Debbie, NYSDOH
Bart P, DEC
Bruce Frazier, DEC
FYI comment
Rick Elliott

Leader Professional Services, Inc.
271 Marsh Road
Pittsford, New York 14534

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487.001

August 23, 2005

John Frazer, P.E.
Monroe County Department of Health
111 Westfall Road
PO Box 92832
Rochester, New York 14692-8932

Re: Kalden Construction
Mendon, New York

Dear Mr. Frazer:

Leader Professional Services, Inc. ("Leader") is providing this letter on the behalf of Kalden Construction ("Kalden") and in response to your telephone call of July 27, 2005 to Leader. Leader's understanding from your telephone message is that the Department of Health ("DOH") wishes to better understand the conditions at the Kalden property so they might allow continued building within a limited area of the Kalden development and use of topsoil stored at various locations within the undeveloped property.

As you are aware, Kalden has limited resources to provide the information the DOH and New York State Department of Environmental Conservation ("NYSDEC") is requesting to address the contamination resulting from the illegal disposal of drums on their property. As a result, no new information has been developed by Leader or Kalden to address the contamination issues. In fact, it is probably the DOH that has the most recent groundwater sample results and Leader requests the DOH share those results with Kalden. We have seen reports from newspaper and television sources that these results found no new contamination. If true, this is good news.

We were pleasantly surprised to learn that the USEPA recently was working on the property to further identify what contaminants are present in the containerized waste so they can remove it from the property. The USEPA took everyone by surprise, except for the NYSDEC, with their arrival to complete the sampling. When and if we learn the results from the USEPA's work we will pass it along to the DOH, and trust the DOH will reciprocate.

Included with our letter is a table of groundwater sample results (Table 1). Figure 1 presents our interpretation of the groundwater surface contours in the uppermost groundwater zone and our interpretation of the direction of groundwater flow. Boring logs prepared from the drilling of the monitoring wells have also been included.

No soil samples were collected for analysis, but during drilling and sampling, all soils were field screened using a portable organic vapor analyzer with a photoionization detector. The results of this screening analysis are presented on the borehole logs and the results found no elevated concentrations of volatile organic compounds. Additionally, during the drilling and sampling no stained soil or waste-like material was found. This suggests that the contamination found associated with the drum burial migrated vertically downward through the sand and gravel soils. Once in the groundwater, some dispersion and migration of the contaminants occurred as evidenced by the presence of volatile organic compounds present in the groundwater samples hydraulically downgradient from the burial spot.

Groundwater sample results from each of the monitoring wells installed by Kalden (Table 1) shows several volatile organic compounds were found at concentrations, which exceed New York State's groundwater quality standards and guidelines. Of the chemicals identified in the waste samples, only Benzene, Toluene, Trichloroethene, 1,1,1-Trichloroethane, cis 1,2-Dichloroethene, and 1,1-Dichloroethane were found in the groundwater samples. All of the detected chemicals were found at concentrations of less than 100 parts per billion. This is significant because the concentrations are lower than expected and may be caused by a higher percentage of the contaminated free liquids or leachate, from contaminated solids, being absorbed by the soils. This factor in the contaminant migration is believed to be evident by the lower than expected groundwater contaminant concentrations observed in monitoring well MW-4 (the monitoring well closest to the drums), and also between monitoring wells MW-3 and MW-4 where the absorption and attenuation of contaminants is resulting in a loss of approximately 25% to 33% of their starting concentration at monitoring well MW-4. The contamination may have also migrated vertically downward and may be accumulating at a lower elevation in the groundwater zone. This migration mechanism is probable and needs to be evaluated further. However, even if the contaminants are pooling on a lower impermeable layer, the concentration of the dissolved phase chemical contaminants are low in the upper parts of the groundwater zone. Therefore, there is less likely an impact to homes. The vertical migration of contaminants also highlights another aspect of groundwater contamination, the vapor intrusion risks, which are discussed below.

The groundwater analytical results also support our interpretation of the direction of groundwater flow. Contamination is found only in a direction parallel with our interpretation of the direction of groundwater flow. Although, we have the minimum number of monitoring wells needed to define the direction of groundwater. We believe that the disposal of the drums occurred as one or two events based on how the drums were found in a single area. Evidence for two events is supported by the fact that there was a narrow column or wall of soil found within the drum cluster. This may indicate two burial cells or excavations, thus two burial events. Assuming that the burial occurred as a single event or within a short period of time, then the amount of time the contaminants have been

available to migrate would be approximately the same (in comparison to the time it takes groundwater to migrate a given distance). It is equally likely the direction of groundwater flow and the rate of flow has remained the same since the burial of the drums. Given these assumptions, we would expect the pattern of contamination, or the shape of the contaminant plume to be constant. Slight seasonal variation is also expected, but if the contamination has been in the ground for 30 or more years, then the pattern has been established and is no longer changing due to short-term effects.

If the interpretation of the groundwater surface contours suggested that a radial groundwater flow pattern exists around the drum disposal area, then contaminants should also be present in all monitoring wells that are hydraulically downgradient of the disposal area. For example, the distance between monitoring well MW-1 and the disposal area is approximately 12.5 feet further than the distance to monitoring well MW-3. Given the same groundwater flow rate and the same contaminant migration rate, then contaminants should be present in MW-1 if radial groundwater flow exists. Since contaminants are not found in monitoring well MW-1, then uniform radial flow is not present, nor is there a flow component that directs groundwater preferentially toward monitoring well MW-1. The same concept also applies for monitoring well MW-2 and the same conclusion can be reached, that the direction of groundwater flow is to the north and northwest.

