

September 8, 2008

Mr. Gary E. Bonarski, P.E.
Project Manager
New York State Department of
Environmental Conservation
Div. of Environmental Remediation
6274 East Avon-Lima Road
Avon, New York 14414-9519

Re: Former Brainerd Manufacturing Site (#V00519)
Off-Site Soil Vapor/Groundwater Investigation Report

Dear Mr. Bonarski:

In accordance with our Work Plans dated July 8, 2008 and July 30, 2008, Benchmark Environmental Engineering and Science, PLLC (Benchmark) has completed supplemental off-site soil vapor and groundwater investigations northwest of former Brainerd Manufacturing Site. Sample locations are shown on Figure 1. A description of the work performed and the investigation findings are presented below.

SUPPLEMENTAL SOIL VAPOR INVESTIGATION

On July 9, 2008 two semi-permanent soil gas sampling wells, identified as SV-1 and SV-2, were installed to approximately five feet below ground surface (fbgs) with a direct-push drill rig using 3/4-inch inside diameter steel rods at the locations shown on Figure 1. The two soil vapor wells were constructed in accordance with our July 8, 2008 work plan. Sampling was initiated on the following day no sooner than 24-hours following vapor well installation. Initially, helium tracer gas injected into a temporary surface shroud was used to check the integrity of the bentonite surface seal of each vapor point. Upon charging the surface shroud, helium gas concentration was measured and compared to a three tubing-volume-purge (TVP) of subsurface vapor withdrawn from the sample tubing and injected into a Tedlar bag from each point. Unfortunately, due to meter malfunction the pre-sampling helium gas results could not be accurately measured. Therefore, further confirmation via a post-sample assessment was conducted immediately following soil vapor sample collection (approximately 8-hours later). The post-sampling TVP helium concentrations at both soil vapor locations were less than 10% of the shroud concentration, confirming the integrity of each surface seal. Soil vapor sample collection field forms are presented in Attachment 1.

Sample tubing from both vapor points (SV-1 and SV-2) and one concurrently collected ambient air sample (Outdoor Air #1) were connected to dedicated 6-liter Summa canisters each equipped with 8-hour regulators. The outdoor air sample was collected to establish background ambient air concentrations during soil vapor collection. Sample duration for each sample was

approximately 8-hours and final canister vacuums measured at or below -6 pounds per square inch gauge (psig) and greater than 0 psig. Upon completion of the sampling, canister valves were closed and shipped under chain-of-custody command to TestAmerica Laboratories, Inc., a NYSDOH certified laboratory, for VOC analysis in accordance with USEPA Method TO-15.

Table 1 summarizes the laboratory-reported soil vapor and ambient air sampling results. As indicated, certain VOCs were detected in the soil vapor, including BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), tetrachloroethene (PCE), 4-ethyltoluene, and n-heptane. Excluding PCE, all of these compounds were also detected in the outdoor ambient air sample in addition to dichlorodifluoromethane, trichlorofluoromethane, 2,2,4-trimethylpentane, and n-hexane.

SUPPLEMENTAL GROUNDWATER INVESTIGATION

On August 5, 2008 an additional off-site monitoring well, designated as MW-13, was installed on the south side of Linden Avenue within the Monroe County Department of Transportation right-of-way (ROW) at the approximate location shown on Figure 1. As requested by Monroe County, this new well was completed as a flush mount well within the existing sidewalk area. Nothnagle Drilling of Scottsville, New York provided subcontract drilling work under Benchmark's supervision. The well construction log is presented in Attachment 2. No visual or olfactory evidence of contamination was detected during well installation, and all photoionization detector (PID) scans of the cuttings registered non-detectable organic vapor concentrations.

MW-13 was developed and sampled on August 7, 2008. Well development and sampling logs are presented as Attachment 3. The collected groundwater sample was analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs) by TestAmerica Laboratories, Inc. in accordance with USEPA Method 8260.

Groundwater analytical results are summarized on Table 2 with corresponding NYSDEC Class "GA" groundwater quality standards and guidance values (GWQS/GVs). For comparison, historic groundwater results collected from other Site monitoring wells have also been included in the table. Monitoring well MW-13 groundwater analysis detected bromodichloromethane, chloroform, PCE, and trichloroethene (TCE) at concentrations exceeding their respective GWQSs. All other TCL VOCs were reported as non-detectable or at concentrations well below their associated GWQS/GVs.

