Please note change of address:
P.O. Box 1760
205 Main Street
Brattleboro, VT 05302
XXXXX
214 Main Street
Brattleboro, VT 05301

ENVIRONMENTAL CONSULTING

(802) 254-3677 (24 hrs.)
(802) 254-7630 (FAX)

JUL 27 1992

July 22, 1992

Mr. Robert Haslam
Asst. Hazardous Materials Specialist
Sites Management Section
Hazardous Materials Management Division
Department of Environmental Conservation
103 South Main Street/West Building
Waterbury, VT 05671-0404

Re: Kearley Fuel Service, East Jamaica

Dear Mr. Haslam:

Enclosed please find a summary report of activities at the above-referenced site from September 6, 1991, through April 30, 1992.

Please contact me if you require any further information.

Sincerely,

Colin Blazej
Environmental Technician

MFC

Enclosures (3 volumes)

cc: L. Merrill

\210\haslam23.let

Branch Office:
25 Pinney Street, Ellington, CT 06029 (203) 875-2110 (24 hrs.)
Fax: (203) 875-8587 (24 hrs.)

Please note change of address.
P.O. Box 1760
205 Main Street
Brattleboro, VT 05302
XXXXX
(802)254-3677 (24 hrs.)
(802)254-7630 (FAX)

SUMMARY REPORT

Kearley Fuel Service
Route 30
East Jamaica, Vermont 05343

Vol. 1

Prepared For:

Robert Haslam
Sites Management Section
Hazardous Materials Management Division
Department of Environmental Conservation
103 South Main Street/West Building
Waterbury, Vermont 05671-0404

July 21, 1992

Branch Office:
25 Pinney Street, Ellington, CT 06029 (203)875-2110 (24 hrs.)
Fax: (203)875-8587 (24 hrs.)

TABLE OF CONTENTS

Page

FIGURES

TABLES

APPENDICES

The following summary report covers remediation efforts at the Kearley Fuel Service site in East Jamaica, Vermont from September 6, 1991, through April 30, 1992.

1. Spill Response

TRI-S Environmental Consulting (TEC) was called in response to a possible leak from a 1,000-gallon gasoline underground storage tank (UST) at Kearley Fuel Service in East Jamaica, Vermont ("the site") on 9/6/91 (see Figure 1, page 2). The tank owner, Kearley Fuel Service (a subsidiary of Barrows Oil Co.) made arrangements with their contractor, Roy Coleman and Sons Excavating, to pull both the suspected leaking tank as well as an additional 1,000-gallon gasoline UST. These tanks were pulled on 9/10 and 9/11/91. The Jamaica Fire Department was on site while the gas tank was being removed on 9/10/91, as a safety precaution in case explosive vapors were encountered. Paul Miller of TEC was on site to oversee the tank pull and to screen soils during excavation. Two 1/8" diameter holes were discovered in the bottom of the gasoline tank during the tank pull. Robert Haslam of the Vermont Department of Environmental Conservation (VT DEC) and David Gagnon of TEC developed a plan of action based on the available information. In order to assess the impact of the leak on domestic wells, five drinking wells surrounding the site were sampled that afternoon. Plans were also made for installation of monitoring wells to determine the extent of the leak and to facilitate soil vapor extraction.

2. Well Installation

Monitoring wells were installed by Frost Well Drillers on 9/14, 9/16, 9/26, and 9/27/91 with TEC personnel overseeing the drilling. One recovery well and 11 monitoring wells were drilled. Soils encountered during drilling, along with well construction details, are shown in Appendix A.

3. Vapor Migration/Soil Vapor Extraction System Installation

Because of the gasoline vapors migrating into the Kearley Fuel building, TEC monitored volatile organic vapor levels with an organic vapor meter (OVM) each day from 9/14 through 9/25/91 throughout the building. On 9/14/91, the Jamaica Fire Department was called to assist in venting vapors from the building. On 9/15/91, the building was left open throughout the day. On 9/16/91, Robert Haslam and David Gagnon met to review the situation and to discuss installing a soil vapor extraction system designed to prevent the continued migration of gasoline vapors into the building. On 9/17/91, Brown's Country Services (BCS) moved a shed to house the vapor extraction blower and carbon

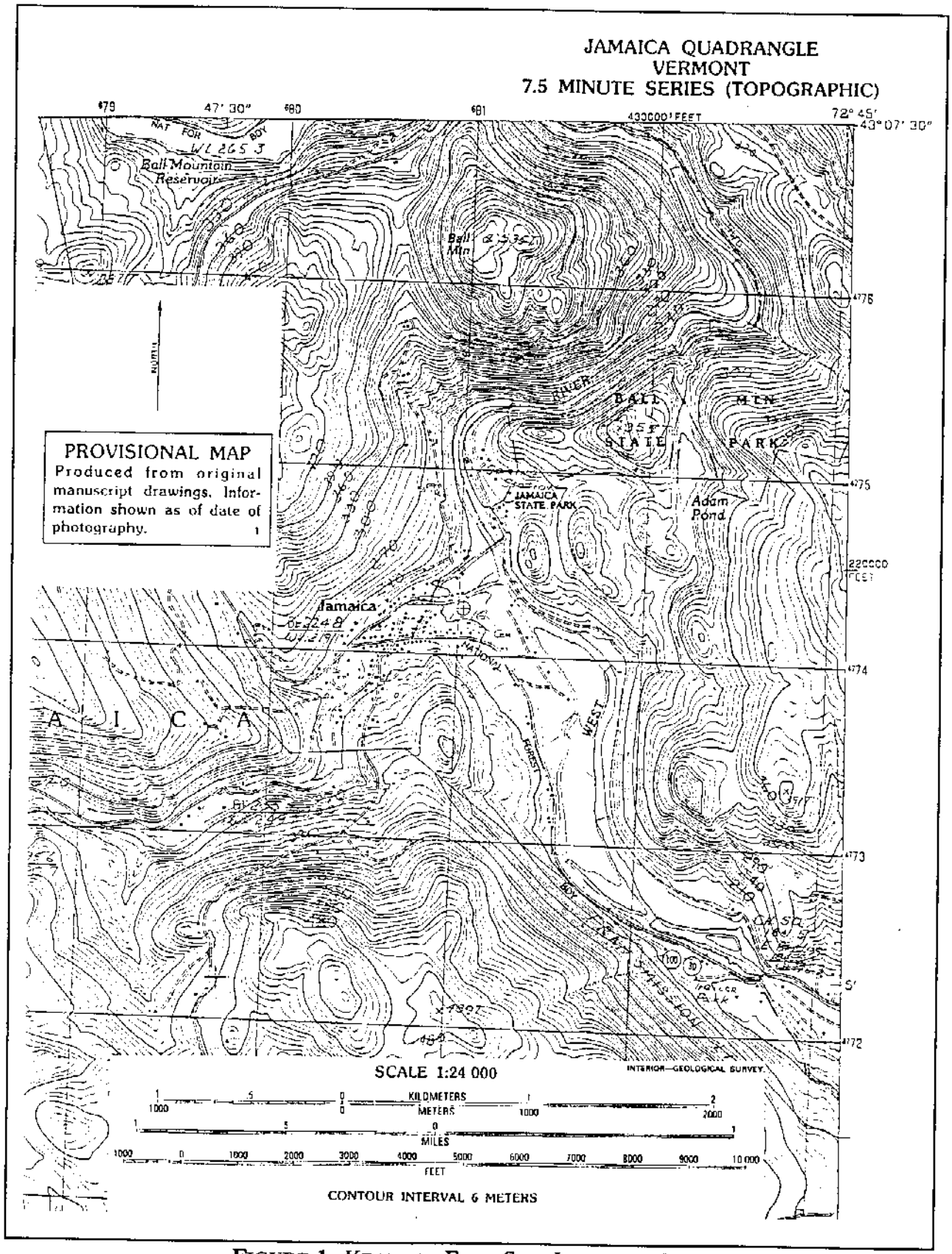


FIGURE 1 KEARLEY FUEL SITE LOCATION MAP

drums. Installation of the soil Vapor extraction system was completed by TEC and BCS (see Figure 2, following page 4). The first four monitoring wells were installed along the southern wall of the building and were used as vent points. Vapors are withdrawn under vacuum throughout the length of exposed screen and piped below grade first to the vapor extraction shed then through a series of three regenerative carbon canisters. The system was completed on 9/18/91 and was started after testing and balancing the four withdrawal points. Mr. Haslam and Maria Stadl-Meyer of the VT DEC were at the site to meet with Mr. Gagnon during start-up. Within an hour of system start-up, levels of VOC concentrations in the basement sump decreased from 208 parts per million (ppm) to 6.5 ppm.

4. Groundwater Treatment System Installation

Design and equipment purchasing for the groundwater treatment system took place from 9/27 through 10/9/91. After extensive discussions with Mr. Haslam and various equipment suppliers regarding performance and specifications, equipment was ordered on 10/4 and 10/9/91. Upon consideration of liquid carbon treatment versus air stripping, it was decided to utilize an air stripper owned by the VT DEC Petroleum Clean-up Fund, at that time in use at a Saxtons River site. On 10/9/91, BCS and TEC personnel moved the shed temporarily housing the soil vapor extraction system to a location adjacent to the newly installed recovery well. TEC and BCS disconnected the air stripper and moved it to the shed at the site on 10/10/91. Tyler Electric was on site to begin electrical connections for the system. Mr. Gagnon met Bruce Chapin, the Jamaica Health Officer, at the site to review plans for the system and to assure Mr. Chapin that the set-up would comply with local ordinances. BCS began excavation for underground piping and electrical conduits, and TEC began taking delivery of equipment for the system. On 10/14/91, while TEC continued work on the system, BCS took delivery of a 1,000-gallon concrete holding tank and began excavation for the tank and upgradient leach field. Plumbing and electrical connections continued on 10/16 and 10/17/91 as did additional equipment installation and site grading. Carbon canisters were delivered and connected on 10/18/91, and TEC personnel started the system that afternoon. Flow rate was set at 14 gpm. Final backfilling of the tank took place on 10/21/91.

The groundwater treatment system operates as follows: Contaminated water is pumped from the recovery well through the air stripper and discharged to the 1,000-gallon underground concrete holding tank (see Figure 2, and Figure 3, page 5). A pump in the tank brings the water to a leach field upgradient of the site. Discharge air from the air stripper containing volatilized gasoline contaminants is treated through the carbon canisters and discharged via pipes through the shed wall.

FIGURE 2

SYSTEM LAYOUT MAP

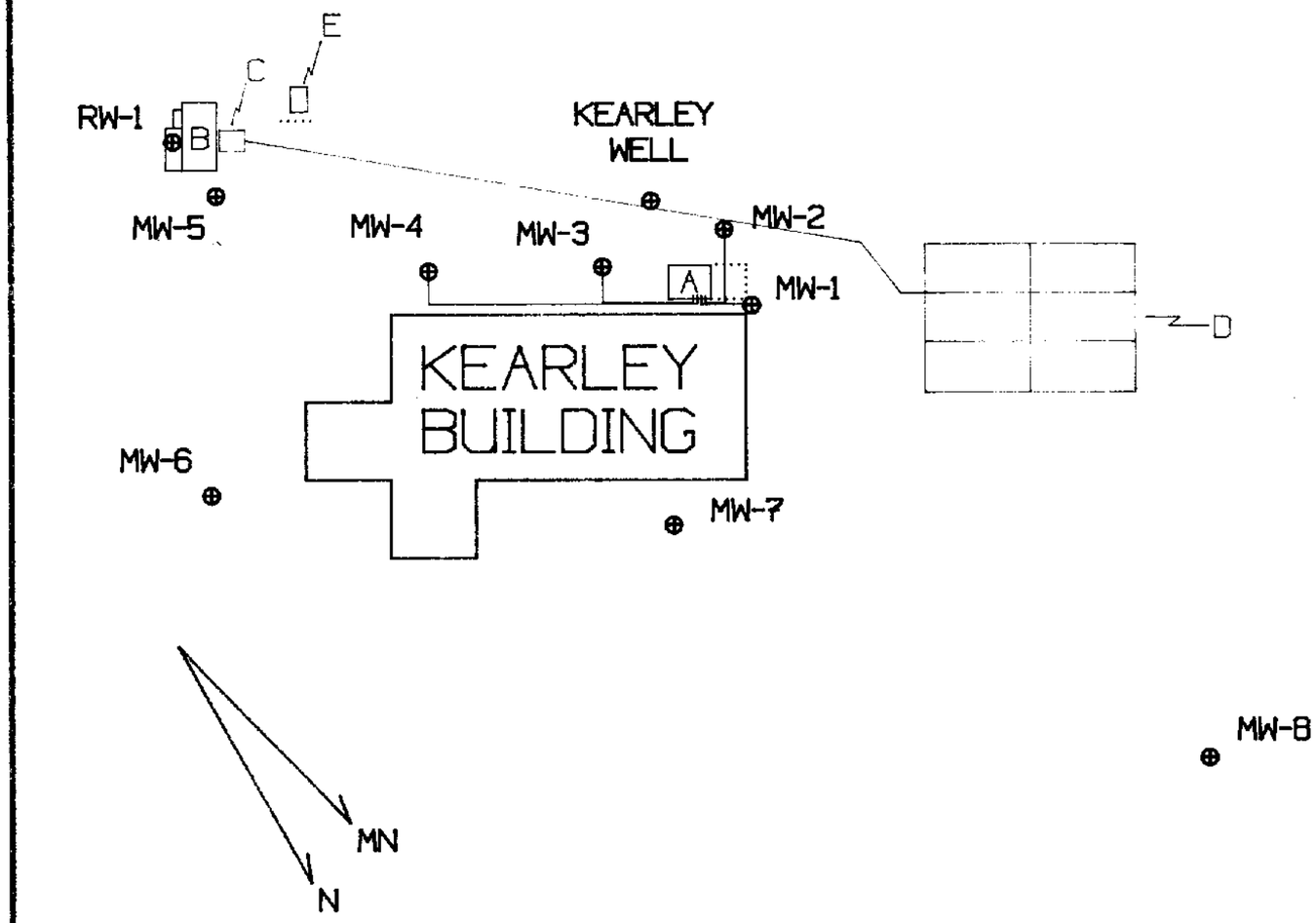


FIGURE 2

SYSTEM LAYOUT MAP

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-8 ⊕ MONITORING WELL MW-8

A = SOIL VENT SYSTEM SHED
(INCLUDES WATER SEPARATOR AND BLOWER.
FENCE ENCLOSES INCINERATOR)

B = GROUNDWATER TREATMENT SYSTEM SHED
(INCLUDES AIR STRIPPER, PUMP, CONTROLLER)

C = 1000 GALLON UNDERGROUND HOLDING TANK
(INCLUDES DISCHARGE PUMP TO LEACHFIELD)

D = LEACHFIELD FOR EFFLUENT DISCHARGE

E = 300 GALLON ABOVEGROUND PRODUCT TANK

..... = FENCE

SCALE 1 : 420

0 35 70 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302

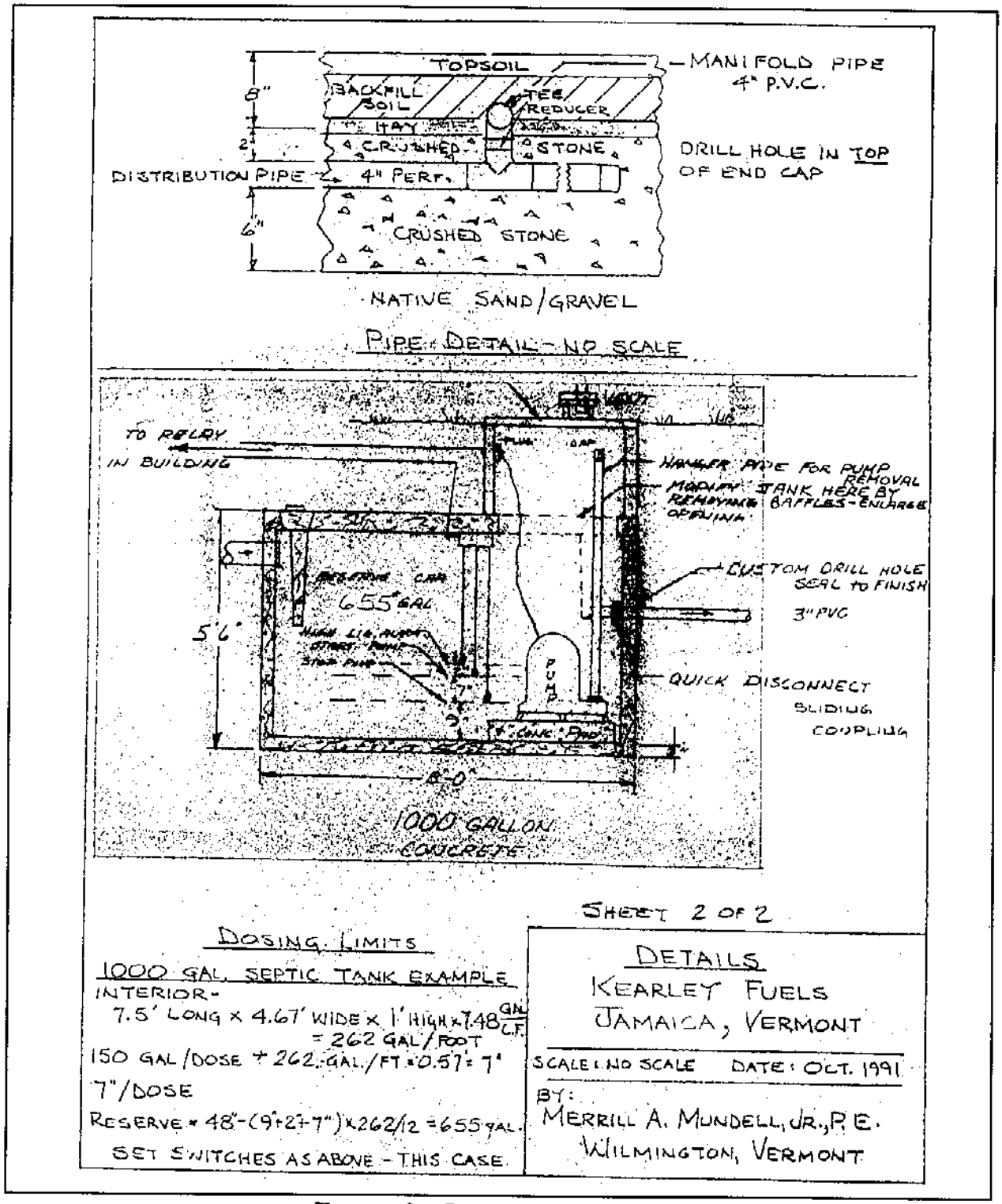


FIGURE 3 - SEPTIC TANK LAYOUT

5. Catalytic Oxidizer Installation

Discussions with Mr. Haslam following the start-up of the soil vapor extraction system led to the decision to pursue incineration as an alternative to the high carbon consumption experienced at the site during its first weeks of operation (see Section 10, Carbon Consumption). Discussions with Jim Cleary of Falmouth Products, Inc., led to the purchase of a catalytic oxidizer ("the incinerator") to treat emissions from the soil vapor extraction system. On 10/10 and 10/11/91, TEC and Falmouth Products personnel worked together to install, test and review start-up procedures for the incinerator. Tyler Electric provided electrical connections. During this installation, a vacuum leak was discovered on the blower provided by the VT DEC. Using parts from both blowers, one operable blower was created. After installation was completed, the soil vapor extraction system was re-balanced to optimize combustion temperature.

6. System Checks

Site visits to monitor operation and performance of the soil vapor extraction system and to monitor vapors in the Kearley Fuel Building were conducted by TEC personnel on the following dates: 9/18, 9/19, 9/21, 9/22, 9/23, 9/24, 9/25, 9/26, 9/27, 10/1, 10/7, 10/9, 10/11, 10/14, 10/15, and 10/18/91. Since 10/18/91, system checks have included the groundwater treatment system. Full system checks occurred on 10/21, 10/25, 11/4, 11/10, 11/11, 11/20, 11/25, 11/27, 12/2, 12/9, 12/23, and 12/31/91, and on 1/6, 1/20, 1/28, 2/6, 3/3, 3/13, 3/19, 4/3, 4/8, 4/18, and 4/22/92.

7. Groundwater Level Checks

Groundwater readings were taken in the monitoring wells and recovery well on 9/27, 9/30, 10/7, 10/14, 10/21, 10/25, 11/4, 11/10, and 12/9/91, and on 1/6, 2/6, 3/3, and 4/8/92.

8. Water Sampling

Weekly samples of monitoring wells and residential wells in the vicinity of the site were taken on 9/12, 9/19, 9/24, 9/30, 10/7, 10/14, 10/21, 10/28, 11/4, and 11/11/91. After reviewing the results, a revised schedule of biweekly sampling of sensitive wells and the system influent and effluent and full round monthly sampling was instituted. Biweekly samples were taken on 11/25 and 12/23/91, and on 1/20, 2/24, 3/19, and 4/22/92. The full round monthly samples were taken on 12/9/91, and 1/6, 2/6, 3/3, and 4/8/92.

9. DATA ANALYSIS

a. Site Hydrogeology

Groundwater potentiometric maps were constructed for each date that full rounds of groundwater elevations were taken (see Appendix B). Data from these maps is summarized in Table I (page 8). The maps for 9/23, 9/30, 10/7, and 10/14/91 each depict the natural groundwater flow regime at the site previous to the pumping in RW-1. These maps indicate that both groundwater flow direction and elevation fluctuate greatly. Flow across the site is generally toward the east but exhibits vectorial changes toward the southeast and northeast. Topographic highs occur to the south and west of the site and therefore provide recharge sources to the local groundwater. These sources appear to be accentuated on the map of 10/7/91. Additionally, it appears that the West River, located to the north of the site, is a groundwater source and contributes a southeastern gradient as shown on the map of 9/30/91. The influence of these three recharge sources on the groundwater flow system at the site appears to vary with one source showing great influence one week and not the next. The very coarse nature (coarse sand to boulder-sized material) of the subsurface at the site allows quick transmittal of any changes in groundwater contribution from any of these three sources. The above-mentioned four maps indicate that contamination originating from the area of the leaky UST (where MW-1 is located) could spread out to a considerable area a short distance from its origin.

Precipitation, of course, is also a contributing source to the flow system at the site. This source, however, imparts its greatest influence when acting upon the three previously mentioned sources.

Groundwater elevations during this three-week period vary from 4.14' in MW-7 to 4.74' in MW-5 (see Table I). Therefore, groundwater fluctuations, aside from dissolved flow, have contributed substantially to the vertical distribution of contamination.

Groundwater extraction from RW-1 began on 10/18/91, and, since that time, has shown varying degrees of influence on the groundwater system. The pump, operating continually at a rate of 14 gpm, had a pronounced impact on the groundwater flow system on 11/11/91 and 3/3/93. Additionally, it seemingly caused negligible effects on 1/6/92 and 4/8/92. The negligible effects of RW-1 may have been caused by a large influx of water along with the fast transmittal of this water due to the high hydraulic conductivity of the aquifer.

