8976 Wellington Road
Manassas, VA 20109

December 4, 2019

Jessica LaClair
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau E, 12th Floor
625 Broadway
Albany, New York 12233-7014

Re: Work Plan for Subslab Depressurization Pilot Testing
Building 310 – Northwest Area
Former IBM East Fishkill Facility
Hopewell Junction, New York
NYSDEC Site No. 314054

Dear Ms. LaClair:

Enclosed is work plan to conduct subslab depressurization pilot extraction testing beneath the northwest portion of Building 310 located at the former IBM East Fishkill Facility in Hopewell Junction, New York. Building 310 is currently owned by iPark East Fishkill I LLC.

If you have any questions, please contact me at (703) 257-2583.

Sincerely,
International Business Machines Corporation

Dean W. Chartrand
Program Manager
Corporate Environmental Affairs

Enclosure: Work Plan

Cc:	Julia Kenney	NYSDOH	(w/enclosure via e-mail)
	Mike Buckley	iPark	(w/enclosure via e-mail)
	Carl Monheit	iPark	(w/enclosure via e-mail)
	Gary Marone	Global Foundries	(w/enclosure via e-mail)
	David Shea	Sanborn Head	(w/enclosure via e-mail)

SANBORN HEAD ENGINEERING
Building Trust. Engineering Success.

20 Foundry Street
Concord, NH 03301

Dean Chartrand
IBM Corporation
8976 Wellington Road
Manassas, VA 20109

December 4, 2019
File No. 2999.13

Re: Work Plan for Subslab Depressurization Pilot Testing
Building 310 – Northwest Area
Former IBM East Fishkill Facility
Hopewell Junction, New York
NYSDEC Site No. 314054

Dear Mr. Chartrand:

This letter presents a work plan to evaluate the feasibility of subslab depressurization (SSD) as a means of mitigating soil vapor intrusion beneath the northwest portion of Building 310 (B310) at the former IBM East Fishkill facility located in Hopewell Junction, New York (the site). B310 is currently owned by iPark East Fishkill I LLC (iPark), and its location is shown on Figure 1. B310 is vacant except for the Model Shop area at the southern end.

The northwest portion of B310 that is the subject of this work plan is defined as the areas north and west of the current B310 SSD system area of influence. The work described herein will be conducted in general accordance with IBM's RCRA Facility Investigation (RFI) Work Plan,[1] which was approved by the New York State Department of Environmental Conservation (NYSDEC) and the Department of Health (NYSDOH) (the Departments).

BACKGROUND

B310 is equipped with an SSD system (System VE-2) that serves the central portion of the building, as shown on Figure 2. The SSD system, combined with heating, ventilating, and air conditioning (HVAC) system operations, was successful in mitigating soil vapor intrusion and maintaining acceptable indoor air quality (IAQ) in B310, as documented in previous reports[2,3] to the Departments.

The area north and west of System VE-2 is currently vacant and has undergone major renovations, including removal of almost all interior walls and partitions and shut-down of the HVAC units that serve the area. Because iPark intends to re-occupy this space in the future, IBM commissioned Sanborn Head to conduct subslab vapor sampling on October

1 *RCRA Facility Investigation Work Plan, VOC Source Assessment, IBM East Fishkill Facility, Hopewell Junction, New York*, Sanborn, Head Engineering, P.C., June 15, 2009.
2 *Performance Monitoring and Confirmatory Sampling Results, Building 310 VOC Source Assessment, IBM East Fishkill Facility, Hopewell Junction, NY*, Sanborn, Head Engineering, P.C., May 2013.
3 *Report of HVAC Adjustment and Indoor Air Quality Testing – Building 310*, Sanborn, Head Engineering P.C., July 22, 2016.

22, 2019 while the area was readily accessible. The sampling was performed in general accordance with the methods described in the August 23, 2019 SSD pilot testing work plan,[4] which was approved by the Departments. In addition, the VE-2 SSD system was shut down two weeks prior to the October 22, 2019 sampling to allow subslab vapor concentrations to equilibrate.

