

Second Annual Interim Measures Capture Zone Report January 31, 1997 Through January 31, 1998

Delphi Harrison Thermal Systems
Moraine, Ohio


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May 6, 1998

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Delphi Harrison Thermal Systems

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Introduction

Delphi Harrison Thermal Systems (Delphi Thermal) of General Motors Corporation (GMC) has been operating a groundwater recovery and treatment system at their Moraine, Ohio facility since January 31, 1996 as a component of interim measures required by the United States Environmental Protection Agency (U.S. EPA). The objective of these interim measures, as stated in the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995), is to control the migration of groundwater that contains volatile organic compounds (VOCs). The Final Interim Measures Design Plans was approved by the U.S. EPA in a July 31, 1995 letter.

The interim measures consist of continued pumping of Montgomery County Well DN-13, screened in the lower aquifer, at a rate of 2.663 million gallons per day (mgd) and pumping Delphi Thermal Recovery Well 2 (TW-2), screened in the upper aquifer, at a rate of 0.239 mgd (166 gallons per minute [gpm]). DN-13 is a well that Montgomery County has been using in a Pump-to-Waste Program since March 1990. TW-2 is a component of the interim measures system which was designed, installed, started up, and monitored in compliance with the approved Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995). The groundwater recovered by TW-2 is treated using an air stripper tower and discharged through Delphi Thermal's National Pollutant Discharge Elimination

System (NPDES) permitted outfall to the Miami River.

Data collected to monitor the effectiveness of the interim measures system during the first seven months of operation (January 31, 1996 through August 29, 1996) was summarized in a report titled Interim Measures Capture Zone Monitoring (Geraghty & Miller, Inc. 1996a) in response to a request from U.S. EPA, through, PRC Environmental Management. A summary of data collected during the first year of operation (January 31, 1996 through January 31, 1997) was submitted in a report titled First Annual Interim Measures Capture Zone Report (Geraghty & Miller, Inc. 1997). This report provides a summary of data collected during the second year of operation (January 31, 1997 through January 31, 1998). Data summarized in these reports were collected to monitor the effectiveness of the interim measures system as required by the approved Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995).

TW-2 Operation

Groundwater recovery from TW-2 began on the afternoon of January 31, 1996. During the first two years of operation (January 31, 1996 through January 31, 1998), the system has recovered and treated a total of 155,632,340 gallons at an average flow rate of approximately 152 gpm. During the first year of operation, the system recovered a total of 82,041,370 gallons of water at an

average flow rate of approximately 159 gpm. During the second year of operation, the system recovered 73,590,970 gallons of water at an average flow rate of approximately 144 gpm.

From November 1996 through December 1997, Delphi Thermal has continued to adjust the TW-2 flow rate and monitor the water level in TW-2 as recommended in the October 1996 Monthly Technical Progress Report (Geraghty & Miller, Inc. 1996b) and approved by U.S. EPA (Personnel Conversation, 1996). This procedure was implemented to avoid drawdown levels within the well which could cause damage to the well screen and/or the pump. The flow rate from TW-2 is adjusted as necessary to maintain the water level in TW-2 at least 0.5 feet above the top of the well screen.

From January 31, 1997 through January 31, 1998, the TW-2 component of the Interim Measures remediation system has operated continuously except for two brief unscheduled shutdowns and periods of scheduled routine maintenance and cleaning. During March 1997, the system was shut down for about eight hours to allow for the internal portions of the tower to be chemically cleaned. A 22 hour unscheduled shutdown occurred in April 1997 due to a power outage. The treatment system was shutdown for 13 hours in May 1997 due to low levels of chemical defoamer and short duration outages due to sporadic problems with the coyote pump controller. During September 1997, the Interim Measures

Remediation System was down approximately 6 hours due to high air pressure in the stripping tower. During November 1997, the system was down for approximately 84 hours to allow for the cleaning of the tower and the influent piping. Finally, the system was shut down for approximately 5 days during December 1997 for a planned cleaning of the recovery-well screen.

DN-13 Operation

Montgomery County Well DN-13 was operational from the beginning of the reporting period until February 12, 1997, when it was shut down due to mechanical problems. DN-13 was reactivated on October 15, 1997 following a system upgrade which included the purchase and installation of a new well pump and motor and installation of a new electrical feed. Following the reactivation, Well DN-13 operated continuously for the remainder of the reporting period (October 15, 1997 through January 31, 1998) at a rate of 2.8 million gallons a day (mgd) with the exception of scheduled one-day shutdowns to facilitate groundwater quality sampling and any required maintenance.

Regulatory Monitoring

The Air Permit and NPDES Permit issued to Delphi Thermal for the groundwater recovery and treatment system require periodic monitoring and reporting of water quality in the influent and effluent streams, and pumping flow rates. Samples of groundwater being

pumped through the air stripping treatment tower were collected and analyzed monthly by National Environmental Testing, Inc., Dayton Division, in Dayton, Ohio for the parameters required in the permits. All analyses were conducted in accordance with methods specified in the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995). The results of the influent and effluent sampling are presented in Tables 1 and 2, respectively.

Influent sampling results (Table 1) were within the required Air Permit limits during the reporting period (January 31, 1997 through January 31, 1998). Effluent sampling results (Table 2) during the same period were within the required NPDES Permit limits.

Capture Zone Influence Monitoring

The purpose of capture zone influence monitoring is to verify that operation of the groundwater recovery and treatment system meets the interim measures objectives. This monitoring was accomplished by collecting water levels and groundwater quality data from select wells identified in the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995).

Groundwater Elevation Monitoring

Groundwater elevations for select upper aquifer monitoring wells and lower aquifer monitoring wells are presented in

Tables 3 and 4, respectively.

Groundwater elevations were collected prior to start-up of the system (with both TW-2 and DN-13 not pumping), and then during 20 other groundwater monitoring events to provide sufficient data for evaluating the effectiveness of the Interim Measures in accordance with the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995).

To evaluate the effectiveness of Interim Measures, groundwater flow maps were developed. Groundwater flow maps depicting upper and lower aquifer conditions have been developed for January 1996 pre-start-up conditions (Figures 1 and 2, respectively), and for the four quarters of the reporting period (January 31, 1997 through January 31, 1998). The quarterly groundwater elevation measurements were performed for shallow and deep wells on April 30, 1997 (Figures 3 and 4, respectively), July 30, 1997 (Figures 5 and 6, respectively), October 30, 1997 (Figures 7 and 8, respectively) and January 30, 1998 (Figures 9 and 10, respectively).

Figures 3, 5, and 7 depict groundwater flow in the upper aquifer under reduced pumping rates from TW-2 throughout the quarterly periods. Figure 9 depicts groundwater flow in the upper aquifer during a month that TW-2 operated at an average flowrate of approximately 162 gpm. Well TW-2 is shown to effectively influence upper aquifer groundwater flow in all four quarters of the reporting period. Figures 4 and 6 depict the groundwater flow in the lower aquifer on

April 30, 1997 and July 30, 1997. The figures show a lack of influence over groundwater flow by Well DN-13 since this well was not operational from February 12, 1997 through October 15, 1997. Figure 4 also provides evidence that TW-2 does influence groundwater flow in the deep aquifer, though this influence is generally masked by pumping from deep well DN-13. Figures 8 and 10, (October 30, 1997 and January 30, 1998) depict the influence of the Interim Measures on groundwater flow in the lower aquifer with DN-13 operating. Based on the groundwater contours in the vicinity of monitoring well GM-11, these figures provide further evidence of the effect that pumping of TW-2 in the upper aquifer has increased the capture zone in the lower aquifer.

These figures indicate that the Interim Measures continue to be effective at maintaining hydraulic control at the southern end of the Delphi Thermal site. Additionally, it should be noted that these flow maps are consistent with the flow conditions predicted by the capture zone modeling, presented on Figures 2 and 3 of the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995).

