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New York State Department of Environmental Conservation
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Sub-Slab Depressurization System Installation Summary Report

Bridge Cleaners – OU2 – Off-Site

39-26 30th Street

Long Island City, NY

January 9, 2019

Version 1.0

Sub-Slab Depressurization System Installation Summary Report

Bridge Cleaners – OU2 – Off-SIte
39-26 30th Street, Long Island City, NY

Prepared for:
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Professional Engineer 1 (Environmental)
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New York State Department of Environmental Conservation
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Prepared by:
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GES Project:
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Date:
January 2019

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2019.01.08 15:04:57
-05'00'

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Project Manager

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Acronyms

Airtek	Airtek Environmental
ASTM	American Society for Testing and Materials
AWT	AWT Environmental Services, Inc.
BC	Building Code
DOB	Department of Buildings
GES	Groundwater & Environmental Services, Inc.
i.w.	Inches of water column
NYCDOB	New York City Department of Buildings
NYSDEC	New York State Department of Environmental Conservation
PVC	Polyvinyl Chloride
ROI	Radius-of-influence
SSD	Sub Slab Depressurization
SSDS	Sub Slab Depressurization System

1 Introduction

Groundwater and Environmental Services, Inc. (GES) has prepared this report to summarize sub-slab depressurization system (SSDS) installation activities completed at 39-37 29th Street (Airtek Environmental) in September 2018. The subject property is located west of New York State Department of Environmental Conservation (NYSDEC) Site #241127, referred to as the former Bridge Cleaners. A Site Location Map is provided as **Figure 1** and an Expanded Site Map is provided as **Figure 2**.

The SSDS was designed and constructed as outlined in the *Off-Site Sub-Slab Depressurization System Design Report (Design Report)* dated May 3, 2018. Based on communication testing and as outlined in the *Design Report*, a vacuum blower capable of a maximum vacuum of 15 inches of water (i.w.) was selected. During Site testing, this applied vacuum resulted in an estimated induced vacuum radius-of-influence (ROI) of approximately 42 feet at test point SV-1 and approximately 59 feet at test point SV-2.

2 SSD System Installation

The SSD system is designed to apply negative pressure beneath the basement floor of the Airtek building in order to mitigate the potential for a vapor intrusion pathway between the subsurface and the indoor air. Based on the feasibility testing vacuum influence from December 2018, two suction points were installed through the basement slab and connected to an SSD fan via above-grade piping.

The installation of the suction points, piping, and fan was completed in accordance with New York City Building Code (BC) of 2014 under New York City Department of Buildings (NYCDOB) permit number 421655140-01-EW-MH (included as **Appendix A**). AWT Environmental Services, Inc. (AWT) of Sayreville, New Jersey was contracted by GES to complete the SSD system installation. A Mitigation System Installation Record in included as **Appendix B**.

2.1 Suction Point Install

Two (2) suction points, SP-1 and SP-2, were installed in the concrete slab of the Airtek building basement. The suction points were relocated from their proposed location in the middle of the basement because the property owner identified the walls adjacent to the proposed locations to be temporary walls. The suction points SP-1 and SP-2 were relocated adjacent to the wall along the southern boundary of the building. A SSDS Layout Map detailing the location of the two (2) suction points is included as **Figure 3**.

Each suction point was installed utilizing a core drill to install a hole in the concrete slab with a diameter of 10-inches. Approximately one cubic foot of sub-slab material from below each suction hole was removed to create a void space. A hubless cast iron pipe was installed into the void space at approximately 3-inches below the bottom of the concrete slab inside the suction hole. The void space was backfilled with clean stone and sealed with non-shrink grout to securely seal

the space between the pipe and the concrete slab. Photographs of the installed suction points are included in **Appendix C**.

2.2 Piping Install

All piping on the interior of the building is hubless cast iron as required by NYCDOB code. Each suction point has its own individual 3-inch diameter hubless cast iron line with a sample port and a ball valve. The sample port is utilized to collect pressure readings with a manometer that is mounted to the vertical pipe. Currently, the ball valve at each suction point location is in the fully open position.

The hubless cast iron pipe is 3-inches in diameter on each individual line for the suction points and transitions to 4-inches in diameter for the one (1) combined line. Pipe from the suction points is secured at a minimum of every 8-feet to the walls by clevis-type hangers with 1/2 inch rods or channel conduit and clamps. All horizontal pipe after the suction point is sloped back towards the suction point at approximately 1.5% slope to ensure that water from rain or condensation drains downwards into the ground beneath the slab.

The hubless cast iron pipe transitions to PVC at the fan inlet. Fan discharge piping is 2-inch schedule 40 PVC and runs to approximately 2-feet above the roofline per American Society for Testing and Materials (ASTM) 2121. The 2-inch piping transitions to 3-inch piping for the last 6-inches of piping to install a rain guard and critter guard which prevent rain and debris from entering the piping and getting into the fan. Photographs of the installed pipe throughout the system are included in **Appendix C**.

All wall penetrations between floors and between the interior and exterior of the building are sealed with red fire barrier sealant caulk. Piping is identified in the interior of the building every 20 feet with a label reading “ACTIVE SUB-SLAB VENT SYSTEM – DO NOT ALTER”. Piping flow direction is also labeled on the individual lines from the suction points and at piping intersections. Photographs of fire wall penetrations and pipe labels are included in **Appendix C**.

2.3 Fan Install

A RadonAway HS2000 fan was selected for the SSDS based on the results of the feasibility test. The HS2000 fan is capable of applying a maximum pressure of 14 inches of water (i.w) based on the manufacturer specifications.

The SSD system fan is mounted vertically on the exterior of the building approximately 15 feet above grade near the southwest corner of the building. A photograph of the fan mounted on the exterior of the building is included in **Appendix C**. Fan specifications are included in **Appendix D**.

2.4 Electrical Wiring

Electrical wiring for the SSDS was completed by a New York State licensed electrician. All wiring was completed in accordance with state and local building codes. A dedicated circuit for the RadonAway HS2000 fan was installed in the building circuit breaker panel which is located in the

basement of the building. Rigid conduit runs from the circuit breaker panel in the basement to the RadonAway HS2000 fan mounted on the exterior of the building. Photographs of the circuit breaker panel are included in **Appendix C**.

2.5 NYCDOB Permitting

SSDS installation activities were completed under NYCDOB permit number 4215655140-01-EW-MH. A copy of the permit is included as **Appendix A**. The NYCDOB permit requires special inspections be completed in accordance with NYC BC of 2014. The special inspections included the following:

- Energy Code Compliance (BC 110.35).
- Mechanical Systems (BC 1704.16)
- Fire-Resistant Penetrations and Joints (BC 1704.27)
- Final Inspection (BC 28-116.2.4.2 and Directive 14 of 1975)

An inspector with Alan Margolin & Associates Consulting Engineers and Architects, D.P.C. completed the inspection on October 12, 2018. A copy of the Special Inspection Report is included as **Appendix E**. All items required of the special inspections were either approved or not applicable.

3 SSD System Operation

3.1 Start-Up

Operation of the SSD system was started on October 12, 2018, following the completion of the NYCDOB special inspections. Start-up activities included operating the HS2000 fan and completing SSD system communication testing.

