



HYDRODYNAMICS CONSULTANTS, INC.

Environmental Engineering, Consulting, and Contracting

December 13, 2021

Binyoti Felix Amungwafor, Environmental Program Associate
Wisconsin Department of Natural Resources
2300 Martin Luther King Drive
Milwaukee, WI 53212

Re: WDNR BRRTS #02-41-552537
Indoor Air Sampling and Sub-slab Vapor Sampling Results Report
Westwood Dry Cleaners
8731 W. North Ave
Wauwatosa, WI 53226

Dear Mr. Amungwafor:

Per your request dated November 8, 2021, Hydrodynamics Consultants, Inc. (HDC) completed the following scope of work on November 23 & 24, 2021:

- Collect four indoor air samples at the Nail SPA, Super Cuts, Restaurant., and its basement.
- Drill and sample for soil vapor at the locations of SV-2, 6, & 7.

Please find the attached report for the results of the above site investigation which indicated that all the VOC concentrations from those samples are below the US EPA's Vapor Intrusion Screening Levels (VISLs).

Indoor air samples taken from Nail Spa & Super Cuts (IA-1 & IA-2) contained a certain level of isopropyl alcohol (3,500 & 2,200 ug/m³, respectively). Since isopropyl alcohol can be used as a cleaning agent, Nail Spa & Super Cuts might have used it for cleaning activities for their daily operations, resulting in elevated levels in their indoor air at the time of indoor air sampling, as well as potentially encountered during previous sub-slab sampling events through wastewater sewers etc.

Based on the sampling results, HDC believes that it is not necessary to install the sub-slab depressurization system (SSDS) since there is no exceedance of Contamination of Concerns (COCs, PCE & related by-products) in the soil vapor samples for commercial properties. As a result, HDC recommends that the WDNR grant an official letter to bring the site to closure for environmental concerns regarding the existing contamination.

Please contact me at Yong-Yu@HydrodynamicsConsultants.com or 630-724-0098 for any questions.

Regards,

Yong H. Yu, Ph.D. & President
Maple Testing Services, Inc. D/B/A Hydrodynamics Consultants, Inc.

5403 Patton Drive, Suite 215, Lisle, Illinois 60532

Tel.: 630-724-0098 Fax: 800-881-2051



Indoor Air Sampling & Sub-Slab Vapor Sampling Results Report

Prepared For
Westwood Cleaners
(WDNR BRRTS#02-41-552537)
8731 West North Avenue
Wauwatosa, Wisconsin 53226

December 13, 2021



HYDRODYNAMICS CONSULTANTS, INC.

Environmental Engineering, Consulting, and Contracting

December 13, 2021

Jennifer Dorman, Environmental Program Associate
Wisconsin Department of Natural Resources
2300 Martin Luther King Drive
Milwaukee, WI 53212

Re: WDNR BRRTS #02-41-552537
Indoor Air Sampling and Sub-slab Vapor Sampling Results Report
Westwood Dry Cleaners
8731 W. North Ave
Wauwatosa, WI 53226

Dear Ms. Dorman:

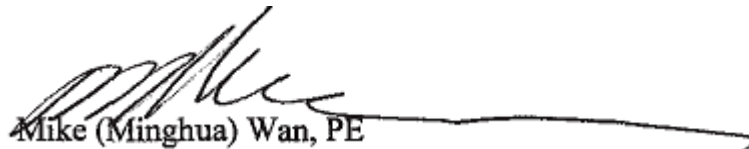
In accordance with the WDNR's letter from Binyoti F. Amungwafor dated November 8, 2021, Hydrodynamics Consultants, Inc. (HDC) is pleased to submit this Indoor Air Sampling and Sub-slab Vapor Sampling Results Report for your review and approval.

Based on the sampling results, HDC believes that it is not necessary to install the sub-slab depressurization system (SSDS) since no exceedance of Contamination of Concerns (COCs, PCE and related by-products) in the soil vapor samples for commercial properties. As a result, HDC recommends WDNR to grant an official letter to bring the site closure for environmental concerns regarding the existing contamination.

Please contact Dr. Yong Yu or myself at 630-724-0098 for any questions.

Certifications

I, Mike (Minghua) Wan, 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 Wis. Adm. Code."



Mike (Minghua) Wan, PE

Maple Testing Services, Inc. D/B/A Hydrodynamics Consultants, Inc.



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1.0 EXECUTIVE SUMMARY

Hydrodynamics Consultants, Inc. (HDC) has been retained by the owner to complete this Indoor Air Sampling and Sub-Slab Sampling Results Report at and around the Westwood Cleaners site, located at 8371 West North Ave. Wauwatosa, WI 53226. The site investigations and quarterly monitoring were summarized chronologically as follows.

In August 19, 2008, HDC performed limited soil boring and testing at the subject property. Four (4) soil borings were advanced to a depth of 16' deep each, and two soil samples were collected from each boring for laboratory analysis of chlorinated volatile organic compounds (cVOCs). The analytical results indicated up to 320,000 ug/Kg of tetrachloroethene (PCE or perc) and up to 3,970 ug/Kg of trichloroethene (TCE) were present in the samples at the site.

Based on the findings, HDC submitted a Site Investigation Work Plan (SIWP). On July 31, 2018, the WDNR received HDC's revised SIWP and approved it on August 7, 2018.

From September 16 to 19, 2018, HDC performed a Site Investigation (SI) at this site. Twelve new soil borings (NSB1-NSB12) were completed to a depth of 16' each. Three representative soil samples were collected from each boring. Low levels of PCE, TCE, and vinyl chloride (VC) were detected from these borings. Six of the soil borings were converted to monitoring wells (MW1 to MW6). These wells were 1"- to 2"-diameter PVC wells constructed to a depth approximately 15' below the ground surface. Five sub-slab soil vapor ports (SV1 - SV5) were installed at this site. One soil vapor sample was collected from each of these ports during the site investigation. Up to 1,200 ug/m³ of PCE and 100 ug/m³ of TCE were found in the soil vapor samples. The highest level of PCE was found in the basement of the adjoining restaurant building at SV2.