The results of subslab vapor sampling are provided in Table 1, and the concentrations of tetrachloroethene (PCE) in the subslab vapor samples are shown on Figure 3. Notably, the subslab vapor PCE concentrations within the area of influence of the SSD VE-2 System have decreased by several orders of magnitude since the system began operations in February 2012. The highest PCE concentrations are north of the SSD VE-2 System area of influence, with lower PCE concentrations (less than 1,000 µg/m^3) beneath the western portion of the building.

IBM has elected to conduct SSD pilot testing in the north and west portions of the building, outside the area of influence of the existing SSD VE-2 System, to support possible expansion of SSD for B310.

WORK PLAN

The objectives of this work plan are to obtain design data to support possible expansion of SSD beneath the north and west portions of B301. To meet this objective, the following work scope is planned:

Subslab Vapor Monitoring and Extraction Port Installation

Approximately 6 subslab vapor (SSV) monitoring ports and 6 subslab vapor extraction ports (EPs) will be installed at the approximate locations shown on Figure 3. The proposed locations will be cleared for utilities and asbestos-containing floor tile (if floor tile is present) by a licensed asbestos handler prior to installation. Subslab ports will be installed in general accordance with the 2006 NYSDOH Vapor Intrusion Guidance. Refer to Figure 4 for construction details of SSV monitoring and extraction ports. Given that the ports will be constructed through the concrete floor slab using grout sealants and gas-tight hardware, approximately 10% of locations will be leak-tested following installation to verify the integrity of the construction.

The SSV ports will be installed using a hammer drill, and an industrial vacuum equipped with a HEPA-filter will be used to collect concrete chips and dust generated during the installation. The EPs will be installed using a concrete coring drill equipped with a water delivery system which will be operated for dust suppression and bit cooling during coring. A wet/dry vacuum will be used to collect excess water and concrete cuttings as they are generated.

The breathing zone will be screened for total VOCs using a photoionization detector (PID) during concrete drilling, coring, and port installation. If sustained PID readings exceed the

[4] *Work Plan for Subslab Depressurization Pilot Testing, Building 310 – South-Central Area, Former IBM East Fishkill Facility, Hopewell Junction, New York*, Sanborn, Head Engineering, P.C., August 23, 2019.

action levels in Sanborn Head's site-specific health and safety plan, the slab will be temporarily covered using plastic sheeting or similar, and work will be discontinued until the situation can be re-assessed. Additional engineering controls, such as the use of exhaust fans, may be implemented as needed.

Excess soil generated during extraction port installation will be containerized and sampled for waste characterization purposes to assess whether the soil can remain on-site, or if it needs to be managed and transported off-site for appropriate treatment or disposal.

Subslab Depressurization Pilot Testing

Individual SSD pilot tests will be performed on each of the proposed subslab EPs using a regenerative vacuum blower mounted on a portable cart. Testing of multiple EPs simultaneously may also be conducted depending on the results of individual testing.

During each test, the applied vacuum, subslab vapor extraction flowrate, and total VOC screening values measured with a PID would be monitored and recorded periodically. The cross-slab differential pressure response will be monitored at nearby SSV monitoring ports using digital manometers for each test.

CLOSING

The above work is planned to commence in mid-December and is expected to be completed within one to two months thereafter. A report documenting the results will be submitted approximately six to eight weeks following completion of the work.

Very truly yours,
SANBORN, HEAD ENGINEERING, P.C.

David Shea, P.E.
Principal Engineer

Joseph W. Corsello
Project Manager

Encl. Table 1 – Summary of Subslab Vapor Sample Analytical Results
Figure 1 – B310 Location Plan
Figure 2 – Building 310 Layout
Figure 3 – Summary of PCE Concentrations in Subslab Vapor
Figures 4A and 4B – SSV Monitoring and Extraction Port Construction Detail

P:\2900s\2999.13\Source Files\201911 B310 NW Pilot Testing Work Plan\201911-B310-NW Area-WP.docx

TABLE

TABLE 1
Summary of Subslab Vapor Sample Analytical Results
Work Plan for Subslab Depressurization Pilot Testing - Building 310 Northwest Area
Former IBM East Fishkill Facility
Hopewell Junction, New York