Although the observed concentrations have been low, the presence of volatile organic compounds in the soil and groundwater, there is a concern that contaminated vapors may infiltrate into homes near the site and affect the residents. But unlike many homes that are located above contaminated groundwater, this concern is known and precautionary measures can be planned for in the building construction. Possible precautionary measures could include: monitoring basement excavations and other deep excavations for unexpected conditions like debris and perched groundwater, and the placement of passive or active vapor extraction systems. Fortunately, due to the geologic characteristics of the Mendon are, Kalden already designs and builds their homes to minimize radon gas intrusion and the same system can be used, without modification, to mitigate organic vapor intrusion.

Kalden is prepared to complete reasonable monitoring and sampling in an effort to make properties available for building. We object to the installation of additional monitoring wells for the following reasons:

- Kalden has already informed the NYSDEC that completing the site investigation of the property, in conformance with NYSDEC protocols for inactive hazardous waste sites, is financially not feasible. Kalden does not have the means, especially since they are currently not building homes, to undertake such an investigation.

- Installing monitoring wells without NYSDEC and Monroe County DOH review can be done at a lower cost, but will the data ever be accepted? If not, then Kalden risks having to pay for the work twice when the NYSDEC completes their investigation.
- If the monitoring wells should indicate contaminated groundwater conditions existed, Kalden needs to understand how it will change the DOH's approach and how will it change the risks future residents are exposed to.

If the DOH will not allow Kalden to build, this will be catastrophic to Kalden. But what are the risks? The residents have public water and vapor mitigation systems are installed. Attachment 1 presents the results of an USEPA vapor intrusion model completed by Leader. It shows the modeled contaminant concentration in air and the cancer risk from the indoor air quality estimated over a variety of soil and groundwater conditions. The models presented in Attachment 1 indicate that the indoor air contaminant (Trichloroethene) is below the New York State's DOH guidance level of 5 micrograms per cubic meter. The circle drawn on Figure 2 shows the limits of where a potential indoor air concentration of 4.0 micrograms per cubic meter might be present. The circle was drawn assuming uniform contaminant and groundwater flow, a Trichloroethene concentration of 30 micrograms per Liter, and a groundwater depth of 20 feet. For added conservatism we modeled the predicted indoor air concentration assuming a groundwater depth of 20 feet below ground surface. This is more than 5 feet shallower than what has been observed in monitoring well MW-2 the shallowest groundwater depth.

We are hereby asking that the following building lots be approved for construction: 32, 33, 34, 38, 40, 41, 42, 43, 44, 45, 39, 71, 72, 73, 74, and 75 because the risk to residents from groundwater is within acceptable levels given the following information:

- The groundwater appears to be migrating to the northwest;
- Groundwater depths are in excess of 20 feet below ground surface;
- Kalden is installing vapor migration system in every home;
- Assumption that uniform radial contaminant flow from the disposal area exists; and
- The area within circle drawn on Figure 2 shows where an elevated risk might be present.

Lastly, we understand the DOH has been concerned about the quality of the topsoil stockpiled on Lot 33 of the property. It is our understanding that it is the DOH's position that topsoil should be tested to ensure that the soil is not contaminated. I spoke to Mr. Joseph Albert, of the DOH, regarding this issue and

according to Mr. Albert, Kalden needs to sample the topsoil for volatile organic compounds or monitor the topsoil when disturbed with a portable organic vapor analyzer. When monitoring the topsoil with an organic vapor analyzer, if the concentration of organic vapors exceeded a background level of 5 parts per million, then laboratory testing for volatile organic compounds would be necessary. In addition, the topsoil would require analysis for heavy metals including Lead, Chromium, Cadmium, Barium, Arsenic, and Mercury. The frequency of sample collection would be based on a NYSDEC's ("STARS") guidance document for sampling soil piles.

It is our understanding that the topsoil in question did not originate from the drum disposal area of the development, but from parcels that have already been developed. The site was undeveloped until the earthmoving began that exposed the drums at depths of 1-2 feet. In addition, we have provided the following drawings taken from Kalden's site development plans (see Figures 3 and 4), to show the pre-construction (pre-earthmoving) ground surface elevations and the proposed final ground surface elevations. Figure 3 shows the location of the drum burial area overlain with both existing ground surface contours and proposed finished contours. We have also provided Figure 4, which shows the existing ground surface contours on a separate drawing that is less complicated with other information. From Figure 3 and 4, the pre-drum removal ground surface elevation ranged from +653 to +655. The proposed finished ground surface elevation will range from +651 to +654. Assuming the finished grade also includes road base gravel and pavement, the amount of soil needing to be cut from the drum area might increase by 0.75 feet. According to Kalden, when the drums were found, the sub-grade elevation of the road was at the required elevation indicating that approximately 2 to 3 feet of soil had been removed. With this much soil having been removed, how can the topsoil become contaminated with the waste materials in the drums? Needless to say, we find the request to sample by the DOH unnecessary.

