

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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October 26, 2017

Frank Chiappone
Bausch & Lomb
1400 North Goodman Street
Rochester, NY 14609

Dear Mr. Chiappone:

**Subject: 690 St. Paul Street Off-Site, Site #C828159A
Interim Remedial Measures: Remedial Action Work Plan
September 29, 2017
691 Saint Paul Street
City of Rochester, Monroe County**

The New York State Departments of Environmental Conservation and Health, collectively referred to as the Departments, have completed their review of the document entitled "Interim Remedial Measures: Remedial Action Work Plan" (the Work Plan) dated September 29, 2017 for the 691 Saint Paul Street property located in the City of Rochester. In accordance with 6 NYCRR Part 375-1.6, the Departments have determined that the Work Plan, with modifications, substantially addresses the requirements of the Order-on-Consent. The modified Work Plan is attached to the electronic version of this letter.

With the understanding that the modified Work Plan is agreed to, the Work Plan is hereby approved. If you choose not to accept the modified Work Plan, you are required to notify this office within 20 days after receipt of this letter or prior to the start of field activities. In this event, I suggest a meeting be scheduled to discuss your concerns prior to the end of this 20-day period.

This approval includes the Community Air Monitoring Plan, but does not otherwise extend to the Health and Safety Plan as the Departments are not responsible for the health and safety of remediation workers.

Prior to the start of field activities, please attach a copy of this letter to the Work Plan and distribute the approved Work Plan as follows:

- Frank Sowers (2 hardcopies, 1 with an original signature on the certification page);



- Document repositories (1 hardcopy for each of the document repositories established for this site: Central Library of Rochester and Monroe County; Phillis Wheatley Community Library; Lincoln Branch Library; and Rochester City School District Offices); and
- Copies to other interested parties upon request.

Please notify me at least seven days in advance of the start of field activities.

Thank you for your continued cooperation in this matter and please contact me at 585-226-5357 if you have questions.

Sincerely,

A handwritten signature in cursive script that reads "Frank Sowers".

Frank Sowers, P.E.
Professional Engineer 1

e-Attach:

ec: w/Attach
Dan Noll
Eamonn O'Neil
Dennis Harkawick
Bernette Schilling
Wade Silkworth
Amy Butler

Interim Remedial Measure:

REMEDIAL ACTION WORK PLAN

Sub-Slab Depressurization System –
NYSDEC BCP Site #C828159A

Location:

691 and 705 Saint Paul Street
Rochester, New York

Prepared for:

Bausch & Lomb
1400 North Goodman Street
Rochester, New York 14609

LaBella Project No. 2170820

September 29, 2017

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CERTIFICATIONS

"I Daniel P. Noll certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10)."



081996

9/29/2017

D. P. Noll

NYS Professional Engineer #

Date

Signature

1.0 INTRODUCTION

As required under the terms of the New State Department of Environmental Conservation (NYSDEC) Order of Consent and Administrative Settlement (Index No. R8-20161013-107) with Bausch & Lomb (B&L), this Remedial Action Work Plan (RAWP) details the proposed installation of a sub-slab depressurization system (SSDS) to mitigate soil vapor intrusion (SVI) concerns for the property addressed as 691 and 705 Saint Paul Street, City of Rochester, Monroe County, New York. A site location map is included as Figure 1. This RAWP was completed on B&L's behalf by LaBella Associates, D.P.C.

SVI sampling conducted at the site has identified trichloroethene (TCE) at concentrations above the New York State Department of Health (NYSDOH) Indoor Air Guideline Value of 2 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The SVI sampling activities were conducted in accordance with NYSDEC approved work plans and summarized in an investigation report. The following documents provide additional details on this work:

- *Soil Gas Sampling Work Plan, NYSDEC Site #828159A, 691 and 705 Saint Paul Street, Rochester, New York* dated January 30, 2017 prepared by LaBella Associates, D.P.C.
- *Soil Vapor Intrusion Work Plan, NYSDEC Site #828159A, 691 and 705 Saint Paul Street, Rochester, New York* dated March 24, 2017 prepared by LaBella Associates, D.P.C.
- *Soil Vapor Intrusion Investigation Report, NYSDEC BCP Site #828159A, 691 and 705 Saint Paul Street, Rochester, New York* dated September, 2017 prepared by LaBella Associates, D.P.C. (Note: This report is pending submittal)

This RAWP was completed in accordance with the NYSDEC Division of Environmental Remediation (DER) BCP Guide dated May 2004 and the DER-10 (*Technical Guidance for Site Investigation and Remediation*) dated May 3, 2010 and the New York State Department of Health (NYSDOH) Final document "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006 (and amendments).

1.1 Report Organization

The remainder of this SVI Report is organized into the sections listed below.

- **Section 2** provides a general description of the site and surrounding properties and an environmental summary of the 690 Saint Paul Street BCP Site #C828159
- **Section 3** provides a description of the subsurface geologic conditions in the area of the site
- **Section 4** provides a description of the Standards, Criteria, and Guidance that are used to define the soil vapor cleanup guidelines for the site
- **Section 5** provides a description of the objective of the RAWP
- **Section 6** provides a summary of the remedial goals for the site
- **Section 7** provides a summary of the results of the SVI sampling work completed to date
- **Section 8** provides a description of the work plan for the installation of the SSDS
- **Section 9** provides a description of the community air monitoring plan
- **Section 10** provides a description of the health and safety plan
- **Section 11** provides a description of the anticipated schedule and reporting for the remedial work

2.0 SITE DESCRIPTION AND ENVIRONMENTAL SUMMARY

2.1 Site Description

The site is located directly across from NYSDEC BCP site #C828159 known as 690 Saint Paul Street as shown on Figure 2. BCP Site #C828159A includes the adjacent 705 Saint Paul Street parcel. However, this RAWP only includes and refers to the 691 Saint Paul Street portion of BCP Site #C828159A.

The 691 Saint Paul Street property is primarily used as commercial office space by: 1) Monroe County Social Services (primary tenant) that occupies the upper basement and the remaining upper floors (2) St. Michael's Woodshop occupies most of the lower basement space, and (3) Newport Gratings (photonics company) occupies the northern end of the upper and lower basement space. The site is improved with one building as outlined in Table 2.1A below.

TABLE 2.1A
Site Description

Acreage of Site	2.94
Approximate Building Footprint (square feet)	30,630
Foundation Type	Basement (two different levels)
Construction Date	1920
Current Use	Commercial office space

The basement of the site building is divided into two separate levels or elevations. The eastern half of the upper basement is approximately 8 to 10 ft higher in elevation than the lower basement that is located on the approximate western half of the site building as shown on Figures 3A and 3B.

The exterior of the site primarily consists of an asphalt paved parking lot located south of the building. Neighboring properties that border the site include the following:

TABLE 2.1B
Adjacent Properties

Location	Current Use
North	Richardson Gratings (Manufacturing)
South	Smith Street, High Fall Brewery
East	690 Saint Paul Street, NYSDEC BCP Site# C828159
West	Suntru Street, RG&E Substation #34

2.2 Environmental Summary of NYSDEC 690 Saint Paul Street BCP Site #C828159

The 690 Saint Paul Street BCP site was developed prior to 1875 and was utilized primarily for residential purposes prior to approximately the 1920s. Based on the review of historical mapping and local street directories, the BCP site was primarily utilized for industrial purposes by Bausch & Lomb, Inc., formerly known as Bausch & Lomb Optical Company (“B&L”) from sometime around 1920 until it was abandoned by the company in the late 1960s. The property was developed for industrial use by B&L to manufacture lenses and other products. From the early 1970s until 2000, the BCP site was used predominantly for light commercial and storage applications. Occupants and/or owners of the Site have included various individual residences, B&L, Thomas Edison Technical and Industrial High School, Geva Theater storage, and various manufacturing and industrial tenants.

Prior uses of the BCP site that appear to have led to site contamination include underground storage tanks (USTs) that may have leaked. These tanks appear to have contained chlorinated solvents including trichloroethene (TCE) and petroleum products including gasoline and fuel oil. In 2002, a 500-gallon UST was removed from the site and contaminated soil was encountered. In 2008, a Phase II Environmental Site Assessment (ESA) was performed to evaluate subsurface soil and groundwater. The Phase II ESA identified an area of petroleum contaminated soil. The investigation was followed by the excavation of approximately 1,650 cubic yards of petroleum impacted soil and a previously undocumented UST. TCE was identified in confirmation samples in soil and ground and thus the 690 Saint Paul Street site was entered into the BCP. A Remedial Investigation (RI) conducted through the BCP identified eight (8) Areas of Concern that related to elevated concentrations of metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons, petroleum products, and/or chlorinated solvents. The areas of concern related to this Work Plan are two groundwater chlorinated solvent plumes that were identified to have migrated off the BCP site to the west and toward the site. It should be noted that the 690 Saint Paul Street site is currently undergoing remediation.

3.0 SUMMARY OF LOCAL SUBSURFACE GEOLOGIC CONDITIONS

This section relies upon information obtained from the 690 Saint Paul Street NYSDEC BCP site environmental investigations. The overburden material ranges in depth up to approximately 12 feet (ft) below the ground surface (bgs) and consists primarily of glacial till. Fill material is anticipated to overlie the till and may consist of sand, gravel, cinders, and ash.

The Decew Dolomite underlies the overburden material. The Decew Dolomite is the uppermost formation of the Clinton Group and consists of variably bedded, dark-gray to olive-gray, argillaceous to sandy, fine-grained dolomite that contains shaly partings and interbeds, as well as frequent pits and vugs. The thickness of this unit is generally 8 to 12 ft.

The Rochester Shale underlies the Decew Dolomite, and is a relatively uniform dark- to medium-gray, pale- and platy-weathering, highly calcareous to dolomitic mudstone. It contains abundant thin interbeds of medium gray, pale-buff weathering, laminated calcisiltites. Its thickness in Western New York is generally 58 to 65 ft.

The overburden groundwater table at the BCP site ranged from 4 to 9 ft bgs in the southern portion of the site and 8 to 10 ft bgs in the northern portion of the site. The overburden groundwater and flows generally to the west-southwest.

The shallow bedrock water-bearing interval was identified as the uppermost bedrock down to depths of approximately 20 ft bgs. This interval is the uppermost water-bearing unit within the bedrock, and no low permeability horizon separates this zone from the overburden. Groundwater flow direction is generally to the west.

4.0 STANDARDS CRITERIA AND GUIDELINES

This section identifies the Standards, Criteria, and Guidance (SCGs) for the site. The SCGs identified are used in order to quantify the extent of contamination at the site that may require remedial work. The SCGs will be used to evaluate the effectiveness of any remedial measures and will be used to determine if remedial actions are warranted. The SCG's for soil vapor are provided below:

- **Sub-Slab Soil Vapor and Indoor Air SCGs:** The NYSDOH Final document "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006 and updates for tetrachloroethene (September 2013), TCE (August 2015), and the soil vapor/indoor air decision matrices (May 2017). These updates are included on NYSDOH website: https://www.health.ny.gov/environmental/indoors/vapor_intrusion/update.htm.

5.0 OBJECTIVE

The primary objective of this RAWP is to mitigate chlorinated VOC impacts identified in ~~indoor air~~ samples collected in April 2017. This objective is to be completed via the installation of a SSDS within the site building. The site is currently utilized for commercial purposes and primarily as office space. The overall objective for the site is its continued use for commercial purposes.

actual and potential exposures associated with

soil vapor intrusion

6.0 SUMMARY OF REMEDIAL GOALS

The Remedial Goals for this RAWP are as follows:

1. Install a SSDS to create negative sub-slab pressure within the 691 Saint Paul Street site building identified on Figure 2, thus mitigating soil vapor intrusion issues within the site building.
2. Patch interior and exterior walls within the lower basement to optimize the efficiency of the SSDS.
3. Containerize, characterize and properly dispose of any soil or fill material generated during the remedial work. If necessary, impacted materials will be transported to a NYS part 360 permitted landfill for disposal.
4. Install gauges and alarms associated with the SSDS as well as pressure field extension (PFE) points to monitor the operation of the SSDS.
5. Confirm the effectiveness of the SSDS via the collection and laboratory analysis of indoor air samples.

7.0 SOIL VAPOR INTRUSION INVESTIGATION FINDINGS

As required by the NYSDEC, SVI samples were collected from the Site on April 1, 2017 by LaBella. This sampling event included the collection of one (1) outdoor air sample (as a control sample) and seven (7) indoor air samples, and six (6) sub slab vapor samples as shown on Figures 3A and 3B. Please note that there were only six (6) interior sample locations and the extra or 7th interior sample (i.e. 691-B19-IAQ-2) was collected during the testing work, as it appeared the gauge during the collection of a sample 691-B19-IAQ-1 may have malfunctioned.

The sampling was completed in substantial accordance with the NYSDEC approved work plan. The work plan included analysis of SVI samples for contaminants of concern, specifically TCE and its breakdown products identified to be migrating from the 690 Saint Paul Street site. The VOC were analyzed using United States Environmental Protection Agency (USEPA) Method TO-15. The list is included in Table 7.0A.

TABLE 7.0A
Targeted VOC Sampling List

VOCs	
• TCE	• cis-1,2-dichloroethene (CIS-1,2-DCE)
• trans-1,2-dichloroethene)	• vinyl chloride
• 1,1-Dichloroethene (1,1-DCE)	• chloroethane

Validation of the data for the indoor air samples collected by LaBella on April 1, 2017 was completed by DataVal, Inc. (DataVal). This validated data are summarized in Table 7.0B (attached). As indicated in the table, target VOCs were detected above the laboratory MDL in each of the sub-slab vapor samples and were also detected above the laboratory MDL in five (5) of the six (6) corresponding ambient air samples. The outdoor air/background ambient air sample did not detect targeted VOCs above the laboratory MDL.

A comparison of the SVI results to the NYSDOH Ambient Air Guidelines, NYSDOH Decision Matrices (as updated May 2017), and the USEPA BASE Database 90th Percentile values are summarized in Table 7.0C.

TABLE 7.0C
Summary of SVI Sample Results

Sample Location/ID	Result above USEPA Database - 90th Percentile	Indoor Ambient Air Result above NYSDOH Ambient Air Guideline	NYSDOH Decision Matrix	
			Result Above Minimum NYSDOH Decision Matrix	NYSDOH Recommendation
Upper Basement				
691-NE	None	None	None	None
691-B15	TCE	TCE	TCE	Mitigate
691-B19	TCE	TCE	TCE	Mitigate
Lower Basement				
691-SB5B	TCE, CIS-1,2-DCE	TCE	TCE, CIS-1,2-DCE	Mitigate
691-SB5A	TCE, CIS-1,2-DCE	TCE	TCE, CIS-1,2-DCE	Mitigate
691-5A	TCE, CIS-1,2-DCE	None	CIS-1,2-DCE	Mitigate

Note: CIS-1,2-DCE denoted cis-1,2-Dichloroethene

As indicated in Table 7.0C, TCE was detected above the NYSDOH Ambient Air Guideline in indoor air samples 691-B15 and 691-B-19 from the upper basement and samples 691-SB5B and 691-SB5A in the lower basement. In addition, comparison of the results to the NYSDOH Decision Matrices recommends mitigation at five (5) of the six (6) sample locations.

8.0 REMEDIAL ACTION WORK PLAN

The SSDS installation, design, and post start-up sampling and monitoring work is described below.

8.1 Sub-Slab Depressurization System (SSDS) Installation

8.1.1 System Overview

The SSDS will be installed in substantial accordance with the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 (and associated amendments). The majority of the system will be constructed of Schedule 40 polyvinyl chloride (PVC) piping and fittings which shall conform to American Society of Testing Materials (ASTM) D3034. The SSDS is designed to influence the 691 Saint Paul Street site building shown on Figure 2. The SSDS is proposed to consist of 19 depressurization points which will be manifolded together horizontally along the building's ceiling to form between approximately 3 to 4 smaller sub-slab systems (or "sub-systems") each consisting of approximately 4 to 5 depressurization points manifolded into one (1) fan. The approximate location of the depressurization points are depicted on Figures 4A and 4B, and these locations may vary slightly based on building conditions, tenant requirements and vacuum requirements. SSDS installation details are shown on Figure 5 and described below.

8.1.2 Sealing of Walls and Floor Cracks

As part of the full installation of the SSDS, building leaks identified in the basements will be sealed to the extent practicable. Common locations where leaks and openings can occur include:

- visible floor cracks
- exposed pits or sumps will be covered and sealed to the extent practicable,
- around floor drains, and
- piping or wiring penetrations.

Potential or likely vapor entry points will be sealed with caulk or expanding foam (or equivalent), and damaged concrete will be repaired to the extent practicable.

Specifically the lower basement eastern interior wall will be patched and sealed and the lower basement exterior western wall will be patched to the extent practical to optimize the efficiency of the SSDS.

The effectiveness of the sealing work is anticipated to affect the piping and fan size required to depressurize the building slab. As such, size of the depressurization points piping and fan size is subject to change based on the outcome of the sealing. As-built drawings and a list of components used for the installed SSDS will be included in the Site Management Plan (SMP) and Final Engineering Report (FER).

8.1.3 Depressurization Points

Each depressurization point is designed to consist of a vertical 3 or 4 inch (in.) diameter Schedule 40 PVC header pipe which will be manifolded into a horizontal 4 or 6 in. diameter Schedule 40 PVC pipe (a lateral) located along the building's ceiling. It is anticipated that the SSDS will utilize 3 in. diameter piping with the exception of the sub-system along the western wall of the lower basement. This system is anticipated to be constructed with 4 in. diameter piping that will allow a greater volume of air flow to manage influx of air from the building's exterior.

Each depressurization point will be installed by coring a nominal 4 to 8 in. diameter hole in the concrete floor slab. Approximately one (1) cubic (cu) foot (ft) of void space will be created directly under the cored area by removing material beneath the slab through the corehole. This material will be containerized for future characterization and appropriate disposal. The header PVC pipe will then be lowered into the corehole so the bottom of the pipe is flush with the bottom of the floor slab. At that point, the PVC will be sealed into the concrete floor slab using urethane caulk and backer rod to ensure that a vacuum is created during system operation.

