February 23, 2023

Mathew Andrews
Deputy Director – Community and Economic Development
City of Rome
198 North Washington Street
Rome, New York 13440

Subject: **Soil Vapor Intrusion Sampling Results**
233 - 235 West Dominick Street, Rome, New York

Dear Mr. Andrews,

This letter provides a summary of a soil vapor intrusion (SVI) evaluation completed on February 15, 2023 at the above-referenced Site. Compounds detected during this evaluation included low levels of various volatile organic compounds (VOCs) in soil vapor and indoor air samples. These compounds are described herein and include VOCs typically associated with paints, coatings, interior furnishings, general cleaners, varnishes as well as chemicals that occur in nature.

Soil Vapor Intrusion Sampling

Sampling was conducted in accordance with New York State Department of Health (NYSDOH) *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (October 2006, revised May 2017) Section 2.7.3. Three (3) samples were collected over an 8-hour period on February 15, 2023. The following samples were collected:

Basement

- Sub-slab soil vapor sample (SS-01)

Outdoor

- Outdoor ambient air sample (OA-01)
- Subsurface soil vapor sample on western side of building (SS-02)

The outdoor ambient air sample was collected from an upwind location to evaluate background conditions. Sample locations are shown on the NYSDOH Indoor Air Quality Questionnaire and Building Inventory forms, as well as Figure 1. It is noted that due to the ongoing construction activity and the overall condition of the building, ambient indoor air was not evaluated as part of this investigation. Outdoor air results were used for purposes of comparison relative to sub-slab/soil vapor results.

Prior to sampling, a NYSDOH Indoor Air Quality Questionnaire and inventory form were completed. Background readings were collected with a ppbRAE® photoionization detector (PID) capable of detecting VOCs in the parts per billion (ppb) range. Background readings were recorded on the SUMMA® Canister Field Data Sheet (Attachment A) and are detailed in the following table:

Location	PID Reading (ppb)
Basement Sub-Slab	12.0
Basement Ambient Air	49.0
Exterior Ambient Air	0.0
Exterior Soil Vapor	0.0

Soil vapor and indoor air samples were collected in one-liter stainless steel SUMMA® canisters equipped with calibrated low-flow regulators. The canisters were certified pre-cleaned by Centek Laboratories, LLC, a NYS

Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory. Samples were analyzed for VOCs by EPA Method TO-15. Results of the SVI sampling are discussed below.

Results

A total of three (3) samples were collected during this investigation and submitted to Centek Laboratories, LLC for analysis. Laboratory reports are provided in Attachment B. The results were compared to applicable criteria outlined in NYSDOH '*Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York'* revised May 2017.

Three (3) of the eight (8) compounds listed in the NYSDOH Soil Vapor/Indoor Air Matrices were detected at elevated concentrations in the soil vapor samples:

- Trichloroethene (TCE) (commonly used in consumer products, including some wood finishes, adhesives, paint removers, and stain removers) was detected at a concentration exceeding actionable criteria at SS-01 from beneath the floor slab (5.3 µg/m^3). TCE was not detected in the outdoor air sample (OA-01).
- Cis 1,2-Dichloroethene (cis 1,2-DCE) (commonly used in consumer products, including some solvents, waxes, and resins) was detected at a concentration exceeding actionable criteria at SS-01 (1.5 µg/m^3). cis 1,2-DCE was not detected in the outdoor air sample.
- Methylene Chloride (commonly used in consumer products, including some paint removers, degreasers, and cleaners) was detected at a concentration exceeding actionable criteria at SS-01 (14.0 µg/m^3). Methylene chloride was detected in the outdoor air sample.

It is noted that both TCE and methylene chloride were detected in sample SS-02 (soil vapor adjacent to the building), but at a substantially lower concentration than at SS-01. The remaining compounds identified on the NYSDOH Soil Vapor/Indoor Air Matrix A, B, and C were detected below established actionable criteria.

<u>Compounds not listed in NYSDOH Soil Vapor/Indoor Air Matrices:</u>
Petroleum and non-petroleum related VOCs were detected at varying concentrations, as indicated by the attached summary table. Since no NYSDOH guidance values exist for these compounds in soil vapor, detections are compared to background estimates of indoor air levels levels from NYSDOH's '*Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes'* revised 2003.Values published in this study were developed to evaluate conditions within fuel-oil heated homes but may be applied more broadly to residential buildings.

Typical residential vapor concentration ranges, referenced herein as "NYSDOH indoor air range" for each compound included in the TO-15 method analysis, are provided by the NYSDOH study and are referenced accordingly in the attached results summary table. It is noted that these guidance values are not regulatory limits and are subject to interpretation given a building's status relative to construction, renovation and/or other factors potentially influencing VOC concentrations and sampling results.

An index of non-listed TO-15 compounds and their common associated uses is included as Attachment C.

Petroleum-Related Compounds:
Four (4) petroleum-related compounds were detected above NYSDOH guidance criteria including the following:

- Cyclohexane at a concentration of 5.70 µg/m^3 (SS-01)
- Heptane at a concentration of 20.0 µg/m^3 (SS-01)
- Hexane at a concentration of 7.4 µg/m^3 (SS-02)
- M&p-xylene at a concentration of 1.0 µg/m^3 (OA-01)

Non-Petroleum Related Compounds
Three (3) non-petroleum related compounds detected above NYSDOH guidance criteria including the following:

- Acetone at a concentration of 16.0 µg/m^3 (OA-01)
- Chloroform at concentrations ranging from 1.4 to 22 µg/m^3 (SS-01 and SS-02, respectively)
- Methyl Ethyl Ketone (MEK) at a concentration of 31.0 µg/m^3 (SS-01)

The highest observed total VOCs (PPB RAE) in soil vapor was observed in the basement at SS-01. It is noted that various containers of paint and primer were stored in the vicinity.

Conclusions & Recommendations

Analytical results observed at SS-01 indicate potential exceedances of NYSDOH (Matrix B) vapor intrusion criteria for TCE, cis-1,2-DCE and methylene chloride. Ambient indoor air sampling was not possible at this point during the rehabilitation process. Therefore, it is not possible to determine whether mitigation or additional sampling is required at this time.

Based on historical records and investigation results discussed herein, Lu Engineers recommends that a passive sub-slab depressurization system (SSDS) be installed beneath the building at 233-235 West Dominick prior to full-time occupancy. The SSDS could successfully mitigate vapor intrusion concerns relative to identified concentrations of petroleum and non-petroleum related compounds in the subsurface.

Once construction has been completed, additional vapor sampling is recommended to verify regulatory compliance with NYSDOH (Matrix B) vapor intrusion criteria for TCE, cis-1,2-DCE and methylene chloride. If mitigation is suggested by additional testing results, activation of the SSDS may be warranted.

