ARCADIS GERAGHTY & MILLER

Third Annual Interim Measures Capture Zone Report

Delphi Harrison Thermal Systems
Moraine, Ohio

PREPARED FOR

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 Great 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) were 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 and second years of operation (January 31,1996 through January 31, 1997, and January 31, 1997 through January 31, 1998, respectively) was submitted in reports titled First Annual Interim Measures Capture Zone Report (Geraghty & Miller, Inc. 1997) and Second Annual Interim Measures Capture Zone Report (ARCADIS Geraghty & Miller, 1998). This report provides a summary of data collected during the third year of operation (January 31, 1998 through January 31, 1999). 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 three years of operation (January 31, 1996 through January 31, 1999), the system has recovered and treated a total of 231,658,610 gallons at an average flow rate of approximately 150 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. During the third year of operation, the system recovered 76,026,270 gallons of water at an average flow rate of approximately 149 gpm.

From November 1996 through the end of this reporting period, 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 (Personal Communication, 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, 1998 through January 31, 1999, the TW-2 component of the Interim Measures remediation system has operated continuously except for two brief unscheduled shutdowns and three scheduled shutdowns for routine maintenance and cleaning. During June 1998, the system was shut down for about 25 hours to allow for the internal portions of the tower to be inspected and chemically cleaned. The tower packing was also replaced by the tower manufacturer. A 23-minute unscheduled shutdown occurred in August 1998 due to a power outage. The treatment system was shut down for 15 minutes in early November 1998 when a valve was installed in the brominator feed system. Also in early November 1998, an unscheduled shutdown occurred for approximately 2.5 hours due to a power outage. Finally, the system was shut down for approximately 9 days during December 1998 for a planned cleaning of the recovery-well screen and below-ground portions of the influent line from TW-2 to the air stripper tower.

DN-13 Operation

Montgomery County Well DN-13 was operational throughout the reporting period (January 31, 1998 through January 31, 1999) except for undetermined periods of time

on September 11, 14, 15, 16, and 24, 1998 due to electrical overload problems and on October 13th and 15th due to brief power outages.

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 Test America, Inc. (formerly 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, 1998 through January 31, 1999). 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 24 other groundwater monitoring events over the three years of operation, with four of these events conducted during the current reporting period. These groundwater monitoring events 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, 1998 through January 31, 1999). The quarterly groundwater elevation measurements were performed for shallow and deep wells on April 29, 1998 (Figures 3 and 4, respectively), July 30, 1998 (Figures 5 and 6, respectively), October 30, 1998 (Figures 7 and 8, respectively) and January 29, 1999 (Figures 9 and 10, respectively).

Figures 3, 5, 7 and 9 depict groundwater flow in the upper aquifer during the quarterly events. Well TW-2 is shown to effectively influence upper aquifer groundwater flow in all four quarters of the reporting period. Figures 4, 6, 8, and 10 depict the influence of the Interim Measures on groundwater flow in the lower aquifer with DN-13 operating. During September 1998 when DN-13 was experiencing some downtime, an evaluation of its influence was made using groundwater flow data obtained on September 14, 1998 as part of the North Settling Lagoon Groundwater Quality Assessment Program. Figure 12 of the North Settling Lagoon Fifteenth Annual Groundwater Quality Assessment (ARCADIS Geraghty & Miller, 1999) illustrates the potentiometric surface on September 14, 1998 (Appendix A). Well DN-13 is shown to effectively influence lower aquifer groundwater flow throughout the reporting period.

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, 18 months after operation began, and 30 months after operation began. In general, total VOC concentrations have steadily decreased in these wells during the three years of combined TW-2 and DN-13 operation. 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 third 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 DN-13 such that hydraulic control at the southern end of the facility has been established (Figures 3 though 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).

4. Groundwater quality results (Table 5) indicate that total VOC concentrations have decreased over the three years of combined TW-2 and DN-13 operation.

References

ARCADIS Geraghty & Miller. 1999. Fifteenth Annual Groundwater Quality Assessment, North Settling Lagoon, January 1998 through December 1998, Delphi Harrison Thermal Systems, Moraine, Ohio, February 1999.