Manometers were permanently installed at each suction point (SP-1 and SP-2) to measure applied vacuum at each point. During start-up, SP-1 had a measured vacuum of 11.0 i.w. and SP-2 had a measured vacuum of 11.5 i.w. A digital micromanometer was utilized to collect sub-slab differential pressure readings from 11 permanent sub-slab points for communication testing. A Monitoring Point Location Map detailing the location of the two (2) suction points and the eleven (11) temporary points is included as **Figure 4**. During communication testing with applied vacuums of 11.0 i.w. at SP-1 and 11.5 i.w. at SP-2, at least 0.004 i.w. of vacuum was observed at all 11 monitoring points. Results of the communication testing are included below:

Communication Testing - 10/12/2018

Date	Location	Reading/Result (i.w.)	Distance From Suction Point (feet)	Passed?
10/12/2018	T1	1.352	6 feet from SP-1	Y
	T2	0.353	21 feet from SP-1	Y
	T3	0.873	19.5 feet from SP-1; 20 feet from SP-2	Y
	T4	0.637	14 feet from SP-1	Y
	T5	0.157	32 feet from SP-1	Y
	T6	0.346	16.5 feet from SP-1	Y
	T7	0.246	24 feet from SP-2	Y
	T8	0.628	16 feet from SP-2	Y
	T9	0.094	38.5 feet from SP-2	Y
	T10	0.105	34 feet from SP-2	Y
	T11	0.285	19.5 feet from SP-2	Y

A map depicting the anticipated system vacuum ROI at approximately 10 i.w. based on the results of the 2017 pilot test and the actual vacuum readings collected during communication testing on October 12, 2018 is included as **Figure 5**.

3.2 System Check

After two (2) weeks of operation of the SSDS, a system check was conducted to monitor the operation of the system on October 22, 2018. The HS2000 Fan was operating upon arrival and a visual inspection indicated the system and system piping was in good operating condition with no leaks. Additional communication testing results were collected during the system check and are summarized below:

Communication Testing - 10/22/2018

Date	Location	Reading/Result (i.w.)	Distance From Suction Point (feet)	Passed?
10/22/2018	T1	1.380	6 feet from SP-1	Y
	T2	0.380	21 feet from SP-1	Y
	T3	0.910	19.5 feet from SP-1; 20 feet from SP-2	Y
	T4	0.645	14 feet from SP-1	Y
	T5	0.155	32 feet from SP-1	Y
	T6	0.375	16.5 feet from SP-1	Y
	T7	0.230	24 feet from SP-2	Y
	T8	0.645	16 feet from SP-2	Y
	T9	0.090	38.5 feet from SP-2	Y
	T10	0.115	34 feet from SP-2	Y
	T11	0.275	19.5 feet from SP-2	Y

Following the system check, one (1) drum of soil was removed for the site and transported to the MXI Environmental, Inc, disposal facility located in Abingdon, Virginia. The drum of soil was generated during suction point installation activities. A copy of the waste disposal manifest is included as **Appendix F**.

3.3 Operations, Maintenance and Monitoring

3.3.1 System Performance Monitoring

The SSD system shall be inspected periodically by the building occupant. Inspections should include:

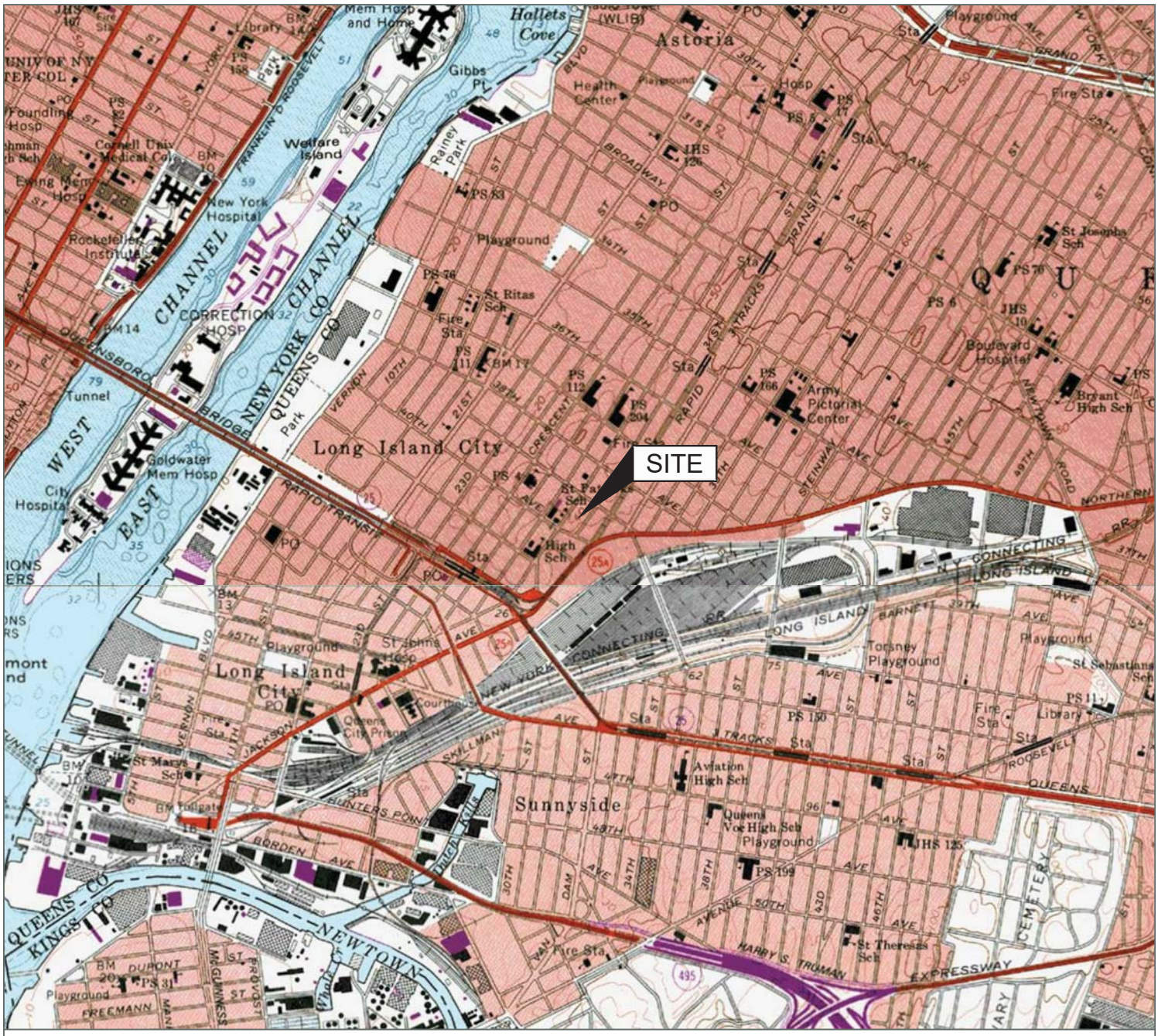
- A visual inspection of the system to inspect the condition of the fan, piping, labeling, and manometers.
- Ensure that the fan is operating and all piping/labels/manometers are in good condition.
- Observe the vacuum at each suction point via the manometer. Valves at the suction points should be fully open and vacuum at the suction points should be higher than 10 i.w.
- Inspect the fan discharge point on the roof and confirm that no air intakes have been installed within 10 feet of the discharge.
- Check the circuit breaker panel in the basement which controls the SSDS is still labeled as “Environmental Exhaust Fan”.
- Inspect the basement slab for any penetrations. At the time of the SSDS installation, there were no sumps, drains, large cracks, or other penetrations noted in the basement slab.

If the vacuum at each suction point is observed to be below 10 i.w. or if any new penetrations in the basement slab are observed, vacuum at the 11 sub-slab points in the building basement should be monitored to ensure a vacuum of at least 0.004 i.w. is present across the basement slab. Additionally, any piping/labels/manometers found to be in poor condition should be repaired or replaced.