CONCLUSIONS

Although PCE was identified in the off-site soil gas samples, the concentrations were reported below 100 ug/M³, which is the lowest concentration that would require actions (monitoring or maintenance) to address subsurface vapors per Matrix 2 of the NYSDOH Soil Vapor Intrusion Guidance¹. Thus, the soil gas samples indicate that subsurface vapor intrusion in the residences along Linden Avenue is not a pathway of concern.

Groundwater data for MW-13 indicate low concentrations of VOCs, with total concentrations less than one part per million. Based on the comparability of these levels to MW-12, no increases in plume concentration or secondary sources are evident. Accordingly, we propose that any additional field efforts be focused on development and implementation of final remedial measures for the site.

Please contact us if you have any questions or concerns.

Sincerely,
Benchmark Environmental Engineering & Science, PLLC



Thomas H. Forbes, P.E.
Project Manager

Att.
File: 0101-001-100

c: A. Shaffer (Despatch)
S. Chalifoux (Boylan Brown)
B. Putzig (NYSDEC)
D. McNaughton (NYSDOH)
J. Kosmala, P.E. (Monroe County Health Dept)

¹ Although the matrix decisions are intended to be based on both subsurface and indoor air concentrations, any subsurface concentration less than 100 ug/M³ will result in a "No Further Action" or "Identify Source/Reduce Exposure" action, the latter of which is intended to address situations where a source other than soil vapor intrusion (e.g., indoor air source) produces elevated indoor air concentrations.

TABLES

TABLE 1

**SUMMARY OF OFF-SITE SOIL VAPOR MONITORING RESULTS
JULY 2008**

**Former Brainerd Manufacturing Facility
East Rochester, New York**

Parameter	Sample Location (ug/m ³)		
	SV-1	SV-2	Outdoor Air #1
Dichlorodifluoromethane	--	--	2
Trichlorofluoromethane	--	--	1.1
Benzene	6.4	11	2.2
Toluene	450	410	8.3
Tetrachloroethene	75	52	--
Ethylbenzene	31	33	0.96
Xylene (m,p)	96	100	4.3
Xylene (o)	17	19	1.5
4-Ethyltoluene	6.4	5.9	1.1
2,2,4-Trimethylpentane	--	--	3
n-Hexane	--	--	5.6
n-Heptane	66	110	1.5

TABLE 2

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS TO-DATE

Off-Site Soil Vapor Investigation
Former Brainerd Manufacturing Site
East Rochester, New York

