

Landmark Environmental LLC

October 7, 2011

Mr. Al Timm and Ed Olson
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155

Re: Vapor Intrusion Pathway Evaluation
MN Bio Business Center, 221 First Avenue S.W., Rochester

Dear Al and Ed:

This letter provides a summary of the results from soil vapor and groundwater sampling at and in the vicinity of the above referenced property (Property), which previously consisted of the 219 and 223 Parcels (the former 219 and 223 Parcels). Some of the data evaluated in this letter was obtained during the March 2007 Phase II Environmental Investigation (Investigation) conducted by Landmark Environmental, LLC (Landmark) on behalf of the City of Rochester (City) and the Rochester Economic Development Authority. This letter also references soil vapor sampling results published in a July 2006 report by DPRA, titled Implementation Report, Dual Phase Extraction System Installation and Start-up (DPRA Report), on behalf of the previous owner of the former 219 Parcel. In addition, this letter compares the current groundwater results at the Property to the the Minnesota Pollution Control Agency's (MPCA's) Groundwater Intrusion Screening Values (GWISVs).

The former 219 Parcel was the site of two former dry cleaning operations and previous environmental investigations conducted there have documented significant quantities of the dry cleaning solvent tetrachloroethylene (PCE) in deep soils and groundwater. During redevelopment of the Property, a dual phase extraction (DPE) system was installed to remediate source area PCE in the soil, fractured bedrock, and groundwater. In addition to the DPE system, vapor barrier and passive venting systems were installed to address the potential for vapor intrusion after source area remediation from the DPE system is completed.

The soil vapor samples were collected for a number of volatile organic compounds (VOCs), including benzene and PCE, both of which are reported carcinogens. The applicable MPCA screening criteria for soil vapor samples collected on commercial/industrial properties, such as the Property, are the 10X Industrial Intrusion Screening Values (IISVs) (February 2009 version). Detections of soil vapor were obtained during the investigation on the Property and on adjacent properties as described below.

DPRA Soil Gas Results from November 2005

Soil vapor sampling presented in the DPRA Report involved four sampling locations. Two soil vapor samples were collected on the former 219 Parcel, one soil vapor sample was collected on property located at former 223 Parcel and one soil vapor sample was collected on an adjacent property located at 201 First Avenue S.W. (the 201 Parcel). The results from the DPRA

sampling event were submitted to the MPCA Voluntary Investigation and Cleanup (VIC) Program for review. The DPRA data is included in Table 1. The DPRA soil vapor sample locations are labeled SG-1 through SG-4 on the attached Figure 1.

PCE was reported in each soil vapor sample ranging from 2.2 to 520 micrograms per cubic meter (ug/m^3). SG-2 was located on the 201 Parcel and reported PCE at a concentration of $2.2 \text{ ug}/\text{m}^3$, which is below the IISVs of $60 \text{ ug}/\text{m}^3$ and the 10X IISV of $600 \text{ ug}/\text{m}^3$. PCE concentrations in SG-1 (located on the southeast property boundary of the former 223 Parcel), SG-3 (located on the southwest property boundary of the former 219 Parcel) and SG-4 (located on the south boundary of the former 219 Parcel) were detected at concentrations ranging from $480 \text{ ug}/\text{m}^3$ to $520 \text{ ug}/\text{m}^3$, and were above the IISV, but below the 10X IISV. All other parameters analyzed were either not detected, or detected at concentrations that did not exceed the IISVs, or 10X IISVs.

Landmark Soil Gas Results from December 2006

In December 2006, Landmark installed six soil vapor monitoring ports and collected six soil vapor samples, labeled LSG-1 through LSG-6. VOCs were reported in each soil gas sample. The results from the December 2006 soil vapor sampling event are shown in Table 1. A copy of Landmark's summary table from the previous report is included in Attachment 1. The Landmark soil vapor sample locations are shown in Figure 1. Benzene was detected above the IISV of $13 \text{ ug}/\text{m}^3$ at locations LSG-1 ($15.7 \text{ ug}/\text{m}^3$), LSG-2 ($27.9 \text{ ug}/\text{m}^3$), LSG-5 ($38.8 \text{ ug}/\text{m}^3$), and LSG-6 ($15.5 \text{ ug}/\text{m}^3$). However, the benzene concentrations were below the applicable 10X IISV of $130 \text{ ug}/\text{m}^3$. PCE was either not detected at any of the sampling locations, or was detected at concentrations below the IISV.

