FINAL

Sub-Slab Depressurization System Design Report

Site:
Utility Manufacturing/Wonder King
700-712 Main Street
New Cassel, New York 115 90

Submitted to:
New York State Department of Conservation
625 Broadway
Albany, New York 12233

Prepared for:
New York State Department of Conservation
625 Broadway
Albany, New York 12233

Prepared by:
AECOM
100 Red Schoolhouse Road, Suite B-1
Chestnut Ridge, NY 10977

September 2010

AECOM Project No. 60134954

Table of Contents

Figures

Tables

Appendices

ENGINEERING CERTIFICATION

I hereby certify that the Sub-Slab Depressurization System Design for the Utility Manufacturing/ Wonder King Site was prepared in accordance with all applicable statues and regulations and in substantial conformance with the New York State Department of Environmental Conservation Division of Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER10).

Respectfully submitted,
AECOM Technical Services Northeast, Inc.

Scott A. Underhill — 9-8-10
Scott A. Underhill — Date
Registered Professional Engineer
New York License No. 075332

1.0 INTRODUCTION

This report represents the proposed design for Sub-Slab Depressurization (SSD) systems for the Utility Manufacturing/Wonder King Site, located at 700-712 Main Street (south side) between Bond Street and Frost Street, approximately 500 feet (ft) north of Old Country Road in the New Cassel Industrial Area (NCIA), Town of North Hempstead, Nassau County, New York (Figure 1 – Site Location Map). Installation and start-up of SSD systems at the three properties shown in Figure 2 is to be competitively bid to remediation subcontractors by the New York State Department of Conservation (NYSDEC). This document contains the design plans, specifications, and cost estimate to support the bid process.

1.1 Background

The Utility Manufacturing Site is approximately one acre in size and is comprised of one building with pavement on three of the four sides, a fence along the west, south and east sides with a gate to the driveway area opening on the north. Trailers (sea containers) are located along the southern perimeter fence.

Currently, Utility Manufacturing Site is an active facility consisting of a 20,000 square feet (sf) main floor manufacturing and storage facility, and a 10,000 sf second floor for offices, technical laboratory, silk screening, and storage area. The company manufactures a variety of cleaning and lubricating products primarily for commercial and industrial customers. Utility Manufacturing stores, blends, and repackages tetrachloroethylene (perchloroethylene, or PCE). The facility uses over 20,000 pounds of PCE per year (ERM, December 2005). In 1988, several dry wells and cesspools were sampled at the Utility Manufacturing site by Utility Manufacturing's consultant. Sampling results indicated that these drainage structures were contaminated with PCE and other volatile organic chemicals (VOCs). Utility Manufacturing subsequently remediated these drainage structures under the supervision of the Nassau County Health Department (NCHD). Groundwater contamination from the Utility Manufacturing has migrated downgradient of the site and has mingled with the contaminated groundwater from other sites in the New Cassel Industrial Area (NCIA).

The site and study area are located within the NCIA, which is a 170-acre industrial and commercial area on the north side of Old Country Road. The NCIA is bounded on north by the Long Island Railroad, on the east by the Wantagh Parkway, on the south by Old Country Road, and on the west by Grand Boulevard. Land uses directly north, south and west are primarily residential with some light business interests along Old Country Road. East and northeast of the Wantagh Parkway (east side of the NCIA) is the West Hicksville industrial/commercial area. These areas were developed in the late 1940s–early 1950s timeframe. The sites within the study area consist mostly of commercial and industrial operations including auto repair, auto garage, office spaces, warehouse, and machine tool shop.

1.2 Investigations Conducted at the Utility Manufacturing Site

In 1986, an investigation revealed that groundwater beneath and downgradient of the NCIA was impacted by four chlorinated VOCs, whose concentrations exceeded New York State Class GA Groundwater Standards: PCE, trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), and 1,1,1-trichloroethane (1,1,1-TCA). As a result of the investigation, the NYSDEC classified the entire NCIA as a Class 2 site in 1988. Regional groundwater was determined to flow to the southwest, and consequently, impacted groundwater leaving the NCIA flows directly towards the Bowling Green Water District (BGWD) public supply wells (Well Nos. N8956 and N8957) located south of Old Country Road at the end of Iris Place. At the time of the 1986 investigation, the BGWD public supply wells were not impacted by the VOCs, but have since been impacted by VOC contamination. An air-stripper treatment system was constructed in 1996, and the water supplied to the public system from the BGWD wells has since then been treated by the air stripping system to meet Federal and New York State Drinking Water Maximum Contaminant Levels (MCLs) and guidelines.

In 1988, drywells and cesspools at Utility Manufacturing were sampled and found to have elevated concentrations of chlorinated and aromatic VOCs (PCE, TCE, 1,2-DCE, 1,1,1-TCA, methylene chloride, chloroform, toluene, ethylbenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, chloroethane, chloromethane, bromomethane, and vinyl chloride). These structures were remediated by Utility Manufacturing in 1989 by pumping them out and power-washing them under the supervision of the NCDH. Endpoint sampling results met NYSDEC Soil Cleanup criteria. The Utility Manufacturing facility was subsequently connected to the municipal sewer.

Based on the findings of a 1995 site investigation report, the NYSDEC removed the NCIA from the Registry in March 1995. In 1996, NYSDEC issued a Preliminary Site Assessment (PSA) report for several properties in the NCIA. Groundwater sampling results from the PSA showed PCE concentrations downgradient of the Utility Manufacturing Site an order of magnitude greater than upgradient concentrations. The NYSDEC added the Utility Manufacturing Site to the Registry of Inactive Hazardous Waste Sites as a Class 2 site in May 1996, naming Utility Manufacturing as a Potentially Responsible Party (PRP). Utility Manufacturing filed petitions to delist the site in 1996 and 1997. The NYSDEC denied both petitions.

In September 1997, Utility Manufacturing entered into a Consent Order with NYSDEC to perform a Remedial Investigation/Feasibility Study (RI/FS) for the Utility Manufacturing Site. The RI included the installation of groundwater monitoring wells, and the collection of both soil and groundwater samples. The RI indicated that groundwater beneath the Utility Manufacturing Site was contaminated with volatile organic compounds and the contaminants appear to flow in the general groundwater direction flow from northeast to southwest. No on-site soil contamination exceeding the evaluation criteria was detected during the RI. The NYSDEC required Utility Manufacturing to perform additional groundwater sampling to fully define the extent of on-site groundwater contamination. The additional sampling was completed in fall 2000. The result of the fall 2000 sampling revealed elevated levels of PCE in groundwater beneath the Utility Manufacturing Site. PCE was detected in on-site groundwater at concentrations exceeding the New York State groundwater standard. PCE was detected in on-site soils at concentrations below the NYSDEC guidance value of 1.4 mg/kg. Two semivolatile organic compounds (SVOCs), benzo(a)anthracene and benzo(a)pyrene, were detected in on-site soils at concentration exceeding NYSDEC guidance values. However, neither compound was detected in the groundwater.

An Interim Remedial Measure (IRM) consisting of an air sparge/soil vapor extraction (AS/SVE) system was installed to the south of the Utility Manufacturing building to remediate on-site soil and groundwater contamination. The AS/SVE system operated from December 2001 to December 2002. By December 2002, the system had reduced total VOC concentrations in groundwater from 1,019 µg/L to 13 µg/L, and the contaminant concentration had stopped decreasing. The AS/SVE system was chosen for the final remedy for on-site contamination in the Record of Decision (ROD) dated March 2003 (NYSDEC, 2003). The remaining contamination was allowed to attenuate naturally. After the AS/SVE system ceased operation, Utility Manufacturing's consultant (CA RICH Consultants, Inc.) obtained groundwater samples annually until 2005 to detect any possible rebound in groundwater contaminant concentrations. As no rebound was detected, the NYSDEC deemed the on-site remediation to be complete.

In 2002, NYSDEC ordered Utility Manufacturing to perform off-site (downgradient) groundwater sampling to Old Country Road. This off-site area comprises Operable Unit 2 (OU2) of the site and is known as the study area. Utility Manufacturing refused to perform this work in accordance with the NYSDEC's requirements. As a result, NYSDEC lead the off-site RI/FS. As part of the off-site RI, 11 soil borings were advanced to the south of the site. Groundwater samples were collected from each of the soil borings by Hydropunch sampling and new groundwater monitoring wells were installed in the south parking lot of the office building located at 1025 Old Country Road. Thirteen VOCs were detected in the Hydropunch and monitoring well groundwater samples; seven of which exceeded the applicable New York State Groundwater Quality Standard by one to two orders of magnitude. The vertical distribution of contaminants shows that VOCs were present in groundwater at higher concentrations beneath the low permeability unit, in the deeper more transmissive strata of the Magothy aquifer. The RI concluded that

the distribution of the VOCs in groundwater is consistent with southwesterly flow direction from the site across the study area towards the public supply wells.

A total of 17 soil vapor/indoor air/outdoor air samples were also collected from various locations across the study area. Initially, one soil vapor sample was collected from each of the 11 soil borings. Based on the results of the initial soil vapor samples, a sub-slab soil vapor sample from the ground floor of the office building located at 1025 Old Country Road, and two soil vapor samples from the parking lot of the shopping center at 1065 Old Country Road were also collected. Outdoor air samples were collected on the east side of the 1025 Old Country Road office building and an indoor air sample was collected from a small office area on the south end of the building at 1025 Old Country Road. A total of 30 VOCs were detected in the soil vapor/indoor/outdoor air samples. PCE was the dominant VOC in soil vapor. The results indicated that volatilization of VOCs from groundwater represented a complete and significant exposure pathway that is confirmed by the presence of VOCs in groundwater, soil vapor, and indoor/outdoor air samples collected in the study area.

1.3 Summary of Off-Site Soil Vapor Intrusion Site Characterization

A total of eight properties in the study area were investigated as part of the Off-Site Soil Vapor Intrusion study. Originally, 13 properties were proposed for sampling. Since access was denied for five of the structures only eight structures were sampled. The thirteen properties are listed below.

Table 1 – List of Properties proposed for Off-Site Soil Vapor Intrusion Study

Property ID	Address	Land Use
Property 1	694 Main Street	Office and warehouse
Property 2	717 Main Street	Machines and tools manufacturing
Property 3	96 Bond Street	Showroom and warehouse
Property 4	686 Main Street	Unknown, access denied
Property 5	67 Bond Street	Unknown, access denied
Property 6	50 Bond Street	Machine shop
Property 7	44 Bond Street	Showroom and Storage
Property 8	32-26 Bond Street	Unknown, access denied
Property 9	1025 Old Country Road	Office and Parking Lot
Property 10	1035 Old Country Road	Sleepy's Mattress
Property 11	19 State Street	Auto Body Shop
Property 12	25 State Street	Unknown, access denied
Property 13	58 State Street	Movie Retail Outlet

Based on the detected concentrations of TCE and PCE in the sub-slab vapor and indoor air samples:

- No additional actions were required to address human exposures for two properties (Property 3 and Property 11).
- Continued monitoring was recommended at three properties (Property 1, Property 7 and Property 13)
- Based on TCE concentrations mitigation was recommended for three properties (Property 2, Property 6, and Property 9).

The location of the three properties and different slabs requiring mitigation are shown in Figure 2. The sub-slab and indoor air sampling results for these structures are shown in Figure 3.

1.4 Pathways for Vapor Intrusion

It is generally believed that most vapor-phase intrusion occurs via cracks in masonry foundation (as opposed to diffusion through concrete). Of particular concern are the smaller perimeter cracks that generally develop in poured concrete foundations at the intersection of footing/wall/slab. Other

problematic entry points include the annulus space around incoming utility pipes, as well as sumps, open pipes, open cinder blocks, settling, or shrinking cracks that can develop over time within the walls or slab.

1.5 Vapor Mitigation Approaches

The predominant method used to reduce vapor entry into the building is to control the pressure relationship between the soil and the room above the slab. One method is to increase the outdoor air intake into the building (i.e., create a positive pressure inside the building). This procedure involves modifying the HVAC system of the building. This form of mitigation can be compromised every time a building or the HVAC system is modified and when occupants modify the HVAC system for different comfort needs.

A second method is to create a negative sub-slab pressure field directly under a building and on the outside of the foundation (in relation to building ambient pressure). This negative pressure field becomes a “sink” for any gases present in the vicinity of the structure. Vapors caught in the advective sweep of the negative pressure field are collected and piped out to a controlled, ambient air discharge point.

2.0 SUMMARY OF PRE-DESIGN ACTIVITIES

2.1 Summary of Building Properties

Construction drawings for each structure were obtained from the Town of North Hempstead building department. Each building is slab on grade. Information from these drawings was considered in the design for placement of equipment, suction holes and piping. The three buildings have five distinct slabs shown in Figure 2. Property 2 has two distinct slabs representing the original building towards the north (Slab A) and the addition to the south (Slab B). Property 6 consisted of one distinct slab (Slab C). Property 9 had two distinct slabs at different elevations. Slab D located on the east side of the building is approximately four ft higher than Slab E. The approximate size of each building and slab is provided below.

Property 2

- Description: One story masonry building
- Approximate area of the building: 28,000 sf
  - Slab A area: 23,000 sf
  - Slab B area: 5,000 sf
- Height: 15-25 ft
  - Slab A - height of building: approximately 25 ft
  - Slab B – height of building: approximately 15 ft

Property 6

- Description: One story masonry building
- Approximate area of the building (Slab C): 6,400 sf (80 ft x 80 ft)
- Height: approximately 20 ft

Property 9

- Description: Four story steel frame building
- Approximate area of the building: 22,000 sf (140 ft x 180 ft)
  - Slab D area: 10,000 sf
  - Slab E area: 12,000 sf
- Height: approximately 60 ft

2.2 Inspection of Building Floor and Foundation

Prior to conducting the sub-slab communication testing at each building, an inspection of the floor and foundation performed. During the inspection, particular attention was paid to identifying all potential entry routes for vapor, such as cracks in concrete floor slab, construction joints between walls and slabs, and annulus space around utility pipes.

Property 2

On December 2, 2009, an inspection of the building was performed. The building is currently used as office space, warehouse and for manufacturing parts. The concrete slab was observed to be in good condition with no observed cracks or utility perforations that could provide conduits for vapor intrusion.

Property 6

On February 4, 2010, an inspection of the building was performed. The building is currently used as office space and workshop for making aircraft electronics. The concrete slab was observed to be in very good condition with no observed cracks or utility perforations that could provide conduits for vapor intrusion. The owner requested that no drilling activities be performed in the office and machine shop area.

Property 9

On November 30, December 1 and December 3, 2009, inspections of the building were performed. The building is currently used as office space (on the northern part of the property) and a multi-story parking garage (on the southern part of the property). The concrete slab beneath the office building was not accessible due to carpeted floor but the concrete slab in the corridors were observed to be in good condition with no cracks that could provide conduits for vapor intrusion.

2.2.1 Cracks in Floor Slab

No evidence of cracks were observed in the concrete floor slabs

2.2.2 Utilities

Some underground utilities are known to run beneath the concrete slabs of the buildings. The presence of these utilities was confirmed during the geophysical survey that was conducted during the prior investigation at the site. The presence of these utilities was confirmed by the existence of kitchens and bathrooms in the buildings. No pipes/utilities were observed protruding through the slab with apparent openings to the sub-slab.

2.2.3 Construction Joints between Walls and Slabs

No openings were noted in the joints between the walls and slab.

2.3 Sub-Slab Communication Testing

The air flow characteristics and capacity of the material(s) beneath the slab can be quantitatively determined by sub-slab communication testing. In addition, the radius of influence (ROI) can be determined by inducing a vacuum beneath the slab.

2.3.1 Sub-Slab Communication Testing Method

Between November 30, 2009 and February 4 2010, Alliance Water performed communication testing with the sub-slab soils of the site. No problems with footings were noted except for the necessity to not place a vacuum point or test point directly next to the footing since it is unlikely that these extended into the sub slab proper. The objective of communication test was to evaluate the potential radius of influence at sub-slab soil vacuum points. The test involved drilling 3/8 inch diameter extraction holes through the concrete floor slab at different locations to serve as extraction points, with communication test points consisting of similar size holes drilled through the floor slab at varying distances from the extraction points. To impart a vacuum at the extraction point, a commercial RadonAway fan (RP265) was placed within the sealed vacuum point hole. Each of the vacuum points was placed in a convenient location for the tenant and owner. The selection of the vacuum point was made such that the final vacuum point can also be installed near or on the ones used in the communication testing. The pressure differential of the indoor air with ambient outdoor air was also recorded at each location.

The pressure change in the soil induced by drawing air out of the vacuum hole was measured with a micro-manometer that can measure down to 0.1 Pascals. One Pascal is equal to 0.004 inches of WC. To be able to maintain a negative pressure in the sub-slab throughout the heating season when the negative pressure created by warm air escaping out of the building competes with the sub-slab depressurization system, a negative pressure of at least 0.5 Pascals should be obtained. AECOM defined the ROI at the point where the pressure rises to -1.0 Pascals.

The results of the communication testing indicated that the soils immediately beneath the building floor slabs are dense.

2.3.2 Sub-Slab Communication Testing Result

Figures 4a through 4c show the suction and the sub-slab communication test locations for each of the Slabs A, B, C, D and E. The sub-slab communication testing results for each of the section is summarized below. The communication testing data for each sample location and the ROI calculations are provided in Appendix A.

Slab A
A total of 6 vacuum points and 12 test locations were advanced through the concrete floor in Slab A. The soil encountered below the concrete floor was fine compacted sand. The sub-slab communication tests in Slab A indicated that static pressure is approximately 2.5 inches of water column. Using a GP501 this is equivalent to a flow rate of approximately 70 cfm and a ROI for Slab A estimated to extend out 29 ft.

Slab B
A total of 5 vacuum points and 9 test locations were advanced through the concrete floor in Slab B. The soil encountered below the concrete floor was fine compacted sand. The sub-slab communication tests in Slab B indicated that static pressure is approximately 2.5 inches of water column. Using a GP501 this is equivalent to a flow rate of approximately 70 cfm and a ROI for Slab B estimated to extend out 33 ft.

Slab C
A total of 2 vacuum points and 4 test locations were advanced through the concrete floor in Slab C. The soil encountered below the concrete floor was fine compacted sand. The sub-slab communication tests in Slab C indicated that static pressure is approximately 2.9 inches of water column. Using a GP501 this is equivalent to a flow rate of approximately 60 cfm and a ROI for Slab C estimated to extend out 17 ft.

Slab D
A total of 3 vacuum points and 7 test locations were advanced through the concrete floor in Slab D. The soil encountered below the concrete floor was fine compacted sand. The sub-slab communication tests in Slab D indicated that static pressure is approximately 2.5 inches of water column. Using a GP501 this is equivalent to a flow rate of approximately 70 cfm and a ROI for Slab D estimated to extend out 43 ft.

Slab E
A total of 8 vacuum points and 18 test locations were advanced through the concrete floor in Slab E. The soil encountered below the concrete floor was fine compacted sand. The sub-slab communication tests in Slab E indicated that static pressure is approximately 2.7 inches of water column. Using a GP501 this is equivalent to a flow rate of approximately 65 cfm and a ROI for Slab E estimated to extend out 22 ft.

3.0 SUB-SLAB DEPRESSURIZATION SYSTEM DESIGN

A sub-slab depressurization system basically consists of a fan or blower that draws air from the soil beneath a building and discharges it to the atmosphere through a series of collection and discharge pipes. Based upon the results of the sub-slab communication testing, AECOM proposes the installation of ten sub-slab depressurization systems, with each system consisting of several suction points connected to a dedicated fan or blower. Please note that the final locations of the suction points shall be determined based on the discussion with the property owner. Proposed locations are shown in Figures 5a to 5c. The radius of influence is shown on Figures 5a to 5c for each suction point. There are some areas outside of the radius of influence inside the buildings, but these areas are limited to locations with low occupancy (e.g., storage) or areas that are generally open to the outside (e.g., warehouse and machine shop). In addition, the suction points along the perimeter of the building may have a greater radius of influence since they are only affecting areas under the slab. The planned location of suction points and piping is shown. Every suction point has a dedicated fan. The piping shall be 4 inch diameter PVC for runs greater than 100 ft. Schematics of the fan installation are provided in Appendix B.

Slab A

A total of 3 systems with 9 suction points/fans are proposed for Slab A as summarized below.

System ID	# of Suction Points/ # of Fans	Recommended Fan Model
System 1	3/3	RadonAway GP501 or equivalent
System 2	3/3	RadonAway GP501 or equivalent
System 3	3/3	RadonAway GP501 or equivalent

Slab B

A total of 1 system with 3 suction points/fans is proposed for Slab B as summarized below.

