

**AVALON WEST 28TH STREET  
MANHATTAN, NEW YORK**

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**Site Management Plan**

**Block 700, Lot 9**

**OER Project Number: 09EHAN169M**

**DEP Project Number: 07DEPTECH073M**

**E-Designation E-142**

**CEQR Number 03DCP069M**

**Special West Chelsea District Rezoning**

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**OCTOBER 2014**

<b>TABLE OF CONTENTS</b>	<b>Page</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>2.0 ENGINEERING CONTROLS .....</b>	<b>2</b>
2.1 Composite Cover System.....	2
2.2 Vapor Barrier.....	2
2.3 Sub-Slab Depressurization System.....	3
<b>3.0 INSPECTIONS .....</b>	<b>4</b>
3.1 Engineering Control Inspection.....	4
3.1.1 Composite Cover .....	4
3.1.2 Vapor Barrier.....	5
3.1.3 Sub Slab Depressurization System.....	5
3.2 Inspection Reporting .....	6
3.3 Certifications .....	6
<b>4.0 NOTIFICATIONS .....</b>	<b>7</b>
<b>5.0 SOIL/MATERIALS MANAGEMENT PLAN .....</b>	<b>8</b>
<b>6.0 CONTINGENCY PLAN.....</b>	<b>9</b>
6.1 Emergency Telephone Numbers .....	9

## **APPENDICES**

APPENDIX A	Final Site Cover
APPENDIX B	Vapor Barrier Specifications
APPENDIX C	Sub-Slab Depressurization System Design
APPENDIX D	System Operation: Routine Operating Procedures
APPENDIX E	Site Inspection Forms
APPENDIX F	Differential Pressure Gauge Specifications
APPENDIX G	Sub-Slab Depressurization System Blower Specifications

## LIST OF ACRONYMS

CAMP	Community Air Monitoring Plan
EC	Engineering Control
HASP	Health and Safety Plan
NOC	Notice of Completion
NYSDEC	New York State Department of Environmental Conservation
NYCDEP	New York City Department of Environmental Protection
OER	New York City Office of Environmental Remediation
PE	Professional Engineer
PID	Photoionization Detector
ppm	Parts Per Million
QA/QC	Quality Assurance / Quality Control
QEP	Qualified Environmental Professional
RAR	Remedial Action Report
RCA	Recycled Concrete Aggregate
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SPDES	State Pollution Discharge Elimination System
SSDS	Sub-Slab Depressurization System
VOC	Volatile Organic Compound

## **SITE MANAGEMENT PLAN**

### **1.0 INTRODUCTION**

Site management is the last phase of the remedial process and begins after the approval of the Remedial Closure Report (RCR) and issuance of the Notice of Satisfaction (NOS) by the New York City Office of Environmental Remediation (OER). It is the responsibility of the property owner to ensure that all site management responsibilities are performed. Failure to implement the SMP will result in revocation of the NOS and all associated certifications and liability protections.

Engineering Controls (ECs) have been incorporated into this Remedial Action to ensure that the site remains protective of public health and the environment. ECs provide physical protective measures. This Site Management Plan has been established to govern long-term performance of ECs for this property.

The SMP provides a detailed description of procedures required to manage residual material at the Site following the completion of remedial construction in accordance with the NYC Voluntary Cleanup Agreement with OER. This includes: (1) operation and maintenance of Engineering Controls; (2) inspection of ECs; and (3) certification of performance of ECs.

## **2.0 ENGINEERING CONTROLS**

ECs are employed in the remedial action to address residual materials remaining at the site. The Site has three ECs. These are:

- (1) Composite cover system consisting of concrete building slabs across the majority of the Site and a 2-foot clean soil cap in the northeast corner of the Site;
- (2) Vapor barrier system beneath the entire Site buildings;
- (3) Sub-slab depressurization system beneath the slab on grade portion of the building foundations.

### **2.1 Composite Cover System**

The Composite Cover System is a permanent Engineering Control for the Site. The system will be inspected and its performance certified at specified intervals defined in this SMP. A Soil/Materials Management Plan is included in this Site Management Plan and outlines the procedures to be followed in the event that the composite cover system and underlying residual soil/material must be disturbed after the Remedial Action is complete.

The Composite Cover System does not require any special operation or maintenance activities. If the system is breached during future construction activities, the system will be rebuilt by reconstructing the system according to the original design and tying newly constructed cover layers into existing cover layers to form a continuous layer. The final composite cover system design is shown in Appendix A.

### **2.2 Vapor Barrier**

The Vapor Barrier System is a permanent Engineering Control for the Site. The system will be inspected and its performance certified at specified intervals defined in this SMP.

The Vapor Barrier System does not require any special operation or maintenance activities. If the system is breached during future construction activities, the system will be rebuilt by reconstructing the vapor barrier layers and adhering the newly constructed materials with existing barrier materials in accordance with manufacturer specifications. The design specifications for the vapor barrier are included in appendix B.

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

The Active SSDS is a permanent Engineering Control for the Site. The system will be inspected and its performance certified at specified intervals defined in this SMP.

The design drawings for the active SSDS are included in Appendix C. The Active SSDS will be operated and maintained as prescribed in Appendix D.

### **3.0 INSPECTIONS**

ECs will be inspected on a regular basis and certified periodically as described below. Inspections will include routine evaluation by custodial and maintenance staff to identify obvious signs of potential failure of system components (i.e., cracks or fissures in the foundation or building slab, erosion of cover soils, Active SSDS alarm warnings, etc.) and periodic inspections by trained personnel for the purpose of certification of the performance of ECs. Inspection of ECs will be conducted monthly. Site inspection forms are provided in Appendix E.

The inspections will evaluate the following:

- Whether ECs continue to perform as designed;
- If compliance with this SMP has been maintained;
- If remedial performance criteria continues to be achieved;
- If Site records are complete and up to date; and
- Whether changes are needed to the remedial systems; and
- General Site conditions at the time of inspection.

In addition, if an emergency occurs, such as a natural disaster, or if an unforeseen failure of any of the ECs occurs, an inspection of the Site will be performed within 30 days to evaluate the Engineering Controls and a letter report of findings will be submitted to OER.

### **3.1 Engineering Control Inspection**

#### **3.1.1 Composite Cover**

- EC inspections of the composite cover shall include observations of the conditions of the concrete sidewalks, concrete building slabs and courtyard area. The composite cover will be inspected for cracks, holes or other openings that will provide access to the possible residual soil/fill. Any cracks, holes or other openings in the composite cover that are observed during the EC inspection will be recommended to be immediately filled and/or sealed as necessary.

### **3.1.2 Vapor Barrier**

- Unless the concrete slab above the vapor barrier is removed, EC inspections of the vapor barrier cannot be made. Observations of the concrete slab will be made to determine if cracks and gaps are visible. The seams and edges of exposed sections of vapor barrier, if any, shall be inspected in addition to the presence of holes in the vapor barrier. Additional vapor barrier tape or sealant will be recommended to repair holes in the vapor barrier or if there is missing sealant along the vapor barrier edges or seams. The concrete slab shall be replaced over the exposed sections of vapor barrier once necessary repairs have been made.

### **3.1.3 Sub Slab Depressurization System**

- EC inspections of the SSDS shall include inspections of the individual SSDS components. Inspection of the SSDS components shall include the following:
  - Observe visible components (blower, differential pressure alarm/monitor, differential pressure gauge, tubing, riser pipe, etc.) for physical wear, damage and operational issues, and replace as necessary;
  - Remove any blockages in differential pressure alarm/monitor and gauge tubing and riser pipe taps;
  - Verify operation of differential pressure alarm/monitor by disconnecting tubing from riser pipe and noting if the building management system is alerted;
  - Verify operation of differential pressure gauge by disconnecting tubing from riser pipe and noting if the indicator moves to zero (check high and low pressure ports to see if they are plugged correctly);
  - Inspect riser pipe penetrations in concrete slab for proper seal;
  - Inspect riser pipe connections at blower for leaks and tightness;
  - Inspect condition of muffler at end of outlet pipe; and
  - Inspect power to blower by operating dedicated switch.



### **3.2 Inspection Reporting**

Results of inspections performed during a reporting period and certification of performance of all Engineering Controls will be included in an Inspection and Certification Letter Report to be submitted by October 30, 2015 (for the reporting period calendar years 2014-2015), and every three years thereafter (for the reporting period consisting of the three prior calendar years). Inspection and Certification Letter Reports will be submitted to OER in digital format to the project manager (wiwong@dep.nyc.gov), edesignation@dep.nyc.gov, and brownfields@cityhall.nyc.gov.

EC inspections will be performed by a person knowledgeable with the mechanical systems present in the buildings and familiar with the property and may include a building or property superintendent. The letter report will include, at a minimum:

- Date of inspection;
- Personnel conducting inspection;
- Description of the inspection activities performed;
- Any observations, conclusions, or recommendations;
- Copy of inspection forms; and
- Certification of ECs, as discussed below.

### **3.3 Certifications**

Site inspections will take place as outlined above. The results of the EC inspections will be certified at the time of the inspection.

The Inspection Certification will certify whether:

- On-site ECs are unchanged from the previous certification;
- On-site ECs remain in-place and effective;
- On-site ECs performing as designed; and
- Anything has occurred that would impair the ability of the controls to protect public health and the environment.

The signed inspection certification(s) will be included in the SMP letter report.

#### **4.0 NOTIFICATIONS**

Notifications are to be submitted by the property owner to OER as described below:

- 60-day advance notice of any proposed changes in Site use that was not contemplated is the Remedial Action.
- Notice within 10 days of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the Site.

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

Any future intrusive work that will disturb any residual soil/materials beneath the property, including modifications or repairs to the existing composite cover system, will be performed with the prior approval of OER.

## **6.0 CONTINGENCY PLAN**

### **6.1 Emergency Telephone Numbers**

In the event of any emergency condition pertaining to this remedial system, the Owner's representative(s) should contact the appropriate parties from the contact list below. Prompt contact should also be made to a qualified environmental professional. These emergency contact lists must be maintained in an easily accessible location at the Site.

