



VAPOR MITIGATION SYSTEM INSTALLATION REPORT

**ONE HOUR MARTINIZING
285 EAST HAMPTON AVENUE
MILWAUKEE, WISCONSIN
BRRTS# 02-41-543260**

April 10, 2019

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Handwritten signature of Brian Kappen in blue ink.

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2	Diagnostic Testing Data Summary
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B	Vapor Mitigation System Operation, Maintenance, and Monitoring Plan

1.0 INTRODUCTION

EnviroForensics, LLC (EnviroForensics) has completed this *Vapor Mitigation System Installation Report* detailing the sub-slab depressurization system (SSDS) installed at the One Hour Martinizing facility located at 285 East Hampton Avenue in Milwaukee, Wisconsin (Site). Feasibility testing completed in 2016 indicated that soil vapor extraction (SVE) was not a suitable remedial action option for the Site. Therefore, sub-slab depressurization was selected as the best option for vapor intrusion mitigation, based upon Site-specific conditions, reliability, and the ability to implement. Mitigation activities were conducted in general accordance with WDNR Publication RR-800: *Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin*.

1.1 Site Background

The Site was operated as a gasoline service station from 1953 to 1979, and an active dry cleaning facility from 1980 until 2007, when active dry cleaning was discontinued. Several underground storage tanks were removed in the early 1990s, and a remediation system for petroleum contamination operated for several years. Since 2007, the 2,500 square foot, concrete slab-on-grade commercial building has been utilized as a drop off and pick-up location for clothes dry cleaned elsewhere. The layout of the Site, including Site features and the surrounding area, is depicted on **Figure 1**.

1.2 Vapor Intrusion Assessment

Vapor intrusion assessment activities were conducted at the Site building beginning in June 2013. Tetrachloroethene (PCE) was detected in sub-slab vapor at concentrations above the vapor risk screening level (VRSL) for small commercial buildings of 6,000 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) in two (2) of three (3) samples. At that time, remedial action options, including SVE, were being evaluated so mitigation was not immediately implemented. An indoor air sample collected from the Site building in May 2015 contained PCE at a concentration above the small commercial vapor action level (VAL) of $180 \mu\text{g}/\text{m}^3$; however, photo-ionization detector (PID) readings indicated that residual solvent in the dry cleaning machine was the source of the indoor air impacts. The dry cleaning machine was removed from the building in 2016.

Vapor intrusion sampling was repeated in August 2018 to confirm the vapor intrusion risk. The indoor air sample did not contain PCE or related compounds above laboratory detection limits. One (1) of two (2) sub-slab vapor samples contained PCE above the VRSL, indicating that a vapor intrusion risk was still present at the Site building. The vapor intrusion assessment analytical results are summarized in **Table 1** and depicted in **Figure 2**.

2.0 PRE-MITIGATION ACTIVITIES

2.1 Building Inspection

The integrity of the concrete floor was assessed prior to diagnostic testing. One (1) penetrating crack and one (1) noticeable gap between the block wall and floor slab were observed on the west side of the building. These were sealed with self-leveling caulk to prevent vacuum short-circuiting.

The western third of the Site building is an addition, with a footer dividing the sub-slab space into two (2) separate areas. The holes that were cored through the floor indicated that the concrete slab associated with the addition was approximately 2-inches thicker than the original building slab.

2.2 Diagnostic Pressure Field Extension Testing

EnviroForensics personnel performed diagnostic testing on September 18, 2018. On-site pressure-field extension (PFE) testing was performed by advancing two (2) temporary suction points through the concrete floor, applying a vacuum to the sub-slab space at the suction point locations using a Shop-Vac® vacuum, and measuring pressure at several test points across the slab. The locations of the suction points (EP-1 and EP-2) and vacuum test points (TP-1 through TP-7) are shown on **Figure 3**.

Three (3) separate tests were conducted as follows:

- Test 1: Applied vacuum at both suction points
- Test 2: Applied vacuum at EP-2 only
- Test 3: Applied vacuum at EP-1 only

The Shop-Vac was capable of a maximum flow rate of 62 cubic feet per minute (cfm) with an unknown maximum vacuum. Each test was performed for 15 minutes, during which sub-slab pressure, flow rate, and temperature were recorded. The data collected from the test points was evaluated to establish a radius of influence (ROI). Using the recommended minimum negative pressure value of -0.004 inches of water (in H₂O) specified in WDNR Publication RR-800, the average ROI for each suction point was estimated to be 18 feet. Refer to **Table 2** and **Figure 3** for all recorded PFE test data.

3.0 SYSTEM INSTALLATION

The diagnostic testing results and building construction details were evaluated by EnviroForensics resulting in an SSDS design for the Site building. The number and placement of suction points, and number and type of fans, were included in the design to achieve depressurization beneath the footprint of the entire building. Two (2) RadonAway Model GP-501 fans capable of -2.5 in H₂O at a flow rate of 70 cubic feet per minute (CFM) were specified, connected to five (5) suction points.

The EnviroForensics vapor mitigation staff installed the SSDS on October 2-4, 2018. The five (5) suction points were installed by coring the concrete floor and removing a portion of the sub-slab material, creating a sump. The small gap between the vertical suction point piping and concrete where the pipe penetrates through the floor was sealed airtight with polyurethane caulk. Ball valves were installed on each suction point pipe to allow for system balancing. Valves and other fittings were installed with airtight solvent welds.

Three (3) suction points (EP-2B, EP-3, and EP-4) are located in the original part of the building, with the remaining two (2) points (EP-1 and EP-2A) serving the addition. The suction points are connected via 3-inch diameter schedule 40 PVC pipe to two (2) fans located on the west and south exterior walls of the building, respectively. Vapor is routed to discharge points above the roofline of the neighboring buildings. The following items were installed in the piping leading to each fan:

- U-tube manometers indicating vacuum;
- Audible alarm units that signal loss of vacuum to building occupants;
- Ports for measurement of static pressure; and
- Ports for measurement of air flow rate.

Each fan is equipped with an electrical disconnect switch near the fan location. The switches are hard wired into a nearby electrical circuit breaker panel. The electrical components were installed by Advance Electrical Contractors of Milwaukee, Wisconsin.

The system configuration is depicted on **Figure 4**. Photographs of system components are presented in **Appendix A**.

4.0 SYSTEM COMMISSIONING

EnviroForensics generally followed the commissioning guidelines detailed in Appendix D of WDNR Publication RR-800. Commissioning is intended to demonstrate that the SSDS is effectively mitigating vapor intrusion in all conditions. Therefore, three (3) commissioning events were performed seasonally during the first several months of operation. System commissioning events consisted of the following activities:

1. Measuring sub-slab pressure field extension (PFE). The PFE was measured by connecting a hand-held digital manometer to sub-slab test ports installed in the floors. Four (4) permanent sub-slab vacuum measurement ports designated VP-1 through VP-4 were installed at the locations shown on Figure 3 to facilitate PFE measurements. The ports are Vapor Pins[®] with stainless steel flush-mount covers;
2. Measuring flow rate in the piping leading to each fan using a thermo-anemometer inserted into ports in the piping;
3. Reading u-tube manometers to confirm vacuum is induced at each suction point; and
4. Visually inspecting the concrete floor penetration seals and all system components including fans, manometers, pressure switches, and piping connections.

System commissioning activities are summarized in the table below:

Parameter	Location	Equipment
Pressure Field Extension (PFE)	Sub-slab ports	Digital manometer
Flow Rate	Suction piping	Thermo-anemometer
Pressure	Suction piping	U-tube manometer
System condition	Multiple	Visual inspection

4.1 Data Summary and Analysis

Commissioning activities were performed on three (3) occasions: October 4, 2018; January 10, 2019; and April 4, 2019. The inspections indicated that the SSDS was performing normally during the commissioning period. Pressure and flow rate data are summarized in **Tables 3 and 4**, respectively. Sub-slab negative pressure measurements were greater than the recommended minimum of -0.004 in H₂O with two (2) exceptions: port VP-4 in January 2019 and port VP-1 in April 2019 each measured -0.001 in H₂O. The reason for these lower negative pressure readings does not appear to be associated with seasonal variations because the readings did not occur



during the same commissioning event. At both VP-1 and VP-4, the other two (2) negative pressure readings were well above the recommended minimum value. Furthermore, as listed in **Table 3** the *average* negative pressures exceed the recommended minimum value at all sub-slab ports. Therefore, EnviroForensics interprets the data to demonstrate complete depressurization of the building slab. A summary of the commissioning data is illustrated on **Figure 5**.

5.0 OPERATION, MAINTENANCE, AND MONITORING

A Vapor Mitigation System Operation, Maintenance and Monitoring Plan (OM&M Plan) is presented in **Appendix B**. The OM&M Plan details the system components, operating procedures, system monitoring, and maintenance required to ensure the system is operating effectively. The recommended OM&M includes an annual inspection of the system fans and discharge points, piping and connections, floor slab/suction point seals, and u-tube manometers to determine if system components are damaged and need repair. An inspection and maintenance log is included with the OM&M Plan. The system inspection should be conducted starting six (6) months after the date of this report, and should take place annually thereafter while the system is in operation.