Groundwater Quality Monitoring

Groundwater samples from TW-2 and four monitoring wells were collected and analyzed for VOCs by Method 8240 during the month before the system was initially started, 6 months after operation began, and 18 months after operation

began. Results from these sampling events are provided in Table 5.

Conclusions

The results of monitoring conducted to evaluate the performance of the interim measures during the second year of operation indicate that the groundwater recovery and treatment system is operating to provide effective capture. This conclusion is based on the following facts.

1. Groundwater elevations indicate that an effective zone of influence has been developed by pumping TW-2 and, while operational, DN-13, such that hydraulic control at the southern end of the facility has been established (Figures 3 through 10) as described in the approved Interim Measures Design Plans.
2. Influent groundwater samples contain VOCs at concentrations below the regulatory requirements set by the Air Permit (Table 1).
3. Effluent (treated) groundwater samples are within allowable limits for all parameters required by the NPDES permit (Table 2).

References

- Geraghty & Miller, Inc. 1995. Final Interim Measures Design Plans, Harrison Division - General Motors Corporation, Moraine, Ohio. April 1995.
- Geraghty & Miller, Inc. 1996a. Interim Measures Capture Zone Monitoring. Delphi Harrison Thermal Systems, Moraine, Ohio. September 1996.
- Geraghty & Miller, Inc. 1996b. Monthly Technical Progress Report, November 1996, RCRA Facility Investigation, Delphi Harrison Thermal Systems, General Motors Corporation, Moraine, Ohio. November 1996.
- Geraghty & Miller, Inc. 1997. First Annual Interim Measures Capture Zone Report, January 31, 1996 Through January 31, 1997, Delphi Harrison Thermal Systems, Moraine, Ohio. March 1997.
- Personal Conversation. 1996. Personal Conversation between Mr. William Buller of the U.S. EPA and Mr. James Reid of Geraghty & Miller, Inc. November 1996.

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Table 1. Air Permit Influent Monitoring, Interim Measures Capture Zone Monitoring, Delphi Harrison Thermal Systems, Moraine, Ohio.

CONSTITUENT	RESULTS												
	2/11/97	3/11/97	4/8/97	5/19/97	6/3/97	7/1/97	7/29/97	8/28/97	9/23/97	10/21/97	11/25/97	12/16/97	1/14/98
Benzene	1.1	1.0	1.1	1.3	--	1.2	1.2	1.2	1.2	1.3	1.6	1.6	--
Chloroethane	--	--	--	--	--	--	--	--	--	--	11.8	10.9	--
1,1-Dichloroethane	45.5	42.1	37.5	36.7	37.0	35.0	35.0	44.0	38.3	39.8	55.1	48.6	41.8
trans-1,2-Dichloroethene	2.7	2.6	2.8	2.7	2.4	2.4	2.5	3.2	2.9	3.2	3.4	3.3	--
Ethylbenzene	6.9	12.5	6.9	11.0	5.9	6.9	5.6	5.2	5.9	4.2	16.9	20.4	8.0
Tetrachloroethene	25.9	29.6	25.9	23.7	29.2	24.0	26.1	24.1	25.2	28.9	27.1	32.4	40.9
Toluene	--	--	--	--	--	--	--	--	--	--	1.7	3.0	3.8
1,1,1-Trichloroethane	17.4	18.9	15.2	14.0	17.9	12.8	13.8	13.4	13.3	13.7	12.7	14.4	17.1
Trichloroethene	72.8	89.5	74.2	73.0	73.6	69.5	72.2	66.1	64.2	65.1	67.1	68.9	79.6
Vinyl chloride	4.6	4.3	3.8	3.8	3.9	5.3	3.4	3.7	3.4	4.0	5.4	5.4	5.1
Xylenes	15.3	12.7	2.0	12.2	9.6	8.5	10.2	9.6	9.5	12.2	16.6	15.4	24.7
TOTAL*	192.2	213.2	169.4	178.4	179.5	165.6	170.0	170.5	163.9	172.4	219.4	224.3	221.0

* Permit Limit 850 ug/L.

All concentrations in micrograms per liter (ug/L) as reported by the laboratory.

-- Not detected.

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Table 2. NPDES Effluent Monitoring, Interim Measures Capture Zone Monitoring, Delphi Harrison Thermal Systems, Moraine, Ohio.

CONSTITUENT	PERMIT LIMIT	RESULTS												
		2/11/97	3/11/97	4/8/97	5/19/97	6/3/97	7/1/97	7/29/97	8/28/97	9/23/97	10/21/97	11/25/97	12/16/97	1/14/98
Fats, Oils & Grease (mg/L)	10 mg/L	--	--	--	9.0	--	--	--	--	--	--	--	--	--
pH, Field (S.U.)	6.5 - 9.0 S.U.	8.14*	8.05	7.85	7.95	8.06	7.92	7.91	7.97	7.15	8.16	7.64	7.56	7.07
Benzene (ug/L)	5 ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene (ug/L)	5 ug/L	--	--	--	--	--	--	--	--	--	--	--	1.2	1.1
Toluene (ug/L)	5 ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes (ug/L)	NA	--	--	--	--	--	--	--	--	--	--	--	--	3.9

mg/L Milligrams per Liter.

S.U. Standard Units.

ug/L Micrograms per Liter.

-- Not detected.

NA Not available.

*Sampled February 21, 1997.

Table 3. Water-Level Elevations from Upper Aquifer Monitor Wells, Interim Measures Capture Zone Monitoring, Delphi Harrison Thermal Systems, Moraine, Ohio.

Date	Water-Level Elevation (Feet MSL)														GM-10	TW-2	WS-19	WS-18	WS-17	WS-16	GM-17	GM-18	WS-17	WS-18	WS-19	TW-2	GM-10	WSU-24
	GM-2	4S	GM-6	GM-8	GM-16	GM-17	GM-18	WS-17	WS-18	WS-19	TW-2	GM-10	WSU-24															
1/31/96	705.77	705.75	705.80	705.88	705.68	705.46	705.63	705.83	705.79	705.92	705.76	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/1/96	705.66	705.51	705.34	705.62	705.47	705.46	705.42	705.46	704.96	705.67	702.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/2/96	705.57	705.38	705.20	705.49	705.34	705.31	705.26	705.32	705.32	705.53	702.71	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/3/96	705.50	705.31	705.12	705.39	705.24	705.22	705.17	705.22	705.24	705.42	702.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/4/96	705.41	705.19	704.95	705.24	705.09	705.07	705.03	705.08	705.12	705.29	702.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/5/96	705.38	705.15	704.89	705.18	704.99	705.01	704.96	705.00	705.07	705.21	702.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/6/96	705.31	705.09	704.82	705.11	704.90	704.93	704.87	704.92	705.01	705.14	702.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/7/96	705.31	705.06	704.77	705.06	704.87	704.90	704.84	704.88	704.98	705.08	702.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/13/96	705.11	704.86	704.50	704.79	704.58	704.63	704.55	704.63	714.27	704.81	701.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/22/96	704.42	704.07	703.63	703.97	703.68	703.73	703.65	703.76	703.93	703.98	700.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/27/96	704.28	703.94	703.51	703.86	703.61	703.63	703.56	703.64	703.82	703.85	700.35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/12/96	704.35	704.03	703.62	703.97	703.72	703.74	703.65	702.90	703.92	704.02	700.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6/10/96	709.33	708.99	708.64	708.79	708.68	707.79	708.69	708.78	708.93	708.87	705.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7/31/96	707.21	706.79	706.24	706.45	704.34	706.27	706.14	706.37	706.64	706.46	701.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/30/96	704.28	703.89	703.44	703.75	703.42	703.49	703.38	703.38	703.79	703.76	696.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1/30/97	704.32	704.04	703.65	703.94	703.67	703.70	703.62	703.77	703.92	703.97	698.05	723.90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4/30/97	705.16	704.85	703.55	703.77	704.39	704.50	704.41	704.54	704.77	704.66	695.58	704.43	705.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7/30/97	705.43	705.10	704.66	704.87	704.59	704.72	704.69	704.78	705.00	704.91	697.38	704.64	705.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/30/97	703.13	702.83	702.43	702.70	702.36	702.40	702.30	702.52	702.72	702.69	696.11	702.06	703.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1/30/98	702.90	702.61	702.17	702.50	702.20	702.27	702.18	702.29	702.50	702.48	700.13	701.97	702.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA Not Available.

