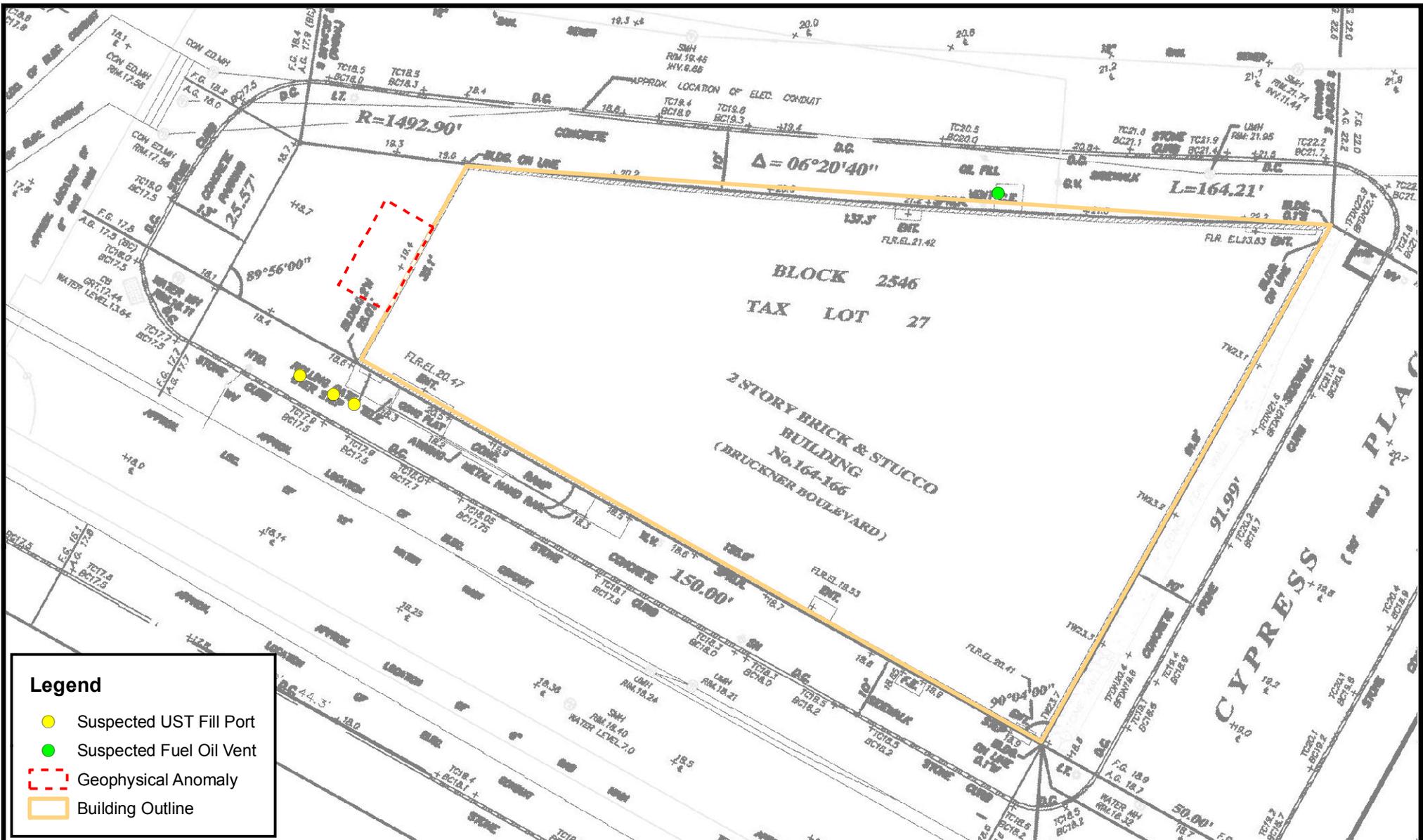
	DATE:	04/17/2013
	SCALE:	As Indicated
	PROJECT NUMBER:	160862

ALL LOCATIONS APPROXIMATE



One Civic Center Plaza  
 Suite 501  
 Poughkeepsie, New York 12601  
 Phone: (845) 454-2544  
 Fax: (845) 454-2655

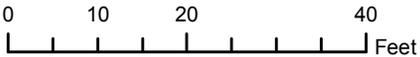
**Figure 2**  
**Selected Site Features**



**Legend**

- Suspected UST Fill Port
- Suspected Fuel Oil Vent
- Geophysical Anomaly
- Building Outline

BASEMAP:  
 "ALTA/ACSM LAND TITLE SURVEY",  
 ARTISTOTLE BOURNAZOS, P.C.,  
 DATED 6-15-2007



**SELECTED SITE FEATURES**  
 SOUTH BRONX CHARTER SCHOOL  
 611 EAST 133rd STREET  
 BRONX, NEW YORK

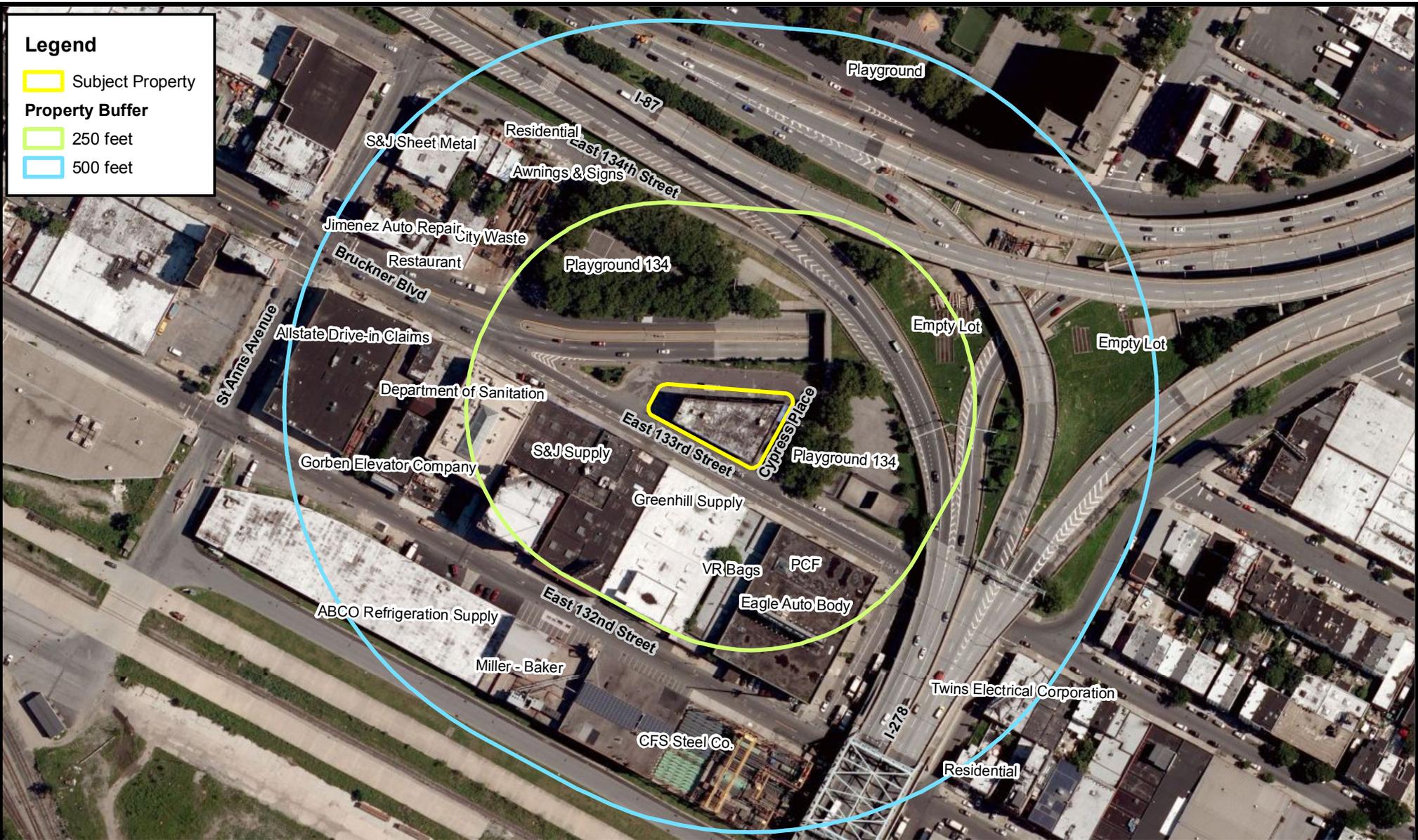
One Civic Center Plaza  
 Suite 501  
 Poughkeepsie, New York 12601  
 Phone: (845) 454-2544  
 Fax: (845) 454-2655

**FIGURE 2**

	DATE:	04/17/2013
	SCALE:	As Indicated
	PROJECT NUMBER:	160862

ALL LOCATIONS APPROXIMATE

**Figure 3**  
**Surrounding Land Usage**

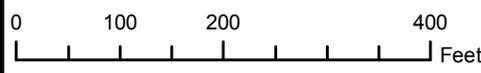


AERIAL PHOTO:  
 BING MAPS AERIAL, ESRI BASEMAP,  
 ACCESSED APRIL 2013

**SURROUNDING LAND USAGE**  
 SOUTH BRONX CHARTER SCHOOL  
 611 EAST 133rd STREET  
 BRONX, NEW YORK



One Civic Center Plaza  
 Suite 501  
 Poughkeepsie, New York 12601  
 Phone: (845) 454-2544  
 Fax: (845) 454-2655

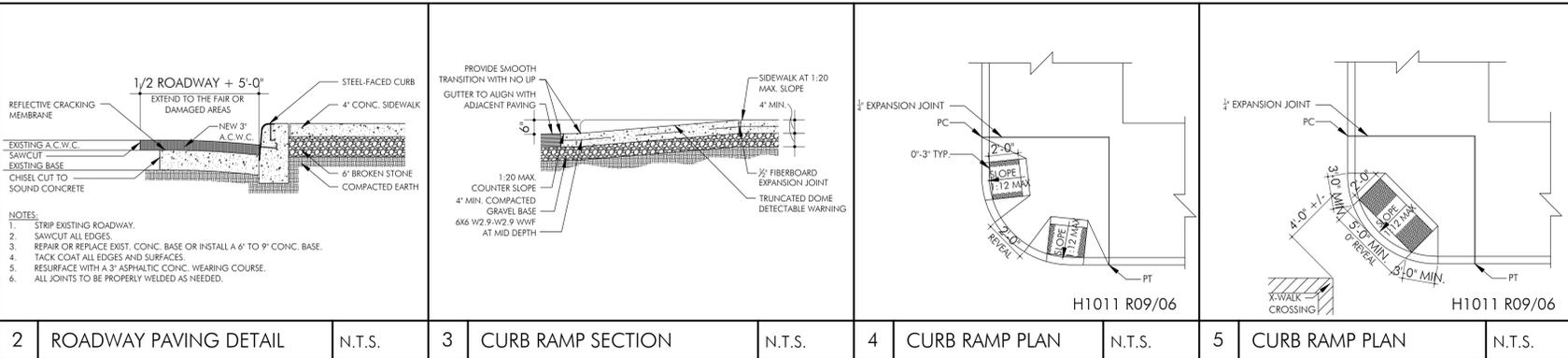


**FIGURE 3**

	DATE:	04/02/2013
	SCALE:	As Indicated
	PROJECT NUMBER:	160862

ALL LOCATIONS APPROXIMATE

**Figure 4**  
**Redevelopment Plan Figures**



2 ROADWAY PAVING DETAIL N.T.S. 3 CURB RAMP SECTION N.T.S. 4 CURB RAMP PLAN N.T.S. 5 CURB RAMP PLAN N.T.S.

**LEGEND**

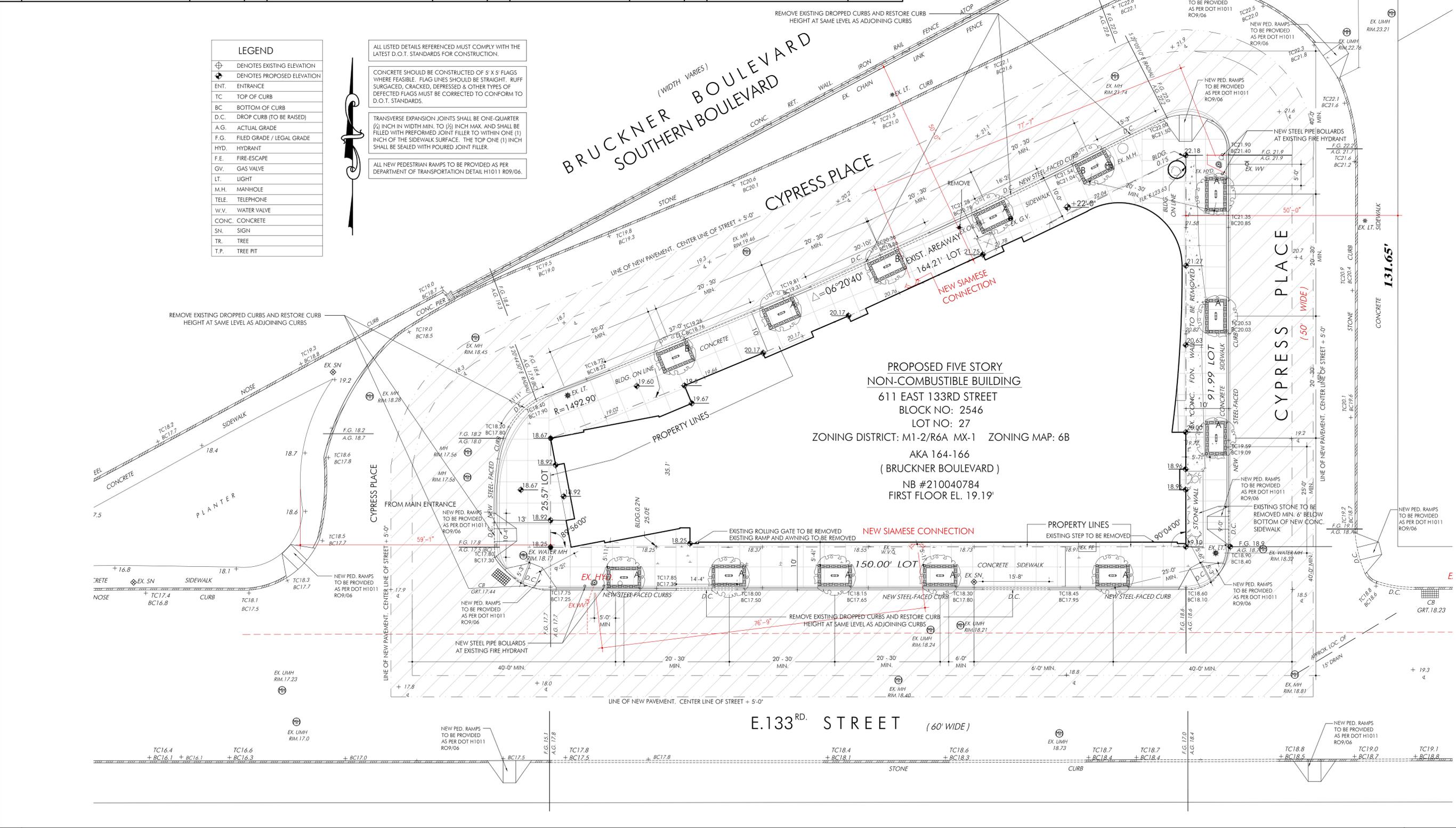
⊕	DENOTES EXISTING ELEVATION
⊕	DENOTES PROPOSED ELEVATION
ENT.	ENTRANCE
TC	TOP OF CURB
BC	BOTTOM OF CURB
D.C.	DROP CURB (TO BE RAISED)
A.G.	ACTUAL GRADE
F.G.	FILED GRADE / LEGAL GRADE
HYD.	HYDRANT
F.E.	FIRE-ESCAPE
GV.	GAS VALVE
LT.	LIGHT
M.H.	MANHOLE
TELE.	TELEPHONE
W.V.	WATER VALVE
CONC.	CONCRETE
SN.	SIGN
TR.	TREE
T.P.	TREE PIT

ALL LISTED DETAILS REFERENCED MUST COMPLY WITH THE LATEST D.O.T. STANDARDS FOR CONSTRUCTION.

CONCRETE SHOULD BE CONSTRUCTED OF 5' X 5' FLAGS WHERE FEASIBLE. FLAG LINES SHOULD BE STRAIGHT, RUFF SURFACED, CRACKED, DEPRESSED & OTHER TYPES OF DEFECTED FLAGS MUST BE CORRECTED TO CONFORM TO D.O.T. STANDARDS.

TRANSVERSE EXPANSION JOINTS SHALL BE ONE-QUARTER (1/4) INCH IN WIDTH MIN. TO (1/2) INCH MAX. AND SHALL BE FILLED WITH PREFORMED JOINT FILLER TO WITHIN ONE (1) INCH OF THE SIDEWALK SURFACE. THE TOP ONE (1) INCH SHALL BE SEALED WITH POURED JOINT FILLER.

ALL NEW PEDESTRIAN RAMPS TO BE PROVIDED AS PER DEPARTMENT OF TRANSPORTATION DETAIL H1011 R09/06.



**ARCHITECTURE**

PARTNERS FOR ARCHITECTURE

48 LINCOLN STREET, BUILDING 3, STAMFORD, CONNECTICUT 06904  
P: 203.358.0101 F: 203.358.0102

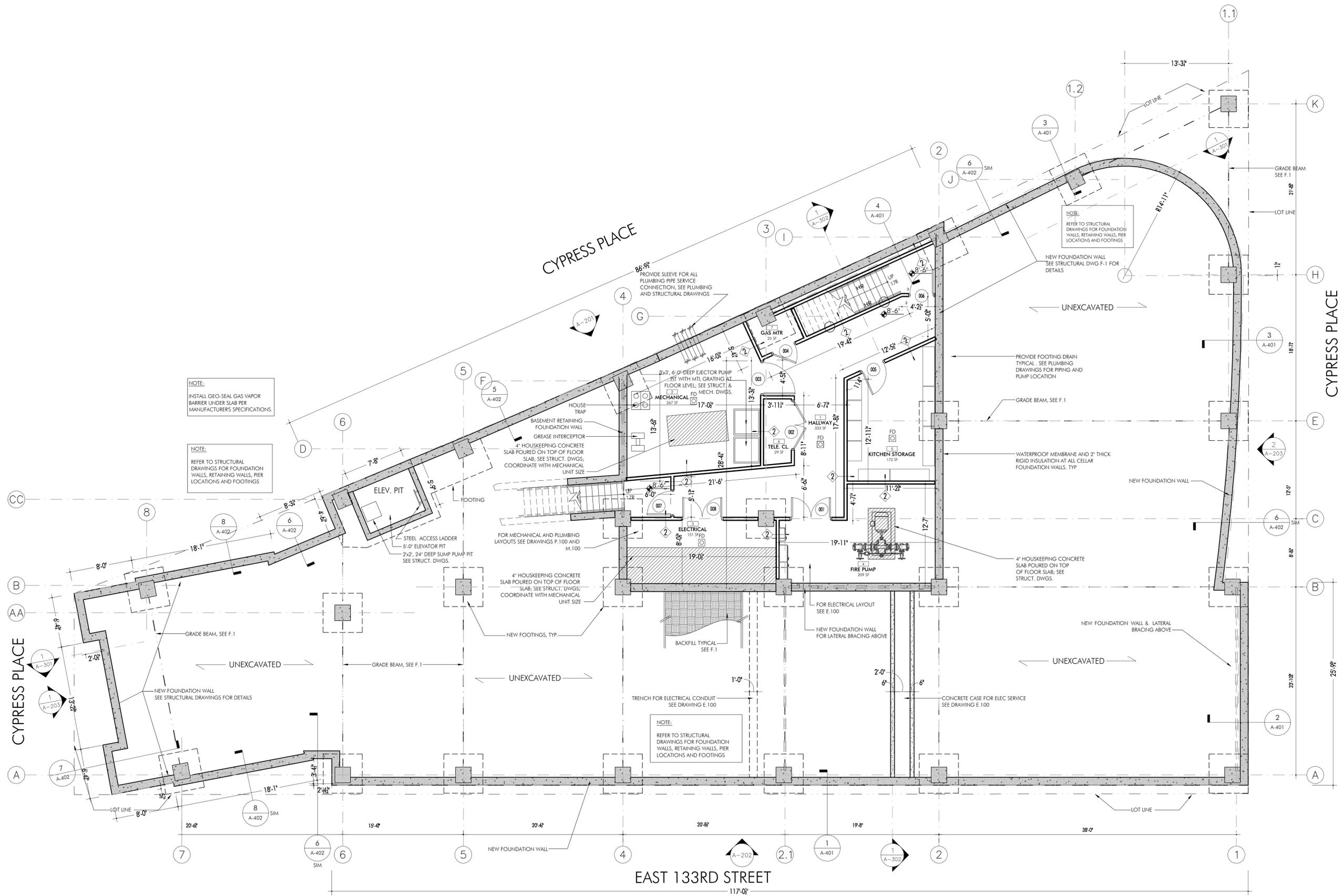
NO.	DATE	SCOPE	DISTRIBUTION
1	02.03.09	ISSUED FOR APPROVAL	DOB
2			
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7			
8			
9			
10			

PHASE: CD  
STATUS: 100%

NEW BUILDING FOR:  
**SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS**  
611 EAST 133RD STREET  
BRONX, NEW YORK 10454

PROJECT NO.: BPP-902.00  
DATE: 09/08/07  
DRAWN BY: VG  
CHECKED BY: VG  
BRANNING NO.:

**BUILDERS PAVEMENT PLAN & DETAILS**



NOTE:  
INSTALL GEO-SEAL GAS VAPOR BARRIER UNDER SLAB PER MANUFACTURER'S SPECIFICATIONS.

NOTE:  
REFER TO STRUCTURAL DRAWINGS FOR FOUNDATION WALLS, RETAINING WALLS, PIER LOCATIONS AND FOOTINGS

NOTE:  
REFER TO STRUCTURAL DRAWINGS FOR FOUNDATION WALLS, RETAINING WALLS, PIER LOCATIONS AND FOOTINGS

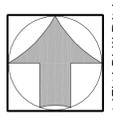
NOTE:  
REFER TO STRUCTURAL DRAWINGS FOR FOUNDATION WALLS, RETAINING WALLS, PIER LOCATIONS AND FOOTINGS

SEAL	
------	--

NO.	DATE	ISSUED FOR CONTRACT	OWNER/CONTRACTOR	DISTRIBUTION
1	12.15.08			

PHASE CD  
STATUS 100%

PROJECT NO.: 07-356  
DATE: 12.05.07  
DRAWN BY: SVG  
CHECKED BY: SVG  
APPROVED BY: SVG



PROJECT NO.: 07-356  
DATE: 12.05.07  
DRAWN BY: SVG  
CHECKED BY: SVG  
APPROVED BY: SVG

NEW BUILDING FOR:  
**SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS**  
611 EAST 133RD STREET  
BRONX, NEW YORK 10454

POPULATION		
FLOOR	STUDENTS	ADULTS
5	217	11
4	217	25
3	217	18
2	202	35
1	285	33
TOTALS	1,138	122

TOILET FIXTURES SCHEDULE			
STUDENTS	FIXTURES	REQUIRED	PROPOSED
1,138	WATER CLOSET	$\frac{1}{35} = 33$	39
1,138	LAVATORIES	$\frac{1}{50} = 23$	30
ADULTS			
122	WATER CLOSET	$111-150=6$	6
122	LAVATORIES	$91-125=5$	6

**EXTERIOR GLAZING LEGEND**

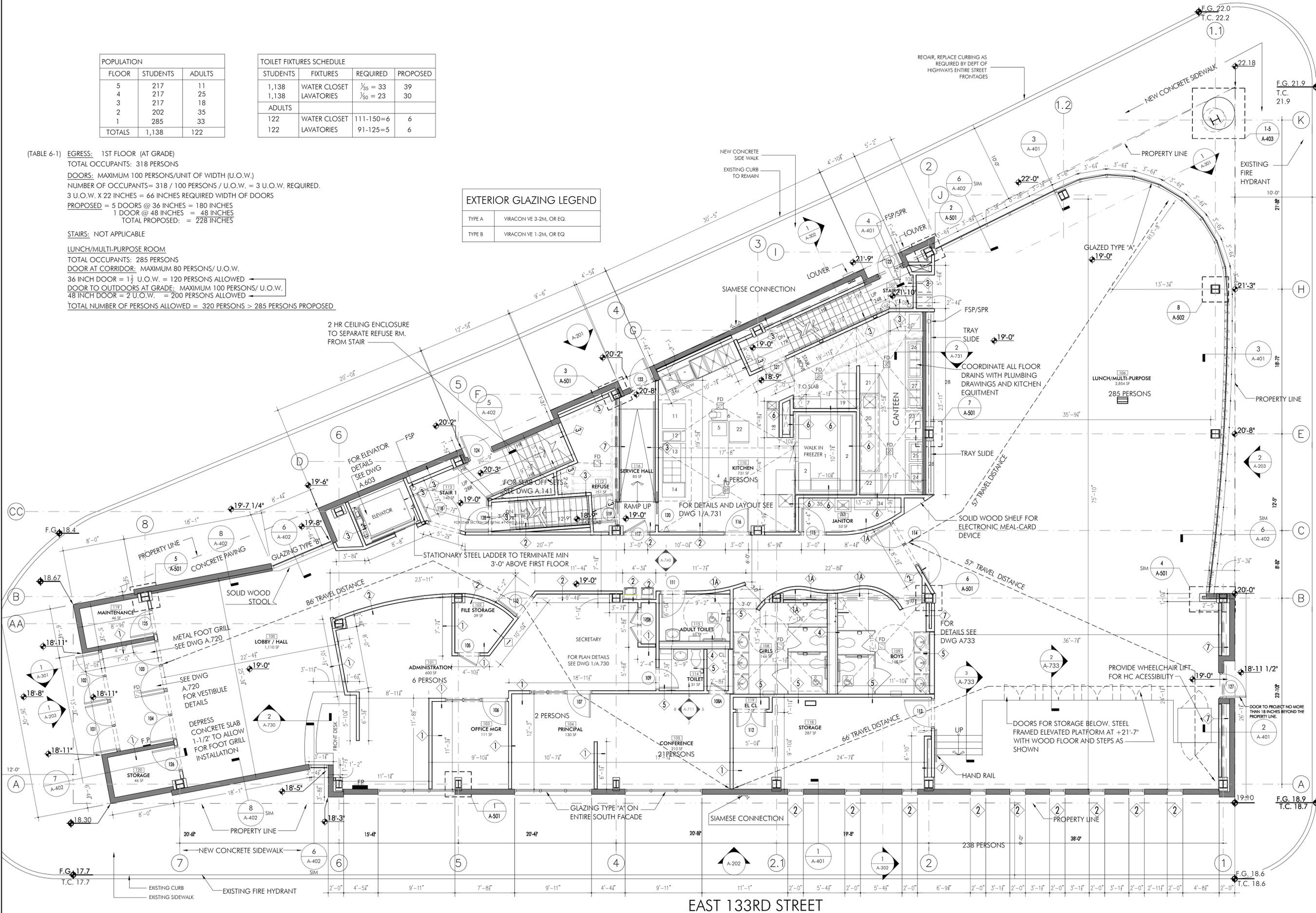
TYPE A	VIRACON VE 3-2M, OR EQ.
TYPE B	VIRACON VE 1-2M, OR EQ.

(TABLE 6-1) EGRESS: 1ST FLOOR (AT GRADE)  
 TOTAL OCCUPANTS: 318 PERSONS  
 DOORS: MAXIMUM 100 PERSONS/UNIT OF WIDTH (U.O.W.)  
 NUMBER OF OCCUPANTS = 318 / 100 PERSONS / U.O.W. = 3 U.O.W. REQUIRED.  
 3 U.O.W. X 22 INCHES = 66 INCHES REQUIRED WIDTH OF DOORS  
 PROPOSED = 5 DOORS @ 36 INCHES = 180 INCHES  
 1 DOOR @ 48 INCHES = 48 INCHES  
 TOTAL PROPOSED: = 228 INCHES

STAIRS: NOT APPLICABLE

**LUNCH/MULTI-PURPOSE ROOM**

TOTAL OCCUPANTS: 285 PERSONS  
 DOOR AT CORRIDOR: MAXIMUM 80 PERSONS/ U.O.W.  
 36 INCH DOOR =  $1\frac{1}{2}$  U.O.W. = 120 PERSONS ALLOWED  
 DOOR TO OUTDOORS AT GRADE: MAXIMUM 100 PERSONS/ U.O.W.  
 48 INCH DOOR = 2 U.O.W. = 200 PERSONS ALLOWED  
 TOTAL NUMBER OF PERSONS ALLOWED = 320 PERSONS > 285 PERSONS PROPOSED



CYPRESS PLACE

EAST 133RD STREET

NO.	DATE	SCOPE	OWNER/CONTRACTOR	DISTRIBUTION
1	12.15.07	ISSUED FOR CONTRACT		
2				
3				
4				
5				
6				
7				
8				

CD	100%
STATUS	

PHASE: CD 100%  
 STATUS: 100%  
 PROJECT NO.: 07-356  
 DATE: 12.05.07  
 DRAWN BY: SVG  
 CHECKED BY: SVG  
 APPROVED BY: SVG  
 PROJECT: NEW BUILDING FOR SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS  
 611 EAST 133RD STREET  
 BRONX, NEW YORK 10454



PROJECT NO.:	07-356
DATE:	12.05.07
DRAWN BY:	SVG
CHECKED BY:	SVG
APPROVED BY:	SVG
DRAWING NO.:	A-101

SHEET NO.: **A-101**

(TABLE 6-1) EGRESS: 2ND FLOOR  
 TOTAL OCCUPANTS: 237 PERSONS  
 DOORS: MAXIMUM 80 PERSONS/UNIT OF WIDTH (U.O.W.)  
 NUMBER OF OCCUPANTS = 237 / 80 PERSONS / U.O.W. = 3 U.O.W. REQUIRED.  
 3 U.O.W. X 22 INCHES = 66 INCHES REQUIRED WIDTH OF DOORS  
 PROPOSED = 3 DOORS @ 36 INCHES = 108 INCHES

STAIRS: MAXIMUM 60 PERSONS / U.O.W.  
 NUMBER OF OCCUPANTS = 237 PERSONS

STAIR # 1  
 5'-0" WIDE (60") = 2 1/2 U.O.W.  
 EGRESS CAPACITY OF 3'-8" (44") STAIR  
 44" U.O.W. = 2 U.O.W.  
 60 PERSONS/U.O.W. X 2 U.O.W. = 120 PERSONS ALLOWED.

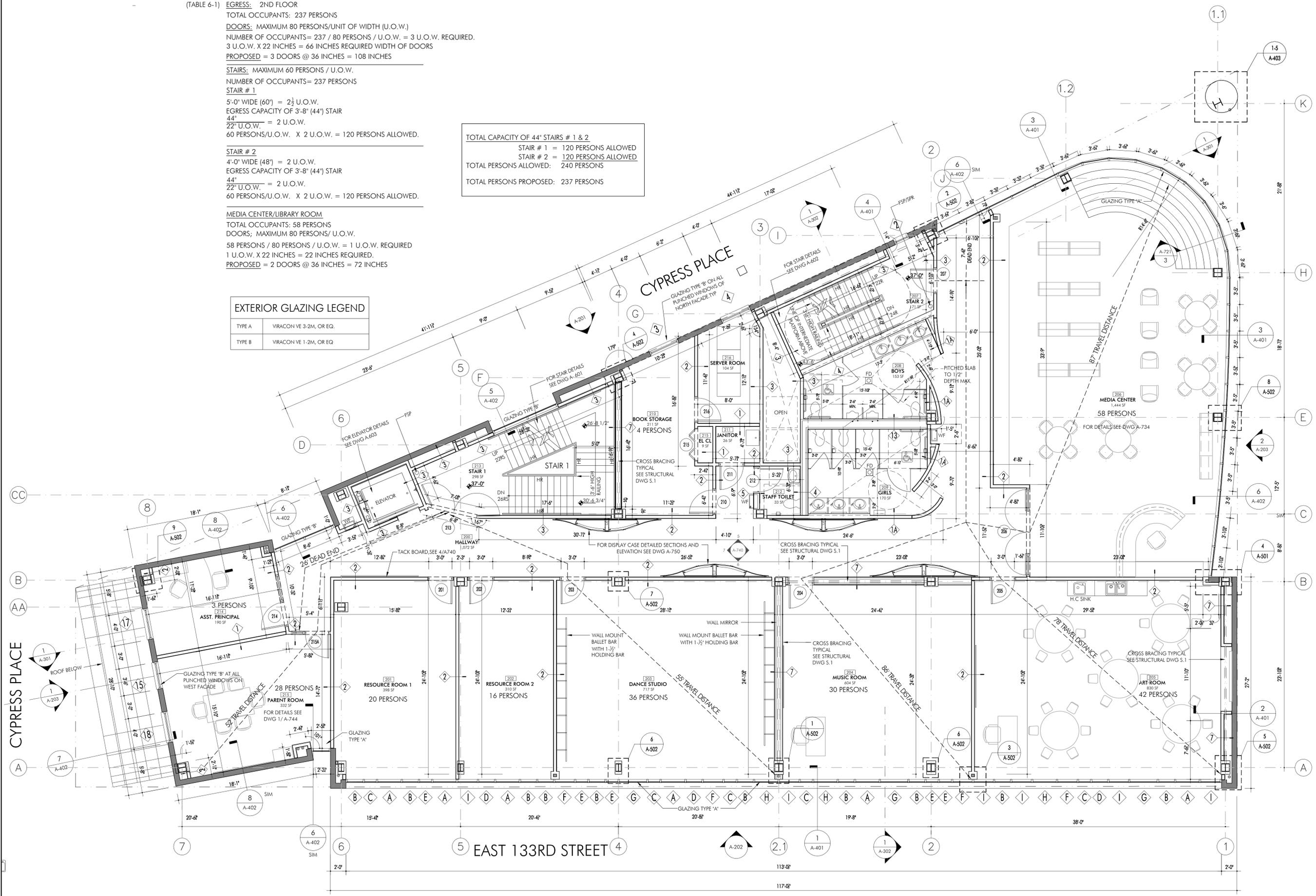
STAIR # 2  
 4'-0" WIDE (48") = 2 U.O.W.  
 EGRESS CAPACITY OF 3'-8" (44") STAIR  
 44" U.O.W. = 2 U.O.W.  
 60 PERSONS/U.O.W. X 2 U.O.W. = 120 PERSONS ALLOWED.

MEDIA CENTER/LIBRARY ROOM  
 TOTAL OCCUPANTS: 58 PERSONS  
 DOORS: MAXIMUM 80 PERSONS / U.O.W.  
 58 PERSONS / 80 PERSONS / U.O.W. = 1 U.O.W. REQUIRED  
 1 U.O.W. X 22 INCHES = 22 INCHES REQUIRED.  
 PROPOSED = 2 DOORS @ 36 INCHES = 72 INCHES

TOTAL CAPACITY OF 44" STAIRS # 1 & 2  
 STAIR # 1 = 120 PERSONS ALLOWED  
 STAIR # 2 = 120 PERSONS ALLOWED  
 TOTAL PERSONS ALLOWED: 240 PERSONS  
 TOTAL PERSONS PROPOSED: 237 PERSONS

EXTERIOR GLAZING LEGEND

TYPE A	VIRACON VE 3-2M, OR EQ.
TYPE B	VIRACON VE 1-2M, OR EQ.



ARCHITECTURE  
 PARTNERS FOR ARCHITECTURE

NO.	DATE	SCOPE	DISTRIBUTION
1	12.15.08	ISSUED FOR CONTRACT	OWNER/CONTRACTOR
2			
3			
4			
5			
6			
7			
8			

PHASE	CD
STATUS	100%

NEW BUILDING FOR:  
 SOUTH BRONX CHARTER SCHOOL FOR  
 INTERNATIONAL CULTURES AND ARTS  
 611 EAST 133RD STREET  
 BRONX, NEW YORK 10454

PROJECT NO.:	07-256
DATE:	12.05.07
SCALE:	3/16" = 1'-0"
DRAWN BY:	IC
CHECKED BY:	APPROVED BY:
PROJECT NO.:	A-102

SHEET NO:  
**A-102**

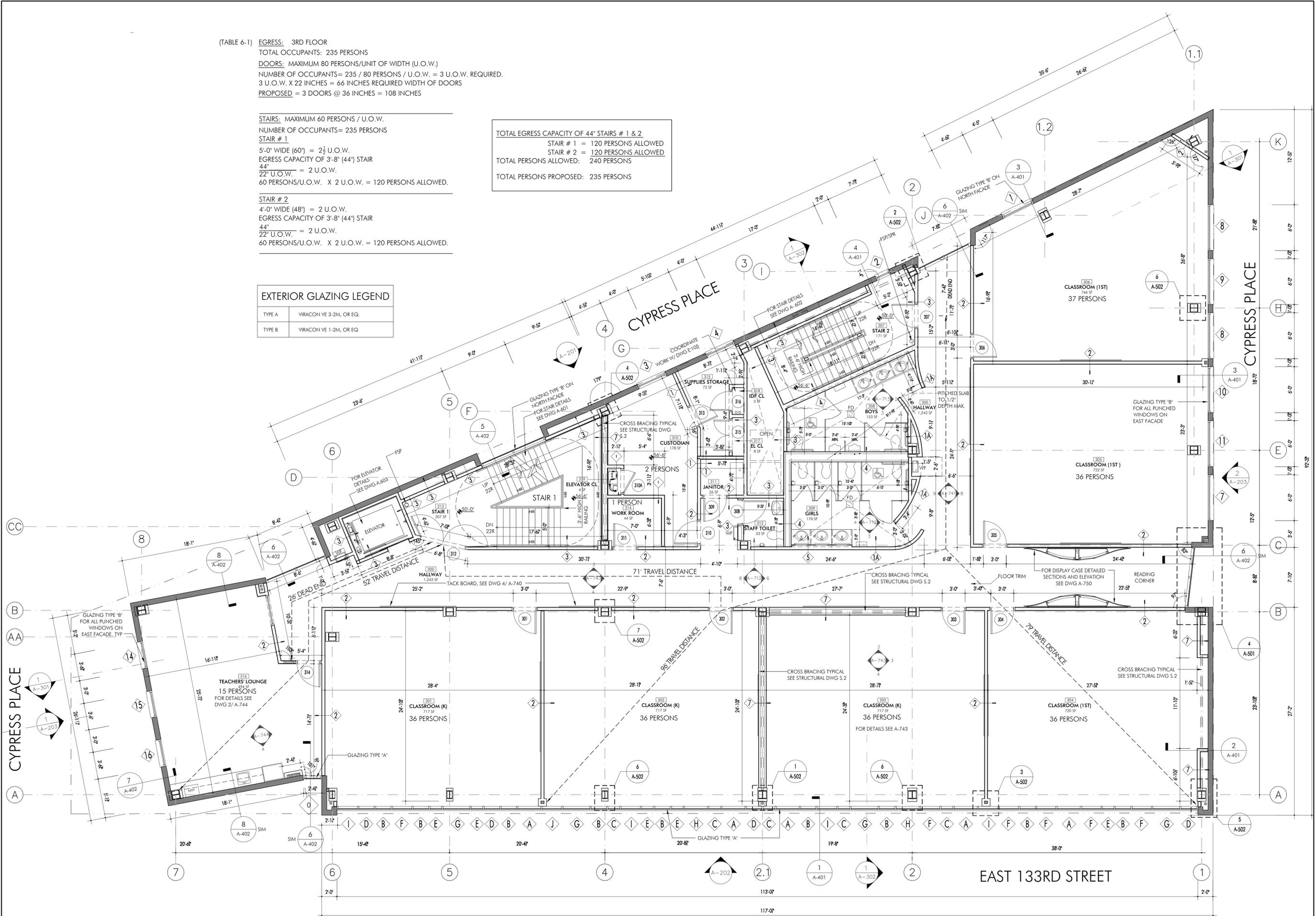
(TABLE 6-1) EGRESS: 3RD FLOOR  
 TOTAL OCCUPANTS: 235 PERSONS  
 DOORS: MAXIMUM 80 PERSONS/UNIT OF WIDTH (U.O.W.)  
 NUMBER OF OCCUPANTS = 235 / 80 PERSONS / U.O.W. = 3 U.O.W. REQUIRED.  
 3 U.O.W. X 22 INCHES = 66 INCHES REQUIRED WIDTH OF DOORS  
 PROPOSED = 3 DOORS @ 36 INCHES = 108 INCHES

STAIRS: MAXIMUM 60 PERSONS / U.O.W.  
 NUMBER OF OCCUPANTS = 235 PERSONS  
 STAIR # 1  
 5'-0" WIDE (60") = 2 1/2 U.O.W.  
 EGRESS CAPACITY OF 3'-8" (44") STAIR  
 44" / 22" U.O.W. = 2 U.O.W.  
 60 PERSONS/U.O.W. X 2 U.O.W. = 120 PERSONS ALLOWED.

