Building 339 Vapor Mitigation System
Basis of Design

at

iPark 84
Former IBM East Fishkill Facility

October 2019

Prepared for:

Jessica LaClair
New York State Dept. of Environmental Conservation
Dept. of Environmental Remediation
625 Broadway
Albany, New York 12233-7013

WALDEN ENVIRONMENTAL ENGINEERING, PLLC
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Sent via email to jess.laclair@dec.ny.gov and julia.kenney@health.ny.gov

October 23, 2019
iPark0118.34

Ms. Jessica LaClair
Environmental Engineer
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7013

Re: iPark 84
Former IBM East Fishkill Facility
Building 339 Vapor Mitigation System
Basis of Design

Dear Ms. LaClair:

This submittal has been prepared by Walden Environmental Engineering, PLLC ("Walden") on behalf of iPark East Fishkill LLC (iPark) to present the basis of design for a vapor mitigation system to be installed at Building 339, located at 2070 State Route 52 in Hopewell Junction, New York, herein after referred to as the "Site". Pre-construction sampling completed between September 30th and October 3rd confirmed the presence of volatile organic compound (VOC) vapors below the Building 339 slab (refer to the *Building 339 Pre-Construction Sampling Summary Report*, Walden, October 23, 2019). The proposed vapor mitigation system will be installed as a preventive measure to ensure protection against soil vapor intrusion at Building 339. The attached engineering design drawings (Drawings 1 through 4), stamped by a New York State licensed Professional Engineer, include the site location map and mitigation system details.

Site Description and Well Point Construction

Building 339 will be refitted to allow for future occupancy by a bakery manufacturing operation. Currently, the building consists of three existing slabs with differing elevations. The re-fit will involve bringing the entire floor slab to a consistent elevation to match the floor elevation in the middle section of the building. In the interest of expediting the modifications to ready the space for the tenant, four (4) vapor extraction well points (SVEP-1, SVEP-2, SVEP-3 and SVEP-4)

and ten (10) microwell monitoring points (MP-1 through MP-10) have been installed within Building 339, and a pilot vapor mitigation test has been conducted. The findings of the pilot test establish the basis of the mitigation system design.

The vapor extraction well points consist of 2-inch slotted PVC pipe connected to a solid PVC riser extending approximately one (1) foot below the bottom of the existing slab at each location. The bottom of the screened interval is capped with solid PVC. The building slab where the extraction wells have been installed is approximately twenty-six (26) inches thick, in the northern and southern sections of the building. In general, the slotted screens extend ten (10) inches below the bottom of the slab. The extraction well points are set in coarse sand and sealed with bentonite and cement. The extraction well risers will be connected to horizontal piping that will be covered by gravel and a new four-inch concrete floor slab. Each leg of the horizontal piping will run to a designated location where it will be brought up through the new slab in a PVC sleeve and then travel up the wall to the ceiling and penetrate the roof. Pressure gauges, vacuum flow controls and valves will be installed on each leg. The mitigation system controls and gauges will be accessed via trough boxes with hatches. The blower, knockout tank and treatment (if required) equipment for the system will be located on the building roof.

The permanent microwell monitoring points consist of six-inch long stainless-steel mesh screens set in coarse sand and connected to ¼-inch inert polyethylene tubing. The tubing will be cut at the final floor slab elevation, and covered with brass fittings flush with the floor to allow for future access to monitor the mitigation system effectiveness. The layouts of the vapor extraction well points, microwell monitoring points and piping are presented on Drawing 2. A schematic of the system components is shown on Drawing 3. The construction details of the well points and monitoring points are provided on Drawing 4.

Pilot Test

Following installation of the vapor extraction well points, a pilot test was performed on October 17, 2019 on two of the wells (SVEP-2 and SVEP-3) to determine the area of influence each extraction well is capable of producing. The pilot test results establish the basis for the full-scale mitigation system design to ensure that the installed system will depressurize the entire building slab. The pilot testing and design were performed in accordance with the New York State Department of Health *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (October 2006), and the United States Environmental Protection Agency Office of Solid Waste and Emergency Response *Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (June 2015). These documents do not contain a specific value to define effective sub-slab depressurization. However, based on available industry guidance, achieving a pressure differential of -0.004 inches of water column

(WC) across a slab is generally considered sufficient to prevent soil vapor intrusion. Therefore, the objective of the mitigation system will be to achieve and maintain a minimum differential pressure of -0.004 inches of WC across the slab of Building 339, regardless of weather conditions, barometric pressure, or HVAC operations.