TABLES

TABLE 1
SUMMARY OF VAPOR INTRUSION ASSESSMENT SAMPLE ANALYTICAL RESULTS
 One Hour Martinizing, Milwaukee, Wisconsin

Sample Identification	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
INDOOR AIR						
6194-OHM-IA-1	5/18/2015	1,570	<1.07	<19.8	<39.6	<1.28
	8/23/2018	<3.19	<1.07	<19.8	<39.6	<1.28
6194-OHM-OA-1	5/18/2015	<3.19	<1.07	<19.8	<39.6	<1.28
	8/23/2018	<3.19	<1.07	<19.8	<39.6	<1.28
Small Commercial Vapor Action Level ¹		180	8.8	NE	NE	28
SUB-SLAB VAPOR						
6194-SSV-1	6/4/2013	210	< 11	<7.9	NR	<5.1
	5/19/2015	4,960	122	<198	<396	<12.8
6194-SSV-2	6/4/2013	12,000	< 120	<87	NR	<56
6194-SSV-3	6/4/2013	6,700	200	<39	NR	<25
6194-SSV-4	5/19/2015	4,260	<10.7	<198	<396	<12.8
6194-SSV-12	8/23/2018	21,400	13.3	<198	<396	<12.8
6194-SSV-13	8/23/2018	539	<10.7	<198	<396	<12.8
Small Commercial Vapor Risk Screening Level ¹		6,000	290	NE	NE	930

Notes:

¹ Vapor Action Levels and Vapor Risk Screening Levels were calculated according to the assumptions and attenuation factors described in WDNR Publication RR-800

All concentrations reported in units of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)

Bolded values are above detection limits

Bolded and Orange Shaded values exceed the Vapor Action/Risk Screening Level

NE = Not established

TABLE 2
DIAGNOSTIC TESTING DATA SUMMARY
 One Hour Martinizing, Milwaukee, Wisconsin

TEST 1				
Measurement Location	Suction Pit Used	Distance from EP-1 (ft)	Distance from EP-2 (ft)	Pressure (inch H ₂ O)
System	EP-1 and EP-2	--	--	-2.753
EP-1	EP-1 and EP-2	--	25	-2.020
EP-2	EP-1 and EP-2	25	--	-2.009
TP-1	EP-1 and EP-2	10	27.5	-0.008
TP-2	EP-1 and EP-2	20	32.5	0
TP-3	EP-1 and EP-2	30	40	0
TP-4	EP-1 and EP-2	20	20	-0.007
TP-5	EP-1 and EP-2	27.5	10	-0.012
TP-6	EP-1 and EP-2	32.5	20	-0.002
TP-7	EP-1 and EP-2	40	30	0
Velocity and Temp (°F)		FPM		CFM
		System (Shop-Vac)		3,378 @ 74.6
		EP-2		1,313 @ 74
		EP-1		1,495 @ 75.4

TEST 2				
Measurement Location	Suction Pit Used	Distance from EP-2 (ft)	Pressure (inch H ₂ O)	
System	EP-2	--	-7.799	
EP-1	EP-2	--	--	
EP-2	EP-2	25	-8.068	
TP-1	EP-2	10	0	
TP-2	EP-2	20	0	
TP-3	EP-2	30	0	
TP-4	EP-2	20	-0.022	
TP-5	EP-2	27.5	-0.055	
TP-6	EP-2	32.5	-0.016	
TP-7	EP-2	40	-0.001	
Velocity and Temp (°F)		FPM		CFM
		System (Shop-Vac)		2787 @ 74.3
		EP-2		2731 @ 73.9

TEST 3				
Measurement Location	Suction Pit Used	Distance from EP-2 (ft)	Pressure (inch H ₂ O)	
System	EP-1	--	-5.564	
EP-1	EP-1	--	-4.993	
EP-2	EP-1	25	--	
TP-1	EP-1	10	-0.037	
TP-2	EP-1	20	-0.013	
TP-3	EP-1	30	0	
TP-4	EP-1	20	0	
TP-5	EP-1	27.5	0	
TP-6	EP-1	32.5	0	
TP-7	EP-1	40	0	
Velocity and Temp (°F)		FPM		CFM
		System (Shop-Vac)		3208 @ 74.5
		EP-1		2589 @ 74.8

Notes:

All pressure readings were measured in inches of water

FPM = Feet per minute

CFM = Cubic feet per minute

TABLE 3
SYSTEM VACUUM AND PRESSURE FIELD EXTENSION DATA SUMMARY

One Hour Martinizing, Milwaukee, Wisconsin

Date	Fan		Suction Point					Sub-Slab Port			
	A	B	EP-1	EP-2A	EP-2B	EP-3	EP-4	VP-1	VP-2	VP-3	VP-4
10/4/2018	-1.798	-1.809	-1.2	-1.2	-1.1	-1.5	-1.5	-0.017	-0.064	-0.166	-0.005
1/10/2019	NM	NM	-1.2	-1.1	-1.2	-1.5	-1.5	-0.015	-0.066	-0.163	-0.001
4/4/2019	-1.474	-1.679	-1.2	-1.2	-1.2	-1.4	-1.5	-0.001	-0.079	-0.298	-0.137
<i>Average</i>	<i>-1.636</i>	<i>-1.744</i>	<i>-1.2</i>	<i>-1.2</i>	<i>-1.2</i>	<i>-1.5</i>	<i>-1.5</i>	<i>-0.011</i>	<i>-0.070</i>	<i>-0.209</i>	<i>-0.048</i>

Notes:

All measurements in units of inches of water (in H₂O)

NM = Not Measured

TABLE 4
AIR FLOW RATE DATA SUMMARY
 One Hour Martinizing, Milwaukee, Wisconsin

Date	Suction Point				
	EP-1	EP-2A	EP-2B	EP-3	EP-4
10/4/2018	1,269	192	453	1,031	669
1/10/2019	1,558	265	533	1,183	651
4/4/2019	1,276	242	547	1,470	789
<i>Average</i>	<i>1,368</i>	<i>233</i>	<i>511</i>	<i>1,228</i>	<i>703</i>

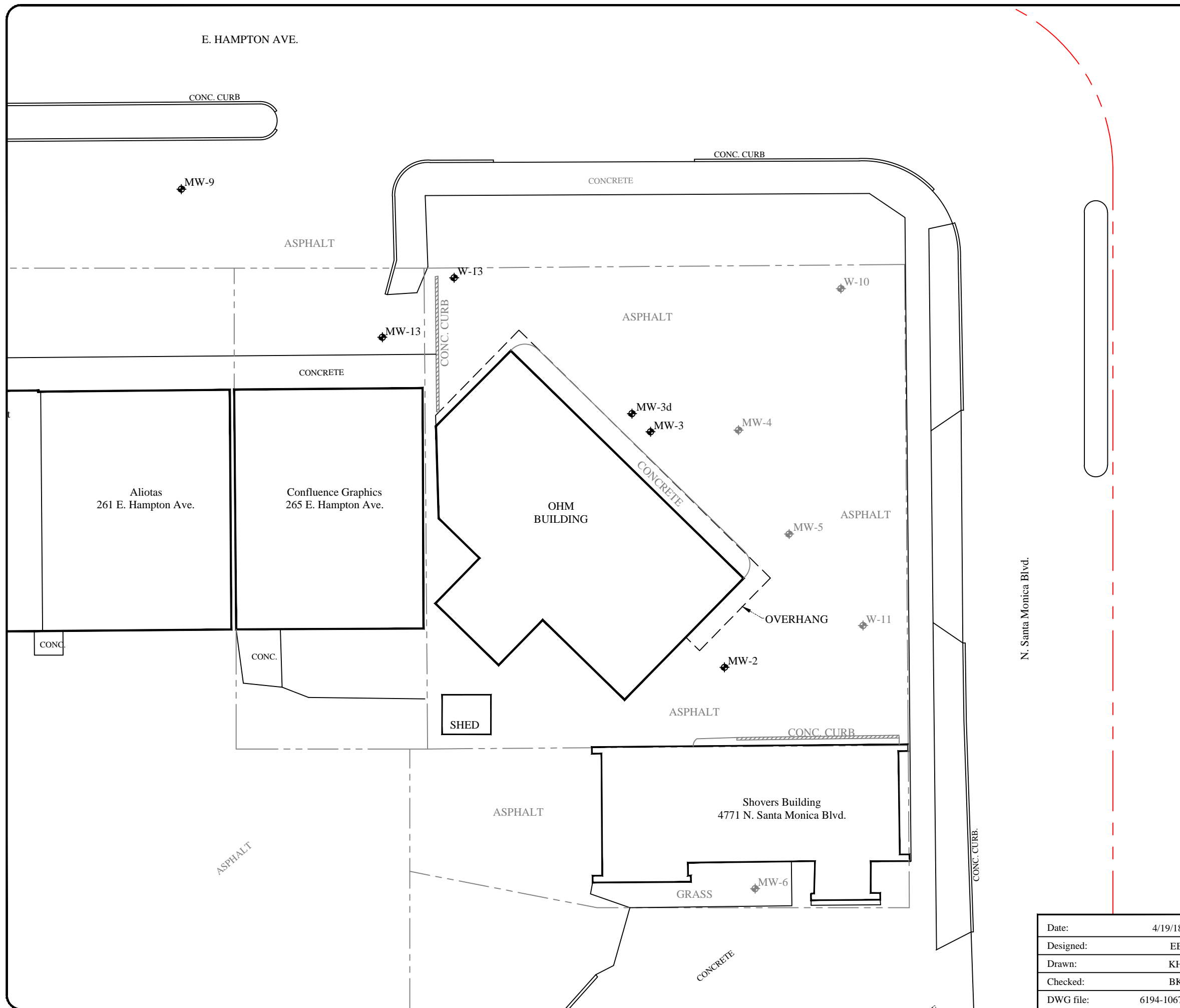
Notes:

All measurements in units of feet per minute (fpm)

FIGURES

Legend

- Property boundary
- - - - - City of Milwaukee/Village Whitefish Bay boundary
- MW-2 ◆ Monitoring Well
- MW-5 ◆ Abandoned Monitoring Well



SITE LAYOUT MAP											
One Hour Martinizing 285 East Hampton Avenue Milwaukee, Wisconsin											
	Figure 1										
825 North Capitol Avenue • Indianapolis, IN 46204 EnviroForensics.com											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Date:</td> <td>4/19/18</td> </tr> <tr> <td>Designed:</td> <td>EB</td> </tr> <tr> <td>Drawn:</td> <td>KH</td> </tr> <tr> <td>Checked:</td> <td>BK</td> </tr> <tr> <td>DWG file:</td> <td>6194-1067</td> </tr> </table>	Date:	4/19/18	Designed:	EB	Drawn:	KH	Checked:	BK	DWG file:	6194-1067	Project 6194
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Designed:	EB										
Drawn:	KH										
Checked:	BK										
DWG file:	6194-1067										

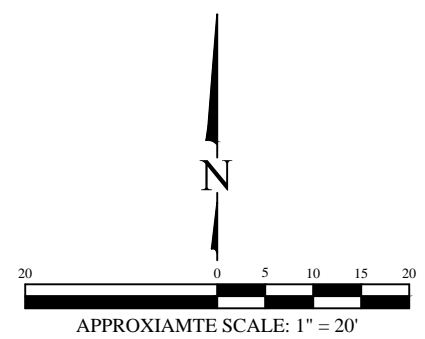
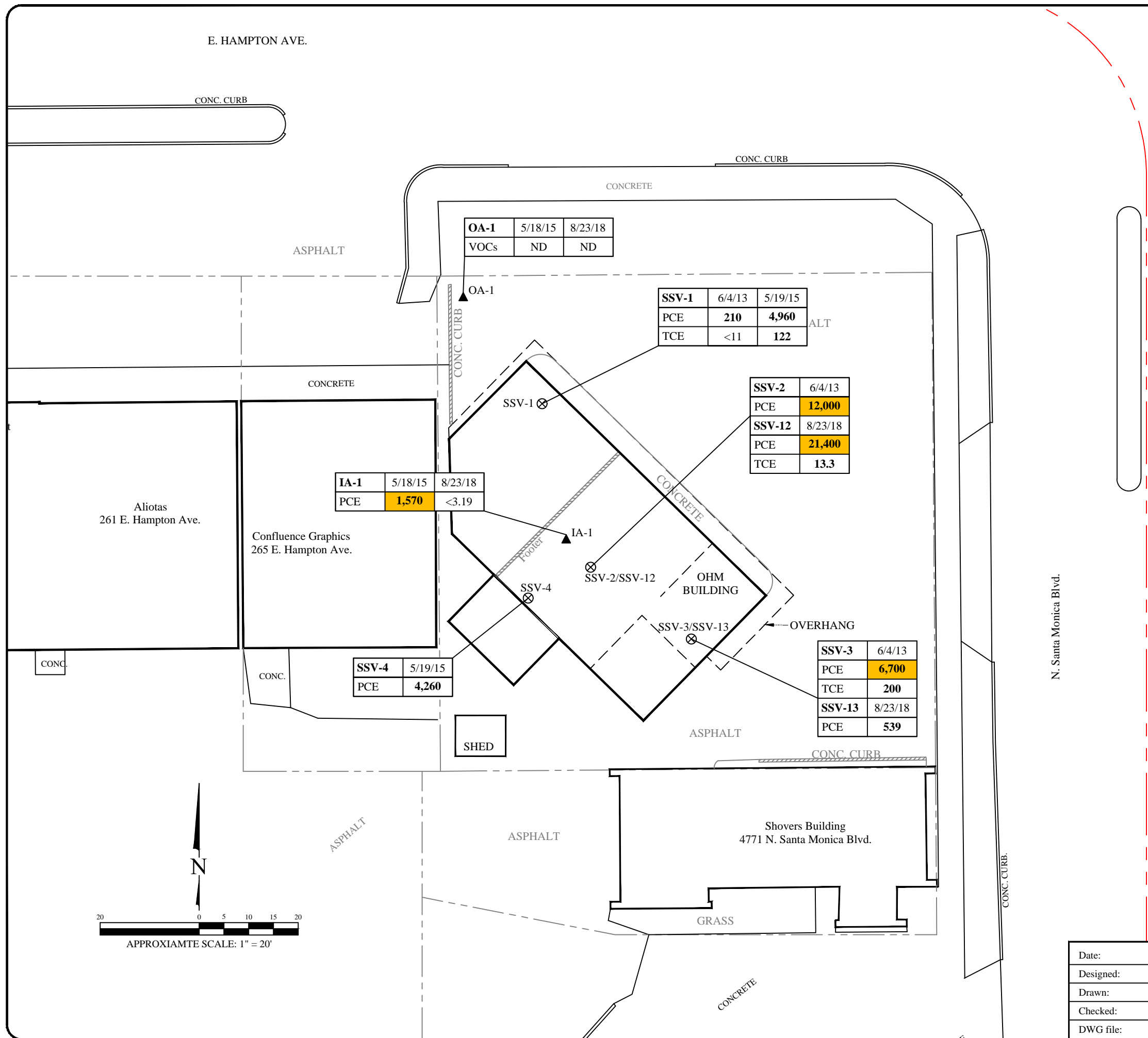
Legend

- Property boundary
- - - - - City of Milwaukee/Village Whitefish Bay boundary
- SSV-1 ⊗ Sub-Slab Vapor sample location
- IA-1/OA-1 ▲ Indoor/outdoor air sample

Analytes	Sub-slab Vapor	Indoor/Outdoor Air
	Small Commercial Vapor Risk Screening Level ¹	Small Commercial Vapor Action Level ²
PCE	6,000	180
TCE	290	8.8

Notes:

1. Bold, orange shaded concentrations exceed the applicable small commercial risk screening or action level
2. Bold concentrations exceed laboratory reporting limits
3. Results reported in micrograms per cubic meter (ug/m³)
4. 1 = Vapor Risk Screening Level = US EPA Regional Screening Level with an attenuation factor of 0.03 for sub-slab vapor to indoor air, and a 0.1 adjustment for carcinogens as described in WDNR Publication RR-800
5. 2 = Indoor air Vapor Action Level = US EPA Regional Screening Level as described in WDNR Publication RR-800
6. PCE = Tetrachloroethene
7. TCE = Trichloroethene






VAPOR INTRUSION ASSESSMENT
ANALYTICAL RESULTS

One Hour Martinizing
285 East Hampton Avenue
Milwaukee, Wisconsin

Date: 10/1/18	Figure: 2
Designed: EB	Project: 6194
Drawn: KH	
Checked: BK	
DWG file: 6194-1141	

