REMEDIAL ACTION WORKPLAN

for

390 and 400 Park Avenue South
New York, New York

NYC OER BCP Site No. 12CBCP042M

Prepared For:

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Prepared By:

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15 February 2012
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ENGINEERING & ENVIRONMENTAL SERVICES

REMEDIAL ACTION WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging / Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C/D	Construction/Demolition
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering and Institutional Controls
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
BCA	Brownfield Cleanup Agreement
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYC 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

Acronym	Definition
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, Ron Boyer, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the 400 Park Avenue South Site – NYC BCP Site No. 12CBCP042M.

I, Steven Ciambruschini, am a Qualified Environmental Professional as defined in §43-140. I have primary direct responsibility for implementation of the remedial action for the 400 Park Avenue South Site No. 12CBCP042M.

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.

Ronald Boyer

Name

085831-1

NYS PE License Number

Signature

14 February 2012

Date

Steven Ciambruschini

QEP Name

QEP Signature

14 February 2012

Date

LANGAN

EXECUTIVE SUMMARY

ET 400 PAS, LLC has enrolled in the New York City Brownfield Cleanup Program (NYC BCP) to investigate and remediate a 19,275-square foot site located at 390 and 400 Park Avenue South in Manhattan, 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 390 and 400 Park Avenue South in the Gramercy section in Manhattan, New York and is identified as Block 857 and Lot 40 and 46 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 19,275-square feet and is bounded to the north and south by East 28th and East 27th Streets, respectively, followed by commercial and residential dwellings to the north and a commercial building to the south. The property to the west of Lot 40 is also a commercial building. Park Avenue South is located east of the subject property followed by commercial and residential buildings. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant land. A 8-story building was recently demolished on Lot 40 in the Fall of 2011.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 475-foot tall 40-story mixed use commercial/residential building with one cellar and one sub-cellar level. The proposed site development will consist of commercial space on the first floor and residential dwellings on floors two through forty. The cellar and sub-cellar level will occupy approximately 62,615 sf. The first floor commercial retail space will occupy approximately 5,897 square-feet (sf). The residential portion of the building will occupy approximately 407,436 sf (362 residential units). The sub-cellar level will be occupied by mechanical rooms. The cellar will be occupied by mechanical rooms, a pool, and amenities for building occupants. The cellar level of the building will be built out to the extents of the subject property and will require the removal of soils on the full footprint of the site to a depth of approximately 17-feet below ground surface (b.g.s.). The sub-cellar will occupy approximately 13,250 sf of the 19,275 sf site. An area of soil beneath the cellar level will remain along the southern and eastern neighboring properties. The ground floor will not occupy the entire lot; however, the required courtyard area will be located

above the cellar level and will be paved with an impervious layer. Layout of the proposed site development is presented in Appendix E.

Site excavation activities will be completed to the bedrock interface for the portion of the site that will be occupied by the sub-cellar on Lot 46 which was encountered between 22 and 30-feet b.g.s. Competent bedrock was encountered beneath the proposed excavation extents on Lot 40; therefore a layer of highly decomposed bedrock will remain in place beneath the area that will be occupied by the sub-cellar. Based on the proposed excavation to allow for construction of the building foundation on-site, it is estimated that approximately 28,060-tons of soil (including all fill material) will be removed from the site.

Groundwater was encountered at 17 to 19-feet b.g.s. during the Remedial Investigation activities, however; this water was likely from a perched aquifer and it is not anticipated that mass dewatering will be required.

The current zoning designation is commercial district C5-3, which is a central commercial district with continuous retail frontage intended for offices and retail establishments Specifically, the C5 zoning indicates that the site is zoned for retail and service uses and may be developed with a tower. The proposed use is consistent with existing zoning for the property.

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

Summary of the Remedy

The preferred remedial action alternative is 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 a Citizen Participation Plan.

2. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.

3. Establish Track 1 Soil Cleanup Objectives (SCOs) and excavation and removal all soils that exceed Track 1 SCOs. Excavation will be performed to a depth of at least 17 feet over the entire footprint of the site and approximately 37 feet over 70% of the site.

4. Removal of any undocumented underground storage tanks and closure of petroleum spills in compliance with applicable local, State and Federal laws and regulations.

5. As part of construction of the building, installation of a waterproofing/vapor barrier system along all subgrade foundation walls and slabs to prevent future migration of vapors from offsite into the building.

6. If the Track 1 Alternative cannot be achieved, a Track 2 remedial action will be implemented and will include a deed notice and site management plan to address institutional and engineering controls.

7. 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.

8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.

9. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking and staking excavation areas.

10. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.

11. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.

12. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries and lists any changes from this RAWP.

COMMUNITY PROTECTION STATEMENT

The Office of Environmental Remediation created the New York City Brownfield Cleanup Program (NYC BCP) to provide governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan ("cleanup plan") describes the findings of prior environmental studies that show the location of contamination at the 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 BCP, a thorough cleanup study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this 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 Health and Safety Plan that is designed to protect community residents and on-Site workers. The elements of this plan are in compliance with safety requirements of the United States Occupational Safety and Health Administration. This plan includes many protective elements including those discussed below.

Site Safety Coordinator. This project has a designated Site safety coordinator to implement the Health and Safety Plan. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is Chris McMahon and can be reached at (201) 794-6900.

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 Chris McMahon at (201) 794-6900 or through email (cmcmahon@langan.com) or NYC Office of Environmental Remediation Project Manager Dan Cole at (212) 341-0964 or through email (danielco@dep.nyc.gov).

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.

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 Brownfield 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 Chris McMahon at (201) 794-6900 or through email (cmcmahon@langan.com) or NYC Office of Environmental Remediation Project Manager Dan Cole at (212) 341-0964 or through email (danielco@dep.nyc.gov), or call 311 and mention the Site is in the NYC Brownfield Cleanup Program.

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

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

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

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

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

Imported Material. All fill materials proposed to be brought onto the 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 Kips Bay Library.

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

REMEDIAL ACTION WORK PLAN

1.0 SITE BACKGROUND

ET 400 PAS, LLC has enrolled in the New York City Brownfield Cleanup Program (NYC BCP) to investigate and remediate a property located at 390 and 400 Park Avenue South in the Gramercy section of Manhattan, 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 390 and 400 Park Avenue South in the Gramercy section in Manhattan, New York and is identified as Block 857 and Lot 40 and 46 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 19,275-square feet and is bounded to the north and south by East 28th and East 27th Streets, respectively, followed by commercial and residential dwellings to the north and a commercial building to the south. The property to the west of Lot 40 is also a commercial building. Park Avenue South is located east of the subject property followed by commercial and residential buildings. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant land.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 475-foot tall 40-story mixed use commercial/residential building with one cellar and one sub-cellar level. The proposed site development will consist of commercial space on the first floor and residential dwellings on floors two through forty. The cellar and sub-cellar level will occupy approximately 62,615 sf. The first floor commercial retail space will occupy approximately 5,897 square-feet (sf). The residential portion of the building will occupy approximately 407,436 sf (362 residential units). The sub-

cellar level will be occupied by mechanical rooms. The cellar will be occupied by mechanical rooms, a pool, and amenities for building occupants. The cellar level of the building will be built out to the extents of the subject property and will require the removal of soils on the full footprint of the site to a depth of approximately 17-feet below ground surface (b.g.s.). The sub-cellar will occupy approximately 13,250 sf of the 19,275 sf site. An area of soil beneath the cellar level will remain along the southern and eastern neighboring properties. The ground floor will not occupy the entire lot; however, the required courtyard area will be located above the cellar level and will be paved with an impervious layer. Layout of the proposed site development is presented in Appendix E.

Site excavation activities will be completed to the bedrock interface for the portion of the site that will be occupied by the sub-cellar on Lot 46 which was encountered between 22 and 30-feet b.g.s. Competent bedrock was encountered beneath the proposed excavation extents on Lot 40; therefore a layer of highly decomposed bedrock will remain in place beneath the area that will be occupied by the sub-cellar. Based on the proposed excavation to allow for construction of the building foundation on-site, it is estimated that approximately 28,060-tons of soil (including all fill material) will be removed from the site.

Groundwater was encountered at 17 to 19-feet b.g.s. during the Remedial Investigation activities, however; this water was likely from a perched aquifer and it is not anticipated that mass dewatering will be required.

The current zoning designation is commercial district C5-3, which is a central commercial district with continuous retail frontage intended for offices and retail establishments Specifically, the C5 zoning indicates that the site is zoned for retail and service uses and may be developed with a tower. The proposed use is consistent with existing zoning for the property.

