REMEDIAL ACTION DESIGN REPORT

HARBORVIEW CLEANERS
134 EAST GRAND AVENUE
PORT WASHINGTON, WISCONSIN
BRRTS# 02-46-548092

June 12, 2017

Prepared For:

Harborview Cleaners
134 East Grand Avenue
Port Washington, WI 53074

Prepared By:

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Project Manager

Rob Hoverman, LPG
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CERTIFICATIONS

I, Andrew Horwath, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Manager, Technical Group, PE #E-43831-6

Digitally signed by Andrew D. Horwath Date: 2017.06.13 15:44:33 -04'00'

Signature, title and P.E. number

P.E. stamp

I, Brian Kappen, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Project Manager

Signature and title

6/7/2017

Date

1.0 BACKGROUND

Environmental Forensic Investigations, Inc. (EnviroForensics) has prepared this Remedial Action Options Report (Report) for the Harborview Cleaners (Harborview) facility located at 134 East Grand Avenue in Port Washington, Wisconsin (Site). The location of the Site is shown on **Figure 1**. The operator of the Site and the responsible party is Harborview. This Report follows guidelines for the design of remedial actions set forth in the Wisconsin Administrative Code (WAC) Chapter NR 724 and other associated Chapter NR 700 series rules. This Report is being submitted subsequent to the Remedial Action Options Report (RAOR) dated November 8, 2016, and the February 20, 2017 letter from the Wisconsin Department of Natural Resources (WDNR) to Harborview regarding review of the RAOR.

The Site is improved with a single-story commercial building approximately 1,300 square feet in size that was constructed in the 1930s or 1940s. Reportedly the building was occupied by a gas station until approximately 1970 when it was converted to a dry cleaning operation. The building is concrete slab on grade with the remainder of the property being a paved asphalt driveway and parking area. The Site is bound by East Grand Avenue to the south, a commercial building to the west, a mixed use commercial and residential building to the north, and North Franklin Street to the east. The Site layout is presented as **Figure 2**.

1.1 Site Hydrogeology

Fill material is encountered from below the pavement to approximately five (5) feet below ground surface (bgs), followed by silty clay from 5 to 24 feet bgs with a sand lens at approximately 10 feet bgs. The water table is encountered at depths ranging from 8 to 12 feet bgs. Groundwater elevations appear to be randomly distributed across the monitored area. Specific wells may be influenced by laterally discontinuous zones of higher permeability and/or recharge rates may vary widely across the Site to cause this indiscernible water table. The distribution of contaminants detected in groundwater indicates that shallow groundwater at the Site flows towards the south.

1.2 Nature and Extent of Contamination

The nature and extent of contamination associated with release(s) at the Site was detailed in the Supplemental Site Investigation Report. A summary is provided herein for reference. The investigative sample locations are depicted on **Figure 2**.

The soil source area appears to be located near the dry-cleaning machine. The primary contaminant of concern at this site is the dry-cleaning solvent tetrachloroethene (PCE). The horizontal extent of PCE impacts in soil is bounded to the west by boring B-5, and to the south and east of the Site property by MW-5 and B-2, respectively. The extent of impacts was further defined by non-detect results in samples collected from three (3) hand auger borings in the basement of the 103-109 N. Franklin Street building (SB-5, SB-6 and SB-7). Soil PCE isoconcentration contours are depicted on **Figure 3**.

The vertical extent of PCE impacts in soil beneath the Site building is limited to within 12 feet of the ground surface. The vertical impacts at the city-owned property west and south of the Site extend to 10-12 feet bgs. As shown on **Figure 4**, the extent of chlorinated volatile organic compound (CVOC) impacts to groundwater (i.e., the CVOC plume) above enforcement standards (ESs) is defined to the west by MW-4, to the south by MW-5, to the east by MW-1, and to the north by grab sample SB-1W. However, all groundwater VOC concentrations were below ESs during the most recent monitoring event conducted during July 2016. A cross-section transect map is presented on **Figure 5**, and two (2) cross-sections through the source area are presented on **Figures 6a and 6b**.

The results of vapor intrusion (VI) assessments conducted at 126 East Grand Avenue and 115 North Franklin Street indicate that PCE is present in sub-slab vapor and indoor air; however, all concentrations are below WDNR screening/action levels. The results of a VI assessment at the adjoining residential/commercial space (103 through 109 North Franklin Street) indicate that vapor mitigation activities are appropriate and have been implemented with ongoing enhancements. Soil gas sample results indicate that additional VI assessments at other off-site properties are not warranted. A summary of the VI assessment results is provided in **Figure 7**.

1.3 SVE Pilot Testing

In the November 8, 2016 Remedial Action Options Report, SVE was identified as a likely viable option to achieve remediation objectives at the Site. SVE was determined to have a high probability of success since a majority of the contaminant mass resides in shallow soil beneath the Site building. Soil Vapor Extraction (SVE) pilot testing was performed on February 9 and 10, 2017 using a mobile, positive displacement blower. The blower was connected to one (1) extraction well inside the building, and subsurface response was measured at two (2) vapor monitoring points and four (4) monitoring wells. The SVE Pilot Test Report is provided in **Appendix A**.

2.0 REMEDIAL ACTION PLAN

Remediation at the Site will consist of SVE to address soil impacts. The primary objectives of SVE are to remove contaminant mass from vadose zone soil and reduce the VI risk in the 103-109 N. Franklin Street building. The following sections describe the SVE system design, operation and maintenance activities, and performance monitoring program.

2.1 Permitting

Construction and operation permits apply to remediation systems that emit contaminants under WAC Chapters NR 406 and 407, respectively. The following permitting thresholds apply to remediation systems, regardless of whether or not emissions control devices are used:

- Total VOC emissions greater than 5.7 pounds per hour (lb/hr) [NR 406.04(1)(m)2]; and
- Assuming a stack height less than 25 feet, PCE emissions greater than 9.11 lb/hr or 301 pounds per year (lb/yr) [NR 407.03(1)(sm)].

The sampling data collected during the SVE pilot study indicate a mass removal rate of less than 150 lb/yr at startup. Therefore, EnviroForensics anticipates that the SVE system will be exempt from permitting requirements. However, the SVE system is designed so that carbon treatment can be added if necessary to reduce the concentrations of total VOCs or PCE to below the permit thresholds.

Ambient air quality criteria defined in WAC Chapter NR 445.07 also apply to remediation systems. The concentration of PCE must be less than 4,069 µg/m^3 in ambient air while the SVE system is operating. The monitoring program designed to ensure compliance with all emissions and air quality standards is described in Section 2.4.

2.2 SVE System Design

The SVE system design is based on evaluation of the pilot test results presented in **Appendix A**, and on the logistics of the Site and requirements of the property owner to minimize impacts on business operations.

The SVE system is designed to extract soil vapor from both the sand fill beneath the building slab and the underlying native silty clay. The system includes four (4) extraction wells, including SVE-1 which was installed for the pilot study. The extraction wells designated SVE-2

through SVE-4 will be constructed with shorter screens to target extraction from the native silty clay. Lithological information will be collected during installation of the additional extraction wells to confirm that the screened intervals are set entirely within the silty clay. The radius of influence of each proposed extraction well is expected to be less than that of SVE-1 which is screened across both the sand fill and native sediment.

The additional extraction wells will be constructed of 4-inch diameter schedule 40 PVC with 0.020-inch slot PVC screen from approximately 6 to 9 feet bgs. The wellheads will be accessible via 12-inch diameter flush-mount vaults set in concrete. The extraction wells will be connected individually to the equipment enclosure positioned on the south side of the building. Conveyance piping will consist of 4-inch diameter PVC pipe installed in shallow trenches beneath the building floor. The proposed layout of the system is shown on **Figure 8**. The extraction well and sub-grade piping construction details are depicted on **Figure 9**.

The SVE mechanical system design parameters are as follows:

- Extraction rate of approximately 465 actual cubic feet per minute (ACFM);
- Maximum operating vacuum of 15 in Hg; and
- ROI of 40 feet for SVE-1 and 20 feet for SVE-2 through SVE-4.

The designed ROI is depicted on **Figure 8**. A piping manifold in the system enclosure will be equipped with valves to allow each well to be operated independently. This design allows targeting of depth intervals as the remediation progresses to maximize efficiency.

The SVE mechanical equipment and controls will be constructed on a steel-framed skid with a maximum footprint of 13 by 4.5 feet. An enclosure around the equipment will feature removable panels with sound insulation for the purposes of reducing operational noise. Equipment will include the following:

- Sutorbilt Legend positive displacement blower and 25 horsepower motor;
- Variable frequency drive (VFD) for enhanced vacuum and flow control;
- Particulate air filter;
- Dilution air valve to reduce applied vacuum as needed;
- Air-water separator tank; and
- 1.5 horsepower self-priming transfer pump.

Recovered vapors and condensate first go through the air-water separator tank. After the water and vapor have been separated, the SVE exhaust is discharged to the atmosphere. Water may be discharged to the sanitary sewer under a permit obtained through the City of Port Washington. Alternatively, water will be collected in drums for off-site disposal. The anticipated process and instrumentation diagram is presented on **Figures 10a and 10b**.

2.2.1 Sustainability

Power to operate the SVE system will come from a temporary dedicated service. There are no plans to utilize renewable energy to operate the blower, because the power requirements (i.e., 3-phase and high voltage) will preclude the use of practical renewable energy systems. The SVE exhaust will be sent directly to the atmosphere. The exhaust will be sent through carbon treatment, if needed, to stay below permitting thresholds. EnviroForensics does not anticipate generating particulate matter or greenhouse gases during remediation.

The following sustainable practices will be considered during remedial design, implementation, and long-term monitoring:

- Using local contractors to the extent possible;
- Combining mobilizations with work at other sites to minimize vehicle use;
- Discharging water to the local sewer system, if allowed, rather than transportation to an off-site disposal facility; and
- Intermittent system operation to improve efficiency.

2.3 SVE System Operation and Maintenance (O&M)

Routine O&M of the SVE system will be required. O&M activities will include the following:

- Address system shutdowns or operational issues;
- Record operational parameters and vapor concentrations to evaluate efficiency:
    - Effluent VOC vapor concentration by sample collection in vacuum canisters;
    - Total system run time;
    - System vacuum;
    - Vacuum at each wellhead;
    - Vacuum at monitoring points;

- Flow rate; and
- Exhaust temperature.

- Inspect, maintain, and/or repair the following components as needed and recommended by the manufacturers:
  - Blower belts and pulleys;
  - Blower inlet filter;
  - Blower motor bearings and oil level;
  - System enclosure exhaust fan;
  - Moisture separator tank and float switches;
  - Vacuum bypass valve;
  - Moisture separator dilution valve;
  - Exhaust muffler; and
  - Electrical power phase converter.

EnviroForensics will prepare and submit an Operation and Maintenance Plan to WDNR in accordance with Wisconsin Administrative Code (WAC) Chapter NR 724.13 after the system has been installed.

2.4 SVE Performance Monitoring

The effectiveness of the SVE system will be evaluated periodically by monitoring the subsurface vacuum influence and air emissions of VOCs. These activities are summarized below.

Subsurface vacuum influence will be measured periodically to evaluate magnitude of vacuum and confirm the system ROI. The following monitoring points shown on **Figure 8** will be measured:

- Dedicated vacuum monitoring points VP-1 and VP-2;
- Monitoring wells MW-1 through MW-4; and
- Sub-slab vacuum measurement ports VP-1 through VP-3 (installed in the basement of 105 N. Franklin Street)

Construction information for the measurement points is provided in the SVE Pilot Study Report (**Appendix A**). Measurements will be collected using a hand-held digital manometer.

Samples of the SVE system emissions will be collected from the effluent piping and analyzed for VOCs to calculate mass removal rates and cumulative mass removed; and to determine operational changes to optimize system performance. Testing is also required to determine the need for emissions treatment to stay below permitting thresholds. The emissions testing schedule required under WAC Chapter 419.07 is as follows:

- Once each day for the first 3 days of operation;
- Weekly for the next 3 weeks; and
- Monthly thereafter.

The effluent samples will be collected in 1-liter vacuum canisters at a rate of 200 milliliters per minute and submitted to a laboratory for analysis for PCE and related compounds. The first two samples, collected on days 1 and 2 of operation, will be analyzed on a rush timeframe to avoid delays in meeting the emissions thresholds, if needed.

Outdoor air samples will be collected from locations down-wind of the prevailing wind direction at the time of sampling to evaluate air quality and the need for emissions treatment to meet the ambient air standard. Two (2) 24-hour samples will be collected one day and three days after start up. The first four (4) samples will be analyzed on a rush basis. The samples will be collected in 6-liter vacuum canisters and shipped to a laboratory for analysis of PCE and related compounds.

2.5 Preliminary Schedule

Coordination, contracting, purchasing, and installation of the SVE system can be completed in four (4) months. The process and instrumentation components will be built and assembled off-site and installed at the earliest possible date inside the system enclosure. It is anticipated that the SVE system will remove the majority of contaminant mass in the vadose zone within two (2) years of operation.

2.6 Reporting

In accordance with WAC Chapter NR 724.15, EnviroForensics will prepare a Construction Documentation Report that presents the as-built construction of the SVE system and the final O&M Plan. Tables, maps, figures, and supporting data will also be included, as needed. Any deviation from design plans presented herein will be described. The Construction

Documentation Report will be submitted within 60 days of completing system installation and startup.

Semi-annual remediation progress reports will be submitted to WDNR, as required, using the Remediation Site Operation, Maintenance, Monitoring & Optimization Report (WDNR Form 4400-194). The reports will include information on the operational configuration during the reporting period, figures, tables, and graphs showing rate of mass removal and cumulative mass removal.

2.7 Confirmation Sampling

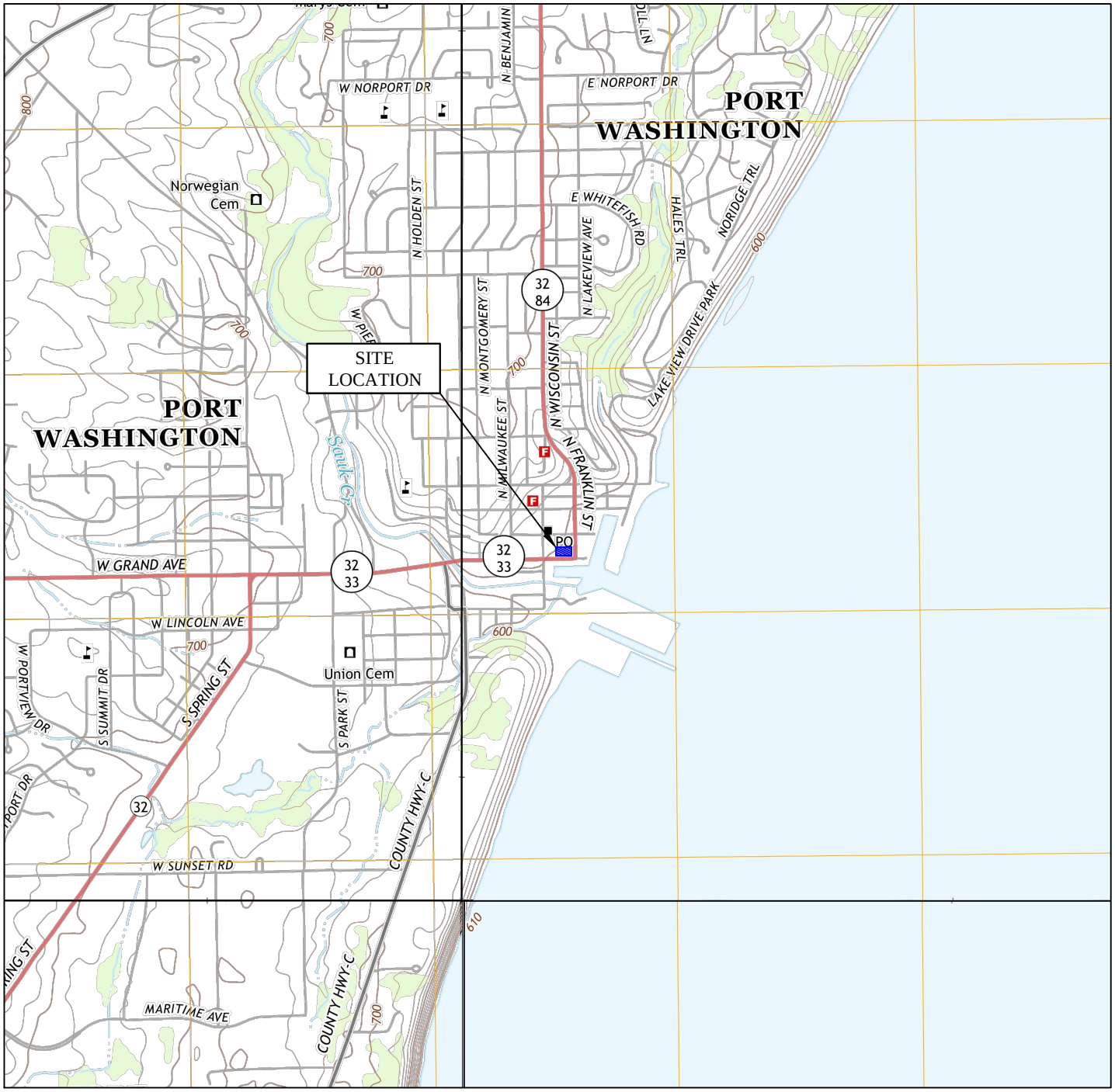
Once performance monitoring data indicates a significantly diminished mass removal rate, the SVE system will be shut down and soil samples will be collected to confirm the effectiveness of the SVE remedy. Up to eight (8) soil samples will be collected using direct-push methods from areas that previously exhibited elevated impacts. The samples will be submitted to a laboratory for analysis of VOCs according to US EPA Test Method 8260.

2.8 Cost Estimate

The estimated total cost for implementation of SVE at the Site is approximately $245,000 and includes:

- Preparation of remedial design documents;
- Planning, coordination, and permitting;
- SVE system installation;
- SVE operation, maintenance, and monitoring for 24 months;
- Construction Documentation Report and semi-annual progress reports; and
- Confirmation sampling.