MSL Mean Sea Level.

TW-2 Upper Aquifer Recovery Well.

Water-level elevations measured in wells GM-16, GM-10, and WSU-24 are not required in the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995) but are being measured for additional data.

Table 4. Water-Level Elevations from Lower Aquifer Monitor Wells, Interim Measures Capture Zone Monitoring, Delphi Harrison Thermal Systems, Moraine, Ohio.

Date	Water-Level Elevation (Feet MSL)													MT-69
	GM-1	GM-3	GM-4	GM-5	GM-7R	GM-9	GM-11	GM-13	GM-14	GM-15	GM-20D	M73C		
1/31/96	705.56	705.46	705.45	705.50	705.85	705.25	705.53	705.25	705.24	705.16	705.80	704.62	NA	
2/1/96	705.52	705.38	705.37	705.43	705.78	705.12	705.22	705.15	705.11	705.06	705.73	704.50	NA	
2/2/96	705.44	705.30	705.28	705.36	705.69	705.02	705.13	705.03	705.01	704.93	705.64	704.38	NA	
2/3/96	705.37	705.21	705.19	705.27	705.61	704.92	705.04	704.94	704.91	704.83	705.57	704.23	NA	
2/4/96	705.31	705.13	705.12	705.21	705.53	704.81	704.93	704.82	704.80	704.73	705.50	704.14	NA	
2/5/96	705.27	705.09	705.08	705.16	705.50	704.77	704.89	704.78	704.75	704.67	705.46	704.09	NA	
2/6/96	705.23	705.03	705.02	705.11	705.44	704.71	704.83	704.72	704.68	704.61	705.41	704.03	NA	
2/7/96	705.23	705.02	704.95	705.11	705.42	704.67	704.81	704.71	704.67	704.56	705.41	704.00	NA	
2/13/96	705.11	704.85	704.86	704.97	705.30	704.48	704.65	704.53	704.47	704.38	705.26	703.79	NA	
2/22/96	703.99	703.39	703.36	703.61	703.89	702.98	702.70	702.12	702.03	703.91	704.08	701.70	NA	
2/27/96	703.94	703.33	703.32	703.55	703.84	702.93	702.65	702.07	701.99	701.87	704.01	NA	NA	
3/12/96	703.98	703.39	703.36	703.53	703.90	702.97	702.43	702.13	702.01	701.92	704.06	702.24	NA	
6/10/96	708.83	708.18	708.20	708.43	708.63	708.04	708.63	707.09	706.98	706.82	709.03	NA	NA	
7/31/96	706.68	705.93	705.89	706.18	706.39	705.51	705.21	704.59	704.45	706.02	706.77	704.63	NA	
10/30/96	703.88	703.21	703.18	703.43	703.71	702.72	702.45	701.86	701.74	701.63	703.91	701.95	NA	
1/30/97	703.91	703.32	703.31	703.54	703.82	702.91	702.67	702.08	701.94	701.84	704.00	702.20	NA	
4/30/97	705.11	703.96	703.98	704.89	704.36	704.39	704.60	704.41	704.35	704.22	705.30	704.17	NA	
7/30/97	705.36	705.03	705.01	705.14	705.43	704.61	704.80	704.61	704.56	704.41	705.51	704.37	703.86	
10/30/97	702.66	701.97	701.93	702.22	702.48	701.46	701.20	700.50	700.39	700.22	702.67	700.62	701.36	
1/30/98	702.50	701.88	701.83	702.11	702.39	701.45	701.17	700.52	700.37	700.24	702.57	700.65	NA	

MSL Mean Sea Level.

NA Not Available.

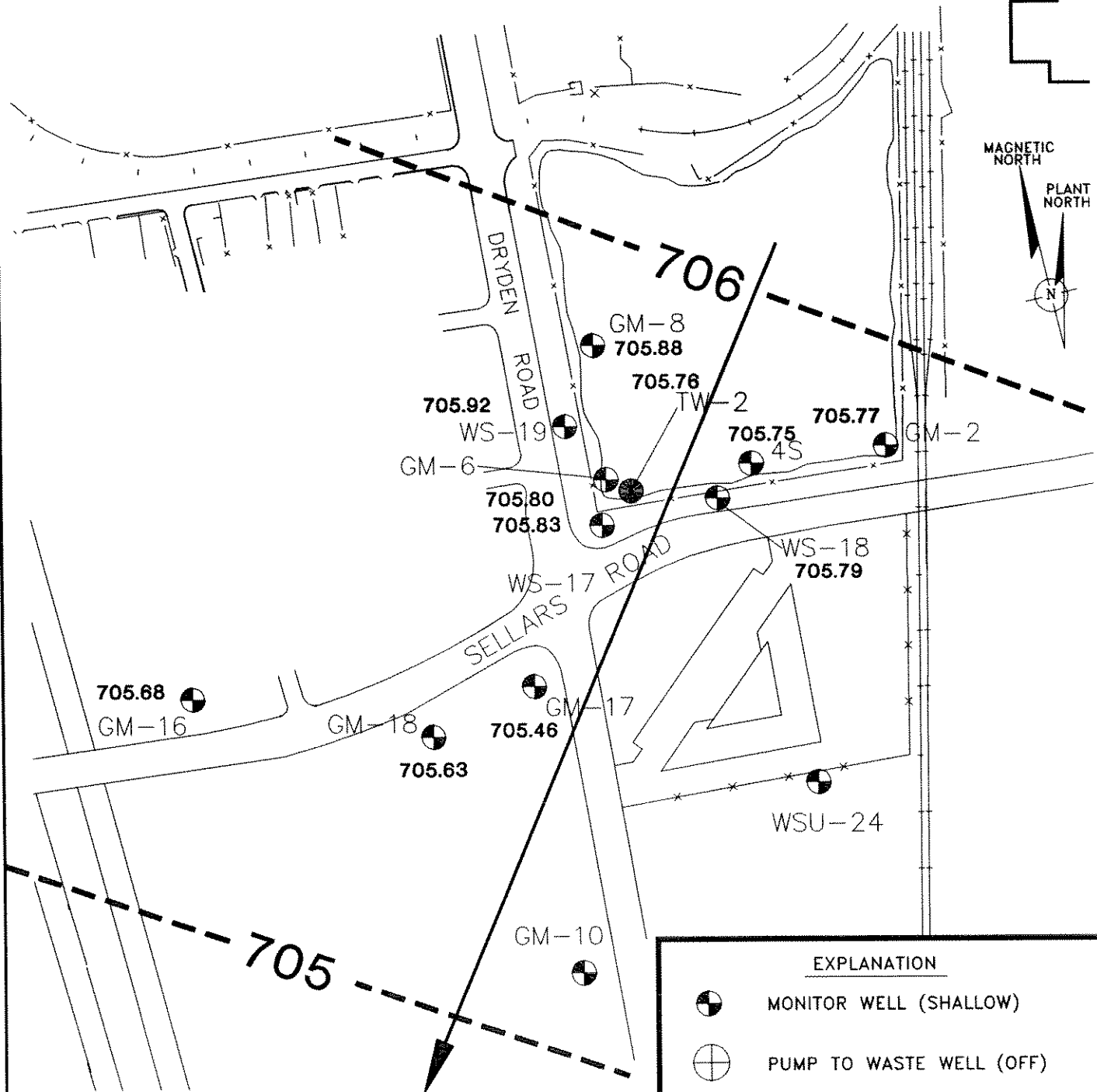
Water-level elevation in well MT-69 are not required in the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995) but are being measured to provide additional data.