1.3 Description of Surrounding Property

The site is located within an area of dense mixed use commercial/residential development in the Gramercy neighborhood of Manhattan. Figure 3 shows the surrounding property usage as well as the day care facility within 500-feet of the site. According to New York City Planning Commission Zoning Map 8D dated 21 September 2011 the subject property and adjoining property to the south and west are zoned C5-3, the adjoining properties to the northwest are zoned C5-2,

the adjoining properties to the northeast and east are zoned C6-4A. The observed use of the surrounding properties (commercial and mixed use commercial/residential) is consistent with the current zoning designations. According to the information maintained on-line by the New York City Office of Environmental Remediation (NYCOER) Searchable Property Environmental E-Database (SPEED [https://gis.nyc.gov/moer/speed/]) a day care center identified as The Children's Center of N.Y. Life whose address is 51 Madison Avenue is located approximately 105-feet to the south of the site. The next closest child care facility is located approximately 800-feet to the northeast of the site. The closest school is identified as the School for the Physical City whose address is 55 East 25th Street is located approximately 475-feet to the south of the site and closest hospital is identified as Bellevue Hospital Center whose address is 462 First Avenue which is located approximately 0.5-miles to the east of the site.

Figure 3 shows the surrounding land usage.

1.4 Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called "*Remedial Investigation Report, 400 and 390 Park Avenue South*", dated February 2012 (RIR). A copy of the report is provided in Appendix F.

Summary of Past Uses of Site and Areas of Concern

Based on Sanborn map review and information provided regarding previous ownership of the site, historic use of the site included commercial and residential buildings. Lot 40 of the site was developed with the former 8-story office building that was identified as having been constructed in 1911. Prior to the construction of the office building Lot 40 was shown as four individual lots that were occupied with two four-story mixed-use commercial/residential buildings with basements on the southern portion and two four-story commercial buildings with basements that are identified as being used as a delivery service on the northern portion of the lot.

Lot 46 was shown as being developed as an at grade parking lot on the 1968 Sanborn map. The 1890 and 1899 Sanborn maps show Lot 46 as being occupied by eight individual lots that were used for mixed use commercial/residential purposes. Lot 46 is shown as being consolidated into

four individual lots, one of which is occupied by a hotel and the remaining are occupied by mixed use commercial/residential buildings. The hotel is identified as containing two horizontal steam boilers on the southeastern corner of the building.

Based on information maintained online by the New York City Department of Finance (NYCDOF) the following provides past ownership information as identified in Langan's 12 September 2011 Phase I ESA:

Block 857 Lot 40

Title records were reviewed from 2002 until present. The current owner is identified as 400 Park Avenue South, LLC. The subject property was previously owned by The New York Life Insurance Company until June 2002 when it was sold to 390 Park Avenue South, LLC which owned the property until February 2005 when the current owner purchased the property.

Block 857 Lot 46

Title records were reviewed from 2004 until present. The current owner is identified as 400 Park Avenue South, LLC, no further information was provided regarding previous ownership of the property.

The following is a list of the AOCs investigated as part of the Remedial Investigation:

1. Horizontal Steam Boilers associated with Lot 46;
2. Onsite Historic Fill; and,
3. Surrounding Sites – Potential onsite migration of offsite contaminants.

Summary of the Work Performed under the Remedial Investigation

ET 400 PAS, LLC performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Completed a geophysical survey of the former parking lot area to determine if any sub-surface anomalies existed;

3. Installed nine soil borings across the entire project Site, and collected twenty-three soil samples for chemical analysis from the soil borings to evaluate soil quality. The results of this sampling are provided in Table 1;

4. Installed three groundwater monitoring wells throughout the Site to establish groundwater flow and collected three groundwater samples for chemical analysis to evaluate groundwater quality, the results of this sampling are provided in Table 2;

5. Installed four soil vapor probes around Site perimeter and collected four samples for chemical analysis, the results of this sampling are provided in Table 3.

   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.

Summary of Environmental Findings

1. Elevation of the property ranges from approximately 34.25 to 34.75-feet above mean sea level (amsl).

2. Depth to groundwater ranges from 17.23 to 21.09-feet amsl below ground surface (b.g.s.) at the Site.

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

4. Depth to bedrock is approximately 9.75 to 7-feet amsl at the Site.

5. The stratigraphy of the site, from the surface down on Lot 46 consists of approximately 5 to 13-feet of fill material underlain by 14 to 23-feet of native silt followed by mica schist bedrock. The stratigraphy of Lot 40, from the surface down consists of demolition debris which is placed on the former 8-story office building slab which occurs approximately 12-feet below current site grades. The existing building slab is underlain by a thin layer (less than 4-feet) of fill material, which is underlain by approximately 8-feet of native silt, which according to the geotechnical report for the site is underlain by a significant layer of dense decomposed bedrock, followed by mica schist bedrock.

6. The soil analytical results of this Remedial Investigation showed no VOCs above Track 1 unrestricted use SCOs (Track 1 SCOs). Seven SVOCs exceeding Track 2 Restricted Residential SCOs in three samples. All of these compounds were PAH and concentrations were consistent with findings of historical fill during soil sampling. Three pesticides were detected above Track 1 in three samples but did not exceed Track 2 Restricted Residential SCOs. Similarly, PCBs were detected in two samples above Track 1 SCOs but did not exceed Track 2 Restricted Residential SCOs. The metals mercury, nickel and zinc exceeded Track 1 SCOs in between one and 6 samples but did not exceed Track 2 Restricted Residential SCOs. Barium, cadmium and copper exceeded Track 2 Restricted Residential SCOs in only one sample each. Lead exceeded Track 2 Restricted Residential SCOs in only two soil samples. Overall, the soil findings were unremarkable and did not indicate any evidence of an onsite contaminant source. Low level contamination that was observed can be explained by the presence of historical fill. This layer of fill material was observed throughout Lot 46 from approximately 5 to 13-feet below current grades and contained varying quantities of sand, brick, concrete, gravel and silt, and was underlain by a native silt layer.

7. The groundwater analytical results showed no exceedances to NYSDEC Part 703 Groundwater Quality Standards (GWQS) for SVOCs, pesticides or PCBs. VOCs were detected in exceedance of the NYSDEC Part 703 Groundwater Quality Standards in the upgradient well MW-1 for 1,2-cis dichloroethene (DCE), tetrachloroethene (PCE), and trichloroethene (TCE) Acetone and chloroform were detected at low concentrations in the MW-2 sample. No other VOC exceedances were reported.

   Dissolved metals in groundwater included sodium, manganese and silver above GWQS. Sodium and manganese are attributed to background water quality influences and silver was only marginally above the standard in one sample. No other metals exceedences of the NYSDEC Part 703 Groundwater Quality Standards were reported in for dissolved groundwater samples collected at the site.

8. The soil vapor analytical results for this Remedial Investigation showed very low levels of PCE and well below the sub-slab guidance value to

initiate monitoring (all results were below 8 ug/m3 compared to the monitor level of 100 ug/m3). TCE was not detected in four soil vapor samples. Low levels of xylenes and acetone were detected in most soil vapor samples. One very low level of chloroform (less than 7 ug/m3) was detected in one of four samples. No VOCs were detected in soil samples from the site above Track 1 SCOs. Several chlorinated hydrocarbons were detected in an upgradient groundwater sample and suggest an offsite source for these compounds to the west of the property.

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 migration of contaminants that would result in groundwater 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

As the proposed site development requires extensive excavation throughout the site, an assessment of remedial alternatives is limited to one remedy, a Track 1 remedial action.. The remedial action being proposed for this site would involve excavation of soil and rock to a depth of 17 feet over the entire property footprint and 37 feet over 70% of the property and would achieve a Track 1 cleanup by removing all fill and soils

above Track 1 SCOs. This would involve excavation of 20-feet of soil with contaminant concentrations below the Track 1 SCOs over approximately 70% of the Site area to allow for the construction of the sub-cellar level.

Due to the presence of off-site impacts to both groundwater and soil vapor, the proposed cleanup will also include placement of a waterproofing/vapor barrier system on all sub-grade foundation walls and slabs.

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.