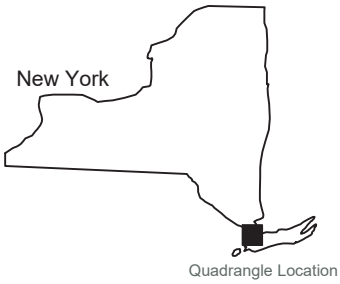
3.3.2 SSD System Maintenance

There are no routine maintenance procedures other than repair/replacement of any damaged piping, labels, or manometers as outlined in Section 3.3.1. If the HS2000 fan is found to be non-operational, first ensure that the circuit breaker in the basement for the “Environmental Exhaust Fan” is on. If the fan is still not operational, the building occupant has been instructed to contact the NYSDEC at 1-888-459-8667 or by email at derweb@dec.ny.gov.

Figures



Source:
USGS 7.5 Minute Series
Topographic Quadrangle, 1979
Central Park, New York
Contour Interval = 10'



Site Location Map

NYSDEC
39-26 30th Street
Long Island City, New York

Drawn
W.G.S.
Designed

Approved

Date
1-8-18
Figure
1

N

Scale In Feet
0 2000

Groundwater & Environmental Services, Inc.

Expanded Site Map

NYSDEC
39-26 30th Street
Long Island City, New York

Drawn
W.G.S.
Designed

Approved

Date
1-8-18
Figure
2

Scale In Feet
0 30

Groundwater & Environmental Services, Inc.

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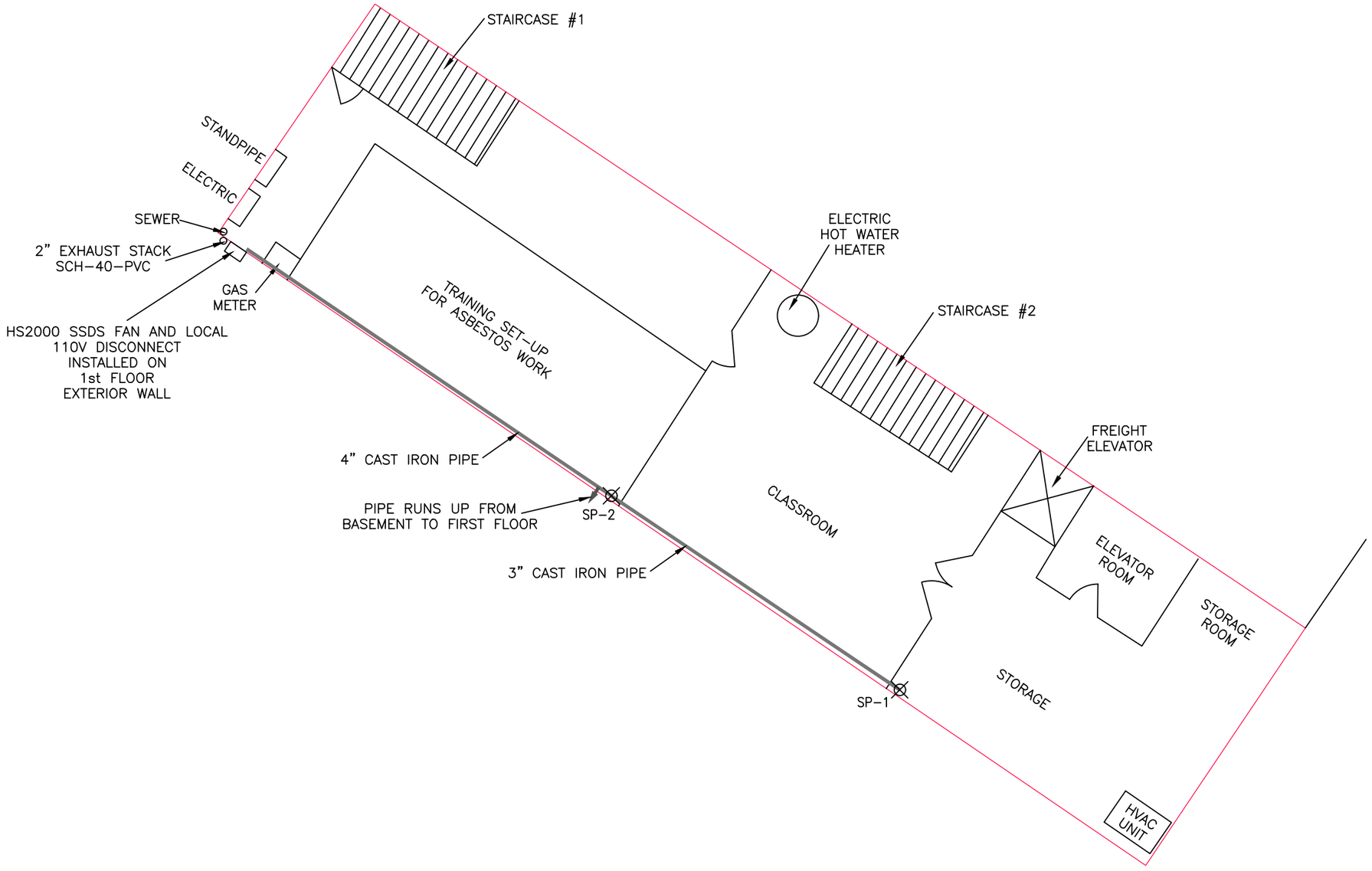
LEGEND

⊗ Suction Point



SSDS Layout Map
Basement and First Floor

NYSDEC
39-37 29th Street
Airtek Building
Long Island City, New York

Drawn W.G.S.
Designed
Approved

Date 12/3/18
Figure 3

N

Scale In Feet
0 10

GES
Groundwater & Environmental Services, Inc.

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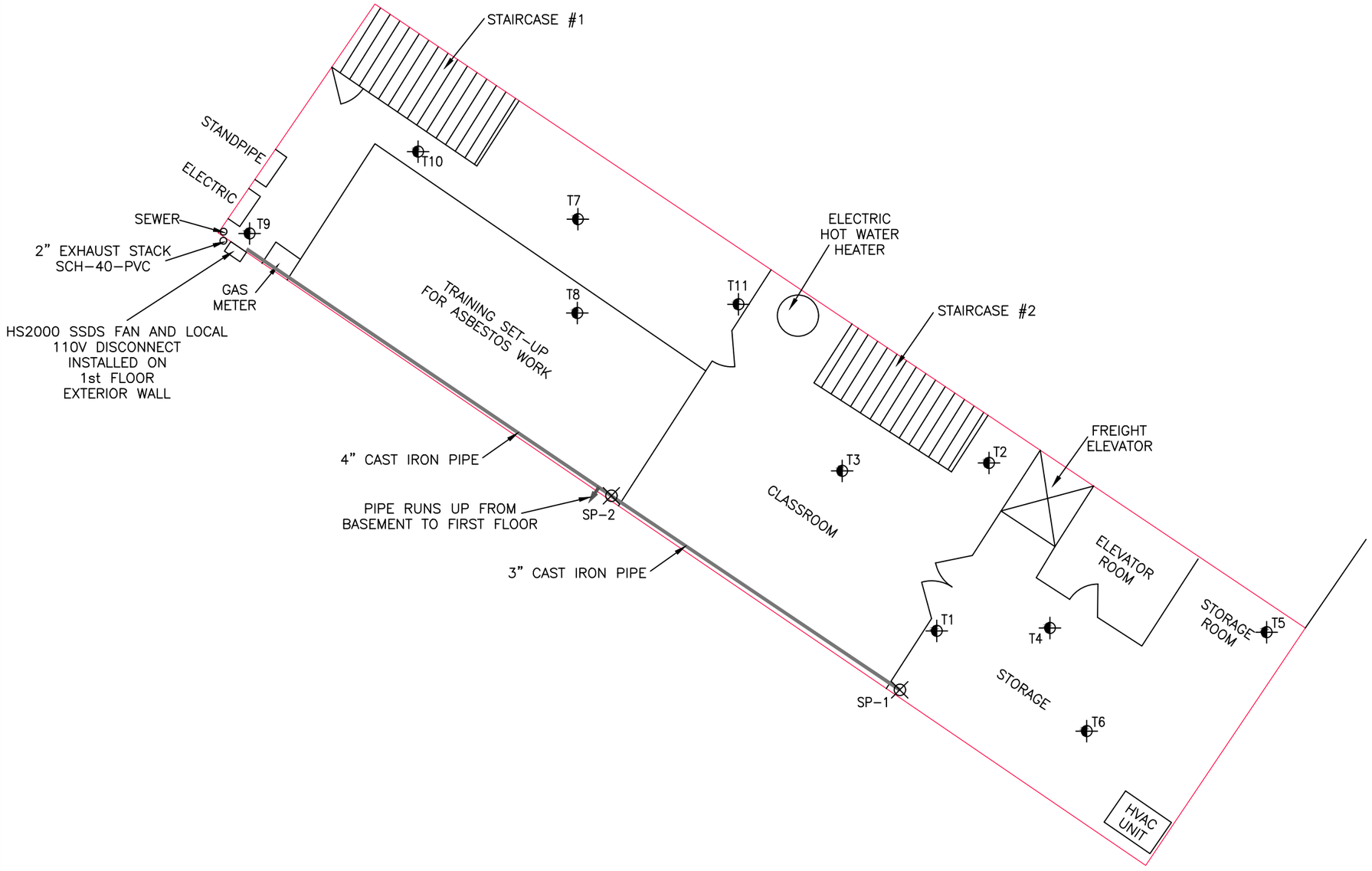
LEGEND