Table 5. Detected Volatile Organic Compounds in Groundwater, Interim Measures Capture Zone Monitoring, Delphi Harrison Thermal Systems, Moraine, Ohio.

DETECTED CONSTITUENTS	TW-2			4S			GM-6			GM-17			GM-18		
	1/31/96	7/31/96	7/30/97	1/31/96	7/31/96	7/30/97	1/31/96	7/31/96	7/30/97	1/31/96	7/31/96	7/30/97	1/31/96	7/31/96	7/30/97
Benzene	3.9	1.6	1.2	2.2	--	--	2.5	--	--	4.3	1.5	--	--	1.1	1.1
Chlorobenzene	--	5.5	2.5	4.9	--	--	--	--	--	3.1	6.7	3.1	--	--	--
Chloroethane	17.0	--	--	19.9	16.0	--	13.0	24.3	19.5	16.4	--	--	--	--	--
1,1-Dichloroethane	110.0	50.6	37.6	69.6	45.6	24.5	88.5	82.6	55.4	99.7	28.1	6.4	57.1	61.6	45.4
1,1-Dichloroethene	1.2	--	--	--	--	--	1.2	--	1.8	--	--	--	1.9	--	1.6
trans-1,2-Dichloroethene	11.1	4.4	2.6	3.7	8.4	3.0	9.1	6.5	3.0	9.9	2.4	--	4.1	5.3	3.7
cis-1,2-Dichloroethene	--	41.3	35.2	--	16.2	1.0	--	97.4	119.0	--	21.2	4.1	--	118.0	80.8
Ethylbenzene	127.0	10.7	5.7	2.9	4.1	--	88.8	3.6	--	--	--	--	--	--	--
Tetrachloroethene	--	10.4	26.4	--	--	--	10.3	68.0	94.0	1.2	1.2	1.4	2.5	3.2	3.9
Toluene	4.0	6.7	--	--	--	--	1.3	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	4.9	9.7	14.3	--	--	--	20.0	36.8	48.9	7.0	4.7	3.4	41.6	41.2	33.5
Trichloroethene	43.0	64.6	73.5	5.6	8.0	2.4	118.0	160.0	118.0	39.2	34.5	44.6	105.0	110.0	105.0
Vinyl Chloride	32.4	8.7	3.3	--	14.1	--	16.3	21.4	7.8	16.6	--	--	--	--	--
Xylenes	103.0	25.6	10.3	1.0	--	--	37.6	--	--	--	--	--	--	--	--
Total VOC Concentration	457.5	239.8	212.6	109.8	112.4	30.9	406.6	500.6	467.4	197.4	100.3	63.0	212.2	340.4	275.0

All concentrations in micrograms per liter (ug/L) as reported by the laboratory.

-- Not detected.



EXPLANATION

- MONITOR WELL (SHALLOW)
- PUMP TO WASTE WELL (OFF)
- RECOVERY WELL (OFF)
- 705.63** GROUNDWATER ELEVATION (FEET MSL)
- 705-** GROUNDWATER CONTOUR (FEET MSL)
DASHED WHERE INFERRED
- GROUNDWATER FLOW DIRECTION

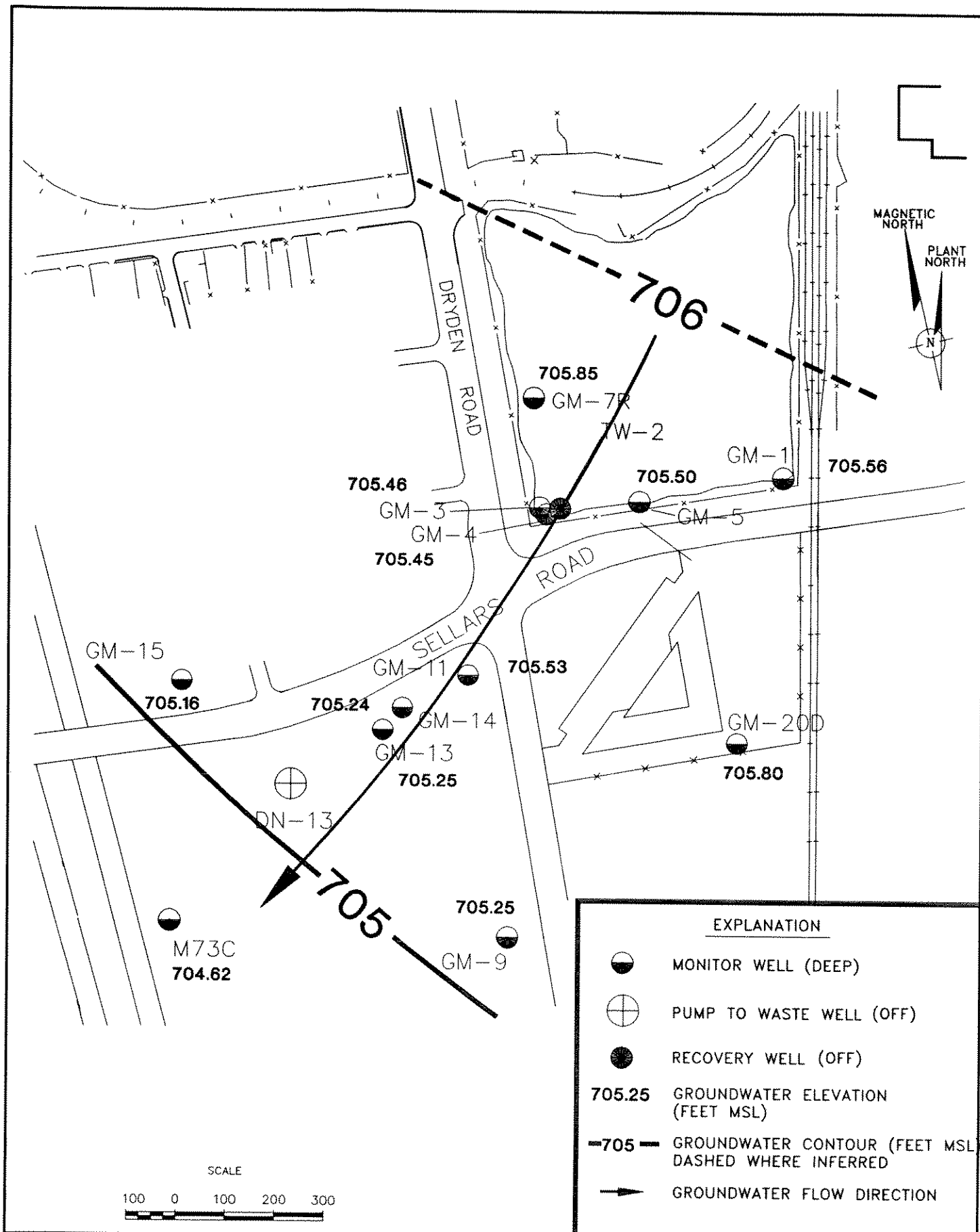
ARCADIS GERAGHTY & MILLER



4700 Lakeshore Court
Suite 100, Dublin, OH 43016
Tel: 614/764-2310 Fax: 614/764-1270

PRE-PUMPING WATER-TABLE
SURFACE - SHALLOW ON JANUARY 31, 1996,
CAPTURE ZONE MONITORING
DELPHI HARRISON THERMAL SYSTEMS,
MORaine, OHIO

DATE 02MAR1996	PROJECT MANAGER R.A.	DRAWING NAME LI-1M
DRAWN R.S.	LEAD DESIGN PROF. J.R.	CHECKED R.A.
PROJECT NUMBER OH000486.0001	DRAWING NUMBER 1	