Analyte	Sample Location	SS14	SS15	SS16	SS17	SS18	SS19	SS20	SS104	SS110	SS117
	Collection Date	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19
Acetone	µg/m^3	<31	<27	<29	<270	<30	<27	<29	<180	<29	<29
Benzene	µg/m^3	<4.2	<3.7	<3.9	<36	<4.0	<3.7	<3.9	<24	<3.8	<4.0
Carbon tetrachloride	µg/m^3	<8.3	<7.2	<7.7	<71	<7.9	<7.3	<7.6	<48	<7.6	<7.8
Chlorobenzene (Monochlorobenzene)	µg/m^3	<6.1	<5.3	<5.6	<52	<5.8	<5.3	<5.6	<35	<5.5	<5.7
Dichlorobenzene (1,2-)	µg/m^3	<8.0	<6.9	<7.4	<68	<7.5	<6.9	<7.3	<46	<7.2	<7.4
Dichlorobenzene (1,3-)	µg/m^3	<8.0	<6.9	<7.4	<68	<7.5	<6.9	<7.3	<46	<7.2	<7.4
Dichlorobenzene (1,4-)	µg/m^3	<8.0	<6.9	<7.4	<68	<7.5	<6.9	<7.3	<46	<7.2	<7.4
Dichlorodifluoromethane (CFC12)	µg/m^3	<6.6	<5.7	<6.0	<56	8.5	<5.7	<6.0	<38	<6.0	<6.1
Dichloroethene (1,1-)	µg/m^3	<5.2	<4.6	<4.8	100	<5.0	<4.6	<4.8	41	<4.8	<4.9
Dichloroethene (cis-1,2-)	µg/m^3	<5.2	<4.6	420	340	<5.0	<4.6	<4.8	32	14	11
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	µg/m^3	<10	<8.8	51	6,500	<9.6	210	12	3,900	91	140
Ethylbenzene	µg/m^3	<5.8	<5.0	<5.3	<49	<5.4	<5.0	<5.2	<33	<5.2	<5.4
Methylene Chloride (Dichloromethane)	µg/m^3	<46	<40	<42	<390	<43	<40	<42	<260	<42	<43
Tetrachloroethene (PCE)	µg/m^3	39	200	1,100	14,000	240	940	560	11,000	1,000	410
Toluene	µg/m^3	<5.0	<4.3	<4.6	<42	<4.7	<4.4	<4.6	<29	<4.5	<4.7
Trichlorobenzene (1,2,4-)	µg/m^3	<39	<34	<36	<330	<37	<34	<36	<230	<36	<37
Trichloroethane (1,1,1-)	µg/m^3	<7.2	<6.3	7.1	<61	<6.8	<6.3	<6.6	<42	<6.6	<6.8
Trichloroethene (TCE)	µg/m^3	8.4	110	380	2,200	12	120	42	1,100	180	77
Trichlorofluoromethane (CFC11)	µg/m^3	21	130	<6.9	130	14	13	30	100	57	37
Vinyl chloride	µg/m^3	<3.4	<2.9	<3.1	<29	<3.2	<3.0	<3.1	<20	<3.1	<3.2
Xylene (m,p-)	µg/m^3	<5.8	<5.0	<5.3	<49	<5.4	<5.0	<5.2	<33	<5.2	<5.4
Xylene (o-)	µg/m^3	<5.8	<5.0	<5.3	<49	<5.4	<5.0	<5.2	<33	<5.2	<5.4

Notes:

1. Samples were collected by Sanborn Head on the dates indicated in Summa canisters over an approximately 1-hour sampling period. The samples were analyzed by Eurofins Air Toxics, Inc. (EATI) of Folsom, California for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in the full scan mode.

2. Results are presented in micrograms per cubic meter (µg/m^3).

3. "<" indicates the analyte was not detected above the indicated reporting limit.