A Track 1 cleanup would result in removal of all fill material with contaminant concentrations above Track 1 SCOs and a portion of the native material with contaminant concentrations below Track 1 SCOs to a depth of 17-feet b.g.s. over 100% of the Site to allow for the construction of the cellar level and an additional 20-feet of soil with contaminant concentrations below the Track 1 SCOs will be excavated from approximately 70% of the Site to allow for the construction of the sub-cellar level. As part of building construction, a waterproofing/vapor barrier will be placed beneath the subgrade slab and foundation walls to prevent migration of soil vapor that might be present offsite. This remedial action is consistent with the RAOs and would provide overall protection of public health and the environment in consideration of current and potential future land use by eliminating the following:

- Eliminate the risk of ingestion exposures or other direct contact with contaminated on-site soils consistent with the remedial action objectives;
- Eliminate the risk of leaching into groundwater, ingestion exposures or other direct contact with groundwater with contaminants derived from the site consistent with remedial action objectives; and,

- Eliminate the risk of potential sources for on-Site production of soil vapors, and prevent migration of on-Site derived vapors into occupied structures and eliminate associated inhalation exposures consistent with remedial action objectives.

3.2 Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

Alternative 1 would address the chemical-specific SCGs, as fill in excess of Track 1 SCOs and a portion of the clean native soils to a depth of 17-feet b.g.s. would be removed over 100% of the Site and an additional 20-feet of clean soil below Track 1 SCOs will be removed from approximately 70% of the Site. All soil/fill excavated from the Site would be managed and disposed of in accordance with applicable regulations.

Groundwater and soil vapor are generally not impacted by onsite soil or fill. Removal of all soil and fill above Track 1 SCOs will eliminate any possible future impacts.

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.

A Track 1 cleanup would result in short-term impacts associated with excavation, handling, load-out of materials and truck traffic. Due to the low concentrations and nature of contaminants, limited impacts associated with direct exposure via contact, inhalation or ingestion of soils during construction must be addressed. The potential impact on site workers during construction and requirements for monitoring of airborne contaminants to limit onsite exposure and prevent offsite exposure above applicable Exposure Levels are addressed in the Soil Management Plan and Construction Health and Safety Plan provided as Appendices to this document.

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.

A Track 1 cleanup would provide long-term effectiveness with the removal of all impacted soil above Track 1 SCOs. The impacted material consists of urban fill containing concentrations of metals and PAHs above applicable Track 1 and Track 2 Restricted Residential criteria. Excavation of these materials will eliminate any potential on-Site sources of soil, soil vapor and groundwater contamination consistent with remedial action objectives. In order to address the presence of low concentrations of volatile organic compounds in groundwater associated with offsite sources, installation of a waterproofing/ vapor barrier system below the proposed building will be completed to prevent migration of soil gas from groundwater.

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.

A Track 1 cleanup will provide maximum reduction of toxicity, mobility and volume of contaminated material on-Site by excavation and removal of all impacted fill the installation of a vapor barrier, and the placement of the new buildings concrete slab.

Implementability

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

The Track 1 cleanup is feasible and implementable. For implementation of the remedy, standard construction equipment utilized for the overall earthwork will be used. OSHSA trained personnel will complete all activities that include excavation and handling of impacted soils. No special permits other than earthwork permits required for completion of the required site redevelopment scope are required for implementation of the remedy. Installation of the vapor barrier will be conducted in accordance with standard methods utilized to install waterproofing membranes.

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 Track 1 cleanup provides appropriate public health and environmental protections, satisfies the threshold balancing criterion and other criterion listed here and is a cost effective method of remediation. The proposed cleanup will utilize equipment and manpower required for other site work activities, with additional fees associated with engineering oversight of the excavation and vapor barrier installation and additional disposal costs associated with removal of impacted fill material beyond standard transportation and disposal costs for clean fill incurred. As no engineering or institutional controls are required to be maintained or documented and the proposed vapor mitigation system is not an active system, no long term costs associated with the Track 1 cleanup will be incurred.

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. Cleanup to the most stringent Track 1 cleanup is also anticipated to be a preferred remedial option for the community. This RAWP will be subject to and undergo public review under the NYC BCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedial action. This public comment will be considered by OER prior to approval of this plan.

Land Use

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

The Track 1 cleanup at the site is appropriate with respect to the proposed use and to land uses in the vicinity of the Site. The proposed use is consistent with the existing zoning designation for the property and is consistent with recent development patterns. The Site is surrounded by commercial and mixed-use commercial/residential properties and both alternatives provide comprehensive protection of public health and the environment for these uses. Improvements in the current brownfield condition of the property achieved by the Track 1 cleanup is also consistent with the City's goals for cleanup of contaminated land and

bringing such properties into productive reuse and is protective of natural resources and cultural resources. This RAWP will be subject to undergo public review under the NYC BCP and will provide the opportunity for detailed public input on the land use factors described in this section. This public comment will be considered by OER prior to approval of this plan.

Sustainability of the Remedial Action

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

The Track 1 cleanup and proposed redevelopment of the site will utilize sustainable methodology. A complete list of green remedial activities considered as part of the BCP is included in the Sustainability Statement, included as Appendix B.

4.0 REMEDIAL ACTION

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is excavation of impacted fill material on the site to 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 a Citizen Participation Plan.

2. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.

3. Establish Track 1 Soil Cleanup Objectives (SCOs) and excavation and removal all soils that exceed Track 1 SCOs. Excavation will be performed to a depth of at least 17 feet over the entire footprint of the site and approximately 37 feet over 70% of the site.

4. Removal of any undocumented underground storage tanks and closure of petroleum spills in compliance with applicable local, State and Federal laws and regulations.

5. As part of construction of the building, installation of a waterproofing/ vapor barrier system along all subgrade foundation walls and slabs to prevent future migration of vapors from offsite into the building.

6. If the Track 1 Alternative cannot be achieved, a Track 2 remedial action will be implemented and will include a deed notice and site management plan to address institutional and engineering controls.

7. 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.

8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.

9. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.

10. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.

11. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.

12. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries and lists any changes from this RAWP.

4.2 Soil Cleanup Objectives and Soil/Fill Management

Track 1 Soil Cleanup Objectives (SCOs) are proposed for this project. The SCOs for this Site are listed in Table 4. 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 C. As part of the proposed remediation effort, 100% of the Site will be excavated to a depth of 17-feet b.g.s. to allow for the construction of the cellar level and an additional 20-feet of native soil will be removed from approximately 70% of the site to allow for the construction of the sub-cellar level. The location of planned excavations is shown in Figure 4.

Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is 28,800 tons. As a significant volume of soil will be excavated within a relatively short time frame in order to meet site development schedules, multiple disposal facilities will likely be utilized to allow for direct loading and continuous transportation from the site. Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action. A pre-approval letter from all disposal facilities will be provided to OER prior to any soil/fill material removal from the site. Documentation specified in the RAWP - Appendix C - Section 1.6 "Materials Disposal Off-Site" will be provided to OER. If a different or additional disposal facility(ies) for the soil/fill material is selected, documentation of the facility permitting and acceptance criteria, rationale for acceptance and final disposal documentation will be provided in the RAR.

End-Point Sampling

Based on the results of the Remedial Investigation Report, the in situ soil sampling that was completed during the Remedial Investigation documented that the fill material at the site has been impacted with SVOCs, PCBs pesticides and metals. As the site re-development activities will include the removal of all fill material, no end-point sampling is recommended for the projected site re-development activities. Removal actions of previously undocumented conditions or Areas of Concern, such as the removal of any undocumented USTs, under this plan will be performed in conjunction with remedial end-point sampling. Endpoint sampling for hotspots will consist of the following:

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, the bottom samples will be taken within 24 hours of excavation, and will be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours will be taken at six to twelve inches.

4. For contaminated soil removal, post remediation soil samples for laboratory analysis will be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation sample locations and depth will be biased towards the areas and depths of highest contamination based on field instrument measurements or visual contamination identified during the remedial action. In all cases, post-remediation samples will be biased toward locations and depths of the highest expected contamination.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs for end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. End-point samples will be analyzed 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,
- If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and "finger print analysis" and required regulatory reporting (i.e. spills hotline) will be performed.

Quality Assurance/Quality Control

Quality assurance (duplicate and trip blanks) and quality control (field blanks) samples will be incorporated into the sampling events as required by NYCOER and will consist of one duplicate soil sample and one field blank per 20 end-point soil samples collected. Soil field blanks will be analyzed for VOCs and soil duplicate samples will be analyzed for VOCs, SVOCs, Pesticides, PCBs and Metals.

4.3 Engineering Controls

As a Track 1 cleanup is proposed for the site, Engineering Controls (EC) have not been incorporated in this remedial action. However, as part of construction, a waterproofing/vapor barrier system will be built to prevent future migration of offsite soil vapors.