At the time of the pilot test, Building 339 was open to the atmosphere. Photographs taken during the pilot test are presented in Attachment A. Wind gusts of up to 20 miles per hour were observed throughout the testing. Background pressure readings were collected prior to the testing. During the course of the test, a vacuum blower (1.5 horsepower capable of delivering 59" inches of WC vacuum and a maximum flow rate of 120 SCFM) was connected to SVEP-2 and SVEP-3. The blower was set to varying pressures and flow rates. Pressure readings were recorded from each monitoring point utilizing a micromanometer. MP-1 and MP-2, located near the open end at the south side of the building, were impacted by the wind and atmospheric conditions, thus the pressure readings during the test at these points are not valid. MP-10 was observed to show no response during any of the tests. Due to saturated sub slab conditions in this area from rain water, it is suspected that MP-10 was clogged. The readings from MP-1, MP-2 and MP-10 were not considered when evaluating the pilot test results.

The pressure readings collected during the pilot test are included in Tables 1 and 2. The data from SVEP-3 and SVEP-2 respectively under an applied vacuum of 40 inches of WC is plotted with accompanying trend lines in Attachment B. Based upon the results of the pilot test, the vapor extraction well points each produced an approximate radius of influence of 40 feet at an applied vacuum of 40 inches of WC and a flow rate of 65 cubic feet per minute (CFM).

SVE Design

Based on the pilot test results, the full-scale vapor extraction system will include the following:

- Four vapor extraction well points (SVEP-1, SVEP-2, SVEP-3 and SVEP-4) as shown on Drawing 2.
- Ten monitoring points (MP-1 through MP-10). Note that MP-10 (existing point is clogged) will be removed relocated for full-scale system monitoring.
- 275 – 300 CFM blower with integral noise and vibration controls.
- Knockout tank for condensate management.
- Pressure gauges and system controls.
- Granular activated carbon treatment units for emissions treatment, if required.

Based on the 40-foot radius of influence observed during the pilot testing, the four (4) vapor extraction well points will depressurize the slab as shown on Drawing 2. As-built drawings for

the full-scale system installation will be submitted to NYSDEC/NYSDOH after construction is completed. In addition, start-up testing results documenting the system's effectiveness will be submitted to NYSDEC/NYSDOH.

Operation and Maintenance

All mechanical aspects of the mitigation system will be visually inspected on a routine basis, and repaired as needed, to ensure proper function. Following the initial startup of the system and stabilization of pressure readings, routine inspections, monitoring, and maintenance will be conducted on a periodic basis.

The vacuum at the monitoring points will be measured at the time of startup to confirm that mitigation system effectively depressurizes the slab beneath Building 339. All system PID screening and gauge readings will be collected for subsequent reporting. The frequency of the monitoring shall be evaluated at start-up and/or as directed by NYSDEC/NYSDOH.

Given the tenant's desire to take occupancy as soon as possible, iPark is ready to move forward with pouring the new slab upon authorization from the State. Therefore, we respectfully request that NYSDEC and NYSDOH prioritize issuing its authorization to proceed with the finalization of the system described herein. Note that indoor air sampling will be performed in Building 339 after construction of the building modifications is completed, the Building has been sealed, and prior to tenant occupancy to confirm that indoor air quality is acceptable. The indoor air sampling locations shall be presented to NYSDEC and NYSDOH for approval prior to pre-occupancy testing.

Please call me at (516) 624-7200 if you have any questions or need any additional information.

Very truly yours,
Walden Environmental Engineering, PLLC

Nora M. Brew, P.E.
Senior Project Manager

cc: J. Kenney, NYSDOH
M. Buckley, National Resources
C. Monheit, National Resources
D. Chartrand, IBM

Enclosures

Table 1 – Vapor Extraction System Pilot Test Data SVEP-2
Table 2 – Vapor Extraction System Pilot Test Data SVEP-3
Attachment A – Pilot Test Photographs
Attachment B – Pilot Test Data Plots
Attachment C – Engineering Design Drawings - Building 339 Vapor Extraction/Depressurization System Design

Z:\iPark0118\iPark0118.34 - Bldg 339 Fitup\Vapor Mitigation System Design\Building 339 Mitigation System Basis of Design Submittal 10.23.19.docx

TABLES

Table 1
iPark0118.34-Building 339
Vapor Extraction System Pilot Test Findings
SVEP-2

Applied Pressure ("wc)	Applied Flow (cfm)	Differential Pressure at Monitoring Points ("wc)						
		MP-3	MP-4	MP-5	MP-6	MP-7	MP-8	MP-9
10	12	0.01	0.016	0.001	0.016	0.005	0.003	0.005
20	28	0.018	0.013	0.025	0.029	0.006	0.013	0.006
30	49	0.009	0.02	0.05	0.053	0.008	0.024	0.008
40	65	0.032	0.034	0.049	0.072	0.008	0.032	0.013
45	94	0.005	0.035	0.099	0.081	0.01	0.046	0.016
Distance to MP from SVEP-2 (Feet)		50	29.25	33.5	20.5	28.75	7.25	32.3