TABLE 1
Summary of Subslab Vapor Sample Analytical Results
Work Plan for Subslab Depressurization Pilot Testing - Building 310 Northwest Area
Former IBM East Fishkill Facility
Hopewell Junction, New York

Analyte	Sample Location	SS121	SS125	SS127	SS134	SS134 Dup	SS138	SS141	SS183	SS184	SS185
	Collection Date	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19	10/22/19
Acetone	µg/m^3	<28	<30	<29	<29	<29	<28	<28	<360	<160	79
Benzene	µg/m^3	<3.8	<4.0	<3.9	<3.9	<3.9	<3.8	<3.8	<49	<52	<3.9
Carbon tetrachloride	µg/m^3	<7.4	<7.8	<7.7	<7.6	<7.7	<7.5	<7.4	<96	<100	<7.6
Chlorobenzene (Monochlorobenzene)	µg/m^3	<5.4	<5.7	<5.6	<5.6	<5.6	<5.5	<5.4	<71	<76	<5.6
Dichlorobenzene (1,2-)	µg/m^3	<7.1	<7.5	<7.3	<7.3	<7.3	<7.2	<7.1	<92	<99	<7.3
Dichlorobenzene (1,3-)	µg/m^3	<7.1	<7.5	<7.3	<7.3	<7.3	<7.2	<7.1	<92	<99	<7.3
Dichlorobenzene (1,4-)	µg/m^3	<7.1	<7.5	<7.3	<7.3	<7.3	<7.2	<7.1	<92	<99	<7.3
Dichlorodifluoromethane (CFC12)	µg/m^3	<5.8	<6.2	<6.0	6.0	<6.0	<5.9	<5.8	<76	<81	<6.0
Dichloroethene (1,1-)	µg/m^3	<4.6	<4.9	<4.8	<4.8	<4.8	<4.7	<4.7	<61	<65	<4.8
Dichloroethene (cis-1,2-)	µg/m^3	<4.6	<4.9	7.4	<4.8	<4.8	<4.7	<4.7	120	<65	<4.8
Ethane, 1,1,2-trichloro-1,2,2-trifluoro- (CFC113)	µg/m^3	21	<9.5	20	15	13	55	<9.0	3,000	76,000	27
Ethylbenzene	µg/m^3	<5.1	<5.4	<5.3	<5.2	<5.3	<5.2	<5.1	<67	<71	<5.2
Methylene Chloride (Dichloromethane)	µg/m^3	<41	<43	<42	<42	<42	<41	<41	<530	<230	<42
Tetrachloroethene (PCE)	µg/m^3	330	880	970	210	210	290	<8.0	25,000	59,000	2,600
Toluene	µg/m^3	<4.4	<4.7	<4.6	5.8	7.0	<4.5	<4.4	<58	<62	15
Trichlorobenzene (1,2,4-)	µg/m^3	<35	<37	<36	<36	<36	<35	<35	<460	<490	<36
Trichloroethane (1,1,1-)	µg/m^3	<6.4	<6.8	<6.6	<6.6	<6.6	<6.5	<6.4	<84	<90	<6.6
Trichloroethene (TCE)	µg/m^3	64	11	40	14	16	30	<6.3	2,300	1,800	230
Trichlorofluoromethane (CFC11)	µg/m^3	12	54	42	190	190	32	<6.6	<86	590	52
Vinyl chloride	µg/m^3	<3.0	<3.2	<3.1	<3.1	<3.1	<3.0	<3.0	<39	<42	<3.1
Xylene (m,p-)	µg/m^3	<5.1	<5.4	<5.3	<5.2	<5.3	<5.2	<5.1	<67	<71	<5.2
Xylene (o-)	µg/m^3	<5.1	<5.4	<5.3	<5.2	<5.3	<5.2	<5.1	<67	<71	<5.2

Notes:

1. Samples were collected by Sanborn Head on the dates indicated in Summa canisters over an approximately 1-hour sampling period. The samples were analyzed by Eurofins Air Toxics, Inc. (EATI) of Folsom, California for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in the full scan mode.

2. Results are presented in micrograms per cubic meter (µg/m^3).

3. "<" indicates the analyte was not detected above the indicated reporting limit.

FIGURES

Figure 1

B310 Location Plan

Subslab Depressurization Pilot Testing Work Plan

Former IBM East Fishkill Facility
Hopewell Junction, New York

Drawn By: E. Wright
Designed By: J. Sanborn
Reviewed By: D. Shea
Project No: 2999.13
Date: November 2019

Figure Narrative

This figure shows the buildings at the former IBM East Fishkill facility. Building B310 is highlighted.