Landmark Groundwater Results from August 2011

The soil vapor results from DPRA's investigation in November 2005 and Landmark's investigation in 2006 delineated the horizontal extent of soil vapor to the north, south, and west of the Property. Therefore, for purposes of this letter, the current groundwater concentrations at monitoring wells MW-19 and MW-20 were compared with GWISVs to evaluate the potential risk for soil vapor migration to the east of the Property. During the August 2011 groundwater monitoring event, PCE was the only VOC detected at MW-19 (2.9 micrograms per liter [ug/L]) and MW-20 ($12.2 \text{ ug}/\text{L}$). PCE was detected at these wells below the GWISV of $60 \text{ ug}/\text{L}$. PCE concentrations exceeded the GWISV for PCE at DPE-1 ($309 \text{ ug}/\text{L}$), DPE-2 ($2,080 \text{ ug}/\text{L}$), DPE-3 ($4,260 \text{ ug}/\text{L}$), DPE-4 ($771 \text{ ug}/\text{L}$), DPE-8 ($700 \text{ ug}/\text{L}$), MW-16 ($590 \text{ ug}/\text{L}$), and MW-17 ($107 \text{ ug}/\text{L}$). Detected VOCs from the August 2011 groundwater monitoring event are included in Table 2.

A Phase I Environmental Site Assessment completed by Landmark for the properties located at 227 and 229 First Avenue S.W. in January 2007 identified the groundwater flow in the area to the west/northwest. Groundwater monitoring activities by Landmark prior to and during DPE system operation (from December 2008 through August 2011) have shown the groundwater flow to be to the west/southwest.

Based on the results of the DPRA's and Landmark's previous investigation results, the MPCA approved the following response actions (RAs) be implemented during the redevelopment of the Property: 1. installation of a DPE system to remediate source area PCE contamination in the soil, fractured bedrock, and groundwater; and, 2. installation of a vapor barrier and venting systems to prevent vapor intrusion into the building from residual and source area PCE contamination in the subsurface.

Soil vapor results prior to DPE system source area remediation were below the MPCA's applicable 10x IISVs for PCE to the north, south, and west of the Property. Current groundwater concentrations at MW-19 and MW-20, located on the east side of the Property, were below the MPCA's GWISV for PCE. In addition, the groundwater flow direction to the west will prevent shallow VOC groundwater contamination from migrating to the east, and causing vapor intrusion issues. Based on the evaluation of previous soil vapor concentrations and current groundwater concentrations of VOCs to the MPCA's vapor intrusion screening criteria, vapor plume migration from the Property to adjacent properties is not a concern. After approximately two years of DPE system operation, 3,371 pounds of total VOCs and 2,633 pounds of PCE have been removed from the source area. Therefore, current soil vapor sampling results would likely be lower than those collected by Landmark and DPRA in 2005 and 2006.