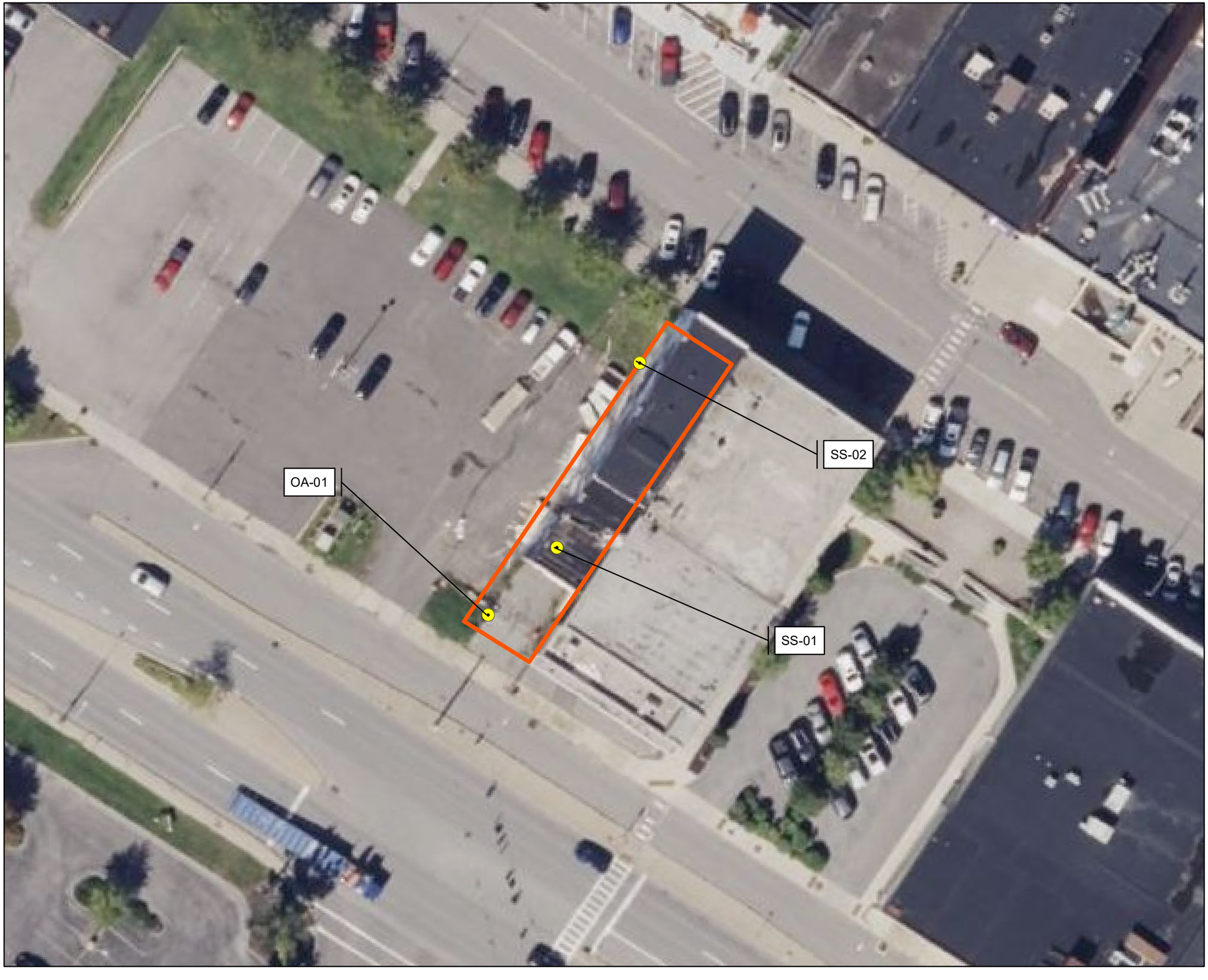
Please do not hesitate to reach out if you have any questions or concerns.

Respectfully Submitted,

Gregory L. Andrus, P.G.
Group Leader
Environmental Investigation & Remediation

Benjamin Seifert
Geologist; GIS Specialist
Environmental Investigation & Remediation

Enclosure(s):
- Sample Location Plan
- Sample Analytical Results Table
- Attachment A – Field Logs & NYSDOH Questionnaire
- Attachment B – Laboratory Analytical Reports
- Attachment C – Index of Unlisted TO-15 Compounds
- Appendix A- NYSDOH Decision Matrices



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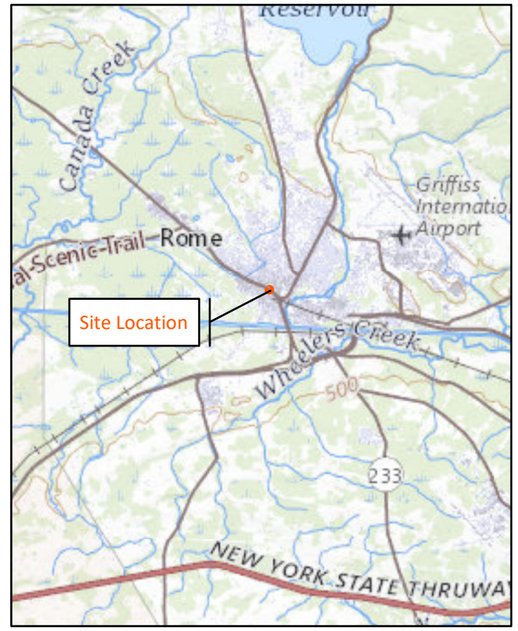

Figure 2:
Sample Locations

Project:
Soil Vapor Intrusion Sampling

Location:
233-235 West Dominick Street
City of Rome, Oneida County, NY

Legend

Property Boundary

Sampling Locations

N

1 inch = 50 feet

0 12.5 25 50 75 100 Feet

Drawn/Checked By:	MGA/GLA
Lu Project Number:	50208-14
Date:	February 2023

Notes:
1. Coordinate System: NAD 1983 (2011) State Plane NY Central FIPS 3102 Feet
2. Imagery from CONNECTExplorer April 2020
3. Scale: 1:700 (original document size 11"x17")