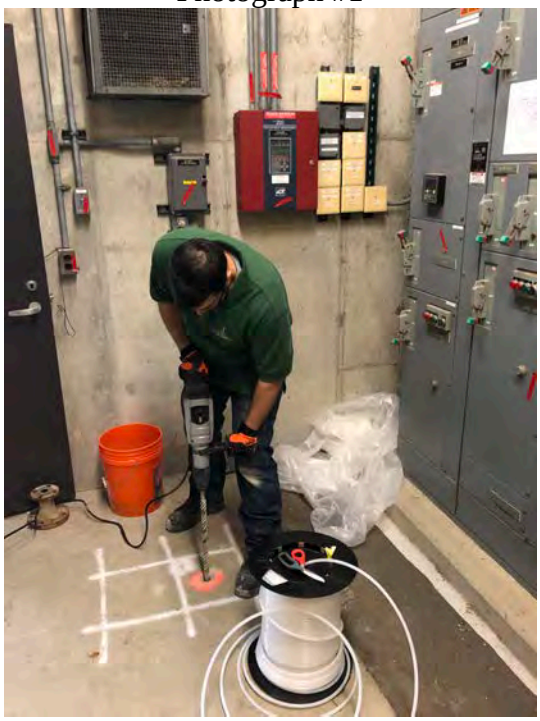
Table 2
iPark0118.34-Building 339
Vapor Extraction System Pilot Test Findings
SVEP-3

Applied Pressure ("wc)	Applied Flow (cfm)	Differential Pressure at Monitoring Points ("wc)						
		MP-3	MP-4	MP-5	MP-6	MP-7	MP-8	MP-9
10	17	0.006	0.045	-0.115	0.004	0.001	0	0.003
20	41	0.008	0.128	0.01	0.008	0.001	0	0.003
30	60	0.017	0.234	0.011	0.011	0.004	0.005	0
40	68	0.024	0.352	0.005	0.011	0.004	0.002	0.006
55	72	0.032	0.424	0.01	0.012	0.004	0.001	0.003
Distance to MP from SVEP-3 (Feet)		35	10.5	35.5	18.3	42	30	55.5