⊗ Suction Point

⊕ TEST POINT



Monitoring Point Location Map

NYSDEC
39-37 29th Street
Airtek Building
Long Island City, New York

Drawn W.G.S.
Designed
Approved

Date 12/3/18
Figure 4

N

Scale In Feet
0 10

GES
Groundwater & Environmental Services, Inc.

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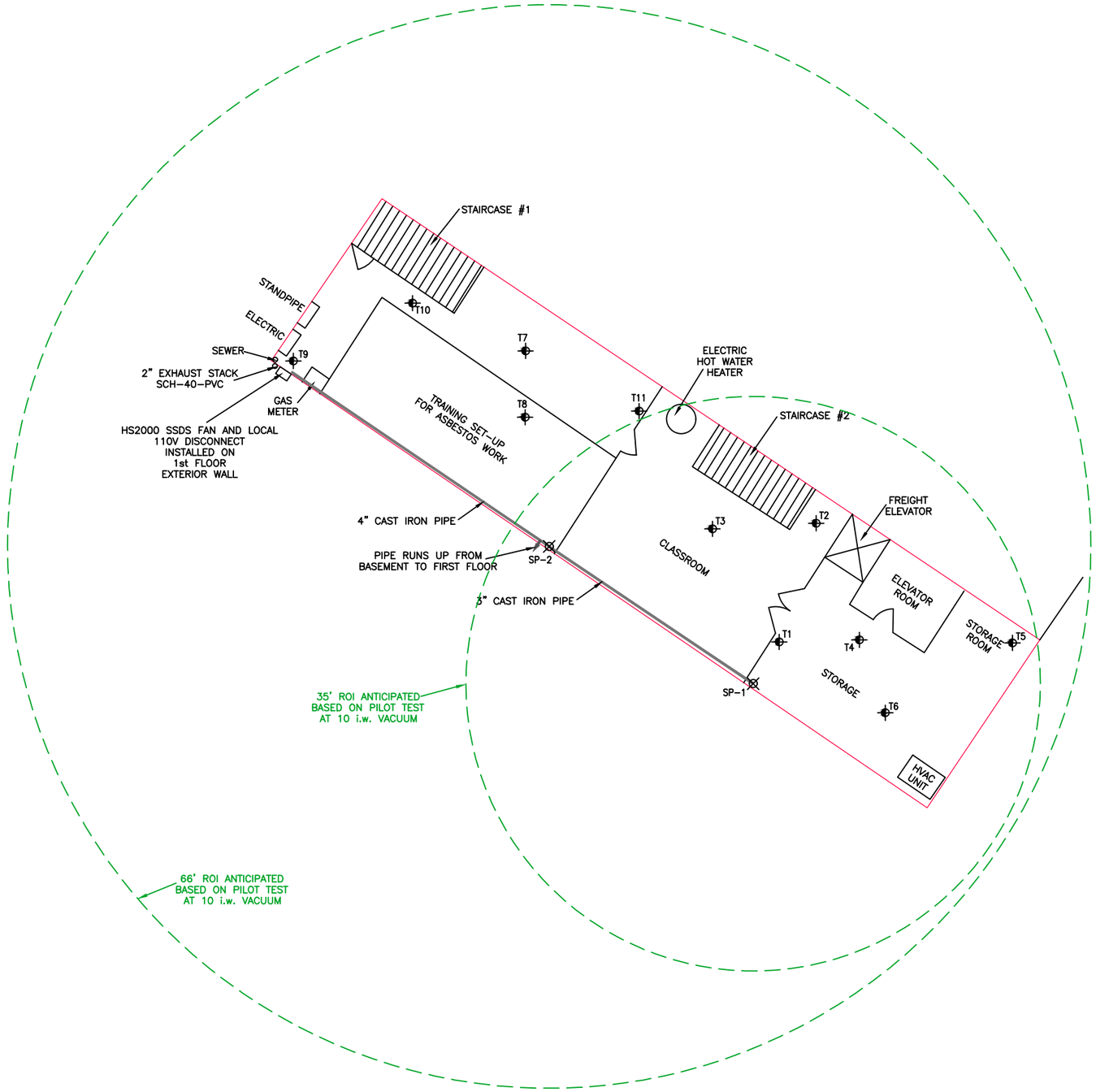

LEGEND

- Suction Point
- TEST POINT

ACTUAL VACUUM READINGS FROM INSTALLED SUBSLAB DEPRESSURIZATION SYSTEM

Date	Location	Vacuum Reading/Result (i.w.)
10/12/2018	T1	1.352
	T2	0.353
	T3	0.873
	T4	0.637
	T5	0.157
	T6	0.346
	T7	0.246
	T8	0.628
	T9	0.094
	T10	0.105
	T11	0.285

SSDS Vacuum Map

NYSDEC
39-37 29th Street
Airtek Building
Long Island City, New York

Drawn W.G.S.
Designed
Approved
Date 1/8/19
Figure 5

Scale In Feet
0 15

Groundwater & Environmental Services, Inc.

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Appendix A – NYC DOB Permit

NYC Buildings

Work Permit Department of Buildings

Permit Number: *421655140-01-EW-MH*

Issued: *08/29/2018* Expires: *11/05/2018*

Address: *QUEENS 3937 29TH STREET*

Issued to: MELISSA NEMETH

Business: AWT ENVIRONMENTAL SVCS IN

Contractor No: GC-603304

Description of Work:

ALTERATION TYPE 2 - MECH/HVAC MODIFICATION TO EXISTING HVAC SYSTEM AS PER PLANS FILED HEREWITH. NO CHANGE IN USE, EGRESS OR OCCUPANCY UNDER THIS APPLICATION.

Number of dwelling units occupied during construction: 0000
Review is requested under Building Code: 2014 *SITE FILL: NOT APPLICABLE*

To see a Zoning Diagram (ZD1) or to challenge a zoning approval filed as part of a New Building application or Alteration application filed after 7/13/2009, please use "My Community" on the Buildings Department web site at www.nyc.gov/buildings.

Emergency Telephone Day or Night: 311

Borough Commissioner:

Commissioner of Buildings:

Tampering with or knowingly making a false entry in or falsely altering this permit is a crime that is punishable by a fine, imprisonment or both.