From September 19, 2018 to July 13, 2019, groundwater samples were collected from all of the existing monitoring wells on a quarterly basis for a period of one year. The quarterly groundwater sampling results confirmed that up to 4,300 ug/L of PCE, 120 ug/L of TCE, 23 ug/L of cis-1,2-dichloroethene (cDCE), and 20 ug/L of VC were present in MW2, MW5, and MW6. The concentrations of the cVOCs were stable or decreasing.

Since VOC concentrations in groundwater monitoring well MW2, which was installed near the property line, contained 53 ug/L of PCE in the last monitoring event dated July 13, 2019, further groundwater-impact extent evaluation to the south and southwest of the property was proposed by HDC. The WDNR approved HDC's Change Order #1, Additional Site Investigation Work Plan on February 3, 2020. The Change Order #1 included installation of 3 additional soil borings, 3 monitoring wells, and to complete quarterly soil vapor and groundwater monitoring for a period of one year. The Work Plan was approved by WDNR.

From July 28, 2020 to August 10, 2020, HDC performed an Additional Site Investigation and 1st Quarterly Monitoring at this site. Three additional soil borings (NSB13-NSB15) were installed to the depth of 16' below the ground surface. Three soil samples were collected from these new borings and analyzed for VOCs. The soil analytical results confirmed that the soil VOC concentrations are



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all below the NR 720 Residual Contaminant Level (RCLs) for the groundwater pathway for VOCs. Three additional monitoring wells (NMW7-NMW9) were installed to the depth of 15' each. All the existing and new monitoring wells were sampled for VOCs, and the analytical results confirmed cVOCs were present in existing monitoring wells MW2, MW5, and MW6, with the same order of contaminant concentrations as the levels we previously found. Low level of PCE (10 ug/L) was also found in a new monitoring well, MW8, with concentration higher than the WDNR's Enforcement Standard of 5 ug/L. This monitoring well is located in the down-gradient direction (southwest) to the site. Two new sub-slab soil vapor sampling ports (SV6 and SV7) were installed in the building, and soil vapor samples were collected from all of the vapor sampling ports (SV1 to SV7) for analysis of VOCs with US EPA Method TO-15. The analytical results confirmed that soil vapor PCE (up to 38,000 ug/m³) and TCE (630 ug/m³) concentrations in the source area (around SV-7) have exceeded the US EPA's Vapor Risk Screening Levels (VRSLs: 6,000 ug/m³ for PCE and 290 ug/m³ for TCE).

From July 28, 2020 to June 16, 2021, HDC completed three additional quarterly soil vapor and groundwater samplings at this site. All quarterly sampling events included collecting samples from all the existing monitoring wells (MW1 to MW9) and sub-slab vapor sampling ports (SV1 to SV7). The quarterly groundwater sampling results confirmed that up to 4,600 ug/L of PCE, 180 ug/L of TCE, 23 ug/L of cis-1,2-dichloroethene (cDCE), and 7.8 ug/L of VC were present in MW2, MW5, MW6, and MW7. The concentrations of the cVOCs were found to be stable or decreasing.

On July 28, 2021, HDC filed a Site Investigation Report (Updated) for this site. The WDNR reviewed the report. Based on the site-specific conditions, Mr. Binyoti Amungwafor from the WDNR issued a review letter dated November 8, 2021. The following are part of the requirements:

1. Immediate Action is needed right away at this site. No submittal of a workplan and bidding is required per Ch. NR 169. You are required to:
 - Conduct indoor air sampling with a quick turn over analysis for PCE, TCE, Cis/Trans-1,2-DCE at the Nails SPA, Super Cuts, and Restaurant including the partial basement to evaluate acute exposure of occupants and workers from vapor intrusion per Wis. Admin. Code § NR 708.05

Hydrodynamics Consultants, Inc. (HDC) conducted the above tasks on November 23 and 24, 2021 inside the Nails SPA, Super Cut, and the Restaurant. The sampling results confirmed all the VOC concentrations are below the US EPA's Vapor Intrusion Screening Levels (VISLs) for indoor samples.

To confirm the accuracy of the Sub-slab vapor sampling results reported from 2018 to 2021, re-sampling of SV-2, SV-6 and SV-7 was also required by the WDNR. The re-sampling tasks were conducted on November 23, 2021 using the Shroud-Helium and Shut-in test method as required by RR-986. The new sampling results confirmed all the VOC concentrations are below the US EPA's Vapor Intrusion Screening Levels (VISLs) for sub-slab samples. The new re-sampling results reached the same conclusion as reported previously.

This report will summarize the results of the indoor air sampling and sub-slab vapor re-sampling results conducted on November 23 and 24, 2021. Sample results notifications to the DNR and



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property owner have been submitted separately. For details of the previous results, please refer to previous reports filed with the Wisconsin DNR.



2.0 INTRODUCTION

2.1 Location and Project Information

1. Site Owner:

Dong Sin
8371 West North Avenue
Wauwatosa, WI 53226

2. Site Address:

8371 West North Avenue
Wauwatosa, WI 53226

3. Site Location (Figure 1):

NE ¼ of the NW ¼ of Section 21, T07N, R21E, Milwaukee County, Wisconsin.

4. Environmental Consultant:

Mike Wan, PE, Project Manager
Hydrodynamics Consultants, Inc.
5403 Patton Drive, Suite 215
Lisle, IL 60532
Tel. 630-724-0098
Email Mike_Wan@HydrodynamicsConsultants.com

5. WDNR BRRS#:

02-41-552537

6. WDNR Project Manager:

Binyoti Amungwafor
Wisconsin Department of Natural Resources
2300 Martin Luther King Drive, Milwaukee, WI 53212
Tel. 414-263-8607
Email: Binyoti.Amingwafor@Wisconsin.gov

2.2 Site Location Map

Please see attached Figure 1, Site Vicinity Map

2.3 Site Physiographical and Geological Information

2.3.1 Topography/Geology

The general topography of land is flat with an elevation of approximately 705 feet above mean sea level (MSL). The local ground surface slopes gently toward the west or southwest.



No bedrock is encountered in the borings. According to the Glacial Deposit Map compiled by Wisconsin Geological & Natural History Survey in 1976, the site is located on the End Moraine deposit. The thickness of the glacial deposit is between 50' and 100' according to the Glacial Depth to Bedrock Map compiled by L.C. Trotta and R. D. Otter in 1973.