Many of the depressurization points are anticipated to be installed against columns so to allow the preexisting column can be utilized to support the vertical piping. The column footings may extend 2 to 3 ft horizontally from the center of each column, limited trenching may be necessary to ensure that the depressurization point comes in contact with the sub-slab space and not with the concrete footer, which will prevent air flow. Such trenching will be completed by removing a small rectangle of the concrete floor just wide enough to insert a horizontal 3 or 4 in. diameter PVC pipe to connect the sub-slab space to the vertical riser supported by the column. Any soil or fill material removed as part of the trenching will be containerized for future characterization.

8.1.4 System Lateral Piping and Fans

The laterals are designed to consist of 4 or 6 in. diameter Schedule 40 PVC into which the vertical depressurization points will be manifolded too. The laterals are anticipated to link together several depressurization points to create 3 to 4 sub-systems, each with their own fan and will be located along the building's ceiling and/or other overhead utility corridors. Sub-systems #1 and #2 shown on Figure 4A may be combined into one sub-system/connected to one fan if site conditions allow. Each sub-system will be tied into a vertical riser which will extend through the roof where a fan will be located. Various fans will be utilized depending on the specific vacuum requirements of each sub-system; however, OBAR Systems, Inc. models GBR 76 and/or GBR 89 are currently anticipated to be utilized at the site. Effluent from the fans shall be discharged a minimum of 10 ft away from any air intakes, at minimum of 12 in. above the surface of the roof, and a minimum of 10 ft from any opening that is less than 2 ft below the exhaust point. The proposed fan/discharge location is shown on Figure 4A and will be on the roof of the first floor of the loading dock portion of the building.

8.1.5 Pressure Field Extension (PFE) Monitoring Points

Semi-permanent PFE monitoring points will be installed during the installation of the SSDS to confirm the creation of a pressure differential, sub-slab to ambient air pressure. The proposed locations of the monitoring points are shown on Figure 4A and 4B and may be moved based on obstructions or other site features. A Vapor Pin® will be utilized to construct the PFE monitoring point. A Vapor Pin® will be installed by coring an approximate 2 inch diameter hole into the floor at each sub-slab sampling location. Subsequently, a 5/8 inch diameter hole will be drilled through the slab to approximately 1 to 2 inches beneath the floor slab. A 5/8 inch diameter polyethylene tube/gasket and barbed fitting will be inserted into the corehole. The polyethylene tube/gasket will act as seal between the sub floor and interior ambient air space around the annulus of the barbed fitting. A cap will be placed over the barbed fitting. Manufacturer information regarding the installation and use Vapor Pins® are included in Appendix A. PFE monitoring points will be constructed in the same manner at all locations to minimize possible discrepancies. A protective cap will be installed to complete the installation.

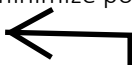
8.1.6 Labels, System Gauges, and Alarms

Labels

All exposed and visible interior vent pipes shall be identified with a label at least every 25 ft. The label shall read: "Sub-Slab Depressurization System."

System Gauges

Each sub-system will be equipped with a RadonAway® Easy Read Manometer (or equivalent) that allows a visual confirmation whether the sub-system is operating or a Dwyer Magnehelic (or equivalent) differential pressure gauge measuring real time vacuum readings. The magnahelic pressure range will be selected after diagnostic testing and exhaust blower selection. The location of the gauges cannot be determined at this time as they will depend on the configuration of the sub-systems. The installed system gauge locations will be provided in the Site Management Plan (SMP) and will be in a location where occupants and/or building management routinely visit.



The sub-slab pressure must be a minimum of 0.004 inches of water lower than the pressure inside the building.

Indoor air samples will be collected 30 to 45 days after full startup. If this initial sampling event is conducted outside of the heating season, then a second full round of indoor air samples will be collected during the next heating season.

Alarms

Each fan shall be equipped with a prominently positioned visible or audible warning system (RadonAway Checkpoint IIA Mitigation System Alarm (see Appendix A) or approved equivalent to alert the building occupant if there is loss of pressure or air flow in the vent pipe, or if the fan ceases operation. The warning system shall be installed on a separate circuit so that in the event the fan loses power, the warning system will still activate. The warning system shall be located inside the building and subject to owner/environmental consultant approval. A label shall be affixed to the alarm system providing the name and number of owner contact. The location of the alarms cannot be determined at this time as they will depend on the configuration of the sub-systems. The installed alarm locations will be provided in the SMP and FER.

8.2 Post Startup Sub-Slab Depressurization System Sampling

seven (7)

8.2.1 Indoor Air Sampling

~~During the heating season and a minimum of at least 30 days after full startup of the SSDS, indoor air samples will be collected from the same locations as shown on Figures 3A and 3B in which previous samples were collected within the mitigation area. Specifically, ~~three (3)~~ indoor air sample locations will be collected from the upper basement and ~~three (3)~~ indoor air samples will be collected from the lower basement. One (1) outdoor air sample will also be collected as part of this sampling event.~~

Air samples will be collected utilizing individually certified-clean 1 liter Summa® canisters (or equivalent) equipped with laboratory calibrated flow controllers. The samples will be collected over an approximate eight (8) hour time period. The indoor and outdoor air samples will be collected at a height of approximately 3 to 5 ft above the floor or ground surface to simulate the breathing zone. The outdoor air sample will be collected at an upwind location of the Site building. Immediately after opening each Summa® canister, the initial vacuum (inches of mercury) and time will be noted and recorded on the laboratory chain-of-custody. After approximately eight (8) hours, final vacuum readings (inches of mercury) will be noted and the Summa® canisters will be closed. All samples will be collected over the same general time period and in the same manner at all locations to minimize possible discrepancies.

Samples will be sent under chain of custody control to a NYSDOH Environmental Laboratory Approval Program certified laboratory for testing. The samples will be tested for a specific list of VOCs using United States Environmental Protection Agency Method TO-15. Targeted VOCs and their associated laboratory detection limits include:

five (5)

and from additional areas shown on Figures 3A and 3B to address tenant requests, re-sample some areas previously sampled by tenants, and obtain adequate spatial coverage.

TABLE 8.2.1
Laboratory Detection Limits of Targeted VOCs

Targeted VOCs	Laboratory Detection Limit ($\mu\text{g}/\text{m}^3$)
TCE	0.2
cis-1,2-dichloroethene	0.2
trans-1,2-dichloroethene	1.0
vinyl chloride	0.2
1,1-Dichloroethene	0.2
chloroethane	1.0

$\mu\text{g}/\text{m}^3$ denotes micrograms per cubic meter

The detection limits for the compounds above will be the goal for the minimum detection limit by the laboratory for the samples.

Pending results, these samples will act as “endpoint” samples to confirm “the effectiveness of remedial measures” per the NYSDOH Guidance. In the event that one or more of these samples show targeted VOCs at levels above the appropriate SCGs, resampling will be completed within 45 days of the receipt of the ~~validated~~ sample results. If similar results occur, changes to the mitigation system will be made and subsequent sampling will be completed until VOC concentrations in indoor air are below the SCGs.

8.2.2 Quality Control Plan

Activities completed at the site will be managed under LaBella’s Quality Control Program, which is included in Appendix B. Sampling will include the collection of a sample duplicate and a matrix spike/matrix spike duplicate (MS/MSD) as part of the quality assurance/quality control plan. In addition, a NYSDOH Analytical Services Protocol (ASP) Category B–like data deliverable will be generated by the laboratory and a data usability summary report (DUSR) will be developed. The DUSRs will include the laboratory data summary pages showing corrections made by the data validator and each page will be initialed by the data validator. The laboratory data summary pages will be included even if no changes were made.

9.0 COMMUNITY AIR MONITORING PLAN

The NYSDOH Generic Community Air Monitoring Plan (CAMP) and Fugitive Dust and Particulate Monitoring will be utilized for this RAWP and is included as Appendix C. Based on the nature of the work some modifications/clarifications are warranted for the CAMP monitoring. These are provided below:

- Fugitive dust and VOC monitoring will only be completed during times of floor coring and open floor penetrations. When the penetrations to the floors are sealed, CAMP monitoring will not be completed. As such, the installation of SSDS laterals, sealing, fans, and alarms/gauges will not require monitoring.

This sampling process will occur regardless of time of year. Only samples collected during the heating season will be considered for use as final endpoint samples.

in accordance with a Department
approved IRM Work Plan Amendment

- All work will be completed within the building and thus upwind/downwind monitoring will be modified. Specifically, a background reading for VOCs and fugitive dust will be established at each work area prior to conducting any subsurface penetrations and then monitoring will be conducted within the work zone (approximate 5 ft radius area around floor penetration). The action levels will be applied to the edge of the work zone.
- Subsequent to completing work and sealing the floor penetrations, a reading for VOCs will be recorded to confirm background levels have been established.
- Fugitive dust monitoring will be completed in accordance with the NYSDOH Guidance and as noted above; however, it should be noted that coring of the concrete floor will likely create some minimal dust for a short duration and wet techniques will be employed to minimize this issue.

The building contains three tenants: (1) The primary tenant of the site is Monroe County Social Services that occupies the upper basement and the remaining upper floors (2) St. Michael's Woodshop occupies most of the lower basement space, and (3) Newport Gratings (photonics company) occupies the northern end of the lower basement space. The upper and lower basement levels are not fully occupied and intermittently used. The upper basement proposed work area consists primarily of utility, storage and conference rooms and are typically not occupied full time during normal business hours and are intermittently used. The St. Michael's wood shop within the lower basement is typically not used or occupied until typically between 4 to 7 pm. Newport Gratings space is not heavily occupied and proposed work in the space is limited. Based on this, it is anticipated that the majority of the SSDS related work will be completed during normal business hours.

10.0 HEALTH AND SAFETY PLAN


A site-specific Health and Safety Plan (HASP) has been prepared for the field work described in this Work Plan. This HASP is included in Appendix D. All LaBella personnel will be required to follow the procedures in the HASP. Subcontractors, will have access to a copy of the HASP, however, they are responsible to provide their own safety procedures and monitoring for their own personnel.

11.0 SCHEDULE AND REPORTING


11.1 Schedule

~~An estimated~~ schedule is provided in Table 11.1 below, and is based on the date the RAWP is approved by the NYSDEC.

TABLE 11.1
~~Anticipated Schedule~~

Task	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9
Contractor coordination and scheduling	X								
Install SSDS		X	X	X					
Sample and Analysis of Post Startup Samples					X				
ASP Data Package and DUSR of Post Startup Samples							X		
Submit SMP and FER 								X	X

11.2 Reporting

The completed work associated with the RAWP will be provided in accordance with the NYSDEC SMP and FER for the site. The reports will include field documentation and observations, and summary tables for the analytical data obtained from the samples during the remedial work. Supporting documentation will include as-built drawings of the SSDS, operation and maintenance plan for the SSDS, sampling logs, laboratory reports and chains of custody, the DUSR, and figure showing sampling locations. In addition,  an electronic data deliverable will be provided subsequent to the validation of the data.

I:\Bausch & Lomb\2170820 - 691 St Paul St SVIA BCP Site\Reports\RAWP SSDS\RPT.2017-09-29.RAWP SSDS_ 691 St Paul.docx

FIGURES

I:\Barozzi Woodworking, Inc\213211 - 1445 Jefferson Rd, Phase II, ESADDrawings\Figure2.mxd



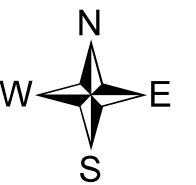
SITE LOCATION MAP

**REMEDIAL ACTION WORK
PLAN - SUB-SLAB
DEPRESSURIZATION SYSTEM**

**BROWNFIELD CLEANUP
PROGRAM SITE #C828159A**

**691 AND 705 SAINT PAUL ST
ROCHESTER, NEW YORK**

**CLIENT:
BAUSCH & LOMB**



250 0 1,000
1 inch = 1,000 feet

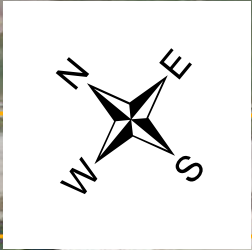
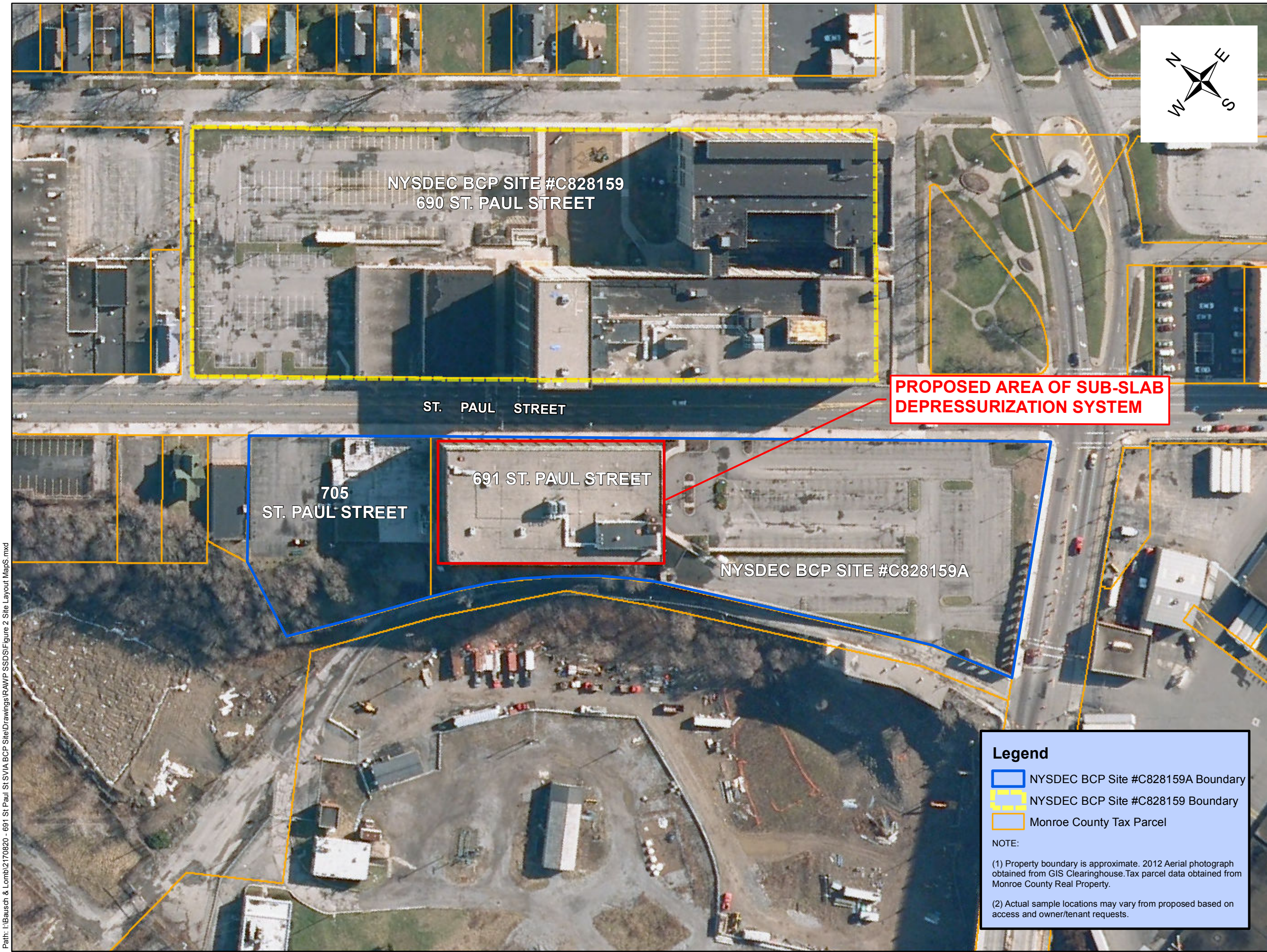
DATE: 8/17/2017

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[2170820]

[FIGURE 1]

Path: I:\Bausch & Lomb\2170820 - 691 St Paul St SVIA BCP Site\Drawings\RAWP SSDS\Figure 2 Site Layout MapS.mxd



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TITLE
SITE MAP

PROJECT
REMEDIAL ACTION WORK
PLAN - SUB-SLAB
DEPRESSURIZATION SYSTEM

**BROWNFIELD CLEANUP
PROGRAM #C828159A**

**691 AND 705 SAINT PAUL ST
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Legend

- NYSDEC BCP Site #C828159A Boundary
- NYSDEC BCP Site #C828159 Boundary
- Monroe County Tax Parcel

NOTE:

(1) Property boundary is approximate. 2012 Aerial photograph obtained from GIS Clearinghouse. Tax parcel data obtained from Monroe County Real Property.

(2) Actual sample locations may vary from proposed based on access and owner/tenant requests.