SVI Sample Analytical Results
233-235 W Dominick Street
City of Rome, NY

SVI Sample Analytical Results Detected Parameters[1]:			Sample ID:	SS-01		SS-02		OA-01	
			Location:	Basement		Outside			
			Date:	2/15/2023					
NYSDOH Matrix Listed VOCs[2]	**NYSDOH Action Limits**		**Matrix Determination**	**Conc.**	**Q**	**Conc.**	**Q**	**Conc.**	**Q**
	Indoor Air	**Soil Vapor**							
1,1,1-Trichloroethane [B]	3.00	100	NFA	< 0.82		< 0.82		< 0.82	
1,1-Dichloroethene [A]	0.20	6.00	NFA	< 0.59		< 0.59		< 0.59	
Carbon Tetrachloride [A]	0.20	6.00	NFA	< 0.94		< 0.94		< 0.94	
cis-1,2-Dichloroethene [A]	0.20	6.00	NFA	**1.50**		< 0.16		< 0.16	
Methylene Chloride [B]	3.00	100	Identify Source	**14.0**		**0.97**		**1.00**	
Tetrachloroethene [B]	3.00	100	NFA	**1.30**		**0.88**	**J**	**1.40**	
Trichloroethene [A]	0.20	6.00	NFA	**5.30**		**0.81**		< 0.16	
Vinyl Chloride [C]	0.20	6.00	NFA	< 0.38		< 0.38		< 0.38	
TO-15 Total VOCs	**NYSDOH Background Levels[3]**			**Conc.**	**Q**	**Conc.**	**Q**	**Conc.**	**Q**
	Indoor Air	**Outdoor Air**	**Soil Vapor**						
1,1,2,2-Tetrachloroethane	< 0.25	< 0.25	--	< 1.00		< 1.00		< 1.00	
1,1,2-Trichloroethane	< 0.25	< 0.25	--	< 0.82		< 0.82		< 0.82	
1,1-Dichloroethane	< 0.25	< 0.25	--	< 0.61		< 0.61		< 0.61	
1,2,4-Trichlorobenzene	< 0.25	< 0.25	--	< 1.10		< 1.10		< 1.10	
1,2,4-Trimethylbenzene	0.7 - 4.3	< 0.25 - 0.8	--	**0.79**		< 0.74		< 0.74	
1,2-Dibromoethane	< 0.25	< 0.25	--	< 1.20		< 1.20		< 1.20	
1,2-Dichlorobenzene	< 0.25	< 0.25	--	< 0.90		< 0.90		< 0.90	
1,2-Dichloroethane	< 0.25	< 0.25	--	< 0.61		< 0.61		< 0.61	
1,2-Dichloropropane	< 0.25	< 0.25	--	< 0.69		< 0.69		< 0.69	
1,3,5-Trimethylbenzene	0.3 - 1.7	< 0.25 - 0.3	--	< 0.74		< 0.74		< 0.74	
1,3-butadiene	--	--	--	< 0.33		< 0.33		< 0.33	
1,3-Dichlorobenzene	< 0.25	< 0.25	--	< 0.90		< 0.90		< 0.90	
1,4-Dichlorobenzene	< 0.25 - 0.54	< 0.25	--	< 0.90		< 0.90		< 0.90	
1,4-Dioxane	--	--	--	< 1.10		< 1.10		< 1.10	
2,2,4-trimethylpentane	--	--	--	**2.10**		**1.80**		< 0.70	
4-ethyltoluene	--	--	--	< 0.74		< 0.74		< 0.74	
Acetone	9.9 - 52	3.4 - 14	--	**18.0**		**6.40**	**J**	**16.0**	
Allyl chloride	--	--	--	< 0.47		< 0.47		< 0.47	
Benzene	1.1 - 5.9	0.6 - 2.3	--	**2.60**		**2.10**		**0.64**	
Benzyl chloride	--	--	--	< 0.86		< 0.86		< 0.86	
Bromodichloromethane	--	--	--	< 1.00		< 1.00		< 1.00	
Bromoform	--	--	--	< 1.60		< 1.60		< 1.60	
Bromomethane	< 0.25	< 0.25	--	< 0.58		< 0.58		< 0.58	
Carbon disulfide	--	--	--	< 0.47		**0.81**		< 0.47	
Chlorobenzene	< 0.25	< 0.25	--	< 0.69		< 0.69		< 0.69	
Chloroethane	< 0.25 - < 0.25	< 0.25 - < 0.25	--	< 0.40		< 0.40		< 0.40	
Chloroform	< 0.25 - 0.5	< 0.25 - < 0.25	--	**1.40**		**22.0**		< 0.73	
Chloromethane	< 0.25 - 1.8	< 0.25 - 1.8	--	< 0.31		< 0.31		**0.99**	
cis-1,3-Dichloropropene	< 0.25	< 0.25	--	< 0.68		< 0.68		< 0.68	
Cyclohexane	< 0.25 - 2.6	< 0.25 - 0.4	--	**0.52**		**5.70**		< 0.52	
Dibromochloromethane	--	--	--	< 1.30		< 1.30		< 1.30	
Ethyl acetate	--	--	--	< 0.54		< 0.54		< 0.54	
Ethylbenzene	0.4 - 2.8	< 0.25 - 0.5	--	< 0.65		< 0.65		< 0.65	
Freon 11	1.1 - 5.4	< 0.25 - 2.2	--	**1.10**		**1.30**		**1.20**	
Freon 113	--	--	--	< 1.10		< 1.10		< 1.10	
Freon 114	--	--	--	< 1.00		< 1.00		< 1.00	
Freon 12	< 0.25 - 4.1	< 0.25 - 4.2	--	**2.80**		**2.70**		**2.40**	
Heptane	1 - 7.6	< 0.25 - 1.0	--	**20.0**		**4.00**		< 0.61	
Hexachloro-1,3-butadiene	< 0.25	< 0.25	--	< 1.60		< 1.60		< 1.60	
Hexane	0.6 - 5.9	< 0.25 - 1	--	< 0.53		**7.40**		**0.42**	**J**
Isopropyl alcohol	--	--	--	**4.20**		**1.60**		< 0.37	
m&p-Xylene	0.5 - 4.6	< 0.25 - 0.5	--	**0.74**	**J**	**1.00**	**J**	**0.65**	**J**
Methyl Butyl Ketone	--	--	--	< 1.20		< 1.20		< 1.20	
Methyl Ethyl Ketone	1.4 - 7.3	0.8 - 2.6	--	**31.0**		**1.00**		**1.10**	
Methyl Isobutyl Ketone	< 0.25 - 0.9	< 0.25	--	**0.66**	**J**	< 1.20		< 1.20	
Methyl tert-butyl ether	< 0.25 - 5.6	< 0.25 - 0.86	--	< 0.54		< 0.54		< 0.54	
o-Xylene	0.4 - 3.1	< 0.25 - 0.6	--	< 0.65		< 0.65		< 0.65	
Propylene	--	--	--	**13.0**		< 0.26		< 0.26	
Styrene	< 0.25 - 0.6	< 0.25	--	< 0.64		< 0.64		< 0.64	
Tetrahydrofuran	< 0.25 - 0.4	<0.25	--	< 0.44		< 0.44		< 0.44	
Toluene	3.5 - 25	0.6 - 2.4	--	**1.60**		**5.90**		**1.20**	
trans-1,2-Dichloroethene	--	--	--	< 0.59		< 0.59		< 0.59	
trans-1,3-Dichloropropene	< 0.25	< 0.25	--	< 0.68		< 0.68		< 0.68	
Vinyl acetate	--	--	--	< 0.53		< 0.53		< 0.53	
Vinyl Bromide	--	--	--	< 0.66		< 0.66		< 0.66	

Notes:

1 - All values presented in micrograms per cubic meter (ug/m^3)

2 - NYSDOH *'Guidance for Evaluating Soil Vapor Intrusion in the State of New York'* May 2017

[A/B/C] - Corresponding Decision Matrix

3 - NYSDOH *'Summary of Indoor and Outdoor Levels of Volatile Organic Compounds From Fuel Oil Heated Homes in NYS'* 1997 to 2003. Unpublished. The

< : Substance not identified above the minimum laboratory quantitation limit

NFA: No Further Action

	Petroleum related compound
	Value exceeds upper limit of background concentrations
	NYSDOH Decision Matrix exceedance

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Soil Vapor Intrusion - Structure Sampling Building Questionnaire Structure ID : _____

Site No. : N/A Site Name : _____

Date: 02/15/23 Time: 09:00

Structure Address : 233-235 W. Dominick Street, Rome NY

Preparer's Name & Affiliation : Ben Seifert + Michael Andrus : Lu Engineers

Residential ? ☐ Yes ☑ No Owner Occupied ? ☐ Yes ☑ No Owner Interviewed ? ☐ Yes ☑ No

Commercial ? ☑ Yes ☐ No Industrial ? ☐ Yes ☑ No Mixed Uses ? ☐ Yes ☑ No

Identify all non-residential use(s) : Vacant commercially zoned property

Owner Name : City of Rome Owner Phone : ( ) _____ - _____

Secondary Owner Phone : ( ) _____ - _____

Owner Address (if different) : _____

Occupant Name : N/A Occupant Phone : ( ) _____ - _____

Secondary Occupant Phone : ( ) _____ - _____

Number & Age of All Persons Residing at this Location : _____

Additional Owner/Occupant Information : _____

Describe Structure (style, number floors, size) : _____

Approximate Year Built : Early 1900's Is the building Insulated? ☐ Yes ☐ No

Lowest level : ☐ Slab-on-grade ☑ Basement ☐ Crawlspace

Describe Lowest Level (finishing, use, time spent in space) : Split level basement (see sketch)

Floor Type: ☑ Concrete Slab ☐ Dirt ☐ Mixed : _____

Floor Condition : ☑ Good (few or no cracks) ☐ Average (some cracks) ☐ Poor (broken concrete or dirt)

Sumps/Drains? ☐ Yes ☐ No Describe : _____

Identify other floor penetrations & details : Floor only partially inspected due to trash and building debris obstructing view

Wall Construction : ☐ Concrete Block ☐ Poured Concrete ☑ Laid-Up Stone

Identify any wall penetrations : _____

Identify water, moisture, or seepage: location & severity (sump, cracks, stains, etc) : < 1" standing water in NE section of basement

Heating Fuel : ☐ Oil ☑ Gas ☐ Wood ☐ Electric ☐ Other : _____

Heating System : ☐ Forced Air ☐ Hot Water ☐ Other : unknown

Hot Water System : ☐ Combustion ☐ Electric ☐ Boilermate ☐ Other: unknown

Clothes Dryer : ☐ Electric ☐ Gas Where is dryer vented to? unknown

If combustion occurs, describe where air is drawn from (cold air return, basement, external air, etc.) : unknown

Fans & Vents (identify where fans/vents pull air from and where they vent/exhaust to) : unknown

Describe factors that may affect indoor air quality (chemical use/storage, unvented heaters, smoking, workshop):