System ID	# of Suction Points/ # of Fans	Recommended Fan Model
System 4	3/3	RadonAway GP501 or equivalent

Slab C

A total of 2 systems with 6 suction points/fans are proposed for Slab C as summarized below.

System ID	# of Suction Points/ # of Fans	Recommended Fan Model
System 5	3/3	RadonAway GP501 or equivalent
System 6	3/3	RadonAway GP501 or equivalent

Slab D

A total of 1 system with 3 suction points/fans is proposed for Slab D as summarized below.

System ID	# of Suction Points/ # of Fans	Recommended Fan Model
System 7	3/3	RadonAway GP501 or equivalent

Slab E

A total of 3 systems with 9 suction points/fans are proposed for Slab E as summarized below.

System ID	# of Suction Points/ # of Fans	Recommended Fan Model
System 8	3/3	RadonAway GP501 or equivalent
System 9	3/3	RadonAway GP501 or equivalent
System 10	3/3	RadonAway GP501 or equivalent

A round of communication testing shall be conducted to confirm that conditions have not changed since the pre-design study. The testing shall be conducted with a GP501. The contractor shall have an industrial fan available to provide a greater range of pressures in the event the GP501 is not achieving the planned radius of influence. The results of the communication testing indicated that the static pressures were higher than those recommended for the RP265 and lower than those recommended for the HS2000. If the static pressures vary greatly from those exhibited during the pre-design communication testing, particularly if the static pressures are higher, the fan may be exchanged with NYSDEC approval with a HS2000. This may be readily done since both fans use the same diameter piping and only slight modifications to the mounting location would be necessary. The manufacturer's specifications and installation instructions for the GP501 and HS2000 fans are provided in Appendix B.

The installation of the SSD systems shall require compliance with the Town of North Hempstead permitting. The permit requirements and applications are provided in Appendix C.

4.0 SUB-SLAB DEPRESSURIZATION SYSTEM INSTALLATION REQUIREMENTS

4.1 General Installation Requirements

1. The SSD system installation shall be done so as to coordinate with other building components especially those that require maintenance or clearance of any type. All mitigation system components shall be installed to facilitate servicing, maintenance and repair or replacement of other equipment components in or outside the building. Where mounting heights are not detailed or dimensions given, system materials and equipment are to be installed to provide the maximum headroom or side clearance as is possible. NYSDEC must be contacted in cases where a conflict exists between these or other requirements and the drawings or specifications. All systems, materials and equipment shall be installed level, plumb, parallel or perpendicular to other building systems and components unless otherwise specified.

2. The contractor installing the SSD system shall take every possible precaution to avoid any damage to existing utilities located anywhere in the building or those located in or below the slab floor. A geophysical survey shall be conducted at all locations where the contractor is required to drill through the slab. A radius of approximately 10 ft around the drill point shall be surveyed. Additional locations shall be surveyed as instructed by NYSDEC or their representative to address potential relocation of suction point.

3. The contractor shall be responsible for covering or finishing any SSD system piping or electrical conduit that is exposed. The degree of finishing that is required shall be based on a consensus between the owners and NYSDEC. The contractor installing the SSD system shall seal all penetrations through foundation walls or floors created by the contractor to install the SSD system. Penetrations through side walls shall be carefully cut to match the shape of the pipe unless other finishing is to be done at the discretion of NYSDEC.

4. The contractor installing the SSD system shall ensure that any foreign materials are not left or drawn into the SSD system piping or fan which might at a later period interfere with or in any way impair the SSD system performance.

5. The entire system shall have UL or equivalent ratings for both individual components and the entire system as applicable.

6. The work shall conform to ASTM 2121

7. A determination on the presence/absence of asbestos in tiles, mastic, or concrete shall be made prior to any invasive work. Additionally, above ground pipe runs shall be inspected for possible asbestos materials prior to determining final pipe runs. If asbestos is present, invasive work shall be conducted by a certified asbestos contractor following the appropriate notification, containment, and sampling procedures. If above ground pipe runs are in the proximity of asbestos materials, procedures shall be established to prevent disturbance of asbestos materials during construction.

8. A determination on the presence/absence of lead in painted areas shall be made prior to any invasive work. If lead paint is found to be present, invasive work shall be conducted in a manner to contain and remove lead based paints.

4.2 System Materials Specification

4.2.1 Sub-Slab Depressurization Fans

The fan for each of the systems is specified in Section 3.0. The vendors that carry the fans specified in Section 3.0 are listed below.

- RadonAway, Ward Hill, MA 800 767-3703
- RCI, Carmel, IN 800 523-2084
- Festa, Pittsburgh, PA 800 806-7866

4.2.2 Sub-Slab Depressurization System Piping

All the pipes and fitting shall meet the requirements stated below.

- All pipes and fittings shall be of 3-inch diameter smooth PVC schedule 40 and shall comply with ASTM D-2665
- PVC cement primer shall comply with ASTM F-656
- PVC cement adhesive shall comply with ASTM D-2564

4.2.3 Piping Supports

The 3-inch hanging pipe supports shall have the following components:

- Swivel ring or standard bolt type clevis
- Adjustable band hanger
- Sammy Screws or Drop in Anchors
- 3/8” threaded rod
- Assorted bolts, nuts & washers

The pipe support for securing 3-inch pipes to concrete floor or wall shall have the following components:

- Slotted Conduit Channel
- Conduit Clamps
- 3/8” Wedge Anchors
- Appropriate sized tapcons
- Assorted bolts, nuts & washers

4.2.4 Sealing Materials

Urethane sealant shall comply with Federal Specification TT-S-00230C. The following manufacturers of urethane caulking sealants may be used:

- Pecora Corp. (Dynatrol)
- Mameco Inc. (Vulkem or CR Lawrence)
- Geocel

The following manufacturers may be used for the 4-inch fire collars (assuming final approval from local Fire Marshal):

- Metacaulk
- Hilti
- Nelson

4.2.5 Fire Wall Penetrations

The 6-inch PVC fire wall penetrations must use metal box with fusible links and two 6-inch rubber boots with short piece of 6-inch piping to allow easy inspection of fusible link. Where the installation of the SSD system requires pipes or ducts to penetrate a firewall or other fire resistance rated wall or floor, penetrations shall be protected in accordance with applicable building, mechanical, fire, and electrical codes.

4.2.6 Visual Pressure Indicator U-Tube Manometer

The U-Tube Manometer shall be a Carlon CV1085/Carlon JP108 protective box with clear cover, or equivalent.

4.3 Suction Hole Installation

The contractor installing the SSD system shall follow the procedures listed in Section 5.1 to minimize damaging any sub-slab utilities. The contractor shall remove a minimum of 1 cubic foot of sub-slab material from below and around each suction hole. Crushed stone shall be backfilled into the suction hole. 3-inch schedule 40 PVC (as specified by the manufacturer's installation instructions, Appendix B) shall be installed so that it is flush with the bottom of the concrete slab in each suction hole. To prevent blockage of air flow into the bottom of suction point pipes, they shall be supported and secured in a permanent manner that prevents their downward movement to the bottom of the suction pits. A urethane caulk sealant shall be applied to securely seal the space between the outer diameter of the pipe and the concrete floor. When more than one extraction point is connected to a single blower, shut-off valves shall be installed on each extraction point.

4.4 PVC Pipe Installation

All horizontal pipe runs between the fan and the suction holes shall be sloped to ensure that water from rain or condensation drains downward into the ground beneath the slab. All vertical pipe runs shall be installed plumb. In no case shall the piping be installed so as to create a possible water trap in the piping.

All horizontal pipe runs shall have a support with an appropriate device within 2 ft of each fitting and a maximum distance between supports of 6 ft as per BOCA National Plumbing Code and ASTM 2121. Vertical runs shall be secured either above or below the points of penetration through floors, ceilings, and roofs, or at least every 8 ft (2.5 m) on runs that do not penetrate floors, ceilings, or roofs. System piping shall be fastened to the structure of the building with hangers, strapping, or other supports that shall secure it adequately. System piping shall not be attached to or supported by existing pipes, ducts, conduits, or any kind of equipment. System piping shall not block window and doors or access to installed equipment.

Conduit channel with pipe clamps can also be used to support PVC routed along the ceiling or walls. Use swivel ring or standard bolt type clevis to support PVC pipe. All support straps and anchors installed outdoors shall be either aluminum, stainless steel or galvanized.

4.5 Sidewall Penetrations

The suction points shall extend to above the hanging ceiling. Once above the hanging ceiling, a 90-degree PVC elbow would transition the piping from vertical to horizontal. The horizontal riser piping would consist of similar size PVC pipe connected to the existing ceiling structure using pipe hangers. These horizontal pipe runs would extend to the back or side of main building, pass through the exterior wall, and enter the inlet of the fan. The contractor shall be responsible for penetrating the wall and sealing it with a non-VOC material.

4.6 Fan Installation

The SSD system fans shall be mounted on the exterior wall of the building in a manner that minimizes transfer of vibration to the structural framing of the building. The fan should be rated for outdoor use. The contractor shall install the appropriate sealing material for the pipe penetration and the electrical conduit through the wall.

To reduce the risk of vent stack blockage due to heavy snow fall, to reduce the potential for re-entrainment of vapors into the building, and to prevent direct exposure of individuals outside of buildings, the discharge from the vent stack pipes shall meet the following minimum requirements. As outlined in ASTM 2121 discharge from vent stack pipes shall be:

1. Vertical and upward, outside the structure, at least 10 ft (3 m) above the ground level, above the edge of the roof. Whenever practicable, they shall be above the highest roof of the building and above the highest ridge.
2. Ten ft (3 m) or more away from any window, door, or other opening into conditioned or otherwise occupiable spaces of the structure, if the discharge point is not at least 2 ft (0.6 m) above the top of such openings.
3. Ten ft (3 m) or more away from any opening into the conditioned or other occupiable spaces of an adjacent building. Chimney flues shall be considered openings into conditioned or otherwise occupiable space
4. For vent stack pipes that penetrate the roof, the point of discharge shall be at least 12 in. (0.3 m) above the surface of the roof. For vent stack pipes attached to or penetrating the sides of buildings, the point of discharge shall be vertical and a minimum of 6 in. (150 mm) above the edge of the roof and in such a position that it can neither be covered with snow, or other materials nor be filled with water from the roof or an overflowing gutter. In areas where it snows, the point of discharge shall be 12 in. (0.3 m) above the surface of the roof.

To facilitate maintenance and future replacement, the vent fan shall be installed in the vent pipe using removable couplings or flexible connections that can be tightly secured to both the fan and the vent pipe. A moisture bypass fitting design to allow water condensate in vent pipes above the fan to drain away rather than enter the fan shall be installed on the exhaust vent pipe.

All wall mounted fans shall have a galvanized or aluminum roof chimney cap installed on top of the fan. Inlet to exhaust shall include ½" by ½" galvanized critter screen. The manufacturer's specifications and installation instructions for the fans are provided in Appendix B.

4.7 Sealing

4.7.1 Slab Crack and Expansion Joint Sealing

Any visible expansion joints or slab cracks in the areas being mitigated that have 1/16 of an inch or greater opening shall be sealed. Any cracks to be sealed shall be vacuumed to prepare them for installation of gun-grade urethane caulk sealant. Cracks or open expansion joints in the concrete floor shall be sealed by applying a bead of urethane caulk on top of the joint. The gun grade caulk shall then be mechanically pressed down into the crack in order to maximize its seal. Sealants that spill over or drip onto the existing floor shall be scraped off as soon as possible and then wiped thoroughly with a solvent and a rag. Any openings into the slab such as may occur around conduit pipe penetrations through the slab shall be cleaned and sealed with gun-grade urethane caulk.

4.7.2 Perimeter Expansion Joint

Any expansion strips in the concrete slab of the rooms being mitigated that are accessible shall be sealed with urethane caulking. The contractor shall remove any vinyl baseboard molding that is covering expansion strips in the rooms to be mitigated. The expansion joint shall be sealed with gun grade

urethane caulking after the joint has been vacuumed. The caulking inserted on top of the expansion strip shall be pressed into place. After the sealing materials have been installed and tooled, the baseboard vinyl molding shall be glued back to the wall. The current owner of the building will be responsible for any necessary painting of the baseboard molding.

4.8 Fan Wiring and Pressure Gauge

All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. Wiring may not be located in or chased through the mitigation installation ducting or any other heating or cooling ductwork. All electrical work shall be performed by a licensed electrician and meet the substantive requirements of the Town of North Hempstead (Appendix C).

If the rated electricity requirements of a sub-slab depressurization unit fan exceed 50 percent of the circuit capacity into which it shall be connected, or if the total connected load on the circuit exceeds 80 percent of the circuit's rated capacity, a separate, dedicated circuit shall be installed to power the fan.

The contractor shall install a disconnect switch within 3 ft of each fan in an outdoor rated electrical box with a switch cover.

The contractor shall use outdoor rated flexible conduit from each switch box to the fan. Wiring from the switch box to the fan shall be approved individual 12 gauge wire. A dedicated breaker is not required. The contractor shall be responsible to obtain all the permits necessary to install the wiring for the system.

All SSD systems shall have at least one U-tube manometer installed by the contractor for each suction point. The U-tubes shall be installed on the interior or exterior wall of the building. The U-Tube shall be installed inside a box that has a plexiglass window for easy viewing and copper tubing routed from the U-tube to the closest section of SSD system piping. The final location of the U-tube shall be decided by NYSDEC.

4.9 System Labeling

All U-tube manometer locations shall contain a label explaining their use and be marked with the installation date and final installation U-tube pressure readings. The electrical circuit used to control the SSD system fan shall be labeled as "Sub-Slab Depressurization System". At least every 20 ft of SSD system pipe length shall have a label that reads "Sub-Slab Depressurization System" attached to the pipe. All labels must be readable from 3 ft away. A label shall also be installed at the disconnect switch that says "Sub-Slab Depressurization System, do not alter". A label shall be installed at the main panel electrical disconnect switch that says "Sub-Slab Depressurization System".

The contractors name, telephone number, date of installation, and an advisory to retest every two years shall be left at each manometer location.

4.10 Final Vacuum Test

The contractor shall measure the pressure field extension in the sub-slab when the SSD system is activated. The test holes shall be 1/4" to 5/16" drilled through the slab at the farthest distance from the suction pit but still inside the room. The contractor shall record these final pressure readings between the sub-slab and the room on a copy of the SSD system design drawing. The measurements shall be made with a digital micro-manometer capable of reading down to 0.001-inch of water column. A copy of these final measurements, including the U-tube measurements, shall be maintained by the contractor and NYSDEC.

The results of the vacuum testing shall be discussed with NYSDEC. If the appropriate vacuum is not obtained at the furthest monitoring point the NYSDEC and their consultant shall review the results and determine the course of action (if any) required. The course of action may include installation of additional suction points, replacement of the fan, installation of additional systems or no action. No action may be appropriate if there is a negative pressure field under the entire slab although the pressure it is above -1 Pascal.

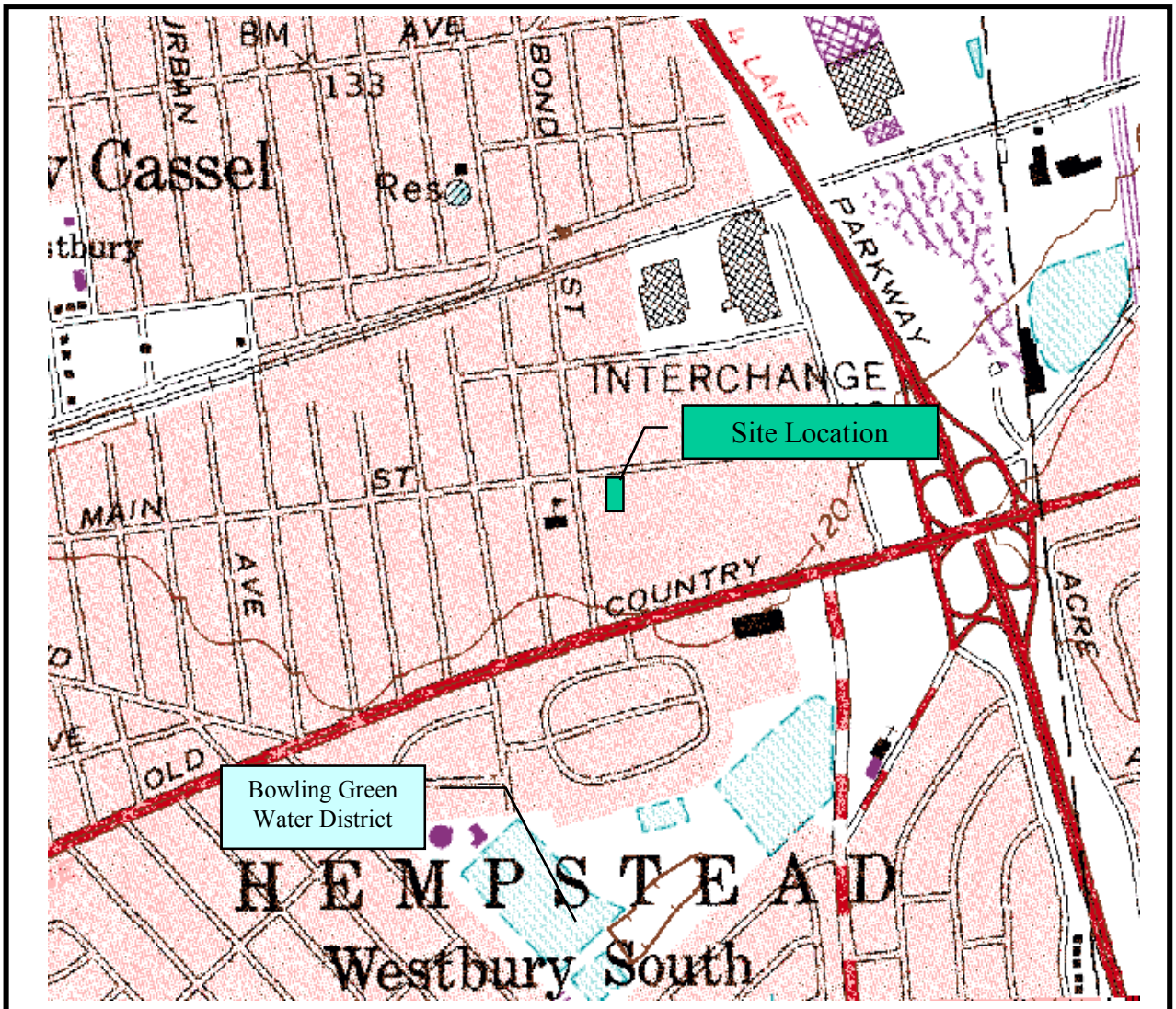
5.0 OPERATION AND MAINTANENCE REQUIREMENTS

An operation and maintenance (O&M) manual shall be provided to the owners by NYSDEC's consultant. At a minimum, the O&M manual shall require the following items:

- Installation and warranty information
    - Sub-Slab Depressurization Layout and Pressure Test Readings
    - Name and contact information for the contractor including warranty information
    - Name and contact information for the electrician including warranty information
    - Description of the fan and manufacturers information including warranty information
- Maintenance and Inspection by building owner
    - How to check the manometer to verify that the system is operating properly
    - Periodic (e.g., every 3 months) assessments by the occupant

Audits shall be performed by NYSDEC to evaluate performance of the system. Audits may include:

- Inspection of the manometer to see if there is a failure or degradation of the system
- Inspection of the extraction point to see that it has remained sealed.
- Inspection of piping and vent stacks for cracks or leaks on interior and exterior of the building.
- Inspection of fan and rubber mounts for leaks.
- Inspection of electrical connection and test of cut off switch by turning the switch on and off.
- Collection of air samples.