0 25 50 100 Feet

1 inch = 100 feet

DATE: 8/17/2017

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2170820

FIGURE 2

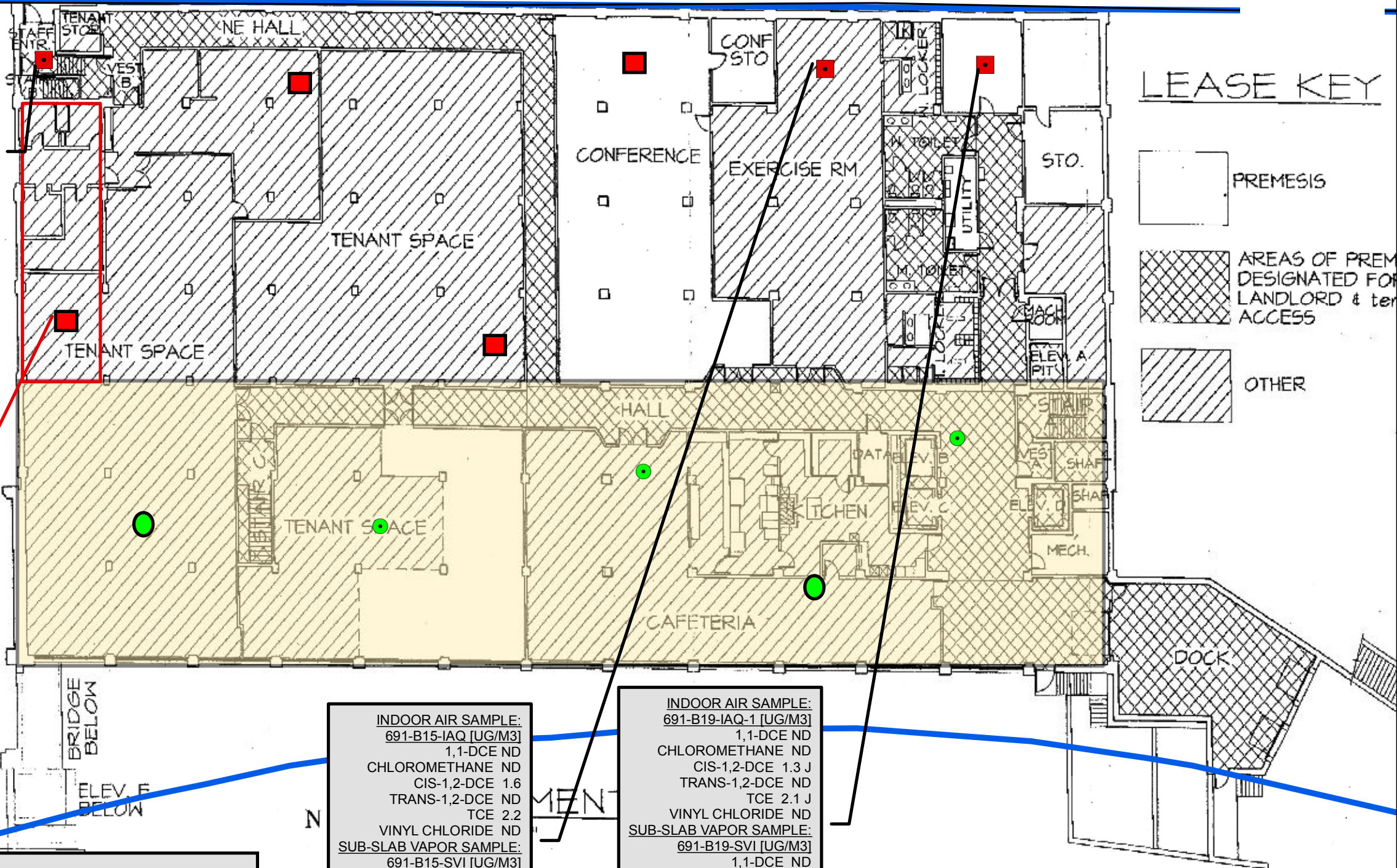
Path: I:\Bausch & Lomb\2170820 - 691 St Paul St SVIA BCP Site\Drawings\RAWP SSDS\Figure 3A Sample Map Upper Basement.mxd

ST. PAUL STREET



INDOOR AIR SAMPLE:
691-NE-IAQ [UG/M3]
1,1-DCE ND
CHLOROMETHANE ND
CIS-1,2-DCE ND
TRANS-1,2-DCE ND
TCE ND
VINYL CHLORIDE ND
SUB-SLAB VAPOR SAMPLE:
691-NE-SVI [UG/M3]
1,1-DCE ND
CHLOROETHANE ND
CIS-1,2-DCE ND
TRANS-1,2-DCE ND
TCE 3.9
VINYL CHLORIDE ND

Approximate area of
crawl space beneath
floor (access through
lower basement)



INDOOR AIR SAMPLE:
691-B15-IAQ [UG/M3]
1,1-DCE ND
CHLOROMETHANE ND
CIS-1,2-DCE 1.6
TRANS-1,2-DCE ND
TCE 2.2
VINYL CHLORIDE ND
SUB-SLAB VAPOR SAMPLE:
691-B15-SVI [UG/M3]
1,1-DCE ND
CHLOROETHANE 0.37 J
CIS-1,2-DCE ND
TRANS-1,2-DCE ND
TCE 220
VINYL CHLORIDE 0.28

INDOOR AIR SAMPLE:
691-B19-IAQ-1 [UG/M3]
1,1-DCE ND
CHLOROMETHANE ND
CIS-1,2-DCE 1.3 J
TRANS-1,2-DCE ND
TCE 2.1 J
VINYL CHLORIDE ND
SUB-SLAB VAPOR SAMPLE:
691-B19-SVI [UG/M3]
1,1-DCE ND
CHLOROETHANE ND
CIS-1,2-DCE ND
TRANS-1,2-DCE ND
TCE 26 J
VINYL CHLORIDE 0.20 J

NOTE:
(1) Property boundary is approximate. Tax parcel data obtained from Monroe County Real Property.
(2) Building plan referenced from Bero Architecture dated 07/01/03.
(3) Actual basement plan may differ.
(4) ND denotes Non Detect
(5) UG/M3 denotes micrograms per cubic meter
(6) J denotes estimated result

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TITLE
SOIL VAPOR INTRUSION
SAMPLE LOCATIONS AT
UPPER BASEMENT

PROJECT
REMEDIAL ACTION WORK
PLAN - SUB-SLAB
DEPRESSURIZATION SYSTEM

**BROWNFIELD CLEANUP
PROGRAM #C828159A**

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0 12.5 25 Feet

1 inch = 25 feet

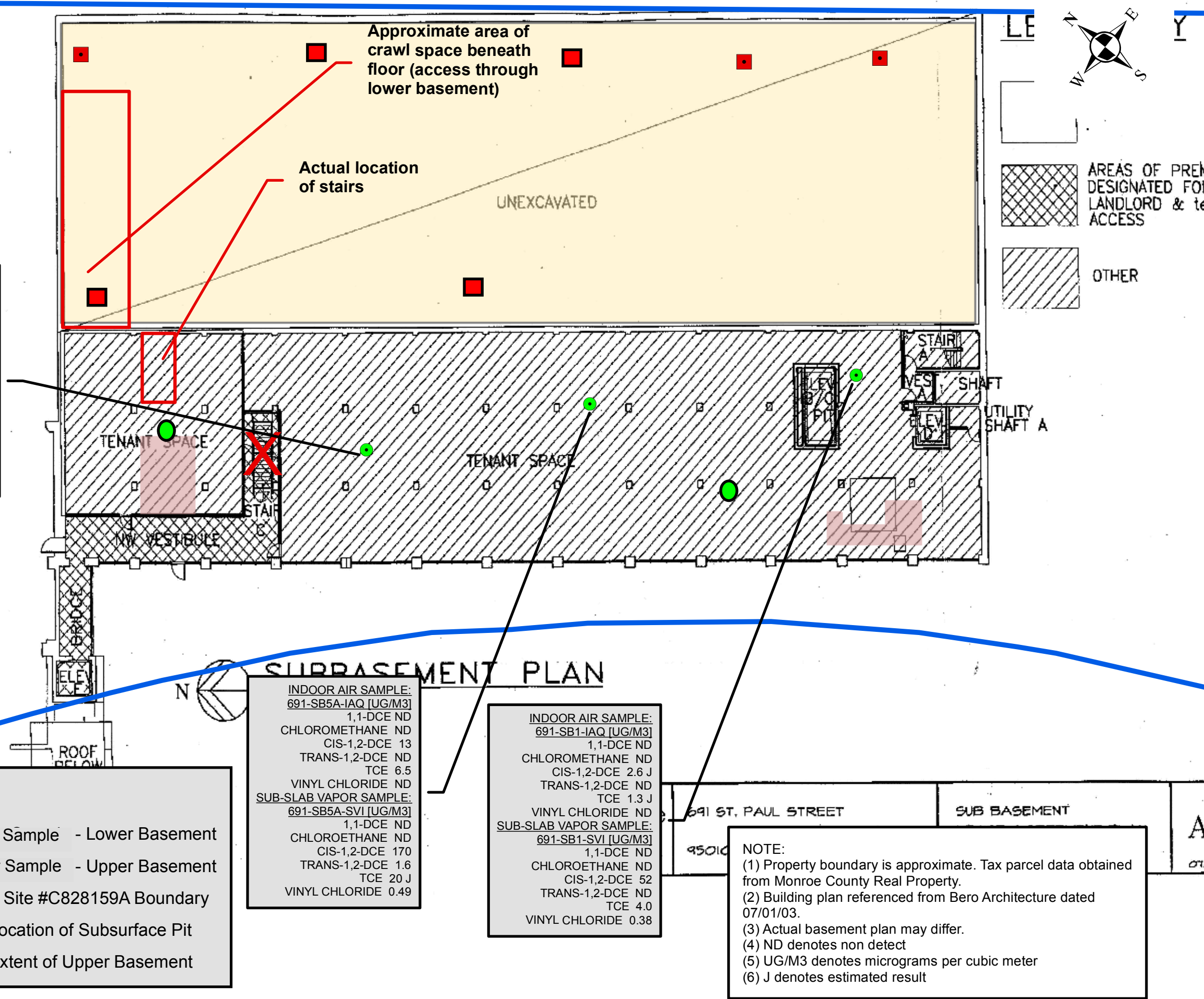
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FIGURE 3A

Path: I:\Bausch & Lomb\2170820 - 691 St Paul St SVIA BCP Site\Drawings\RAWP SSDS\Figure 3B Sample Map Lower Basement.mxd



TITLE
SOIL VAPOR INTRUSION
SAMPLE LOCATIONS AT
UPPER BASEMENT

PROJECT
REMEDIAL ACTION WORK
PLAN - SUB-SLAB
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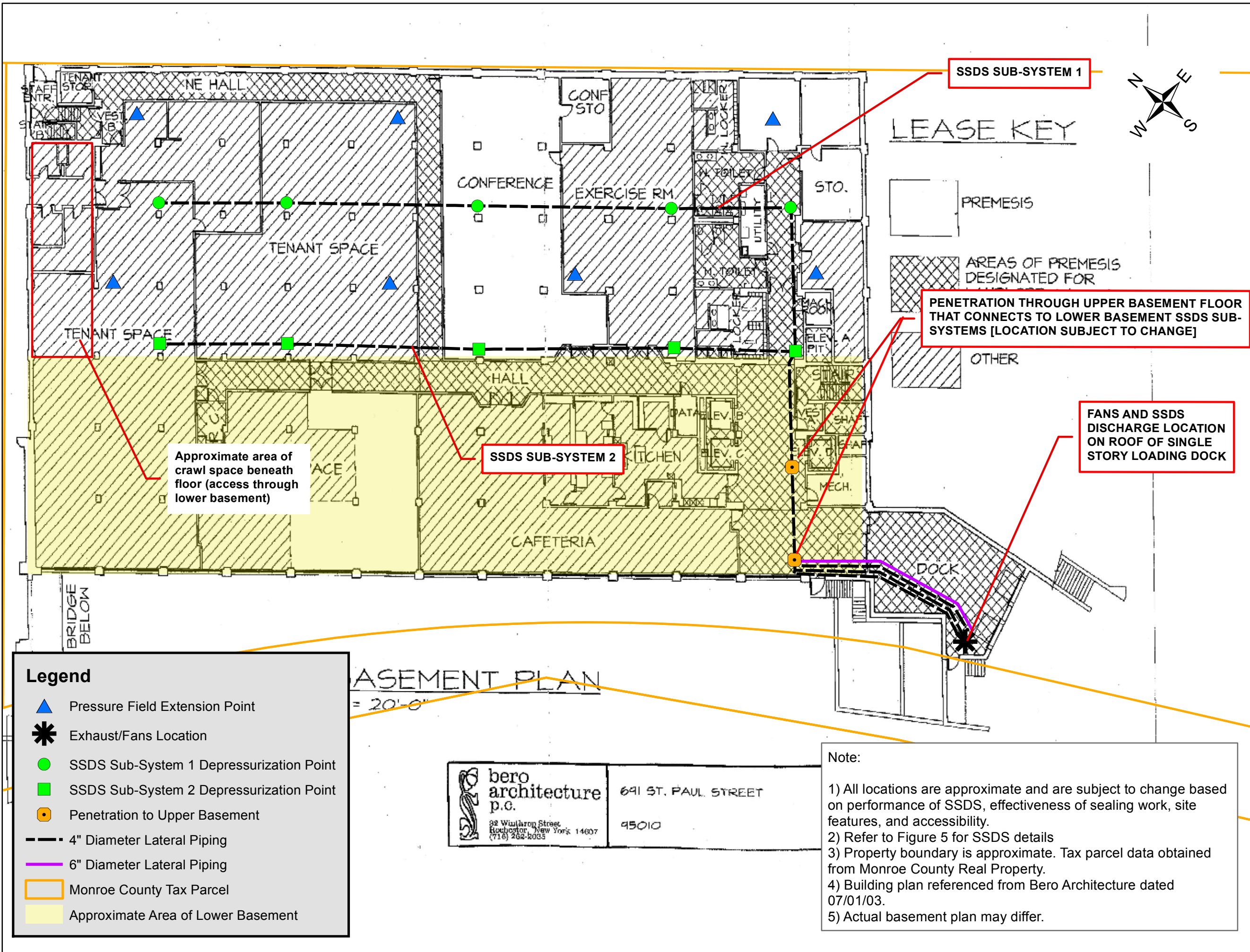
0 12.5 25 Feet
1 inch = 25 feet

DATE: 8/3/2017
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FIGURE 3B

Path: I:\Bausch & Lomb\2170820 - 691 St Paul St VIA BCP Site Drawings\RAWP SSDS\Figure 4A SSDS Layout Upper Basement.mxd



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TITLE
SUB-SLAB DEPRESSURIZATION
SYSTEM LAYOUT AT
UPPER BASEMENT

PROJECT
REMEDIAL ACTION WORK
PLAN - SUB-SLAB
DEPRESSURIZATION SYSTEM

**BROWNFIELD CLEANUP
PROGRAM #C828159A**

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012.525

012.525

012.525

1 inch = 25 feet

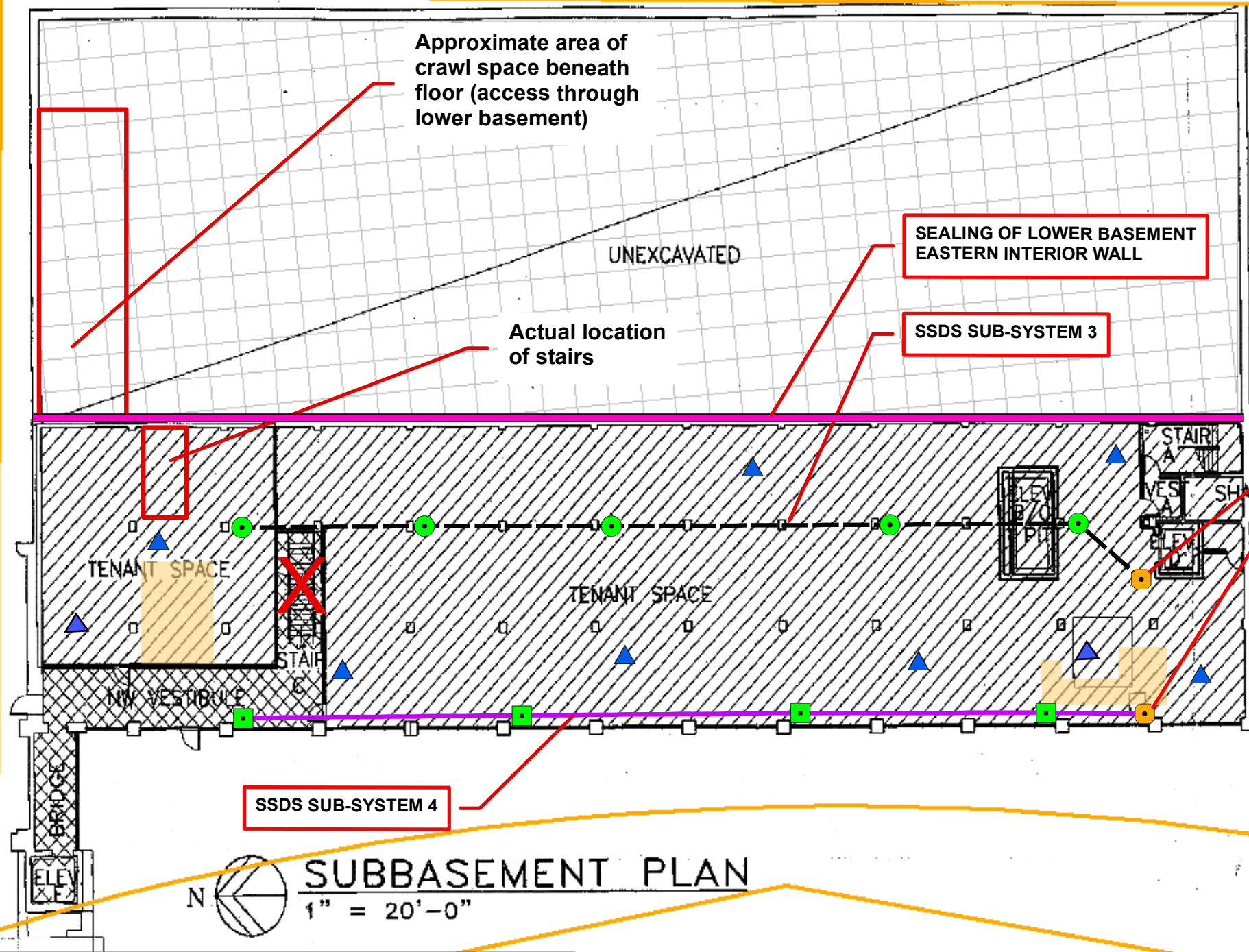
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FIGURE 4A

Path: I:\Bausch & Lomb\2170820 - 691 St Paul St VIA BCP Site Drawings\RAWP SSDS\Figure 4B SSDS Layout Lower Basement.mxd



SUBBASEMENT PLAN
1" = 20'-0"

Note:

- 1) All locations are approximate and are subject to change based on performance of SSDS, effectiveness of sealing work, site features, and accessibility.
- 2) Refer to Figure 5 for SSDS details
- 3) Property boundary is approximate. Tax parcel data obtained from Monroe County Real Property.
- 4) Building plan referenced from Bero Architecture dated 07/01/03.
- 5) Actual basement plan may differ.