STAIR # 2  
 4'-0" WIDE (48") = 2 U.O.W.  
 EGRESS CAPACITY OF 3'-8" (44") STAIR  
 44" / 22" U.O.W. = 2 U.O.W.  
 60 PERSONS/U.O.W. X 2 U.O.W. = 120 PERSONS ALLOWED.

TOTAL EGRESS CAPACITY OF 44" STAIRS # 1 & 2  
 STAIR # 1 = 120 PERSONS ALLOWED  
 STAIR # 2 = 120 PERSONS ALLOWED  
 TOTAL PERSONS ALLOWED: 240 PERSONS  
 TOTAL PERSONS PROPOSED: 235 PERSONS

EXTERIOR GLAZING LEGEND	
TYPE A	VIRACON VE 3-2M, OR EQ.
TYPE B	VIRACON VE 1-2M, OR EQ.



PARTNERS FOR ARCHITECTURE

48 HUNTON STREET, BRONX, NY 10451  
 P: 203.708.5047 F: 203.438.4145

NO.	DATE	ISSUED FOR CONTRACT	SCOPE	OWNER/CONTRACTOR	DISTRIBUTION
1	12.15.08				

PHASE CD  
STATUS 100%

PROJECT NO.: 07-356  
 DATE: 12.05.07  
 DRAWN BY: 3/16-1/0  
 CHECKED BY:  
 ID:  
 DRAWING NO.: A-103

THIRD LEVEL FLOOR PLAN

NEW BUILDING FOR:  
 SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS  
 611 EAST 133RD STREET  
 BRONX, NEW YORK 10454

SHEET NO.: **A-103**

3/16" = 1'-0"



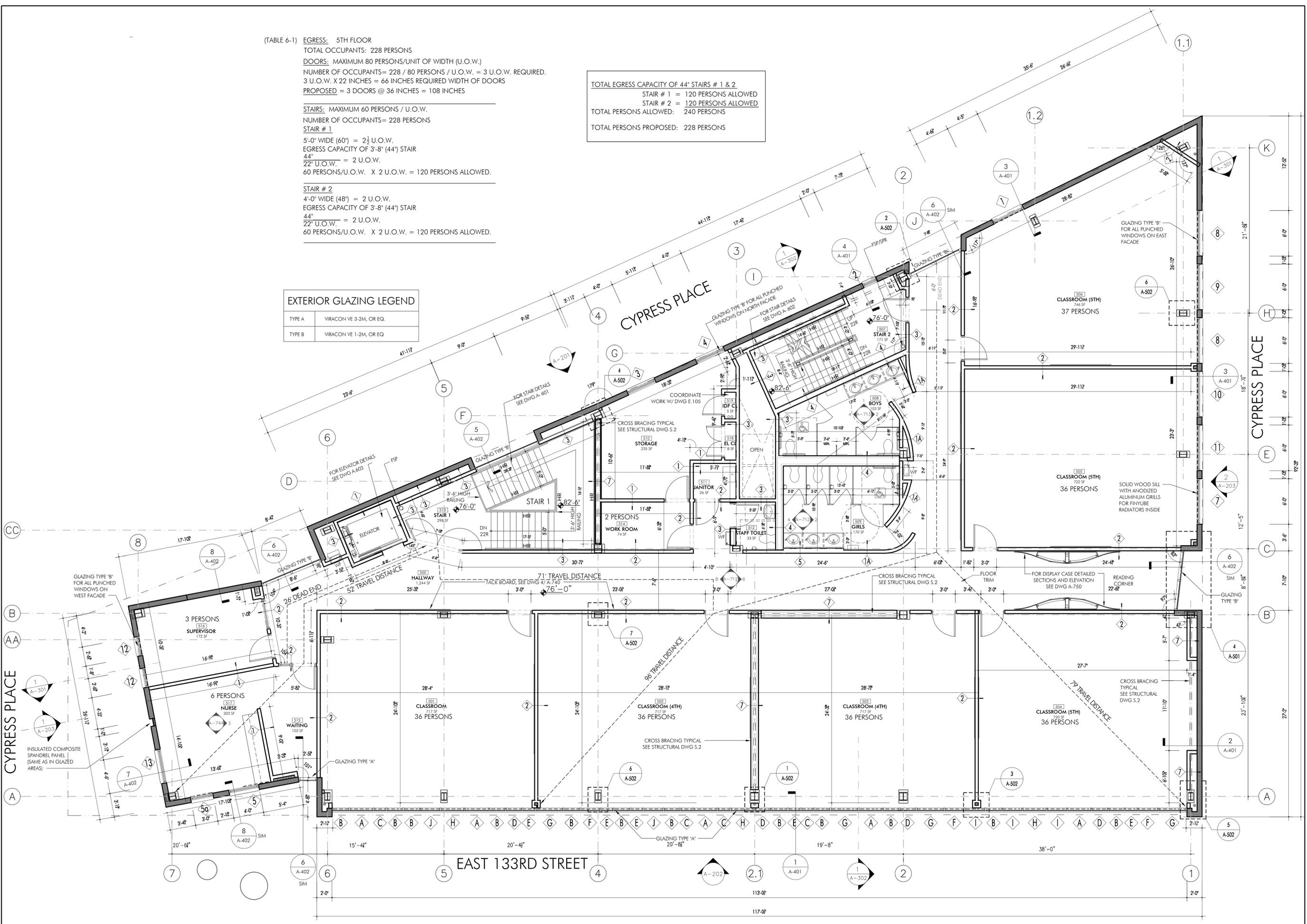
(TABLE 6-1) EGRESS: 5TH FLOOR  
 TOTAL OCCUPANTS: 228 PERSONS  
 DOORS: MAXIMUM 80 PERSONS/UNIT OF WIDTH (U.O.W.)  
 NUMBER OF OCCUPANTS = 228 / 80 PERSONS / U.O.W. = 3 U.O.W. REQUIRED.  
 3 U.O.W. X 22 INCHES = 66 INCHES REQUIRED WIDTH OF DOORS  
 PROPOSED = 3 DOORS @ 36 INCHES = 108 INCHES

STAIRS: MAXIMUM 60 PERSONS / U.O.W.  
 NUMBER OF OCCUPANTS = 228 PERSONS  
 STAIR # 1  
 5'-0" WIDE (60") = 2 1/2 U.O.W.  
 EGRESS CAPACITY OF 3'-8" (44") STAIR  
 44" / 22" U.O.W. = 2 U.O.W.  
 60 PERSONS/U.O.W. X 2 U.O.W. = 120 PERSONS ALLOWED.

STAIR # 2  
 4'-0" WIDE (48") = 2 U.O.W.  
 EGRESS CAPACITY OF 3'-8" (44") STAIR  
 44" / 22" U.O.W. = 2 U.O.W.  
 60 PERSONS/U.O.W. X 2 U.O.W. = 120 PERSONS ALLOWED.

TOTAL EGRESS CAPACITY OF 44" STAIRS # 1 & 2  
 STAIR # 1 = 120 PERSONS ALLOWED  
 STAIR # 2 = 120 PERSONS ALLOWED  
 TOTAL PERSONS ALLOWED: 240 PERSONS  
 TOTAL PERSONS PROPOSED: 228 PERSONS

EXTERIOR GLAZING LEGEND	
TYPE A	VIRACON VE 3-2M, OR EQ.
TYPE B	VIRACON VE 1-2M, OR EQ.



PARTNERS FOR ARCHITECTURE

48 HUNTON STREET, BROOKLYN, NEW YORK 11211  
 P: 203.738.8207 F: 203.738.8145

NO.	DATE	ISSUED FOR	CONTRACT	OWNER/CONTRACTOR	DISTRIBUTION
1	12.15.08	ISSUED	CONTRACT		
2					
3					
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12					

PHASE CD STAIRS 100%

NEW BUILDING FOR:  
 SOUTH BRONX CHARTER SCHOOL FOR  
 INTERNATIONAL CULTURES AND ARTS  
 611 EAST 133RD STREET  
 BRONX, NEW YORK 10454

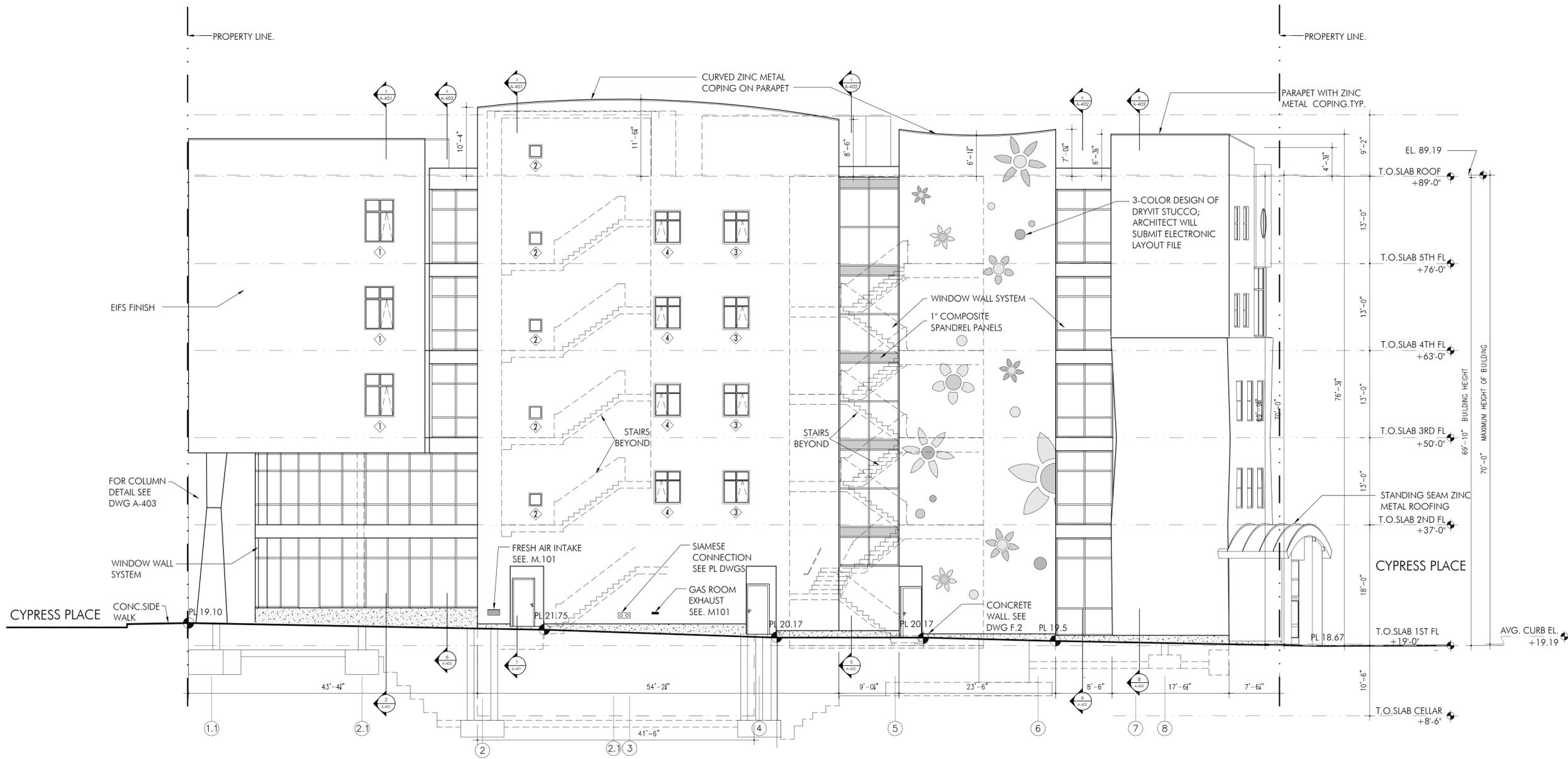
PROJECT NO.:	07-356	APPROVED BY:	A-105
DATE:	12.05.07	CHECKED BY:	
SCALE:	3/16"=1'-0"	DRAWN BY:	
DRAWING NO.:			

FIFTH LEVEL FLOOR PLAN

SHEET NO. **A-105**

3/16"=1'-0"





NO.	DATE	ISSUED FOR CONTRACT	OWNER/CONTRACTOR	DISTRIBUTION
1				
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PHASE:	CD
STATUS:	100%

NEW BUILDING FOR:  
**SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS**  
 611 EAST 133RD STREET  
 BRONX, NEW YORK 10454

PROJECT NO.: 07-559  
 DATE: 05.06.08  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 APPROVED BY: [Signature]  
 DRAWING NO.: A-201

SCALE: 1/8" = 1'-0"  
 NORTH ELEVATION (BRUCKNER BLVD.)

SHEET NO.: **A-201**



SEAL

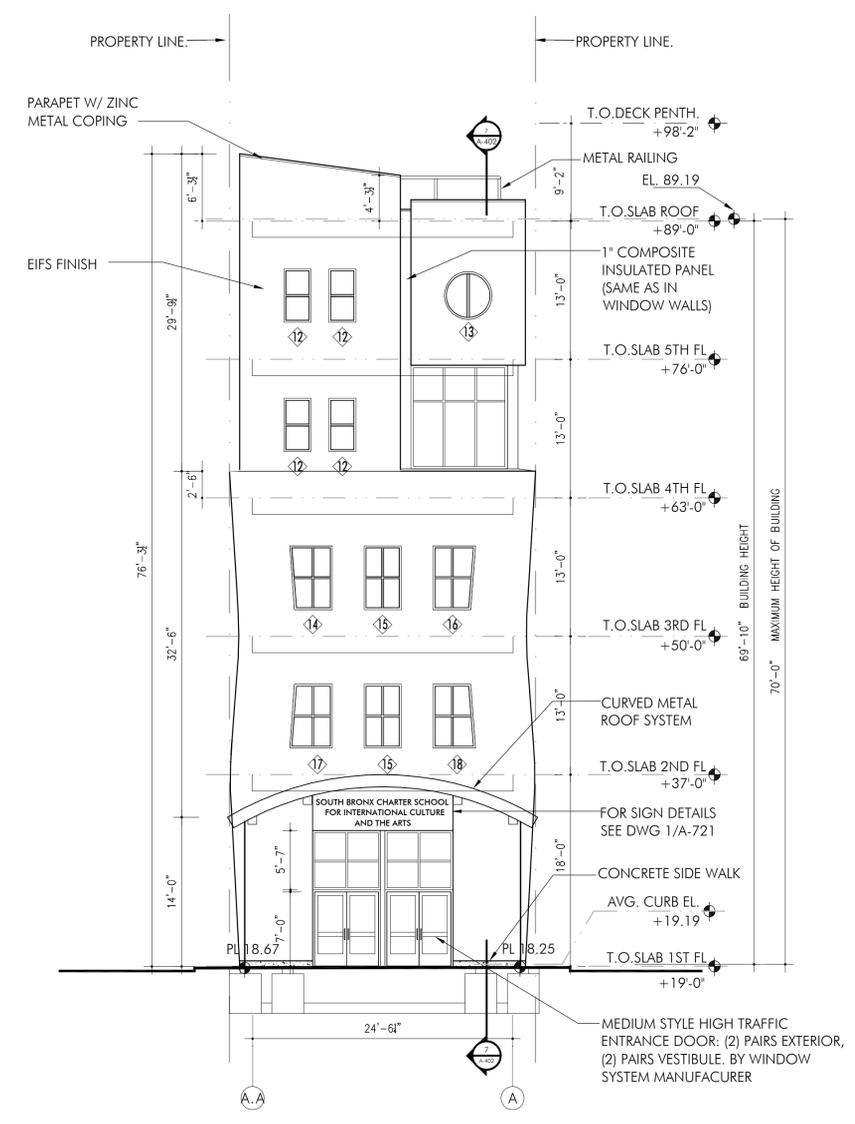
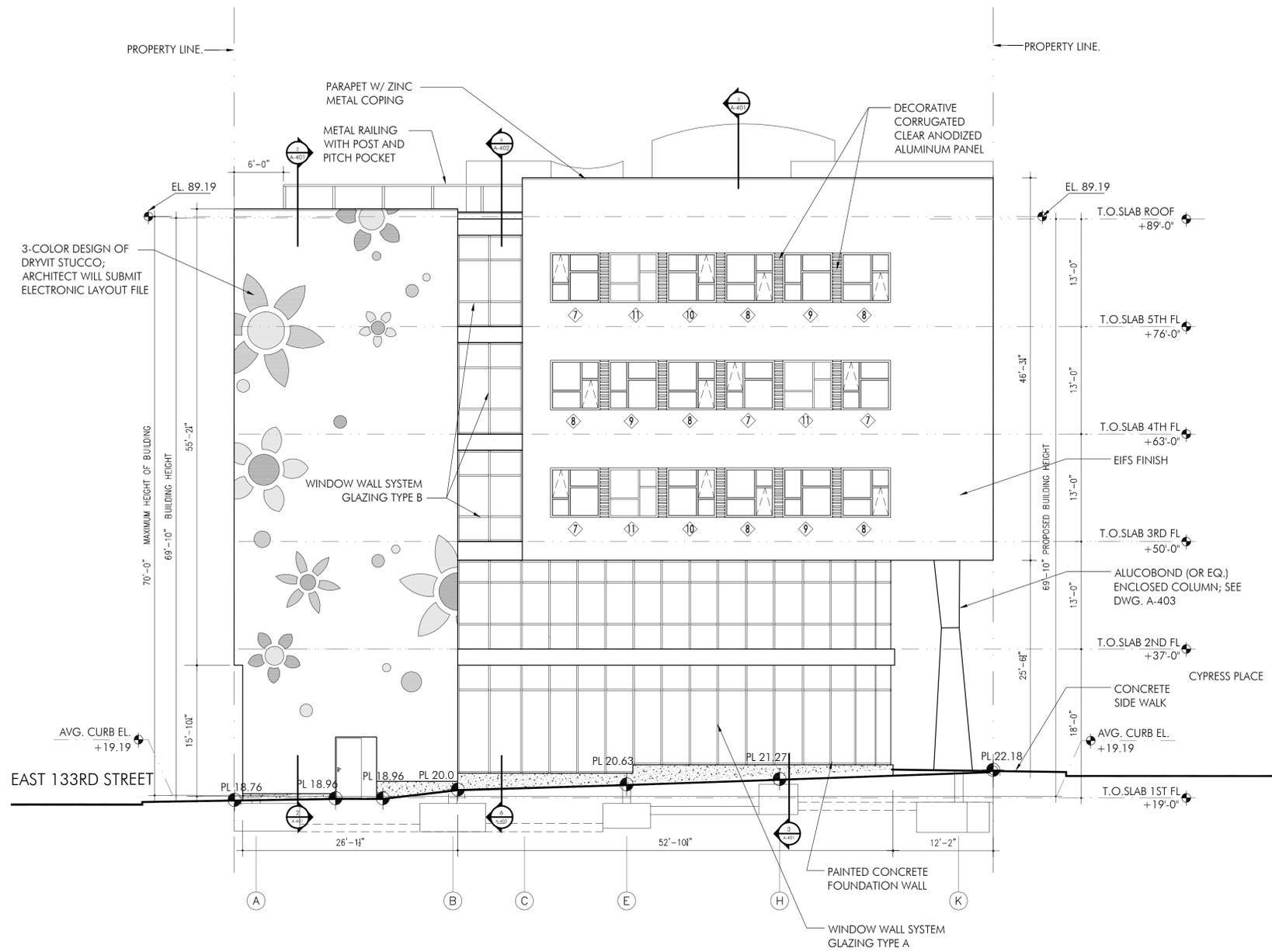
NO.	DATE	SCOPE	OWNER/CONTRACTOR	DISTRIBUTION
1	12.15.08	ISSUED FOR CONTRACT		
2				
3				
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5				
6				
7				
8				
9				
10				

PHASE CD  
STATUS 100%

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NEW BUILDING FOR:  
SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS  
611 EAST 133RD STREET  
BRONX, NEW YORK 10454

SCALE: 1/8"=1'-0"	DATE: 05.06.08	PROJECT NO.: 07-536
DRAWN BY: FY	CHECKED BY:	APPROVED BY:
DRAWING NO: A-202	SOUTH ELEVATION (EAST 133RD STREET)	



PL22'-18"

NO.	DATE	ISSUED FOR CONTRACT	DRAWN BY	SCOPE	DISTRIBUTION
1	XX	12.15.08			

PHASE	CD
STATUS	100%

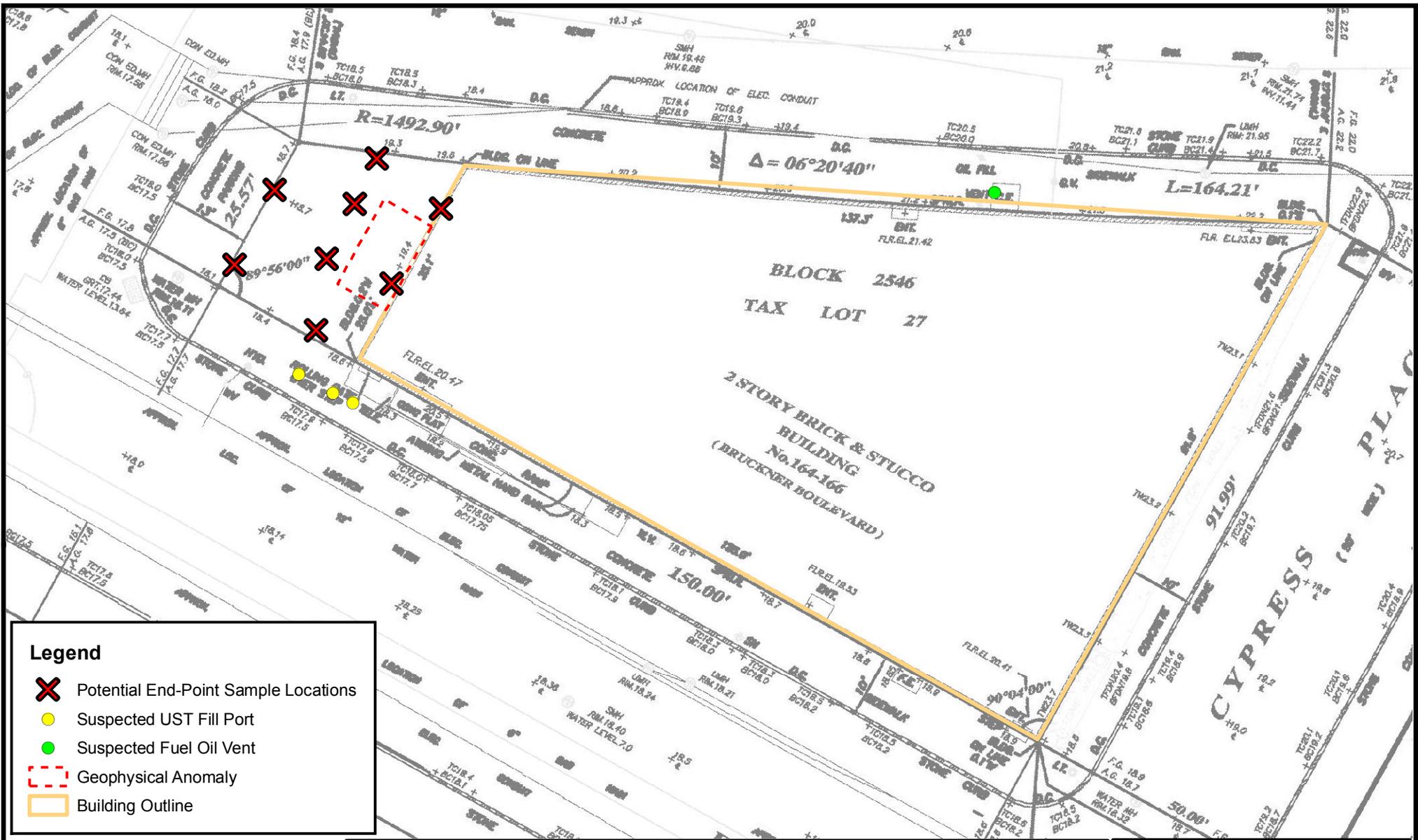
NEW BUILDING FOR:  
 SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS  
 611 EAST 133RD STREET  
 BRONX, NEW YORK 10454

PROJECT NO.: 07-558  
 DATE: 05.06.2008  
 DRAWN BY: P  
 CHECKED BY: P  
 APPROVED BY: A-203  
 DRAWING NO.: A-203

WEST & EAST SIDE ELEVATIONS

**Figure 5**

**Map of Potential End-Point Sample Locations**



**Legend**

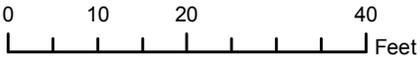
- Potential End-Point Sample Locations
- Suspected UST Fill Port
- Suspected Fuel Oil Vent
- Geophysical Anomaly
- Building Outline

BASEMAP:  
 "ALTA/ACSM LAND TITLE SURVEY",  
 ARTISTOTLE BOURNAZOS, P.C.,  
 DATED 6-15-2007

**POTENTIAL END-POINT SAMPLE LOCATIONS**  
 SOUTH BRONX CHARTER SCHOOL  
 611 EAST 133rd STREET  
 BRONX, NEW YORK



One Civic Center Plaza  
 Suite 501  
 Poughkeepsie, New York 12601  
 Phone: (845) 454-2544  
 Fax: (845) 454-2655



**FIGURE 5**

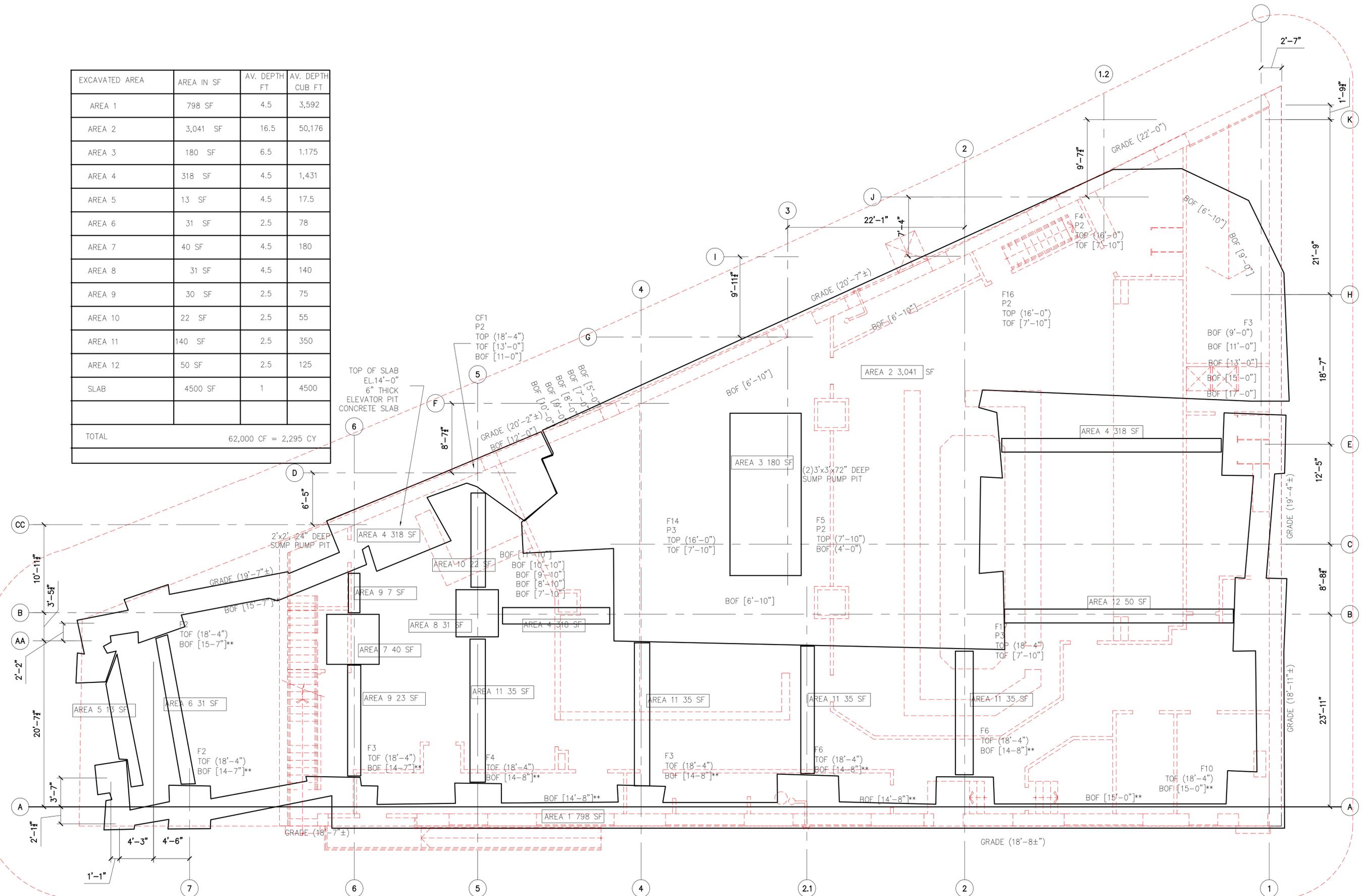


DATE:	04/26/2013
SCALE:	As Indicated
PROJECT NUMBER:	160862

ALL LOCATIONS APPROXIMATE

**Figure 6**  
**Excavation Plan**

EXCAVATED AREA	AREA IN SF	AV. DEPTH FT	AV. DEPTH CUB FT
AREA 1	798 SF	4.5	3,592
AREA 2	3,041 SF	16.5	50,176
AREA 3	180 SF	6.5	1,175
AREA 4	318 SF	4.5	1,431
AREA 5	13 SF	4.5	17.5
AREA 6	31 SF	2.5	78
AREA 7	40 SF	4.5	180
AREA 8	31 SF	4.5	140
AREA 9	30 SF	2.5	75
AREA 10	22 SF	2.5	55
AREA 11	140 SF	2.5	350
AREA 12	50 SF	2.5	125
SLAB	4500 SF	1	4500
TOTAL			62,000 CF = 2,295 CY



ISSUE NO.	DATE	SCOPE	OWNER/CONTRACTOR	DISTRIBUTION
1	02-15-13	ISSUED FOR CONTRACT		

PHASE	STATUS
..	..

ADDITIONS & RENOVATIONS TO  
SOUTH BRONX CHARTER SCHOOL FOR  
INTERNATIONAL CULTURES AND ARTS  
611 EAST 133RD STREET  
BRONX, NEW YORK 10454



PROJECT NO. 07-256	DATE 05-02-08	CHECKED BY JK	APPROVED BY JK
SCALE 1/16"=1'-0"	DRAWN BY JK	JOB JK	DRAWING NO. JK

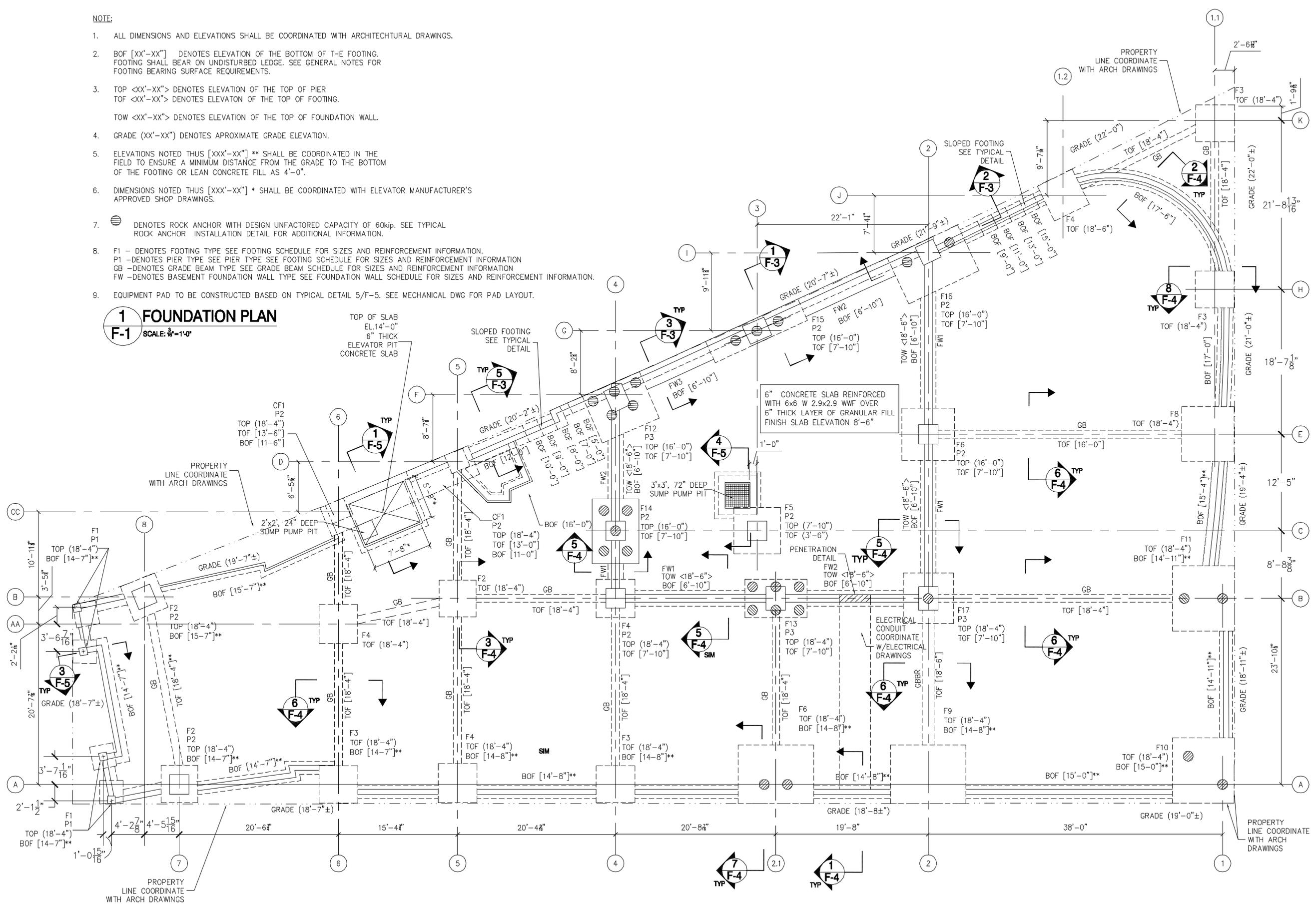
**Figure 7**  
**Site-Wide Cover System Plan**



**NOTE:**

- ALL DIMENSIONS AND ELEVATIONS SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS.
- BOF [XX'-XX"] DENOTES ELEVATION OF THE BOTTOM OF THE FOOTING. FOOTING SHALL BEAR ON UNDISTURBED LEDGE. SEE GENERAL NOTES FOR FOOTING BEARING SURFACE REQUIREMENTS.
- TOP <XX'-XX"> DENOTES ELEVATION OF THE TOP OF PIER  
TOF <XX'-XX"> DENOTES ELEVATION OF THE TOP OF FOOTING.  
TOW <XX'-XX"> DENOTES ELEVATION OF THE TOP OF FOUNDATION WALL.
- GRADE (XX'-XX") DENOTES APPROXIMATE GRADE ELEVATION.
- ELEVATIONS NOTED THUS [XXX'-XX"]\*\* SHALL BE COORDINATED IN THE FIELD TO ENSURE A MINIMUM DISTANCE FROM THE GRADE TO THE BOTTOM OF THE FOOTING OR LEAN CONCRETE FILL AS 4'-0".
- DIMENSIONS NOTED THUS [XXX'-XX"]\* SHALL BE COORDINATED WITH ELEVATOR MANUFACTURER'S APPROVED SHOP DRAWINGS.
-  DENOTES ROCK ANCHOR WITH DESIGN UNFACTORED CAPACITY OF 60kip. SEE TYPICAL ROCK ANCHOR INSTALLATION DETAIL FOR ADDITIONAL INFORMATION.
- F1 - DENOTES FOOTING TYPE SEE FOOTING SCHEDULE FOR SIZES AND REINFORCEMENT INFORMATION.  
P1 - DENOTES PIER TYPE SEE PIER TYPE SEE FOOTING SCHEDULE FOR SIZES AND REINFORCEMENT INFORMATION  
GB - DENOTES GRADE BEAM TYPE SEE GRADE BEAM SCHEDULE FOR SIZES AND REINFORCEMENT INFORMATION  
FW - DENOTES BASEMENT FOUNDATION WALL TYPE SEE FOUNDATION WALL SCHEDULE FOR SIZES AND REINFORCEMENT INFORMATION.
- EQUIPMENT PAD TO BE CONSTRUCTED BASED ON TYPICAL DETAIL 5/F-5. SEE MECHANICAL DWG FOR PAD LAYOUT.