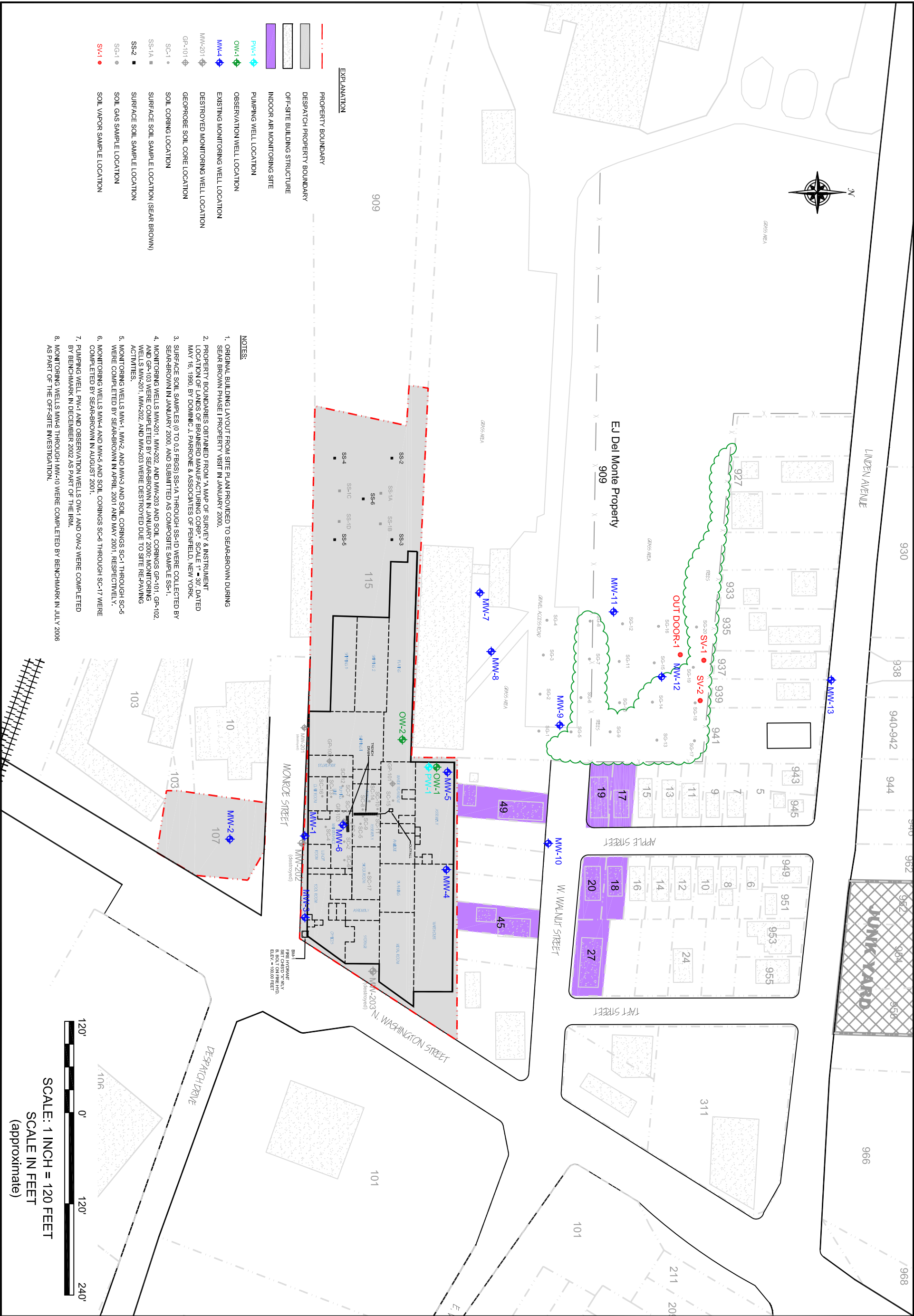
Parameter ¹	Monitoring Well Location & Date of Sample Collection																								GWQS/GV ²		
	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6		MW-7		MW-8		MW-9		MW-10		MW-11		MW-12			MW-13	
	08/18/06	08/18/06	08/21/06	08/22/06	08/22/06	08/22/06	08/22/06	08/21/06	08/21/06	08/21/06	08/21/06	09/12/07	08/21/06	03/10/08	03/10/08	08/07/08											
Field Measurements (units as indicated)																											
pH (units)	7.28	7.27	7.43	7.46	7.45	7.46	7.20	7.21	7.24	7.24	6.98	6.97	7.33	7.34	7.30	7.30	6.97	7.04	7.18	7.19	7.58	7.61	6.90	6.83	7.21	6.5 - 8.5	
Temperature (°C)	19.1	18.1	16.8	17.5	19.8	19.3	19.0	19.3	15.8	15.7	18.1	18.1	14.0	13.9	14.3	13.8	15.2	15.5	16.9	16.8	16.2	15.7	12.4	11.2	15.7	--	
Specific Conductance (uS)	1010	1009	1795	1805	2806	2824	2566	2603	2076	2077	3190	3192	495.6	500.1	511.7	532.4	2912	2957	1497	1525	1546	1541	717	737	851.3	--	
Turbidity	6.5	5.25	19.8	13.7	22.1	16.5	32.3	27.3	45.1	40.4	107	68	15.6	11.4	5.52	3.24	30.5	17.3	65.8	89	155	106	330	371	>1000	--	
DO (ppm)	1.43	1.47	4.72	5.53	5.06	5.45	5.53	5.56	3.04	2.91	3.25	3.21	6.74	6.95	6.49	6.25	1.68	1.74	3.12	3.09	3.32	3.54	6.09	3.09	--	--	
ORP (mV)	-27	-32	+ 62	+ 67	+ 138	+ 134	+ 120	+ 118	+ 118	+ 119	+ 129	+ 128	+ 127	+ 127	+ 125	+ 124	+ 149	+ 165	+ 107	+ 105	+ 157	+ 157	+ 137	+ 60	+ 10	--	
TCL VOCs (ug/L)																											
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.1 J	4.8 J	4.6 J	5		
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.99 J	0.82 J	6	5		
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.2	50*		
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	0.94 J	0.42 J	5		
Chloroform	ND	0.91 J	ND	0.86 J	1.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	2 J	0.9 J	ND	ND	ND	ND	ND	1.7	1.6	15	7		
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.6	50*		
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.62 J	ND	ND	ND	ND	ND	ND	ND	ND	5	
1,1 Dichloroethene	ND	ND	ND	ND	ND	0.56 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.5 J	1.3	ND	ND	ND	ND	ND	ND	0.4 J	5	
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	0.8 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.2 J	1.3	ND	ND	ND	ND	0.66 J	ND	ND	5	
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	
Tetrachloroethene	3.1 J	8.2	ND	87	1600	3100	ND	13	3100	2600 D	17	ND	300 D	350 D	5												
Toluene	ND	ND	ND	ND	ND	3.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	
1,1,1-Trichloroethane	ND	ND	0.74 J	2.6 J	11	16 J	ND	ND	34	12	0.6 J	ND	2	1.8	5												
1,1,2-Trichloroethane	ND	ND	ND	ND	1.5 J	ND	ND	ND	3.8 J	1.9	ND	ND	0.42 J	1													
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	5											
Trichloroethene	0.78 J	6.3	11	240	1400	1500	6.0	20	2700	1900 D	15	ND	270 D	300 D	5												
TOTAL VOCs	3.88	15.41	11.74	330.46	3015.26	4619.2	6	33	5847.12	4517.4	32.6	17.89	580.82	684.44	--												

