

Legend

- Extraction Point (EP) (Installed 5/26/2017)
- ⊙ Soil Vapor Extraction (SVE) Well (Installed 5/26/2017)
- Vapor Points (VPs) (Installed 6/3/2017)
- ⊠ Vapor Monitoring Well (VMWs) (Installed 5/26/2017)
- ⊕ Existing Vapor Pin to be Used in Feasibility Test (Installed 4/29/2016)
- ⊞ Vapor Pin Location (Installed 11/4/2014)
- Vapor Pin Location (Installed 2/3/2015)
- ⊕ Vapor Pin Location (Installed 4/29/2016)

Source for Vapor Pins installed before 2017:
P&D Environmental, 2016. Sub-Slab Soil Gas Investigation Report. September.

0 60 Feet

Feasibility Test Layout
2101 Williams Street
San Leandro, California

Geosyntec consultants

WR2292 September 2017

Figure
2

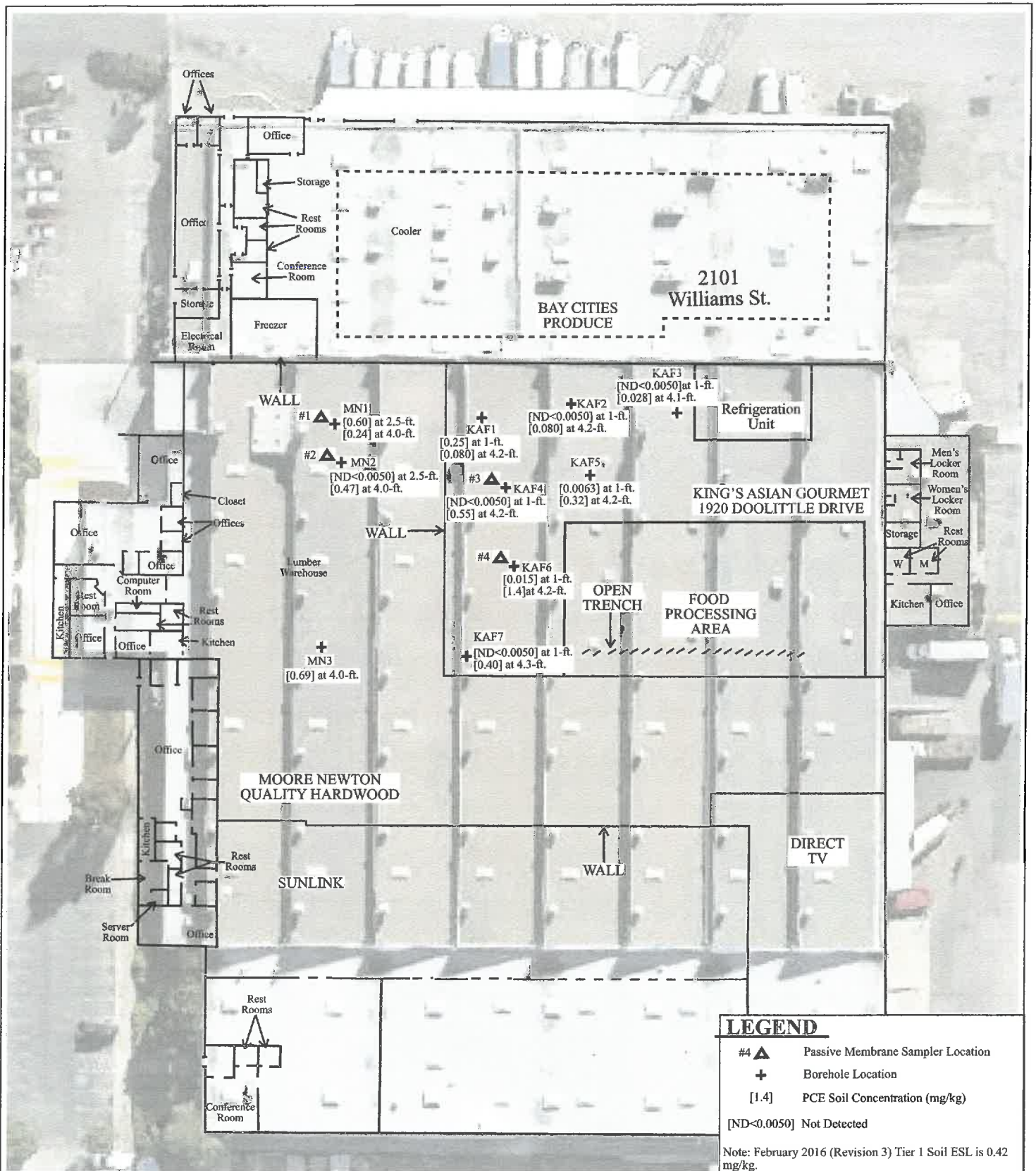
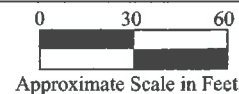