USGS Hicksville (NY) Quadrangle

U.S.G.S. 1:24 000 SCALE TOPOGRAPHIC MAP

1 — 1/2 — 0 — 1 MILE

1000 — 0 — 1000 — 2000 — 3000 — 7000 FEET

1 — .5 — 0 — 1 KILOMETER

CONTOUR INTERVAL 10 FEET

MN — GN

12° 213 MILS — 0° 42' 12 MILS

UTM GRID & 1979
MAGNETIC NORTH
DECLINATION AT
CENTER OF SHEET

300 Broadacres Drive,
Bloomfield, New Jersey 07003

ENVIRONMENTAL/CONSULTING ENGINEERS

AECOM	PROJECT: **Utility Manufacturing/Wonder King, OU2** 700 – 712 Main Street, Westbury, New York	SITE LOCATION MAP Site No. 130043H Figure No: 1

Prepared by: AECOM

Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Utility Manufacturing/Wonder King
Operable Unit 2
Site No. 130043H

Date:	Building and Slab Locations	Figure No. :
June 2010		2

ug/m³	SS-03	FF-03
TCE	74.6	1.13
PCE	61.9	13.6

ug/m³	SS-04	FF-04
TCE	5.25	1.13
PCE	182	20

ug/m³	SS-07	FF-07
TCE	3.21	5.47
PCE	18.2	0.88

ug/m³	SS-08	FF-08
TCE	22.7	0.91
PCE	80.7	3.58

ug/m³	SS-15	FF-15
TCE	ND	2.84
PCE	2.04	ND

ug/m³	SS-13	FF-13
TCE	39.4	35.4
PCE	436	1.02

ug/m³	SS-14	FF-14
TCE	5.47	1.66
PCE	190	0.75

State St
Main St
Bond St
Old Country Rd
Hyacinth

0 25 50 100 150 200 Feet

N

Legend

Slabs

Buildings

2007 Air Samples

Sub-slab (SS)

Indoor Air (FF)

Prepared by: AECOM

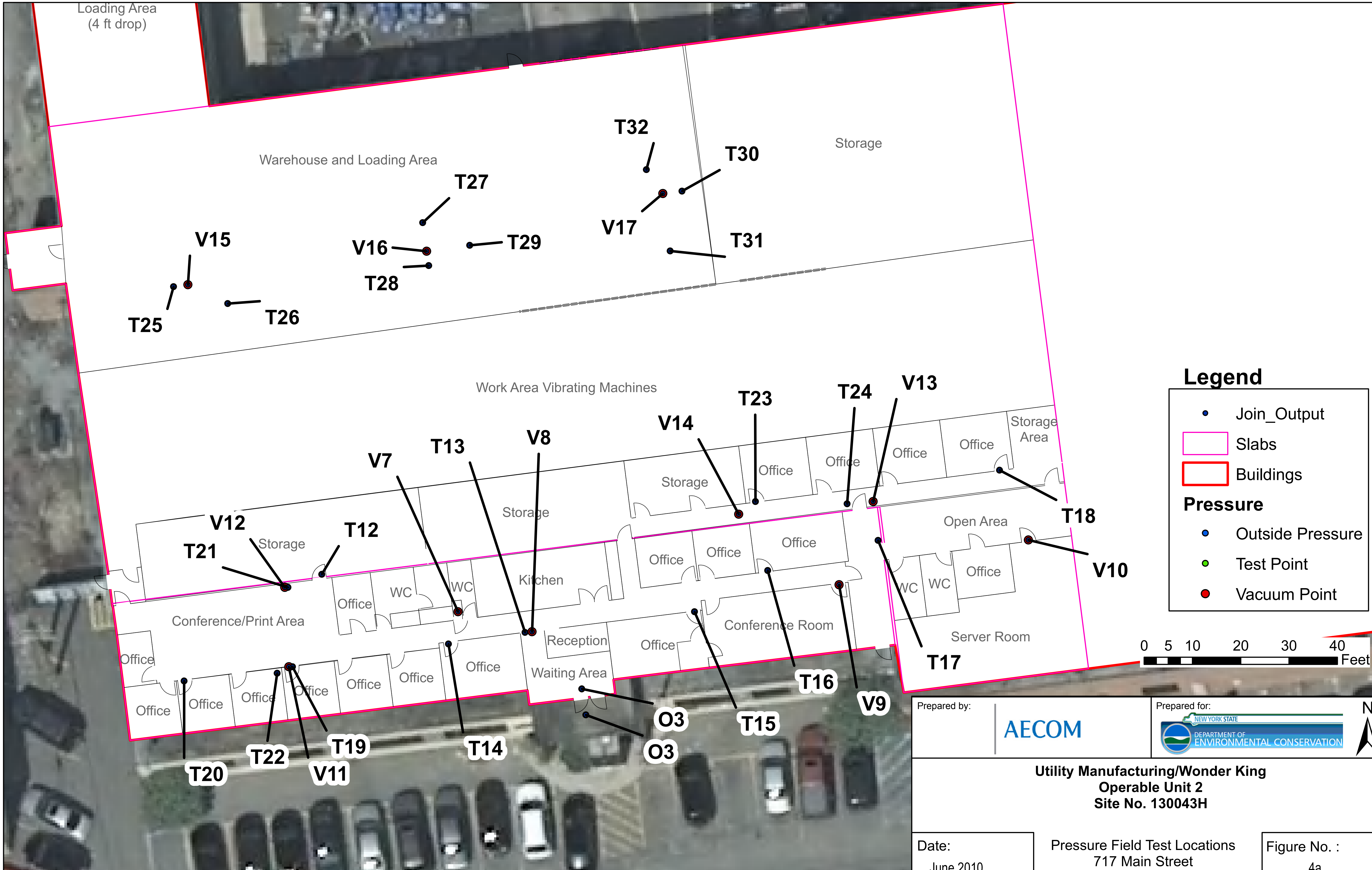
Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Utility Manufacturing/Wonder King
Operable Unit 2
Site No. 130043H

Date: June 2010

2007 Sub-slab and Indoor Air Sampling Locations and Results

Figure No. : 3



Prepared by: AECOM

Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Utility Manufacturing/Wonder King
Operable Unit 2
Site No. 130043H

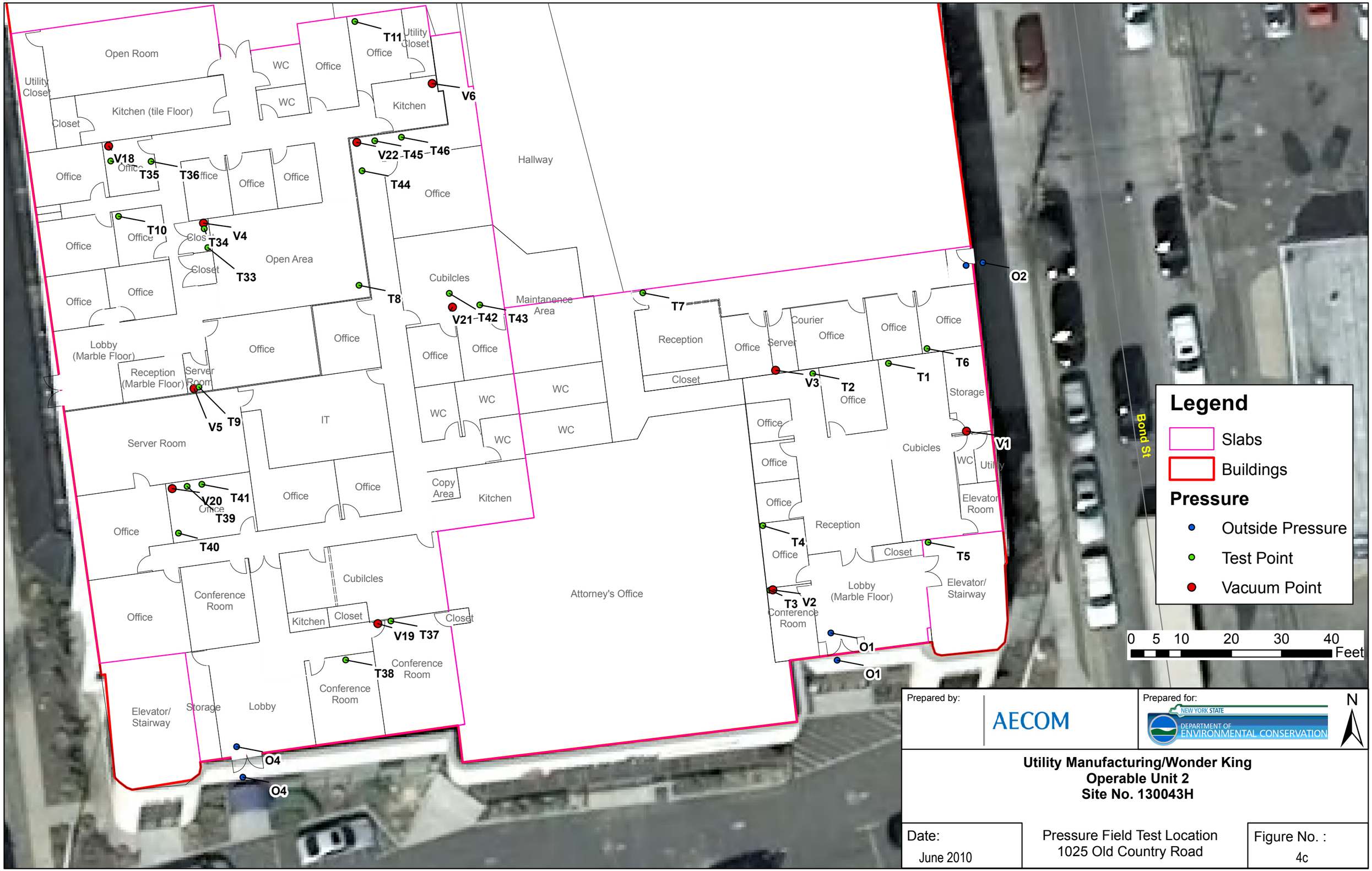
Date:	Pressure Field Test Locations	Figure No. :
June 2010	717 Main Street	4a

Prepared by: AECOM

Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Utility Manufacturing/Wonder King
Operable Unit 2
Site No. 130043H

Date:	Pressure Field Test Locations	Figure No. :
June 2010	50 Bond Street	4b

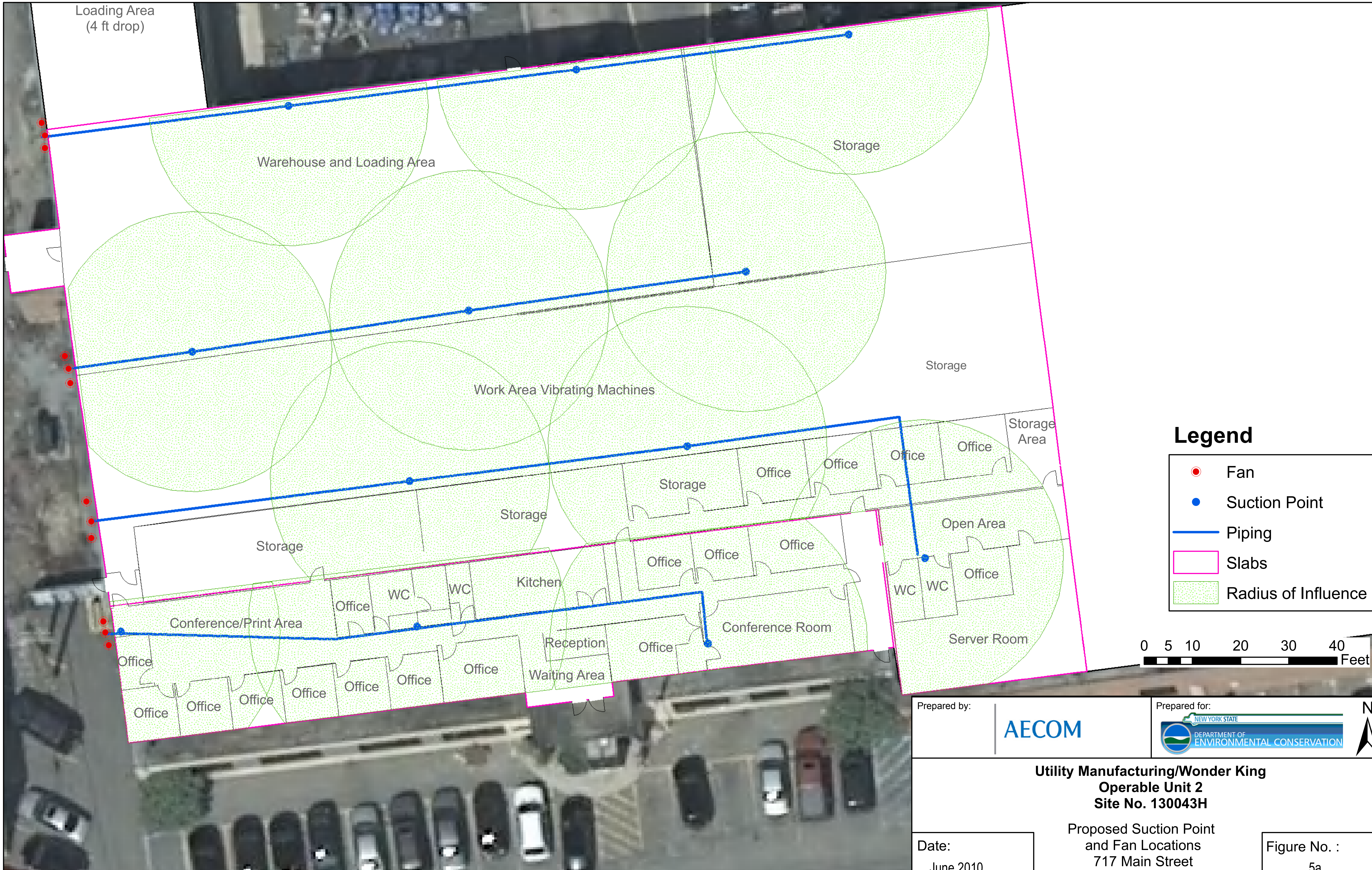


Prepared by: AECOM

Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Utility Manufacturing/Wonder King
Operable Unit 2
Site No. 130043H

Date:	Pressure Field Test Location	Figure No. :
June 2010	1025 Old Country Road	4c



Prepared by: AECOM

Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Utility Manufacturing/Wonder King
Operable Unit 2
Site No. 130043H

Proposed Suction Point
and Fan Locations
717 Main Street

Date:
June 2010

Figure No. :
5a

Prepared by: AECOM

Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Utility Manufacturing/Wonder King
Operable Unit 2
Site No. 130043H

Proposed Suction Point and Fan Locations
50 Bond Street

Date: June 2010

Figure No. : 5b

Prepared by: AECOM

Prepared for: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Utility Manufacturing/Wonder King
Operable Unit 2
Site No. 130043H

Proposed Suction Point and Fan Locations
1025 Old Country Road

Date: June 2010

Figure No. : 5c

Appendix A

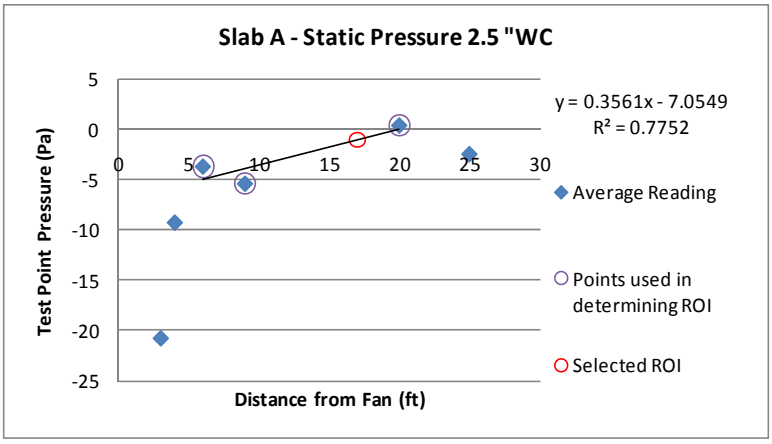
Radius of Influence (ROI) Estimates

Radius of Influence for RP265 Fan

An RP265 fan was used in the field during communication testing at the three structures. The radius of influence (ROI) for the RP265 fan based on the upper limit of the static pressures for each slab was measured during the pre-design investigation. The pressure measurements are provided in Attachment 1. At most test points, a maximum and a minimum pressure reading were collected. The average of these readings at each test point is used in the analysis. The ROIs were selected using the data with the highest static pressure for the slab. The ROI is the distance at which the pressure reaches -1.0 Pascal moving away from the fan. A description of ROI selection for each slab is provided below. Only usable data are shown in the determination of the ROI. All data are shown in the attachment. Those data that are not considered usable are noted in the table provided in Attachment 1. Data were not considered usable for two reasons:

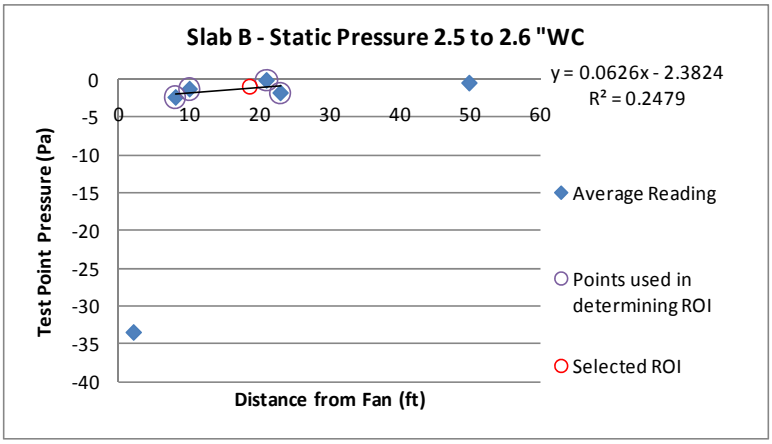
- Vacuum and test point locations had no communication either due to obstructions under the slab or distances exceeding the ROI.
- The pressure data are unreasonably low and represent outliers from the distance/ pressure relationship

Property 2 - Slab A



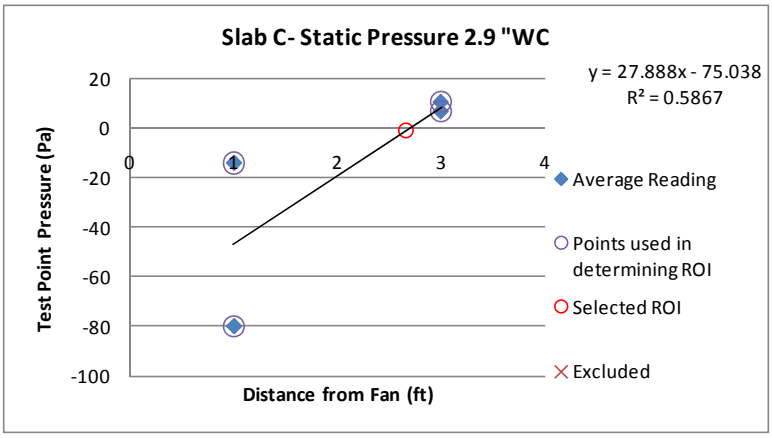
The static pressure for Slab A with the fan on full power was 2.5 ”WC. The linear regression for all usable data yielded a low coefficient of determination (R^2 = 0.27) indicating a poor fit to the data. Use of a logarithmic trend line also resulted in a similarly poor fit. For distances with multiple readings, the average of the readings was used. When the readings were collected closer to the fan, the test pressure rises quickly with increasing distance. The test pressure begins to level off as the ROI is approached. For Slab A, the pressures level off after approximately 6 ft. The data indicate the ROI is between 6 and 20 ft. Since the readings at 9 ft ranged from -10.15 Pascal to -0.65 Pascal and another reading from a test point located 21 ft away from the fan had no communication, it is assumed that the ROI is between 6 ft and 20 ft. Therefore, the single point at 25 ft, which does not fit the general trend of decreasing pressure with increasing distance, was not used in the determination of the ROI. This is a conservative assumption. Using a linear regression for the average readings within these distances (R^2 = 0.78), the ROI is calculated at 17 ft.

Property 2 - Slab B



The static pressure for Slab B with the fan on full power was 2.5 ”WC to 2.6 ”WC. The linear and logarithmic regressions for all data yielded coefficients of determination indicating a poor fit to the data. For distances with multiple readings, the average of the readings was used. When the readings were collected closer to the fan, the test pressure rises quickly with increasing distance. The test pressure begins to level off as the ROI is approached. For Slab B, the pressures level off after approximately 8 ft. The data indicate the ROI is between 8 and 23 ft. Using a linear regression for the average readings within these distances, the ROI is calculated at 19 ft as the best estimate given the available data, although the coefficient of determination for this regression is low (R^2 = 0.25).