ARCADIS Geraghty & Miller. 1998. Second Annual Interim Measures Capture Zone Report, January 31, 1997 through January 31, 1998, Delphi Harrison Thermal Systems, Moraine, Ohio, May, 1998.

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 Communication. 1996. Personal Communication between Mr. William Buller of the U.S. EPA and Mr. James Reid of Geraghty & Miller, Inc. November 1996.

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

	RESULTS												
CONSTITUENT	2/11/98	3/11/98	4/28/98	5/5/98	6/2/98	7/1/98	7/30/98	8/26/98	9/22/98	10/21/98	11/18/98	12/22/98	1/12/99
Benzene	1.0	--	--	--	1.1	1.3	1.5	1.4	1.4	1.4	1.2	1.4	1.1
Chloroethane	--	--	--	--	5.8	--	--	8.0	--	10.4	9.8	--	9.8
1,1-Dichloroethane	29.5	26.3	24.2	25.0	24.1	23.8	28.3	30.3	32.9	38.5	34.2	31.5	31.5
trans-1,2-Dichloroethene	2.1	2.1	2.1	2.2	2.3	2.3	2.8	3.1	3.6	4.2	3.3	3.2	2.8
Ethylbenzene	2.8	4.3	5.2	5.0	4.8	6.3	6.0	5.1	4.5	4.6	4.7	17.9	5.8
Tetrachloroethene	44.2	26.9	34.8	34.0	25.9	24.6	28.4	26.1	27.7	35.3	33.8	31.7	43.3
Toluene	--	--	--	--	--	--	1.8	1.0	--	--	--	1.4	1.9
1,1,1-Trichloroethane	14.2	12.9	12.7	11.2	8.8	9.3	8.8	9.1	10.0	11.7	10.1	10.1	13.1
Trichloroethene	65.7	68.3	80.1	77.6	65.8	68.5	69.2	63.3	63.5	75.4	68.9	64.4	73.8
Vinyl chloride	3.1	2.8	5.6	4.5	3.8	4.2	3.4	4.0	5.0	5.2	5.6	5.1	6.0
Xylenes	14.4	8.5	10.3	10.5	8.8	--	9.5	8.8	7.8	7.6	6.9	13.8	10.8
TOTAL*	177.0	152.1	175.0	170.0	151.2	140.3	159.7	160.2	156.4	194.3	178.5	180.5	199.9

* Permit Limit 850 ug/L.

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

-- Not detected.

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

CONSTITUENT	PERMIT LIMIT	RESULTS												
		2/11/98	3/11/98	4/28/98	5/5/98	6/2/98	7/1/98	7/30/98	8/26/98	9/22/98	10/21/98	11/18/98	12/22/98	1/12/99
Fats, Oils & Grease (mg/L)	10 mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--
pH, Field (S.U.)	6.5 - 9.0 S.U.	7.73	7.48	7.09	7.15	7.30	7.82	7.77	7.92	8.04	7.94	7.96	8.09	8.20
Benzene (ug/L)	5 ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene (ug/L)	5 ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene (ug/L)	5 ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes (ug/L)	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

mg/L Milligrams per Liter.
S.U. Standard Units.
ug/L Micrograms per Liter.
-- Not detected.
NA Not available.

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-2	4S	GM-6	GM-8	GM-16	GM-17	GM-18	WS-17	WS-18	WS-19	TW-2	GM-10	WSU-24	GM-26S
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
4/29/98	705.22	704.93	704.56	704.80	704.53	704.61	704.52	704.67	703.85	704.70	703.30	704.34	705.19	704.08
7/30/98	706.05	705.66	705.16	705.36	705.00	704.14	705.01	705.26	705.53	705.34	702.97	704.89	705.91	704.46
10/30/98	702.99	702.66	702.25	702.51	702.25	702.30	702.22	702.36	702.58	702.53	700.23	702.00	702.90	701.56
1/29/99	704.64	703.55	704.54	704.83	704.68	704.58	704.51	704.40	704.54	704.83	701.90	704.11	704.73	703.72

NA Not Available.

MSL Mean Sea Level.