A vapor barrier in the form of a vapor/waterproofing layer will be installed below the building floor slab and along the foundation walls. The vapor barrier will consist of the 46 mil Grace Preprufe 300R, the 32 mil Preprufe 160R, and Bituthene 4000 (59-mil composite) below grade system foundation damp-proofing material in conjunction with sealing of joints with Preprufe LT tape and

Bituthene EdgeGuard tape. The vapor barrier layer will provide a barrier to water, moisture, and gas, and is chemically resistant. The proposed vapor barrier will be protective of the building occupants. Product specifications and installation instructions and figures showing installation locations and details are provided in Appendix H. Detailed plans showing the installation specifications will be provided upon completion for submittal to the Department of Buildings.

4.4 Institutional Controls

As a Track 1 cleanup is proposed for the site, Institutional Controls (IC) are not required in this remedial action.

4.5 Site Management Plan

As a Track 1 cleanup is proposed for the site, implementation of a Site Management Plan is not required in this remedial action.

4.6 Qualitative Human Health Exposure Assessment

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

Known and Potential Sources

Historic fill onsite is a known source of low concentrations of metals, pesticides, PCBs and SVOCs. The RI identified concentrations of VOCs in exceedance of the NYSDEC Part 703 Groundwater Quality Standards for 1,2-cis dichloroethene (DCE), tetrachloroethene (PCE) and trichloroethene (TCE) were detected in upgradient well MW-1 were detected above the Groundwater Quality Standards and are likely attributable to an off-site source. Acetone and chloroform were detected above the Groundwater Quality Standards in the MW-2. No other VOC exceedances were reported.

Exceedances of the NYSDEC Part 703 Groundwater Quality Standard for manganese and sodium in dissolved samples were reported in the groundwater samples and are attributed to site background conditions.

The RI identified elevated concentrations of VOCs including xylenes which were detected in all four of the soil vapor samples above the 2003 Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes guidance values.

Additionally, chloroform (SV-3) and toluene (SV-4) were detected above the 2003 Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes guidance values. PCE was detected at concentrations ranging from 3.9 to 7.5 µg/m3 in three of the four samples (SV-2 through SV-4), which is well below the 2006 New York State Department of Health Soil Vapor Intrusion Guidance value for sub-slab concentrations. The source of the VOCs in soil vapor appear to be from an off-site source to the west of the site.

Nature, Extent, Fate and Transport of Contaminants

Concentrations of metals exceeding the Track 1 SCOs are present within the historic fill at the Site. These contaminants are a constituent of the historic fill material that was used to fill the land for development purposes and is present to a depth of approximately 7 to 14-feet bgs. Based on the findings of the RI and current Site conditions, these contaminants are not mobile or migrating within or from the site. All soils in excess of Track 1 SCOs will be removed from the site.

Concentrations of VOCs, and metals exceeding NYSDEC Part 703 Groundwater Quality Standards are present in groundwater at the Site. The depth of groundwater is approximately 17 to 19 feet b.g.s. at the site. The source of the VOC and metals contamination appears to be principally from an off-site source to the west of the Site (VOCs), and site background conditions (metals).

There were elevated concentrations of VOCs in soil vapor. The source of the VOC soil vapors appears to be from an off-site source to the west of the site. It is expected that soil vapors would accumulate underneath the proposed building foundation. An engineered composite cover slab, consisting of the building foundation and a waterproofing/vapor barrier system, will act as a vertical barrier to the soil vapor coming into the building.

Potential Routes of Exposure

Currently, there are limited potential pathways for absorption, inhalation or ingestion, since there the Site is covered with the former building slab and demolition debris on approximately 38% of the site, with the remaining 62% of the site covered with pavement./ The site is protected with security fencing and there are no human receptors at the site except authorized site workers. The soil at the site is primarily contaminated with SVOCs, PCBs, pesticides and

metals. The groundwater at the site is primarily contaminated with VOCs, and metals and there are VOC-contaminated soil vapors at the site.

The work performed at the site will include excavation of soil/fill material, limited dewatering, and general construction activities that could affect the on-site construction/remediation workers and the off-site local population. The construction and remediation work at the site will expose the contaminants to the on-site workers via direct contact to the soil and groundwater (during excavation and dewatering), and ingestion or inhalation of the soil (by means of dust), and soil vapors. These exposures will be limited to the short duration of the intrusive work. The construction and remediation work at the site may expose the contaminants to off-site local residents via inhalation of soil (by means of dust) and soil vapors.

A Construction Health and Safety Plan will be implemented during construction and remediation work for the safety of the on-site workers and off-site local population. Other measures include conducting a community air monitoring programs (CAMP) for dust and VOCs to track on-site and off-site conditions, requiring personal protective equipment, provisions for upgrading the level of personal protective equipment when needed, and applying dust and vapor suppression measures where applicable and needed, for on-site workers and the off-site local population.

Upon the completion of remediation, all soils exceeding Track 1 SCOs will be removed, a waterproofing/vapor barrier system will be installed outside the building slab and the foundation walls and the entire site will be covered by the proposed building which will prevent direct exposure of humans to the groundwater and soil vapors at the site.

Existence of Human Health Exposure

An exposure pathway begins with a source and mechanism of contaminant release, resulting in the contamination of a receiving matrix (environmental medium). A complete exposure pathway also requires a point of potential contact with the contaminated matrix (i.e., exposure point), an exposure route (i.e., inhalation, ingestion, or dermal contact), and a receptor population. If an exposure pathway is not complete because it does not include a contaminated matrix, a point of potential contact, an exposure route, or a receptor, then no risk exists.

On-site sources of SVOCs, PCBs, pesticides and metals were identified in the Remedial Investigation for soil and the potential pathways are direct exposure, inhalation, and leaching to groundwater. Full removal of impacted soil will be performed and these pathways are eliminated for long term use of the use and only have to be considered during construction. Low concentrations of detected contaminants in soil have generally not been detected in groundwater or the native material that underlies the impacted fill; therefore, the leaching pathway has not been completed and is not a concern. Potential exposure to contaminants through direct contact with impacted material will occur; however, this exposure route is addressed by the implementation of the CHASP and Community Air Monitoring Plan.

The groundwater at the site is contaminated with VOCs and metals. The source of VOCs in groundwater, as well as the resulting soil vapors from the groundwater contamination, is likely the result of an up-gradient source where a release has occurred. Groundwater is not used for potable supply and exposure pathways do not exist for ingestion after remediation. Direct contact with any groundwater contamination from offsite with the slab and waterproofing/vapor barrier system. The vapor barrier will also prevent against any residual soil vapors that might otherwise infiltrate the building.

Receptor Populations

The receptors identified under the proposed remedy include:

- On-site workers: adult (remediation and construction workers); and,
- Temporary worker: adult (utility worker/inspector, subcontractors, sampler/remediation inspector).
- Adult and child local residents and passersby.

The receptors identified under the proposed remedy and future site use as mixed-use commercial/residential development include:

- Adult and child patrons of commercial and retail properties;
- Adult and child occupiers of the residential units;

- On-site workers: adult retail/commercial office/maintenance workers; and

- Temporary worker: adult (utility worker/inspector, landscape worker, construction worker).

The receptors identified above are believed to be the primary receptors of interest.

Overall Human Health Exposure Assessment

The proposed development requires excavation which will remove 100% of the contaminated soil/fill material on-site which exceeds the Track 1 SCOs. The Site will also be fully covered with the building foundation and the vapor barrier, eliminating any direct exposures and threat to human health or the environment. The groundwater at the site is not a source of drinking water, and a waterproofing/vapor barrier system will be installed as part of construction at the site to address any residual and off-site sources of groundwater or soil vapor impacts.

Exposure to the contaminated media (soil, groundwater, and soil vapor) is most likely to occur during the remedial and construction work to both the on-site workers and the off-site local population. In order to eliminate or greatly reduce the possible exposure levels, a CHASP and CAMP will be implemented in order to monitor dust and vapor emissions, set personal protective equipment requirements for on-site personnel, have provisions to increase the level of personal protective equipment as needed, and apply dust and vapor suppression measures where applicable and needed, for on-site workers and the off-site local population.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Chris McMahon who will be the Project Manager and Site Safety Coordinator. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Ron Boyer and Steven Ciambruschini.

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 conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency.