Legend

- Property Line
- Unlabeled features include wastewater treatment tanks, pump houses, trailers, and other structures and features not intended for human occupancy
- B310 — Indicates building number
- Indicates the location of B310

GlobalFoundries	
Lot 1	GlobalFoundries U.S 2 LLC
Lot 5	GlobalFoundries U.S 2 LLC

i.Park	
Lot 2	i.Park East Fishkill I LLC
Lot 3	i.Park East Fishkill I LLC
Lot 4	i.Park East Fishkill LLC
Lot 6	i.Park East Fishkill LLC
Lot 7	i.Park East Fishkill LLC
Lot 8	i.Park East Fishkill LLC

- Subdivision (GlobalFoundries U.S. 2 LLC)
- Subdivision (i.Park East Fishkill LLC)
- Subdivision (i.Park East Fishkill I LLC)

N W E S

200' 100' 0 200' 400' Feet

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File:P:\2990s\2999.00\Graphics Files\CAD\B310\B310 SSD Concept Design\B310_SSD_LocationPlan.dwg Plot Date: 11-19-19

Figure 2

Building 310 Layout

Subslab Depressurization Pilot Testing
Work Plan
Building 310

Former IBM East Fishkill Facility
Hopewell Junction, New York

Drawn By:	E. Wright
Designed By:	J. Corsello
Reviewed By:	J. Sanborn
Project No:	2999.13
Date:	November 2019

Figure Narrative

This figure shows the extent of the proposed subslab depressurization (SSD) pilot testing area located in the northwest portion of Building 310. Note that most of the interior walls and rooms in this area have been demolished and the building cleared. The building layout and HVAC zones in this area reflect the pre-demolition conditions.

This figure also shows the location of the Model Shop area, and the layout of the existing SSD system, including the approximate area of subslab vapor vacuum influence. The presumed area of vacuum influence represents the inferred apparent vacuum conditions based on subslab differential pressure readings collected on December 18, 2018.

Legend

- Existing subslab vapor extraction port
- HVAC Zone
- Occupied areas
- Overhead vacuum/discharge piping for existing SSD system VE-2
- Inferred area of vacuum influence for existing SSD system VE-2
- Extent of proposed SSD pilot testing

Feet
40 20 0 40 80

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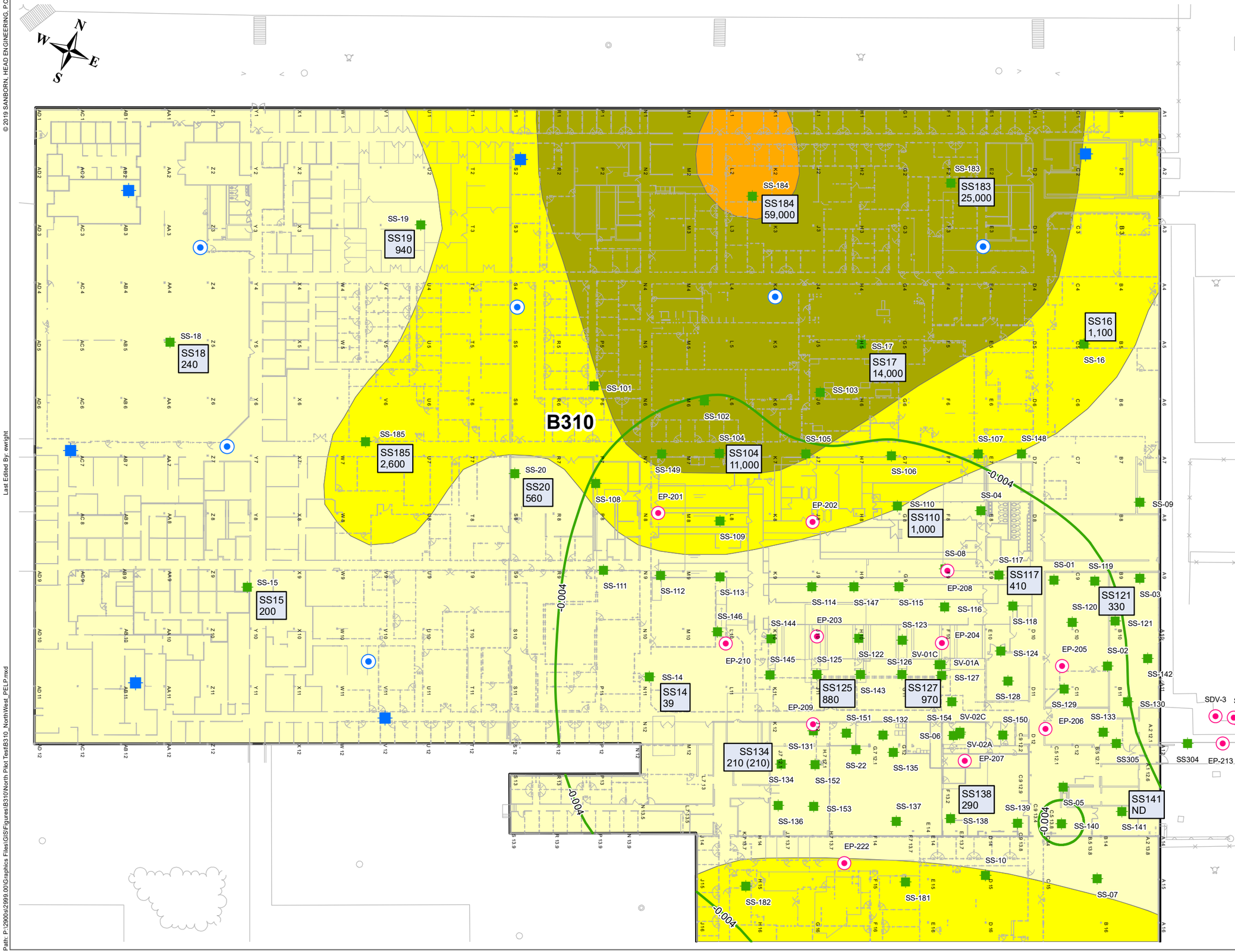