#### **Emergency Contact Numbers**

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3 day notice required for utility markout)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

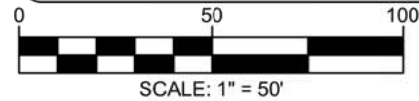
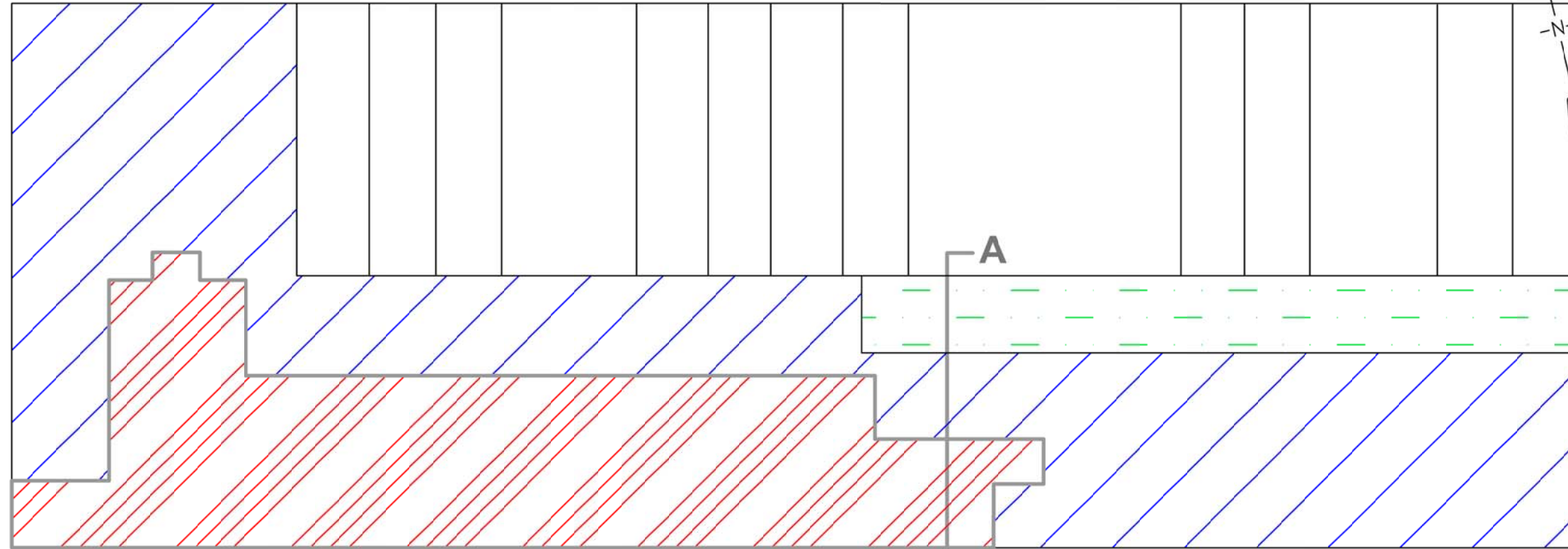
#### **Project Contact Numbers**

Qualified Environmental Professional or Fleming-Lee Shue, Inc.	(212) 675-3225
Office of Environmental Remediation	(212) 788-8841; 311

**APPENDIX A**  
**FINAL SITE COVER**

WEST 29TH ST.

11TH AVENUE



WEST 28TH ST.

A

A'



Environmental Management & Consulting

158 West 29th Street, 9th Fl.  
New York, NY 10001

Avalon West 28th Street Site  
New York, NY




## APPENDIX A

### FINAL SITE COVER

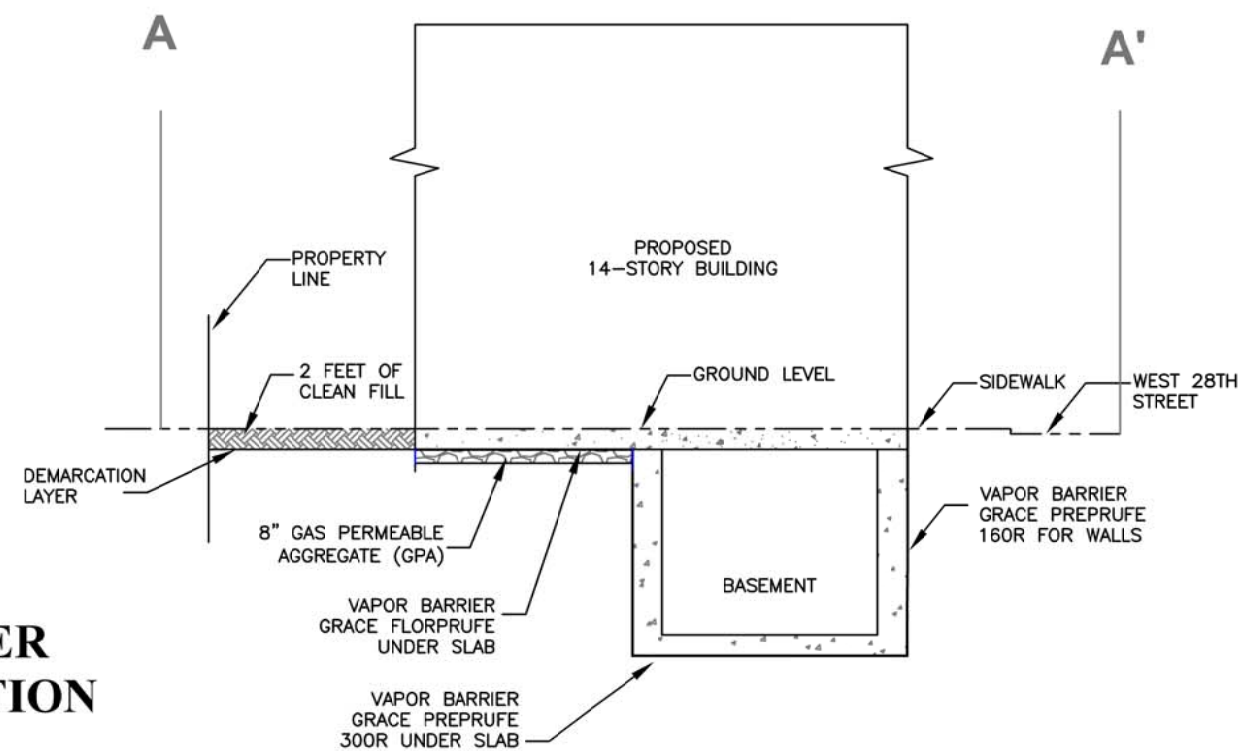
Date  
February 2014

Project Number  
10105-001

## LEGEND

- SITE BOUNDARY
- BASEMENT OUTLINE
-  VAPOR BARRIER WITH SUB-SLAB DEPRESSURIZATION SYSTEM INSTALLED
-  VAPOR BARRIER INSTALLED
-  DEMARCATION AND 2 FEET CLEAN FILL COVER

### SITE COVER CROSS-SECTION



**APPENDIX B**  
**VAPOR BARRIER SPECIFICATIONS**

## Grace Below Grade Waterproofing

### 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:

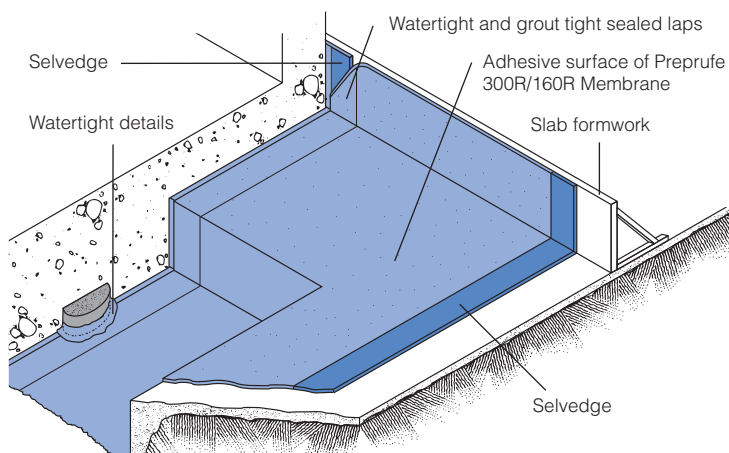
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe 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](http://graceconstruction.com) for specific application details.



## Installation

The most current application instructions, detail drawings and technical letters can be viewed at [graceconstruction.com](http://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 selvage 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 selvage. 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 clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvage 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](http://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 selvage 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<sup>2</sup>) 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

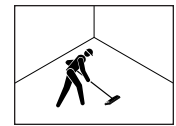


Figure 2

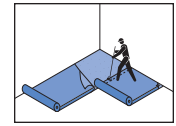
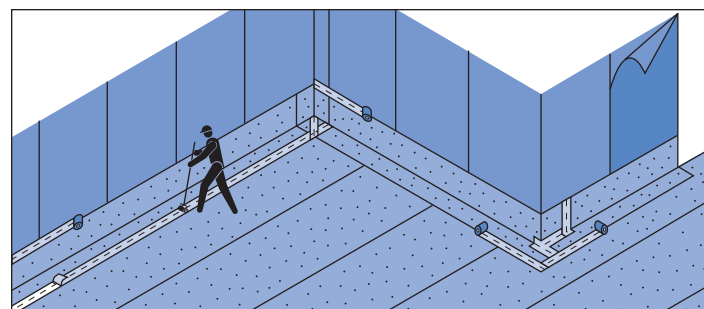
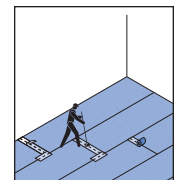