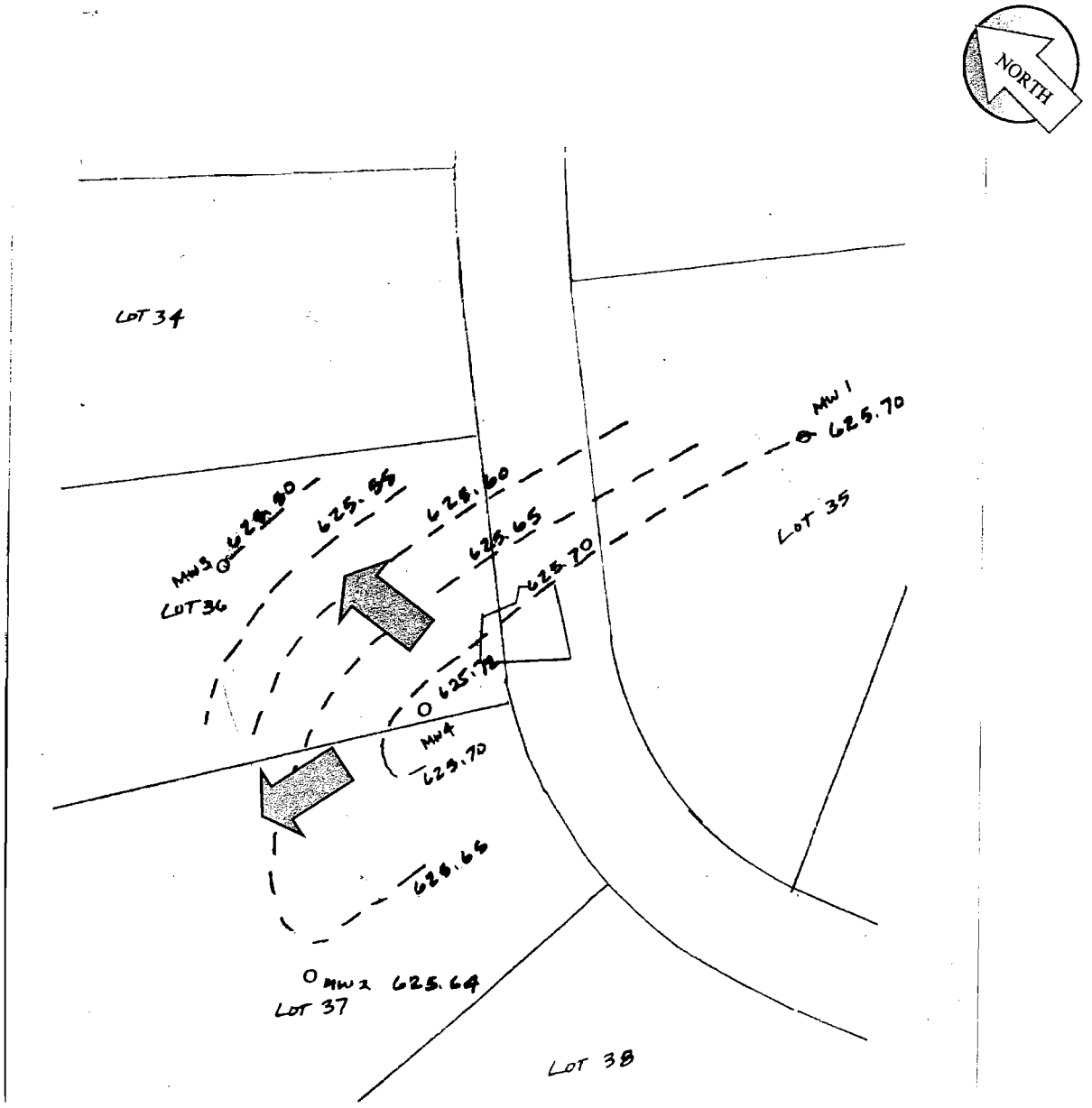
We also find it interesting that it has taken the DOH nearly two months to make this request especially when the residents have complained about airborne dust, some of which probably came from the topsoil piles. During the pubic meeting held on May 18, 2005, Dr. Doniger mentioned that he saw no health concerns with the property. Possibly we are taking Dr. Doniger's comments out of context, but I am sure if he was worried by the dust or surface soil issues, he would not have made this statement. We request that the DOH reconsider their position on sampling the topsoil stockpile.

If you have any questions regarding the information we have conveyed in our letter, please call us at 248-2413.

Very truly yours,
LEADER PROFESSIONAL SERVICES, INC.