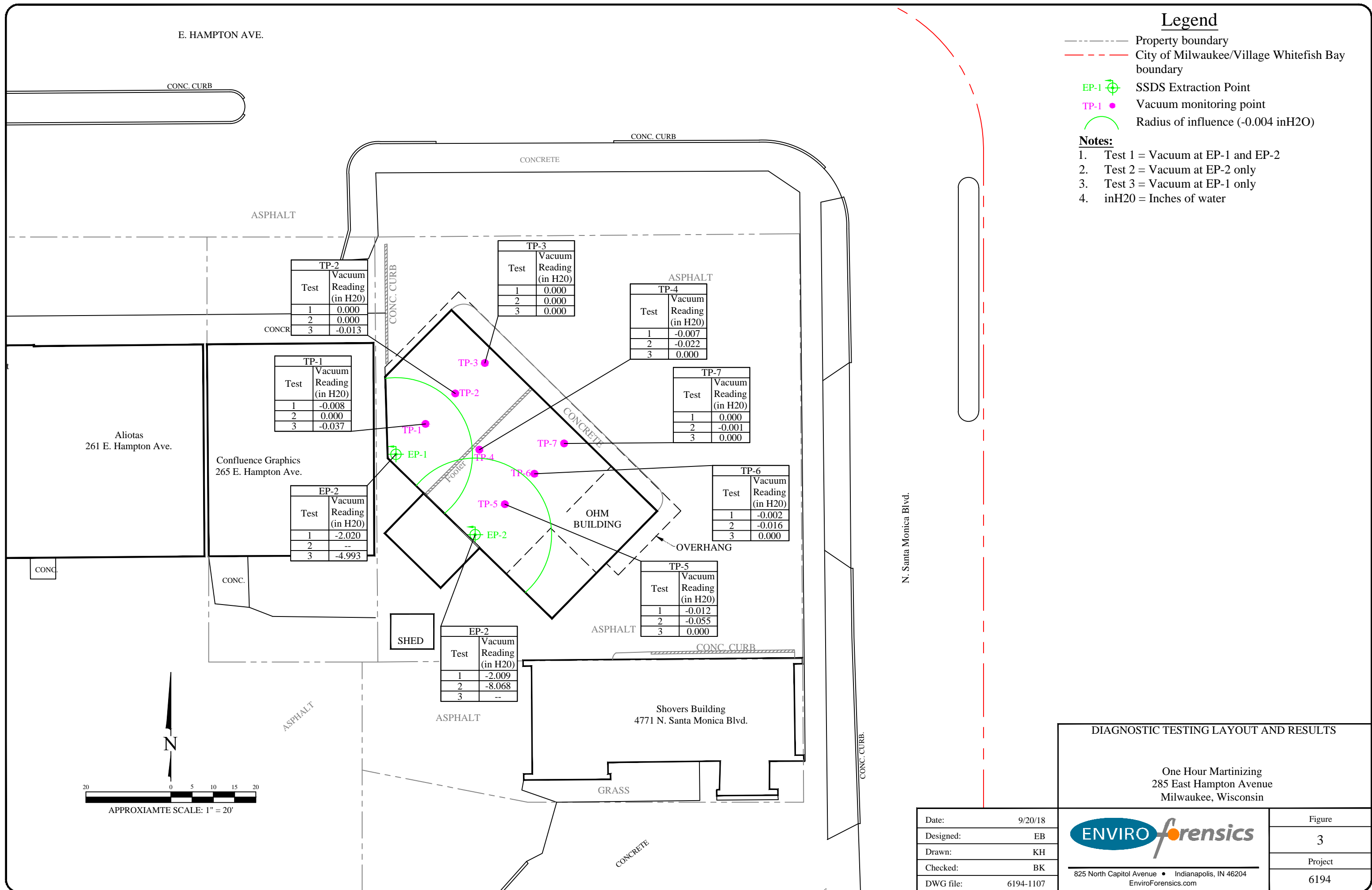
825 North Capitol Avenue • Indianapolis, IN 46204
EnviroForensics.com

Legend

- Property boundary
- - - - - City of Milwaukee/Village Whitefish Bay boundary
- EP-1  SSDS Extraction Point
- TP-1  Vacuum monitoring point
-  Radius of influence (-0.004 inH2O)

Notes:

1. Test 1 = Vacuum at EP-1 and EP-2
2. Test 2 = Vacuum at EP-2 only
3. Test 3 = Vacuum at EP-1 only
4. inH2O = Inches of water



DIAGNOSTIC TESTING LAYOUT AND RESULTS

One Hour Martinizing
285 East Hampton Avenue
Milwaukee, Wisconsin





Date:	9/20/18
Designed:	EB
Drawn:	KH
Checked:	BK
DWG file:	6194-1107

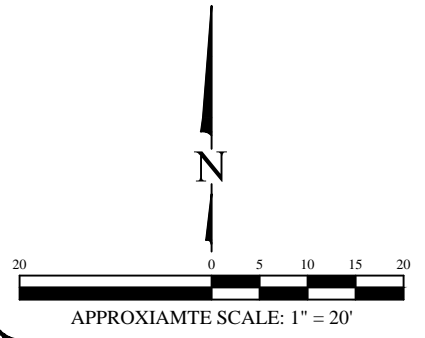
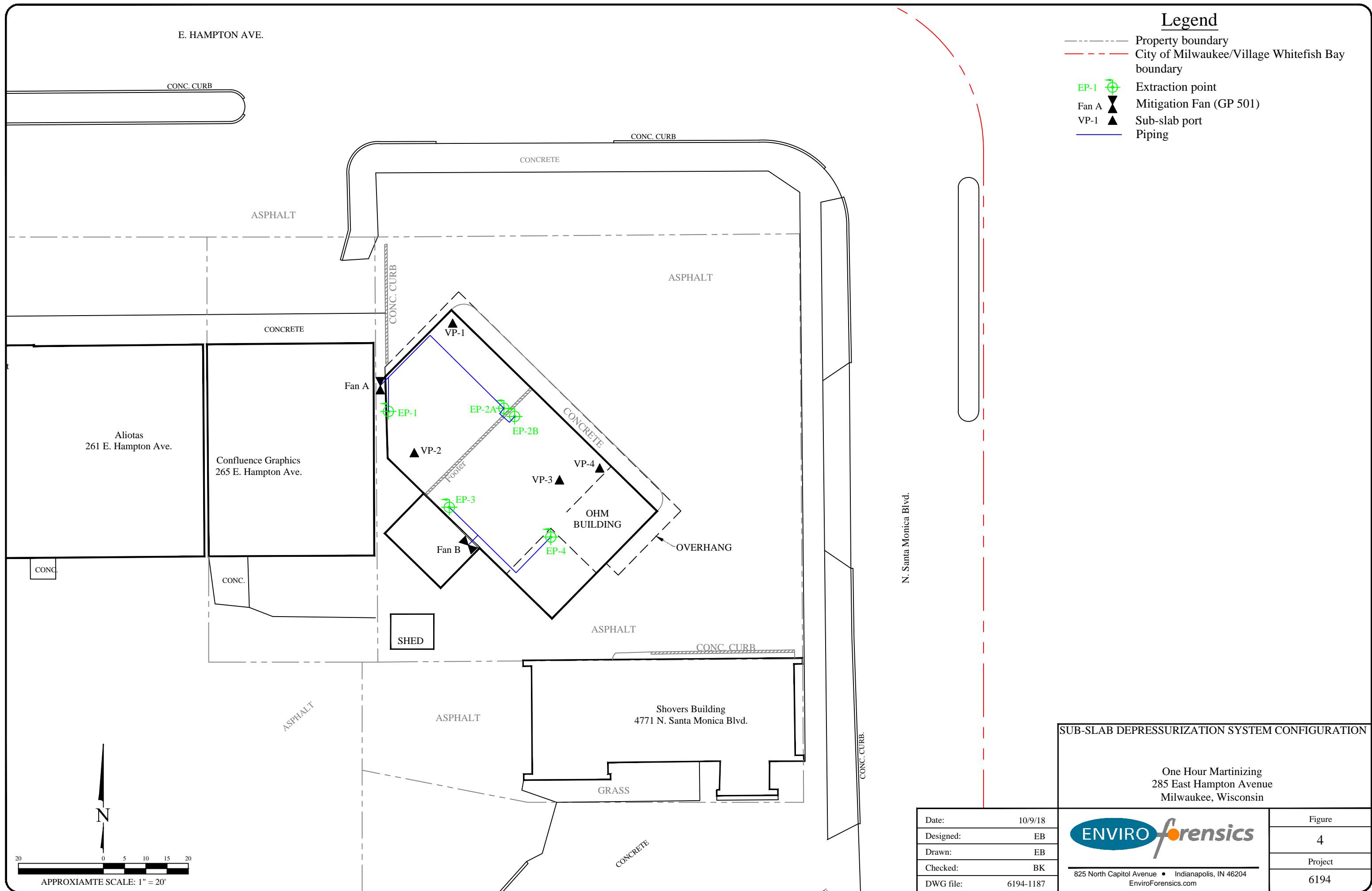


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Figure	3
Project	6194

Legend

- Property boundary
- - - - - City of Milwaukee/Village Whitefish Bay boundary
- EP-1  Extraction point
- Fan A  Mitigation Fan (GP 501)
- VP-1  Sub-slab port
-  Piping