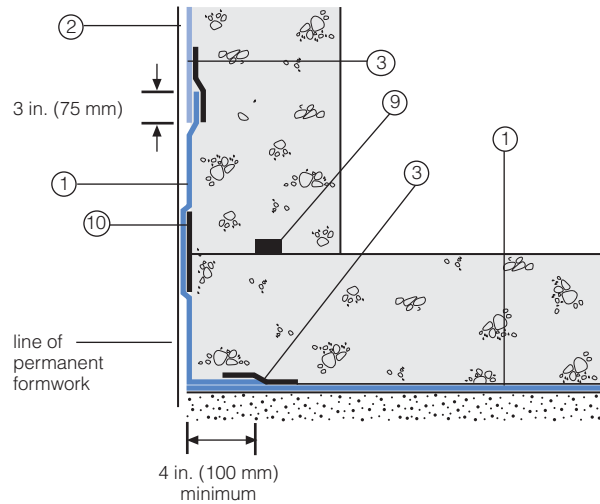
Figure 3



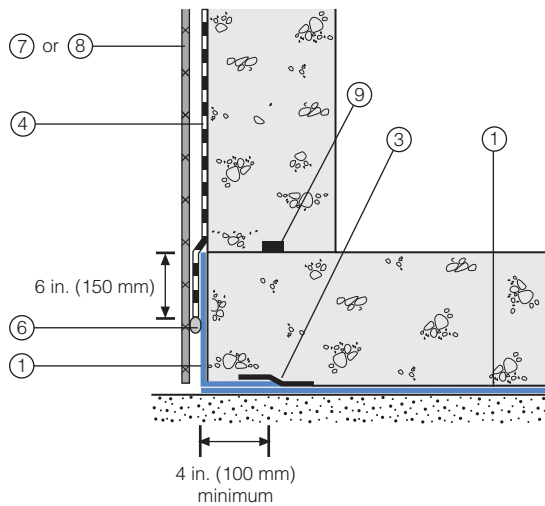
## Detail Drawings

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

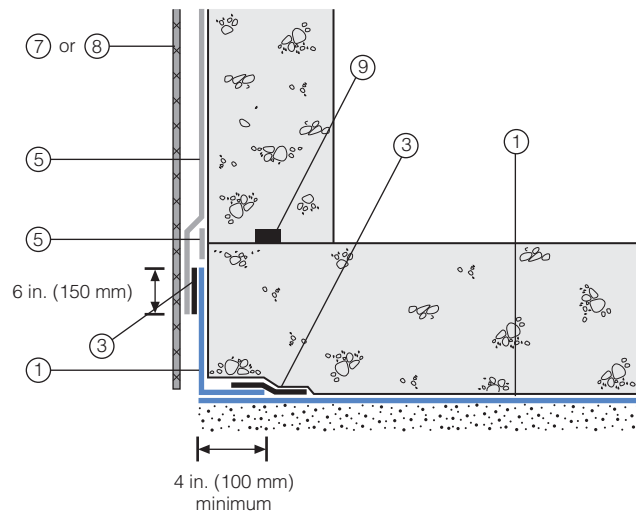
### Wall base detail against permanent shutter



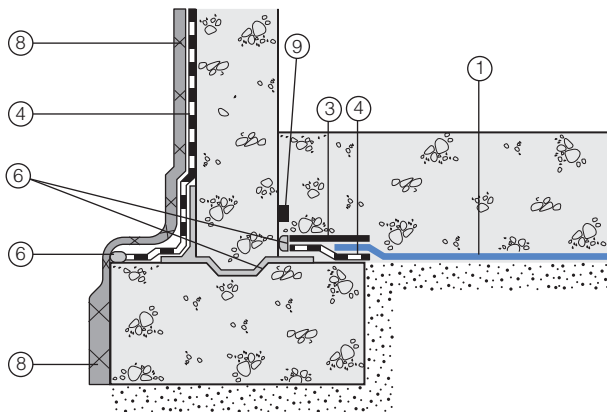
### Bituthene wall base detail (Option 1)



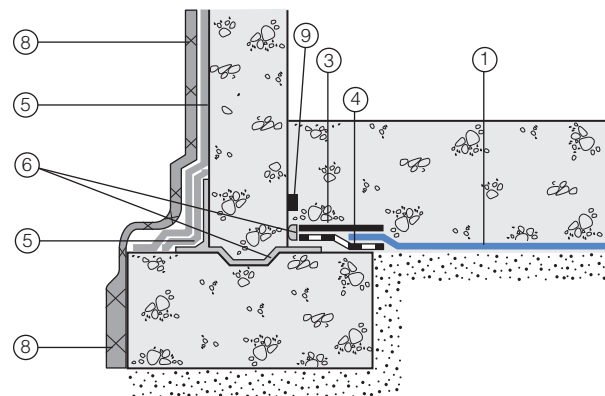
### Procor wall base detail (Option 1)



### Bituthene wall base detail (Option 2)



### Procor wall base detail (Option 2)



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

- 5 Procor
- 6 Bituthene Liquid Membrane
- 7 Protection

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

## Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	4 ft x 98 ft (1.2 m x 30 m)	4 ft x 115 ft (1.2 m x 35 m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	392 ft <sup>2</sup> (36 m <sup>2</sup> )	460 ft <sup>2</sup> (42 m <sup>2</sup> )	
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))			
<b>Ancillary Products</b>			
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 <sup>1</sup>
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 <sup>2</sup>
Elongation	500%	500%	ASTM D412, modified <sup>3</sup>
Tensile strength, film	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836
Puncture resistance	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903, modified <sup>4</sup>
Lap peel adhesion	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D1876, modified <sup>5</sup>
Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa × s × m <sup>2</sup> ))	0.01 perms (0.6 ng/(Pa × s × m <sup>2</sup> ))	ASTM E96, method B
Water absorption	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.

[www.graceconstruction.com](http://www.graceconstruction.com)

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

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GRACE

### FLORPRUFE® 120

## Integrally bonded vapor protection for slabs on grade

### Description

Florprufe® 120 is a high performance vapor barrier with Grace's Advanced Bond Technology™ that forms a unique seal to the underside of concrete floor slabs.

Comprising a highly durable polyolefin sheet and a specially developed, non-tacky adhesive coating, Florprufe 120 seals to liquid concrete to provide integrally bonded vapor protection.

Florprufe exceeds ASTM E1745 Class A rating.

### Advantages

- Forms a powerful integral seal to the underside of concrete slabs
- Protects valuable floor finishes such as wood, tiles, carpet and resilient flooring from damage by vapor transmission
- Direct contact with the slab complies with the latest industry recommendations
- Remains sealed to the slab even in cases of ground settlement
- Ultra low vapor permeability
- Durable, chemical resistant polyolefin sheet
- Lightweight, easy to apply, kick out rolls
- Simple lap forming with mechanical fixings or tape

### Use

Florprufe 120 is engineered for use below slabs on grade with moisture-impermeable or moisture-sensitive floor finishes that require the highest level of vapor protection.

<sup>1</sup> ACI 302.1R-96

Florprufe complies with the latest recommendations of ACI Committees 302 and 360, i.e. for slabs with vapor sensitive coverings, the location of the vapor barrier should always be in direct contact with the slab<sup>1</sup>.

The membrane is loose laid onto the prepared sub-base, forming overlaps that can be either mechanically secured or taped. The unique bond of Florprufe to concrete provides continuity of vapor protection at laps. Alternatively, if a taped system is preferred, self-adhered Preprufe® Tape can be used to overband the laps.

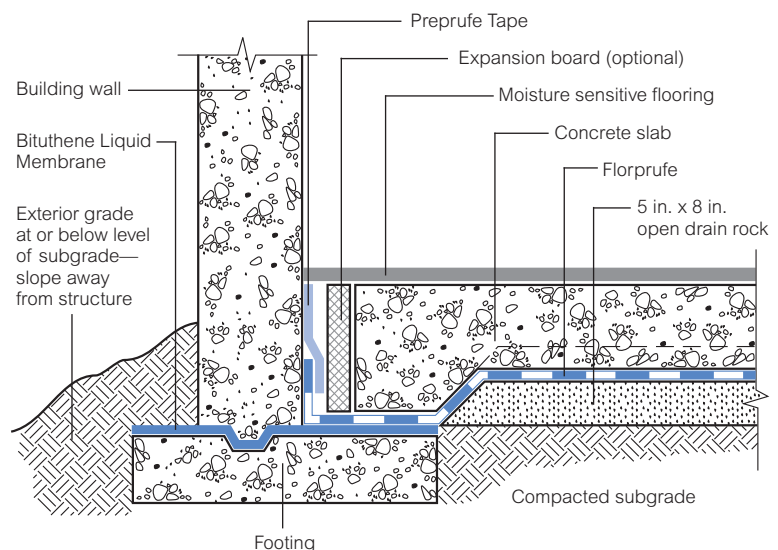
Slab reinforcement and concrete can be placed immediately. Once the concrete is poured, an integral bond develops between the concrete and membrane.

### Installation

#### Health & Safety

Refer to relevant Material Safety Data Sheet. Complete rolls should be handled by 2 persons.

Florprufe 120 can be applied at temperatures of 25°F (-4°C) or above. Membrane installation is unaffected by wet weather. Installation and detailing of Florprufe 120 are generally in accordance with ASTM E1643-98.



### Typical Assembly

Drawings are for illustration purposes only. Please refer to [www.graceconstruction.com](http://www.graceconstruction.com) for specific application details.

### Product Advantages

- Forms a powerful integral seal
- Protects valuable floor finishes
- Ultra low vapor permeability
- Durable, chemical resistant
- Lightweight and easy to apply

## Supply

<b>Florprufe 120</b>		
Supplied in rolls	4 ft x 115 ft (1.2 m x 35 m)	
Roll area	460 ft <sup>2</sup> (42 m <sup>2</sup> )	
Roll weight	70 lbs (32 kg) approx.	
<b>Ancillary Products</b>		
Preprufe Tape is packaged in cartons containing 4 rolls that are 4 in. x 49 ft (100 mm x 15 m).		
Bituthene Liquid Membrane is supplied in 1.5 gal (5.7 L) pails.		

## Physical Properties: Exceeds ASTM E1745 Class A rating

Property	Typical Value	Test Method
Color	White	
Thickness (nominal)	0.021 in. (0.5 mm)	ASTM D3767—method A
Water vapor permeance	0.03 perms	ASTM E96—method B1
Tensile strength	65 lbs/in.	ASTM E1541
Elongation	300%	ASTM D412
Puncture resistance	3300 gms	ASTM D17091
Peel adhesion to concrete	>4 lbs/in.	ASTM D903

1. Test methods that comprise ASTM E1745 standard for vapor retarders

Prepare substrate in accordance with ACI 302.1R Section 4.1. Install Florprufe 120 over the leveled and compacted base. Place the membrane with the smooth side down and the plastic release liner side up facing towards the concrete slab. Remove and discard plastic release liner. End laps should be staggered to avoid a build up of layers. Succeeding sheets should be accurately positioned to overlap the previous sheet 2 in. (50 mm) along the marked lap line.

### Laps

#### 1. Mechanical fastening method—

To prevent the membrane from moving and gaps opening, the laps should be fastened together at 39 in. (1.0 m) maximum centers. Fix through the center of the lap area using 0.5 in. (12 mm) long washer-head, self-tapping, galvanized screws (or similar) and allowing the head of the screw to bed into the adhesive compound to self-seal. It is not necessary to fix the membrane to the substrate, only to itself. Ensure the membrane lays flat and no openings occur. (See Figure 1.) Additional fastening may be required at corners, details, etc. Continuity is achieved once the slab is poured and the bond to concrete develops.