**1 FOUNDATION PLAN**  
SCALE: 1/8" = 1'-0"



PARTNERS FOR ARCHITECTURE

140 LARSON STREET, BRONX, NY 10450, CONSTRUCTION  
P: 718.592.9200 F: 718.592.9201

B.G.M. ENGINEERING, LLC  
CONSULTING ENGINEERS  
2123 45TH ROAD, LONG ISLAND CITY, NY 11101  
52 ASCOLESE ROAD, TRUMBULL, CT 06611  
TEL: 203.462.2400 FAX: 203.462.2305  
E-MAIL: bgm@bgmcharter.com

NO.	DATE	ISSUED FOR	CONTRACTOR	OWNER	CONTRACTOR	DISTRIBUTION
1	XX	12.15.08	ISSUED	CONTRACTOR	OWNER	DISTRIBUTION
			ISSUE	REV	DATE	SCOPE

PHASE: STATUS:

ADDITIONS & RENOVATIONS TO  
SOUTH BRONX CHARTER SCHOOL FOR  
INTERNATIONAL CULTURES AND ARTS  
611 EAST 133RD STREET  
BRONX, NEW YORK 10454

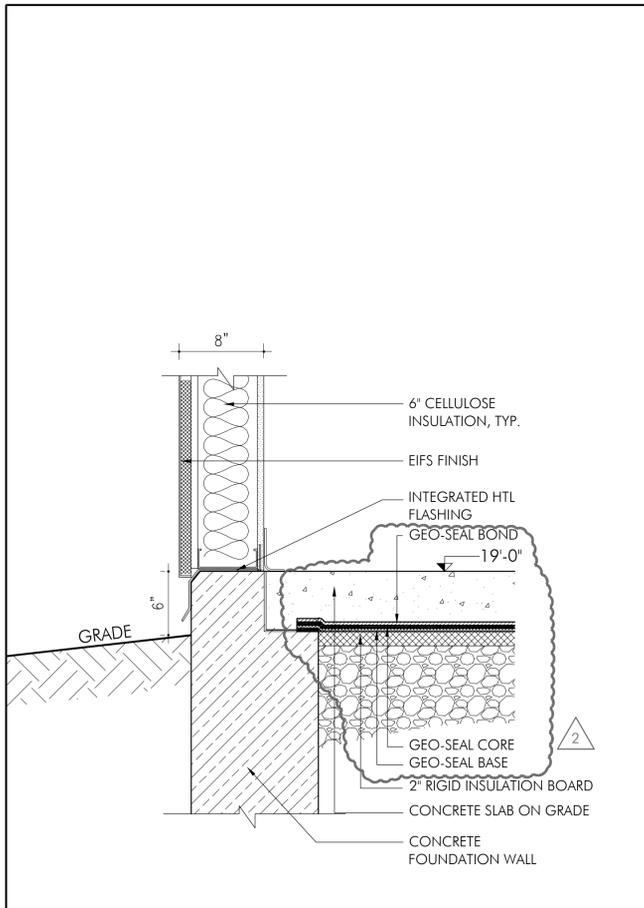
PROJECT NO.: 07-366  
DATE: 05-08-08  
SCALE: 3/16" = 1'-0"  
DRAWN BY: JK  
CHECKED BY: JB  
APPROVED BY: JB  
DRAWING NO.:

FOUNDATION PLAN

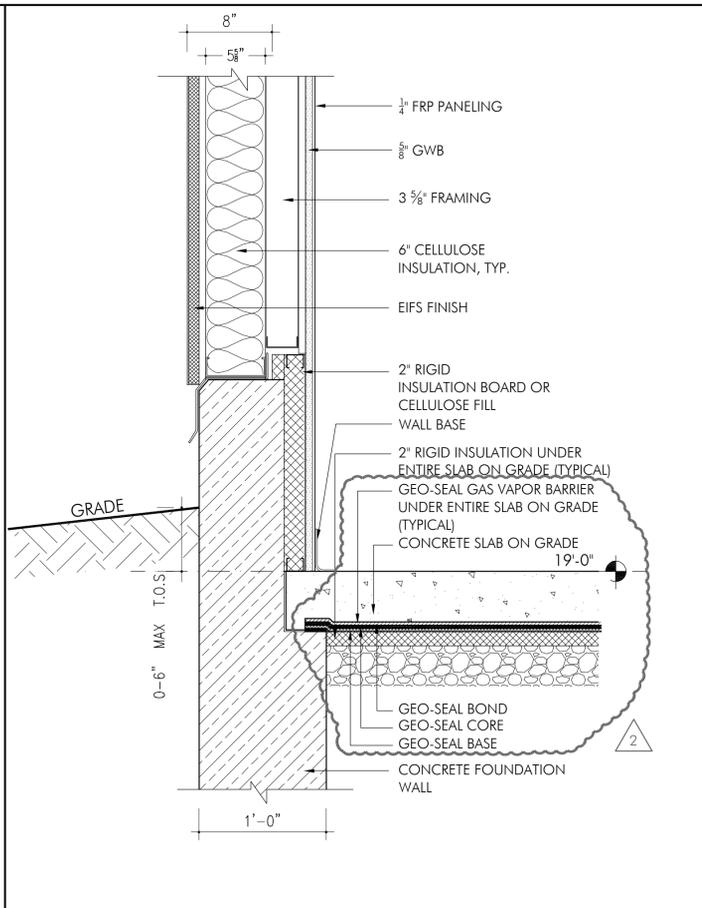
SHEET NO. **F-1**

**Figure 8**

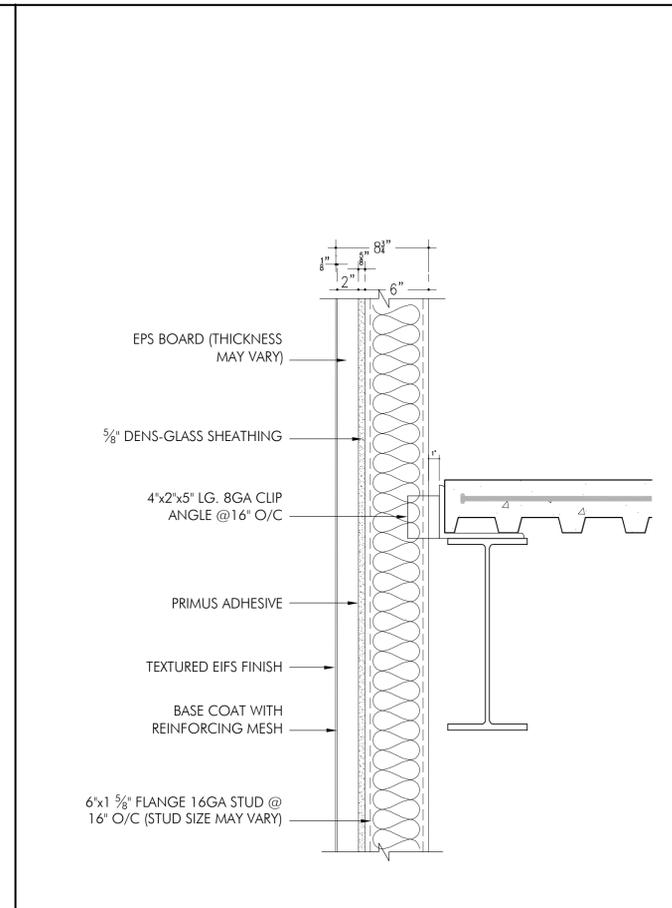
**Typical Cover Detail for all Cover Types**



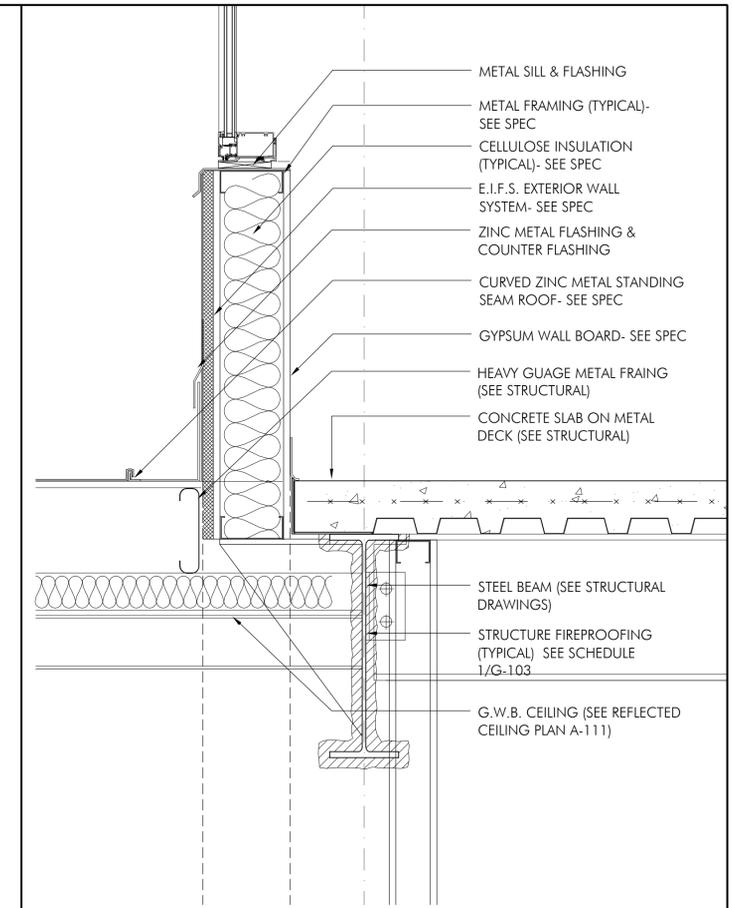
8 SECTION DETAIL @ EXTERIOR WALL 1 1/2"=1'-0"



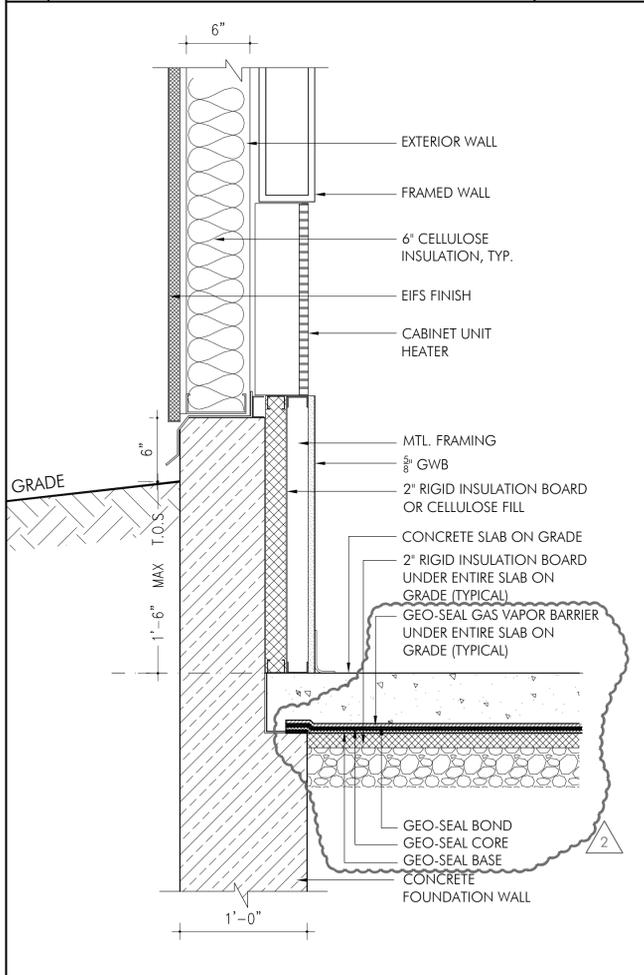
6 SECTION DETAIL @ KITCHEN 1 1/2"=1'-0"



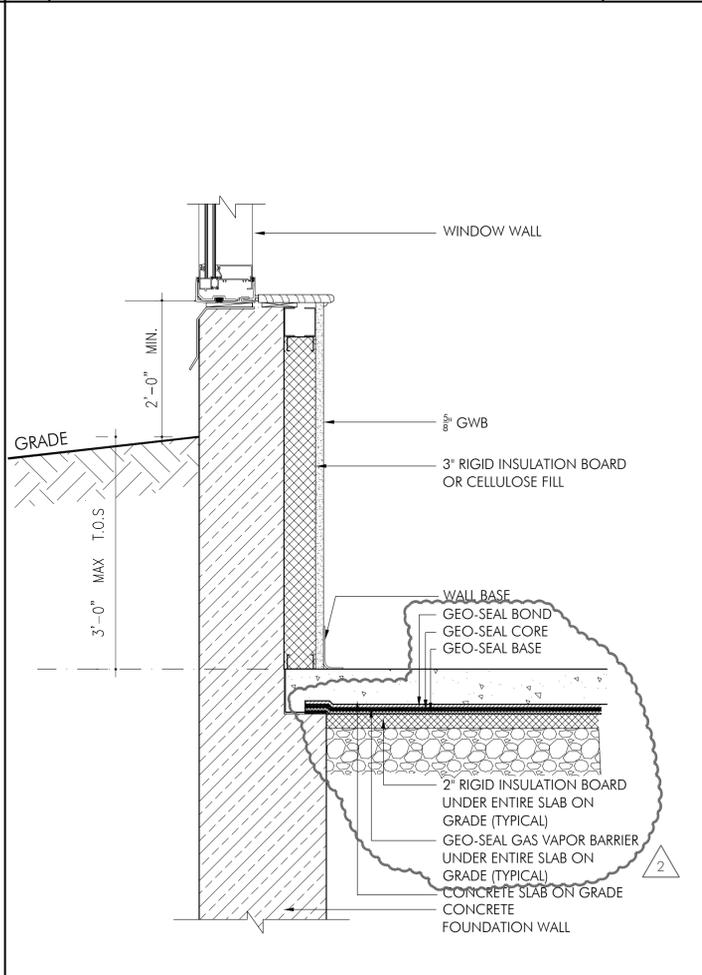
4 TYPICAL SECTION DETAIL @ ENTRY AREA EXT. WALL 1 1/2"=1'-0"



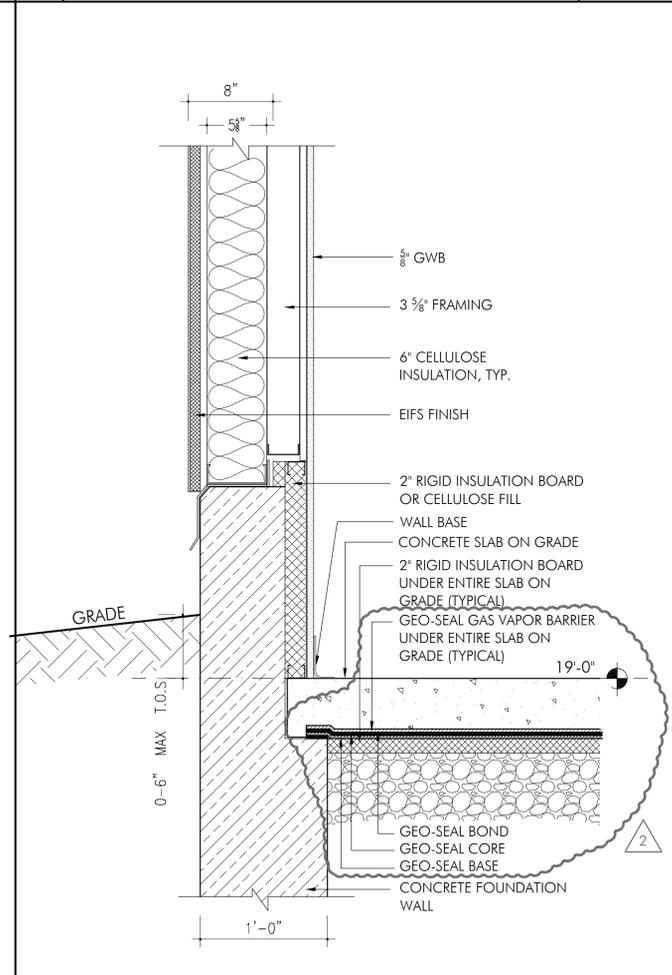
2 SECTION DETAIL AT FRONT ENTRY 1 1/2"=1'-0"



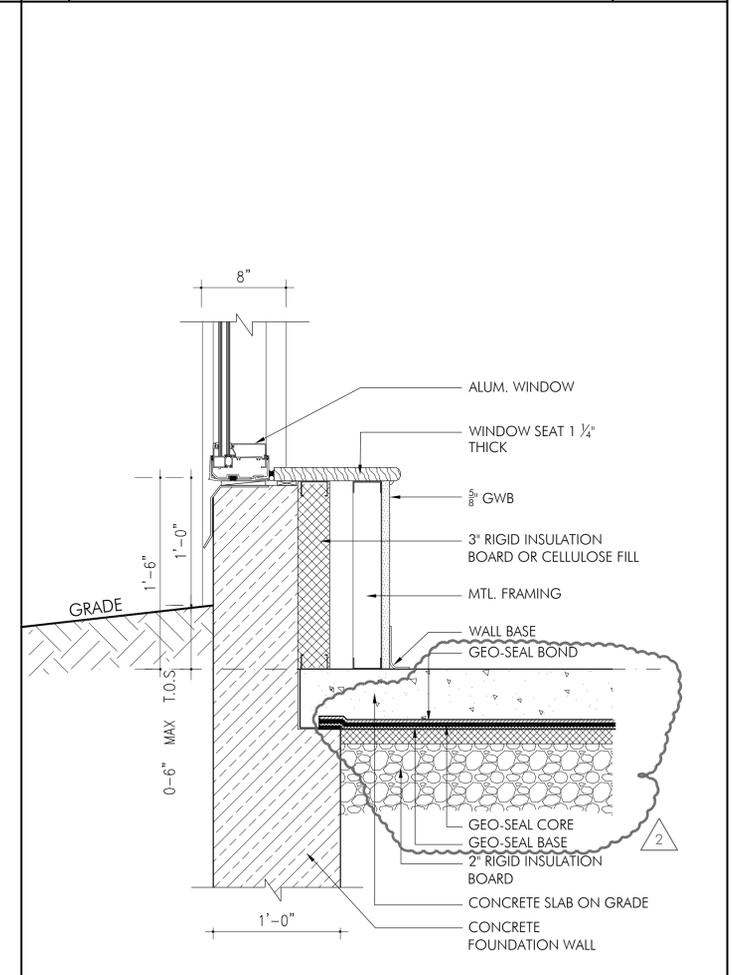
7 SECTION DETAIL @ STAIR 1 1/2"=1'-0"



5 SECTION DETAIL @ MULTI-PURPOSE ROOM 1 1/2"=1'-0"



3 SECTION DETAIL @ LOBBY 1 1/2"=1'-0"



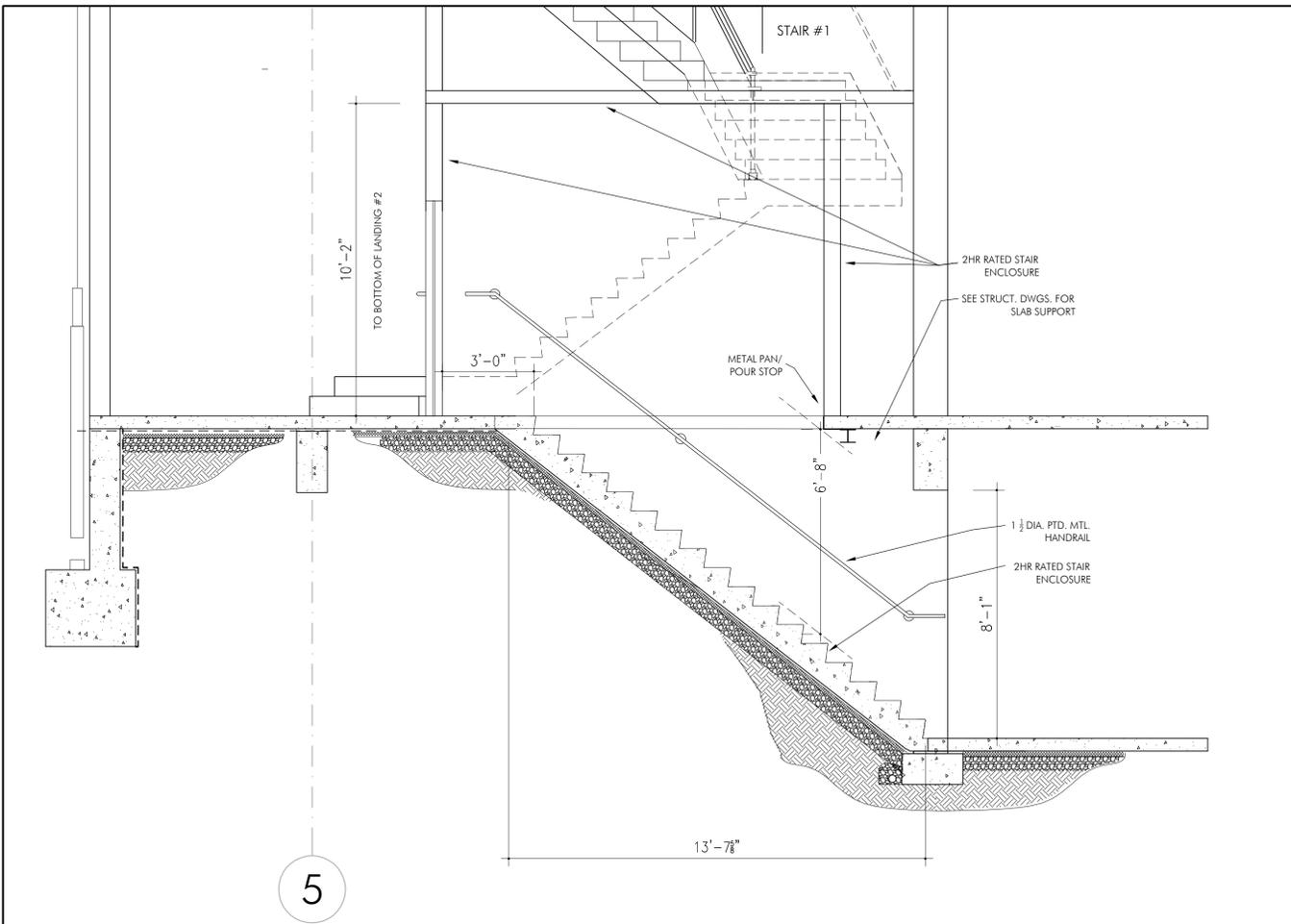
1 SECTION DETAIL @ WINDOW SILL @ LOBBY 1 1/2"=1'-0"

NO.	DATE	SCOPE	OWNER/CONTRACTOR	DISTRIBUTION
1	12.15.08	ISSUED FOR CONTRACT		
2				
3				
4				
5				
6				
7				
8				

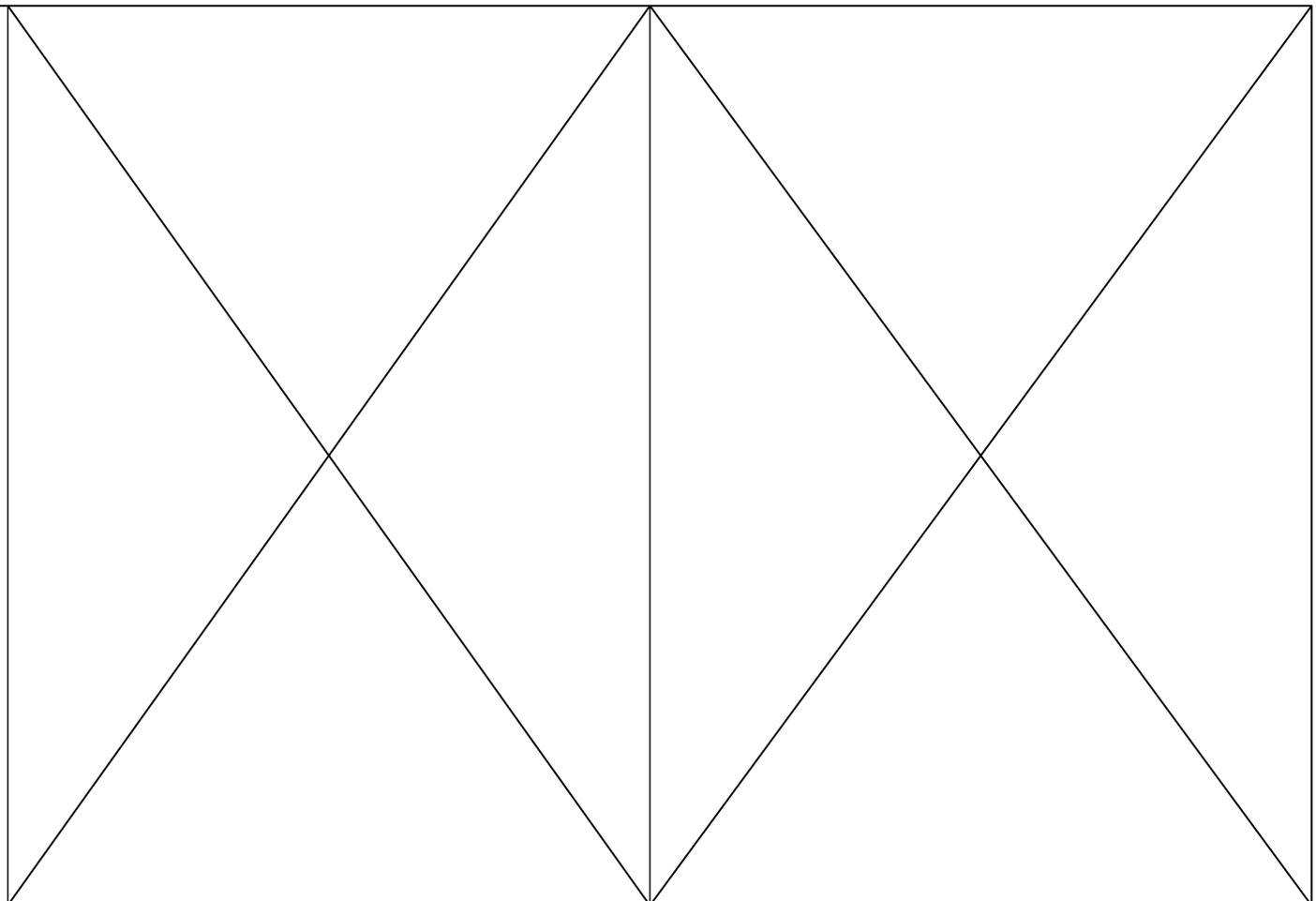
PHASE	CD
STATUS	100%

NEW BUILDING FOR:  
SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS  
611 EAST 133RD STREET  
BRONX, NEW YORK 10454

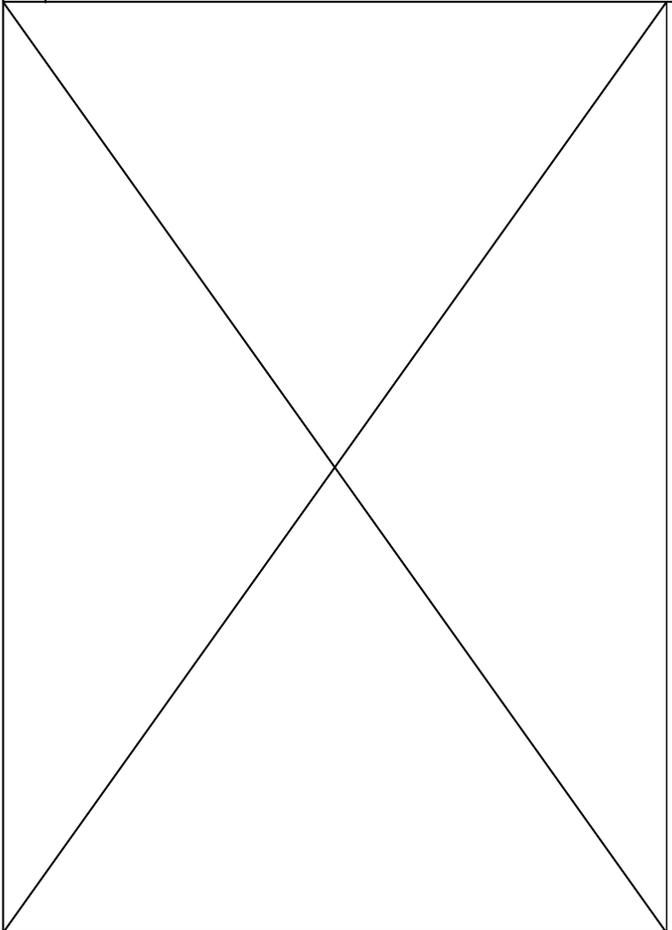
PROJECT NO.:	07-255
DATE:	03.10.08
DRAWN BY:	1.17Z
CHECKED BY:	APPROVED BY:
DRAWING NO.:	A-511
SECTION DETAILS EXTERIOR WALLS	



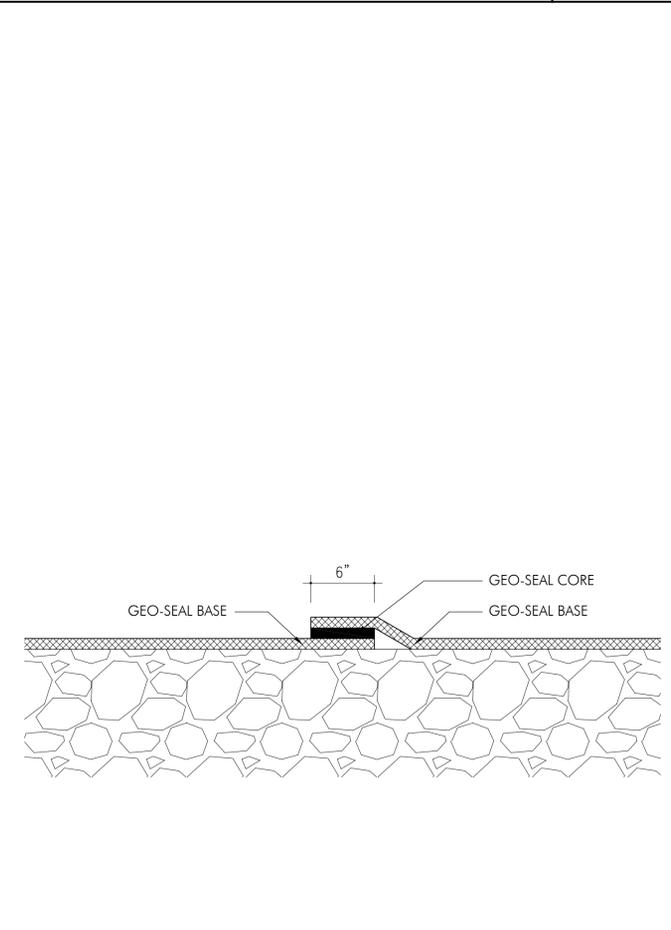
7 BASEMENT STAIR (2ND MEANS OF EGRESS) 3/8"=1'-0"



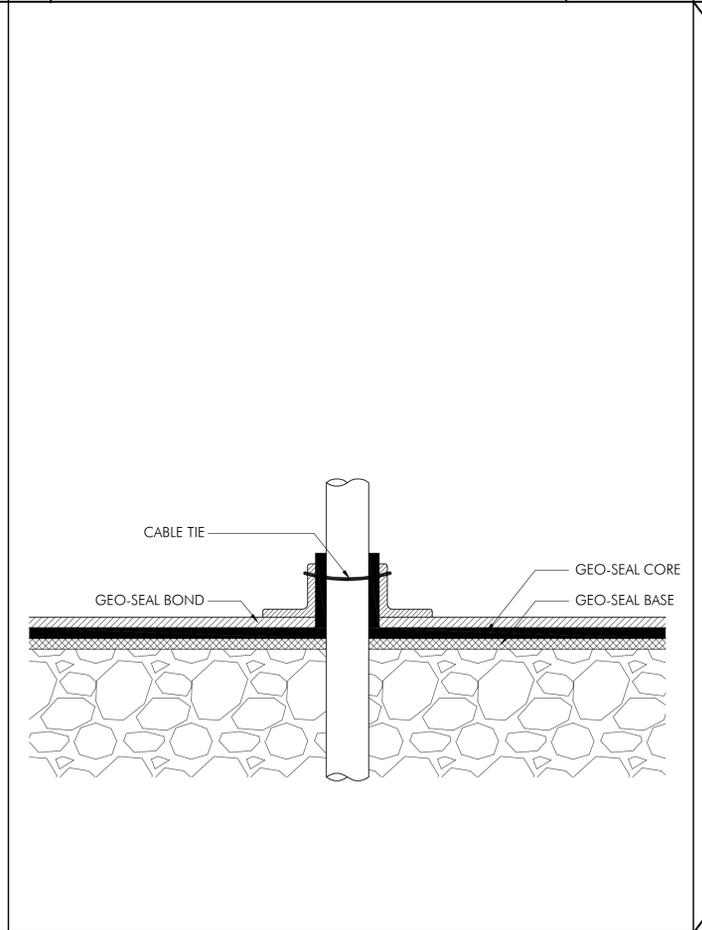
4 SECTION DETAIL 1"=1'-0" 2 SECTION DETAIL 1"=1'-0"



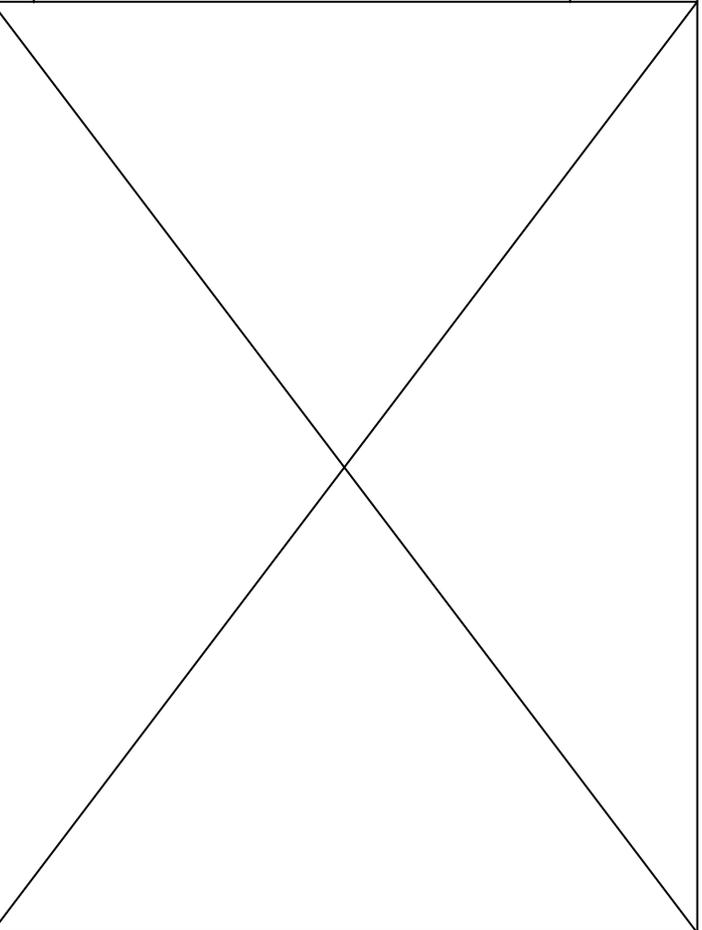
7 SECTION DETAIL 1"=1'-0"



5 GEO-SEAL BASE DETAIL 1 1/2"=1'-0"



3 GEO-SEAL PENETRATION DETAIL 1 1/2"=1'-0"



1 SECTION DETAIL 1"=1'-0"

**PARTNERS FOR ARCHITECTURE**

48 HUNTON STREET BRONX, N.Y. 10458 CONTACT: MARK P. 203.708.5507 F. 203.418.4145

SEAL

NO.	DATE	ISSUED FOR	CONTRACT	OWNER/CONTRACTOR	DISTRIBUTION
1	12.13.08	ISSUED FOR CONTRACT			
2					
3					
4					
5					
6					
7					
8					
9					
10					

PHASE: CD STATUS: 100%

**NEW BUILDING FOR: SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS**  
611 EAST 133RD STREET BRONX, NEW YORK 10454

PROJECT NO.: 07-536

DATE: 05.08.08

SCALE: 1"=1'-0"

DRAWN BY: P

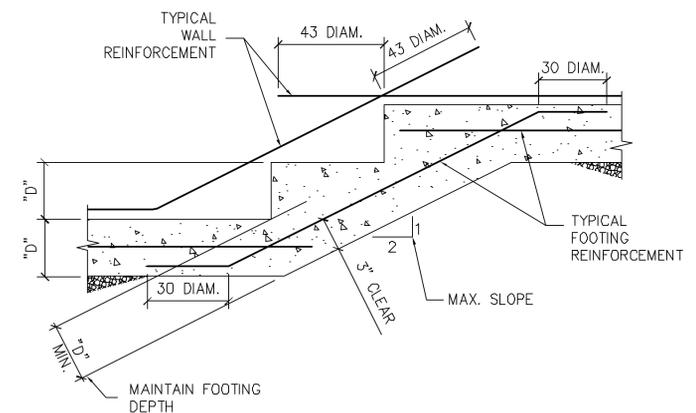
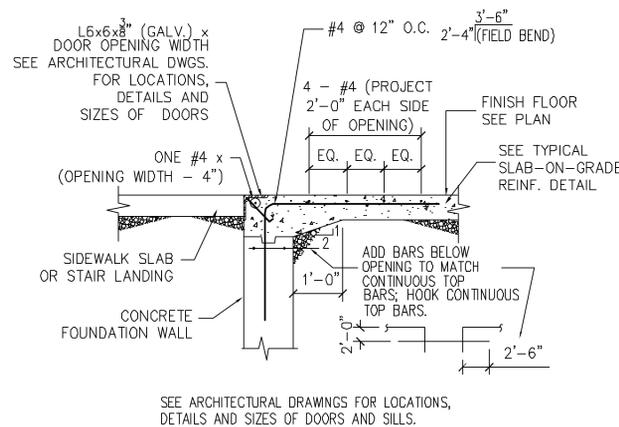
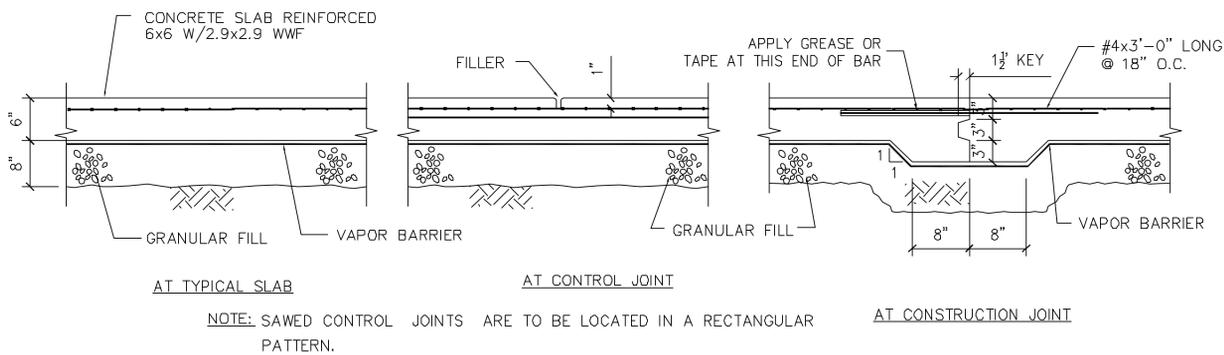
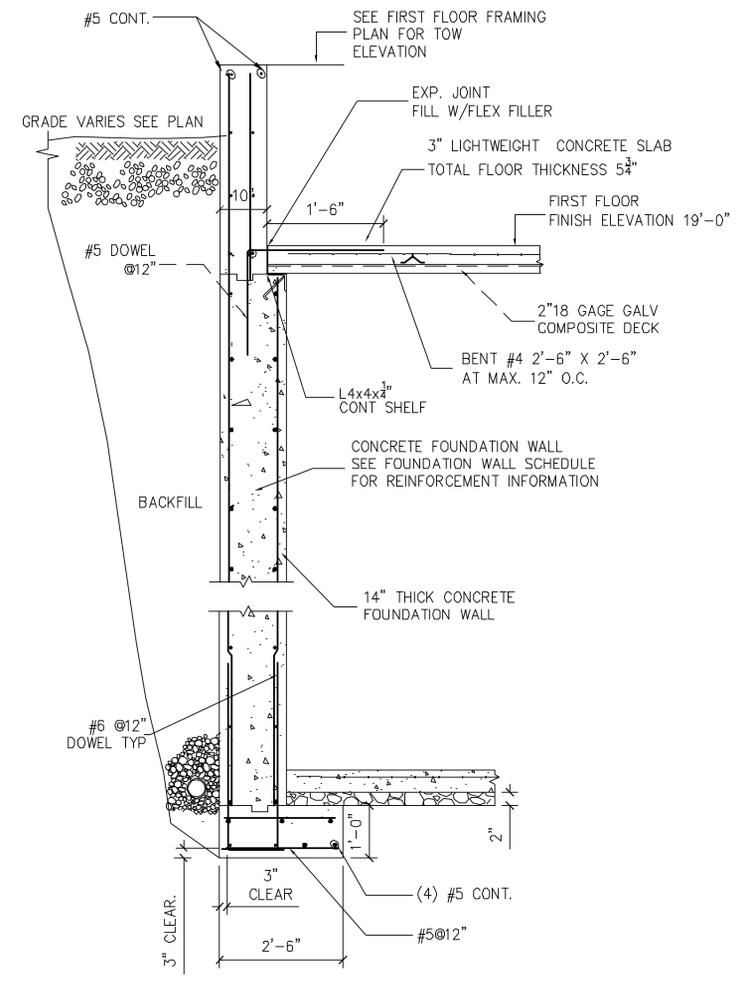
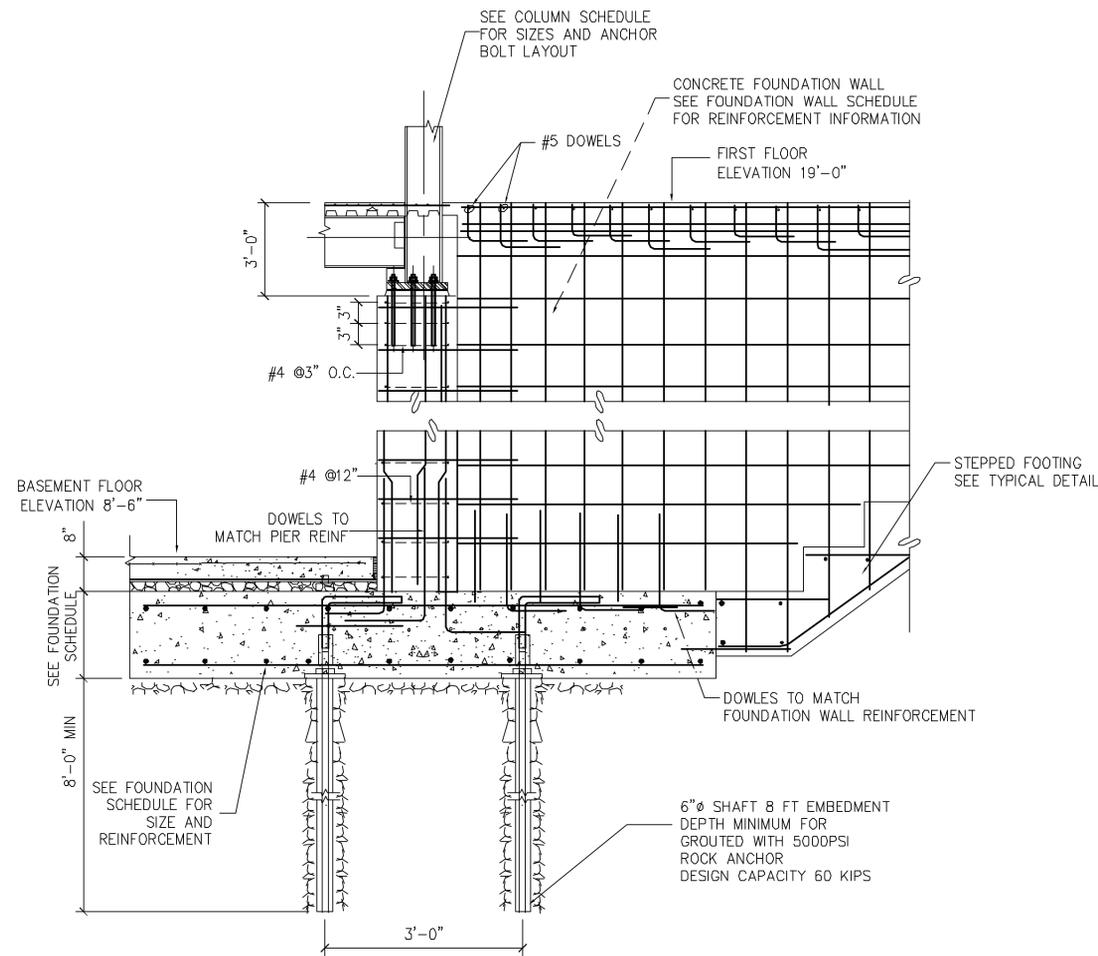
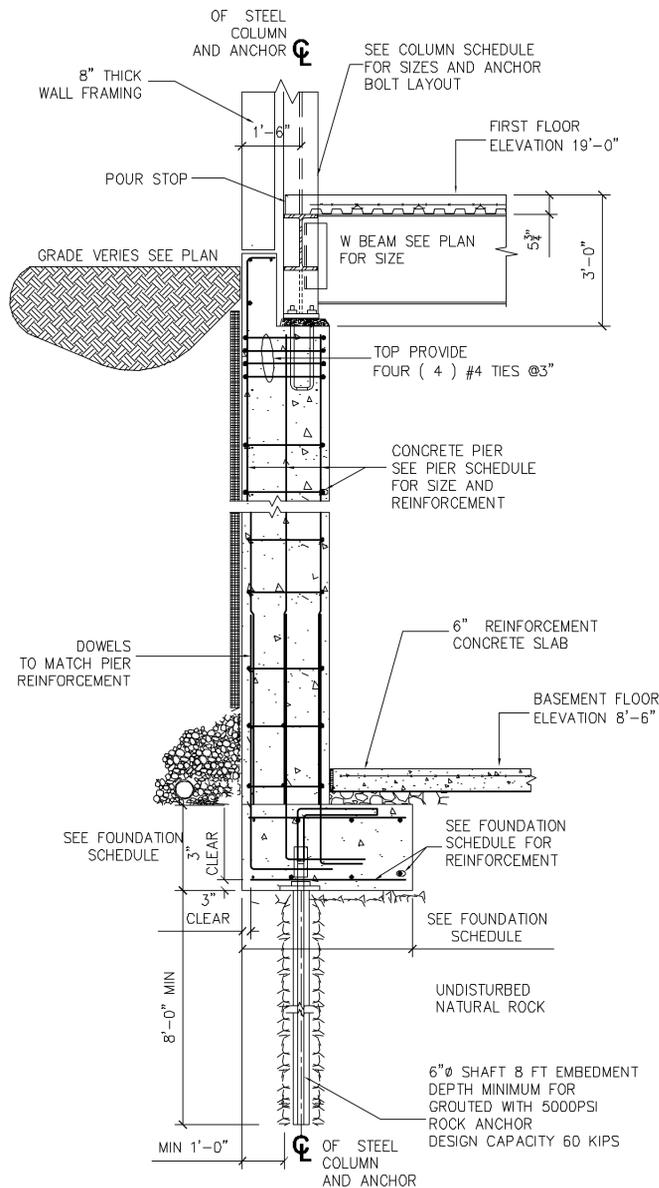
CHECKED BY:

APPROVED BY:

DRAWING NO.: A-512

**STAIR & FOUND. DETAILS**

SHEET NO.: **A-512**



NO.	DATE	ISSUED FOR	SCOPE	OWNER/CONTRACTOR	DISTRIBUTION
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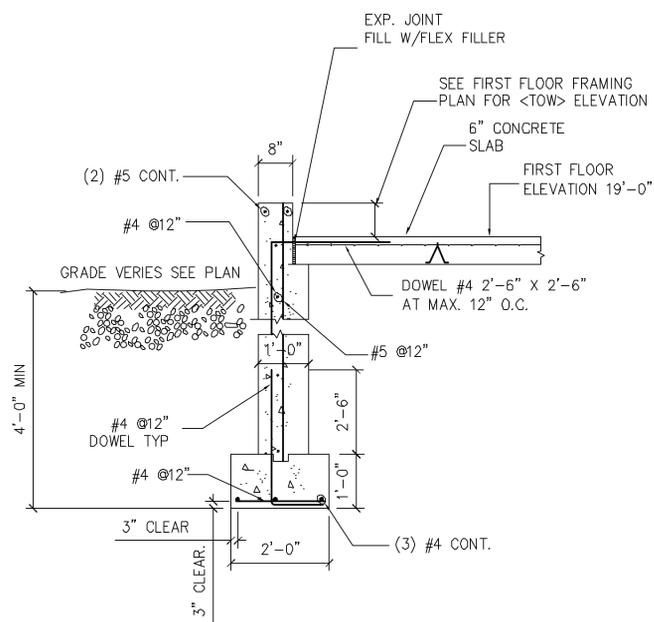
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1	XX	12.15.08	ISSUED FOR CONTRACT		

PHASE	STATUS
DESIGN	...

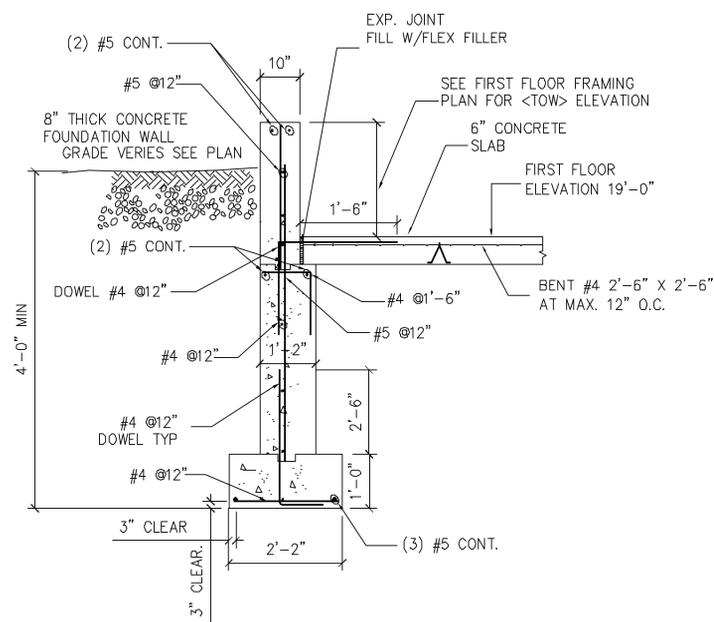
ADDITIONS & RENOVATIONS TO  
SOUTH BRONX CHARTER SCHOOL FOR  
INTERNATIONAL CULTURES AND ARTS  
611 EAST 133RD STREET  
BRONX, NEW YORK 10454



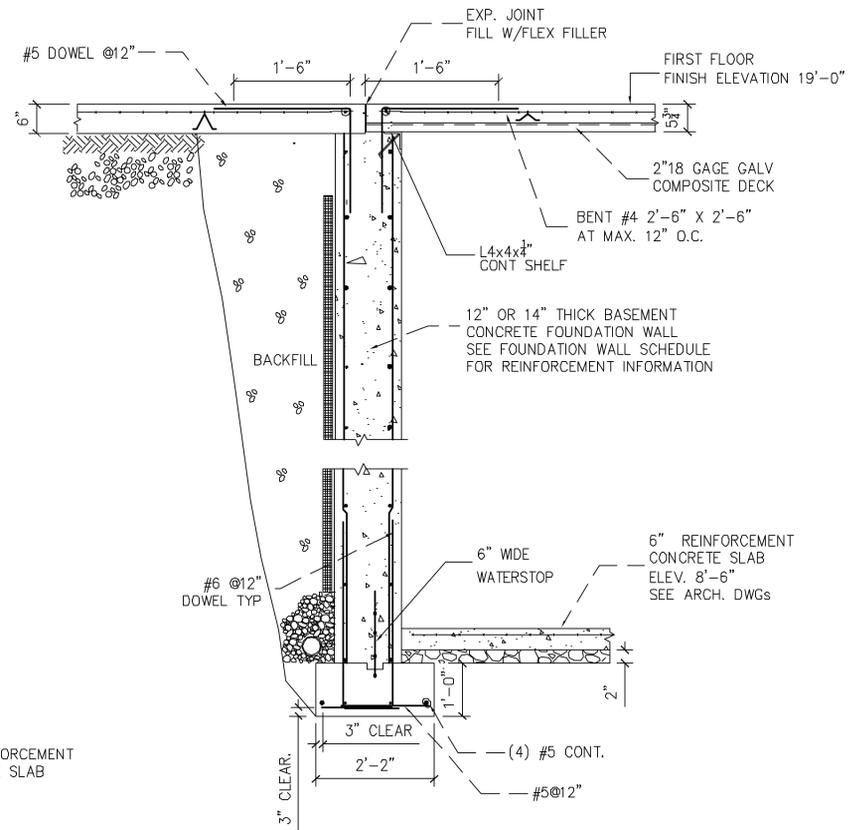
PROJECT NO.	DATE	SCALE	DRAWN BY	CHECKED BY	APPROVED BY
07-306	10-02-08	1/8"=1'-0"	K	JB	



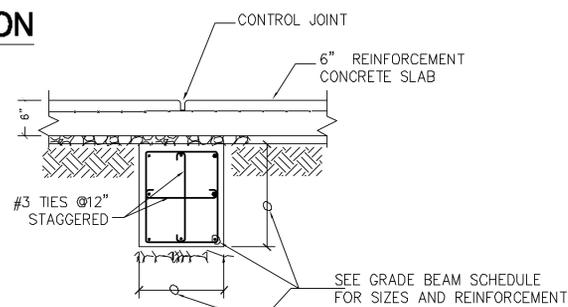
**1** TYPICAL FOUNDATION SECTION  
F-4 SCALE: 1/2"=1'-0"



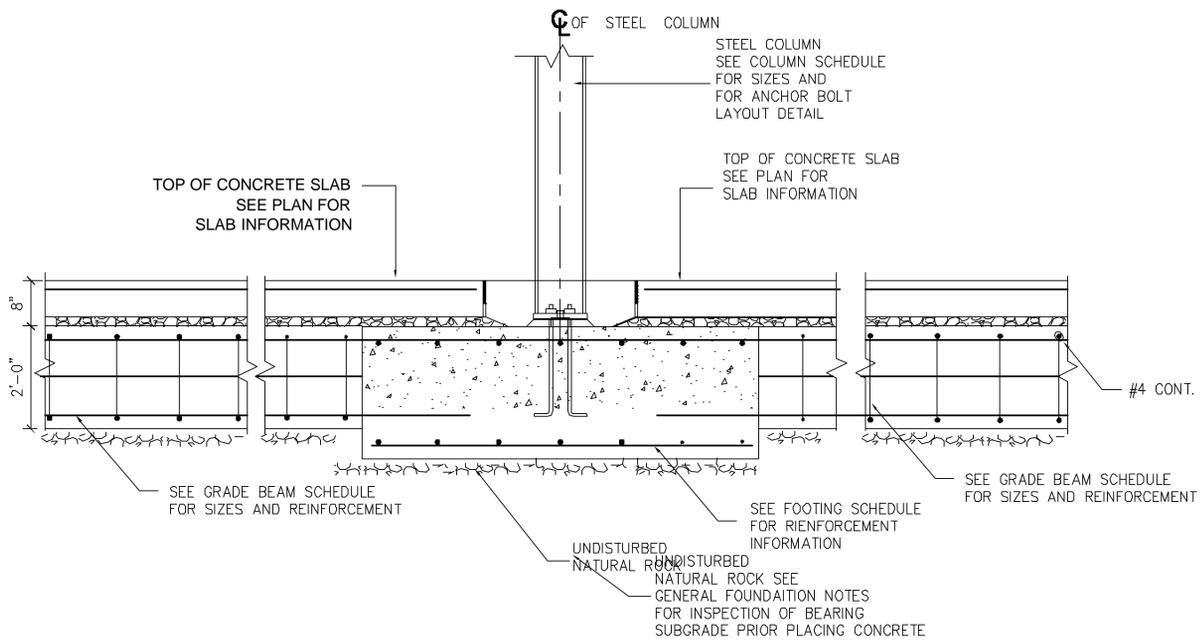
**2** TYPICAL FOUNDATION SECTION  
F-4 SCALE: 1/2"=1'-0"



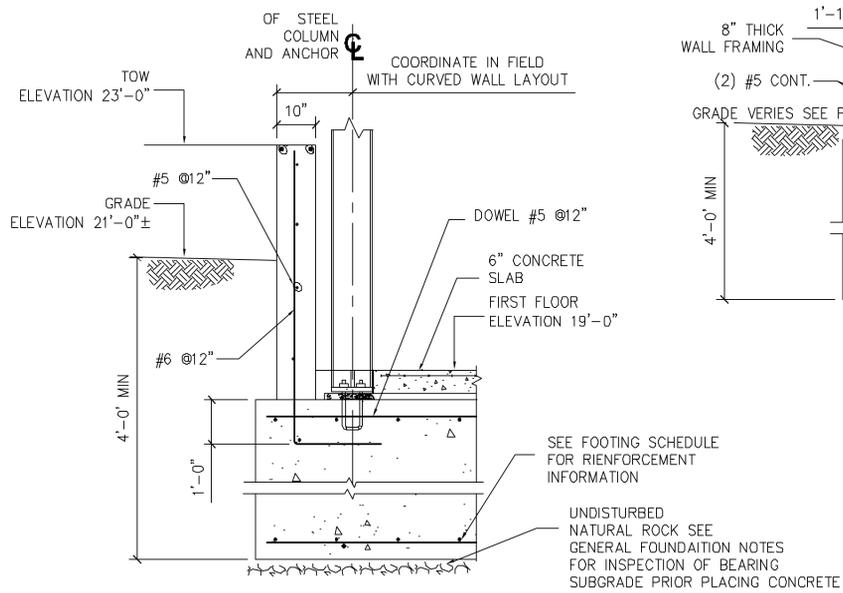
**5** TYPICAL FOUNDATION SECTION  
F-4 SCALE: 1/2"=1'-0"



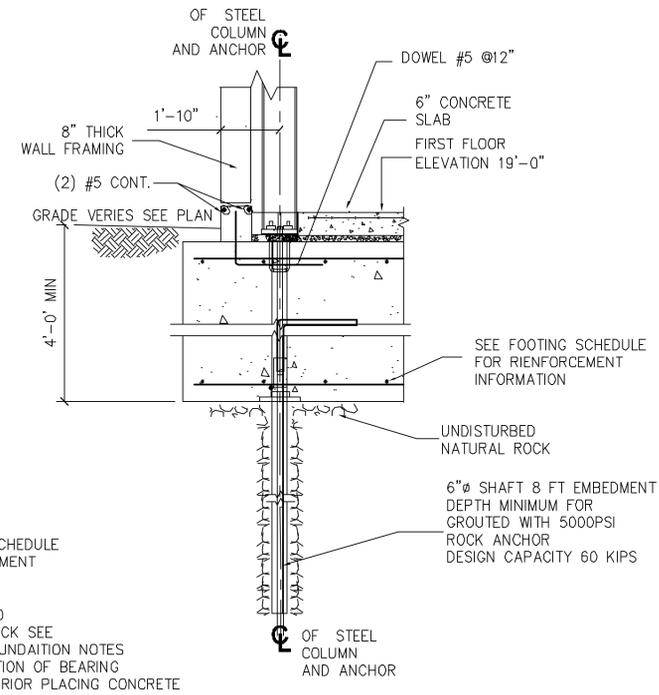
**6** TYPICAL FOUNDATION SECTION  
F-4 SCALE: 1/2"=1'-0"



**3** TYPICAL FOUNDATION SECTION  
F-4 SCALE: 1/2"=1'-0"



**8** TYPICAL FOUNDATION SECTION  
F-4 SCALE: 1/2"=1'-0"



**7** TYPICAL BRACED COLUMN FOUNDATION DETAIL  
F-4 SCALE: 1/2"=1'-0"

NO.	DATE	ISSUED FOR	SCOPE	OWNER/CONTRACTOR	DISTRIBUTION
1	XX	12.18.07	ISSUED FOR CONTRACT		

PHASE	STATUS

ADDITIONS & RENOVATIONS TO  
SOUTH BRONX CHARTER SCHOOL FOR  
INTERNATIONAL CULTURES AND ARTS  
611 EAST 133RD STREET  
BRONX, NEW YORK 10454



DATE	CHECKED BY	APPROVED BY

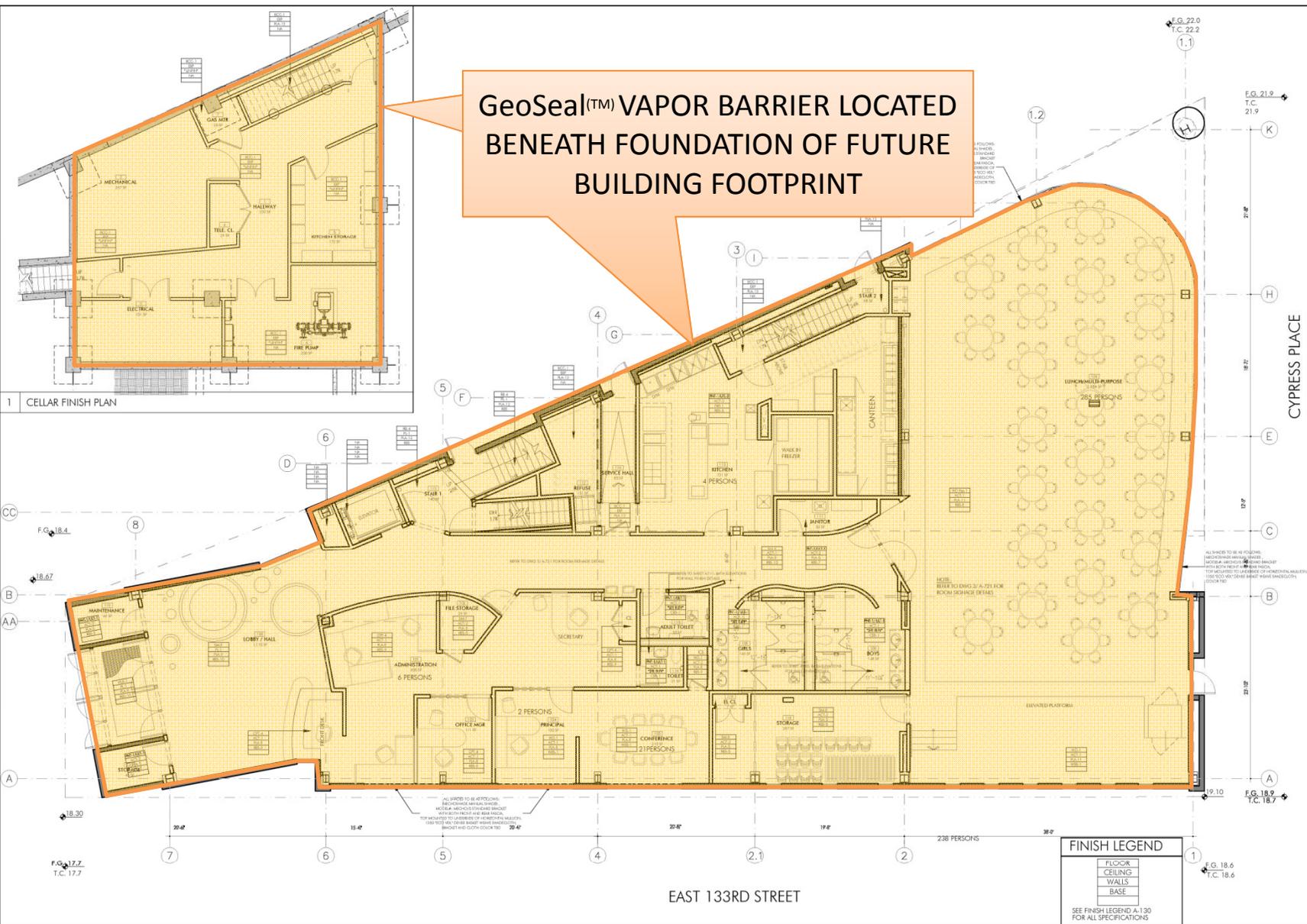






**Figure 9**  
**Vapor Barrier Location**

**GeoSeal™ VAPOR BARRIER LOCATED BENEATH FOUNDATION OF FUTURE BUILDING FOOTPRINT**



1 CELLAR FINISH PLAN

1 GROUND LEVEL FINISH PLAN

**FINISH LEGEND**

FLOOR
CEILING
WALLS
BASE

SEE FINISH LEGEND A-130 FOR ALL SPECIFICATIONS

CYPRESS PLACE

EAST 133RD STREET

**PARTNERS FOR ARCHITECTURE**

NEW BUILDING FOR:  
**SOUTH BRONX CHARTER SCHOOL FOR INTERNATIONAL CULTURES AND ARTS**  
 611 EAST 133RD STREET  
 BRONX, NEW YORK 10454

DATE: 03-20-2018  
 TIME: 10:00 AM  
 SCALE: AS SHOWN  
 SHEET NO: A-131

**CELLAR & GROUND LEVEL FINISH PLAN**

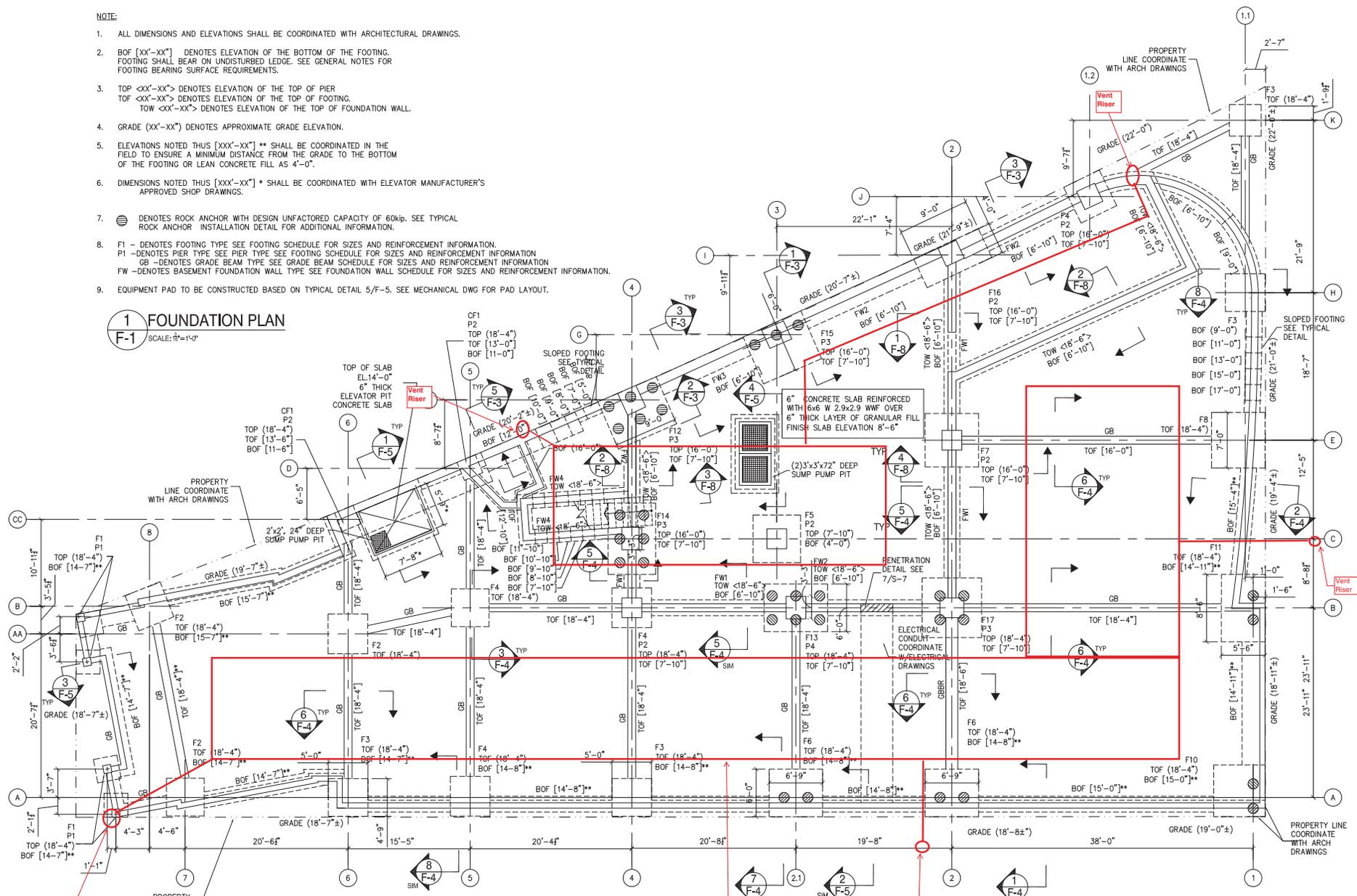
**A-131**

**Figure 10**  
**Sub-Slab Depressurization Layout**

**NOTE:**

- ALL DIMENSIONS AND ELEVATIONS SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS.
- BOF [XX'-XX"] DENOTES ELEVATION OF THE BOTTOM OF THE FOOTING. FOOTING SHALL BEAR ON UNDISTURBED LEDGE. SEE GENERAL NOTES FOR FOOTING BEARING SURFACE REQUIREMENTS.
- TOP <XX'-XX"> DENOTES ELEVATION OF THE TOP OF PIER  
TOP <XX'-XX"> DENOTES ELEVATION OF THE TOP OF FOOTING.  
TOW <XX'-XX"> DENOTES ELEVATION OF THE TOP OF FOUNDATION WALL.
- GRADE (XX'-XX") DENOTES APPROXIMATE GRADE ELEVATION.
- ELEVATIONS NOTED THUS [XXX'-XX"] \*\* SHALL BE COORDINATED IN THE FIELD TO ENSURE A MINIMUM DISTANCE FROM THE GRADE TO THE BOTTOM OF THE FOOTING OR LEAN CONCRETE FILL AS 4'-0".
- DIMENSIONS NOTED THUS [XXX'-XX"] \* SHALL BE COORDINATED WITH ELEVATOR MANUFACTURER'S APPROVED SHOP DRAWINGS.
- ⊕ DENOTES ROCK ANCHOR WITH DESIGN UNFACTORED CAPACITY OF 60kIP. SEE TYPICAL ROCK ANCHOR INSTALLATION DETAIL FOR ADDITIONAL INFORMATION.
- F1 - DENOTES FOOTING TYPE SEE FOOTING SCHEDULE FOR SIZES AND REINFORCEMENT INFORMATION.  
P1 - DENOTES PIER TYPE SEE PIER TYPE SEE FOOTING SCHEDULE FOR SIZES AND REINFORCEMENT INFORMATION  
GB - DENOTES GRADE BEAM TYPE SEE GRADE BEAM SCHEDULE FOR SIZES AND REINFORCEMENT INFORMATION  
FW - DENOTES BASEMENT FOUNDATION WALL TYPE SEE FOUNDATION WALL SCHEDULE FOR SIZES AND REINFORCEMENT INFORMATION.
- EQUIPMENT PAD TO BE CONSTRUCTED BASED ON TYPICAL DETAIL 5/F-5. SEE MECHANICAL DWG FOR PAD LAYOUT.

**1 FOUNDATION PLAN**  
SCALE: 1/8"=1'-0"



Notes:  
- This is a general vent layout guideline  
- Vent riser placement is at the discretion of the architect and owner

ARCHITECTURE

DATE: 07-20-08  
PROJECT NO: 07-208  
DRAWING NO: 07-208

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

DATE: 07-20-08  
PROJECT NO: 07-208  
DRAWING NO: 07-208

DATE: 07-20-08  
PROJECT NO: 07-208

# **TABLE**

**TABLE 1**  
**Soil Cleanup Objectives**

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
<b>METALS</b>							
Arsenic	7440-38 -2	16 <sub>f</sub>	16 <sub>f</sub>	16 <sub>f</sub>	16 <sub>f</sub>	13 <sub>f</sub>	16 <sub>f</sub>
Barium	7440-39 -3	350 <sub>f</sub>	400	400	10,000 <sub>d</sub>	433	820
Beryllium	7440-41 -7	14	72	590	2,700	10	47
Cadmium	7440-43 -9	2.5 <sub>f</sub>	4.3	9.3	60	4	7.5
Chromium, hexavalent <sub>h</sub>	18540-29-9	22	110	400	800	1 <sub>e</sub>	19
Chromium, trivalent <sub>h</sub>	16065-83-1	36	180	1,500	6,800	41	NS
Copper	7440-50 -8	270	270	270	10,000 <sub>d</sub>	50	1,720
Total Cyanide <sub>h</sub>		27	27	27	10,000 <sub>d</sub>	NS	40
Lead	7439-92 -1	400	400	1,000	3,900	63 <sub>f</sub>	450
Manganese	7439-96 -5	2,000 <sub>f</sub>	2,000 <sub>f</sub>	10,000 <sub>d</sub>	10,000 <sub>d</sub>	1600 <sub>f</sub>	2,000 <sub>f</sub>
Total Mercury		0.81 <sub>j</sub>	0.81 <sub>j</sub>	2.8 <sub>j</sub>	5.7 <sub>j</sub>	0.18 <sub>f</sub>	0.73
Nickel	7440-02 -0	140	310	310	10,000 <sub>d</sub>	30	130
Selenium	7782-49 -2	36	180	1,500	6,800	3.9 <sub>f</sub>	4 <sub>f</sub>
Silver	7440-22 -4	36	180	1,500	6,800	2	8.3
Zinc	7440-66 -6	2200	10,000 <sub>d</sub>	10,000 <sub>d</sub>	10,000 <sub>d</sub>	109 <sub>f</sub>	2,480
<b>PESTICIDES / PCBs</b>							
2,4,5-TP Acid (Silvex)	93-72-1	58	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	3.8
4,4'-DDE	72-55-9	1.8	8.9	62	120	0.0033 <sub>e</sub>	17
4,4'-DDT	50-29-3	1.7	7.9	47	94	0.0033 <sub>e</sub>	136
4,4'-DDD	72-54-8	2.6	13	92	180	0.0033 <sub>e</sub>	14
Aldrin	309-00-2	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	319-84-6	0.097	0.48	3.4	6.8	0.04 <sub>g</sub>	0.02
beta-BHC	319-85-7	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	5103-71 -9	0.91	4.2	24	47	1.3	2.9
delta-BHC	319-86-8	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	0.04 <sub>g</sub>	0.25
Dibenzofuran	132-64-9	14	59	350	1,000 <sub>c</sub>	NS	210
Dieldrin	60-57-1	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	959-98-8	4.8 <sub>i</sub>	24 <sub>i</sub>	200 <sub>i</sub>	920 <sub>i</sub>	NS	102
Endosulfan II	33213-65-9	4.8 <sub>i</sub>	24 <sub>i</sub>	200 <sub>i</sub>	920 <sub>i</sub>	NS	102
Endosulfan sulfate	1031-07 -8	4.8 <sub>i</sub>	24 <sub>i</sub>	200 <sub>i</sub>	920 <sub>i</sub>	NS	1,000 <sub>c</sub>
Endrin	72-20-8	2.2	11	89	410	0.014	0.06
Heptachlor	76-44-8	0.42	2.1	15	29	0.14	0.38
Lindane	58-89-9	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	1336-36 -3	1	1	1	25	1	3.2
<b>SEMI-VOLATILES</b>							
Acenaphthene	83-32-9	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	20	98
Acenaphthylene	208-96-8	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	107
Anthracene	120-12-7	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	1,000 <sub>c</sub>
Benz(a)anthracene	56-55-3	1 <sub>f</sub>	1 <sub>f</sub>	5.6	11	NS	1 <sub>f</sub>
Benzo(a)pyrene	50-32-8	1 <sub>f</sub>	1 <sub>f</sub>	1 <sub>f</sub>	1.1	2.6	22
Benzo(b) fluoranthene	205-99-2	1 <sub>f</sub>	1 <sub>f</sub>	5.6	11	NS	1.7
Benzo(g,h,i) perylene	191-24-2	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	1,000 <sub>c</sub>
Benzo(k) fluoranthene	207-08-9	1	3.9	56	110	NS	1.7
Chrysene	218-01-9	1 <sub>f</sub>	3.9	56	110	NS	1 <sub>f</sub>
Dibenz(a,h) anthracene	53-70-3	0.33 <sub>e</sub>	0.33 <sub>e</sub>	0.56	1.1	NS	1,000 <sub>c</sub>
Fluoranthene	206-44-0	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	1,000 <sub>c</sub>
Fluorene	86-73-7	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	30	386
Indeno(1,2,3-cd) pyrene	193-39-5	0.5 <sub>f</sub>	0.5 <sub>f</sub>	5.6	11	NS	8.2
m-Cresol	108-39-4	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	0.33 <sub>e</sub>
Naphthalene	91-20-3	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	12
o-Cresol	95-48-7	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	0.33 <sub>e</sub>
p-Cresol	106-44-5	34	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	0.33 <sub>e</sub>
Pentachlorophenol	87-86-5	2.4	6.7	6.7	55	0.8 <sub>e</sub>	0.8 <sub>e</sub>
Phenanthrene	85-01-8	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	1,000 <sub>c</sub>
Phenol	108-95-2	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	30	0.33 <sub>e</sub>
Pyrene	129-00-0	100 <sub>a</sub>	100 <sub>a</sub>	500 <sub>b</sub>	1,000 <sub>c</sub>	NS	1,000 <sub>c</sub>

**TABLE 1**  
**Soil Cleanup Objectives**

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
<b>VOLATILES</b>							
1,1,1-Trichloroethane	71-55-6	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	0.68
1,1-Dichloroethane	75-34-3	19	26	240	480	NS	0.27
1,1-Dichloroethene	75-35-4	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	0.33
1,2-Dichlorobenzene	95-50-1	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	1.1
1,2-Dichloroethane	107-06-2	2.3	3.1	30	60	10	0.02 <sup>d</sup>
cis-1,2-Dichloroethene	156-59-2	59	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	0.25
trans-1,2-Dichloroethene	156-60-5	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	0.19
1,3-Dichlorobenzene	541-73-1	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	106-46-7	9.8	13	130	250	20	1.8
1,4-Dioxane	123-91-1	9.8	13	130	250	0.1 <sup>e</sup>	0.1 <sup>e</sup>
Acetone	67-64-1	100 <sup>a</sup>	100 <sup>b</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	2.2	0.05
Benzene	71-43-2	2.9	4.8	44	89	70	0.06
Butylbenzene	104-51-8	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	12
Carbon tetrachloride	56-23-5	1.4	2.4	22	44	NS	0.76
Chlorobenzene	108-90-7	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	40	1.1
Chloroform	67-66-3	10	49	350	700	12	0.37
Ethylbenzene	100-41-4	30	41	390	780	NS	1
Hexachlorobenzene	118-74-1	0.33 <sup>e</sup>	1.2	6	12	NS	3.2
Methyl ethyl ketone	78-93-3	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	100 <sup>a</sup>	0.12
Methyl tert-butyl ether	1634-04 -4	62	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	0.93
Methylene chloride	75-09-2	51	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	12	0.05
n-Propylbenzene	103-65-1	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	3.9
sec-Butylbenzene	135-98-8	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	11
tert-Butylbenzene	98-06-6	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	NS	5.9
Tetrachloroethene	127-18-4	5.5	19	150	300	2	1.3
Toluene	108-88-3	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	36	0.7
Trichloroethene	79-01-6	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	95-63-6	47	52	190	380	NS	3.6
1,3,5-Trimethylbenzene	108-67-8	47	52	190	380	NS	8.4
Vinyl chloride	75-01-4	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	1330-20 -7	100 <sup>a</sup>	100 <sup>a</sup>	500 <sup>b</sup>	1,000 <sup>c</sup>	0.26	1.6

All soil cleanup objectives (SCOs) are in parts per million (ppm). NS=Not specified. See Technical Support Document (TSD). Footnotes

a The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm. See TSD section 9.3.

b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

c The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm. See TSD section 9.3.

d The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.

e For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

## APPENDIX 1

### CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and South Bronx Charter School have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, South Bronx Charter School 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, Rebecca Bub, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 341-2073

**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. South Bronx Charter School will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

New York City Library  
Mott Haven Branch  
321 E. 140<sup>th</sup> Street  
Bronx, NY 10454  
718 665-4878

Repository Hours of Operation: 10am to 6 pm

**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.** No issues of Public Concern are anticipated for this project.

**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 OER, distributed and mailed by South Bronx Charter School/ PVE Sheffler, LLC. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

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

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

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

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

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

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

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

## APPENDIX 2

### SUSTAINABILITY STATEMENT

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

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

This project intends to use recycled concrete aggregate wherever possible in grading and backfilling the Site. An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

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

The project will reduce the consumption of virgin materials by substituting recycled concrete aggregate for mined gravel and/or sand backfill whenever possible. An estimate of the quantity (in tons) of virgin and non-renewable resources, the use of which will be avoided under this plan, will be quantified and reported in the RAR.

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

Recycled concrete materials and other backfill materials will be locally sourced reducing energy consumption associated with transportation. 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.

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

Contaminated materials stockpiled on site pending waste characterization and off-site disposal will be covered with 6-mil poly sheeting and bermed to prevent transportaion of contaminated particulate matter via stormwater. An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

**Storm-water Retention.** Storm-water retention improves water quality by lowering the rate of combined storm-water and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.

An estimate of the enhanced storm-water retention capability of the redevelopment project will be included in the RAR.

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

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

**Paperless Brownfield Cleanup Program.** South Bronx Charter School 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.** South Bronx Charter School is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and

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

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

An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

## **APPENDIX 3**

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

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

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

#### **1.2 STOCKPILE METHODS**

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

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

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

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

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

The PE/QEP overseeing the remedial action will:

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

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

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

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

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

Outbound truck transport routes will head east on 133<sup>rd</sup> Street to access Bruckner Boulevard.. 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 soil cleanup objectives established in this plan may be reused on-Site. Considering the excavation requirements for construction, we do not anticipate re-use of soil on-site. In the event that soil is re-used, the soil cleanup objectives for on-Site reuse are listed in Table 1. '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 VCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAWP are followed

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

## **1.8 DEMARCATION**

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

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

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

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives are listed in Table 1.