TABLE I
GROUNDWATER POTENTIOMETRIC CHART
September, 1991 through April, 1992

Date	MW2	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10	MW11	RW1
9/23/91	84.98	84.86		84.06	84.09	85.06					
9/30/91	86.09	86.01		85.30	85.38	86.31	87.87	84.10	84.77	84.56	
10/7/91	87.61	87.54	87.38	87.14	87.19	87.57	88.92	85.43	86.41	86.73	87.18
10/14/91	89.42	89.03	89.02	88.80	88.54	89.20	89.84	85.69	87.98	88.69	88.36
10/21/91	89.57	89.41	88.80	88.20	88.23	89.27	89.95	86.50	87.77	87.99	86.76
10/28/91	88.84	88.67	88.12	87.34	87.44	88.62	89.34	85.79	87.04	87.09	85.25
11/4/91	87.67	87.42	86.99	85.33	85.97	87.46	88.42	84.69	85.84	85.94	80.77
11/11/91	87.13	86.85	86.48	84.64	85.38	87.00	88.04	84.27	85.31	85.46	78.27
12/9/91	89.03	88.87	88.38	87.92	87.76	88.75	89.46	85.91	87.19	87.64	86.27
1/6/92	89.68	89.07	89.05	88.63	88.35	89.28	89.98	86.41	87.76	89.02	87.95
2/6/92	ICE	87.48	ICE	86.26	86.34	87.55	88.67	84.86	85.84	85.81	83.33
3/3/92	86.75	86.58	86.28	85.10	85.43	86.77	87.93	84.19	85.00	85.03	77.86
4/8/92	89.53	89.35	88.95	88.62	88.34	89.24	89.87	86.35	87.63	88.15	88.04

Measured in feet from an arbitrary datum point *Blank = No data, not measured* *ICE = ice covering well, no measurements taken*

It should be noted that the distance between the wells in close proximity to the Kearley building and the three outlying wells (MW-9, -10 and -11) is considerable, and, therefore, specifics of groundwater flow cannot accurately be determined. This is most evident in the area between RW-1, MW-10 and MW-11. Differences in groundwater elevation between MW-10 and MW-11 are at times only a few hundredths of a foot. Therefore, groundwater contours, as well as any groundwater divides which may be present, are difficult to place or identify. Additionally, the extent of groundwater drawdown surrounding RW-1 is difficult to establish due to the distance between wells where pumping has affected levels. The cone of depression surrounding RW-1 is assumed to be broad with a gradual slope, due to the coarse nature of the aquifer.

b. Groundwater Contamination

BTEX and MTBE isoconcentration maps were constructed for each date of full round groundwater sampling (see Appendix C). The data used for these maps is summarized in Table II, page 10 and Table III, page 11. (Data for RW-1 and the Kearley well is included with the information for household wellwater testing results, see Table IV, page 13 and Table V, page 14.) Appendix D contains all laboratory results.

As indicated on these maps, the movement of gasoline contamination through the surficial aquifer was and continues to be rapid. Free product was evident in MW-4 during the first two sampling sessions (9/19 and 9/24/91). The outlying wells were sampled for the first time on 9/30/91. Each of these wells showed some degree of contamination, with MW-11 showing high levels which have not been reached since. Based on information from the first three sampling results, groundwater data, and the site layout, a recovery well (RW-1) was installed just south of MW-5.

Most of the isoconcentration maps after 9/30/91 show that contamination has generally progressed in the direction of MW-9 and MW-10. While high BTEX and MTBE concentrations have been found in MW-5 and MW-6, they have not reached such levels in either MW-9 or MW-10. One exception to this is a period of time (10/21 to 11/11/92) when MTBE was greater than 100 ppb in MW-9.

It appears that contamination (1) is greatly diluted by the time it reaches MW-9; (2) has been pushed to a lower portion of the aquifer (below the screen interval of MW-9); (3) is moving off-site in a more northerly direction (north of MW-9) and therefore is not being detected; or (4) a combination of all three. A combination of all three seems most likely due to the widely fluctuating groundwater flow pattern and elevations at the site.

TABLE II
MONITORING WELL TESTING RESULTS
September through December, 1991

		MW2	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10	MW11	Field Blank
9-19-91	*Benzene*	1,200	1,100	FP	ND	ND	ND					ND
	BTEX	11,200	3,563	FP	ND	ND	ND					ND
	MTBE	1,300	840	FP	3.2	32	ND					ND
9-24-91	*Benzene*	420	5,200	FP	ND	ND	ND					ND
	BTEX	5,140	21,640	FP	ND	ND	ND					ND
	MTBE	1,300	10,000	FP	14	96	ND					ND
9-30-91	*Benzene*	5,600	5,500	6,800	2,800	ND	ND	ND	ND	ND	28	ND
	BTEX	49,400	20,830	94,000	7,464	ND	ND	ND	ND	2.1	97	ND
	MTBE	16,000	8,500	8,300	6,300	13	ND	ND	3	27	79	ND
10-7-91	*Benzene*	820	1,800	150	29	ND	ND	ND	ND	ND	ND	ND
	BTEX	7,720	5,790	3,680	100	ND	ND	ND	ND	ND	ND	ND
	MTBE	2,400	3,400	140	230	ND	ND	ND	10	21	ND	ND
10-14-91	*Benzene*	1,700	1,600	7,600	1	2,000	ND	ND	ND	ND	ND	ND
	BTEX	9,220	25,400	39,900	25	9,350	ND	ND	ND	ND	ND	ND
	MTBE	3,700	2,900	6,400	490	5,500	57	ND	19	52	ND	ND
10-21-91	*Benzene*	1,700	1,500	4,100	1,100	2,400	26	ND	6	2	ND	ND
	BTEX	14,900	12,150	35,300	6,870	13,130	84	ND	6	2	ND	ND
	MTBE	4,100	2,600	trace	1,300	3,400	160	ND	280	31	12	ND
10-28-91	*Benzene*	2,400	1,900	4,700	2,300	1,000	5	ND	ND	ND	ND	ND
	BTEX	10,450	15,150	37,200	13,180	5,450	12	ND	ND	ND	ND	ND
	MTBE	2,400	2,600	2,900	2,200	1,300	25	ND	560	27	23	ND
11-4-91	*Benzene*	330	2,300	4,000	4,700	370	9	ND	ND	ND	ND	ND
	BTEX	1,900	13,980	35,500	24,140	1,980	38	ND	ND	ND	ND	ND
	MTBE	trace	2,800	trace	4,600	ND	27	ND	720	22	21	ND
11-11-91	*Benzene*	1,300	1,600	4,900	8,200	740	20	ND	ND	ND	ND	ND
	BTEX	17,000	4,500	38,900	37,900	3,992	89	ND	ND	ND	ND	1
	MTBE	390	3,300	3,100	7,300	710	32	ND	230	17	16	ND
12-9-91	*Benzene*	3,100	1,200	2,200	91	1,500	190	6	ND	ND	4	ND
	BTEX	26,700	7,170	28,300	769	6,700	772	31	ND	ND	33	ND
	MTBE	ND	800	1,500	96	1,200	ND	ND	120	7	8	ND

All results reported in parts per billion (ppb) ND = Non detectable, FP = Free Product Blank = No data, not sampled
BTEX = Total Benzene, Toluene, Ethylbenzene, and Xylenes MTBE = Methyl Tertiary Butylether

TABLE III
MONITORING WELL TESTING RESULTS
January through April, 1992

		MW2	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10	MW11	Field Blank
1/6/92	*Benzene*	4,900	1,600	2,000	ND	660	130	ND	ND	ND	ND	ND
	BTEX	30,600	8,940	18,900	ND	2,910	732	ND	ND	ND	ND	ND
	MTBE	3,000	1,800	1,200	10	790	ND	ND	49	8	ND	ND
2/6/92	*Benzene*	well frozen	well frozen	well frozen	330	220	50	ND	ND	ND	ND	ND
	BTEX				1,543	1,110	183	ND	ND	ND	ND	ND
	MTBE				310	190	5	ND	86	60	ND	ND
2/24/92	*Benzene*	well frozen	2,900	4,400								
	BTEX		9,700	27,400								
	MTBE		1,400	2,900								
3/3/92	*Benzene*	2,100	3,500	4,900	3,000	390	ND	ND	ND	ND	ND	ND
	BTEX	29,000	15,120	28,600	19,110	1,309	ND	ND	ND	ND	ND	ND
	MTBE	950	2,300	2,700	3,100	290	ND	ND	60	11	ND	ND
4/8/92	*Benzene*	3,400	1,900	1,100	ND	1,100	54	ND	ND	ND	ND	ND
	BTEX	32,700	10,530	12,540	7	6,640	259	ND	ND	ND	ND	ND
	MTBE	ND	ND	ND	ND	ND	ND	ND	13	ND	ND	ND

All results reported in parts per billion (ppb) *ND = Non-detectable* *Blank = No data, not sampled*
BTEX = Total Benzene, Toluene, Ethylbenzene, and Xylenes *MTBE = Methyl Tertiary Butylether*

Throughout the time period of this report, the most contaminated wells have been those located closest to the initial leak (MW-2, -3, and -4). These three wells generally have had BTEX levels greater than 10,000 ppb. BTEX contamination in these and the remaining wells has not changed considerably. MTBE has fluctuated more and has even shown signs of disappearing (4/8/92). The highest level of BTEX and MTBE contamination taken from RW-1 was on 11/4/91 when 4,480 ppb and 960 ppb were recorded, respectively. Contamination levels in RW-1 have generally remained lower than either MW-2, -3, or -4. Therefore, it appears that while the pumping of RW-1 significantly affects the local groundwater, it is still not influential enough to overcome the natural groundwater flow system and so is unable to capture the "hottest" portions of the plume. It is possible that the contamination is locked up in the finer soils of MW-2, -3, and -4, presenting an immobile phase for a groundwater pump treatment system. From this information and soil vapor extraction information, it is clear that the most successful form of contamination remediation at the site has been through the continuous use of the soil vapor extraction system. The groundwater remediation system has removed a smaller amount of contamination.

c. Water Supply Contamination

The Kearley well has shown contamination from the first sampling episode. After the 10/7/91 sampling, BTEX levels ranged from 610 to 3,772 ppb and MTBE levels have ranged from 290 to 1,100 ppb through the end of the year. MTBE was detected on 9/24/91 and remained through 10/18/91 in the Lamarche well. BTEX also showed once in the Cobb well at 2 ppb on 10/21/91. The VT DEC had a point-of-entry water treatment system installed at the Lamarche residence which proved effective in removing MTBE. It was removed after sampling showed influent to the system had non-detectable contaminant levels over several sampling events. The Messina well showed 2 ppb of BTEX on the last sampling episode of the year, 12/23/91. This followed the appearance of 31 ppb of BTEX on 12/9/91 in MW-8, directly across Route 30 from the Messina well.

All water wells except Kearley's remained at non-detectable levels from the new year until 3/19/92, when 1 ppb of toluene and 1 ppb of xylene were present in the Cobb, Wilkens, and Lamarche wells (see Table IV, page 13, and Table V, page 14). A rush re-sampling of these three wells on 4/8/92 showed non-detectable levels in the Cobb and Wilkens wells and 6 ppb of MTBE in the Lamarche well. Due to these results, the VT DEC is reinstalling the point of entry water treatment system at the Lamarche residence. The Kearley well continues to show contamination at levels ranging from 1,299 to 9,160 ppb BTEX and non-detectable to 470 ppb MTBE.

TABLE IV
HOUSEHOLD WELL WATER TESTING RESULTS
September through December, 1991

		RW1	Messina	Cobb	Kearley	Lamarche	Wilkins	Quagliaroli	Miller	Effluent
9/12/91	*Benzene*		ND	ND	48	ND	ND			
	BTEX		ND	ND	105	ND	ND			
	MTBE		ND	ND	220	ND	ND			
9/24/91	*Benzene*		ND	ND	93	ND	ND			
	BTEX		ND	ND	267	ND	ND			
	MTBE		ND	ND	350	3	ND			
9/30/91	*Benzene*		ND	ND	water turned off	ND	ND			
	BTEX		ND	ND		ND	ND			
	MTBE		ND	ND		6.4	ND			
10/7/91	*Benzene*	ND	ND	ND	490	ND	ND	ND	ND	
	BTEX	ND	ND	ND	1,475	ND	ND	ND	ND	
	MTBE	14	ND	ND	1,100	5	ND	ND	ND	
10/14/91	*Benzene*	1	ND	ND	200	ND	ND			10/18/91 System Start up
	BTEX	32	ND	ND	610	ND	ND			
	MTBE	210	ND	ND	430	33	ND			
10/21/91	*Benzene*	450	ND	ND	390	trace	ND		ND	ND
	BTEX	3,150	ND	3	1,450	trace	ND		ND	5
	MTBE	690	ND	ND	690	18	ND		ND	90
10/28/91	*Benzene*	670	ND	ND	670	ND	ND			ND
	BTEX	3,770	ND	ND	2,252	ND	ND			ND
	MTBE	680	ND	ND	650	15	ND			106
11/4/91	*Benzene*	880	ND	ND	530	ND*†	ND		ND	1
	BTEX	4,480	ND	ND	2,010	ND*†	ND		ND	7
	MTBE	960	ND	ND	530	ND*†	ND		ND	110
11/11/91	*Benzene*	460	ND	ND	920	ND*†	ND		ND	ND
	BTEX	2,460	ND	ND	3,772	ND*†	ND		ND	1
	MTBE	530	ND	ND	550	ND*†	ND		ND	56
11/25/91	*Benzene*	120		ND		ND*	ND			ND
	BTEX	569		ND		ND*	ND			ND
	MTBE	320		ND		ND*	ND			ND
12/9/91	*Benzene*	100	ND	ND	290	ND*	ND		ND	ND
	BTEX	741	ND	ND	1,273	ND*	ND		ND	ND
	MTBE	120	ND	ND	290	ND*	ND		ND	11
12/23/91	*Benzene*	7	ND	ND		ND	ND			ND
	BTEX	42	2	ND		ND	ND			1
	MTBE	15	ND	ND		trace	ND			ND

Blank = No data, not sampled
† = only effluent from water treatment system sampled
** = point of entry water treatment system in place*
All results reported in parts per billion (ppb)

TABLE V
HOUSEHOLD WELL WATER TESTING RESULTS
January through April, 1992

		RW1	Messina	Cobb	Kearley	Lamarche	Wilkins	Quagliaroli	Miller	Effluent
1/6/92	Benzene	16	ND	ND	370	ND	ND		ND	ND
	BTEX	102	ND	ND	1,983	ND	ND		ND	ND
	MTBE	37	ND	ND	150	ND	ND		ND	trace
1/20/92	Benzene	7		ND		ND	ND			ND
	BTEX	58		ND		ND	ND			ND
	MTBE	13		ND		ND	ND			ND
2/6/92	Benzene	200	ND	ND	740	ND	ND		ND	ND
	BTEX	1,314	ND	ND	5,440	ND	ND		ND	ND
	MTBE	110	ND	ND	ND	ND	ND		ND	6
2/24/92	Benzene	320	ND	ND		ND	ND			ND
	BTEX	1,423	ND	ND		ND	ND			ND
	MTBE	300	ND	ND		ND	ND			5
3/3/92	Benzene	590	ND	ND	960	ND	ND		ND	ND
	BTEX	2,574	ND	ND	9,160	ND	ND		ND	ND
	MTBE	470	ND	ND	470	ND	ND		ND	ND
3/19/92	Benzene	79		ND		ND	ND			ND
	BTEX	617		2		2	2			ND
	MTBE	84		ND		ND	ND			ND
4/8/92	Benzene	1	ND	ND	180	ND	ND		ND	ND
	BTEX	6	1	ND	1,239	ND	ND		ND	ND
	MTBE	ND	ND	ND	ND	6	ND		ND	ND
4/22/92	Benzene	ND		ND		ND	ND			ND
	BTEX	2		ND		ND	ND			ND
	MTBE	ND		ND		ND	ND			ND

All results reported in parts per billion (ppb) *BTEX = Total Benzene, Toluene, Ethylbenzene, and Xylenes*
ND = Non-detectable; *Blank = No data, not sampled* *MTBE = Methyl Tertiary Butylether*
** = point of entry water treatment system in place* *† = only effluent from water treatment system sampled*

The groundwater treatment system has been fully operational since 10/18/91. Although this system is not regulated under the State's wastewater discharge program, treatment of the groundwater through the shallow tray aeration unit has achieved effluent quality of less then 5 ppb benzene and less than 50 ppb BTEX.

d. OVM Readings

i. Kearley Building

Table VI (page 16) and Table VII (page 17) present OVM readings from inside the Kearley building. These tables show the levels of vapors before the installation of the soil vapor extraction system at 208 parts per million (ppm) in the basement sump and demonstrate dramatic decreases after the 9/18/91 start-up date. Readings have remained at or near zero ppm since September 30, 1991. The exception is when contaminated water from the Kearley well is run into the bathroom sink and gasoline vapors are emitted into the room.

ii. Soil Vapor Extraction System and Groundwater Treatment System

Carbon consumption during the first three weeks of operation of the soil vapor extraction system was 16 55-gallon drum canisters. During this time, the incinerator was being ordered and set up. Tyler Electric connected the building heating system so that it would turn off in the event the soil vapor extraction system shut down. This would prevent the furnace from providing an ignition source if vapors migrated into the building during this time interval. After start-up on 10/11/91, combined influent readings from the soil vapor extraction system feeding the incinerator showed that levels ranged from 250 to 650 ppm and then began declining toward December. They remained below 250 ppm throughout the winter. Table VIII (page 18) and Table IX (page 19) present summaries of this data.

10. CARBON CONSUMPTION

After initial soil vapor extraction system start up on 9/19/91, the first carbon canister of two in series reached breakthrough after three hours. A third canister was added, and the system was checked daily from 9/21 through 9/27/91. Carbon canisters were changed on 9/22, 9/24, 9/25, 9/27, 10/1, and 10/7/91. The blower was switched to another supplied by the VT DEC on 9/25/91. The 55-gallon drum carbon canisters were supplied by Filcorp. Total carbon consumption was 16 canisters.

TABLE VI
KEARLEY BUILDING OVM READINGS
September, 1991

Date	Time	Ambient Outdoor	Ambient Office	Bathroom	Bathroom Water	Basement	Sump	Garage	Pit
9/14/91	08:30	0.0	1.7			0.0	11.0		
	10:00	0.0	280.0			285.0	70.0		284.0
	14:00	0.0	8.5			275.0			275.0
9/15/91	14:30	0.0	2.0			8.0	278.0		128.0
9/16/91	08:45	0.0	2.0			13.4	284.0		290.0
	10:30	0.0	0.3			111.0	251.0		251.0
	12:00	0.0	5.0			64.0	282.0	0.2	185.0
	13:30	0.0	1.9			191.0	287.0		174.0
	14:30	1.4				165.0	265.0	1.6	173.0
	17:00	0.0	0.2			181.0	279.0	0.0	220.0
9/18/91	17:00	0.0	0.5			5.0	208.0		78.0
	17:30	0.0	0.0			10.5	7.5		82.0
	17:45	0.0	0.0			9.5	6.5		77.0
9/19/91	17:00	0.0	2.5			1.0	1.1	5.0	38.0
9/21/91	15:00	0.0	0.6			0.0	0.0	0.3	10.0
9/22/91	08:30	0.0	2.1			0.0	0.0	0.1	9.1
9/23/91	09:30	0.0	0.0			0.0	0.0	0.0	9.5
	11:00	0.0	0.0			0.0	0.0	0.0	8.6
9/24/91	10:10	0.0	1.7			2.0	1.5	0.4	8.4
	12:45		0.2			1.2	1.7	0.4	11.4
9/30/91		0.0	0.0			0.0	0.0	0.4	6.2

All results reported in parts per million (ppm) *Blank = No data, not measured*

TABLE VII
KEARLEY BUILDING OVM READINGS
October, 1991, through April, 1992

Date	Time	Ambient Outdoor	Ambient Office	Bathroom	Bathroom Water	Basement	Sump	Garage	Pit
10/7/91	15:00	0.0	0.0			0.0	0.0	0.0	8.7
10/9/91		0.0	0.0			0.0	0.0	0.7	9.3
10/14/91	18:30	0.0	0.0			0.0	0.0	0.4	5.9
10/15/91	15:30	0.0	0.0			0.0	0.0	1.1	4.1
10/18/91	17:35	0.3	0.8			0.5	0.8	2.2	3.2
10/21/91	12:30	0.0	0.0			0.0	0.0	0.0	0.0
11/4/91	11:50	0.0	0.0			0.0	0.0		1.8
11/10/91		0.0	0.0			0.0	0.0	0.0	0.0
11/20/91	14:50	0.0	0.0	0.0	36.7	0.0	0.0	0.0	0.0
11/27/91	10:15	0.0	0.0	0.0	36.6	0.0	0.0	0.0	0.0
12/2/91	11:35	0.0	0.0	0.0	12.2	0.0	0.0	0.0	0.0
12/9/91	14:20	0.0	0.0	0.0	18.0	0.0	0.0	0.0	0.0
12/23/91	15:30	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0
12/31/91	09:35	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
1/6/92	15:07		0.0	0.0	46.0	0.0	0.0	0.0	0.0
1/20/92	13:00	0.0	0.0	1.3	30.0	3.9	3.9	3.1	7.0
1/28/92	10:50	19.1	14.2	15.1	93.6	17.1	18.1	17.1	24.0
2/5/92		Organic Vapor Meter Cleaned and Serviced							
2/6/92	12:24	0.0	0.0	0.0	81.0	0.0	0.0	0.0	0.0
3/3/92	16:35	0.0	0.0	0.0	78.0	0.0	0.0	0.0	5.4
3/13/92	11:37	0.0	0.0	0.0	95.0	0.0	0.0	0.0	2.9
3/19/92	12:45	0.9	0.1	0.1	36.0	1.2	1.2	1.6	8.2
4/3/92	14:37	0.2	0.6	0.6	87.0	1.0	1.0	1.5	14.4
4/8/92	11:55	0.0	0.0	0.0	50.0	0.0	0.0	0.0	7.8
4/18/92	12:59	0.0	0.3	0.3	73.0	1.6	1.6	3.2	7.5
4/22/92	12:17	0.0	1.4	1.8	72.0	3.0	3.0	8.0	57.3

All results reported in parts per million (ppm) *Blank = No data, not measured*

TABLE VIII
SOIL VAPOR EXTRACTION SYSTEM ORGANIC VAPOR METER (OVM) READINGS
September through October, 1991

Date	Time	Well 1	Well 2	Well 3	Well 4	Combined	Between 1st & 2nd	Between 2nd & 3rd	Effluent Carbon	Downwind Ambient	Ambient SVS
9/19/91	17:00	181.0	220.0	209.0	259.0	273.0	227.0	221.0	38.0	0.9	
9/21/91	15:00	270.0	280.0	299.0	315.0	320.0	276.0	280.0	263.0	2.1	
9/22/91	08:30	345.0	319.0	310.0	349.0	346.0	1.4	0.3	0.1	0.0	10.0
9/23/91	09:30	352.0	322.0	359.0	391.0	419.0	313.0	239.0	0.4	0.0	10.3
9/24/91	10:10	460.0	422.0	424.0	424.0	453.0	391.0	330.0	346.0	0.0	15.8
9/30/91		657.0	334.0	232.0	284.0	297.0	301.0	223.0	170.0		14.0
10/7/91	15:00	722.0	24.0	63.0	8.0	309.0	250.0	122.0	78.0		5.3
10/9/91		542.0	18.0	4.4	40.0	301.0	60.0	0.0	0.0		4.1

All results reported in parts per million (ppm)
Between = Sample ports between carbon filters
Carbon = Carbon filters
Blank = No data, not measured
SVS = Soil Vent Shed

TABLE IX
SOIL VAPOR EXTRACTION SYSTEM AND GROUNDWATER SYSTEM OVM READINGS
October, 1991, through April, 1992

Date	Time	Well 1	Well 2	Well 3	Well 4	Combined (Influent)	Effluent Incinerator	Ambient SVS	Ambient GWS	Influent *	Effluent 1A	Effluent 1B
10/14/91	18:30	703.0	252.0	3.6	6.4	636.0	0.0					
10/15/91	15:30	891.0	137.0	4.0	61.0	600.0	0.0	0.0				
10/18/91	17:35	348.6	9.8	6.7	3.2	306.0	1.5	2.2		2.5	3.6	1.3
10/21/91	12:30	274.0	0.0	0.8	2.8	272.0	0.0	0.0		10.0	0.0	0.0
10/31/91	17:00	459.0	57.9	37.0	196.3	358.0	0.0	0.0				
11/4/91	11:50	482.0	52.0	40.1	100.0	313.0	2.5	0.0	0.0	19.0	6.2	6.6
11/10/91		420.0	20.5	15.9	62.0	297.0	2.7	1.3		11.6	5.5	5.5
11/20/91	14:50	119.0	0.0	0.0	5.5	267.0	0.0	0.0	0.0	5.0	0.0	0.0
11/27/91	10:15	524.0	6.5	3.2	3.2	632.0	0.0	0.0	0.0	8.2	8.2	8.2
12/2/91	11:35	0.0	0.6	1.3	1.3	172.0	0.0	0.0	0.0	0.6	0.6	0.6
12/9/91	14:20	7.1	0.0	0.0	0.0	205.0	0.0	0.0	0.0	0.6	0.0	0.0
12/23/91	15:30	49.9	3.0	1.0	1.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0
12/31/91	09:35	†	0.0	0.0	0.0	†	†	0.0	†	†	†	†
1/6/92	15:07	0.0	0.0	0.0	0.0	88.0	0.0	0.0		0.0	0.0	0.0
1/20/92	13:00	10.4	0.4	2.1	1.3	89.4	0.0	2.6	3.4	4.7	3.4	3.9
1/28/92	10:50	33.0	19.1	28.0	19.1	191.0	15.1	19.1	8.3	10.0	7.3	7.3
2/5/92		Organic Vapor Meter Cleaned and Serviced										
2/6/92	12:24	65.0	0.0	0.0	18.0	62.5	0.0	0.0	0.0	0.0	0.0	0.0
3/3/92	16:35	93.0	0.0	2.9	30.0	85.0	0.0	0.0	0.0	4.0	2.9	2.7
3/13/92	11:37	22.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0
3/19/92	12:45	24.3	0.9	4.0	0.9	28.3	0.9	0.9	0.9	2.0	1.6	1.4
4/3/92	14:37	24.3	0.0	0.0	0.2	30.4	0.0	0.2	0.0	0.0	0.0	0.0
4/8/92	11:55	12.6	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0	0.0	0.0
4/18/92	12:59	12.1	5.9	0.9	0.9	28.2	0.9	0.9	0.9	2.3	1.3	1.3
4/22/92	12:17	15.0	2.2	2.2	3.0	19.9	0.0	1.8	1.0	1.0	1.8	1.8

*Influent * = From shallow tray oxidizer to carbon filters 1A and 1B* *SVS = Soil Vent Shed* *GWS = Ground Water Shed*
Blank No data, not measured *† = OVM malfunction* *All results reported in parts per million (ppm)*

11. Soil Vapor Extraction System Product Recovery Calculation

Table X represents raw data and average cumulative levels compiled from periodic OVM readings taken since 12/9/91. All readings in this table are recorded in ppm and represent combined influent levels.