ATTACHMENT A
PILOT TEST PHOTOGRAPHS

Building 339 Vapor Mitigation Pilot Test Photographs
October 2019

Photograph #1



Drilling for monitoring microwell installation in electric room

Photograph #2

Microwell screen for monitoring point

Photograph #3

Monitoring point completed for pilot test

Photograph #4

Vapor extraction well point slotted PVC pipe

Photograph #5

Vapor extraction well point connected to blower during pilot test

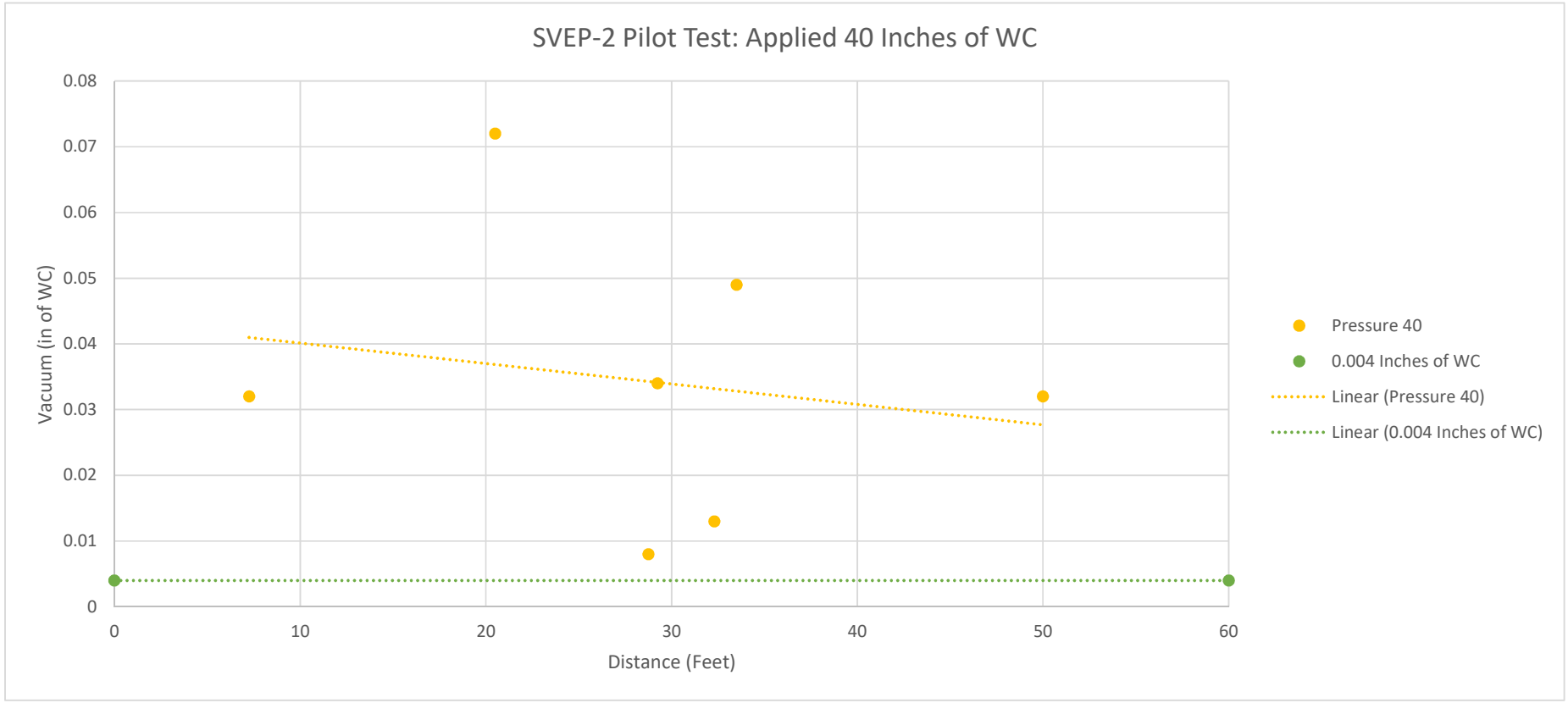
Photograph #6

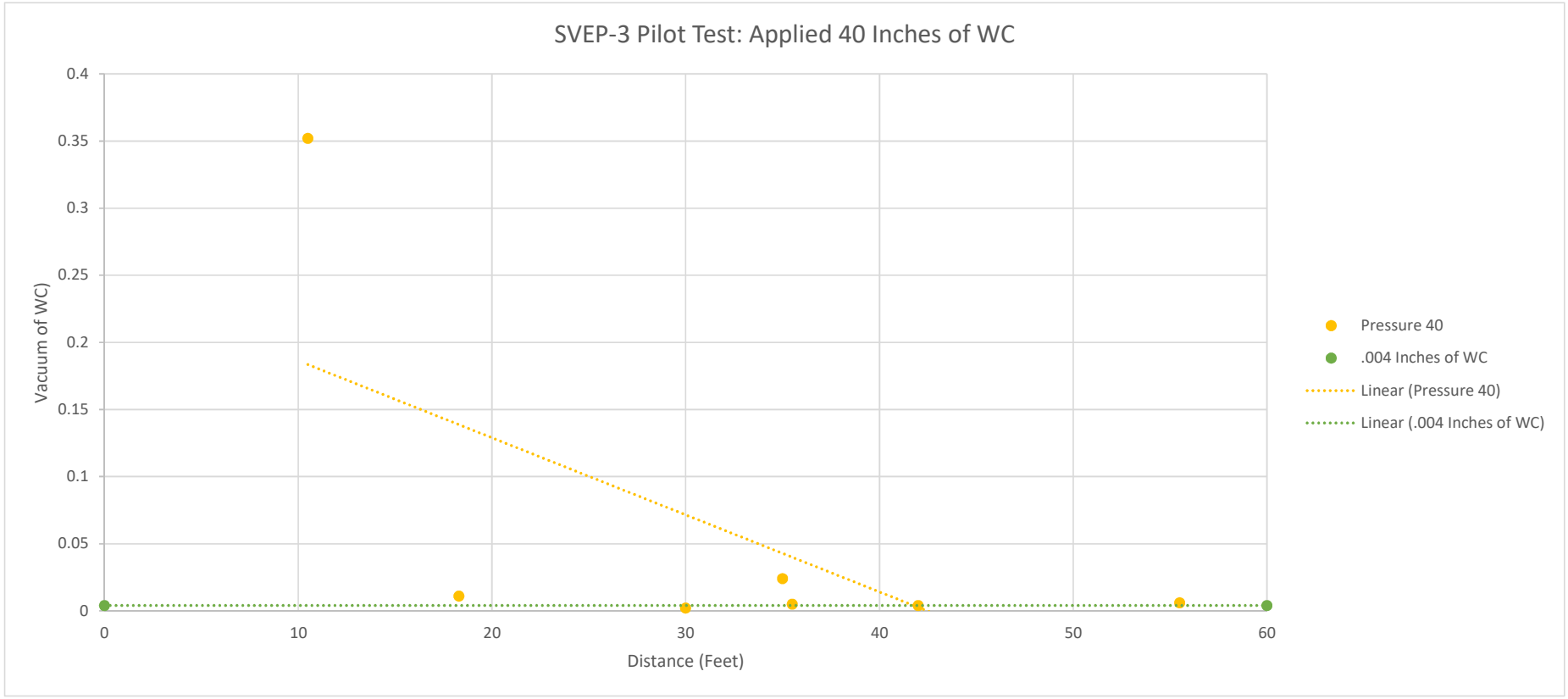
Monitoring point readings in progress during pilot test

Photograph #7

Vacuum blower used for pilot test

ATTACHMENT B
PILOT TEST DATA PLOTS


SVEP-2 Pilot Test: Applied 40 Inches of WC
Vacuum (in of WC)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
10
20
30
40
50
60
Distance (Feet)
Pressure 40
0.004 Inches of WC
Linear (Pressure 40)
Linear (0.004 Inches of WC)