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

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

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

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

## **Source Screening and Testing**

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

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

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

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RAR. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the

period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

## **1.10 FLUIDS MANAGEMENT**

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

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

## **1.11 STORM-WATER POLLUTION PREVENTION**

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

the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

## **1.12 CONTINGENCY PLAN**

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

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

### **Odor Control**

All necessary means will be employed to prevent on- and off-Site odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying the Remedial Action Report.

## **Dust Control**

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

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

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying the Remedial Action Report.

## **Other Nuisances**

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

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

**APPENDIX 4**

**HEALTH AND SAFETY PLAN**

# CONSTRUCTION HEALTH AND SAFETY PLAN

Site Redevelopment  
South Bronx Charter School for International Culture and the Arts  
**611 East 133<sup>rd</sup> Street**  
**Bronx, New York, 10454**  
NYCDEP# 08DEPTECH282X  
OER Project # 13RHAZ408X

Prepared by: Lawrence Environmental Group  
Date: April 26, 2013

Approved by: Gerard L. Baril, CIH  
Health and Safety Manager

Date: April 26, 2013

Approved by: \_\_\_\_\_  
Project Manager

Date: \_\_\_\_\_

## EMERGENCY CONTACTS:

**Ambulance:** Notify 911

**Fire:** Notify 911

**Police:** Notify 911

**Hospital:** **St. Barnabas Hospital**  
4422 Third Avenue (Third Avenue & 183<sup>rd</sup> Street)  
Bronx, New York 10457  
(718) 960-9000

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Figure 1: Site Location Map

Figure 2: Site Features Map

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- Attachment A: C-HASP Receipt and Acceptance Form
- Attachment B: C-HASP Pre-Entry Briefing Attendance Form
- Attachment C: Supervisor’s Accident Investigation Report Form
- Attachment D: Chemical Hazard and MSDS Sheets

## **1.0 INTRODUCTION**

### **1.1 C-HASP Applicability**

This site-specific Construction Health and Safety Plan (C-HASP) has been developed by Lawrence Environmental Group (LEG) for PVE Sheffler, LLC. It establishes the health and safety procedures to minimize potential risks to personnel involved with the excavation vites activities at 611 E 133<sup>rd</sup> Street, the future location of the South Bronx Charter School for International Culture and the Arts. (South Bronx Charter School or SBCS) located in the Bronx, New York. This C-HASP applies to all personnel potentially exposed to safety and/or health hazards which may be encountered during excavation activities during construction; this C-HASP does not apply to any other construction related activities during redevelopment of the property.

This C-HASP will be distributed to each person involved with excavation and demolition activities at the site. Each person must sign a copy of the attached C-HASP Receipt and Acceptance Form (see Attachment A).

#### **1.1.1 Health & Safety Manager (HSM)**

The Health & Safety Manager (HSM) will be responsible for reviewing site monitoring air monitoring data provided by the SSO. The HSM will discuss the onsite monitoring results with the Project Manager. In the event that air monitoring data reveals exceedances above site action levels (see section 9.0) occur, the HSM will recommend modifications/changes in exposure control methods used at the site. All such modifications to exposure control methods will be discussed with the Project Manager.

At the completion of the project, the HSM will prepare an air monitoring summary report that will be submitted to the Project Manager for inclusion into the project close out documents.

### **1.1.2 Site Safety Officer (SSO)**

A PVE Sheffler representative will be responsible for implementing the safety requirements specified in this C-HASP. This person will be designated to serve as the Site Safety Officer (SSO). The SSO is responsible for enforcing the requirements of this C-HASP once work begins. The SSO has the authority to immediately correct all situations where non-compliance with this C-HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Maintaining a high level of health and safety consciousness among employees at the work site;
- Procuring and distributing the PPE needed for personnel involved with this project;
- Verifying that all PPE and health and safety equipment is in good working order;
- Informing site workers of air monitoring data and the need to modify PPE.

### **1.1.3 Field Personnel and Covered Subcontractor Personnel**

All site workers covered by this C-HASP are responsible for following the health and safety procedures specified herein and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading this C-HASP in its entirety prior to the start of on-site work;
- Submitting a completed C-HASP Receipt and Acceptance Form (see Attachment A) and attending the pre-entry briefing prior to beginning on-site work;
- Bringing forth any questions or concerns regarding the content of this C-HASP to the SSO prior to the start of work;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the SSO; and
- Complying with the requirements of this C-HASP and the requests of the SSO.

#### **1.1.4 Contractors**

In addition to requirements referenced in Section 1.1.2, all contractors are required to:

- Provide appropriate PPE for their employees;
- Ensure, via daily inspections, that their equipment is maintained in good working condition;
- Operate their equipment in a safe manner; and
- Appoint an on-site safety coordinator to interface with the SSO.

#### **1.2 Modification of this C-HASP**

The procedures in this C-HASP have been developed based on general knowledge of the site, proposed tasks, and anecdotal information obtained from previous investigations at the site. Should additional information become available regarding potential on-site hazards, it may be necessary to modify this C-HASP. All proposed modifications to this C-HASP must be reviewed and approved by the HSM before such modifications are implemented.

Any significant modifications must be incorporated into the written document as addenda and the C-HASP must be re-issued.

### **2.0 SITE DESCRIPTION AND HISTORY**

The subject property is Block 2546, Lot 27 located in the Bronx, NY (Figure 1). The site is an 8,772-square foot trapezoid-shaped parcel, bordered on all sides by public roads (Figure 2). The property has been improved with a 15,000-square foot two-story building. Historically, the property has been operated as a retail gasoline station, automotive repair facility and for various industrial purposes. Based on conversations with site representatives, the building at the subject property is to be demolished. Remedial activities will occur at the time of site re-development.

Prior environmental site investigations (August 2007) included two rounds of soil borings completed by Airtek Environmental (reported in June and August of 2007) during which five soil samples were collected. Groundwater was not encountered above bedrock and, therefore, only soil samples were collected. Petroleum odors were detected in soil samples collected from the western portion of the property, where the former gasoline station operated. Historical Sanborn Fire Insurance maps depict six underground storage tanks (USTs) across the property. Fill ports were subsequently observed in the field by NYCDEP representatives. Laboratory analysis of soil samples identified tetrachloroethylene (PCE), a chlorinated solvent used in various industrial and commercial applications. PCE is not a constituent of gasoline.

### **July 2008 Phase II Investigation Work Plan**

On July 10, 2008, PVE Sheffler submitted a work plan to NYCDEP to complete the investigation of the property which included three main tasks:

- Task 1 – Utility Mark-out/UST Investigation.
- Task 2 - Soil Borings, including four borings in the western parking area and three borings in the building's interior; collection and analysis of up to two soil samples from each boring for the required parameters.
- Task 3 – Groundwater Sampling, including collection and analysis of groundwater samples from four of the borings for the required parameters.

### **Phase II Investigation Results**

This work plan was reviewed and approved by NYCDEP. Field work commenced on July 15, 2008. The results of this investigation were submitted to NYCDEP on August 11, 2008, and included the following conclusions:

1. **Presence of USTs in the Western Parking Area:** Based on the geophysical survey, an area adjacent to the western wall of the building appeared to be disturbed. This location corresponds to a small shed depicted on Sanborn fire insurance maps as recently as 1989. Although the presence of USTs

could not be ruled out, no other tank-like anomalies were noted in the western portion of the property. Underground storage tanks were not identified during the soil boring program, and no indication of USTs.

2. **Soil:** No VOCs or SVOCs were detected at concentrations that indicate significant quantities of petroleum-contaminated soil beneath the parking area in the western part of the property. Depth to bedrock is shallow, further minimizing the potential volume of contaminated soil. The slab of the ground floor of the building appears to rest directly upon bedrock.

Some metals were detected in on-site soil at concentrations exceeding applicable standards. Steps should be taken to minimize dust and prevent inhalation hazards.

3. **Groundwater:** Low VOC concentrations were detected in groundwater in the western part of the site (parking area). No SVOCs, metals, PCBs pesticides or herbicides were detected at concentrations that would necessitate groundwater remediation.
4. **Free-Phase Hydrocarbons:** A small quantity of free product (thickness 0.01 feet) was measured in SB-5, on the water table, 15 feet below the ground floor of the building. The slab of the ground floor is directly above bedrock and no contaminated soil was encountered in this boring. Groundwater samples collected from this boring did not contain elevated concentrations of VOCs, SVOCs PCBs, pesticides or herbicides. USTs are depicted on Sanborn Fire Insurance Maps in the vicinity of SB-5, and the presence of tanks beneath the building cannot be ruled out. These tanks could represent the source of free product and steps should be taken to address this condition during building demolition and construction. Considering the depth to groundwater in this location, it is possible that free product may have originated from an off-site source.

### 3.0 SCOPE OF WORK

Activities proposed at the Site include demolition of the existing building and construction of a new building which will be occupied by the SBCS.

### 4.0 CONTAMINANT HAZARD ASSESSMENT AND CONTROLS

#### 4.1 Contaminant Hazards

The predominant contaminants that may be encountered during site redevelopment include: volatile and semi-volatile organic compounds (VOCs and SVOCs, respectively) and inorganic metals including arsenic, barium, cadmium, chromium, copper, lead, magnesium, manganese, mercury, vanadium and zinc. Chemical Hazard and MSDS Sheets are provided in Attachment D.

#### 4.1.1 Table: Occupational Exposure Limits and Ionization Potentials of VOCs and SVOCs

Data from soil and groundwater samples collected at the site are presented in the attached tables. VOCs detected in these samples are at concentrations which would not exceed applicable exposure values, listed below. Compounds may still be present at concentrations which would necessitate air monitoring.

VOCs								
Name	Skin Absorption	PEL <sup>(1)</sup> (PPM)	REL <sup>(2)</sup> (PPM)	STEL (PPM)	IDLH (PPM)	TLV <sup>(3)</sup> (PPM)	IP (eV)	Carcinogen
Methyl-tert butyl ether	Yes	NA	NA	NA	NA	50	NA	Suspected
1,2,4-Trimethylbenzene	Yes	NA	25	NA	NA	25	8.27	
1,3,5- Trimethylbenzene	Yes	25	NA	NA	NA	25	NA	
Benzene	Yes	1	0.1	1 <sup>(2)</sup>	500	0.5	9.24	X
Ethylbenzene	Yes	100	100	125 <sup>(2)</sup>	800	20	8.76	
Isopropylbenzene	Yes	NA	NA	NA	NA	50	NA	
n-butylbenzene	Yes	NA	NA	NA	NA	NA	NA	
n-propylbenzene	Yes	NA	NA	NA	NA	NA	NA	
p-isopropyltoluene	NA	NA	NA	NA	NA	NA	NA	
Sec-butylbenzene	Yes	NA	NA	NA	NA	NA	NA	
Tert-butylbenzene	Yes	NA	NA	NA	NA	NA	NA	
m & p-xylene	Yes	100	100	150 <sup>(2)</sup>	900	100	8.56	
Methylene chloride	Yes	25	NA	125 <sup>(1)</sup>	2300	50	11.32	X
Naphthalene	Yes	10	10	15 <sup>(2)</sup>	250	10	8.12	
o-xylene	Yes	100	100	150 <sup>(2)</sup>	900	100	8.56	

Toluene	Yes	200	100	150 <sup>(2)</sup>	500	20	8.82	
Acetone	Yes	1000	250	NA	2500	500	9.69	
Tetrachloroethylene	Yes	100	NA	NA	150	25	NA	X
SVOCs								
Name	Skin Absorption	PEL <sup>(1)</sup> (PPM)	REL <sup>(2)</sup> (PPM)	STEL (PPM)	IDLH (PPM)	TLV <sup>(3)</sup> (PPM)	IP (eV)	Carcinogen
Acenaphthylene (4)	NA	NA	NA	NA	NA	NA	NA	
Acenaphthene (4)	Yes	NA	NA	NA	NA	NA	NA	
Anthracene (4)	Yes	0.2 <sup>(5)</sup> mg/m <sup>3</sup>	0.1 <sup>(6)</sup> mg/m <sup>3</sup>	NA	80 mg/m <sup>3</sup>	NA	NA	
Benzo(a)anthracene (4)	No	NA	NA	NA	NA	L	NA	X
Benzo(a)pyrene (4)	Yes	0.2 <sup>(5)</sup> mg/m <sup>3</sup>	0.1 <sup>(6)</sup> mg/m <sup>3</sup>	NA	80 mg/m <sup>3</sup>	L	NA	X
Benzo(b)fluoranthene (4)	Yes	NA	NA	NA	NA	L	NA	X
Benzo(g,h,i) perylene (4)	Yes	NA	NA	NA	NA	NA	NA	
Benzo(k)fluoranthene (4)	Yes	NA	NA	NA	NA	NA	NA	X
Chrysene (4)	Yes	0.2 <sup>(5)</sup> mg/m <sup>3</sup>	0.1 <sup>(6)</sup> mg/m <sup>3</sup>	NA	80 mg/m <sup>3</sup>	L	NA	X
Coal Tar Pitch Volatiles	NA	0.2 <sup>(5)</sup> mg/m <sup>3</sup>	0.1 <sup>(6)</sup> mg/m <sup>3</sup>	NA	80 mg/m <sup>3</sup>	0.2 <sup>(7)</sup> mg/m <sup>3</sup>	NA	X
Dibenzo(a,h)Anthracene (4)	Yes	NA	NA	NA	NA	NA	NA	X
Fluoranthene (4)	Yes	NA	NA	NA	NA	NA	NA	Suspected
Fluorene (4)	Yes	NA	NA	NA	NA	NA	NA	Suspected
Indeno(1,2,3-cd)pyrene (4)	Yes	NA	NA	NA	NA	NA	NA	X
Phenanthrene (4)	Yes	0.2 <sup>(5)</sup> mg/m <sup>3</sup>	0.1 <sup>(6)</sup> mg/m <sup>3</sup>	NA	80 mg/m <sup>3</sup>	NA	NA	X
Pyrene (4)	Yes	0.2 <sup>(5)</sup> mg/m <sup>3</sup>	0.1 <sup>(6)</sup> mg/m <sup>3</sup>	NA	80 mg/m <sup>3</sup>	NA	NA	X

- 1 - OSHA (Occupational Safety and Health Administration)  
 PEL - Permissible Exposure Limit (OSHA Standard)  
 STEL - Short Term Exposure Limit
- 2 - NIOSH (National Institutes for Occupational Safety and Health)  
 REL - Recommended Exposure Limit  
 IDLH - Immediately Dangerous to Life and Health  
 STEL - Short Term Exposure Limit
- 3 - ACGIH (formerly American Conference of Governmental Industrial Hygienists)  
 TLV - Threshold Limit Value  
 STEL - Short Term Exposure Limit  
 L - exposure by all routes should be as carefully controlled to levels as low as possible
- 4 - PELs are listed for these items under Coal Tar Pitch Volatiles
- 5 - Benzene Soluble fraction
- 6 - Cyclohexane-extractable fraction
- 7 - Benzene Soluble Aerosol
- NA - not applicable
- PPM - parts of airborne contaminant per million parts of air (by volume)
- mg/m<sup>3</sup> - milligrams of airborne contaminant per cubic meter of air
- IP - ionization potential
- eV - electron volt

OSHA PELs, ACGIH TLVs, and NIOSH RELs are time-weighted averages (TWAs), which are defined as concentrations for a normal 8-hour work day (NIOSH RELs are based on 10 hours) and 40-hour work week to which almost all workers can be exposed repeatedly without suffering adverse health effects.

Per ACGIH, a STEL is defined as the concentration to which “workers can be exposed for short time periods without irritation, chronic or irreversible tissue damage, dose-rate-dependent toxic effects, or narcosis sufficient to be likely to increase the likelihood of accidental injury, impaired self-rescue or materially reduced work efficiency.” The STEL is a 15-minute TWA. STELs are used by OSHA, ACGIH, and NIOSH.

IP refers to ionization potential which is the amount of energy required to remove an electron from an atom or molecule. Air sampling devices known as photo ionization detectors (PIDs) use ultraviolet (UV) light to ionize gas molecules in order to measure the presence of volatile organic compounds (VOCs). The most common light source used in PIDs is a 10.6 eV (electron volt) lamp.

#### **4.1.2 Metals of Concern: Health Effects**

The metals detected in on-site soils and associated potential health effects are presented below.

If dust control measures implemented during excavation cannot maintain dust levels at an acceptable level, the SSO will notify site workers of the condition. Personal Protective Equipment (PPE) summarized in Section 4.2.2 will be utilized.

##### **Arsenic:**

Exposure Routes: Inhalation, skin absorption, skin and/or eye contact.

Symptoms: Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, potential carcinogen.

Target Organs: Liver, kidneys, skin, lungs, and lymphatic system.

Cancer Site: Lung & lymphatic cancer.

OSHA PEL: 0.01 mg/m<sup>3</sup> as an 8-hour time-weighted average (TWA).

##### **Barium:**

Exposure Routes: Inhalation, skin and/or eye contact.

Symptoms: Irritation of eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse; extrasystoles; hypokalemia.

Target Organs: Eyes, skin, respiratory system, heart, and central nervous system.

OSHA PEL: 0.5 mg/m<sup>3</sup> as an 8-hour TWA.

**Cadmium:**

Exposure Routes: Inhalation, skin and/or eye contact.

Symptoms: Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea; vomiting; diarrhea; anosmia (loss of the sense of smell), emphysema; proteinuria; mild anemia; potential carcinogen.

Target Organs: Respiratory system, kidneys, prostate, and blood.

Cancer Site: Prostatic & lung cancer.

OSHA PEL: 0.005 mg/m<sup>3</sup> as an 8-hour TWA.

**Chromium:**

Exposure Routes: Inhalation, skin and/or eye contact.

Symptoms: Irritation eyes, skin; lung fibrosis.

Target Organs: Eyes, skin, and respiratory system.

OSHA PEL: 1 mg/m<sup>3</sup> as an 8-hour TWA.

**Cobalt:**

Exposure Routes: Inhalation.

Symptoms: The substance is mildly irritating to the respiratory tract. Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.

Target Organs: Skin and respiratory system.

OSHA PEL: 0.1 mg/m<sup>3</sup> as an 8-hour TWA

**Copper:**

Exposure Routes: Inhalation skin and/or eye contact.

Symptoms: Contact can irritate and burn the eyes and skin. Inhalation can irritate the nose and throat causing coughing and wheezing.

Target Organs: Eye, skin and respiratory system.

OSHA PEL: 1 mg/m<sup>3</sup> as an 8-hour TWA

**Lead:**

Exposure Routes: Inhalation, ingestion, skin and/or eye contact.

Symptoms: Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension.

Target Organs: Eyes, gastrointestinal tract, central nervous system, kidneys, blood, and gingival tissue.

OSHA PEL: 0.050 mg/M<sup>3</sup> as an 8-hour TWA.

**Magnesium:**

Exposure Routes: Inhalation, skin and/or eye contact.

Symptoms: Inhaling this substance can irritate the nose, throat and lungs causing tightness in the chest and difficulty in breathing.

Target Organs: Nose, throat and lungs.

OSHA PEL: 15 mg/M<sup>3</sup> as an 8-hour TWA.

**Manganese:**

Exposure Routes: Inhalation.

Symptoms: The aerosol is irritating to the respiratory tract. The substance may have effects on the lungs and central nervous system, resulting in increased susceptibility to bronchitis, pneumonitis and neurologic, neuropsychiatric disorders

Target Organs: Respiratory tract and central nervous system.

OSHA PEL: 5 mg/M<sup>3</sup> as a Ceiling.

**Mercury:**

Exposure Routes: inhalation, skin absorption, ingestion, skin and/or eye contact.

Symptoms: Irritation of eyes and skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.

Target Organs: Eyes, skin, respiratory system, central nervous system, kidneys.

OSHA PEL: 0.1mg/m<sup>3</sup> as an 8-hour TWA.

### **Vanadium:**

Exposure Routes: Inhalation, skin and/or eye contact.

Symptoms: The aerosol can irritate the nose, throat and lungs causing coughing, wheezing, and/or shortness of breath. Exposure can cause headache, tremors, and dizziness. Exposure may cause an asthma-like allergy. Exposure may damage the kidneys.

Target Organs: Respiratory tract, kidneys, eyes and skin and central nervous system.

OSHA PEL: 0.5 mg/M<sup>3</sup> as a Ceiling.

### **Zinc:**

Exposure Routes: Inhalation, skin and/or eye contact.

Symptoms: The aerosol can irritate the nose and throat resulting in wheezing.

Target Organs: Eyes, skin, nose and throat.

OSHA PEL: 15 mg/M<sup>3</sup> as a Ceiling.

## **4.2 Chemical Exposure and Control**

### **4.2.1 Exposure Potential and Monitoring**

The primary route of exposure during site activities will be in areas contaminated with VOCs, SVOCs and inorganic metals through inhalation of contaminant laden dust, direct dermal contact, and accidental or incidental ingestion. Worker exposure to chemicals is possible in areas where soil excavation is occurring. Engineering controls such as wetting with an airless sprayer will be utilized as a control measure to suppress dust levels.

### ***Metal Dusts***

Potential worker exposures exist, through accidental ingestion and direct skin contact, during the excavation task, as airborne dusts can be generated. Semi-volatile organic compounds typically adhere to the airborne soil particles while metals are liberated as well. Of the metals identified in the soil samples, cadmium possesses the lowest Threshold Limit Value (TLV) at 0.01 mg/m<sup>3</sup> (10 ug/m<sup>3</sup>) for an 8-hour time weighted average (TWA). The highest concentration of cadmium detected in soil was 5 ug/kg.

Assuming an uniform distribution and applying a safety factor, worker exposure can be controlled by establishing an action level of 0.5 mg/m<sup>3</sup> total airborne dust, through engineering controls such as dust control. A direct reading dust monitor (e.g. TSI DustTrak) will be used as a surrogate to obtain real time data to aid in monitoring the effectiveness of dust controls. Exposures above the established action level, above background level, will require the use of a NIOSH approved half-face respirator with an N or P, 100 filter.

### ***Mercury Vapor***

Soil data indicates the possibility of mercury exposure during performance of work in the western parking area. In addition to the aforementioned dust monitor, usage of a direct reading Mercury vapor analyzer will be required during excavation in the western parking area. Exposures to mercury vapor above the 0.1 mg/m<sup>3</sup> PEL for Mercury serve as the site's action level. Exposures above the Mercury PEL will require the use of a half face respirator with a NIOSH approved combination Mercury Vapor cartridge (with end of service life indicator) and P-100 pre-filter or a supplied air respirator. PPE will be discussed in section 10.

Engineering controls such as wetting with an airless sprayer will be utilized as a control measure to suppress dust levels.

### ***VOCs***

The VOC detected in the soil borings with the lowest Threshold Limit Value level (TLV) is naphthalene, which has a PEL of 10 ppm. The naphthalene TLV of 10 ppm will be used as the site's VOC action level. PPE will be upgraded to include NIOSH approved half-face respirators with organic vapor cartridges, if airborne concentrations of VOCs, as measured with a direct reading Photo Ionization Detector (PID) exceed 10 ppm or are above background level during on-site activities.

If PID readings in the areas above and surrounding the work area exceed 100 ppm, all on-site activities will be suspended. Future PPE selected will depend on the identity

and concentrations of the contaminants encountered. PPE will be discussed in section 10.

To summarize, dust generated during excavation activities will be monitored continuously using a particulate air monitoring instrument. VOC levels during excavation activities will be continuously monitored using a PID. In the western parking area, the above monitoring activities will, be supplemented by usage of a mercury vapor analyzer. Exposure monitoring will be further discussed in section 9.

#### **4.2.2 Exposure Control**

A combination of PPE and engineering controls will be utilized to control skin contact and airborne exposures. Engineering controls will consist of demarcating areas to be bored and allow required personnel only in the work areas. Dust suppression will be used whenever possible to keep dust from becoming airborne. PPE will be discussed in section 10.

The following contaminant exposure control measures will be implemented during the proposed excavation activities:

- The SSO will perform area monitoring (see Section 9.1) to determine exposure to VOCs, dust, and mercury vapor during field activities. If exposures exceed the action levels, respiratory protection, as discussed in Section 10.2, will be donned.
- To avoid direct dermal contact with potentially contaminated media, chemical protective clothing, as described in Section 10.1, will be required when collecting samples and decontaminating sampling equipment.
- Although highly unlikely, exposure to all of the contaminants of concern may occur via ingestion (hand-to-mouth transfer). The decontamination procedures described in Section 11.0 address personal hygiene issues that will limit the potential for contaminant ingestion.

## **5.0 Physical Hazards and Controls**

### **5.1 Utility Hazards**

#### **5.1.1 Underground Utilities**

New York law requires that, at least 48 hours prior to initiation of any subsurface work, a utility clearance be performed at the site. The Site Contractor will contact New York City One Call Center (1-800-272-4480) to request a mark-out of underground utilities in the proposed sampling areas. Work will not begin until the required utility clearances have been performed. Public utility clearance organizations typically do not mark-out underground utility lines that are located on private property.

#### **5.1.2 Overhead Utilities**

Be particularly aware of overhead power lines in the work area. Any vehicle or mechanical equipment capable of having parts of its structure elevated (drill rig, crane, etc.) near energized overhead lines shall be operated so that a clearance of at least ten (10) feet is maintained. If the voltage is higher than 50kV, the clearance shall be increased four (4) inches for every 10kV over that voltage.

### **5.2 Traffic Concerns**

Work is being performed at exterior locations where traffic may be a concern (i.e. Bruckner Avenue and intersecting cross streets). Wear an orange safety vest. If work is being performed at dawn, dusk or evening, the vests must have reflective tape. Set up traffic cones 50 feet in front of the work area. "Work Zone" signs should also be placed in a conspicuous area to warn others of your presence.

### **5.3 Noise Exposure**

The use of the heavy machinery will generate noise levels that will require the use of hearing protection in the immediate vicinity. Appropriate earmuffs or earplugs (i.e., with an NRR greater than 25 dB) should be worn to prevent overexposure. The general rule of thumb is that if you have to raise your voice to be understood by someone who is

standing 3 to 5 feet away from you, the noise levels are likely to be above 85 dB and therefore require the use of hearing protection.

#### **5.4 Lifting/Back Safety**

Using the proper techniques to lift and move heavy pieces of equipment, such as drums of investigation-derived wastes, are important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects.

- Use mechanical devices to move objects, such as drums of investigation derived wastes, which are too heavy to be moved manually.
- If mechanical devices are not available, ask another person to assist you.
- Bend at the knees, not the waist. Let your legs do the lifting.
- Do not twist while lifting.
- Bring the load as close to you as possible before lifting.
- Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip and fall hazards.

#### **5.5 Electrical Safety**

- If using portable tools that are electrically powered, follow the safety precautions listed below:
- Check to see that electrical outlets used to supply power during field operations is of the three (3) wire grounding type.
- Extension cords used for field operations should be of the three (3) wire grounding type and designed for hard or extra-hard usage. This type of cord uses insulated wires within an inner insulated sleeve and will be marked S, ST, STO, SJ, SJO or SJTO.
- NEVER remove the ground plug blade to accommodate ungrounded outlets.

- Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings or floors.
- Protect the cord from becoming damaged if the cord is run through doorways, windows or across pinch points.
- Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades must be removed from service immediately.
- All portable or temporary wiring which is used outdoors or in other potentially wet or damp locations must be connected to a circuit that is protected by a ground fault circuit interrupter (GFCI). Ground fault circuit interrupters are mandatory on all 120 volt single phase, 15 and 20 amp receptacle outlets. GFCI's are available as permanently installed outlets, as plug-in adapters and as extension cord outlet boxes. Do not continue to use a piece of equipment or extension cord that causes a GFCI to trip.
- Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground-fault circuit interrupters.
- For portable generators, the frame of the generator need not be grounded and may serve as the grounding electrode for a system supplied by the generator if: (1) the generator supplies only equipment mounted on the generator and/or cord- and plug-connected equipment through receptacles mounted on the generator, and (2) The noncurrent-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame.
- For vehicle-mounted generators, the frame of the vehicle may serve as the grounding electrode for the system supplied by the generator if: (1) the frame of the generator is bonded to the vehicle frame; (2) the generator supplies only equipment located on the vehicle and/or cord- and plug-connected equipment

through receptacles mounted on the vehicle or on the generator; (3) the noncurrent-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame; and (4) the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces

- When working in flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class I, Division I atmospheres.
- Do not touch a victim who is still in contact with current. Separate the victim from the source using a dry, non-metallic item such as a broom stick or cardboard box. Be sure your hands are dry and you are standing on a dry surface. Turn off the main electrical power switch and then begin rescue efforts.

## 5.6 Explosion

No explosion hazards are expected for the scope of work performed at this site.

## 5.7 Heat Stress

Outdoor workers who are exposed to hot and humid conditions are at risk of heat-related illness. The risk of heat-related illness becomes greater as the weather gets hotter and more humid. This situation is particularly serious when hot weather arrives suddenly early in the season, before workers have had a chance to adapt to warm weather. The use of Level C protective equipment, or greater, may create heat stress.

Symptoms of heat stress include:

- **Prickly Heat (Heat Rash)** - Painful, itchy red rash. Occurs during Sweating, on skin covered by clothing
- **Heat Cramps** - Painful spasms of arm, leg, or abdominal muscles, during or after work.
- **Heat Exhaustion** - Headache, nausea, dizziness. Cool, clammy, moist skin. Heavy sweating. Weak, fast pulse. Shallow respiration, normal temperature.

- **Heat Fatigue-** Weariness, irritability, loss of skill for fine or precision work. Decreased Ability to concentrate. No loss of temperature control.
- **Heat Syncope** (Heat Collapse) - Fainting while standing in a hot environment.
- **Heat Stroke** - Headache, nausea, weakness, hot dry skin, fever, rapid strong pulse, rapid deep respirations, loss of consciousness, convulsions, coma. **This is a life threatening condition.**

Do not permit a worker to wear a semi-permeable or impermeable garment when they are showing signs or symptoms of heat-related illness. To monitor the worker, measure:

- **Heart Rate:** Count the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the following work cycle by one-third. A worker cannot return to work after a rest period until their heart rate is below 100 beats per minute.
- **Oral Temperature:** Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).

If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period. A worker cannot return to work after a rest period until their oral temperature is below 99.6°F.

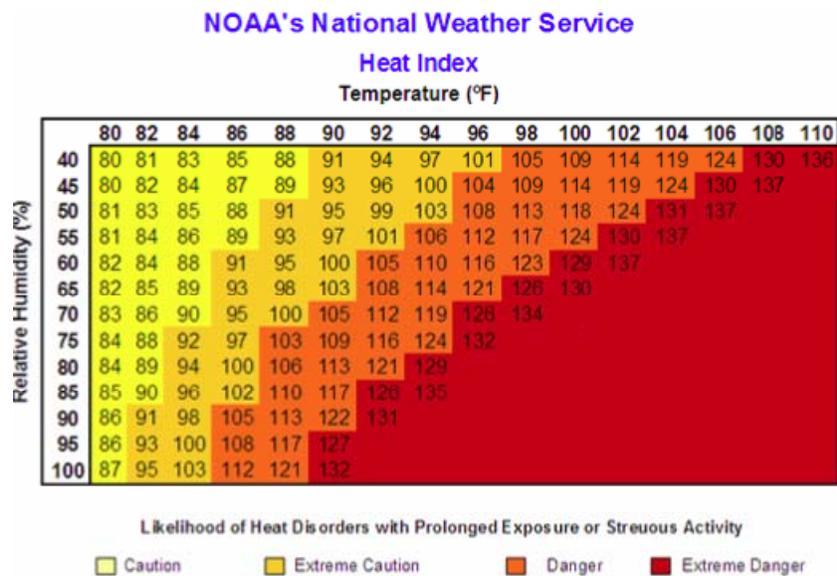
If oral temperature still exceeds 99.6°F (37.6°C), at the beginning of the next rest period, shorten the following work cycle by one-third.

Do not permit a worker to wear a semi-permeable or impermeable garment when oral temperature exceeds 100.6°F (38.1°C).

For personnel working outdoors in hot weather, both air temperature and humidity affect how hot they feel. The "**heat index**" is a single value that takes both temperature and humidity into account. The higher the heat index, the hotter the weather feels, since sweat does not readily evaporate and cool the skin. The heat index is a better measure

than air temperature alone for estimating the risk to workers from environmental heat sources.

The U.S. National Oceanographic and Atmospheric Administration (NOAA) developed the heat index system. The heat index combines both air temperature and relative humidity into a single value that indicates the apparent temperature in degrees Fahrenheit, or how hot the weather will feel. The higher the heat index, the hotter the weather will feel, and the greater the risk that outdoor workers will experience heat-related illness. NOAA issues heat advisories as the heat index rises.



The heat index values were devised for shady, light wind conditions, **and exposure to full sunshine can increase heat index values by up to 15° Fahrenheit.** To account for solar load, added precautions are recommended. See Protective Measures to Take at Each Risk Level.

The heat index can be used to help determine the risk of heat-related illness for outdoor workers, what actions are needed to protect workers, and when those actions are triggered. Depending on the heat index value, the risk for heat-related illness can range from lower to very high to extreme. As the heat index value goes up, more preventive measures are needed to protect workers. Heat index values are divided into four bands associated with four risk levels. These bands differ from those appearing in the NOAA

Heat Index chart, which was developed for the public. The NOAA bands have been modified for use at worksites:

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic heat safety and planning
91°F to 103°F	Moderate	Implement precautions and heighten awareness
103°F to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

The following actions will be taken to help prevent heat-related illnesses at each risk level:

Heat Index	Risk Level	Protective Measures
<91°F	Lower (Caution)	<ul style="list-style-type: none"> <li>• Provide drinking water</li> <li>• Ensure that adequate medical services are available</li> <li>• Plan ahead for times when heat index is higher, including worker heat safety training</li> <li>• Encourage workers to wear sunscreen</li> </ul> <p><b>If workers must wear heavy protective clothing, perform strenuous activity or work in the direct sun, additional precautions are recommended to protect workers from heat-related illness.</b></p>
91°F to 103°F	Moderate	<p>In addition to the steps listed above:</p> <ul style="list-style-type: none"> <li>• Remind workers to drink water often (about 4 cups/hour)**</li> <li>• Review heat-related illness topics with workers: how to recognize heat-related illness, how to prevent it, and what to do if someone gets sick</li> <li>• Schedule frequent breaks in cool, shaded area</li> <li>• Acclimatize workers</li> <li>• Set up buddy system/instruct supervisors to watch workers for signs of heat-related illness</li> </ul> <p><b>If workers must wear heavy protective clothing, perform strenuous activity or work in the direct sun, additional precautions are recommended to protect workers from heat-related illness.</b></p>

		<ul style="list-style-type: none"> <li>• Schedule activities at a time when the heat index is lower</li> <li>• Develop work/rest schedules</li> <li>• Monitor workers closely</li> </ul>
103°F to 115°F	High	<p>In addition to the steps listed above:</p> <ul style="list-style-type: none"> <li>• Alert workers of high risk conditions</li> <li>• Actively encourage workers to drink plenty of water (about 4 cups/hour)**</li> <li>• Limit physical exertion (e.g. use mechanical lifts)</li> <li>• Have a knowledgeable person at the worksite who is well-informed about heat-related illness and able to determine appropriate work/rest schedules</li> <li>• Establish and enforce work/rest schedules</li> <li>• Adjust work activities (e.g., reschedule work, pace/rotate jobs)</li> <li>• Use cooling techniques</li> <li>• Watch/communicate with workers at all times</li> </ul> <p>When possible, reschedule activities to a time when heat index is lower</p>
>115°F	Very High to Extreme	<p>Reschedule non-essential activity for days with a reduced heat index or to a time when the heat index is lower</p> <p>Move essential work tasks to the coolest part of the work shift; consider earlier start times, split shifts, or evening and night shifts. Strenuous work tasks and those requiring the use of heavy or non-breathable clothing or impermeable chemical protective clothing should not be conducted when the heat index is at or above 115°F.</p> <p>If essential work must be done, in addition to the steps listed above:</p> <ul style="list-style-type: none"> <li>• Alert workers of extreme heat hazards</li> <li>• Establish water drinking schedule (about 4 cups/hour)**</li> <li>• Develop and enforce protective work/rest schedules</li> <li>• Conduct physiological monitoring (e.g., pulse, temperature, etc)</li> <li>• Stop work if essential control methods are</li> </ul>

## 5.8 Cold

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally called frostbite.

**Hypothermia:** Hypothermia is defined as a decrease in the patient core temperature below 96°F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a “cold” ambient

temperature. Symptoms of hypothermia include: Shivering, apathy, listlessness, sleepiness, and unconsciousness.

**Frostbite:** Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20°F. Symptoms of frostbite are: a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

**Prevention of Cold-Related Illness:** To prevent cold-related illness:

- Educate workers to recognize the symptoms of frostbite and hypothermia.
- Identify and limit known risk factors.
- Assure the availability of enclosed, heated environment on or adjacent to the Site.
- Assure the availability of dry changes of clothing.
- Assure the availability of warm drinks.
- Start (oral) temperature recording at the job site;
  - At the SSO's discretion when suspicion is based on changes in a worker's performance or mental status.
  - At a worker's request.
  - As a screening measure, two times per shift, under unusually hazardous Conditions (e.g., wind-chill less than 20°F, or wind-chill less than 30°F with precipitation).
  - As a screening measure whenever any one worker on the Site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92°F) cannot return to work for 48 hours.

## **5.9 Falling Hazards**

Soil material, crushed stone, tools, etc. may fall from power shovels, front-end loaders, etc. Hard hats are to be worn at all times while in work zones.

## **5.10 Heavy Machinery**

Care should be exercised when working near heavy equipment such as an excavator. Workers should always stay in view of the equipment operator; give equipment wide berth. Clear communications signals, including hand signals, should be established prior to commencement of work and the equipment should have a back-up alarm.

## **5.11 Hand and Power Tools**

On-site personnel will utilize hand/ or power tools to perform daily tasks. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Ground Fault Circuit Interrupters (GFCIs) are required for all portable tools.

## **5.12 Slips, Trips, and Falls**

Care should be exercised when walking at the Site, especially when carrying equipment. The presence of surface debris, uneven surfaces, pits, facility equipment, and soil piles contribute to tripping hazards and fall hazards. To the extent possible, all hazards should be identified and marked on the Site, with hazards communicated to all workers in the area.

## **6.0 RADIATION HAZARDS**

No known radiation hazards are known or expected at the Site.

## **7.0 BIOLOGICAL HAZARDS**

### **7.1 Animals**

During Site operations, animals such as dogs, pigeons, sea gulls, mice, and rats may be encountered. Workers will use discretion and avoid all contact with animals. Bites and scratches from dogs can be painful and if the animal is rabid, the potential for contracting rabies exists. Contact with rat and mice droppings may lead to contracting hantavirus. Inhalation of dried pigeon droppings may lead to psittacosis; cryptococcosis and histoplasmosis are also diseases associated with exposure to dried bird droppings but these are less likely to occur in this occupational setting.

## **7.2 Insects**

Insects, including bees, wasps, hornets, mosquitoes, and spiders, may be present at this Site. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition. In addition, mosquito bites may lead to St. Louis encephalitis or West Nile encephalitis. Personnel that have been bitten or stung by an insect at the Site should notify the SSO of such immediately. The following is a list of preventative measures:

- Apply insect repellent prior to fieldwork and/ or as often as needed throughout the shift.
- Wear proper protective clothing (work boots, socks, and light colored pants).
- When walking in wooded areas, to the extent possible avoid contact with bushes, tall grass, or brush.
- Field personnel who may have insect allergies (e.g., bee sting) should provide this information to the SSO prior to commencing work and have allergy medication on Site.

The SSO will instruct the project personnel in the recognition and procedures for encountering potentially hazardous insects at the Site.

Lyme disease is caused by infection from a deer tick that carries a spirochete. During the painless tick bite, the spirochete may be transmitted into the bloodstream, which could lead to the worker contracting Lyme disease. This flu-like illness occurs out of

season, commonly happening between May and October when ticks are more active. Symptoms can include a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. Early signs may include an expanding skin rash and joint pain. If left untreated, Lyme disease can cause serious nerve or heart problems as well as disabling type of arthritis. If personnel feel sick or have signs similar to those above, they should notify the SSO immediately.