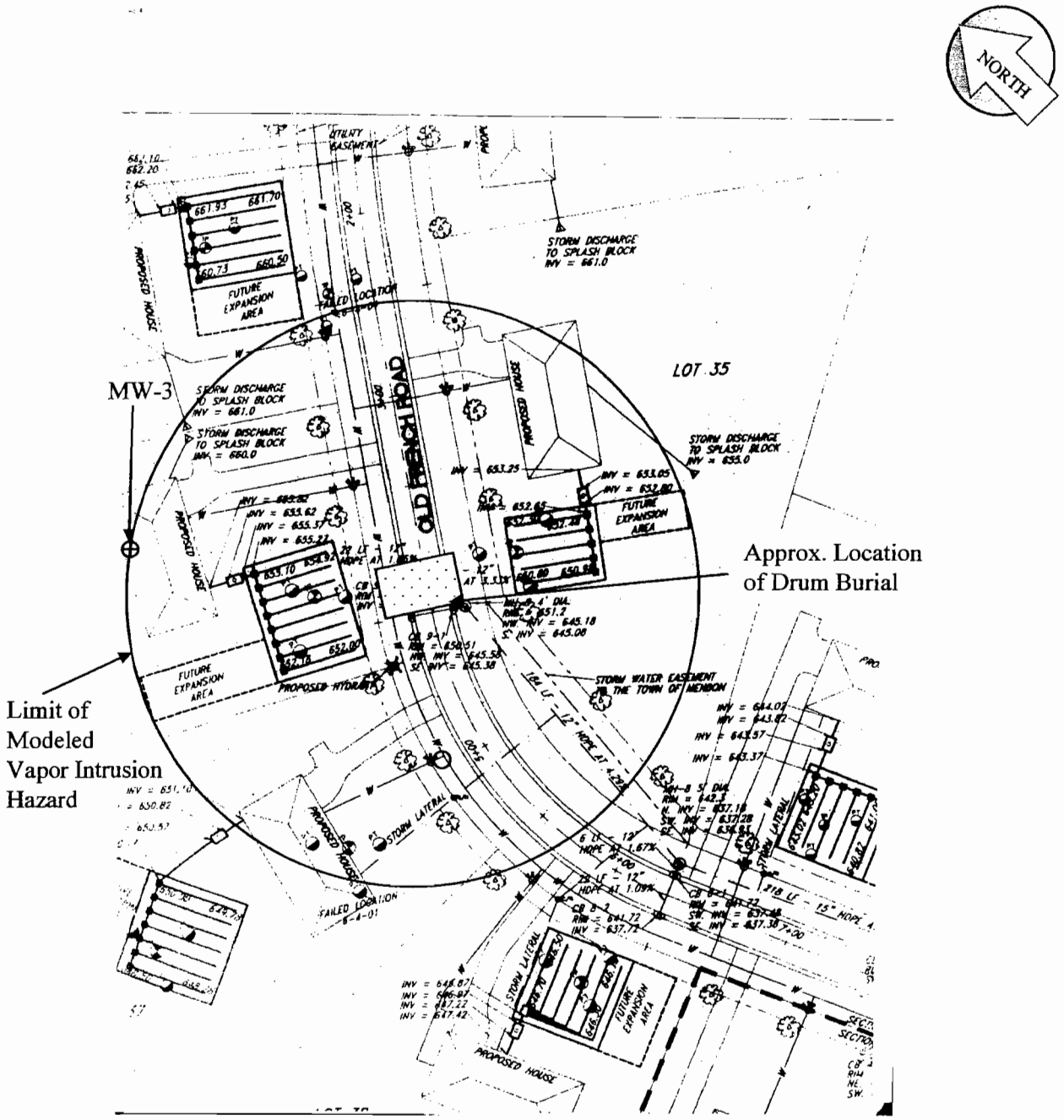
Peter von Schondorf, PG
Senior Project Manager

Enc.