691 ST. PAUL STREET
14601

SUB
LEA
EXH

Legend

- ▲ Pressure Field Exention Point
- SSDS Sub-System 3 Depressurization Point
- SSDS Sub-System 4 Depressurization Point
- Penetration to Upper Basement
- 4" Diameter Lateral Piping
- 6" Diameter Lateral Piping
- Approximate Location of Subsurface Pit
- Approximate Extent of Upper Basement
- Monroe County Tax Parcel

LEASE KEY

- PREMESIS
- AREAS OF PREMESIS DESIGNATED FOR LANDLORD & tenant ACCESS
- OTHER



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TITLE
SUB-SLAB DEPRESSURIZATION
SYSTEM LAYOUT AT
LOWER BASEMENT

PROJECT
REMEDIAL ACTION WORK
PLAN - SUB-SLAB
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**BROWNFIELD CLEANUP
PROGRAM #C828159A**

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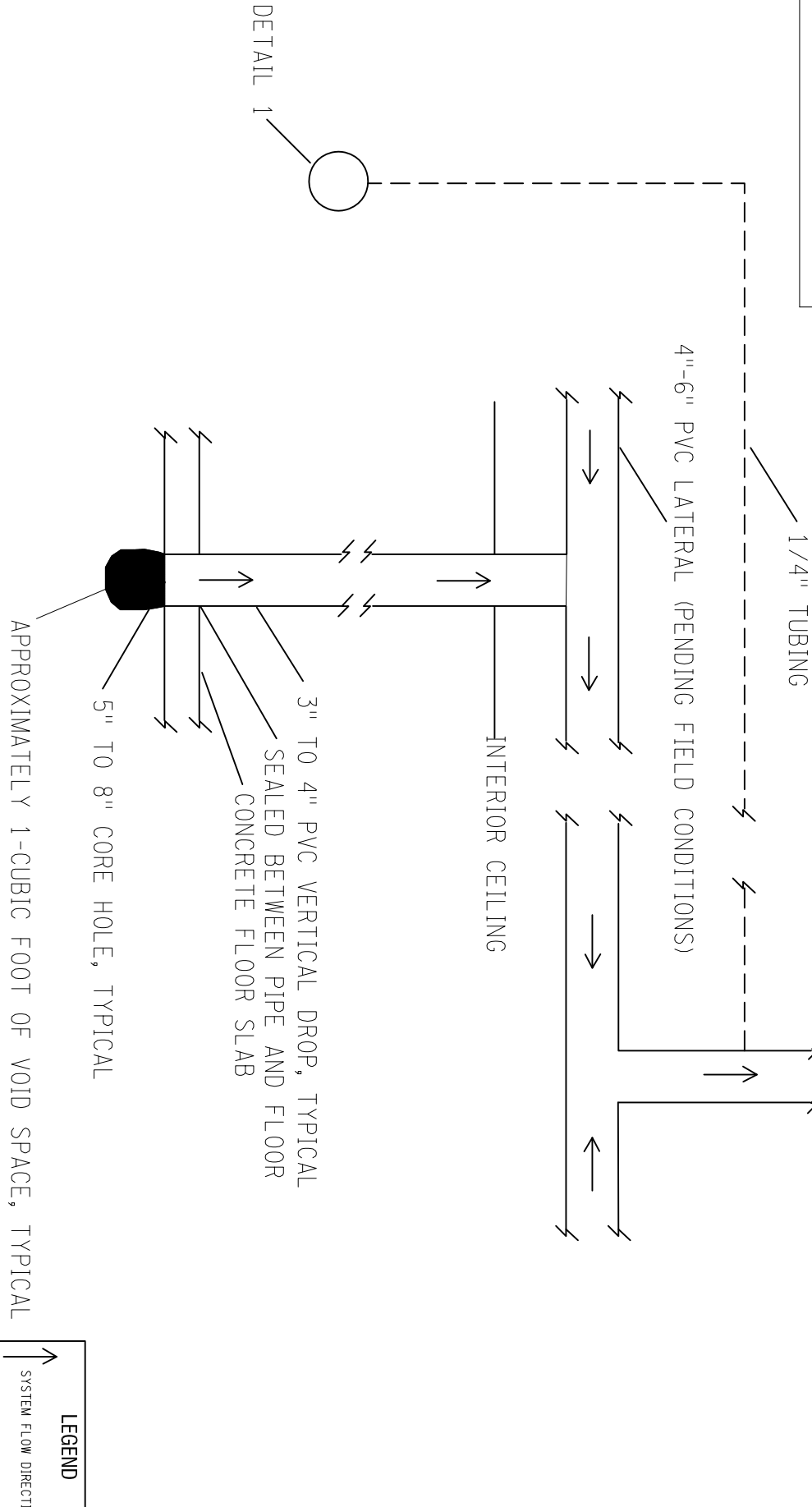
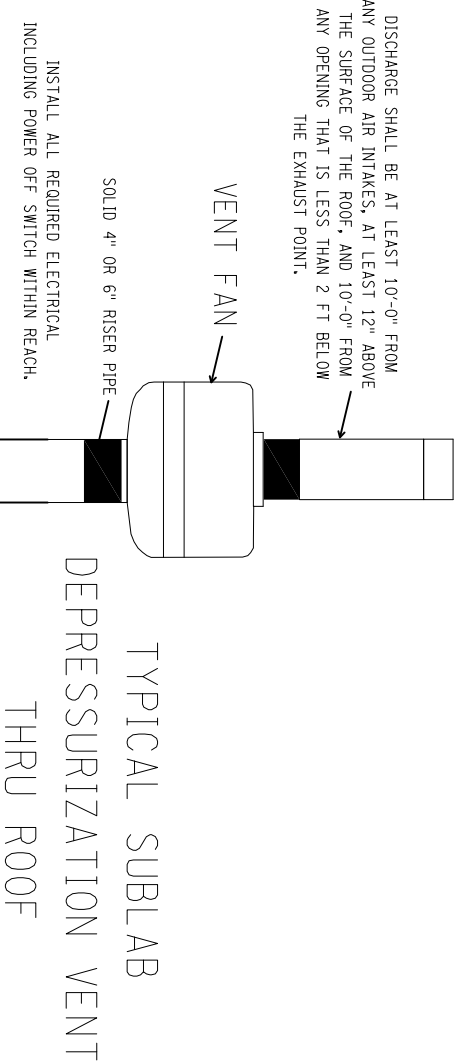
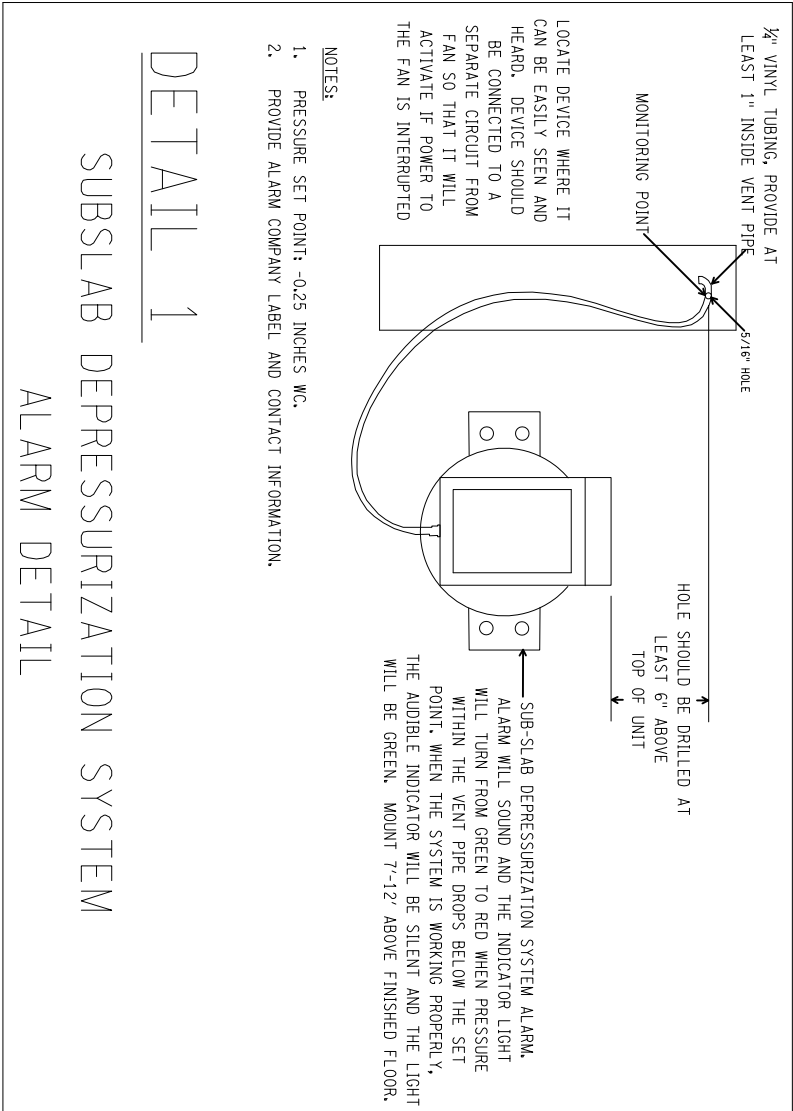


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0 12.5 25 Feet
1 inch = 25 feet

2170820

FIGURE 4B



SUBSOIL DEPRESSURIZATION SYSTEM PIPING NOTES:

A. POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS SHALL CONFORM TO ASTM D3034.

i:\Bausch & Lomb\2170820 - 691 St Paul St SWA BCP Site\Drawings\BAMP SSDS

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PROJECT/CLIENT

DEPRESSURIZATION SYSTEM DETAIL
BCP SITE #C828159A

691 AND 705 SAINT PAUL STREET
ROCHESTER, NEW YORK

DRAWING TITLE

PROPOSED SUB-SLAB
DEPRESURIZATION SYSTEM DETAILS

ISSUED FOR

FINAL

DATE: AUGUST 2017

DESIGNED BY: DPN

DRAWN BY: DRP

REVIEWED BY: DPN

PROJECT/DRAWING NUMBER

2170820

FIGURE 5

TABLE

REFERENCE PAGE FOR SAMPLE RESULTS

Remedial Action Work Plan - SSDS
NYSDEC BCP Site #C828159A
691 Saint Paul Street, Rochester, New York

Concentrations displayed in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)

Samples analyzed by USEPA Method TO-15

NL denotes Not Listed

(1) *New York State Department of Health (NYSDOH), Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006 (Updated May 2017). [Note: This Guidance uses a combination of indoor air and sub-slab soil vapor when comparing to the matrices. In addition, for compounds not listed in the matrices an overall site approach is employed which utilizes the USEPA BASE Database (see 2. below) as typical background for commercial buildings and also uses the outdoor air sample, refer to Guidance document for details.]

(2) USEPA 2001 Building Assessment and Survey Evaluation (BASE) Database (90th Percentile). As recommended in Section 3.2.4 of the NYSDOH Guidance (Refer to Footnote "1") this database is referenced for the indoor air sampling results. This database is also referenced to provide initial benchmarks for comparison to the air sampling data and does not represent regulatory standards or compliance values.

(3) No value was listed in NYSDOH Table C2 - USEPA Base Database. A value from Table C3 NYSDOH 1997: Control home database (90th Percentile) was used.

U indicates the value was detected below the reported laboratory method detection limit

UJ indicates the value was detected below the estimated reported laboratory method detection limit

J indicates an estimated value

BOLD type denotes that the compound was detected at a concentration that was found to exceed the NYSDOH Sub-Slab Vapor Concentration Decision Matrix (minimum action level).

UNDERLINED type denotes that the compound was detected at a concentration that was found to exceed the NYSDOH Indoor Air Concentration (minimum action level).

RED values are above Air Guideline Derived by NYSDOH in Table 3.1 of NYSDOH Guidance titled "Evaluating Soil Vapor Intrusion in the State of NY", October 2006 (and subsequent updates).

YELLOW HIGHLIGHT indicates the compound was detected at a concentration that was found to exceed NYSDOH Guidance 90th Percentile Database Value

TABLE 7.0B**SAMPLE LOCATION: 691-SB5B****Soil Vapor Intrusion Sampling Results**

NYSDEC BCP Site #C828159A

691 Saint Paul Street, Rochester, New York

Sample ID	Units	691-SB5B-SVI	691-SB5B-IAQ	691-OUTDOOR-04012017	NYSDOH Sub-Slab Vapor Concentration Decision Matrix (minimum action level) ⁽¹⁾	NYSDOH Indoor Air Concentration (minimum action level) ⁽¹⁾ / NYSDOH Air Guideline Value	NYSDOH Guidance Table C2 USEPA BASE Database 90th Percentile ⁽²⁾
Sample Type		Sub-Slab	Indoor Air	Outdoor Air			
Sample Date		4/1/2017	4/1/2017	4/1/2017			
1,1-Dichloroethene	ug/m ³	0.59 UJ	0.59 UJ	0.59 U	6	0.2	<1.4
Chloroethane	ug/m ³	0.40 UJ	0.40 UJ	0.40 U	NL	NL	<1.2
cis-1,2-Dichloroethene	ug/m ³	23 J	12 J	0.59 U	6	0.2	<1.8
trans-1,2-Dichloroethene	ug/m ³	0.71 J	0.59 UJ	0.59 U	NL	NL	<10 ⁽³⁾
Trichloroethene (TCE)	ug/m ³	58 J	6.8 J	0.21 U	<6	<0.2 / 2*	1.3
Vinyl chloride	ug/m ³	0.28 J	0.15 J	0.10 U	<6	<0.2	<1.8

TABLE 7.0B**SAMPLE LOCATION: 691-SB5A****Soil Vapor Intrusion Sampling Results**

NYSDEC BCP Site #C828159A

691 Saint Paul Street, Rochester, New York

Sample ID	Units	691-SB5A-SVI	691-SB5A-IAQ	691-OUTDOOR-04012017	NYSDOH Sub-Slab Vapor Concentration Decision Matrix (minimum action level) ⁽¹⁾	NYSDOH Indoor Air Concentration (minimum action level) ⁽¹⁾ / NYSDOH Air Guideline Value	NYSDOH Guidance Table C2 USEPA BASE Database 90th Percentile ⁽²⁾
Sample Type		Sub-Slab	Indoor Air	Outdoor Air			
Sample Date		4/1/2017	4/1/2017	4/1/2017			
1,1-Dichloroethene	ug/m ³	0.59 U	0.59 U	0.59 U	6	0.2	<1.4
Chloroethane	ug/m ³	0.40 U	0.40 U	0.40 U	NL	NL	<1.2
cis-1,2-Dichloroethene	ug/m ³	170	13	0.59 U	6	0.2	<1.8
trans-1,2-Dichloroethene	ug/m ³	1.6	0.59 U	0.59 U	NL	NL	<10 ⁽³⁾
Trichloroethene (TCE)	ug/m ³	20 J	6.5	0.21 U	<6	<0.2 / 2*	1.3
Vinyl chloride	ug/m ³	0.49	0.10 U	0.10 U	<6	<0.2	<1.8

TABLE 7.0B**SAMPLE LOCATION: 691-SB1****Soil Vapor Intrusion Sampling Results**

NYSDEC BCP Site #C828159A

691 Saint Paul Street, Rochester, New York

Sample ID	Units	691-SB1-SVI	691-SB1-IAQ	691-OUTDOOR-04012017	NYSDOH Sub-Slab Vapor Concentration Decision Matrix (minimum action level) ⁽¹⁾	NYSDOH Indoor Air Concentration (minimum action level) ⁽¹⁾ / NYSDOH Air Guideline Value	NYSDOH Guidance Table C2 USEPA BASE Database 90th Percentile ⁽²⁾
Sample Type		Sub-Slab	Indoor Air	Outdoor Air			
Sample Date		4/1/2017	4/1/2017	4/1/2017			
1,1-Dichloroethene	ug/m ³	0.59 U	0.59 UJ	0.59 U	6	0.2	<1.4
Chloroethane	ug/m ³	0.40 U	0.40 UJ	0.40 U	NL	NL	<1.2
cis-1,2-Dichloroethene	ug/m ³	52	2.6 J	0.59 U	6	0.2	<1.8
trans-1,2-Dichloroethene	ug/m ³	0.59 U	0.59 UJ	0.59 U	NL	NL	<10 ⁽³⁾
Trichloroethene (TCE)	ug/m ³	4.0	1.3 J	0.21 U	<6	<0.2 / 2*	1.3
Vinyl chloride	ug/m ³	0.38	0.10 UJ	0.10 U	<6	<0.2	<1.8

TABLE 7.0B**SAMPLE LOCATION: 691-NE****Soil Vapor Intrusion Sampling Results**

NYSDEC BCP Site #C828159A

691 Saint Paul Street, Rochester, New York

Sample ID	Units	691-NE-SVI	691-NE-IAQ	691-OUTDOOR-04012017	NYSDOH Sub-Slab Vapor Concentration Decision Matrix (minimum action level) ⁽¹⁾	NYSDOH Indoor Air Concentration (minimum action level) ⁽¹⁾ / NYSDOH Air Guideline Value	NYSDOH Guidance Table C2 USEPA BASE Database 90th Percentile ⁽²⁾
Sample Type		Sub-Slab	Indoor Air	Outdoor Air			
Sample Date		4/1/2017	4/1/2017	4/1/2017			
1,1-Dichloroethene	ug/m ³	0.59 U	0.59 U	0.59 U	6	0.2	<1.4
Chloroethane	ug/m ³	0.40 U	0.40 U	0.40 U	NL	NL	<1.2
cis-1,2-Dichloroethene	ug/m ³	0.59 U	0.59 U	0.59 U	6	0.2	<1.8
trans-1,2-Dichloroethene	ug/m ³	0.59 U	0.59 U	0.59 U	NL	NL	<10 ⁽³⁾
Trichloroethene (TCE)	ug/m ³	3.9	0.21 U	0.21 U	<6	<0.2 / 2*	1.3
Vinyl chloride	ug/m ³	0.10 U	0.10 U	0.10 U	<6	<0.2	<1.8