It is recommended that personnel check themselves when in areas that could harbor deer ticks, wear light colored clothing, and visually check themselves and their buddy when coming from wooded or vegetation covered areas. If a tick is found biting an individual, the SSO should be contacted immediately. The tick can be removed by pulling gently at the head with tweezers. The affected area should then be disinfected with an antiseptic wipe.

## **8.0 CONFINED SPACES**

### **8.1 General Description and Definitions**

This section discusses the procedure for confined space entry which must be adhered to for entry into any confined space, for sampling, inspection, cleaning, plumbing repairs, or other work activities.

The following definitions apply during this project as defined by OSHA 29 CFR 1910.146. OSHA uses the term “permit-required confined space” (permit space) to describe those spaces which meet both the definition of “confined space” and pose a health or safety hazard.

Examples of confined spaces or enclosures may include, BUT ARE NOT LIMITED TO, storage tanks, underground storage tanks (USTs), UST excavations, stacks, pits, basements, silos, boilers, ventilation and exhaust ducts, manholes, sewers, tunnels, underground utility vaults, pipelines, diked areas, and any open topped space four feet or more in depth that is not subject to adequate ventilation.

**Confined Space-** Any space which meets the following criteria:

- is large enough and so configured that an employee can enter and perform assigned work;
- has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- is not designed for continuous employee occupancy.

**Permit-Required Space**- A confined space that has one or more of the following characteristics:

- contains or has a potential to contain a hazardous atmosphere;
- contains a material that has the potential for engulfing an entrant;
- has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- contains any other recognized safety or health hazard.

## **8.2 Confined Space Hazards**

Confined spaces represent a major safety and health risk to many employees. The major hazards potentially encountered in confined spaces include: atmospheric hazards, engulfment, and mechanical hazards. A NIOSH study of 88 confined space fatalities lists the following causes of worker deaths in confined spaces:

- ⇒ asphyxiation 47%,
- ⇒ drowning 23%,
- ⇒ exposure to toxic chemicals 19%,
- ⇒ blunt force trauma 10%,
- ⇒ electrocution 2%, and
- ⇒ burns 1%

The vast majority of fatalities associated with entry into confined spaces are atmospheric hazards. Although some airborne dusts or particles may be easy to see, and some hazardous chemicals are easy to smell, there are other hazards such as oxygen

deficiency and odorless chemicals (e.g. carbon monoxide) that cannot be detected by the senses.

OSHA Standard 1910.146, *Permit-Required Confined Spaces*, characterizes atmospheric hazards into three categories: oxygen deficient, flammable, and toxic. The following conditions are hazardous atmospheres which can be encountered in a confined space:

- ⇒ an oxygen concentration below 19.5% (oxygen deficient) or above 23.5% (oxygen enriched);
- ⇒ a flammable or explosive atmosphere that has a gas, vapor or dust present at a concentration greater than 10% of their lower explosive limit (LEL);
- ⇒ an atmospheric concentration of any toxic contaminant above the OSHA permissible exposure limit (PEL) or any other recommended standard;
- ⇒ an airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or greater;
- ⇒ any immediately dangerous to life or health (IDLH) atmosphere.

Other hazards presented by entry into confined spaces include: engulfment, entrapment, mechanical, electrical, biological, thermal and noise.

### **8.3 Confined Space Entry Prohibited**

Due to the potentially hazardous nature of confined space entry, if a confined space is encountered at the site, personnel shall immediately notify the SSO. ***Site personnel are strictly prohibited from performing entry into a confined space.*** The definition of entry is provided below:

**Entry**- The act of intentionally passing through an opening into a confined space. Entry occurs as soon as any part of the entrant's body breaks the plane of the opening.

Entry into confined spaces will only be performed by specialized contractors that demonstrate training, proficiency and equipment capabilities that comply with OSHA standard 1910.146, *Permit-Required Confined Spaces*.

## 9.0 AIR MONITORING

### 9.1 Monitoring Parameters and Action Levels

Based on the existing Site data, it is not expected that significant levels of organic vapors will be encountered during the Site work. However, air monitoring will be conducted for VOCs. Air monitoring of the breathing zone will be conducted periodically or continuously during excavation activities to assure proper health and safety protection for the team, workers, and passersby.

VOCs will be monitored with a PID in accordance with the C-HASP with an action level of 10 ppm. If the action level is exceeded and adequate ventilation cannot be provided, work will cease and the potential affected portion of the work area will be evacuated, until adequate mechanical ventilation can be setup to reduce the VOC exposure. Level C respiratory protection may be donned in accordance with the C-HASP, if the action level is exceeded.

Fugitive dust generation that could affect site workers, site occupants, or the public is not expected because the majority of work will be conducted in moist soil. Soil that is not moist will be wetted as appropriate to minimize visible dust emissions. Particulate monitoring will be conducted at the perimeter of the Site. If dust levels exceed the action level of 5 mg/m<sup>3</sup> or background levels (whichever is highest), based on PM-10 size for a duration exceeding 15 or more minutes, work activities will be suspended until dust levels diminish to an acceptable level.

During the performance of excavation work on the west side of the property, mercury vapor will be monitored using a factory calibrated direct instrument such as the Jerome 431-X. If mercury vapor levels exceed the action level of 0.1 mg/m<sup>3</sup> for a duration exceeding 15 or more minutes, work activities will be suspended until mercury levels diminish to an acceptable level

The following table summarizes **air monitoring action levels** established for the site:

<b>Contaminants</b>	<b>Action level</b>	<b>Actions</b>
<b>Organic Vapor</b>		Measure and record the upwind background concentration.
	Reading <b>less than 10 ppm</b> above background for a sustained period of 15 minutes in WBZ.	Continue work in Level D protection.
	Reading <b>greater than 10 ppm</b> above background for a sustained period of 15 minutes in the WBZ	Discontinue work, allow work area to ventilate, collect additional PID readings. If concentrations remain greater than 10 ppm, work can resume in Level C protection with respiratory protection equipped with organic vapor cartridges.
	Readings <b>greater than 100 ppm</b> above background for a sustained period of 15 minutes in the WBZ.	Discontinue work, allow work area to ventilate, collect additional PID readings until concentrations are below 100 ppm before work can resume.
<b>Dusts</b>		Measure and record the upwind background concentration.
	Reading <b>less than 0.5 mg/m<sup>3</sup></b> , based on PM-10, above background for a sustained period of 15 minutes in the WBZ.	Continue work in level D protection.
	Reading <b>greater than 0.5 mg/m<sup>3</sup>, based on PM-10</b> , above background for a sustained period of 15 minutes in the WBZ	Discontinue work. Employ dust suppression using a water spray, collect additional airborne dust measurements. If concentrations remain greater than 0.5 mg/m <sup>3</sup> , work can resume in Level C protection with respiratory protection equipped with P-100 cartridges.
<b>Mercury Vapor</b>		Measure and record the upwind background concentration.
	Reading <b>less than 0.1 mg/m<sup>3</sup></b> above background for a sustained period of 15 minutes in the WBZ.	Continue work in level D protection.
	Reading <b>greater than 1.0 mg/m<sup>3</sup></b> above background for a sustained period of 15 minutes in the WBZ	Discontinue work, allow work area to ventilate, collect additional Hg vapor readings. If concentrations remain greater than 1.0 mg/m <sup>3</sup> , work can resume in Level C protection with respiratory protection equipped with mercury vapor cartridges with HEPA pre-filter.
	Readings <b>greater than 10 mg/m<sup>3</sup></b> above background for a sustained period of 15 minutes in the WBZ.	Discontinue work, allow work area to ventilate, collect additional Hg vapor readings until concentrations are below 10 mg/m <sup>3</sup> before work can resume.

## **9.2 Direct Reading Instruments**

A PID such as the RAE MiniRAE 2000, equipped with a 10eV lamp, shall be used to monitor total VOCs during soil excavation activities. Dust levels will be monitored using a particulate air monitoring instrument (PM10).

Mercury vapor will be monitored using a factory calibrated direct instrument such as the Jerome 431-X or an equivalent device.

All monitoring instruments must be calibrated and maintained periodically. Calibration and on-site maintenance records will be kept in the field log book. The operator must understand the limitations and possible sources of errors for each instrument. It is important that the operator checks that the instrument responds properly to the substances it was designed to monitor. Portable air quality monitoring equipment that measures total volatile organic compounds present such as the Rae Systems MiniRae 2000 (or equivalent) photo ionization detector (PID) must be calibrated at least once per week by the SSO. Dust monitors must be calibrated at least once a week by the SSO. The mercury vapor analyzer must be factory calibrated annually. The specific instructions for calibration and maintenance provided for each instrument should be followed.

## **9.3 Personal Monitoring**

OSHA does not require the collection of personal air sampling during the proposed activities. As such, this type of monitoring will not be conducted by personnel during any of the proposed tasks.

## **9.4 Record Keeping**

Air monitoring results will be recorded in the field book during construction activities and made available for NYCDEP and New York State Department of Health (NYSDOH) review.

Site air monitoring data will be reviewed weekly by the HSM. Electronic copies of all air monitoring data will be maintained by the HSM.

## **10.0 PERSONAL PROTECTIVE EQUIPMENT**

Personal protective equipment (PPE) will be worn during site activities to prevent site workers from being injured by the hazards posed by the site and/or the activities being performed. If monitoring dictates the need, chemical protective clothing will be worn to prevent direct dermal contact with the site's chemical contaminants.

All construction activities will be conducted in Level D PPE, as described in the table below. PPE will be upgraded to Level C if air monitoring demonstrates VOCs in the breathing zone exceeding the guidance values outlined in Section 4.2.2, or if particulate monitoring indicates dust levels exceed action levels.

### **10.1 Chemical Protective Clothing**

The following tables describe the Level D and Level C PPE and chemical protective clothing to be worn for general site activities and for certain specific tasks.

#### **10.1.1 Level D and Modified Level D PPE**

Level D protection will be worn for initial entry on-site and initially for all activities. Level D protection will consist of:

- Standard work clothes;
- Steel-toed safety boots;
- Safety glasses or goggles (must be worn when splash hazard is present);
- Nitrile outer gloves and PVC or nitrile inner gloves (must be worn during all sampling activities); and
- Hard hat (must be worn during all Site activities).

Modified Level D is the same as Level D but includes Tyvek coveralls and disposable polyethylene overboots to contact with the skin or clothes if significant contamination is present in subsurface materials.

#### **Conditions for Level D:**

All areas:

- PID readings <10 ppm
- No visible fugitive dust emissions from Site activities
- Mercury levels < 0.1 mg/m<sup>3</sup>

### **10.1.2 Level C PPE**

The level of personal protection will be upgraded to Level C if the concentration of volatile organic compounds which can be detected with a PID in the breathing zone equals or exceeds the specified action limits and the contaminants of concern have characteristic warning properties appropriate for air purifying respirators (e.g., taste, odor). Level C protection will consist of the following equipment:

- Full-face or half-face APR or PAPR, depending on presence and abundance or airborne toxic constituents of concern;
- Combination HEPA filter/ organic vapor cartridges;
- Tyvek coveralls (must be worn if particulate hazard present);
- Polyethylene-coated Tyvek coveralls (if liquid contamination present);
- Steel-toed safety boots;
- Nitrile outer gloves and PVC inner gloves (must be worn during all sampling activities); and
- Hard hat (must be worn during all Site activities).

The level of personal protection will be upgraded to Level C, if the concentration of mercury vapor that can be detected with the mercury vapor exceeds the specified action level. All standard Level C PPE will be worn, however, the respirator cartridge will be a combination HEPA filter/mercury vapor cartridge.

#### **Conditions for Level C:**

All areas:

- Where PID readings >10 ppm (sustained for 15 minutes in the breathing zone) to 100 ppm and/ or
- Mercury vapor > 0.1 mg/m<sup>3</sup> to 10 ppm and/or
- Any visible fugitive dust emissions from Site activities that disturb contaminated soil.

### 10.1.3 Level B (Retreat)

If the concentration of volatile organics which can be detected with a PID equals or exceeds the specified action level (100 ppm) or mercury levels exceed 10 ppm, all field personnel associated with the project will immediately retreat to a location up-wind of the source of contamination. At this point the SSO must consult with the HSM, who will review the condition with PVE Sheffler home office staff to discuss appropriate actions.

## 10.2 Respiratory Protection

**Level D PPE:** No respiratory protection required. Air monitoring devices will be used to determine when PPE will be upgraded to include respiratory protection.

**Level C PPE:** Half-mask, air-purifying respirator equipped with organic vapor (or mercury vapor)/P-100 cartridges.

Respiratory protection will also be worn if odors become objectionable at any time, if respiratory tract irritation is noticed, or if VOCs are detected in the breathing zone as discussed in Section 4.2.2. All on-site personnel who are expected to wear respiratory protection must have successfully passed a qualitative or quantitative fit-test within the past year for the brand, model and size respirator they plan to wear during the proposed activities.

## 10.3 OSHA PPE Requirements

All PPE used during the course of this field investigation must meet the following OSHA standards:

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133 29 CFR 1926.102	ANSI Z87.1-2003
Respiratory	29 CFR 1910.1134 29 CFR 1926.103	ANSI Z88.1-1992
Head	29 CFR 1910.135 29 CFR 1926.100	ANSI ZA89.1-2009
Foot	29 CFR 1910.136 29 CFR 1926.96	ASTM Standards F-2415-2005 and F-2413-2005

Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.134). Based on performance criteria of air purifying respirators, they cannot be worn under the following conditions:

- Oxygen deficiency;
- Immediately Dangerous to Life and Health (IDLH) concentrations;
- High relative humidity; and
- If contaminant levels exceed designated use concentrations.

#### **10.4 Other Safety Equipment**

The field team will bring the following additional safety items to the site for use as necessary:

- Portable, hand-held eyewash bottles
- First aid kit
- Portable communications equipment
- Fire Extinguisher

#### **11.0 DECONTAMINATION**

Generally, any water used in decontamination procedures will be placed in containers, temporarily stored on-site, and properly characterized and disposed of in accordance with appropriate rules and regulations.

##### **11.1 Personnel Decontamination**

Decontamination of personnel will be necessary if Level C or Level B protection is used, which is not anticipated based on current knowledge of the site history. Decontamination will not be necessary if only Level D protection is used. However,

disposable gloves used during sampling activities should be removed and bagged; personnel should be encouraged to remove clothing and shower as soon as is practicable at the end of the day.

All clothing should be machine-washed. All personnel will wash hands and face prior to eating and before and after using the restroom. A container of potable water and liquid soap will be made available so employees can wash their hands before leaving the site for lunch or for the day.

### **11.2 Decontamination of Field Equipment**

Decontamination of field equipment will be necessary for all equipment in contact with contaminated materials. Decontamination activities shall be performed in a designated area lined with polyethylene sheeting designed to collect the decontamination rinsate or over a contaminated portion of the site (i.e., cleaning an excavator bucket over a section of Site soil that will be part of future removal). Equipment to be decontaminated includes, but is not limited to, excavators, pumping equipment, hand tools, trucks, loaders and bull dozers.

### **11.3 Remedial Activity - Derived Waste**

All PPE related remedial activity-derived waste materials (e.g., PPE, decontamination waste) will be placed in labeled containers and appropriately disposed. Contaminated soil will be kept moist, properly characterized and disposed off-site. Stockpiling of contaminated materials will only occur temporarily and if adequate space exists.

## **12.0 ACCIDENT PREVENTION PLAN AND CONTINGENCY PLAN**

### **12.1 Site Specific Training**

All site personnel will receive health and safety training prior to the initiation of any Site activities. The SSO will conduct a pre-entry briefing before site activities begin. C-HASP receipt and acceptance sheets will be collected at this meeting. Attendance of the pre-entry meeting is mandatory and will be documented by the SSO. An attendance form is presented in Attachment B.

On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before daily work assignments, a regular meeting should be held. Discussion should include:

- Tasks to be performed;
- Time constraints (e.g., rest breaks, cartridge changes);
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals; and
- Emergency procedures.

Short safety refresher meetings will be conducted, as needed, by the SSO throughout the duration of the project.

## **12.2 Vehicles and Heavy Equipment**

Working with large motor vehicles and heavy equipment could be a major hazard at this Site. Injuries can result from equipment hitting or running over personnel, impacts from flying objects, or overturning of vehicles. Vehicles and heavy equipment design and operation will be in accordance with 29 CFR, Subpart O, 1926.600 through 1926.602. In particular, the following precautions will be utilized to help prevent injuries/ accidents:

- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be checked at the beginning of each shift.
- Large construction motor vehicles will not be backed up unless the vehicle has a reverse signal alarm audible above the surrounding noise level or the vehicle is backed up only when an observer signals that it is safe to do so.
- Heavy equipment or motor vehicle cable will be kept free of all nonessential items, and all loose items will be secured.

- Large construction motor vehicles and heavy equipment will be provided with necessary safety equipment (such as seat belts, roll-over protection, emergency shut-off in case of roll-over protection, emergency shut-off in case of roll-over, backup warning lights, and audible alarms).
- Blades and bucket will be lowered to the ground and parking brakes will be set before shutting off any heavy equipment or vehicles.

### **12.3 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.
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

General emergency procedures, and specific procedures for personal injury, chemical exposure and or other exposure, are described below.

### **12.4 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 inform the SSO (via voice and hand signals) that chemical exposure has occurred. 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 or the exposed employee's immediate supervisor is responsible for completing the accident report.

## **12.5 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.
- The victim should then be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim.
- For less severe cases, the individual can be taken to the Site dispensary.
- The employee's immediate supervisor or SSO is responsible for making certain that an Accident Report Form is completed. This form is to be submitted to the PVE Sheffler home office. 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 and blood-borne pathogens kit will be kept on-site during the field activities.

## **12.6 Evacuation Procedures**

The SSO will initiate evacuation procedures by signaling to leave the Site. 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. The SSO will then give further instruction.

### **12.7 Major Fire or Explosion Emergencies**

- 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 Form and distribute to appropriate personnel.

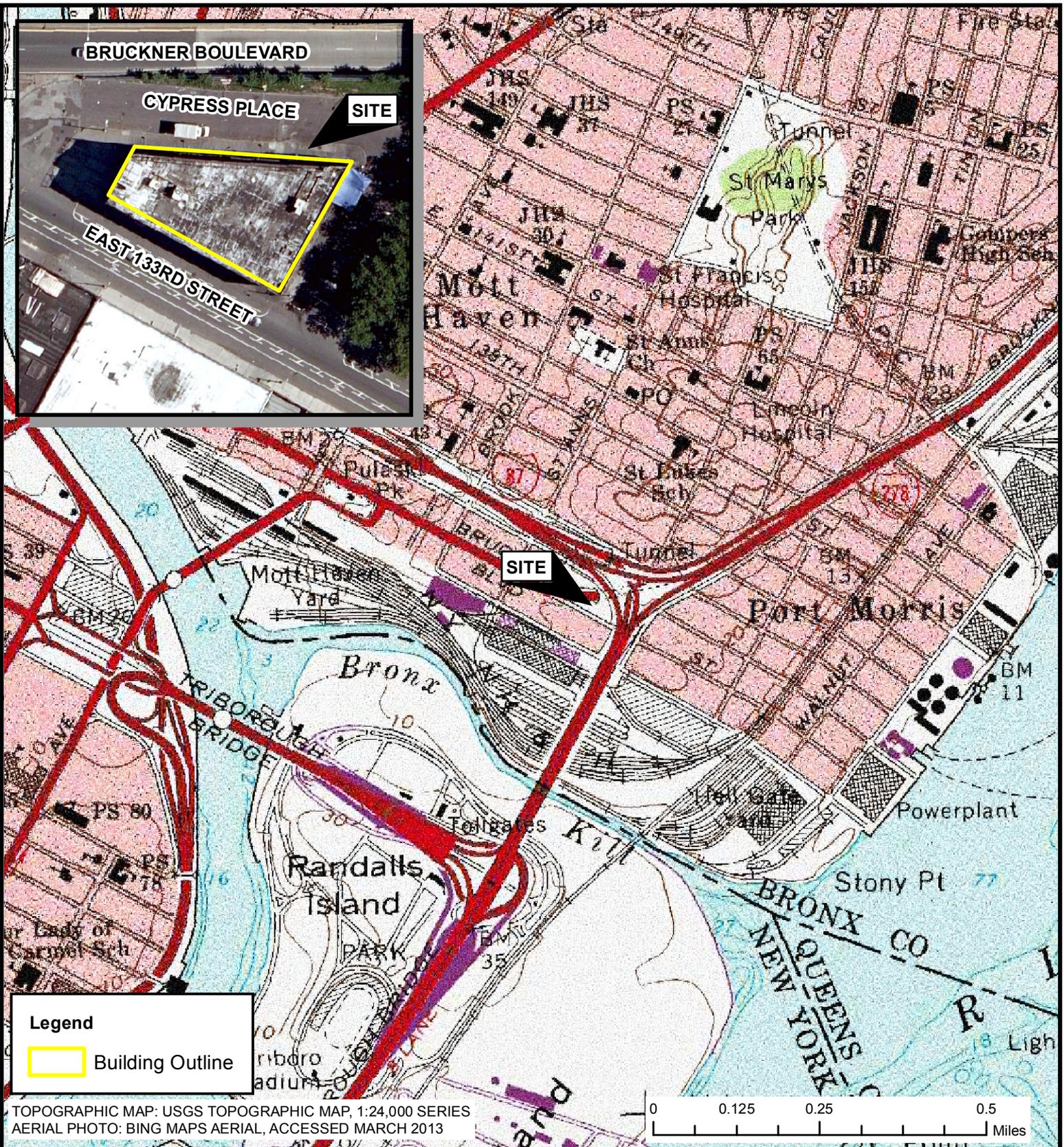
### **13.0 EMERGENCY RESPONSE**

#### **EMERGENCY REFERENCES**

<b>Ambulance:</b>	Notify 911
<b>Fire:</b>	Notify 911
<b>Police:</b>	Notify 911
<b>Hospital:</b>	<b>St. Barnabas Hospital</b> 4422 Third Avenue (Third Avenue & 183 <sup>rd</sup> Street) Bronx, New York 10457 (718) 960-9000

## FIGURES

**FIGURE 1  
SITE LOCATION MAP**



**SITE LOCATION MAP**

**SOUTH BRONX CHARTER SCHOOL**  
 611 EAST 133rd STREET  
 BRONX, NEW YORK

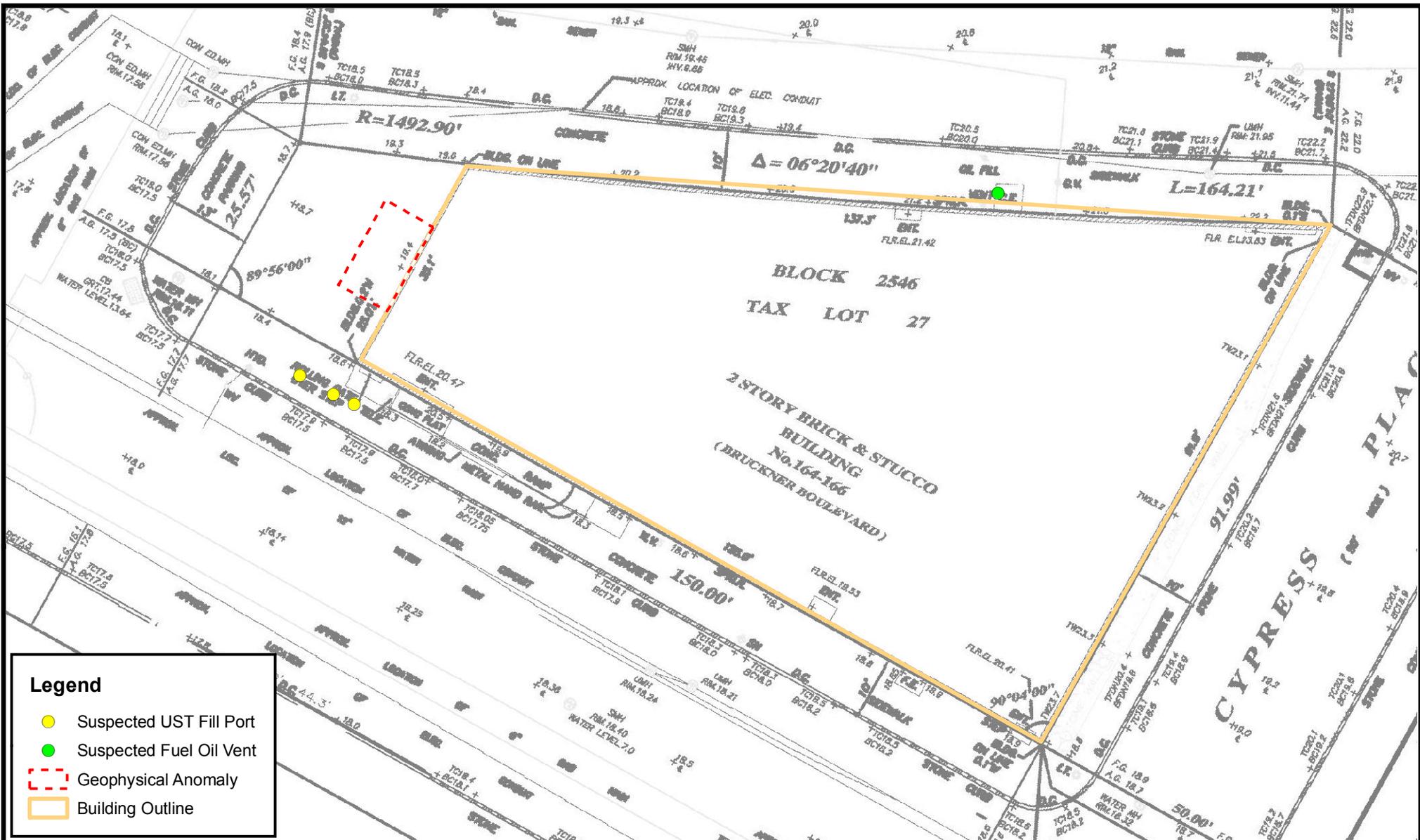
**FIGURE 1**

	DATE:	04/17/2013
	SCALE:	As Indicated
	PROJECT NUMBER:	160862

ALL LOCATIONS APPROXIMATE



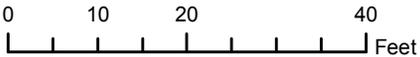
One Civic Center Plaza  
 Suite 501  
 Poughkeepsie, New York 12601  
 Phone: (845) 454-2544  
 Fax: (845) 454-2655



**Legend**

- Suspected UST Fill Port
- Suspected Fuel Oil Vent
- Geophysical Anomaly
- Building Outline

BASEMAP:  
 "ALTA/ACSM LAND TITLE SURVEY",  
 ARTISTOTLE BOURNAZOS, P.C.,  
 DATED 6-15-2007



**SELECTED SITE FEATURES**  
 SOUTH BRONX CHARTER SCHOOL  
 611 EAST 133rd STREET  
 BRONX, NEW YORK

One Civic Center Plaza  
 Suite 501  
 Poughkeepsie, New York 12601  
 Phone: (845) 454-2544  
 Fax: (845) 454-2655

**FIGURE 2**

	DATE:	04/17/2013
	SCALE:	As Indicated
	PROJECT NUMBER:	160862

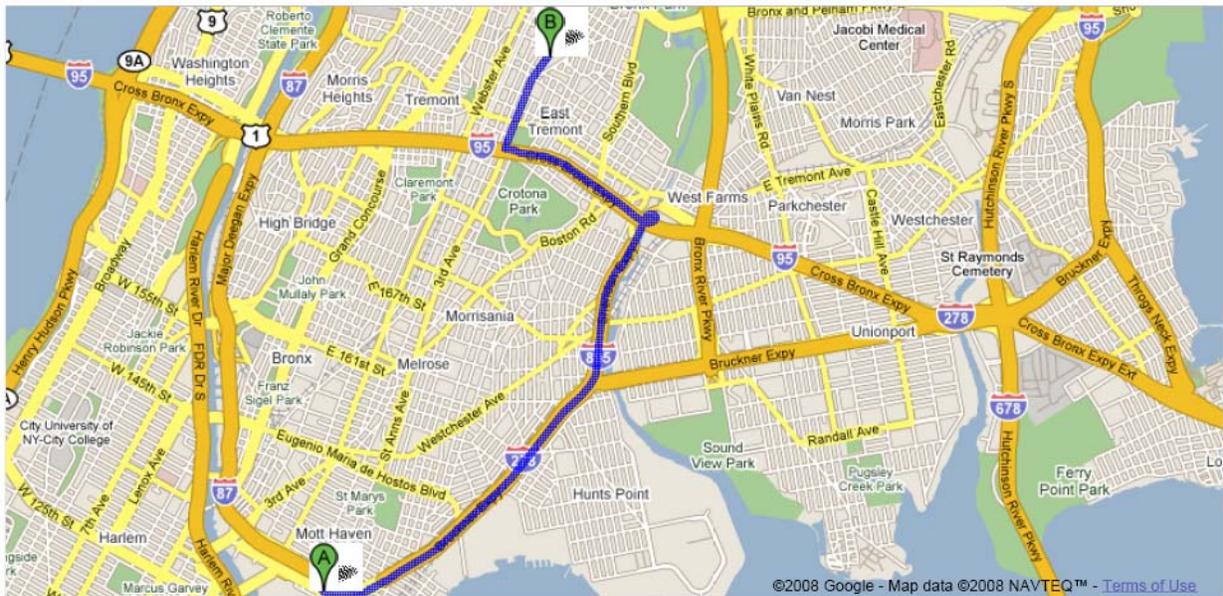
ALL LOCATIONS APPROXIMATE

**Figure 3  
Route to Nearest Hospital**

**Directions to Hospital:**

VIA HIGHWAYS

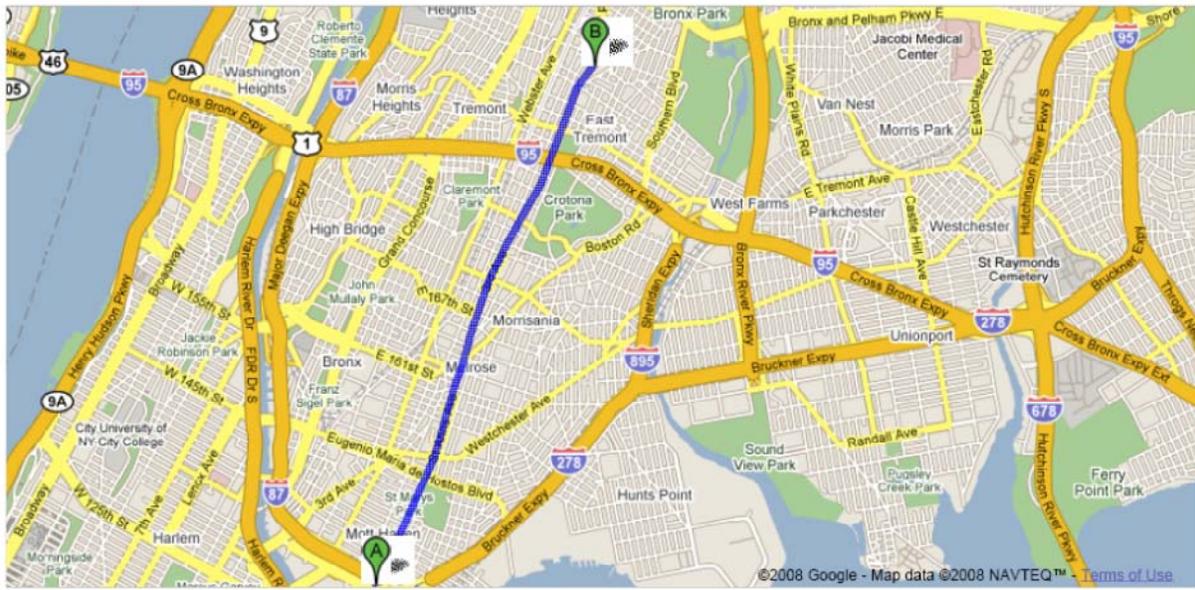
- |    |  |        |
|----|--|--------|
| 1. | Head <b>southeast</b> on <b>E 133rd St/Bruckner Blvd</b> toward <b>Bruckner Blvd</b><br>Continue to follow Bruckner Blvd | 0.4 mi |
| 2. | Merge onto <b>Bruckner Expy/I-278 E</b> via the ramp to <b>Throgs Neck Bridge/New England</b>                            | 1.6 mi |
| 3. | Take exit <b>49</b> to merge onto <b>I-895 N/Sheridan Expy</b> toward <b>E 177 St</b>                                    | 1.2 mi |
| 4. | Take the exit onto <b>Cross Bronx Expy/I-95 S</b> toward <b>Trenton/G Washington Bridge</b>                              | 1.3 mi |
| 5. | Take exit <b>3</b> toward <b>Third Ave</b>   | 177 ft |
| 6. | Merge onto <b>E 175th St</b>   | 351 ft |
| 7. | Turn <b>right</b> at <b>3rd Ave</b>  | 0.7 mi |
| 8  | ARRIVE: 4422 3rd Ave Bronx, NY 10457   |        |



VIA LOCAL ROADS

- |    |  |        |
|----|--|--------|
| 1. | Head <b>northeast</b> on <b>St Anns Ave</b> toward <b>E 135th St</b> | 1.4 mi |
| 2. | Continue on <b>3rd Ave</b> to<br>4422 3rd Ave                        | 2.3 mi |

Bronx, NY 10457



**ATTACHMENT A**

**Health and Safety Plan Receipt and Acceptance Form**



**ATTACHMENT B**

**Health and Safety Plan Pre-Entry Briefing Attendance Form**



**ATTACHMENT C**

**Supervisor's Accident Investigation Report Form**

**SUPERVISOR'S ACCIDENT INVESTIGATION REPORT**

Injured Employee \_\_\_\_\_ Job Title \_\_\_\_\_

Home Office \_\_\_\_\_ Division/Department \_\_\_\_\_

Date/Time of Accident \_\_\_\_\_

Location of Accident \_\_\_\_\_

Witnesses to the Accident \_\_\_\_\_

Injury Incurred? \_\_\_\_\_ Nature of Injury \_\_\_\_\_

Engaged in What Task When Injured? \_\_\_\_\_

Will Lost Time Occur? \_\_\_\_\_ How Long? \_\_\_\_\_ Date Lost Time Began \_\_\_\_\_

Were Other Persons Involved/Injured? \_\_\_\_\_

How Did the Accident Occur? \_\_\_\_\_

What Could Be Done to Prevent Recurrence of the Accident? \_\_\_\_\_

What Actions Have You Taken Thus Far to Prevent Recurrence? \_\_\_\_\_

Supervisor's Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

Reviewer's Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

**Note: If the space provided on this form is insufficient, provide additional information on a separate page and attach. The completed accident investigation report must be submitted to the Health and Safety Manager within two days of the occurrence of the accident.**

**ATTACHMENT D**

**Chemical Hazard and MSDS Sheets**

**APPENDIX 5**

**DESIGN DIAGRAMS AND SPECIFICATIONS FOR VAPOR  
BARRIER/WATERPROOFING MEMBRANE & SSDS**

**Geo-Seal® Vapor Intrusion Barrier**  
**02 56 19.13**  
**Fluid-Applied Gas Barrier**  
**Version 1.30**

*Note: If membrane will be subjected to hydrostatic pressure, please contact Land Science Technologies™ for proper recommendations.*

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

**1.2 SUMMARY**

- A. This section includes the following:
  - 1. Substrate preparation:
  - 2. Vapor intrusion barrier components:
  - 3. Seam sealer and accessories.
- B. Related Sections: The following sections contain requirements that relate to this section:
  - 1. Division 2 Section "Earthwork", "Pipe Materials", "Sub-drainage Systems", "Gas Collection Systems":
  - 2. Division 3 Section "Cast-in-Place Concrete" for concrete placement, curing, and finishing:
  - 3. Division 5 Section "Expansion Joint Cover Assemblies", for expansion-joint covers assemblies and installation.

**1.3 PERFORMANCE REQUIREMENTS**

- A. General: Provide a vapor intrusion barrier system that prevents the passage of methane gas and/or volatile organic compound vapors and complies with physical requirements as demonstrated by testing performed by an independent testing agency of manufacturer's current vapor intrusion barrier formulations and system design.

**1.4 SUBMITTALS**

- A. Submit product data for each type of vapor intrusion barrier, including manufacturer's printed instructions for evaluating and preparing the substrate, technical data, and tested physical and performance properties.
- B. Project Data - Submit shop drawings showing extent of vapor intrusion barrier, including details for overlaps, flashing, penetrations, and other termination conditions.
- C. Samples – Submit representative samples of the following for approval:
  - 1. Vapor intrusion barrier components.
- D. Certified Installer Certificates – Submit certificates signed by manufacturer certifying that installers comply with requirements under the "Quality Assurance" article.

**1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced installer who has been trained and certified in writing by the membrane manufacturer, Land Science Technologies™ for the installation of the Geo-Seal® System.
- B. Manufacturer Qualification: Obtain vapor intrusion barrier materials and system components from a single manufacturer source Land Science Technologies.
- C. Field Sample: Apply vapor intrusion barrier system field sample to 100 ft<sup>2</sup> (9.3 m<sup>2</sup>) of field area demonstrate application, detailing, thickness, texture, and standard of workmanship.
  - 1. Notify engineer or special inspector one week in advance of the dates and times when field sample will be prepared.
  - 2. If engineer or special inspector determines that field sample, does not meet requirements, reapply field sample until field sample is approved.
  - 3. Retain and maintain approved field sample during construction in an undisturbed condition as a standard for judging the completed methane and vapor intrusion barrier. An undamaged field sample may become part of the completed work.
- D. Pre-installation Conference: A pre-installation conference shall be held prior to application of the vapor intrusion barrier system to assure proper site and installation conditions, to include contractor, applicator, architect/engineer, other trades influenced by vapor intrusion barrier installation and special inspector (if any).

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site as specified by manufacturer labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.
- B. Store materials as specified by the manufacturer in a clean, dry, protected location and within the temperature range required by manufacturer. Protect stored materials from direct sunlight. If freezing temperatures are expected, necessary steps should be taken to prevent the freezing of the Geo-Seal CORE and Geo-Seal CORE Detail components.
- C. Remove and replace material that cannot be applied within its stated shelf life.

## 1.7 PROJECT CONDITIONS

- A. Protect all adjacent areas not to be installed on. Where necessary, apply masking to prevent staining of surfaces to remain exposed wherever membrane abuts to other finish surfaces.
- B. Perform work only when existing and forecasted weather conditions are within manufacturer's recommendations for the material and application method used.
- C. Minimum clearance of 24 inches is required for application of product. For areas with less than 24-inch clearance, the membrane may be applied by hand using Geo-Seal CORE Detail.
- D. Ambient temperature shall be within manufacturer's specifications. (Greater than +45°F/+7°C.) Consult manufacturer for the proper requirements when desiring to apply Geo-Seal CORE below 45°F/7°C.
- E. All plumbing, electrical, mechanical and structural items to be under or passing through the vapor intrusion barrier system shall be positively secured in their proper positions and appropriately protected prior to membrane application.
- F. Vapor intrusion barrier shall be installed before placement of fill material and reinforcing steel. When not possible, all exposed reinforcing steel shall be masked by general contractor prior to membrane application.
- G. Stakes used to secure the concrete forms **shall not penetrate** the vapor intrusion barrier system after it has been installed. If stakes need to puncture the vapor intrusion barrier system after it has been installed, the necessary repairs need to be made by a certified Geo-Seal applicator. To confirm the staking procedure is in agreement with the manufacturer's recommendation, contact Land Science Technologies.