FIGURES



Scale 1:24,000

1 1/2 0 1 Mile

1000 0 1000 2000 3000 4000 5000 6000 7000 Feet

N

Source: US Geological Survey, Port Washington East, Wisconsin, 7.5 Minute Series, 2013
Source: US Geological Survey, Port Washington West, Wisconsin, 7.5 Minute Series, 2013
Source: US Geological Survey, Cedarburg, Wisconsin, 7.5 Minute Series, 2013
Source: US Geological Survey, Cedarburg OE E, Wisconsin, 7.5 Minute Series, 2013

No.	Date	Revision	Approved

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Date:	7/22/15
Designed:	EB
Drawn:	EB
Checked:	RH
DWG file:	6348-0057

SITE LOCATION MAP
Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Figure
1
Project
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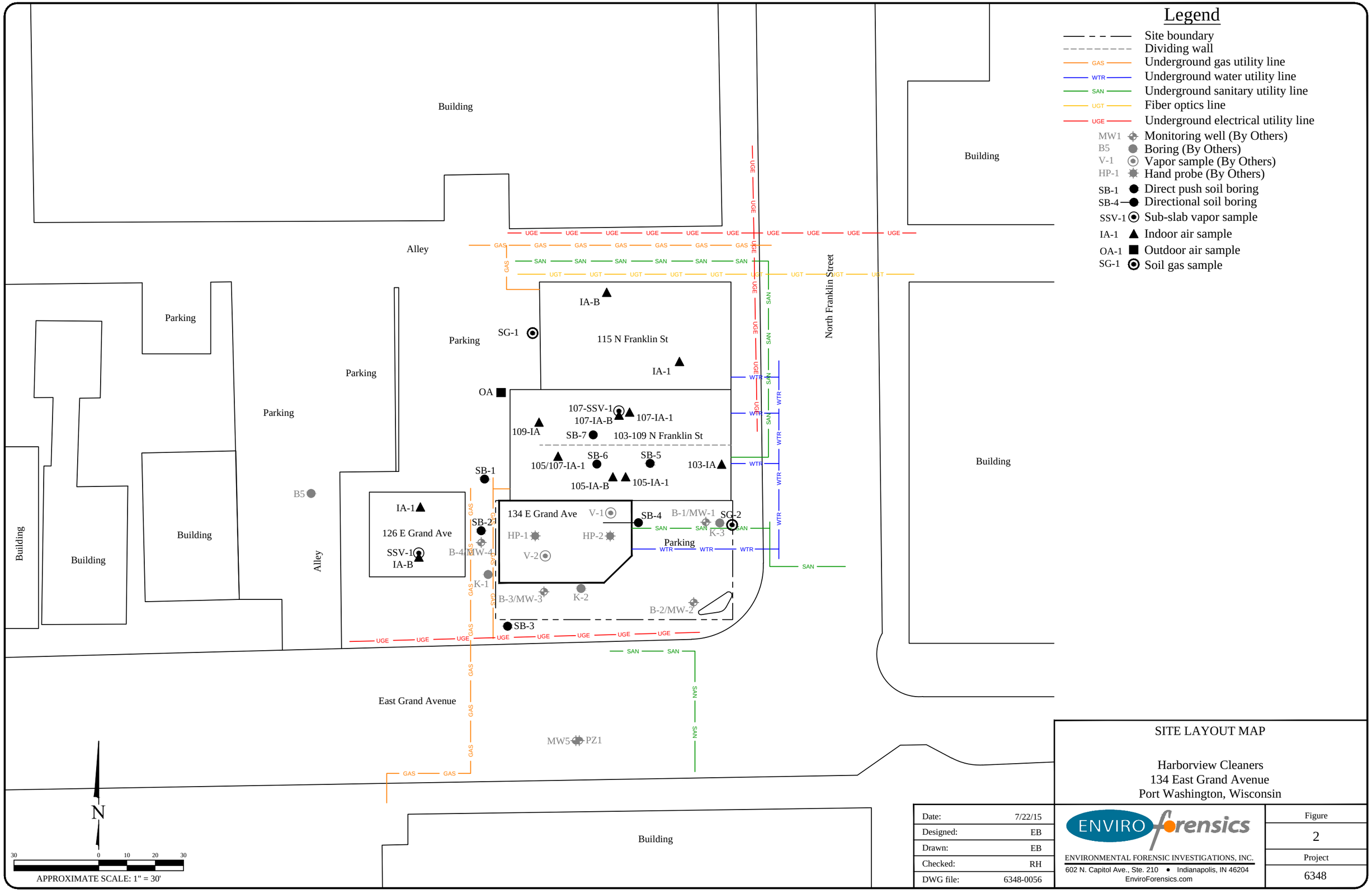

SITE LAYOUT MAP

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

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Figure
2

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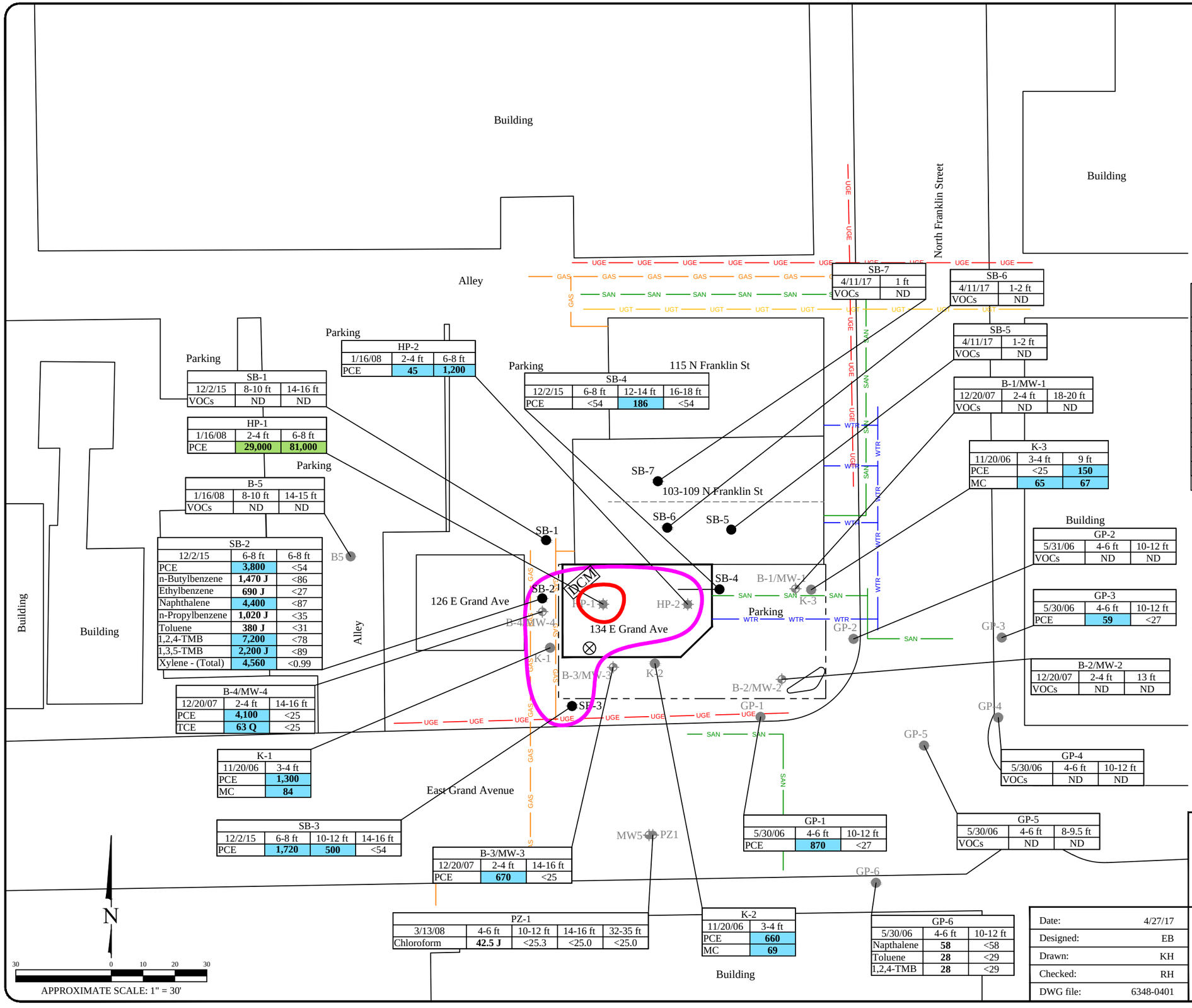

Legend

- Site boundary
- Dividing wall
- GAS — Underground gas utility line
- WTR — Underground water utility line
- SAN — Underground sanitary utility line
- UGT — Fiber optics line
- UGE — Underground electrical utility line
- MW1 — Monitoring well (By Others)
- B5 — Boring (By Others)
- HP-1 — Hand probe (By Others)
- SB-1 — Direct push soil boring
- SB-4 — Directional soil boring
- DCM — Dry cleaning machine location
- Historic spent solvent/filter storage

Analyte	Soil to Groundwater Residual Contaminant Level	Residential Residual Contaminant Level	Industrial Residual Contaminant Level
PCE	**4.5**	**33,000**	**145,000**
TCE	**3.6**	**1,300**	**8,410**
Chloroform	**3.3**	**423**	**2,130**
n-Butylbenzene	NE	**108,000**	**108,000**
Ethylbenzene	**1,570**	**8,020**	**35,400**
MC	**2.6**	**61,800**	**1,150,000**
Naphthalene	**658**	**5,520**	**24,100**
n-Propylbenzene	**1,970**	**264,000**	**264,000**
Toluene	**1,107**	**818,000**	**818,000**
1,2,4-TMB	**1,382**	**219,000**	**219,000**
1,3,5-TMB	**1,382**	**182,000**	**182,000**
Xylenes (total)	**3,960**	**260,000**	**260,000**

Note:

1. Bolded and green shaded values exceed the Non-Industrial Residual Contaminant Level
2. Bolded and blue shaded values exceed the Public Health Preventive Action Limit
3. Bolded values are above detection limits
4. J,Q = Analyte concentration less that laboratory reporting limit
5. Samples analyzed using EPA SW-846 Method 8260
6. All results reported in units of micrograms per kilogram (µg/kg)
7. PCE = Tetrachloroethene
8. TCE = Trichloroethene
9. 1,2,4-TMB = 1,2,4- Trimethylbenzene
10. 1,3,5-TMB = 1,3,5- Trimethylbenzene
11. MC = Methylene Chloride
12. VOCs = Volatile Organic Compounds
13. ND = Not detected

- 1,000 µg/kg PCE isoconcentration
- 10,000 µg/kg PCE isoconcentration

SOIL ANALYTICAL RESULTS MAP

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	4/27/17
Designed:	EB
Drawn:	KH
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DWG file:	6348-0401

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Figure 3

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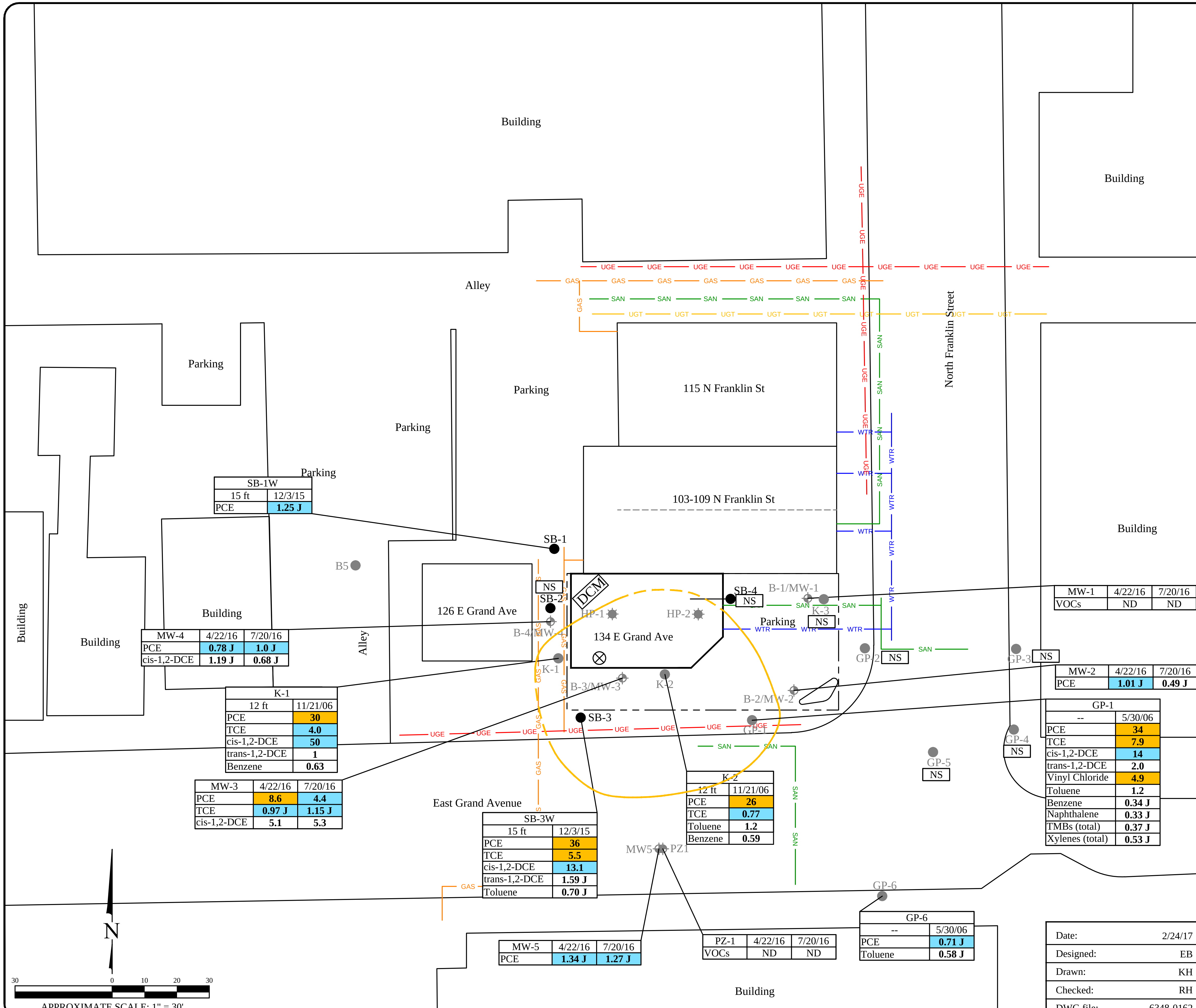

SB-1W		
	15 ft	12/3/15
PCE		**1.25 J**

MW-4	4/22/16	7/20/16
PCE	**0.78 J**	**1.0 J**
cis-1,2-DCE	**1.19 J**	**0.68 J**

K-1	
12 ft	11/21/06
PCE	**30**
TCE	**4.0**
cis-1,2-DCE	**50**
trans-1,2-DCE	**1**
Benzene	**0.63**

MW-3	4/22/16	7/20/16
PCE	**8.6**	**4.4**
TCE	**0.97 J**	**1.15 J**
cis-1,2-DCE	**5.1**	**5.3**

SB-3W	
15 ft	12/3/15
PCE	**36**
TCE	**5.5**
cis-1,2-DCE	**13.1**
trans-1,2-DCE	**1.59 J**
Toluene	**0.70 J**

K-2	
12 ft	11/21/06
PCE	**26**
TCE	**0.77**
Toluene	**1.2**
Benzene	**0.59**

MW-5	4/22/16	7/20/16
PCE	**1.34 J**	**1.27 J**

PZ-1	4/22/16	7/20/16
VOCs	ND	ND

GP-6	
--	5/30/06
PCE	**0.71 J**
Toluene	**0.58 J**

MW-1	4/22/16	7/20/16
VOCs	ND	ND

MW-2	4/22/16	7/20/16
PCE	**1.01 J**	**0.49 J**

GP-1	
--	5/30/06
PCE	**34**
TCE	**7.9**
cis-1,2-DCE	**14**
trans-1,2-DCE	**2.0**
Vinyl Chloride	**4.9**
Toluene	**1.2**
Benzene	**0.34 J**
Naphthalene	**0.33 J**
TMBs (total)	**0.37 J**
Xylenes (total)	**0.53 J**

Legend

- Site boundary
- Dividing wall
- GAS — Underground gas utility line
- WTR — Underground water utility line
- SAN — Underground sanitary utility line
- UGT — Fiber optics line
- UGE — Underground electrical utility line
- MW1 — Monitoring well (By Others)
- B5 — Boring (By Others)
- HP-1 — Hand probe (By Others)
- SB-1 — Proposed direct push soil boring
- SB-4 — Directional soil boring
- DCM — Dry cleaning machine location
- ⊗ Historic spent solvent/filter storage

Analyte	Public Health Preventive Action Limit	Public Health Enforcement Standard
PCE	**0.5**	**5**
TCE	**0.5**	**5**
cis-1,2-DCE	**7**	**70**
trans-1,2-DCE	**20**	**100**
Toluene	**200**	**1,000**
Benzene	**0.5**	**5**
n-Butylbenzene	NE	NE
Chlorobenzene	**20**	**100**
sec-Butylbenzene	NE	NE
p-Isopropyltoluene	NE	NE
Naphthalene	**10**	**100**
TMBs (total)	**96**	**480**
Xylenes (total)	**1,000**	**10,000**

Note:
1. Bolded and orange shaded values exceed the Public Health Enforcement Standard
2. Bolded and blue shaded values exceed the Public Health Preventive Action Limit
3. Bolded values are above detection limits
4. J = Analyte concentration less that laboratory detection limits
5. Samples analyzed using EPA SW-846 Method 8260
6. All results reported in units of micrograms per liter (µg/L)
7. PCE = Tetrachloroethene
8. TCE = Trichloroethene
9. TMBs = Trimethylbenzenes
10. VOCs = Volatile Organic Compounds
11. ND = Not detected
12. NS = Not sampled

Extent of PCE impacts in groundwater above Enforcement Standards (Dashed where inferred)

GROUNDWATER ANALYTICAL RESULTS MAP

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	2/24/17
Designed:	EB
Drawn:	KH
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DWG file:	6348-0162

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Figure 4

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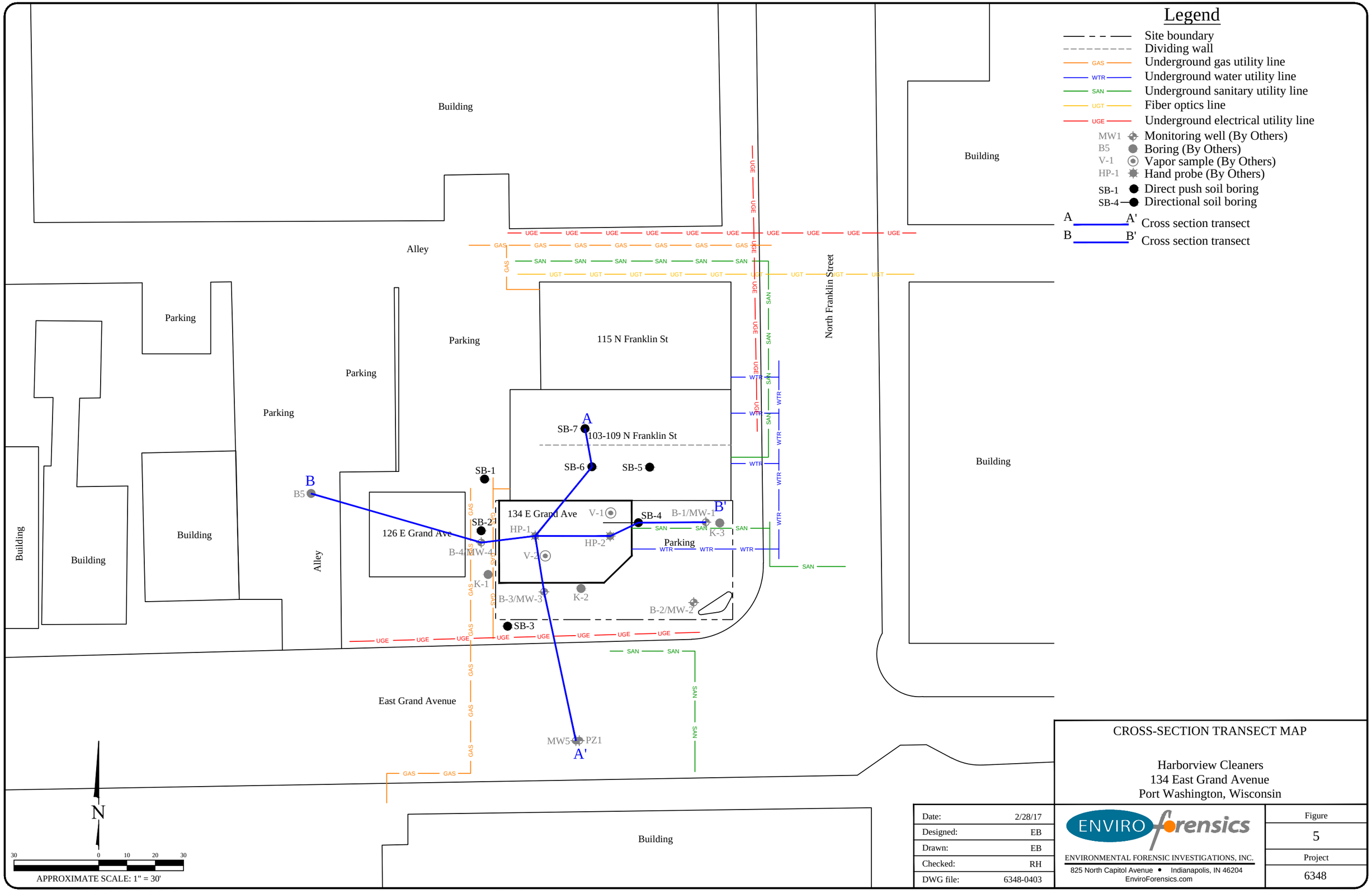

CROSS-SECTION TRANSECT MAP

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	2/28/17
Designed:	EB
Drawn:	EB
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DWG file:	6348-0403