TABLE 7.0B**SAMPLE LOCATION: 691-B15****Soil Vapor Intrusion Sampling Results**

NYSDEC BCP Site #C828159A

691 Saint Paul Street, Rochester, New York

Sample ID	Units	691-B15-SVI	691-B15-IAQ	691-OUTDOOR-04012017	NYSDOH Sub-Slab Vapor Concentration Decision Matrix (minimum action level) ⁽¹⁾	NYSDOH Indoor Air Concentration (minimum action level) ⁽¹⁾ / NYSDOH Air Guideline Value	NYSDOH Guidance Table C2 USEPA BASE Database 90th Percentile ⁽²⁾
Sample Type		Sub-Slab	Indoor Air	Outdoor Air			
Sample Date		4/1/2017	4/1/2017	4/1/2017			
1,1-Dichloroethene	ug/m ³	0.59 U	0.59 U	0.59 U	6	0.2	<1.4
Chloroethane	ug/m ³	0.37 J	0.40 U	0.40 U	NL	NL	<1.2
cis-1,2-Dichloroethene	ug/m ³	0.59 U	1.6	0.59 U	6	0.2	<1.8
trans-1,2-Dichloroethene	ug/m ³	0.59 U	0.59 U	0.59 U	NL	NL	<10 ⁽³⁾
Trichloroethene (TCE)	ug/m ³	220	2.2	0.21 U	<6	<0.2 / 2*	1.3
Vinyl chloride	ug/m ³	0.28	0.10 U	0.10 U	<6	<0.2	<1.8

TABLE 7.0B**SAMPLE LOCATION: 691-B19****Soil Vapor Intrusion Sampling Results**

NYSDEC BCP Site #C828159A

691 Saint Paul Street, Rochester, New York

Sample ID	Units	691-B19-SVI	691-B19-IAQ-1	691-B19-IAQ-2	691-OUTDOOR-04012017	NYSDOH Sub-Slab Vapor Concentration Decision Matrix (minimum action level) ⁽¹⁾	NYSDOH Indoor Air Concentration (minimum action level) ⁽¹⁾ / NYSDOH Air Guideline Value	NYSDOH Guidance Table C2 USEPA BASE Database - 90th Percentile ⁽²⁾
Sample Type		Sub-Slab	Indoor Air	Indoor Air	Outdoor Air			
Sample Date		4/1/2017	4/1/2017	4/1/2017	4/1/2017			
1,1-Dichloroethene	ug/m ³	0.59 UJ	0.59 UJ	0.59 U	0.59 U	6	0.2	<1.4
Chloroethane	ug/m ³	0.40 UJ	0.40 UJ	0.40 U	0.40 U	NL	NL	<1.2
cis-1,2-Dichloroethene	ug/m ³	0.59 UJ	1.3 J	1.1	0.59 U	6	0.2	<1.8
trans-1,2-Dichloroethene	ug/m ³	0.59 UJ	0.59 UJ	0.59 U	0.59 U	NL	NL	<10 ⁽³⁾
Trichloroethene (TCE)	ug/m ³	26 J	2.1 J	2.1	0.21 U	<6	<0.2 / 2*	1.3
Vinyl chloride	ug/m ³	0.20 J	0.10 UJ	0.10 U	0.10 U	<6	<0.2	<1.8

APPENDIX A

SPECIFICATION SHEETS



INSTALLATION & OPERATING INSTRUCTIONS
Instruction P/N IN015 Rev E
FOR CHECKPOINT IIa™ P/N 28001-2 & 28001-3
RADON SYSTEM ALARM

INSTALLATION INSTRUCTIONS
(WALL MOUNTING)

Select a suitable wall location near a vertical section of the suction pipe. The unit should be mounted about four or five feet above the floor and as close to the suction pipe as possible. Keep in mind that with the plug-in transformer provided, the unit must also be within six feet of a 120V receptacle. **NOTE: The Checkpoint IIa is calibrated for vertical mounting, horizontal mounting will affect switchpoint calibration.**

Drill two 1/4" holes 4" apart horizontally where the unit is to be mounted.

Install the two 1/4" wall anchors provided.

Hang the CHECKPOINT IIa from the two mounting holes located on the mounting bracket. Tighten the mounting screws so the unit fits snugly and securely against the wall.

Drill a 5/16" hole into the side of the vent pipe about 6" higher than the top of the unit.

Insert the vinyl tubing provided about 1" inside the suction pipe.

Cut a suitable length of vinyl tubing and attach it to the pressure switch connector on the CHECKPOINT IIa.

CALIBRATION AND OPERATION.

The CHECKPOINT IIa units are calibrated and sealed at the factory to alarm when the vacuum pressure falls below the factory setting and should not normally require field calibration. Factory Settings are:

28001-2 - .25" WC Vacuum

28001-3 - .10" WC Vacuum

To Verify Operation:

With the exhaust fan off or the pressure tubing disconnected and the CHECKPOINT IIa plugged in, both the red indicator light and the audible alarm should be on.

Turn the fan system on or connect the pressure tubing to the fan piping. The red light and the audible alarm should go off. The green light should come on.

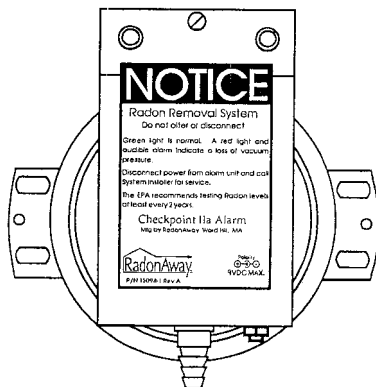
Now turn the fan off. The red light and audible alarm should come on in about two or three seconds and the green light should go out.

WARRANTY INFORMATION

Subject to applicable consumer protection legislation, RadonAway warrants that the CHECKPOINT IIa will be free from defective material and workmanship for a period of (1) year from the date of purchase. Warranty is contingent on installation in accordance with the instructions provided. This warranty does not apply where repairs or alterations have been made or attempted by others; or the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway. All other warranties, expressed or written, are not valid. To make a claim under these limited warranties, you must return the defective item to RadonAway with a copy of the purchase receipt. RadonAway is not responsible for installation or removal cost associated with this warranty. In no case is RadonAway liable beyond the repair or replacement of the defective product FOB RadonAway.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THERE IS NO WARRANTY OF MERCHANTABILITY. ALL OTHER WARRANTIES, EXPRESSED OR WRITTEN, ARE NOT VALID.

For service under these warranties, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. **No returns can be accepted without an RMA.** If factory return is required, the customer assumes all shipping costs to and from factory.



Manufactured by:
RadonAway
Ward Hill, MA
(978)-521-3703



Standard Operating Procedure Installation and Extraction of the Vapor Pin®

Updated September 9, 2016

Scope:

This standard operating procedure describes the installation and extraction of the VAPOR PIN® for use in sub-slab soil-gas sampling.

Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the VAPOR PIN® for the collection of sub-slab soil-gas samples or pressure readings.

Equipment Needed:

- Assembled VAPOR PIN® [VAPOR PIN® and silicone sleeve(Figure 1)]; Because of sharp edges, gloves are recommended for sleeve installation;
- Hammer drill;
- 5/8-inch (16mm) diameter hammer bit (hole must be 5/8-inch (16mm) diameter to ensure seal. It is recommended that you use the drill guide). (Hilti™ TE-YX 5/8" x 22" (400 mm) #00206514 or equivalent);
- 1½-inch (38mm) diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch (19mm) diameter bottle brush;
- Wet/Dry vacuum with HEPA filter (optional);
- VAPOR PIN® installation/extraction tool;
- Dead blow hammer;
- VAPOR PIN® flush mount cover, if desired;
- VAPOR PIN® drilling guide, if desired;

- VAPOR PIN® protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel for repairing the hole following the extraction of the VAPOR PIN®.



Figure 1. Assembled VAPOR PIN®

Installation Procedure:

- 1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.
- 2) Set up wet/dry vacuum to collect drill cuttings.
- 3) If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. Use of a VAPOR PIN® drilling guide is recommended.
- 4) Drill a 5/8-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. Hole must be 5/8-inch (16mm) in diameter to ensure seal. It is recommended that you use the drill guide.

VAPOR PIN® protected under US Patent # 8,220,347 B2, US 9,291,531 B2 and other patents pending

- 5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.
- 6) Place the lower end of VAPOR PIN® assembly into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the vapor pin to protect the barb fitting, and tap the vapor pin into place using a dead blow hammer (Figure 2). Make sure the installation/extraction tool is aligned parallel to the vapor pin to avoid damaging the barb fitting.



Figure 2. Installing the VAPOR PIN®

During installation, the silicone sleeve will form a slight bulge between the slab and the VAPOR PIN® shoulder. Place the protective cap on VAPOR PIN® to prevent vapor loss prior to sampling (Figure 3).



Figure 3. Installed VAPOR PIN®

- 7) For flush mount installations, cover the vapor pin with a flush mount cover, using either the plastic cover or the optional stainless-steel Secure Cover (Figure 4).



Figure 4. Secure Cover Installed

- 8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.
- 9) Remove protective cap and connect sample tubing to the barb fitting of the VAPOR PIN®. This connection can be made using a short piece of Tygon™ tubing to join the VAPOR PIN® with the Nylaflo tubing (Figure 5). Put the

Nylaflow tubing as close to the VAPOR PIN® as possible to minimize contact between soil gas and Tygon™ tubing.



Figure 5. VAPOR PIN® sample connection

- 10) Conduct leak tests in accordance with applicable guidance. If the method of leak testing is not specified, an alternative can be the use of a water dam and vacuum pump, as described in SOP Leak Testing the VAPOR PIN® via Mechanical Means (Figure 6). For flush-mount installations, distilled water can be poured directly into the 1 1/2 inch (38mm) hole.



Figure 6. Water dam used for leak detection

- 11) Collect sub-slab soil gas sample or pressure reading. When finished, replace the protective cap and flush mount cover

until the next event. If the sampling is complete, extract the VAPOR PIN®.

Extraction Procedure:

- 1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the VAPOR PIN® (Figure 7). Turn the tool clockwise continuously, don't stop turning, the VAPOR PIN® will feed into the bottom of the installation/extraction tool and will extract from the hole like a wine cork, DO NOT PULL.
- 2) Fill the void with hydraulic cement and smooth with a trowel or putty knife.



Figure 7. Removing the VAPOR PIN®

- Prior to reuse, remove the silicone sleeve and protective cap and discard. Decontaminate the VAPOR PIN® in a hot water and Alconox® wash, then heat in an oven to a temperature of 265° F (130° C) for 15 to 30 minutes. For both steps, STAINLESS – 1/2 hour, BRASS 8 minutes
- 3) Replacement parts and supplies are available online.

Innovative Sampling Methods for Focusing the Sub-Slab Soil-Gas Investigation

Martin (Mort) Schmidt
Cox-Colvin & Associates, Inc.
August 3, 2012

Introduction

Sub-slab soil-gas is critical to vapor intrusion investigations, but spatial heterogeneity in soil-gas can be extremely high. McHugh's investigation¹ on spatial and temporal variability showed that the variability in sub-slab soil gas was equal to that in deeper soil gas and far higher than the variability in indoor air. However, due in part to the difficulty of installing sub-slab sampling points via conventional methods, many investigations probably lack representative soil-gas data. California's vapor intrusion guidance indicates that, "*Collecting as many as eight subsurface samples for a single building, even a large commercial building, both spatially and temporally, is rarely done*".²

More extensive sub-slab soil gas sampling is hampered by two factors – the effort and cost required to install sampling points, and the costs of collecting and analyzing soil-gas samples. A typical sub-slab sampling point is described in US EPA's Raymark investigation.³ Points consisted of either stainless-steel Swagelok® or commonly-available brass plumbing parts. The report recommends using quick-drying cement and, even then, allowing it to cure for a minimum of 24 hours before sampling. DiGiulio, et al. indicated that using this procedure, probes could be installed in as little as 40 minutes. The report goes on to explain that one of the points could not be sampled when it broke loose while making connections. Similarly, Ohio EPA's Vapor Intrusion Guidance⁴ provides a Standard Operating Procedure (SOP) for installing sub-slab sampling points using Swagelok® fittings, and includes advice on repairing the assembly if it breaks loose while removing or installing the end plug. The sub-slab points were well designed, given the available hardware, but the time and difficulty of installing them properly is a major limitation.

Simplified means of collecting sub-slab soil gas include the use of "rubber" stoppers with holes pre-drilled for tubing, as described in the Massachusetts vapor intrusion guidance,⁵ or jamming modeling clay and tubing into holes in the floor. These alternatives can be useful, but the data they provide may be questionable, and the sample points are generally not useable for repeat sampling. Moreover, short-term cost savings might come at a high cost in data quality, without lowering long-term economic costs.

Cox-Colvin conducts sub-slab soil-gas sampling using rapidly-installed sampling points (Vapor Pins™). The device can be installed with hand-held tools in under ten minutes and requires no cement. Vapor Pins™ can be installed above grade for one time sampling, or below grade for repeat sampling. This presentation highlights an investigation in which we installed and sampled 145 sample points in five days to locate a source of tetrachloroethene (PCE) at a manufacturing facility.

Costs were further reduced by collecting samples into 22-ml glass vials for laboratory analysis by gas chromatography (GC), for approximately a third the cost of TO-15 analysis of samples from canisters. The streamlined procedures and reduced costs enabled the collection of an extensive array of soil-gas samples, allowing us to focus subsequent investigative and remediation efforts.

Vapor Pins™ might not comply with some regulatory requirements for vapor intrusion sampling, particularly if barbed fittings are not allowed for tubing connections. Additionally, reporting levels for the glass vials were higher than for evacuated canisters – 10 ppb for PCE – potentially limiting the use of vials to data screening, depending upon data quality objectives.

Background

The investigation was conducted at a manufacturing facility in western Ohio which historically used PCE for cleaning and degreasing. The facility has operated since 1933, but the current owner purchased the property in the 1990s and has a limited understanding of earlier solvent use. PCE had been observed in groundwater at the facility at concentrations as high as 440 ug/L, but declined dramatically following remediation at an area that once held PCE degreasing equipment. A smaller, nearby source of PCE contamination was remediated concurrently using the same techniques, with a similar drop in groundwater PCE.

PCE in groundwater remained elevated in the eastern part of the facility, averaging 18 ug/L in one monitor well. This area contained an aboveground storage tank (AST) that was overtopped with PCE in the 1980s. But because the area was remediated immediately after the release, the spill area was not directly in line with the plume, and groundwater at the spill location was consistently free of PCE, we assumed that the source of PCE was most likely a different AST or former degreaser. The client had us investigate soil and groundwater beneath the eastern building via Geoprobe® direct-push drilling. But soil samples next to the former degreasers and ASTs lacked major contamination, and because the client was pressed to make financial decisions on long-term environmental costs, we were tasked with locating all remaining source areas in a single deployment, and at a limited cost.

Experimental Methods

Having previously located unsuspected sources of VOCs at another Ohio site by prospecting with soil gas, we decided to collect soil gas beneath the building in a grid pattern with 20 ft spacing. In the earlier investigation, soil gas was collected via Geoprobe® from a depth of 5 ft, injected into evacuated 22-ml glass vials, and analyzed by GC in a mobile laboratory by Microseeps of Pittsburgh, PA. The more recent investigation was streamlined by collecting soil gas directly through the floor with methods we had since developed for vapor intrusion assessments. Recognizing the limitations of conventional sub-slab soil-gas sampling points, we developed the Vapor Pin™, constructed from a single piece of brass or stainless steel that forms a seal against concrete with a silicone sleeve (Figure 1).

The Vapor Pins™ were installed by drilling 5/8-inch holes through the floor with a hand-held hammer drill. After dusting the holes with a bottle brush, the Vapor Pins™ were hammered into place, capped, and allowed to equilibrate for approximately one hour. At several locations, a second, larger hole was countersunk around the 5/8-inch holes so that the Vapor Pins™ could be installed in a flush-mount configuration and left in place for long-term monitoring (Figure 2).

Following equilibration, soil gas was purged from the sampling points at a rate of 200 ml/minute with a multi-meter equipped with a photo-ionization detector (PID) and oxygen (O₂) sensor. Purging ended after PID and O₂ levels stabilized – approximately 20 seconds. Soil gas was collected from the sample points by puncturing the sample tubing with a disposable syringe and withdrawing the plunger. Soil gas was injected through the septum of evacuated glass vials and sent to Microseeps for analysis.

At the end of each shift, the Vapor Pins™ were removed and the holes were plugged with hydraulic cement, allowing daytime plant operations to go uninterrupted. Following each use, the silicone sleeves were stripped from the Vapor Pins™ and discarded, and the pins were decontaminated for reuse.