The closest surface water body is the Menomonee River which is approximately 1,600 feet to the west or southwest of the subject property.

The subsurface soil encountered in the soil borings is predominantly clay to silty clay from the surface down to the end of the borings at 16' below the ground surface, with thin lenses of silty fine sand/gravel being present in some borings.

2.3.2 Hydrogeology

The site is located in the City of Wauwatosa where the ground surface is mostly covered with asphalt pavement or concrete. Surface water drains to the municipal storm water system through the manhole sumps in the parking lots and storm water grills along the edges of streets. Surface water may recharge to the groundwater table via infiltration in landscaped areas or open fields where no surface barrier is present. The subject property is mostly covered with asphalt pavement or concrete slabs except for the lawn covered area to the west of the strip mall building. The groundwater study conducted through the monitoring wells at this site discovered that the local groundwater flows generally to the west or southwest, with high hydraulic conductivity as detailed in later sections of this report. The regional groundwater table may slightly slope to the southwest and discharge into the Menomonee River system located about 1,600 ft. southwest of the site. This water surface elevation at Menomonee River channel is about 656' above the mean sea level (or about 49' below the concrete floor at Westwood Cleaners).

2.4 Background Information

The subject property is located on the southeast corner of the intersection of West North Avenue and North Ludington Avenue in the City of Wauwatosa, WI (See Site Vicinity Map, Figure 1).

According to our inquiry, the subject dry-cleaning plant has been operating there since 1985. Drycleaning solvent, tetrachloroethene or perchloroethene (perc or PCE) has been used and stored at this site since 1985. Prior to 1985, no known record indicates that the site had been involved with any hazardous materials. Therefore, PCE and its degraded compounds (such as trichloroethene (TCE), cis-1,2-dichloroethene (cDCE), and vinyl chloride (VC) (called chlorinated volatile organic compounds, cVOCs) are the only contaminants of concern (COCs) for this site. Based on our observation and inquiries of the owner, the subsurface contamination of PCE may have been from historical spills or incidental releases during the past drycleaning operation. Further PCE release is unlikely because the drycleaning facility has installed secondary containments under the drycleaning machine and attention has been paid to proper storage and handling of the drycleaning generated wastes.



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Hydrodynamics Consultants, Inc. (HDC) completed a preliminary site investigation on August 19, 2008. HDC performed limited soil boring and testing at the subject property to confirm the site conditions. Four (4) soil borings (SB1 to SB4) were advanced to a depth of 16' each boring and two soil samples were collected from each boring for laboratory analysis of volatile organic compounds (VOCs). The analytical results indicated the drycleaning solvent, tetrachloroethene and its degraded products are present at the site. Based on the laboratory analysis from samples collected from these 4 borings, up to 320,000 µg/Kg of PCE was present in the borings (See Figure 3, Soil cVOC Distribution Map).

A Potential Claim Notification was completed and sent to the Department of Nature Resources (DNR) on August 28, 2008. Jennifer Feyerherm, Grant Manager of the WDNR sent the owner, Mr. Song Sin a letter on July 20, 2016, stating the site is qualified for reimbursement from the Wisconsin Drycleaners Environmental Response Fund (DERF).

Based on the initial site inspection, HDC believed that the contamination was related to unknown incidental spills or releases of perchloroethene near the drycleaning machine and waste drums. Other similar incidents may also have taken place near the back door through which the drycleaning solvent was delivered and waste solvent drums were removed. The drycleaner owner has implemented secondary storage containers under the potential source containers in order to minimize the impact of any incidental releases or spills. It appears that this dry-cleaner operation is in compliance with all the regulatory requirements.

The surrounding properties or store spaces have been used for commercial purposes without known involvement of any hazardous materials, except for petroleum products. Based on the ERRTS databases, a gasoline filling station is present on the northwest corner of the intersection of North Avenue and Ludington Avenue (8806 W North Avenue, WDNR BRRTS#: 03-41-100572). The gasoline station site was conditionally closed with proper GIS Registry. The property at 8901 West North Avenue, on the southwest corner of the intersection of North Avenue and Ludington Avenue (WDNR BRRTS#: 03-41-563748), was also used as a gasoline filling station. Petroleum release was found in that property. No further information was readily available for review.

There is no known risk at this time from the released cVOCs to the public health, safety, welfare, or the environment.

3.0 INDOOR AIR SAMPLING AND SUB-SLAB VAPOR SAMPLING RESULTS

3.1 Indoor Air Sampling Results

3.1.1 General Procedures for Indoor Air Sampling

On November 23, 2021, HDC dispatched a professional crew to the site to conduct the indoor air sampling. The following tasks were performed for the indoor air sampling:

1. Notify the owners and/or occupants of the stores, including the Westwood Cleaners, SPA Nails, Super Cut, and the neighboring Restaurant, to get permission to access to the stores;
2. Request a certified lab to deliver 6-liter Summa Canisters with pre-calibrated regulators for 24-hours sampling;
3. Complete Shut-In tests to make sure the Summa Canisters have a minimum of 30" Hg of vacuum before using;
4. Coordinate with the store owners for locations to place the Summa Canister within the store at 3' to 5' heights;
5. Install a Summa Canister within each store and turn on the inlet valve;
6. Turn-off the Summa Canister and remove them from each store after 24 hours.

Proper handling and chain-of-custody for the samples were followed. The Summa Canisters were then sent to the lab for analysis of VOCs with TO-15 Method.

The sampling locations are illustrated in Figure 6, with sample IA-1 in SPA Nails, IA-2 in Super Cut, IA-3 on the first floor of the restaurant, and IA-4 in the basement of the restaurant.

