ARM Group LLC
Engineers and Scientists

February 2, 2021

Ms. Barbara Brown
Project Coordinator
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: RADWP Addendum:
Sub-Slab Soil Gas
& Indoor Air Monitoring Plan
Area A: Sub-Parcel A10-1
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

ARM Group LLC (ARM), on behalf of Tradepoint Atlantic, is proposing to conduct sub-slab soil gas and indoor air sampling within Sub-Parcel A10-1 (the Site), which is part of Area A of the Tradepoint Atlantic property located in Sparrows Point, Maryland. The Sub-Parcel A10-1 Response and Development Work Plan (RADWP) (Revision 2 dated December 31, 2020) and associated Comment Response Letter that were submitted to the Maryland Department of the Environment (MDE) and United States Environmental Protection Agency (USEPA) proposed pre- and post-occupancy monitoring to assess potential vapor intrusion (VI) risk. This RADWP Addendum provides additional specification for this proposed indoor air and soil gas monitoring.

A total of 10 sub-slab soil gas monitoring points are proposed to be installed and sampled prior to building occupancy. The proposed monitoring point locations for both sub-slab soil gas and indoor air are shown on **Figure 1**. **Figure 2** was adapted from the RADWP (Figure 7) and includes the proposed sub-slab soil gas and indoor air sample locations along with pertinent groundwater data. **Figure 2** includes the shallow and perched piezometers sampled during the preceding chlorinated volatile organic compound (CVOC) groundwater investigation (highlighting any cumulative VI risk/hazard exceedances in red), as well as the locations of the non-aqueous phase liquid (NAPL) screening piezometers installed in the vicinity of A10-006-PZ. Minor adjustments to the final locations of the monitoring points may be necessary following construction based on the final interior layout of the building.

Sampling will be conducted in accordance with the schedule established in Section 5.5 of the RADWP. One round of pre-occupancy sub-slab soil gas sampling will be performed using the new monitoring points following their installation. If the results of the initial round of sub-slab

soil gas sampling are below the Project Action Limits (PALs), then the building will be occupied, and a subsequent post-occupancy round of indoor air and sub-slab soil gas sampling will be performed within 90 days of occupancy. If the pre-occupancy sub-slab soil gas results indicate the presence of a potentially unacceptable VI risk (i.e., exceedances of the PALs), then a subsequent round of indoor air and sub-slab soil gas sampling will be performed prior to occupancy, and any additional monitoring and/or response measures will be coordinated with the MDE and USEPA as needed.

Each sub-slab soil gas monitoring point will be installed in accordance with the procedures referenced in Section 4.2.5 of the RADWP. For each installation, a 6-inch diameter pilot-hole will be cored through the concrete floor. The vapor barrier (below the concrete slab) will be carefully cut and peeled back to gain access to the subsurface. A hammer drill and/or a hand auger will be used to create a shallow borehole that extends through the subgrade to a depth of 12 inches below the bottom of the floor slab. A 6-inch soil gas implant, constructed of double woven stainless-steel wire screen, will be attached to an appropriate length of polyethylene tubing and lowered to the bottom of the borehole. Once the implant and tubing are installed, the tubing will be capped with a three-way valve, and clean sand will be added around the implant to create a permeable layer that extends at least 2 inches above the implant. Bentonite will be added and hydrated to create a seal above the sand pack that extends to the vapor barrier, which will then be folded back into place prior to adding additional hydrated bentonite. Additional bentonite will be added until it is within the pilot-hole and at least 2 inches above the vapor barrier. The monitoring points will be finished with a flush-mount surface completion (manhole) with a concrete collar.

Once installed, each sub-slab soil gas monitoring probe will be allowed to equilibrate for at least 24 hours. Following this equilibration period, leak testing will be performed at each location in accordance with the procedures referenced in the Quality Assurance Project Plan (QAPP) Worksheet 21 – Field Standard Operating Procedures (SOPs), SOP No. 002 to confirm no fresh air intrusion.