## 1.8 WARRANTY

- A. General Warranty: The special warranty specified in this article shall not deprive the owner of other rights the owner may have under other provisions of the contract documents, and shall be in addition to, and run concurrent with, other warranties made by the contractor under requirements of the contract documents.
- B. Special Warranty: Submit a written warranty signed by vapor intrusion barrier manufacturer agreeing to repair or replace vapor intrusion barrier that does not meet requirements or that does not remain methane gas and/or volatile organic compound vapor tight within the specified warranty period. Warranty does not include failure of vapor intrusion barrier due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in the attached to structures that exceed 1/16 inch (1.58 mm) in width.
  - 1. Warranty Period: 1 year after date of substantial completion. Longer warranty periods are available upon request to the manufacturer.
- C. Labor and material warranties are available upon request to the manufacturer.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. Geo-Seal; Land Science Technologies™, San Clemente, CA. (949) 481-8118
  - 1. Geo-Seal BASE sheet layer
  - 2. Geo-Seal CORE spray layer and Geo-Seal CORE Detail
  - 3. Geo-Seal BOND protection layer

### 2.2 VAPOR INTRUSION BARRIER SPRAY MATERIALS

- A. Fluid applied vapor intrusion barrier system – Geo-Seal CORE; a single course, high build, polymer modified, asphalt emulsion. Waterborne and spray applied at ambient temperatures. A nominal thickness of 60 dry mils, unless specified otherwise. Non-toxic and odorless. Geo-Seal CORE Detail has similar properties with greater viscosity and is roller or brush applied. Manufactured by Land Science Technologies.

B. Fluid applied vapor intrusion barrier physical properties.

Geo-Seal CORE – TYPICAL CURED PROPERTIES

Properties	Test Method	Results
Tensile Strength - CORE only	ASTM 412	32 psi
Tensile Strength - Geo-Seal System	ASTM 412	662 psi
Elongation	ASTM 412	4140%
Resistance to Decay	ASTM E 154 Section 13	4% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	.026 g/ft <sup>2</sup> /hr
Hydrostatic Water Pressure	ASTM D 751	26 psi
Perm rating	ASTM E 96 (US Perms)	0.21
Methane transmission rate	ASTM D 1434	Passed
Adhesion to Concrete & Masonry	ASTM C 836 & ASTM C 704	11 lbf./inch
Hardness	ASTM C 836	80
Crack Bridging	ASTM C 836	No Cracking
Heat Aging	ASTM D 4068	Passed
Environmental Stress Cracking	ASTM D 1693	Passed
Oil Resistance	ASTM D543	Passed
Soil Burial	ASTM D 4068	Passed
Low Temp. Flexibility	ASTM C 836-00	No Cracking at –20°C
Resistance to Acids:		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248°F
Flexible		13°F

Geo-Seal CORE Detail – TYPICAL CURED PROPERTIES

Properties	Test Method	Results
Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	3860%
Resistance to Decay	ASTM E 154 Section 13	9% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	.026 g/ft <sup>2</sup> /hr
Hydrostatic Water Pressure	ASTM D 751	28 psi
Perm rating (US Perms)	ASTM E 96	0.17
Methane transmission rate	ASTM D 1434	Passed
Adhesion to Concrete & Masonry	ASTM C 836	7 lbf./inch
Hardness	ASTM C 836	85
Crack Bridging	ASTM C 836	No Cracking
Low Temp. Flexibility	ASTM C 836-00	No Cracking at –20°C
Resistance to Acids:		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248°F
Flexible		13°F

2.3 VAPOR INTRUSION BARRIER SHEET MATERIALS

- A. The Geo-Seal BASE layer and Geo-Seal BOND layer are chemically resistant sheets comprised of a 5 mil high density polyethylene sheet thermally bonded to a 3 ounce non woven geotextile.
- B. Sheet Course Usage
  1. As foundation base layer, use Geo-Seal BASE course and/or other base sheet as required or approved by the manufacturer.
  2. As top protective layer, use Geo-Seal BOND layer and/or other protection as required or approved by the manufacturer.

C. Geo-Seal BOND and Geo-Seal BASE physical properties.

Properties	Test Method	Results
Film Thickness		5 mil
Composite Thickness		18 mil
Water Vapor Permeability	ASTM E 96	0.214
Adhesion to Concrete	ASTM D 1970	9.2 lbs/inch <sup>2</sup>
Dart Impact	ASTM D 1790	>1070 gms, method A 594 gms, method B
Puncture Properties Tear	ASTM B 2582 MD	11,290 gms
	ASTM B 2582 TD	13,150 gms

2.4 AXILLARY MATERIALS

- A. Sheet Flashing: 60-mil reinforced modified asphalt sheet good with double-sided adhesive.
- B. Reinforcing Strip: Manufacturer's recommended polypropylene and polyester fabric.
- C. Gas Venting Materials: Geo-Seal Vapor-Vent HD or Geo-Seal Vapor-Vent Poly, and associated fittings.
- D. Seam Detailing Sealant Mastic: Geo-Seal CORE Detail, a high or medium viscosity polymer modified water based asphalt material.
  - 1. Back Rod: Closed-cell polyethylene foam.

PART 3 – EXECUTION

3.1 AUXILIARY MATERIALS

- A. Examine substrates, areas, and conditions under which vapor intrusion barrier will be applied, with installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 SUBGRADE SURFACE PREPARATION

- A. Verify substrate is prepared according to manufacturer's recommendations. On a horizontal surface, the substrate should be free from material that can potentially puncture the vapor intrusion barrier. Additional protection or cushion layers might be required if the earth or gravel substrate contains too many jagged points and edges that could puncture one or more of the system components. Contact manufacturer to confirm substrate is within manufactures recommendations.
- B. Geo-Seal can accommodate a wide range of substrates, including but not limited to compacted earth, sand, aggregate, and mudslabs.
  - 1. Compacted Earth: Remove pieces of debris, gravel and/or any other material that can potentially puncture the Geo-Seal BASE. Remove any debris from substrate that can potentially puncture the Geo-Seal system prior to application.
  - 2. Sand: A sand subgrade requires no additional preparation, provided any material that can potentially puncture the Geo-Seal BASE layer is not present.
  - 3. Aggregate: Contact the manufacturer to ensure the aggregate layer will not be detrimental to the membrane. **The gravel layer must be compacted and rolled flat.** Ideally a ¾" minus gravel layer with rounded edges should be specified; however the Geo-Seal system can accommodate a wide variety of different substrates. Contact Land Science Technologies if there are questions regarding the compatibility of Geo-Seal and the utilized substrate. Exercise caution when specifying pea gravel under the membrane, if not compacted properly, pea gravel can become an unstable substrate.
  - 4. Mudslabs: The use of a mubslab under the Geo-Seal system is acceptable, contact Land Science Technologies for job specific requirements.
- C. Mask off adjoining surface not receiving the vapor intrusion barrier system to prevent the spillage or over spray affecting other construction.
- D. Earth, sand or gravel subgrades should be prepared and compacted to local building code requirements.

3.3 CONCRETE SURFACE PREPARATION

- A. Clean and prepare concrete surface to manufacturer's recommendations. In general, only apply the Geo-Seal CORE material to dry, clean and uniform substrates. Concrete surfaces must be a light trowel, light broom or equivalent finish. Remove fins, ridges and other projections and fill honeycomb, aggregate pockets, grout joints and tie holes, and other voids with hydraulic

cement or rapid-set grout. It is the applicator's responsibility to point out unacceptable substrate conditions to the general contractor and ensure the proper repairs are made.

- B. When applying the Geo-Seal CORE or Geo-Seal CORE Detail material to concrete it is important to not apply the product over standing water. Applying over standing water will result in the membrane not setting up properly on the substrate
- C. Surfaces may need to be wiped down or cleaned prior to application. This includes, but is not limited to, the removal of forming oils, concrete curing agents, dirt accumulation, and other debris. Contact form release agent manufacturer or concrete curing agent manufacturer for VOC content and proper methods for removing the respective agent.
- D. Applying the Geo-Seal CORE to "green" concrete is acceptable and can be advantageous in creating a superior bond to the concrete surface. To help reduce blistering, apply a primer coat of only the asphalt component of the Geo-Seal CORE system. Some blistering of the membrane will occur and may be more severe on walls exposed to direct sunlight. Blistering is normal and will subside over time. Using a needle nose depth gauge confirm that the specified mil thickness has been applied.

#### 3.4 PREPARATIONS AND TREATMENT OF TERMINATIONS

- A. Prepare the substrate surface in accordance with Section 3.3 of this document. Concrete surfaces that are not a light trowel, light broom or equivalent finish, will need to be repaired.
- B. Terminations on horizontal and vertical surfaces should extend 6" onto the termination surface. Job specific conditions may prevent a 6" termination. In these conditions, contact manufacturer for recommendations.
- C. Apply 30 mils of Geo-Seal CORE to the terminating surface and then embed the Geo-Seal BASE layer by pressing it firmly into the Geo-Seal CORE layer. Next, apply 60 mils of Geo-Seal CORE to the BASE layer. When complete, apply the Geo-Seal BOND layer. After the placement of the Geo-Seal BOND layer is complete, apply a final 30 mil seal of the Geo-Seal CORE layer over the edge of the termination. For further clarification, refer to the termination detail provided by manufacturer.
- D. The stated termination process is appropriate for terminating the membrane onto exterior footings, pile caps, interior footings and grade beams. When terminating the membrane to stem walls or vertical surfaces the same process should be used.

#### 3.5 PREPARATIONS AND TREATMENT OF PENETRATIONS

- A. All pipe penetrations should be securely in place prior to the installation of the Geo-Seal system. Any loose penetrations should be secured prior to Geo-Seal application, as loose penetrations could potentially exert pressure on the membrane and damage the membrane after installation.
- B. To properly seal around penetrations, cut a piece of the Geo-Seal BASE layer that will extend 6" beyond the outside perimeter of the penetration. Cut a hole in the Geo-Seal BASE layer just big enough to slide over the penetration, ensuring the Geo-Seal BASE layer fits snug against the penetration, this can be done by cutting an "X" no larger than the inside diameter of the penetration. There should not be a gap larger than a 1/8" between the Geo-Seal BASE layer and the penetration. Other methods can also be utilized, provided, there is not a gap larger than 1/8" between the Geo-Seal BASE layer and the penetration.
- C. Seal the Geo-Seal BASE layer using Geo-Seal CORE or Geo-Seal CORE Detail to the underlying Geo-Seal BASE layer.
- D. Apply one coat of Geo-Seal CORE Detail or Geo-Seal CORE spray to the Geo-Seal BASE layer and around the penetration at a thickness of 30 mils. Penetrations should be treated in a 6-inch radius around penetration and 3 inches onto penetrating object.
- E. Embed a fabric reinforcing strip after the first application of the Geo-Seal CORE spray or Geo-Seal CORE Detail material and then apply a second 30 mil coat over the embedded joint reinforcing strip ensuring its complete saturation of the embedded strip and tight seal around the penetration.
- F. After the placement of the Geo-Seal BOND layer, a cable tie should then be placed around the finished penetration. The cable tie should be snug, but not overly tight so as to slice into the finished seal.

OPTION: A final application of Geo-Seal CORE may be used to provide a finishing seal after the Geo-Seal BOND layer has been installed.

NOTE: Metal or other slick penetration surfaces may require treatment in order to achieve proper adhesion. For plastic pipes, sand paper may be used to achieve a profile, an emery cloth is more appropriate for metal surfaces. An emery cloth should also be used to remove any rust on metal surfaces.

#### 3.6 GEO-SEAL BASE LAYER INSTALLATION

- A. Install the Geo-Seal BASE layer over substrate material in one direction with six-inch overlaps and the geotextile (fabric side) facing down.
- B. Secure the Geo-Seal BASE seams by applying 60 mils of Geo-Seal CORE between the 6" overlapped sheets with the geotextile side down.
- C. Visually verify there are no gaps/fish-mouths in seams.

- D. For best results, install an equal amount of Geo-Seal BASE and Geo-Seal CORE in one day. Leaving unsprayed Geo-Seal BASE overnight might allow excess moisture to collect on the Geo-Seal BASE. If excess moisture collects, it needs to be removed.

NOTE: In windy conditions it might be necessary to encapsulate the seam by spraying the Geo-Seal CORE layer over the completed Geo-Seal BASE seam.

### 3.7 GEO-SEAL CORE APPLICATION

- A. Set up spray equipment according to manufacturer's instructions.
- B. Mix and prepare materials according to manufacturer's instructions.
- C. The two catalyst nozzles (8001) should be adjusted to cross at about 18" from the end of the wand. This apex of catalyst and emulsion spray should then be less than 24" but greater than 12" from the desired surface when spraying. When properly sprayed the fan pattern of the catalyst should range between 65° and 80°.
- D. Adjust the amount of catalyst used based on the ambient air temperature and surface temperature of the substrate receiving the membrane. In hot weather use less catalyst as hot conditions will quickly "break" the emulsion and facilitate the curing of the membrane. In cold conditions and on vertical surfaces use more catalyst to "break" the emulsion quicker to expedite curing and set up time in cold conditions.
- E. To spray the Geo-Seal CORE layer, pull the trigger on the gun. A 42° fan pattern should form when properly sprayed. Apply one spray coat of Geo-Seal CORE to obtain a seamless membrane free from pinholes or shadows, with an average dry film thickness of 60 mils (1.52 mm).
- F. Apply the Geo-Seal CORE layer in a spray pattern that is perpendicular to the application surface. The concern when spraying at an angle is that an area might be missed. Using a perpendicular spray pattern will limit voids and thin spots, and will also create a uniform and consistent membrane.
- G. Verify film thickness of vapor intrusion barrier every 500 ft<sup>2</sup>. (46.45 m<sup>2</sup>), for information regarding Geo-Seal quality control measures, refer to the quality control procedures in Section 3.9 of this specification.
- H. The membrane will generally cure in 24 to 48 hours. As a rule, when temperature decreases or humidity increases, the curing of the membrane will be prolonged. The membrane does not need to be fully cured prior the placement of the Geo-Seal BOND layer, provided mil thickness has been verified and a smoke test will be conducted.
- I. **Do not penetrate** membrane after it has been installed. If membrane is penetrated after the membrane is installed, it is the responsibility of the general contractor to notify the certified installer to make repairs.
- J. If applying to a vertical concrete wall, apply Geo-Seal CORE directly to concrete surface and use manufacturer's recommended protection material based on site specific conditions. If applying Geo-Seal against shoring, contact manufacturer for site specific installation instructions.

NOTE: Care should be taken to not trap moisture between the layers of the membrane. Trapping moisture may occur from applying a second coat prior to the membrane curing. Repairs and detailing may be done over the Geo-Seal CORE layer when not fully cured.

### 3.8 GEO-SEAL BOND PROTECTION COURSE INSTALLATION

- A. Install Geo-Seal BOND protection course perpendicular to the direction of the Geo-Seal BASE course with overlapped seams over nominally cured membrane no later than recommended by manufacturer and before starting subsequent construction operations.
- B. Sweep off any water that has collected on the surface of the Geo-Seal CORE layer, prior to the placement of the Geo-Seal BOND layer.
- C. Overlap and seam the Geo-Seal BOND layer in the same manner as the Geo-Seal BASE layer.
- D. To expedite the construction process, the Geo-Seal BOND layer can be placed over the Geo-Seal CORE immediately after the spray application is complete, provided the Geo-Seal CORE mil thickness has been verified.

### 3.9 QUALITY ASSURANCE

- A. The Geo-Seal system must be installed by a trained and certified installer approved by Land Science Technologies.
- B. For projects that will require a material or labor material warranty, Land Science Technologies will require a manufacturer's representative or certified 3<sup>rd</sup> party inspector to inspect and verify that the membrane has been installed per the manufacturer's recommendations.

The certified installer is responsible for contacting the inspector for inspection. Prior to application of the membrane, a notice period for inspection should be agreed upon between the applicator and inspector.

- C. The measurement tools listed below will help verify the thickness of the Geo-Seal CORE layer. As measurement verification experience is gained, these tools will help confirm thickness measurements that can be obtained by pressing one's fingers into the Geo-Seal CORE membrane.

To verify the mil thickness of the Geo-Seal CORE, the following measurement devices are required.

1. Mil reading caliper: Calipers are used to measure the thickness of coupon samples. To measure coupon samples correctly, the thickness of the Geo-Seal sheet layers (18 mils each) must be taken into account. Mark sample area for repair.
2. Wet mil thickness gauge: A wet mil thickness gauge may be used to quickly measure the mil thickness of the Geo-Seal CORE layer. The thickness of the Geo-Seal sheet layers do not factor into the mil thickness reading.  
  
NOTE: When first using a wet mil thickness gauge on a project, collect coupon samples to verify the wet mil gauge thickness readings.
3. Needle nose digital depth gauge: A needle nose depth gauge should be used when measuring the Geo-Seal CORE thickness on vertical walls or in field measurements. Mark measurement area for repair.

To obtain a proper wet mil thickness reading, take into account the 5 to 10 percent shrinkage that will occur as the membrane fully cures. Not taking into account the thickness of the sheet layers, a freshly sprayed membrane should have a minimum wet thickness of 63 (5%) to 66 (10%) mils.

Methods on how to properly conduct Geo-Seal CORE thickness sampling can be obtained by reviewing literature prepared by Land Science Technologies.

- D. It should be noted that taking too many destructive samples can be detrimental to the membrane. Areas where coupon samples have been removed need to be marked for repair.
- E. Smoke Testing is highly recommended and is the ideal way to test the seal created around penetrations and terminations. Smoke Testing is conducted by pumping non-toxic smoke underneath the Geo-Seal vapor intrusion barrier and then repairing the areas where smoke appears. Refer to smoke testing protocol provided by Land Science Technologies. For projects that will require a material or labor material warranty, Land Science Technologies will require a smoke test.
- F. Visual inspections prior to placement of concrete, but after the installation of concrete reinforcing, is recommended to identify any punctures that may have occurred during the installation of rebar, post tension cables, etc. Punctures in the Geo-Seal system should be easy to identify due to the color contrasting layers of the system.

**Geo-Seal<sup>®</sup> Vapor-Vent**  
**SOIL GAS COLLECTION SYSTEM**  
**Version 1.2**

SECTION 02292 – BROWNFIELD/METHANE GAS CONTROL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Substrate preparation.
  - 2. Strip Composite installation.
  - 3. Strip Composite accessories.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 2 Section “Earthwork”, “Pipe Materials”, “Sub-drainage systems”, “Gas Control System”, “Vapor intrusion barrier”.
  - 2. Division 3 Section “Cast-in-Place Concrete” for concrete placement, curing, and finishing.
  - 3. Division 5 Section “Expansion Joint Cover Assemblies”, for expansion-joint covers assemblies and installation.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide a gas venting material that collects gas vapors and directs them to discharge or to collection points as specified in the gas vapor collection system drawings and complies with the physical requirements set forth by the manufacturer.

1.4 SUBMITTALS

- A. Submit Product Data for each type of gas venting system specified, including manufacturer’s specifications.
- B. Sample – Submit representative samples of the following for approval:
  - 1. Gas venting, strip geocomposite.
  - 2. Strip composite accessories.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who is certified in writing and approved by Vapor intrusion barrier manufacturer Land Science Technologies for the installation of the Geo-Seal<sup>®</sup> Vapor intrusion barrier System.
- B. Manufacturer Qualification: Obtain gas venting, vapor intrusion barrier and system components from a single manufacturer Land Science Technologies
- C. Pre-installation Conference: A pre-installation conference shall be held prior to installation of the venting system, vapor intrusion barrier and waterproofing system to assure proper site and installation conditions, to include contractor, applicator, architect/engineer and special inspector (if any).

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site as specified by manufacturer labeled with manufacturer’s name, product brand name and type, date of manufacture, shelf life, and directions for handling.

- B. Store materials as specified by the manufacturer in a clean, dry, protected location and within the temperature range required by manufacturer. Protect stored materials from direct sunlight.
- C. Remove and replace material that is damaged.

**PART 2 – PRODUCTS**

**2.1 MANUFACTURERS**

- A. Land Science Technologies, San Clemente, CA. 949-366-8000

- 1. Strip Geocomposite – Geo-Seal Vapor-Vent

**2.2 GAS VENT MATERIALS**

- A. Strip Geocomposite – Geo-Seal Vapor-Vent is a low profile, trenchless, flexible, sub slab vapor collection system used in lieu or in conjunction with perforated piping. Vapor-Vent is offered with two different core materials, Vapor-Vent PS is recommended for sites with inert methane gas and Vapor-Vent HD is recommended for sites with aggressive chlorinated volatile organic or petroleum vapors. Manufactured by Land Science Technologies
- B. Strip Geocomposite physical properties

<b>VENT PROPERTIES</b>	<b>TEST METHOD</b>	<b>VAPOR-VENT PS</b>	<b>VAPOR-VENT HD</b>
Material		Polystyrene	HDPE
Comprehensive Strength	ASTM D-1621	9,000 lbs / ft <sup>2</sup>	9,200 lbs / ft <sup>2</sup>
Shear Strength	ASTM D-1621	9,500 lbs / ft <sup>2</sup>	N/A
Peel Strength	ASTM D-1876	38 lbs / ft	35 lbs / ft
Fungus Resistance (core)	ASTM G-21	No Growth	No Growth
In-plane flow (Hydraulic gradient-0.1, loading-10 psi)	ASTM D-4716	21 gpm / ft of width	21 gpm / ft of width
Unobstructed inflow area Pavement side		85%	85%
Chemical Resistance		N/A	Excellent
<b>FABRIC PROPERTIES</b>	<b>TEST METHOD</b>	<b>VAPOR-VENT-PS</b>	<b>VAPOR-VENT-HD</b>
Weight	ASTM D-3776	4.0 oz.	4.5 oz.
Grab Tensile Strength	ASTM D-4632	115 lbs.	120 lbs.
Puncture Strength	ASTM D-3787	70 psi	65 psi
Trapezoidal Tear	ASTM D-4533	50 lbs.	30 lbs.
Mullen Burst Strength	ASTM D-3786	240 psi	50 psi
Elongation	ASTM D-4632	50%	50%
EOS (AOS)	ASTM D-4751	80	70
Permeability	ASTM D-4491	20 cm/sec	21 cm / sec
Flow Rate	ASTM D-4491	170 gpm / ft <sup>2</sup>	135 gpm / ft <sup>2</sup>
UV Stability (500 hours)	ASTM D-4355	85% Retained	70% Retained
Fungus Resistance	ASTM D-G21	No Growth	No Growth
<b>DIMENSIONAL DATA</b>			
Thickness		1"	1"
Standard Widths		12"	12"
Roll Length		150 ft	150 ft
Roll Diameter		7 ft	7 ft
Roll Weight		60 lbs	60 lbs

**2.3 AUXILIARY MATERIALS**

- A. Geo-Seal Vapor-Vent pipe reducers.
- B. Reinforced Tape.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which gas vent system will be installed, with installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 SUBSTRATE PREPARATION

- A. Verify substrate is prepared according to project requirements.

### 3.3 PREPARATION FOR STRIP COMPOSITE

- A. Mark the layout of strip geocomposite per layout design developed by engineer.

### 3.4 STRIP GEOCOMPOSITE INSTALLATION

- A. Install Geo-Seal Vapor-Vent over substrate material where designated on drawings with the flat base of the core placed down and shall be overlapped in accordance with manufacturer's recommendations.
- B. At areas where Geo-Seal Vapor-Vent strips intersect cut and fold back fabric to expose the dimpled core. Arrange the strips so that the top strip interconnects into the bottom strip. Unfold fabric to cover the core and use reinforcing tape, as approved by the manufacturer, to seal the connection to prevent sand or gravel from entering the core.
- C. When crossing Geo-Seal Vapor-Vent over footings or grade beams, **consult with the specifying environmental engineer and structural engineer for appropriate use and placement of solid pipe materials**. Place solid pipe over or through concrete surface and attach a Geo-Seal Vapor-Vent pipe reducer at both ends of the pipe before connecting the Geo-Seal Vapor-Vent to the pipe reducer. Seal the Geo-Seal Vapor-Vent to the Geo-Seal Vapor-Vent pipe reducer using fabric reinforcement tape. Refer to Vapor-Vent detail provided by Land Science Technologies.
- D. Place vent risers per specifying engineer's project specifications. Connect Geo-Seal Vapor-Vent to Geo-Seal Vapor-Vent pipe reducer and seal with fabric reinforced tape. Use Geo-Seal Vapor-Vent pipe reducer with the specified diameter piping as shown on system drawings.

### 3.5 PLACEMENT OF OVERLYING AND ADJACENT MATERIALS

- A. All overlying and adjacent material shall be placed or installed using approved procedures and guidelines to prevent damage to the strip geocomposite.
- B. Equipment shall not be directly driven over and stakes or any other materials may not be driven through the strip geocomposite.

## FR SERIES INLINE EXHAUST FANS



Fantech's versatile FR Series Inline Fans provide the ideal answer for a variety of air movement problems in residential and commercial applications. The fans feature a plastic housing constructed of UL-recognized, UV protected thermo-plastic resin. This tough protective shell allows the fan to be mounted in outdoor and wet locations\*. FR fans feature external rotor motors that have proven dependable year after year. Fan is fully caulked to prevent moisture from entering the housing.

### Applications

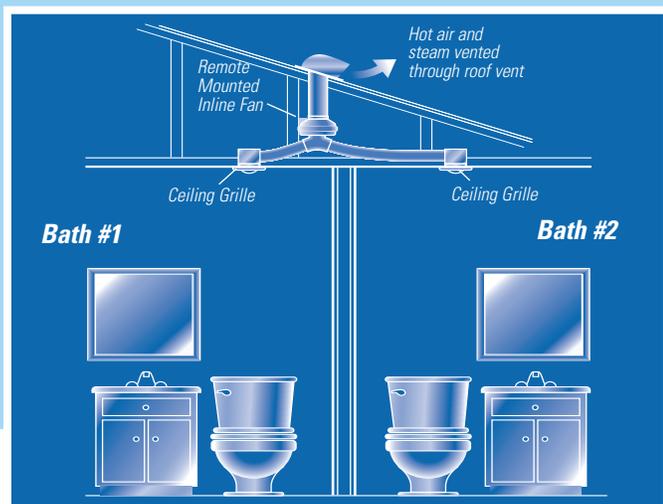
FR fans can be used for multiple point exhaust applications, crawl space venting or make-up air supply. They are also widely used as booster fans to move air from one room or area to another.



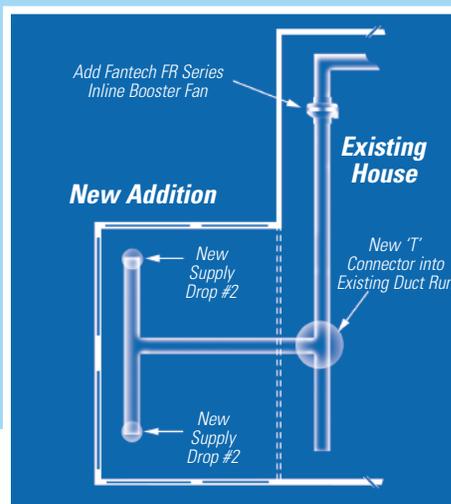
Look for the Energy Star Rated Models in Performance Data Chart on back page



### DUAL BATH APPLICATIONS - COMMERCIAL OR RESIDENTIAL



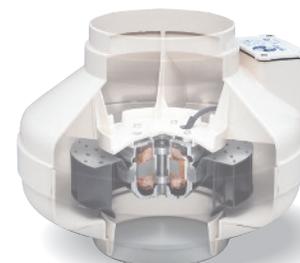
### NEW ADDITION



### EASY TO INSTALL. LOADED WITH FEATURES:

- Prewired and supplied with a mounting bracket for easy installation
- UL Listed; CSA Certified
- Approved for residential and commercial applications and for wet locations
- Suitable for airstream temperatures up to 140° F
- Easy connection using external wiring box with waterproof gasket

- 137-649 CFM
- 4" to 10" duct diameters
- 100% speed controllable
- Five-year factory warranty



Fantech external rotor motor

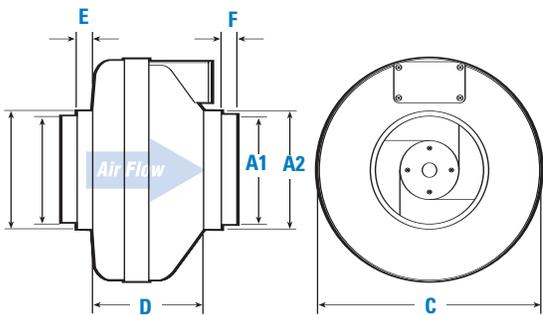
\* The FR Series is not manufactured to operate with water running through the motor compartment, or to be used in applications where the fan would be buried underground. A UL-recognized waterproof conduit should be used for all outdoor applications to prevent moisture entry via knockout in wiring box.

# FR SERIES

## INLINE EXHAUST FANS



### DIMENSIONAL DATA



Model	†A1	A2	C	D	E	F
FR 100	4	5	9½	6⅞	7⅞	7⅞
FR 110	4	5	9½	6⅞	7⅞	7⅞
FR 125	—	5	9½	6⅞	7⅞	—
FR 140	6	6¼	11¾	5⅞	1	7⅞
FR 150	6	6¼	11¾	5⅞	1	7⅞
FR 160	6	6¼	11¾	5⅞	1	7⅞
FR 200	8	10	13¼	6¼	1½	1½
FR 225	8	10	13¼	6¼	1½	1½
FR 250	—	10	13¼	6¼	1½	—

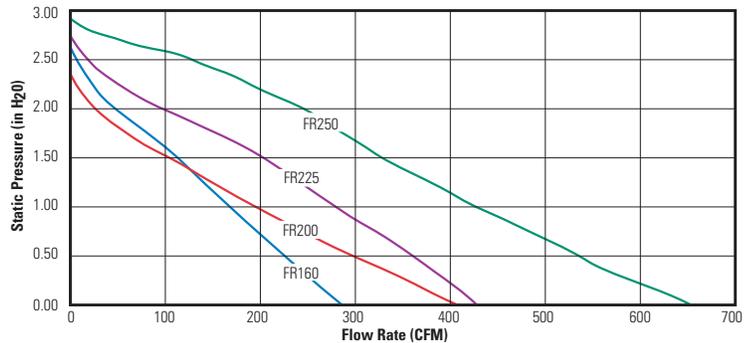
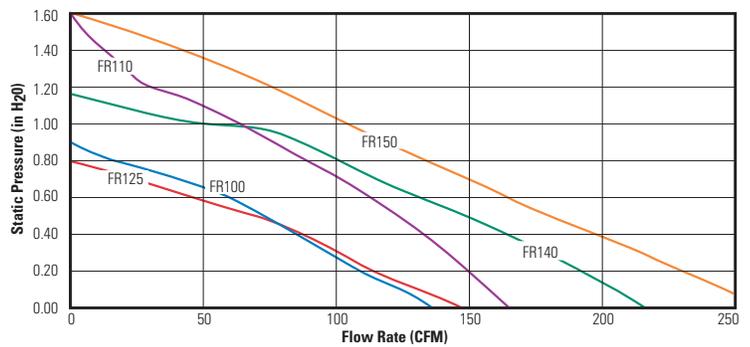
All dimensions in inches.  
 † Duct connections are 1/8" smaller than duct size.

**FIVE  
YEAR  
WARRANTY**



Look for the Energy Star Rated Models in Performance Data Chart.

### AIR PERFORMANCE GRAPHS



### PERFORMANCE DATA

Fan Model	Energy Star	RPM	Voltage	Rated Watts	Wattage Range	Max. Amps	Static Pressure in Inches W.G.						Max. Ps	Duct Dia.	
							0"	.2"	.4"	.6"	.8"	1.0"			1.5"
FR 100	✓	2950	120	21.2	13 – 22	0.18	137	110	83	60	21	—	—	0.9"	4"
FR 110	—	2900	115	80	62 – 80	0.72	167	150	133	113	88	63	4	1.60"	4"
FR 125	✓	2950	115	18	15 – 18	0.18	148	120	88	47	—	—	—	0.79"	5"
FR 140	✓	2850	115	61	47 – 62	0.53	214	190	162	132	99	46	—	1.15"	6"
FR 150	✓	2750	120	71	54 – 72	0.67	263	230	198	167	136	106	17	1.58"	6"
FR 160	—	2750	115	129	103 – 130	1.14	289	260	233	206	179	154	89	2.32"	6"
FR 200	✓	2750	115	122	106 – 128	1.11	408	360	308	259	213	173	72	2.14"	8"
FR 225	✓	3100	115	137	111 – 152	1.35	429	400	366	332	297	260	168	2.48"	8"
FR 250	—	2850	115	241	146 – 248	2.40	649	600	553	506	454	403	294	2.58"	10"

Performance shown is for installation type D - Ducted inlet, Ducted outlet. Speed (RPM) shown is nominal. Performance is based on actual speed of test. Performance ratings do not include the effects of appurtenances in the airstream.



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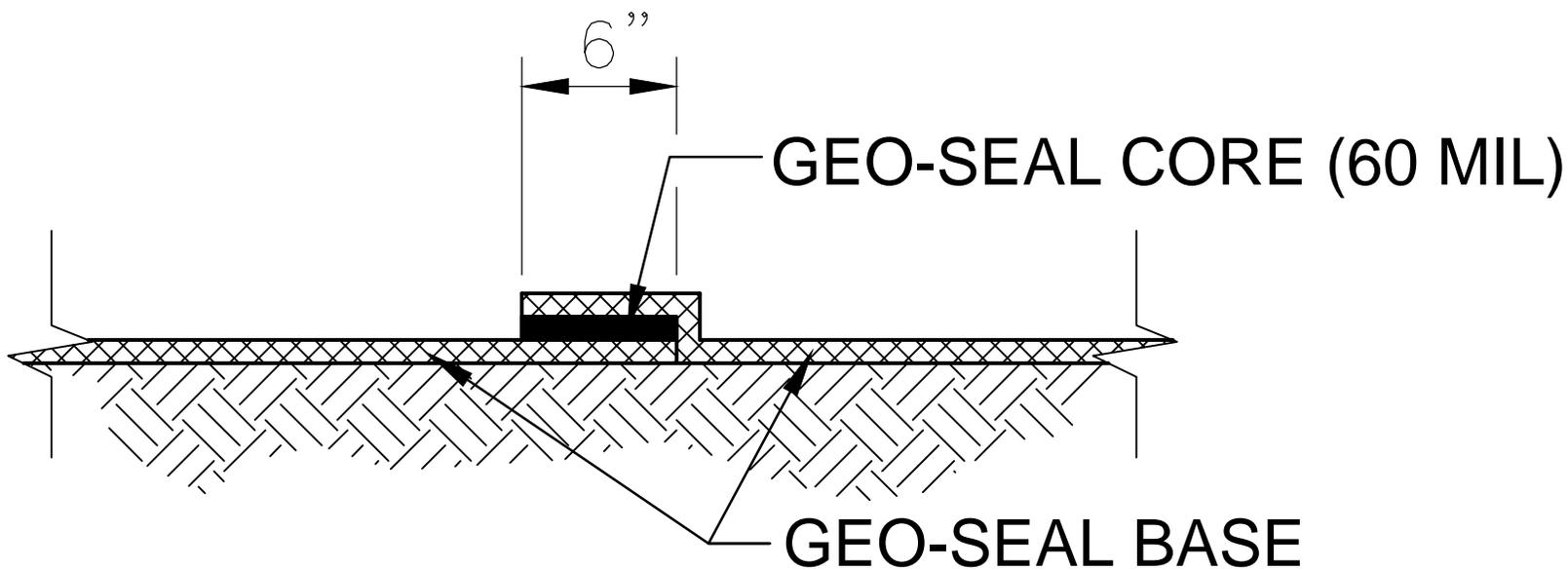
Item #: 450399  
 Rev Date: 111009

Fantech, reserves the right to modify, at any time and without notice, any or all of its products' features, designs, components and specifications to maintain their technological leadership position.