3.1.2 Indoor Air Sampling Results

Stat Analytical Corporation performed the VOC analysis with EPA's TO-15 Method. The analytical results are tabulated in Table 2 and illustrated in Figure 6. The analytical results can be summarized as follows:

1. All VOC concentrations are below the US EPA's Vapor Intrusion Screen Levels (VISLs) in all the samples;
2. Elevated PCE concentrations are present in the samples collected in the Super Cut ($100 \mu\text{g}/\text{m}^3$), in SPA Nails ($40 \mu\text{g}/\text{m}^3$), and in the Restaurant ($8 \mu\text{g}/\text{m}^3$ on first floor and $17 \mu\text{g}/\text{m}^3$ in the basement), however, they are below Indoor Air Vapor Action Level (VAL) of $175 \mu\text{g}/\text{m}^3$ for commercial properties;
3. Elevated concentrations of Isopropyl Alcohol are found in the SPA Nails ($3,500 \mu\text{g}/\text{m}^3$) and in the Super Cut ($2,200 \mu\text{g}/\text{m}^3$). However, they are not related to the drycleaning solvents;
4. Elevated concentrations of Isotone are found in the SPA Nails ($25,000 \mu\text{g}/\text{m}^3$) and in the Super Cut ($560 \mu\text{g}/\text{m}^3$). However, they are not related to the drycleaning solvents.

3.2 Sub-Slab Soil Gas/Vapor Sampling Results

3.2.1 General Procedures for Sub-Slab Soil Gas/Vapor Sampling

To confirm the accuracy of the Sub-slab vapor sampling results reported from 2018 to 2021, re-sampling of SV-2, SV-6 and SV-7 was required by the WDNR. The re-sampling tasks were conducted on November 23, 2021 using the Shroud-Helium and Shut-in test methods as required in the RR-986.

To avoid the influence of the sump manhole near SV2, this sampling port was moved to the northwest corner of the basement next to the stairs, and named SV2A. This location is closer to the source from Westwood Cleaners (see Figure 5).

The configuration of the sampling train is illustrated in Figure 5b, and described as follows.

1. Tightly connect the sampling train to the sampling port on the concrete floor as shown in the Figure 5b, and keep valves A, B, C, and D in the off-position.
2. Shut-in Test for the Sampling Train
 - Turn Valve B to connect Port 1 to Port 2, pull out air from Port 2 with a hand pump until Vacuum Gauge (A) reaches 10" + mercury (Hg) of negative pressure (>130" water column);
 - Turn off Valve B and watch for Vacuum Gauge (A) to maintain the negative pressure without dropping. If there is a pressure drop, tighten the connections until steady pressure is observed for a minimum of 1 minute.
3. Helium Shroud Leaking Test
 - Turn on Valve A and place the tip of Helium Detector under the shroud near the sampling probe;
 - Turn on Valve D to supply helium to inside the shroud and watch the He concentration increase from 0 ppm to >30% with a He detector;
 - Turn Valve B to connect Port 2 with the He detector to read the air inside the sampling train via Port 1. If the He reading is below 1% (generally <500 ppm) without increase, no leakage is present. Otherwise, tighten the connections and retest until very low concentrations of He are present in the sampling train.

4. Sampling Train Purging
 - Connect a hand pump to Port 2 at Valve B and pull air inside the sampling train from Port 1;
 - Turn Valve B to the Port 3 position and discharge the air from the hand pump.
 - Repeat the above steps 3 to 5 times to remove about 3 times the volume of air inside the sampling train.
 - Turn off Valve B.

5. Vapor Sample Collection to the Summa Canister
 - Turn on Valve C and observe Vacuum Gauge (B) change from about -30" of Hg to near 0" Hg (for about 30 minutes);
 - Turn off Valve C securely and cap the inlet of the Summa Canister.

Upon completion of the sampling, samples were properly kept with a chain-of-custody, and provided to the laboratory for analysis with TO-15 Method.

3.2.2 Sub-Slab Soil Gas/Vapor Sampling Results

Stat Analytical Corporation performed the VOC analysis with TO-15 Method. The analytical results are tabulated in Table 1 and illustrated in Figure 5. The analytical results can be summarized as follows:

1. All VOC concentrations are below the US EPA's Vapor Intrusion Screen Levels (VISLs) in all the samples;
2. Elevated PCE concentrations are present in the samples collected in SV6 (1,100 $\mu\text{g}/\text{m}^3$), in SV2A (880 $\mu\text{g}/\text{m}^3$), and in SV7 (280 $\mu\text{g}/\text{m}^3$). However, they are below the Vapor Risk Screening Levels (VRSL) for residential/commercial properties.
3. Slightly elevated concentrations of Isopropyl Alcohol, Acetone, TCE, Xylenes, and others are found in the samples.



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4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on indoor air sampling and additional sub-slab vapor sampling results, all VOC concentrations are below the US EPA's Vapor Intrusion Screening Levels (VISLs). These new sampling results further confirmed the conclusion we have previously reached is accurate.

Based on the sampling results, HDC believes that it is not necessary to install the sub-slab depressurization system (SSDS) since no exceedance of Contamination of Concerns (COCs, PCE and related by-products) in the soil vapor samples for commercial properties. As a result, HDC recommends WDNR to grant an official letter to bring the site closure for environmental concerns regarding the existing contamination.

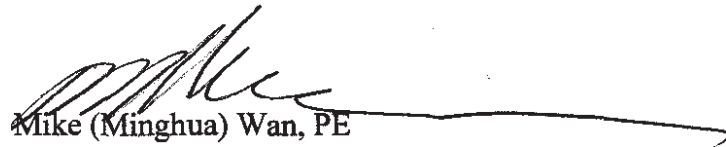


5.0 CONCLUDING REMARKS

The environmental assessment detailed in this report has been performed in accordance with generally accepted methods and practices of the environmental profession. The findings obtained in this project are believed to be reliable to the extent possible for the information gathered and for the scope and intent of the work mutually agreed upon by the client and HDC. HDC does not make any warranty or guarantee, expressly or implied, to conditions that could not be considered in our report, because the conditions were not readily available, hidden, or not disclosed/found to our inquiries and investigations.

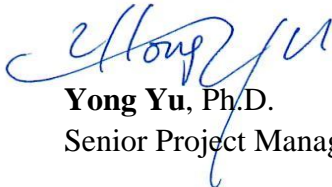
HDC appreciates the opportunity to be of service to you on this project. If you have any questions concerning this report, please feel free to contact my office.

Prepared by:



Mike (Minghua) Wan, PE
Senior Engineer

Reviewed by



Yong Yu, Ph.D.
Senior Project Manager

Maple Testing Services, Inc.
D/B/A Hydrodynamics Consultants, Inc.