Sub-slab soil gas samples will be collected according to procedures outlined in QAPP Worksheet 21 – Field SOPs, SOP No. 002 – Sub-Slab Soil Gas Sampling. The sub-slab soil gas samples will be collected using 6-liter Summa Canisters set for an 8-hour collection time. The indoor air samples will be collected according to procedures outlined in QAPP Worksheet 21 – Field SOPs, SOP No. 001 – Indoor Air Sampling. The indoor air samples will be collected during the second round of monitoring at the same approximate time as the sub-slab soil gas samples; these will also be collected using 6-liter Summa Canisters set for an 8-hour collection time. All samples will be submitted to Pace Analytical Services, Inc. (PACE) and analyzed for VOCs via USEPA Method TO-15. The full list of TO-15 VOCs approved for property-wide investigations is included as **Attachment 1**. Sample containers, preservatives, and holding times for the TO-15 analysis are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

Quality assurance and quality control (QA/QC) samples are collected during field studies for various purposes, among which are to isolate site effects (control samples), to define background conditions (background sample), and to evaluate field/laboratory variability (duplicates, etc.). The following QA/QC samples will be submitted for analysis during each scheduled monitoring event (as appropriate):

- Blind Field Duplicate – 1 sample of air or sub-slab soil gas (selected by field personnel).
- Field Blank – 1 sample of ambient air from an exterior area in the breathing zone during indoor air sampling.
- Equipment Blank – 1 sample of "clean" air provided by the laboratory.

The QA/QC samples will be collected and analyzed in accordance with the QAPP Worksheet 12 – Measurement Performance Criteria, QAPP Worksheet 20 – Field Quality Control, and QAPP Worksheet 28 – Analytical Quality Control and Corrective Action.

Following each monitoring event, a brief Letter Report will be submitted to the MDE and USEPA that will document the sample collection procedures and present and interpret the analytical results. All results will be presented in tabular and graphical formats as appropriate to best summarize the data for future use. Recommendations will be presented for any additional site investigation activities such as supplemental sampling, if warranted.