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Figure
5

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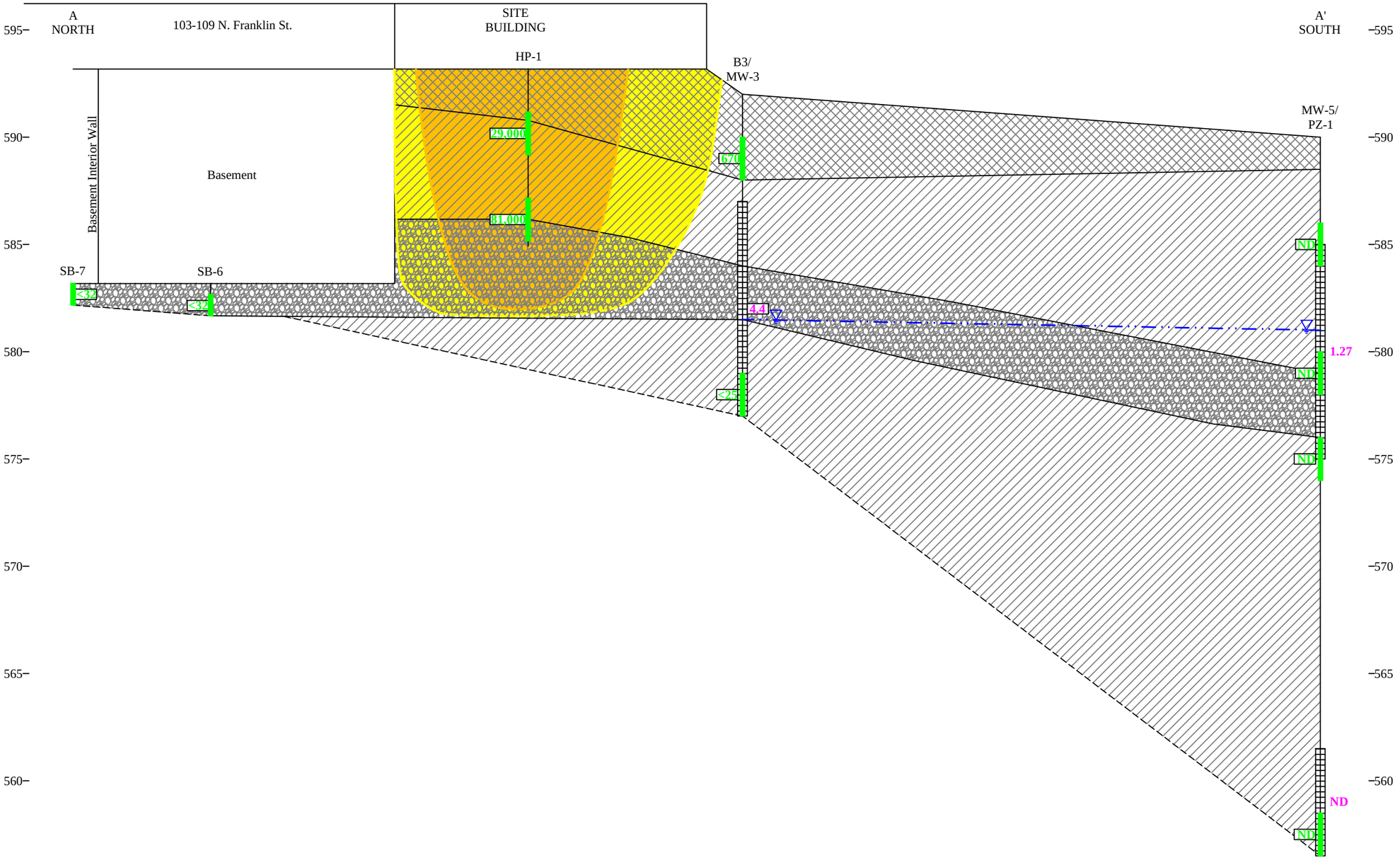

Legend

- Fill
- Silty Clay
- Gravel/Sand
- Monitoring well screen
- Dashed boundaries are inferred

700 PCE concentration in soil sample (µg/kg)

700 PCE concentration in monitoring well sample (µg/L)

PCE in soil >1,000 µg/kg

PCE in soil >10,000 µg/kg

Observed groundwater elevation in monitoring well

5
0
0 10
SCALE

Horizontal Scale: 1" = 10'
Vertical Scale: 1" = 5'
VERTICAL EXAGGERATION: 2X

CROSS-SECTION
A-A'

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	2/28/17
Designed:	EB
Drawn:	EB
Checked:	RH
DWG file:	6348-0403

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Figure	
	6a
Project	
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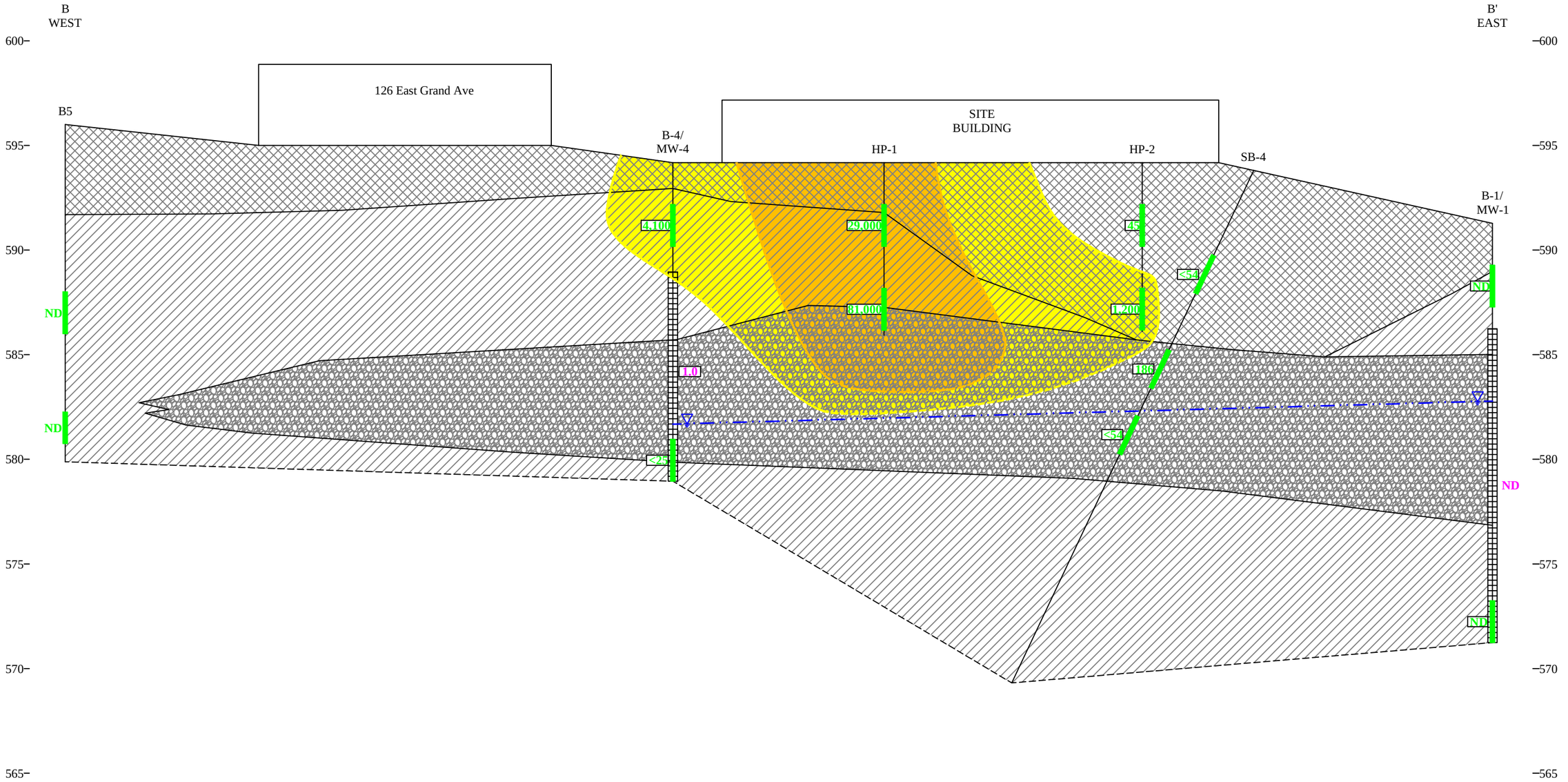

Legend

Fill (Sand/Roadbase)	700 PCE concentration in soil sample (µg/kg)
Silty Clay	700 PCE concentration in monitoring well sample (µg/L)
Gravel/Sand/Silt	PCE in soil >1,000 µg/kg
	PCE in soil >10,000 µg/kg
	Observed groundwater elevation in monitoring well
Monitoring well screen	
Dashed boundaries are inferred	

5
0
0 10
SCALE

Horizontal Scale: 1" = 10'
Vertical Scale: 1" = 5'
VERTICAL EXAGGERATION: 2X

CROSS-SECTION
B-B'

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	3/22/17
Designed:	EB
Drawn:	EB
Checked:	RH
DWG file:	6348-0403

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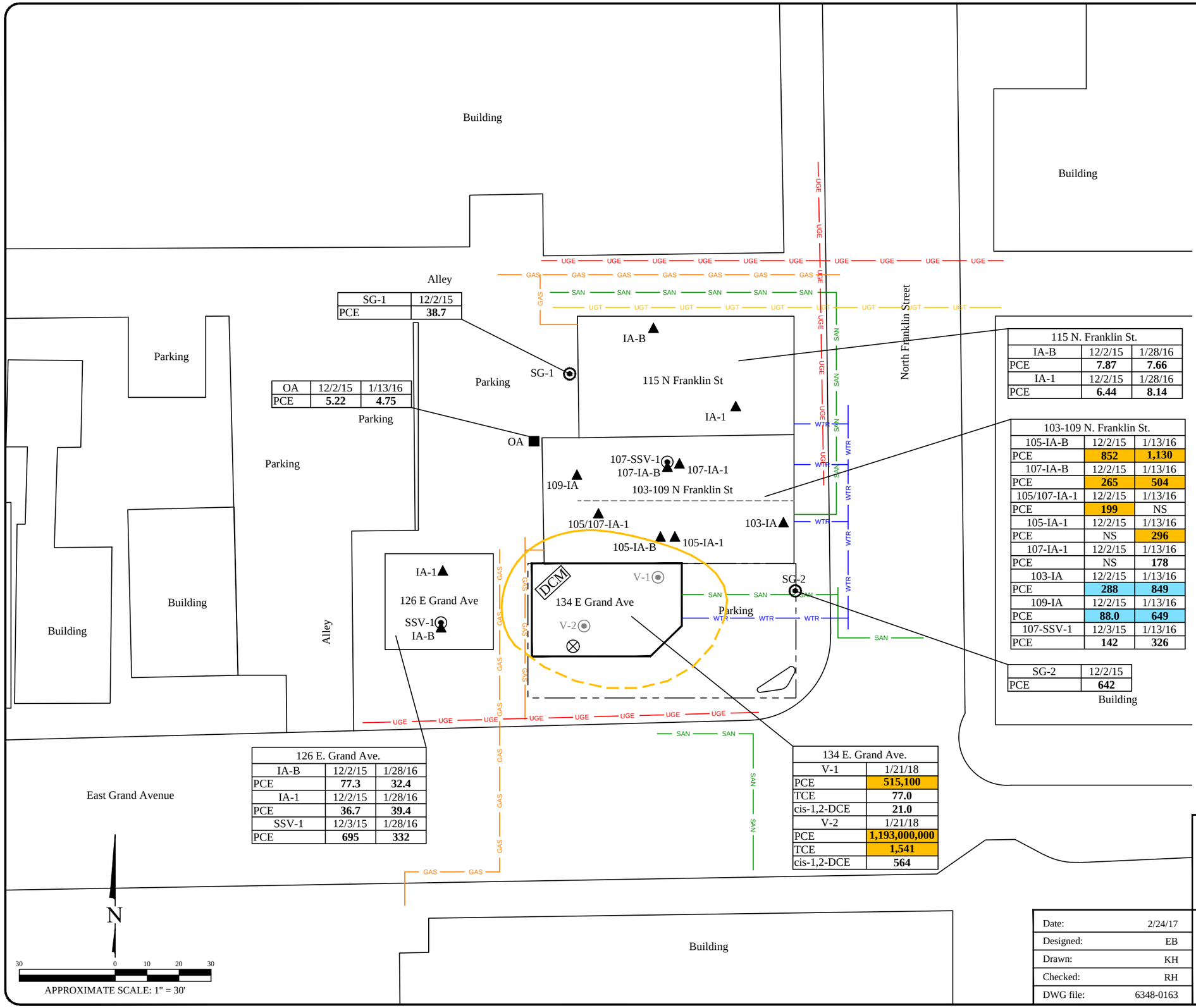
Figure
6b

Project
6348



SG-1	12/2/15
PCE	**38.7**

OA	12/2/15	1/13/16
PCE	**5.22**	**4.75**

126 E. Grand Ave.		
IA-B	12/2/15	1/28/16
PCE	**77.3**	**32.4**
IA-1	12/2/15	1/28/16
PCE	**36.7**	**39.4**
SSV-1	12/3/15	1/28/16
PCE	**695**	**332**

115 N. Franklin St.		
IA-B	12/2/15	1/28/16
PCE	**7.87**	**7.66**
IA-1	12/2/15	1/28/16
PCE	**6.44**	**8.14**

103-109 N. Franklin St.		
105-IA-B	12/2/15	1/13/16
PCE	**852**	**1,130**
107-IA-B	12/2/15	1/13/16
PCE	**265**	**504**
105/107-IA-1	12/2/15	1/13/16
PCE	**199**	NS
105-IA-1	12/2/15	1/13/16
PCE	NS	**296**
107-IA-1	12/2/15	1/13/16
PCE	NS	**178**
103-IA	12/2/15	1/13/16
PCE	**288**	**849**
109-IA	12/2/15	1/13/16
PCE	**88.0**	**649**
107-SSV-1	12/3/15	1/13/16
PCE	**142**	**326**

SG-2	12/2/15
PCE	**642**

134 E. Grand Ave.	
V-1	1/21/18
PCE	**515,100**
TCE	**77.0**
cis-1,2-DCE	**21.0**
V-2	1/21/18
PCE	**1,193,000,000**
TCE	**1,541**
cis-1,2-DCE	**564**

Legend

- Site boundary
- Dividing wall
- GAS — Underground gas utility line
- WTR — Underground water utility line
- SAN — Underground sanitary utility line
- UGT — Fiber optics line
- UGE — Underground electrical utility line
- V-1 — Vapor sample (By Others)
- SSV-1 — Sub-slab sample
- IA-1 — Indoor air sample
- OA-1 — Outdoor air sample
- SG-1 — Soil Gas sample
- DCM — Dry cleaning machine location
- Historic spent solvent/filter storage

Sub-slab vapor and Soil gas		
Analyte	Small Commercial Vapor Risk Screening Level	Residential Vapor Risk Screening Level
PCE	**6,000**	**14,000**
TCE	**293**	**70**
cis-1,2-DCE	NE	NE

Indoor Air		
Analyte	Small Commercial Vapor Action Level	Residential Vapor Action Level
PCE	**180**	**42**

Note:

1. Bolded and shaded orange values exceed Non-Residential Vapor Risk Screening Levels
2. Bolded and shaded bleu values exceed Residential Vapor Risk Screening Levels
3. All results reported in micrograms per cubic meter ($\mu g/m^3$)
4. NE = Not established
5. Vapor Risk Screening Levels calculated according to WDNR Publication RR-800 and subsequent vapor intrusion guidance documents
6. PCE = Tetrachloroethene
7. TCE = Trichloroethene
8. cis-1,2-DCE = cis-1,2-Dichloroethene

Extent of PCE vapor impacts above the Small Commercial Vapor Risk Screening Level (Dashed where inferred)

VAPOR INTRUSION ANALYTICAL RESULTS MAP

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	2/24/17
Designed:	EB
Drawn:	KH
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Figure
7
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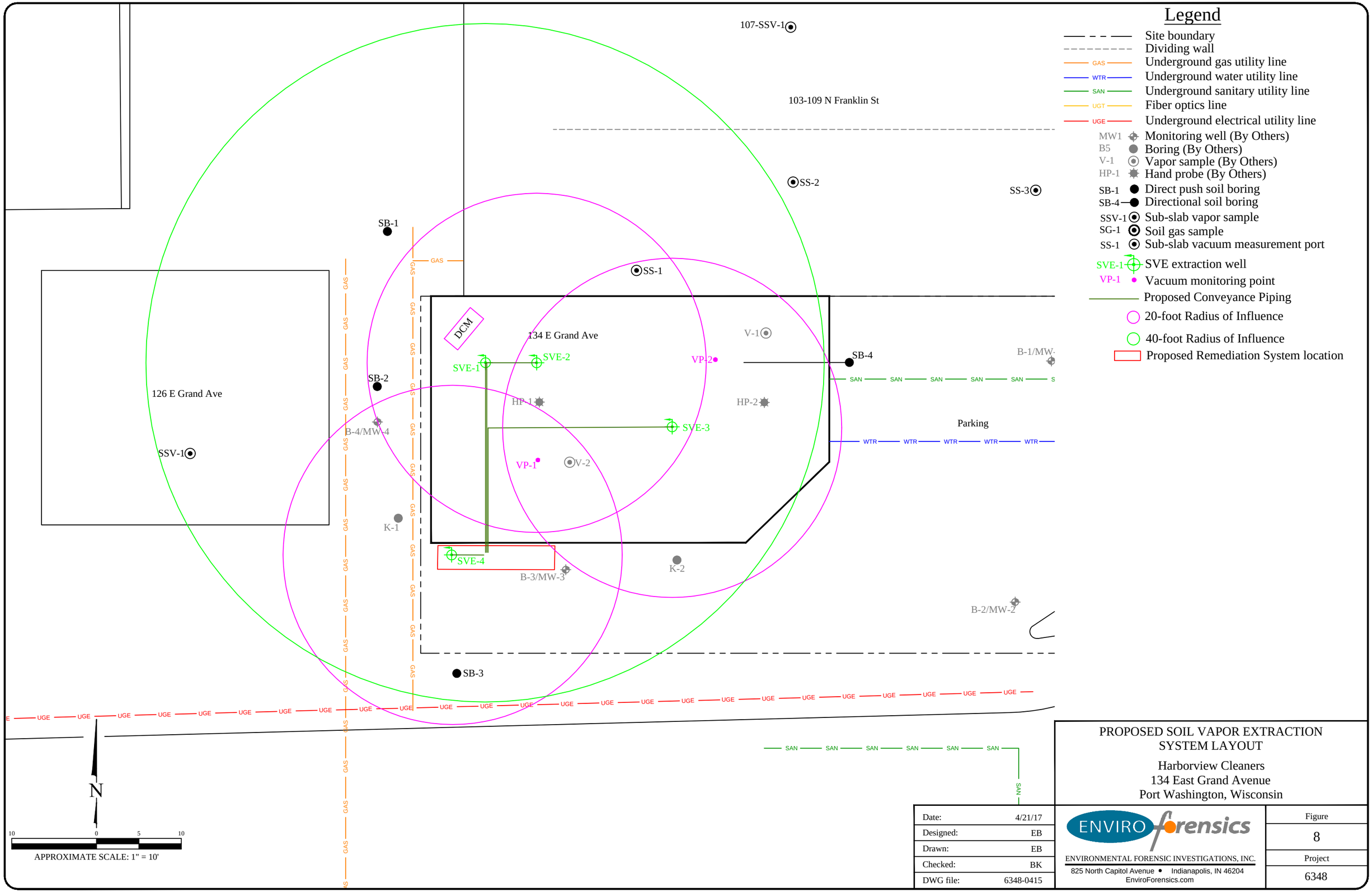

Legend

- Site boundary
- Dividing wall
- GAS — Underground gas utility line
- WTR — Underground water utility line
- SAN — Underground sanitary utility line
- UGT — Fiber optics line
- UGE — Underground electrical utility line
- MW1 — Monitoring well (By Others)
- B5 — Boring (By Others)
- V-1 — Vapor sample (By Others)
- HP-1 — Hand probe (By Others)
- SB-1 — Direct push soil boring
- SB-4 — Directional soil boring
- SSV-1 — Sub-slab vapor sample
- SG-1 — Soil gas sample
- SS-1 — Sub-slab vacuum measurement port
- SVE-1 — SVE extraction well
- VP-1 — Vacuum monitoring point
- Proposed Conveyance Piping
- 20-foot Radius of Influence
- 40-foot Radius of Influence
- Proposed Remediation System location