SAMPLING PHOTOS

Sampling Photos for Indoor Air and Sub-Slab Soil Vapor



Configuration for Sub-Slab Vapor Sampling



Sampling Port on Concrete Floor



Connect to the Sampling Train



Shut-In Test for the Sampling Train



Supply Helium to the Shroud Covered on the Sampling Port



Test the Sampling Train for Helium Leakage



IA-1 in Nail Spa



IA-2 in Super Cuts



IA-3 in the Restaurant



IA-4 in the Basement

TABLES

Table 1 - Soil Vapor VOC Analytical Results

Sample ID:	SV7-11-2021	SV2A-11-2021	SV6-11-2021	Vapor Risk Screening Levels (VRSL)*	
Date:	11/23/2021			Residential	Commercial
VOCs				µg/m³	µg/m³
1,1,1-Trichloroethane	< 1.8	< 1.7	< 1.7	174000	730000
1,1,2-Trichloroethane	< 1.8	< 1.7	< 1.7	6.95	29.2
1,1-Dichloroethane	< 1.3	< 1.2	< 1.2	585	2560
1,1-Dichloroethene	< 1.3	< 1.2	< 1.2	6950	29200
1,2,4-Trichlorobenzene	< 2.4	< 2.3	< 2.3	69.5	292
1,2-Dibromoethane	< 2.5	< 2.3	< 2.3	1.56	6.81
1,2-Dichlorobenzene	< 2.0	< 1.8	< 1.8	6950	29200
1,2-Dichloroethane	< 1.3	< 1.2	< 1.2	36	157
1,2-Dichloropropane	< 1.5	< 1.4	< 1.4	139	584
1,4-Dichlorobenzene	< 2.0	< 1.8	< 1.8	85.1	372
1,4-Dioxane	< 2.9	< 2.7	< 2.8	187	818
2-Butanone	6.3	6.0	5.6	NV	NV
Acetone	18	49	20	1070000	4510000
Benzene	5.1	3.6	1.4	120	524
Bromodichloromethane	< 2.2	< 2.0	< 2.0	25.3	110
Bromoform	< 8.4	< 7.9	< 7.9	851	3720
Bromomethane	< 3.2	< 3.0	< 3.0	174	730
Carbon disulfide	1.2	2.8	< 0.95	24300	102000
Carbon tetrachloride	< 2.0	< 1.9	< 1.9	156	681
Chlorobenzene	< 1.5	< 1.4	< 1.4	1740	7300
Chloroform	4.0	4.0	2.4	40.7	178
cis-1,2-Dichloroethene	2.0	< 1.2	< 1.2	NS	NS
cis-1,3-Dichloropropene	< 1.5	< 1.4	< 1.4	NS	NS
Dibromochloromethane	< 2.8	< 2.6	< 2.6	NS	NS
Dichlorodifluoromethane	3.2	2.6	2.7	3480	14600
Ethylbenzene	6.6	5.0	3.9	374	1640
Isopropyl Alcohol	38	35	33	6950	29200
m,p-Xylene	27	20	14	3480	14600
Methyl tert-butyl ether	< 1.2	< 1.1	< 1.1	3600	15700
Methylene chloride	< 11	54	< 11	20900	87600
Naphthalene	18	< 1.6	< 1.6	27.5	120
o-Xylene	7.5	6.1	5.3	3480	14600
Styrene	< 1.4	5.9	< 1.3	34800	146000
Tetrachloroethene	280	880	1100	1390	5840
Toluene	37	26	15	174000	730000
trans-1,2-Dichloroethene	< 1.3	< 1.2	< 1.2	NS	NS
trans-1,3-Dichloropropene	< 1.5	< 1.4	< 1.4	NS	NS
Trichloroethene	15	20	23	69.5	292
Trichlorofluoromethane	3.6	2.3	2.1	NS	NS
Vinyl acetate	< 11	< 11	< 11	6950	29200
Vinyl chloride	< 0.83	< 0.78	< 0.78	55.9	929
Xylenes, Total	34	27	20	3480	14600

Notes:

* US EPA Vapor Intrusion Screening Levels (VISL) Calculator (Default Results)

J - Analyte detected below reporting limit

Bold fonts/Shaded boxes indicate the levels exceed the VRSL (Commercial) Quality Standards.