Table X
Cumulative Soil Vapor Product Recovery
December, 1991, through April, 1992

Date of Reading	*Influent Level*	*Days Elapsed*	*Cumulative Level*
12/23	29.0	97	1638
1/6	88.0	111	819
1/20	89.4	125	1,242
1/28	191.0	133	1,122
2/6	62.5	142	1,141
3/3	85.0	168	1,918
3/13	22.0	178	535
3/19	28.3	184	151
4/3	30.4	199	440
4/8	13.5	204	110
4/18	28.2	214	209
4/22	19.9	218	96
Total Cumulative Level			9,421

Assumptions:

- "Cumulative Level" represents the cumulative average for the interval between OVM readings
- Molecular weight of BTEX = 110
- A flow of standard air (0.075 lb/ft^3) at 80 cfm over 24 hrs weighs 8,640 lbs
- Specific gravity of gasoline = 0.74
- Water weighs 8.34 lb/gal, therefore gasoline weighs 6.17 lb/gal

- Blower flow rate is constant at 80 cfm
- Daily average of hydrocarbon vapor contained in air stream = 68.785 ppmv
- Mass concentration = ppmv concentration multiplied by ratio of 110/29 (molecular weight of BTEX/molecular weight of air) or 3.97 * 68.785 ppmv = 277.04645 ppm mass concentration = 0.000277 mass fraction of hydrocarbon

Based upon the above data and assumptions, the following calculations were made to determine product recovered from the soil vapor extraction system for this interval:

a) 0.000277 * 8640 lb/day of air = 2.39 lb/day of hydrocarbon * 135 days = 322.65 lb hydrocarbon removed

b) 322.65 lb / 6.17 lb/gal = 52.3 gallons of hydrocarbons removed 202.3 gallons to date

This number is not an exact figure, due to estimated variable values, but may be a guide in assessing how the remediation is progressing. Levels from the air stripper have been too low to calculate product removed (less than three gallons total). More accurate numbers can be obtained when the carbon is regenerated.

12. Projected Carbon Consumption

Projected carbon use will vary over the next 12 months. Assuming an 80 cfm constant flow rate through the soil vapor extraction system at an average of 20 ppm concentration, there will be 250 lbs. of hydrocarbons removed. This translates to between 18 and 30 carbon canisters used in one year, based on the use of virgin carbon at 170 lbs. per canister. If the existing regenerated carbon units are used in addition to all unused canisters stored at the site, 9 virgin and 12 - 26 regenerated units would be used, based on 4% to 6.4% adsorption by weight versus 5% to 8% for virgin carbon. Costs addressed below are based on these percentages. The adsorption rates are based on information from Brad Horn of Windham Environmental Associates, Jim Davidson of Carbtrol Corporation, and Steve LaRosa of Lincoln Applied Geology. Greg Simays of Filcorp Industries estimates the range of carbon efficiency for gasoline to be from 25% to 33%. Using this higher range, 4.5 to 6 canisters of virgin carbon would be used in a year. However, he disputes the concept that loss of efficiency by regeneration is generally limited to a one time loss of 20%. He has insisted that each successive regeneration results in further loss of efficiency.

13. Cost Benefit Analysis: Falmouth Incinerator vs. Granular Activated Carbon for Soil Vapor Extraction System

The cost of regeneration has been estimated by Lincoln Applied Geology to be approximately $0.85/lb. for carbon, which includes the cost of free product disposal and fuel costs, and assumes the treatment of wastewater on site.

There are 11 spent canisters awaiting regeneration and 5 regenerated units awaiting reuse along with the 9 virgin canisters at the site. The additional cost of regeneration would be from $1,011.50 to $3,034.50, assuming 7 to 21 canisters. If all canisters were eventually regenerated on site, the cost would be from $4,624 to $6,647, assuming 32 to 46 total regenerations. No new carbon would be purchased for the site and all the units could be used at another site after the final regeneration. Approximately $18,000 has been spent on carbon for the soil vapor extraction system to date, including unused canisters.

Another option for the carbon is a take-back program by Filcorp Industries for regenerative canisters. For $95/drum delivered to their site in Concord, NH, they will regenerate the carbon and sell back virgin canisters for $575 to $625 plus shipping, depending on the quantity purchased. They will also provide free pickup when delivering new canisters. There is a one time testing cost of $950 for a TCLP analysis of the first canister. Using this alternative and assuming first using the 5 regenerated canisters, the 11 units awaiting regeneration would be sent out and the 9 virgin units used. Between 4 and 16 new canisters would have to be purchased and disposed of. The total number of units to be disposed of would range from 29 to 41. Assuming $625/ drum (including shipping) for new canisters, purchase costs would range from $2,500 to $10,000. Disposal would range from $2,755 to $3,895 plus the $950 one time testing fee. Totals for this alternative are from $6,205 to $14,845 for disposal and equipment. Carbon change-out would be performed during site visits as necessary.

By contrast, the incinerator has cost up to $2,955.62 in electricity to run from 10/11/91 to 4/30/92. It will cost up to $4,713.84 to operate for the next 12 months. Added to this would be the potential cost of replacing the heating element (approximately $2,000, including labor) which could prematurely fail under lower level influent conditions.

The above electricity costs are derived using actual Central Vermont Power Service (CVPS) rates and the following equations:

7.2 kw/hr * 24 hr/day = 172.8 kwhr/day * 31 days = 5,356.8 kwhr/month

@ winter rates (Nov.-Feb.) or peak season
$0.06601/kwhr * 5,356.8 kwhr/month = $353.60/month + demand surcharge of $21.536/kw * 7.2 kw = $155.06/month = $508.66/month total

@ summer rates (Mar.-Oct.)
$0.05222/kwhr * 5356.8 kwhr/month = $279.73/month + demand surcharge of $7.663/kw * 7.2 kw = $55.17/month = $334.90/month total

The maximum cost of electricity from incinerator start-up on 10/11/91 through 4/30/92 is as follows: 2.75 months @ $334.90/month = $920.98 + 4 months @ $508.66/month = $2,034.64, for a yearly total of $2,955.62.

The maximum cost for one year of incinerator operation of electricity is as follows: 8 months @ $334.90/month = $2,679.20 + 4 months @ $508.66/month = $2,034.64, for a yearly total of $4,713.84.

In summary, regeneration on site may range from $4,624 to $6,647 for the year, while a carbon take-back plan may cost from $6,205 to $14,845, including new carbon purchase. This compares with $4,718.84/year for electricity to run the incinerator with a possible $2,000 added for replacement of a heating element.

14. Site Monitoring Plan

We recommend the following site monitoring schedule for the next 12 months:

- Weekly groundwater treatment and soil vapor extraction system checks and monitoring the Kearley building with OVM
- Biweekly sampling of groundwater system influent/effluent and priority water wells
- Monthly sampling of the full round of monitoring wells and water wells and monthly groundwater elevation readings

After three months, progress should be reevaluated to assure that the remediation needs of the site are being adequately addressed. At any time during the year, if there is a major change in conditions which necessitates adding or removing wells from the priority list, or any other action deemed appropriate, TEC will consult with VT DEC and Kearley representatives before making the changes.

15. Estimated Operating Expenses for the Next 12 Months for Existing Remedial Systems

Labor	
Field	$25,000.00
Administrative and Reports	15,000.00
Lab Analysis	24,000.00
Equipment	
OVM	2,000.00
Water Meter	600.00
Sampling Supplies	600.00
Carbon	6,000.00 *
Mileage	600.00
TOTAL ESTIMATE	$73,800.00 **

* Assumes use of carbon only for the soil vapor extraction system.
** Total does not include "Recommendations" beyond monitoring and monthly sampling.

Any changes in the proposed schedule would likely change one or more of the above items. We would be happy to update these costs if such a change takes place. The most variable number is likely the carbon, and the above number assumes using existing and regenerated carbon for the soil vapor extraction system.

16. Recommendations

A. TEC recommends the use of the Kearley well as a recovery well for contaminated groundwater. This recommendation is made for the following reasons:

- The currently used recovery well (RW-1) has consistently shown low contaminant levels while the Kearley well has shown consistently high levels.
- The Kearley well is located close to the initial leak area and therefore may capture a larger proportion of contamination before it is subjected to the dispersing effects of the groundwater.

- Drawdown in the area of the Kearley well will expose additional contaminated soil to the effects of nearby soil vapor extraction points (MW-1, -2, -3, and -4).

- The Kearley well is of sufficient diameter (6") to house the pumping unit and low water shutoff controls.

- Only minor modifications to the Kearley well will be needed, such as raising the well casing to ground level, surficial protection around the top of the well, and trenching for the water line from the well to the groundwater treatment shed.

B. In conjunction with Recommendation A, TEC recommends that the pump supplying the Kearley building be moved from the water supply well to the holding tank in the treatment system for the following reasons:

- If Recommendation A is agreed upon, a new water supply will be needed for the Kearley building.

- When this cleaner water supply is used inside the building, there will be less likelihood of VOC vapor impact to humans.

- The holding tank contains treated groundwater of close to or below drinking water standards.

- This option eliminates the need of a point-of-entry water treatment system.

- The only modifications for this system would be the trenching for the water line from the Kearley building to the holding tank and pump adjustments.

- This water would not be used for drinking.

C. TEC recommends that two additional wells be attached to the current soil vapor extraction system for the following reasons:

- The connection of MW-5 and MW-6 to the soil vapor extraction system should allow a much greater horizontal area of the vadose zone to be affected by the soil vapor extraction system.

- Pumping from the Kearley well should increase the vadose zone vertically in the area of both MW-5 and MW-6.

(GW)

- MW-5 and MW-6 have shown significant levels of contamination surpassed only by the wells already connected to the soil vapor extraction system.

- The trenching costs for connection of these two wells will be reduced since the necessary trenching equipment will already be at the site completing Recommendations A and B.

D. TEC recommends that two additional monitoring wells be installed in the area northeast (northeast side of Route 30 on property of the trailer park) of MW-6 and MW-9 for the following reasons:

- Both MW-6 and MW-9 represent the furthest downgradient wells containing significant (above drinking water standards) contamination. The impact or severity of contamination past these points is unknown.

- The two additional wells will help determine the movement and fate of contamination off-site.

- The installation of two monitoring wells can be completed in one day. If feasible and if time provides, a third well would be installed. (Note: Additional monitoring wells would be recommended for the area between the outlying wells (MW-9, -10, and -11) and the wells at the site (MW-5, MW-6, and RW-1) to better determine the extent of recovery well (RW-1) influence. However, site conditions (CVPS high tension wires) prevent this.

All modifications completed at the site will be re-evaluated after three months.

APPENDIX A

SOIL BORING/MONITORING WELL CONSTRUCTION LOGS

TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER MW-1 *

SHEET No. 1 of 1

CLIENT BARROWS COAL, CO.
PROJECT NAME KEARLEY FUEL
PROJECT # 210
WELL LOCATION SEE ENCLOSED MAP
DRILLING CO. ROY COLEMAN & SONS EXCAV.
LOG BY EOLIN BLAZEJ

DATE DRILLED 9/11/91
WELL TOP ELEV. NA
PVC ELEV. NA
GROUND ELEV. NA
DRILLER N.A

DRILLING METHOD EXCAVATED
TOTAL DEPTH OF WELL 12.0'
SCREEN DIA. 4" LENGTH 12.0'
RISER DIA. NA LENGTH N/A
SLOT SIZE 3/4" perforations

DEPTH (FEET)	SAMPLE No.	SAMPLE PEN./REC.	SAMPLE DEPTH (FT.)	SAMPLE BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING	EQUIPMENT INSTALLED
0					MEDIUM TO COARSE GRAVEL AND BOULDERS	SEE TANK PULL FORM	PERFORATED PIPE; NATIVE BACKFILL
10					END OF EXCAVATION * SERVES AS VENT POINT ONLY FROM TANK PIT EXCAVATION. PIPE INSTALLED DURING BACKFILLING.		12.0' (BOTTOM OF TANK PIT)

NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM), MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LB. HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER MW-2 SHEET No. 1 of 1

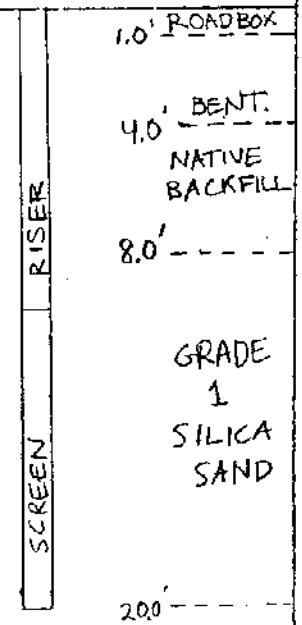
CLIENT BARROWS COAL, CO.
PROJECT NAME KEARLEY FUEL
PROJECT # 210
WELL LOCATION SEE ENCLOSED MAP
DRILLING CO. EROST, INC.
LOG BY COLIN BLAZEJ

DATE DRILLED 9/14/91
WELL TOP ELEV. 99.89'
PVC ELEV. 99.415'
GROUND ELEV. 99.89'
DRILLER JODY TOWNSEND

DRILLING METHOD AR
TOTAL DEPTH OF WELL 22.0'
SCREEN DIA. 2" LENGTH
RISER DIA. 2" LENGTH
SLOT SIZE 10

DEPTH (FT)	SAMPLE No.	PEN./ REC.	DEPTH (FT.)	BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING
5					MEDIUM TO COARSE SAND	ND
10						ND
15					BOULDERS	315 ppm
20					BOULDERS AND LITTLE MEDIUM TO FINE GRAVEL	
25					END OF BORING	
30						
35						
40						

EQUIPMENT INSTALLED



NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM) MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LB. HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER MW-3 SHEET No. 1 of 1

CLIENT BARROWS COAL, CO.
PROJECT NAME KEARLEY FUEL
PROJECT # 210
WELL LOCATION SEE ENCLOSED MAP
DRILLING CO. FROST, INC.
LOG BY COLIN BLAZEJ

DATE DRILLED 9/14/91
WELL TOP ELEV. 99.24'
PVC ELEV. 98.81'
GROUND ELEV. 99.24'
DRILLER JODY TOWNSEND

DRILLING METHOD AR
TOTAL DEPTH OF WELL 18.5'
SCREEN DIA. 2" LENGTH 10.0'
RISER DIA. 2" LENGTH 8.5'
SLOT SIZE 10

DEPTH (FT)	SAMPLE No.	SAMPLE PEN/REC.	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING	EQUIPMENT INSTALLED
0							1.0' ROAD BOX
					MEDIUM TO COARSE SAND	ND	4.0' BENT. NATIVE BACKFILL
5						ND	7.0' RISER
10					BOULDERS AND LITTLE MEDIUM TO COARSE GRAVEL	ND	GRADE 1 SILICA SAND
15						295 ppm	SCREEN 18.5'
					END OF BORING		
20							
25							
30							
35							
40							

NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM), MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LB. HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER MW-4 SHEET No. 1 of 1

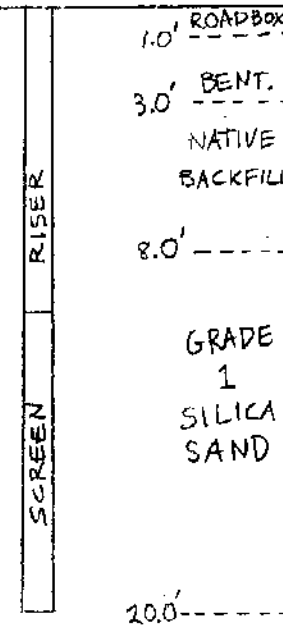
CLIENT BARROWS COAL, CO.
PROJECT NAME KEARLEY FUEL
PROJECT # 210
WELL LOCATION SEE ENCLOSED MAP
DRILLING CO. FROST, INC.
LOG BY COLIN BLAZEJ

DATE DRILLED 9/16/91
WELL TOP ELEV. 98.175'
PVC ELEV. 97.80'
GROUND ELEV. 98.175'
DRILLER JODY TOWNSEND

DRILLING METHOD AR
TOTAL DEPTH OF WELL 20.0'
SCREEN DIA. 2" LENGTH 10.0'
RISER DIA. 2" LENGTH 10.0'
SLOT SIZE 10

DEPTH (FT)	SAMPLE No.	SAMPLE PEN/REC.	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING
5					MEDIUM TO COARSE SAND	ND
						ND
10					MEDIUM TO COARSE SAND AND MEDIUM TO COARSE GRAVEL	ND
15						145 ppm
20					END OF BORING	
25						
30						
35						
40						

EQUIPMENT INSTALLED



NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM) MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LB. HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER MW-5 SHEET No. 1 of 1

CLIENT BARROWS COAL, CO. DATE DRILLED 9/14/91 DRILLING METHOD AR
PROJECT NAME KEARLEY FUEL WELL TOP ELEV. 96.68' TOTAL DEPTH OF WELL 19.0'
PROJECT # 210 PVC ELEV. 96.2775' SCREEN DIA. 2" LENGTH 10.0'
WELL LOCATION SEE ENCLOSED MAP GROUND ELEV. 96.68' RISER DIA. 2" LENGTH 9.0'
DRILLING CO. FROST, INC. DRILLER JODY TOWNSEND SLOT SIZE .10
LOG BY COLIN BLAZEJ

HNu (PPM)	SAMPLE No.	PEN/REC	DEPTH (FT)	BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING
					MEDIUM TO COARSE SAND AND FINE GRAVEL	ND
					BOULDERS	ND
					BOULDERS AND SOME MEDIUM TO COARSE GRAVEL	ND
						ND
					BOULDERS	ND
					MEDIUM TO COARSE GRAVEL	ND
					END OF BORING	

EQUIPMENT INSTALLED: 1.0' ROAD BOX; BENT. 4.0'; RISER; NATIVE BACKFILL 8.0'; SCREEN; GRADE; SILICA SAND; 19.0'

NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM), MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LB. HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER MW-6 SHEET No. 1 of 1

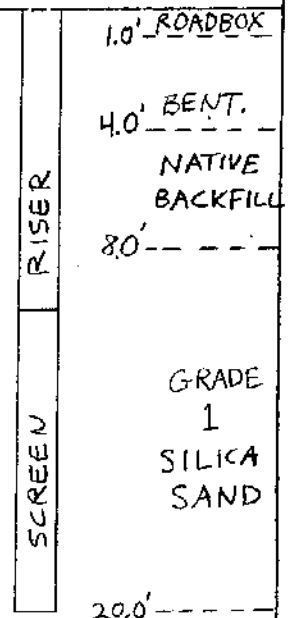
CLIENT BARROWS COAL CO.
PROJECT NAME KEARLEY FUEL
PROJECT # 210
WELL LOCATION SEE ENCLOSED MAP
DRILLING CO. FROST, INC.
LOG BY COLIN BLAZEJ

DATE DRILLED 9/16/91
WELL TOP ELEV. 96.76'
PVC ELEV. 96.34'
GROUND ELEV. 96.76'
DRILLER JODY TOWNSEND

DRILLING METHOD AR
TOTAL DEPTH OF WELL 20.0'
SCREEN DIA. 2" LENGTH 10.0'
RISER DIA. 2" LENGTH 10.0'
SLOT SIZE 10

DEPTH (FEET)	SAMPLE No.	SAMPLE PEN/REC	SAMPLE DEPTH (FT)	SAMPLE BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING
					MEDIUM TO COARSE SAND AND FINE GRAVEL	ND
5					BOULDERS AND LITTLE MEDIUM TO COARSE GRAVEL	ND
					COBBLES AND SOME MEDIUM TO COARSE GRAVEL	9.0 ppm
10					BOULDERS AND LITTLE MEDIUM TO COARSE GRAVEL	5.0 ppm
15					BOULDERS AND COARSE GRAVEL	7.0 ppm
20					END OF BORING	
25						
30						
35						
40						

EQUIPMENT INSTALLED



NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM) MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LBL HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

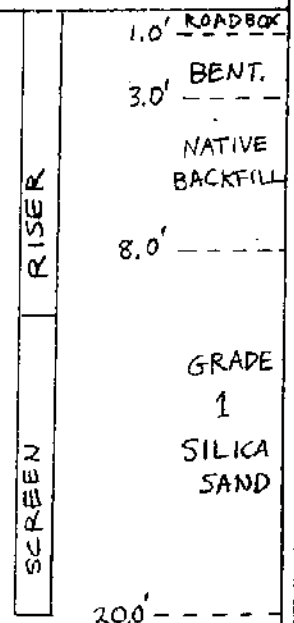
TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER MW-7 SHEET No. 1 of 1