PROPOSED SOIL VAPOR EXTRACTION SYSTEM LAYOUT

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	4/21/17
Designed:	EB
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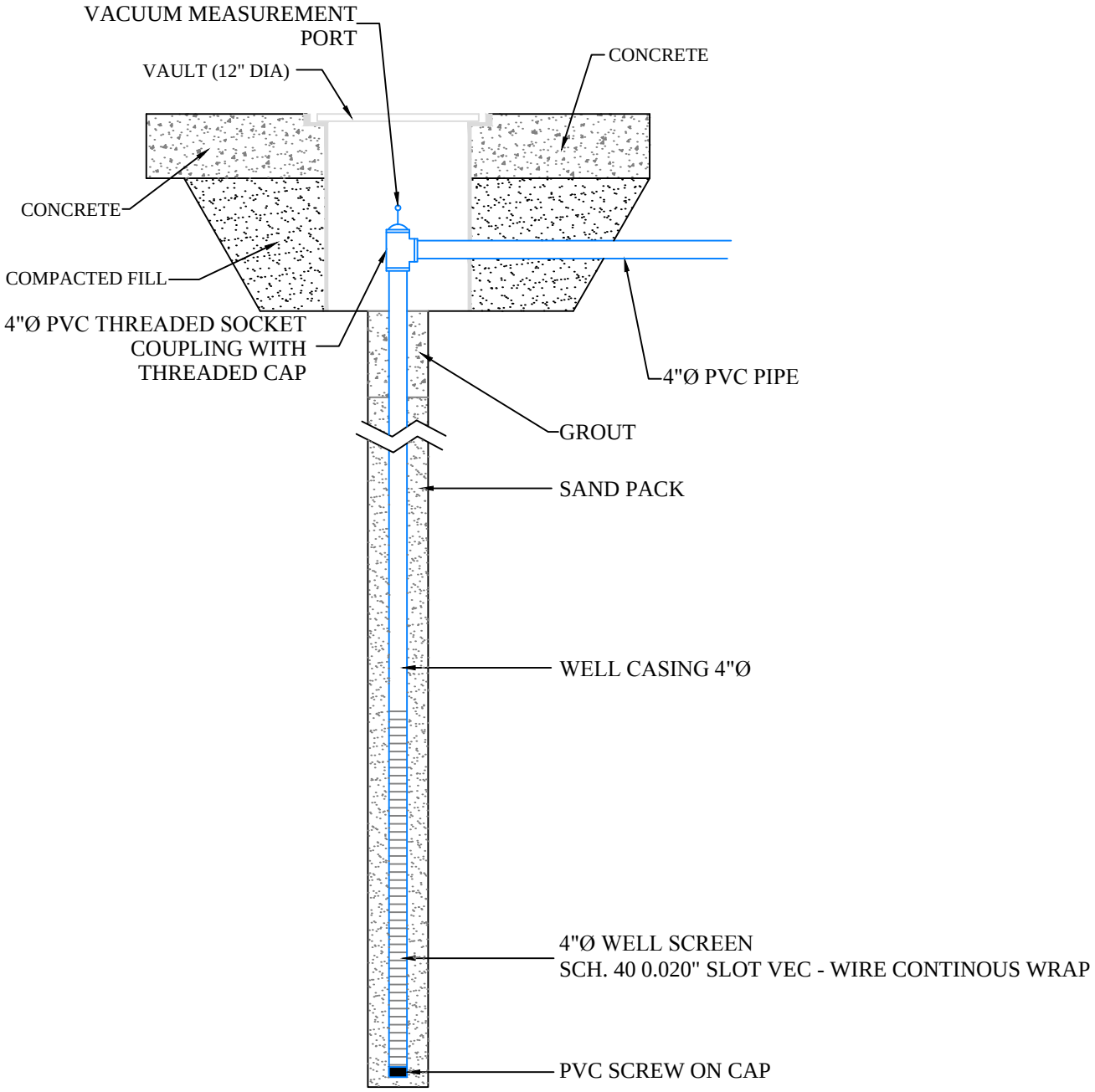
Figure	8
Project	6348

SVE WELLHEAD



No.	Date	Revision	Approved

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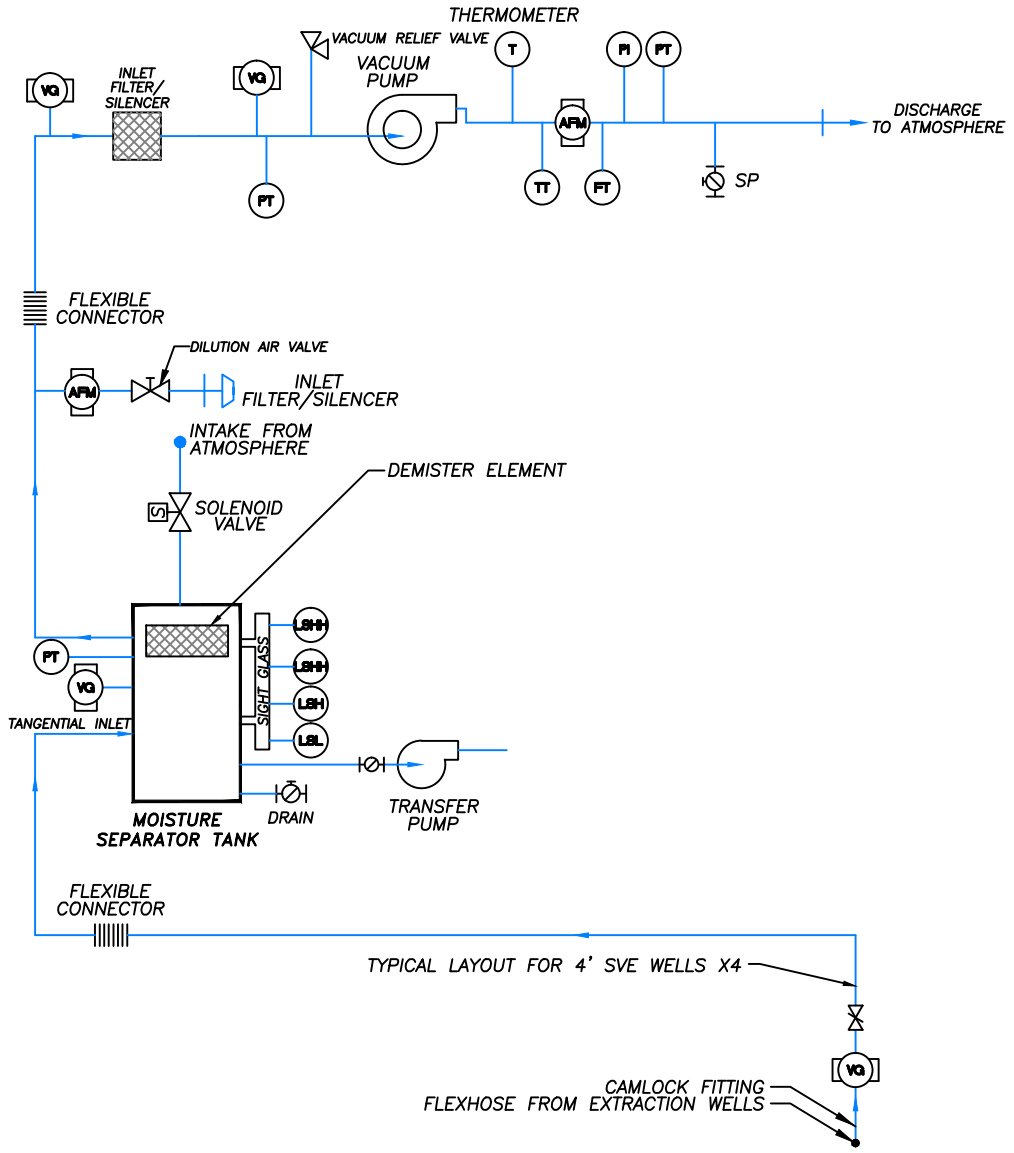
DWG file:	6348-0448

SVE WELLHEAD CONNECTION DIAGRAM
Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Figure 9

Project 6348



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PROCESS AND INSTRUMENTATION DIAGRAM FOR REMEDIATION SYSTEM

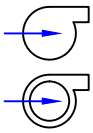
Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Figure
10a
Project
6348

VALVE AND PIPING SYMBOLS

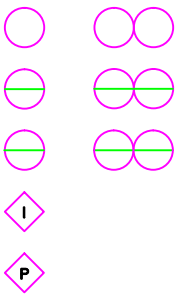
- GATE VALVE
- SOLENOID VALVE
- CHECK VALVE
- BALL VALVE
- SAMPLING PORT
- EXHAUST TO ATMOSPHERE (INSIDE)
- EXHAUST TO ATMOSPHERE (OUTSIDE)
- PRESSURE RELIEF VALVE
- VACUUM GAUGE
- ANTI-SIPHON VALVE
- BUTTERFLY VALVE

EQUIPMENT SYMBOLS



- PUMP
- BLOWER

GENERAL INSTRUMENT SYMBOLS



- LOCALLY MOUNTED
- PANEL MOUNTED
- REAR-OF-PANEL MOUNTED
- INTERLOCK
- PURGE

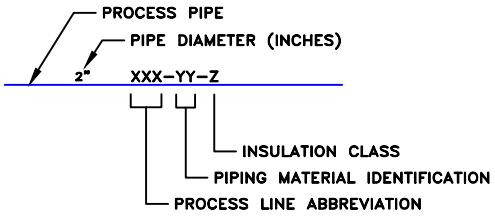
ABBREVIATIONS

DP	DIFFERENTIAL PRESSURE
DO	DISSOLVED OXYGEN
FC	FAIL CLOSED
FI	FAIL INDETERMINATE
FL	FAIL LOCKED
FO	FAIL OPEN
FQ	FAIL QUANTIFIER
HOA	HAND-OFF-AUTOMATIC
HS	HAND SWITCH
IL	INDICATOR LIGHT
I/I	CURRENT-TO-CURRENT
I/P	CURRENT-TO-PNEUMATIC
KC	PROGRAM CONTROLLER
LC	LEVEL CONTROLLER
LEL	LOWER EXPLOSIVE LIMIT
LR	LOCAL-REMOTE
LS	LEVEL SWITCH
LSHH, LSL, LSH	LIQUID SWITCH HIGH / LOW
M	MOTOR
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
P	PRESSURE
PI	PRESSURE INDICATOR
PS	PRESSURE SWITCH
PT	PRESSURE TRANSMITTER
PRV	PRESSURE RELIEF VALVE
PSH	PRESSURE SWITCH - HIGH
SG	SIGHT GLASS
SP	SAMPLING PORT
UA	UNIVERSAL ALARM
FMT	FLOW METER TOTALIZER
AFM	AIR FLOW METER
TT	TEMPERATURE TRANSMITTEF
FT	FLOW TRANSMITTER

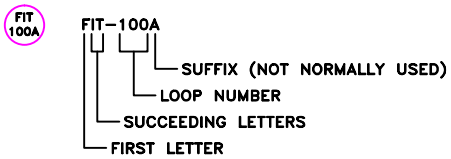
LINE SYMBOLS

- PROCESS PIPES OR CHANNELS
- ELECTRIC SIGNAL
- COMPRESSED AIR LINE

PROCESS PIPING IDENTIFICATION



INSTRUMENT IDENTIFICATION



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PROCESS AND INSTRUMENTATION LEGEND
Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Figure 10b
Project 6348

APPENDIX A

SOIL VAPOR EXTRACTION PILOT STUDY REPORT

March 8, 2017

Barb Bahr
Harborview Cleaners
134 East Grand Avenue
Port Washington, WI 53074

Re: Soil Vapor Extraction Pilot Test Report
Harborview Cleaners
134 East Grand Avenue
Port Washington, WI 53074
BRRTS#: 02-46-548092

Dear Ms. Bahr:

Environmental Forensic Investigations, Inc. (EnviroForensics) is pleased to submit this Soil Vapor Extraction (SVE) Pilot Test Report for Harborview Cleaners located at 134 East Grand Avenue in Port Washington, Wisconsin (Site). The Site layout is presented as **Figure 1**. This report presents the pilot test methods, data analysis, and recommendations for the application of SVE as a remedial action at the Site.

In the November 8, 2016 *Remedial Action Options Report*, SVE was identified as a likely viable option to achieve remediation objectives at the Site. SVE was determined to have a high probability of success because the majority of the contaminant mass resides in shallow soil beneath the Site building.

INTRODUCTION

The Site is improved with a single-story commercial building approximately 1,300 square feet in size that was constructed in the 1930s or 1940s. Reportedly the building was occupied by a gas station until approximately 1970 when it was converted to a dry cleaning operation. The building is concrete slab on grade with the remainder of the property being a paved asphalt driveway and parking area. The Site is bound by East Grand Street to the south, a commercial building to the west, a mixed use commercial and residential building to the north, and North Franklin Street to the east. The adjacent buildings to the north and west are constructed with full basements.

Site lithology consists of fill material from below the pavement to approximately five (5) feet below ground surface (bgs), followed by silty clay from 10 to 24 feet bgs with a sand lens at approximately 10 feet bgs. The water table is encountered at depths ranging from 8 to 12 feet

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Phone: 262-290-4001 • Fax 317-972-7875

bgs. Groundwater elevations appear to be randomly distributed across the monitored area; however, the distribution of contaminants detected in groundwater indicates that shallow groundwater at the Site flows towards the south.

The primary contaminants of concern at the Site are tetrachloroethene (PCE) and intermediate products of the natural degradation of PCE, including trichloroethene (TCE); dichloroethene (DCE); and vinyl chloride (VC). The Site investigation revealed that soil contamination is limited to a small area within the footprint of the former dry cleaner building. The highest concentrations of PCE in soil (i.e., the apparent source area) were detected near the dry cleaning machine. PCE was detected at a maximum concentration of 81,000 micrograms per kilogram (µg/kg) in this area.

SVE PILOT TEST ACTIVITIES

Pilot test activities performed include SVE well and monitoring point installation, SVE pilot testing, and analysis of the SVE pilot test data. This section provides a summary of the SVE field activities performed.

Extraction Well and Monitoring Point Installation

On January 17 and January 31, 2017, EnviroForensics directed the installation of one (1) SVE pilot test extraction well (SVE-1) and two (2) vacuum monitoring points (VP-1 and VP-2). The locations of the SVE extraction well and vacuum monitoring points are depicted on **Figure 2**. The extraction well and VP-1 were installed using hollow-stem auger drilling methods with 4.25-inch ID augers. Monitoring point VP-2 was installed using 3-inch ID direct-push tooling.

SVE-1 is constructed of 4-inch diameter schedule 40 PVC, with a 0.020-inch slot Vee-Wire® screen from 4 to 9 feet bgs. A filter pack consisting of coarse sand was installed from the bottom of the borehole to 1 foot above the screened interval. The borehole was sealed with hydrated bentonite chips from the top of the filter pack to within 1 foot of the ground surface. The SVE extraction well was finished at grade with a flush-mount, steel vault set in a concrete pad.

The vacuum monitoring points were installed to measure applied vacuum in the subsurface. Each monitoring point was constructed with 1-inch diameter, schedule 40 PVC, 0.010-inch slotted well screen, and coarse sand filter pack. The screened intervals of VP-1 and VP-2 are 4 to 9 feet bgs and 3 to 8 feet bgs, respectively. The filter packs were installed from the bottom of each borehole to 1 foot above the screened interval. The boreholes were sealed with hydrated bentonite chips from the top of the filter packs to within 1 foot of the ground surface. The vacuum monitoring points were finished at grade with flush-mount vaults set in a concrete pad.

In addition to the extraction well and vacuum monitoring points, existing groundwater monitoring wells MW-1 through MW-4 were utilized during the pilot test to gauge vacuum

influence in the surrounding area. These consist of 2-inch diameter PVC wells screened from depths ranging from 3 to 13 feet bgs to 8 to 18 feet bgs.

A summary of construction information for the extraction well and vacuum monitoring points, as well as the existing monitoring wells used during the pilot test, is provided in **Table 1**. Boring logs for the existing monitoring wells and soil borings within the SVE radius of influence (ROI) are provided in **Attachment 1**.

SVE Pilot Test Implementation

SVE pilot testing was performed on February 9 and 10, 2017 using a mobile, positive displacement blower capable of producing a flow rate of 523 actual cubic feet per minute (ACFM) at 15 inches of mercury (inHg). The vacuum system was piped to the extraction well using 4-inch PVC pipe. A generalized process and instrumentation diagram for the extraction system and an associated legend are depicted on **Figures 3 and 4**.

The test was conducted for approximately 6 hours and consisted of three steps (steps 1 through 3), with applied vacuum and flow rate varied for each step by adjusting the in-line dilution valve. System vacuum, as measured at the air-water separator, was adjusted during each step at 6, 10, and 3 inHg, which corresponded to equivalent vacuums at the SVE wellhead. A summary of each step and the recorded vacuum is included in **Table 2**.

During each step, volumetric flow rates, applied vacuums, recorded vacuums, and effluent air total volatile organic compound (VOC) concentrations were monitored at fixed intervals. Applied vacuum to the extraction wells, as well as subsurface vacuums at the monitoring points, were measured using a hand-held digital manometer. Site groundwater levels were evaluated prior to testing to confirm that vacuum monitoring point screens were exposed above the water table, to ensure the vacuum measurements collected represented unsaturated soil conditions.

Effluent air was field-screened using a photoionization detector (PID) for the presence of VOCs. Effluent air samples were also collected from a sampling port using laboratory-supplied vacuum canisters, which were submitted to Envision Air Laboratories in Indianapolis, Indiana for analysis of select VOCs according to United States (U.S.) Environmental Protection Agency (EPA) Method TO-15. The TO-15 samples were collected at the start of each step and at the end of the test.

PILOT TEST RESULTS

Pilot test data was analyzed to determine the following parameters:

1. System flow rates
2. VOC mass removal rates
3. Subsurface vacuum response

Vacuum, flow rate, and PID data collected at the remediation system during testing are presented in **Table 3** and graphically depicted on **Chart 1**. Subsurface vacuum data is presented in **Table 4** and graphically depicted on **Chart 2**. No measurable subsurface moisture was collected during testing.

System Flow Rates

System flow rates varied during the test from a minimum of 182 standard cubic feet per minute (SCFM) during Step 1 at an applied vacuum of 10 inHg to a maximum of 266 SCFM during Step 3 at an applied vacuum of 3 inHg.

VOC Mass Removal Rates

Effluent air samples were collected at the start of each step of the test and at the end of the test. PCE, trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE) were detected in all air samples. PCE concentrations ranged from 57,600 micrograms per cubic meter ($\mu g/m^3$) at the start of Step 1 to 12,200 $\mu g/m^3$ at the end of the test. The TCE and cis-1,2-DCE concentrations were more than an order-of-magnitude less than the PCE concentrations in all samples. A copy of the laboratory analytical report is provided in **Attachment 2** and the results are summarized on **Table 5**.

The VOC mass removed during each step was estimating using flow rate, step duration, and VOC concentrations in the sample collected at the start of each step. The total VOC mass removed during the 6-hour test was 0.207 pounds. Coupling effluent vapor concentrations with the effluent flow rates over the test duration for each period indicates that the VOC mass removal rate would be approximately 150 pounds per year during full-scale system operation. A summary of effluent concentrations and calculated mass removal rates is provided in **Table 5**.

Subsurface Vacuum Response

Subsurface vacuum response versus time for each monitoring point is graphically depicted in **Chart 2** and summarized in **Table 4**. The maximum observed monitoring point influence of 1.59 inches of water (inH_2O) vacuum was detected during Step 2 at monitoring well MW-4, which is located approximately 19.5 feet southwest of SVE-1. The closest monitoring point, VP-1, exhibited a maximum vacuum of 0.96 inH_2O during Step 2.

The observed vacuum responses in the monitoring points varied throughout the duration of the pilot test, most likely due to subsurface anomalies, heterogeneity of the subsurface lithology, and different construction methodology for the selected monitoring points. Vacuum monitoring points that were determined to be non-standard with regard to linear vacuum responses were not utilized during calculation of the estimated SVE radius of influence (ROI). In order to mitigate

the variances in the data sets, the recorded vacuums were averaged for each point during each step as listed on **Table 6**.

In order to evaluate the generalized SVE ROI for the Site, a best-fit statistical distribution was identified for Step 1, Step 2, and Step 3 during both tests to describe the attenuation of subsurface vacuum with respect to distance from the extraction wells.