Results

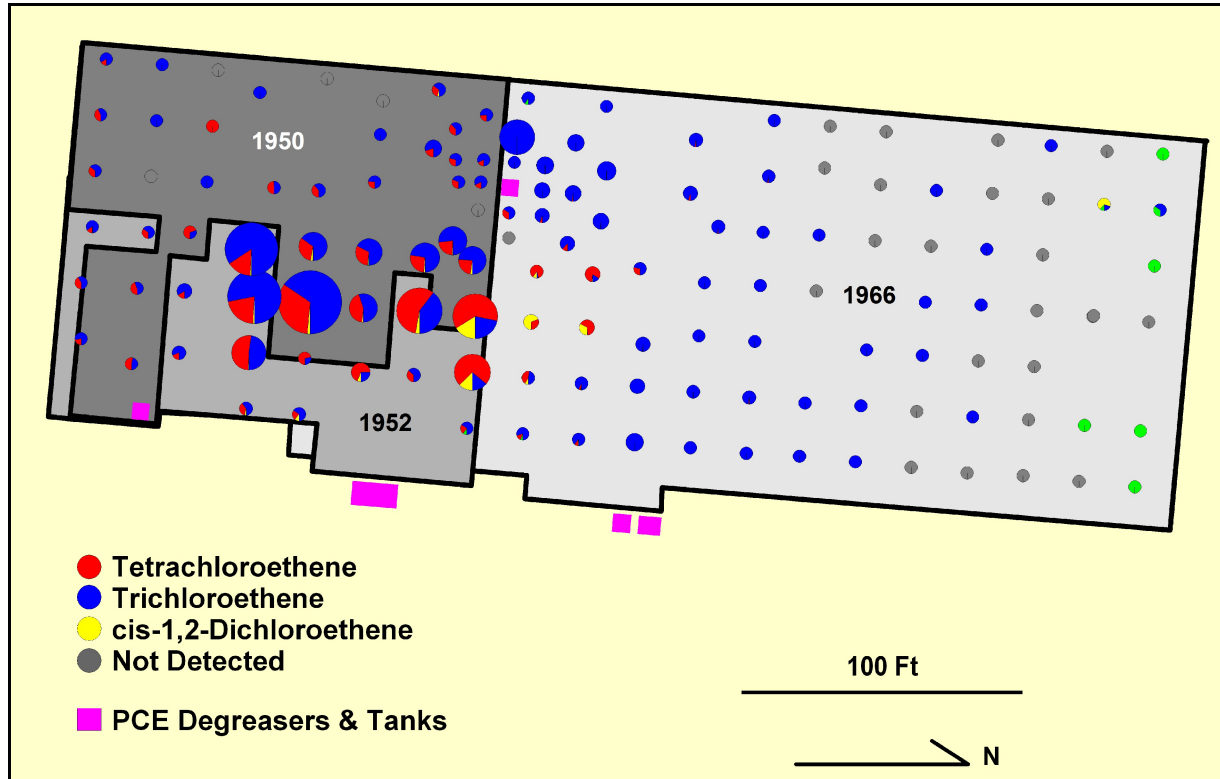
Total VOCs in soil gas, as indicated by the field PID, ranged from non-detect to 100,000 ppb (up to 58,000 ppb, corrected for PCE). Total chlorinated solvents in laboratory samples closely resembled PID data, with concentrations ranging from non-detect to 57,000 ppb. VOCs in soil gas did not correspond to expected sources of PCE, i.e., the location of former ASTs or degreasers (Figure 3). Additionally, laboratory results showed a strong correlation with the field-PID data, suggesting that future costs could be further reduced by limiting laboratory analysis to samples with high PID concentrations.



Figure 1. Vapor Pin™ Sub-Slab Samplers.



Figure 2. Flush-Mount Installation Process.



Soil samples were subsequently collected via Geoprobe® from areas of highly contaminated soil-gas to verify the presence of VOC sources and to provide data on soil properties for the subsequent remediation. Soil samples were sent to a commercial laboratory for analysis for VOCs via gas chromatography/mass spectrometry (GC/MS).

Laboratory results showed high levels of PCE in soil at a depth of approximately 15 ft in the areas of high VOCs in soil gas. Soil data also indicated an area of what appears to be primary contamination by trichloroethene (TCE), which had previously been considered a PCE-degradation product. The soil investigation was followed by the installation of a soil-vapor extraction (SVE) remediation system – approximately nine months after collecting the first soil-gas sample.

Discussion

As we had seen in previous investigations, most of the contamination was *not* near former degreasing equipment or ASTs. By overlaying the map of soil-gas contamination with historic building outlines, taken from fire insurance maps and aerial photographs, we found that the distribution of PCE and TCE matched the building configuration of 1950 – a time when wastes were routinely dumped or spilled at back doors and loading docks. By 1952, the building completely surrounded the area of PCE contamination.

There are important implications for vapor intrusion. With the cost and effort required to construct sub-slab sample points made of lab-grade stainless hardware, set into concrete mixed with distilled water, and leak testing with ultra-pure helium, one risks collecting a few high-quality samples in the wrong place. The situation is analogous to the argument over Geoprobe® drilling for soil or groundwater in the 1980s. At the time, many argued that direct-push drilling could not provide adequate sample quality for environmental assessment. Experience has proven that while direct-push drilling is not the answer to all sampling needs, the ability to collect more samples in a timely, cost-effective way, enables one to focus efforts on where contamination levels are highest. Likewise, the use of streamlined sampling techniques, including Vapor Pins™, PIDs, and glass vials, allows collecting significantly more data within time and budgetary constraints, potentially reducing problems caused by sample heterogeneity.

References

1. McHugh, T.E. 2007. Evaluation of Spatial and Temporal Variability in VOC Concentrations at Vapor Intrusion Investigation Sites, A&WMA Vapor Intrusion Conference, Providence, RI, September 2007.
2. California Department of Toxic Substances Control & California Environmental Protection Agency, 2011. Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance), October, 2011.
3. DiGiulio, D.C.; Paul, C.J; Cody, R; Willey, R; Clifford, S; Kahn, P; Mosley, R; Lee, A.; Christensen, K., 2006. Assessment of Vapor Intrusion in Homes Near the Raymark Superfund Site Using Basement and Sub-Slab Air Samples. March 2006, EPA/600/R-05/147.
4. Ohio Environmental Protection Agency, 2010. Sample Collection and Evaluation of Vapor Intrusion to Indoor Air for Remedial Response and Voluntary Action Programs. May 2010.
5. Massachusetts Department of Environmental Protection, 2011. Interim Final Vapor Intrusion Guidance, December 2011, WSC#-11-435.

Key Words

Vapor Intrusion, Vapor Pin™, Subslab, Sub-Slab, Soil Gas, Volatile Organic Compound, VOC, Tetrachloroethene, Spatial Heterogeneity.

APPENDIX B

QUALITY CONTROL PLAN

Quality Control Plan (QCP) NYSDEC Site #828159A

Location:

691 and 705 Saint Paul Street
Rochester, New York

Prepared for:

Bausch & Lomb
1400 North Goodman Street
Rochester, New York 14609

LaBella Project No. 2170820

August 18, 2017

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1.0 INTRODUCTION

LaBella's Quality Control (QC) Program is an integral part of its approach to environmental investigations. By maintaining a rigorous QC program, our firm is able to provide accurate and reliable data. QC also provides safe working conditions for all on-site workers.

The Quality Control program contains procedures, which provide for collected data to be properly evaluated, and which document that quality control procedures have been followed in the collection of samples. The quality control program represents the methodology and measurement procedures used in collecting quality field data. This methodology includes the proper use of equipment, documentation of sample collection, and sample handling practices.

Procedures used in the firm's Quality Control program are compatible with federal, state, and local regulations, as well as, appropriate professional and technical standards.

This QC program has been organized into the following areas:

- QC Objectives and Checks
- Field Equipment, Handling, and Calibration
- Sampling Techniques
- Sample Handling and Packaging

It should be noted that the Soil Gas Sampling Work Plan (SGS) Work Plan may have project specific details that will differ from the procedures in this QC program. In such cases, the SGS Work Plan should be followed (subsequent to regulatory approval).

2.0 QUALITY CONTROL OBJECTIVES

The United States Environmental Protection Agency (EPA) has identified five general levels of analytical data quality as being potentially applicable to site investigations conducted under CERCLA. These levels are summarized below:

- **Level I** - Field screening. This level is characterized by the use of portable instruments, which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations.
- **Level II** - Field analysis. This level is characterized by the use of portable analytical instruments, which can be used on site or in mobile laboratories stationed near a site (close-support labs). Depending upon the types of contaminants, sample matrix, and personnel skills, qualitative and quantitative data can be obtained.
-

- **Level III** - Laboratory analysis using methods other than the Contract Laboratory Program (CLP) Routine Analytical Services (RAS). This level is used primarily in support of engineering studies using standard EPA-approved procedures. Some procedures may be equivalent to CLP RAS, without the CLP requirements for documentation.
- **Level IV** - CLP Routine Analytical Services. This level is characterized by rigorous QC protocols and documentation and provides qualitative and quantitative analytical data. Some regions have obtained similar support via their own regional laboratories, university laboratories, or other commercial laboratories.
- **Level V** - Non-standard methods. Analyses, which may require method modification and/or development. CLP Special Analytical Services (SAS) are considered Level V.

Unless stated otherwise, all data will be generated in accordance with Level IV. When CLP methodology is not available, federal and state approved methods will be utilized. Level III will be utilized, as necessary, for non-CLP RAS work which may include ignitability, corrosivity, reactivity, EP toxicity, and other state approved parameters for characterization. Level I will be used throughout the SGS for health and safety monitoring activities.

All measurements will be made to provide that analytical results are representative of the media and conditions measured. Unless otherwise specified, all data will be calculated and reported in units consistent with other organizations reporting similar data to allow comparability of data bases among organizations. Data will be reported in µg/L and mg/L for aqueous samples, and µg/kg and mg/kg (dry weight) for soils, or otherwise as applicable.

The characteristics of major importance for the assessment of generated data are accuracy, precision, completeness, representativeness, and comparability. Application of these characteristics to specific projects is addressed later in this document. The characteristics are defined below.

2.1 Accuracy

Accuracy is the degree of agreement of a measurement or average of measurements with an accepted reference or "true" value and is a measure of bias in the system.

2.2 Precision

Precision is the degree of mutual agreement among individual measurements of a given parameter.

2.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct normal conditions.

2.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

Careful choice and use of appropriate methods in the field will ensure that samples are representative. This is relatively easy with water or air samples since these components are homogeneously dispersed. In soil and sediment, contaminants are unlikely to be evenly distributed, and thus it is important for the sampler and analyst to exercise good judgment when removing a sample.

2.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another. The data sets may be inter- or intra- laboratory.

3.0 MEASUREMENT OF DATA QUALITY

3.1 Accuracy

Accuracy of a particular analysis is measured by assessing its performance with "known" samples. These "knowns" take the form of EPA standard reference materials, or laboratory prepared solutions of target analytes spiked into a pure water or sample matrix. In the case of GC or GC/MS analyses, solutions of surrogate compounds, which can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination, are used.

In each case the recovery of the analyte is measured as a percentage, correcting for analytes known to be present in the original sample if necessary, as in the case of a matrix spike analysis. For EPA supplied known solutions, this recovery is compared to the published data that accompany the solution.

For the firm's prepared solutions, the recovery is compared to EPA-developed data or the firm's historical data as available. For surrogate compounds, recoveries are compared to EPA CLP acceptable recovery tables.

If recoveries do not meet required criteria, then the analytical data for the batch (or, in the case of surrogate compounds, for the individual sample) are considered potentially inaccurate. The analyst or his supervisor must initiate an investigation of the cause of the problem and take corrective action. This can include recalibration of the instrument, reanalysis of the QC sample, reanalysis of the samples in the batch, or flagging the data as suspect if the problems cannot be resolved. For highly contaminated samples, recovery of the matrix spike may depend on sample homogeneity. As a rule, analyses are not corrected for recovery of matrix spike or surrogate compounds.

3.2. Precision

Precision of a particular analysis is measured by assessing its performance with duplicate or replicate samples. Duplicate samples are pairs of samples taken in the field and transported to the laboratory as distinct samples. Their identity as duplicates is sometimes not known to ASC and usually not known to bench analysts, so their usefulness for monitoring analytical precision at bench level is limited. For most purposes, precision is determined by the analysis of replicate pairs (i.e., two samples prepared at the laboratory from one original sample). Often in replicate analysis the sample chosen for replication does not contain target analytes so that quantitation of precision is impossible.

For EPA CLP analyses, replicate pairs of spiked samples, known as matrix spike/matrix spike duplicate samples, are used for precision studies. This has the advantage that two real positive values for a target analyte can be compared.

Precision is calculated in terms of Relative Percent Difference (RPD).

- Where X_1 and X_2 represent the individual values found for the target analyte in the two replicate analyses or in the matrix spike/matrix spike duplicate analyses.
- RPDs must be compared to the method RPD for the analysis. The analyst or his supervisor must investigate the cause of RPDs outside stated acceptance limits. This may include a visual inspection of the sample for non homogeneity, analysis of check samples, etc. Follow-up action may include sample reanalysis or flagging of the data as suspect if problems cannot be resolved.
- During the data review and validation process (see Section 9), field duplicate RPDs are assessed as a measure of the total variability of both field sampling and laboratory analysis.

3.3. Completeness

Completeness for each parameter is calculated as follows:

- The firm's target value for completeness for all parameters is 100%. A completeness value of 95% will be considered acceptable. Incomplete results will be reported to the site managers. In planning the field sample collection, the site manager will plan to collect field duplicates from identified critical areas. This procedure should assure 100% completeness for these areas.

3.4. Representativeness

The characteristic of representativeness is not quantifiable. Subjective factors to be taken into account are as follows:

- The degree of homogeneity of a site;
- The degree of homogeneity of a sample taken from one point in a site; and
- The available information on which a sampling plan is based.

To maximize representativeness of results, sampling techniques and sample locations will be carefully chosen so that they provide laboratory samples representative of the site and the specific area. Within the laboratory, precautions are taken to extract from the sample bottle an aliquot representative of the whole sample. This includes premixing the sample and discarding pebbles from soil samples.

4.0 QC TARGETS

Target values for detection limit, percent spike recovery and percent "true" value of known check standards, and RPD of duplicates/replicates are included in the QCP, Analytical Procedures. Note that tabulated values are not always attainable. Instances may arise where high sample concentrations, non homogeneity of samples, or matrix interferences preclude achievement of target detection limits or other quality control criteria. In such instances, the firm will report reasons for deviations from these detection limits or noncompliance with quality control criteria.

5.0 SAMPLING PROCEDURES

5.1 *Ambient Air Sampling*

This section describes the sampling procedures to be utilized for each environmental medium that will be collected and analyzed in accordance with appropriate state and federal requirements. All procedures described are consistent with EPA sampling procedures as described in SW-846, Update V, dated August 2015 and New York State Department of Health's *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006.

To obtain representative samples and to minimize possible discrepancies, air samples should be collected in the following manner at all locations:

- The protective brass plug from each canister will be removed and the pre-calibrated flow controller will be connected to the canister. The canister will be connected to the soil gas sampling probe via inert tubing (e.g., polyethylene, stainless steel, or Teflon®).
- The identification numbers for the canisters and flow controllers will be recorded along with the initial canister pressures on the vacuum gauge. Canisters with a significantly different pressure than originally recorded by the testing laboratory should not be used for sampling.
- The flow controller valve will be completely opened and the time that the valve was opened (beginning of sampling) will be recorded.
- Sample collection will be stopped after the scheduled duration of sample collection (approximately 8 hours) and care will be taken to make sure that the canister still has a minimum amount of vacuum remaining. If there is no vacuum remaining, the sample will be rejected and should be collected again in a new canister.
- The final vacuum pressure will be recorded and the flow controller valve will be closed completely. The date and time sample collection was stopped will be recorded.
- The flow controller from the canister will be removed and the protective brass plugs will be replaced.

- Labels/tags (sample name, time/date of sampling, etc.) will be attached to the canisters as directed by the laboratory and placed in the packaging provided by the laboratory.
- The information required for each sample will be entered on the chain of custody form. Copies of the chain-of-custody form will be included in the shipping packaging, as directed by the laboratory. The field manager will retain a copy of the chain of custody for the project file.
- The samples will be shipped to the laboratory within one business day of sample collection via overnight delivery.
- In addition to the indoor air samples, one exterior ambient air sample will also be collected from the apparent upwind location. The ambient air sample will be collected from about 3 to 5ft above the ground using a Summa Canister over the same approximate sampling period.

In some cases, weather conditions may present certain limitations for the sampling. When soil vapor samples are collected, the following actions will be taken to document local conditions during sampling that may influence interpretation of the results:

- Weather conditions (e.g., precipitation and outdoor temperature) should be noted for the past 24 to 48 hours; and
- Any pertinent observations should be recorded, such as odors and readings from field instrumentation.

6.0 SURVEYING

Coordinates and elevations will be established for each soil gas sampling point. Elevations to the closest 0.01 foot shall be used for the survey. These elevations shall be referenced to a regional, local, or project-specific datum. USGS benchmarks will be used whenever available. The location, identification, coordinates, and elevations of the wells will be plotted on maps with a scale large enough to show their location with reference to other structures at each site. Interior locations will be located via tape measure and elevations based on tape measure from exterior grade, to the extent practicable.

7.0 GEOLOGIC LOGGING AND SAMPLING

At each investigative location, the boring will be advanced through overburden using either a drill rig and hollow-stem auger or direct push technology; soils will be visually inspected for stains and monitored with a PID to help determine potential for vertical migration of contaminants. Soil samples will be collected continuously. The sampling device will be decontaminated according to procedures outlined in the Decontamination section of this document. Recovered soil will be screened in the field for volatile organic vapors using a PID, classified in accordance with Unified Soil Classification System (USCS) specifications, and logged.

All samples will be screened with a PID during collection. The headspace of all samples taken in the field will be screened using USEPA method 3810.

8.0 MANAGEMENT OF INVESTIGATIVE DERIVED WASTE

Purpose:

The purposes of these guidelines are to ensure the proper holding, storage, transportation, and disposal of materials that may contain hazardous wastes. Investigation-derived waste (IDW) included the following:

- Drill cuttings, discarded soil samples, drilling mud solids, and used sample containers;
- Soiled disposable personal protective equipment (PPE);
- Used disposable sampling equipment;
- Used plastic sheeting and aluminum foil;
- Other equipment or materials that either contain or have been in contact with potentially-impacted environmental media.
- Because these materials may contain regulated chemical constituents, they must be managed as a solid waste. This management may be terminated if characterization analytical results indicate the absence of these constituents.

Procedure:

1. Contain all investigation-derived wastes in Department of Transportation (DOT)-approved 55-gallon drums, roll-off boxes, or other containers suitable for the wastes.
2. Contain wastes from separate borings or wells in separate containers (i.e. do not combine wastes from several borings/wells in a single container, unless it is a container used specifically for transfer purposes, or unless specific permission to do so has been provided by the LaBella Project Manager. Unused samples from surface sample locations within a given area may be combined.