Multiple old paint & stain cans located in basement. Trash & debris throughout

Attached garage ? ☐ Yes ☑ No Air fresheners ? ☐ Yes ☑ No

New carpet or furniture ? ☐ Yes ☑ No What/Where ? _____

Recent **painting** or **staining** ? ☐ Yes ☐ No Where ? : unknown

Any **solvent** or **chemical-like** odors ? ☐ Yes ☑ No Describe : _____

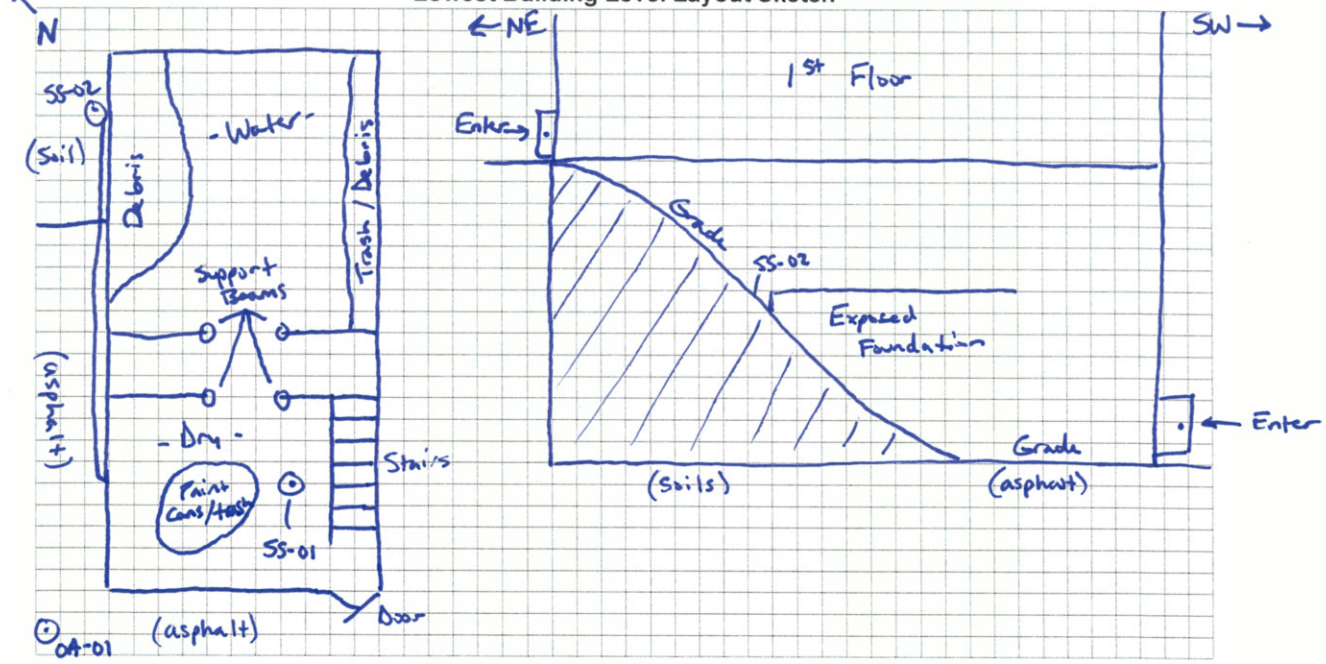
Last time **Dry Cleaned** fabrics brought in ? Unknown What / Where ? _____

Do any building occupants use solvents at work ? ☐ Yes ☐ No N/A Describe : _____

Any testing for Radon ? ☐ Yes ☑ No Results : _____

Radon System/Soil Vapor Intrusion Mitigation System present ? ☐ Yes ☑ No If yes, describe below

Lowest Building Level Layout Sketch



- Identify and label the locations of all sub-slab, indoor air, and outdoor air samples on the layout sketch.
- Measure the distance of all sample locations from identifiable features, and include on the layout sketch.
- Identify room use (bedroom, living room, den, kitchen, etc.) on the layout sketch.
- Identify the locations of the following features on the layout sketch, using the appropriate symbols:

B or F	Boiler or Furnace	o	Other floor or wall penetrations (label appropriately)
HW	Hot Water Heater	xxxxxxx	Perimeter Drains (draw inside or outside outer walls as appropriate)
FP	Fireplaces	######	Areas of broken-up concrete
WS	Wood Stoves	● SS-1	Location & label of sub-slab vapor samples
W/D	Washer / Dryer	● IA-1	Location & label of indoor air samples
S	Sumps	● OA-1	Location & label of outdoor air samples
@	Floor Drains	● PFET-1	Location and label of any pressure field test holes.

Structure Sampling - Product Inventory

Homeowner Name & Address: City of Rome

Date: 02/15/23

Samplers & Company: Ben Seifert + Michael Andrus; Lu Engineers

Structure ID:

Site Number & Name: 233-235 W. Dominick Street

Phone Number:

Make & Model of PID: Mini RAE ppb RAE

Date of PID Calibration: 02/12/23

Identify any Changes from Original Building Questionnaire :

Product Name/Description	Quantity	Chemical Ingredients	PID Reading	Location
"Zinsser" Primer Sealer Stain Killer	1 gal	Illegible - unknown	49 ppb (ambient)	Basement
"Jasco" Concrete cleaner	1.5 gal	↓	↓	↓
"Olympus" Interior Paint	1 gal			
"Seal Krete" concrete Sealant	1 gal			
Illegible paint cans	5 gal			

SUMMA Canister Field Data Sheet

Project Name: 233-235 W. Dominick Street Date: 02/15/23

Project #: 50208-14 Sampler(s): BGJ, MGA

Sampling Location: Basement

Sub-Slab Vapor Sample		Soil Vapor ~~Indoor Air~~ Sample		Associated Outdoor Air Sample	
Sample ID:	SS-01	Sample ID:	SS-02	Sample ID:	OA-01
Can #:	162	Can #:	239	Can #:	~~337~~ 333
Regulator #:	1153	Regulator #:	342	Regulator #:	337
Start Date/Time:	02/15/23	Start Date/Time:	02/15/23	Start Date/Time:	02/15/23
Start Pressure:	30	Start Pressure:	30	Start Pressure:	29.5
Stop Date/Time:	4.5	Stop Date/Time:	6	Stop Date/Time:	3.5
Stop Pressure:	02/15/23	Stop Pressure:	02/15/23	Stop Pressure:	02/15/23
Slab Thickness:	~8"	Location:	NW corner exterior	Direction from bldg:	SW
Floor Surface:	Concrete	~~Indoor Air Temp~~:		Distance from bldg:	~30'
Odors?:	mold/mildew	Odors?:	none	Odors?:	none
PID Reading (ppb):	12	PID Reading (ppb):	49	PID Reading (ppb):	none

Comments/Location Sketch:

Centek/SanAir Technologies Laboratory

Date: *20-Feb-23*

CLIENT:	Lu Engineers	**Client Sample ID:**	OA-01
Lab Order:	C2302033	**Tag Number:**	333,337
Project:	233 W. Dominick City of Rome	**Collection Date:**	2/15/2023
Lab ID:	C2302033-001A	**Matrix:**	AIR

Analyses	Result	DL	Qual	Units	DF	Date Analyzed
1UG/M3 W/ 0.2UG/M3 CT-TCE-VC-DCE-1,1DCE		**TO-15**				Analyst: **RJP**
1,1,1-Trichloroethane	< 0.82	0.82		ug/m3	1	2/17/2023 3:21:00 PM
1,1,2,2-Tetrachloroethane	< 1.0	1.0		ug/m3	1	2/17/2023 3:21:00 PM
1,1,2-Trichloroethane	< 0.82	0.82		ug/m3	1	2/17/2023 3:21:00 PM
1,1-Dichloroethane	< 0.61	0.61		ug/m3	1	2/17/2023 3:21:00 PM
1,1-Dichloroethene	< 0.16	0.16		ug/m3	1	2/17/2023 3:21:00 PM
1,2,4-Trichlorobenzene	< 1.1	1.1		ug/m3	1	2/17/2023 3:21:00 PM
1,2,4-Trimethylbenzene	< 0.74	0.74		ug/m3	1	2/17/2023 3:21:00 PM
1,2-Dibromoethane	< 1.2	1.2		ug/m3	1	2/17/2023 3:21:00 PM
1,2-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 3:21:00 PM
1,2-Dichloroethane	< 0.61	0.61		ug/m3	1	2/17/2023 3:21:00 PM
1,2-Dichloropropane	< 0.69	0.69		ug/m3	1	2/17/2023 3:21:00 PM
1,3,5-Trimethylbenzene	< 0.74	0.74		ug/m3	1	2/17/2023 3:21:00 PM
1,3-butadiene	< 0.33	0.33		ug/m3	1	2/17/2023 3:21:00 PM
1,3-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 3:21:00 PM
1,4-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 3:21:00 PM
1,4-Dioxane	< 1.1	1.1		ug/m3	1	2/17/2023 3:21:00 PM
2,2,4-trimethylpentane	< 0.70	0.70		ug/m3	1	2/17/2023 3:21:00 PM
4-ethyltoluene	< 0.74	0.74		ug/m3	1	2/17/2023 3:21:00 PM
Acetone	16	7.1		ug/m3	10	2/17/2023 6:57:00 PM
Allyl chloride	< 0.47	0.47		ug/m3	1	2/17/2023 3:21:00 PM
Benzene	0.64	0.48		ug/m3	1	2/17/2023 3:21:00 PM
Benzyl chloride	< 0.86	0.86		ug/m3	1	2/17/2023 3:21:00 PM
Bromodichloromethane	< 1.0	1.0		ug/m3	1	2/17/2023 3:21:00 PM
Bromoform	< 1.6	1.6		ug/m3	1	2/17/2023 3:21:00 PM
Bromomethane	< 0.58	0.58		ug/m3	1	2/17/2023 3:21:00 PM
Carbon disulfide	< 0.47	0.47		ug/m3	1	2/17/2023 3:21:00 PM
Carbon tetrachloride	< 0.19	0.19		ug/m3	1	2/17/2023 3:21:00 PM
Chlorobenzene	< 0.69	0.69		ug/m3	1	2/17/2023 3:21:00 PM
Chloroethane	< 0.40	0.40		ug/m3	1	2/17/2023 3:21:00 PM
Chloroform	< 0.73	0.73		ug/m3	1	2/17/2023 3:21:00 PM
Chloromethane	0.99	0.31		ug/m3	1	2/17/2023 3:21:00 PM
cis-1,2-Dichloroethene	< 0.16	0.16		ug/m3	1	2/17/2023 3:21:00 PM
cis-1,3-Dichloropropene	< 0.68	0.68		ug/m3	1	2/17/2023 3:21:00 PM
Cyclohexane	< 0.52	0.52		ug/m3	1	2/17/2023 3:21:00 PM
Dibromochloromethane	< 1.3	1.3		ug/m3	1	2/17/2023 3:21:00 PM
Ethyl acetate	< 0.54	0.54		ug/m3	1	2/17/2023 3:21:00 PM
Ethylbenzene	< 0.65	0.65		ug/m3	1	2/17/2023 3:21:00 PM
Freon 11	1.2	0.84		ug/m3	1	2/17/2023 3:21:00 PM
Freon 113	< 1.1	1.1		ug/m3	1	2/17/2023 3:21:00 PM
Freon 114	< 1.0	1.0		ug/m3	1	2/17/2023 3:21:00 PM