CLIENT BARROWS COAL, CO. DATE DRILLED 9/16/91 DRILLING METHOD AR
PROJECT NAME KEARLEY FUEL WELL TOP ELEV. 100.00' TOTAL DEPTH OF WELL 20.0'
PROJECT # 210 PVC ELEV. 99.60' SCREEN DIA. 2" LENGTH 10.0'
WELL LOCATION SEE ENCLOSED MAP GROUND ELEV. 100.00' RISER DIA. 2" LENGTH 10.0'
DRILLING CO. FROST, INC. DRILLER JODY TOWNSEND SLOT SIZE .10
LOG BY COLIN BLAZEJ

DEPTH (FEET)	SAMPLE No.	SAMPLE PEN/REC.	SAMPLE DEPTH (FT.)	SAMPLE BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING
0					COBBLES AND MEDIUM TO COARSE GRAVEL	ND
5						ND
10					BOULDERS AND LITTLE MEDIUM TO COARSE GRAVEL	ND
						24ppm
15						ND
					COBBLES AND MEDIUM TO COARSE GRAVEL	ND
20					END OF BORING	
25						
30						
35						
40						

EQUIPMENT INSTALLED



NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM), MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LB. HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

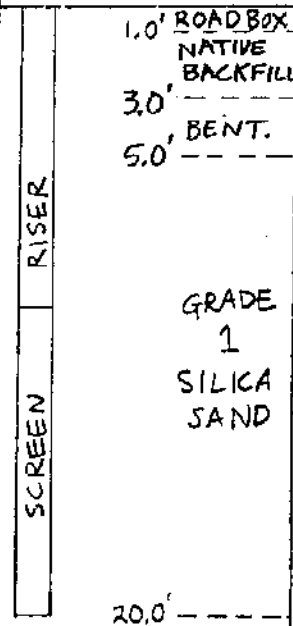
TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER MW-8 SHEET No. 1 of 1

CLIENT BARROWS COAL, CO. DATE DRILLED 9/26/91 DRILLING METHOD AR
PROJECT NAME KEARLEY FUEL WELL TOP ELEV. 99.92' TOTAL DEPTH OF WELL 20.0'
PROJECT # 210 PVC ELEV. 99.635' SCREEN DIA. 2" LENGTH 10.0'
WELL LOCATION SEE ENCLOSED MAP GROUND ELEV. 99.92 RISER DIA. 2" LENGTH 10.0'
DRILLING CO. FROST, INC. DRILLER JODY TOWNSEND SLOT SIZE 10
LOG BY COLIN BLAZEK

HNU (ppm)	SAMPLE No.	SAMPLE PEN./REC.	SAMPLE DEPTH (FT.)	SAMPLE BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING
					MEDIUM TO COARSE SAND AND FINE GRAVEL	ND
					COBBLES AND MEDIUM TO COARSE GRAVEL	ND
					BOULDERS	ND
					BOULDERS AND SOME COARSE GRAVEL	ND
					END OF BORING	

EQUIPMENT INSTALLED



NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM) MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LB. HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

TRI-S ENVIRONMENTAL CONSULTING
SOIL BORING / MONITORING WELL LOG

WELL NUMBER RW-1 SHEET No. 1 of 1

CLIENT BARROWS COAL CO.
PROJECT NAME KEARLEY FUEL
PROJECT # 210
WELL LOCATION SEE ENCLOSED MAP
DRILLING CO. FROST, INC.
LOG BY COLIN BLAZEJ

DATE DRILLED 9/27-9/30/91
WELL TOP ELEV. 99.27'
PVC ELEV. ____
GROUND ELEV. ____
DRILLER JODY TOWNSEND

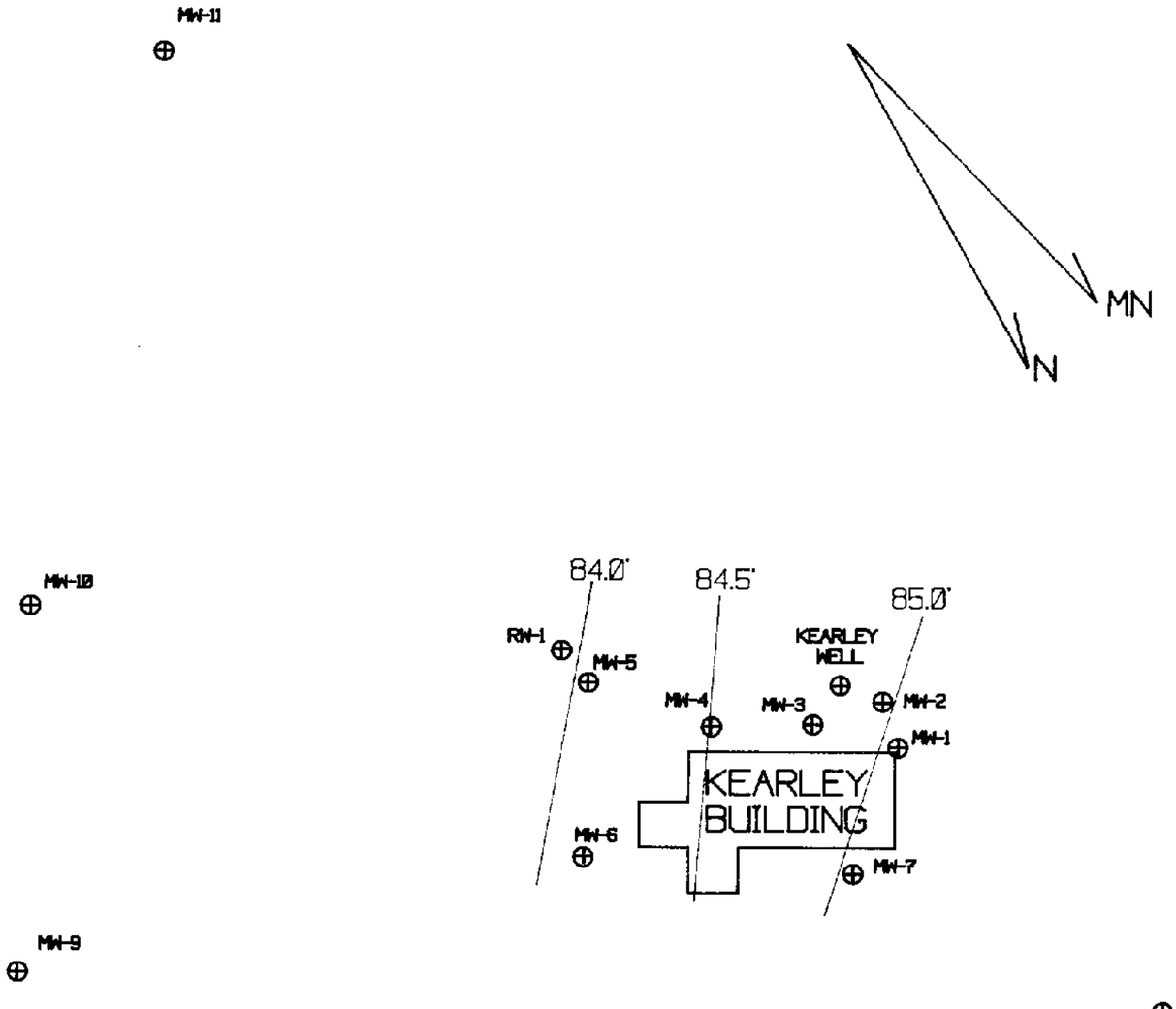
DRILLING METHOD AR
TOTAL DEPTH OF WELL 30.0'
SCREEN DIA. 8" LENGTH 20.0'
RISER DIA. 8" LENGTH 10.0'
SLOT SIZE 10'

HNu/OVM	SAMPLE No.	PEN/REC.	DEPTH (FT.)	BLOWS/6"	FIELD CLASSIFICATION AND REMARKS	FIELD TESTING	EQUIPMENT INSTALLED
					COARSE GRAVEL		BENT. & PELTONITE 6.0'
					BOULDERS AND COARSE GRAVEL		RISER
					BOULDERS		GRADE 1 SILICA SAND
					MEDIUM TO COARSE GRAVEL		SCREEN
					END OF BORING		30.0'

NOTES:
1. FIELD TESTING PERFORMED USING A THERMO ENVIRONMENTAL INSTRUMENTS INC. ORGANIC VAPOR METER (OVM), MODEL 580B. METER RESPONSE IN PPM.
2. ND INDICATES NON-DETECTABLE CONTAMINANT CONCENTRATIONS ON OVM.
3. SAMPLES COLLECTED USING A SPLIT SPOON SAMPLER UNLESS OTHERWISE INDICATED.
4. SPLIT SPOON SAMPLER HAS A 2" DIAMETER AND IS DRIVEN USING A 140 LBL HAMMER FALLING 30 INCHES
5. HSA = HOLLOW STEM AUGER
   AR = AIR ROTARY

APPENDIX B

GROUNDWATER POTENTIOMETRIC MAPS



GROUNDWATER POTENTIOMETRIC MAP FOR 9/23/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

84.5' GROUNDWATER CONTOUR AT 84.5 FEET (CONTOUR INTERVAL OF 0.5 FEET)

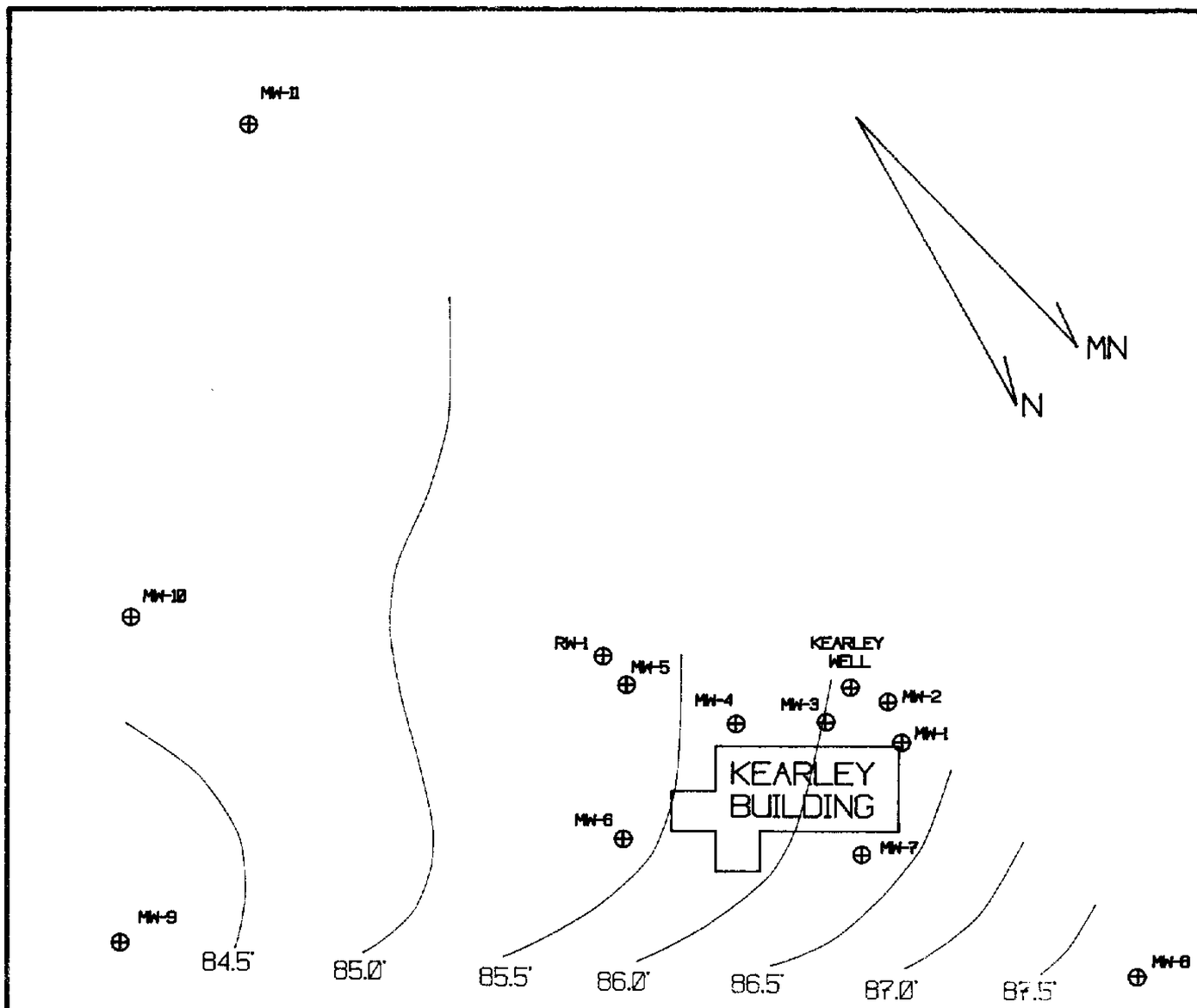
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	84.98	MW-6	84.09	MW-10	——
MW-3	84.86	MW-7	85.06	MW-11	——
MW-4	——	MW-8	——	RW-1	——
MW-5	84.86	MW-9	——		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 9/30/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

87.5' GROUNDWATER CONTOUR AT 87.5 FEET (CONTOUR INTERVAL OF 0.5 FEET)

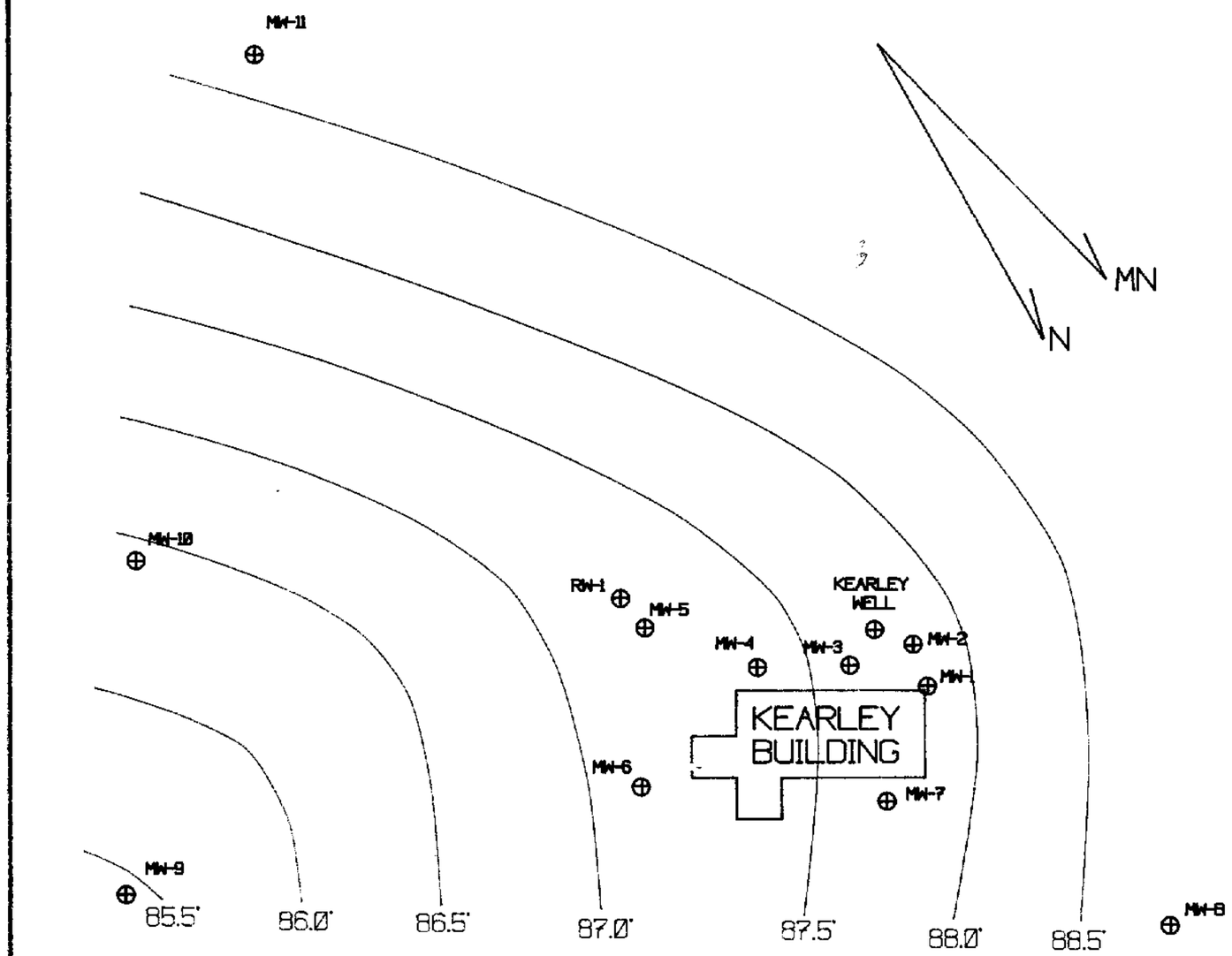
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	86.09	MW-6	85.38	MW-10	84.77
MW-3	86.01	MW-7	86.31	MW-11	84.56
MW-4	——	MW-8	87.87	RW-1	——
MW-5	85.38	MW-9	84.10		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 10/7/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

86.0' GROUNDWATER CONTOUR AT 86.0 FEET (CONTOUR INTERVAL OF 0.5 FEET)

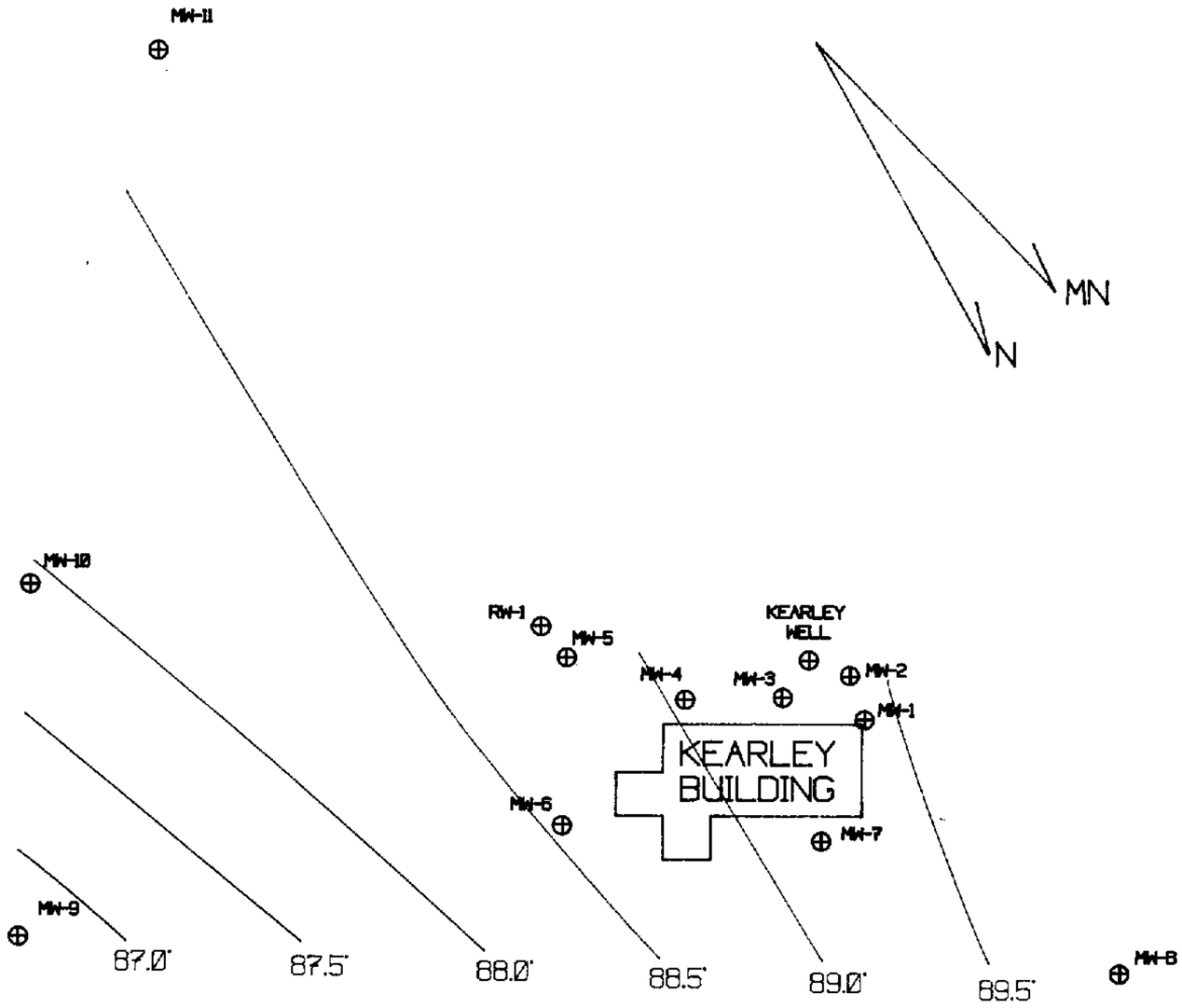
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	87.61	MW-6	87.19	MW-10	86.41
MW-3	87.54	MW-7	87.57	MW-11	88.73
MW-4	87.38	MW-8	88.92	RW-1	87.18
MW-5	87.14	MW-9	85.43		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 10/14/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

⊕ MW-10 MONITORING WELL MW-10

87.0' GROUNDWATER CONTOUR AT 87.0 FEET (CONTOUR INTERVAL OF 0.5 FEET)

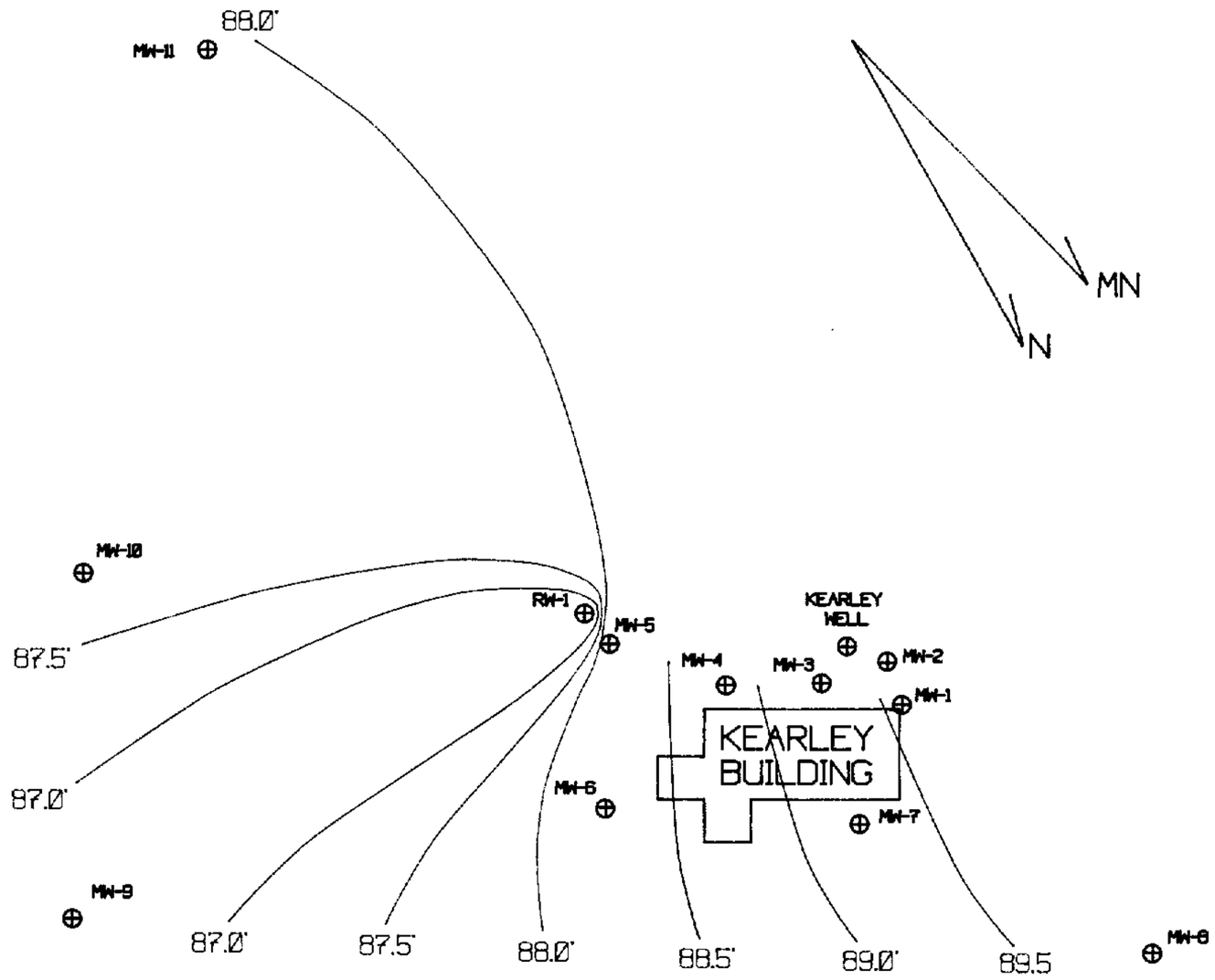
MONITORING WELL GROUNDWATER ELEVATIONS
(IN FEET)