01 08/29/2018

OP-35A (5/10)

Appendix B – Mitigation System Installation Record

Mitigation System Installation Record

☐ Structure was sampled previously

System Information

Site No: 241127

System ID: Sub-Slab Depressurization

Site Name: Bridge Cleaners

Owner Name: Airtek Environmental ☐ Owner Occupied

System Address: 39-37 29th Street Telephone: 718-937-3720

City: Long Island City Zip: 11101 Alt. Telephone:

Contractor Information

Installer Name: Jessica Thomas Company: GES, inc.

Telephone: 800-360-9405 x4328

Building Conditions

Building Type: General Commercial

Slab Integrity: ○ Poor ○ Average ○ Good ◉ Excellent

Slab Penetrations: ☐ Sump ☐ Floor drain ☐ Perimeter drain ☒ Other

Describe:

N/A

Observed Water: ◉ Dry ○ Damp ○ Sump only ○ Standing

Describe:

System Installation

Installation Type: Sub-Slab Depressurization (Active) Date Installed: 10/12/2018

Slab Thickess (inches): >5 in.

Subslab Material: Silt Subslab Moisture: Dry

Number of Suction Points: 2 Number of Fans Installed: 1

	☒ Fan #1 Operating	☐ Fan #2 Operating	☐ Fan #3 Operating
Fan Model No(s):	RadonAway HS2000		
Fan Serial No(s):	011805		
Final U-Tube Levels:	11.0 i.w. @ SP-1; 11.5 i.w. @ SP-2		

Additional Mitigation Elements (check all that apply):

☐ Drainjer ☐ Membrane ☐ Sealed cracks ☐ New floor ☒ Rain cap ☐ Other

Comments:

Communication Testing

Test Method: Micromanometer Meter Type/Manufacturer: TSI Alnor AXD620

Location	Reading/Result	Dist. From Suction Point (ft)	Passed?
T1 through T11	See Table 1 (attached)	Varies	☒
			☐
			☐
			☐
			☐

System Sketch
(indicate notable features, location of extraction points, and communication test holes)

NORTH

See attached Figure

Mitigation System Installation Record
NYSDEC Site #
39-37 29th Street, Long Island City, NY

TABLE 1

Communication Testing

Date	Location	Reading/Result (i.w.)	Distance From Suction Point (feet)	Passed?
10/12/2018	T1	1.352	6 feet from SP-1	Y
	T2	0.353	21 feet from SP-1	Y
	T3	0.873	19.5 feet from SP-1; 20 feet from SP-2	Y
	T4	0.637	14 feet from SP-1	Y
	T5	0.157	32 feet from SP-1	Y
	T6	0.346	16.5 feet from SP-1	Y
	T7	0.246	24 feet from SP-2	Y
	T8	0.628	16 feet from SP-2	Y
	T9	0.094	38.5 feet from SP-2	Y
	T10	0.105	34 feet from SP-2	Y
	T11	0.285	19.5 feet from SP-2	Y

Notes:

Results from communication testing for Mitigation System Installation Record

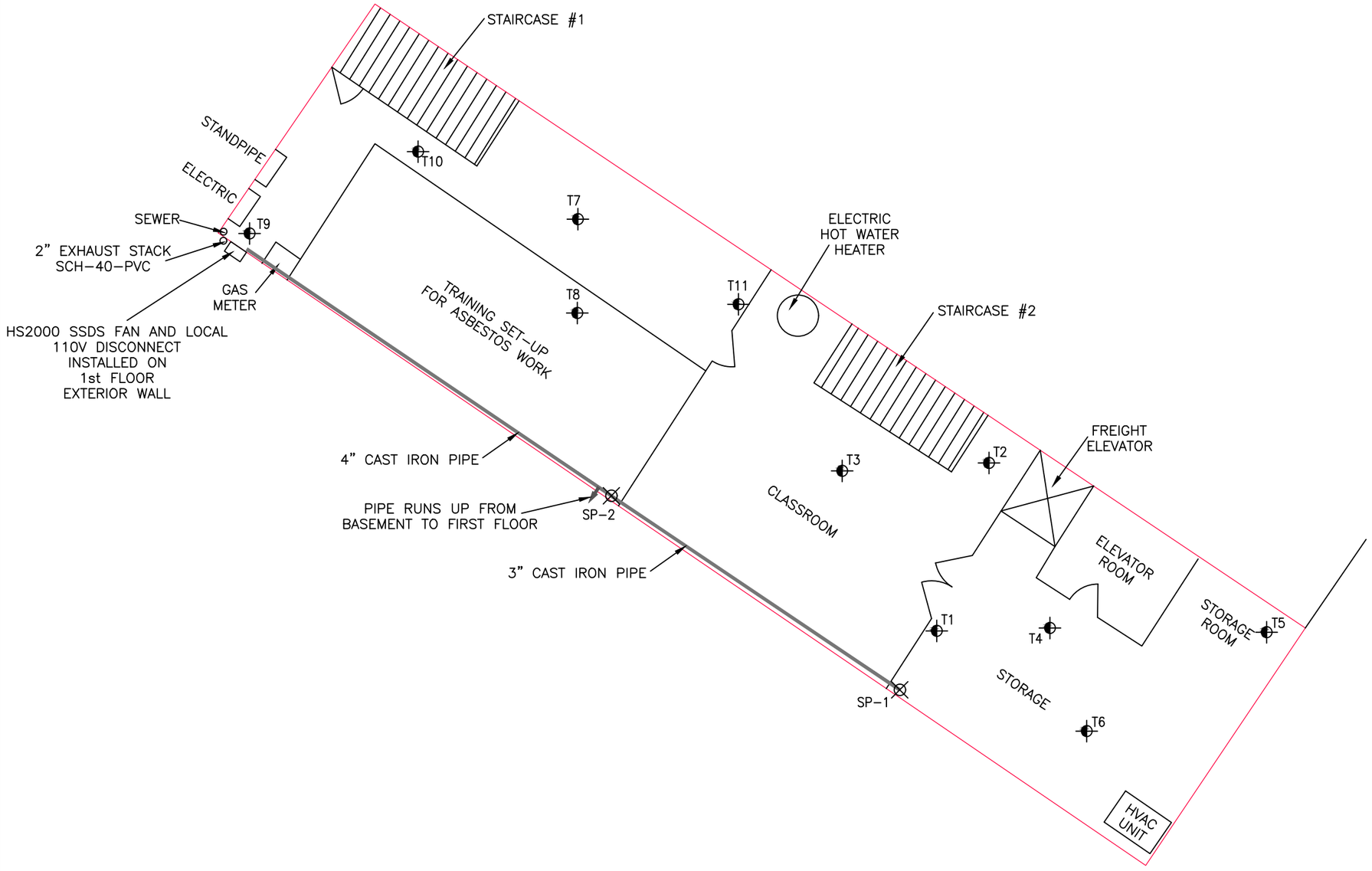
i.w. = inches of water

Y = yes

LEGEND

⊗ Suction Point

⊕ TEST POINT



Monitoring Point Location Map

NYSDEC
39-37 29th Street
Airtek Building
Long Island City, New York

Drawn W.G.S.
Designed

Approved

Date 12/3/18
Figure

N

Scale In Feet

0 10

GES

Groundwater & Environmental Services, Inc.

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Appendix C – Photograph Log

Photograph Log

SSDS Installation Summary Report
Bridge Cleaners
39-26 30th Street, Long Island City, NY

Photograph 1:

Date: 10/10/2018

Description:
Vertical piping from suction point SP-2.

Photograph 2:

Date: 10/12/2018

Description:
Vertical piping from suction point SP-2 with manometer mounted to piping.

Photograph 3:

Date: 10/10/2018

Description: View of piping flow direction labels where vertical piping from SP-2 and horizontal piping from SP-1 combine to one line and exit out the top of the basement floor.