Qualifiers:

.	Results reported are not blank corrected	B	Analyte detected in the associated Method Blank
DL	Detection Limit	E	Estimated Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limit
JN	Non-routine analyte. Quantitation estimated.	ND	Not Detected at the Limit of Detection
S	Spike Recovery outside accepted recovery limits	SC	Sub-Contracted

Centek/SanAir Technologies Laboratory

Date: *20-Feb-23*

CLIENT:	Lu Engineers	**Client Sample ID:**	OA-01
Lab Order:	C2302033	**Tag Number:**	333,337
Project:	233 W. Dominick City of Rome	**Collection Date:**	2/15/2023
Lab ID:	C2302033-001A	**Matrix:**	AIR

Analyses	Result	DL	Qual	Units	DF	Date Analyzed
1UG/M3 W/ 0.2UG/M3 CT-TCE-VC-DCE-1,1DCE		**TO-15**				Analyst: **RJP**
Freon 12	2.4	0.74		ug/m3	1	2/17/2023 3:21:00 PM
Heptane	< 0.61	0.61		ug/m3	1	2/17/2023 3:21:00 PM
Hexachloro-1,3-butadiene	< 1.6	1.6		ug/m3	1	2/17/2023 3:21:00 PM
Hexane	0.42	0.53	J	ug/m3	1	2/17/2023 3:21:00 PM
Isopropyl alcohol	< 0.37	0.37		ug/m3	1	2/17/2023 3:21:00 PM
m&p-Xylene	0.65	1.3	J	ug/m3	1	2/17/2023 3:21:00 PM
Methyl Butyl Ketone	< 1.2	1.2		ug/m3	1	2/17/2023 3:21:00 PM
Methyl Ethyl Ketone	1.1	0.88		ug/m3	1	2/17/2023 3:21:00 PM
Methyl Isobutyl Ketone	< 1.2	1.2		ug/m3	1	2/17/2023 3:21:00 PM
Methyl tert-butyl ether	< 0.54	0.54		ug/m3	1	2/17/2023 3:21:00 PM
Methylene chloride	1.0	0.52		ug/m3	1	2/17/2023 3:21:00 PM
o-Xylene	< 0.65	0.65		ug/m3	1	2/17/2023 3:21:00 PM
Propylene	< 0.26	0.26		ug/m3	1	2/17/2023 3:21:00 PM
Styrene	< 0.64	0.64		ug/m3	1	2/17/2023 3:21:00 PM
Tetrachloroethylene	1.4	1.0		ug/m3	1	2/17/2023 3:21:00 PM
Tetrahydrofuran	< 0.44	0.44		ug/m3	1	2/17/2023 3:21:00 PM
Toluene	1.2	0.57		ug/m3	1	2/17/2023 3:21:00 PM
trans-1,2-Dichloroethene	< 0.59	0.59		ug/m3	1	2/17/2023 3:21:00 PM
trans-1,3-Dichloropropene	< 0.68	0.68		ug/m3	1	2/17/2023 3:21:00 PM
Trichloroethene	< 0.16	0.16		ug/m3	1	2/17/2023 3:21:00 PM
Vinyl acetate	< 0.53	0.53		ug/m3	1	2/17/2023 3:21:00 PM
Vinyl Bromide	< 0.66	0.66		ug/m3	1	2/17/2023 3:21:00 PM
Vinyl chloride	< 0.10	0.10		ug/m3	1	2/17/2023 3:21:00 PM

Qualifiers:

.	Results reported are not blank corrected	B	Analyte detected in the associated Method Blank
DL	Detection Limit	E	Estimated Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limit
JN	Non-routine analyte. Quantitation estimated.	ND	Not Detected at the Limit of Detection
S	Spike Recovery outside accepted recovery limits	SC	Sub-Contracted

Centek/SanAir Technologies Laboratory

Date: *20-Feb-23*

CLIENT:	Lu Engineers	**Client Sample ID:**	SS-01
Lab Order:	C2302033	**Tag Number:**	162,1153
Project:	233 W. Dominick City of Rome	**Collection Date:**	2/15/2023
Lab ID:	C2302033-002A	**Matrix:**	AIR

Analyses	Result	DL	Qual	Units	DF	Date Analyzed
1UG/M3 BY METHOD TO15		**TO-15**				Analyst: **RJP**
1,1,1-Trichloroethane	< 0.82	0.82		ug/m3	1	2/17/2023 4:05:00 PM
1,1,2,2-Tetrachloroethane	< 1.0	1.0		ug/m3	1	2/17/2023 4:05:00 PM
1,1,2-Trichloroethane	< 0.82	0.82		ug/m3	1	2/17/2023 4:05:00 PM
1,1-Dichloroethane	< 0.61	0.61		ug/m3	1	2/17/2023 4:05:00 PM
1,1-Dichloroethene	< 0.59	0.59		ug/m3	1	2/17/2023 4:05:00 PM
1,2,4-Trichlorobenzene	< 1.1	1.1		ug/m3	1	2/17/2023 4:05:00 PM
1,2,4-Trimethylbenzene	< 0.74	0.74		ug/m3	1	2/17/2023 4:05:00 PM
1,2-Dibromoethane	< 1.2	1.2		ug/m3	1	2/17/2023 4:05:00 PM
1,2-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 4:05:00 PM
1,2-Dichloroethane	< 0.61	0.61		ug/m3	1	2/17/2023 4:05:00 PM
1,2-Dichloropropane	< 0.69	0.69		ug/m3	1	2/17/2023 4:05:00 PM
1,3,5-Trimethylbenzene	< 0.74	0.74		ug/m3	1	2/17/2023 4:05:00 PM
1,3-butadiene	< 0.33	0.33		ug/m3	1	2/17/2023 4:05:00 PM
1,3-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 4:05:00 PM
1,4-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 4:05:00 PM
1,4-Dioxane	< 1.1	1.1		ug/m3	1	2/17/2023 4:05:00 PM
2,2,4-trimethylpentane	1.8	0.70		ug/m3	1	2/17/2023 4:05:00 PM
4-ethyltoluene	< 0.74	0.74		ug/m3	1	2/17/2023 4:05:00 PM
Acetone	6.4	7.1	J	ug/m3	10	2/17/2023 7:40:00 PM
Allyl chloride	< 0.47	0.47		ug/m3	1	2/17/2023 4:05:00 PM
Benzene	2.1	0.48		ug/m3	1	2/17/2023 4:05:00 PM
Benzyl chloride	< 0.86	0.86		ug/m3	1	2/17/2023 4:05:00 PM
Bromodichloromethane	< 1.0	1.0		ug/m3	1	2/17/2023 4:05:00 PM
Bromoform	< 1.6	1.6		ug/m3	1	2/17/2023 4:05:00 PM
Bromomethane	< 0.58	0.58		ug/m3	1	2/17/2023 4:05:00 PM
Carbon disulfide	0.81	0.47		ug/m3	1	2/17/2023 4:05:00 PM
Carbon tetrachloride	< 0.94	0.94		ug/m3	1	2/17/2023 4:05:00 PM
Chlorobenzene	< 0.69	0.69		ug/m3	1	2/17/2023 4:05:00 PM
Chloroethane	< 0.40	0.40		ug/m3	1	2/17/2023 4:05:00 PM
Chloroform	22	7.3		ug/m3	10	2/17/2023 7:40:00 PM
Chloromethane	< 0.31	0.31		ug/m3	1	2/17/2023 4:05:00 PM
cis-1,2-Dichloroethene	< 0.59	0.59		ug/m3	1	2/17/2023 4:05:00 PM
cis-1,3-Dichloropropene	< 0.68	0.68		ug/m3	1	2/17/2023 4:05:00 PM
Cyclohexane	5.7	0.52		ug/m3	1	2/17/2023 4:05:00 PM
Dibromochloromethane	< 1.3	1.3		ug/m3	1	2/17/2023 4:05:00 PM
Ethyl acetate	< 0.54	0.54		ug/m3	1	2/17/2023 4:05:00 PM
Ethylbenzene	< 0.65	0.65		ug/m3	1	2/17/2023 4:05:00 PM
Freon 11	1.3	0.84		ug/m3	1	2/17/2023 4:05:00 PM
Freon 113	< 1.1	1.1		ug/m3	1	2/17/2023 4:05:00 PM
Freon 114	< 1.0	1.0		ug/m3	1	2/17/2023 4:05:00 PM