MW-2	89.42	MW-6	88.54	MW-10	87.98
MW-3	89.03	MW-7	89.20	MW-11	88.69
MW-4	89.02	MW-8	89.84	RW-1	88.86
MW-5	88.80	MW-9	86.69		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 10/21/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

⊕ MW-10 — MONITORING WELL MW-10

89.0' — GROUNDWATER CONTOUR AT 89.0 FEET (CONTOUR INTERVAL OF 0.5 FEET)

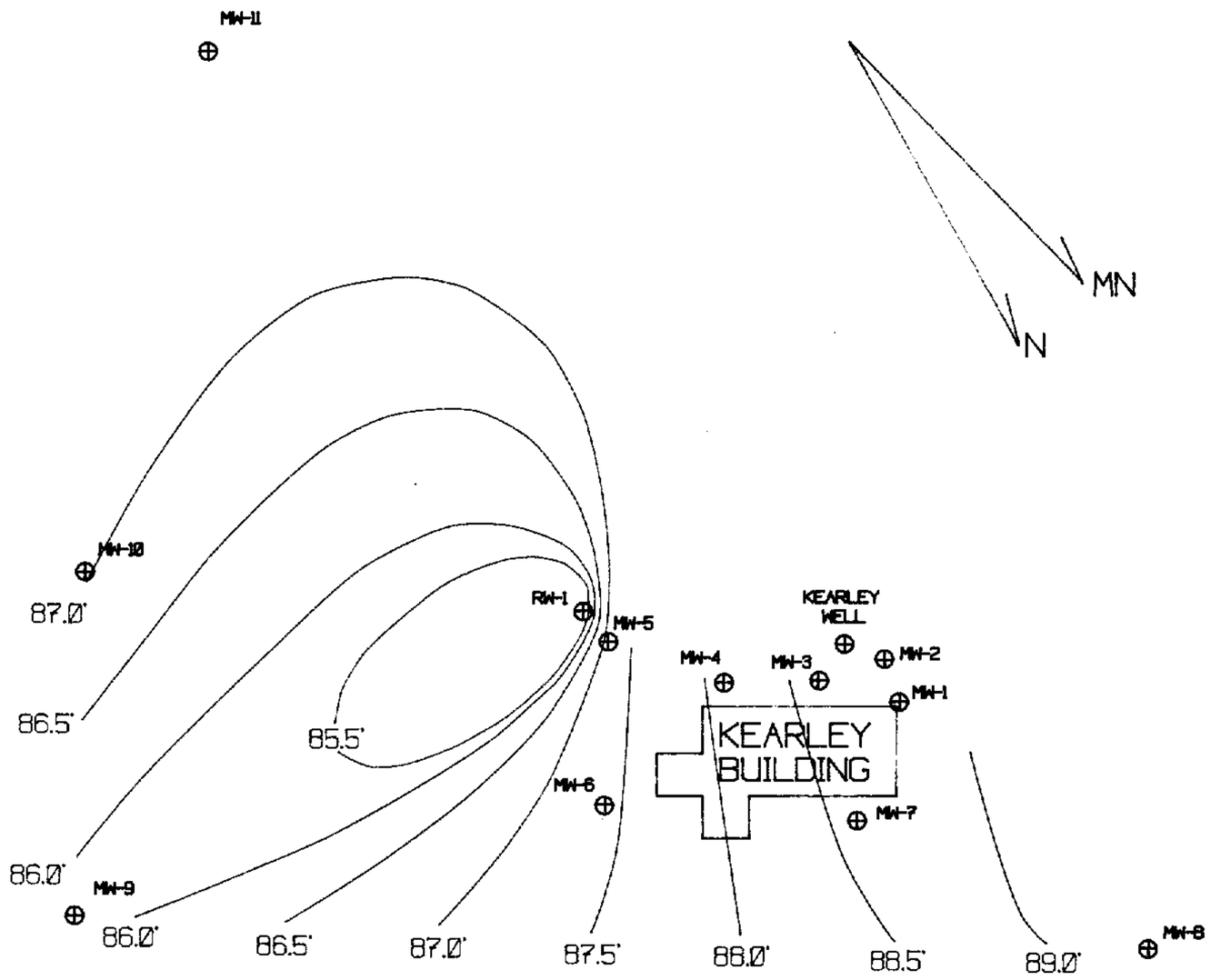
MONITORING WELL GROUNDWATER ELEVATIONS
(IN FEET)

MW-2	89.57	MW-6	88.23	MW-10	87.77
MW-3	89.41	MW-7	89.27	MW-11	87.99
MW-4	88.80	MW-8	89.95	RW-1	86.76
MW-5	88.20	MW-9	86.50		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 10/28/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

⊕ MW-10 MONITORING WELL MW-10

87.5' GROUNDWATER CONTOUR AT 87.5 FEET (CONTOUR INTERVAL OF 0.5 FEET)

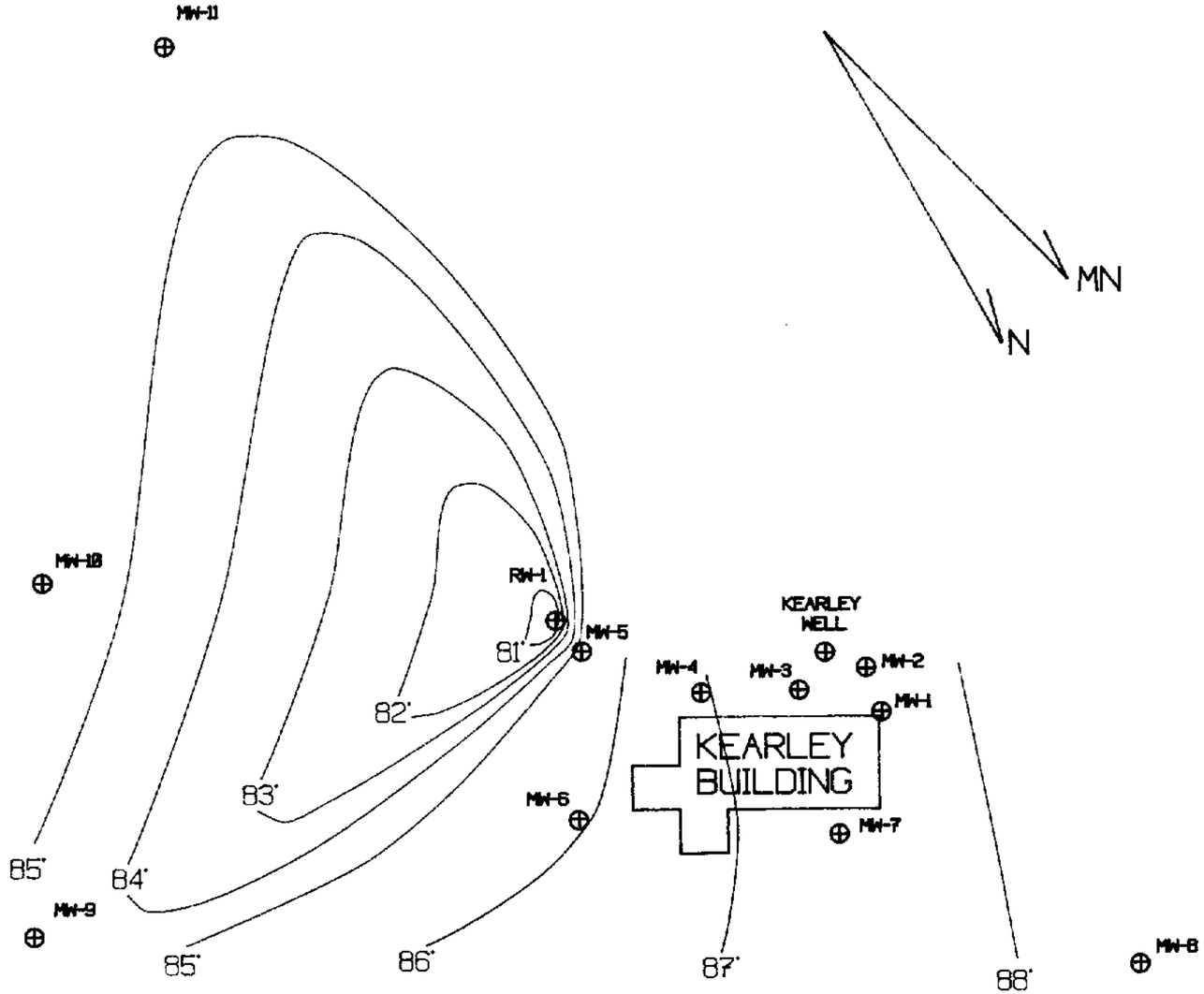
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	88.84	MW-6	87.44	MW-10	87.04
MW-3	88.67	MW-7	88.62	MW-11	87.09
MW-4	88.12	MW-8	89.34	RW-1	86.25
MW-5	87.34	MW-9	85.79		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 11/4/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

⊕ MW-10 — MONITORING WELL MW-10

82' — GROUNDWATER CONTOUR AT 82 FEET (CONTOUR INTERVAL OF 1 FOOT)

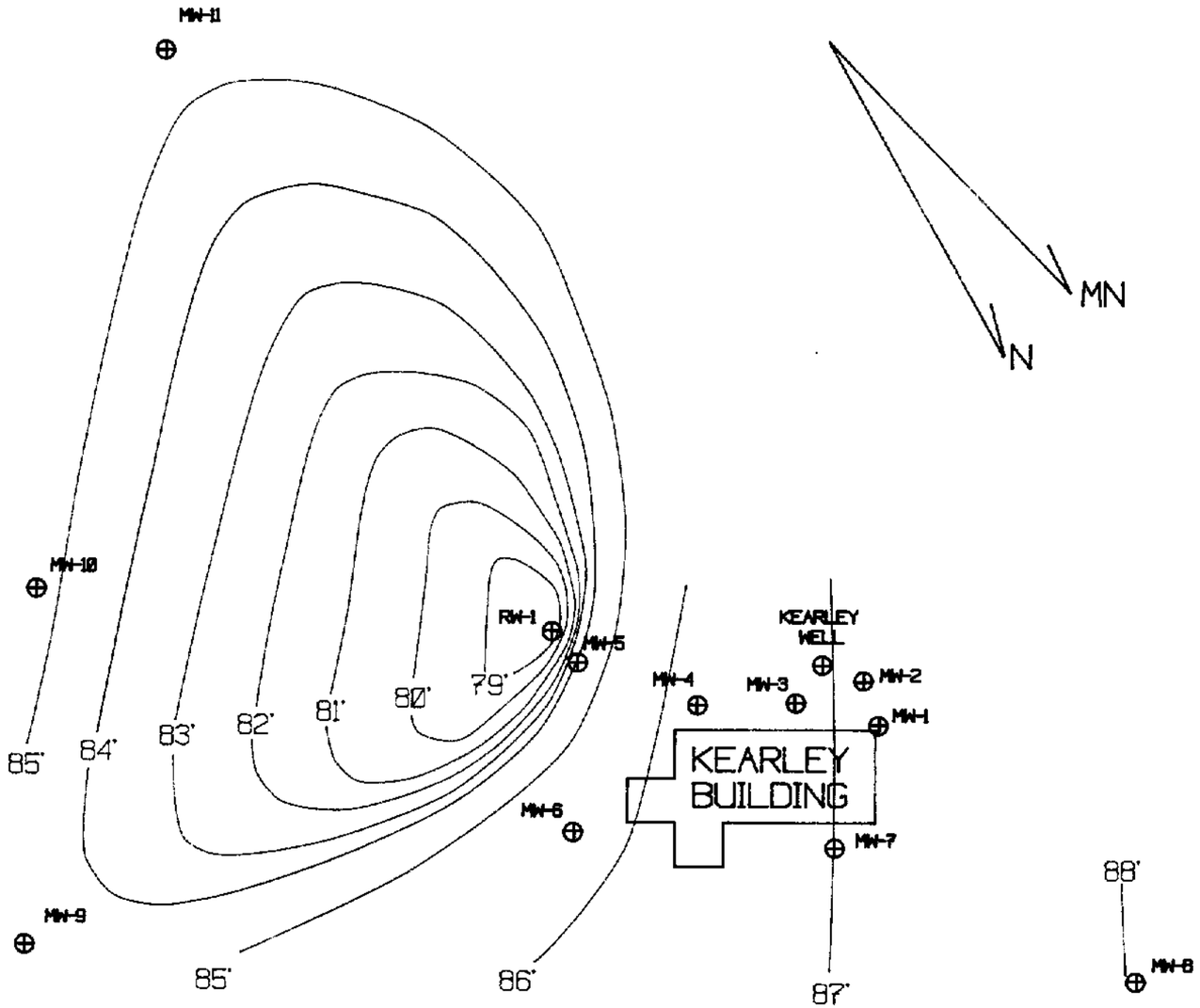
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	87.57	MW-6	85.97	MW-10	85.84
MW-3	87.42	MW-7	87.46	MW-11	85.94
MW-4	86.99	MW-8	88.42	RW-1	88.77
MW-5	85.33	MW-9	84.69		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 11/11/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

⊕ MW-10 MONITORING WELL MW-10

81' GROUNDWATER CONTOUR AT 81 FEET (CONTOUR INTERVAL OF 1 FOOT)

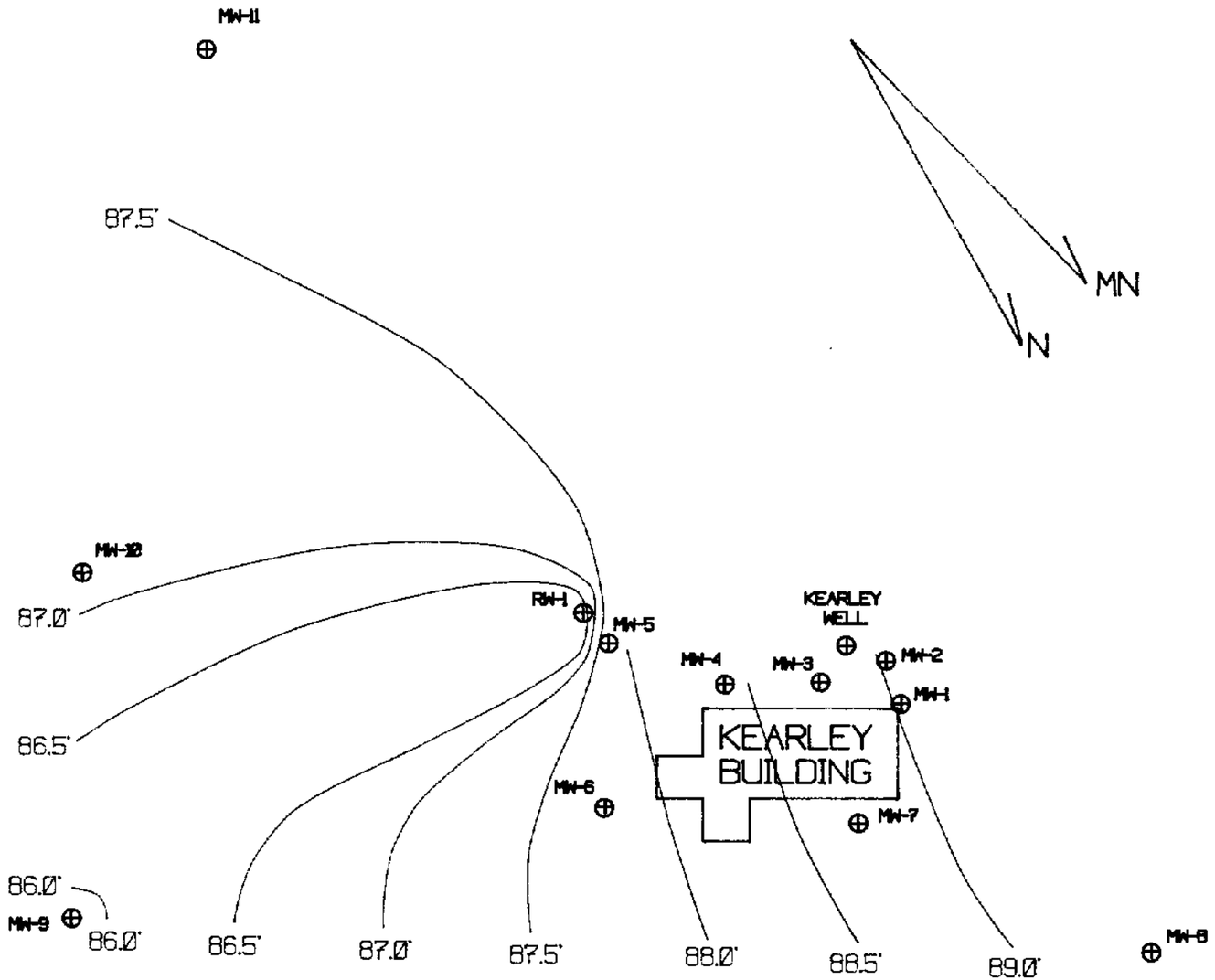
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	87.13	MW-6	85.38	MW-10	85.31
MW-3	86.85	MW-7	87.00	MW-11	85.46
MW-4	86.48	MW-8	88.04	RW-1	78.27
MW-5	84.54	MW-9	84.27		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 12/9/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

87.0' GROUNDWATER CONTOUR AT 87.0 FEET (CONTOUR INTERVAL OF 0.5 FEET)

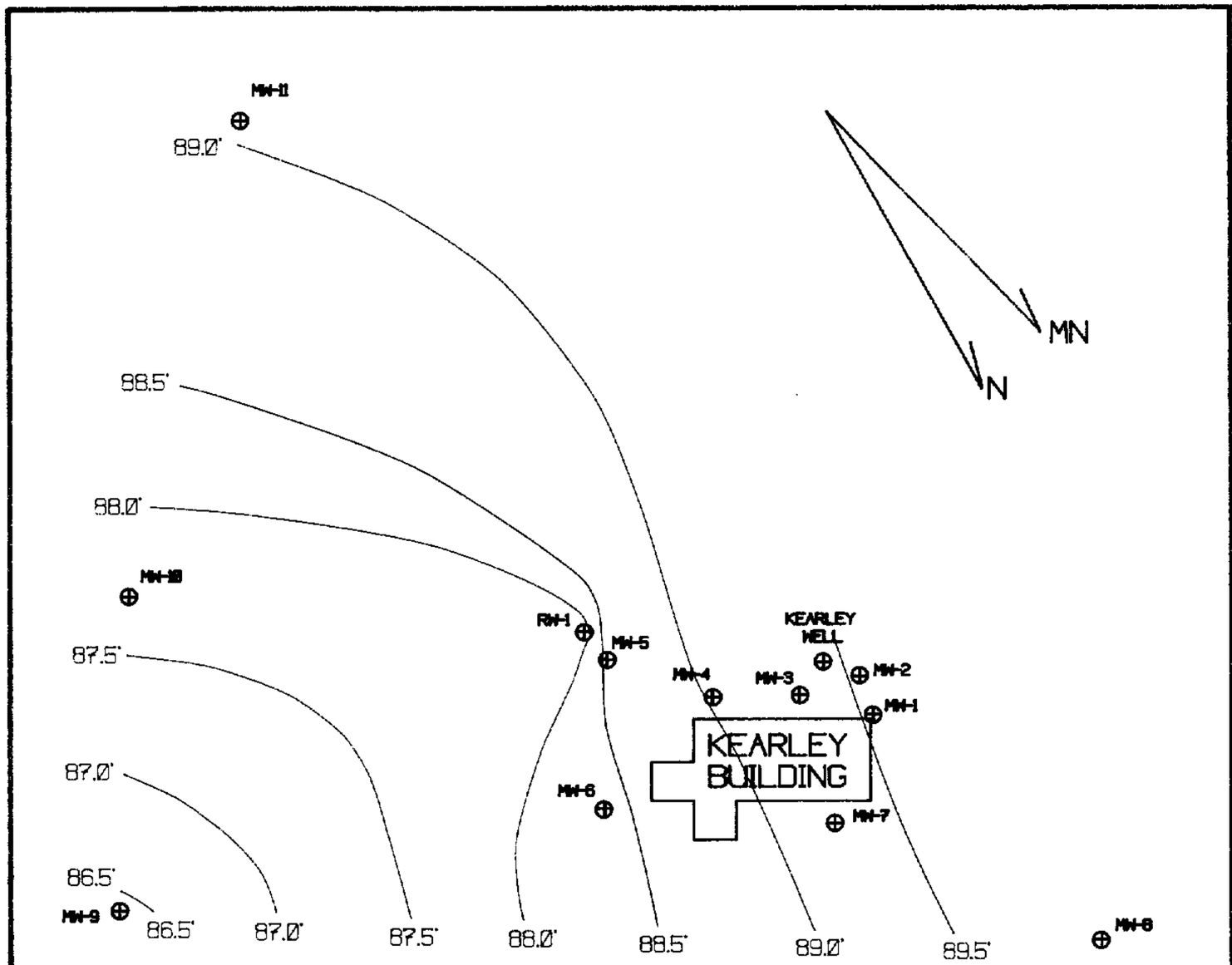
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	89.03	MW-6	87.76	MW-10	87.19
MW-3	88.87	MW-7	88.75	MW-11	87.64
MW-4	88.36	MW-8	89.46	RW-1	86.27
MW-5	87.92	MW-9	85.91		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
214 MAIN STREET
BRATTLEBORO, VT 05301



GROUNDWATER POTENTIOMETRIC MAP FOR 1/6/92

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 MONITORING WELL MW-10

87.0' GROUNDWATER CONTOUR AT 87.0 FEET (CONTOUR INTERVAL OF 0.5 FEET)