Figure 1
 Site Plan Aerial Photograph Detail Showing Sample Collection Locations and Soil PCE Concentrations
 2101 Williams Street
 San Leandro, California

Base Map from:
 Google Earth, image dated August 28, 2012

P&D Environmental, Inc.
 55 Santa Clara Avenue
 Oakland, CA 94610



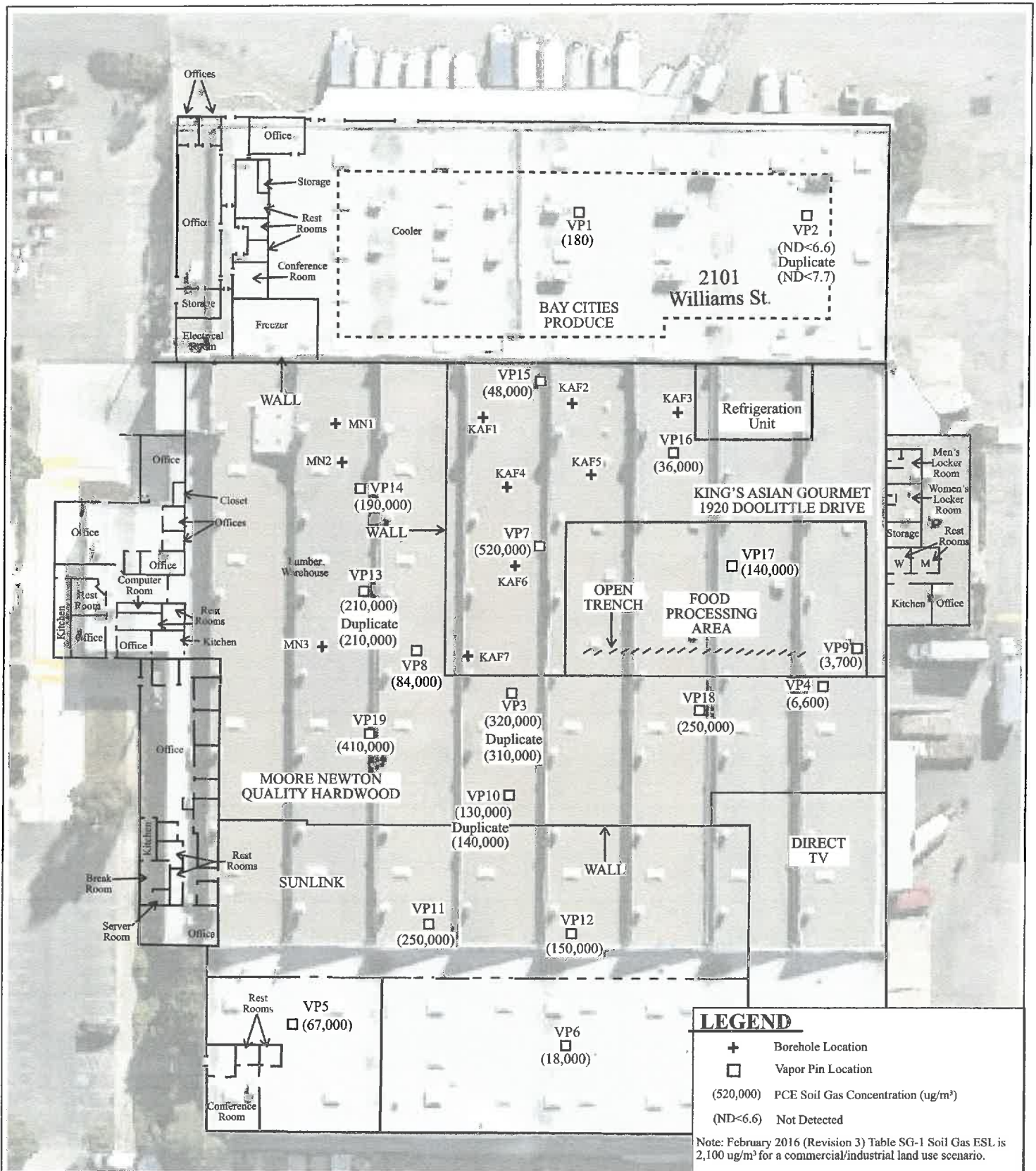
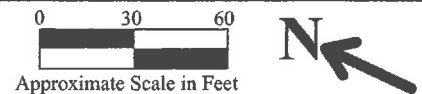