Qualifiers:

.	Results reported are not blank corrected	B	Analyte detected in the associated Method Blank
DL	Detection Limit	E	Estimated Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limit
JN	Non-routine analyte. Quantitation estimated.	ND	Not Detected at the Limit of Detection
S	Spike Recovery outside accepted recovery limits	SC	Sub-Contracted

Centek/SanAir Technologies Laboratory

Date: *20-Feb-23*

CLIENT:	Lu Engineers	**Client Sample ID:**	SS-01
Lab Order:	C2302033	**Tag Number:**	162,1153
Project:	233 W. Dominick City of Rome	**Collection Date:**	2/15/2023
Lab ID:	C2302033-002A	**Matrix:**	AIR

Analyses	Result	DL	Qual	Units	DF	Date Analyzed
1UG/M3 BY METHOD TO15		**TO-15**				Analyst: **RJP**
Freon 12	2.7	0.74		ug/m3	1	2/17/2023 4:05:00 PM
Heptane	4.0	0.61		ug/m3	1	2/17/2023 4:05:00 PM
Hexachloro-1,3-butadiene	< 1.6	1.6		ug/m3	1	2/17/2023 4:05:00 PM
Hexane	7.4	5.3		ug/m3	10	2/17/2023 7:40:00 PM
Isopropyl alcohol	1.6	0.37		ug/m3	1	2/17/2023 4:05:00 PM
m&p-Xylene	1.0	1.3	J	ug/m3	1	2/17/2023 4:05:00 PM
Methyl Butyl Ketone	< 1.2	1.2		ug/m3	1	2/17/2023 4:05:00 PM
Methyl Ethyl Ketone	1.0	0.88		ug/m3	1	2/17/2023 4:05:00 PM
Methyl Isobutyl Ketone	< 1.2	1.2		ug/m3	1	2/17/2023 4:05:00 PM
Methyl tert-butyl ether	< 0.54	0.54		ug/m3	1	2/17/2023 4:05:00 PM
Methylene chloride	0.97	0.52		ug/m3	1	2/17/2023 4:05:00 PM
o-Xylene	< 0.65	0.65		ug/m3	1	2/17/2023 4:05:00 PM
Propylene	< 0.26	0.26		ug/m3	1	2/17/2023 4:05:00 PM
Styrene	< 0.64	0.64		ug/m3	1	2/17/2023 4:05:00 PM
Tetrachloroethylene	0.88	1.0	J	ug/m3	1	2/17/2023 4:05:00 PM
Tetrahydrofuran	< 0.44	0.44		ug/m3	1	2/17/2023 4:05:00 PM
Toluene	5.9	0.57		ug/m3	1	2/17/2023 4:05:00 PM
trans-1,2-Dichloroethene	< 0.59	0.59		ug/m3	1	2/17/2023 4:05:00 PM
trans-1,3-Dichloropropene	< 0.68	0.68		ug/m3	1	2/17/2023 4:05:00 PM
Trichloroethene	0.81	0.81		ug/m3	1	2/17/2023 4:05:00 PM
Vinyl acetate	< 0.53	0.53		ug/m3	1	2/17/2023 4:05:00 PM
Vinyl Bromide	< 0.66	0.66		ug/m3	1	2/17/2023 4:05:00 PM
Vinyl chloride	< 0.38	0.38		ug/m3	1	2/17/2023 4:05:00 PM

Qualifiers:

.	Results reported are not blank corrected	B	Analyte detected in the associated Method Blank
DL	Detection Limit	E	Estimated Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limit
JN	Non-routine analyte. Quantitation estimated.	ND	Not Detected at the Limit of Detection
S	Spike Recovery outside accepted recovery limits	SC	Sub-Contracted

Centek/SanAir Technologies Laboratory

Date: *20-Feb-23*

CLIENT:	Lu Engineers	**Client Sample ID:**	SS-02
Lab Order:	C2302033	**Tag Number:**	239,342
Project:	233 W. Dominick City of Rome	**Collection Date:**	2/15/2023
Lab ID:	C2302033-003A	**Matrix:**	AIR

Analyses	Result	DL	Qual	Units	DF	Date Analyzed
1UG/M3 BY METHOD TO15		**TO-15**				Analyst: **RJP**
1,1,1-Trichloroethane	< 0.82	0.82		ug/m3	1	2/17/2023 4:49:00 PM
1,1,2,2-Tetrachloroethane	< 1.0	1.0		ug/m3	1	2/17/2023 4:49:00 PM
1,1,2-Trichloroethane	< 0.82	0.82		ug/m3	1	2/17/2023 4:49:00 PM
1,1-Dichloroethane	< 0.61	0.61		ug/m3	1	2/17/2023 4:49:00 PM
1,1-Dichloroethene	< 0.59	0.59		ug/m3	1	2/17/2023 4:49:00 PM
1,2,4-Trichlorobenzene	< 1.1	1.1		ug/m3	1	2/17/2023 4:49:00 PM
1,2,4-Trimethylbenzene	0.79	0.74		ug/m3	1	2/17/2023 4:49:00 PM
1,2-Dibromoethane	< 1.2	1.2		ug/m3	1	2/17/2023 4:49:00 PM
1,2-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 4:49:00 PM
1,2-Dichloroethane	< 0.61	0.61		ug/m3	1	2/17/2023 4:49:00 PM
1,2-Dichloropropane	< 0.69	0.69		ug/m3	1	2/17/2023 4:49:00 PM
1,3,5-Trimethylbenzene	< 0.74	0.74		ug/m3	1	2/17/2023 4:49:00 PM
1,3-butadiene	< 0.33	0.33		ug/m3	1	2/17/2023 4:49:00 PM
1,3-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 4:49:00 PM
1,4-Dichlorobenzene	< 0.90	0.90		ug/m3	1	2/17/2023 4:49:00 PM
1,4-Dioxane	< 1.1	1.1		ug/m3	1	2/17/2023 4:49:00 PM
2,2,4-trimethylpentane	2.1	0.70		ug/m3	1	2/17/2023 4:49:00 PM
4-ethyltoluene	< 0.74	0.74		ug/m3	1	2/17/2023 4:49:00 PM
Acetone	18	7.1		ug/m3	10	2/17/2023 8:23:00 PM
Allyl chloride	< 0.47	0.47		ug/m3	1	2/17/2023 4:49:00 PM
Benzene	2.6	0.48		ug/m3	1	2/17/2023 4:49:00 PM
Benzyl chloride	< 0.86	0.86		ug/m3	1	2/17/2023 4:49:00 PM
Bromodichloromethane	< 1.0	1.0		ug/m3	1	2/17/2023 4:49:00 PM
Bromoform	< 1.6	1.6		ug/m3	1	2/17/2023 4:49:00 PM
Bromomethane	< 0.58	0.58		ug/m3	1	2/17/2023 4:49:00 PM
Carbon disulfide	< 0.47	0.47		ug/m3	1	2/17/2023 4:49:00 PM
Carbon tetrachloride	< 0.94	0.94		ug/m3	1	2/17/2023 4:49:00 PM
Chlorobenzene	< 0.69	0.69		ug/m3	1	2/17/2023 4:49:00 PM
Chloroethane	< 0.40	0.40		ug/m3	1	2/17/2023 4:49:00 PM
Chloroform	1.4	0.73		ug/m3	1	2/17/2023 4:49:00 PM
Chloromethane	< 0.31	0.31		ug/m3	1	2/17/2023 4:49:00 PM
cis-1,2-Dichloroethene	1.5	0.59		ug/m3	1	2/17/2023 4:49:00 PM
cis-1,3-Dichloropropene	< 0.68	0.68		ug/m3	1	2/17/2023 4:49:00 PM
Cyclohexane	0.52	0.52		ug/m3	1	2/17/2023 4:49:00 PM
Dibromochloromethane	< 1.3	1.3		ug/m3	1	2/17/2023 4:49:00 PM
Ethyl acetate	< 0.54	0.54		ug/m3	1	2/17/2023 4:49:00 PM
Ethylbenzene	< 0.65	0.65		ug/m3	1	2/17/2023 4:49:00 PM
Freon 11	1.1	0.84		ug/m3	1	2/17/2023 4:49:00 PM
Freon 113	< 1.1	1.1		ug/m3	1	2/17/2023 4:49:00 PM
Freon 114	< 1.0	1.0		ug/m3	1	2/17/2023 4:49:00 PM