Figure 3

Summary of PCE Concentrations in Subslab Vapor

Subslab Depressurization Pilot Testing
Work Plan
Building 310

Former IBM East Fishkill Facility
Hopewell Junction, New York

Drawn By:	E. Wright
Designed By:	J. Corsello
Reviewed By:	J. Sanborn
Project No:	2999.13
Date:	November 2019

Figure Narrative

This figure shows the concentrations of tetrachloroethene (PCE) detected in subslab vapor samples in units of micrograms per cubic meter (ug/m3). Subslab vapor samples were collected on October 22, 2019 into 1-L Summa canisters equipped with 1-hour flow controllers approximately 2 weeks after SSD system VE-2 was turned off. The colored shading represents inferred PCE concentrations below the slab based on the results of the samples collected at the monitoring ports. Other interpretations are possible. Refer to Table 1 for other analyte concentrations.

This figure also shows the locations of the proposed subslab vapor extraction ports. Actual locations may change based on the presense of subsurface utilities and other building conditions.

Legend

- Existing subslab vapor monitoring port
- Proposed subslab vapor monitoring port
- Existing subslab vapor extraction port
- Proposed subslab vapor extraction port
- Inferred area of vacuum influence for existing SSD system VE-2
- 970 — PCE concentration (µm/m^3) ( ) indicates duplicate sample

PCE Concentrations (µg/m³)