Figure 2
 Site Plan Aerial Photograph Detail Showing PCE Concentrations in Sub-Slab Soil Gas
 2101 Williams Street
 San Leandro, California

Base Map from:
 Google Earth, image dated August 28, 2012

P&D Environmental, Inc.
 55 Santa Clara Avenue
 Oakland, CA 94610



The observed vacuum response at each vapor pin for each vacuum level applied during the step test is shown on **Graphs 1 through 5**. In addition, the minimum vacuum that DTSC recommends maintaining in the sub-slab relative to indoor air to prevent vapor intrusion (0.02 IWG) is displayed for reference. The distance from the extraction point to where the vacuum decreases below 0.02 IWG is the observed radius of influence (ROI) for the SSD system at the corresponding applied vacuum.

The results of the observed vacuum response and the estimated ROI for each applied vacuum is summarized in the following table.

Vacuum Applied at EP1 (-IWG)	<u>Vapor Pins (Distance from EP1)</u>					Estimated ROI (ft)
	VP20 (5 ft)	VP14 (9 ft)	VP21 (30 ft) [- IWG]	VP13 (42.5 ft)	VP22 (60 ft)	
3	0.06	0.01	0.00	0.00	0.00	8
6	0.13	0.02	0.00	0.00	0.00	9
15	0.31	0.06	0.005	0.01	0.00	25
35	0.60	0.11	0.01	0.015	0.00	32
60	0.97	0.17	0.01	0.02	0.00	32
Constant Rate (35 IWG)	0.63875	0.17	0.012	0.0188	0.0073	33

Note: Vacuums shown in this table are the average of the last few readings during each test.

Based on the pilot test results summarized above, the sub-slab layer does not appear to have sufficient interconnectivity to propagate vacuum a reasonable distance. Relatively high vacuum for an SSD system was necessary to produce a depressurization zone beneath the slab (35 IWG for a 32-foot ROI). Increases in applied vacuums over 25 IWG produced diminishing returns in ROI. The sub-slab conditions do not appear to be conducive to depressurization and therefore an SSD system would not be cost-effective for this Site.

Graph 6 shows the results of the helium injection and monitoring conducted during the constant rate 35 IWG vacuum test. As described in Section 5.2, helium was injected into VP14 and the helium concentration was measured at EP1. VP14 was only 9 feet away from EP1, and it took over two hours from the start of injection for helium concentrations to peak at EP1. This data corroborates the resistance to sub-slab air flow observed based on the vacuum response.

5.3.1.1 Deeper Zone

The vacuums observed at the VMWs are shown in **Graphs 9** through **13** for each vacuum level applied during the step test. A minimum pressure differential of 0.1 IWG is considered the minimum vacuum for promoting cleanup, so this vacuum was used to estimate the effective ROI for the SVE system. Based on the results summarized in **Table 3**, applied vacuums of 25, 50, and 75 IWG did not produce the threshold vacuum at the VMW closest to EW1. Only high applied vacuums (≥ 100 IWG, up to a maximum feasibility test blower capacity of 140 IWG) resulted in achieving the threshold vacuum in the VMWs, with an ROI ranging from 10 to 21 feet. The constant rate test at 100 IWG resulted in an ROI of 19 feet. The results of the observed vacuum response and the estimated ROI for each vacuum applied to EW1 is summarized in the following table.

Vacuum Applied at EW1 (IWG)	Vapor Monitoring Wells (Distance from EW1)				Estimated ROI (ft)
	VMW1 (22.5 ft)	VMW2 (10 ft)	VMW3 (44 ft)	VMW4 (59.5 ft)	
25	0.01	0.01	0.00	0.00	<10
50	0.02	0.026	0.01	0.01	<10
75	0.02	0.047	0.015	0.01	<10
100	0.04	0.100	0.025	0.015	10
140	0.080	0.221	0.054	0.026	21
Constant Rate (100 IWG)	0.066	0.172	0.046	0.023	19

Note: Vacuums shown in this table are the average of the last few readings during each test. “<10” indicates that the ROI is less than 10 feet.