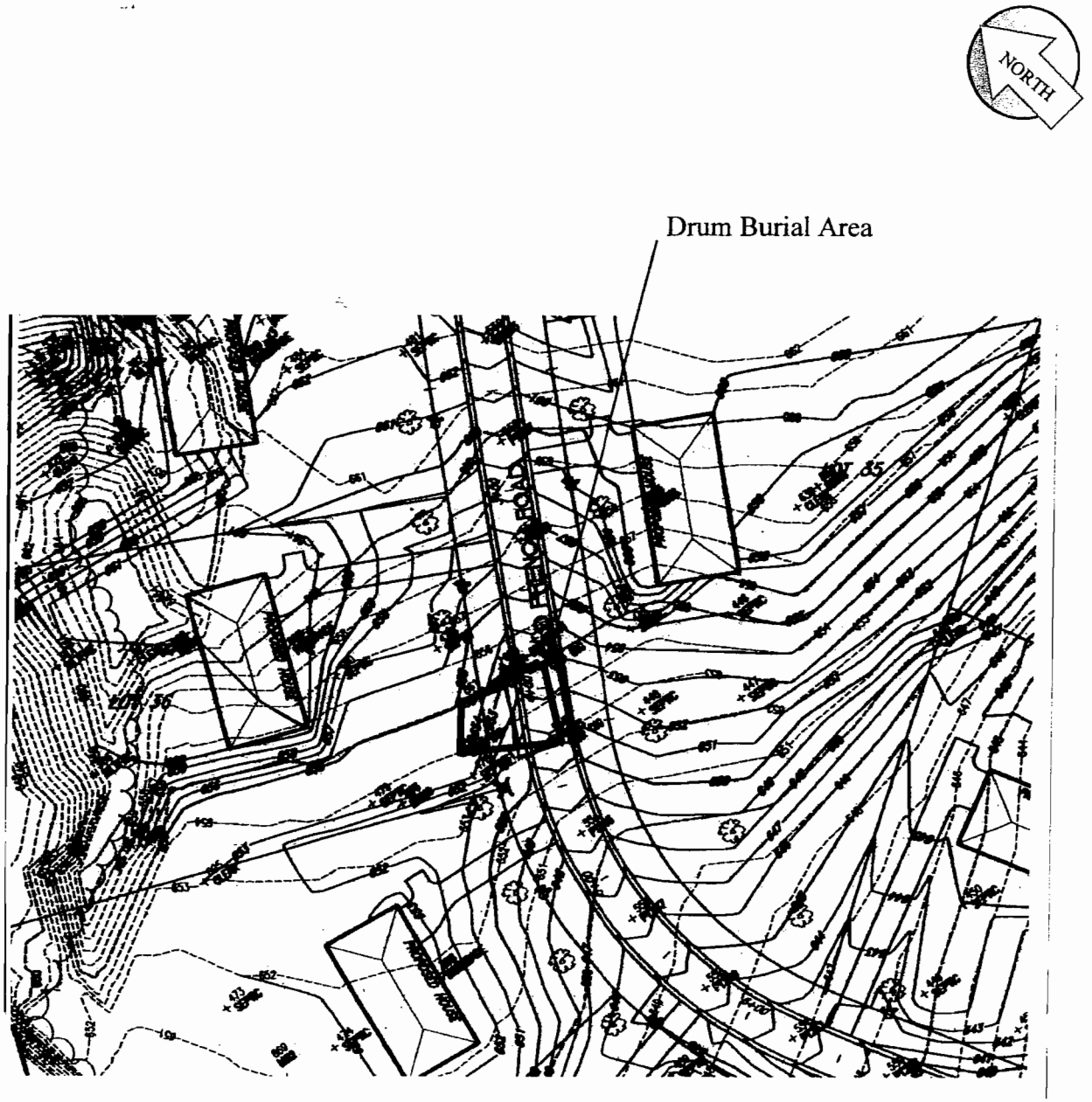


= Estimated Direction of Groundwater Flow

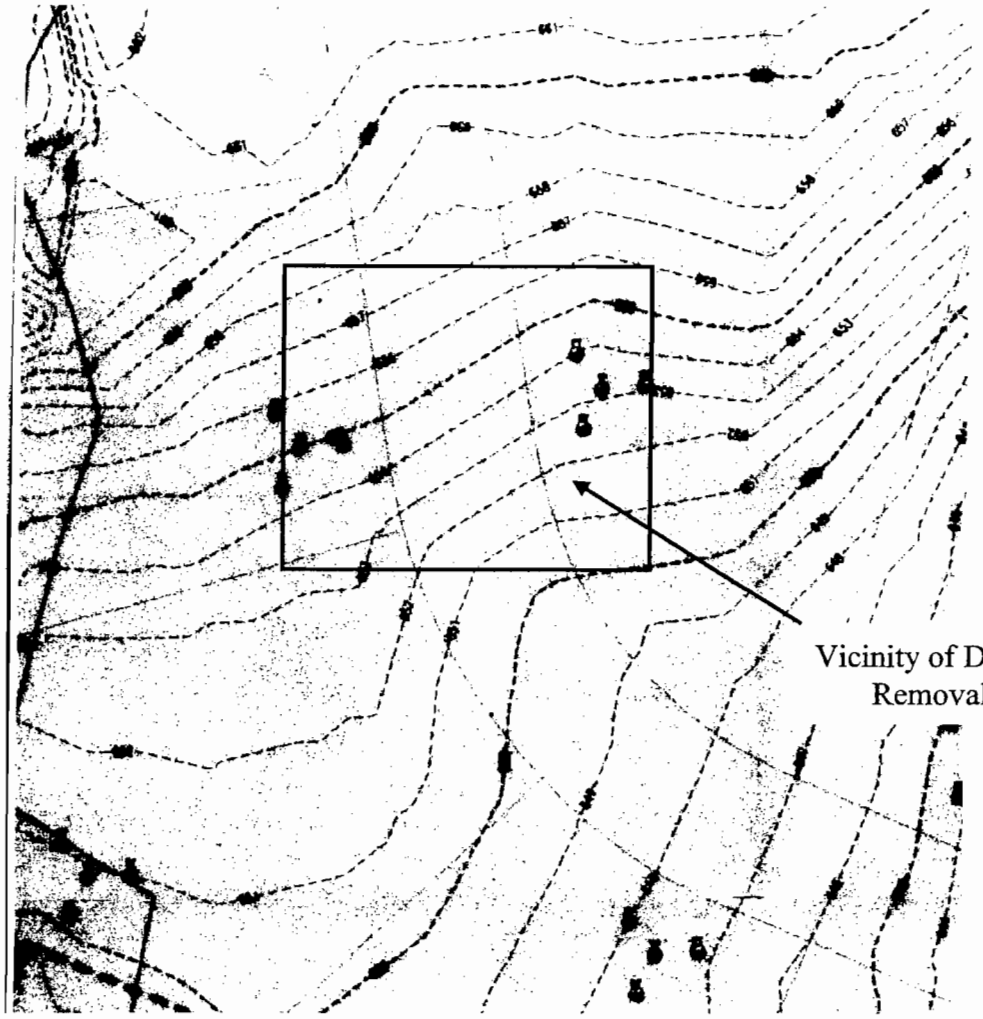
Title: Direction of Groundwater Flow, Rolling Plains Development, Mendon, New York Prepared For: Kalden Construction, Mendon, NY 14604	LEADER Leader Professional Services 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Project: 487.001 Date: 8/05 Scale (Approx.): 1" = 84'	Drawn: PVS Checked: MPR File Name: Site Map	Figure: 1



Title: Modeled Limit of Vapor Intrusion Hazard Rolling Plains Development Mendon, New York	LEADER Leader Professional Services 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Project: 487.001 Date: 8/05 Scale (Approx.): 1" = 88.8'	Drawn: PVS Checked: MPR File Name: Site Map	Figure: 2
Prepared For Kalden Construction Mendon, NY 14604				



Title: Pre-Construction and Proposed Final Ground Surface Elevations Rolling Plains Development, Mendon, New York	LEADER	Project: 487.001	Drawn: PVS	Figure: 3
Prepared For: Kalden Construction Mendon, NY 14604	Leader Professional Services 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Date: 8/05	Checked: MPR	
		Scale (Approx.): 1" = 75'	File Name: Site Map	



Title: Pre-Construction Ground Surface Elevations Rolling Plains Development Mendon, New York	LEADER Leader Professional Services 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Project: 487.001 Date: 8/05 Scale (Approx.): 1" = 72'	Drawn: PVS Checked: MPR File Name: Site Map	Figure: 4
Prepared For Kalden Construction Mendon, NY 14604				

TABLE 1
Monitoring Well Summary of Analytical Results from Wells on the Kalden Property
Monitoring Sample Date: May 13, 2005