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV), 6 NYCRR Part 703.

Definitions:
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
D = Compound analyzed at a secondary dilution factor.
ND = parameter not detected above laboratory detection limit.
" * " = NYSDEC Class GA Guidance Value, where a Standard has not been established.

BOLD = Analytical result exceeds individual GWQS/GV.

FIGURES



ATTACHMENT 1

SOIL VAPOR SAMPLING FORMS

AIR CANISTER FIELD RECORD

PROJECT INFORMATION:

Project: Offsite Soil Vapor Inv
Job No: 0040-002-400
Location: EAST Rochester, NY
Field Staff: RWD
Client: Boylan Brown

SAMPLE I.D.: SU-1

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.: 68°F
Ambient Air Temp. - P.M.: 75°F
Wind Direction: West
Wind Speed: 10-20 mph
Precipitation: none

Size of Canister: 6L SUMA
Canister Serial No.: 3042
Flow Controller No.: 2763
Sample Date(s): 7/10/08
Shipping Date: 7/11/08
Sample Type: ☐ Indoor Air ☐ Outdoor Air
☐ Subslab, complete section below ☒ Soil Gas
Soil Gas Probe Depth: 5 Fbg's

FIELD SAMPLING INFORMATION:

READING	TIME	VACUUM (inches Hg) or PRESSURE (psig)	DATE	INITIALS
Gauge Reading Upon Receipt	—	—	—	—
Initial Vacuum Check ¹	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
Initial Field Vacuum ²	<u>1055</u>	<u>-29.3</u>	<u>7/10/08</u>	<u>TAB</u>
Final Field Vacuum ³	<u>1951</u>	<u>-2</u>	<u>7/10/08</u>	<u>RWD</u>
Duration of Sample Collection	<u>8 hr 56 min</u>			

LABORATORY CANISTER PRESSURIZATION:

Initial Vacuum (inches Hg and psia)	<u>-29.3</u>
Final Pressure (psia)	
Pressurization Gas	

SUBSLAB SHROUD:

Shroud Helium Concentration:

Calculated tubing volume: 9.653 x 3 = 183 cc

Purged Tubing Volume Concentration: Pre-0 ppm Post-0 ppm

Is the purged volume concentration less than or equal to 10% in shroud?

☒ YES, continue sampling

☐ NO, improve surface seal and retest

COMPOSITE TIME (hours)	FLOW RATE RANGE (ml/min)
15 Min.	316 - 333
0.5 Hours	158 - 166.7
1	79.2 - 83.3
2	39.6 - 41.7
4	19.8 - 20.8
6	13.2 - 13.9
8	9.9 - 10.4
10	7.92 - 8.3
12	6.6 - 6.9
24	3.5 - 4.0

NOTES:

1 Vacuum measured using portable vacuum gauge (provided by Lab)

2 Vacuum measured by canister gauge upon opening valve

3 Vacuum measured by canister gauge prior to closing valve

Signed: 

AIR CANISTER FIELD RECORD

PROJECT INFORMATION:

Project: OFFSITE SOIL VAPOR INV
Job No: 0040-002-400
Location: EAST ROCHESTER, NY
Field Staff: RWD
Client: BOYER BEAVER

SAMPLE I.D.:

SV-2

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.: 65°F
Ambient Air Temp. - P.M.: 75°F
Wind Direction: WEST
Wind Speed: 15-20 mph
Precipitation: none