SVEP-3 Pilot Test: Applied 40 Inches of WC
Vacuum of WC)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
10
20
30
40
50
60
Distance (Feet)
Pressure 40
.004 Inches of WC
Linear (Pressure 40)
Linear (.004 Inches of WC)

ATTACHMENT C
ENGINEERING DESIGN DRAWINGS

BUILDING 339
VAPOR EXTRACTION / DEPRESSURIZATION SYSTEM DESIGN

PREPARED FOR:
IPARK EAST FISHKILL LLC

BY
WALDEN ENVIRONMENTAL ENGINEERING, PLLC
16 SPRING STREET, OYSTER BAY, NEW YORK 11771
OCTOBER 2019

LOCATION MAP
SOURCE: GOOGLEMAPS.COM
N.T.S.

PROPERTY MAP
SOURCE: GOOGLEMAPS.COM
N.T.S.

DRAWING INDEX:

1. COVER
2. VAPOR EXTRACTION WELL LAYOUT
3. FLOW DIAGRAM
4. VAPOR EXTRACTION WELLS AND MONITORING POINTS DETAILS

GENERAL INFORMATION:

1. LOCATION DETAIL:
   - IPARK 84 CAMPUS, 2070 STATE ROUTE 52, HOPEWELL JUNCTION, NEW YORK 12533
   - PARCEL NUMBER 132800-6456-03-047060-0000
2. SCHOOL DISTRICT: WAPPINGERS CSD
3. OWNER DETAILS:
   iPARK EAST FISHKILL LLC, HOPEWELL JUNCTION, NEW YORK 12533
   - CONTACT - MIKE BUCKLEY, GENERAL MANAGER
   - TELEPHONE - (845) 765-2110
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REVISION		
No	DATE	COMMENTS
0	10/23/2019	DESIGN SUBMITTAL TO NYSDEC

STATE OF NEW YORK · MICHAEL J. CHERNEY · 086022 · LICENSED PROFESSIONAL ENGINEER

LOCATION:
BUILDING 339
iPark 84 Campus
2070 State Route 52
Hopewell Junction, NY 12533

FOR:
BUILDING 339 MODIFICATIONS
iPark 84 Campus
2070 State Route 52
Hopewell Junction, NY 12533