- <1,000
- 1,000 10,000
- 10,000 - 50,000
- >50,000

25 12.5 0 25 50 Feet

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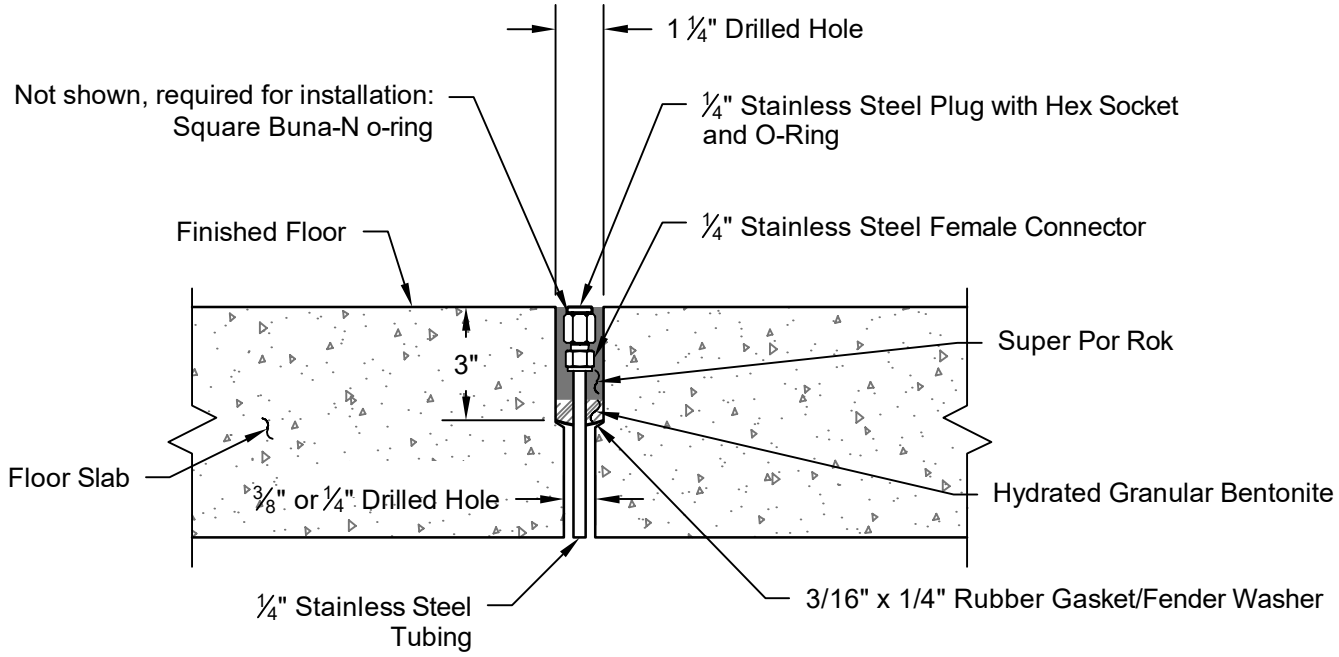
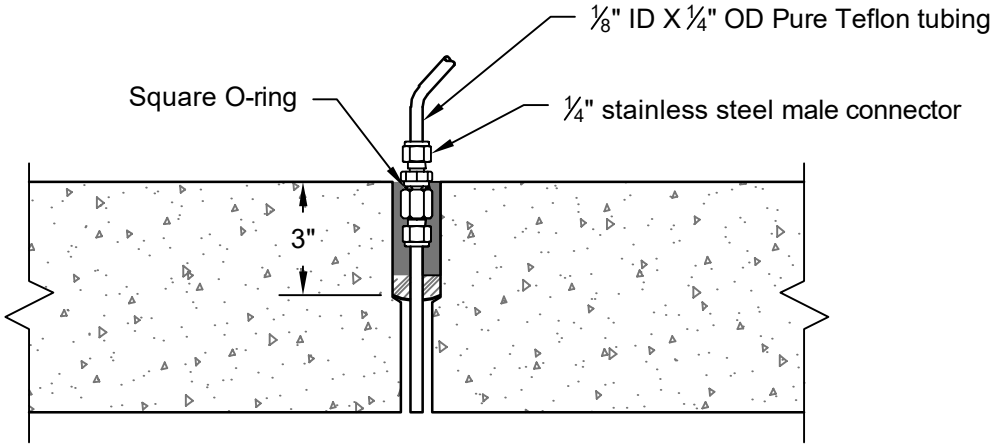


1 Subslab Sampling/Monitoring Port

Not To Scale



2 Subslab Vapor Sampling Configuration

Not To Scale

Drawn By: E. Wright
Designed By: J. Corsello
Reviewed By: J. Sanborn
Project No: 2999.13
Date: November 2019