Size of Canister: 6L SUMA
Canister Serial No.: 3196
Flow Controller No.: 3119
Sample Date(s): 7/10/08
Shipping Date: 7/11/08
Sample Type: ☐ Indoor Air ☒ Outdoor Air
☐ Subslab, complete section below ☒ Soil Gas
Soil Gas Probe Depth: 5 FT BGS

FIELD SAMPLING INFORMATION:

READING	TIME	VACUUM (inches Hg) or PRESSURE (psig)	DATE	INITIALS
Gauge Reading Upon Receipt	<u>1146</u>	<u>-29.30</u>	<u>—</u>	<u>—</u>
Initial Vacuum Check ¹	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
Initial Field Vacuum ²	<u>1146</u>	<u>-30</u>	<u>7/10/08</u>	<u>JAB</u>
Final Field Vacuum ³	<u>1452</u>	<u>-4</u>	<u>7/10/08</u>	<u>RWD</u>
Duration of Sample Collection	<u>8 hr 6 min</u>			

LABORATORY CANISTER PRESSURIZATION:

Initial Vacuum (inches Hg and psia)	<u>-29.30</u>
Final Pressure (psia)	<u>—</u>
Pressurization Gas	<u>—</u>

SUBSLAB SHROUD:

Shroud Helium Concentration: Pre 660ppm Post 100,000 ppm
Calculated tubing volume: 9.653 x 3 = 183 cc
Purged Tubing Volume Concentration: Pre 660ppm Post 100,000 ppm
Is the purged volume concentration less than or equal to 10% in shroud?
☒ YES, continue sampling
☐ NO, improve surface seal and retest

COMPOSITE TIME (hours)	FLOW RATE RANGE (ml/min)
15 Min.	316 - 333
0.5 Hours	158 - 166.7
1	79.2 - 83.3
2	39.6 - 41.7
4	19.8 - 20.8
6	13.2 - 13.9
8	9.9 - 10.4
10	7.92 - 8.3
12	6.6 - 6.9
24	3.5 - 4.0

NOTES:

- Vacuum measured using portable vacuum gauge (provided by Lab)
- Vacuum measured by canister gauge upon opening valve
- Vacuum measured by canister gauge prior to closing valve

Signed: [Signature]

AIR CANISTER FIELD RECORD

PROJECT INFORMATION:

Project: OFFSITE Soil Vapor Inv
Job No: 0040-002-400
Location: EAST Rochester, NY
Field Staff: RLD
Client: Boylan Brown

SAMPLE I.D.:

Outdoor #1
Air

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.: 65°F
Ambient Air Temp. - P.M.: 25°F
Wind Direction: west
Wind Speed: 15-20 mph - AM
Precipitation: none

Size of Canister: 6L SUMA
Canister Serial No.: 2706
Flow Controller No.: 4245
Sample Date(s): 7/11/08
Shipping Date: 7/11/08
Sample Type: ☐ Indoor Air ☒ Outdoor Air
☐ Subslab, complete section below ☐ Soil Gas
Soil Gas Probe Depth:

FIELD SAMPLING INFORMATION:

READING	TIME	VACUUM (inches Hg) or PRESSURE (psig)	DATE	INITIALS
Gauge Reading Upon Receipt	—	—	—	—
Initial Vacuum Check ¹	—	—	—	—
Initial Field Vacuum ²	<u>1200</u>	<u>-30</u>	<u>7/11/08</u>	<u>RLD</u>
Final Field Vacuum ³	<u>2100</u>	<u>-6</u>	<u>7/11/08</u>	<u>RLD</u>
Duration of Sample Collection	<u>9 hrs.</u>			

LABORATORY CANISTER PRESSURIZATION:

Initial Vacuum (inches Hg and psia)	
Final Pressure (psia)	
Pressurization Gas	

SUBSLAB SHROUD:

Shroud Helium Concentration: NA
Calculated tubing volume: NA x 3 =
Purged Tubing Volume Concentration:
Is the purged volume concentration less than or equal to 10% in shroud?
☐ YES, continue sampling
☐ NO, improve surface seal and retest

COMPOSITE TIME (hours)	FLOW RATE RANGE (ml/min)
15 Min.	316 - 333
0.5 Hours	158 - 166.7
1	79.2 - 83.3
2	39.6 - 41.7
4	19.8 - 20.8
6	13.2 - 13.9
8	9.9 - 10.4
10	7.92 - 8.3
12	6.6 - 6.9
24	3.5 - 4.0

NOTES:

- Vacuum measured using portable vacuum gauge (provided by Lab)
- Vacuum measured by canister gauge upon opening valve
- Vacuum measured by canister gauge prior to closing valve

Signed: _____

SOIL VAPOR SAMPLE COLLECTION LOG



Site: EAST Rochester

Sampler(s): 220/TAS

[illegible]

Notes:

1. See Work Plan for sampling frequency and actual number of QC samples.

Suite 11

South Burlington, VT 05403

phone 802-660-1990 fax 802-660-1919

Canister Samples Chain of Custody Record

TestAmerica Analytical Testing Corp. assumes no liability with respect to the collection and shipment of these samples.