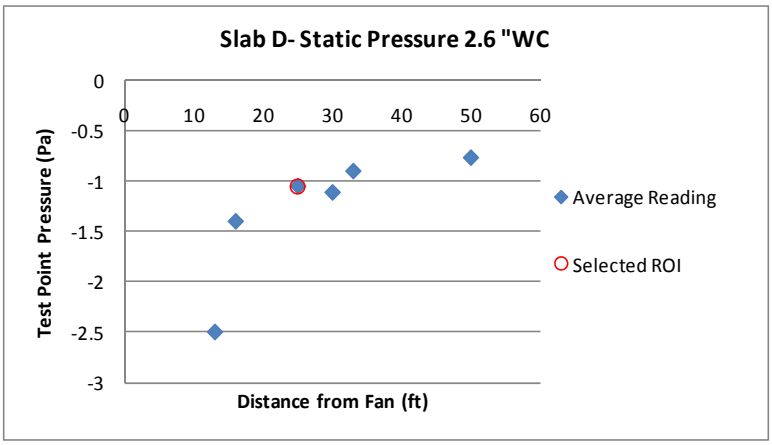
Property 6 - Slab C



The static pressure for Slab C with the fan on full power was 2.9 ”WC. At this static pressure, it is not recommended that the RP265 be used since it is associated with a low flow rate. In addition, the subcontractors noted that the sub-slab soils were compact and wet. Therefore, only the closest locations exhibited communication with the fan. Although the pressures at a distance of 3 ft are positive, this does not indicate a lack of communication with the vacuum. The distance of 3 ft is greater than the ROI because the pressure readings exceed -1.0 Pascal). However, the pressures are also less than the baseline pressures under the slab (pressure

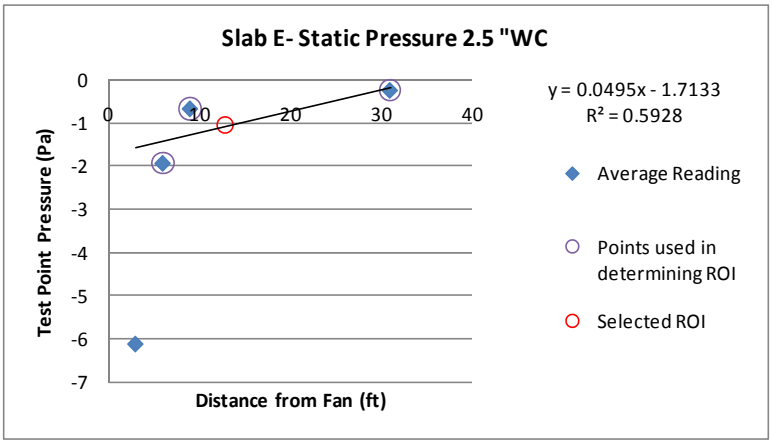
without the fan running) and therefore, there is communication at these distances. The use of a fan designed to operate at 2.9 “WC is expected to greatly increase the ability to pull air under the slab. For Slab C, the data indicate the ROI is between 1 ft and 3 ft. Using a linear regression for the average readings within these distances, the ROI is calculated at 2.7 ft as the best estimate given the available data, although the coefficient of determination for this regression is moderate (R^2 = 0.59). The ROI will be field verified prior to construction per the specifications provided in the design report.

Property 9 - Slab D



The static pressure for Slab D with the fan on full power was 2.6 ”WC. The linear and logarithmic regressions for the data yielded coefficients of determination indicating poor fits to the data. For distances with multiple readings, the average of the readings was used. When the readings were collected closer to the fan, the test pressure rises quickly with increasing distance. The test pressure begins to level off as the ROI is approached. For Slab D, the pressures level off after approximately 25 ft. The data indicate the ROI (distance at which the pressure is -1.0 Pascal) is at approximately 25 ft (test pressure reading of -1.05 Pascal). This measurement was taken as the best estimate of the ROI, because it is consistent with the pattern of the pressure measurements with distance from the fan and trend line models do not provide an adequate representation of the system. Although there is a reading at 30 ft that is below -1.0 Pascal, there was also another test point at 30 ft which showed no communication. Therefore, the single point at 30 ft with a pressure reading below -1.0 Pascal, which does not fit the general trend of decreasing pressure with increasing distance, was not used in the determination of the ROI. This is a conservative assumption.

Property 9 - Slab E



The static pressure for Slab E with the fan on full power was 2.5 ”WC. The linear and logarithmic regressions for all data yielded coefficients of determination indicating a poor fit to the data. Two points were eliminated from the regression due to unusually low test point pressures. For distances with multiple readings, the average of the readings was used. When the readings were collected closer to the fan, the test pressure rises quickly with increasing distance. The test pressure begins to level off as the ROI is approached. For Slab E, the pressures level off after approximately 9 ft. The data indicate the ROI is between 9 ft and 30 ft. Using a linear regression for the average readings within these distances, the ROI is calculated at 12.8 ft as the best estimate given the available data, although the coefficient of determination for this regression is also moderate (R^2 = 0.59).

Radius of Influence for GP501 Fan

The corresponding ROI for the GP501 was calculated by assuming that the operating static pressure would be the same as the RP265. For any given static pressure, the RP265 and GP501 have different flow rates. These are based on information by the manufacturer and shown in Table A-1. It is assumed that the ratio of the flow rates is proportional to the ratio of the volumes of influence. If the heights are assumed to be equal than the ratio of the flow rates is proportional to the squared ROIs. The calculated GP501 ROIs are shown in Table A-2 and the summary of the systems are shown in Table A-3. The number of systems for each slab is based on the figures in the main text which are designed to provide complete coverage in occupied areas of the buildings.

Table A-1: Radius of Influence (ROI) relationship

Static Pressure ("WC)	CFM RP265	CFM GP501	$\frac{ROI(RP265)^2}{ROI(GP501)^2}$
0	327	111	2.95
0.5	259	103	2.52
1	209	95	2.20
1.5	139	87	1.60
2	57	80	0.71
2.2	40	76	0.52
2.3	33	74	0.45
2.4	28	72	0.39
2.5	23	70	0.33
2.6	20	67	0.29
2.7	16	65	0.25
2.8	7.0	62	0.11
2.9	1.5	60	0.03

Table A-2: Slab Radius of Influence's (ROI)

Slab ID	Static Pressure	Measured ROI(RP265) (ft)	Estimated ROI(GP501) (ft)
A	2.5	17	29
B	2.5	19	33
C	2.9	2.7	17
D	2.5	25	43
E	2.5	13	22

Assumptions:

The ratio of the cfms is equal to the ratio of the volume of influence.

$$\frac{CFM(measured)}{CFM(estimated)} = \frac{\pi \times ROI(measured)^2 \times h}{\pi \times ROI(estimated)^2 \times h}$$

If the height is assumed to be the same, the ratios of the cfms is equal to the ratio to the squared ROIs

$$\frac{CFM(measured)}{CFM(estimated)} = \frac{ROI(measured)^2}{ROI(estimated)^2}$$

Table A-3: System Summary

Slab	Static Pressure ("WC)	GP-501 cfm	Estimated Radius of Influence (ft)	Area (SF)	Suction Points	Total Sytems	Total suction points
A	2.5	70	29	23,000	9		
B	2.5	70	33	5,000	3	**12**	**12**
C	2.9	60	17	5,000	6	**6**	**6**
D	2.5	70	43	10,000	3		
E	2.5	70	22	12,000	9	**12**	**12**

Attachment 1

Pressure Measurements

Pressure Field Testing Data

Distance (ft)	Fan Location	Test Location	Reading1 (Pascal)	Reading2 (Pascal)	Static Pressure ("WC)	Slab	Notes
3	V15	T25	-12.1	-12.1	2.5	A	Good
3	V15	T25	-9.8	-9.8	2	A	Good
3	V15	T25	-5.9	-5.9	1.5	A	Good
3	V15	T25	-1	-1	1	A	Good
3	V15	T25	2.7	2.7	0.5	A	Good
3	V15	T25	1.1	1.1	0	A	Good
3	V16	T28	-29.5	-29.5	2.5	A	Good
3	V16	T28	-22.5	-22.5	2	A	Good
3	V16	T28	-14.2	-14.2	1.5	A	Good
3	V16	T28	-8	-8	1	A	Good
3	V16	T28	2.3	2.3	0.5	A	Good
3	V16	T28	8	8	0	A	Good
4	V13	T24	-13.2	-13.2	2.5	A	Good
4	V13	T24	-10.7	-10.7	2	A	Good
4	V13	T24	-8.2	-8.2	1.5	A	Good
4	V13	T24	-4.7	-4.7	1	A	Good
4	V13	T24	-1.5	-1.5	0.5	A	Good
4	V13	T24	1.7	1.7	0	A	Good
4	V17	T30	-4.4	-6.3	2.5	A	Good
4	V17	T30	-3.5	-4.2	2	A	Good
4	V17	T30	-2.4	-2.7	1.5	A	Good
4	V17	T30	1	0.4	1	A	Good
4	V17	T30	1.8	2.8	0.5	A	Good
4	V17	T30	1.5	3.3	0.5	A	Good
4	V17	T30	1.5	2	0	A	Good
6	V16	T27	-42.2	-42.2	2.5	A	Outlier
6	V16	T27	-38	-38	2	A	Outlier
6	V16	T27	-25.3	-25.3	1.5	A	Outlier
6	V16	T27	-12	-12	1	A	Outlier
6	V16	T27	-9	-9	0.5	A	Outlier
6	V16	T27	3.2	4.2	0	A	Outlier
6	V17	T32	-3.4	-4	2.5	A	Good
6	V17	T32	-3	-3.6	2	A	Good
6	V17	T32	-2.1	-3.3	1.5	A	Good
6	V17	T32	-1	-1.7	1	A	Good
6	V17	T32	-0.2	-2	1	A	Good
6	V17	T32	1.9	1.9	0.5	A	Good
6	V17	T32	7.7	8.3	0	A	Good
8	V13	T23	0	0	2.5	A	No communication at full fan
8	V13	T23	0	0	0	A	No communication at full fan
8	V14	T18			2.5	A	No communication at full fan
9	V15	T26	-0.6	-0.7	2.5	A	Good
9	V15	T26	0.8	0.8	2	A	Good
9	V15	T26	1.2	1.2	1.5	A	Good
9	V15	T26	0.6	0.6	1	A	Good
9	V15	T26	0.8	0.8	0.5	A	Good
9	V15	T26	0.5	0.5	0	A	Good
9	V16	T29	-9.5	-10.8	2.5	A	Good
9	V16	T29	-7	-7	2	A	Good
9	V16	T29	-4.5	-4.5	1.5	A	Good
9	V16	T29	-1	-1	1	A	Good

Pressure Field Testing Data

Distance (ft)	Fan Location	Test Location	Reading1 (Pascal)	Reading2 (Pascal)	Static Pressure ("WC)	Slab	Notes
9	V16	T29	1.6	1.6	0.5	A	Good
9	V16	T29	0.5	0.5	0	A	Good
12	V17	T31	4.3	4.3	0	A	No communication at full fan
21	V13	T18			2.5	A	No communication at full fan
25	V10	T18	-0.6	-4.3	2.5	A	Good
25	V10	T18	0.3	-1.4	2	A	Good
25	V10	T18	0.7	1.1	1.5	A	Good
25	V10	T18	1.8	0.8	1	A	Good
25	V10	T18	-0.8	1	0.5	A	Good
25	V10	T18	0.1	0.5	0	A	Good
	O3	O3	-0.1	0.3	0	A	Outside
29	V10	T17	0.8	0.8	2.5	A/B	No communication at full fan
29	V10	T17	0.8	0.8	0	A/B	No communication at full fan
2	V11	T22	-33.5	-33.5	2.6	B	Good
2	V11	T22	-23.2	-23.2	2	B	Good
2	V11	T22	-16.1	-16.1	1.5	B	Good
2	V11	T22	-8	-8	1	B	Good
2	V11	T22	-1	-1	0.5	B	Good
2	V11	T22	1.4	1.4	0	B	Good
8	V7	T14	0		0.5 WC	B	Good
8	V7	T14	-3.3		2.6	B	Good
8	V7	T14	-2.3		2	B	Good
8	V7	T14	-1.3		1.5	B	Good
8	V7	T14	-0.3		1	B	Good
8	V7	T14	0.5		0	B	Good
9	V9	T16	-18.5	-18.5	2.5	B	Outlier
9	V9	T16	-14.1	-14.1	2	B	Outlier
9	V9	T16	-11.5	-11.5	1.5	B	Outlier
9	V9	T16	-6	-6	1	B	Outlier
9	V9	T16	1	1.4	0.5	B	Outlier
9	V9	T16	1.6	1.6	0	B	Outlier
10	V9	T17	-1.3	-1.3	2.5	B	Good
10	V9	T17	-1.1	-1.1	2	B	Good
10	V9	T17	-1	-1	1.5	B	Good
10	V9	T17	-0.4	-0.4	1	B	Good
10	V9	T17	-0.2	-0.2	0.5	B	Good
10	V9	T17	1.5	0	0	B	Good
16	V11	T21	0.4	0.4	2.5	B	No communication at full fan
16	V11	T21	0.7	0.7	0	B	No communication at full fan
18	V7	T13	0.5	1	2.6	B	No communication at full fan
18	V7	T13	0.6	1.1	0	B	No communication at full fan
20	V11	T20	0.4	0.4	2.5	B	Good
20	V11	T20	0.5	0.6	2	B	Good
20	V11	T20	0.6	1	1.5	B	Good
20	V11	T20	0.6	1	1	B	Good
20	V11	T20	0.6	1	0.5	B	Good
20	V11	T20	0.8	0.8	0	B	Good
21	V8	T14	-0.3	0	2.5	B	Good
21	V8	T14	0	0.5	2	B	Good
21	V8	T14	0.1	0.4	1.5	B	Good
21	V8	T14	0.1	0.4	1	B	Good

Pressure Field Testing Data

Distance (ft)	Fan Location	Test Location	Reading1 (Pascal)	Reading2 (Pascal)	Static Pressure ("WC)	Slab	Notes
21	V8	T14	0.1	0.4	0.5	B	Good
21	V8	T14	0.1	0.4	0	B	Good
23	V9	T15	-1.8	-1.8	2.5	B	Good
23	V9	T15	-1.3	-1.5	2	B	Good
23	V9	T15	-1	-1.3	1.5	B	Good
23	V9	T15	-0.7	-0.7	1	B	Good
23	V9	T15	-0.4	-0.4	0.5	B	Good
23	V9	T15	0.4	0.4	0	B	Good
33	V8	T15	0.1	0.4	2.7	B	No communication at full fan
33	V8	T15	0.4	0.7	0	B	No communication at full fan
50	V7	T19	0	-1	2.5	B	Good
50	V7	T19	-0.6	-0.7	2	B	Good
50	V7	T19	0	-0.7	1.5	B	Good
50	V7	T19	-0.3	-0.9	1	B	Good
50	V7	T19	-0.5	-0.5	0.5	B	Good
50	V7	T19	-0.1	-0.9	0	B	Good
70	V7	T20	-1	-0.5	0	B	No communication at full fan
8	V12	T12	-1.5	-1.5	2.6	B/A	Good
8	V12	T12	-1.1	-1.1	2	B/A	Good
8	V12	T12	-0.4	-0.4	1.5	B/A	Good
8	V12	T12	0	0	1	B/A	Good
8	V12	T12	0.9	0.9	0.5	B/A	Good
8	V12	T12	0.9	0.9	0	B/A	Good
34	V7	T12	1	1	2.6	B/A	No communication at full fan
34	V7	T12	1	1	0	B/A	No communication at full fan
1	V23	T48	-13.9	-14.3	2.9	C	Good
1	V23	T48	-8.8	-10	2.5	C	Good
1	V23	T48	-6	-6	2	C	Good
1	V23	T48	-1.9	-1.9	1.5	C	Good
1	V23	T48	5	5	1	C	Good
1	V23	T48	9	9	0.5	C	Good
1	V23	T48	10.2	14.8	0	C	Good
1	V24	T50	-80.2	-80.2	2.9	C	Good
1	V24	T50	-70.7	-70.7	2.5	C	Good
1	V24	T50	-56.2	-56.2	2	C	Good
1	V24	T50	-42.2	-42.2	1.5	C	Good
1	V24	T50	-27.3	-27.3	1	C	Good
1	V24	T50	-6.5	-6.5	0.5	C	Good
1	V24	T50	1.3	1.3	0	C	Good
3	V23	T47	10.5		2.9	C	Good
3	V23	T47	10.2		2.5	C	Good
3	V23	T47	10.2		2	C	Good
3	V23	T47	11.5		1.5	C	Good
3	V23	T47	11.6		1	C	Good
3	V23	T47	11.9		0.5	C	Good
3	V23	T47	12.4		0	C	Good
3	V24	T49	8	5.5	2.9	C	Good
3	V24	T49	9.1	5.6	2.5	C	Good
3	V24	T49	8.1	8.6	2	C	Good
3	V24	T49	5.6	8.6	1.5	C	Good
3	V24	T49	6.9	10.5	1	C	Good

Pressure Field Testing Data

Distance (ft)	Fan Location	Test Location	Reading1 (Pascal)	Reading2 (Pascal)	Static Pressure ("WC)	Slab	Notes
3	V24	T49	6.6	9	0.5	C	Good
3	V24	T49	7.5	10.6	0	C	Good
	O5	O5	5.4	5.4	0	C	Outside
13	V2	T4	-2.2	-2.8	2.7	D	Good
13	V2	T4	-1.8	-3.2	2.7	D	Good
13	V2	T4	-1.8	-3.2	2.7	D	Good
13	V2	T4	-3.1	-3.7	2	D	Good
13	V2	T4	-2.9	-4.3	2	D	Good
13	V2	T4	-1.6	-4.7	2	D	Good
13	V2	T4	-1.6	-3.1	1.5	D	Good
13	V2	T4	-0.6	-4.6	1.5	D	Good
13	V2	T4	-2.2	-2.9	1	D	Good
13	V2	T4	0	-1	0.5	D	Good
13	V2	T4	0	0	0	D	Good
16	V1	T1	-1.8	-1	2.75	D	Good
16	V1	T1	-1.4	-1.2	2	D	Good
16	V1	T1	0.7	-1.4	1.5	D	Good
16	V1	T1	-0.7	-1.2	1	D	Good
16	V1	T1	-0.8	1	0.5	D	Good
16	V1	T1	0	0	0	D	Good
25	V1	T2	0	-1	2.65	D	Good
25	V1	T2	-1	-2.2	2.65	D	Good
25	V1	T2	-1	0.3	2	D	Good
25	V1	T2	-0.4	0.1	1.5	D	Good
25	V1	T2	-0.8	0.1	1	D	Good
25	V1	T2	-0.4	0.4	0.5	D	Good
25	V1	T2	0	0	0	D	Good
30	V2	T6	0.6	0.4	2.7	D	No communication at full fan
30	V2	T6	0.3	0.1	2.7	D	No communication at full fan
30	V2	T6	0.6	0.4	0	D	No communication at full fan
30	V2	T6	0.3	0.1	0	D	No communication at full fan
30	V3	T6	-0.9	-1.4	2.5	D	Good
30	V3	T6	-0.7	-1.2	2.5	D	Good
30	V3	T6	-0.7	-1.9	2.5	D	Good
30	V3	T6	-0.5	-1.6	2.5	D	Good
30	V3	T6	-0.5	-1	2	D	Good
30	V3	T6	-0.6	-0.9	2	D	Good
30	V3	T6	-0.5	-1.2	2	D	Good
30	V3	T6	0	-0.5	1.5	D	Good
30	V3	T6	0	-0.4	1	D	Good
30	V3	T6	0.1	-0.6	1	D	Good
30	V3	T6	0	0.4	0.5	D	Good
30	V3	T6	0.1	0.3	0.5	D	Good
30	V3	T6	0.6	0.4	0	D	Good
30	V3	T6	0.3	0.1	0	D	Good
30	V3	T7	-2.7	-2.5	2.5	D	Outlier
30	V3	T7	-3	-2.4	2.5	D	Outlier
30	V3	T7	-1.8	-2	2	D	Outlier
30	V3	T7	-1.6	-1.9	2	D	Outlier
30	V3	T7	-2.1	-1.9	2	D	Outlier
30	V3	T7	-1.4	-1.6	1.5	D	Outlier