DRAWING TITLE: COVER

DRAWING NO: 1

ISSUED

REVISION NO: 0

DESIGNED BY: NMB / JMS
DRAWN BY: JMS / LTG
APPROVED BY: JMH
SCALE: AS NOTED
JOB NO: IPARK0118.34
DATE: October 23, 2019
SHEET NO: 1 OF 4
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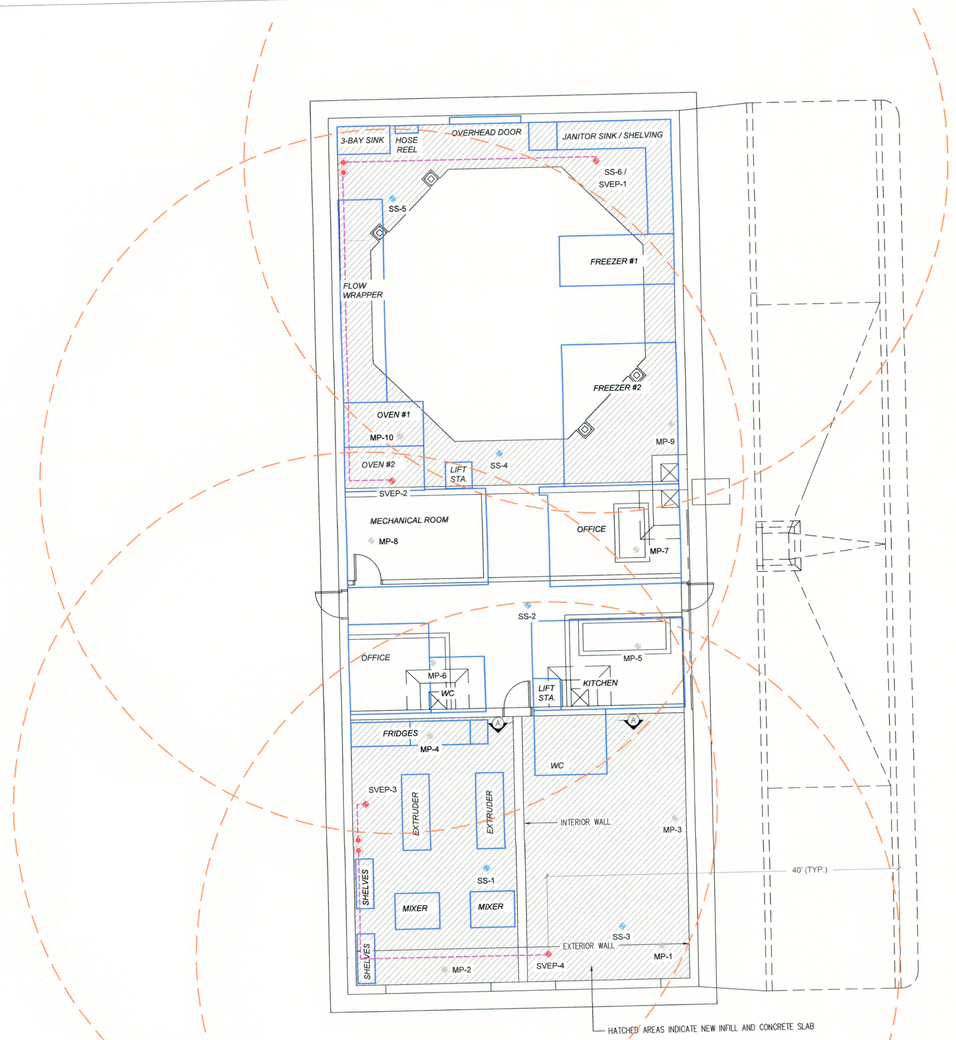
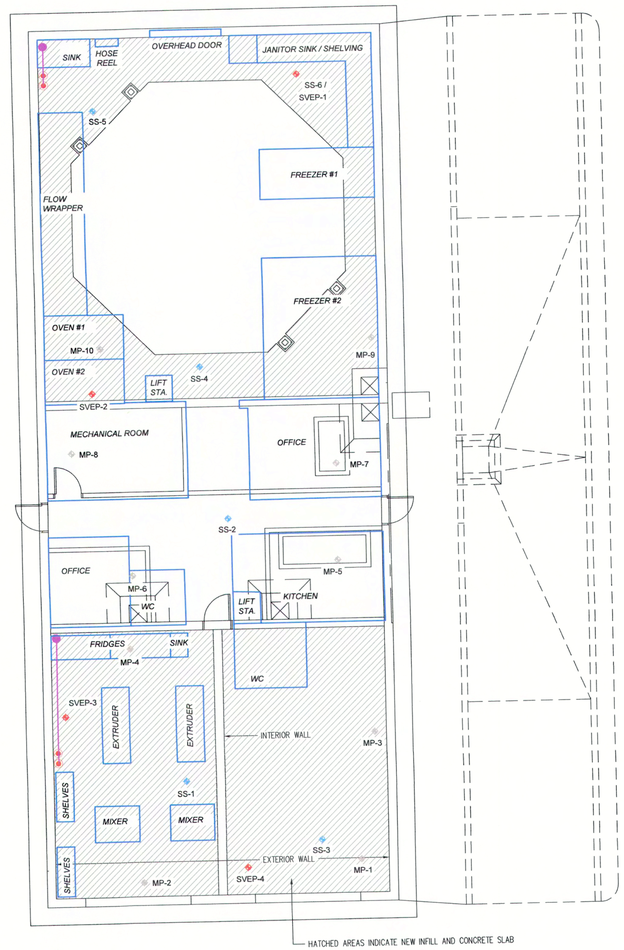


BELOW NEW FLOOR SLAB PIPING PLAN

SCALE: 1/8" = 1'



ABOVE NEW FLOOR SLAB PIPING PLAN

SCALE: 1/8" = 1'

LEGEND

- PROPOSED VAPOR EXTRACTION POINT
- PVC BELOW PROPOSED NEW SLAB
- PVC ABOVE PROPOSED NEW SLAB
- ROOF PENETRATION TO BLOWER
- SUB SLAB SOIL SAMPLE LOCATIONS (OCTOBER 2019)
- PROPOSED MICRO-WELL LOCATIONS
- FLOOR PENETRATION FOR VERTICAL PIPING SECTIONS
- OUTLINES OF PROPOSED ROOMS
- 40' RADIUS OF influence

NOTES:

1. THIS DRAWING IS A SCHEMATIC REPRESENTATION OF THE SYSTEM, ONLY. ACTUAL LOCATIONS OF PIPING RUNS SHALL BE DETERMINED IN THE FIELD.

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STATE OF NEW YORK — JOSEPH MICHAEL HENSLY III — 088022 — LICENSED PROFESSIONAL ENGINEER

LOCATION:
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iPark 84 Campus
2070 State Route 52
Hopewell Junction, NY 12533

FOR: BUILDING 339 MODIFICATIONS
iPark 84 Campus
2070 State Route 52
Hopewell Junction, NY 12533