3. To the extent practicable, separate solids from drilling muds, decontamination waters, and similar liquids. Place solids within separate containers.
4. Transfer all waste containers to a staging area. Access to this area will be controlled. Waste containers must be transferred to the staging area as soon as practicable after the generating activity is complete.
5. Pending transfer, all containers will be covered and secured when not immediately attended,
6. Label all containers with regard to contents, origin, and date of generation. Use indelible ink for all labeling.
7. Collect samples for waste characterization purposes, use boring/well sample analytical data for characterization.
8. For wastes determined to be hazardous in character, be aware on accumulation time limitations. Coordinate the disposal of these wastes with the Owner and NYSDEC.
9. Dispose of investigation-derived wastes as follows;
 - Soil, water, and other environmental media for which analysis does not detect organic constituents, and for which inorganic constituents are at levels consistent with background, may be spread on-site or otherwise treated as a non0-waste material.
 - Soils, water, and other environmental media in which organic compounds are detected or metals are present above background will be disposed as industrial waste. Alternate disposition must be consistent with applicable State and Federal laws.
 - Personal protective equipment, disposable bailers, and similar equipment may be disposed as municipal waste, unless waste characterization results mandate disposal as industrial wastes

9.0 DECONTAMINATION

Sampling methods and equipment have been chosen to minimize decontamination requirements and to prevent the possibility of cross-contamination. Decontamination of equipment will be performed between discrete sampling locations. Equipment used to collect samples between composite sample locations will not require decontamination between collection of samples. All drilling equipment will be decontaminated prior to drilling, after drilling each monitoring well, and after the completion of all drilling. Special attention will be given to the drilling assembly, augers, and PVC casing and screens.

Drilling decontamination will consist of:

- Steam cleaning;
- Scrubbing with brushes, if soil remains on equipment; and
- Steam rinse.

Split spoons and other non-disposable equipment will be decontaminated between each sampling event. The sampler will be cleaned prior to each use, by one of the following procedures:

- Initially cleaned of all foreign matter;
- Sanitized with a steam cleaner;

OR

- Initially cleaned of all foreign matter;
- Scrubbed with brushes in trisodium phosphate or alconox solution;
- Rinsed with deionized water;
- Rinsed with pesticide grade methanol;
- Triple rinsed with deionized water; and
- Allowed to air dry.

10.0 SAMPLE CONTAINERS

The volumes and containers required for the sampling activities are included in pre-washed sample containers will be ordered directly from a firm, which prepares the containers in accordance with EPA bottle washing procedures.

TABLE 1
Air Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Maximum Holding Time
Volatile Organics via USEPA Method TO-15	Summa Canister, 1 to 6 Liter	One (1), fill as regulator allows	Keep away from sunlight	30 days

* Holding time is based on the times from verified time of sample receipt at the laboratory.

11.0 SAMPLE CUSTODY

This section describes standard operating procedures for sample identification and chain-of-custody to be utilized for all Phase II field activities. The purpose of these procedures is to ensure that the quality of the samples is maintained during their collection, transportation, and storage through analysis. All chain-of-custody requirements comply with standard operating procedures indicated in EPA sample handling protocol.

Sample identification documents must be carefully prepared so that sample identification and chain-of-custody can be maintained and sample disposition controlled. Sample identification documents include:

- Field notebooks,
- Sample label,
- Custody seals, and
- Chain-of-custody records.

12.0 CHAIN OF CUSTODY

The primary objective of the chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. A sample is in custody if it is:

- In someone's physical possession;
- In someone's view;
- Locked up; or
- Kept in a secured area that is restricted to authorized personnel.

12.1 Field Custody Procedures

- As few persons as possible should handle samples.
- Sample bottles will be obtained precleaned from a source such as I-Chem. Coolers or boxes containing cleaned bottles should be sealed with a custody tape seal during transport to the field or while in storage prior to use.
- The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under chain-of-custody rules.
- The sample collector will record sample data in the notebook.
- The site manager will determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required.

12.2 Sample Tags

Sample tags attached to or affixed around the sample container must be used to properly identify all samples collected in the field. The sample tags are to be placed on the bottles so as not to obscure any QC lot numbers on the bottles; sample information must be printed in a legible manner using waterproof ink. Field identification must be sufficient to enable cross-reference with the logbook. For chain-of-custody purposes, all QC samples are subject to exactly the same custodial procedures and documentation as "real" samples.

12.3 Transfer of Custody and Shipment

- The coolers in which the samples are packed must be accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving them must sign, date, and note the time on the chain-of-custody record. This record documents sample custody transfer
- Shipping containers must be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier, and other pertinent information are entered in the "Remarks" section of the chain-of-custody record and traffic reports.
- All shipments must be accompanied by the chain-of-custody record identifying their contents. The original record accompanies the shipment. The other copies are distributed appropriately to the site manager.
- If sent by mail, the package is registered with return receipt requested. If sent by common carrier, a bill of lading is used. Freight bills, Postal Service receipts, and bill of lading are retained as part of the permanent documentation.

12.4 Chain-of-Custody Record

The chain-of-custody record must be fully completed in duplicate, using black carbon paper where possible, by the field technician who has been designated by the project manager as responsible for sample shipment to the appropriate laboratory for analysis. In addition, if samples are known to require rapid turnaround in the laboratory because of project time constraints or analytical concerns (e.g., extraction time or sample retention period limitations, etc.), the person completing the chain-of-custody record should note these constraints in the "Remarks" section of the record.

12.5 Laboratory Custody Procedures

A designated sample custodian accepts custody of the shipped samples and verifies that the sample identification number matches that on the chain-of-custody record and traffic reports, if required. Pertinent information as to shipment, pickup, and courier is entered in the "Remarks" section.

12.6 Custody Seals

Custody seals are preprinted adhesive-backed seals with security slots designed to break if the seals are disturbed. Sample shipping containers (coolers, cardboard boxes, etc., as appropriate) are sealed in as many places as necessary to ensure security. Seals must be signed and dated before use. On receipt at the laboratory, the custodian must check (and certify, by completing the package receipt log and LABMIS entries) that seals on boxes and bottles are intact. Strapping tape should be placed over the seals to ensure that seals are not accidentally broken during shipment.

13.0 DOCUMENTATION

13.1 Sample Identification

All containers of samples collected from the project will be identified using the following format on a label or tag fixed to the sample container (labels are to be covered with Mylar tape):

XX-YY-O/D

- XX This set of initials indicates the specific Phase II sampling project
- YY These initials identify the sample location. Actual sample locations will be recorded in the task log.
- O/D An "O" designates an original sample; "D" identifies it as a duplicate.

Each sample will be labeled, chemically preserved, if required and sealed immediately after collection. To minimize handling of sample containers, labels will be filled out prior to sample collection. The sample label will be filled out using waterproof ink and will be firmly affixed to the sample containers and protected with Mylar tape. The sample label will give the following information:

- Name of sampler,
- Date and time of collection,
- Sample number,
- Analysis required,
- pH, and
- Preservation.

13.2 Daily Logs

Daily logs and data forms are necessary to provide sufficient data and observations to enable participants to reconstruct event that occurred during the project and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings. All daily logs will be kept in a bound waterproof notebook containing numbered pages. All entries will be made in waterproof ink, dated, and signed. No pages will be removed for any reason. Corrections will be made according to the procedures given at the end of this section. The daily logs will include a site log and task log.

The site log is the responsibility of the site manager and will include a complete summary of the day's activity at the site.

The **Task Log** will include:

- Name of person making entry (signature).
- Names of team members on-site.
- Levels of personnel protection:
 - Level of protection originally used;
 - Changes in protection, if required; and
 - Reasons for changes.
- Time spent collecting samples.
- Documentation on samples taken, including:
 - Sampling location and depth station numbers;
 - Sampling date and time, sampling personnel;
 - Type of sample (grab, composite, etc.); and
 - Sample matrix.

- On-site measurement data.
- Field observations and remarks.
- Weather conditions, wind direction, etc.
- Unusual circumstances or difficulties.
- Initials of person recording the information.

14.0 CORRECTIONS TO DOCUMENTATION

14.1 Notebook

As with any data logbooks, no pages will be removed for any reason. If corrections are necessary, these must be made by drawing a single line through the original entry (so that the original entry can still be read) and writing the corrected entry alongside. The correction must be initialed and dated. Most corrected errors will require a footnote explaining the correction.

14.2 Sampling Forms

As previously stated, all sample identification tags, chain-of-custody records, and other forms must be written in waterproof ink. None of these documents are to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made on a document assigned to one individual, that individual may make corrections simply by crossing a line through the error and entering the corrected information. The incorrect information should not be obliterated. Any subsequent error discovered on a document should be corrected by the person who made the entry. All corrections must be initialed and dated.

14.3 Photographs

Photographs will be taken as directed by the site manager. Documentation of a photograph is crucial to its validity as a representation of an existing situation. The following information will be noted in the task log concerning photographs:

- Date, time, location photograph was taken;
- Photographer (signature);
- Weather conditions;
- Description of photograph taken;
- Reasons why photograph was taken;
- Sequential number of the photograph and the film roll number; and
- Camera lens system used.

After the photographs have been developed, the information recorded in the field notebook should be transferred to the back of the photographs

15.0 SAMPLE HANDLING, PACKAGING, AND SHIPPING

The transportation and handling of samples must be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects due to the possible hazardous nature of samples. Regulations for packaging, marking, labeling, and shipping hazardous materials are promulgated by the United States Department of Transportation (DOT) in the Code of Federal Regulation, 49 CFR 171 through 177. All samples will be delivered to the laboratory with 24 to 48 hours from the day of collection.

All chain-of-custody requirements must comply with standard operating procedures in the EPA sample handling protocol. All sample control and chain-of-custody procedures applicable to the Consultant are presented in the Field Personnel Chain-of-Custody Documentation and Quality Control Procedures Manual, January 1992.

15.1 Sample Packaging

Samples must be packaged carefully to avoid breakage or contamination and must be shipped to the laboratory at proper temperatures. The following sample packaging requirements will be followed:

- Sample bottle lids must never be mixed. All sample lids must stay with the original containers.
- The sample volume level can be marked by placing the top of the label at the appropriate sample height, or with a grease pencil. This procedure will help the laboratory to determine if any leakage occurred during shipment. The label should not cover any bottle preparation QC lot numbers.
- All sample bottles are placed in a plastic bag to minimize the potential for vermiculite contamination.
- Shipping coolers must be partially filled with packing materials and ice when required, to prevent the bottles from moving during shipment.
- The sample bottles must be placed in the cooler in such a way as to ensure that they do not touch one another.
- The environmental samples are to be cooled. The use of "blue ice" or some other artificial icing material is preferred. If necessary, ice may be used, provided that it is placed in plastic bags. Ice is not to be used as a substitute for packing materials.
- Any remaining space in the cooler should be filled with inert packing material. Under no circumstances should material such as sawdust, sand, etc., be used.
- A duplicate custody record and traffic reports, if required must be placed in a plastic bag and taped to the bottom of the cooler lid. Custody seals are affixed to the sample cooler.

15.2 Shipping Containers

Shipping containers are to be custody-sealed for shipment as appropriate. The container custody seal will consist of filament tape wrapped around the package at least twice and custody seals affixed in such a way that access to the container can be gained only by cutting the filament tape and breaking a seal.

Field personnel will make arrangements for transportation of samples to the lab. When custody is relinquished to a shipper, field personnel will telephone the lab custodian to inform him of the expected time of arrival of the sample shipment and to advise him of any time constraints on sample analysis. The lab must be notified as early in the week as possible, and in no case later than 3 p.m. (EST) on Thursday, regarding samples intended for Saturday delivery.

15.3 Marking and Labeling

- Use abbreviations only where specified.
- The words "This End Up" or "This Side Up" must be clearly printed on the top of the outer package. Upward pointing arrows should be placed on the sides of the package. The words "Laboratory Samples" should also be printed on the top of the package.
- After a sample container has been sealed, two chain-of-custody seals are placed on the container, one on the front and one on the back. The seals are protected from accidental damage by placing strapping tape over them.
- If samples are designated as medium or high hazard, they must be sealed in metal paint cans, placed in the cooler with vermiculite and labeled and placarded in accordance with DOT regulations.
- In addition, the coolers must also be labeled and placarded in accordance with DOT regulations if shipping medium and high hazard samples.

16.0 CALIBRATION PROCEDURES AND FREQUENCY

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations as well as criteria set forth in the applicable analytical methodology references. Operation, calibration, and maintenance will be performed by personnel properly trained in these procedures. Documentation of all routine and special maintenance and calibration information will be maintained in an appropriate logbook or reference file, and will be available on request. Table 7-1 lists the major instruments to be used for sampling and analysis. Brief descriptions of calibration procedures for major field and laboratory instruments follow.

17.0 FIELD INSTRUMENTATION

17.1 Photovac/MiniRae Photoionization Detector (PID)

Standard operating procedures for the PID require that routine maintenance and calibration be performed every six months. Field calibration will be performed on a daily basis. The packages used for calibration are non-toxic analyzed gas mixtures available in pressurized containers.

17.2 Internal Quality Control Checks

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of field equipment. Field-based QC will comprise at least 10% of each data set generated and will consist of standards, replicates, spikes, and blanks. Field duplicates and field blanks will be analyzed by the laboratory as samples and will not necessarily be identified to the laboratory as duplicates or blanks. For each matrix, field duplicates will be provided at a rate of one per 10 samples collected or one per shipment, whichever is greater. Field blanks which consist of trip, routine field, and rinsate blanks will be provided at a rate of one per 20 samples collected for each parameter group, or one per shipment, whichever is greater.

Calculations will be performed for recoveries and standard deviations along with review of retention times, response factors, chromatograms, calibration, tuning, and all other QC information generated. All QC data, including split samples, will be documented in the site logbook. QC records will be retained and results reported with sample data.

17.3 Blank Samples

Blank samples are analyzed in order to assess possible contamination from the field and/or laboratory so that corrective measures may be taken, if necessary. Field samples are discussed in the following subsection:

17.4 Field Blanks

Various types of blanks are used to check the cleanliness of field handling methods. The following types of blanks may be used: the trip blank, the routine field blank, and the field equipment blank. They are analyzed in the laboratory as samples, and their purpose is to assess the sampling and transport procedures as possible sources of sample contamination. Field staff may add blanks if field circumstances are such that they consider normal procedures are not sufficient to prevent or control sample contamination, or at the direction of the project manager. Rigorous documentation of all blanks in the site logbooks is mandatory.

- **Routine Field Blanks** or bottle blanks are blank samples prepared in the field to assess ambient field conditions. They will be prepared by filling empty sample containers with deionized water and any necessary preservatives. They will be handled like a sample and shipped to the laboratory for analysis.
- **Trip Blanks** are similar to routine field blanks with the exception that they are not exposed to field conditions. Their analytical results give the overall level of contamination from everything except ambient field conditions. For the SGS, one trip blank will be collected with every batch of water samples for volatile organic analysis. Each trip blank will be prepared by filling a 40-ml vial with deionized water prior to the sampling trip, transported to the site, handled like a sample, and returned to the laboratory for analysis without being opened in the field.

- **Field Equipment Blanks** are blank samples (sometimes called transfer blanks or rinsate blanks) designed to demonstrate that sampling equipment has been properly prepared and cleaned before field use, and that cleaning procedures between samples are sufficient to minimize cross contamination. If a sampling team is familiar with a particular site, they may be able to predict which areas or samples are likely to have the highest concentration of contaminants. Unless other constraints apply, these samples should be taken last to avoid excessive contamination of sampling equipment.

17.5 Field Duplicates

Field duplicate samples consist of a set of two samples collected independently at a sampling location during a single sampling event. In some instances the field duplicate can be a blind duplicate, i.e., indistinguishable from other analytical samples so that personnel performing the analyses are not able to determine which samples are field duplicates. Field duplicates are designed to assess the consistency of the overall sampling and analytical system.

17.6 Quality Control Check Samples

Inorganic and organic control check samples are available from EPA free of charge and are used as a means of evaluating analytical techniques of the analyst. Control check samples are subjected to the entire sample procedure, including extraction, digestion, etc., as appropriate for the analytical method utilized.

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APPENDIX C

COMMUNITY AIR MONITORING PLAN

Appendix 1A

New York State Department of Health

Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

APPENDIX D

HEALTH AND SAFETY PLAN

Site Health and Safety Plan

NYSDEC BCP Site #C828159A

Location:

691 and 705 Saint Paul Street
Rochester, New York 14605

Prepared For:

Bausch & Lomb
1400 N. Goodman Street
Rochester, New York 14609

LaBella Project No. 2170820

August 18, 2017

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SITE HEALTH AND SAFETY PLAN

Project Title: 691 and 705 Saint Paul Street RAWP

Project Number: 2170436

Project Location (Site): 691 and 705 Saint Paul Street, Rochester,
New York 14605-1742

Environmental Director: Gregory Senecal, CHMM

Project Manager: Dan Noll, P.E.

Plan Review Date: _____

Plan Approval Date: _____

Plan Approved By: _____
Mr. Richard Rote, CIH

Site Safety Supervisor: To Be Determined

Site Contact: To Be Determined

Safety Director: Rick Rote, CIH

Proposed Date(s) of Field Activities: To Be Determined

Site Conditions: Slightly sloping, encompassing approximately 3.74 acres

Site Environmental Information Provided By: Interim SMP for 690 St. Paul (NYSDEC Site Code #: C828159)
prepared by LaBella Associates, D.P.C., dated March 2013

Air Monitoring Provided By: LaBella Associates, D.P.C.