Table 2 - Indoor Air VOC Analytical Results

Sample ID:	IA-1	IA-2	IA-3	IA-4	Indoor Air Vapor Action Levels (VAL)*	
Date:	11/24/2021				Residential	Commercial
VOCs					µg/m³	µg/m³
1,1,1-Trichloroethane	< 1.9	< 1.6	< 2.1	< 2.3	5210	21900
1,1,2-Trichloroethane	< 1.9	< 1.6	< 2.1	< 2.3	0.209	0.876
1,1-Dichloroethane	< 1.4	< 1.2	< 1.6	< 1.7	17.5	76.7
1,1-Dichloroethene	< 1.4	< 1.2	< 1.5	< 1.7	209	876
1,2,4-Trichlorobenzene	< 2.6	< 2.2	< 2.9	< 3.1	2.09	8.76
1,2-Dibromoethane	< 2.7	< 2.3	< 3.0	< 3.2	0.0468	0.204
1,2-Dichlorobenzene	< 2.1	< 1.8	< 2.3	< 2.5	209	876
1,2-Dichloroethane	< 1.4	< 1.2	< 1.6	< 1.7	1.08	4.72
1,2-Dichloropropane	< 1.6	< 1.4	< 1.8	< 1.9	4.17	17.5
1,4-Dichlorobenzene	< 2.1	< 1.8	< 2.3	< 2.5	2.55	11.1
1,4-Dioxane	< 3.2	< 2.7	< 3.5	< 3.8	5.62	24.5
2-Butanone	17	3.7	< 2.8	4.1	NV	NV
Acetone	25000	560	31	14	32200	135000
Benzene	< 1.1	2.5	1.8	< 1.3	3.6	15.7
Bromodichloromethane	< 2.4	< 2.0	< 2.6	< 2.8	0.759	3.31
Bromoform	< 9.2	< 7.8	< 10	< 11	25.5	111
Bromomethane	< 3.4	< 2.9	< 3.7	< 4.0	5.21	21.9
Carbon disulfide	< 1.1	< 0.94	< 1.2	< 1.3	730	3070
Carbon tetrachloride	< 2.2	< 1.9	< 2.4	< 2.6	4.68	20.4
Chlorobenzene	< 1.6	< 1.4	< 1.8	< 1.9	52.1	219
Chloroform	< 1.7	< 1.5	< 1.9	2.7	1.22	5.33
cis-1,2-Dichloroethene	< 1.4	< 1.2	< 1.5	< 1.7	NS	NS
cis-1,3-Dichloropropene	< 1.6	< 1.4	< 1.8	< 1.9	NS	NS
Dibromochloromethane	< 3.0	< 2.6	< 3.3	< 3.5	NS	NS
Dichlorodifluoromethane	2.9	2.7	2.4	2.3	104	438
Ethylbenzene	< 1.5	1.7	< 1.7	< 1.8	11.2	49.1
Isopropyl Alcohol	3500	2200	54	9.3	209	876
m,p-Xylene	< 3.1	6.1	4.0	< 3.6	104	438
Methyl tert-butyl ether	< 1.3	< 1.1	< 1.4	< 1.5	108	472
Methylene chloride	26	98	25	< 14	626	2630
Naphthalene	< 1.9	< 1.6	< 2.0	< 2.2	0.826	3.61
o-Xylene	< 1.5	2.1	< 1.7	< 1.8	104	438
Styrene	< 1.5	5.6	3.9	< 1.8	1040	4380
Tetrachloroethene	40	100	8.0	17	41.7	175
Toluene	40	15	8.3	< 1.6	5210	21900
trans-1,2-Dichloroethene	< 1.4	< 1.2	< 1.5	< 1.7	NS	NS
trans-1,3-Dichloropropene	< 1.6	< 1.4	< 1.8	< 1.9	NS	NS
Trichloroethene	< 1.9	< 1.6	< 2.1	< 2.2	2.09	8.76
Trichlorofluoromethane	2.1	< 1.7	< 2.2	< 2.3	NS	NS
Vinyl acetate	< 13	< 11	< 14	< 15	209	876
Vinyl chloride	< 0.91	< 0.77	< 0.99	< 1.1	1.68	27.9
Xylenes, Total	< 4.6	8.2	5.4	< 5.4	104	438

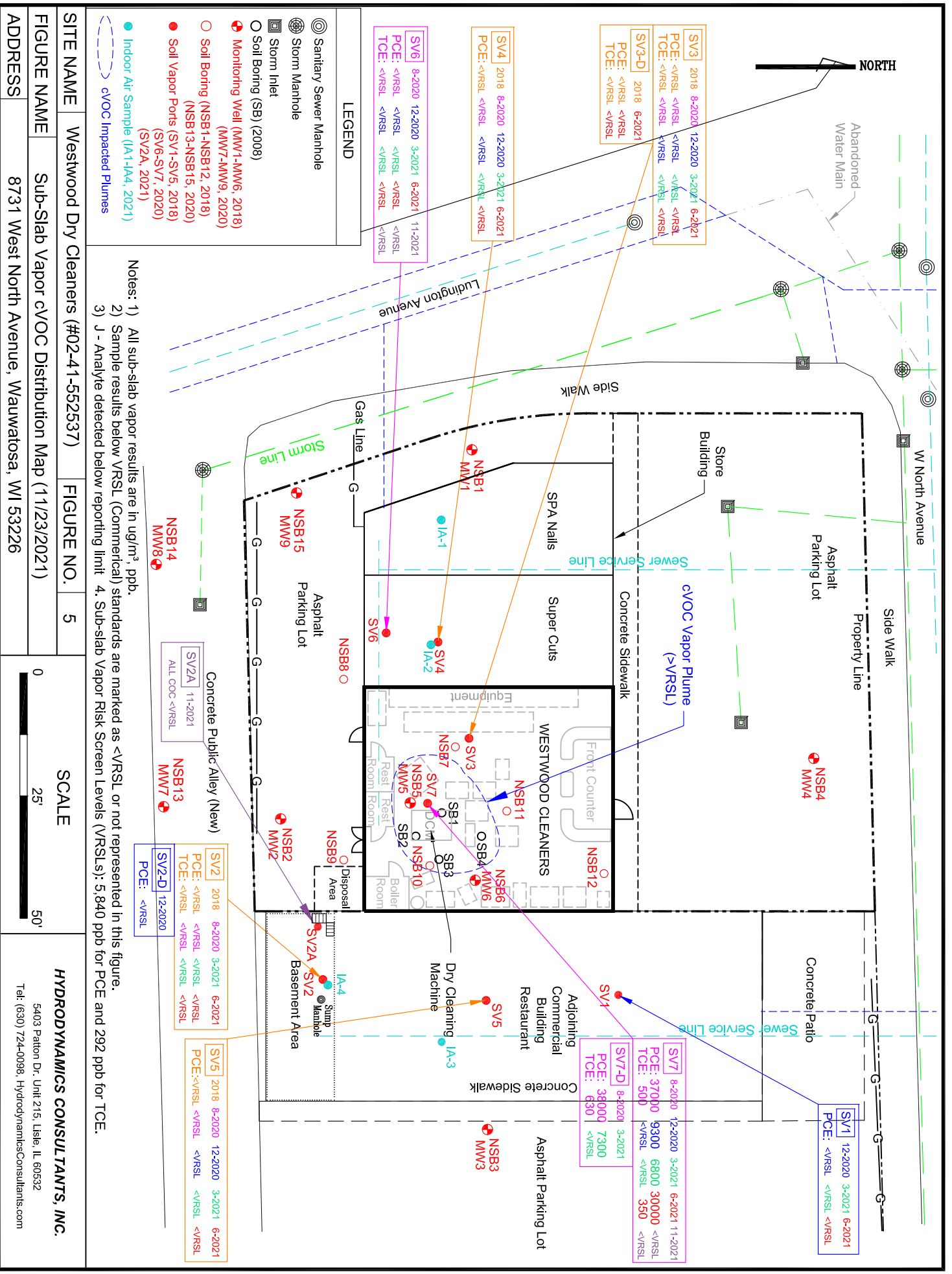
Notes:

* US EPA Vapor Intrusion Screening Levels (VISL) Calculator (Default Results)

J - Analyte detected below reporting limit

Bold fonts/Shaded boxes indicate the levels exceed the Indoor Air Vapor Action Levels (VAL) (Commercial) Quality Standards.