Photograph 4:

Date: 10/10/2018

Description: Horizontal piping from SP-1 with pipe labeling every 20 feet.

Photograph 5:

Date: 10/10/2018

Description: Horizontal piping from SP-1 with pipe labeling every 20 feet.

Photograph 6:

Date: 10/10/2018

Description: Vertical and horizontal piping from suction point SP-1.

Photograph 7:

Date: 10/12/2018

Description: Vertical piping from suction point SP-1 with manometer mounted to piping.

Photograph 8:

Date: 10/12/2018

Description: Temporary point installed to monitor differential pressure throughout the slab in the Airtek basement.

Photograph 9:

Date: 10/10/2018

Description: View of vertical piping that runs from basement to the first floor in the Airtek building.

Photograph 10:

Date: 10/10/2018

Description: View of horizontal piping on first floor of Airtek building.

Photograph 11:

Date: 10/10/2018

Description: Red fire barrier sealant caulk is used to seal the penetration from the basement to the first floor of the Airtek building.

Photograph 12:

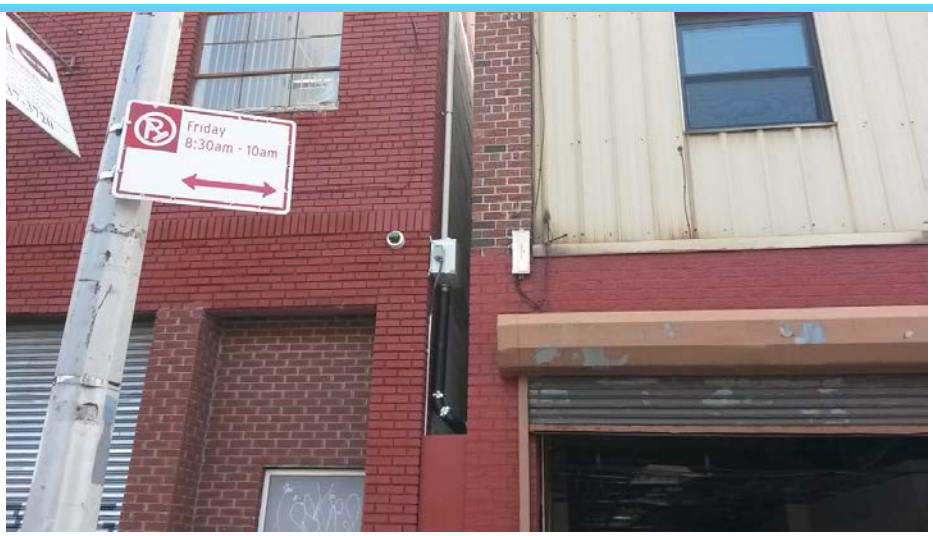
Date: 10/10/2018

Description: Red fire barrier sealant caulk is used to seal the penetration from the interior to the exterior of the Airtek building.

Photograph 13:

Date: 10/12/2018

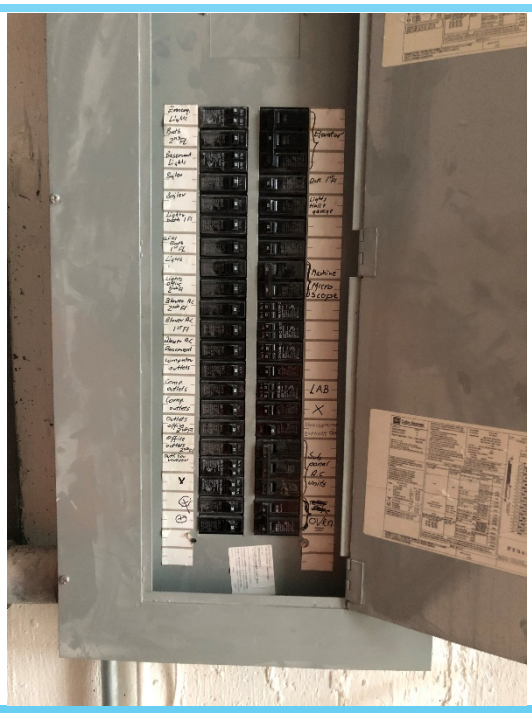
Description: View of the HS2000 fan mounted on the southeast corner of the Airtek building.



Photograph 14:

Date: 10/10/2018

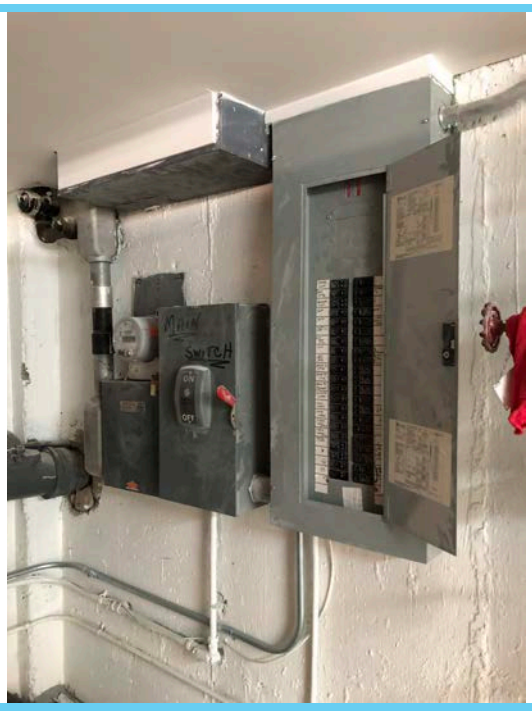
Description: View of the circuit breaker panel.



Photograph 15:

Date: 10/10/2018

Description: View of the circuit breaker panel and disconnect switch in the basement of the Airtek building.



Appendix D – HS2000 Fan Specifications

Zoom

HS2000 Radon Fan w/ Power Cord

SKU: 23004-1

Be the first to review this product

HS fans offer a proven solution for tough radon mitigation jobs, providing up to 25 times the suction of inline tube fans to deal with sand, tight soil or clay sub-slab material.

NOTICE

Log In to Purchase

RadonAway is a B2B business only. You must be an approved RadonAway customer to purchase products through this website. If you are an existing RadonAway customer and need a website login, click here. If you are a professional and would like to become a RadonAway customer, click here.

Add to Wishlist

Add to Compare Share

Product Categories

- Radon Fans
  - Pro Series
  - Contractor Series
  - GP 500
  - SF180
  - HS Series
  - Fantech HP/FR Fans
  - Energy Star® Rated Radon Fans
- HRVs / ERVs
- Radon System Components
- Mitigation Tools & Diagnostic Aids
- Sealing Products
- Crawlspace Moisture and Radon Control
- Sump Pumps & Accessories
- Pipe Accessories
- Radon System Accessories
- Radon in Water Removal Systems

Details | Additional Info | Reviews | Conditions of Sale

Features:

Internal condensate bypass
Mounts vertically indoors or outdoors
Inlet: 3.0" PVC/Outlet: 2.0" PVC
Weight: 18 lbs.
Size: 15"W x 13"H x 8"D
One-year limited warranty (3-year option available)

Radon Fan Model Selection Guidelines:

(Choice of model is dependent on building characteristics and should be made by a radon professional.)

HS2000 - High suction and high flow for large areas such as schools and commercial buildings
HS3000 - Single family homes with very tight sub-slab material
HS5000 - For extremely tight sub-slab material or where the number of holes is restricted; also useful for high altitudes

Additional Fan Information:

Downloadable Fan Installation Instructions (PDF format)
Calculate your estimated annual electrical cost.

Typical CFM vs. Static Pressure WC

Model	P/N	Watts	Recomm Max Op Pressure "WC	0"	10"	15"	20"	25"	35"
HS2000 w/cord	23004-1	159-318	14	63	37	12	-	-	
	23004-4	159-318	14	63	37	12	-	-	-

Radon Testing +
Spruce Inline Ventilation +
Canada Fulfillment +
Air Purifiers

1-2 day shipping in most of US Read more...