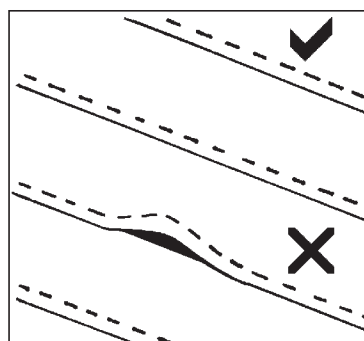


Figure 1

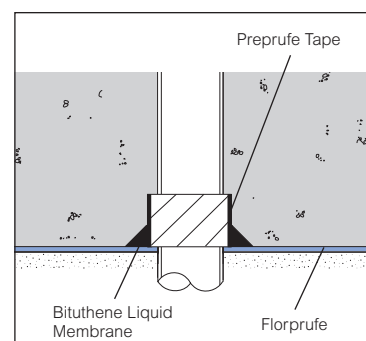


Figure 2

OR

#### 2. Taped lap method—

For additional security use Grace Preprufe Tape to secure and seal the overlaps. Overband the lap with the 4 in. (100 mm) wide Preprufe Tape, using the lap line for alignment. Remove plastic release liner to ensure bond to concrete.

### Penetrations

Mix and apply Bituthene Liquid Membrane detailing compound to seal around penetrations such as drainage pipes, etc. (See Figure 2 and refer to the Bituthene Liquid Membrane data sheet, BIT-230.)

### Concrete Placement

Place concrete within 30 days. Inspect membrane and repair any damage with patches of Preprufe Tape. Ensure all liner is removed from membrane and tape before concreting.

[www.graceconstruction.com](http://www.graceconstruction.com)

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

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**APPENDIX C**  
**SUB-SLAB DEPRESSURIZATION SYSTEM DESIGN**



## **SECTION 314600**

### **SUB-SLAB DEPRESSURIZATION SYSTEM**

#### **PART 1 - GENERAL**

##### **1.01 DESCRIPTION OF WORK**

- A. Furnish and install a sub-slab depressurization system (SSDS) as specified, as shown on the Drawings. The Contractor shall furnish and install a SSDS complete and ready for use. The SSDS shall depressurize the entire building floor slab (as shown on the Drawings), creating a differential pressure: lower pressure in the gas permeable aggregate layer below the floor slab than in the building interior. The SSDS shall provide a pressure drop of -0.01 inches of W.C. beneath the entire building slab. The SSDS shall be connected to, and monitored by, the Building Management System (BMS).
- B. Furnish and install a geotextile placed directly on the compacted subbase, and a minimum 8-inch thick gas permeable aggregate layer beneath the entire floor slab with six (6) 4-foot x 4-foot sub-slab depressurization pits. Trenches shall be dug an additional 4 inches in the area of pipes that will be laid through the gravel layer. Sub-slab depressurization pits ("sub-slab pit") shall use (1) 6" vertical riser extending through the building and to the roof.
- C. The Contractor shall furnish and install as part of the SSDS, nine (9) sub-slab monitoring points.
- D. Furnish, install, and test all system components as indicated, specified and required in the Contract Documents, as shown on the Drawings.
- E. All materials and equipment furnished under this section shall be new, in first-class condition, supplied directly from original equipment manufacturers, and installed in accordance with the manufacturers' recommendations.
- F. Perform and certify results of inspections and tests as specified.

##### **1.02 STANDARDS AND REGULATIONS**

- A. Comply with applicable portions of the Building Code of the City of New York. Where requirements for products, materials, equipment, methods and other portions of the work specified herein exceed minimum requirements of New York City Building Code, Contractor shall comply with such requirements specified herein, unless specifically approved otherwise by the Remedial Engineer.
- B. Standards issued by the organizations listed below may be referenced in this section.
  - 1. American Society for Testing and Materials (ASTM)

2. American Standards Association (ASA)
3. American National Standards Institute (ANSI)
4. Cast Iron Soil Pipe and Fitting Handbook (2006)

#### **1.03 RESTRICTIONS AND QUALITY CONTROL**

- A. Pre-installation Meeting: The Contractor shall arrange for and convene a pre-installation meeting prior to the start of work of this Section to review installation procedures, protection, and coordination with other work. Attendance of parties directly affecting work of this Section, including designer of the SSDS, Contractor, and Contractor's installer shall be required. The Contractor shall schedule the pre-installation meeting at a time and at a location that is agreeable to the Remedial Engineer. The meeting shall be held on a date which is a minimum of ten (10) business days prior to start of the work of this Section.
- B. Inspection: Remedial Engineer will be required to conduct inspections of the SSDS installation.
- C. Contractor to verify that all SSDS stack exhaust locations are a distance of 25 feet or more from any air inlets and operable windows (including those on adjoining properties). Final locations and heights of vent stacks shall be in accordance with New York City Building Codes.

#### **1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to site in manufacturers' original, unopened container and packaging, with labels clearly identifying product and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturers' instructions.
- C. Protect materials during handling and installation to prevent damage.
- D. Delivery, Storage and Handling of Pipe Materials:
  1. Deliver pipe materials properly protected, and undamaged.
  2. Properly protect all piping to prevent damage to the pipe and the introduction of foreign material into the pipe. For protecting piping from pre-installation contamination, all piping shall be shipped to job site with suitable caps, sheet metal covers or plugs. Pipe caps shall not be removed until just before installation.
  3. Examine all pipe and fittings before laying pipe. Do not install any piece that is found to be defective. Protect all materials during handling and installation to prevent damage.



## **PART 2 - PRODUCTS**

### **2.01 MATERIALS AND ACCESSORIES**

#### **A. NON-WOVEN GEOTEXTILE**

Geotextile material to be placed on prepared subgrade below the gas permeable aggregate layer shall be a non-woven polypropylene type, such as Mirafi N-Series product type 140NL or approved equal and having the following properties:

<b>Property/Test Method</b>	<b>Units</b>	<b>Value</b>
<b>MECHANICAL PROPERTIES</b>		
<b>Grab Tensile Strength</b>		
ASTM D 4632	kN (lbs)	0.40 (90)
<b>Grab Tensile Elongation</b>		
ASTM D 4632	%	50
<b>Mullen Burst Strength</b>		
ASTM D 3786	kPa (psi)	1205 (175)
<b>Trapezoidal Tear Strength</b>		
ASTM D 4533	kN (lbs)	0.18 (40)
<b>Puncture Strength</b>		
ASTM D 4833	kN (lbs)	0.24 (55)
<b>UV Resistance at 500 hrs.</b>		
ASTM D 4355	% Strength retained	70
<b>HYDRAULIC PROPERTIES</b>		
<b>Apparent Opening Size (AOS)</b>		
ASTM D 4751	mm (US Sieve)	0.25 (60)
<b>Permittivity</b>		
ASTM D 4491	sec-1	2.0
<b>Flow Rate</b>		
ASTM D 4491	L/min/m2 (Gal/min/ft2)	5907 (145)
<i>NOTE: All Mechanical Properties and Hydraulic Properties shown are Minimum Average Roll Values (MARV).</i>		

#### **B. GAS PERMEABLE AGGREGATE LAYER**

Gas permeable aggregate layer shall be clean, washed ¾" stone. No fines passing a ¼" sieve shall be included in gas permeable aggregate mix.

#### **C. SUB-SLAB PITS, PIPE, AND APPURTENANCES**

1. Install sub-slab depressurization pits as shown on the Drawings. The sub-slab depressurization pits shall be 4-foot by 4-foot in area. Pits shall be constructed with solid concrete blocks supporting and covered by 2-inch thick precast concrete plates

reinforced with No. 4 rebar 4-inches on center each way, or an equivalent welded wire fabric of equal size, throughout the center of the plate.

2. Pipe shall be installed as shown on the Drawings and shall terminate in and slope uniformly to each of the sub-slab depressurization pits. Condensate drains must be installed at all low points in the piping that are not sloped back to the SSDS pits.
3. All vertical and horizontal SSDS pipes will be cast iron unless otherwise noted on the drawings.

**D. MONITORING POINTS**

1. Monitoring points shall be installed through the floor slab and shall be constructed with 2-inch diameter solid-wall Schedule 80 PVC pipe as shown on the Drawings. Penetrations through floor slab for monitoring points shall be air-tight and completed monitoring points shall be air-tight, preventing the potential for migration of gas from the sub-slab into the building.
2. Sub-slab monitoring points shall terminate four inches below the top of the gas permeable aggregate layer.
3. Access cover shall be flush mounted 8-inch diameter cast iron lid with galvanized steel skirt that is watertight and lockable.
4. The 2-inch diameter PVC pipe shall be completed with 2-inch diameter PVC cap with quick connect fitting as shown on the Drawings.
5. Label each monitoring point with engraved metal tag on chain around PVC pipe with: "SSDS MONITORING POINT – (Monitoring Point Number, i.e., MP-1)". Letter height shall be 1/4-inch minimum.

**E. VAPOR BARRIER**

The Vapor Barrier shall be 20 mil Polyethylene and installed in accordance with manufacturer's installation procedures.

**F. SUB-SLAB PIPE, BUILDING PENETRATIONS AND RISER PIPES**

Pipe, fittings, unions, cleanouts, sleeves, supports, and related accessories shall be furnished in accordance with the requirements for plumbing sanitary vent piping in Division 15.

**G. SUCTION FAN**

A blower test will be performed by the Remedial Engineer near the completion of construction to select the proper sizing of the suction fan required.

**H. GENERAL**

Provide additional installation accessories as necessary for a complete SSDS, ready for use.

Ensure accessories are from same manufacturers as specified products. Furnish all manufacturer recommended accessories.

I. CONDENSATE DRAINS

1. Condensate drains shall be installed at all low points in SSDS piping not sloped to SSDS pits.
2. Condensate drains shall be of same construction as shown on Contract Drawings.

**PART 3 - EXECUTION**

**3.01 EXAMINATION/INSPECTION**

At a minimum, inspection by and approval from the Remedial Engineer at all milestones identified on the following Inspection Schedule shall be required prior to commencing each subsequent phase of work. The interior riser pressure testing as described in Article 3.01(B) must be performed in the presence of a representative of the Remedial Engineer. Additional inspections, examinations and quality control measures may be required in accordance with manufacturers' recommendations and are the responsibility of the Contractor.

A. INSPECTION SCHEDULE

#	Inspection Schedule – Milestone Description
1	Completion of Subbase preparation following foundation and footing installation and installation of geotextile.
2	Delivery to the site of gas permeable aggregate layer, prior to use.
3	Installation of sub-slab depressurization pits and riser “stub-outs” prior to completion of gas permeable aggregate layer.
4	Completion of installation of gas permeable aggregate layer.
5	Completion of all SSDS subsurface components prior to installation of sheet membrane waterproofing/gas vapor barrier system.
6	Completion of installation of all portions of interior risers prior to enclosure within sheetrock/interior walls.
7	Implementation of pressure test of completed interior riser pipes. <b>See Article 3.01(B) regarding test requirements.</b>
8	BMS installation, programming and testing.
9	Start-up of completed system.