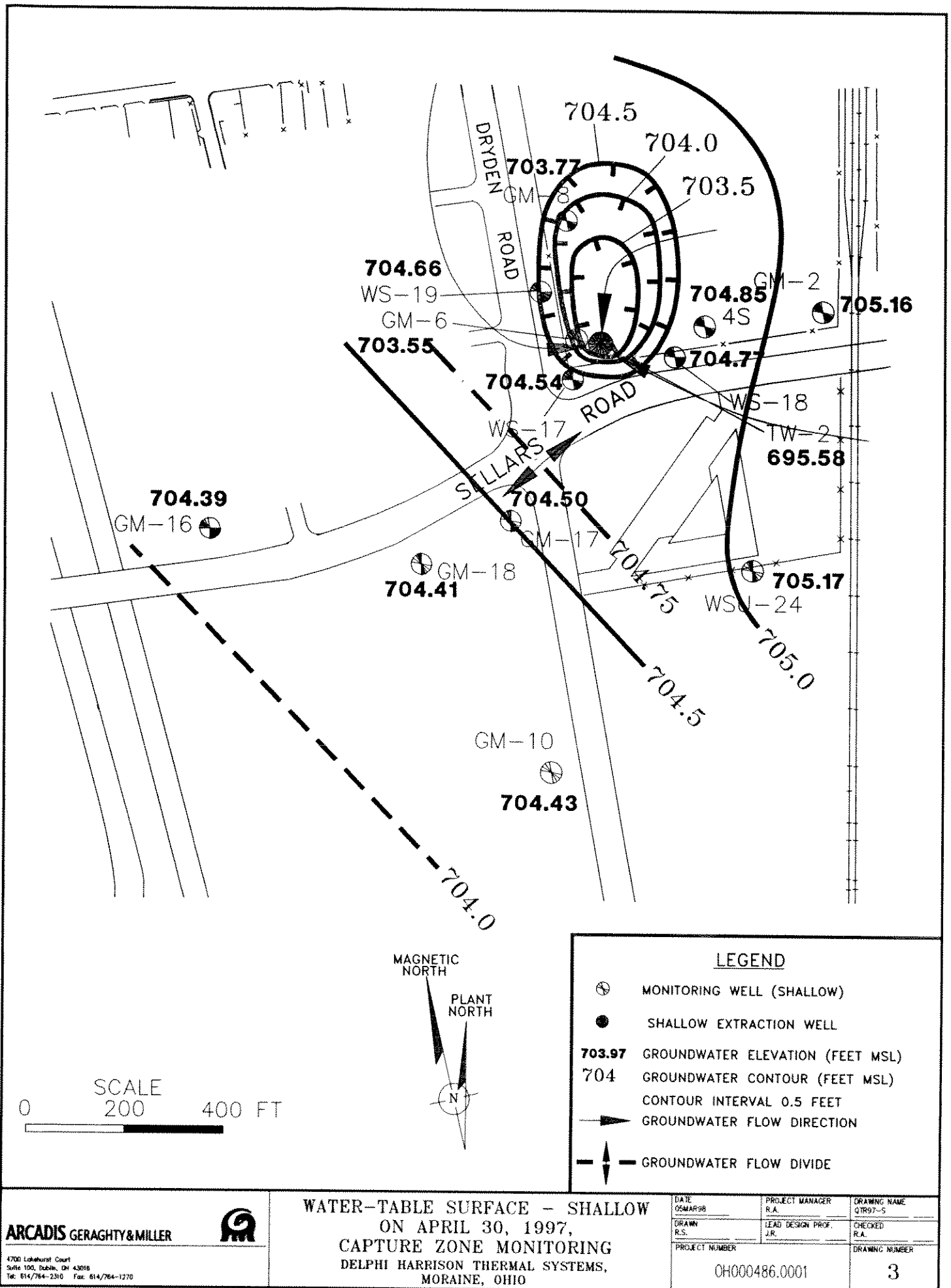
ARCADIS GERAGHTY & MILLER

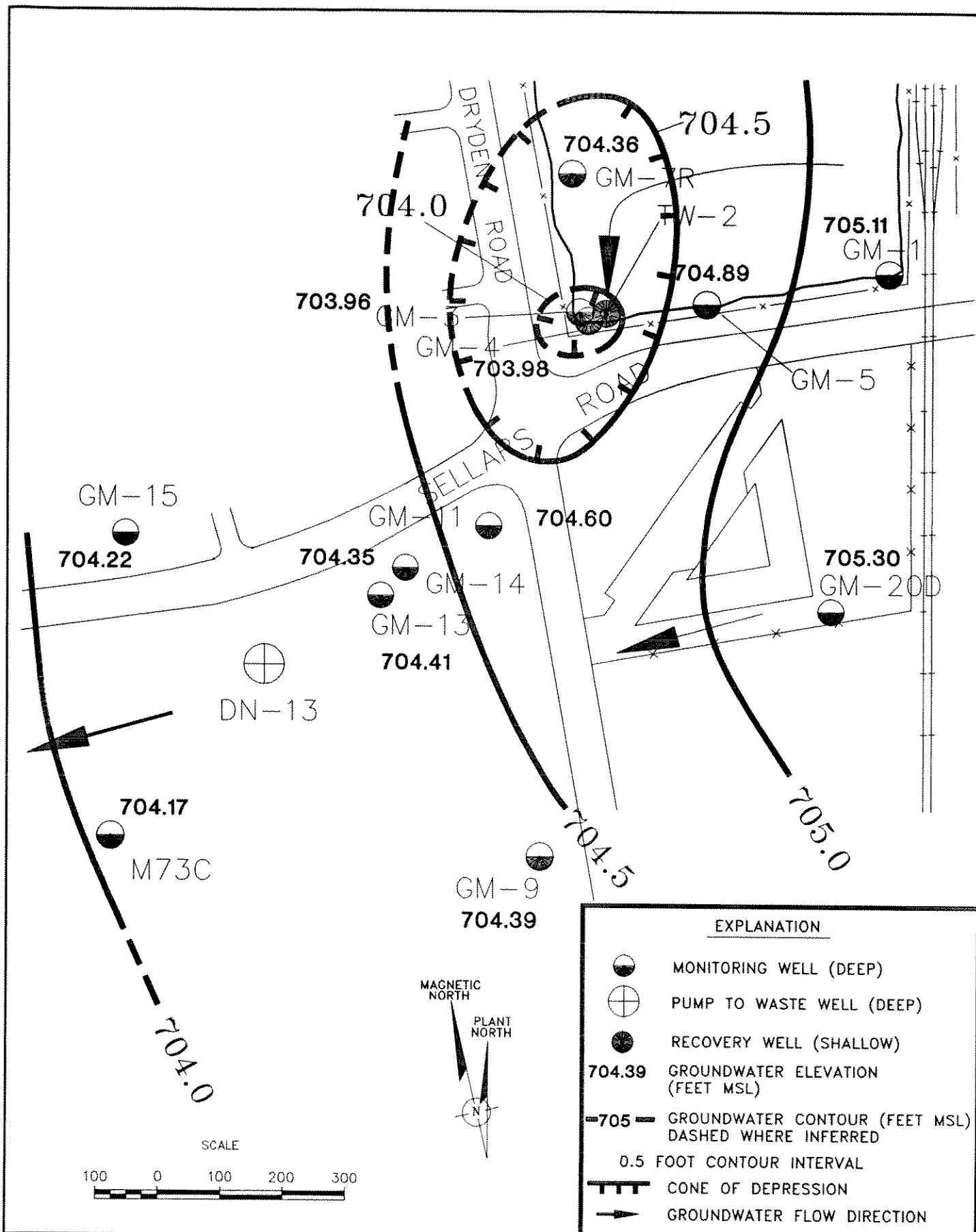


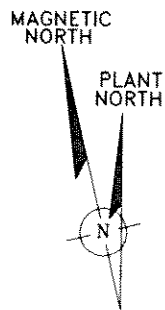
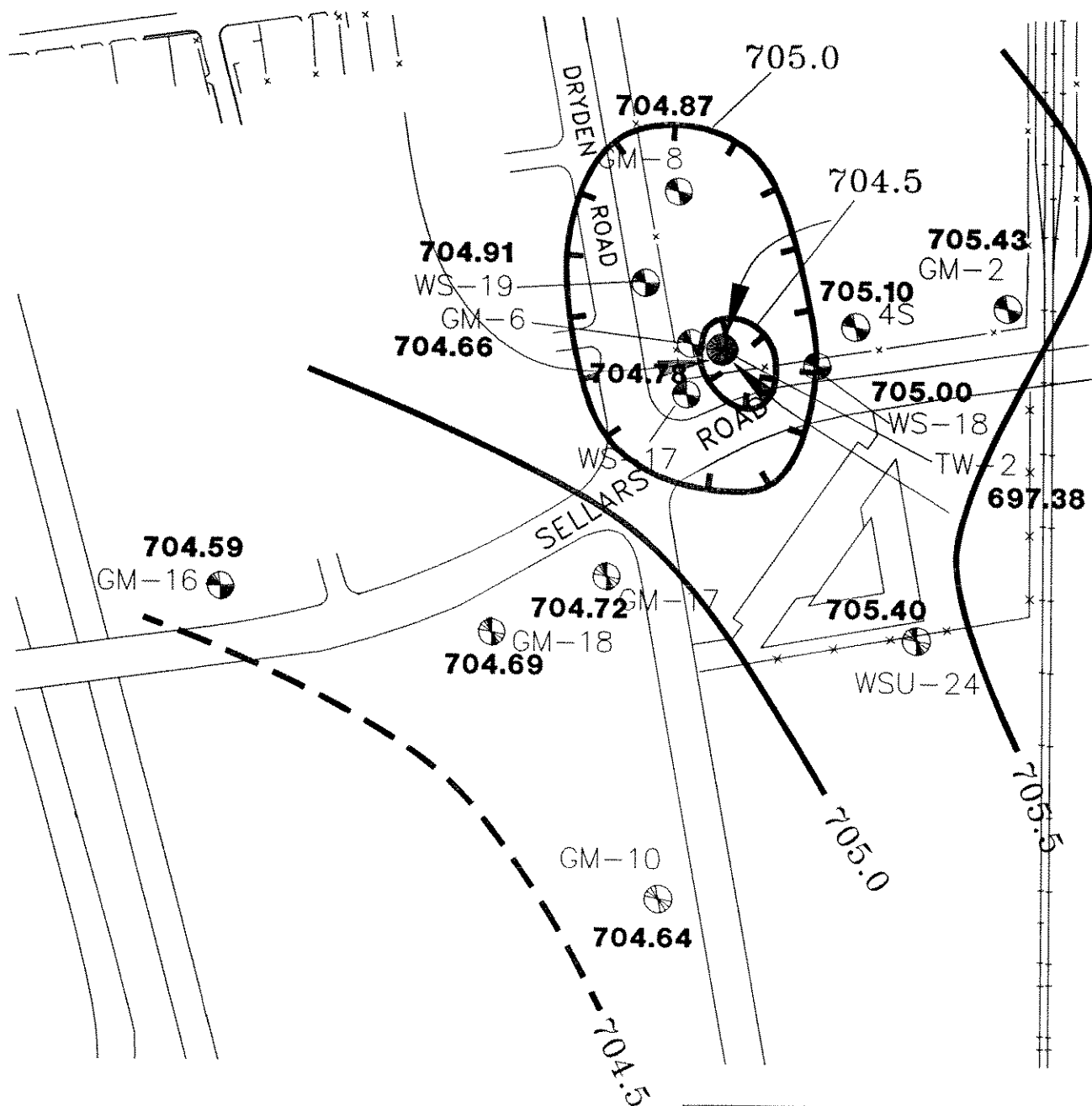
4700 Lukhurst Court
Suite 100, Dublin, OH 43016
Tel. 614/764-2310 Fax 614/764-1270

PRE-PUMPING POTENTIOMETRIC
SURFACE - DEEP ON JANUARY 31, 1996,
CAPTURE ZONE MONITORING
DELPHI HARRISON THERMAL SYSTEMS
MORaine, OHIO

DATE 05MAR96	PROJECT MANAGER R.A.	DRAWING NAME L1-BM
DRAWN R.S.	LEAD DESIGN PROF. J.R.	CHECKED R.A.
PROJECT NUMBER 04000486.0001	DRAWING NUMBER 2	







SCALE
0 200 400 FT

LEGEND

- ⊕ MONITORING WELL (SHALLOW)