Five year manufacturer's warranty on RadonAway fans

Free technical support for our customers

Contact Us

Model	P/N	Watts	Recomm Max Op Pressure "WC	Typical CFM vs. Static Pressure WC 0"	10"	15"	20"	25"	35"
HS2000 w/switch box									
HS3000 w/cord	23004-2	120-250	21	39	30	25	19	-	-
HS3000 w/switch box	23004-5	120-250	21	39	30	25	19	-	-
HS5000 w/cord	23004-3	202-350	35	44	37	33	29	25	16
HS5000 w/switch box	23004-6	202-350	35	44	37	33	29	25	16

Related

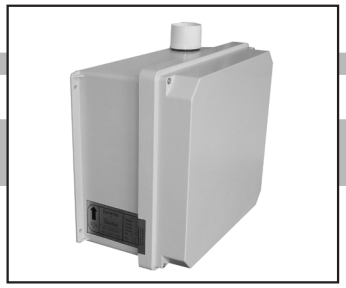
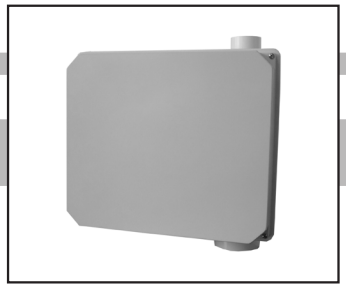
Magnehelic® Manometer by Dwyer
Add to Wishlist

2 X 3 Black Coupling (Single)
Add to Wishlist

3 x 3 White C (Single)
Add to Wishlis

RadonAway®

The World's Leading
Radon Fan Manufacturer

HS Series

Installation & Operating Instructions

RadonAway
3 Saber Way | Ward Hill, MA 01835
www.radonaway.com

P/N IN007-REV K

10/15

RadonAway Ward Hill, MA.

HS Series Fan Installation & Operating 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.
   See Vapor Intrusion Application Note #AN001 for important information on VI applications. RadonAway.com/vapor-intrusion
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.
10. **WARNING!** TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

    a) Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.

    b) Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The HS Series Fan is intended for use by trained, certified/licensed, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of the HS Series Fan. This instruction should be considered as a supplement to EPA/Radon Industry 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 HS Series Fan 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 HS Series Fan should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F. The HS Series Fan is thermally protected such that it will shut off when the internal temperature is above 104 degrees F. Thus if the HS Series Fan 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 HS Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. There are, however, some considerations to be taken into account in the system design and installation. When installing the HS Series Fan 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 HS Series Fan 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 24002, is strongly recommended.

1.4 GROUND WATER

Under no circumstances should water be allowed to be drawn into the inlet of the HS Series Fan as this may result in damage to the unit. The HS Series Fan should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the HS Series Fan 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 HS Series Fan. The lack of cooling air will result in the HS Series 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 HS Series Fan be disconnected until the water recedes allowing for return to normal operation.

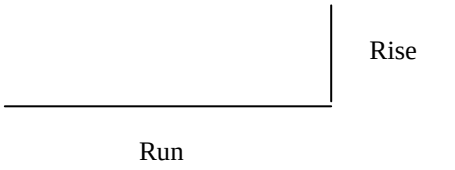
1.5 CONDENSATION & DRAINAGE

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

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 HS Series Fan inlet piping, the following table provides the minimum recommended pipe diameters as well as minimum pitch under several system conditions. 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 MONITOR AND LABEL

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. A System Label (P/N 15022) with instructions for contacting the installing contractor for service and also identifying the necessity for regular radon tests to be conducted by the building occupants, must be conspicuously placed where the occupants frequent and can see the label.

1.7 SLAB COVERAGE

The HS Series Fan 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

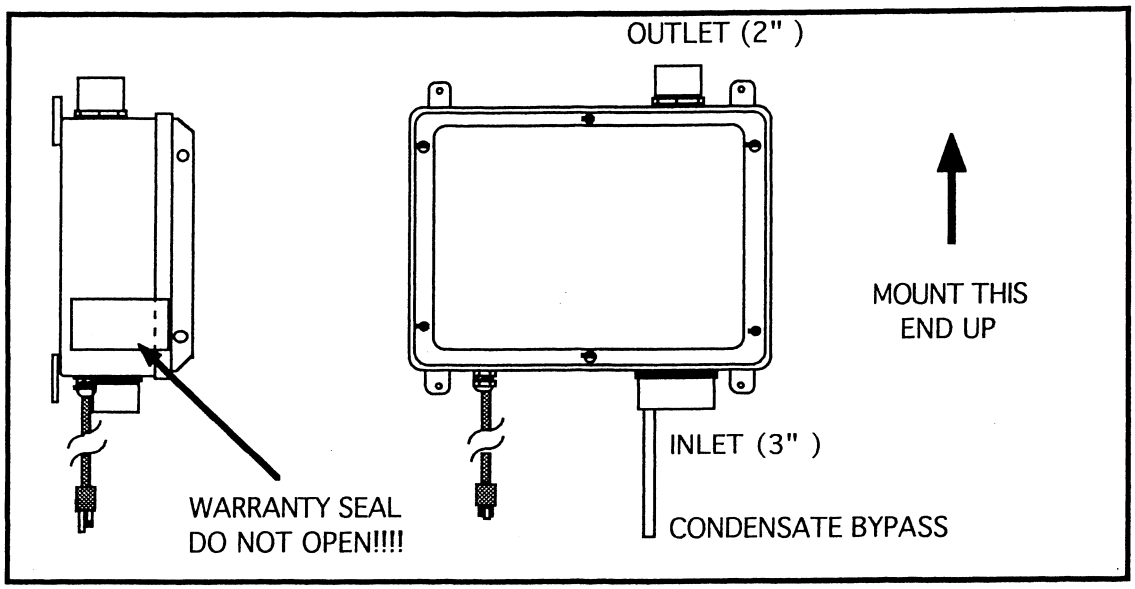
The HS Series Fan plugs into a standard 120V outlet. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly caulked to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

1.8a ELECTRICAL BOX (optional)

The optional Electrical Box (p/n 20003) provides a weather tight 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. Ensure that all exterior electrical boxes are outdoor rated and properly caulked to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.

1.9 SPEED CONTROLS

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



2.0 INSTALLATION

2.1 MOUNTING

Mount the HS Series Fan 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 HS Series Fan is both plumb and level.

2.2 DUCTING CONNECTIONS

Make final ducting connection to HS Series Fan with flexible couplings. Insure all connections are tight. Do not twist or torque inlet and outlet piping on HS Series Fan 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 & ANNUAL SYSTEM MAINTENANCE

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

____ Insure the HS Series Fan and all ducting is secure and vibration-free.

____ Verify system vacuum pressure with Magnehelic. Insure vacuum pressure is within normal operating range and less than the maximum recommended as shown below:

HS2000	14" WC
HS3000	21" WC
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.

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.

Provide a copy of this instruction or comparable radon system and testing information to the building occupants after completing system installation.

WARRANTY

RadonAway® warrants that the HS 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 during the Warranty Term. 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®.

1 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway® will extend the Warranty Term of the fan to one (1) year from date of purchase or fifteen (15) months from the date of manufacture, whichever is sooner, if the Fan is installed in a professionally designed and professionally installed active soil depressurization system or installed as a replacement fan in a professionally designed and professionally installed active soil depressurization system by a qualified installer. 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.

LIMITATION OF 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 costs, including insurance, to and from factory.