The vacuum versus distance data for Step 2 exhibited an exponential distribution and had the highest coefficient of determination (R^2) (0.69). This data indicated that Step 2 provided the most linear, and therefore predictable, subsurface vacuum response. The minimum subsurface vacuum identified for determining an effective ROI for vapor capture is 0.1 inH_2O. Using this minimum standard, the estimated vapor capture ROI for an applied vacuum of 10 inHg is approximately 40 feet. The data points and trend lines are presented in **Table 6** and **Charts 3 through 5**. The calculated ROIs for each step of the test are depicted on **Figure 5**.

CONCLUSIONS AND RECOMMENDATIONS

SVE is a viable remedial alternative for unsaturated soils at the Site. It may also provide additional benefit for mitigation of the Site building and the adjacent commercial building during implementation. Evaluation of SVE design for remedial implementation at the property will consider the ROIs, flow rates, and other information identified in this report as well as Site-specific considerations such as local VOC concentrations, access limitations, lithologic heterogeneities, and subsurface utility corridors that may affect the vacuum propagation or influence the design criteria.

We appreciate the opportunity to provide you with this SVE pilot test report. Please feel free to contact us at 262-290-4001 with any questions.

Sincerely,
Environmental Forensic Investigations, Inc.

Brian Kappen, PG
Project Manager

Rob Hoverman, LPG
Senior Project Manager

Attachments

TABLES

TABLE 1

Monitoring Point Construction Information

Soil Vapor Extraction Pilot Study Report

Harborview Cleaners

Port Washington, WI

WDNR BRRTS No. 02-46-548092

Monitoring Point I.D.	Date Installed	Drilling Method	Well Diameter (inches)	Screened Interval (feet bgs)
SVE-1	1/17/2017	Hollow Stem Auger	4	4.0-9.0
VP-1	1/17/2017	Hollow Stem Auger	1	4.0-9.0
VP-2	1/31/2017	Hollow Stem Auger	1	3.0-8.0
MW-1	12/20/2007	Hollow Stem Auger	2	4.6-19.6
MW-2	12/20/2007	Hollow Stem Auger	2	2.6-12.6
MW-3	12/20/2007	Hollow Stem Auger	2	4.4-14.4
MW-4	12/20/2007	Hollow Stem Auger	2	7.7-17.7

bgs = below ground surface

TABLE 2

SVE Pilot Study Testing Regime

Soil Vapor Extraction Pilot Study Report

Harborview Cleaners

Port Washington, WI

WDNR BRRTS No. 02-46-548092

Step	Time Start	Time Stop	Hour Start	Hour Stop	Step Duration (hours)	System Vacuum (inH_g)	Wellhead Vacuum (inHg)
1	2/9/2017 20:40	2/9/2017 22:40	0.0	2.0	2.0	-5.9	-6.02
2	2/9/2017 22:50	2/10/2017 00:50	2.0	4.0	2.0	-10.0	-10.01
3	2/10/2017 01:00	2/10/2017 03:00	4.0	6.0	2.0	-3.1	-3.06

TABLE 3

SVE Pilot Study System Data

Soil Vapor Extraction Pilot Study Report

Harborview Cleaners

Port Washington, WI

WDNR BRRTS No. 02-46-548092

Step	Date and Time	Test Hour	System at A/W Separator Vacuum (inHg)	System Effluent Flow Rate (SCFM)	System Effluent Temperature (°C)	System Effluent VOC Concentration (ppm)
1	2/9/17 20:55	0.3	5.91	228	80	38.0
	2/9/17 21:10	0.5	6.07	228	85	32.4
	2/9/17 21:25	0.8	6.04	221	95	21.2
	2/9/17 21:40	1.0	5.96	221	95	19.6
	2/9/17 22:10	1.5	5.93	221	105	17.5
	2/9/17 22:40	2.0	5.76	228	110	15.6
2	2/9/17 23:05	2.3	9.99	190	140	29.7
	2/9/17 23:20	2.5	9.90	199	145	28.0
	2/9/17 23:35	2.8	9.94	202	145	26.9
	2/9/17 23:50	3.0	9.90	202	140	26.6
	2/10/17 0:20	3.5	9.92	202	140	22.9
	2/10/17 0:50	4.0	9.88	182	140	21.5
3	2/10/17 1:15	4.3	3.12	266	73	8.9
	2/10/17 1:30	4.5	3.15	260	66	9.0
	2/10/17 1:45	4.8	3.15	260	68	8.7
	2/10/17 2:00	5.0	3.14	254	71	8.9
	2/10/17 2:30	5.5	3.14	260	69	8.8
	2/10/17 3:00	6.0	3.13	266	71	8.4

A/W = Air-Water

inHg = vacuum in inches of mercury (measured at air-water separator)

SCFM = standard cubic feet per minute

ppm = parts per million

VOC = Volatile organic compound

TABLE 4

SVE Pilot Study Subsurface Data

Soil Vapor Extraction Pilot Study Report

Harborview Cleaners

Port Washington, WI

WDNR BRRTS No. 02-46-548092

Step	Date and Time	Test Hour	SVE-1	VP-1	VP-2	MW-1	MW-2	MW-3	MW-4
Distance from SVE-1 (feet)			**0**	**10.5**	**20**	**59**	**61**	**23**	**19.5**
1	2/9/17 20:55	0.3	6.02	0.34	0.03	0.00	0.03	0.21	0.97
	2/9/17 21:10	0.5	6.01	0.16	0.02	0.04	0.03	0.03	0.97
	2/9/17 21:25	0.8	5.93	0.55	0.10	0.01	0.03	0.20	0.97
	2/9/17 21:40	1.0	6.00	0.41	0.02	0.03	0.02	0.22	0.98
	2/9/17 22:10	1.5	5.88	0.40	0.02	0.04	0.04	0.22	0.99
	2/9/17 22:40	2.0	5.88	0.41	0.04	0.01	0.03	0.20	0.97
2	2/9/17 23:05	2.2	10.01	0.95	0.08	0.03	0.03	0.34	1.57
	2/9/17 23:20	2.5	9.91	0.85	0.06	0.02	0.04	0.33	1.58
	2/9/17 23:35	2.8	9.87	0.91	0.07	0.01	0.03	0.33	1.57
	2/9/17 23:50	3.0	9.79	0.85	0.08	0.01	0.04	0.33	1.59
	2/10/17 0:20	3.5	9.76	0.84	0.07	0.02	0.04	0.34	1.59
	2/10/17 0:50	4.0	9.73	0.96	0.07	0.01	0.04	0.34	1.59
3	2/10/17 1:15	4.3	3.07	0.41	0.00	0.02	0.02	0.16	0.69
	2/10/17 1:30	4.5	3.08	0.36	0.03	0.01	0.02	0.16	0.68
	2/10/17 1:45	4.8	3.06	0.36	0.01	0.01	0.03	0.16	0.68
	2/10/17 2:00	5.0	3.07	0.33	0.00	0.01	0.02	0.17	0.68
	2/10/17 2:30	5.5	3.11	0.39	0.02	0.02	0.03	0.17	0.68
	2/10/17 3:00	6.0	3.06	0.40	0.04	0.00	0.02	0.17	0.68
Maximum vacuum:			10.01	0.96	0.10	0.04	0.04	0.34	1.59

All values are vacuum readings, in units of inches water column; except for SVE-1 is in units of inches of mercury
SCFM = standard cubic feet per minute

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TABLE 5

SVE Pilot Study Mass Removal Estimates

Soil Vapor Extraction Pilot Study Report

Harborview Cleaners

Port Washington, WI

WDNR BRRTS No. 02-46-548092

Step 1; Sample 6348-PILOT-1; Flow rate = 225 SCFM; Duration = 2 Hours					
Analyte	**Concentration ($\mu g/m^3$)**	**Removal Rate (lb/hour)**	**Removal Rate (lb/year)**	**Removal Rate (tons/year)**	**Mass Removed (lb)**
Tetrachloroethene	**57,600**	**0.042**	**370.499**	**0.185**	**0.085**
Trichloroethene	**3,520**	**0.003**	**22.642**	**0.011**	**0.005**
cis-1,2-Dichloroethene	**2,090**	**0.002**	**13.443**	**0.007**	**0.003**
trans-1,2-Dichloroethene	<39.6	< 0.00001	< 0.1	< 0.00005	NA
Vinyl Chloride	<6.4	< 0	< 0	< 0	NA

Step 2; Sample 6348-PILOT-2; Flow rate = 196 SCFM; Duration = 2 Hours					
Analyte	**Concentration ($\mu g/m^3$)**	**Removal Rate (lb/hour)**	**Removal Rate (lb/year)**	**Removal Rate (tons/year)**	**Mass Removed (lb)**
Tetrachloroethene	**47,600**	**0.035**	**306.177**	**0.153**	**0.070**
Trichloroethene	**2,390**	**0.002**	**15.373**	**0.008**	**0.004**
cis-1,2-Dichloroethene	**1,400**	**0.001**	**9.005**	**0.005**	**0.002**
trans-1,2-Dichloroethene	<39.6	< 0.00001	< 0.1	< 0.00005	NA
Vinyl Chloride	<6.4	< 0	< 0	< 0	NA

Step 3; Sample 6348-PILOT-3; Flow rate = 261 SCFM; Duration = 2 Hours					
Analyte	**Concentration ($\mu g/m^3$)**	**Removal Rate (lb/hour)**	**Removal Rate (lb/year)**	**Removal Rate (tons/year)**	**Mass Removed (lb)**
Tetrachloroethene	**18,600**	**0.018**	**159.317**	**0.080**	**0.036**
Trichloroethene	**581**	**0.001**	**4.977**	**0.002**	**0.001**
cis-1,2-Dichloroethene	**363**	**0.000**	**3.109**	**0.002**	**0.001**
trans-1,2-Dichloroethene	<39.6	< 0.00004	< 0.4	< 0.0002	NA
Vinyl Chloride	<6.4	< 0.00001	< 0.09	< 0.00005	NA

Total estimated mass removed (lb):	**0.207**

Duration = Length of time applied to mass removal estimate

Removal Rate = concentration multiplied by duration

NA = Not Available

Mass Removed = Estimated mass removed through SVE system during representative pilot study periods

SCFM = Standard cubic feet per minute

µg = microgram

m = meter

lb = pound

ENVIROforensics

TABLE 6

Radius of Influence Calculation Data

Soil Vapor Extraction Pilot Study Report

Harborview Cleaners

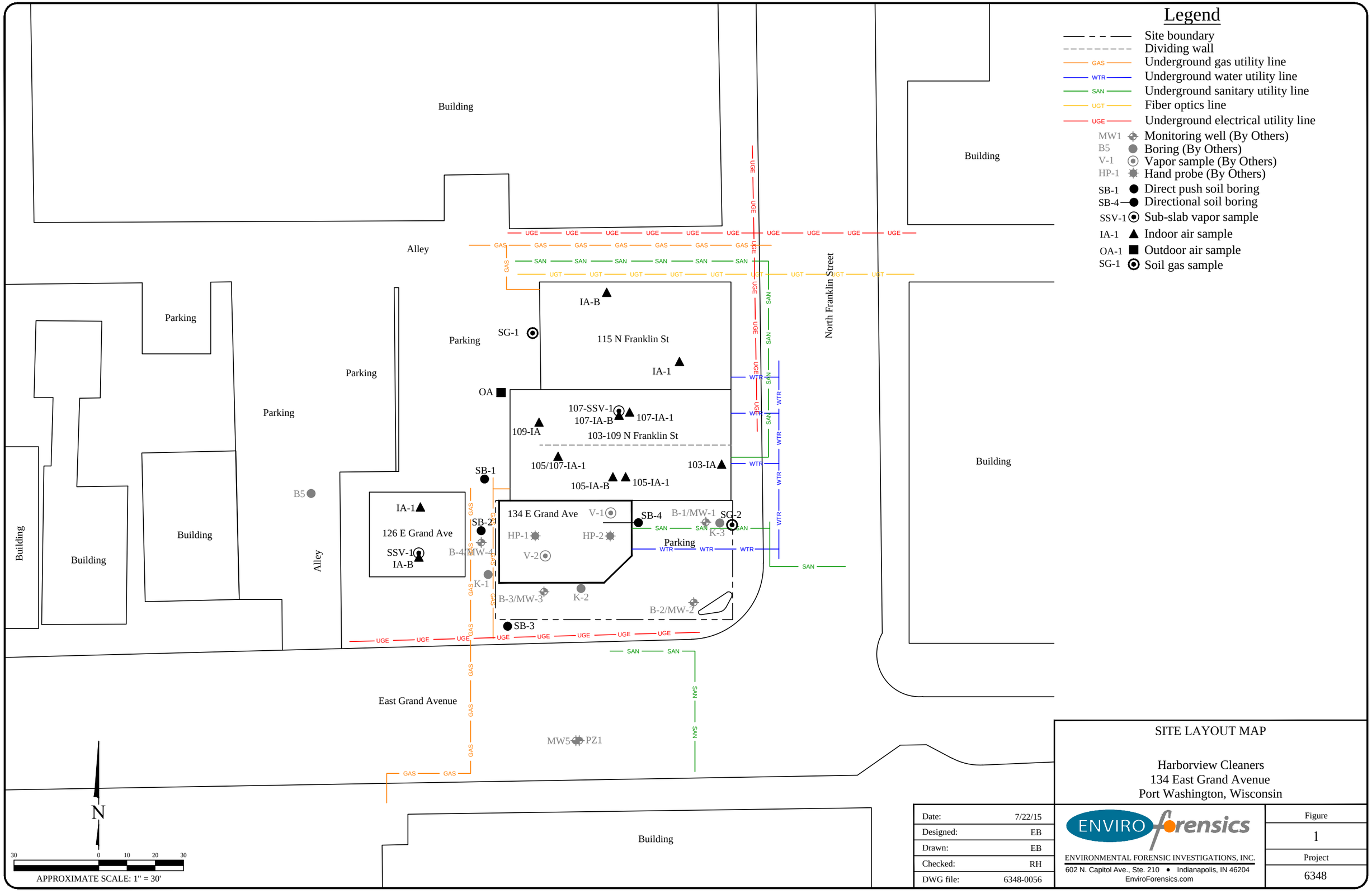
Port Washington, WI

WDNR BRRTS No. 02-46-548092

Monitoring Point I.D.	Distance from SVE-1s (feet)	Average Vacuum (inH_2O)		
		Step 1	Step 2	Step 3
VP-1	10.5	0.379	0.893	0.374
MW-4	19.5	0.974	1.579	0.682
VP-2	20	0.038	0.072	0.017
MW-3	23	0.177	0.333	0.165
MW-1	59	0.023	0.015	0.010
MW-2	61	0.028	0.037	0.023

- inH_2O = inches of water column

FIGURES



SITE LAYOUT MAP

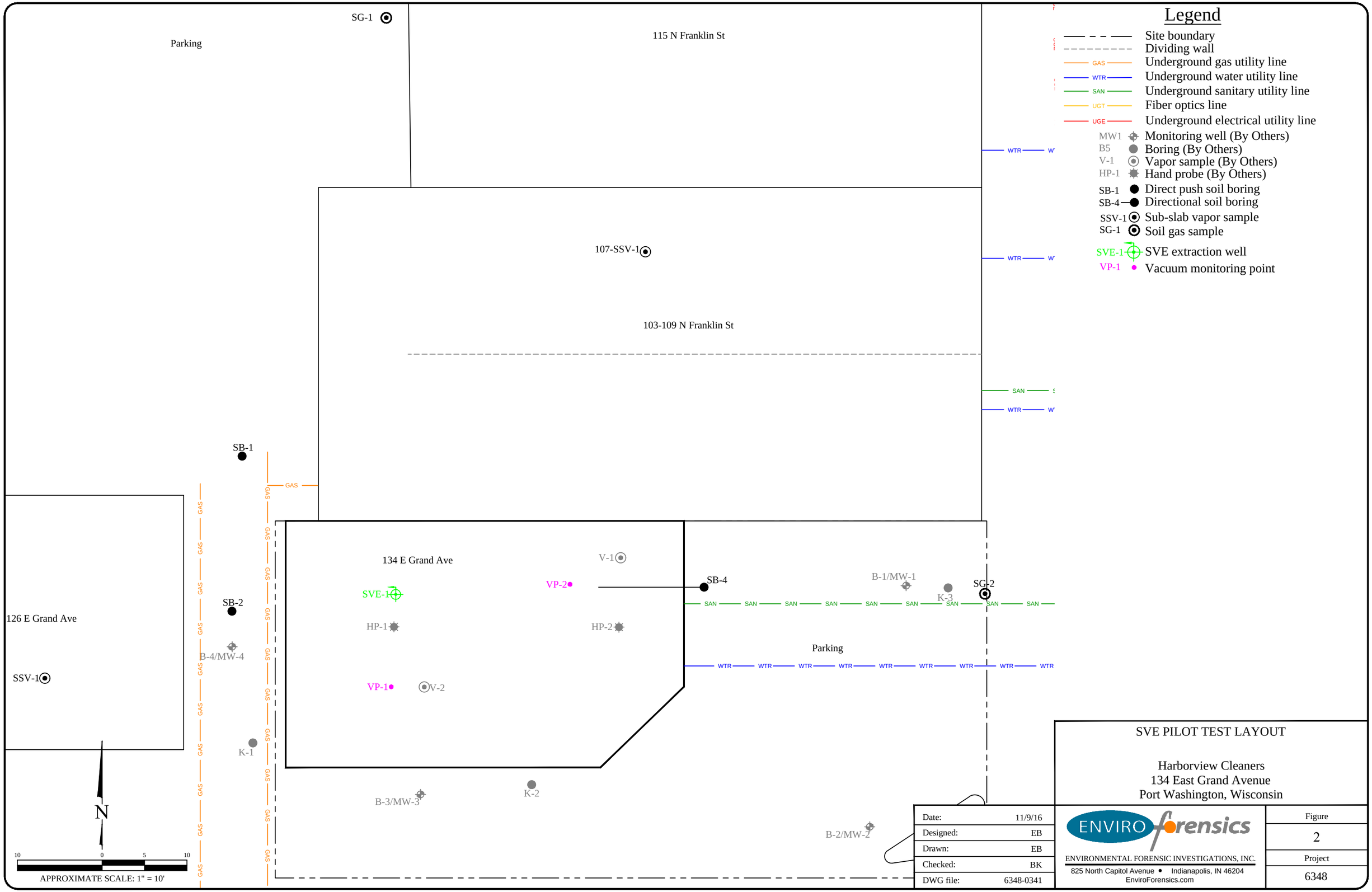
Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	7/22/15
Designed:	EB
Drawn:	EB
Checked:	RH
DWG file:	6348-0056

ENVIRO forensics
ENVIRONMENTAL FORENSIC INVESTIGATIONS, INC.
602 N. Capitol Ave., Ste. 210 • Indianapolis, IN 46204
EnviroForensics.com