Client Contact Information				Project Manager: <u>Tom Forbes</u>		Samples Collected By: <u>RLO</u>		1 of 1 COCs														
Company: <u>Bachman Inc Eng'g, LLC</u>				Phone: <u>716-856-0599</u>																		
Address: <u>726 Exchange St Suite 624</u>				Email: <u>forbes@bachmaneng.com</u>																		
City/State/Zip: <u>Buffalo, NY 14210</u>																						
Phone: <u>716-856-0595</u>				Site Contact: <u>Rick Ditzel - Bachman</u>																		
FAX: <u>716-856-0593</u>				STL Contact: <u>B. Fisher - Buffalo</u>																		
Project Name: <u>EAST ROUTE BRIDGE - BALANCE</u>				Analysis Turnaround Time																		
Site:				Standard (Specify)																		
PO #				Rush (Specify)																		
Sample Identification				Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-15	TO-14A	EPA 3C	EPA 25C	ASTM D-1946	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
SV-1				7/10/08	1055	1951	-29.5	-2	2763	3042	X					X						
SV-2				7/10/08	1142	1952	-30	-4	3119	3196	X					X						
OUTDOOR AIR #1				7/10/08	1200	2100	-30	-6	4245	2706	X							X				
<p>Special Instructions/QC Requirements & Comments: <u>PETROLEUM HELIUM ANALYSIS ON SAMPLE SV-1, SV-2 - Report Separately From TO-15 Results</u></p> <p><u>LAB IV QC ON TO-15 RESULTS</u></p> <p><u>LAB II REPORTS ON HELIUM RESULTS</u></p>																						
Samples Shipped by: <u>[Signature]</u>				Date/Time: <u>7/10/08 15:00</u>	Samples Received by:																	
Samples Relinquished by: <u>[Signature]</u>				Date/Time:	Received by:																	
Relinquished by:				Date/Time:	Received by:																	
Lab Use Only				Shipper Name:				Opened by:				Condition:										

ATTACHMENT 2

MONITORING WELL CONSTRUCTION LOGS

Borehole Number: MW-13

Client: Despatch Industries, Inc.

Logged By: TAB

Checked By: BCH



Benchmark Environmental Engineering & Science, PLLC
726 Exchange Street, Suite 624
Buffalo, NY
(716) 856-0599

SUBSURFACE PROFILE			SAMPLE				PID VOCs		Lab Sample	Well Completion Details or Remarks
Depth (fbgs)	Elev. /Depth	Description (ASTM D2488: Visual-Manual Procedure)	Sample No.	SPT N-Value	Recovery (ft)	Symbol				
								0 ppm 25 12.5		
0.0	0.0	Ground Surface								
		Concrete - Sidewalk								
		Subbase								
		One inch crusher-run								
		Fine Sand								
		Medium brown, Fine Sand with few Silt, moist, medium density, very faint reddish brown laminations	Hand	NA	5					
5.0	-5.0	Same as above								
	5.0		S1	NA	3.2		0.0			
	-9.0									
	9.0	Same as above with rootlets					0.0			
			S2	NA	3.6		0.0			
	-13.0									
	13.0	Same as above with no rootlets					0.0			
			S3	NA	3.3		0.0			
	-17.0									
	17.0	Same as above					0.0			
			S4	NA	3.5		0.0			
	-20.0									
	20.0	Same as above, wet					0.0			
	-21.0									
	21.0	Same as above					0.0			
			S5	NA	2.2		0.0			
	-24.0									
	24.0	Same as above with trace coarse gravel					0.0			
			S6	NA	2.9		0.0			
	-28.0									
	28.0	Same as above with no gravel					0.0			
			S7	NA	2.4		0.0			
	-32.0									
	32.0	Same as above					0.0			
			S8	NA	2.2		0.0			
35.0	-35.0	End of Boring								
	35.0									
	-40.0									
40.0	40.0									

Sch. 40 PVC Riser (0.5-16.5')

0.010" Slot PVC Screen (16.5-32')

Bentonite Chips (12.5-14.5')

00N Sand (14.5-32')

Soil Cuttings (3-12.5') DON Sand (1-3')

Drill Date(s): 08-05-08

Sheet: 1 of 1

ATTACHMENT 3

WELL DEVELOPMENT AND SAMPLING LOGS

EQUIPMENT CALIBRATION LOG

PROJECT INFORMATION:

Project Name: Off-Site GW Inv.