RadonAway® 3 Saber Way
Ward Hill, MA 01835 USA TEL (978) 521-3703
FAX (978) 521-3964
Email to: Returns@RadonAway.com

Record the following information for your records:

Serial No. 011805 Purchase Date 7/10/2018

Appendix E – Special Inspection Report

Alan Margolin & Associates Consulting Engineers and Architects, D.P.C.
IAS Accredited Special Inspections Agency 194-NY NYC DOB Registered SIA No. 000423

Special Inspection Report

REPORT: PROGRESS ☐ FINAL ☒

Client: AWT Environmental
City/County Of: Queens
Project Name:
Address: 39-37 29th Street

AMAA Project #: 7069
Date: Oct 9, 2018
Date: Oct 12, 2018
Person Met With: Pawel Mecinski
Floor: Cellar

Sent To: Brendan O'Neill
Time Arrived: 12:00 PM Time Departed: 1:00 PM
Time Arrived: 9:00 AM Time Departed: 10:00 AM
DOB Application #: (MRC 61177)

Special Inspector Email: alam@amaa-eng.com

In accordance with applicable sections of the New York City Building Code (BC) of 2014, special inspections have been provided for the following items:

	Approved	See Comments
Energy Code Compliance, as per BC 110.3.5	☒	☐
Mechanical Systems, as per BC 1704.16	☒	☐
Fire-Resistant Penetrations and Joints, as per BC 1704.27	☒	☐
Final Inspection, as per BC 28-116.2.4.2 and Directive 14 of 1975	☒	☐

Health & Safety Plan ☐ In Job File ☐ Seen At Job Site
Plan read and understood

Check Lists of Items Requiring Inspections

Energy Code Compliance, as per BC 110.3.5
A=Approved, D=Disapproved, NA=Not Applicable
Not checked is work is not completed

A	D	NA	
☐	☐	☒	HVAC and service water heating equipment
☐	☐	☒	HVAC and service water heating system controls
☐	☐	☒	HVAC insulation and sealing
☐	☐	☒	Duct leakage testing
☐	☐	☒	Electrical energy consumption
☐	☐	☒	Lighting in dwelling units
☐	☐	☒	Interior lighting power
☐	☐	☒	Exterior lighting power
☐	☐	☒	Lighting controls
☒	☐	☐	Electrical motors

☐ ☐ ☒ Maintenance information

☐ ☐ ☒ Permanent certificate

Comments: (October 9, 12, 2018, MA, M-001.00, M-002.00 10/12/18) Exhaust fan model number HS2000 matched the project drawing.

Ready for our sign off.

Mechanical Systems, as per BC 1704.16
A=Approved, D=Disapproved, NA=Not Applicable
Not checked is work is not completed

A	D	NA	
☒	☐	☐	Systems are complete in accordance with mfrs guidelines and approved documents
☒	☐	☐	Supports, hangers, bracing, and vibration isolation are properly spaced and anchored
☒	☐	☐	Required signage and safety instructions are present
☐	☐	☒	Verified Electrical and Fire Alarm work related to HVAC installation have been installed and signed off
☐	☐	☒	Ventilation balancing report is complete and in accordance with design
☒	☐	☐	Required labeling is present
☐	☐	☒	Noise producing equipment within 100 feet of habitable window shall be tested for compliance to code
☐	☐	☒	Required fire and fire smoke dampers have been installed and are functioning properly
☐	☐	☒	Installed unit and DOB approved drawings match for Equipment Use Permits (EUPs)
☐	☐	☒	Witnessed air balancing test performed using currently calibrated equipment
☐	☐	☒	All materials used are approved

Comments: (October 9, 12, 2018, MA, M-001.00, M-002.00 10/12/18) All the piping and component has been installed for the sub slab depressurization system. There are two suction pits through the grade slab. One exhaust fan has been installed on the exterior wall. Cast iron piping has been installed from suction pits (basement) to exterior fan; PVC pipe has been installed from fan discharge to termination point on roof. Piping is properly supported, labeled and pitched.

Ready for our sign off.

Fire-Resistant Penetrations and Joints, as per BC 1704.27
A=Approved, D=Disapproved, NA=Not Applicable
Not checked is work is not completed

A	D	NA	
☒	☐	☐	Penetrations of fire-rated walls properly sealed with approved materials
☒	☐	☐	Penetrations of floors properly sealed with approved materials
☐	☐	☒	Construction joints have properly sealed with approved materials
☐	☐	☒	Draftstopping installed in approved manner
☐	☐	☒	Fireblocking installed in approved manner

Comments: (October 9, 12, 2018, MA, M-001.00, M-002.00 10/12/18) Cast iron piping penetrating the floor/exteriors wall at two locations have been firestopped/sealed.

Ready for our sign off.

Final Inspection, as per BC 28-116.2.4.2 and Directive 14 of 1975
A=Approved, D=Disapproved, NA=Not Applicable
Not checked is work is not completed

A	D	NA	
☒	☐	☐	Construction work is complete and in substantial compliance with approved construction documents
☒	☐	☐	All work has been built to code and complies with all local laws
☒	☐	☐	All required special and progress inspection items have been approved
☒	☐	☐	Paths of egress are provided in accordance with design and code requirements
☐	☐	☒	Exit signs are in the proper location and indicate the correct means of egress
☐	☐	☒	Construction complies with ADA requirements indicated on drawings
☒	☐	☐	Doors open in the correct direction and have fire-ratings indicated on drawings

Comments: (October 9, 12, 2018, MA, M-001.00, M-002.00 10/12/18) This project is ready for a Final sign off.

Comments and additional information, including photographs:

Photos 1-2 (October 12, 2018): View of installed piping (cast iron) within cellar.

Photo 3 (October 12, 2018): View of installed exhaust stack and fan.

Photo 4 (October 12, 2018): Floor penetration has been firestopped.

Photo 5 (October 12, 2018): View of suction pit/point through grade slab.

Resolution of any discrepancies noted during previous inspections.

☐ See below ☒ None

General

Review of material/samples	☒ Not Applicable	☐ See Attached
Copies of DOB approved drawings	☐ In Our File	☒ On Site

Estimated Date of Next Inspection: N/A

Director's Statement: The inspector named below has met the qualifications for performing these inspections as required by the New York City Building Code. He has received education and training in these inspections and is working under my direct supervision.

Special Inspector
Name: MD ALAM, P.E.

Agency Director
Name: Young S. Suh, P.E.

Date: October 14, 2018

Note: Our final inspection reports are valid as of the date of the inspection. We are not responsible for any changes made at the job after this date.

Appendix F – Waste Disposal Manifest

NON-HAZARDOUS WASTE MANIFEST

GENERATOR

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	**4. Waste Tracking Number**
Not Required	1	732-813-1660	15743-1

5. Generator's Name and Mailing Address

NYSDEC c/o GES
625 Broadway, 12th Floor
Albany, NY 11101

Generator's Phone: 518-402-9767

Generator's Site Address (if different than mailing address)

39-37 29th Street
Long Island City, NY 11101 Queens

6. Transporter 1 Company Name: [illegible] Express [illegible]

U.S. EPA ID Number: NJD 986607 380

7. Transporter 2 Company Name: Truck #6 Lic Plate # AC-583B NJ

U.S. EPA ID Number:

8. Designated Facility Name and Site Address

MXI Environmental, Inc
26319 Old Trail Road
Abingdon, VA 24210

Facility's Phone: 276-628-6636

U.S. EPA ID Number: VAR000503920

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non RCRA Non DOT Solids	001	DM	200	P
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information

1. Soil 80%, Concrete 20%, S

AWT P.O. # 15743-RHG

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name	Signature	Month	Day	Year
[illegible] on behalf of NYSDEC	[signature]	10	22	18

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
M. [illegible]son	[signature]	10	22	18

Transporter 2 Printed/Typed Name	Signature	Month	Day	Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name	Signature	Month	Day	Year