- SHALLOW EXTRACTION WELL (ON)
- 705.84 GROUNDWATER ELEVATION (FEET MSL)
- 705— GROUNDWATER CONTOUR (FEET MSL)
CONTOUR INTERVAL 0.5 FEET
- ➔ GROUNDWATER FLOW DIRECTION
- ⌌ CONE OF DEPRESSION

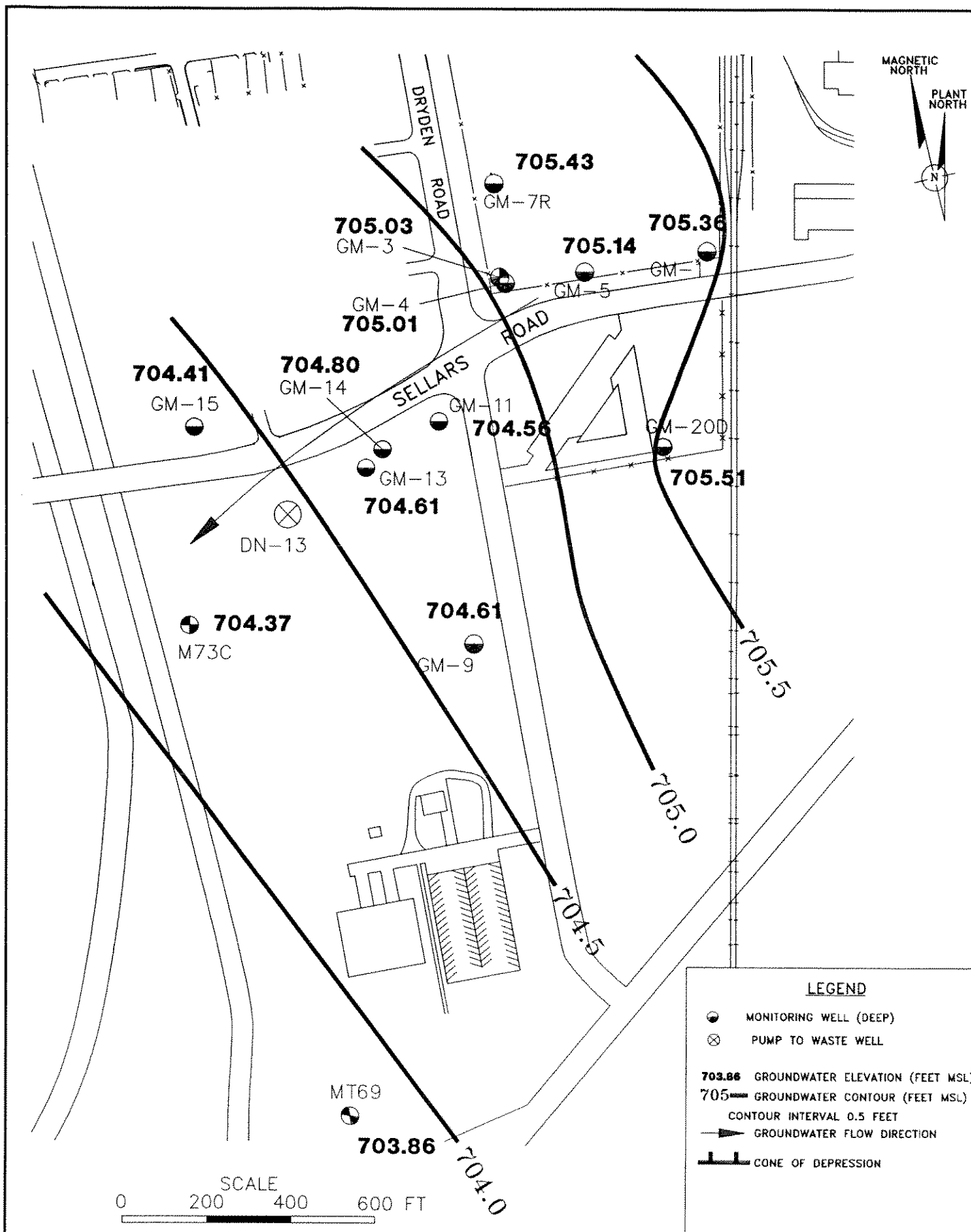
ARCADIS GERAGHTY & MILLER



4700 Lakeshore Court
Suite 100, Dublin, OH 43016
Tel: 614/764-2310 Fax: 614/764-1270

WATER-TABLE SURFACE - SHALLOW
ON JULY 30, 1997,
CAPTURE ZONE MONITORING
DELPHI HARRISON THERMAL SYSTEMS
MORAIN, OHIO

DATE 05MARG8	PROJECT MANAGER R.A.	DRAWING NAME QTR87-S
DRAWN R.S.	LEAD DESIGN PROF. J.R.	CHECKED R.A.
PROJECT NUMBER OH000486.0001	DRAWING NUMBER 5	