Project No.: 0040-002-400

Client: Despatch

Date: 8/7/08

Instrument Source: ☒ BM ☐ Rental

METER TYPE	UNITS	TIME	MAKE/MODEL	SERIAL NUMBER	CAL. BY	STANDARD	POST CAL. READING	SETTINGS
<input checked="" type="checkbox"/> pH meter	units	10:20	Myron L Company Ultra Meter 6P	606987	PWL	4.00 7.00 10.01 < 0.4	4.00 7.00 10.00 20.018	4.00 ok 7.00 ok 10.01 ok 20.04 ok
<input checked="" type="checkbox"/> Turbidity meter	NTU	10:25	Hach 2100P Turbidimeter	970600014560	PWL	20 100 800	18.3 92.5 738	20 ok 100 ok 800 ok
<input checked="" type="checkbox"/> Sp. Cond. meter	uS mS	10:20	Myron L Company Ultra Meter 6P	606987	PWL	2764 ms @ 25 °C	2764	2764 ok
<input type="checkbox"/> PID	ppm		MinRAE 2000			open air zero _____ ppm Iso. Gas		MIBK response factor = 1.0
<input type="checkbox"/> Dissolved Oxygen	ppm		YSI Model 55	05D2677				
<input type="checkbox"/> Particulate meter	mg/m ³					zero air		
<input type="checkbox"/> Oxygen	%					open air		
<input type="checkbox"/> Hydrogen sulfide	ppm					open air		
<input type="checkbox"/> Carbon monoxide	ppm					open air		
<input type="checkbox"/> LEL	%					open air		
<input type="checkbox"/> Radiation Meter	uR/H					background area		
<input type="checkbox"/>								

ADDITIONAL REMARKS:

PREPARED BY:

DATE:

GROUNDWATER WELL DEVELOPMENT LOG

Project Name: Off-Site GW Investigation
Project Number: 0040-002-400
Client: Despatch

WELL NUMBER: MW-13
Sample Matrix: groundwater
Weather: overcast, windy, mid 70's

WELL DATA:

DATE: <u>8/7/08</u>	TIME: <u>10:30</u>
Casing Diameter (inches): <u>2"</u>	Casing Material: <u>2" PVC</u>
Screened interval (ftTOR): <u>17.0 - 32.0</u>	Screen Material: <u>2" slotted PVC</u>
Static Water Level (ftTOR): <u>23.56</u>	Bottom Depth (ftTOR): <u>28.28</u>
Elevation Top of Well Riser (fmsl): <u>NA</u>	Datum Ground Surface: <u>Mean Sea Level</u>
Elevation Top of Screen (fmsl): <u>NA</u>	Stick-up (feet): <u>flush-mount</u>

PURGING DATA:

DATE: <u>8/7/08</u>	START TIME: <u>10:33</u>	END TIME: <u>11:30</u>
Method: <u>Bailer</u>	Is purge equipment dedicated to sample location?	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>
No. of Well Volumes Purged: <u>> 10</u>	Was well purged to dryness?	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>
Standing Volume (gallons): <u>0.77</u>	Was well purged below top of sand pack?	yes <input checked="" type="checkbox"/> no <input type="checkbox"/>
Volume Purged (gallons): <u>8</u>	Condition of Well:	<u>good</u>
Purge Rate (gal/min): <u>—</u>	Field Personnel:	<u>PWW</u>

VOLUME CALCULATION:

(A) Total Depth of Well (ftTOR):	<u>28.28</u>
(B) Casing Diameter (inches):	<u>2"</u>
(C) Static Water Level (ftTOR):	<u>23.56</u>
One Well Volume (V, gallons):	<u>0.77</u>
$V = 0.0408 [(B)^2 \times ((A) - (C))]$	

Volume Calculation

Well Diameter	Volume gal/ft
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469
8"	2.611

Stabilization Criteria

Parameter	Criteria
DO	+/- 0.3 mg/L
Turbidity	+/- 10%
SC	+/- 3%
ORP	+/- 10 mV
pH	+/- 0.1 unit

*Use the table to the right to calculate one well volume.