Figure
1

Project
6348



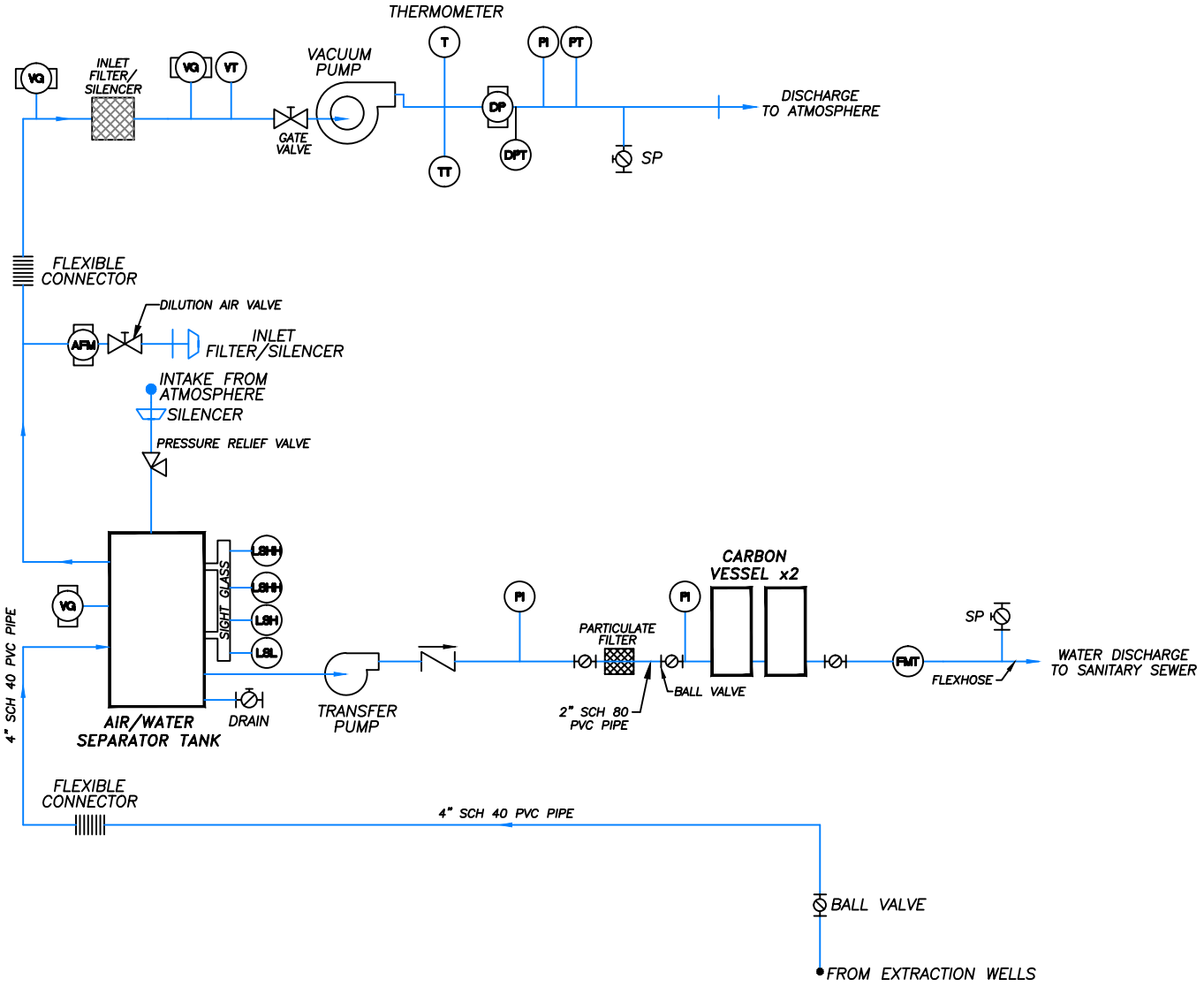
SVE PILOT TEST LAYOUT

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	11/9/16
Designed:	EB
Drawn:	EB
Checked:	BK
DWG file:	6348-0341

ENVIRO forensics
ENVIRONMENTAL FORENSIC INVESTIGATIONS, INC.
825 North Capitol Avenue • Indianapolis, IN 46204
EnviroForensics.com

Figure
2
Project
6348



No.	Date	Revision	Approved

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

Date:	10/18/16
Designed:	EB
Drawn:	EB
Checked:	BK
DWG file:	6143-0541

PROCESS AND INSTRUMENTATION DIAGRAM FOR PILOT SVE SYSTEM

Harborview Cleaners
Port Washington, WI

Figure
3
Project
6143

VALVE AND PIPING SYMBOLS

- GATE VALVE
- SOLENOID VALVE
- CHECK VALVE
- BALL VALVE
- SAMPLING PORT
- EXHAUST TO ATMOSPHERE (INSIDE)
- EXHAUST TO ATMOSPHERE (OUTSIDE)
- PRESSURE RELIEF VALVE
- VACUUM GAUGE

ABBREVIATIONS

DP	DIFFERENTIAL PRESSURE
DO	DISSOLVED OXYGEN
FC	FAIL CLOSED
FI	FAIL INDETERMINATE
FL	FAIL LOCKED
FO	FAIL OPEN
FQ	FAIL QUANTIFIER
HOA	HAND–OFF–AUTOMATIC
HS	HAND SWITCH
IL	INDICATOR LIGHT
I/I	CURRENT–TO–CURRENT
I/P	CURRENT–TO–PNEUMATIC
KC	PROGRAM CONTROLLER
LC	LEVEL CONTROLLER
LEL	LOWER EXPLOSIVE LIMIT
LR	LOCAL–REMOTE
LS	LEVEL SWITCH
LSHH, LSL, LSH	LIQUID SWITCH HIGH / LOW
M	MOTOR
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
P	PRESSURE
PI	PRESSURE INDICATOR
PS	PRESSURE SWITCH
PT	PRESSURE TRANSMITTER
PRV	PRESSURE RELIEF VALVE
PSH	PRESSURE SWITCH – HIGH
SG	SIGHT GLASS
SP	SAMPLING PORT
UA	UNIVERSAL ALARM
FMT	FLOW METER TOTALIZER
AFM	AIR FLOW METER

EQUIPMENT SYMBOLS

- PUMP
- BLOWER

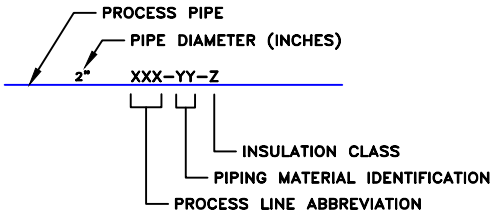
LINE SYMBOLS

- PROCESS PIPES OR CHANNELS
- ELECTRIC SIGNAL
- COMPRESSED AIR LINE

GENERAL INSTRUMENT SYMBOLS

- LOCALLY MOUNTED
- PANEL MOUNTED
- REAR–OF–PANEL MOUNTED
- INTERLOCK (I)
- PURGE (P)

PROCESS PIPING IDENTIFICATION



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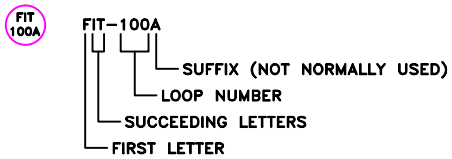

No.	Date	Revision	Approved

ENVIRO forensics
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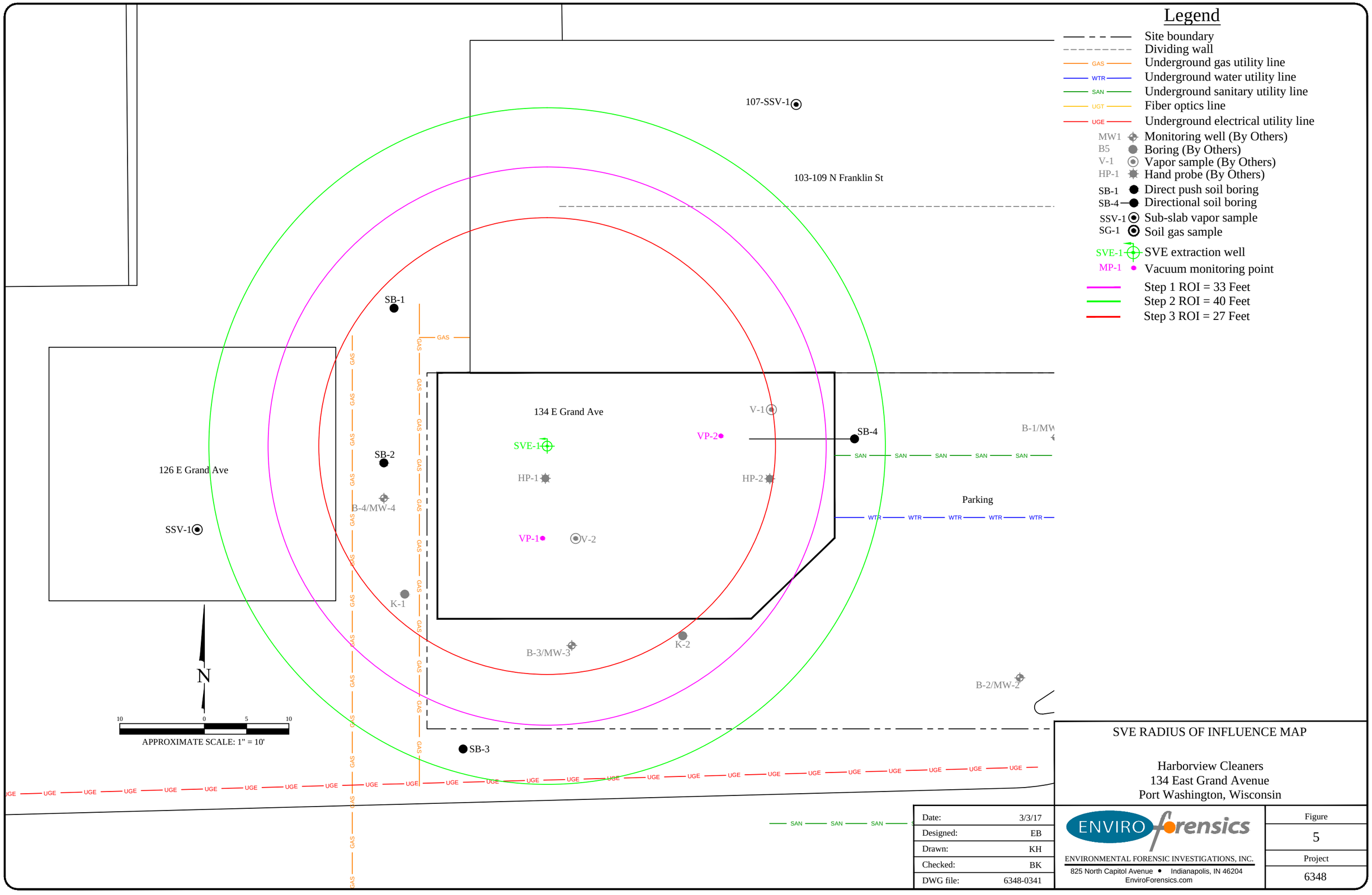
EnviroForensics.com

Date:	10/18/16
Designed:	EB
Drawn:	EB
Checked:	BK
DWG file:	6143-0541

PROCESS AND INSTRUMENTATION LEGEND
Harborview Cleaners
Port Washington, WI

Figure 4
Project 6143



SVE RADIUS OF INFLUENCE MAP

Harborview Cleaners
134 East Grand Avenue
Port Washington, Wisconsin

Date:	3/3/17
Designed:	EB
Drawn:	KH
Checked:	BK
DWG file:	6348-0341

ENVIRO forensics
ENVIRONMENTAL FORENSIC INVESTIGATIONS, INC.
825 North Capitol Avenue • Indianapolis, IN 46204
EnviroForensics.com

Figure	5
Project	6348

CHARTS

CHART 1

Extraction Regime and Organic Vapor Concentrations

Soil Vapor Extraction Pilot Study Report

Harborview Cleaners

Port Washington, Wisconsin

WDNR BRRTS No. 02-46-548092

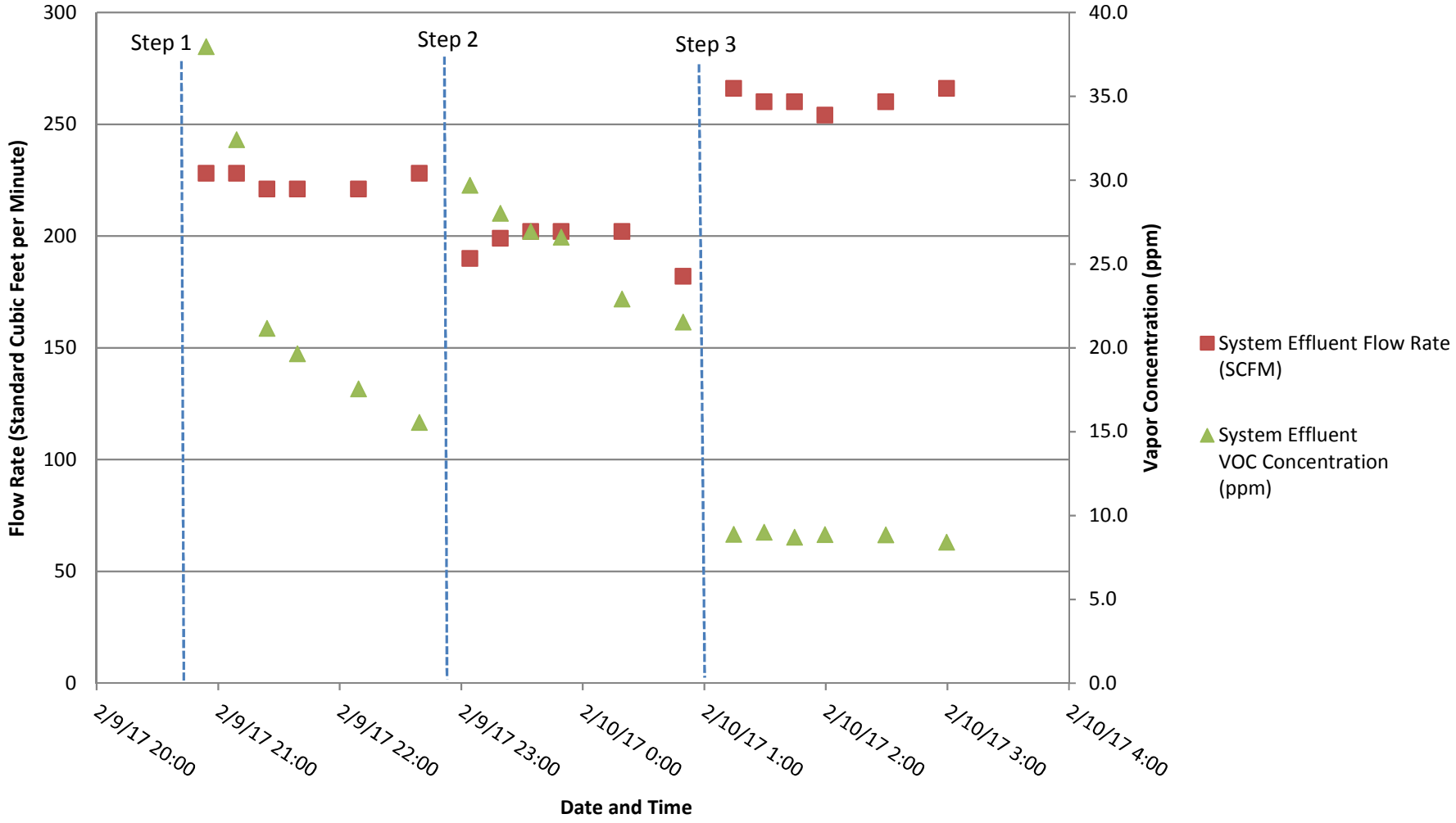


CHART 2

Subsurface Vacuum Data

Soil Vapor Extraction Pilot Study Report

Harborview Cleaners

Port Washington, Wisconsin

WDNR BRRTS No. 02-46-548092

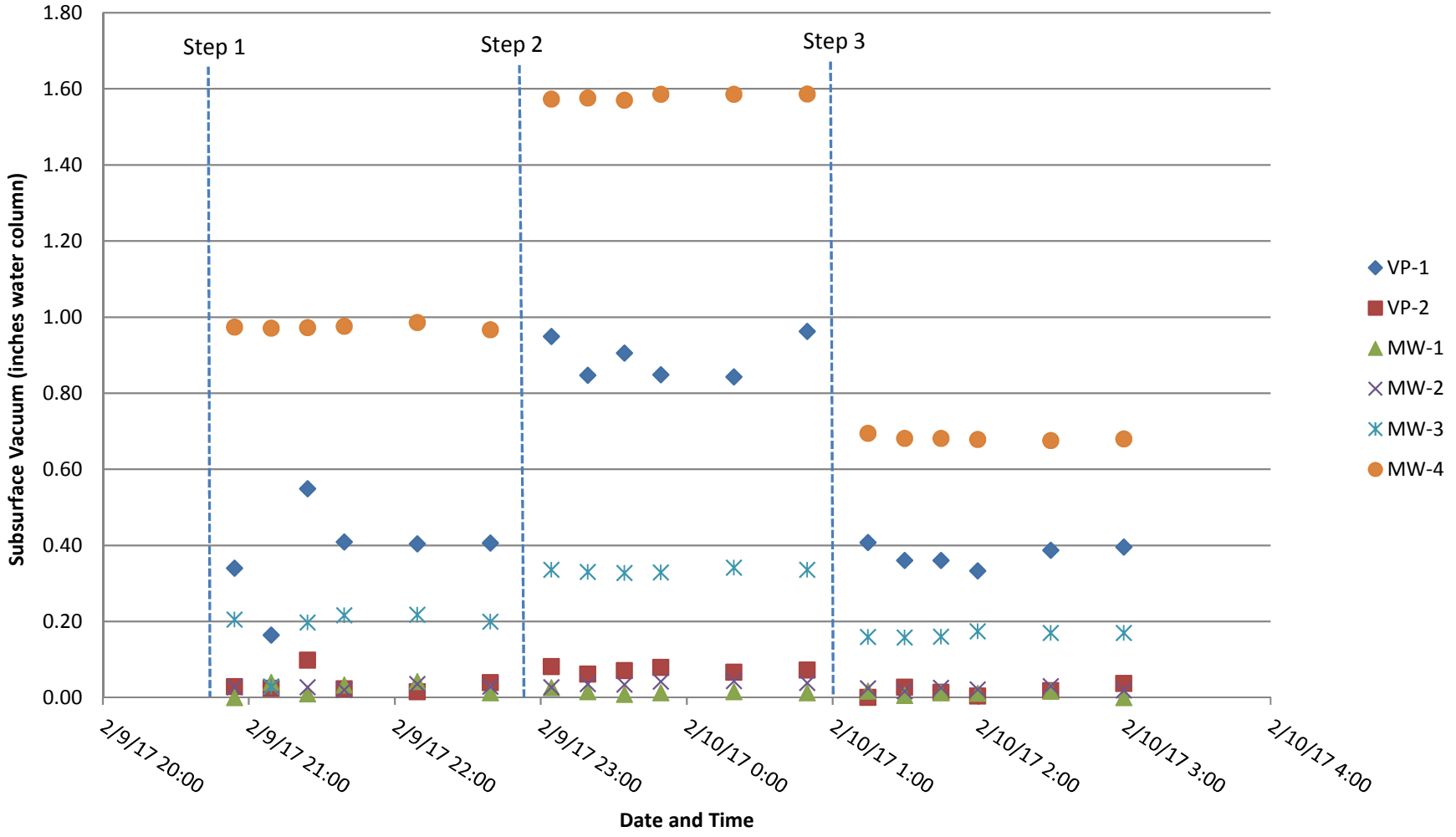


CHART 3
Radius of Influence
Step 1 - Applied Vacuum 6 inHg
Soil Vapor Extraction Pilot Study Report
Harborview Cleaners
Port Washington, Wisconsin
WDNR BRRTS No. 02-46-548092

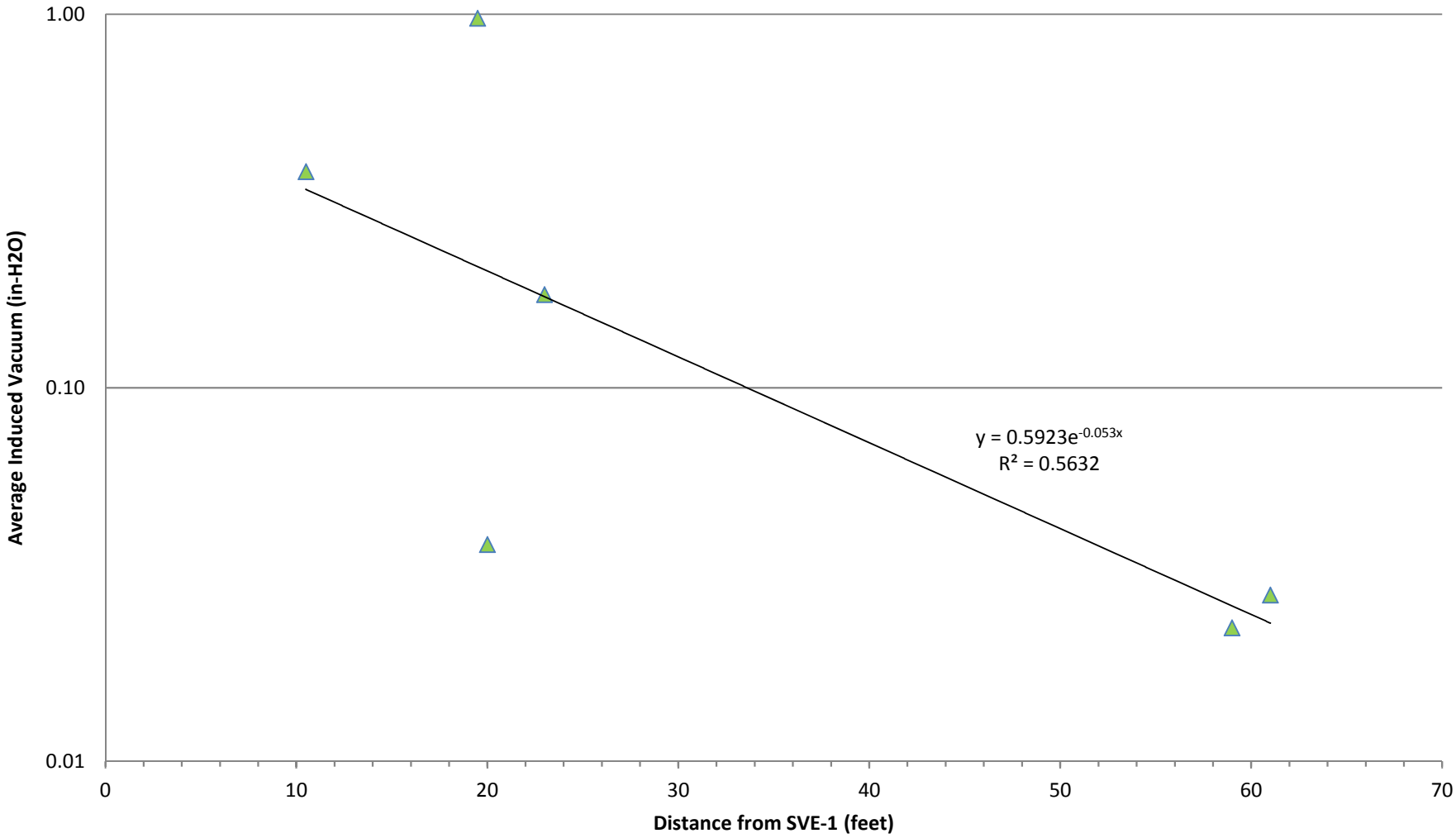


CHART 4
Radius of Influence
Step 2 - Applied Vacuum 10 inHg
Soil Vapor Extraction Pilot Study Report
Harborview Cleaners
Port Washington, Wisconsin
WDNR BRRTS No. 02-46-548092