5.4 Construction Health and Safety Plan

The site-specific Construction Health and Safety Plan is included in Appendix D. The Site Safety Coordinator will be Chris McMahon. 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 during removal of all impacted fill materials. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

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

VOC Monitoring, Response Levels, and Actions

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

running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

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

Particulate Monitoring, Response Levels, and Actions

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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 mcg/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 mcg/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 mcg/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 incompliance with applicable laws and regulations to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Markout Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

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

Dewatering

Excavation is anticipated to extend below the water table and will require limited dewatering. It is anticipated that dewatering activities will be conducted by use of submersible pumps within gravel lined sumps in the excavations or a system of well points to allow for sufficient dewatering for building foundations. Extracted groundwater will be conveyed to a storage tank or treatment system.

Depending on the selected discharge option, a NYCDEP sewer use permit will be obtained prior to discharge treated groundwater to the sewer system. As part of the permitting requirements groundwater will be sampled in accordance with NYCDEP regulations for sewer discharge permits.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. The location of proposed equipment and material staging areas, truck inspection station, stockpile areas, and other pertinent remedial management features has not been determined.

Stabilized Construction Entrance

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

Truck Inspection Station

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

5.8 Traffic Control

Drivers of trucks leaving the NYC BCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is shown on Figure 5.

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;
- 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.
- Recorded Declaration of Covenants and Restrictions.
- Reports and supporting material will be submitted in digital form.

Remedial Action Report Certification

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

I, Ronald Boyer, 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 400 Park Avenue South Site 12CBCP042M.

I, Steven Ciambruschini, am a qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the 400 Park Avenue South Site 12CBCP042M.

I certify that the OER-approved Remedial Action Work Plan dated 6 February 2012 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 six month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	9 weeks prior	-
Fact Sheet 2 announcing start of remedy	2 weeks prior	-
Mobilization	1	1
Remedial Excavation	1 week after start	24
Demobilization	26	1
Record Declaration of Covenants and Restrictions	TBD	-
Submit Remedial Action Report	30	-

APPENDIX C

SOIL/MATERIALS MANAGEMENT PLAN

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a 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 are shown on Figure 6. 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 Manhattan, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RAR.

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

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

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

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

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

1.7 Materials Reuse On-Site

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. 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 BCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAWP are followed.

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.

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.

Generic Procedures for Management of Underground Storage Tanks

The following procedure will be implemented if a petroleum containing underground storage tank (UST) is identified during the remedial action or subsequent redevelopment excavation activities. All petroleum spills will be reported to the NYSDEC hotline as required by applicable laws and regulations. This contingency plan is designed for heating oil tanks and other small or moderately sized storage vessels. If larger tanks, such as gasoline storage tanks are identified, OER will be notified before this criterion is utilized.

Prior to Tank removal, the following procedures should be followed:

- Dig down to the top of the tank and expose the upper half.
- Remove all fluid to its lowest draw-off point.
- Drain and flush piping into the tank.
- Vacuum out the "tank bottom" consisting of water product and sludge.
- Remove the fill tube and disconnect the fill, gauge, product, vent lines and pumps. Cap and plug open ends of lines.
- Temporarily plug all tank openings, complete the excavation, remove the tank and place it in a secure location.
- Render the tank safe and check the tank atmosphere to ensure that petroleum vapors have been satisfactorily purged from the tank.
- Clean tank or remove to storage yard for cleaning.
- If the tank is to be moved, it must be transported by licensed waste transporter. Plug and cap all holes prior to transport leaving a 1/8 inch vent hole located at the top of the tank during transport.
- After cleaning, the tank must be made acceptable for disposal at a scrap yard, cleaning the tanks interior with a high pressure rinse and cutting the tank in several pieces.

During the tank and pipe line removal, the following field observations should be made and recorded:

- A description and photographic documentation of the tank and pipe line condition (pitting, holes, staining, leak points, evidence of repairs, etc.).
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.).
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation, with a calibrated photoionization detector (PID).

Impacted Soil Excavation Methods

The excavation of the impacted soil will be performed following the removal of the existing tanks. Soil excavation will be performed in accordance with the procedures described under Section 5.5 of Draft DER-10 as follows:

- A description and photographic documentation of the excavation.
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.).
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation, with calibrated photoionization detector (PID).

Final excavation depth, length, and width will be determined in the field, and will depend on the horizontal and vertical extent of contaminated soils as identified through physical examination (PID response, odor, staining, etc.). Collection of verification samples will be performed to evaluate the success of the removal action as specified in this document.

The following procedure will be used for the excavation of impacted soil (as necessary and appropriate):

- Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.
- Prior to excavation, ensure that the area is clear of utility lines or other obstructions. Lay plastic sheeting on the ground next to the area to be excavated.
- Using a rubber-tired backhoe or track mounted excavator, remove overburden soils and stockpile, or dispose of, separate from the impacted soil.
- If additional UST's are discovered, the NYSDEC will be notified and the best course of action to remove the structure should be determined in

the field. This may involve the continued trenching around the perimeter to minimize its disturbance.

- If physically contaminated soil is present (e.g., staining, odors, sheen, PID response, etc.) an attempt will be made to remove it, to the extent not limited by the site boundaries or the bedrock surface. If possible, physically impacted soil will be removed using the backhoe or excavator, segregated from clean soils and overburden, and staged on separated dedicated plastic sheeting or live loaded into trucks from the disposal facility. Removal of the impacted soils will continue until visibly clean material is encountered and monitoring instruments indicate that no contaminants are present.
- Excavated soils which are temporarily stockpiled on-site will be covered with tarp material while disposal options are determined. Tarp will be checked on a daily basis and replaced, repaired or adjusted as needed to provide full coverage. The sheeting will be shaped and secured in such a manner as to drain runoff and direct it toward the interior of the property.

Once the site representative and regulatory personnel are satisfied with the removal effort, verification of confirmatory samples will be collected from the excavation in accordance with DER-10 and the following description of End-Point Sampling procedures.

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.

GRACE

PREPRUFE® 300R & 160R

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

Description

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

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

The Preprufe R System includes:

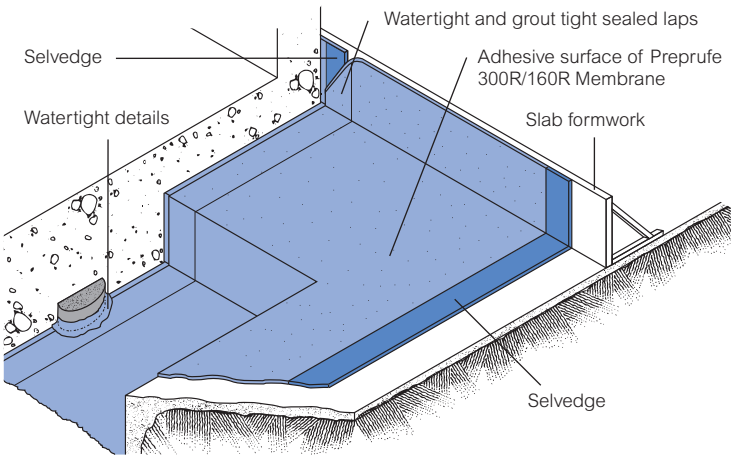
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe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

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

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

Advantages

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



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

BBA BRITISH BOARD OF AGREMENT CERTIFICATE No. 97/3325

Installation

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

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

Substrate Preparation

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

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

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

Membrane Installation

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

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

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

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

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

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

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

Details

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

Membrane Repair

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

Pouring of Concrete

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

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

Removal of Formwork

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

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

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

Figure 1

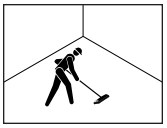


Figure 2

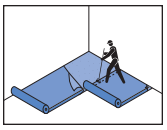
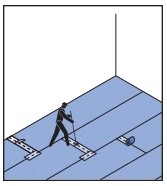
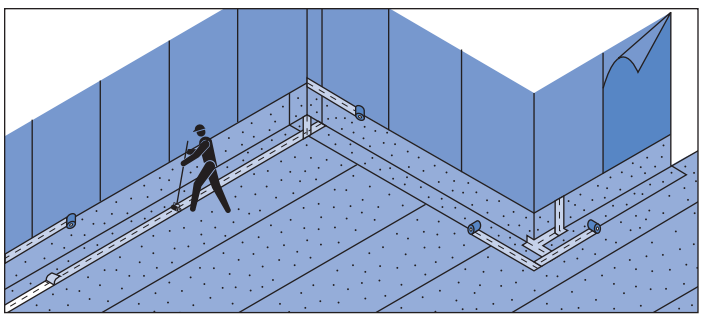