B. INTERIOR RISER PRESSURE TESTING

1. The interior 6” riser shall be subject to a pressure test to ensure all components of the SSDS that pass through the facility interior are airtight at 10.0 psig air pressure.
2. A cleanout shall be permanently installed on each riser pipe with invert within 12-inches above finished floor of the pipe entry into the facility and below the cleanout shall be an uninterrupted straight pipe run, without couplings, joints or fittings. A

pressure-stop balloon shall be inflated between the foundation floor and the cleanout creating an airtight seal. A temporary airtight seal shall be placed at the riser termination on the roof. A static pressure of at least 10.0 psig shall be applied to the pipe at the cleanout location and maintained for a minimum of 30 minutes. All materials, gauges and equipment for this test shall be provided by the Contractor. All test equipment provided must be certified in accordance with Section 15414 Article 2.01(B). Pressure testing must be witnessed by a representative of the Remedial Engineer.

3. If the pipe riser does not successfully maintain pressure, it is the responsibility of the Contractor to identify and seal all leaks. The test shall be performed until satisfactory results are demonstrated.
4. **Caution: Materials under pressure can explode, causing serious injury or death. Extreme care should be exercised in conducting any air test. Persons conducting an air test must exercise care to avoid application of pressure to system under test by using pressure regulating and relief devices. Persons conducting the test are cautioned to inspect for tightness of all system components prior to the beginning of the test and to avoid adjustment of the system while under pressure. Proper protective equipment should be worn by individuals in an area where an air test is being conducted.**

C. BMS TESTING

Prior to the system startup, the BMS must be tested to verify that if low vacuum conditions occur within the SSDS piping, the differential pressure switch is triggered, resulting in an alarm condition. Each fan will be tested to ensure the BMS recognizes the alarm condition and clearly reports this on the BMS Control Screen.

**3.02 SURFACE PREPARATION**

Preparation of all surfaces prior to the installation of the SSDS shall be as specified in the Contract Documents and Plans.

**3.03 INSTALLATION**

All components of the SSDS shall be installed as specified in the Contract Documents and as shown on the Drawings.

A. INSTALLATION OF THE GEOTEXTILE ABOVE PREPARED SOIL SUBGRADE

Following the completion of the building foundation walls and footings, the subbase shall be excavated to the depth required to install the gas permeable aggregate layer below the elevation of the bottom of the floor slab to the extent of the SSDS, as shown on the Contract Drawings. The non-woven geotextile shall be placed on the subbase, overlapped and secured in accordance with the manufacturer's recommendations.

B. INSTALLATION OF THE GAS PERMEABLE AGGREGATE AND SUB-SLAB DEPRESSURIZATION SYSTEM PITS

1. The gas permeable aggregate layer shall be placed and compacted below the SSDS depressurization pit locations as shown on the Contract Drawings.
2. The sub-slab pits and pipe shall be assembled and installed as shown on the Contract Drawings.
3. Following inspection, gas permeable aggregate shall be placed and compacted to the bottom of slab elevation, as shown on the drawings.

C. INSTALLATION OF THE VAPOR BARRIER

The Vapor Barrier shall be constructed of 20 mil Polyethylene, in accordance with manufacturer's installation procedures.

D. INSTALLATION OF PIPING, RISERS AND RELATED WORK

1. Vent riser shall be as identified in the Contract Documents and Drawings. Vent riser shall be installed, tested, labeled and enclosed in the interior wall cavities.
2. The installation of piping, fittings, joints, supports and related accessories shall be in accordance with the requirements of Division 15.
3. Condensate drains must be installed at all low points in the piping that are not sloped back to the SSDS pits. If SSDS lateral pipe intersects a grade beam, the pipe may pass under the grade beam with the proper installation of a condensate drain or may pass through the grade beam with use of a pipe sleeve, with prior approval from the structural engineer.
4. Continuous weather resistant tape labeling on all interior riser pipe beginning at the floor slab elevation and continuing to the installation of suction fans above roof penetrations shall be permanently installed on each riser and shall read:

**CAUTION: DO NOT ALTER  
SUBSURFACE VAPOR VENT PIPE**

Lettering shall be minimum one-inch in height.

5. Piping (General)
  - a. The run and arrangements of all pipes shall be approximately as shown on drawings or specified and as directed during installation, and shall be as straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and neatly spaced.
  - b. Roughing underground or concealed in the floor or wall construction shall be properly installed and inspected before any of the roughing is covered up.

Should any work be covered up before being inspected it shall be uncovered and recovered at the expense of the Contractor.

- c. All lines of piping and branches for fixtures passing through or in connection with waterproofing/vapor barrier shall be brought to the proper locations and levels so that fixtures and piping may be installed without disturbing the waterproofing/vapor barrier.
- d. SSDS vent stack shall be securely anchored with adequate structural supports as shown on the Contract Drawings.

6. Cleanouts

- a. Cleanouts installed on sub-slab depressurization risers shall be of equivalent size of the riser diameter (6-inch) to facilitate pressure testing. Cleanouts shall be gas tight.

7. Sleeves for Pipes and Escutcheon Plates

- a. Install pipe sleeves and escutcheon plates in accordance with requirements of Division 15 and as shown on the Contract Drawings.

**3.04 PROTECTION**

It is the responsibility of the Contractor to ensure that no damage occurs to components of the SSDS prior to, during or following installation of system, or during any subsequent performance of construction for the facility. This includes the installation of all subsurface utilities required for the operation of building systems. Contractor shall visually inspect the condition of the SSDS immediately prior to enclosing/covering. Any damages to the SSDS during performance of the Work shall be repaired and tested at no additional cost.

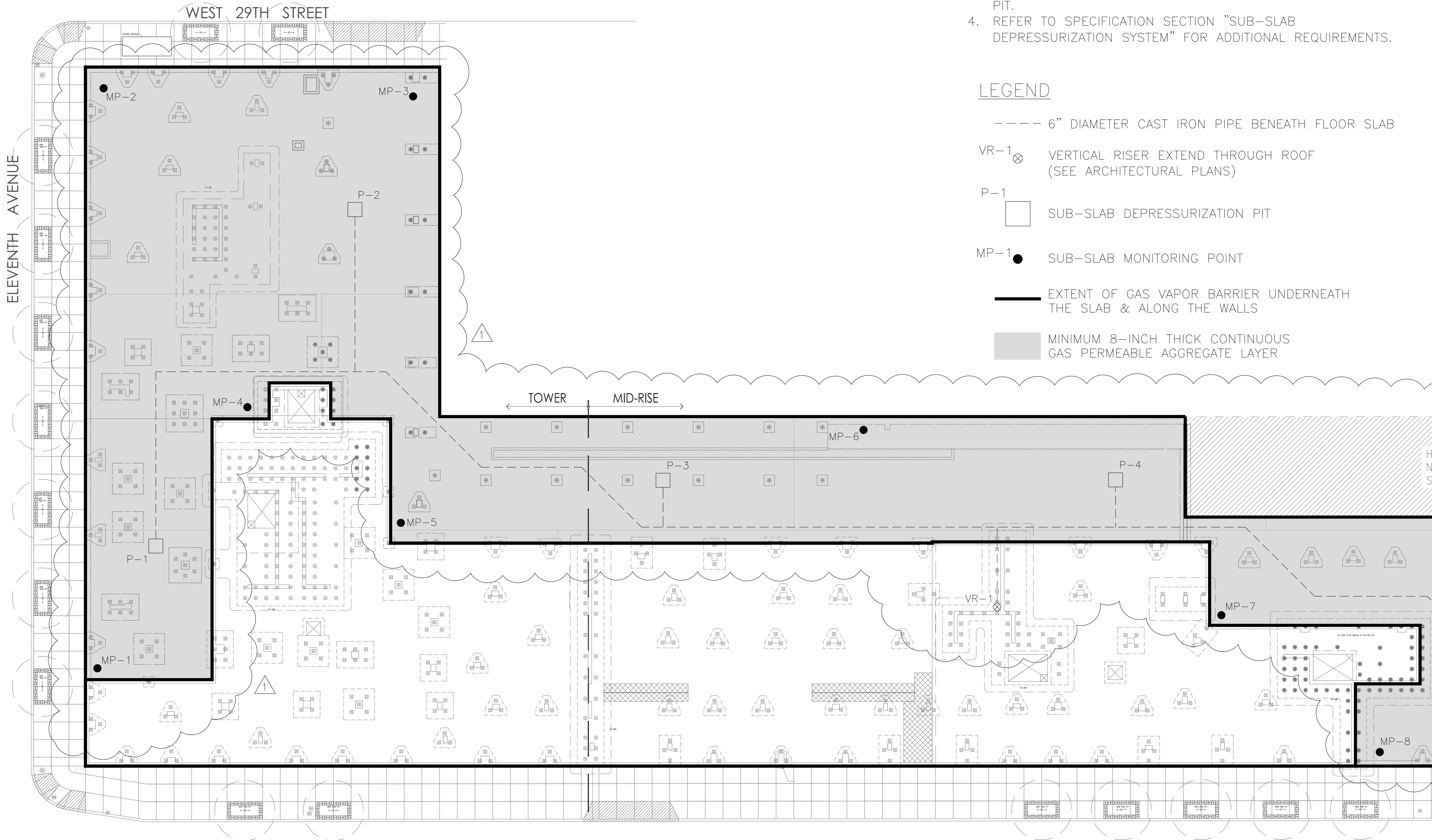
**LIST OF SUBMITTALS**

<b><u>SUBMITTAL</u></b>	<b><u>DATE SUBMITTED</u></b>	<b><u>DATE APPROVED</u></b>
Submittal Schedule		
Inspection Schedule		
Product Data:		
1. Cleanout Test Tee		
2. Non-Woven Geotextile		
3. Pipes and Fittings		
Samples:		
Non-Woven Geotextile		
Manufacturer's Instructions:		
Installation of Fire Stop Materials for Sleeves for Pipes		
Shop Drawings:		
1. Sub-Slab Pits		
2. Monitoring Points		
3. Piping Installations		
4. Cleanout Test Tee Installation		
Schedule:		
Pipe and Fittings		
Material Test Reports		
Vertical Riser Test Results		
Contractor's Report on Inspection and Approval of Work		

**END OF SECTION**

\* \* \*

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## NOTES:

1. DRAWING NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL, OR OTHER REFERENCE EXCEPT FOR SUB-SLAB DEPRESSURIZATION SYSTEM.
2. THE EXTENTS OF THE BUILDING CONSTRUCTION BENEATH THE FLOOR SLABS SHALL BE LINED WITH GAS VAPOR BARRIER. AS PART OF THE BUILDING CONSTRUCTION, THE GAS VAPOR BARRIER SHALL ALSO BE APPLIED VERTICALLY TO BELOW GRADE WALLS AND WALLS OF PITS AND SUMPS.
3. SLOPE HORIZONTAL PIPE A MINIMUM OF 1% UNIFORMLY TOWARDS SUB-SLAB DEPRESSURIZATION SYSTEM PIT OR TO CONDENSATION DRAINS WHEN PIPING CANNOT BE SLOPED TO PIT.
4. REFER TO SPECIFICATION SECTION "SUB-SLAB DEPRESSURIZATION SYSTEM" FOR ADDITIONAL REQUIREMENTS.