Scale As Noted

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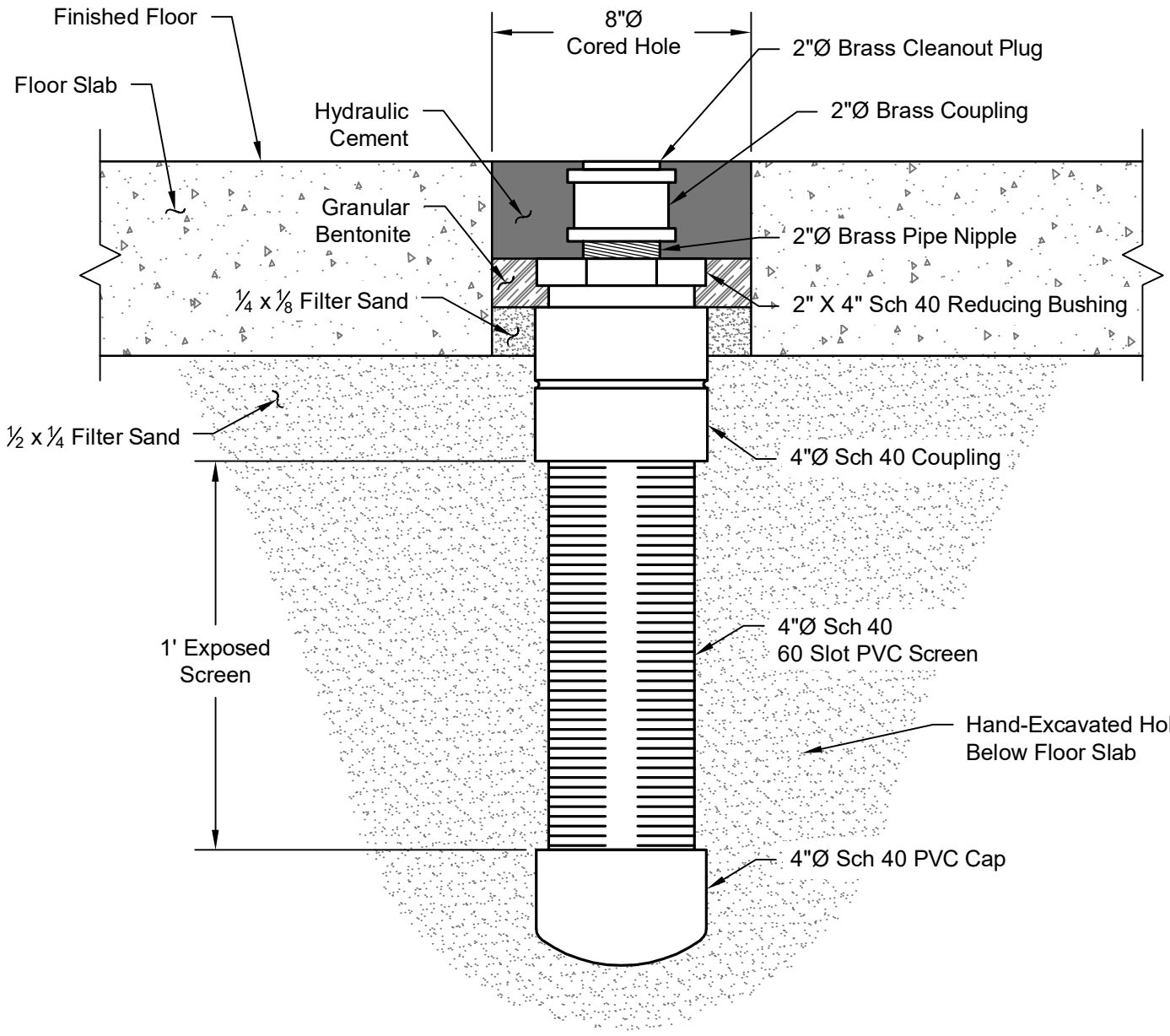
Figure 4A

Subslab Vapor Sampling/ Monitoring Port Construction Details

Building 310

Former IBM East Fishkill Facility
Hopewell Junction, New York



Subslab Vapor Extraction Test Port

1

Not To Scale

Drawn By: E. Wright
Designed By: J. Corsello
Reviewed By: J. Sanborn
Project No: 2999.13
Date: November 2019

Scale As Noted

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Figure 4B

Subslab Vapor Extraction Port Construction Detail

Building 310

Former IBM East Fishkill Facility
Hopewell Junction, New York