SUB-SLAB DEPRESSURIZATION SYSTEM CONFIGURATION

One Hour Martinizing
 285 East Hampton Avenue
 Milwaukee, Wisconsin





Date:	10/9/18
Designed:	EB
Drawn:	EB
Checked:	BK
DWG file:	6194-1187



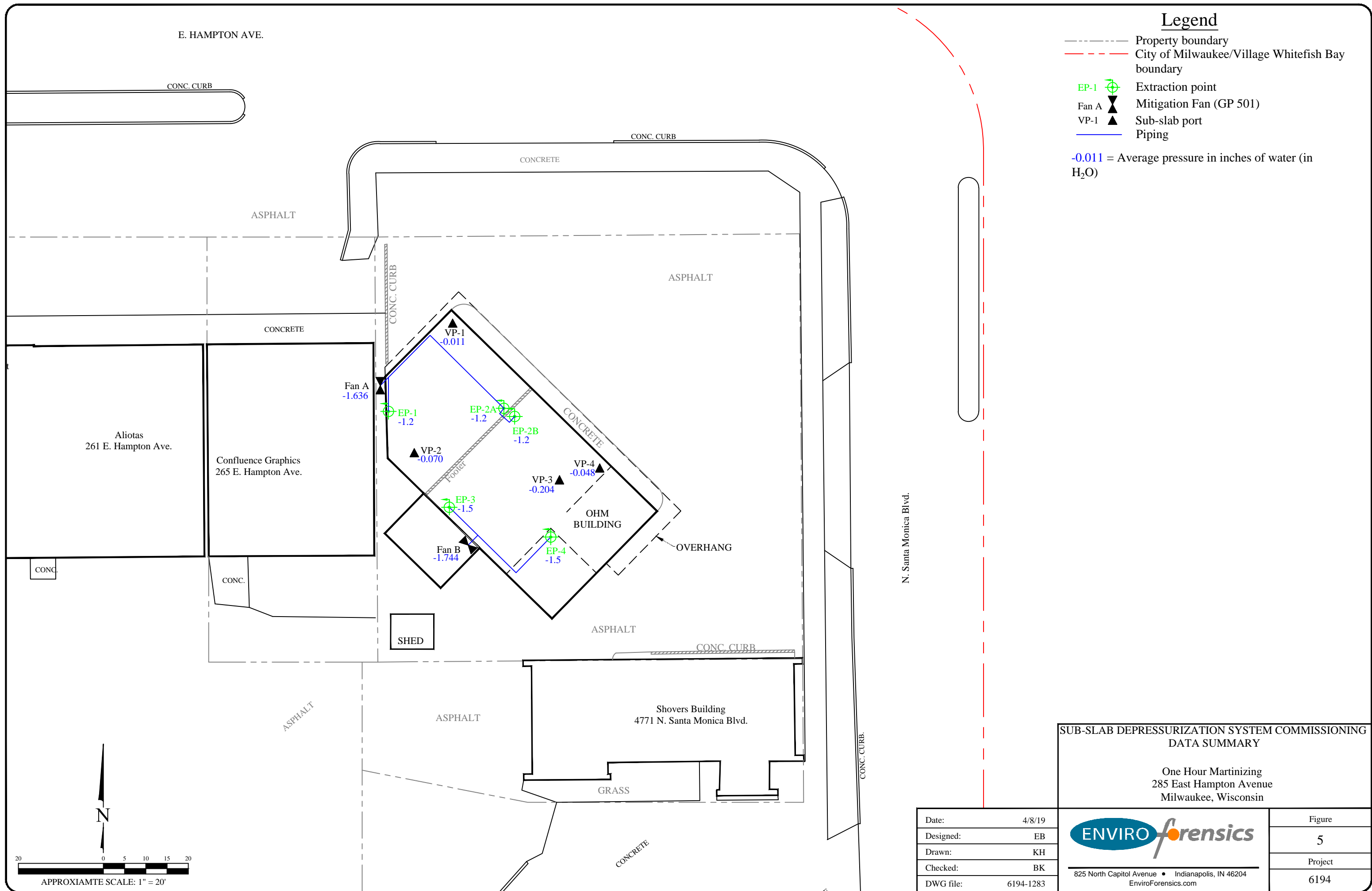
825 North Capitol Avenue • Indianapolis, IN 46204
 EnviroForensics.com

Figure	4
Project	6194

Legend

- Property boundary
- - - - - City of Milwaukee/Village Whitefish Bay boundary
- EP-1  Extraction point
- Fan A  Mitigation Fan (GP 501)
- VP-1  Sub-slab port
-  Piping

-0.011 = Average pressure in inches of water (in H₂O)



SUB-SLAB DEPRESSURIZATION SYSTEM COMMISSIONING DATA SUMMARY

One Hour Martinizing
285 East Hampton Avenue
Milwaukee, Wisconsin

Date:	4/8/19
Designed:	EB
Drawn:	KH
Checked:	BK
DWG file:	6194-1283



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Figure	5
Project	6194

APPENDIX A

Photographic Documentation of System Installation



Suction Point EP-1



Suction Points EP-2A and EP-2B



Suction Point EP-3



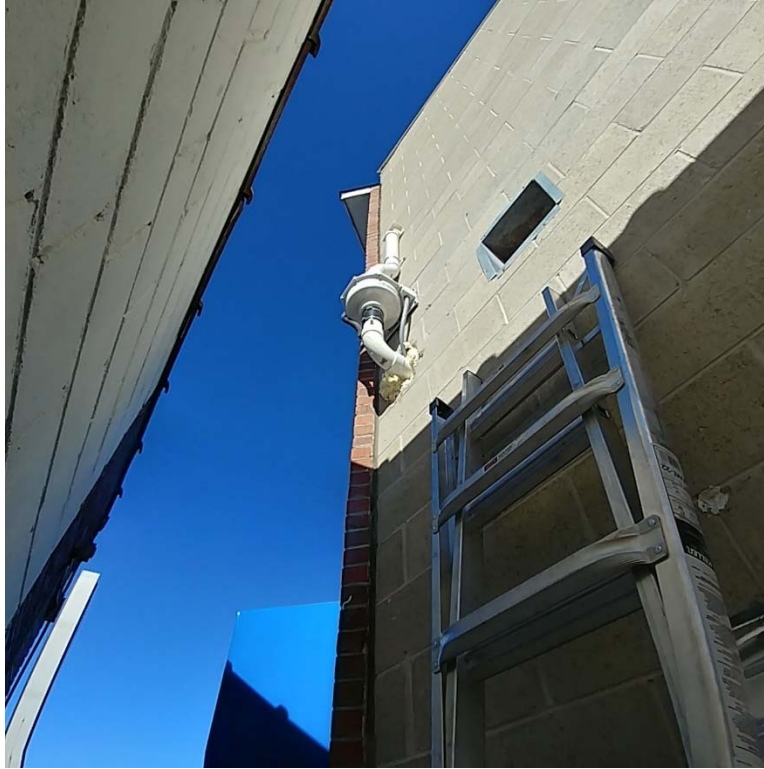
Suction Point EP-4 in boiler room



Mitigation system piping



Fan on south wall of building



Fan on west wall of building



U-tube manometer

APPENDIX B

Vapor Mitigation System Operation, Maintenance, and Monitoring Plan



**VAPOR MITIGATION SYSTEM
OPERATION, MAINTENANCE & MONITORING PLAN**

**ONE HOUR MARTINIZING
285 EAST HAMPTON AVENUE
MILWAUKEE, WISCONSIN
BRRTS# 02-41-543260**

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FIGURES

Figure 1 Sub-Slab Depressurization System Layout

ATTACHMENTS

Attachment 1 Fan Specifications and Warranty Information

Attachment 2 Vapor Mitigation System Inspection and Maintenance Log

1.0 BACKGROUND

A sub-slab depressurization system (SSDS) was installed at 285 East Hampton Avenue in Milwaukee, Wisconsin (Site) to mitigate vapor intrusion risk associated with a tetrachloroethene (PCE) release at the Site. At the time of installation, the property was occupied by a One Hour Martinizing drop-off store and owned by OHM Properties 3 LLC.

The SSDS is designed to depressurize the sub-slab space and prevent vapors from migrating into the building and affecting indoor air quality. The Wisconsin Department of Natural Resources (WDNR) requires that vapor mitigation systems be monitored and maintained to ensure ongoing effectiveness. Proper operation of the SSDS is necessary to prevent exposure to the chemicals of concern via vapor intrusion.

1.1 Site History

The Site was operated as a gasoline service station from 1953 to 1979, and an active dry cleaning facility from 1980 until 2007, when active dry cleaning was discontinued. Several underground storage tanks were removed in the early 1990s, and a remediation system for petroleum contamination operated for several years. Since 2007, the 2,500 square foot, concrete slab-on-grade commercial building has been utilized as a drop off and pick-up location for clothes dry cleaned elsewhere.

2.0 CONTACTS

Property Owner: Brian Cass
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Email: brian@ohmholdings.com

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Address: N16W23390 Stone Ridge Drive, Waukesha, WI 53188
Contact: Brian Kappen/ Wayne Fassbender
Contact/Telephone #: 262-290-4001
Email: bkappen@enviroforensics.com or wfassbender@enviroforensics.com

WDNR Project Manager: John Hnat
Address: 2300 N. Dr. Martin Luther King Jr. Drive, Milwaukee, Wisconsin
Telephone #: 414-263-8644
Email: John.Hnat@wisconsin.gov

3.0 SYSTEM DESIGN AND CONSTRUCTION

EnviroForensics designed the SSDS based on the results of diagnostic testing conducted on September 18, 2018. The system was installed during the week of October 1, 2018. Design and construction details for the SSDS are provided in the April 10, 2019 *Vapor Mitigation System Installation Report*.

The final system configuration is depicted on **Figure 1**. The system is constructed with five (5) suction points connected via 3-inch PVC piping to two (2) RadonAway Model GP501 fans mounted on the exterior of the building. The piping connected to each suction point is equipped with a ball valve for balancing system vacuum, and a u-tube manometer. Low pressure switch alarms are also connected to the system piping.

4.0 SYSTEM OPERATION, MAINTENANCE, AND MONITORING

The Wisconsin Department of Natural Resources (WDNR) has issued guidelines for long-term OM&M of vapor mitigation systems in Appendices D and E of Publication RR-800: *Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin*. The guidelines have been adopted and incorporated into this OM&M Plan.