Site Control Provided By: Contractor(s)






EMERGENCY CONTACTS

	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Rochester General Hospital	585-922-4000
Poison Control Center:	Finger Lakes Poison Control	585-273-4621
Police (local, state):	Monroe County Sheriff	911
Fire Department:	Rochester Fire Department	911
Site Contact:	Frank Chiappone	
Agency Contact:	NYSDEC – Frank Sowers, P.E. NYSDOH – Justin Deming Finger Lakes Poison Control MCDOH – Jeff Kosmala	585-226-5357 518-402-7860 1-800-222-1222 585-753-5904
Environmental Director:	Greg Senecal, CHMM	Direct: 585-295-6243 Cell: 585-752-6480 Home: 585-323-2142
Project Manager:	Dan Noll, P.E.	Direct: 585-295-6611 Cell: 585-301-8458
Site Safety Supervisor:	To Be Determined	
Safety Director	Rick Rote, CIH	Direct: 704-941-2123

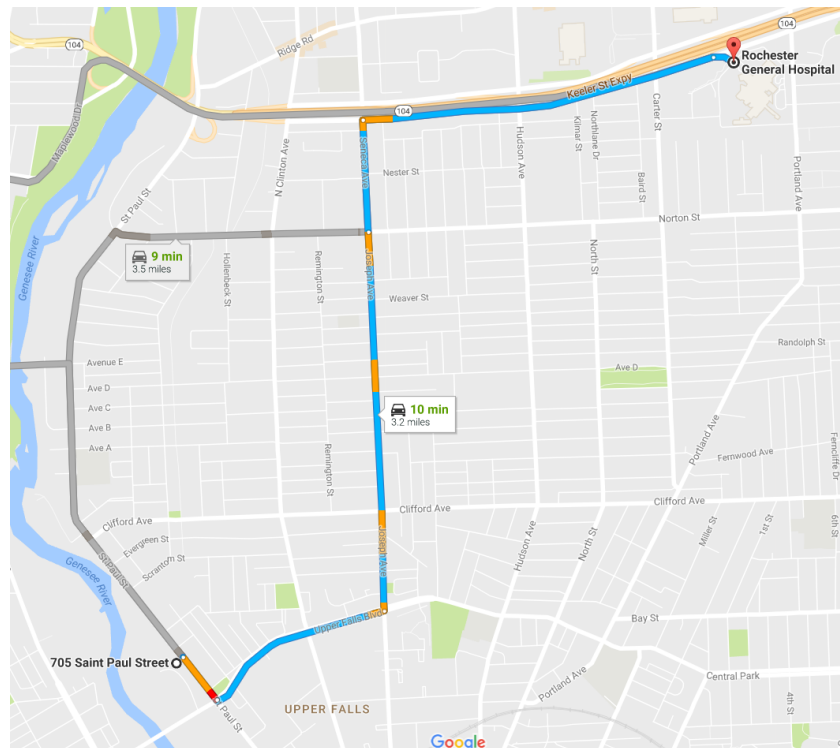
MAP AND DIRECTIONS TO THE MEDICAL FACILITY - ROCHESTER GENERAL HOSPITAL

Total Time: 10 minutes
Total Distance: 3.20 miles

Start: 691 Saint Paul St, Rochester, NY 14605-1742

- | | | |
|---|--|--------|
| START | 1: Start out going SOUTHEAST on ST PAUL ST toward LOWELL ST. | 0.1 mi |
|  | 2: Turn LEFT onto UPPER FALLS BLVD. | 0.6 mi |
|  | 3: Turn LEFT onto JOSEPH AVE. | 1.1 mi |
|  | 4: JOSEPH AVE becomes SENECA AVE. | 0.3 mi |
|  | 5: Turn RIGHT onto RT-104. | 1.2 mi |
|  | 6: Turn RIGHT onto PORTLAND AVE/CR-114. | 0.2 mi |
| END | 7: End at 1425 Portland Ave Rochester, NY 14621-3001 | |

End: 1425 Portland Ave, Rochester, NY 14621-3001



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Bausch and Lomb
Site Health and Safety Plan
691 and 705 Saint Paul Street, Rochester, New York
LaBella Project No. 2170436

LABELLA

1.0 Introduction

The purpose of this Health and Safety Plan (HASP) is to provide guidelines for responding to potential health and safety issues that may be encountered during installation of the sub-slab depressurization system (SSDS) activities at the Site located at 691 and 705 Saint Paul Street in the City of Rochester, Monroe County, New York. This HASP only reflects the policies of LaBella Associates D.P.C. The requirements of this HASP are applicable to all approved LaBella personnel at the work site. This document's project specifications and the Community Air Monitoring Plan (CAMP) are to be consulted for guidance in preventing and quickly abating any threat to human safety or the environment. The provisions of the HASP were developed in general accordance with 29 CFR 1910 and 29 CFR 1926 and do not replace or supersede any regulatory requirements of the USEPA, NYSDEC, OSHA or any other regulatory body.

2.0 Responsibilities

This HASP presents guidelines to minimize the risk of injury to project personnel, and to provide rapid response in the event of injury. The HASP is applicable only to activities of approved LaBella personnel and their authorized visitors. The Project Manager shall implement the provisions of this HASP for the duration of the project. It is the responsibility of LaBella employees to follow the requirements of this HASP, and all applicable company safety procedures.

3.0 Activities Covered

The activities covered under this HASP are limited to the following:

- ☐ Management of environmental investigation and remediation activities
- ☐ Environmental Monitoring
- ☐ Collection of samples
- ☐ Management of excavated soil and fill.

4.0 Work Area Access and Site Control

The contractor(s) will have primary responsibility for work area access and site control. However, a minimum requirement for work area designation and control will consist of:

- Drilling (Geoprobe/Rotary) – Orange cones to establish at least a 10-foot by 10-foot work area
- Test Pitting – Orange cones and orange temporary fencing to establish at least 10-feet of distance between test pit and fencing.

5.0 Potential Health and Safety Hazards

This section lists some potential health and safety hazards that project personnel may encounter at the project site and some actions to be implemented by approved personnel to control and reduce the associated risk to health and safety. This is not intended to be a complete listing of any and all potential health and safety hazards. New or different hazards may be encountered as site environmental and site work conditions change. The suggested actions to be taken under this plan are not to be substituted for good judgment on the part of project personnel. At all times, the Site Safety Officer has responsibility for site safety and his or her instructions must be followed.

5.1 Hazards Due to Heavy Machinery

Potential Hazard:

Heavy machinery including trucks, excavators, backhoes, etc will be in operation at the site. The presence of such equipment presents the danger of being struck or crushed. Use caution when working near heavy machinery.

Protective Action:

Make sure that operators are aware of your activities, and heed operator's instructions and warnings. Wear bright colored clothing and walk safe distances from heavy equipment. A hard hat, safety glasses and steel toe shoes are required.

5.2 Excavation Hazards

Potential Hazard:

Excavations and trenches can collapse, causing injury or death. Edges of excavations can be unstable and collapse. Toxic and asphyxiant gases can accumulate in confined spaces and trenches. Excavations that require working within the excavation will require air monitoring in the breathing zone (refer to Section 9.0).

Excavations left open create a fall hazard which can cause injury or death.

Protective Action:

Personnel must receive approval from the Project Manager to enter an excavation for any reason. Subsequently, approved personnel are to receive authorization for entry from the Site Safety Officer. Approved personnel are not to enter excavations over 4 feet in depth unless excavations are adequately sloped. Additional personal protective equipment may be required based on the air monitoring.

Personnel should exercise caution near all excavations at the site as it is expected that excavation sidewalls will be unstable. All excavations will be backfilled by the end of each day. Additionally, no test pit will be left unattended during the day.

Fencing and/or barriers accompanied by "no trespassing" signs should be placed around all excavations when left open for any period of time when work is not being conducted.

5.3 *Cuts, Punctures and Other Injuries*

Potential Hazard:

In any excavation or construction, work site there is the potential for the presence of sharp or jagged edges on rock, metal materials, and other sharp objects. Serious cuts and punctures can result in loss of blood and infection.

Protective Action:

The Project Manager is responsible for making First Aid supplies available at the work site to treat minor injuries. The Site Safety Officer is responsible for arranging the transportation of authorized on-site personnel to medical facilities when First Aid treatment is not sufficient. Do not move seriously injured workers. All injuries requiring treatment are to be reported to the Project Manager. Serious injuries are to be reported immediately to the Site Safety Officer.

5.4 *Injury Due to Exposure of Chemical Hazards*

Potential Hazards:

Volatile organic vapors from petroleum products, chlorinated solvents or other chemicals may be encountered during excavation activities at the project work site. Inhalation of high concentrations of organic vapors can cause headache, stupor, drowsiness, confusion and other health effects. Skin contact can cause irritation, chemical burn, or dermatitis.

Protective Action:

The presence of organic vapors may be detected by their odor and by monitoring instrumentation. Approved employees will not work in environments where hazardous concentrations of organic vapors are present. Air monitoring (refer to Section 9.0 and to the Modified CAMP in Appendix 7) of the work area will be performed at least every 60 minutes or more often using a Photoionization Detector (PID). Personnel are to leave the work area whenever PID measurements of ambient air exceed 25 ppm consistently for a 5 minute period. In the event that sustained total volatile organic compound (VOC) readings of 25 ppm is encountered personnel should upgrade personal protective equipment to Level C (refer to Section 8.0) and an Exclusion Zone should be established around the work area to limit and monitor access to this area (refer to Section 6.0).

5.5 *Injuries Due to Extreme Hot or Cold Weather Conditions*

Potential Hazards:

Extreme hot weather conditions can cause heat exhaustion, heat stress and heat stroke or extreme cold weather conditions can cause hypothermia.

Protective Action:

Precaution measures should be taken such as dress appropriately for the weather conditions and drink plenty of fluid. If personnel should suffer from any of the above conditions, proper techniques should be taken to cool down or heat up the body and taken to the nearest hospital if needed.

5.6 *Potential Exposure to Asbestos*

Potential Hazards:

During ground intrusive activities (e.g., test pitting or drilling) soil containing asbestos may be encountered. Asbestos is friable when dry and can be inhaled when exposed to air.

Protective Action:

The presence of asbestos can be identified through visual observation of a white magnesium silicate material. If encountered, work should be halted and a sample of the suspected asbestos should be collected and placed in a plastic sealable bag. This sample should be sent to the asbestos laboratory at LaBella Associates for analysis.

6.0 **Work Zones**

In the event that conditions warrant establishing various work zones (i.e., based on hazards - Section 5.4), the following work zones should be established:

Exclusion Zone (EZ):

The EZ will be established in the immediate vicinity and adjacent downwind direction of site activities that elevate breathing zone VOC concentrations to unacceptable levels based on field screening. These site activities include contaminated soil excavation and soil sampling activities. If access to the site is required to accommodate non-project related personnel then an EZ will be established by constructing a barrier around the work area (yellow caution tape and/or construction fencing). The EZ barrier shall encompass the work area and any equipment staging/soil staging areas necessary to perform the associated work. The contractor(s) will be responsible for establishing the EZ and limiting access to approved personnel. Depending on the condition for establishing the EZ, access to the EZ may require adequate PPE (e.g., Level C).

Contaminant Reduction Zone (CRZ):

The CRZ will be the area where personnel entering the EZ will don proper PPE prior to entering the EZ and the area where PPE may be removed. The CRZ will also be the area where decontamination of equipment and personnel will be conducted as necessary.

7.0 **Decontamination Procedures**

Upon leaving the work area, approved personnel shall decontaminate footwear as needed. Under normal work conditions, detailed personal decontamination procedures will not be necessary. Work clothing may become contaminated in the event of an unexpected splash or spill or contact with a contaminated substance. Minor splashes on clothing and footwear can be rinsed with clean water. Heavily contaminated clothing should be removed if it cannot be rinsed with water. Personnel assigned to this project should be prepared with a change of clothing whenever on site.

Personnel will use the contractor's disposal container for disposal of PPE.

8.0 Personal Protective Equipment

Generally, site conditions at this work site require level of protection of Level D or modified Level D. However, air monitoring will be conducted to determine if up-grading to Level C PPE is required (refer to Section 9.0). Descriptions of the typical safety equipment associated with Level D and Level C are provided below:

Level D:

Hard hat, safety glasses, rubber nitrile sampling gloves, steel toe construction grade boots, etc.

Level C:

Level D PPE and full or ½-face respirator and tyvek suit (if necessary). [*Note: Organic vapor cartridges are to be changed after each 8-hours of use or more frequently.*]

9.0 Air Monitoring

According to 29 CFR 1910.120(h), air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection required for personnel working onsite. Air monitoring identified in this HASP is only intended to monitor air for workers involved with the RI. Please refer to the Site Specific CAMP for further details on air monitoring at the Site required for protection of the Site occupants and neighboring properties.

The Air Monitor will utilize a photoionization Detector (PID) to screen the ambient air in the work areas for total Volatile Organic Compounds (VOCs), a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates. [*Note: Radiation monitoring requirements are identified in 5.7 above.*] Air monitoring of the work areas will be performed at least every 15 minutes or more often using a PID, and the DustTrak meter.

If sustained PID readings of greater than 10 ppm are recorded in the breathing zone, then either personnel are to leave the work area until satisfactory readings are obtained or approved personnel may re-enter the work areas wearing at a minimum a ½ face respirator with organic vapor cartridges for an 8-hour duration (i.e., upgrade to Level C PPE). Organic vapor cartridges are to be changed after each 8-hours of use or more frequently, if necessary. If PID readings are sustained, in the work area, at levels above 10 ppm for a 5 minute average, work will be stopped immediately until safe levels of VOCs are encountered or additional PPE will be required (i.e., Level B).

If dust concentrations exceed the upwind concentration by $150 \mu\text{g}/\text{m}^3$ ($0.15 \text{ mg}/\text{m}^3$) consistently for a 10 minute period within the work area or at the downwind location, then LaBella personnel may not re-enter the work area until dust concentrations in the work area decrease below $150 \mu\text{g}/\text{m}^3$ ($0.15 \text{ mg}/\text{m}^3$), which may be accomplished by the construction manager implementing dust control or suppression measures.

10.0 Emergency Action Plan

In the event of an emergency, employees are to turn off and shut down all powered equipment and leave the work areas immediately. Employees are to walk or drive out of the Site as quickly as possible and wait at the assigned 'safe area'. Follow the instructions of the Site Safety Officer.

Employees are not authorized or trained to provide rescue and medical efforts. Rescue and medical efforts will be provided by local authorities.

11.0 Medical Surveillance

Medical surveillance will be provided to all employees who are injured due to overexposure from an emergency incident involving hazardous substances at this site.

12.0 Employee Training

Personnel who are not familiar with this site plan will receive training on its entire content and organization before working at the Site.

Individuals involved with the remedial investigation must be 40-hour OSHA HAZWOPER trained with current 8-hour refresher certification.

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Table 1
Exposure Limits and Recognition Qualities

Compound	PEL-TWA (ppm)(b)(d)	TLV-TWA (ppm)(c)(d)	STEL	LEL (%) ^(e)	UEL (%) ^(f)	IDLH (ppm)(g)(d)	Odor	Odor Threshold (ppm)	Ionization Potential	²³² Thorium Action Level
Acetone	750	500	NA	2.15	13.2	20,000	Sweet	4.58	9.69	NA
Anthracene	0.2	0.2	NA	NA	NA	NA	Faint aromatic	NA	NA	NA
Benzene	1	0.5	5	1.3	7.9	3000	Pleasant	8.65	9.24	NA
Benzo (a) pyrene (coal tar pitch volatiles)	0.2	0.1	NA	NA	NA	700	NA	NA	NA	NA
Benzo (a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (b) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (k) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	10.88	NA
Carbon Disulfide	20	1	NA	1.3	50	500	Odorless or strong garlic type	0.096	10.07	NA
Chlorobenzene	75	10	NA	1.3	9.6	2,400	Faint almond	0.741	9.07	NA
Chloroform	50	2	NA	NA	NA	1,000	ethereal odor	11.7	11.42	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethylene	200	200	NA	9.7	12.8	400	Acrid	NA	9.65	NA
1,2-Dichlorobenzene	50	25	NA	2.2	9.2		Pleasant		9.07	NA
Ethylbenzene	100	100	NA	1	6.7	2,000	Ether	2.3	8.76	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	500	50	NA	12	23	5,000	Chloroform-like	10.2	11.35	NA
Naphthalene	10, Skin	10	NA	0.9	5.9	250	Moth Balls	0.3	8.12	NA
n-propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethane	NA	NA	NA	NA	NA	NA	Sweet	NA	NA	NA
Toluene	100	100	NA	0.9	9.5	2,000	Sweet	2.1	8.82	NA
Trichloroethylene	100	50	NA	8	12.5	1,000	Chloroform	1.36	9.45	NA
1,2,4-Trimethylbenzene	NA	25	NA	0.9	6.4	NA	Distinct	2.4	NA	NA
1,3,5-Trimethylbenzene	NA	25	NA	NA	NA	NA	Distinct	2.4	NA	NA
Vinyl Chloride	1	1	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes (o,m,p)	100	100	NA	1	7	1,000	Sweet	1.1	8.56	NA
<i>Metals</i>										
Arsenic	0.01	0.2	NA	NA	NA	100, Ca	Almond	NA	NA	NA
Cadmium	0.2	0.5	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1	0.5	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.15	NA	NA	NA	700	NA	NA	NA	NA
Mercury	0.05	0.05	NA	NA	NA	28	Odorless	NA	NA	NA
Selenium	0.2	0.02	NA	NA	NA	Unknown	NA	NA	NA	NA
<i>Other</i>										
Asbestos	0.1 (f/cc)	NA	1.0 (f/cc)	NA	NA	NA	NA	NA	NA	NA

(a)

Skin = Skin Absorption

(b)

OSHA-PEL Permissible Exposure Limit (flame weighted average, 8-hour): NIOSH Guide, June 1990

(c)

ACGIH – 8 hour time weighted average from Threshold Limit Values and Biological Exposure Indices for 2003.

(d)

Metal compounds in mg/m3

(e)

Lower Exposure Limit (%)

(f)

Upper Exposure Limit (%)

(g)

Immediately Dangerous to Life or Health Level: NIOSH Guide, June 1990.

Notes:

1.

All values are given in parts per million (PPM) unless otherwise indicated.

2.

Ca = Possible Human Carcinogen, no IDLH information.