Qualifiers:

.	Results reported are not blank corrected	B	Analyte detected in the associated Method Blank
DL	Detection Limit	E	Estimated Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limit
JN	Non-routine analyte. Quantitation estimated.	ND	Not Detected at the Limit of Detection
S	Spike Recovery outside accepted recovery limits	SC	Sub-Contracted

Centek/SanAir Technologies Laboratory

Date: *20-Feb-23*

CLIENT:	Lu Engineers	**Client Sample ID:**	SS-02
Lab Order:	C2302033	**Tag Number:**	239,342
Project:	233 W. Dominick City of Rome	**Collection Date:**	2/15/2023
Lab ID:	C2302033-003A	**Matrix:**	AIR

Analyses	Result	DL	Qual	Units	DF	Date Analyzed
1UG/M3 BY METHOD TO15		**TO-15**				Analyst: **RJP**
Freon 12	2.8	0.74		ug/m3	1	2/17/2023 4:49:00 PM
Heptane	20	6.1		ug/m3	10	2/17/2023 8:23:00 PM
Hexachloro-1,3-butadiene	< 1.6	1.6		ug/m3	1	2/17/2023 4:49:00 PM
Hexane	< 0.53	0.53		ug/m3	1	2/17/2023 4:49:00 PM
Isopropyl alcohol	4.2	3.7		ug/m3	10	2/17/2023 8:23:00 PM
m&p-Xylene	0.74	1.3	J	ug/m3	1	2/17/2023 4:49:00 PM
Methyl Butyl Ketone	< 1.2	1.2		ug/m3	1	2/17/2023 4:49:00 PM
Methyl Ethyl Ketone	31	8.8		ug/m3	10	2/17/2023 8:23:00 PM
Methyl Isobutyl Ketone	0.66	1.2	J	ug/m3	1	2/17/2023 4:49:00 PM
Methyl tert-butyl ether	< 0.54	0.54		ug/m3	1	2/17/2023 4:49:00 PM
Methylene chloride	14	5.2		ug/m3	10	2/17/2023 8:23:00 PM
o-Xylene	< 0.65	0.65		ug/m3	1	2/17/2023 4:49:00 PM
Propylene	13	2.6		ug/m3	10	2/17/2023 8:23:00 PM
Styrene	< 0.64	0.64		ug/m3	1	2/17/2023 4:49:00 PM
Tetrachloroethylene	1.3	1.0		ug/m3	1	2/17/2023 4:49:00 PM
Tetrahydrofuran	< 0.44	0.44		ug/m3	1	2/17/2023 4:49:00 PM
Toluene	1.6	0.57		ug/m3	1	2/17/2023 4:49:00 PM
trans-1,2-Dichloroethene	< 0.59	0.59		ug/m3	1	2/17/2023 4:49:00 PM
trans-1,3-Dichloropropene	< 0.68	0.68		ug/m3	1	2/17/2023 4:49:00 PM
Trichloroethene	5.3	0.81		ug/m3	1	2/17/2023 4:49:00 PM
Vinyl acetate	< 0.53	0.53		ug/m3	1	2/17/2023 4:49:00 PM
Vinyl Bromide	< 0.66	0.66		ug/m3	1	2/17/2023 4:49:00 PM
Vinyl chloride	< 0.38	0.38		ug/m3	1	2/17/2023 4:49:00 PM

Qualifiers:

.	Results reported are not blank corrected	B	Analyte detected in the associated Method Blank
DL	Detection Limit	E	Estimated Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limit
JN	Non-routine analyte. Quantitation estimated.	ND	Not Detected at the Limit of Detection
S	Spike Recovery outside accepted recovery limits	SC	Sub-Contracted

Index of Unlisted TO-15 Parameters

Compound	NYSDOH Matrix A, B, C[3] Listed Compound	Common Uses & Products
Petroleum Related		
1,2,4-Trimethylbenzene	No	Paint and coating additives
1,3,5-Trimethylbenzene	No	Solvents and thinners
2,2,4-Trimethylpentane	No	Fuel additive
4-ethyltoluene	No	Used for the production of specialty polystyrenes
Benzene	No	Industrial solvent in paints, varnishes, lacquer thinners, and is a component of gasoline
Cyclohexane	No	Commonly used as a solvent and adhesive; in addition, it is used in nylon industry to produce precursors such as adipic acid and caprolactam, to produce paint removers and other chemicals. Component of cigarette smoke.
Ethylbenzene	No	Inks, insecticides and paints
Heptane	No	Paint and coating additive, solvent, and in adhesives and sealants
Hexane	No	Widely used as a solvent to extract edible oils from vegetables and seeds, and as well as a cleaning agent. It is also used to manufacture thinner in the paint industry and used as a chemical reaction medium.
m&p-Xylene	No	Solvents in products such as paints and coatings
o-Xylene	No	Solvents in products such as paints and coatings
Styrene	No	Production of polystyrene plastics and resins
Toluene	No	Component in paints, primers, and adhesive products
Non-petroleum Related		
1,1-Dichloroethene	Yes	Used to make certain plastics, such as flexible films like food wrap, and in packaging materials. It is also used to make flame retardant coatings for fiber and carpet backings, and in piping
1,1,1-Trichloroethane	Yes	Solvent and degreaser
cis-1,2-Dichloroethene	Yes	Solvent and degreaser
1,4 Dioxane	No	Used as a solvent in the manufacture of other chemicals
trans-1,2-dichloroethene	No	Produce solvents and chemical mixtures
Acetone	No	Can be found as a biodegradation product in the environment. It is used in the manufacture of plastic and other industrial products, and as a degreaser for textiles
Carbon Disulfide	No	Industrial processes and to make rayon and cellophane. It is also used to dissolve rubber and produce tires and as a raw material in some pesticides
Carbon Tetrachloride	Yes	Refrigerants and propellants for aerosol
Chloroform	No	Solvent to make other chemicals, as a fumigant, or as a refrigerant
Chloroethane	No	Former gasoline additive
Chloromethane	No	Aerosol propellant, a local anesthetic, and as a refrigerant. Low levels occur naturally in the environment.
Ethyl acetate	No	Industrial solvent
Freon 11	No	Historically used as refrigerants and aerosol propellants
Freon 114	No	Historically used as refrigerants and aerosol propellants
Freon 12	No	Historically used as refrigerants and aerosol propellants
Isopropyl alcohol	No	Common antiseptic used in soaps and lotions
Methylene Chloride	Yes	Used in paint stripping, pharmaceutical manufacturing, paint remover manufacturing, metal cleaning and degreasing, adhesives manufacturing and use, polyurethane foam production
Methyl Butyl Ketone	No	General solvent and in paints
Methyl Ethyl Ketone	No	Occurs in nature as a biodegradation product and is also used as a solvent, as a cleaning agent, and in paints and coatings
Methyl Isobutyl Ketone	No	Solvent for gums, resins, paints, varnishes, lacquers, and nitrocellulose
Tetrahydrofuran	No	Solvent for polyvinyl chloride and in varnishes
Tetrachloroethene	Yes	Solvent and degreaser
Trichloroethene	Yes	Solvent and degreaser
Vinyl chloride	Yes	Used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials

Soil Vapor/Indoor Air Matrix A

May 2017

Analytes Assigned:
Trichloroethene (TCE), *cis*-1,2-Dichloroethene (*c*12-DCE), 1,1-Dichloroethene (11-DCE), Carbon Tetrachloride

	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m^3)		
SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m^3)	< 0.2	0.2 to < 1	1 and above
< 6	1. No further action	2. No Further Action	3. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
6 to < 60	4. No further action	5. MONITOR	6. MITIGATE
60 and above	7. MITIGATE	8. MITIGATE	9. MITIGATE

No further action: No additional actions are recommended to address human exposures.

Identify Source(s) and Resample or Mitigate: We recommend that reasonable and practical actions be taken to identify the source(s) affecting the indoor air quality and that actions be implemented to reduce indoor air concentrations to within background ranges. For example, if an indoor or outdoor air source is identified, we recommend the appropriate party implement actions to reduce the levels. In the event that indoor or outdoor sources are not readily identified or confirmed, resampling (which might include additional sub-slab vapor and indoor air sampling locations) is recommended to demonstrate that SVI mitigation actions are not needed. Based on the information available, mitigation might also be recommended when soil vapor intrusion cannot be ruled out.

Monitor: We recommend monitoring (sampling on a recurring basis), including but not necessarily limited to sub-slab vapor, basement air and outdoor air sampling, to determine whether concentrations in the indoor air or sub-slab vapor have changed and/or to evaluate temporal influences. Monitoring might also be recommended to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined based on site-, building- and analyte-specific information, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

Mitigate: We recommend mitigation to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

These general recommendations are made with consideration being given to the additional notes on page 2.

ADDITIONAL NOTES FOR MATRIX A

This matrix summarizes actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate analyte-specific, building-specific conditions (e.g., dirt floor in basement, crawl spaces, thick slabs, current occupancy, etc.), and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, collection of additional samples may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Mitigation might be recommended when the results of multiple contaminants indicate monitoring is recommended. Proactive actions may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action might be undertaken for reasons other than public health (e.g., seeking community acceptance, reducing costs, etc.). However, actions implemented *in lieu* of sampling will typically be expected to be captured in the final engineering report and site management plan, and might not rule out the need for post-implementation sampling (e.g., to document effectiveness or to support terminating the action).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of soil vapor contamination, nor does it preclude remediating contaminated soil vapor or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 0.20 microgram per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples and dirt floor soil vapor samples, a minimum reporting limit of 1 microgram per cubic meter is recommended.

[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions might be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including but not limited to the following: the identified source of the volatile chemicals, the environmental remediation program, and analyte-specific, site-specific and building-specific factors.

Soil Vapor/Indoor Air Matrix B

May 2017

Analytes Assigned:
Tetrachloroethene (PCE), 1,1,1-Trichloroethane (111-TCA), Methylene Chloride

	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m^3)		
SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m^3)	< 3	3 to < 10	10 and above
< 100	1. No further action	2. No Further Action	3. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
100 to < 1,000	4. No further action	5. MONITOR	6. MITIGATE
1,000 and above	7. MITIGATE	8. MITIGATE	9. MITIGATE

No further action: No additional actions are recommended to address human exposures.

Identify Source(s) and Resample or Mitigate: We recommend that reasonable and practical actions be taken to identify the source(s) affecting the indoor air quality and that actions be implemented to reduce indoor air concentrations to within background ranges. For example, if an indoor or outdoor air source is identified, we recommend the appropriate party implement actions to reduce the levels. In the event that indoor or outdoor sources are not readily identified or confirmed, resampling (which might include additional sub-slab vapor and indoor air sampling locations) is recommended to demonstrate that SVI mitigation actions are not needed. Based on the information available, mitigation might also be recommended when soil vapor intrusion cannot be ruled out.

Monitor: We recommend monitoring (sampling on a recurring basis), including but not necessarily limited to sub-slab vapor, basement air and outdoor air sampling, to determine whether concentrations in the indoor air or sub-slab vapor have changed and/or to evaluate temporal influences. Monitoring might also be recommended to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined based on site-, building- and analyte-specific information, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

Mitigate: We recommend mitigation to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

These general recommendations are made with consideration being given to the additional notes on page 2.

ADDITIONAL NOTES FOR MATRIX B

This matrix summarizes actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate analyte-specific, building-specific conditions (e.g., dirt floor in basement, crawl spaces, thick slabs, current occupancy, etc.), and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, collection of additional samples may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Mitigation might be recommended when the results of multiple contaminants indicate monitoring is recommended. Proactive actions may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action might be undertaken for reasons other than public health (e.g., seeking community acceptance, reducing costs, etc.). However, actions implemented *in lieu* of sampling will typically be expected to be captured in the final engineering report and site management plan, and might not rule out the need for post-implementation sampling (e.g., to document effectiveness or to support terminating the action).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of soil vapor contamination, nor does it preclude remediating contaminated soil vapor or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 1 microgram per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples and dirt floor soil vapor samples, a minimum reporting limit of 1 microgram per cubic meter is recommended.

[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions might be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including but not limited to the following: the identified source of the volatile chemicals, the environmental remediation program, and analyte-specific, site-specific and building-specific factors.

Soil Vapor/Indoor Air Matrix C

May 2017

Analytes Assigned:
Vinyl Chloride

	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m^3)	
SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m^3)	< 0.2	0.2 and above
< 6	1. No further action	2. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
6 to < 60	3. MONITOR	4. MITIGATE
60 and above	5. MITIGATE	6. MITIGATE

No further action: No additional actions are recommended to address human exposures.

Identify Source(s) and Resample or Mitigate: We recommend that reasonable and practical actions be taken to identify the source(s) affecting the indoor air quality and that actions be implemented to reduce indoor air concentrations to within background ranges. For example, if an indoor or outdoor air source is identified, we recommend the appropriate party implement actions to reduce the levels. In the event that indoor or outdoor sources are not readily identified or confirmed, resampling (which might include additional sub-slab vapor and indoor air sampling locations) is recommended to demonstrate that SVI mitigation actions are not needed. Based on the information available, mitigation might also be recommended when soil vapor intrusion cannot be ruled out.

Monitor: We recommend monitoring (sampling on a recurring basis), including but not necessarily limited to sub-slab vapor, basement air and outdoor air sampling, to determine whether concentrations in the indoor air or sub-slab vapor have changed and/or to evaluate temporal influences. Monitoring might also be recommended to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined based on site-, building- and analyte-specific information, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

Mitigate: We recommend mitigation to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

These general recommendations are made with consideration being given to the additional notes on page 2.

ADDITIONAL NOTES FOR MATRIX C

This matrix summarizes actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate analyte-specific, building-specific conditions (e.g., dirt floor in basement, crawl spaces, thick slabs, current occupancy, etc.), and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, collection of additional samples may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Mitigation might be recommended when the results of multiple contaminants indicate monitoring is recommended. Proactive actions may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action might be undertaken for reasons other than public health (e.g., seeking community acceptance, reducing costs, etc.). However, actions implemented *in lieu* of sampling will typically be expected to be captured in the final engineering report and site management plan, and might not rule out the need for post-implementation sampling (e.g., to document effectiveness or to support terminating the action).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of soil vapor contamination, nor does it preclude remediating contaminated soil vapor or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 0.20 microgram per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples and dirt floor soil vapor samples, a minimum reporting limit of 1 microgram per cubic meter is recommended.

[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions might be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including but not limited to the following: the identified source of the volatile chemicals, the environmental remediation program, and analyte-specific, site-specific and building-specific factors.