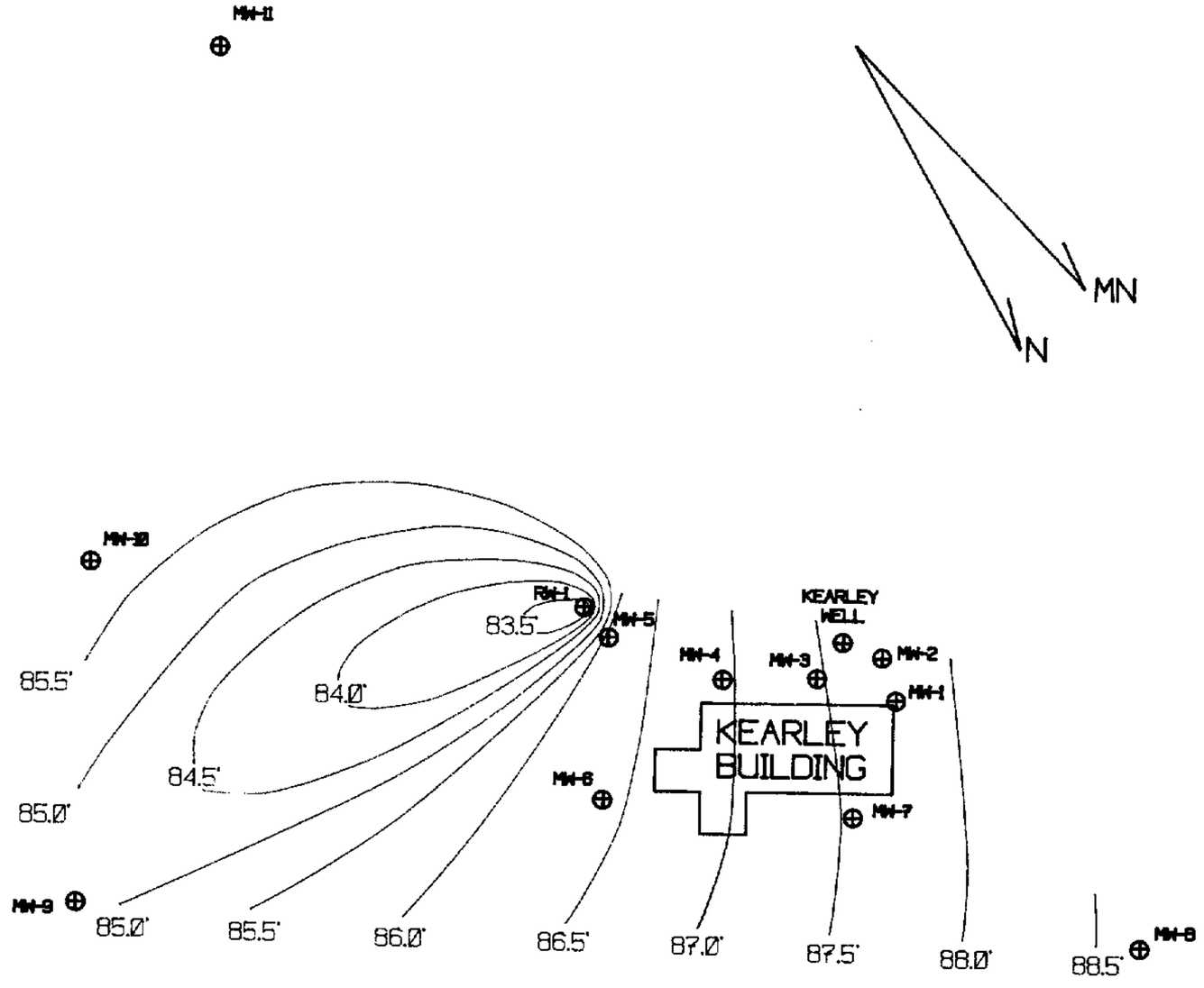
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	88.68	MW-6	88.35	MW-10	87.76
MW-3	88.87	MW-7	89.26	MW-11	89.02
MW-4	88.85	MW-8	88.98	RW-1	87.95
MW-5	88.63	MW-9	86.41		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



GROUNDWATER POTENTIOMETRIC MAP FOR 2/6/92

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

86.0' GROUNDWATER CONTOUR AT 86.0 FEET (CONTOUR INTERVAL OF 0.5 FEET)

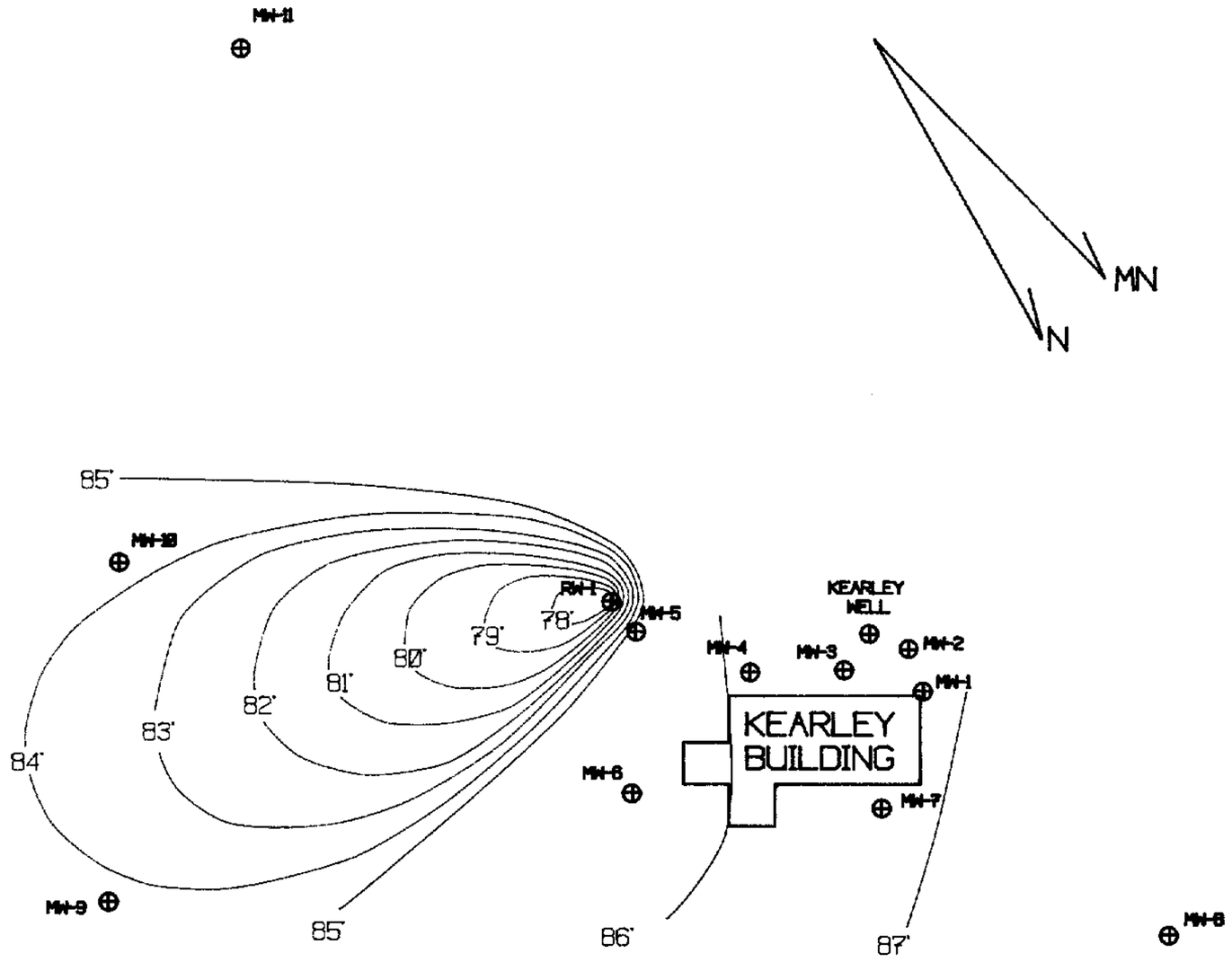
MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	——	MW-6	86.34	MW-10	85.84
MW-3	87.48	MW-7	87.55	MW-11	85.81
MW-4	——	MW-8	88.67	RW-1	83.39
MW-5	86.28	MW-9	84.86		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



GROUNDWATER POTENTIOMETRIC MAP FOR 3/3/92

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

85' GROUNDWATER CONTOUR AT 85 FEET
(CONTOUR INTERVAL OF 1 FOOT)

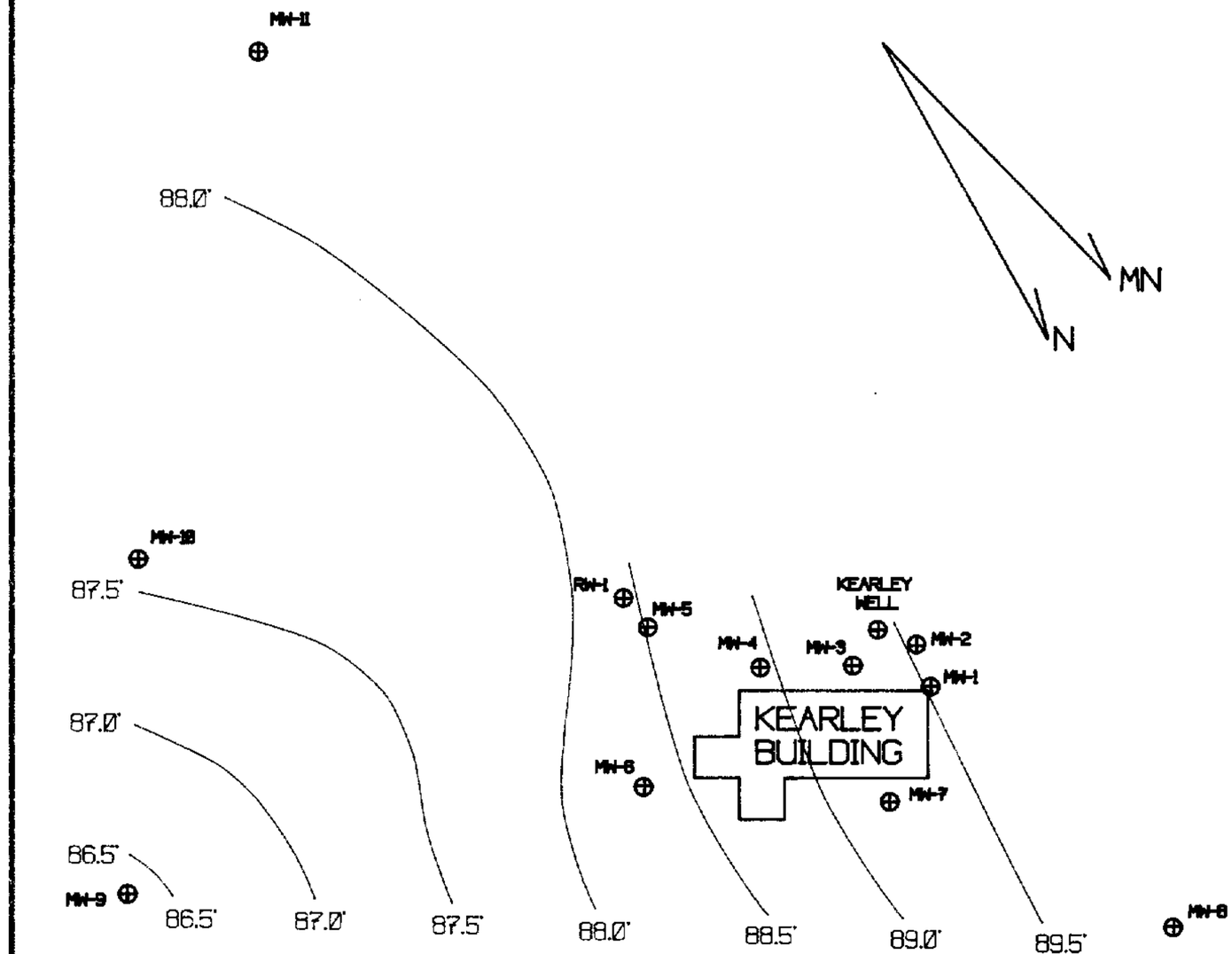
MONITORING WELL GROUNDWATER ELEVATIONS
(IN FEET)

MW-2	86.75	MW-6	85.43	MW-10	85.09
MW-3	86.56	MW-7	86.77	MW-11	85.03
MW-4	86.28	MW-8	87.93	RW-1	77.86
MW-5	85.18	MW-9	84.19		

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



GROUNDWATER POTENTIOMETRIC MAP FOR 4/8/92

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

89.0' GROUNDWATER CONTOUR AT 89.0 FEET (CONTOUR INTERVAL OF 0.5 FEET)

MONITORING WELL GROUNDWATER ELEVATIONS (IN FEET)

MW-2	89.53	MW-6	88.34	MW-10	87.83
MW-3	89.35	MW-7	89.24	MW-11	88.15
MW-4	88.95	MW-8	89.87	RW-1	88.84
MW-5	88.62	MW-9	88.35		

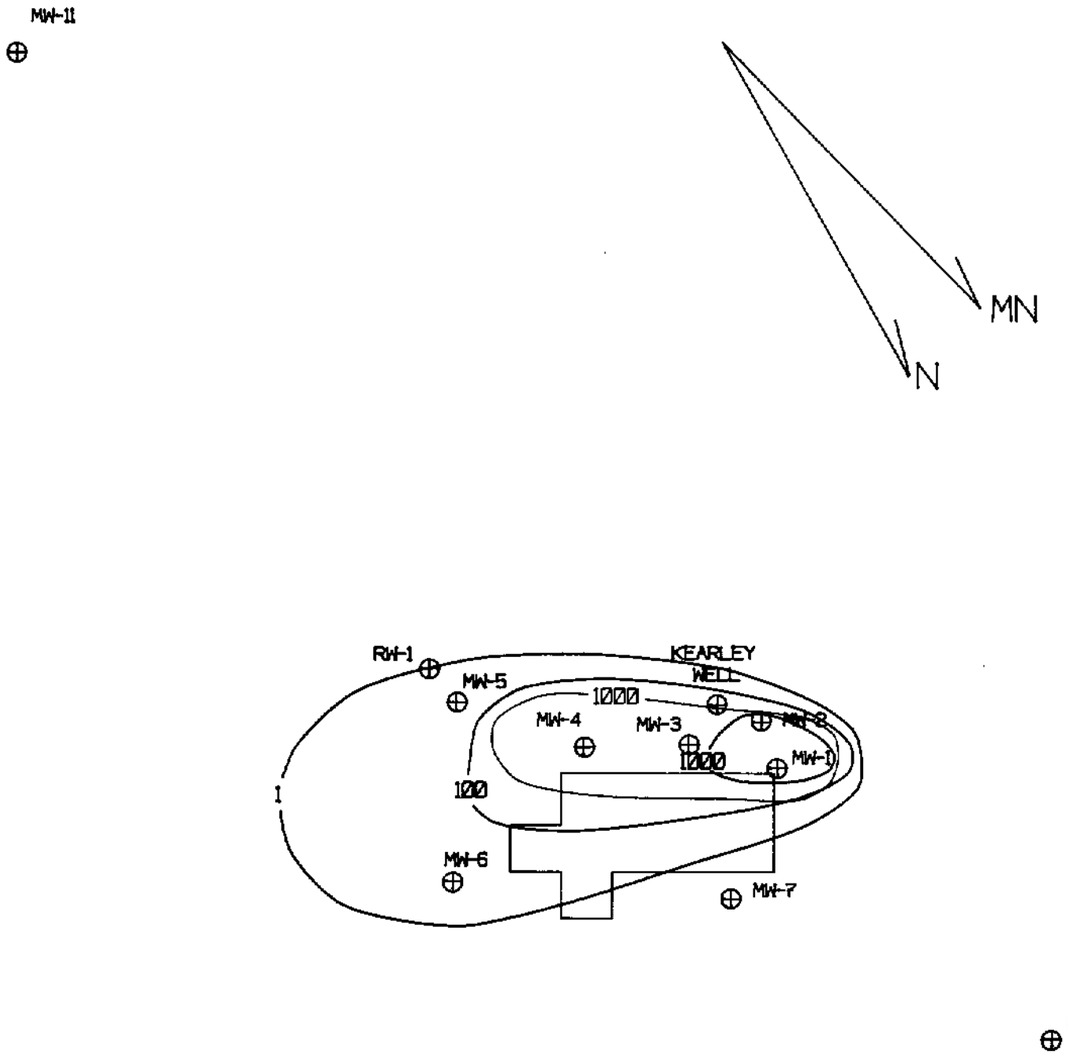
SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302

APPENDIX C

ISOCONCENTRATION MAPS



BTEX AND MTBE ISOCONCENTRATION MAP FOR 9/19/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	11200	1300
MW-3	3563	840
MW-4	PROD	PROD
MW-5	ND	3.2
MW-6	ND	32
MW-7	ND	ND
MW-8	----	----
MW-9	----	----
MW-10	----	----
MW-11	----	----
RW-1	----	----

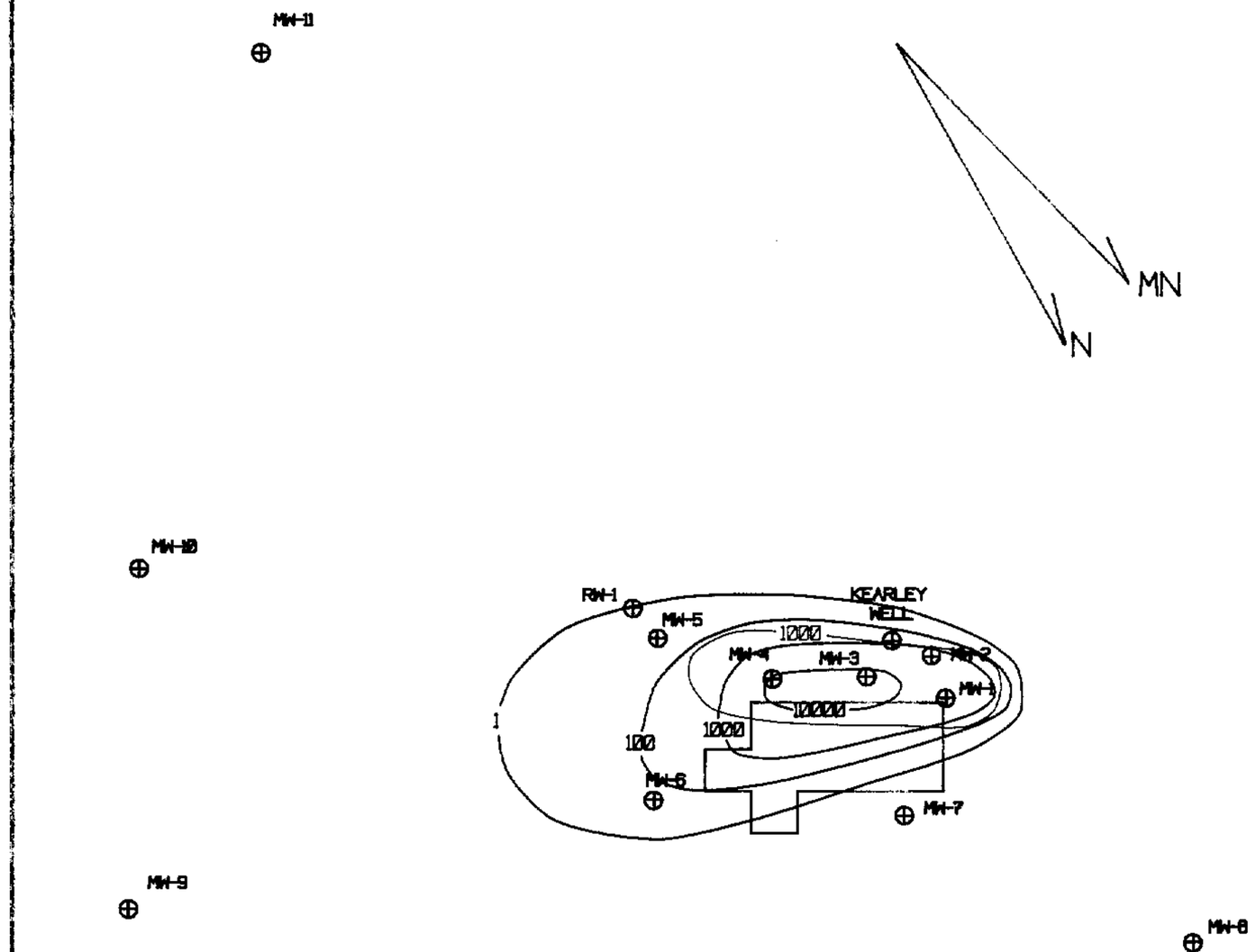
SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302

BTEX AND MTBE ISOCONCENTRATION MAP FOR 9/24/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT



LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

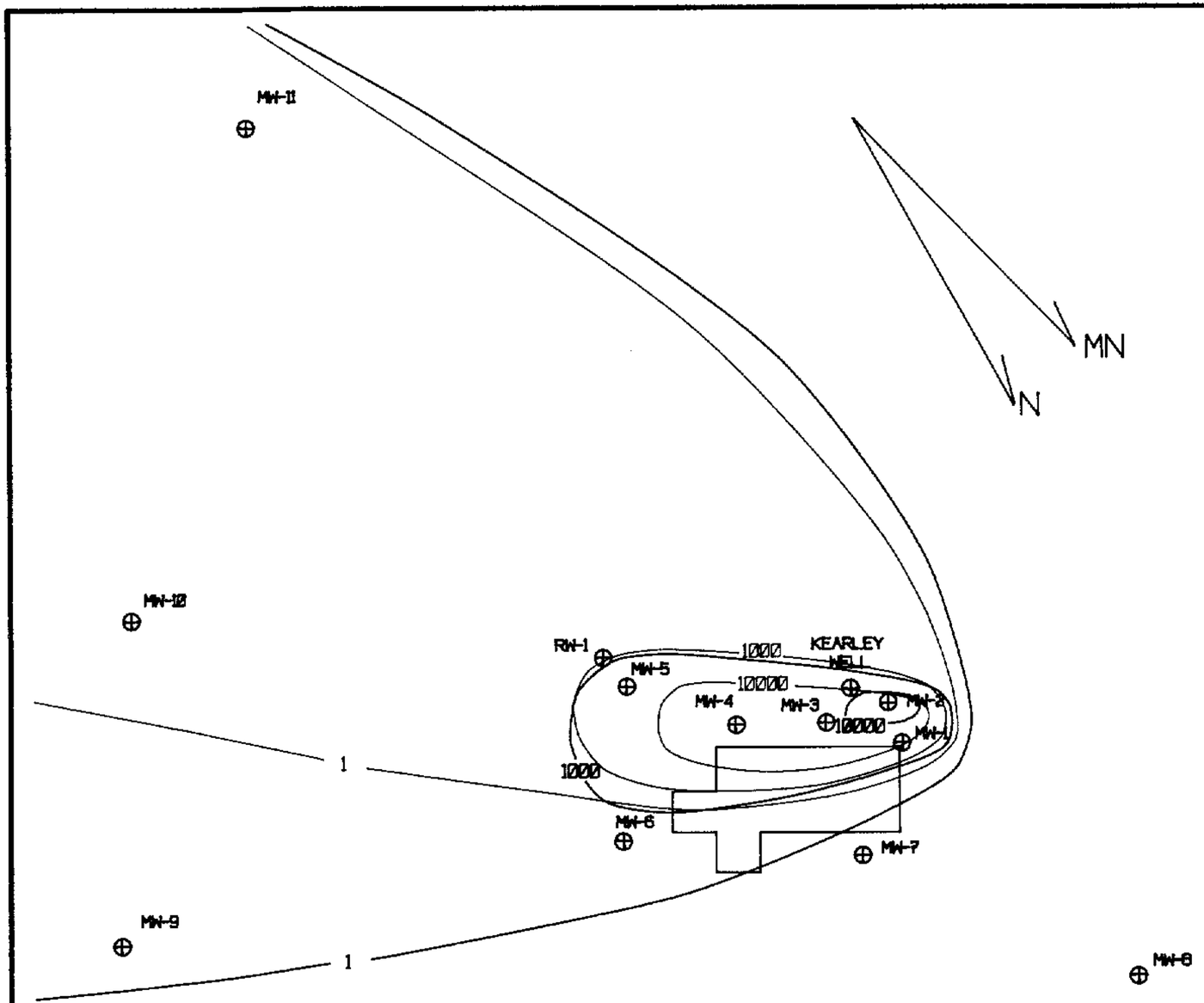
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	5140	1300
MW-3	21640	10000
MW-4	PROD	PROD
MW-5	ND	14
MW-6	ND	96
MW-7	ND	ND
MW-8	-----	-----
MW-9	-----	-----
MW-10	-----	-----
MW-11	-----	-----
RW-1	-----	-----