TW-2 Upper Aquifer Recovery Well.

Water-level elevations measured in wells GM-16, GM-10, WSU-24, and GM-26S 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)												
	GM-1	GM-3	GM-4	GM-5	GM-7R	GM-9	GM-11	GM-13	GM-14	GM-15	GM-20D	M73C	MT-69
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
4/29/98	704.74	704.07	704.08	704.32	704.57	703.82	703.43	702.81	702.65	702.54	704.82	702.95	703.83
7/30/98	705.52	704.76	704.75	705.04	705.26	704.32	704.02	703.32	703.18	703.03	705.57	703.43	NA
10/30/98	702.60	701.92	701.92	702.19	702.43	701.45	701.21	700.54	700.43	700.31	702.64	700.71	NA
1/29/99	704.13	703.71	703.69	703.85	704.19	703.49	703.10	702.49	702.38	702.42	704.26	702.81	703.56

MSL Mean Sea Level.

NA Not Available.

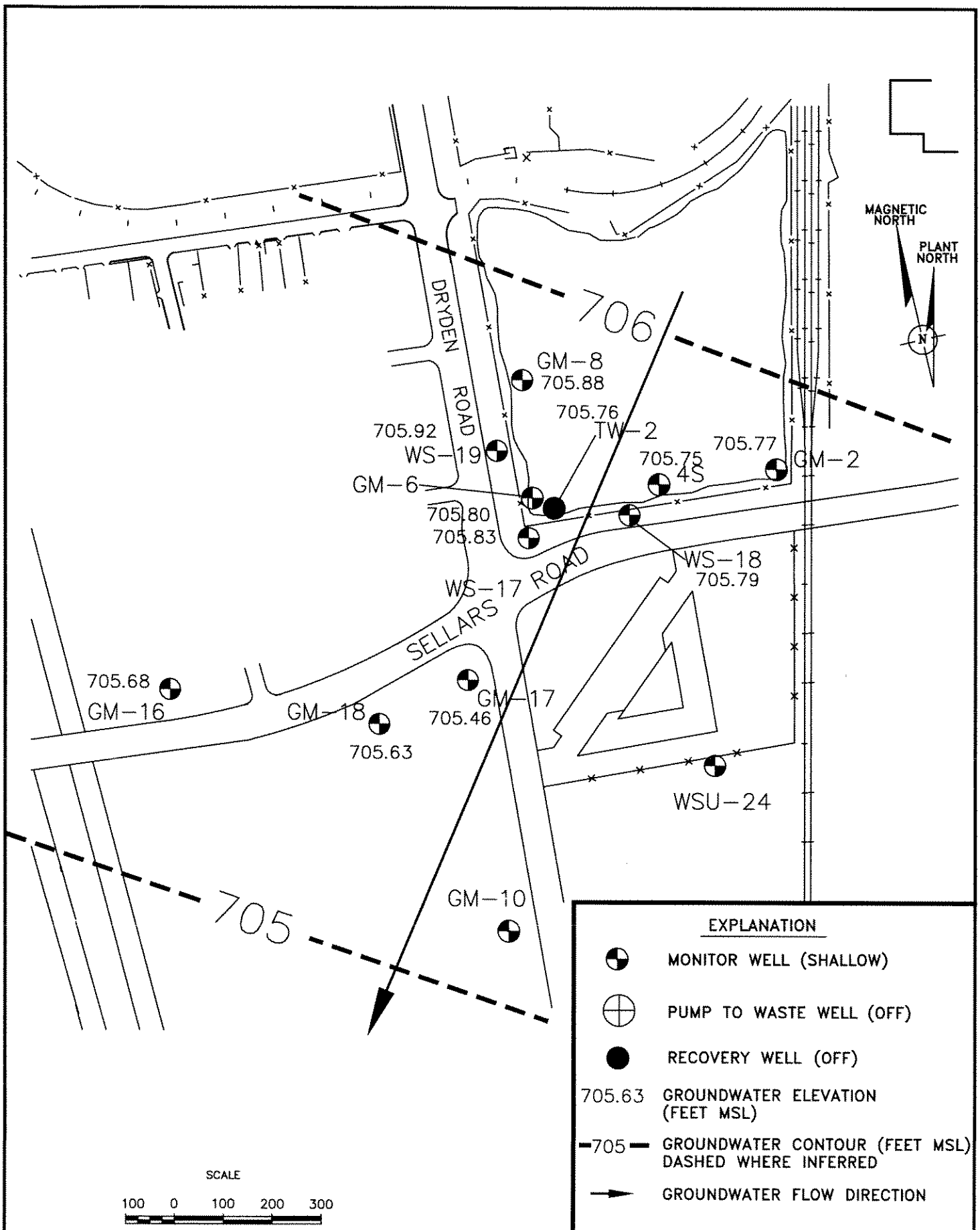
Water-level elevation in well MT-69 are not required in the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995) but are being measured to provide additional data.