FIGURES



Notes: 1) All sub-slab vapor results are in ug/m³, ppb.
 2) Sample results below VRSLS (Commercial) standards are marked as <VRSLS or not represented in this figure.
 3) J - Analyte detected below reporting limit 4. Sub-slab Vapor Risk Screen Levels (VRSLS): 5,840 ppb for PCE and 292 ppb for TCE.

SITE NAME Westwood Dry Cleaners (#02-41-552537) FIGURE NO. 5

FIGURE NAME Sub-Slab Vapor cVOC Distribution Map (1/1/23/2021)

ADDRESS 8731 West North Avenue, Wauwatosa, WI 53226

SCALE 0 25' 50'

HYDRODYNAMICS CONSULTANTS, INC.
 5403 Patton Dr. Unit 215, Lisle, IL 60532
 Tel: (630) 724-0098, HydrodynamicsConsultants.com

LEGEND
 ● Sanitary Sewer Manhole
 ○ Storm Manhole
 □ Storm Inlet
 ○ Soil Boring (SB) (2008)
 ● Monitoring Well (MW1-MW6, 2018) (MMW7-MMW9, 2020)
 ○ Soil Boring (NSB1-NSB12, 2018) (NSB13-NSB15, 2020)
 ● Soil Vapor Ports (SV1-SV5, 2018) (SV6-SV7, 2020) (SV2A, 2021)
 ● Indoor Air Sample (IA1-IA4, 2021)
 - - - cVOC Impacted Plumages

SV3 2018 8-2020 12-2020 3-2021 6-2021
 PCE: <VRSLS <VRSLS <VRSLS <VRSLS
 TCE: <VRSLS <VRSLS <VRSLS <VRSLS
SV3-D 2018 6-2021
 PCE: <VRSLS <VRSLS
 TCE: <VRSLS <VRSLS

SV4 2018 8-2020 12-2020 3-2021 6-2021
 PCE: <VRSLS <VRSLS <VRSLS <VRSLS
 TCE: <VRSLS <VRSLS <VRSLS <VRSLS

SV6 8-2020 12-2020 3-2021 6-2021 11-2021
 PCE: <VRSLS <VRSLS <VRSLS <VRSLS
 TCE: <VRSLS <VRSLS <VRSLS <VRSLS

SV7 8-2020 12-2020 3-2021 6-2021 11-2021
 PCE: 3700 9300 6800 30000 <VRSLS
 TCE: 509 <VRSLS <VRSLS 350 <VRSLS
SV7-D 8-2020 3-2021
 PCE: 38000 7300
 TCE: 630 <VRSLS