OHM Holdings LLC will be responsible for operation, maintenance, and monitoring (OM&M) of the SSDS until the Site is sold to a new owner, or until the WDNR grants approval for system decommissioning. Any new owner of the Site assumes the responsibility for OM&M of the system.

4.1 System Operation

The two (2) RadonAway GP501 fans are hardwired to dedicated circuit breakers in the electrical panel on the south wall of the building. Operation of the SSDS can be confirmed by inspecting the fan (i.e., checking for noise and vibration) or confirming vacuum in the u-tube manometers. The system is designed and intended to operate continuously. Fans specifications and warranty information are presented in **Attachment 1**.

4.2 System Monitoring

The long-term monitoring procedures are described in the system inspection and maintenance log provided in **Attachment 2**. The recommended monitoring includes an annual inspection of the system fans and discharge points, piping and connections, and floor slab/suction point seals, as well as observing the negative pressure indicated by the u-tube manometers mounted on the piping above each suction point. These activities are required to be conducted annually during the heating season. A summary of acceptable observations is provided in the table below.

Parameter	Location	Equipment	Acceptable Result
Pressure	Suction Points EP-1, -2A, -2B, -3, and EP-4	U-tube manometers	1 to 3 in H ₂ O
System condition	Multiple	Visual inspection	No cracks, gaps, leaks in piping or floor slab

Note: in H₂O = inches of water

The inspection and maintenance log shall be completed by the person or group responsible for OM&M of the SSDS. The logs shall be kept on file by the environmental consultant and/or the property owner and made available to WDNR upon request.

4.3 System Maintenance and Repairs

The mitigation fans are factory sealed and require no maintenance. In the event that a fan stops operating due to mechanical failure, the fan shall be replaced with an identical model or a fan with the same performance specifications. Replacement of fans should be handled by a mitigation contractor and/or an electrician. Maintenance and repair activities on other components, including piping and floor seals, can be performed by the environmental consultant or building maintenance personnel.

4.4 Notifications

The WDNR shall be notified at least 45 days before any actions are taken which would terminate or interrupt operation of the SSDS for more than one week.

5.0 DECOMMISSIONING AND CONTINUING OBLIGATIONS

The SSDS will be operated until it is no longer needed to prevent vapor intrusion. The WDNR has issued guidelines for SSDS decommissioning in Appendix F of Publication RR-800. A Decommissioning Plan will be prepared, if appropriate. In general, decommissioning will be performed according to the following procedure:







- Provide WDNR a 45-day notice of intent to begin the decommissioning process.
- Re-assess the vapor intrusion pathway in the building:
 - Turn the fan off and wait 2 to 4 weeks;
 - Collect three (3) rounds of sub-slab vapor samples within one (1) year, with two (2) sampling events during the heating season; and
 - Re-start the fan if a vapor risk screening level is exceeded.

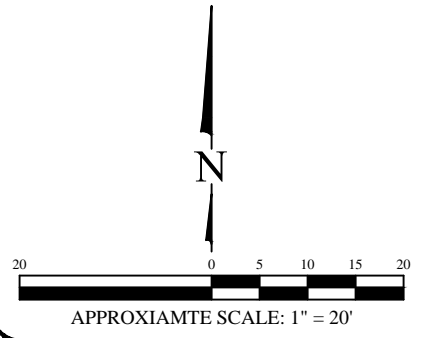
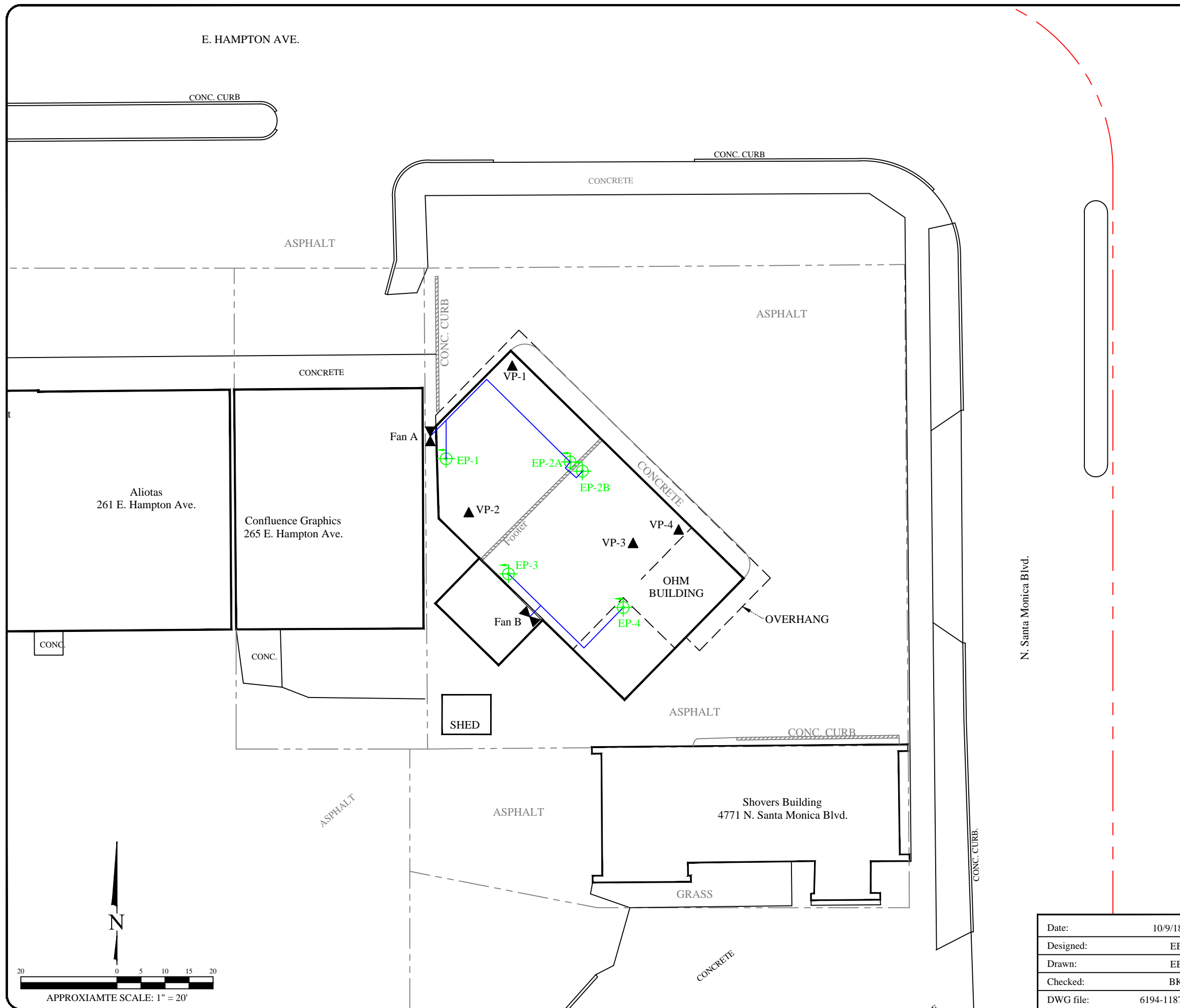
- Submit the sampling data to WDNR with a request for approval to permanently leave the fan off and/or remove the system components from the building.

If the SSDS is necessary to mitigate vapor movement into the building at the time of case closure, there will be a continuing obligation for any owner of the Site to operate and maintain the SSDS post-closure. Post-closure OM&M reporting shall be done using the Continuing Obligations Inspection and Maintenance Log (WDNR Form 4400-305). If subsequent sub-slab vapor sampling data demonstrates that the vapor intrusion risk no longer exists, the owner can submit a Post-Closure Modification to WDNR (with fee) to remove the continuing obligation.

FIGURES

Legend

-  Property boundary
-  City of Milwaukee/Village Whitefish Bay boundary
-  EP-1 Extraction point
-  Fan A Mitigation Fan (GP 501)
-  VP-1 Sub-Slab Port
-  Piping