## LEGEND

- 6" DIAMETER CAST IRON PIPE BENEATH FLOOR SLAB
- VR-1 VERTICAL RISER EXTEND THROUGH ROOF (SEE ARCHITECTURAL PLANS)
- P-1 SUB-SLAB DEPRESSURIZATION PIT
- MP-1 SUB-SLAB MONITORING POINT
- EXTENT OF GAS VAPOR BARRIER UNDERNEATH THE SLAB & ALONG THE WALLS
- MINIMUM 8-INCH THICK CONTINUOUS GAS PERMEABLE AGGREGATE LAYER

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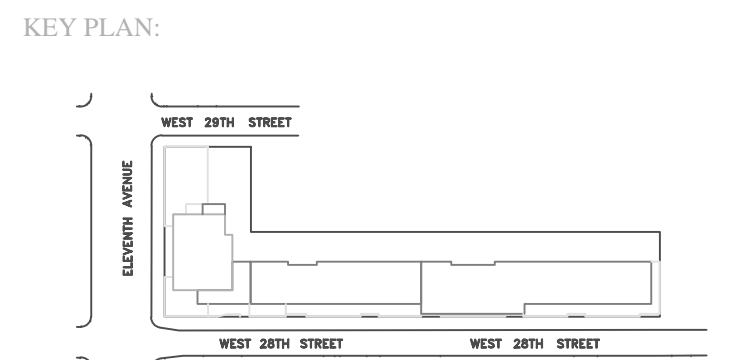
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DATE	REVISION
01/16/12	ISSUED FOR CONSTRUCTION

DWG. NUMBER:  
**NB# 120053707**

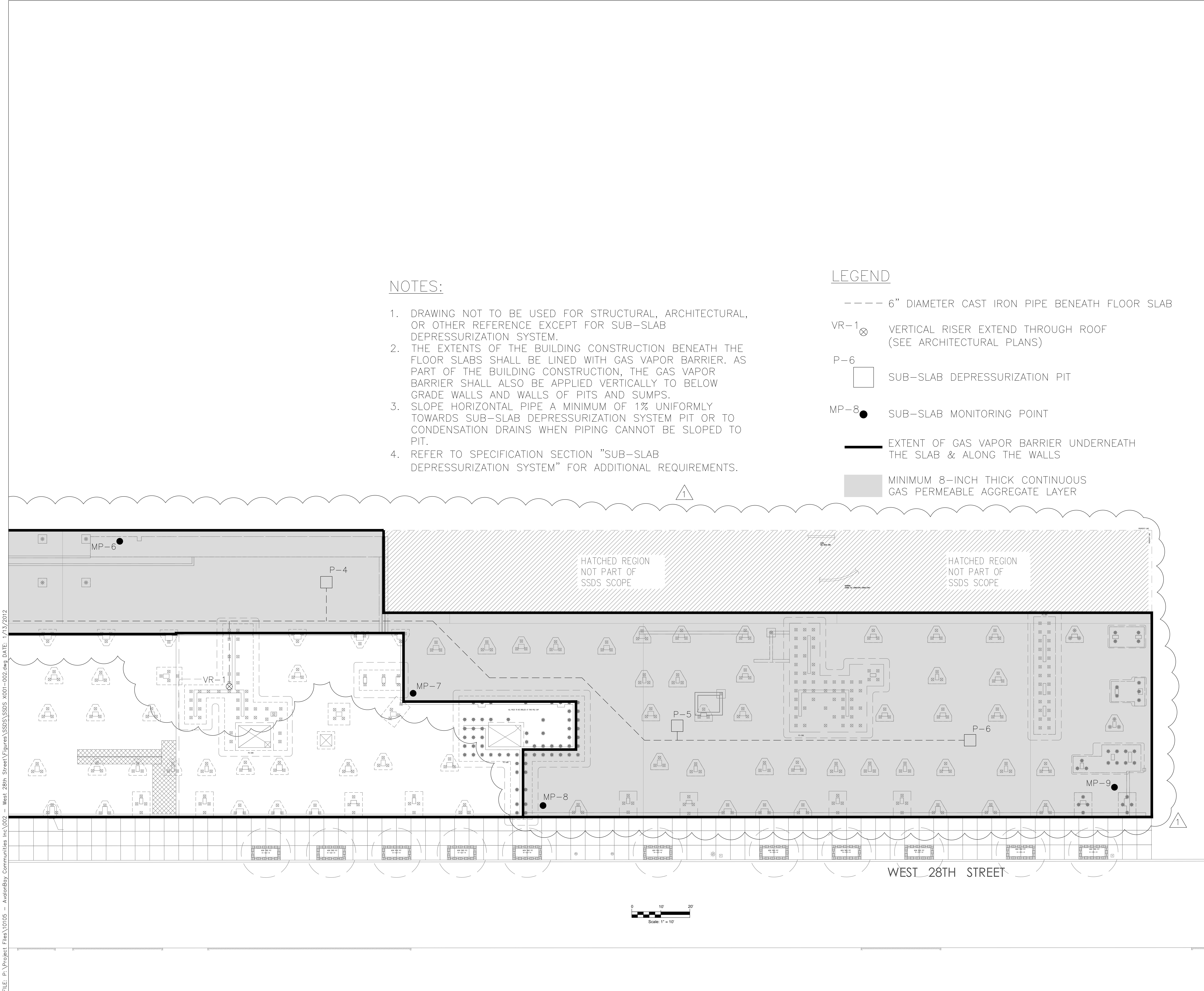


DRAWING TITLE:  
**WEST SUB-SLAB  
DEPRESSURIZATION  
SYSTEM LAYOUT**

SEAL & SIGNATURE:  
DATE: 01-16-12  
PROJECT NO.: 2008-08  
DRAWN BY: PSE  
CHECKED BY: AF  
DWG. NO.:  
**X001**



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**PROJECT:**  
**Avalon**  
WEST CHELSEA  
28TH STREET & 11TH AVENUE  
NEW YORK, NY 10001

**OWNER/DEVELOPER:**  
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architecture interiors  
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**LANDSCAPE ARCHITECT:**  
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**ACOUSTICAL CONSULTANT:**  
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50 WASHINGTON STREET  
NORWALK, CT 06851  
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**REMEDIAL ENGINEER:**  
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DATE	REVISION
01-16-12	ISSUED FOR CONSTRUCTION

**DRAWING NUMBER:**  
**NB# 120053707**

**KEY PLAN:**

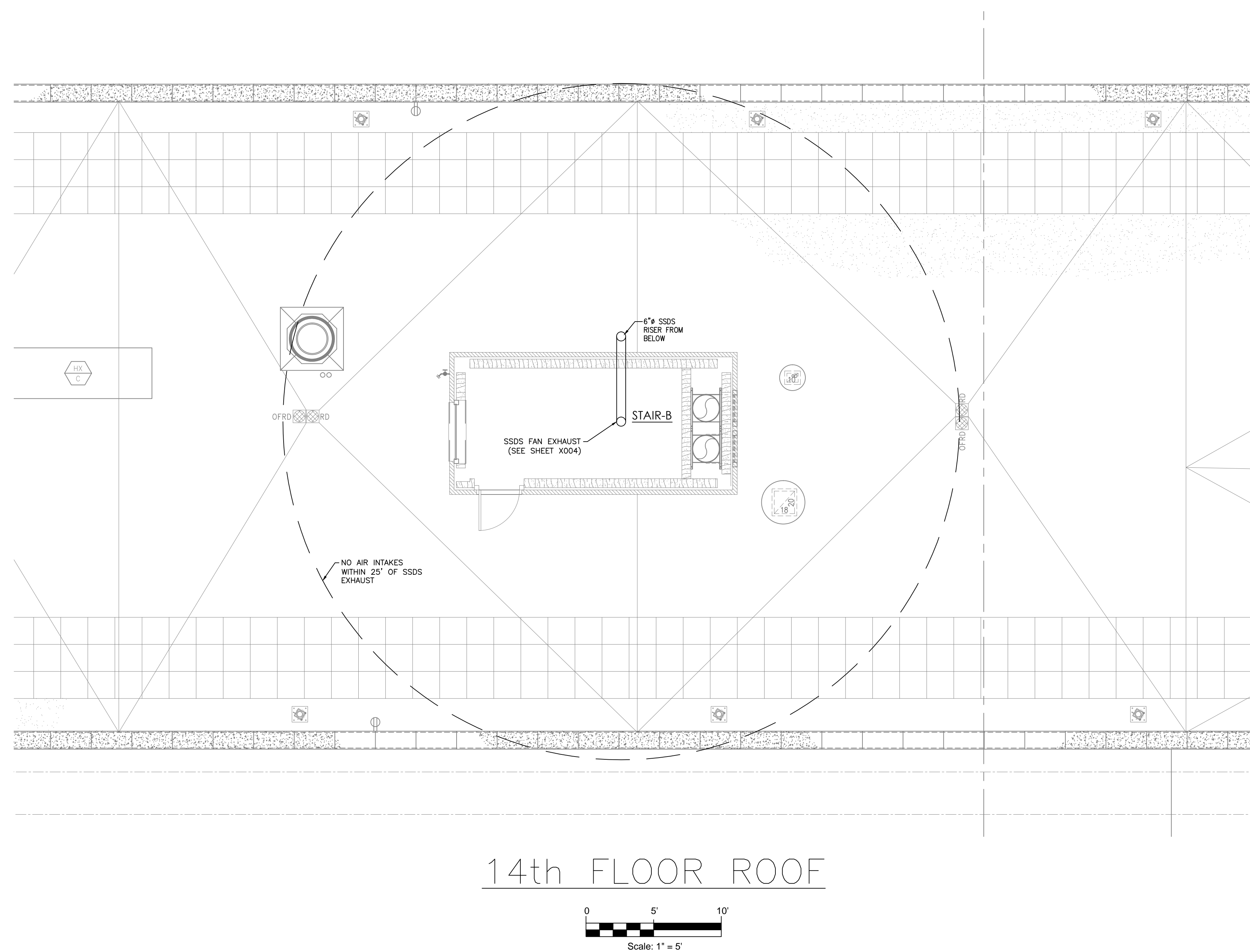
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**EAST SUB-SLAB**  
**DEPRESSURIZATION**  
**SYSTEM LAYOUT**

**SEAL & SIGNATURE:**

**DATE:** 01-16-12  
**PROJECT NO.:** 2008-48  
**DRAWN BY:** PSE  
**CHECKED BY:** AF  
**DWG. NO.:**

**X002**

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NOTES:

1. DRAWING NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL, OR OTHER REFERENCE EXCEPT FOR SUB-SLAB DEPRESSURIZATION SYSTEM.
2. REFER TO SPECIFICATION SECTION "SUB-SLAB DEPRESSURIZATION SYSTEM" FOR ADDITIONAL REQUIREMENTS.