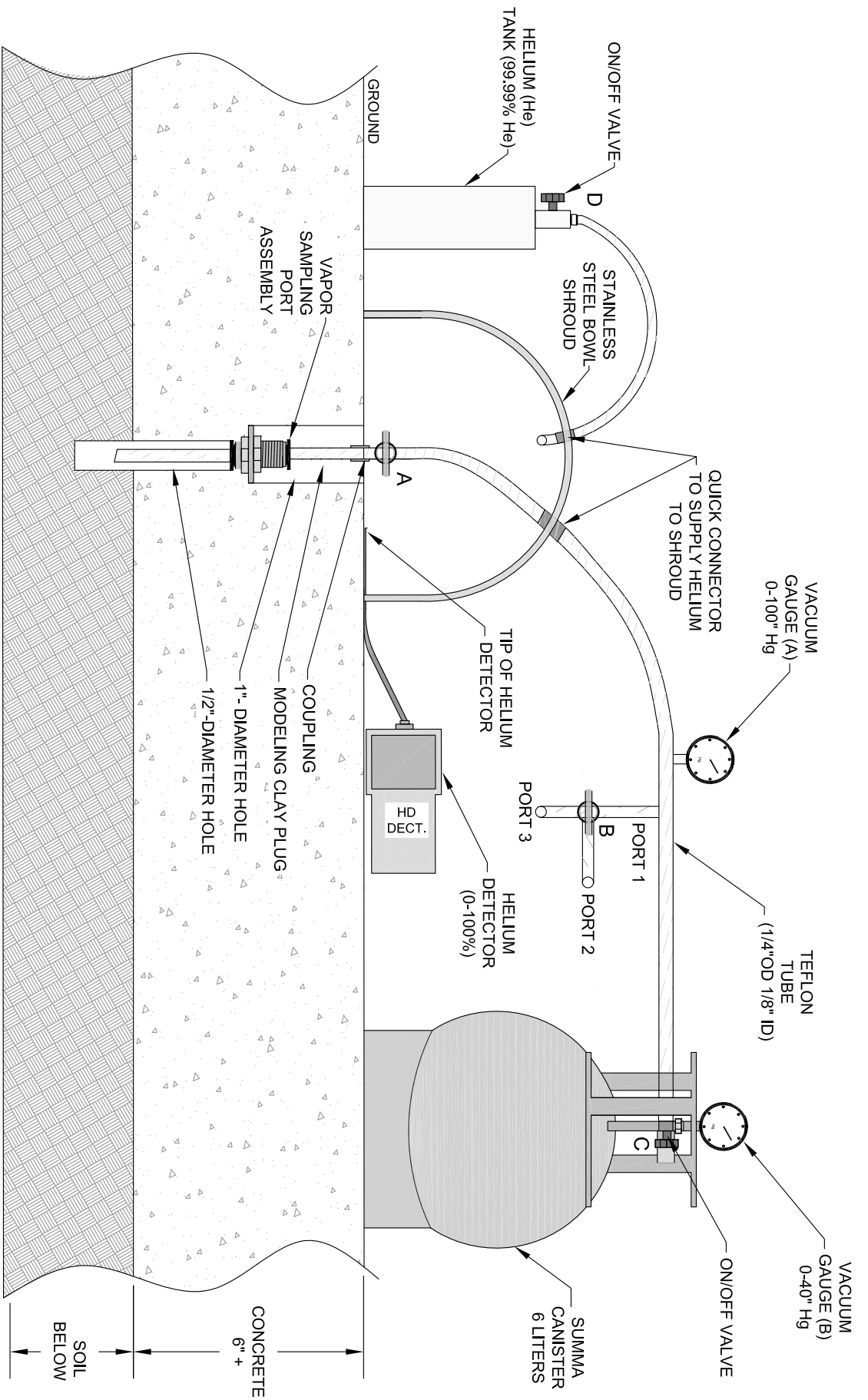
SV2A 11-2021
 ALL COC <VRSLS

SV2-D 12-2020
 PCE: <VRSLS

SV5 2018 8-2020 12-2020 3-2021 6-2021
 PCE: <VRSLS <VRSLS <VRSLS <VRSLS
 TCE: <VRSLS <VRSLS <VRSLS <VRSLS

SV1 12-2020 3-2021 6-2021
 PCE: <VRSLS <VRSLS <VRSLS

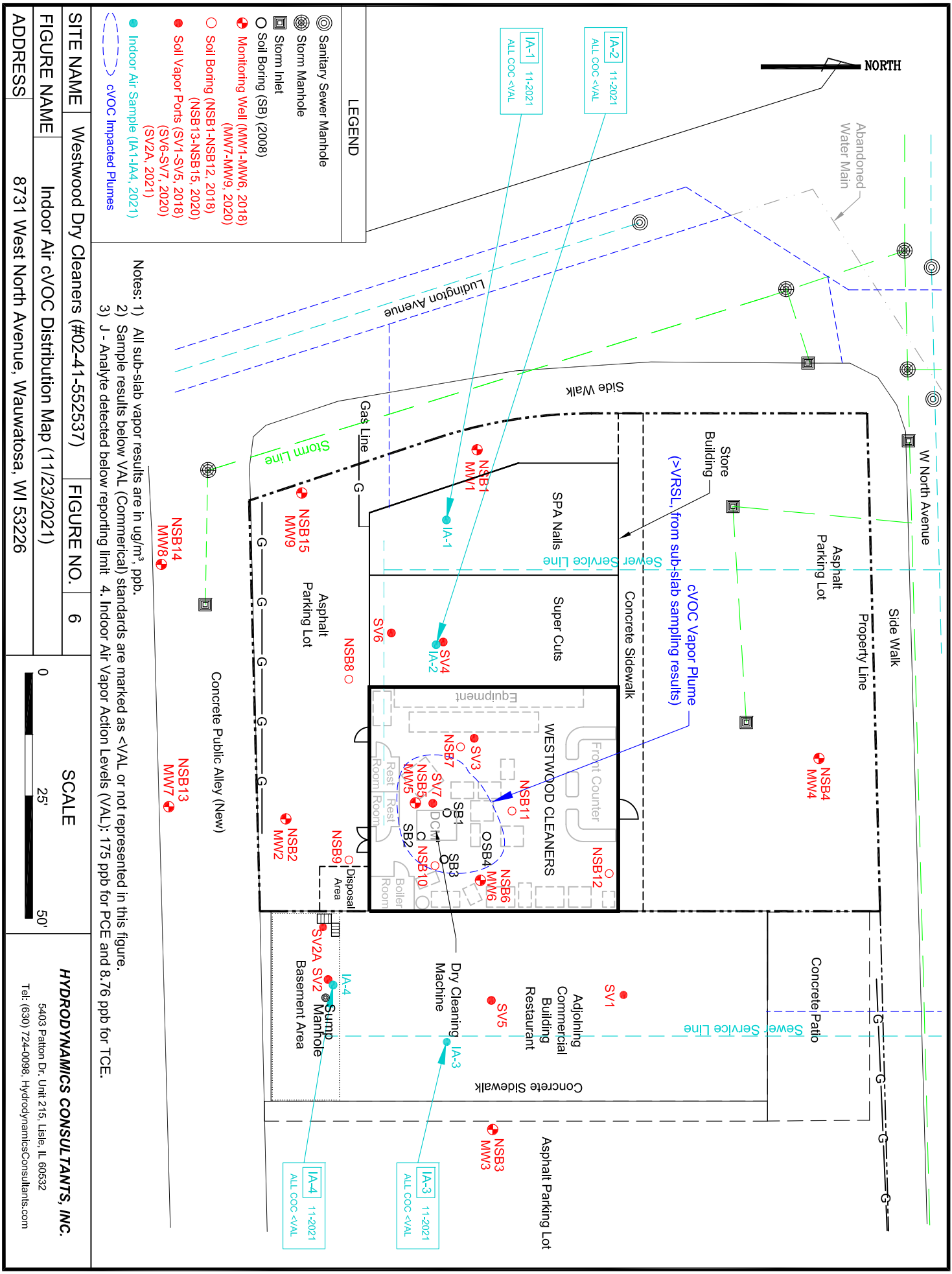
Notes: 1) All sub-slab vapor results are in ug/m³, ppb.
 2) Sample results below VRSLS (Commercial) standards are marked as <VRSLS or not represented in this figure.
 3) J - Analyte detected below reporting limit 4. Sub-slab Vapor Risk Screen Levels (VRSLS): 5,840 ppb for PCE and 292 ppb for TCE.



VALVES:

- A = 2-way valve to connect sampling port probe to the sampling train.
- B = 3-way valve to Port 1 which pulls air out of the sampling train, Port 2 which tests Helium, or Port 3 which purges sampling train.
- C = Turn ON/OFF somma canister
- D = Turn ON/OFF Helium Tank

SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	5b
FIGURE NAME	Sub-Slab Soil Gas Sampling Diagram		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		
NOT TO SCALE			
HYDRODYNAMICS CONSULTANTS, INC. 5403 Patton Dr. Unit 215, Lisle, IL 60532 Tel: (630) 724-0098			



SITE NAME	Westwood Dry Cleaners (#02-41-552537)	FIGURE NO.	6
FIGURE NAME	Indoor Air cVOC Distribution Map (11/23/2021)		
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226		

FIGURE NAME	Indoor Air cVOC Distribution Map (11/23/2021)
ADDRESS	8731 West North Avenue, Wauwatosa, WI 53226