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Vapor Intrusion Barrier

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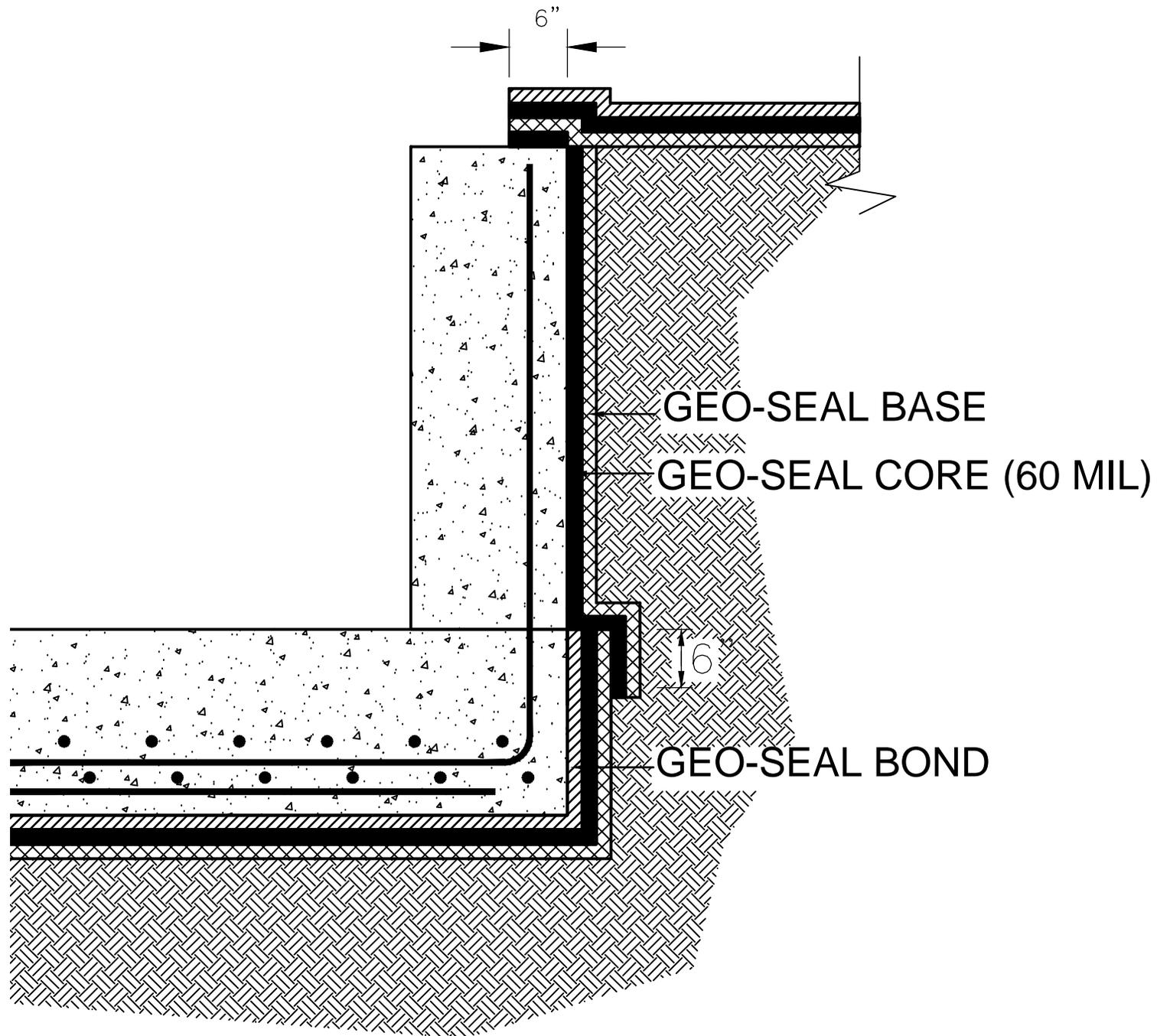
SCALE

TITLE

BASE OVERLAP  
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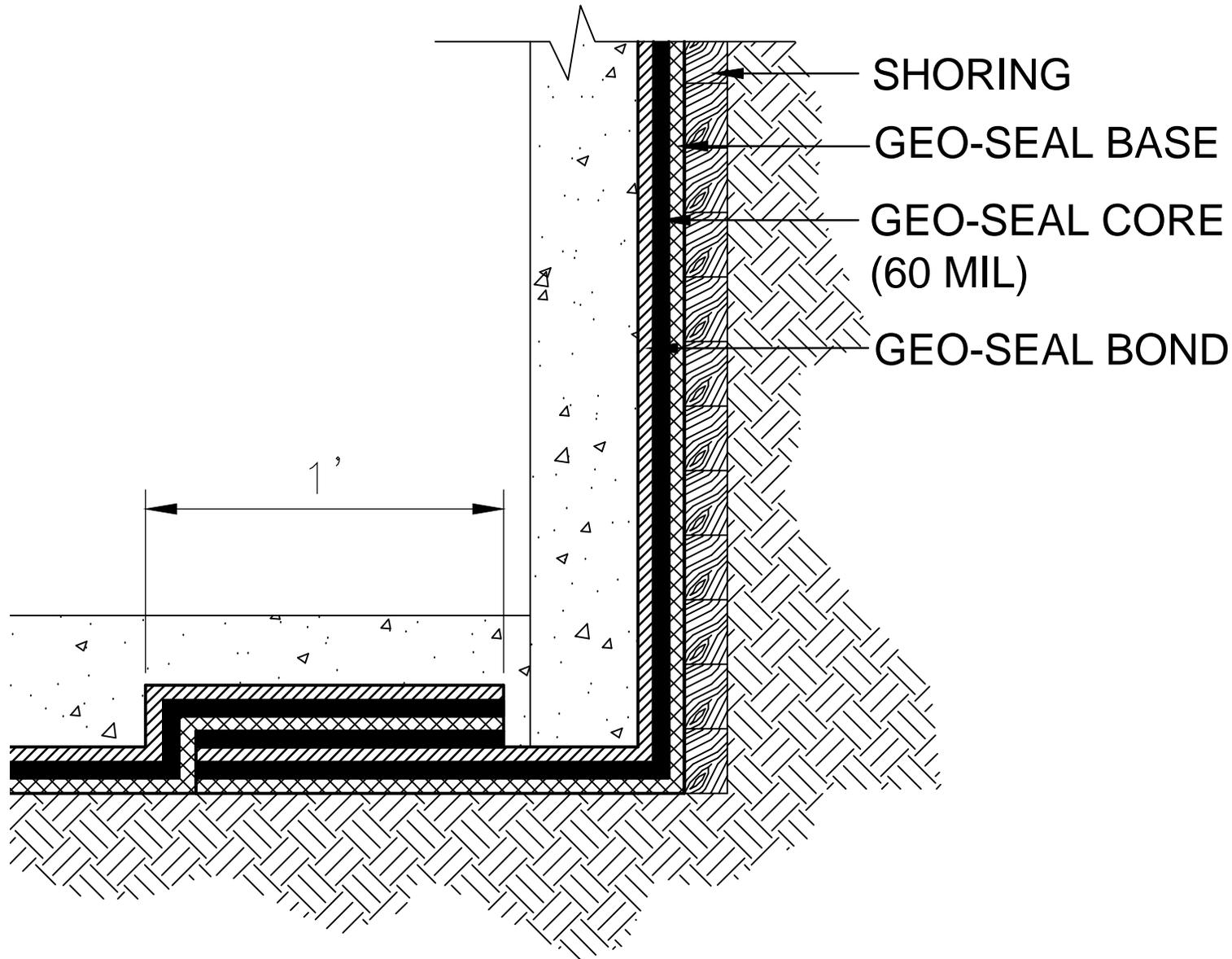
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BELOW GRADE  
OVERLAP DETAIL



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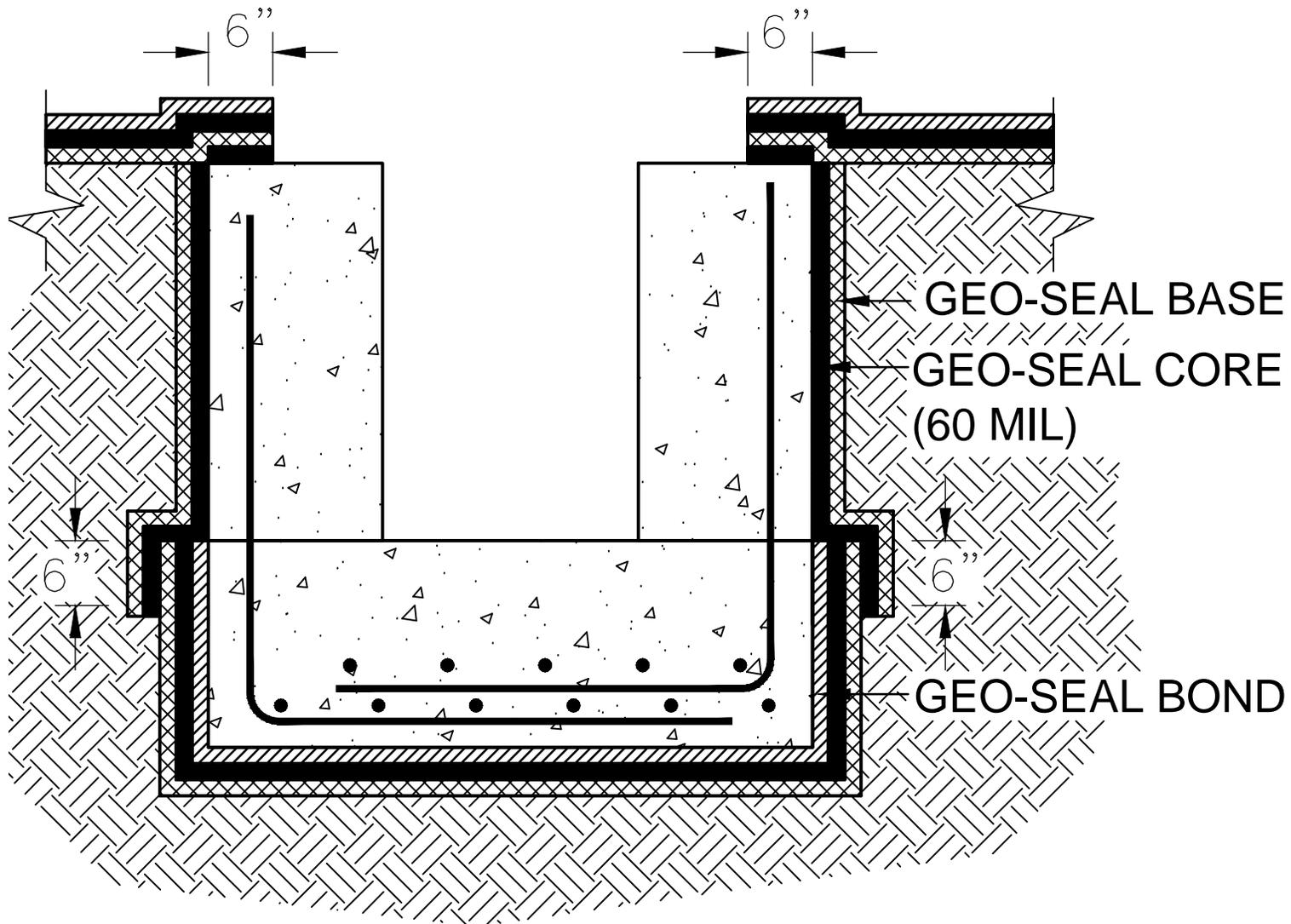
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SHORING DETAIL



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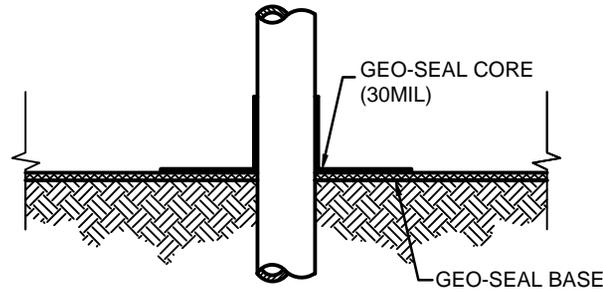
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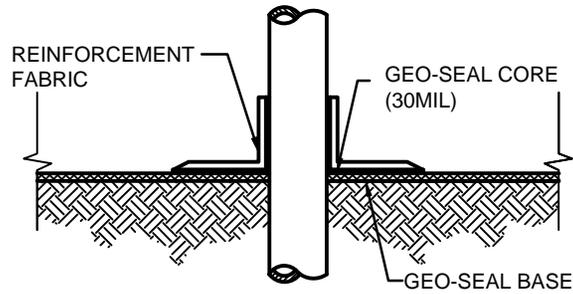
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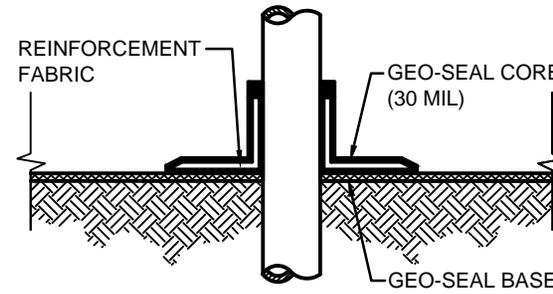
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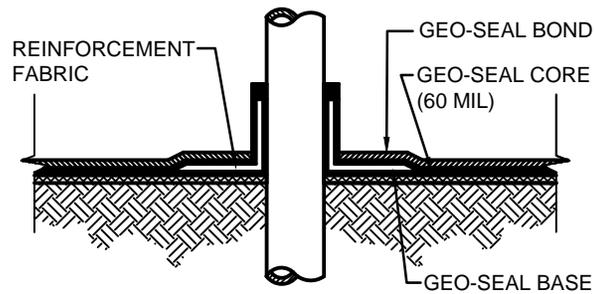
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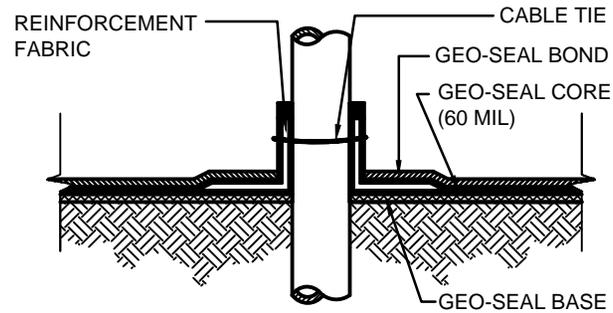
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STEP 3



STEP 4



STEP 5

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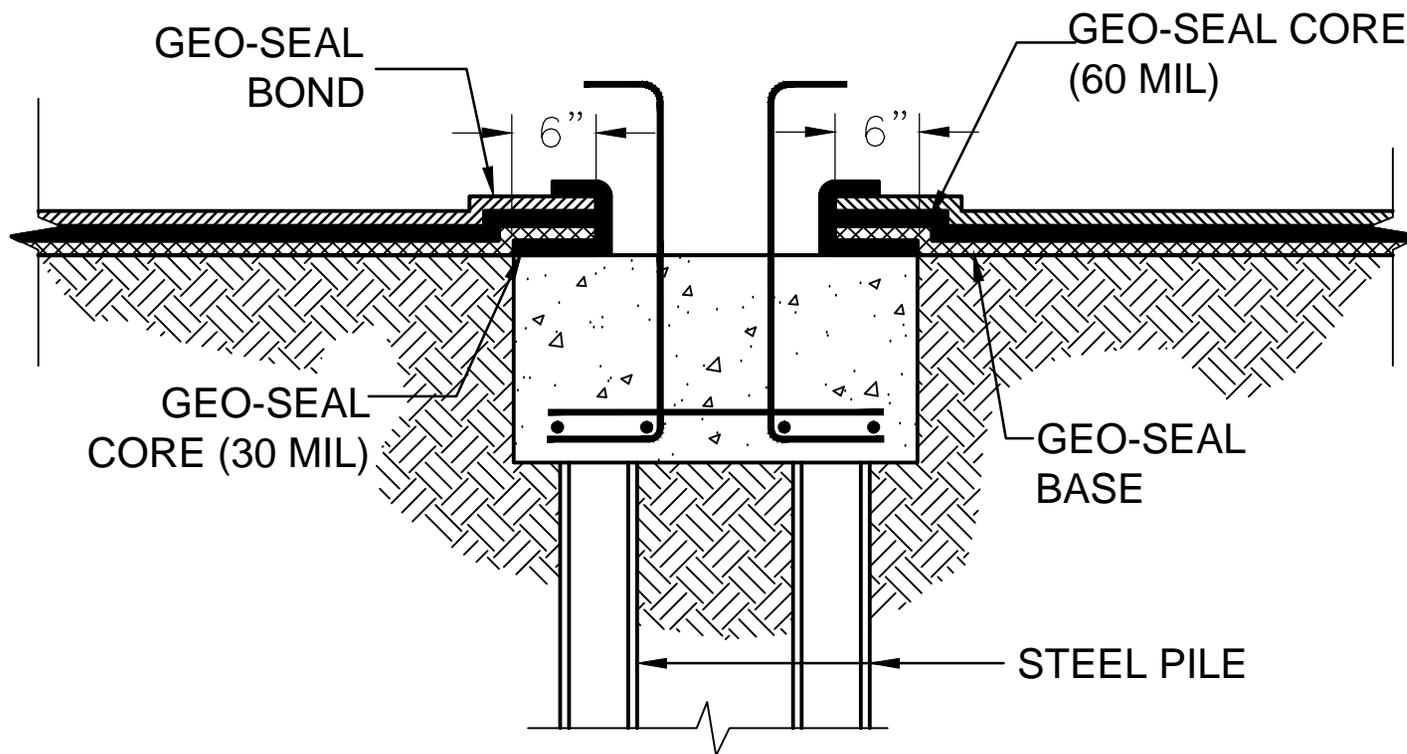
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TITLE \_\_\_\_\_

PENETRATION  
SEQUENCE



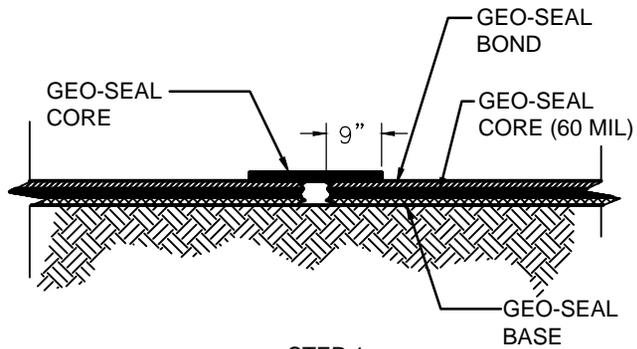
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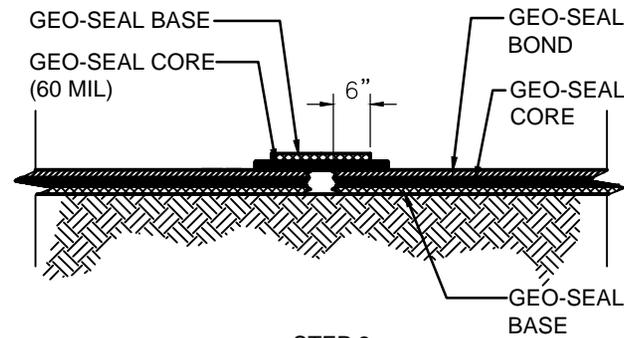
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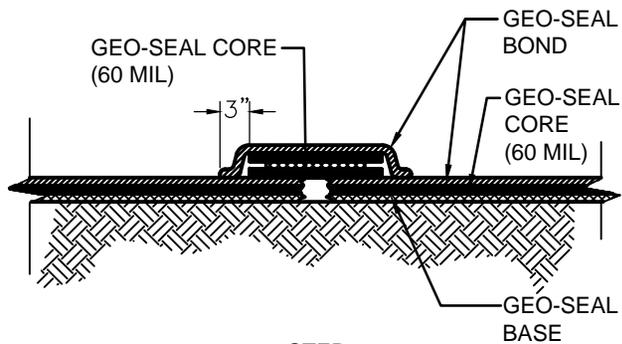

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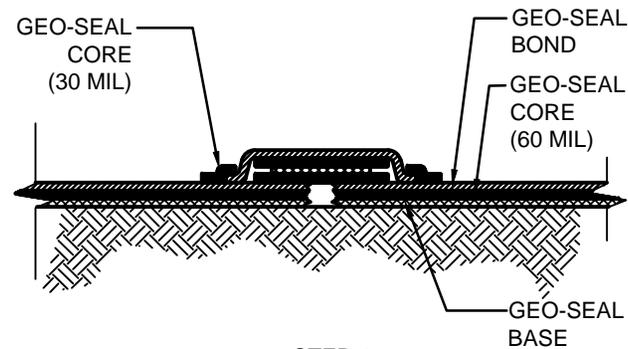
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STEP 2



STEP 3



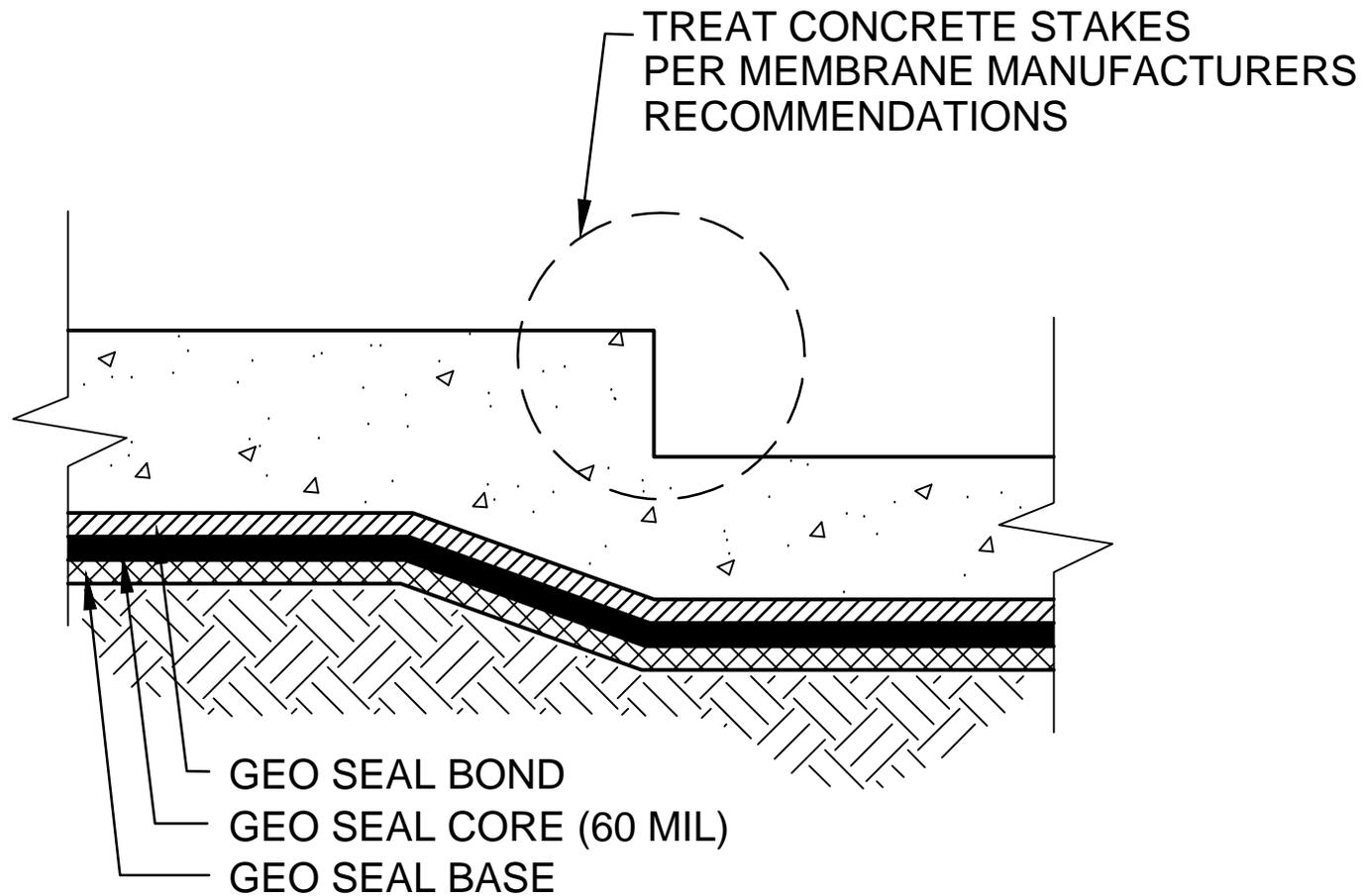
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REPAIR  
 SEQUENCE



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STEP SLAB  
DETAIL



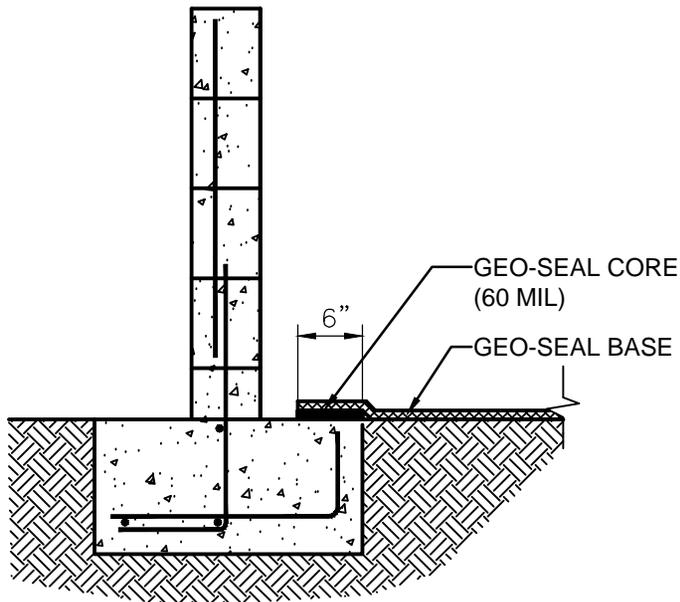
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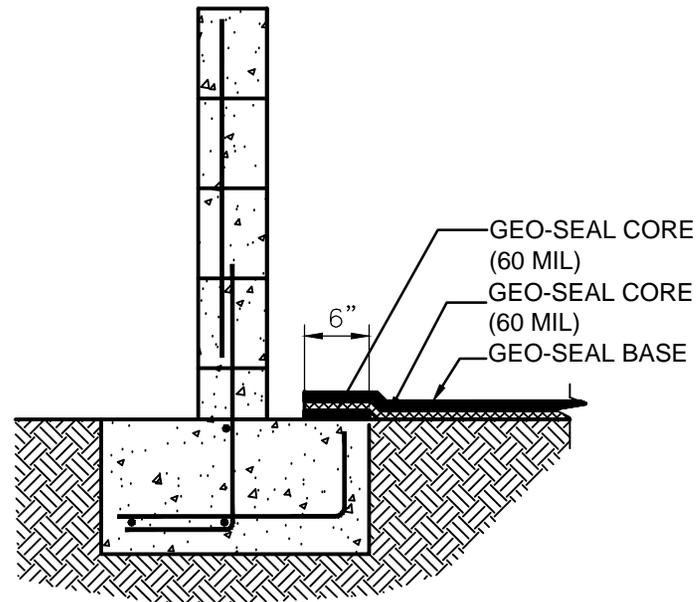
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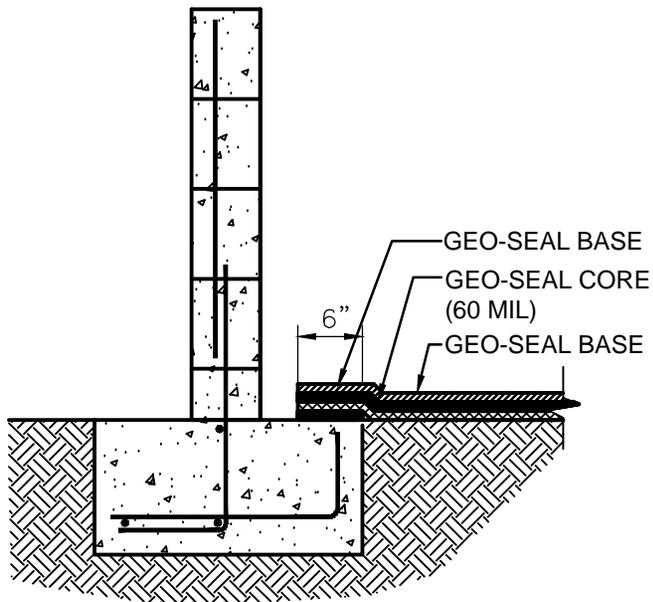
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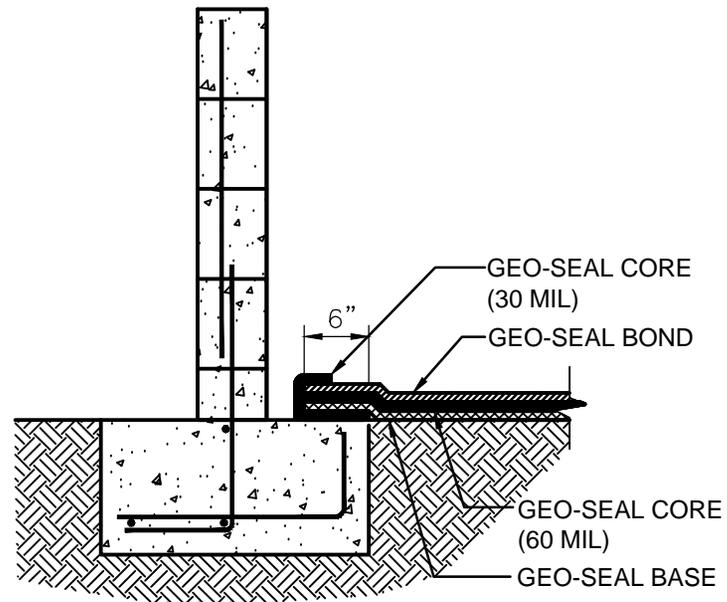
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STEP 2



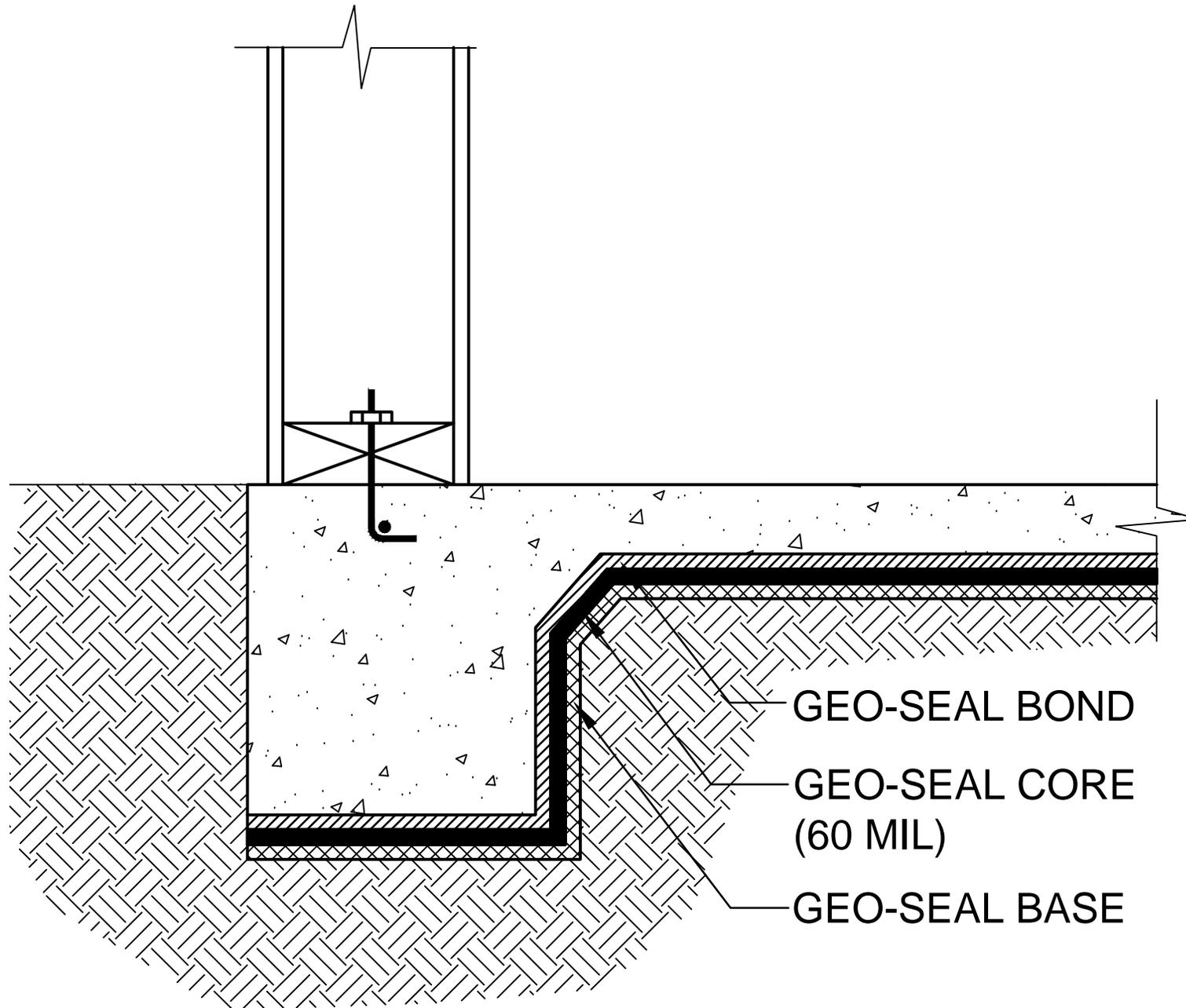
STEP 3



STEP 4



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GEO-SEAL BOND

GEO-SEAL CORE  
(60 MIL)

GEO-SEAL BASE

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Vapor Intrusion Barrier

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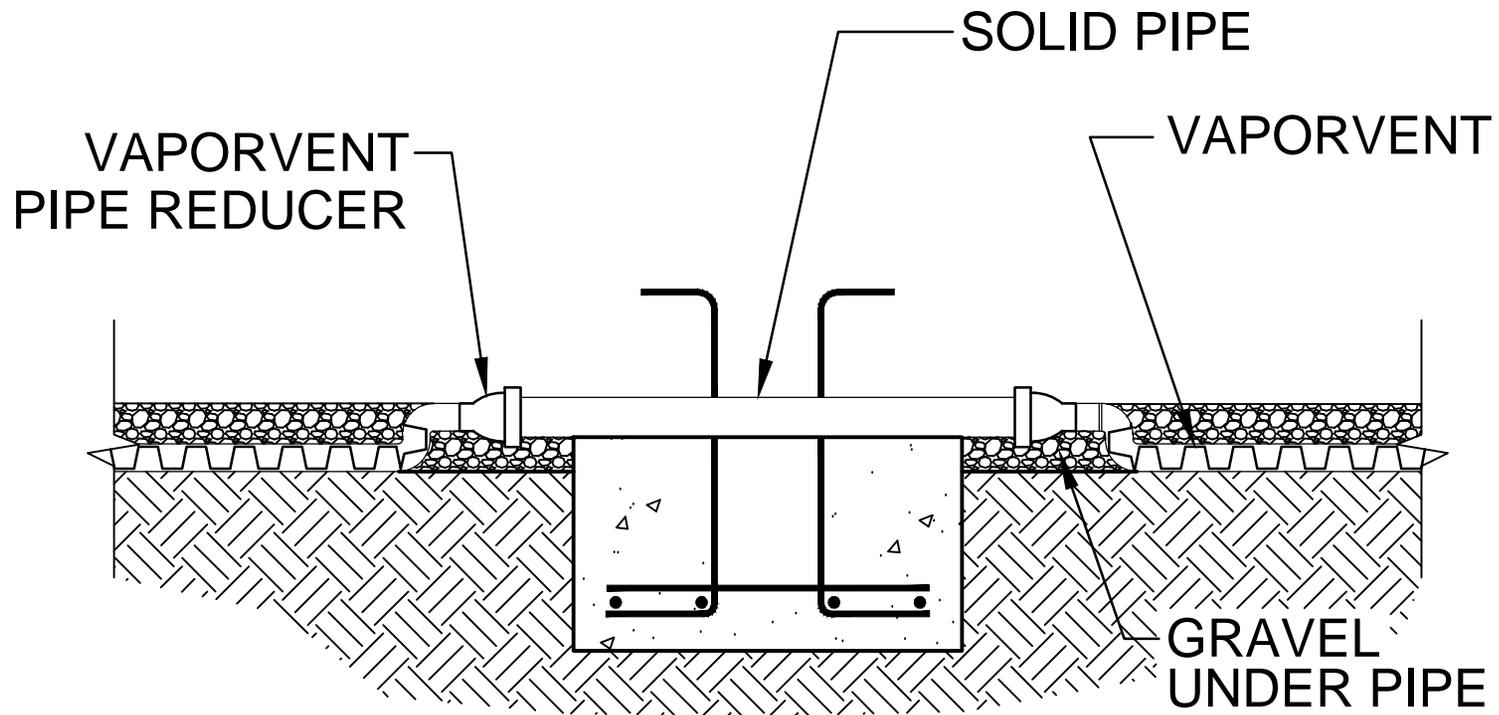
SCALE

TITLE

UNDER FOOTING  
DETAIL



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DATE  
SCALE  
TITLE

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DETAIL

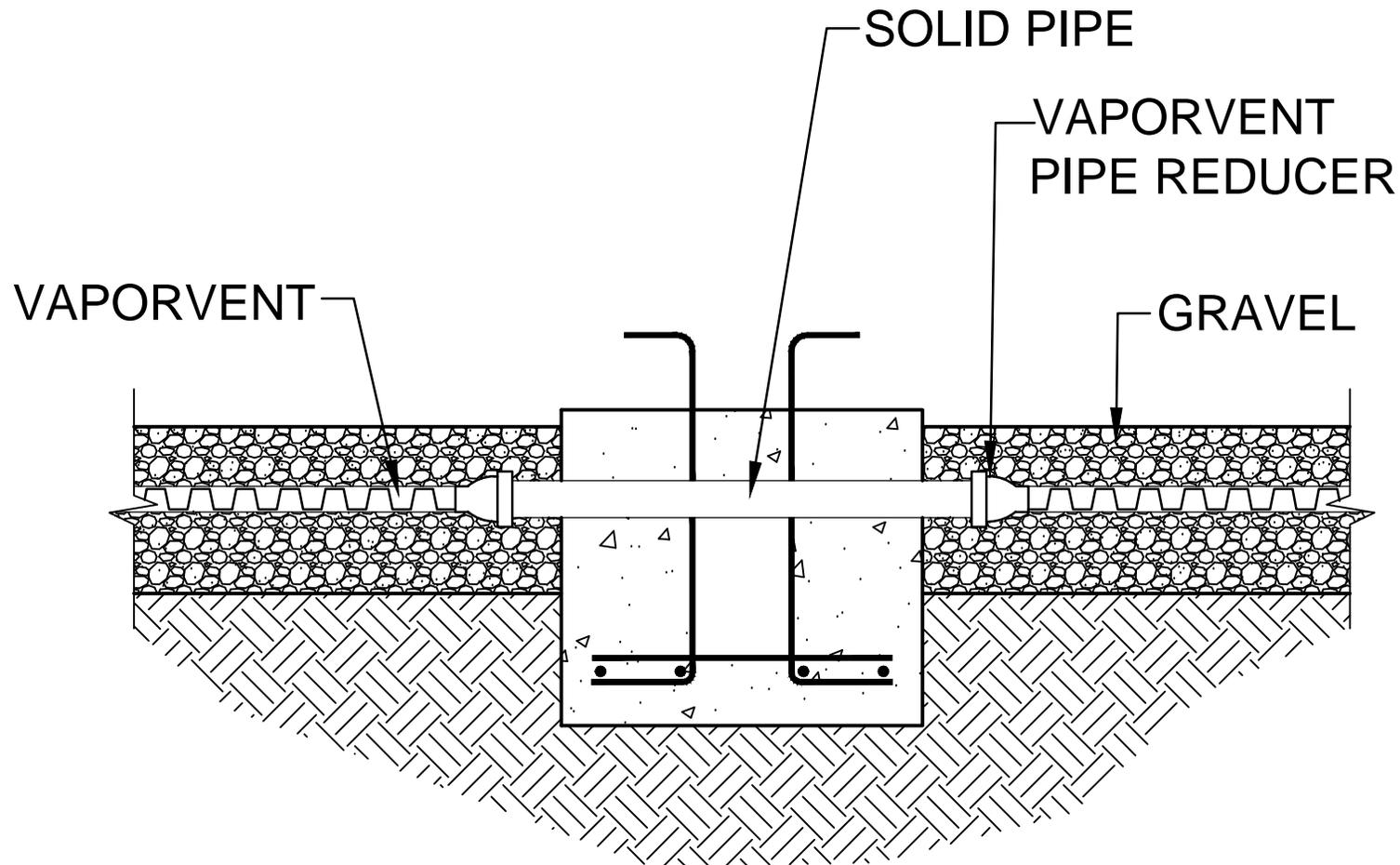


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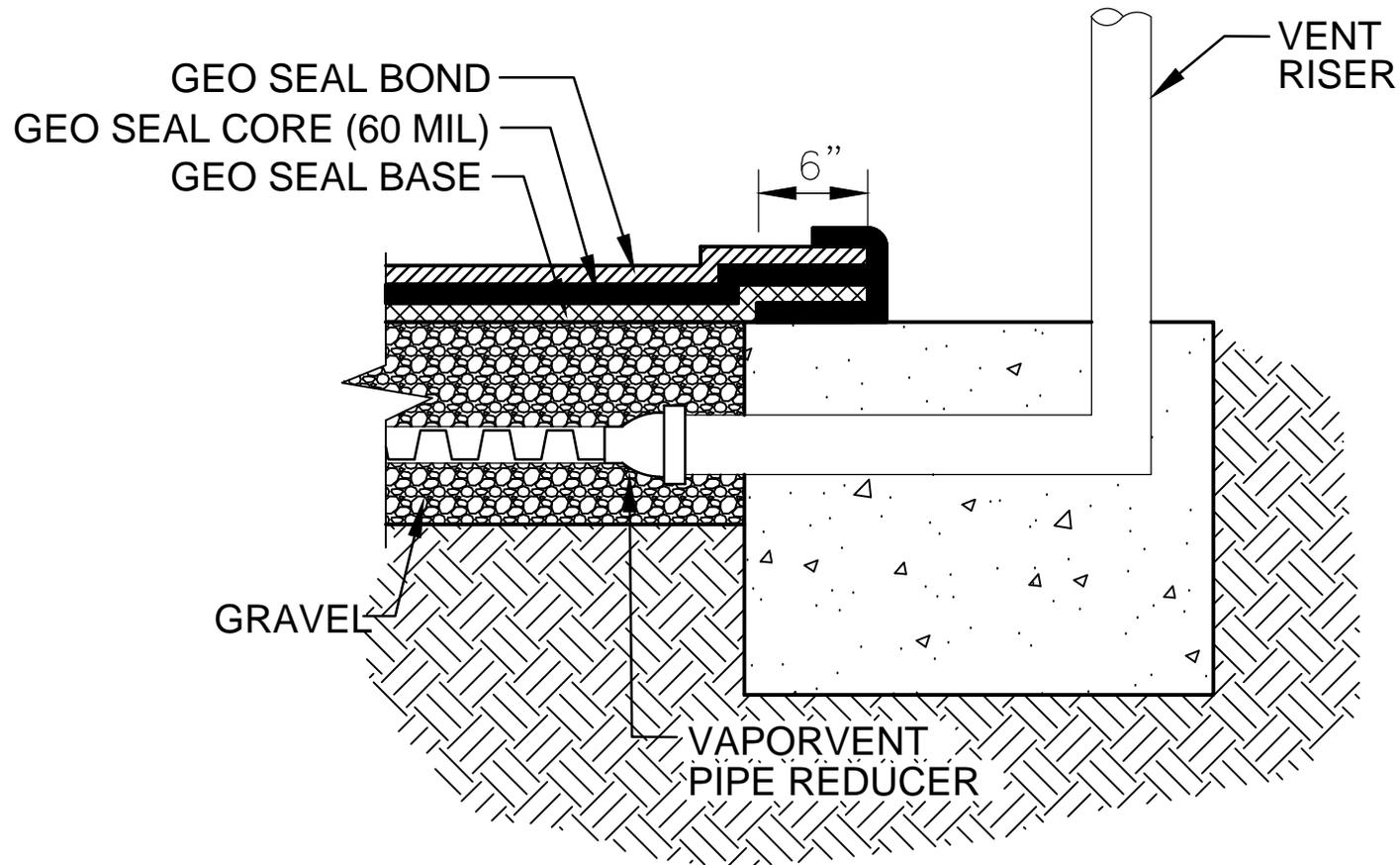
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VAPOR-VENT  
THROUGH  
FOOTING





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SCALE  
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VENT RISER