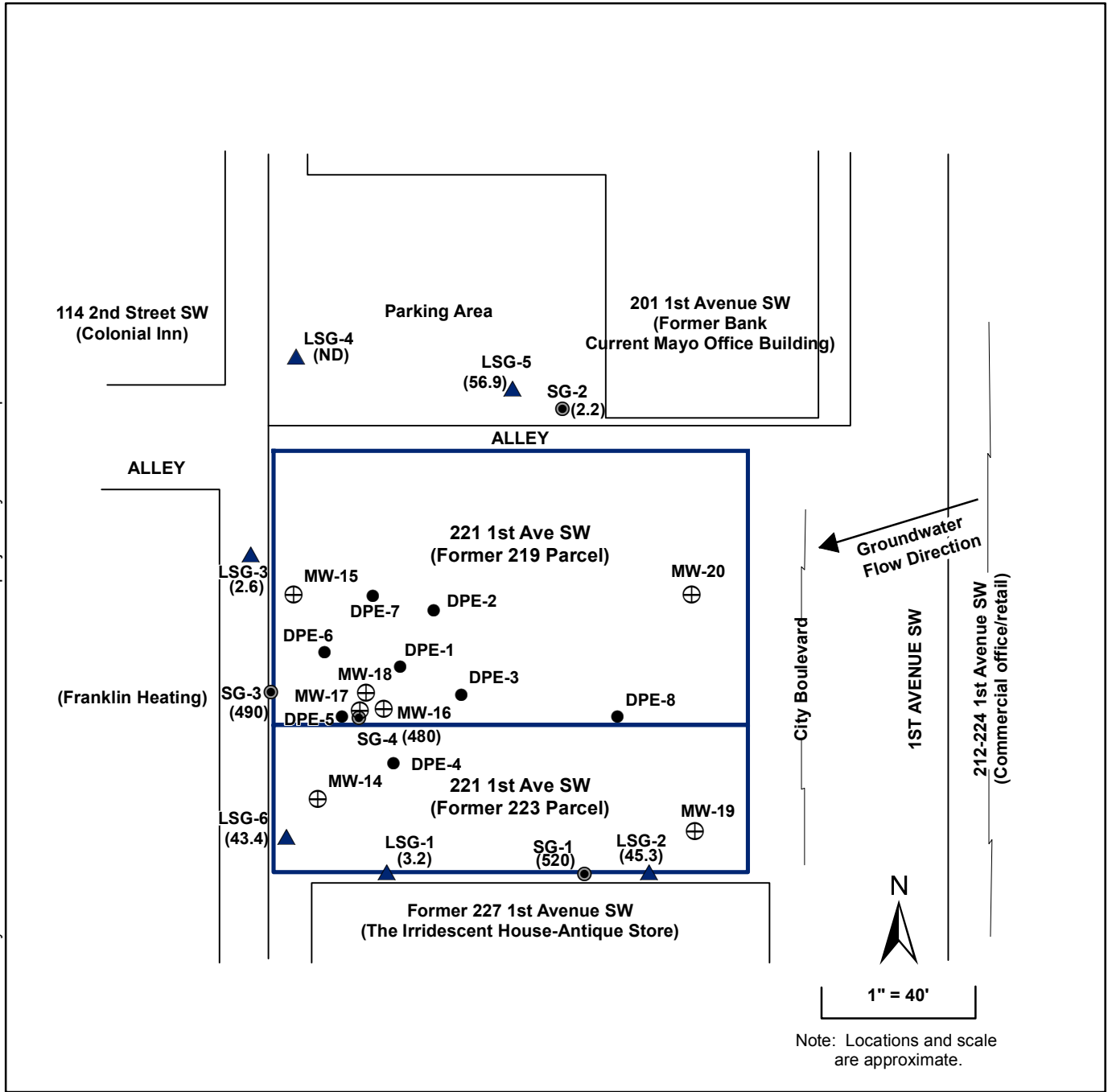
DPE and monitoring wells with PCE groundwater concentrations that exceed the GWISV for PCE do not pose a risk of vapor intrusion on the Property due to the current operation of the DPE system and the presence of the vapor barrier system installed beneath the building. Each of these systems help prevent vapor intrusion into the building from residual and source area PCE contamination in the soil, fractured bedrock, and groundwater. In addition, it does not appear, based on existing data that the PCE present in the groundwater poses a significant risk for vapor intrusion on adjacent properties.

If you have any questions, please feel free to contact me at (952) 887-9601, extension 205.

Sincerely,



Jason D. Skramstad



LEGEND

- Property Line
- (520) DPRA Soil Vapor Point (11/2005) (ug/m3)
- (3.2) Landmark Soil Vapor Point (12/2006) (ug/m3)
- 2008 DPE and Monitoring Wells
- DPE Well
- ⊕ Monitoring Well