Pressure Field Testing Data

Distance (ft)	Fan Location	Test Location	Reading1 (Pascal)	Reading2 (Pascal)	Static Pressure ("WC)	Slab	Notes
30	V3	T7	-1.4	-1.7	1.5	D	Outlier
30	V3	T7	-1.3		1.5	D	Outlier
30	V3	T7	-0.5	-0.9	1	D	Outlier
30	V3	T7	-1.3	-1.4	1	D	Outlier
30	V3	T7	-0.6	-0.8	0.5	D	Outlier
30	V3	T7	-0.5	-0.7	0.5	D	Outlier
30	V3	T7	-0.4	-0.6	0.5	D	Outlier
30	V3	T7	-0.3	-0.1	0	D	Outlier
33	V2	T5	-0.5	-1.3	2.7	D	Good
33	V2	T5	-0.3	-0.9	2	D	Good
33	V2	T5	0.1	-0.6	1.5	D	Good
33	V2	T5	0.1	0.3	0.5	D	Good
33	V2	T5	0	0.5	0	D	Good
50	V1	T3	1.2	1.8	2.65	D	No communication at full fan
50	V1	T3	1.8	2	0	D	No communication at full fan
50	V2	T2	-0.3	-1.6	2.7	D	Good
50	V2	T2	-0.1	-1.3	2.7	D	Good
50	V2	T2	-0.3	-1	2.7	D	Good
50	V2	T2	0.2	-1	2	D	Good
50	V2	T2	0.5	-1.2	2	D	Good
50	V2	T2	0.4	-0.4	2	D	Good
50	V2	T2	-0.4	0.9	1.5	D	Good
50	V2	T2	-0.7	0.8	1.5	D	Good
50	V2	T2	0	-0.6	1.5	D	Good
50	V2	T2	0	-1.4	1.5	D	Good
50	V2	T2	-0.5	0	1	D	Good
50	V2	T2	-1.3	0.2	1	D	Good
50	V2	T2	-0.7	0.2	1	D	Good
50	V2	T2	-1.4	1	1	D	Good
50	V2	T2	-0.3	1	0.5	D	Good
50	V2	T2	-0.7	1	0.5	D	Good
50	V2	T2	0.3	1	0.5	D	Good
50	V2	T2	-0.5	0	0	D	Good
50	V2	T2	1	-1.3	0	D	Good
	O2	O2	0	0	0	D	Outside
1	V4	T34	-1.4	0	2.5	E	No communication at full fan
1	V4	T34	-1.4	0	0	E	No communication at full fan
3	V18	T35	-16.7	-18.2	2.2	E	Good
3	V18	T35	-11.9	-13.6	1.5	E	Good
3	V18	T35	-6.2	-8.1	1	E	Good
3	V18	T35	-6.9	-7.7	1	E	Good
3	V18	T35	0.9	1.6	0.5	E	Good
3	V18	T35	1.7	4.3	0	E	Good
3	V19	T37	-0.6	-1.1	2.5	E	Good
3	V19	T37	-1	0	2	E	Good
3	V19	T37	-0.8	0.5	1.5	E	Good
3	V19	T37	-0.6	0.5	1	E	Good
3	V19	T37	-0.5	0.6	0.5	E	Good
3	V19	T37	0	0.6	0	E	Good
3	V20	T39	-1.6	-2.1	2.5	E	Good
3	V20	T39	-1.3	-0.8	2	E	Good

Pressure Field Testing Data

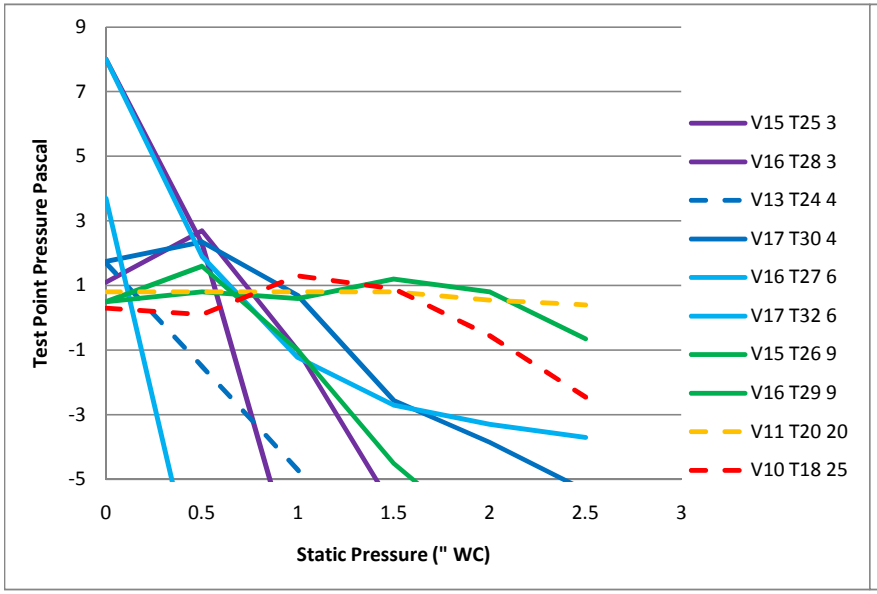
Distance (ft)	Fan Location	Test Location	Reading1 (Pascal)	Reading2 (Pascal)	Static Pressure ("WC)	Slab	Notes
3	V20	T39	-1.1	-1.1	1.5	E	Good
3	V20	T39	-0.5	-0.9	1	E	Good
3	V20	T39	-0.7	-0.7	0.5	E	Good
3	V20	T39	-0.5	-0.8	0	E	Good
3	V21	T42	-3.1	-4.9	2.5	E	Good
3	V21	T42	-3.6	-4.2	2.5	E	Good
3	V21	T42	-3.8	-3.2	2	E	Good
3	V21	T42	-3.5	-3.1	2	E	Good
3	V21	T42	-4.4	-3.4	2	E	Good
3	V21	T42	-2.8	-3.3	1.5	E	Good
3	V21	T42	-3.1	-1.8	1.5	E	Good
3	V21	T42	-2.3	-1.7	1	E	Good
3	V21	T42	-2.6	-1.2	1	E	Good
3	V21	T42	-2.3	-0.8	0.5	E	Good
3	V21	T42	0.2	-0.3	0	E	Good
3	V21	T42	0.5	-0.5	0	E	Good
3	V22	T45	-6.5	-6.5	2.2	E	Good
3	V22	T45	-6.3	-6.3	2	E	Good
3	V22	T45	-5.5	-5.5	1.5	E	Good
3	V22	T45	-4	-4	1	E	Good
3	V22	T45	-1.2	-1.2	0.5	E	Good
3	V22	T45	1	2.3	0	E	Good
3	V22	T45	1.5	2.3	0	E	Good
6	V20	T41			2.5	E	No communication at full fan
6	V20	T41	0.3	0.8	0	E	No communication at full fan
6	V20	T41	1.4	0.4	0	E	No communication at full fan
6	V21	T43	-3	-3	2.5	E	Good
6	V21	T43	-3.5	-2	2.5	E	Good
6	V21	T43	-1.4	-4	2	E	Good
6	V21	T43	-2.4	-1.6	1.5	E	Good
6	V21	T43	-2.2	-1.5	1	E	Good
6	V21	T43	-3.3	0.1	0.5	E	Good
6	V21	T43	-2.2	0.8	0	E	Good
6	V22	T44	-11.5	-11.5	2.2	E	Outlier
6	V22	T44	-7	-13.5	2	E	Outlier
6	V22	T44	-7.6	-5.9	1.5	E	Outlier
6	V22	T44	-6.9	7.3	1.5	E	Outlier
6	V22	T44	-3.1	-5.8	1	E	Outlier
6	V22	T44	-3.4	-5.3	1	E	Outlier
6	V22	T44	-1.3	-2.8	0.5	E	Outlier
6	V22	T44	-4.2	-2.5	0.5	E	Outlier
6	V22	T44	-1.5	-4.4	0.5	E	Outlier
6	V22	T44	-0.4	0.4	0	E	Outlier
6	V4	T33	-4	2	2.5	E	Good
6	V4	T33	-3.4	1.2	2	E	Good
6	V4	T33	-2.4	1.3	1.5	E	Good
6	V4	T33	-3.9	1.2	1	E	Good
6	V4	T33	-4.1	1.2	0.5	E	Good
6	V4	T33	-2	2	0	E	Good
9	V18	T36	1.7	2.5	2.2	E	No communication at full fan
9	V18	T36	1.7	2.5	0	E	No communication at full fan

Pressure Field Testing Data

Distance (ft)	Fan Location	Test Location	Reading1 (Pascal)	Reading2 (Pascal)	Static Pressure ("WC)	Slab	Notes
9	V19	T38	-0.5	-0.2	2.5	E	Good
9	V19	T38	0	-0.7	2	E	Good
9	V19	T38	0.2	-0.7	1.5	E	Good
9	V19	T38	-0.7	0.2	0	E	Good
9	V20	T40			2.5	E	No communication at full fan
9	V20	T40	2.2	0.5	0	E	No communication at full fan
9	V20	T40	1.4	-0.1	0	E	No communication at full fan
9	V20	T40	3.2	1	0	E	No communication at full fan
9	V22	T46	-1	-1	2.2	E	Good
9	V22	T46	-0.1	-0.1	2	E	Good
9	V22	T46	0.5	0.5	1.5	E	Good
9	V22	T46	0.7	0.7	1	E	Good
9	V22	T46	8	8	0.5	E	Good
9	V22	T46	-1.2	0.9	0	E	Good
17	V4	T10	0		2.5	E	No communication at full fan
21	V6	T11	0		2.5	E	No communication at full fan
31	V4	T8	-0.1	-0.3	2.5	E	No communication at full fan
31	V4	T8	-0.1	-0.3	2	E	No communication at full fan
31	V4	T8	-0.1	-0.3	1.5	E	No communication at full fan
31	V4	T8	-0.1	-0.3	0	E	No communication at full fan
31	V4	T9	-0.2	-0.2	2.5	E	Good
31	V4	T9	-0.2	-0.2	2	E	Good
31	V4	T9	-0.2	-0.2	1.5	E	Good
31	V4	T9	-0.1	-0.1	1	E	Good
31	V4	T9	-0.1	-0.1	0.5	E	Good
31	V4	T9	0	0	0	E	Good
40	V5	T10	0		2.7	E	No communication at full fan
	O4	O4	1	1	0	E	Outside