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	7/30/98	1/31/96	7/31/96	7/30/97	7/30/98	1/31/96	7/31/96	7/30/97	7/30/98	1/31/96	7/31/96	7/30/97	7/30/98	1/31/96	7/31/96	7/30/97	7/30/98
Benzene	3.9	1.6	1.2	1.4	2.2	--	--	--	2.5	--	--	--	4.3	1.5	--	--	--	1.1	1.1	--
Chlorobenzene	--	5.5	2.5	1.9	4.9	--	--	--	--	--	--	--	3.1	6.7	3.1	--	--	--	--	--
Chloroethane	17.0	--	--	--	19.9	16.0	--	--	13.0	24.3	19.5	15.4	16.4	--	--	--	--	--	--	--
1,1-Dichloroethane	110.0	50.6	37.6	27.7	69.6	45.6	24.5	17.7	88.5	82.6	55.4	39.3	99.7	28.1	6.4	3.3	57.1	61.6	45.4	29.1
1,1-Dichloroethene	1.2	--	--	--	--	--	--	--	1.2	--	1.8	1.7	--	--	--	--	1.9	--	1.6	--
trans-1,2-Dichloroethene	11.1	4.4	2.6	2.8	3.7	8.4	3.0	--	9.1	6.5	3.0	3.6	9.9	2.4	--	--	4.1	5.3	3.7	2.5
cis-1,2-Dichloroethene	--	41.3	35.2	33.8	--	16.2	1.0	--	--	97.4	119.0	106	--	21.2	4.1	4.3	--	118.0	80.8	49.9
Ethylbenzene	127.0	10.7	5.7	5.6	2.9	4.1	--	--	88.8	3.6	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	--	10.4	26.4	26.5	--	--	--	--	10.3	68.0	94.0	99.8	1.2	1.2	1.4	2.6	2.5	3.2	3.9	3.6
Toluene	4.0	6.7	--	1.8	--	--	--	--	1.3	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	4.9	9.7	14.3	8.5	--	--	--	--	20.0	36.8	48.9	27.5	7.0	4.7	3.4	3.7	41.6	41.2	33.5	31.5
Trichloroethene	43.0	64.6	73.5	66.5	5.6	8.0	2.4	1.3	118.0	160.0	118.0	128.0	39.2	34.5	44.6	43.0	105.0	110.0	105.0	109
Vinly Chloride	32.4	8.7	3.3	4.4	--	14.1	--	--	16.3	21.4	7.8	14.0	16.6	--	--	--	--	--	--	--
Xylenes	103.0	25.6	10.3	8.9	1.0	--	--	--	37.6	--	--	--	--	--	--	--	--	--	--	--
Total VOC Concentration	457.5	239.8	212.6	189.8	109.8	112.4	30.9	19.0	406.6	500.6	467.4	435.3	197.4	100.3	63.0	56.9	212.2	340.4	275.0	225.6

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

-- Not detected.