DRAWING TITLE: VAPOR EXTRACTION WELL LAYOUT

DRAWING NO: 2

ISSUED

REVISION NO: 0

DESIGNED BY: NMB / JMS
DRAWN BY: JMS / LTG
JOB NO: IPARK0118.34
DATE: October 23, 2019
SHEET NO: 2 OF 4
24" x 36"
APPROVED BY: JMH
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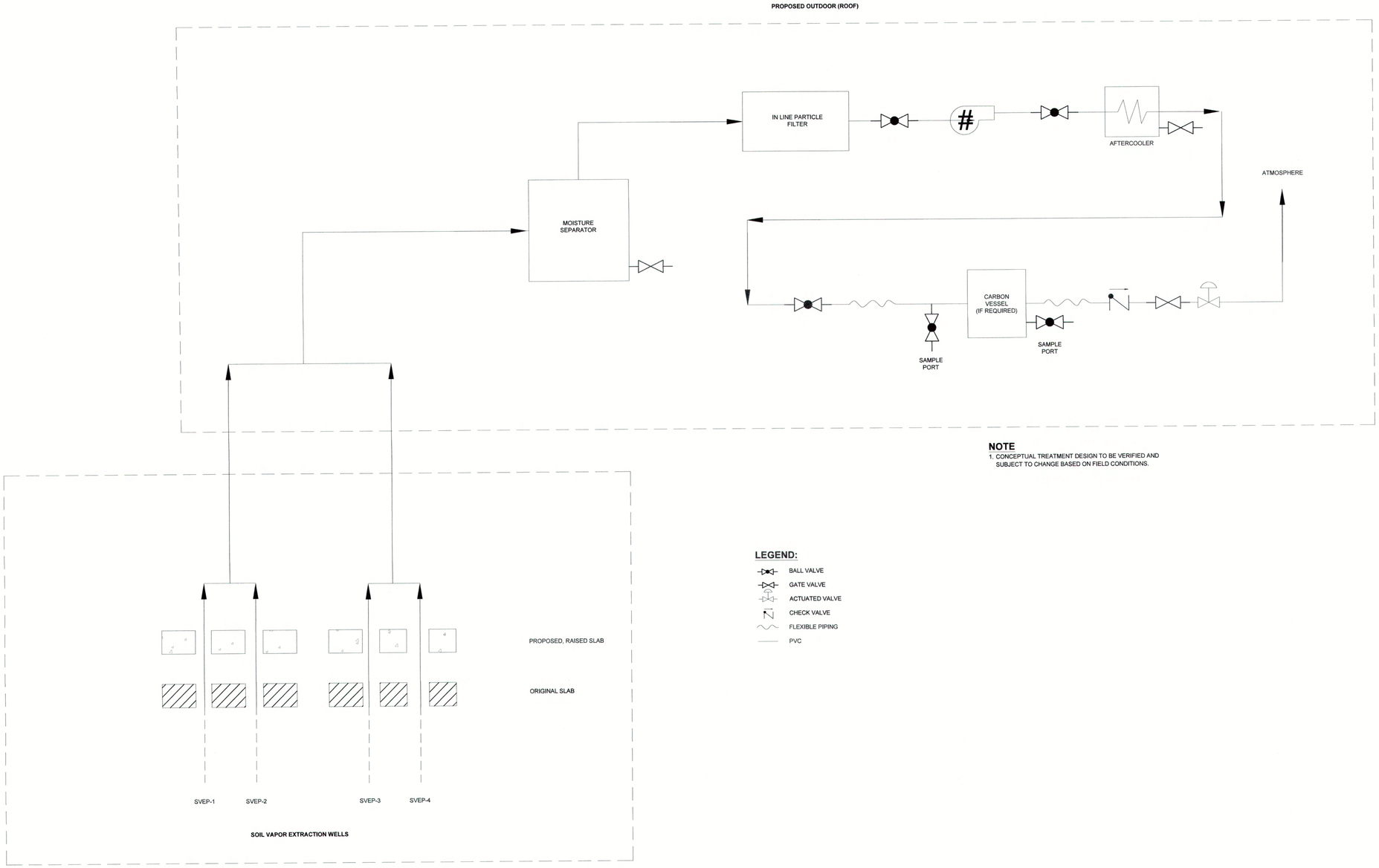

NOTE

1. CONCEPTUAL TREATMENT DESIGN TO BE VERIFIED AND SUBJECT TO CHANGE BASED ON FIELD CONDITIONS.

LEGEND:

- BALL VALVE
- GATE VALVE
- ACTUATED VALVE
- CHECK VALVE
- FLEXIBLE PIPING
- PVC

FLOW DIAGRAM

N.T.S.