- SSDS SUCTION FAN DETAIL  
N.T.S.



PROJECT:

 **Avalon**  
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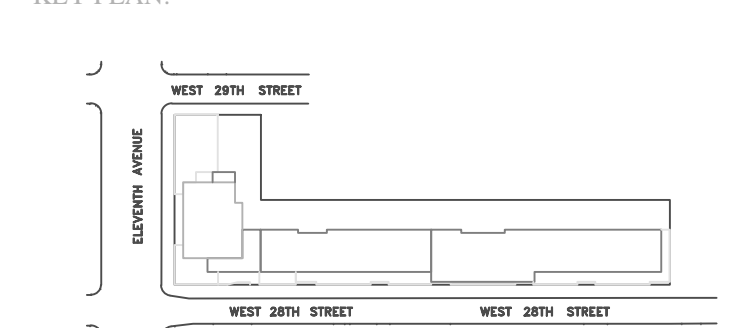
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FAX.: (212) 675-3224

[illegible]

D.O.B. NUMBER:  
NB# 120053707

NORTH:  SCALE: 

KEY PLAN



DRAWING TITLE:

SUB-SLAB  
DEPRESSURIZATION  
SYSTEM DETAILS

SEAL & SIGNATURE:	DATE: 01-16-12
	PROJECT No: 2008-68
	DRAWN BY: PSH
	CHECKED BY: AF
	DMWG No.:

X004

**APPENDIX D**  
**SYSTEM OPERATION: ROUTINE OPERATING PROCEDURES**

The long-term operation and maintenance program described below shall continue throughout the life cycle of the SSDS to ensure a proper working order. The long-term operation and maintenance program for the major SSDS components includes manufacturer's recommendations for the reinstallation of SSDS components if modifications to the existing system need to be made, inspection procedures, an operation schedule, typical routine maintenance activities and schedules, and troubleshooting. Refer to Section 3.1.3 for an overall inspection procedure of the SSDS.

The SSDS is connected to the building management system (BMS) and will be alerted if there is a loss of differential pressure, indicating malfunction of the system. The BMS will alert maintenance staff of the faulty condition. If differential pressure gauge indicates loss of performance and/or the SSDS blower is no longer operating, the maintenance staff shall immediately notify their Qualified Environmental Professional.

The Dwyer Magnahelic differential pressure gauge (model A3030) shall operate continuously and only be disconnected for routine maintenance and inspection activities or replacement. The differential pressure gauge shall maintain a vertical installation to ensure proper operation. The differential pressure gauge does not require lubrication or periodic servicing. The differential pressure gauge is not field serviceable and should be returned to the manufacturer or supplier if repair is needed. If the differential pressure gauge is not indicating a differential pressure while the SSDS is on, make sure that the tubing connected to the riser pipe is connected to either of the low pressure ports on the differential pressure gauge and that the unused low pressure port measures ambient pressure. One or both of the high pressure ports on the vacuum gauge should be vented to atmosphere.

The differential pressure gauge is factory calibrated, but can be zeroed if the indicating pointer does not rest on zero when there is no differential pressure present. To zero the gauge, set the indicating pointer exactly on the zero mark using the external zero adjust screw on the cover at the bottom. The zero check or adjustment can only be made with the high and low pressure taps both open to atmosphere. Common troubleshooting tips that can be followed if the vacuum gauge will not indicate a vacuum or is sluggish include the following:

- The duplicate pressure port (high or low) is not plugged;
- The diaphragm ruptured due to overpressure;

- The fittings or sensing lines are blocked, pinched or leaking;
- The cover is loose or the “O” ring is damaged or missing;
- The differential pressure tap is improperly located;
- The ambient temperature is too low (below 20°C).

The installation and operating instructions for the differential pressure gauge have been included in Appendix F.

The SSDS blower is manufactured by The New York Blower Company (model 1404A) and shall operate continuously and only be turned off for routine maintenance and inspection activities or replacement. The Qualified Environmental Professional shall be contacted if the blower is not operational and/or if repairs are needed. The installation and operating instructions for the SSDS blower unit have been included in Appendix G.

**APPENDIX E**  
**SITE INSPECTION FORMS**

# ENGINEERING CONTROL INSPECTION FORM

Avalon West 28th Street  
New York, New York  
Block 700, Lot 9

Sub-Slab Depressurization System Component	Condition	No	Yes	Describe Deficiency	Any Corrective Action Performed? If so, describe
Composite Cover	Holes, cracks, or other physical deficiencies?				
Vapor Barrier	Holes, cracks, or other physical deficiencies? (only applicable if composite cover is damaged)				
Sub-Slab Depressurization System	Holes, cracks, or other physical deficiencies?				
	Blockages in SSDS piping?				
	Blower operational?				
	BMS alarm operational?				

Differential Pressure Reading from Gauge \_\_\_\_\_ " WC

\_\_\_\_\_  
Name of Inspector

\_\_\_\_\_  
Signature of Inspector

\_\_\_\_\_  
Date of Inspection





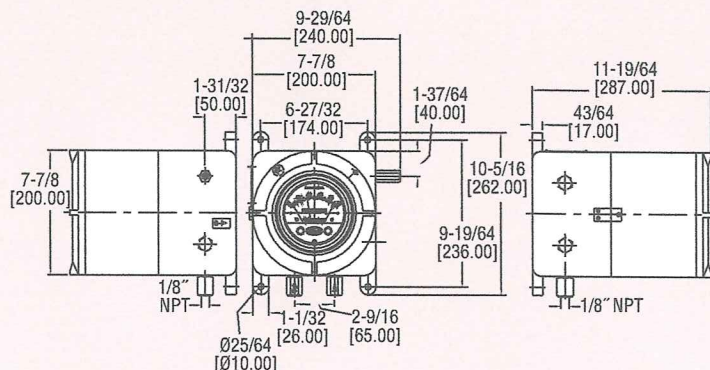
**APPENDIX F**  
**DIFFERENTIAL PRESSURE GAUGE SPECIFICATIONS**



Series  
AT3  
A3000

# ATEX Approved Photohelic® Switch/Gages with 120, 240 or 24 VAC Power

Photohelic® Switch/Gages in Flame-Proof ATEX Enclosures



Flame-proof ATEX approved **Photohelic® Switch/Gages, Series AT3A3000**, function as versatile, highly repeatable pressure switches combined with a precise pressure gage employing the time-proven Magnehelic® gage design. The Photohelic® switch/gage measures and controls positive, negative or differential pressures of air and compatible gases. Standard models are rated to 25 psig (1.7 bar) with options to 35 psig (2.4 bar) or 80 psig (5.5 bar). Two phototransistor actuated, DPDT relays are included for low/high limit control. Easy to adjust set point indicators are controlled by knobs located on the gage face (accessible opening case after de-energizing instrument). Set points can be interlocked to provide variable dead band - ideal for control of fans, dampers, etc. Gage reading is continuous and unaffected by switch operation, even during loss of electrical power. Flame-proof ATEX enclosures are available in aluminum with glass window which allows for viewing of set point needles and process pressure.

#### Important notes for installation:

- Cables must be fitted through 1/2" NPT cable gland or ATEX conduit (not supplied with instrument).
- Make sure after cabling to close tight cover and cable gland, in order to keep IP66 rating (IP65 with option OPV, overpressure relief valve).
- Open cover only after de-energizing instrument.
- **Attention:** Check local safety rules and warnings on unit and manual for a correct use of the instrument in hazardous area.

#### SPECIFICATIONS

**Service:** Air and non-combustible, compatible gases.  
**Wetted Materials:** Consult factory.  
**Housing material:** Aluminum.  
**Finishing:** Texture epoxy coat RAL7038.  
**Accuracy:** ±2% of FS at 70°F (21.1°C); ±3% on -0 and ±4% on -00 models.  
**Pressure Limits:** -20 in Hg to 25 psig (-0.677 to 1.72 bar). MP option; 35 psig (2.41 bar), HP option; 80 psig (5.52 bar).  
**Temperature Limits:** 20 to 120°F (-6.67 to 48.9°C) LT low temperature option to -20°F available; Case: -58 to 140°F (-50 to 60°C) (Note: Product temperature limits differ from case).  
**Dial Size:** 4" (101.6 mm).  
**Mounting Orientation:** Diaphragm in vertical position.  
**Set Point Adjustment:** Adjustable knobs on Photohelic® gage face behind enclosure cover. Follow instructions and safety warnings to open cover.

#### SWITCH SPECIFICATIONS

**Switch Type:** Each setpoint has 2 Form C relays (DPDT).  
**Repeatability:** ±1% of FS.  
**Electrical Rating:** 10 A @ 28 VDC, 10 A @ 120, 240 VAC.  
**Electrical Wiring:** Screw terminals.  
**Power Requirements:** 120 VAC, 50/60 Hz; 240 VAC & 24 VAC power optional.  
**Enclosure Rating:** IP66. IP65 with option OPV, overpressure relief valve.  
**Process Connections:** 1/8" NPT female brass (SS optional). In presence of acetylene it is necessary to use SS.  
**Electrical Connections:** Three 1/2" NPT female. Cable gland not included.  
**Weight:** 28.4 lb (12.9 kg).  
**ATEX Approved Products from Comhas with ECN:** NEMKO 10ATEX1096.  
**Agency Approvals:** CE 0470 Ex II 2 GD Ex d IIC Gb T6; -50°C ≤ Ta ≤ +60°C Ex tb IIIC Db T 85°C.