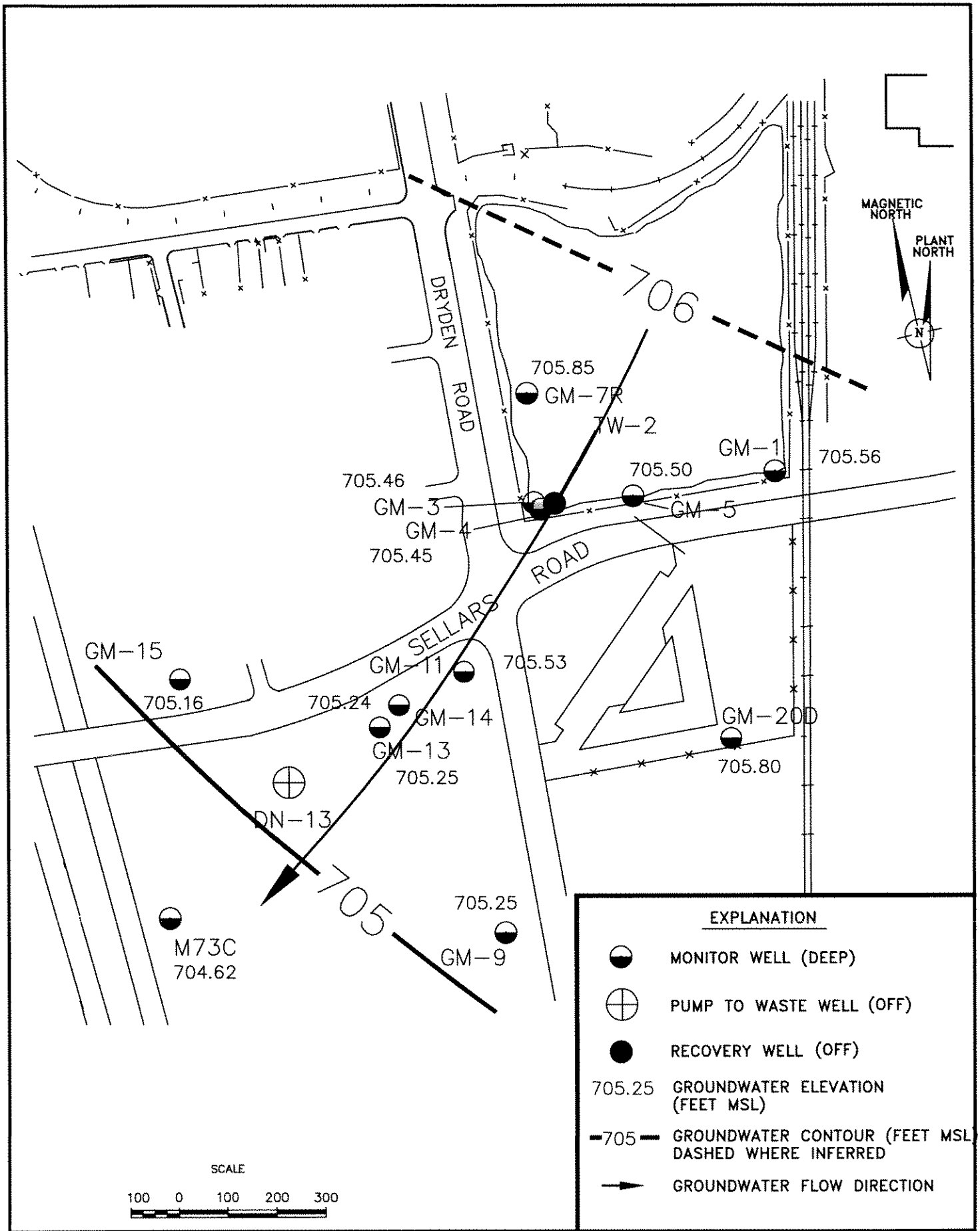
ARCADIS GERAGHTY & MILLER

4700 Lakehurst Court
Suite 100, Dublin, OH 43016
Tel: 614/764-2310 Fax: 614/764-1276

PRE-PUMPING WATER-TABLE SURFACE - SHALLOW ON JANUARY 31, 1996, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
05MAR96	R.A.	L1-IM
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
0H000486.0001		1