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STATE OF NEW YORK · JOSEPH MICHAEL HENNEY III · 068022 · LICENSED PROFESSIONAL ENGINEER

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iPark 84 Campus
2070 State Route 52
Hopewell Junction, NY 12533

FOR:
BUILDING 339 MODIFICATIONS
iPark 84 Campus
2070 State Route 52
Hopewell Junction, NY 12533

DRAWING TITLE: FLOW DIAGRAM

DRAWING NO: 3

ISSUED

REVISION NO: 0

DESIGNED BY: NMB / JMS
DRAWN BY: LS
APPROVED BY: JMH
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DATE: October 23, 2019
SHEET NO: 3 OF 4
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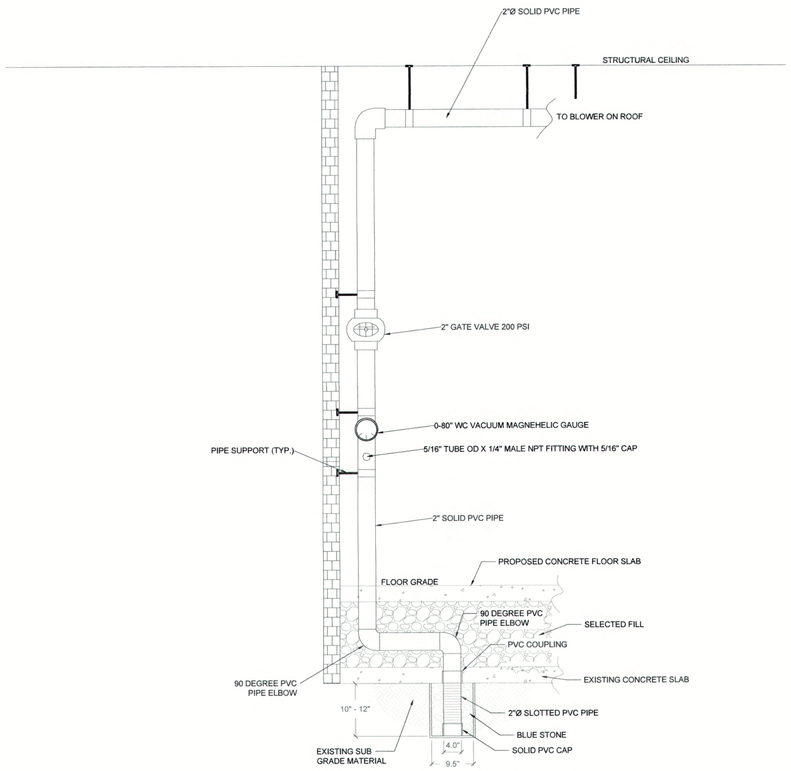
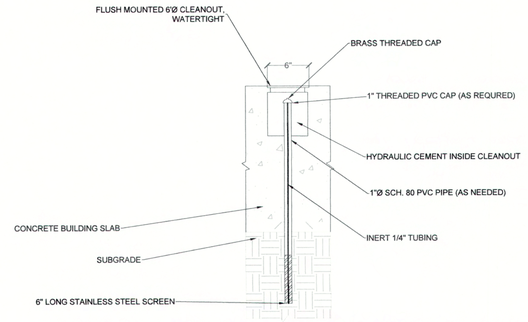


TYPICAL EXTRACTION POINT DETAIL

SCALE: N.T.S.

TYPICAL EXTRACTION POINT DETAIL NOTES:

1. MAGNEHELIC GAUGE SHALL BE DWYER INSTRUMENTS MODEL #2080 OR APPROVED EQUAL, AND SHALL INCLUDE A-610 PIPE MOUNT KIT OR APPROVED EQUAL, A-310A VENT VALVE OR APPROVED EQUAL ON VACUUM SIDE, AND PRESSURE GAUGE SNUBBER WITH 0.5 MICRON FILTERING DISC ON HIGH PRESSURE PORT.
2. THREADED JOINTS SHALL BE MADE WITH TEFLON THREAD SEALANT TAPE TO BE VACUUM AND/OR PRESSURE TIGHT. THREAD SEALANT LIQUIDS OR PASTES SHALL NOT BE USED.



TYPICAL MONITORING POINT DETAIL

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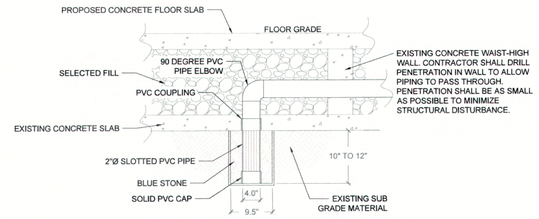
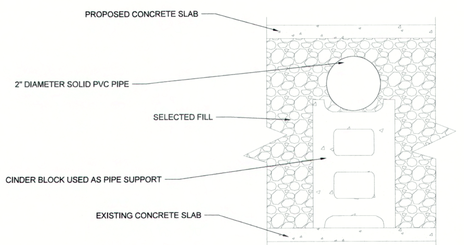


SECTION A-A

SCALE: N.T.S.



TYPICAL HORIZONTAL PIPE SECTION

SCALE: N.T.S.

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DRAWING TITLE:
VAPOR EXTRACTION WELLS AND MONITORING POINTS DETAILS

DRAWING NO: 4

ISSUED

REVISION NO: 0

DESIGNED BY: NMB / JMS	DRAWN BY: JMS / LTG	JOB NO: IPARK0118.34	DATE: October 23, 2019
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SHEET NO: 4 OF 4

24" x 36"