#### Range Chart

Model	Range, in w.c.	Example	AT3	A3001	120 VAC	X	X	X	A	B	1	X	T2	AT3A3001-120VAC-XXX-AB1XT2	Price
A3000-00	0 to .25	Housing	AT3	A3XXX										ATEX Approved Series A3000 Photohelic® Switch/Gages	\$1565.00 <sup>®</sup>
A3000-0	0 to .50	Range												Specify range by wiring Photohelic® model number. See range chart.	
A3001	0 to 1.0	Power			-120 VAC									Power requirement 120 VAC	
A3002	0 to 2.0				-240 VAC									Power requirement 240 VAC	add 40.00 <sup>®</sup>
A3003	0 to 3.0				-24 VAC									Power requirement 24 VAC	add 40.00 <sup>®</sup>
A3004	0 to 4.0	Pressure Rating				-X								Standard -25 in Hg to 25 psig	
A3005	0 to 5.0					-MP								Medium pressure max. static 35 psig	add 90.00 <sup>®</sup>
A3006	0 to 6.0					-HP								High pressure max. static 80 psig	add 250.00 <sup>®</sup>
A3008	0 to 8.0	Construction					X							Standard silicone construction	-
A3010	0 to 10	Temperature Rating						X						Standard temperature 20 to 120°F	
A3015	0 to 15							LT						Low temperature to -20°F	add 25.00 <sup>®</sup>
A3020	0 to 20	Housing Material							-A					Aluminum	-
A3025	0 to 25	Cover												Blind	-
A3030	0 to 30													Glass cover	add 50.00 <sup>®</sup>
A3040	0 to 40	Process Connection									1			1/8" NPT female brass ports	
A3050	0 to 50										2			1/8" NPT female SS ports	add 115.00 <sup>®</sup>
A3060	0 to 60	Overpressure Plug										X		Standard without overpressure relief valve	-
A3080	0 to 80													Overpressure relief valve	add 55.00 <sup>®</sup> brass
A3100	0 to 100													Material same as ports	add 95.00 <sup>®</sup> SS
A3150	0 to 150	Tag											T2	SS information label	-

<sup>®</sup> Items are subject to Schedule B discounts.

**APPENDIX G**  
**SUB-SLAB DEPRESSURIZATION SYSTEM BLOWER SPECIFICATIONS**

## The New York Blower Company

Fan-to-Size  
Fan Selection Data

Project:	Avalon West 28th Street
Location:	New York, NY
Contact:	Fleming-Lee Shue, Inc.

Fan Tagging: SSDS Fan

### Fan Design

Product:	Pressure Blower	Arrangement:	4
Size/Model:	1404A	Drive type:	Direct
Wheel Type:	Aluminum		
Wheel Material:	Aluminum		
Wheel Width:	100.0 %	Wheel Diameter:	100.0 %

### Operating Conditions

Volume Flow Rate:	300 CFM	Fan Speed:	3377 rpm
Fan Static Pressure:	15.0 in wg	Fan Input Power:	1.39 bhp
Outlet Velocity:	3448 ft/min	VP/SP ratio:	0.0495
Altitude (above mean sea level):	0 ft	Operating Temperature:	70 Deg F
Operating Inlet Airstream Density:	0.0750 lb/ft3		
Static Efficiency:	50.90%	Mechanical Efficiency:	53.42%
Maximum Operating Temperature:	70 Deg F	Maximum Safe Operating Speed:	4000 rpm

### Sound Power Level Ratings

 Levels expressed in dB (power levels reference  $10^{-12}$  watts)

Center Frequency (Hz):	63	125	250	500	1000	2000	4000	8000	
Octave Bands:	1	2	3	4	5	6	7	8	Overall
Total Fan Power Levels*:	68.7	80.1	82.1	83.2	83.1	81.1	76.2	74.1	89.5
Inlet Silencer Attenuation:	0.	0.	0.	0.	0.	0.	0.	0.	
Inlet Power Levels**:	65.7	77.1	79.1	80.2	80.1	78.1	73.2	71.1	86.5
Outlet Silencer Attenuation:	-4.	-18.	-26.	-34.	-37.	-30.	-23.	-21.	
Outlet Power Levels**:	61.7	59.1	53.1	46.2	43.1	48.1	50.2	50.1	64.5

\*As corrected for point of operation (location on fan curve)

\*\*Unsilenced Inlet and Outlet power ratings are 3 dB lower than total fan power levels under the assumption that "half" of the sound power can be attributed to each opening. Silenced power ratings include this 3 dB reduction as well as the silencer attenuation.

### Estimated Sound Pressure Levels

 Expressed in dB (pressure levels reference  $2 \times 10^{-7}$  microbar)

Directivity/Reflection Factor (Q) is 1, spherical radiation; Distance is 3.28 ft.; A-weighting is in use.

This fan is connected to inlet ducting which routes some sound away from the designated sound measurement location. The Outlet Sound Power levels (after accounting for any outlet silencer attenuation) are the basis for sound pressure level calculations.

The estimated sound pressure level outside the fan due to outlet noise is 45.1 dBA at 3.3 feet.

Your Representative:  
ACFM Dynamics, LLC  
PO Box 386  
Marion, CT 06444-0386  
Phone: 1.203.395.3227  
Fax: 1.203.271.0141  
E-Mail: philritola@acfmodynamics.net

The New York Blower Company certifies that the Pressure Blower fan is licensed to bear the AMCA Air Performance Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings program.

AMCA Licensed for Air Performance without Appurtenances (Accessories).  
Power (bhp) excludes drives.

Performance certified is for installation type: B - free inlet, ducted outlet.

# The New York Blower Company

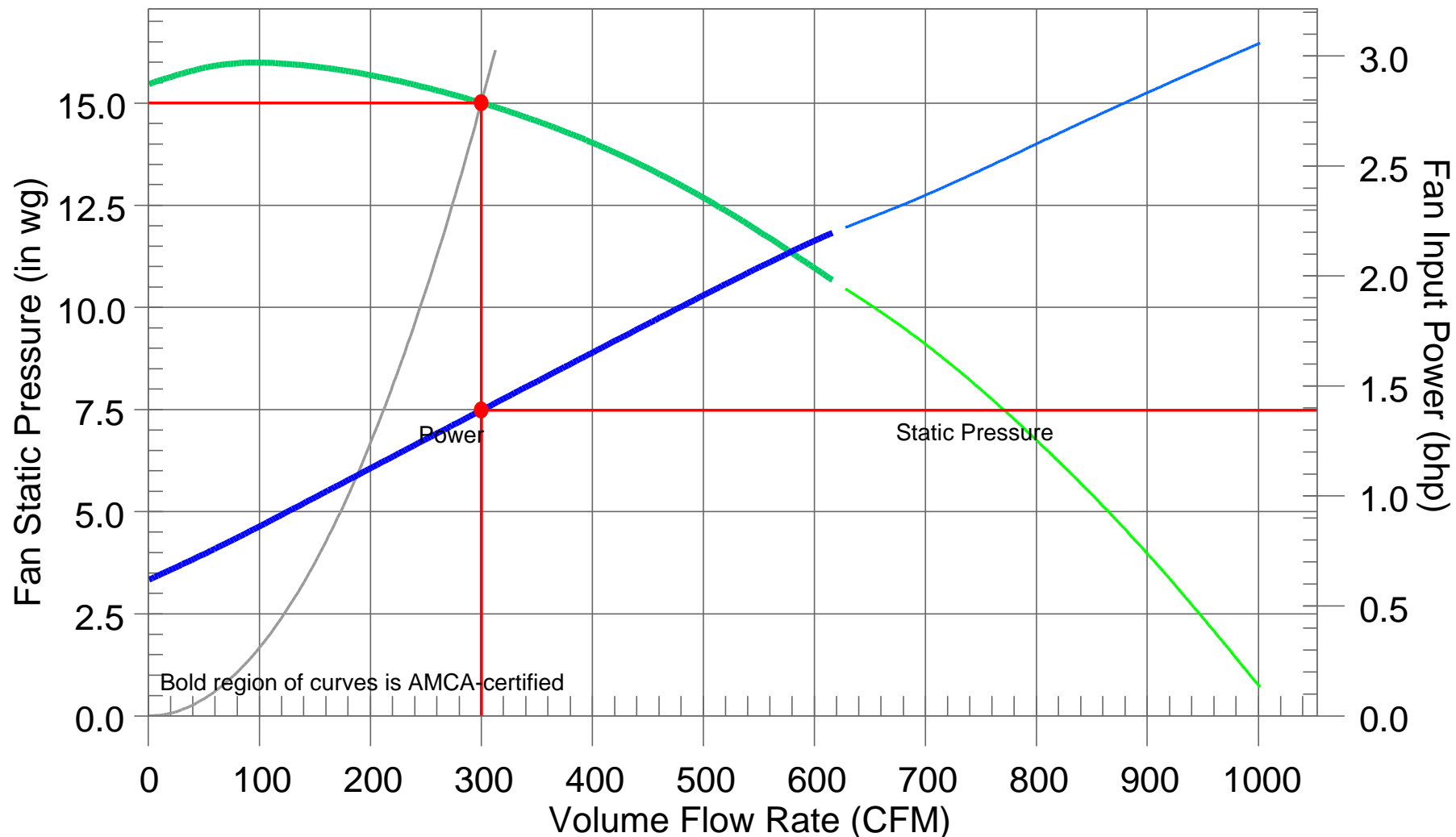
Fan-to-Size

Pressure Blower  
1404 Aluminum  
Arr.: 4

Volume Flow Rate: 300 CFM  
Fan Static Press.: 15.0 in wg  
Speed: 3377 rpm  
Power: 1.39 bhp

Temp.: 70 Deg F  
Altitude: 0 ft  
Density: 0.0750 lb/ft<sup>3</sup>  
Outlet Velocity: 3448 ft/min

Tag: SSDS Fan



AMCA Licensed for Air Performance without Appurtenances (Accessories). Power (bhp) excludes drives.  
Performance certified is for installation type: B - free inlet, ducted outlet.

Customer:  
Fleming-Lee Shue, Inc.

[v1.80.60-R -- July 2010] Date Printed: 6/4/2012  
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