Field Personnel: PWW

EVACUATION STABILIZATION TEST DATA:

Time	Water Level (ftTOR)	Accumulated Volume (gallons)	pH (units)	Temperature (degrees C)	Specific Conductance (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
10:38	23.56	—	6.74	18.2	1396	>1000		149	Turbid brown/No odor
10:45	23.32	0.8 gal	7.12	15.6	782.5	>1000		51	"
10:52	23.30	1.6 gal	7.13	18.3	801.7	>1000		34	"
10:56	23.26	2.4 gal	7.15	18.4	814.2	"		10	"
11:01	24.15	3.2 gal	7.19	15.7	799.6	>1000		4	"
11:06	24.30	4 gal	7.23	15.1	769.5	>1000		23	"
11:10	24.38	4.8 gal	7.24	15.1	782.6	>1000		32	"
11:15	24.51	5.6 gal	7.27	15.1	794.3	>1000		32	"
11:19	24.64	6.4 gal	7.30	14.8	794.3	>1000		32	"
11:24	24.86	7.2 gal	7.33	14.7	805.6	>1000		29	"
11:30	25.01	8 gal	7.36	14.6	811.2	>1000		27	"

REMARKS:

PREPARED BY: Paul W. Wentz

LOW FLOW METHOD GROUNDWATER PURGE & SAMPLE COLLECTION LOG

Project Name: Off-Site GW Investigation WELL LOCATION: MW-13
Project Number: 0040-002-400 Sample Matrix: groundwater
Client: Despatch Weather: Sunny, partial clouds, ↑ 70°s, slight breeze

WELL DATA:		DATE: <u>8/7/08</u>	TIME: <u>12:49</u>	Volume Calculation	
Casing Diameter (inches):	<u>2"</u>	Casing Material:	<u>2" PVC</u>	Well Diameter	Volume gal/ft
Screened interval (fbTC #REF!)	<u>17.0-32.0</u>	Screen Material:	<u>2" slotted PVC</u>	1"	0.041
Static Water Level (fbTOR):	<u>22.54</u>	Bottom Depth (fbTOR):	<u>28.20</u>	2"	0.163
Elevation Top of Well Riser (fn)	<u>NA</u>	Ground Surface Elevation (<u>NA</u>	3"	0.367
Elevation Top of Screen (fmsl)	<u>NA</u>	Stick-up (feet):	<u>flush-mount</u>	4"	0.653
Standing volume in gallons:				5"	1.020
[(bottom depth - static water level) x vol calculation in table per well diameter]:			<u>0.92</u>	6"	1.469

PURGING DATA:		Pump Type: <u>peristaltic mini monsoon</u>							
Is equipment dedicated to location yes <u>no</u>					Is tubing dedicated to location: yes <u>no</u>				
Depth of Sample (i.e. Level of Intake) (fbTOR): <u>~26</u>					Approximate Purge Rate (gal/min): <u>0.125</u>				
Time	Water Level (fbTOR)	Acc. Volume (gallons)	pH (units)	Temp. (deg. C)	SC (uS)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
13:00	Initial	0.25	6.84	20.7	1388	>1000		79	turbid brown / No odor
13:02	23.65	0.25	7.07	17.2	836.9	>1000		20	"
13:05	23.78	0.50	7.15	15.9	834.1	>1000		19	"
13:07	24.12	0.75	7.15	15.9	829.1	>1000		18	"
13:09	24.18	1.25	7.17	15.4	838.0	>1000		19	"
13:11	24.20	1.5	7.19	15.6	843.9	>1000		14	"
13:14	24.24	1.75	7.21	15.7	851.3	>1000		10	

SAMPLING DATA:		DATE: <u>8/7/08</u>	START TIME: <u>13:15</u>	END TIME: <u>13:20</u>
Method: low-flow with dedicated tubing		Was well sampled to dryness? yes <u>no</u>		
Initial Water Level (fbTOR): <u>24.24</u>		Was well sampled below top of sand <u>yes</u> no		
Final Water Level (fbTOR): <u>24.24</u>		Field Personnel: <u>PLW/TAB</u>		

PHYSICAL & CHEMICAL DATA:		WATER QUALITY MEASUREMENTS					
Appearance: <u>Turbid</u>		pH (units)	TEMP. (°C)	SC (uS)	TURB. (NTU)	DO (ppm)	ORP (mV)
Color: <u>Brown</u>		7.21	15.7	851.3	>1000	10	10
Odor: <u>None</u>							
Sediment Present? <u>Yes</u>							

REMARKS: ~4.0' of sand in well

PREPARED BY: Paul W. Wall