FIGURE 1

**PREVIOUS SOIL VAPOR LOCATIONS
AND CURRENT WELL LOCATIONS
221 1st Avenue SW
Rochester, Minnesota**

Table 1
Soil Gas Sampling Results from Previous Investigations

221 First Ave S.W.
Rochester, MN

Compound	MPCA IISVs ug/m ³	MPCA 10X IISVs ug/m ³	SG-1 Grab 9-Nov-05 ug/m ³	SG-2 Grab 9-Nov-05 ug/m ³	SG-3 Grab 9-Nov-05 ug/m ³	SG-4 Grab 9-Nov-05 ug/m ³	LSG-1 Grab 29-Dec-06 ug/m ³	LSG-2 Grab 29-Dec-06 ug/m ³	LSG-3 Grab 29-Dec-06 ug/m ³	LSG-4 Grab 29-Dec-06 ug/m ³	LSG-5 Grab 29-Dec-06 ug/m ³	LSG-6 Grab 29-Dec-06 ug/m ³
Acetone	87000	870000	21	11	7.6	24	24.5	45.5	61.1	64.8	ND	ND
Benzene	13	130	1.5	<0.64	<0.64	0.8	15.7	27.9	3.0	3.0	38.8	15.5
2-Butanone (MEK)	10000	100000	NA	NA	NA	NA	ND	6.2	9.0	14.7	ND	ND
Carbon disulfide	2000	20000	NA	NA	NA	NA	ND	3.6	ND	27.7	362 E	2.1
Chloroform	300	3000	NA	NA	NA	NA	10.4	ND	ND	ND	ND	ND
Chloroethane	30000	300000	NA	NA	NA	NA	ND	ND	ND	23.6	270 E	2.1
Chloromethane	300	3000	NA	NA	NA	NA	ND	0.76	1.1	ND	ND	1.3
Cyclohexane	20000	200000	NA	NA	NA	NA	1.8	ND	ND	3.0	ND	ND
1,2-Dichloroethane	1	10	<0.81	<0.81	<0.81	<0.81	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	600	6000	NA	NA	NA	NA	5.2	3.4	3.3	5.5	ND	3.6
Dichlorotetrafluoroethane	ns	ns	NA	NA	NA	NA	ND	ND	ND	ND	3.6	ND
Ethyl acetate	8000	80000	NA	NA	NA	NA	ND	ND	ND	26.3	17.3	ND
Ethylbenzene	3000	30000	1.6	<0.87	<0.87	<0.87	3.0	6.8	3.2	ND	6.3	6.7
4-Ethyltoluene	ns	ns	NA	NA	NA	NA	ND	8.2	6.3	ND	7.7	4.8
n-Hexane	6000	60000	NA	NA	NA	NA	2.6	20.6	ND	6.3	51.6	12.6
Methylene chloride	60	600	NA	NA	NA	NA	2.8	4.7	3.1	1.9	ND	ND
2-Propanol	20000	200000	27	5.9	<3.1	<3.1	NA	NA	NA	NA	NA	NA
Propylene	8000	80000	5.5	4.8	6.2	5.3	21.4	8.7	3.5	12.7	21.9	3.3
Tetrachloroethylene	60	600	520	2.2	490	480	3.2	45.3	2.6	ND	56.9	43.4
Tetrahydrofuran	ns	ns	NA	NA	NA	NA	ND	6.3	ND	ND	17.6	ND
Toluene	10000	100000	100	1.4	1.7	2.4	19.8	66.9	9.1	1.6	74.4	57.3
1,1,1-Trichloroethane	10000	100000	<1.1	<1.1	<1.1	<1.1	NA	NA	NA	NA	NA	NA
Trichloroethylene	8	80	<1.1	<1.1	2.6	<1.1	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2000	20000	1700	<4.8	64	370	20.1	ND	1.6	14.5	ND	ND
1,2,4-Trimethylbenzene	20	200	4.6	1.2	1.5	1.5	4.0	13.4	9.9	ND	12.3	5.0
1,3,5-Trimethylbenzene	20	200	1.3	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA
Vinyl acetate	600	6000	NA	NA	NA	NA	ND	ND	2.8	ND	ND	ND
Vinyl Chloride	3	30	<0.51	<0.51	<0.51	<0.51	NA	NA	NA	NA	NA	NA
Xylenes	300	3000	8.1	<1.7	2.3	2	15.5	35.8	20.4	ND	31.8	32.7

Notes:

IISVs = Industrial Intrusion Screening Values

10x IISVs = 10x the Industrial Intrusion Screening Values

ns = No Standard

ND = No Detection

NA = Not Analyzed

Table 2
August 2011 Groundwater Analytical Results
(detected parameters)

221 First Avenue S.W.
Rochester, Minnesota

Parameter	MPCA GW _{ISV}	Units	DPE-1	DPE-2	DPE-3	DPE-4	DPE-6	DPE-7	DPE-8	MW-14	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20
1,1,2-Trichlorotrifluoroethane	3000	ug/L	9.5	212	348	93.8	NA*	3.8	32.4	NA*	1.1	19.7	6.5	NA*	NA*	NA*
Chloroform	1000	ug/L	NA*	NA*	NA*	NA*	NA*	1.2	NA*	1.6	1.0	NA*	NA*	NA*	NA*	NA*
Tetrachloroethene	60	ug/L	309	2080	4260	771	7.7	26.9	700	1.5	1.2	590	107	3.6	2.9	12.2
cis-1,2-Dichloroethene	500	ug/L	2.9	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	7.3	1.3	NA*	NA*	NA*

Notes:

NA*: Not Analyzed

9.5 Parameter detected above laboratory reporting limit

309 Parameter detected above MPCA GW ISV