Figure 3

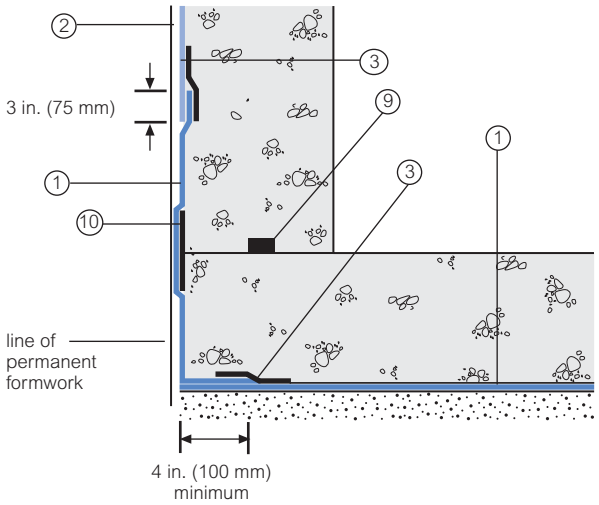




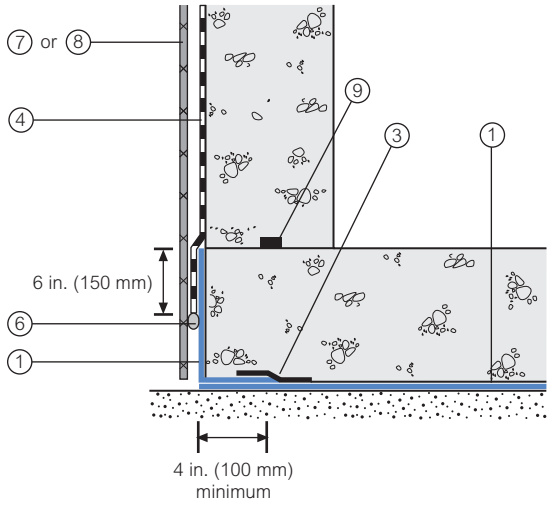
Detail Drawings

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

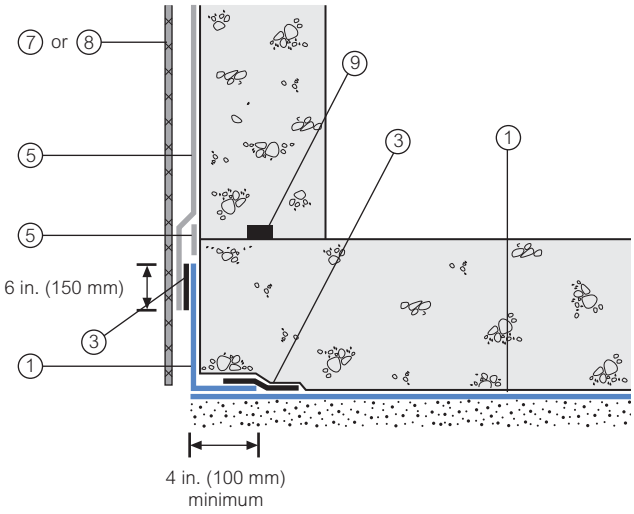
Wall base detail against permanent shutter



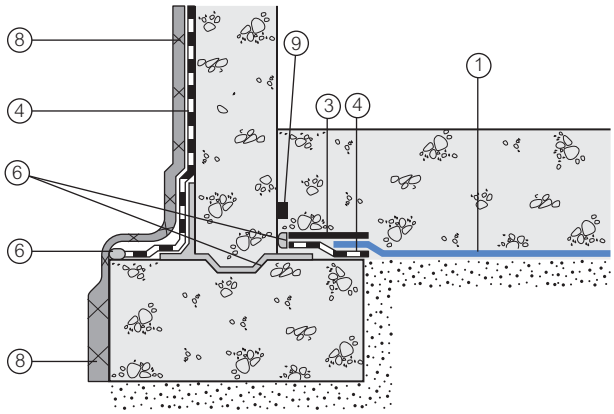
Bituthene wall base detail (Option 1)



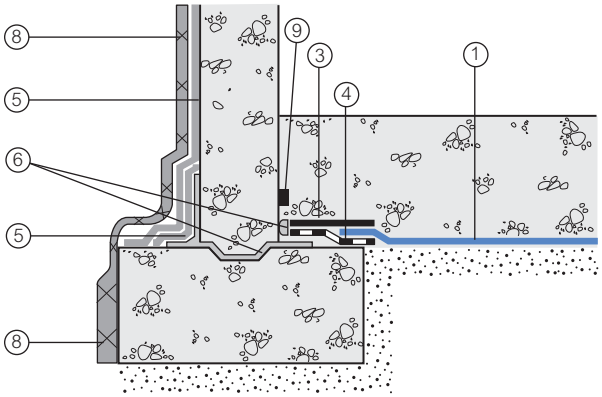
Procor wall base detail (Option 1)



Bituthene wall base detail (Option 2)



Procor wall base detail (Option 2)



1 Preprufe 300R
2 Preprufe 160R
3 Preprufe Tape
4 Bituthene
5 Procor
6 Bituthene Liquid Membrane
7 Protection
8 Hydroduct®
9 Adcor ES
10 Preprufe CJ Tape

Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	4 ft x 98 ft (1.2 m x 30 m)	4 ft x 115 ft (1.2 m x 35 m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	392 ft² (36 m²)	460 ft² (42 m²)	
Roll weight	108 lbs (50 kg)	92 lbs (42 kg)	4.3 lbs (2 kg)
Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)	3 in. (75 mm)
* LT denotes Low Temperature (between 25°F (-4°C) and 86°F (+30°C)) HC denotes Hot Climate (50°F (>+10°C))			
Ancillary Products			
Bituthene Liquid Membrane—1.5 US gal (5.7 liter) or 4 US gal (15.1 liter)			

Physical Properties

Property	Typical Value 300R	Typical Value 160R	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385, modified[1]
Low temperature flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to hydrostatic head	231 ft (71 m)	231 ft (71 m)	ASTM D5385, modified[2]
Elongation	660%	580%	ASTM D412, modified[3]
Tensile strength	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836
Puncture resistance	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903, modified[4]
Lap peel adhesion	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D1876, modified[5]
Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa x s x m²))	0.01 perms (0.6 ng/(Pa x s x m²))	ASTM E96, method B
Water absorption	0.5%	0.5%	ASTM D570

Footnotes:

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

Specification Clauses

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

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

Health and Safety

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

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

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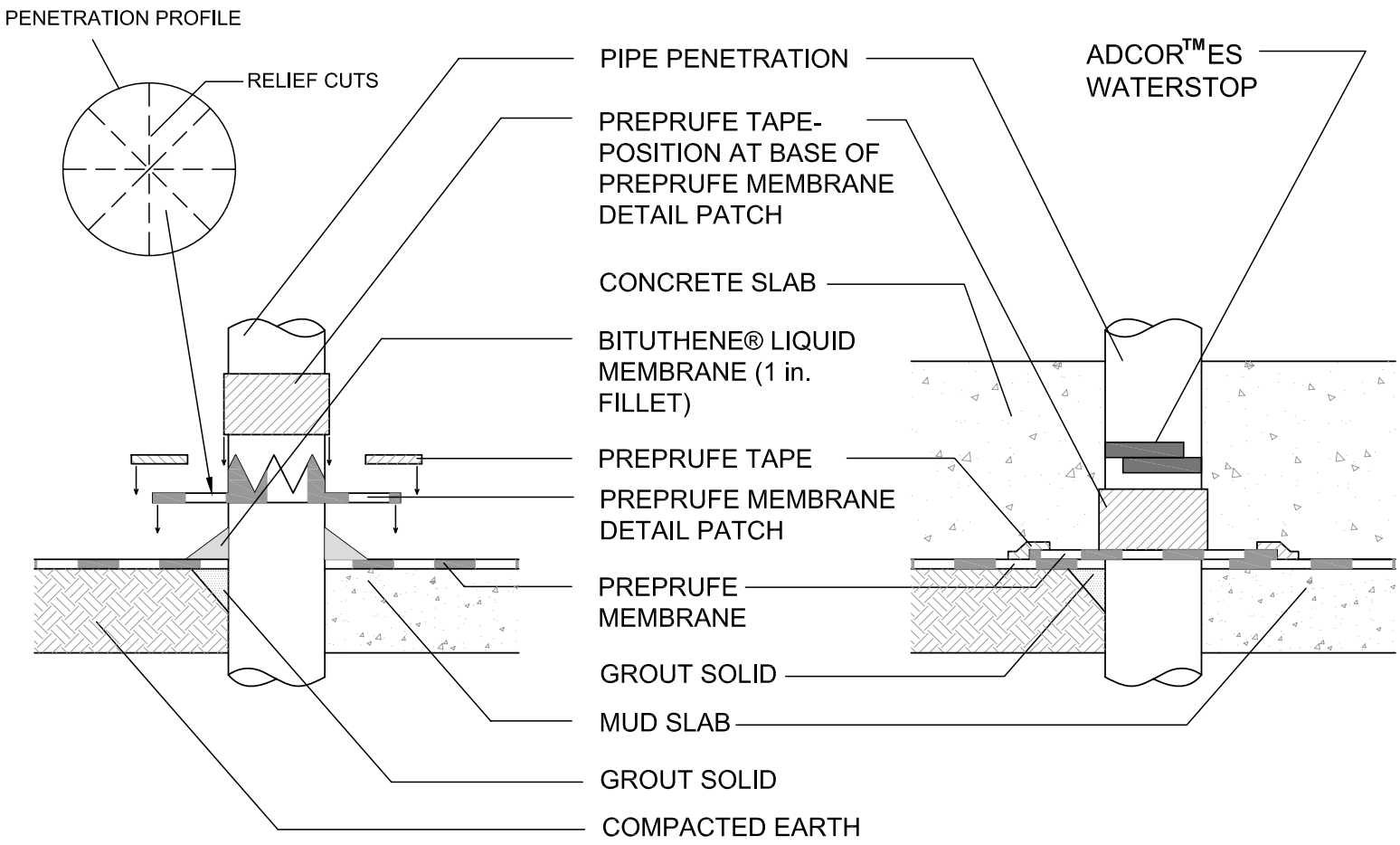