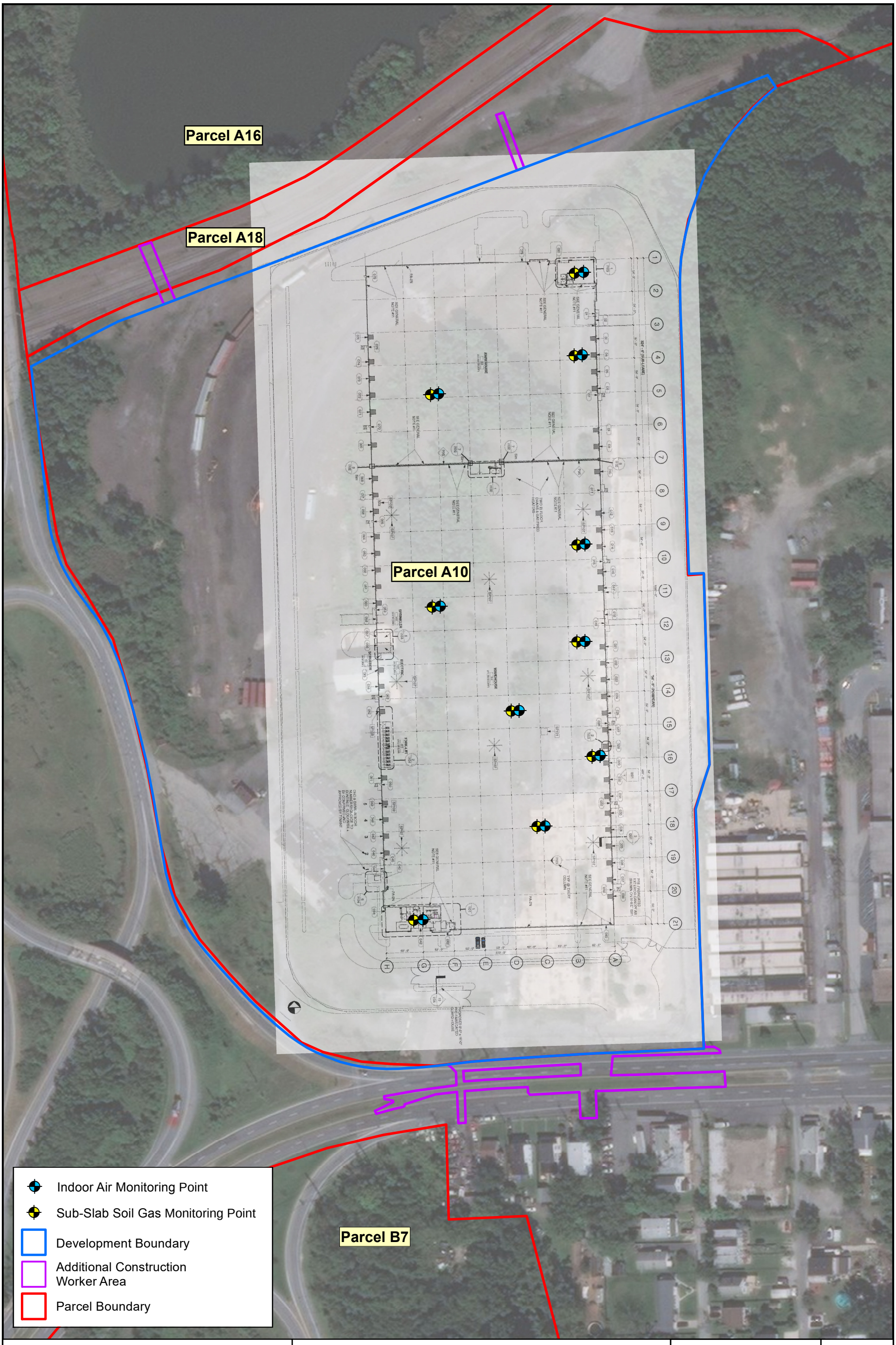
If you have any questions, or if we can provide any additional information at this time, please do not hesitate to contact ARM Group LLC at 410-290-7775.