ARCADIS GERAGHTY&MILLER

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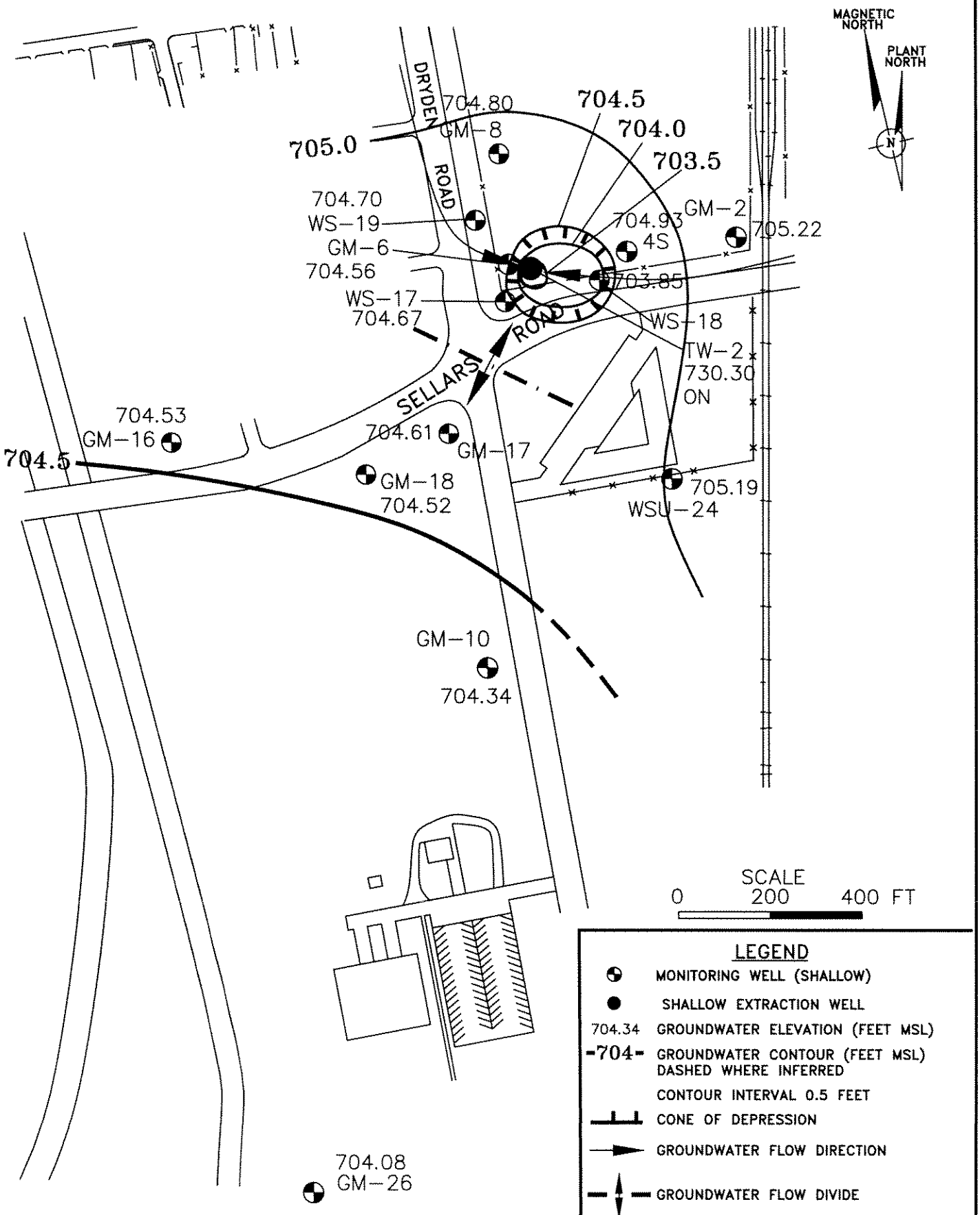
Suite 100, Dublin, OH 43016
Tel: 614/764-2310 Fax: 614/764-1270

PRE-PUMPING POTENTIOMETRIC SURFACE - DEEP ON JANUARY 31, 1996, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS
MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
05MAR98	R.A.	L1-M
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
0H000486.0001		2