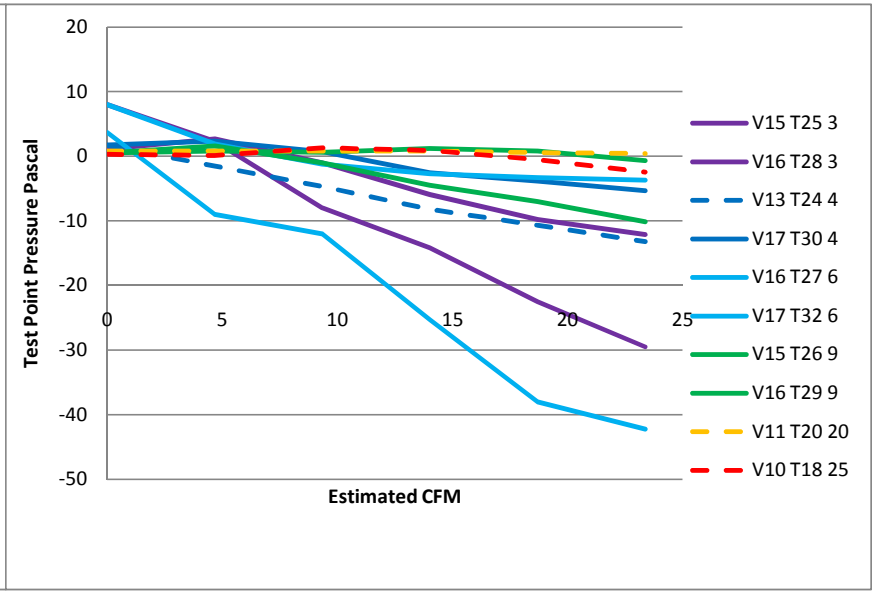
Static Pressure vs. Test Point Pressure

Slab A - 717 Main Original

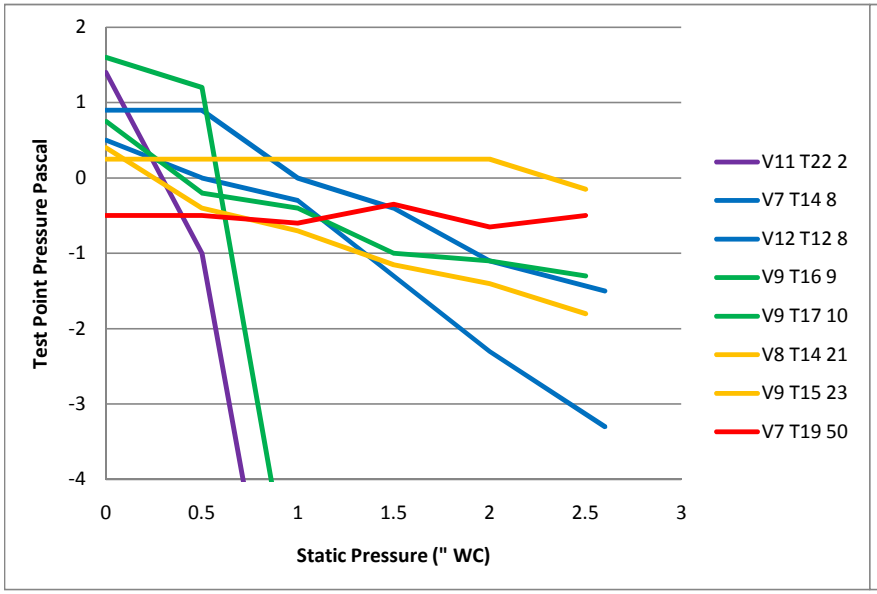


cfm vs. Test Point Pressure

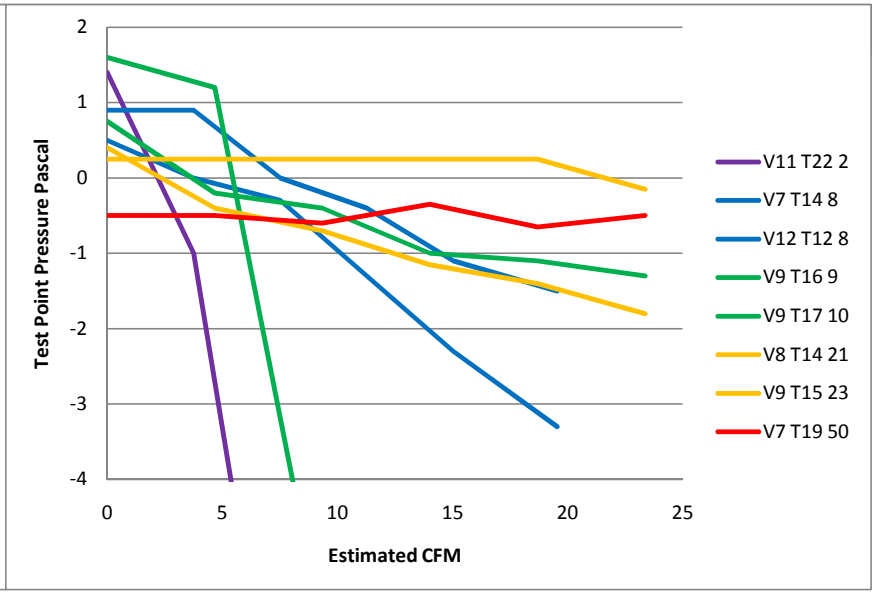
Slab A - 717 Main Original



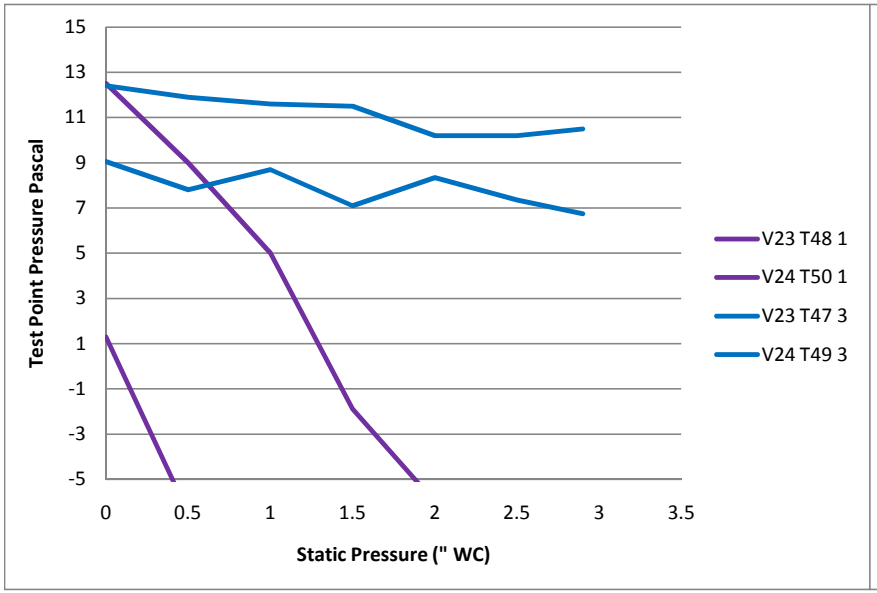
Slab B - 717 Main Addition



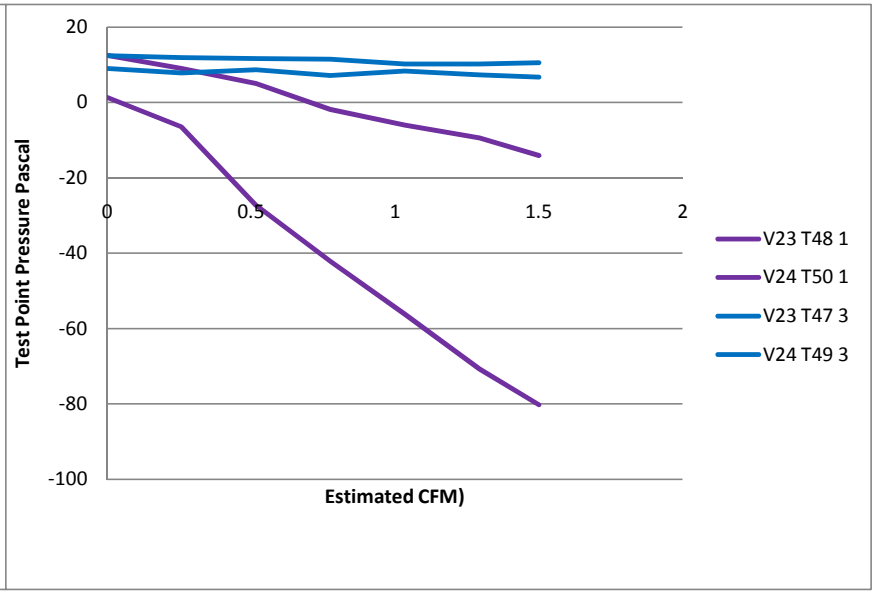
Slab B - 717 Main Addition



Static Pressure vs. Test Point Pressure
Slab C - 50 Bond

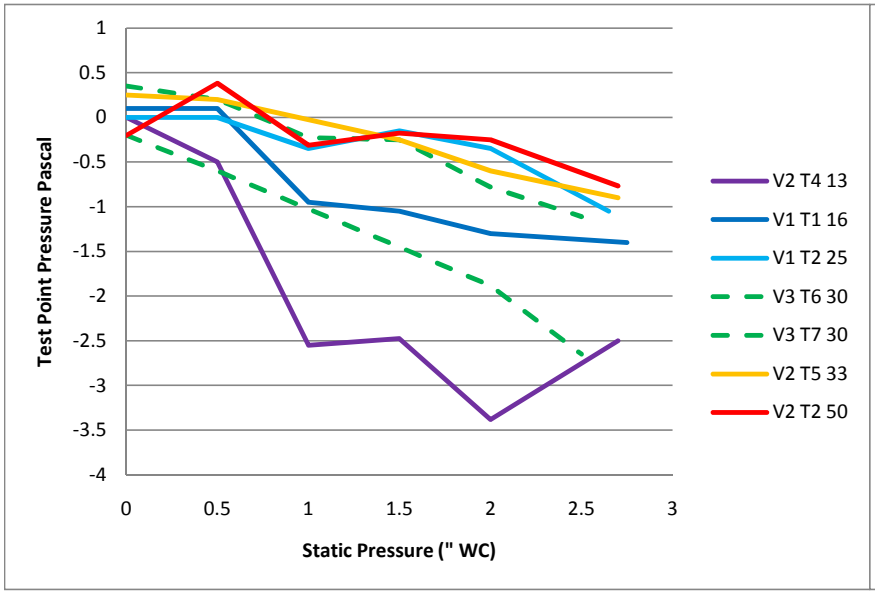


cfm vs. Test Point Pressure
Slab C - 50 Bond



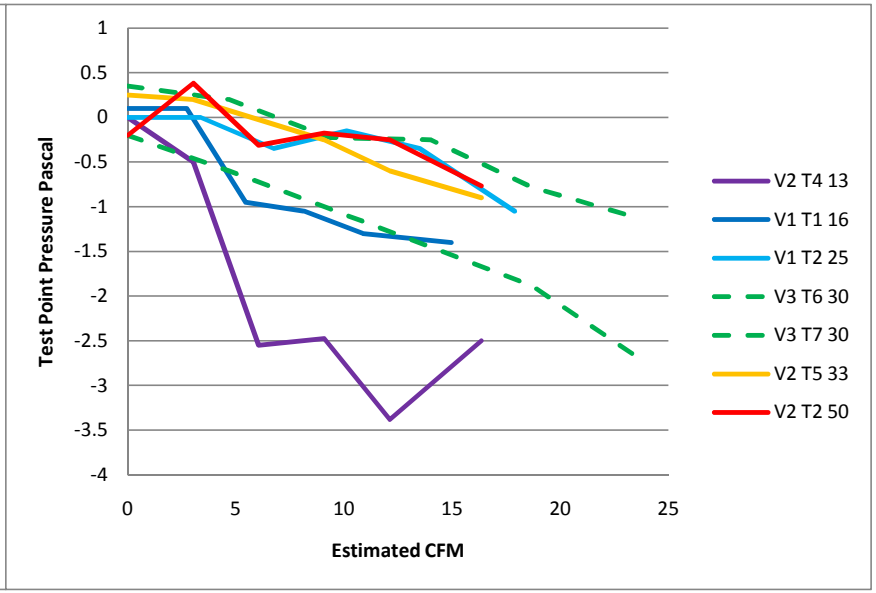
Static Pressure vs. Test Point Pressure

Slab D - 1025 Old Country Rd East

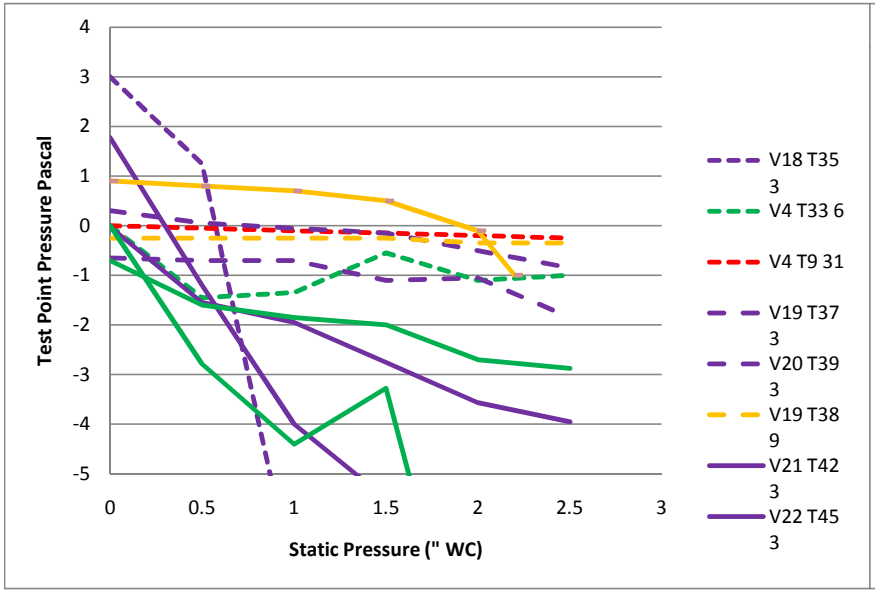


cfm vs. Test Point Pressure

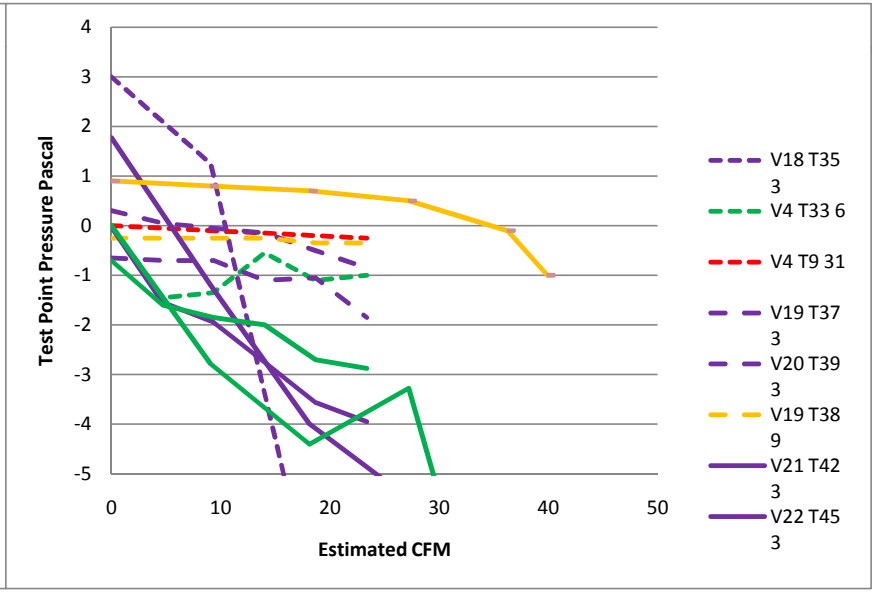
Slab D - 1025 Old Country Rd East



Slab E - 1025 Old Country Rd West



Slab E - 1025 Old Country Rd West



Appendix B

Manufacturer's Specification and Installation Manual for GP501 and HS2000

RP Series

XP Series

GP Series

GP500

HS Series

RadonAway Fan Selection Specifications and Guidelines:

Model	P/N	Fan Duct Diameter	Watts	Max. Pressure "WC	Recom. Max Op. Pressure "WC*	Typical CFM vs. Static Pressure "WC								
						0"	.5"	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
RP140	23029-1	4"	15-21	0.8	0.8	135	70	-	-	-	-	-	-	-
RP145	23030-1	4"	41-72	2.1	1.7	166	126	82	41	3	-	-	-	-
RP260	23032-1	6"	50-75	1.8	1.5	272	176	103	13	-	-	-	-	-
RP265	23033-1	6"	91-129	2.5	2.2	334	247	176	116	52	-	-	-	-
RP380	28208	8"	95-152	2.2	2.0	497	353	220	130	38	-	-	-	-
XP151	23010-1	4"	45-60	1.6	1.3	180	140	80	10	-	-	-	-	-
XP201	23011-1	4"	45-66	1.9	1.7	150	110	74	38	-	-	-	-	-
XR261	23019-1	6"	65-105	1.8	1.6	250	185	115	50	-	-	-	-	-
GP201	23007-1	3"	40-60	2.0	1.8	-	-	82	58	5	-	-	-	-
GP301	23006-1	3"	55-90	2.6	2.4	-	-	92	77	45	10	-	-	-
GP401	23009-1	3"	60-110	3.4	3.0	-	-	93	82	60	40	15	-	-
GP501	23005-1	3"	70-140	4.2	3.8	-	-	95	87	80	70	57	30	10
GP500	23003-1	3"	70-130	4.3	-	-	-	88	80	74	65	54	28	14

Model	P/N	Fan Duct Diameter	Watts	Max. Pressure "WC	Recom. Max Op. Pressure "WC*	Typical CFM vs. Static Pressure "WC							
						0"	10"	1.0"	15"	20"	25"	3.0"	35"
HS2000	23004-1	3"/2"	150-270	18	14	110	72	40	-	-	-	-	-
HS3000	23004-2	3"/2"	105-195	27	21	40	33	30	23	18	-	-	-
HS5000	23004-3	3"/2"	180-320	50	40	53	47	42	38	34	24	-	-

*Reduce by 10% for high temperature operation. For sea level operation, reduce by 4% per 1000 feet of altitude.

RadonAway Ward Hill, MA IN014 Rev F

XP/GP/XR Series Fan Installation Instructions

Please Read And Save These Instructions.

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** Do not use fan in hazardous environments where fan electrical system could provide ignition to combustible of flammable materials.

2. **WARNING!** Do not use fan to pump explosive or corrosive gases.

3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

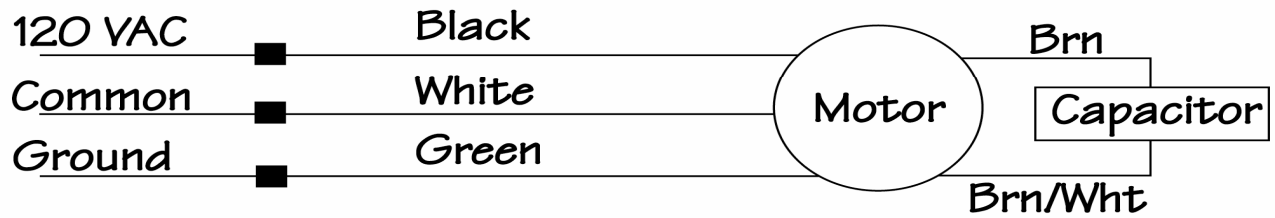
4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.

5. **NOTICE!** There are no user serviceable parts located inside the fan unit. **Do NOT attempt to open.** Return unit to the factory for service.

6. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician.

7. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.

DynaVac GP/XP/XR/RP Series Fan Wiring Diagram



DynaVac - XP/XR Series		DynaVac - GP Series	
XP101	p/n 23008-1,-2	GP201	p/n 23007-1
XP151	p/n 23010-1,-2	GP301	p/n 23006-1,-2
XP201	p/n 23011-1,-2	GP401	p/n 23009-1
XR161	p/n 23018-1,-2	GP501	p/n 23005-1,-2
XR261	p/n 23019-1,-2		

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The DynaVac GP/XP/XR Series Radon Fans are intended for use by trained, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of a DynaVac Fan. This instruction should be considered as a supplement to EPA standard practices, state and local building codes and state regulations. In the event of a conflict, those codes, practices and regulations take precedence over this instruction.

1.2 ENVIRONMENTALS

The GP/XP/XR Series Fans are designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the fan should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F.

1.3 ACOUSTICS

The GP/XP/XR Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. The velocity of the outgoing air should be considered in the overall system design. In some cases the "rushing" sound of the outlet air may be disturbing. In these instances, the use of a RadonAway Exhaust Muffler is recommended.

1.4 GROUND WATER

In the event that a temporary high water table results in water at or above slab level, water may be drawn into the riser pipes thus blocking air flow to the GP/XP/XR Series Fan. The lack of cooling air may result in the fan cycling on and off as the internal temperature rises above the thermal cutoff and falls upon shutoff. Should this condition arise, it is recommended that the fan be turned off until the water recedes allowing for return to normal operation.

1.5 SLAB COVERAGE

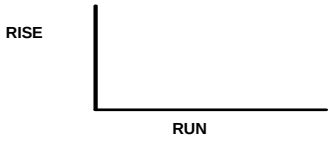
The GP/XP/XR Series Fan can provide coverage up to 2000+ sq. ft. per slab penetration. This will primarily depend on the sub-slab material in any particular installation. In general, the tighter the material, the smaller the area covered per penetration. Appropriate selection of the GP/XP/XR Series Fan best suited for the sub-slab material can improve the slab coverage. The GP & XP series have a wide range of models to choose from to cover a wide range of subslab material. The higher static suction fans are generally used for tighter subslab materials. The XR Series is specifically designed for high flow applications such as stone/gravel and drain tile. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size) be created below the slab at each suction hole.

1.6 CONDENSATION & DRAINAGE

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation. The GP/XP/XR Series Fan **MUST** be mounted vertically plumb and level, with the outlet pointing up for proper drainage through the fan. Avoid mounting the fan in any orientation that will allow water to accumulate inside the fan housing. The GP/XP/XR Series Fans are **NOT** suitable for underground burial.

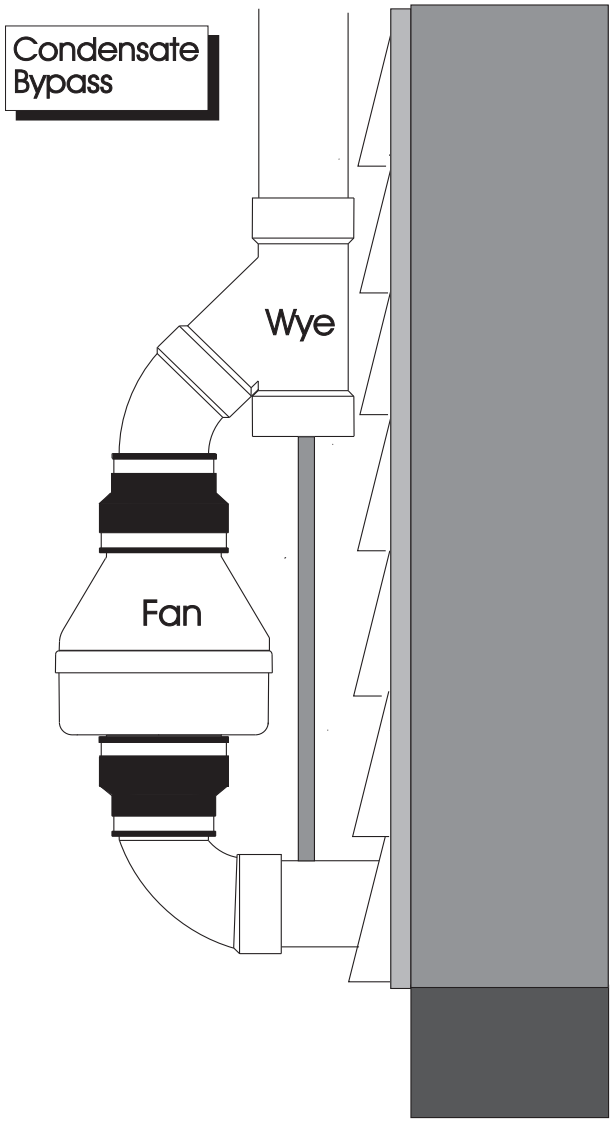
For GP/XP/XR Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Dia.	Minimum Rise per Foot of Run* @25 CFM	@50 CFM	@100 CFM
4″	1/8″	1/4″	3/8″
3"	1/4"	3/8"	1 1/2"



*Typical GP/XP/XR Series Fan operational flow rate is 25 - 90 CFM. (For more precision, determine flow rate by using the chart in the addendum.)

Under some circumstances in an outdoor installation a condensate bypass should be installed in the outlet ducting as shown. This may be particularly true in cold climate installations which require long lengths of outlet ducting or where the outlet ducting is likely to produce large amounts of condensation because of high soil moisture or outlet duct material. Schedule 20 piping and other thin-walled plastic ducting and Aluminum downspout will normally produce much more condensation than Schedule 40 piping.



The bypass is constructed with a 45 degree Wye fitting at the bottom of the outlet stack. The bottom of the Wye is capped and fitted with a tube that connects to the inlet piping or other drain. The condensation produced in the outlet stack is collected in the Wye fitting and drained through the bypass tube. The bypass tubing may be insulated to prevent freezing.

1.7 "SYSTEM ON" INDICATOR

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A manometer, such as a U-Tube, or a vacuum alarm is recommended for this purpose.

1.8 ELECTRICAL WIRING

The GP/XP/XR Series Fans operate on standard 120V 60 Hz. AC. All wiring must be performed in accordance with the National Fire Protection

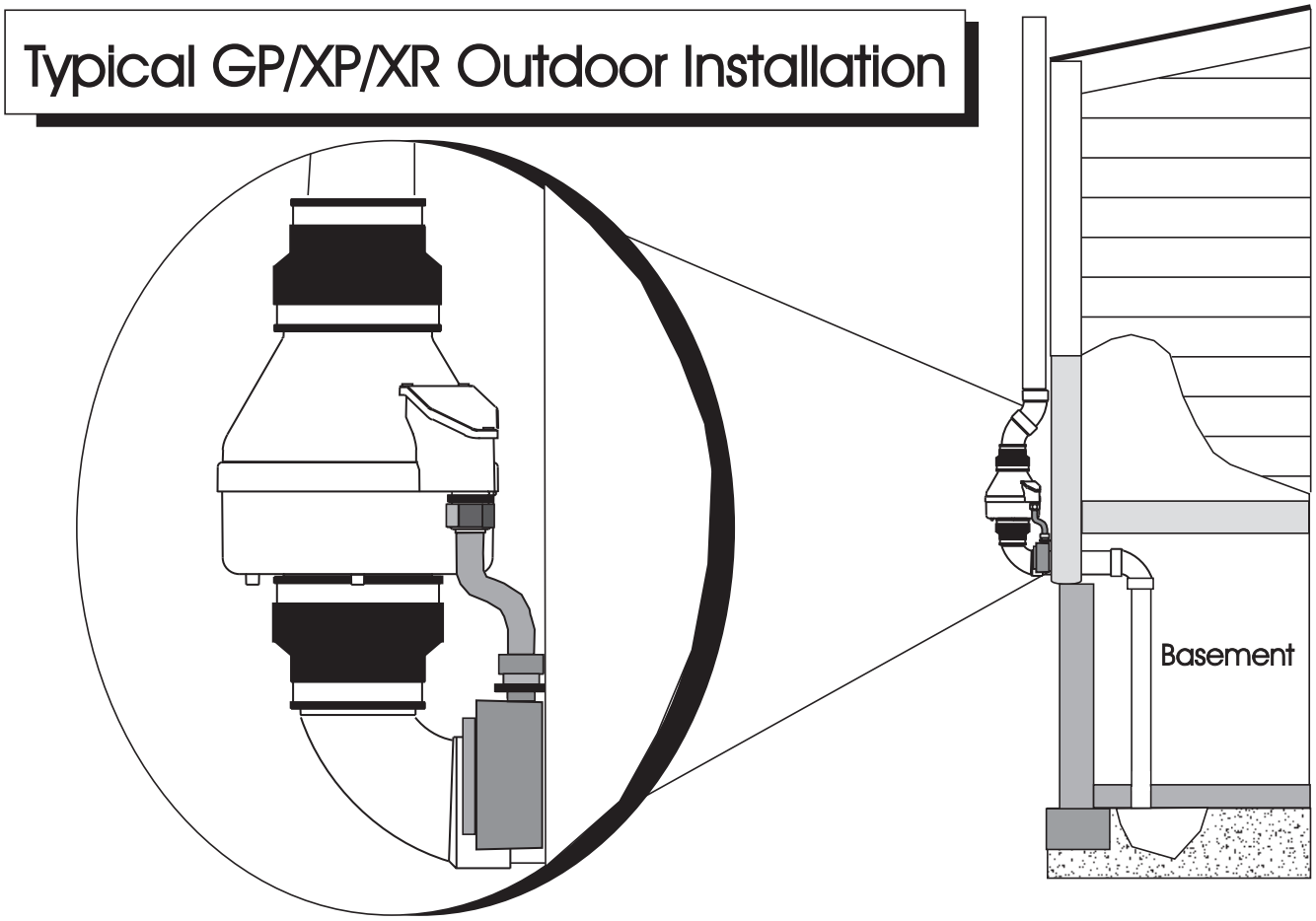
Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit.

1.9 SPEED CONTROLS

The GP/XP/XR Series Fans are rated for use with electronic speed controls ,however, they are generally not recommended.

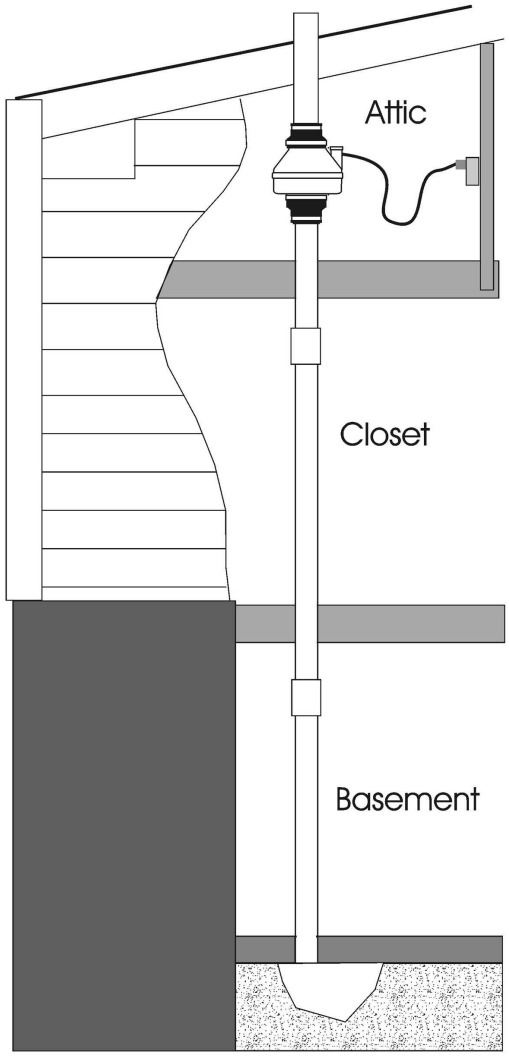
2.0 INSTALLATION

The GP/XP/XR Series Fan can be mounted indoors or outdoors. (It is suggested that EPA recommendations be followed in choosing the fan location.) The GP/XP/XR Series Fan may be mounted directly on the system piping or fastened to a supporting structure by means of optional mounting bracket.