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PIPE PENETRATION
FOR WALL OR SLAB
PREPRUFE® WATERPROOFING SYSTEM

DRAWING: PRE-034
SCALE: NOT TO SCALE
EFFECTIVE DATE: 06/01/10
SUPERCEDES: 03/01/09

Pipe Penetration
(For Wall or Slab): PRE-034

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm) The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

1. All penetrations must be firmly secured and stable. Grout around all penetrations that are not stable. For compacted earth, extend grout a minimum of 3 in. (75 mm) in all directions. Clean loose dust or dirt from the penetration surface using a clean, dry cloth or brush.
2. Cut the field membrane tight to the penetration and remove release liner. If membrane is not within 0.5 in. (12 mm) of penetration and not more than 2 in. (50 mm) from penetration, apply Preprufe Tape to cover the gap. Roll firmly into place and remove release liner. If the membrane is greater than 2 in. (50 mm) from penetration, install more Preprufe Membrane to cover the gap repeating these instructions until Preprufe Membrane/Tape is within 0.5 in. (12 mm).
3. Mix and apply Bituthene Liquid Membrane around the penetration. Liquid Membrane should be placed to form a minimum 1 in. (25 mm) continuous fillet between the Preprufe Membrane/Tape and the base of the penetration. Cut “star” within trace of penetration to allow for patch to slide over penetration.
4. Cut a patch of Preprufe Membrane that is a minimum of 12 in. (300 mm) larger than the diameter or width of the penetration so that the patch extends 6 in. (150 mm) beyond the penetration in all directions. Remove the release liner and center the patch over penetration and trace/draw the penetration profile onto the patch. Using sheers or utility knife, make relief cuts through the membrane. Refer to relief cut figures below. Triangles formed by making a relief cut is not to exceed 2 in. (50 mm) in height when placed over penetration, i.e. penetration diameters or widths greater than 4 in. (100 mm) need to be trimmed. Remove and discard release liner.
5. Slide the patch over penetration and press into the partially cured Liquid Membrane. Ensure that the patch is pressed firmly into the Liquid Membrane and is positioned directly onto the Preprufe Field Membrane/Tape below. Using a trowel, smooth out any Liquid Membrane that has flowed out of the relief cut.
6. Apply Preprufe Tape centered over the edges of the patch and roll firmly to form a tight seal to the Preprufe Field Membrane. Remove release liner from tape and discard.
7. Wrap the penetration with Preprufe Tape, positioning the tape at the base of the patch. Remove enough release liner to overlap Tape on to itself and roll/press firmly into place. Remove remaining release liner and discard. Repair small fishmouths by pressing firmly against penetration and repair large fishmouths by patching with Preprufe Tape.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

Ensure Adcor™ ES is encapsulated with 76.2 mm (3 in.) of concrete cover minimum. Apply Adcor ES according to the installation instructions found on the data sheet.

For Technical Assistance call us at 866-333-3SBM (3726)

Visit our website at www.graceconstruction.com

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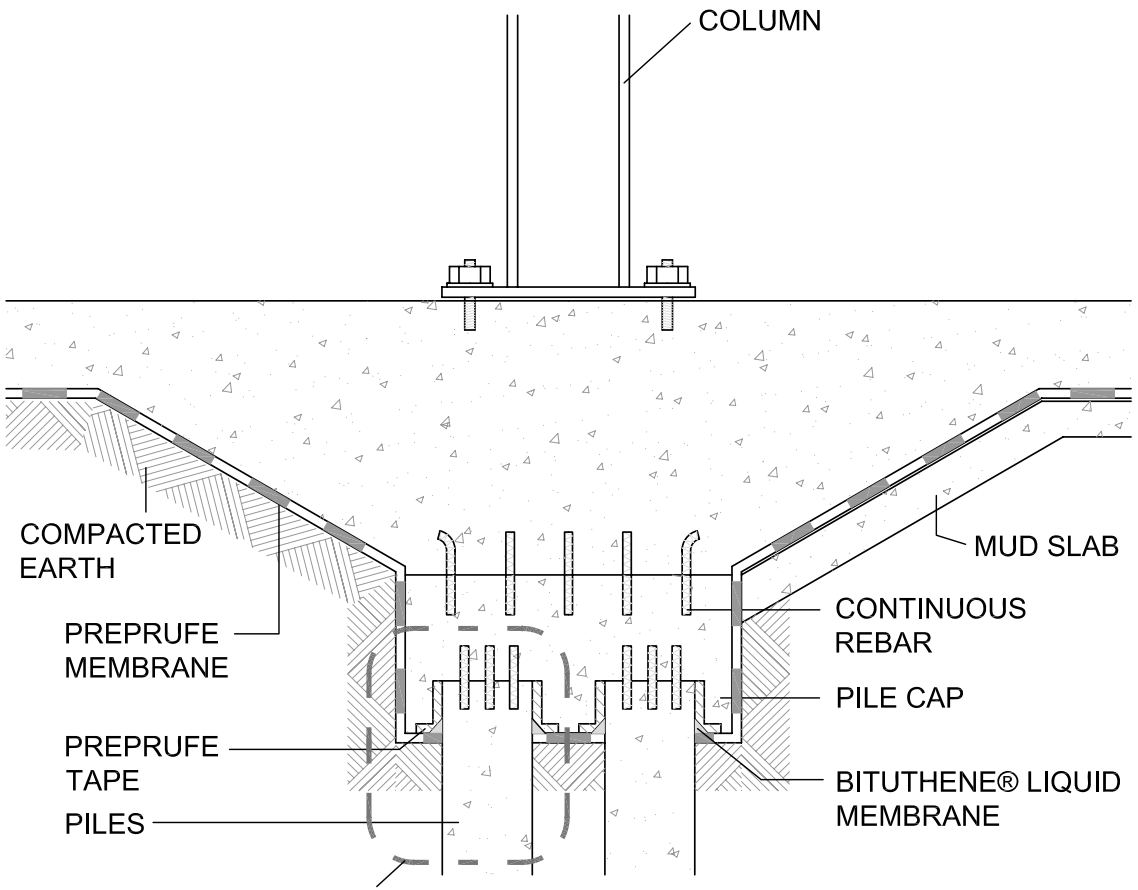

REFER TO PREPRUFE STRAIGHT EDGE PENETRATION
DETAIL PRE 035 OR PREPRUFE PIPE PENETRATION DETAIL PRE 034 DEPENDING ON SHAPE OF PILE

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GRADE BEAM PILE CAP (OPTION 1)

PREPRUFE® WATERPROOFING SYSTEM

DRAWING: PRE-043
SCALE: NOT TO SCALE
EFFECTIVE DATE: 06/01/10
SUPERCEDES: 03/31/07

Grade Beam Pile Cap (Option 1): PRE-043

Prior to Membrane Installation, Review the Preprufe® Data Sheet

Surface Preparation

All surfaces must be sound and solid to eliminate movement during the concrete pour. Substrate must be regular and smooth with no gaps or voids greater than 0.5 in. (13 mm). The surface should also be free from loose aggregate and sharp protrusions as outlined in the Preprufe® Data Sheet section on Surface Preparation.