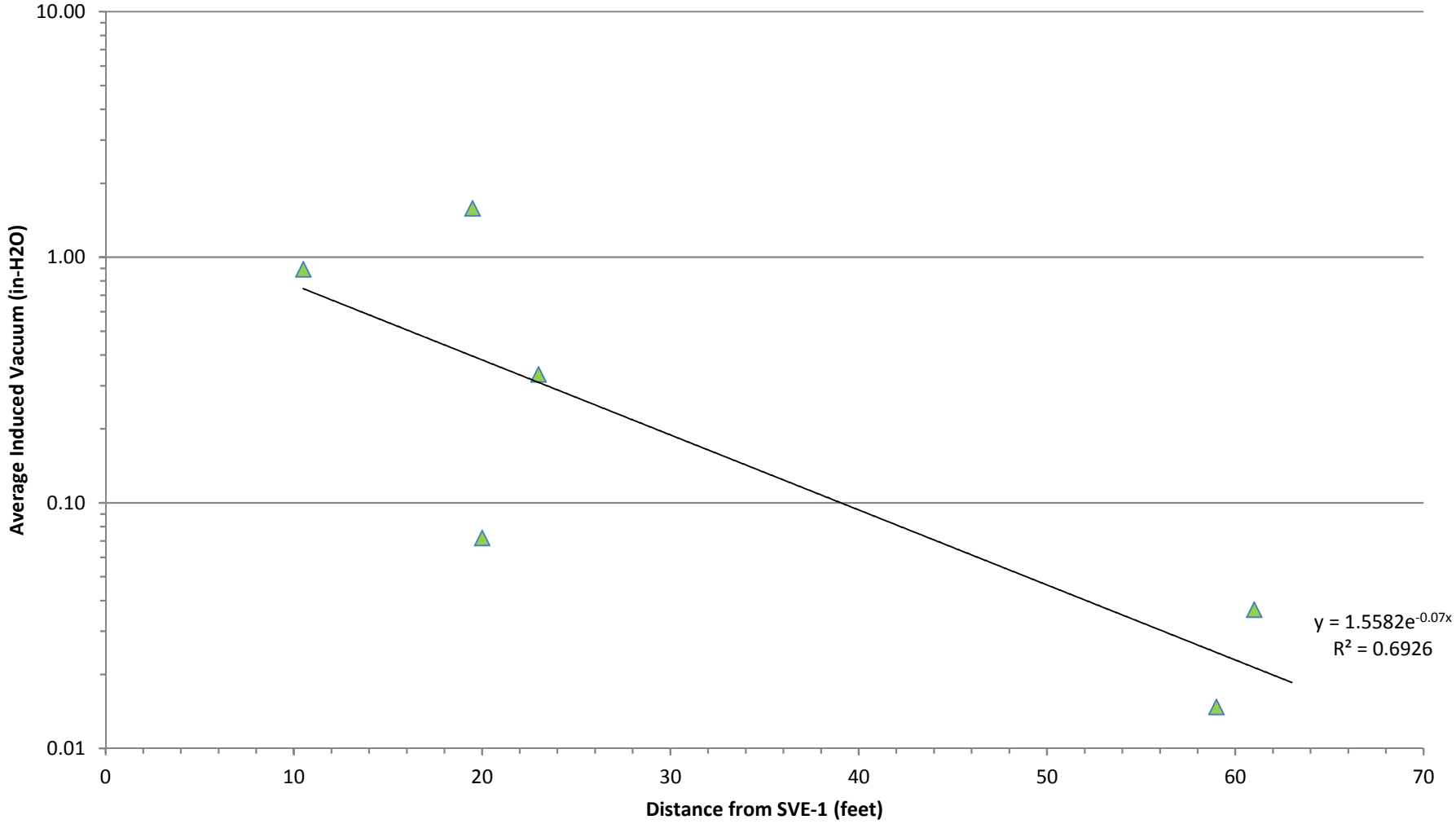
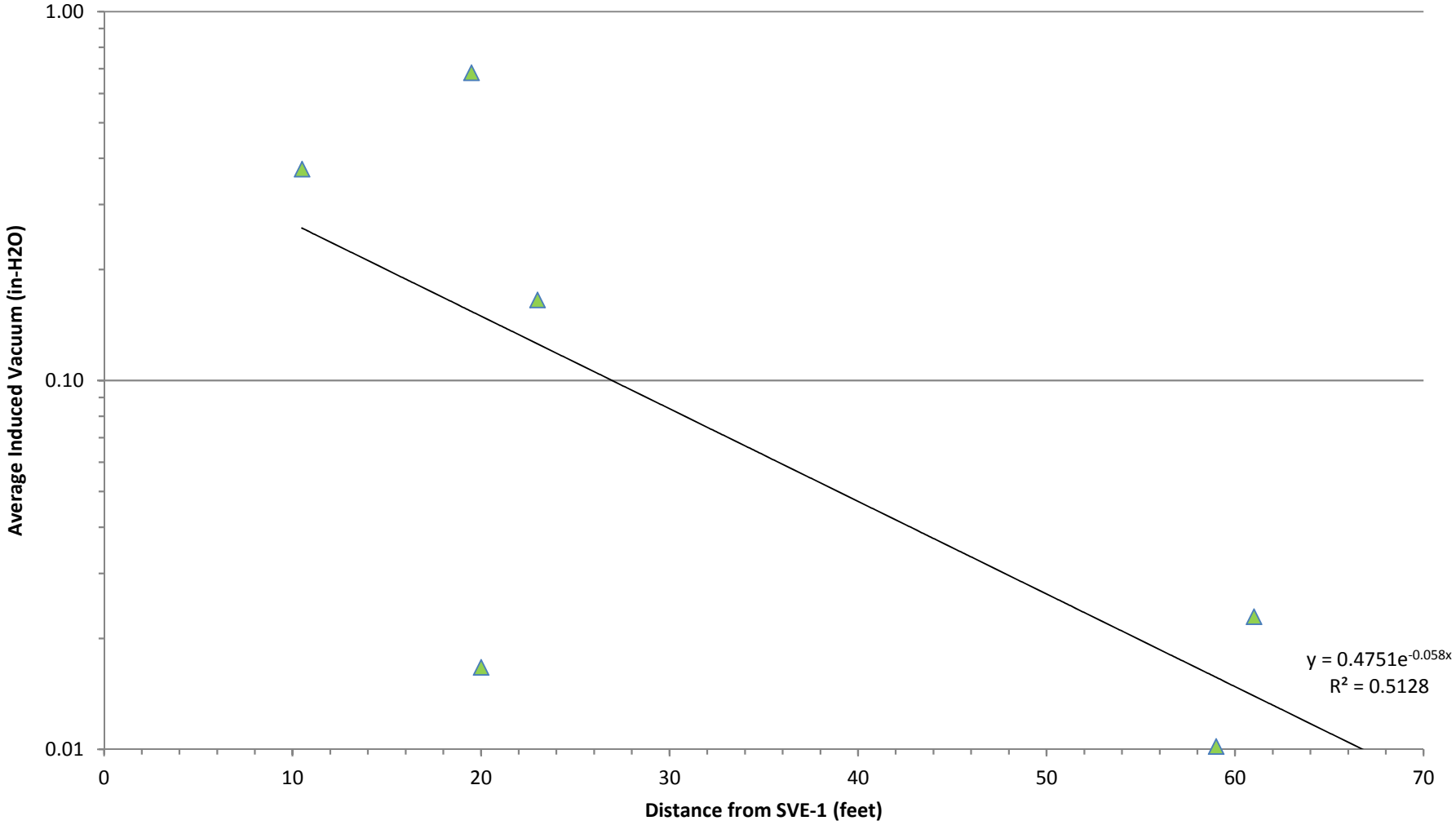


CHART 5
Radius of Influence - Shallow Zone
Step 3 - Applied Vacuum 3 inHg
Soil Vapor Extraction Pilot Study Report
Harborview Cleaners
Port Washington, Wisconsin
WDNR BRRTS No. 02-46-548092



ATTACHMENT 1

SOIL BORING LOGS

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Facility/Project Name: Harborview	License/Permit/Monitoring Number:	Boring Number: B-1/MW-1

Boring Drilled By: Name of crew chief (first, last) and Firm
First Name: Keith Last Name: Flowers
Firm: Giles Engineering

Date Drilling Started	Date Drilling Completed	Drilling Method
12 / 20 / 2007 (m m d d y y y y)	12 / 20 / 2007 (m m d d y y y y)	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
_ _ _ _ _ _	_ _ _ _		_____ Feet MSL	_____ Feet MSL	8 inches

Local Grid Origin [x] (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E

Lat ° ' "
Long ° ' "

Local Grid Location
☐ N ☐ E
_____ Feet ☐ S _____ Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Ozaukee	46	Port Washington

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1		7,5	0 - 1	0.0 - 1.0 Concrete over gravel	FI			<1						
			1 - 2	1.0 - 2.0 No recovery										
2		5,5,3,3	2 - 3	2.0 - 4.0 light brown SILTY CLAY and gravel	CL			<1						
3		3,2,2,2	4 - 5	4.0 - 6.0 same	CL			<1						
4		3,6,7,7	6 - 7	6.0 - 8.0 light brown SANDY CLAY and gravel	CL			<1						
5		4,4,4,4	8 - 9	8.0 - 10.0 Same				<1						
6		15,14,15,16	10 - 12	10.0 - 12.0 same	CL			<1						

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm Konicek Environmental

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

Facility/Project Name: Harborview
Boring No. : B-1/MW-1

License/Project/Monitoring No. :
WI Unique Well No. :

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7		10,10,12,13	12	12.0 - 14.0 No Recovery										
8		22,12,20,24	14	14.0 - 16.0 Light Grayish-Brown SILTY CLAY	CL			<1						
9		26,27,28,28	16	16.0 - 18.0 same	CL			<1						
10		15,27,28,28	18	18.0 - 20.0 same	CL			<1						
			20	EOB 20'										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Facility/Project Name: Harborview	License/Permit/Monitoring Number:	Boring Number: B-2/MW-2

Boring Drilled By: Name of crew chief (first, last) and Firm
First Name: Keith Last Name: Flowers
Firm: Giles Engineering

Date Drilling Started	Date Drilling Completed	Drilling Method
12 / 20 / 2007 (m m / d d / y y y y)	12 / 20 / 2007 (m m / d d / y y y y)	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
_ _ _ _ _ _ _	_ _ _ _		_____ Feet MSL	_____ Feet MSL	_____ inches

Local Grid Origin [x] (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E
Lat ° ' "
Long ° ' "
Local Grid Location: _____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Ozaukee	46	Port Washington

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	0.0 - 1.0 Concrete over gravel	FI									
1		20,10	1	1.0 - 2.0 Reddish-brown SANDY CLAY and gravel	FI			<1						
2		2,4,5,5	2	2.0 - 4.0 Light brown SILTY CLAY mixed with sand and gravel and concrete	FI			<1						
			3											
3		5,4,3,2	4	4.0 - 6.0 same	FI			<1						
			5											
4		3,5,17,20	6	6.0 - 8.0 same	FI			<1						
			7											
5		29,12,20,15	8	8.0 - 10.0 Light brown SILTY CLAY	CL			<1						
			9											
6		20,36,38	10	10.0 - 12.0 same	CL									
			11											
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm Konicek Environmental

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

Facility/Project Name: Harborview
Boring No. : B-2/MW-2

License/Project/Monitoring No. :
WI Unique Well No. :

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			11											
7		50/5"	12	12.0 - ~~14.0~~ 13 Light bluish-gray to brown SILTY CLAY	CL			<1						
			13											
8								<1						
				End of Boring @ ~~15~~ 13 Feet										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview		B-3/MW-3

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
First Name: Keith Last Name: Flowers Firm: Giles Engineering	12/20/2007 (m m d d y y y y)	12/20/2007 (m m d d y y y y)	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
_ _ _ _ _ _	_ _ _ _		_____ Feet MSL	_____ Feet MSL	_____ inches

Local Grid Origin [x] (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E

Lat ° ' "
Long ° ' "

Local Grid Location
☐ N ☐ E
_____ Feet ☐ S _____ Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Ozaukee	46	Port Washington

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				0.0 - 1.0 Concrete over gravel	FI									
1		10,7	1	1.0 - 2.0 Light brown sand	FI			<1						
2		2,3,4,7	2	2.0 - 4.0 Light reddish-brown SILTY CLAY and sand	FI			<1						
			3											
3		3,3,3,3	4	4.0 - 6.0 offwhite sand and concrete dust	FI			<1						
			5											
4		3,3,3,6	6	6.0 - 8.0 light reddish-brown SILTY CLAY and SAND	CL			<1						
			7											
5		8,8,9,9	8	8.0 - 10.0 light brown SILTY CLAY mixed with sand and gravel	CL			<1						
			9											
6		10,15,15,16	10	10.0 - 12.0 same	CL			<1						
			11											
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm Konicek Environmental

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

Facility/Project Name: Harborview
Boring No. : B-3/MW-3

License/Project/Monitoring No. :
WI Unique Well No. :

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			11											
7		16,25 ,22,2 3	12	12.0 - 14.0 light grayish-brown SILTY CLAY	CL			<1						
			13											
8		14,18 ,18,2 0	14	14.0 - ~~16.0~~ 15 same	CL			<1						
			15											
				End of Boring @ ~~16~~ 15 feet										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview		B-4/Mw-4

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
First Name: Keith Last Name: Flowers Firm: Giles Engineering	12 / 20 / 2007 (m m / d d / y y y y)	12 / 20 / 2007 (m m / d d / y y y y)	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
_ _ _ _ _ _	_ _ _		_____ Feet MSL	_____ Feet MSL	_____ inches

Local Grid Origin [x] (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E

Lat ° ' "
Long ° ' "

Local Grid Location
_____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Ozaukee	46	Port Washington

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				0.0 - 1.0 Concrete over gravel	FI									
1		3,3	1	1.0 - 2.0 Brown SILTY CLAY	FI			<1						
2		6,4,3 ,2	2	2.0 - 4.0 Reddish-brown SILTY CLAY	FI			<1						
			3											
3		3,4,4 ,4	4	4.0 - 6.0 same	FI			<1						
			5											
4		3,3,3 ,3	6	6.0 - 8.0 Dark brown SILTY CLAY (organic)	OL			<1						
			7											
5		3,3,3 ,3	8	8.0 - 10.0 reddish-brown SILTY CLAY -(organic) and sand	OL			<1						
			9											
6		3,3,5 ,12	10	10.0 - 12.0 same	OL									
			11											
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm Konicek Environmental

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Facility/Project Name: Harborview
Boring No. : B-4/Mw-4

License/Project/Monitoring No. :
WI Unique Well No. :

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			11											
7		16,19 ,28,3 0	12	12.0 - 14.0 Light brown SILTY CLAY and sand	CL			<1						
			13											
8		8,12, 12,13	14	14.0 - ~~16.0~~ 15 light grayish-brown SILTY CLAY	CL			<1						
			15	End of Boring @ ~~16~~ 15 Feet										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview		B-5

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
First Name: Jim Last Name:	1/ /16/ /2008 (m m d d y y y y)	1/ /16/ /2008 (m m d d y y y y)	Soil probe
Firm: Giles Engineering			

WI Unique Well No.	DNR Well ID No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
_ _ _ _ _ _ _	_ _ _ _		_____ Feet MSL	_____ Feet MSL	_____ inches

Local Grid Origin [x] (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E

Lat ° ' "
Long ° ' "

Local Grid Location
☐ N ☐ E
_____ Feet ☐ S _____ Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	OZAUKEE	46	Port Washington

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	0.0 - 4.0 dark brown SILTY CLAY	FI									
			2											
			3											
			4	4.0 - 9.0 light brown SILTY CLAY	CL									
			5											
			6											
			7											
			8											
			9	9.0 - 16.0 light greyish-brown SILTY CLAY	CL									
			10											
			11											
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Konicek Environmental Consulting, LLC

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Facility/Project Name: Harborview
Boring No. : B-5

License/Project/Monitoring No. :
WI Unique Well No. :

Sample									Soil Properties						
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13											
			14											
			15											
			16	16.0 - 16.1 End of boring @ 16-feet										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Page 1 of 1

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview		HP-1

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
First Name: Jim Last Name: Firm: Giles Engineering	1/6/2008	1/6/2008	Hand probe

WI Unique Well No.	DNR Well ID No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			_____ Feet MSL	_____ Feet MSL	_____ inches

Local Grid Origin [x] (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E

Lat ° ' "
Long ° ' "

Local Grid Location
_____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	OZAUKEE	46	Port Washington

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	0.0 - 0.8 Concrete	FI									
			1	0.8 - 2.0 light brown beach SAND	FI									
			2	2.0 - 5.0 dark brown SILTY CLAY	FI									
			3											
			4											
			5	5.0 - 7.0 light brown SILTY CLAY	CL									
			6											
			7	7.0 - 8.0 tan GRAVEL	GW									
			8	8.0 - 8.0 End of probe @ 8 feet										

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	Konicek Environmental Consulting, LLC

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State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Page 1 of 1

Facility/Project Name: Harborview	License/Permit/Monitoring Number	Boring Number: HP-2
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: Jim Last Name: Firm: Giles Engineering	Date Drilling Started: 1/16/2008 (m m d d y y y y)	Date Drilling Completed: 1/16/2008 (m m d d y y y y)
	Drilling Method: Hand probe	
WI Unique Well No. _ _ _ _ _ _	DNR Well ID No. _ _ _ _	Well Name
Final Static Water Level: _____ Feet MSL	Surface Elevation: _____ Feet MSL	Borehole Diameter: _____ inches
Local Grid Origin [x] (estimated: ☐) or Boring Location ☐ State Plane _____ N, _____ E NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E	Lat ° ' " Long ° ' "	Local Grid Location _____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W
Facility ID	County: OZAUKEE	County Code: 46
	Civil Town/City/ or Village: Port Washington	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	0.0 - 1.0 Concrete	FI									
			1	1.0 - 2.0 no Recovery										
			2	2.0 - 8.0 tan beach SAND with some gravel	SP									
			3											
			4											
			5											
			6											
			7											
			8	8.0 - 8.0 End of probe @ 8 feet										

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Signature _____ Firm: Konicek Environmental Consulting, LLC

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State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview		MW-5

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
First Name: Beauford Last Name: Jones Firm: Giles Engineering	3/13/2008 (m m d d y y y y)	3/13/2008 (m m d d y y y y)	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
_ _ _ _ _ _	_ _ _ _		_____ Feet MSL	_____ Feet MSL	8 inches