SUB-SLAB DEPRESSURIZATION SYSTEM LAYOUT

One Hour Martinizing
 285 East Hampton Avenue
 Milwaukee, Wisconsin

Date:	10/9/18
Designed:	EB
Drawn:	EB
Checked:	BK
DWG file:	6194-1187

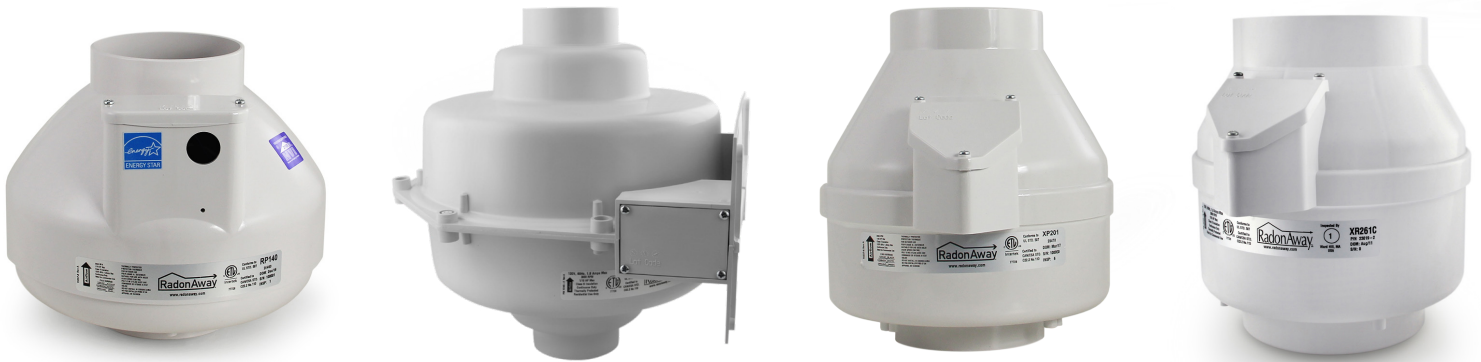


825 North Capitol Avenue • Indianapolis, IN 46204
 EnviroForensics.com

Figure	1
Project	6194

ATTACHMENT 1

Fan Specifications and Warranty Information



RPCc, GPCc, XPCc, XR Series Installation Instructions



Fan Installation & Operating Instructions
RPc, GPc, XPc, XR Series Fans
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!** For General Ventilating Use Only. Do Not Use to Exhaust Hazardous, Corrosive or Explosive Materials, Gases or Vapors. See Vapor Intrusion Application Note #AN001 for important information on VI Applications. RadonAway.com/vapor-intrusion
2. **NOTE:** Fan is suitable for use with solid state speed controls; however, use of speed controls is not generally recommended.
2. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.
3. **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.
4. **NOTICE!** There are no user serviceable parts located inside the fan unit.
Do NOT attempt to open. Return unit to the factory. (See Warranty, p. 8, for details.)
5. **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.
6. **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. (See p. 8.)
 - 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.
 - c) Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire rated construction.
 - d) Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturers' guidelines and safety standards such as those published by any National Fire Protection Association, and the American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), and the local code authorities.
 - e) When cutting or drilling into a wall or ceiling, do not damage electrical wiring and other hidden utilities.
 - f) Ducted fans must always be vented to outdoors.
 - g) If this unit is to be installed over a tub or shower, it must be marked as appropriate for the application and be connected to a GFCI (Ground Fault Circuit Interrupter) protected branch circuit.



Fan Installation & Operating Instructions

RPc Series		GPc Series		XPc / XR Series	
RP140c	P/N 23029-1	GP301c	P/N 23006-1	XP201c	P/N 23011-1
RP145c	P/N 23030-1	GP501c	P/N 23005-1	XR261	P/N 23019-1
RP260c	P/N 23032-1				
RP265c	P/N 23033-1				

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The RPc, GPc, XPc and XR Series Radon Fans are intended for use by trained, professional, certified/licensed radon mitigators. The purpose of these instructions is to provide additional guidance for the most effective use of RPc, GPc, XPc and XR Series Fans. These instructions should be considered supplemental to EPA/radon industry standard practices, state and local building codes and regulations. In the event of a conflict, those codes, practices and regulations take precedence over these instructions.

1.2 FAN SEALING

The RPc, GPc, XPc and XR Series Fans are factory sealed; no additional caulk or other materials are required to inhibit air leakage.

1.3 ENVIRONMENTALS

The RPc, GPc, XPc and 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.

1.4 ACOUSTICS

The RPc, GPc, XPc and XR Series Fans, when installed properly, operate 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.

(To ensure quiet operation of inline and remote fans, each fan shall be installed using sound attenuation techniques appropriate for the installation. For bathroom and general ventilation applications, at least 8 feet of insulated flexible duct shall be installed between the exhaust or supply grille(s) and the fan(s). RPc, GPc, XPc and XR Series Fans are not suitable for kitchen range hood remote ventilation applications.)

1.5 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 RPc, GPc, XPc and 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. Should this condition arise, it is recommended that the fan be turned off until the water recedes, allowing for return to normal operation.

1.6 SLAB COVERAGE

The RPc, GPc, XPc and XR Series Fans 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 RPc, GPc, XPc and XR Series Fan best suited for the sub-slab material can improve the slab coverage. The RPc, GPc, XPc and XR Series have a wide range of models to choose from to cover a wide range of sub-slab materials. The RP140c and 145c are best suited for general purpose use. The RP260c can be used where additional airflow is required, and the RP265c is best suited for large slab, high airflow applications. 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.

1.7 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 RPc, GPc, XPc and 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 RPc, GPc, XPc and XR Series Fans are NOT suitable for underground burial.

For RPc, GPc, XPc and XR Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Diameter	Minimum Rise per Ft of Run*		
	@25 CFM	@50 CFM	@100 CFM
4"	1/8"	1/4"	3/8"
3"	1/4"	3/8"	1 1/2"



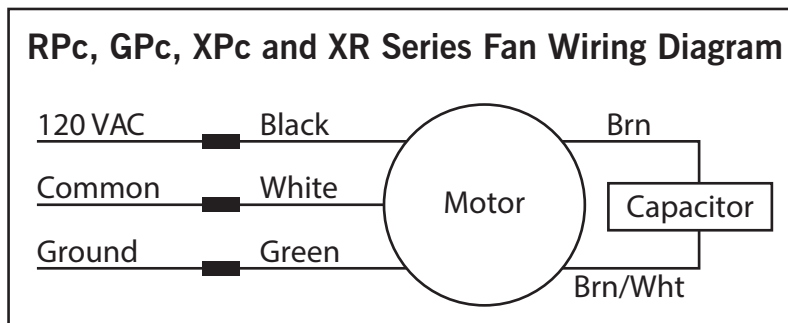
See p. 7 for detailed specifications.

1.8 SYSTEM MONITOR & LABEL

A System Monitor, such as a manometer (P/N 50017) or audible alarm (P/N 28001-2, 28001-4 or 28421), is required to notify the occupants of a fan system malfunction. A System Label (provided with Manometer P/N 50017) with instructions for contacting the installing contractor for service and identifying the necessity for regular radon tests to be conducted by the building occupants must be conspicuously placed in a location where the occupants frequent and can see the label.

1.9 ELECTRICAL WIRING

The RPc, GPc, XPc and XR Series Fans operate on standard 120V, 60Hz AC. All wiring must be performed in accordance with National Fire Protection (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 UL Listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly sealed to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.



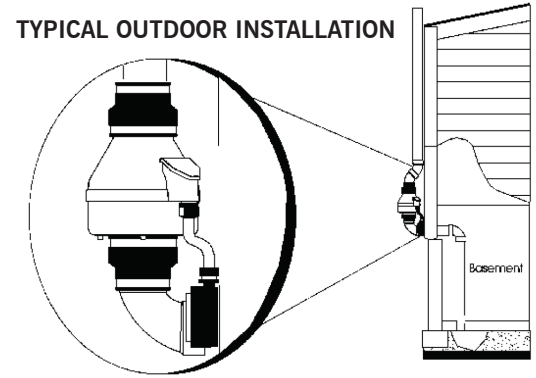
1.10 SPEED CONTROLS

The RPc, GPc, XPc and XR Series Fans are rated for use with electronic speed controls; however, speed controls are generally not recommended. If used, the recommended speed control is Pass & Seymour Solid State Speed Control (Cat. No. 94601-1).

2.0 INSTALLATION

The RPc, GPc, XPc and XR Series Fans can be mounted indoors or outdoors. (It is suggested that EPA and radon mitigation standards recommendations be followed in choosing the fan location.) The GPc fans have an integrated mounting bracket; RPc, XPc and XR Series Fans may be mounted directly on the system piping or fastened to a supporting structure by means of an optional mounting bracket.

The ducting from the fan to the outside of the building has a strong effect on noise and fan energy use. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated airflow.



2.1 MOUNTING

Mount the RPc, GPc, XPc and 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 RPc, XPc and XR Series Fans may be optionally secured with the RadonAway P/N 25007 mounting bracket. 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 a means of disconnect for servicing the unit and for vibration isolation. As the fan is typically outside of the building thermal boundary and is venting to the outside, installation of insulation around the fan is not required.

2.4 ELECTRICAL CONNECTION

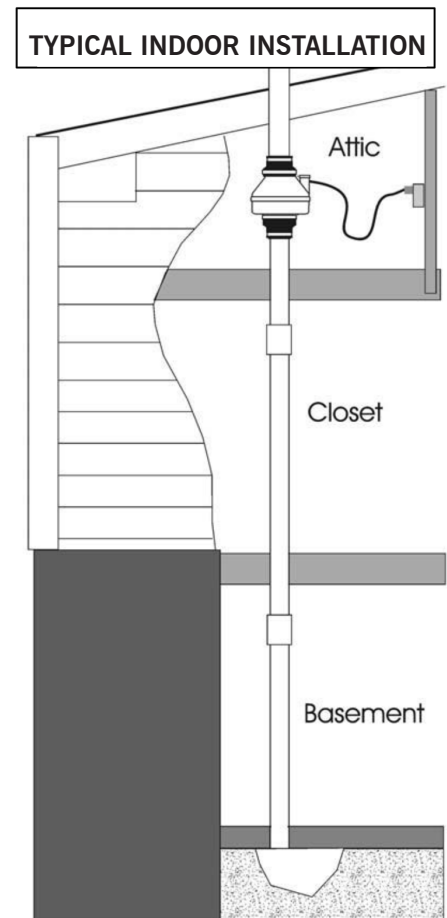
Connect wiring with wire nuts provided, observing proper connections (See Section 1.9). Note that the fan is not intended for connection to rigid metal conduit.