2.1 MOUNTING

Mount the GP/XP/XR Series Fan vertically with outlet up. Insure the unit is plumb and level. When mounting directly on the system piping assure that the fan does not contact any building surface to avoid vibration noise.



2.2 MOUNTING BRACKET (optional)

The GP/XP/XR Series fan may be optionally secured with the integral mounting bracket on the GP Series fan or with RadonAway P/N 25007-2 mounting bracket for an XP/XR Series fan. Foam or rubber grommets may also be used between the bracket and mounting surface for vibration isolation.

2.3 SYSTEM PIPING

Complete piping run, using flexible couplings as means of disconnect for servicing the unit and vibration isolation.

2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections:

Fan Wire	Connection
Green	Ground
Black	AC Hot
White	AC Common

2.5 VENT MUFFLER (optional)

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed at the end of the vent pipe.

2.6 OPERATION CHECKS

_____ **Verify** all connections are tight and **leak-free**.

_____ **Insure** the GP/XP/XR Series Fan and all ducting is secure and vibration-free.

_____ **Verify** system vacuum pressure with manometer. **Insure** vacuum pressure is **less than** maximum recommended operating pressure

(Based on sea-level operation, at higher altitudes reduce by about 4% per 1000 Feet.)
(Further reduce Maximum Operating Pressure by 10% for High Temperature environments)
See Product Specifications. If this is exceeded, increase the number of suction points.

_____ **Verify Radon levels by testing to EPA protocol.**

XP/XR SERIES PRODUCT SPECIFICATIONS

The following chart shows fan performance for the XP & XR Series Fan:

Typical CFM Vs Static Suction "WC									
	0"	.25"	.5"	.75"	1.0"	1.25"	1.5"	1.75"	2.0"
XP101	125	118	90	56	5	-	-	-	-
XP151	180	162	140	117	78	46	10	-	-
XP201	150	130	110	93	74	57	38	20	-
XR161	215	175	145	105	75	45	15	-	-
XR261	250	215	185	150	115	80	50	20	-

Maximum Recommended Operating Pressure*		
XP101	0.9" W.C.	(Sea Level Operation)**
XP151	1.3" W.C.	(Sea Level Operation)**
XP201	1.7" W.C.	(Sea Level Operation)**
XR161	1.3" W.C.	(Sea Level Operation)**
XR261	1.6" W.C.	(Sea Level Operation)**

**Reduce by 10% for High Temperature Operation*
***Reduce by 4% per 1000 feet of altitude*

Power Consumption @ 120 VAC	
XP101	40 - 49 watts
XP151	45 - 60 watts
XP201	45 - 66 watts
XR161	48 - 75 watts
XR261	65 - 105 watts

XP Series Inlet/Outlet: 4.5" OD (4.0" PVC Sched 40 size compatible)

XR Series Inlet/Outlet: 5.875" OD

Mounting: Mount on the duct pipe or with optional mounting bracket.

Recommended ducting: 3" or 4" Schedule 20/40 PVC Pipe

Storage temperature range: 32 - 100 degrees F.

Normal operating temperature range: -20 - 120 degrees F.

Maximum inlet air temperature: 80 degrees F.

Size: 9.5H" x 8.5" Dia. **Weight**: 6 lbs. (XR261 - 7 lbs)

Continuous Duty **Thermally protected**

Class B Insulation **3000 RPM**

Residential Use Only **Rated for Indoor or Outdoor use**

LISTED Electric Fan ETL® Tested to UL Std. 507

77728

GP SERIES PRODUCT SPECIFICATIONS

The following chart shows fan performance for the GPx01 Series Fan:

Typical CFM Vs Static Suction "WC	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
GP501	95	87	80	70	57	30	5
GP401	93	82	60	38	12	-	-
GP301	92	77	45	10	-	-	-
GP201	82	58	5	-	-	-	-

Maximum Recommended Operating Pressure*		
GP501	3.8" W.C.	(Sea Level Operation)**
GP401	3.0" W.C.	(Sea Level Operation)**
GP301	2.4" W.C.	(Sea Level Operation)**
GP201	1.8" W.C.	(Sea Level Operation)**

**Reduce by 10% for High Temperature Operation*

***Reduce by 4% per 1000 feet of altitude*

Power Consumption @ 120 VAC	
GP501	70 - 140 watts
GP401	60 - 110 watts
GP301	55 - 90 watts
GP201	40 - 60 watts

Inlet/Outlet: 3.5" OD (3.0" PVC Sched 40 size compatible)

Mounting: Fan may be mounted on the duct pipe or with integral flanges.

Weight: 12 lbs.

Size: 13H" x 12.5" x 12.5"

Recommended ducting: 3″ or 4" Schedule 20/40 PVC Pipe

Storage temperature range: 32 - 100 degrees F.

Normal operating temperature range: -20 - 120 degrees F.

Maximum inlet air temperature: 80 degrees F.

Continuous Duty

Class B Insulation

3000 RPM

Thermally protected

Rated for Indoor or Outdoor Use

GP301C / GP501C Rated for Commercial Use

LISTED Electric Fan ETL® Tested to UL Std. 507

77728

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the GPx01/XP/XR Series Fan for shipping damage within 15 days of receipt. Notify RadonAway of any damages immediately. Radonaway is not responsible for damages incurred during shipping. However, for your benefit, Radonaway does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open.** Return unit to factory for service.

Install the GPx01/XP/XR Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the GPX01/XP/XR/RP Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 90 days from the date of purchase (the "Warranty Term").

RadonAway will replace any Fan which fails due to defects in materials or workmanship. The Fan must be returned (at Owner's cost) to the RadonAway factory. Any Fan returned to the factory will be discarded unless the Owner provides specific instructions along with the Fan when it is returned regardless of whether or not the Fan is actually replaced under this warranty. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not cover damage in shipment unless the damage is due to the negligence of RadonAway.

5 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway will extend the Warranty Term of the fan to 5 years from date of manufacture if the Fan is installed in a professionally designed and professionally installed radon system or installed as a replacement fan in a professionally designed and professionally installed radon system. Proof of purchase and/or proof of professional installation may be required for service under this warranty. Outside the Continental United States and Canada the extended Warranty Term is limited to one (1) year from the date of manufacture.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

EXCEPT AS STATED ABOVE, THE GPx01/XP/XR/RP SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

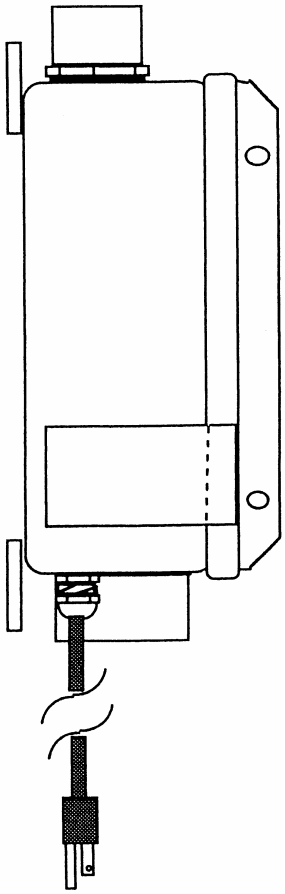
RadonAway
3 Saber Way
Ward Hill, MA 01835
TEL. (978) 521-3703
FAX (978) 521-3964

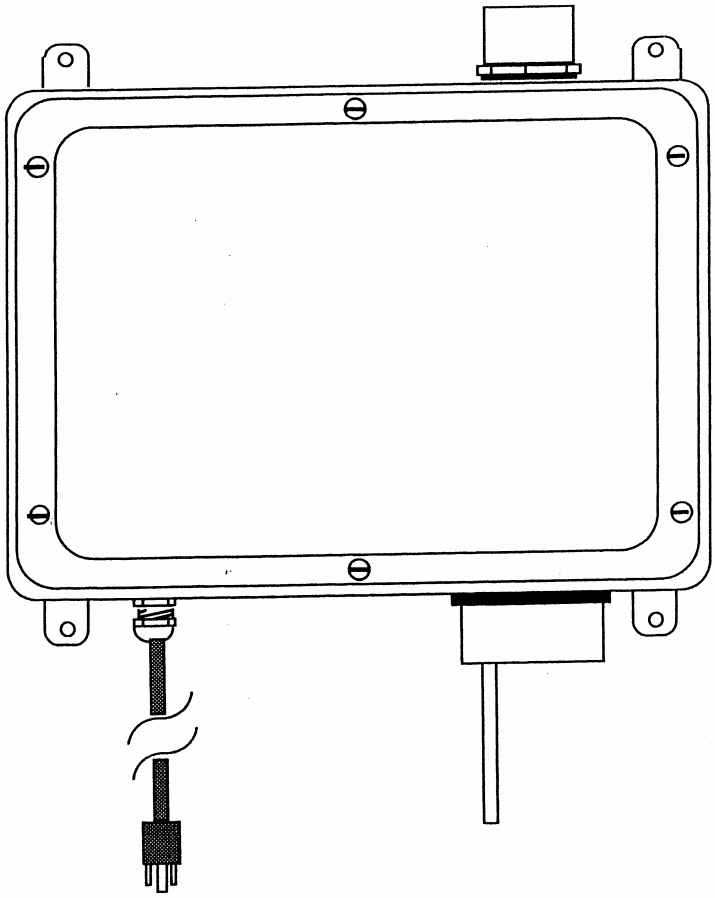
Record the following information for your records:

Serial No._____
Purchase Date_____

HS SERIES INSTALLATION INSTRUCTIONS

BY RadonAway™





RadonAway, Inc. Ward Hill, MA. P/N IN007 Rev F

RadonAway Ward Hill, MA.

HS Series Fan Installation Instructions

Please Read and Save These Instructions.

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** Do not use fan in hazardous environments where fan electrical system could provide ignition to combustible or flammable materials.

2. **WARNING!** Do not use fan to pump explosive or corrosive gases.

3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.

5. **NOTICE!** There are no user serviceable parts located inside the fan unit. **Do NOT attempt to open.** Return unit to the factory for service.

6. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician..

7. **WARNING!** In the event that the fan is immersed in water, return unit to factory for service before operating.

8. **WARNING!** Do not twist or torque fan inlet or outlet piping as Leakage may result.

9. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.

INSTALLATION INSTRUCTIONS (Rev F)
for DynaVac High Suction Series
HS2000 p/n 23004-1
HS3000 p/n 23004-2
HS5000 p/n 23004-3

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The DynaVac is intended for use by trained, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of the DynaVac. This instruction should be considered as a supplement to EPA standard practices, state and local building codes and state regulations. In the event of a conflict, those codes, practices and regulations take precedence over this instruction.

1.2 ENVIRONMENTALS

The DynaVac is designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the DynaVac should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F. The DynaVac is thermally protected such that it will shut off when the internal temperature is above 104 degrees F. Thus if the DynaVac is idle in an area where the ambient temperature exceeds this shut off, it will not restart until the internal temperature falls below 104 degrees F.

1.3 ACOUSTICS

The DynaVac, when installed properly, operates with little or no noticable noise to the building occupants. There are, however, some considerations to be taken into account in the system design and installation. When installing the DynaVac above sleeping areas, select a location for mounting which is as far away as possible from those areas. Avoid mounting near doors, fold-down stairs or other uninsulated structures which may transmit sound. Insure a solid mounting for the DynaVac to avoid structure-borne vibration or noise.

The velocity of the outgoing air must also be considered in the overall system design. With small diameter piping, the "rushing" sound of the outlet air can be disturbing. The system design should incorporate a means to slow and quiet the outlet air. The use of the RadonAway Exhaust Muffler, p/n 24001, is strongly recommended.

1.4 GROUND WATER

Under no circumstances should water be allowed to be drawn into the inlet of the DynaVac as this may result in damage to the unit. The DynaVac should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the DynaVac with water in installations with occasional high water tables.

In the event that a temporary high water table results in water at or above slab level, water will be drawn into the riser pipes thus blocking air flow to the DynaVac. The lack of cooling air will result in the DynaVac cycling on and off as the internal temperature rises above the thermal cutoff and falls upon shutoff. Should this condition arise, it is recommended that the DynaVac be disconnected until the water recedes allowing for return to normal operation.

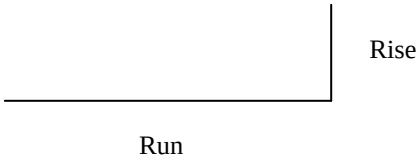
1.5 CONDENSATION & DRAINAGE

(WARNING!: Failure to provide adequate drainage for condensation can result in system failure and damage the DynaVac).

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation.

The use of small diameter piping in a system increases the speed at which the air moves. The speed of the air can pull water uphill and at sufficient velocity it can actually move water vertically up the side walls of the pipe. This has the potential of creating a problem in the negative pressure (inlet) side piping. For DynaVac inlet piping, the following table provides the minimum recommended pipe diameters as well as minimum pitch under several system condition. Use this chart to size piping for a system.

Pipe Diam.	Minimum Rise per Foot of Run*		
	@ 25 CFM	@ 50 CFM	@ 100 CFM
4"	1/32 "	3/32 "	3/8 "
3"	1/8 "	3/8 "	1 1/2 "



*Typical operational flow rates:

HS3000, or HS5000	20 - 40 CFM
HS2000	50 - 90 CFM

All exhaust piping should be 2" PVC.

1.6 "SYSTEM ON" INDICATOR

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A Magnehelic pressure gauge is recommended for this purpose. The indicator should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the gauge with water in installations with occasional high water tables.

1.7 SLAB COVERAGE

The DynaVac can provide coverage of well over 1000 sq. ft. per slab penetration. This will, of course, depend on the sub-slab aggregate in any particular installation and the diagnostic results. In general, sand and gravel are much looser aggregates than dirt and clay. Additional suction points can be added as required. It is recommended that a small pit (2 to 10 gallons in size) be created below the slab at each suction hole.

1.8 ELECTRICAL WIRING

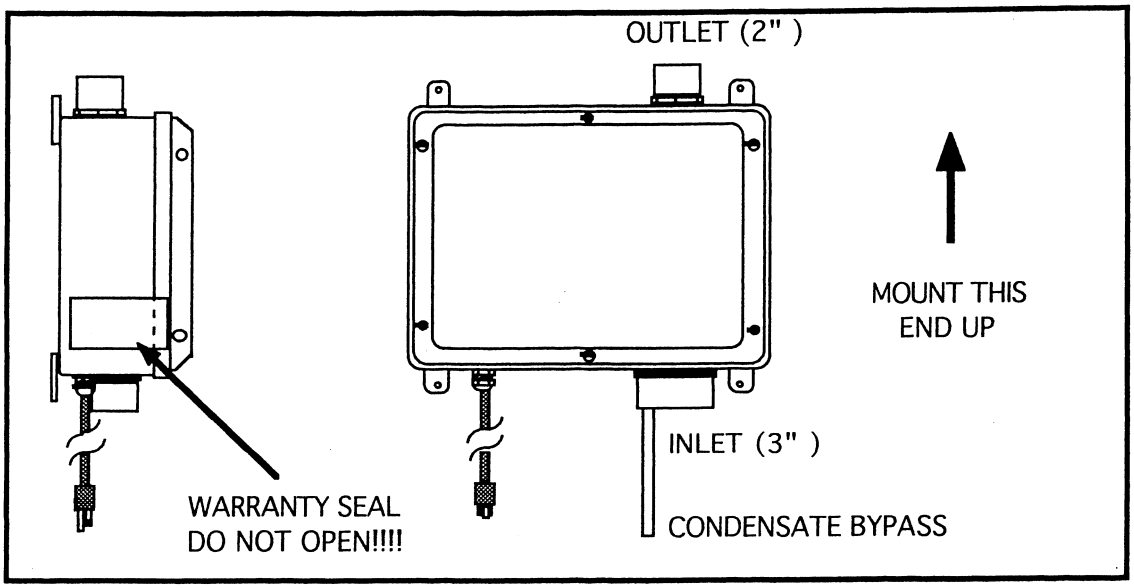
The DynaVac plugs into a standard 120V outlet. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician.

1.8a ELECTRICAL BOX (optional)

The optional Electrical Box (p/n 20003) provides a weathertight box with switch for outdoor hardwire connection. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit.

1.9 SPEED CONTROLS

Electronic speed controls can **NOT** be used on HS series units.



2.0 INSTALLATION

2.1 MOUNTING

Mount the DynaVac to the wall studs, or similar structure, in the selected location with (4) 1/4" x 1 1/2" lag screws (not provided). Insure the DynaVac is both plumb and level.

2.2 DUCTING CONNECTIONS

Make final ducting connection to DynaVac with flexible couplings. Insure all connections are tight. Do not twist or torque inlet and outlet piping on DynaVac or leaks may result.

2.3 VENT MUFFLER INSTALLATION

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed above the roofline at the end of the vent pipe.

2.5 OPERATION CHECKS

____ Make final operation checks by verifying all connections are tight and leak-free.

____ Insure the DynaVac and all ducting is secure and vibration-free.

____ Verify system vacuum pressure with Magnehelic. Insure vacuum pressure is less than the maximum recommended as shown below:

DynaVac	HS2000	14" WC
DynaVac	HS3000	21" WC
DynaVac	HS5000	40" WC

(Above are based on sea-level operation, at higher altitudes reduce above by about 4% per 1000 Feet.)
If these are exceeded, increase number of suction points.

____ Verify Radon levels by testing to EPA protocol.

Addendum

PRODUCT SPECIFICATIONS

Model	Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range)						Power* Watts @ 115 VAC
		0"	10"	15"	20"	25"	35"	
HS2000	18"	110	72	40	-	-	-	150-270
HS3000	27"	40	33	30	23	18	-	105-195
HS5000	50"	53	47	42	38	34	24	180-320

*Power consumption varies with actual load conditions

Inlet: 3.0" PVC
Outlet: 2.0" PVC
Mounting: Brackets for vertical mount
Weight: Approximately 18 lbs.
Size: Approximately 15"W x 13"H x 8"D
Minimum recommended inlet ducting (greater diameter may always be used):
HS3000, HS5000 --- 2.0" PVC Pipe
HS2000 --- Main feeder line of 3.0" or greater PVC Pipe
Branch lines (if 3 or more) may be 2.0" PVC Pipe
Outlet ducting: 2.0" PVC
Storage temperature range: 32 - 100 degrees F.
Thermally protected
Locked rotor protection
Internal Condensate Bypass

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the HS Series Fan for shipping damage within 15 days of receipt. Notify **RadonAway of any damages immediately**. Radonaway is not responsible for damages incurred during shipping. However, for your benefit, Radonaway does insure shipments.
There are no user serviceable parts inside the fan. **Do not attempt to open.** Return unit to factory for service.

Install the HS Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the HS Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of one (1) year from the date of manufacture (the "Warranty Term"). Outside the Continental United States and Canada the Warranty Term is one (1) year from the date of manufacture.

RadonAway will replace any Fan which fails due to defects in materials or workmanship. The Fan must be returned (at owner's cost) to the RadonAway factory. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

EXCEPT AS STATED ABOVE, THE HS SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

RadonAway
3 Saber Way
Ward Hill, MA 01835
TEL. (978) 521-3703
FAX (978) 521-3964

Record the following information for your records:

Serial No._____
Purchase Date_____

Appendix C

Town of North Hempstead Permit Requirements

TOWN OF NORTH HEMPSTEAD

INSURANCE AND LICENSE REQUIRMENTS FOR A PERMIT

The Town of North Hempstead, Nassau County, and the State of New York, require that no building permit may be issued until all current insurances and license information is presented for each permit.

For a homeowner doing a small job, a BP-1 form may be sufficient as described below.

For all other contractors, **FOR EACH PERMIT**, we require a copy of your current **Nassau County Home Improvement License** (this Nassau license is not necessary for commercial jobs or new home construction, or by plumbers or electricians), a copy of your liability insurance, NYS Disability Insurance, and NYS Worker's Compensation Insurance. All three insurances must list the "Town of North Hempstead, 210 Plandome Road, Manhasset, NY 11030" as the Certificate Holder of the policy.

For a demolition permit, a Nassau County Home Improvement License is required unless the entire foundation is removed and a NEW C/O will be issued.

Stand alone permits (such as plumbing, signs, fences, where there is a short review process must have all insurances attached at time of application submittal, or they will not be accepted). Although the Town keeps computer records, records do not always reflect current coverage, so we require copies of all insurances at time of permit application to prevent any unnecessary delays. In submittals that will take longer to review (such as an addition or new home), insurances may be submitted just before a permit is issued.