5.3.1.2 Sub-Slab Zone

Vacuum response was also observed at VPs for each vacuum applied at EW1 to evaluate the effectiveness of SVE at reducing the pressure in the sub-slab material. The vacuums at each VP are shown in **Graphs 14** through **18** for each applied vacuum. The minimum pressure differential that DTSC recommends maintaining between the building air and the sub-slab to prevent vapor intrusion is 0.02 IWG. The high vacuums that achieved the threshold vacuum in the VMWs produced ROIs from 36 to 65 feet in the sub-slab zone. The results of the observed vacuum response and the estimated ROI for each applied vacuum is summarized in the following table.

Table 1
Summary of Soil Sample Analytical Results

Sample ID	Sample Date	Sample Depth (feet)	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other VOCs by EPA 8260
KAF1-1.0	9/18/2017	1.0	0.25	ND<0.020	ND<0.020	ND<0.020	ND<0.020	All ND
KAF1-4.2	9/18/2017	4.2	0.080	0.024	ND<0.0050	ND<0.0050	ND<0.0050	ND, except Xylenes = 0.027, Naphthalene = 0.0086, n-Butyl benzene = 0.031, sec-Butyl benzene = 0.015, 4-Isopropyl toluene = 0.030, 1,2,4-Trimethylbenzene = 0.20, 1,3,5-Trimethylbenzene = 0.073
KAF2-1.0	9/18/2017	1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF2-4.2	9/18/2017	4.2	0.080	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF3-1.0	9/18/2017	1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF3-4.1	9/18/2017	4.1	0.028	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF4-1.0	9/18/2017	1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF4-4.2	9/19/2017	4.2	0.55	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF5-1.0	9/19/2017	1.0	0.0063	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF5-4.2	9/19/2017	4.2	0.32	ND<0.020	ND<0.020	ND<0.020	ND<0.020	All ND
KAF6-1.0	9/19/2017	1.0	0.015	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF6-4.2	9/19/2017	4.2	1.4	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF7-1.0	9/19/2017	1.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
KAF7-4.3	9/15/2017	4.3	0.40	ND<0.033	ND<0.033	ND<0.033	ND<0.033	All ND
MN1-2.5	9/19/2017	2.5	0.60	ND<0.050	ND<0.050	ND<0.050	ND<0.050	All ND
MN1-4.0	9/19/2017	4.0	0.24	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND
MN2-2.5	9/19/2017	2.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
MN2-4.0	9/19/2017	4.0	0.47	ND<0.050	ND<0.050	ND<0.050	ND<0.050	All ND
MN3-4.0	9/19/2017	4.0	0.69	ND<0.050	ND<0.050	ND<0.050	ND<0.050	All ND
ESL			0.42	0.46	0.19	0.67	0.0082	Xylenes = 2.3, Naphthalene = 0.033, n-Butyl benzene = No Value, sec-Butyl benzene = No Value, 4-Isopropyl toluene = No Value, 1,2,4-Trimethylbenzene = No Value, 1,3,5-Trimethylbenzene = No Value
NOTES								
PCE = Tetrachloroethene.								
TCE = Trichloroethene.								
cis-1,2-DCE = cis-1,2-Dichloroethene.								
trans-1,2-DCE = trans-1,2-Dichloroethene.								
VOCs = Volatile Organic Compounds.								
ND = Not Detected.								
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated February 2016 (Revision 3), Soil Tier 1 ESL from Summary of Soil ESLs.								
Results and ESLs reported in milligrams per kilogram (mg/kg) unless otherwise indicated.								

Table 2

Summary of Passive Sampler Laboratory Analytical Results

Sample ID	Sample Date	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other VOCs by EPA 8260
1	9/17/2017	ND<2.3	ND<3.2	ND<7.6	ND<20	All ND
2	9/19/2017	4.8	ND<2.9	ND<6.8	ND<18	ND, except 1,1,1-Trichloroethane = 4.4
3	9/18/2017	ND<2.4	ND<3.2	ND<7.7	ND<20	All ND
4	9/18/2017	ND<2.4	ND<3.2	ND<7.7	ND<20	ND, except 1,1,1-Trichloroethane = 4.9, 1,1,2,2,-Tetrachloroethane = 1.6
ESL		3,000	35,000	350,000	160	1,1,1-Trichloroethane = 4,400,000, 1,1,2,2,-Tetrachloroethane = 210
NOTES						
TCE = Trichloroethene.						
cis-1,2-DCE = cis-1,2-Dichloroethene.						
trans-1,2-DCE = trans-1,2-Dichloroethene.						
VOCs = Volatile Organic Compounds.						
ND = Not Detected.						
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated February 2016 (Revision 3), Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels Table SG-1 ESL. Commercial/Industrial land use.						
Results and ESLs reported in micrograms per cubic meter (ug/m ³) unless otherwise indicated.						