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 9/30/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

1000 MTBE ISOCONCENTRATION CONTOUR OF 1000 PPB

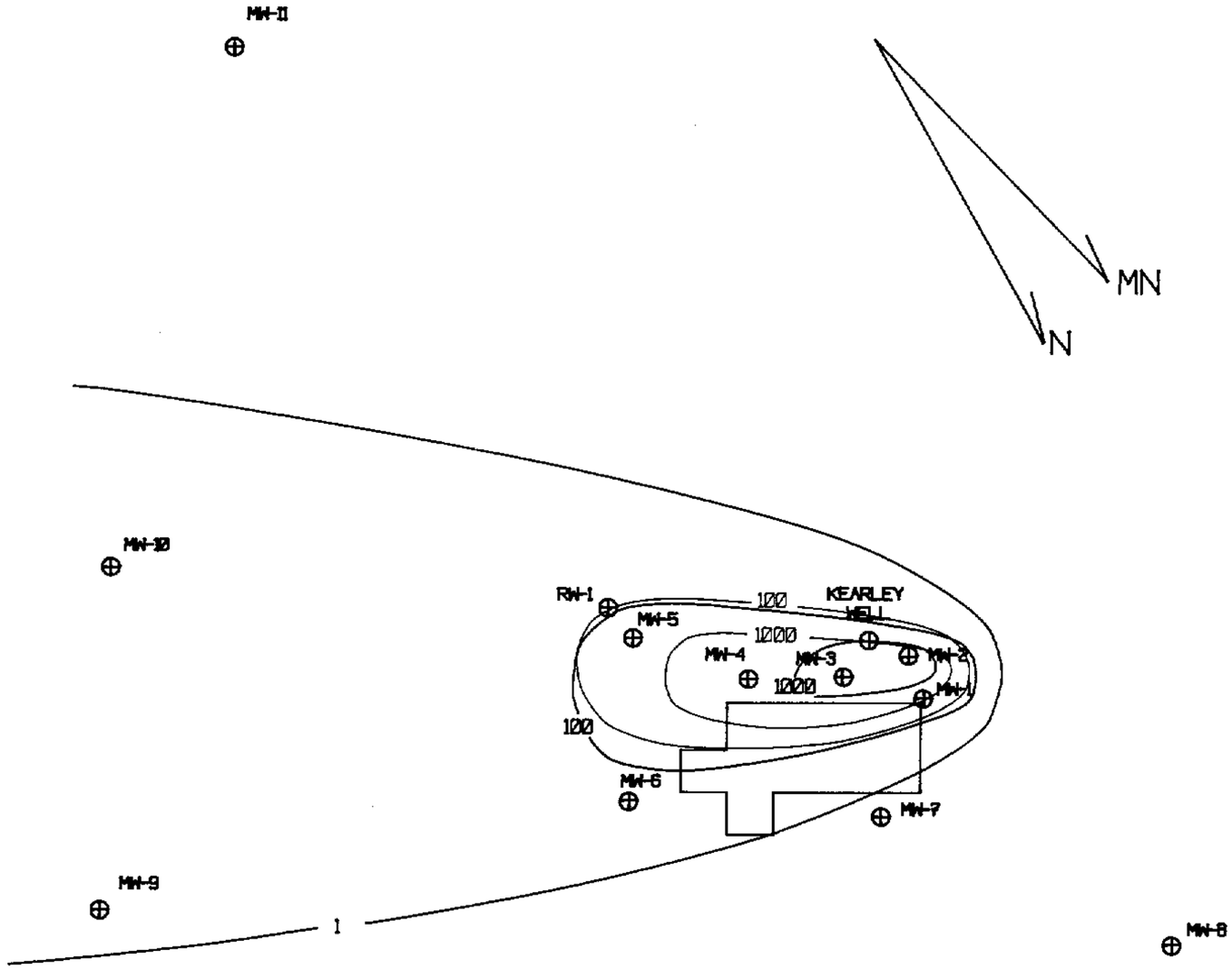
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	49400	16000
MW-3	20630	8500
MW-4	94000	8300
MW-5	7464	6300
MW-6	ND	13
MW-7	ND	ND
MW-8	ND	ND
MW-9	ND	3
MW-10	21	27
MW-11	97	79
RW-1	———	———

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 10/7/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

1000 MTBE ISOCONCENTRATION CONTOUR OF 1000 PPB

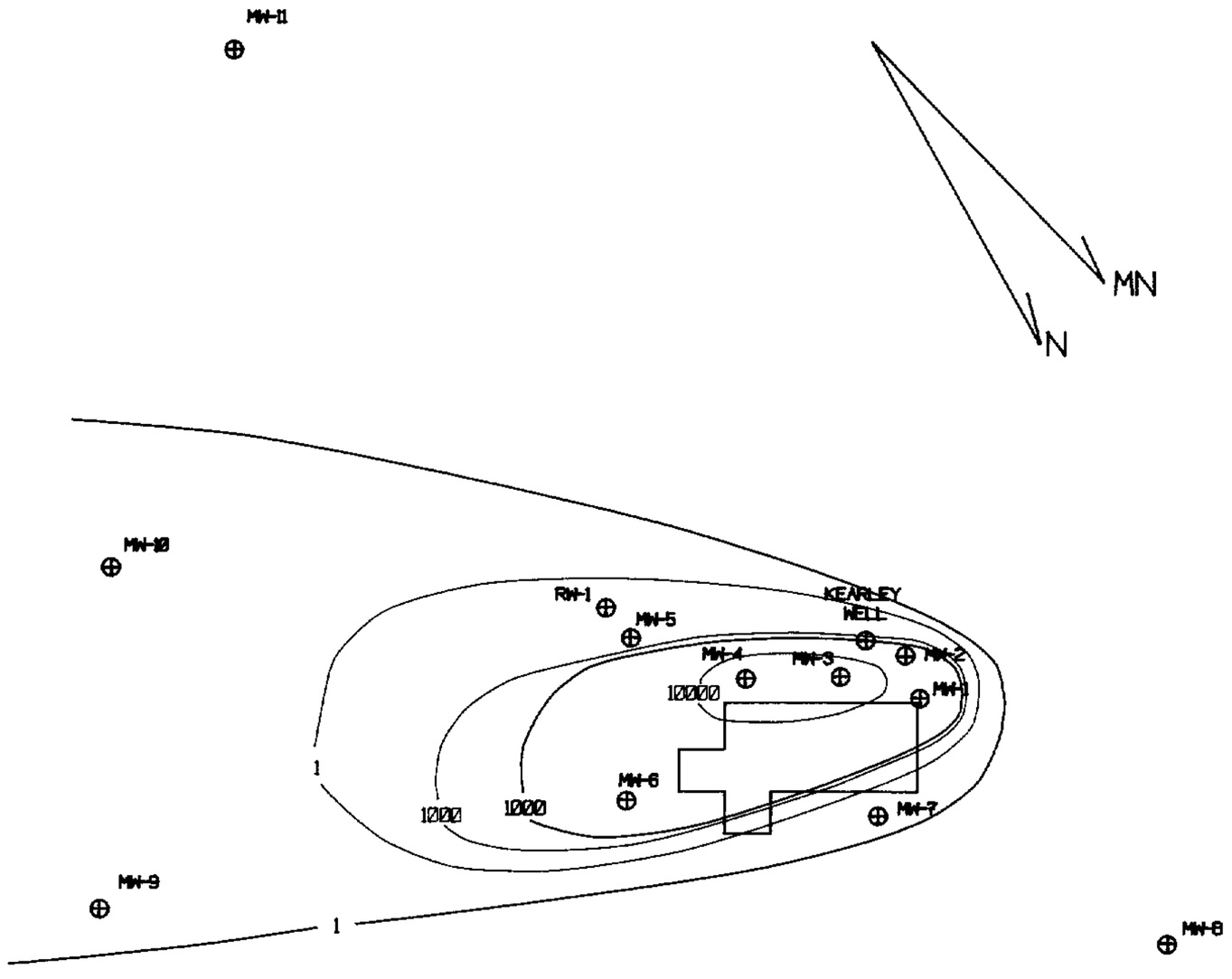
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX		MTBE
MW-2	7720	MW-2	2400
MW-3	5790	MW-3	3400
MW-4	3680	MW-4	140
MW-5	100	MW-5	230
MW-6	ND	MW-6	ND
MW-7	ND	MW-7	ND
MW-8	ND	MW-8	ND
MW-9	ND	MW-9	10
MW-10	ND	MW-10	21
MW-11	ND	MW-11	ND
RW-1	ND	RW-1	14

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 10/14/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

1000 MTBE ISOCONCENTRATION CONTOUR OF 1000 PPB

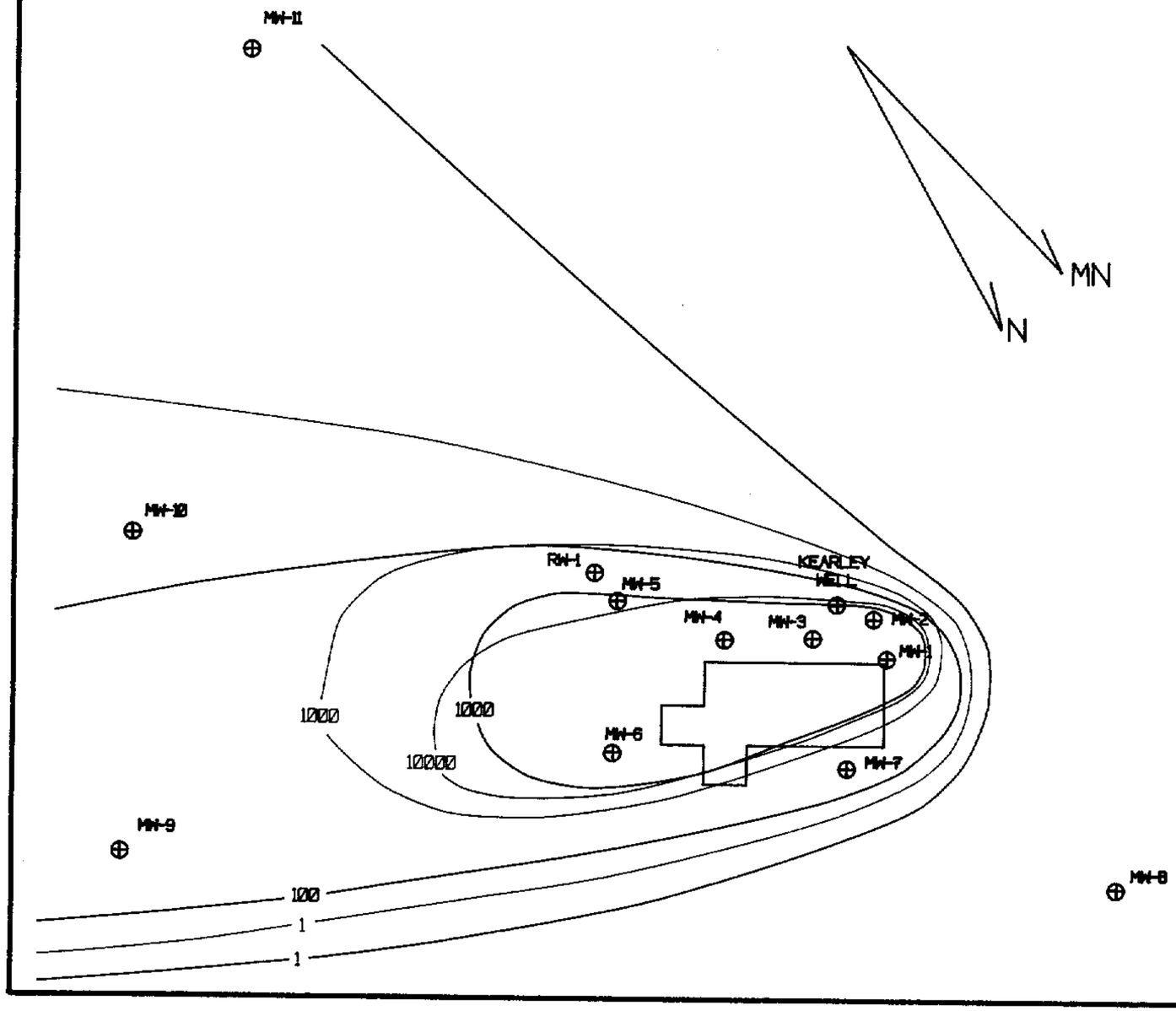
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	9220	3700
MW-3	25400	2900
MW-4	39900	6400
MW-5	25	490
MW-6	9350	5500
MW-7	ND	57
MW-8	ND	ND
MW-9	ND	19
MW-10	ND	52
MW-11	ND	ND
RW-1	32	210

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 10/21/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

1000 MTBE ISOCONCENTRATION CONTOUR OF 1000 PPB

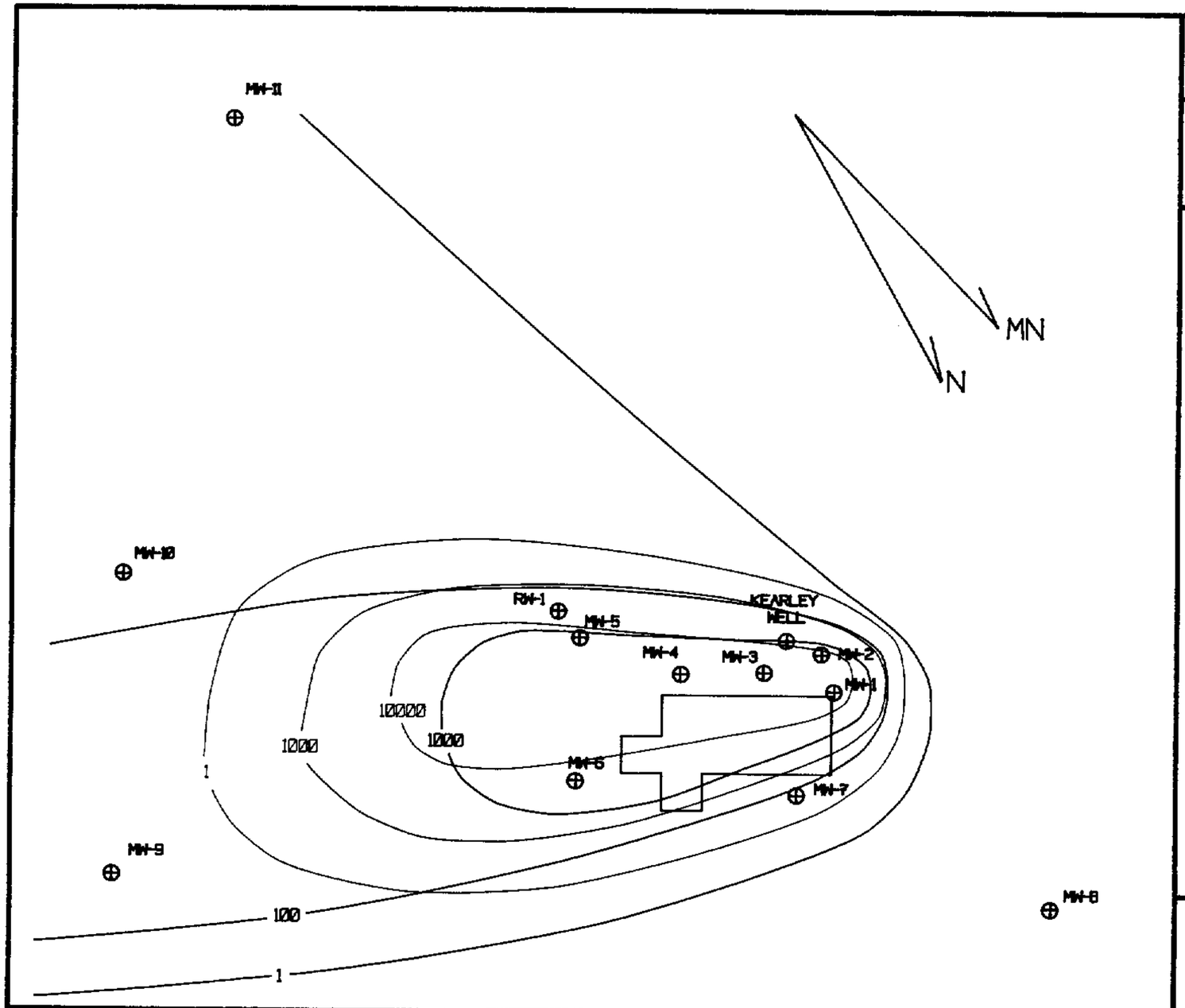
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	14900	4100
MW-3	12150	2600
MW-4	35300	TRACE
MW-5	6870	1300
MW-6	13130	3400
MW-7	84	160
MW-8	ND	ND
MW-9	8	280
MW-10	2	31
MW-11	ND	12
RW-1	3150	690

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 10/28/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 — BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 — MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	10450	2400
MW-3	15150	2600
MW-4	37200	2900
MW-5	13180	2200
MW-6	5450	1300
MW-7	12	25
MW-8	ND	ND
MW-9	ND	560
MW-10	ND	27
MW-11	ND	23
RW-1	3770	680

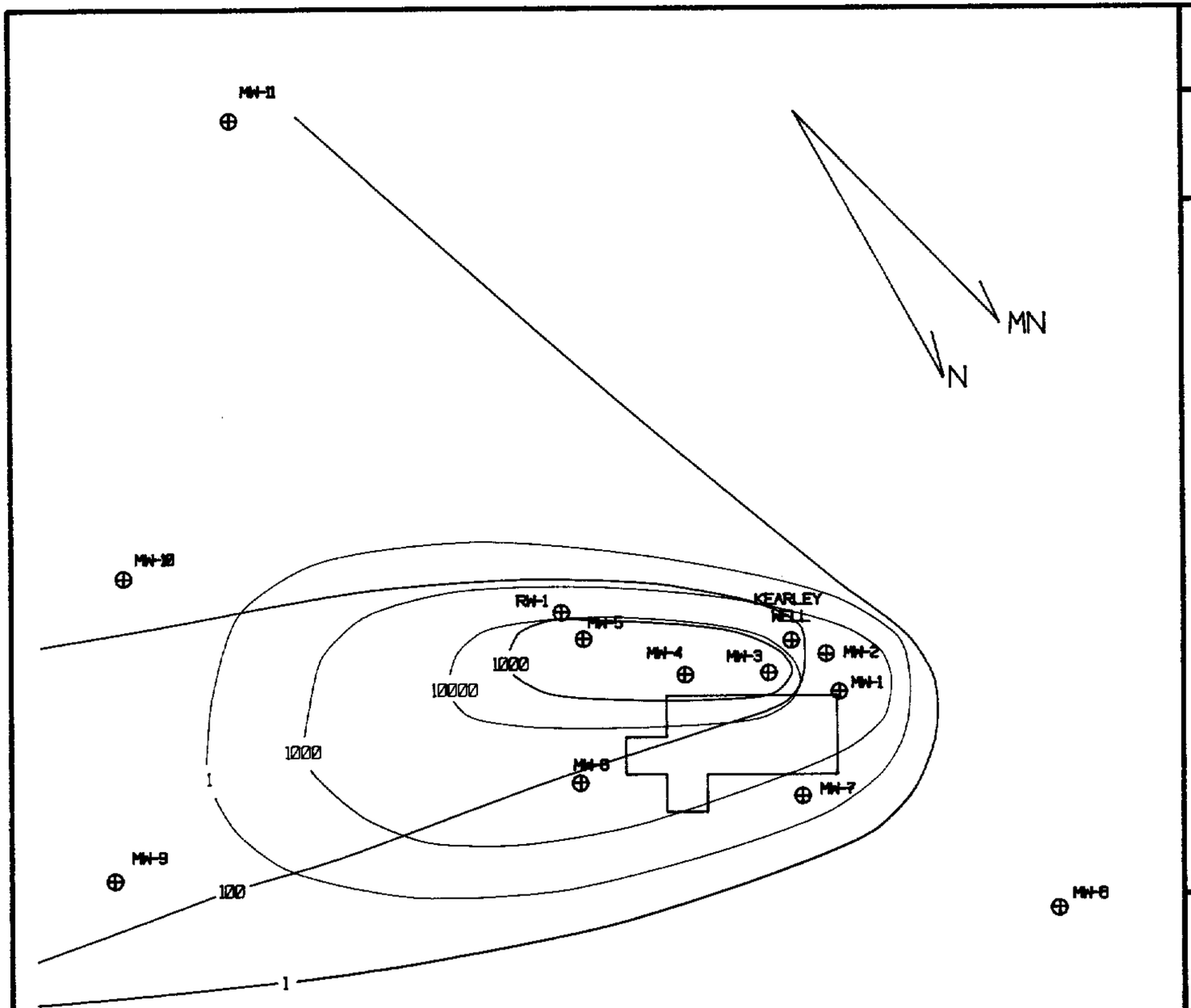
SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302

BTEX AND MTBE ISOCONCENTRATION MAP FOR 11/4/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT



LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 — BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 — MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

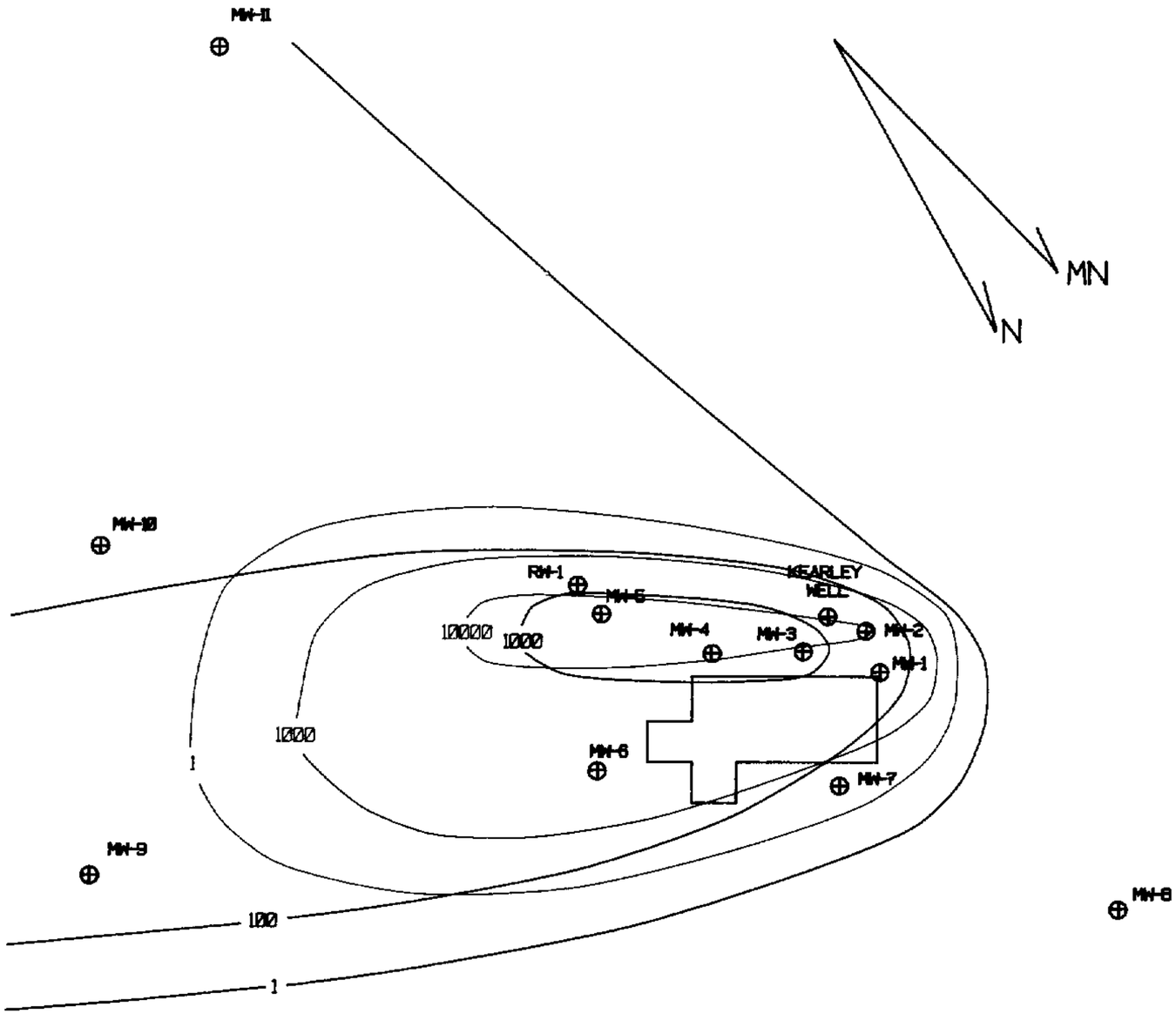
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	1900	TRACE
MW-3	13980	2800
MW-4	355000	TRACE
MW-5	24140	4600
MW-6	1980	ND
MW-7	38	27
MW-8	ND	ND
MW-9	ND	720
MW-10	ND	22
MW-11	ND	21
RW-1	4490	960