Liability insurance is usually submitted on a standard "Acord" form. Some other forms may be acceptable. (Please note: by New York State Law, we can not accept NYS Disability and NYS Worker's Compensation coverage on the Acord form). What we can accept is stated below:

NEW YORK STATE INSURANCE REQUIREMENTS

The Workers' Compensation Law requires that before a New York State or municipal agency, department, board, commission or office issues any permit or license, they must be provided with the completed forms as shown below prior to permit issuance. The applies to all

1) **Form BP-1 (12/08)** Affidavit of Exemption to Show Specific Proof of Workers' Compensation Insurance Coverage for a 1, 2, 3 or 4 Family, **Owner occupied Residence** (This is the **ONLY** form available from the Town of North Hempstead). This form is used by a homeowner who will be doing most of the permit work himself, with no or minimal assistance of up to a total of 40 man-hours per week. This form must be signed and notarized.

2) **Form CE-200** from **Group A** attesting to no need for either or both Workers Compensation and Disability Benefits Coverage (Note: If the CE-200 form does not exclude BOTH Workers Compensation and Disability Benefits Coverage you must supply a form from Group B and/or C that proves you have the coverage not exempted by the CE-200). This form must be submitted with a specific site address for each permit, and the expected duration of the job. The form must have an original signature and date. No copies of this form will be accepted. If the CE-200 is not used or only partially used, then see #3 below

3) A form from either or both **Group B and Group C** (which has not been exempted by the CE-200 form).

The ONLY ACEPTABLE forms are as follows:

Group	Form No.	Description
A	CE-200	Certificate of Attestation For New York Entities With No Employees and Certain Out of State Entities That New York State Worker's Compensation and/or Disability Benefits Insurance Coverage is Not Required.
B	C-105.2 (9-07)	Certificate of Worker's Compensation Insurance
B	SI-12 (10/03)	Certificate of Worker's Compensation Self Insurance
B	GSI-105.2 (2/02)	Certificate of Participation in Worker's Compensation Group Self Insurance
B	U-26.3	New York State Insurance Fund Certificate of Work's Compensation Insurance (For demolition work, this form must state that demolition coverage is included)
C	DB-120.1 (5/06)	Certificate of Disability Benefits Insurance
C	DB-155 (1/98)	Certificate of Disability Benefits Self-Insurance

Effective September 9, 2007, all out-of-state employers with employees working in New York State are required to carry a full, statutory New York State workers' compensation insurance policy. An employer has a full, statutory New York State workers' compensation insurance policy when New York is listed in Item "3A" on the Information Page of the employer's workers' compensation insurance policy. It may be appropriate to contact your insurance broker, carrier or agent, check with your trade association, or conduct additional research to find the most appropriate insurance coverage for your company. In addition, a New York State workers' compensation policy may be obtained from the New York State Insurance Fund by calling 1-888-875-5790 and a disability benefits insurance policy may be obtained from the New York State Insurance Fund by calling 1-866-697-4332.

O/LR/

Town of North Hempstead

Department of Building Safety, Inspection & Enforcement

210 Plandome Road, Manhasset, NY 11030-2326 • Tel. 516-869-7660 • Fax 516-869-7662

Requirements for a Commercial Building Permit

1. Application for Building Permit with Owner's Authorization in triplicate.
2. Proposed Site Plan (2 copies) to include:
   a. Zoning data (including FAR).
   b. Percentage of lot coverage.
   c. Setbacks to all property lines.
   d. Parking calculations.
   e. Topography of site (if more than 1 foot of fill is brought in, a full permit is required).
   f. Locations of trees within property to be removed.
3. Construction drawings (2 copies) - Site plan must be on page 1.
4. Existing survey of property (2 copies).
5. Mechanical Drawings (2 Copies).
6. Application for Plumbing Permit (if applicable) must be filed with application.
   Plumber's name and license number required.
7. Contractor's name, address, telephone, and certificate of insurance.
8. Curb Cut Permit from Highway Department (if applicable).
   State, County, Town (5 copies of Site Plan with drainage and curb cut).
9. Soil Bearing Value Report.
10. Letter of Supervision by architect or engineer (from 10,000 sq. ft.).
11. Statement as to quality of structural steel (from steel fabricator).
12. Permit Fee.

INCOMPLETE APPLICATIONS WILL NOT BE ACCEPTED FOR FILING.

- Approval from local Water Districts also required.

NOTICE: Article 1, Section 2-9.A of the Code of the Town of North Hempstead states as follows: No person, firm or corporation shall commence the alteration of any lot or parcel, including the erection, construction, enlargement, alteration, removal, improvement, demolition or conversion of any building or structure or tree, or part thereof, or change the nature of the occupancy of any building or structure or cause the same to be done or the removal of trees without first filing with the Building Commissioner an application for such removal, construction, alteration, moving or demolition or installation of elevator, heating or heat-producing appliance or equipment, other than ordinary stoves or ranges, and obtaining a permit, except that no permit shall be required for the performance of ordinary repairs which are not structural in nature.

PART II - IMPACT ASSESSMENT (To be completed by Lead Agency)

A. DOES ACTION EXCEED ANY TYPE I THRESHOLD IN 6 NYCRR, PART 617.4? If yes, coordinate the review process and use the FULL EAF.
☐ Yes ☐ No

B. WILL ACTION RECEIVE COORDINATED REVIEW AS PROVIDED FOR UNLISTED ACTIONS IN 6 NYCRR, PART 617.6? If No, a negative declaration may be superseded by another involved agency.
☐ Yes ☐ No

C. COULD ACTION RESULT IN **ANY** ADVERSE EFFECTS ASSOCIATED WITH THE FOLLOWING: (Answers may be handwritten, if legible)

C1. Existing air quality, surface or groundwater quality or quantity, noise levels, existing traffic pattern, solid waste production or disposal, potential for erosion, drainage or flooding problems? Explain briefly:

C2. Aesthetic, agricultural, archaeological, historic, or other natural or cultural resources; or community or neighborhood character? Explain briefly:

C3. Vegetation or fauna, fish, shellfish or wildlife species, significant habitats, or threatened or endangered species? Explain briefly:

C4. A community's existing plans or goals as officially adopted, or a change in use or intensity of use of land or other natural resources? Explain briefly:

C5. Growth, subsequent development, or related activities likely to be induced by the proposed action? Explain briefly:

C6. Long term, short term, cumulative, or other effects not identified in C1-C5? Explain briefly:

C7. Other impacts (including changes in use of either quantity or type of energy)? Explain briefly:

D. WILL THE PROJECT HAVE AN IMPACT ON THE ENVIRONMENTAL CHARACTERISTICS THAT CAUSED THE ESTABLISHMENT OF A CRITICAL ENVIRONMENTAL AREA (CEA)?
☐ Yes ☐ No If Yes, explain briefly:

E. IS THERE, OR IS THERE LIKELY TO BE, CONTROVERSY RELATED TO POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS?
☐ Yes ☐ No If Yes, explain briefly:

PART III - DETERMINATION OF SIGNIFICANCE (To be completed by Agency)

INSTRUCTIONS: For each adverse effect identified above, determine whether it is substantial, large, important or otherwise significant. Each effect should be assessed in connection with its (a) setting (i.e. urban or rural); (b) probability of occurring; (c) duration; (d) irreversibility; (e) geographic scope; and (f) magnitude. If necessary, add attachments or reference supporting materials. Ensure that explanations contain sufficient detail to show that all relevant adverse impacts have been identified and adequately addressed. If question D of Part II was checked yes, the determination of significance must evaluate the potential impact of the proposed action on the environmental characteristics of the CEA.

☐ Check this box if you have identified one or more potentially large or significant adverse impacts which **MAY** occur. Then proceed directly to the FULL EAF and/or prepare a positive declaration.

☐ Check this box if you have determined, based on the information and analysis above and any supporting documentation, that the proposed action **WILL NOT** result in any significant adverse environmental impacts **AND** provide, on attachments as necessary, the reasons supporting this determination.

Name of Lead Agency	Date
Print or Type Name of Responsible Officer in Lead Agency	Title of Responsible Officer
Signature of Responsible Officer in Lead Agency	Signature of Preparer (If different from responsible officer)

Reset

617.20

Appendix C
State Environmental Quality Review
SHORT ENVIRONMENTAL ASSESSMENT FORM
For UNLISTED ACTIONS Only

PART I - PROJECT INFORMATION (To be completed by Applicant or Project Sponsor)

1. APPLICANT/SPONSOR

2. PROJECT NAME

3. PROJECT LOCATION:
Municipality County

4. PRECISE LOCATION (Street address and road intersections, prominent landmarks, etc., or provide map)

5. PROPOSED ACTION IS:
☐ New ☐ Expansion ☐ Modification/alteration

6. DESCRIBE PROJECT BRIEFLY:

7. AMOUNT OF LAND AFFECTED:
Initially _____ acres Ultimately _____ acres

8. WILL PROPOSED ACTION COMPLY WITH EXISTING ZONING OR OTHER EXISTING LAND USE RESTRICTIONS?
☐ Yes ☐ No If No, describe briefly

9. WHAT IS PRESENT LAND USE IN VICINITY OF PROJECT?
☐ Residential ☐ Industrial ☐ Commercial ☐ Agriculture ☐ Park/Forest/Open Space ☐ Other
Describe:

10. DOES ACTION INVOLVE A PERMIT APPROVAL, OR FUNDING, NOW OR ULTIMATELY FROM ANY OTHER GOVERNMENTAL AGENCY (FEDERAL, STATE OR LOCAL)?
☐ Yes ☐ No If Yes, list agency(s) name and permit/approvals:

11. DOES ANY ASPECT OF THE ACTION HAVE A CURRENTLY VALID PERMIT OR APPROVAL?
☐ Yes ☐ No If Yes, list agency(s) name and permit/approvals:

12. AS A RESULT OF PROPOSED ACTION WILL EXISTING PERMIT/APPROVAL REQUIRE MODIFICATION?
☐ Yes ☐ No

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor name: _____ Date: _____

Signature: _____

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment

OVER

Reset

ATTENTION:

MUST BE POSTED ON ALL JOB SITES

36"

TOWN OF NORTH HEMPSTEAD
BUILDING PERMIT NUMBER ########

Construction Hours:
Town Code Section 38-3.b(7)(a)(1)
7:30AM - 6:00PM Monday - Friday Only

YOUR GENERAL CONTRACTOR
1234 Name of the Road
City, State, Zip Code
Telephone: ###-###-####

TOWN OF NORTH HEMPSTEAD
DEPARTMENT OF BUILDING SAFETY
INSPECTION & ENFORCEMENT
Telephone: 516-869-7680

48"

repro copy

Town of North Hempstead

Department of Building Safety Inspection and Enforcement

210 Plandome Road, Manhasset, NY 11030-2327
Tel. (516) 869-7660 Fax. (516) 869-7662

Schedule of Construction Costs

Established Pursuant to §2-28 of the Code of the Town of North Hempstead
Updated November 17, 2007

The Construction Costs identified herein shall be used for the calculation of ALL Building permit fees. Note that the actual rates that may be charged for this work by your contractor are likely to be higher.

Residential Construction

One or Two Family Residence	New Construction	$100.00	per sf
	Alterations and Additions	$85.00	per sf
	Finished Basement/Interior Partitions (no associated structural work)	$25.00	per sf
	Roof sheathing	$10.00	per sf
	Solar panels	$10.00	per sf
Accessory Structures	Decks/Stoops	$25.00	per sf
	Sheds	$30.00	per sf
	Detached Garages	$35.00	per sf
Swimming Pools	In-ground Pools	$75.00	per sf
	Above-ground Pools	$2000	flat rate
Driveways/Flatwork/Hardscape other than retaining walls	No permit required to repair/replace existing in EXACT configuration	12.50	per sf

Commercial Construction

New Construction	Full scope including interior	$135.00	per sf
	Core and shell only	$67.50	per sf
	Tenant fit out only	$67.50	per sf
	Façade/Storefront	$42.50	per sf
	Parking structure	$67.50	per sf
Alterations and Additions	Full scope including interior	$85.00	per sf
	Tenant fit out only	$42.50	per sf
	Core and shell only	$42.50	per sf
	Façade/Storefront	$42.50	per sf
	Parking structure	$42.50	per sf
Parking Areas – on grade	No permit required to resurface/restripe existing on-grade parking areas in EXACT configuration (no change in drainage/pitch)	$35.00	per sf of paved area

General Construction – applies to Residential and Commercial Applications

Fences	up to four foot height	$12.50	per lf
	greater than four foot height	$15.00	per lf
Retaining Walls	less than 3 feet high	$25.00	per lf
	3 feet high to 5 feet high	$35.00	per lf
	greater than 5 feet high	$50.00	per lf

Town of North Hempstead

Department of Building, Safety Inspection and Enforcement
210 Plandome Road, P. O. Box 3000, Manhasset, NY 11030-2327
(516) 869-7680, 7660 FAX: (516) 869-7812

Application Number: _____
Permit Number: _____
Certificate Number: _____

APPLICATION FOR COMMERCIAL BUILDING PERMIT

Issued pursuant to the Building Zone Ordinance and the Administration and Enforcement Ordinance of the Code of the Town of North Hempstead

PLEASE FILL OUT IN TRIPLICATE COMPLETELY AND TYPE OR PRINT LEGIBLY

New Construction [ ] Addition / Renovation [ ] General [ ] Core & Shell [ ] Tenet Improvement [ ]

Section: _____ Block: _____ Lot(s): _____ Date: _____

Owner's Information:
Last Name: _____ First Name: _____ Middle Initial: ____
Address: _____ City: _____
State: _____ Zip Code: _____ Telephone Phone : ( ) _____

Applicant's Information:
Last Name: _____ First Name: _____ Middle Initial: ____
Address: _____ City: _____
State: _____ Zip Code: _____ Telephone Phone : ( ) _____

Address of Permit Activity:
Address: _____ City: _____
State: _____ Zip Code: _____ Telephone Phone : ( ) _____

Location of Permit Activity:
_____ Feet, N S E W (circle one) of _____

Description of work:
_____
_____
_____
_____

Area of Work (SF): Construction Cost Rate: Permitting Cost of Construction:

Environmental Disclosure:
Is the premises presently under the supervisory authority, control, oversight of any State or Federal Agency or required to comply with conditions established by such agency as result of environmental conditions? Yes ☐ No ☐

Zoning: Zoning District: _____ Verified by: _____ Lot Area (SF) _____
Max. Permitted Coverage (SF): _____ Proposed Coverage (SF): _____
Max. Permitted Coverage (%): _____ Proposed Coverage (%): _____
Max. Permitted Floor Area (SF): _____ Proposed Floor Area (SF): _____
Max. Permitted Floor Area Ratio: _____ Proposed Floor Area Ratio: _____
Front Yard: Required: _____ Provided: _____ Rear Yard: Required: _____ Provided: _____
Avg. Front Yard Setback (Properties Within 200 Feet): _____ Aggregate Side Yard: Required: _____ Provided: _____
Side Yard 1: Required: _____ Provided: _____ Side Yard 2: Required: _____ Provided: _____

Architect /Engineer:
Last Name: _____ First Name: _____ Middle Initial: ____ License #: _____
Street Address: _____ City: _____
City: _____ State: _____ Zip: _____ Telephone Phone #: ( ) _____

Contractor:
Last Name: _____ First Name: _____ Middle Initial: ____ License #: _____
Street Address: _____ City: _____
City: _____ State: _____ Zip: _____ Telephone Phone #: ( ) _____

Electrician:
Last Name: _____ First Name: _____ Middle Initial: ____ License #: _____
Street Address: _____ City: _____
City: _____ State: _____ Zip: _____ Telephone Phone #: ( ) _____

Plumber:
Last Name: _____ First Name: _____ Middle Initial: ____ License #: _____
Street Address: _____ City: _____
City: _____ State: _____ Zip: _____ Telephone Phone #: ( ) _____

NOT VALID UNLESS STAMPED HERE

repro copy

OWNER'S AUTHORIZATION

I (we) hereby certify that:

1. I (we) agree to permit the Building Inspector and any officer or employee of the Town of North Hempstead to enter upon the premises in the discharge of their duties with this application.

2. Approved plans and a copy of the approved permit shall remain on the premises at all times until a Certificate of Occupancy / Completion / Approval is issued. These plans will be made available to the Building Inspector upon request.

3. Building Inspector shall be given a minimum forty-eight (48) hours notice to make the required inspection and no work shall continue until such inspection has been completed and approved.

4. Owner or his representative shall be responsible to arrange for all required inspections.

5. Owner shall be responsible for the presence of the appropriate representative for the required inspection as directed by the Building Inspector.

6. Permit shall expire three (3) months from the date of issuance unless construction is in progress. No work is to be started until permit has been received and posted by the owner / applicant. Commencement of any work prior to the receipt and posting of the permit will result in the assessment of triple fees penalties pursuant to §2-28 C (15) of the Code of the Town of North Hempstead.

7. Work shall be permitted between the hours of 7:30 AM and 6:00 PM, Monday through Friday only.

8. Occupancy or Use of the premises without first obtaining Certificates of Completion / Approval is unlawful and may subject the owner of the premises to the penalties described in the Code of the Town of North Hempstead.

State of New York }
County of Nassau }

_____
please print - property in name of

depose and says that he /she resides at _____
mailing address of owner

in that State of _____, that he /she is the owner in fee of all certain lots, parcels of land shown on the attached survey Section: _____, Block: _____, Lot(s): _____, situated, lying and being within the unincorporated area of the Town of North Hempstead; that I /We have read and understand items one (1) through eight (8) as herein stated, recognize the he / she is responsible for all activities occurring on the property, and that failure to comply with any of these items, notwithstanding any other items defined in the Code of the Town of North Hempstead, may result in the temporary suspension or permanent revocation of the permits issued for construction on the premises in accordance with the Code of the Town of North Hempstead.

Signature of Owner: _____

Sworn to me this _____ day of _____, 200

Signature of Notary Public: _____

DO NOT WRITE BELOW - FOR OFFICE USE ONLY

Parallel Permits:	Type:	Permit Number:	Inspector:
**********			
**********			
**********			
**********			
**********			

Final Survey Received:		Electrical Certificate Number:	
Final Inspection Date:		Inspector Signature:	

repro copy

Town of North Hempstead

Department of Building Safety Inspection and Enforcement

210 Plandome Road, Manhasset, NY 11030-2327

Tel. (516) 869-7660 Fax. (516) 869-7662

Appl. Number: _____ (Official Use Only)

COMMERCIAL ZONING ANALYSIS SUBMISSION SHEET

[Required for submission with all Commercial Alterations , Additions and New Building Permit Applications.]

Address: _____

Section: _____ Block: _____ Lot (s): _____

Zoning District	_____	Total Lot Area:	_____ sq. ft.
Max. Permitted Coverage:	_____ sq. ft.	Proposed Coverage:	_____ sq. ft.
Max. Permitted Coverage	_____ %	Proposed Coverage (%):	_____ %
Front Yard Required:	_____ ft.	Front Yard Provided:	_____ ft.
Front Yard Required	_____ ft.	Front Yard Provided (Corner	_____ ft.
Min. Side Yard Permitted:	_____ ft.	Side Yard (1) Provided:	_____ ft.
Min. Side Yard Permitted:	_____ ft.	Side Yard (2) Provided:	_____ ft.
Rear Yard Required:	_____ ft.	Rear Yard Provided:	_____ ft.
Landscaped Buffer	_____ ft.	Landscaped Buffer	_____ ft.
Max. Height Permitted:	_____ ft.	Max. Height Proposed:	_____ ft.

Parking Calculations: To Be Calculated Per the Following Requirements

Retail (deduct 1,000 sf)	1 space : 300 sf	_____ sf	_____ spaces
Office	1 space : 200 sf	_____ sf	_____ spaces
Medical Office	1 space : 150 sf	_____ sf	_____ spaces
All Other Business	1 space : 300 sf	_____ sf	_____ spaces
Assembly	1 space : 4	_____ sf	_____ spaces
Warehouses / Storage	1 space : 600 sf	_____ sf	_____ spaces
Other	1 space :	_____ sf	_____ spaces
Parking Spaces Required:		_____	_____ spaces
Off Street Loading Bays:	1 : 10,000 sf	_____ sf	_____ loading bays

Architect / Engineer: Business / Corporate _____

First: _____ Last: _____ Middle ___ Lic. _____

Street _____ City: _____

State _____ Zip _____ Tel. _____ Fax _____

Architect /Engineer Stamp and Original Signature MUST appear here.