Respectfully Submitted,
ARM Group LLC

Joshua M. Barna, G.I.T.
Staff Geologist

Eric S. Magdar, P.G.
Vice President

FIGURES



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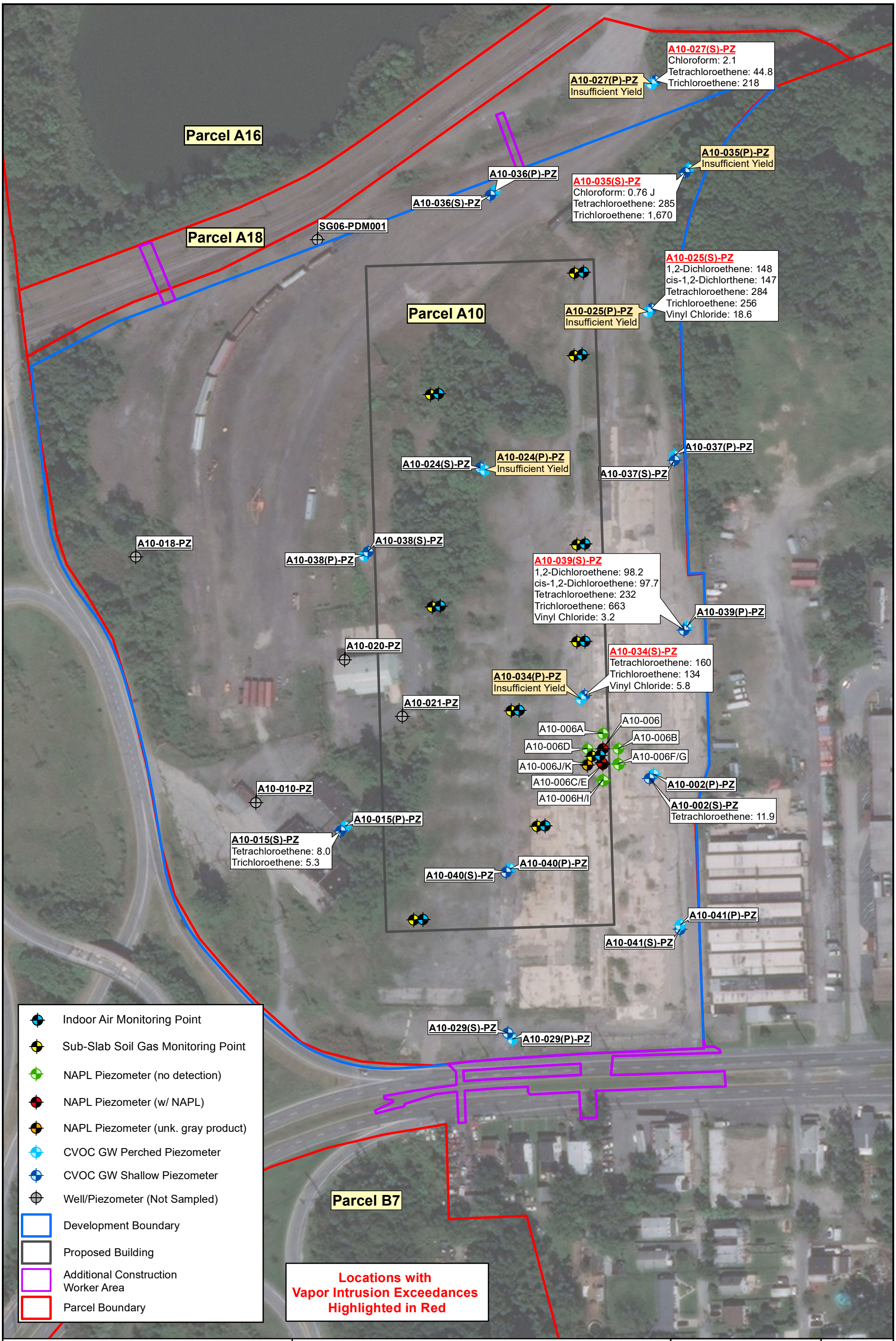
Sub-Parcel A10-1
Building Layout Monitoring Locations
Proposed Sub-Slab Soil Gas and Indoor Air
December 30, 2020

Tradepoint Atlantic
ARM Project 20010110

Sparrows Point
Baltimore County, MD

Figure
1



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Sub-Parcel A10-1
Groundwater CVOC Investigation
Vapor Intrusion & PAL Exceedances (ug/L)

January 28, 2021

Tradepoint Atlantic
ARM Project 20010110

Sparrows Point
Baltimore County, MD

Figure
2

ATTACHMENT 1

Attachment 1 - Sub-Parcel A10-1
TO-15 VOC List

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2-Trichlorotrifluoroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2,3-Trichlorobenzene
1,2,3-Trimethylbenzene
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane (EDB)
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloroethene (Total)
1,2-Dichloropropane
1,3,5-Trimethylbenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,4-Dioxane (p-Dioxane)
2-Butanone (MEK)
2-Hexanone
4-Methyl-2-pentanone (MIBK)
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
Cyclohexane
Dibromochloromethane
Dichlorodifluoromethane
Ethylbenzene
Hexachloro-1,3-butadiene
Isopropylbenzene (Cumene)
Methyl-tert-butyl ether
Methylene Chloride
Naphthalene
Styrene
Tetrachloroethene
Toluene
Trichloroethene
Trichlorofluoromethane
Vinyl chloride
Xylene (Total)
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
trans-1,2-Dichloroethene
trans-1,3-Dichloropropene