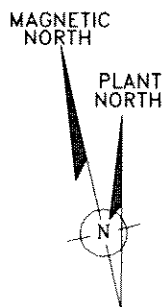
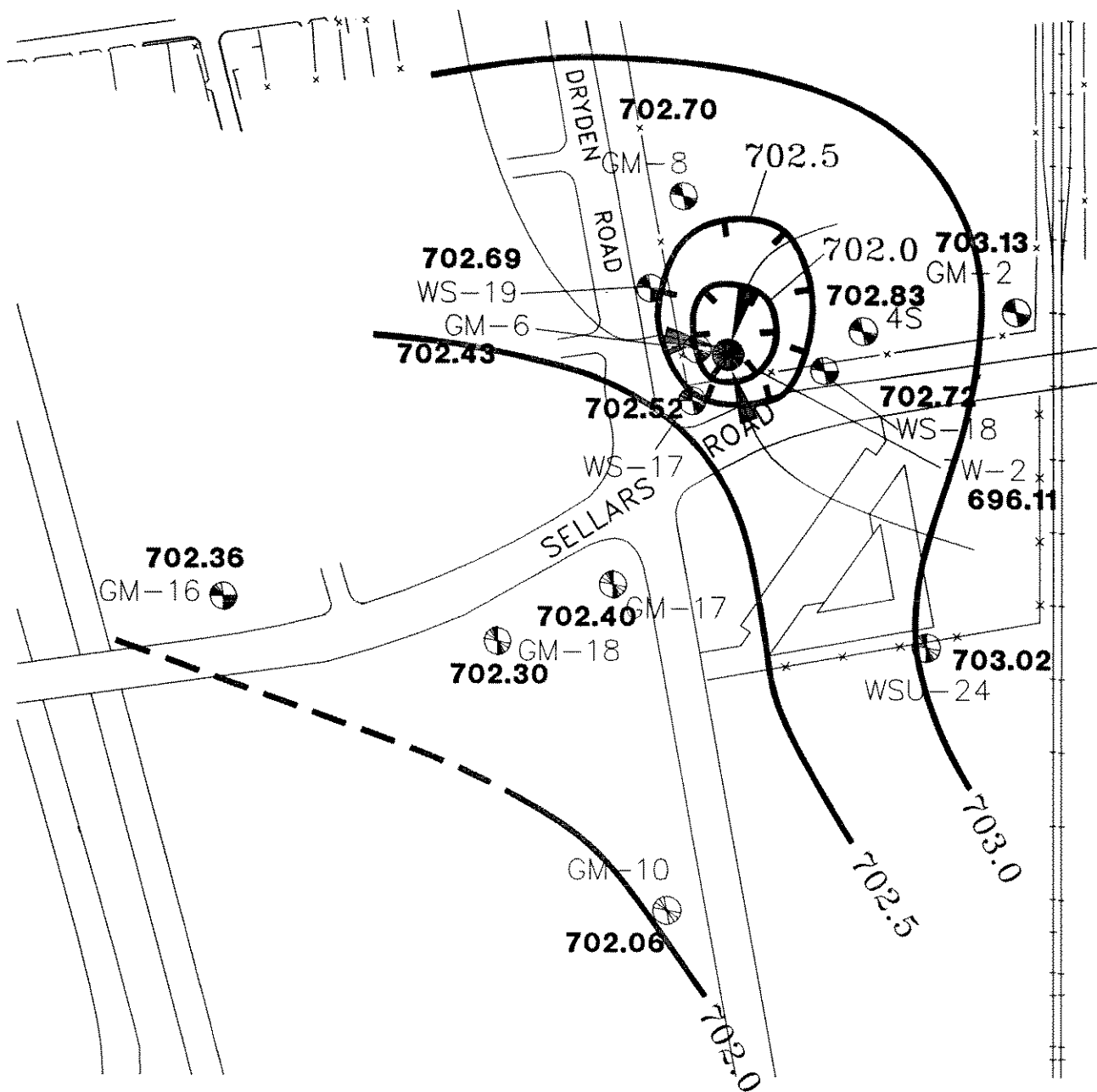
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Suite 100, Dublin, OH 43016
Tel. 614/764-2310 Fax 614/764-1270

POTENTIOMETRIC SURFACE - DEEP
ON JULY 30, 1997,
CAPTURE ZONE MONITORING
DELPHI HARRISON THERMAL SYSTEMS,
MORAINES, OHIO

DATE 03MAR97	PROJECT MANAGER R.A.	DRAWING NAME QRT97-D
DRAWN R.S.	LEAD DESIGN PROJ. J.R.	CHECKED R.A.
PROJECT NUMBER OH000486.0001	DRAWING NUMBER 6	



SCALE
0 200 400 FT

LEGEND

- ⊕ MONITORING WELL (SHALLOW)
- SHALLOW EXTRACTION WELL (ON)
- 702.36** GROUNDWATER ELEVATION (FEET MSL)
- 703** GROUNDWATER CONTOUR (FEET MSL)
- CONTOUR INTERVAL 0.5 FEET
- GROUNDWATER FLOW DIRECTION
- CONE OF DEPRESSION