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 & ANNUAL SYSTEM MAINTENANCE

- _____ **Verify** all connections are tight and **leak-free**.
- _____ **Ensure** the RPc, GPc, XPc and XR Series Fan and all ducting are **secure and vibration-free**.
- _____ **Verify system vacuum pressure** with manometer. **Insure** vacuum pressure is within normal operating range and **less than** the 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 and applicable testing standards.



THE FOLLOWING CHARTS SHOW THE PERFORMANCE OF THE RPc, GPc, XPc and XR SERIES FANS

RPc Series Product Specifications

Typical CFM Vs. Static Pressure "WC									
Model	0"	.25"	.5"	.75"	1.0"	1.25"	1.5"	1.75"	2.0"
RP140c	135	103	70	14	-	-	-	-	
RP145c	166	146	126	104	82	61	41	21	3
RP260c	251	209	157	117	70	26	-	-	-
RP265c	334	291	247	210	176	142	116	87	52

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
RP140c	15 - 21 watts	0.7" WC
RP145c	41 - 72 watts	1.7" WC
RP260c	47-65 watts	1.3" WC
RP265c	91-129 watts	2.2" WC

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

Model	Size	Weight	Inlet/Outlet	L.2
RP140c	8.5"H x 9.7" Dia.	5.5 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)	25
RP145c	8.5"H x 9.7" Dia.	5.5 lbs	4.5" OD	15
RP260c	8.6"H x 11.75" Dia.	5.5 lbs	6.0" OD	48
RP265c	8.6"H x 11.75" Dia.	6.5 lbs	6.0" OD	30

L.2 = Estimated Equivalent Length of Rigid Metal Ducting resulting in .2" WC pressure loss for Duct Size listed. Longer Equivalent Lengths can be accommodated at Flows Lower than that at .2" WC pressure loss (see CFM Vs Static Pressure "WC Table).

XPc and XR Series Product Specifications

Typical CFM Vs. Static Pressure "WC						
	0"	.5"	1.0"	1.5"	1.75"	2.0"
XP201c	112	95	70	40	-	-
XR261	217	149	87	27	-	-

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
XP201c	45 - 66 watts	1.7" WC
XR261	67 - 117 watts	1.6" WC

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

Model	Size	Weight	Inlet/Outlet
XP201c	9.5"H x 8.5" Dia.	6 lbs	4.5" OD
XR261	9.5"H x 8.5" Dia.	7 lbs	6" OD

GPc Series Product Specifications

Typical CFM Vs. Static Pressure "WC							
	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
GP301c	64	54	41	4	-	-	-
GP501c	-	-	66	58	50	27	4

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
GP301c	56-100 watts	2.3" WC
GP501c	68 - 146 watts	3.8" WC

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

Model	Size	Weight	Inlet/Outlet
GP301c	13"H x 12.5" Dia.	12 lbs	3.5" OD
GP501c	13"H x 12.5" Dia.	12 lbs	3.5" OD

RPc, XPc, XR and GPc Series Additional Specifications

Model	Recommended Duct	PVC Pipe Mounting	Thermal Cutout	Insulation Class
RP140c	3" or 4" Schedule 20/40 PVC	Mount on the duct pipe or with optional mounting bracket. For Ventilation: 4", 6" or 8" Rigid or Flexible Ducting.	130°C/266°F	Class B Insulation
RP145c			130°C/266°F	Class F Insulation
RP260c			150°C/302°F	
RP265c			150°C/302°F	
XP201c	3" or 4" Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120°C/248°F	Class B Insulation
XR261				
GP301c	3" or 4" Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120°C/248°F	Class B Insulation
GP501c				

Continuous Duty
3000 RPM
Thermally Protected
RPc, GPc Residential and Commercial
XPc, XR Residential Only
Rated for Indoor or Outdoor Use

LISTED
Electric Fan



Conforms to
UL STD. 507
Certified to
CAN/CSA STD.
C22.2 No.113

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® R Pc, G Pc, X Pc and 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 the housing.** Return unit to factory. (See Warranty below).

Install the R Pc, G Pc, X Pc and XR Series Fan in accordance with all EPA, ANSI/AARST standard practices, and state and local building codes and 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 R Pc, G Pc, X Pc and XR Series Fan (the “Fan”) will be free from defects in materials and workmanship for a period of 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner (the “Warranty Term”).

RadonAway® will replace any fan which fails due to defects in materials or workmanship during the Warranty Term. 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®.

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.

5-YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway® will extend the Warranty Term of the fan to 60 months (5 years) from date of purchase or 66 months from date of manufacture, whichever is sooner, provided that the fan is installed by a professional radon mitigation contractor. Proof of purchase and/or proof of professional installation may be required for service under this warranty. No extended warranty is offered outside the Continental United States and Canada beyond the standard 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner.

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

LIMITATION OF WARRANTY

EXCEPT AS STATED ABOVE, THE R Pc, G Pc, X Pc and XR 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 Number: _____

Purchase Date: _____

ATTACHMENT 2

Vapor Mitigation System Inspection and Maintenance Log

**VAPOR MITIGATION SYSTEM INSPECTION AND MAINTENANCE LOG
ONE HOUR MARTINIZING, MILWAUKEE, WISCONSIN**

SYSTEM COMPONENT						ANNUAL INSEPECTION	
NAME	PHOTO	FUNCTION	CHECK	NORMAL OBSERVATION	POSSIBLE REPAIR	DATE	NOTES / REPAIR COMPLETED
Fan		<p>Fan creates a vacuum and lowers pressure below foundation.</p> <p>The fan also removes soil gasses from below foundation for discharge to atmosphere.</p>	<p>Fan Operation</p> <p>Fan Location</p> <p>Motor Noise</p>	<p>Fan is on</p> <p>Fan mounted outside and secure</p> <p>Fan motor is quiet (loud motor may indicate a problem)</p>	<p>Fan may need to be replaced every 15 to 20 years.</p> <p>Replacement fan to have similar specifications as original with respect to flow and vacuum.</p> <p>Fan Type = RadonAway GP501</p>		
Suction Point with Vent Pipe		<p>Suction Point : Soil gases are collected in a pit below the foundation, and tight seal prevents soil gas from entering the building.</p> <p>Vent Pipe: Pipe conveys the vacuum from the fan, and collects soil gases for discharge to the atmosphere.</p>	<p>Suction Point Seal</p> <p>Vent Pipe Condition</p>	<p>Seal is air tight around pipe penetration.</p> <p>Vent pipe is connected to fan and has not cracked.</p>	<p>Suction point seal or vent pipe may need to be replaced in cracks or leaks appear.</p> <p>Have professional test pressures if pipes are modified or cracks appear.</p>		
Manometer or Differential Pressure Gauge		<p>Measures differential pressure between vacuum side of vent pipe and indoor space.</p> <p>This measurement confirms the fan is creating a vacuum.</p>	<p>Liquid Level in Manometer</p>	<p>Liquid level in manometer is between 1 and 3 in H₂O</p>	<p>A change in liquid level indicates a change in the vacuum below the foundation. This could be caused by fan failure, vent pipe blockage, shallow water below foundation, or other conditions.</p> <p>Troubleshoot or hire professional to identify the cause and repair if needed.</p>		
Outdoor Vent Pipe		<p>Pipe carries soil gas outside and vents it to the atmosphere.</p>	<p>Vent Pipe Condition</p> <p>Vent Pipe Location</p>	<p>Vent pipe remains connected to fan.</p> <p>End of pipe free from obstructions.</p> <p>The exhaust is more than 15 feet from windows and air intakes.</p>	<p>Vent pipe may require replacement, or cleaning to remove ice or debris.</p> <p>Have professional test pressures if pipes are modified or cracks appear.</p>		
Foundation Floor		<p>Foundation is a barrier that minimizes soil gas entry into building.</p>	<p>Foundation Condition</p> <p>Foundation Footprint</p>	<p>No penetrating cracks or holes in foundation.</p> <p>No alterations or additions to building foundation.</p>	<p>Seal cracks or other penetrations as you would to prevent water from entering.</p> <p>If building floor plan has changed, contact a professional contractor or WDNR to evaluate if modifications to the mitigation system are necessary.</p>		
Vapor Pin		<p>This is a sample port to measure vacuum or collect soil gas sample(s) if needed.</p>	<p>Pin Seal/Cap</p> <p>Pin Condition</p>	<p>Pin is sealed and capped when not in use.</p> <p>A manometer can be connected to the vapor pin to check sub-slab vacuum (not required). Vac should be less than -0.004 in H₂O.</p>	<p>Repair or replace the seal and cover as needed.</p> <p>Permanently seal hole if vapor pin is ever removed.</p>		