Detailing

1. Install Preprufe Membrane over the prepared substrate in accord with standard installation instructions.
2. Preprufe Membrane is placed in the area formed for the pile cap before the concrete is poured.
3. When placing the membrane it is important to leave sufficient length (typically 12 in. [300 mm]) of Preprufe beyond the pile cap area to allow for tie-in to the Preprufe Membrane that will be laid to waterproof the general slab area.
4. Cut membrane tight to each pile and complete detail around each pile in accordance with Detail PRE 035 or Detail PRE 034 depending on shape of pile.

Special Notes

Preprufe membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Protect membrane from sunlight as quickly as possible after installation.

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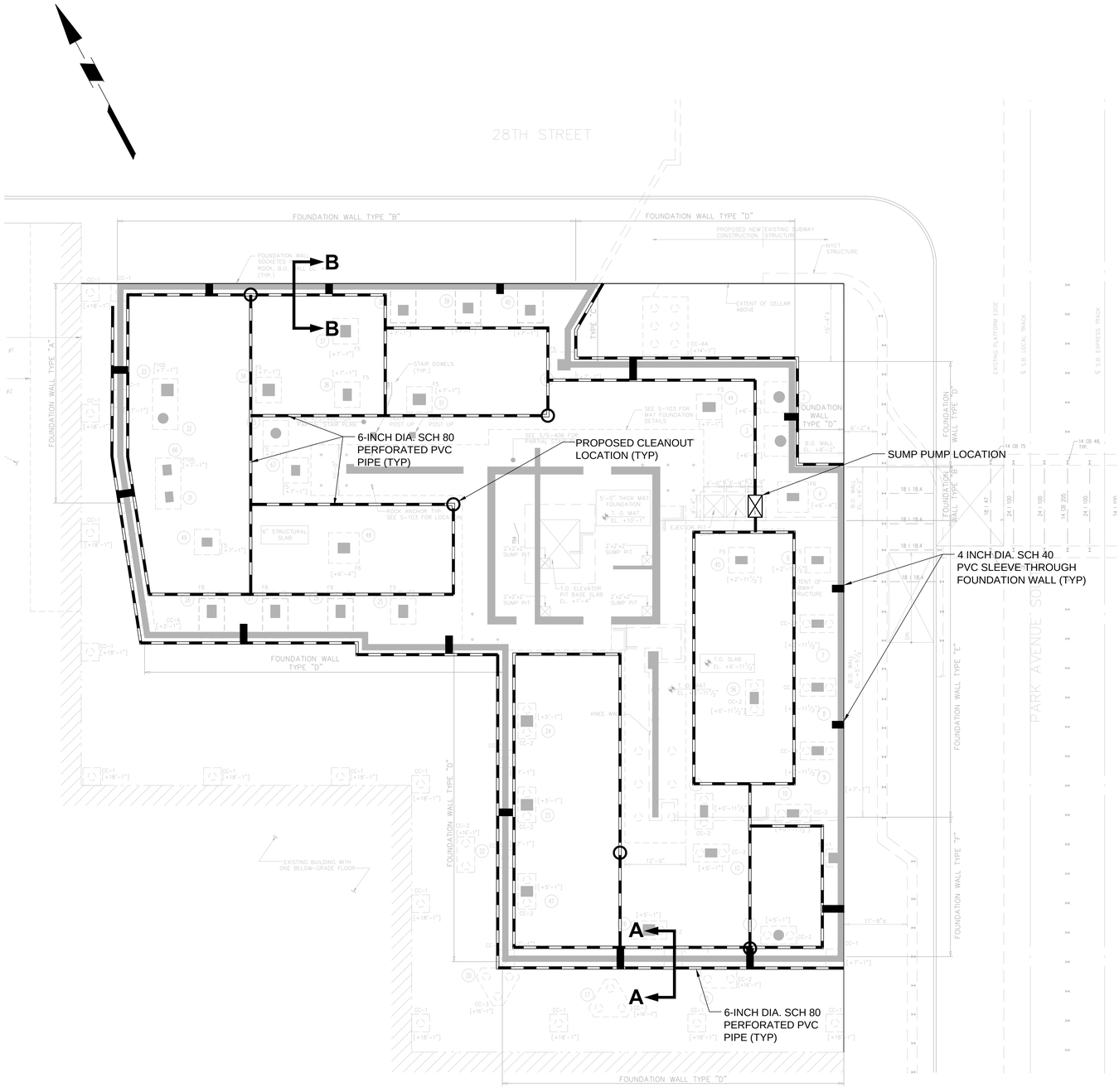
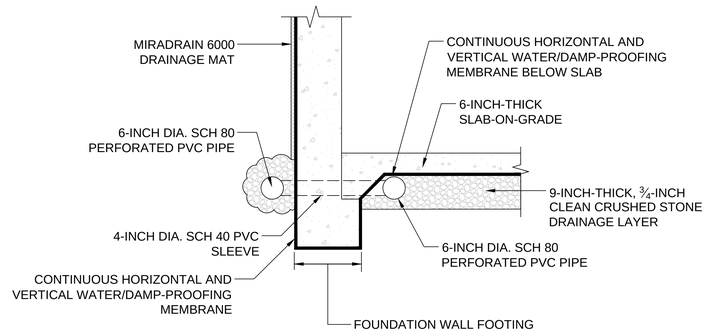
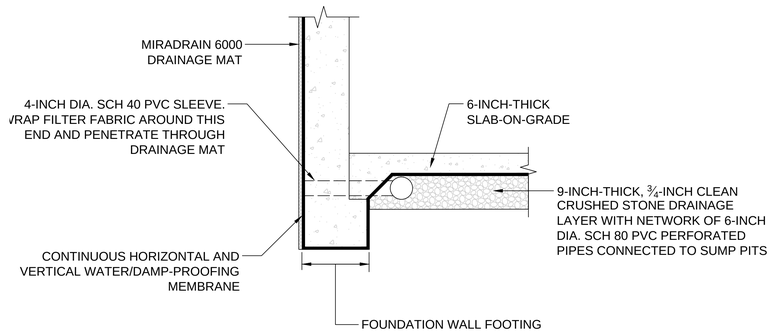


PLAN VIEW
SCALE: 1" = 10'



SECTION A-A - SUB-CELLAR WALL DETAIL
SCALE: NOT TO SCALE



SECTION B-B - BLINDSIDE WALL DETAIL
SCALE: NOT TO SCALE

LEGEND

- 6-INCH SCH 80 PERFORATED PVC
- 4-INCH SCHEDULE 40 PVC SLEEVE
- SUMP PUMP LOCATION
- CLEANOUT LOCATION

NOTES:

1. BASE DRAWING REPRODUCED FROM DRAWING FO-101.00, FOUNDATION AND SUB-CELLAR FLOOR PLAN, DATED 01/18/2012.
2. SUB-CELLAR AND CELLAR SLABS AND WALLS SHALL BE WATERPROOFED IN ACCORDANCE WITH CONSTRUCTION SPECIFICATION SECTIONS "07175-FOUNDATION WATERPROOFING" AND "34613-FOUNDATION DRAINAGE".
3. SEE ARCHITECTURAL DRAWINGS FOR WATERPROOFING DETAILS.
4. SEE MEP DRAWINGS FOR SUMP PUMP DETAILS, SUMP PUMP SPECIFICATIONS, AND INTERNAL PIPE ROUTINGS.

400PAS

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NEW YORK, NY 10016
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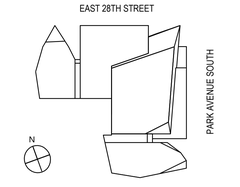
NO.	DATE	ISSUANCE
1	02.03.12	FOUNDATION PERMIT

KEY PLAN



SCALE:
PROJECT NO: 874
SEAL & SIGNATURE

DRAWING TITLE:

FOUNDATION DRAINAGE PLAN

DRAWING NO:

FO-150.00

NYC DOB NO: 1 of 1