Local Grid Origin [x] (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E

Lat ° ' "
Long ° ' "

Local Grid Location
☐ N ☐ E
_____ Feet ☐ S _____ Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Ozaukee	46	Port Washington

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	0.0 - 17.0 Blind drilled										
			2											
			3											
			4											
			5											
			6											
			7											
			8											
			9											
			10											
			11											
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Konicek Environmental Consulting, LLC

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Facility/Project Name: Harborview
Boring No. :

License/Project/Monitoring No. :
WI Unique Well No. :

Sample										Soil Properties					
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13											
			14											
			15											
			16											
			17	17.0 - 17.0 End of boring @ 17-feet										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment [x] Other ☐ _____

Facility/Project Name: Harborview	License/Permit/Monitoring Number:	Boring Number: PZ-1

Boring Drilled By: Name of crew chief (first, last) and Firm
First Name: Beauford Last Name: Jones
Firm: Giles Engineering

Date Drilling Started	Date Drilling Completed	Drilling Method
3/13/2008 (m m d d y y y y)	3/13/2008 (m m d d y y y y)	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
_ _ _ _ _ _ _	_ _ _ _		_____ Feet MSL	_____ Feet MSL	8 inches

Local Grid Origin [x] (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E

Lat ° ' "
Long ° ' "

Local Grid Location: ☐ N ☐ E _____ Feet ☐ S _____ Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Ozaukee	46	Port Washington

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0.0 - 0.5	Concrete	PA									
			0.5 - 1.0	ASPHALT	PA									
		36,24	1.0 - 2.0	GRAVEL	FI									
		24,15,15,30	2.0 - 4.0	Brown SILTY CLAY	FI									
		6,7,8,8	4.0 - 6.0	Black to rust brown SILTY CLAY	FI									
		6,3,3,3	6.0 - 8.0	Brown SILTY CLAY	CL									
		2,2,2,5	8.0 - 10.0	Dark reddish-brown SILTY CLAY	CL									
		4,5,4,4	10.0 - 12.0	Brown SILTY CLAY	CL									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Konicek Environmental Consulting, LLC

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Facility/Project Name: Harborview
Boring No. : PZ-1

License/Project/Monitoring No. :
WI Unique Well No. :

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			11											
		2,3,5 ,5	12	12.0 - 14.0 GRAVEL (wet)	GW									
			13											
		50/3	14	14.0 - 16.0 brown SILTY-CLAY	CL									
			15											
		6,12, 15,18	16	16.0 - 21.0	CL									
			17											
			18											
			19											
			20											
		50/2	21	21.0 - 26.0 light-brown SILTY CLAY - hard pan	CL									
			22											
			23											
			24											
			25											
		14,24	26	26.0 - 29.0	CL									
			27											
			28											
		24,24	29	29.0 - 31.0	CL									
			30											

Facility/Project Name: Harborview
Boring No. : PZ-1

License/Project/Monitoring No. :
WI Unique Well No. :

Sample									Soil Properties					
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			30											
		8,14	31	31.0 - 33.0	CL									
			32											
		16,16	33	33.0 - 35.0 greyish-light brown SILTY CLAY	CL									
			34											
			35	35.0 - 35.0 End of Boring @ 35-feet										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview Cleaners	02-46-548092	SB-1

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Tony Kapugi On-Site Environmental	12/2/2015	12/2/2015	Direct Push

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet MSL	Feet MSL	2.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane N, E Ⓢ/C/N
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E
Lat 43° 23' 27.0" Long 87° 52' 18.0"
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
246063070	Ozaukee	46	Port Washington

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	**(0-.5) CONCRETE (CONCRETE):** CONCRETE.										
			1	**(0.5-1) FILL (FILL):** SAND and GRAVEL, loose, moist.	FILL			0.1						
			2											
			3	**(3-4) SAND and GRAVEL (SWG):** Black, SAND and GRAVEL, wet, loose.	SW			0.2						
			4	**(4-8) CLAY and SILT (CL-ML):** 7.5yr 5/4 Brown, CLAY and SILT, trace, coarse Sand and Gravel, moist, plastic.										
	60 48		5					0.6						
			6		CL-ML									
			7					0.6						
			8	**(8') SAND and GRAVEL (SWG):** 2" SAND and GRAVEL seam.	SW									
Soil GS			9	**(8-10) SAND and SILT (SP-SM):** 7.5yr 3/3 Dark brown, SILT and fine to medium grained SAND, moist, plastic.	SP-SM			0.5						
	60 52		10	**(10-14) SAND (SW):** Fine to coarse grained SAND, with fine grained Gravel, wet, loose.										
			11		SW			0.4						
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	Tel: / Fax:
	EnviroForensics	

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State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number SB-1 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13	**(10-14) SAND (SW):** Fine to coarse grained SAND, with fine grained Gravel, wet, loose. *(continued)*	SW			0.2						
Soil GS	60 60		14 15 16	**(14-16) CLAY and SILT (CL-ML):** 10yr 5/2 Grayish brown, CLAY and SILT, trace, coarse Sand and Gravel, dry, stiff, slightly plastic.	CL-ML			0.0						
				EOB @ 16 ft bgs										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview Cleaners	02-46-548092	SB-2

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Tony Kapugi On-Site Environmental	12/2/2015	12/2/2015	Direct Push

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet MSL	Feet MSL	2.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane N, E Ⓢ/C/N
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E
Lat 43° 23' 26.0"
Long 87° 52' 18.0"
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
246063070	Ozaukee	46	Port Washington

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	**(0-.5) CONCRETE (CONCRETE):** CONCRETE.										
			1	**(0.5-5) FILL (FILL):** SAND and GRAVEL, loose, moist.				0.2						
			2											
			3		FILL			5.3						
			4											
	60 56		5	**(5-7) CLAY and SILT (CL-ML):** 10yr 3/3 Dark brown, CLAY and SILT, trace fine grained Sand, moist, plastic.				9.7						
			6		CL-ML									
Soil GS			7	**(7-10) CLAY and SILT (CL-ML):** 7.5yr 4/6 Strong brown, CLAY and SILT, trace fine grained Sand, moist, plastic.				6.7						
			8											
			9		CL-ML			7.6						
	60 60		10	**(10-10.5) SAND (SW):** Fine to coarse grained SAND, some coarse grained Gravel, moist.	SW									
			11		SP-SM			4.2						
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	Tel: / Fax:
	EnviroForensics	

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State of Wisconsin
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SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number SB-2 Use only as an attachment to Form 4400-122. Page 2 of 2

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Soil GS	60 60		13	**(10-16) CL-ML (CL-ML):** Gray, CLAY and SILT, trace coarse grained Gravel, dry, non-plastic. *(continued)*				3.1						
			14		SP-SM									
			15					0.0						
			16	EOB @ 16 ft bgs										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview Cleaners	02-46-548092	SB-3

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Tony Kapugi On-Site Environmental	12/2/2015	12/2/2015	Direct Push

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet MSL	Feet MSL	2.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane N, E Ⓢ/C/N
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E
Lat 43° 23' 26.0"
Long 87° 52' 18.0"
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
246063070	Ozaukee	46	Port Washington

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	**(0-.5) CONCRETE (CONCRETE):** CONCRETE.										
			1	**(0.5-3) FILL (FILL):** SAND and GRAVEL, loose, dry.	FILL			0.8						
			3	**(3-5) CLAY and SILT (CL-ML):** 7.5yr 4/3 Brown, CLAY and SILT, trace coarse grained Gravel, moist, plastic.	CL-ML			0.7						
	60 60		5	**(5-6) SAND (SP-SM):** Fine to coarse grained SAND with SILT, trace fine grained Gravel, wet, plastic, dense, soft.	SP-SM			0.6						
Soil GS			6	**(6-6.5) SAND (SW):** Fine to coarse grained SAND, some coarse grained Gravel, moist.	SW									
			7	**(6.5-10) CLAY and SILT (CL-ML):** Black, CLAY and SILT, moist, plastic, soft.	CL-ML			1.4						
			9					0.9						
	60 50		10	**(10-11) SAND (SW):** Fine to coarse grained SAND, some fine to coarse grained Gravel, loose, dry.	SW									
Soil GS			11		CL-ML			5.1						
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	Tel: / Fax:
	EnviroForensics	

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number SB-3 Use only as an attachment to Form 4400-122.

Sample									Soil Properties					
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Soil GS	60 48		13 14 15 16	**(11-16) CLAY and SILT (CL-ML):** Gray, CLAY and SILT, some fine to medium grained Gravel, dry, stiff, non-plastic. *(continued)* EOB @ 16 ft bgs	CL-ML			0.9 0.6						

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Harborview Cleaners	02-46-548092	SB-4

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Tony Kapugi On-Site Environmental	12/2/2015	12/2/2015	Direct Push

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet MSL	Feet MSL	2.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane N, E Ⓢ/C/N
NW 1/4 of SE 1/4 of Section 28, T 11 N, R 22 E
Lat 43° 23' 26.0"
Long 87° 52' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
246063070	Ozaukee	46	Port Washington

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Soil GS	60 24		1	**(0-.5) CONCRETE (CONCRETE):** CONCRETE. **(0.5-10) FILL (FILL):** Fine to coarse grained SAND, trace coarse grained Gravel, moist, loose.	FILL			0.3						
			2											
			3					0.5						
			4											
			5					0.3						
			6											
			7					0.4						
			8											
			9					0.5						
	60 12		10	**(10-30) CLAY and SILT (CL-ML):** Gray, CLAY and SILT, some coarse Sand and Gravel, slightly moist, slightly plastic, stiff.	CL-ML									
			11					0.6						
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	Tel: / Fax:
	EnviroForensics	

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number SB-4 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Soil GS			13	**(10-30) CLAY and SILT (CL-ML):** Gray, CLAY and SILT, some coarse Sand and Gravel, slightly moist, slightly plastic, stiff. *(continued)*				0.4						
	60 30		14											
			15					0.3						
			16											
			17					0.0						
			18											
			19					0.0						
	60 60		20											
			21		CL-ML			0.0						
			22											
			23					0.0						
			24											
	60 60		25					0.0						
			26											
			27					0.0						
			28											
			29					0.0						
	60 60		30	EOB @ 30 ft bgs										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number SB-4 Use only as an attachment to Form 4400-122.

Sample									Soil Properties					
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments

ATTACHMENT 2

LABORATORY ANALYTICAL REPORT

EnvisionAir
1441 Sadlier Circle West Drive
Indianapolis, IN 46239
Ph: 317-351-0885
Fax: 317-351-0882
www.envision-air.com

Mr. Brian Kappen
Enviroforensics
N16 W. 23390 Stone Ridge Dr
Suite G
Waukesha, WI 53188

February 22, 2017

EnvisionAir Project Number: 2017-91
Client Project Name: 6348

Dear Mr. Kappen,

Please find the attached analytical report for the samples received February 13, 2017. All test methods performed were fully compliant with local, state, and federal EPA methods unless otherwise noted. The project was analyzed as requested on the enclosed chain of custody record. Please review the comments section for additional information about your results or Quality Control data.

Feel free to contact me if you have any questions or comments regarding your analytical report or service.

Thank you for your business. EnvisionAir looks forward to working with you on your next project.

Yours Sincerely,

Stanley A Hunnicutt

Project Manager
EnvisionAir, LLC

EnvisionAir
1441 Sadlier Circle West Drive
Indianapolis, IN 46239
Ph: 317-351-0885
Fax: 317-351-0882
www.envision-air.com

Client Name: ENVIROFORENSICS

Project ID: 6348

Client Project Manager: BRIAN KAPPEN

EnvisionAir Project Number: 2017-91

Sample Summary

Canister Pressure / Vacuum

Laboratory Sample Number:	Sample Description:	Matrix:	START Date Collected:	START Time Collected:	End Date Collected:	End Time Collected:	Date Received:	Time Received	Initial Field (in. Hg)	Final Field (in. Hg)	Lab Received (in. Hg)
17-348	6348-PILOT-1	A	2/9/17	19:32	2/9/17	19:37	2/13/17	9:15	-29	-3	-3
17-349	6348-PILOT-2	A	2/9/17	23:07	2/9/17	23:12	2/13/17	9:15	-29	-3	-3
17-350	6348-PILOT-3	A	2/10/17	1:05	2/10/17	1:10	2/13/17	9:15	-29	-3	-3
17-351	6348-PILOT-4	A	2/10/17	3:07	2/10/17	3:12	2/13/17	9:15	-29	-3	-3

EnvisionAir
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Indianapolis, IN 46239
Ph: 317-351-0885
Fax: 317-351-0882
www.envision-air.com

Client Name: ENVIROFORENSICS

Project ID: 6348

Client Project Manager: BRIAN KAPPEN

EnvisionAir Project Number: 2017-91

Analytical Method: TO-15
Analytical Batch: 022017AIR

Client Sample ID: 6348-PILOT-1
Envision Sample Number: 17-348
Sample Matrix: AIR

Sample Collection START Date/Time: 2/9/17 19:32
Sample Collection END Date/Time: 2/9/17 19:37
Sample Received Date/Time: 2/13/17 9:15

Compounds	Sample Results ug/m³	Reporting Limit ug/m³	Flag
cis-1,2-Dichloroethene	**2,090**	159	1
Tetrachloroethene	**57,600**	1280	2
trans-1,2-Dichloroethene	< 39.6	39.6	
Trichloroethene	**3,520**	43.0	1
Vinyl Chloride	< 6.4	6.4	
4-bromofluorobenzene (surrogate)	121%		
Analysis Date/Time:	2-20-17/20:15		
Analyst Initials	tjg		

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Client Name: ENVIROFORENSICS

Project ID: 6348

Client Project Manager: BRIAN KAPPEN

EnvisionAir Project Number: 2017-91

Analytical Method: TO-15
Analytical Batch: 022017AIR

Client Sample ID: 6348-PILOT-2
Envision Sample Number: 17-349
Sample Matrix: AIR

Sample Collection START Date/Time: 2/9/17 23:07
Sample Collection END Date/Time: 2/9/17 23:12
Sample Received Date/Time: 2/13/17 9:15

Compounds	Sample Results ug/m³	Reporting Limit ug/m³	Flag
cis-1,2-Dichloroethene	**1,400**	159	1
Tetrachloroethene	**47,600**	1280	2
trans-1,2-Dichloroethene	< 39.6	39.6	
Trichloroethene	**2,390**	43.0	1
Vinyl Chloride	< 6.4	6.4	
4-bromofluorobenzene (surrogate)	116%		
Analysis Date/Time:	2-20-17/20:54		
Analyst Initials	tjg		

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Client Name: ENVIROFORENSICS

Project ID: 6348

Client Project Manager: BRIAN KAPPEN

EnvisionAir Project Number: 2017-91

Analytical Method: TO-15
Analytical Batch: 022017AIR

Client Sample ID: 6348-PILOT-3
Envision Sample Number: 17-350
Sample Matrix: AIR

Sample Collection START Date/Time: 2/9/17 1:05
Sample Collection END Date/Time: 2/9/17 1:10
Sample Received Date/Time: 2/13/17 9:15

Compounds	Sample Results ug/m³	Reporting Limit ug/m³	Flag
cis-1,2-Dichloroethene	**363**	39.6	
Tetrachloroethene	**18,600**	1280	2
trans-1,2-Dichloroethene	< 39.6	39.6	
Trichloroethene	**581**	10.7	
Vinyl Chloride	< 6.4	6.4	
4-bromofluorobenzene (surrogate)	112%		
Analysis Date/Time:	2-20-17/21:33		
Analyst Initials	tjg		

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Client Name: ENVIROFORENSICS

Project ID: 6348

Client Project Manager: BRIAN KAPPEN

EnvisionAir Project Number: 2017-91

Analytical Method: TO-15
Analytical Batch: 022017AIR

Client Sample ID: 6348-PILOT-4
Envision Sample Number: 17-351
Sample Matrix: AIR

Sample Collection START Date/Time: 2/9/17 3:07
Sample Collection END Date/Time: 2/9/17 3:12
Sample Received Date/Time: 2/13/17 9:15

Compounds	Sample Results ug/m³	Reporting Limit ug/m³	Flag
cis-1,2-Dichloroethene	**350**	39.6	
Tetrachloroethene	**12,200**	1280	2
trans-1,2-Dichloroethene	< 39.6	39.6	
Trichloroethene	**571**	10.7	
Vinyl Chloride	< 6.4	6.4	
4-bromofluorobenzene (surrogate)	108%		
Analysis Date/Time:	2-20-17/22:11		
Analyst Initials	tjg		

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Analytical Report

TO-15 Quality Control Data

EnvisionAir Batch Number: 022017AIR

Method Blank (MB):	MB Results (ppbv)	Reporting Limit (ppbv)	Flags
cis-1,2-Dichloroethene	< 5	5	
Tetrachloroethene	< 0.47	0.47	
trans-1,2-Dichloroethene	< 10	10	
Trichlorethene	< 0.2	0.2	
Vinyl Chloride	< 0.5	0.5	
4-bromofluorobenzene (surrogate)	90%		
Analysis Date/Time:	2-20-17/09:57		
Analyst Initials	tjg		

LCS/LCSD	LCS Results (ppbv)	LCSD Results (ppbv)	LCS/D Conc(ppbv)	LCS Rec.	LCSD Rec.	RPD	Flag
Vinyl Chloride	8.6	10.5	10	86%	105%	19.9%	
trans-1,2-Dichloroethene	11.6	11.5	10	116%	115%	0.9%	
cis-1,2-Dichloroethene	10.5	10.3	10	105%	103%	1.9%	
Trichloroethene	10.1	9.49	10	101%	95%	6.2%	
Tetrachloroethene	8.85	8.35	10	89%	84%	5.8%	
4-bromofluorobenzene (surrogate)	97%	104%					
Analysis Date/Time:	2-20-17/08:37	2-20-17/09:17					
Analyst Initials	tjg	tjg					

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Flag Number	Comments
1	Reporting limit is supported by MDL. TJG
2	Reported value is from a 40x dilution. TJG 2-21-17
3	Reported value is from a 400x dilution. TJG 2-21-17

EnvisionAir Proj#: 2017-91 Page 1 of 1 BJK

CHAIN OF CUSTODY RECORD

EnvisionAir | 1441 Sadlier Circle West Drive | Indianapolis, IN 46239 | Phone: (317) 351-0885 | Fax: (317) 351-0882

Client: NFO	P.O. Number:
Report Address: N16 W23390 Stone Ridge Dr Waukesha, WI	Project Name or Number: 6348
Report To: B. Kappen G. Schacht	Sampled by: G. Schacht
Phone: 414-326-4412	QA/QC Required: (circle if applicable) Level III Level IV
Invoice Address: SAME	Reporting Units needed: (circle) ug/m³ mg/m³ PPBV PPMV
Desired TAT: (Please Circle One) 1 day 2 days 3 days Std (5 bus. days)	Media type: 1LC = 1 Liter Canister, 6LC = 6 Liter Canister, TB = Tedlar Bag, TD = Thermal Desorption Tube

REQUESTED PARAMETERS

TO-15 Full List | TO-15 Short List

ENVISIONAIR

Sampling Type:
Soil-Gas: ☒
Sub-Slab: ☐
Indoor-Air: ☐

www.envision-air.com

Canister Pressure / Vacuum

Air Sample ID	Media Type (see code above)	Coll. Date (Grab/Comp Start)	Coll. Time (Grab/Comp Start)	Coll. Date (Comp. End)	Coll. Time (Comp. End)					Canister Serial #	Flow Controller Serial #	Initial Field (in. Hg)	Final Field (in. Hg)	Lab Received (in. Hg)	EnvisionAir Sample Number
6348-Pilot-1	1LC	2-9-17	1932	2-9-17	1937		X			2217	—	-29	-3	-3	17-348
6348-Pilot-2	1LC	2-9-17	2307	2-9-17	2312		X			2226	—	-29	-3	-3	17-349
6348-Pilot-3	1LC	2-10-17	0105	2-10-17	0110		X			2223	—	-29	-3	-3	17-350
6348-Pilot-4	1LC	2-10-17	0307	2-10-17	0312		X			2541	—	-29	-3	-3	17-351

Comments:

Relinquished by:	Date	Time	Received by:	Date	Time
Hank Sellers	2/10/17	1200	FedEx	2/10/17	1200
			Hank Hinnicutt	2/13/17	0915