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 11/11/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 — BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 — MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

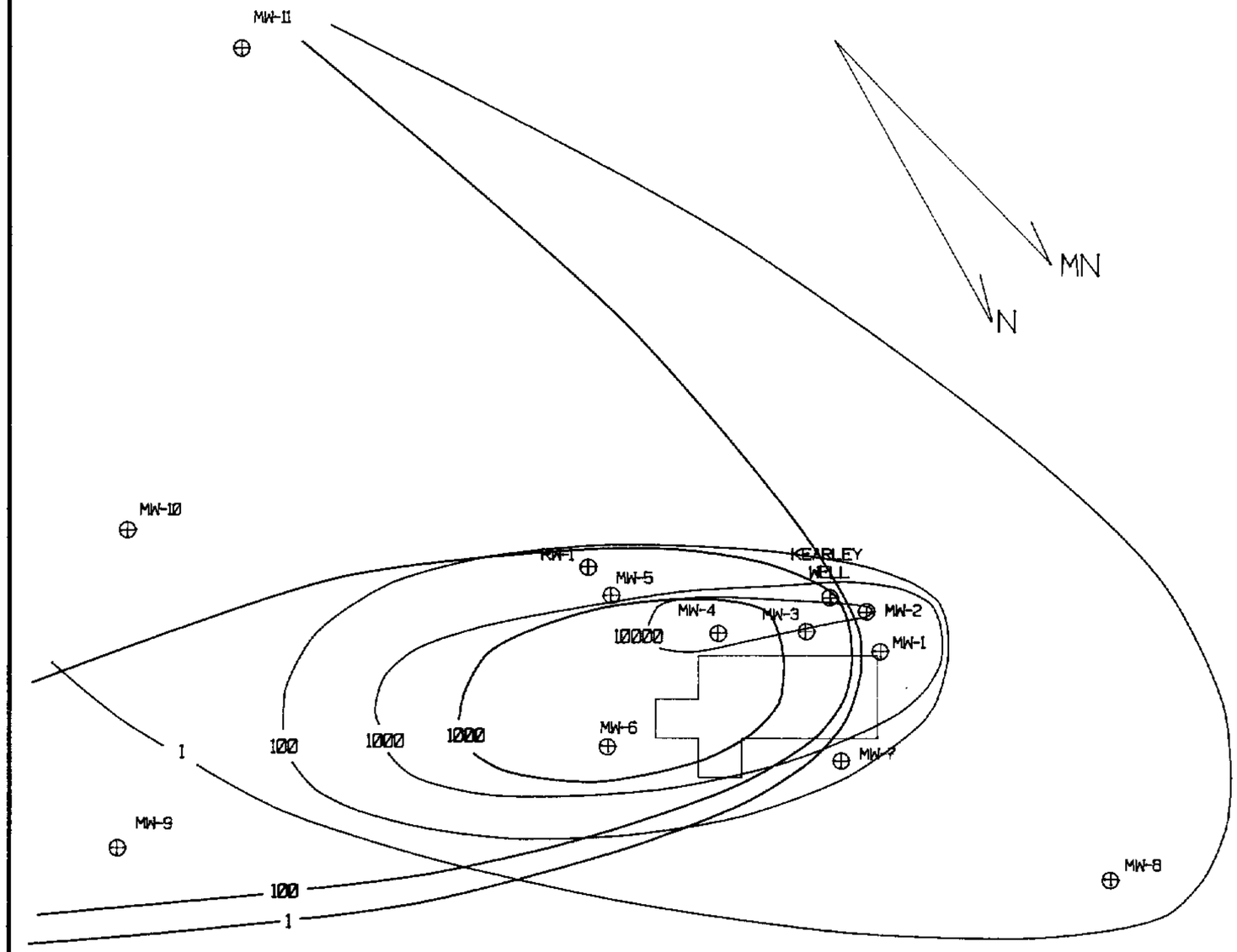
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	17000	390
MW-3	4500	3300
MW-4	38900	3100
MW-5	37900	7300
MW-6	3992	710
MW-7	89	32
MW-8	ND	ND
MW-9	ND	230
MW-10	ND	17
MW-11	ND	16
RW-1	2460	530

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 12/9/91

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 — BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 — MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

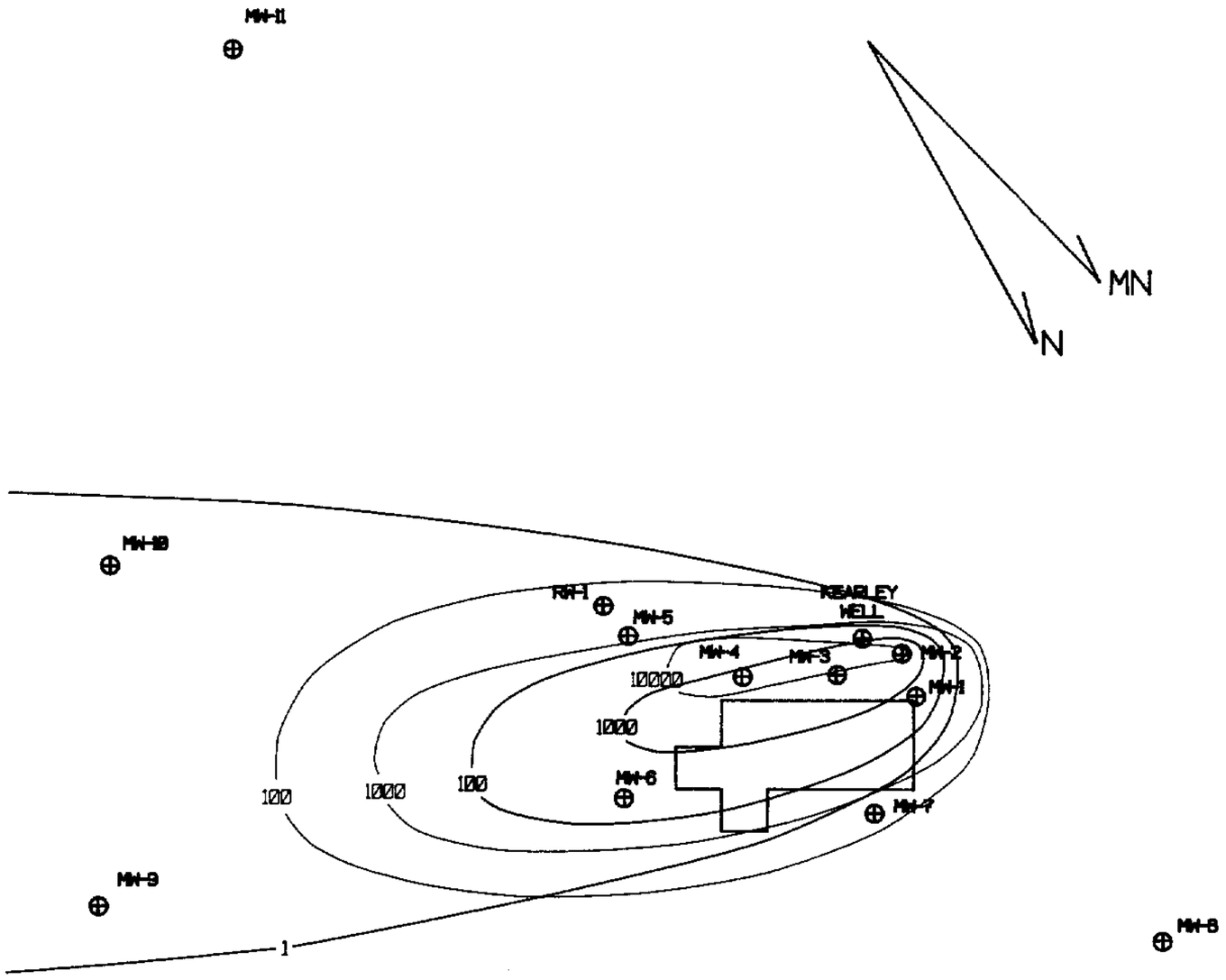
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX		MTBE
MW-2	26700	MW-2	ND
MW-3	7170	MW-3	800
MW-4	28300	MW-4	1500
MW-5	769	MW-5	95
MW-6	6700	MW-6	1200
MW-7	772	MW-7	ND
MW-8	31	MW-8	ND
MW-9	ND	MW-9	120
MW-10	ND	MW-10	7
MW-11	33	MW-11	8
RW-1	741	RW-1	120

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 1/6/92

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 — MONITORING WELL MW-10

1000 — BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 — MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

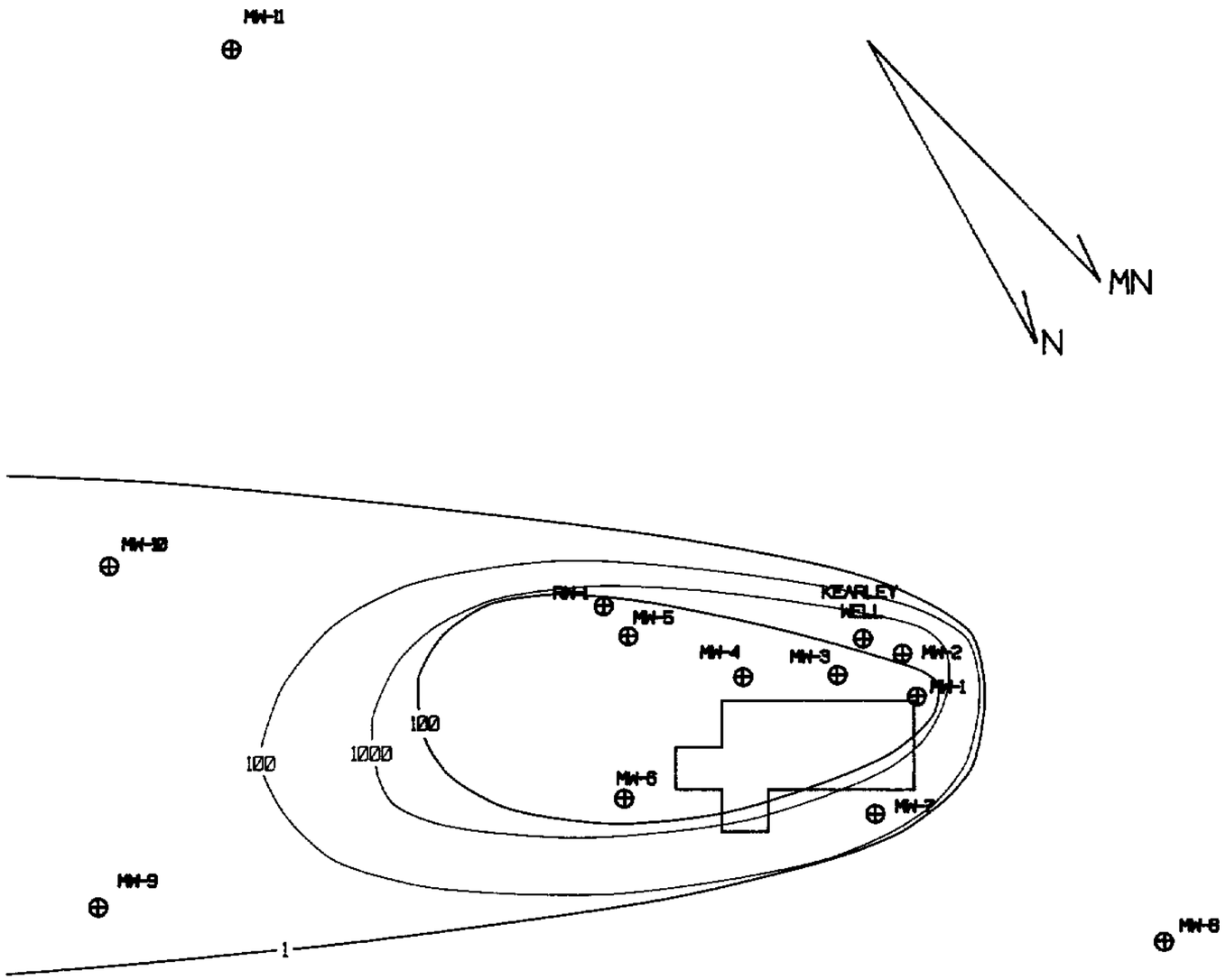
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	30600	3000
MW-3	6940	1800
MW-4	18900	1200
MW-5	ND	10
MW-6	2910	790
MW-7	732	ND
MW-8	ND	ND
MW-9	ND	49
MW-10	ND	8
MW-11	ND	ND
RW-1	102	37

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 2/6/92

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

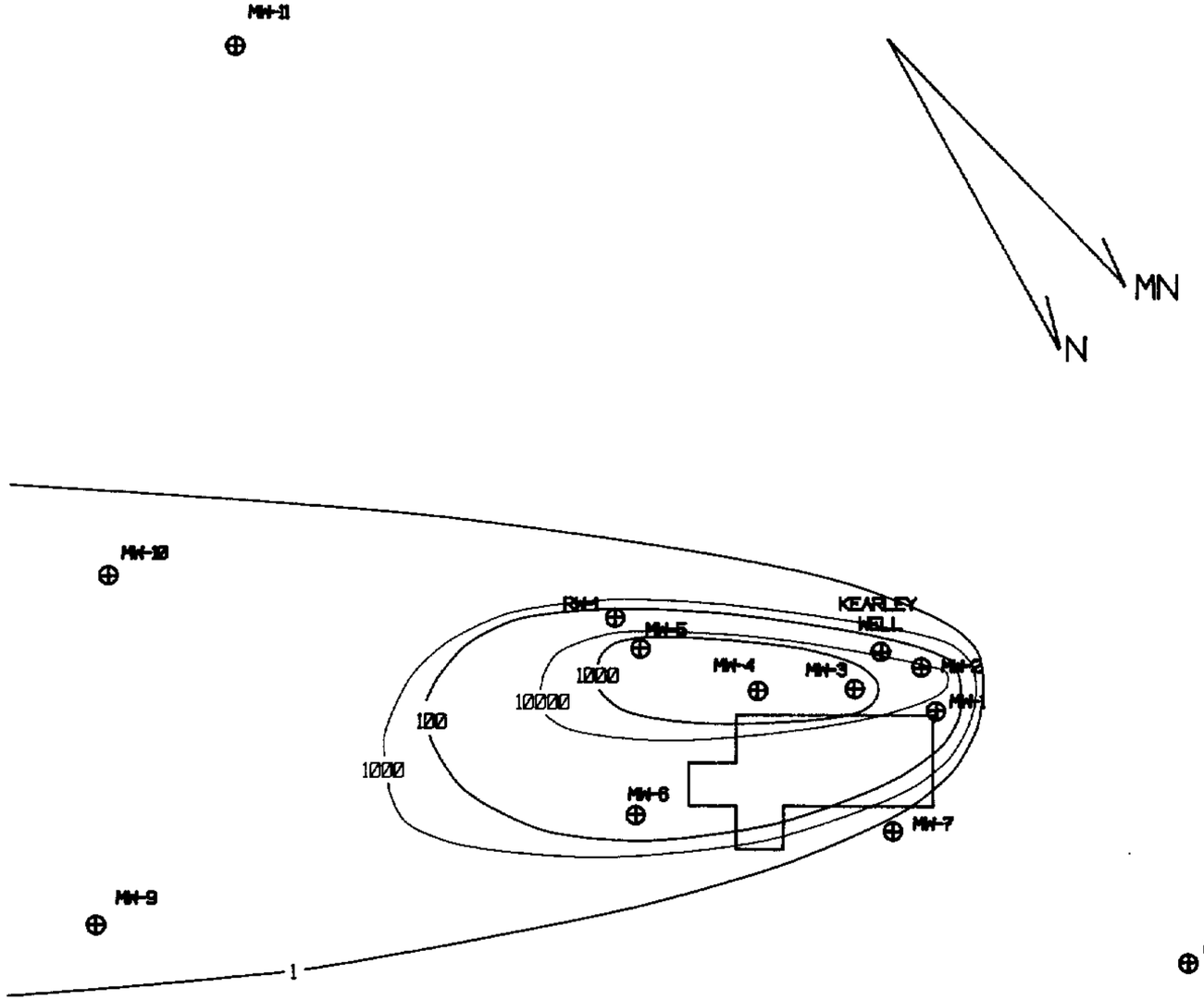
MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	------	------
MW-3	------	------
MW-4	------	------
MW-5	1543	300
MW-6	1110	190
MW-7	163	5
MW-8	ND	ND
MW-9	ND	86
MW-10	ND	60
MW-11	ND	ND
RW-1	1314	110

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302



BTEX AND MTBE ISOCONCENTRATION MAP FOR 3/3/92

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT

LEGEND

MW-10 ⊕ MONITORING WELL MW-10

1000 BTEX ISOCONCENTRATION CONTOUR OF 1000 PPB

100 MTBE ISOCONCENTRATION CONTOUR OF 100 PPB

MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	29000	950
MW-3	15120	2300
MW-4	28600	2700
MW-5	19100	3100
MW-6	1309	290
MW-7	ND	ND
MW-8	ND	ND
MW-9	ND	60
MW-10	ND	11
MW-11	ND	ND
RW-1	2574	470

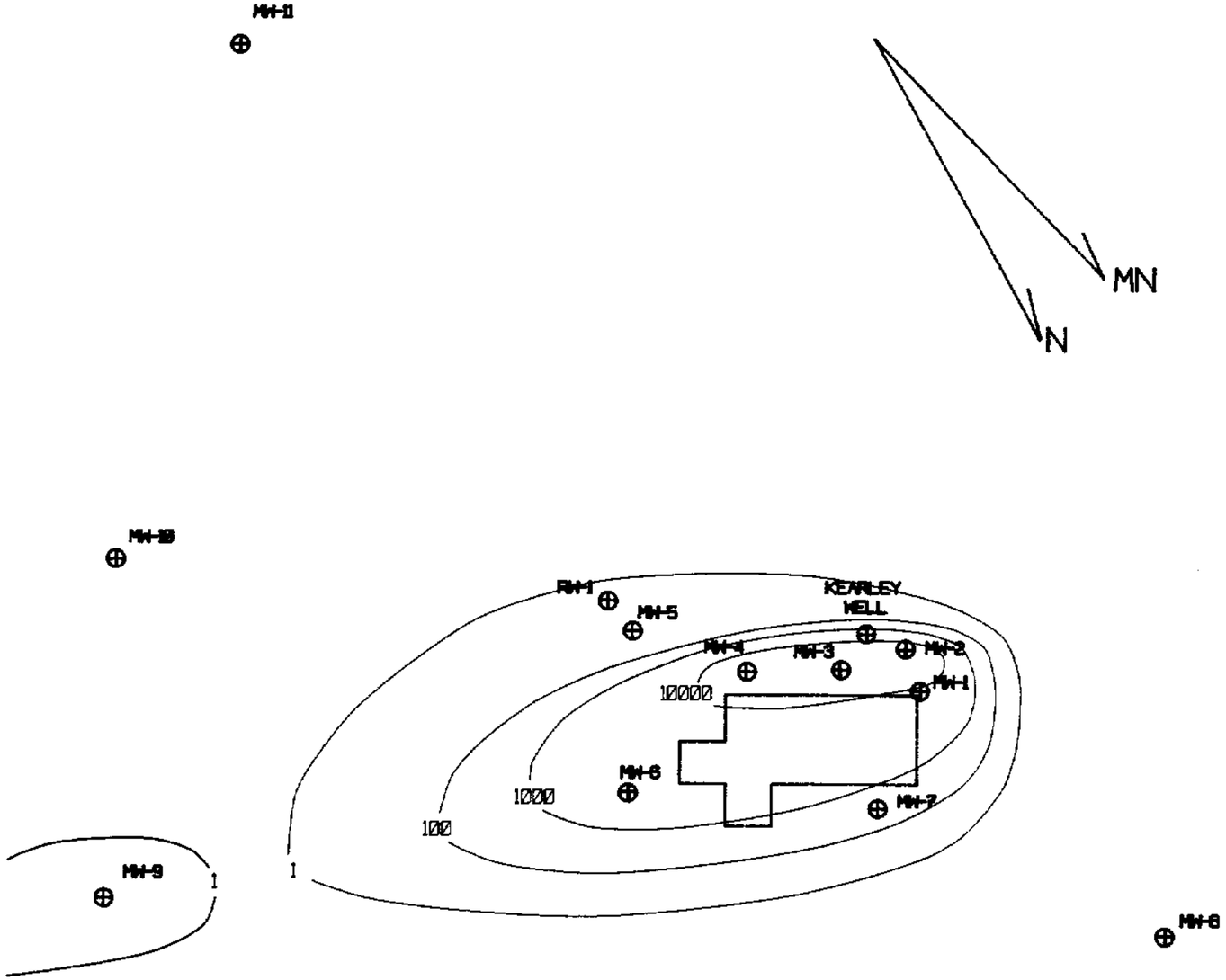
SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302

BTEX AND MTBE ISOCONCENTRATION MAP FOR 4/8/92

KEARLEY FUEL SERVICE
ROUTE 30
JAMAICA, VERMONT



LEGEND

MW-10 ⊕ MONITORING WELL MW-10

100 BTEX ISOCONCENTRATION CONTOUR OF 100 PPB

1 MTBE ISOCONCENTRATION CONTOUR OF 1 PPB

MONITORING WELL CONTAMINANT CONCENTRATIONS
(IN PPB)

	BTEX	MTBE
MW-2	32700	ND
MW-3	10530	ND
MW-4	12540	ND
MW-5	?	ND
MW-6	6640	ND
MW-7	259	ND
MW-8	ND	ND
MW-9	ND	13
MW-10	ND	ND
MW-11	ND	ND
RW-1	6	ND

SCALE 1 : 720

0 60 120 180 FEET

PREPARED BY:
TRI-S ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 1760, 205 MAIN STREET
BRATTLEBORO, VT 05302