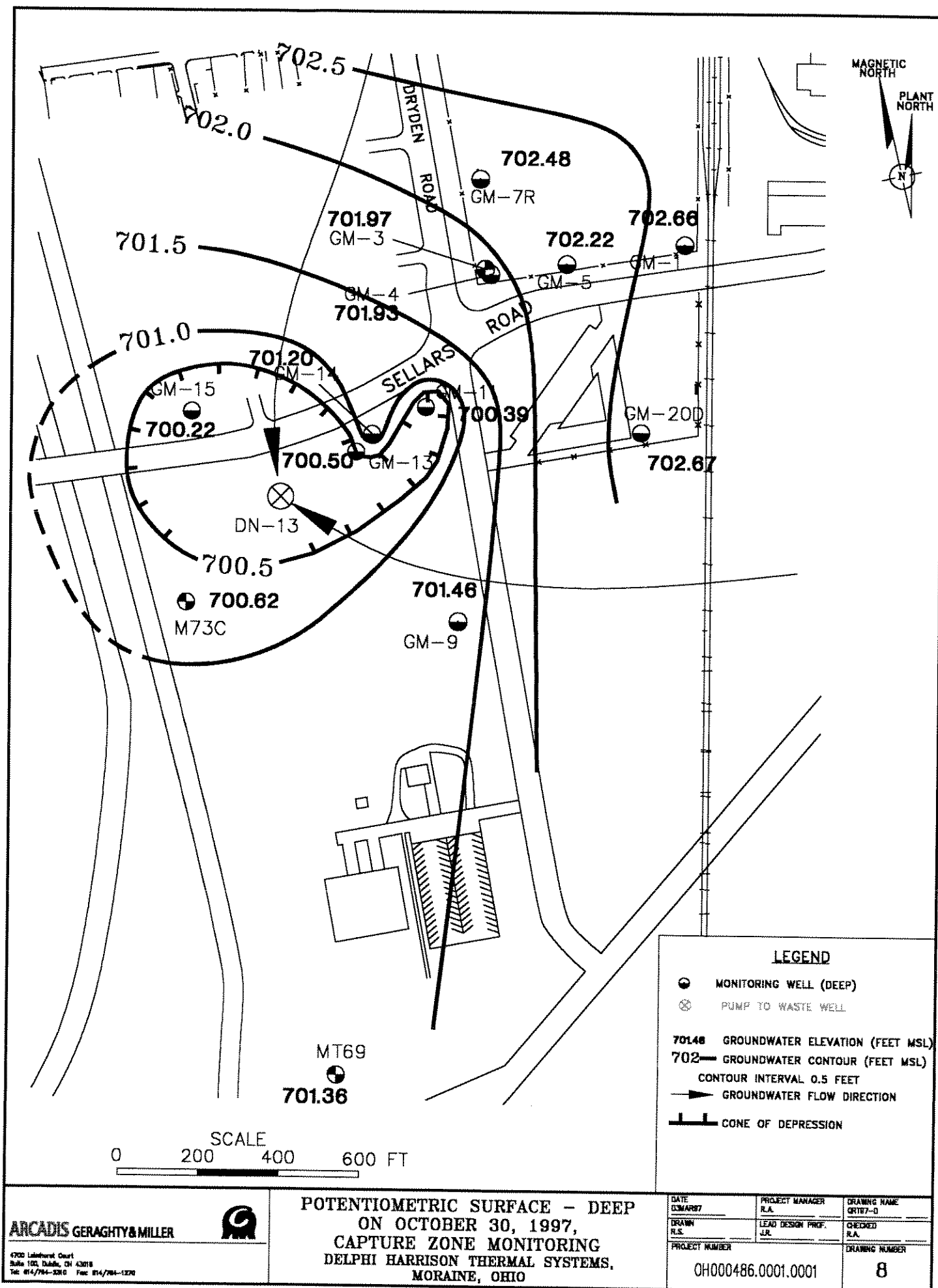
ARCADIS GERAGHTY & MILLER

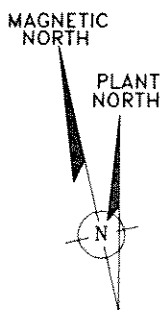
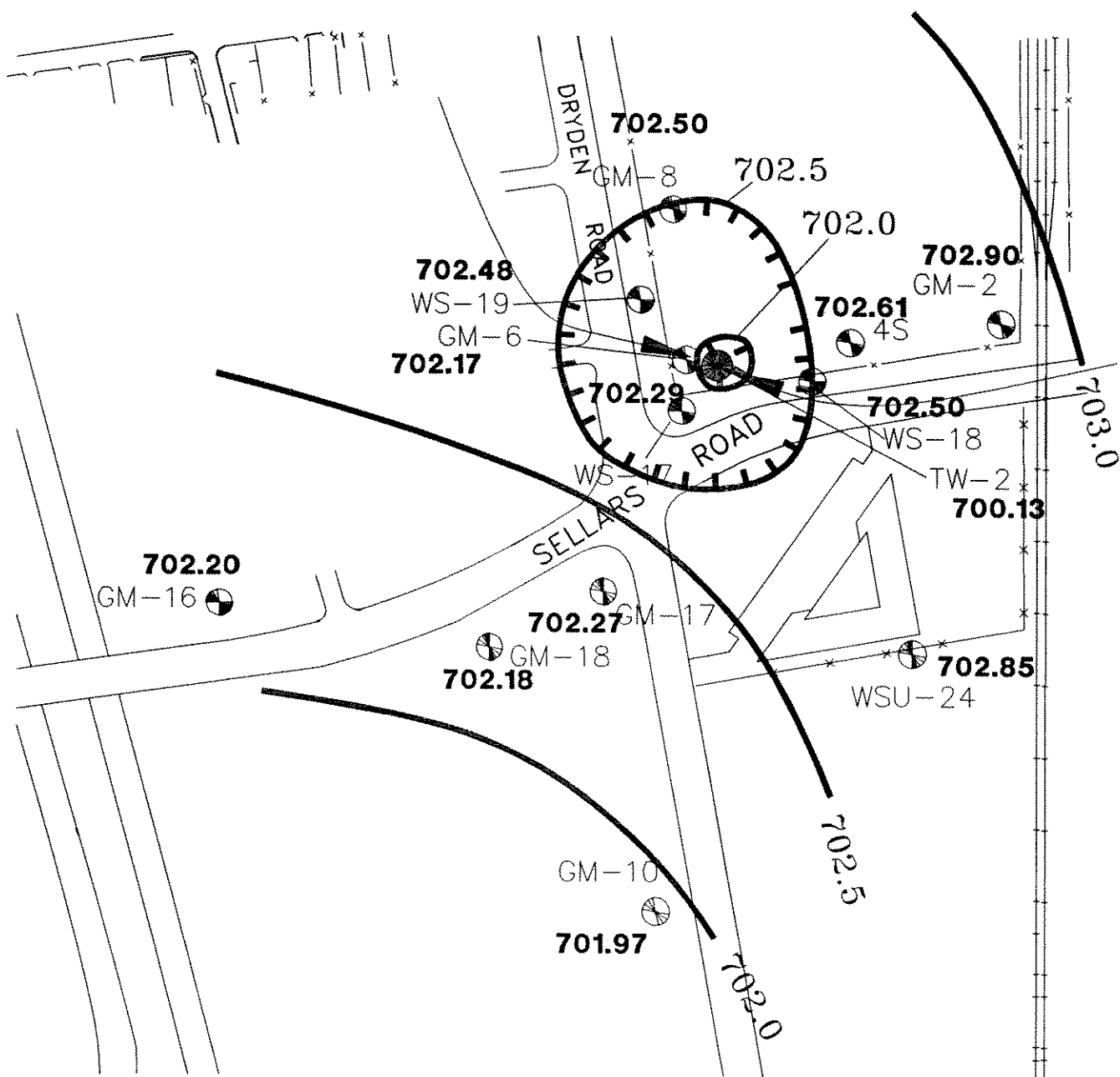


4700 Lakeshore Court
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WATER-TABLE SURFACE - SHALLOW
ON OCTOBER 30, 1997,
CAPTURE ZONE MONITORING
DELPHI HARRISON THERMAL SYSTEMS,
MORAINES, OHIO

DATE 05MAR98	PROJECT MANAGER R.A.	DRAWING NAME QTRB7-5
DRAWN R.S.	LEAD DESIGN PROF. J.R.	CHECKED R.A.
PROJECT NUMBER OH000486.0001	DRAWING NUMBER 7	





SCALE
0 200 400 FT

LEGEND

- MONITORING WELL (SHALLOW)
- SHALLOW EXTRACTION WELL
- 702.85** GROUNDWATER ELEVATION (FEET MSL)
- 703** GROUNDWATER CONTOUR (FEET MSL)
CONTOUR INTERVAL 0.5 FEET
- GROUNDWATER FLOW DIRECTION
- CONE OF DEPRESSION

ARCADIS GERAGHTY & MILLER



4700 Lakeshore Court
Suite 100, Dublin, OH 43016
Tel: 614/764-2310 Fax: 614/764-1270

WATER-TABLE SURFACE - SHALLOW
ON JANUARY 30, 1998,
CAPTURE ZONE MONITORING
DELPHI HARRISON THERMAL SYSTEMS,
MORaine, OHIO

DATE 05MAR98	PROJECT MANAGER R.A.	DRAWING NAME QTR97-S
DRAWN R.S.	LEAD DESIGN PROF. J.R.	CHECKED R.A.
PROJECT NUMBER OH000486.0001	DRAWING NUMBER 9	