	MW-1	MW-2	MW-3	MW-4	Groundwater Standards EPA/DEC MCLs
Metals (mg/l or ppm)					
Antimony	<0.060	<0.060	<0.060	<0.060	0.006
Arsenic	<0.005	<0.005	0.008	<0.005	0.010
Beryllium	<0.005	<0.005	<0.005	<0.005	0.004
Cadmium	<0.005	<0.005	<0.005	<0.005	0.005
Chromium	<0.010	<0.010	<0.010	<0.010	0.100
Copper	0.01	0.025	0.025	0.011	0.200
Lead	<0.005	0.008	0.009	<0.005	0.015
Mercury					
Nickel	<0.040	<0.040	<0.040	<0.040	0.100
Selenium	<0.005	<0.005	<0.005	<0.005	0.050
Silver	<0.010	<0.010	<0.010	<0.010	0.100
Thallium	<0.006	<0.006	<0.006	<0.006	0.002
Zinc	<0.020	<0.020	<0.020	<0.020	5.0
Volatile Analysis (ug/l)					
1,1-Dichloroethane	<2.00	<2.00	6.36	17.8	5.0
cis-1,2-Dichloroethene	<2.00	<2.00	9.21	22.5	5.0
1,1,1-Trichloroethane	<2.00	<2.00	23.5	84.4	5.0
Trichloroethene	<2.00	<2.00	29.5	71.3	5.0
Benzene	<0.70	<0.70	<0.70	0.76	1.0
Ethylbenzene	<2.00	<2.00	<2.00	<2.00	5.0
Toluene	<2.00	<2.00	<2.00	2.17	5.0
m,p-Xylene	<2.00	<2.00	<2.00	<2.00	5.0
o-Xylene	<2.00	<2.00	<2.00	<2.00	5.0
Styrene	<2.00	<2.00	<2.00	<2.00	5.0
Ketones (ug/l)					
Acetone	<10.0	<10.0	<10.0	<10.0	50
2-Butanone	<5.00	<5.00	<5.00	<5.00	50
4-Hexanone	<5.00	<5.00	<5.00	<5.00	50
4-Methyl-2-Pentanone	<5.00	<5.00	<5.00	<5.00	50

TABLE 2
Waste Analytical Results from the Kalden Property

	Oily Substance	Suspected Paint Sludge (Wet)	Suspected Paint Sludge (Dry)	Gray Dry Cake	Soil	Soil TCLP	Pit 1&2 Composite (Excavation Composite) TCLP	Pit 1&2 Composite (Excavation Composite)	Roll Off Composite TCLP	Roll Off Composite
Sample Date	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/13/2005	5/13/2005	5/24/2005	5/24/2005	5/24/2005	5/24/2005
Metals (Mg/Kg)						Mg/L	Mg/L		Mg/L	
Arsenic	0.728	<4.51	1.47	3.28	3.23	<0.1	<0.1	NA	<0.1	NA
Barium	382	34.7	12.6	264	51.5	1.55	1.77	NA	2.12	NA
Cadmium	1.07	0.451	0.629	4	<0.5	<0.025	<0.025	NA	<0.025	NA
Chromium	132	1.6	393	497	148	<0.050	<0.050	NA	<0.050	NA
Lead	4740	68.9	2020	3790	994	4.13	0.452	NA	0.731	NA
Mercury	0.1232	<0.0194	0.353	<0.0281	0.0347	<0.002	<0.002	NA	<0.002	NA
Selenium	<0.479	<0.451	<0.629	<0.767	<0.522	<0.1	<0.100	NA	<0.100	NA
Silver	<0.958	<0.901	<1.25	<1.53	<1.04	<0.05	<0.05	NA	<0.05	NA
PCBs mg/kg	<0.980	NA	NA	NA	ND	NA	NA	NA	NA	NA
Petroleum Hydrocarbon Scan	Lube Oil	NA	NA	NA	NA	NA	NA	NA	NA	NA
Paint Filter	NA	NA	NA	NA	Pass	NA	NA	NA	NA	NA
Flashpoint (degrees C)	58	>70	24	44	>70	NA	NA	NA	NA	NA
Flashpoint (degrees F)	136	158	75	111	158	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	7.78	NA	NA	NA	NA	NA
Reactivity										
Cyanide	Non-Reactive	Non-Reactive	Non-Reactive	Non-Reactive	Non-Reactive	NA	NA	NA	NA	NA
Sulfide	Non-Reactive	Non-Reactive	Non-Reactive	Non-Reactive	Non-Reactive	NA	NA	NA	NA	NA
Volatile Analysis (mg/kg)										
1,1-Dichloroethane	ND	4.19	ND	ND	ND	NA	NA	ND	NA	ND
cis-1,2-Dichloroethene	69.3	0.874	ND	ND	ND	NA	NA	ND	NA	ND
1,1,1-Trichloroethane	403	0.777	ND	ND	31.9	NA	NA	1.84	NA	ND
Trichloroethene	6,680	2.9	568	ND	12.3	NA	NA	0.65	NA	5.45
Ethylbenzene	562	0.386	9,700	2,150	48.1	NA	NA	0.308	NA	7.68
Toluene	2,310	61.2	63,500	3,360	222.0	NA	NA	6.47	NA	30
m,p-Xylene	2,540	1.99	45,400	8,330	213.0	NA	NA	1.67	NA	60.4
o-Xylene	571	0.528	12,200	2,370	68.1	NA	NA	5.2	NA	30.1
Styrene	75.9	ND	ND	ND	ND	NA	NA	ND	NA	ND
Ketones (mg/kg)										
Acetone	ND	2.79	ND	ND	ND	NA	NA	0.8	NA	ND
Base Neutrals (mg/kg)										
Acenaphthene	ND	ND	ND	ND	0.402					
Di-n-butyl phthalate	ND	ND	29.4	ND	2.560	NA	NA	NA	NA	NA
2-Methylnapthalene	ND	151	ND	ND	2.040	NA	NA	NA	NA	NA
Naphthalene	ND	54	31.2	ND	1.430	NA	NA	NA	NA	NA
Bis-2-ethylhexyl phthalate	ND	ND	ND	ND	1.560	NA	NA	NA	NA	NA
Hexachloroethane	ND	ND	ND	ND	0.561	NA	NA	NA	NA	NA
Isophorone	ND	ND	ND	ND	0.463	NA	NA	NA	NA	NA
Phenanthrene	ND	ND	ND	ND	0.401	NA	NA	NA	NA	NA
Acid Extractables (mg/kg)										
Phenol	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Pesticides (mg/Kg)										
Alpha BHC	NA	NA	NA	NA	0.0193	NA	NA	NA	NA	NA
Delta BHC	NA	NA	NA	NA	0.0159	NA	NA	NA	NA	NA
4,4-DDE	NA	NA	NA	NA	0.0143	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	0.0154	NA	NA	NA	NA	NA

LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

BORING #: MW1
Page 1 of 1

LOG OF BORING

Project: MENDON
Location: OLD FRENCH ROAD
Permit #: NA
Date Drilled: 5-10-05
Drilling Co.: SJB
Job #:
Total Depth: 38'
Method Used: Hollowstem Augers
Inspector: P. von Schondorf
Organic Vapor Inst: MicroTIP
Water elv: 33.41'

Depth (feet)	Sample No.	Blows/6" 140 lbs.	Sample Inter.	Adv/Rec (feet)	Org. Vap (ppm)	Sample Description	Unified Class.	Permeability
						Hollow stem auger to 18'		
18 20		10-12 17-20	18-20	2	0	BROWN, FINE Sand little to Trace Silt, dry, dense-loose	SP/SM	
30 32		12-16 17-25	30-32	1.6	0	BROWN FINE Sand little Silt, Moist to wet dense	SM	
						TD 38'		

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LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

BORING #: MW 2
Page 1 of 1
Permit #: NA
Job #:

LOG OF BORING

Project: MENDON
Location: OLD FRENCH ROAD
Date Drilled: 5-11-05
Drilling Co.: SJB
Total Depth: 35'
Method Used: Hollowstem Augers
Inspector: P. von Schondorf
Organic Vapor Inst: MicroTIP
Water elv: 25.85'

Depth (feet)	Sample No.	Blows/6" 140 lbs.	Sample Inter.	Adv/Rec (feet)	Org. Vap (ppm)	Sample Description	Unified Class.	Permeability
						Auger to 25'		
25								
27'	1	NR	25-27'	2'	0	BROWN Medium to Fine Sand, trace Silt, Wet.	SP	
	2	NR	27-29	2'	0	BROWN Medium to Fine Sand, trace Silt, Wet.	SP	
33								
35	3	NR	33-35	2'	0	BROWN MEDIUM to Fine Sand, Wet	SP	
						TD 35'		

LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

BORING #: MW 5
Page 1 of 1
Permit #: NA
Job #:

LOG OF BORING

Project: MENDON
Location: OLD FRENCH ROAD
Date Drilled: 5-11-05
Drilling Co.: STB
Total Depth: 44'
Method Used: Hollowstem Augers
Inspector: P. von Schondorf
Organic Vapor Inst: MicroTIP
Water elv: 37'

Depth (feet)	Sample No.	Blows/6" 140 lbs.	Sample Inter.	Adv/Rec (feet)	Org. Vap (ppm)	Sample Description	Unified Class.	Permeability
						Auger to 25'		
						7-14' GRAVEL		
25	1	NR	25-27	2	0	BROWN FINE to Medium Sand, little Silt, Gravel, Dry	SM	
27								
30	2	NR	30-32	2	0	BROWN FINE Sand Little Silt, Dry.	SM	
32								
34	3	NR	34-36	2	0	BROWN FINE Sand Little Silt, tr Gravel, Wet	SM	
36								
42	4	NR	42-44	2	0	BROWN V. FINE Sand, little Silt, Wet	SM	
44						TD 44'		

LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

BORING #: MW4
Page 1 of 2
Permit #: NA
Job #:

LOG OF BORING

Project MENDON Location OLD FRENCH ROAD
Date Drilled 5-11 & 5-12-05 Drilling Co.: SJB
Total Depth 48' Method Used: Hollowstem Augers
Inspector P. von Schondorf Organic Vapor Inst: MicroTIP Water elv: 24'

Depth (feet)	Sample No.	Blows/6" 140 lbs.	Sample Inter.	Adv/Rec (feet)	Org. Vap (ppm)	Sample Description	Unified Class.	Permeability
						0-8' Cobbles		
10	1	14-25 30-50	8-10	2	0	Brown, Medium Sand occ. Grvl, trace Silt Dry	SP	
12	2	14-24 36-24	10-12	2	0	Brown, Med Sand Little grvl	SP	
14	3	12-14 17-22	12-14	2	0	Brown, Fine Sand tr Grvl, dry	SP	
16	4	8-11 7-17	14-16	2	0	Brown, Fine Sand Tr Silt, dry	SP	
18	5	9-15 19-20	16-18	2	0	Brown Fine Sand Tr Silt dry	SP	
20	6	12-15 15-18	18-20	2	0	Brown Fine Sand Tr - Little Silt	SP/SM	
22	7	10-14 15-15	20-22	2	0	SAME	SP/SM	
24	8	8-16 18-20	22-24	2	0	SAME Little Silt, Dry	SM	
26	9	14-21 30-31	24-26	2	0	Gravel, Sand tr Silt, Moist	GP	
28	10	9-13 21-11	26-28	2	0	Brown, Compact Silt, Fine Grvl Sand, Wet	ML	

LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

BORING #: MW4
Page 1 of 2
Permit #: NA
Job #:

LOG OF BORING

Project: MENDON
Location: OLD FRENCH ROAD
Date Drilled: 5-11 & 5-12
Drilling Co.: JJB
Total Depth: 48'
Method Used: Hollowstem Augers
Inspector: P. von Schondorf
Organic Vapor Inst: MicroTIP
Water elv: 29'

Depth (feet)	Sample No.	Blows/6" 140 lbs.	Sample Inter.	Adv/Rec (feet)	Org. Vap (ppm)	Sample Description	Unified Class.	Permeability
30	11	5-8 11-15	28-30	2	0	Brown Silt, little Coarse Grvl Wet	ML	
35	12	NR	33-35	2	0	SAND + Grvl, WET	SP	
38	13	18-14 15-12	38-40	2	0	Brown Fine to Coarse Sand, Little Silt, Some Silt @ 39.5'	SM/ML	
40								
43	14	5-4 3-3	43-45	2	0	Brown Sand Change to Silt @ 44' w/ little Sand	SM/ML ML	
45								
						48'		

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INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: Rolling Plains
Report Date: Fri Jul 29 15:25:08 EDT 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 30 [µg/L]
Depth to ground water table: 20ft +/- 5ft
Average soil/ground water temperature: 47F

CHEMICAL PROPERTIES
Chemical of Concern: Trichloroethylene CAS Number: 79016
Molecular Weight: 131.39 [g/mole] Henrys Constant: 0.188779 [unitless]
Diffusivity in Air: 7.900e-2 [cm^2/sec] Diffusivity in Water: 9.100e-6 [cm^2/sec]
Unit Risk Factor: 0.00011 [$(\mu g/m^3)^{-1}$] Reference Concentration: 0.04 [mg/m^3]

SOIL PROPERTIES
Soil Type: Sand Total Porosity: 0.375
Unsaturated Zone Moisture Content:
low= 0.053 best estimate= 0.054 high= 0.055
Capillary Zone Moisture Content: 0.253 Height of Capillary Rise: 0.17 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Basement Air Exchange Rate: 0.25 [hr^{-1}]
Building Mixing Height: 3.66 [m] Building Footprint Area: 100 [m^2]
Subsurface Foundation Area: 180 [m^2] Building Crack Ratio: 0.0002 [unitless]
Foundation Slab Thickness: 0.1 [m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.007664 [cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.0007002

[1]Low Indoor Air Prediction: 3.528 [$\mu g/m^3$] or 0.6570 [ppbv]
Cancer Risk of this concentration: 1.595e-4 Hazard Risk of this concentration: 0.08820

Best Estimate Indoor Air Prediction: 3.966 [$\mu g/m^3$] or 0.7384 [ppbv]
Cancer Risk of this concentration: 1.793e-4 Hazard Risk of this concentration: 0.09914

[2]High Indoor Air Prediction: 4.514 [$\mu g/m^3$] or 0.8406 [ppbv]
Cancer Risk of this concentration: 2.041e-4 Hazard Risk of this concentration: 0.1129

Based on parameter analysis: Advection is the dominant mechanism across foundation.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.
[2]"High Prediction" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: Rolling Plains
Report Date: Fri Jul 29 15:22:02 EDT 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 30 [µg/L]
Depth to ground water table: 35ft +/- 5ft
Average soil/ground water temperature: 47F

CHEMICAL PROPERTIES
Chemical of Concern: Trichloroethylene CAS Number: 79016
Molecular Weight: 131.39 [g/mole] Henrys Constant: 0.188779 [unitless]
Diffusivity in Air: 7.900e-2 [cm^2/sec] Diffusivity in Water: 9.100e-6 [cm^2/sec]
Unit Risk Factor: 0.00011 [$(\mu g/m^3)^{-1}$] Reference Concentration: 0.04 [mg/m^3]

SOIL PROPERTIES
Soil Type: Sand Total Porosity: 0.375
Unsaturated Zone Moisture Content:
low= 0.053 best estimate= 0.054 high= 0.055
Capillary Zone Moisture Content: 0.253 Height of Capillary Rise: 0.17 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Basement Air Exchange Rate: 0.25 [hr^{-1}]
Building Mixing Height: 3.66 [m] Building Footprint Area: 100 [m^2]
Subsurface Foundation Area: 180 [m^2] Building Crack Ratio: 0.0002 [unitless]
Foundation Slab Thickness: 0.1 [m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.009249 [cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.0005172

[1]Low Indoor Air Prediction: 2.676 [$\mu g/m^3$] or 0.4984 [ppbv]
Cancer Risk of this concentration: 1.210e-4 Hazard Risk of this concentration: 0.06691

Best Estimate Indoor Air Prediction: 2.929 [$\mu g/m^3$] or 0.5454 [ppbv]
Cancer Risk of this concentration: 1.324e-4 Hazard Risk of this concentration: 0.07322

[2]High Indoor Air Prediction: 3.227 [$\mu g/m^3$] or 0.6009 [ppbv]
Cancer Risk of this concentration: 1.459e-4 Hazard Risk of this concentration: 0.08068

Based on parameter analysis: Advection is the dominant mechanism across foundation.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.
[2]"High Prediction" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.