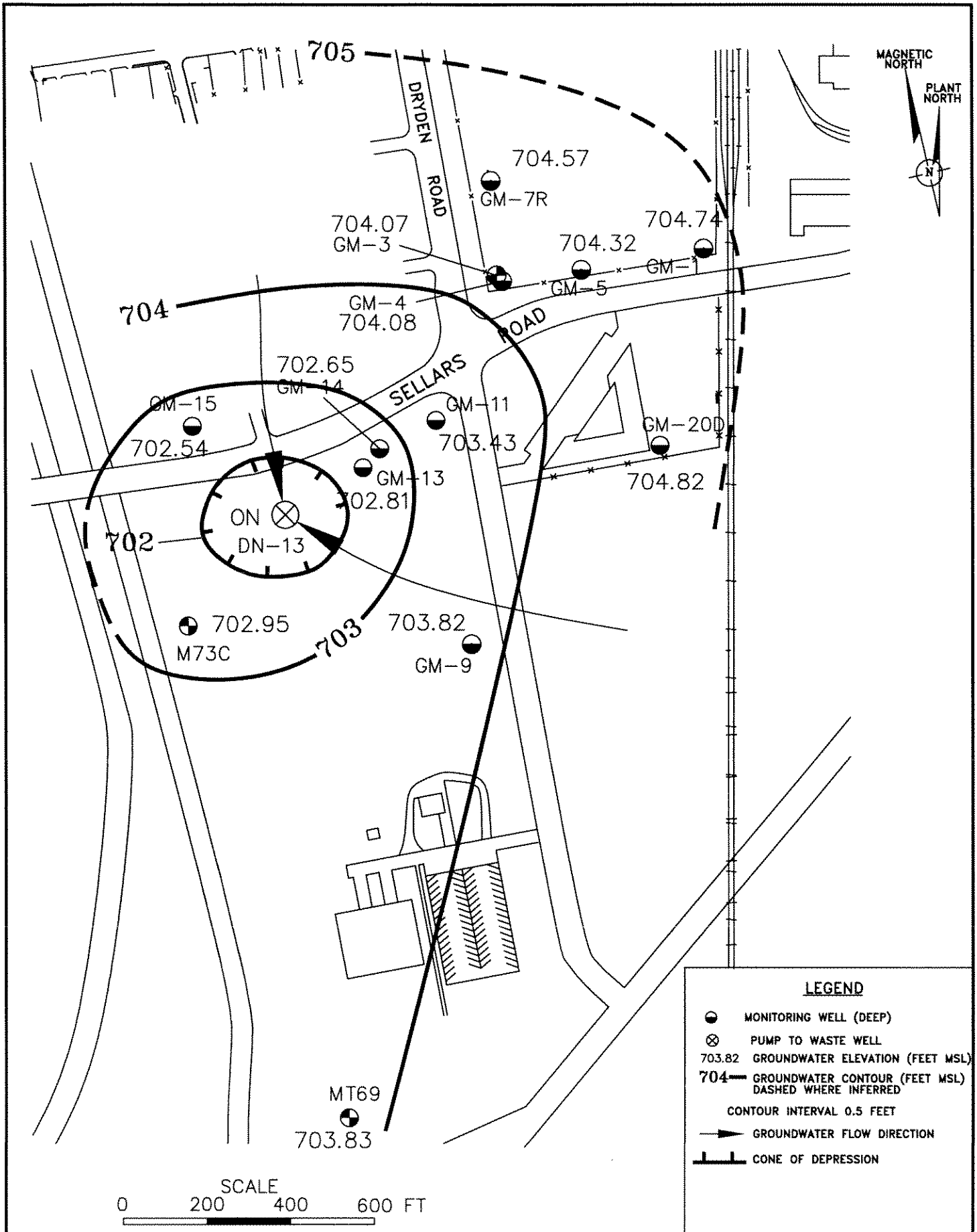
ARCADIS GERAGHTY & MILLER

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

WATER-TABLE SURFACE - SHALLOW ON APRIL 29, 1998, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
05MAR98	R.A.	QTR98-S
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
0H000486.0001.0002		3



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

POTENTIOMETRIC SURFACE - DEEP ON APRIL 29, 1998, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
03MAR97	R.A.	QRTDB-D
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
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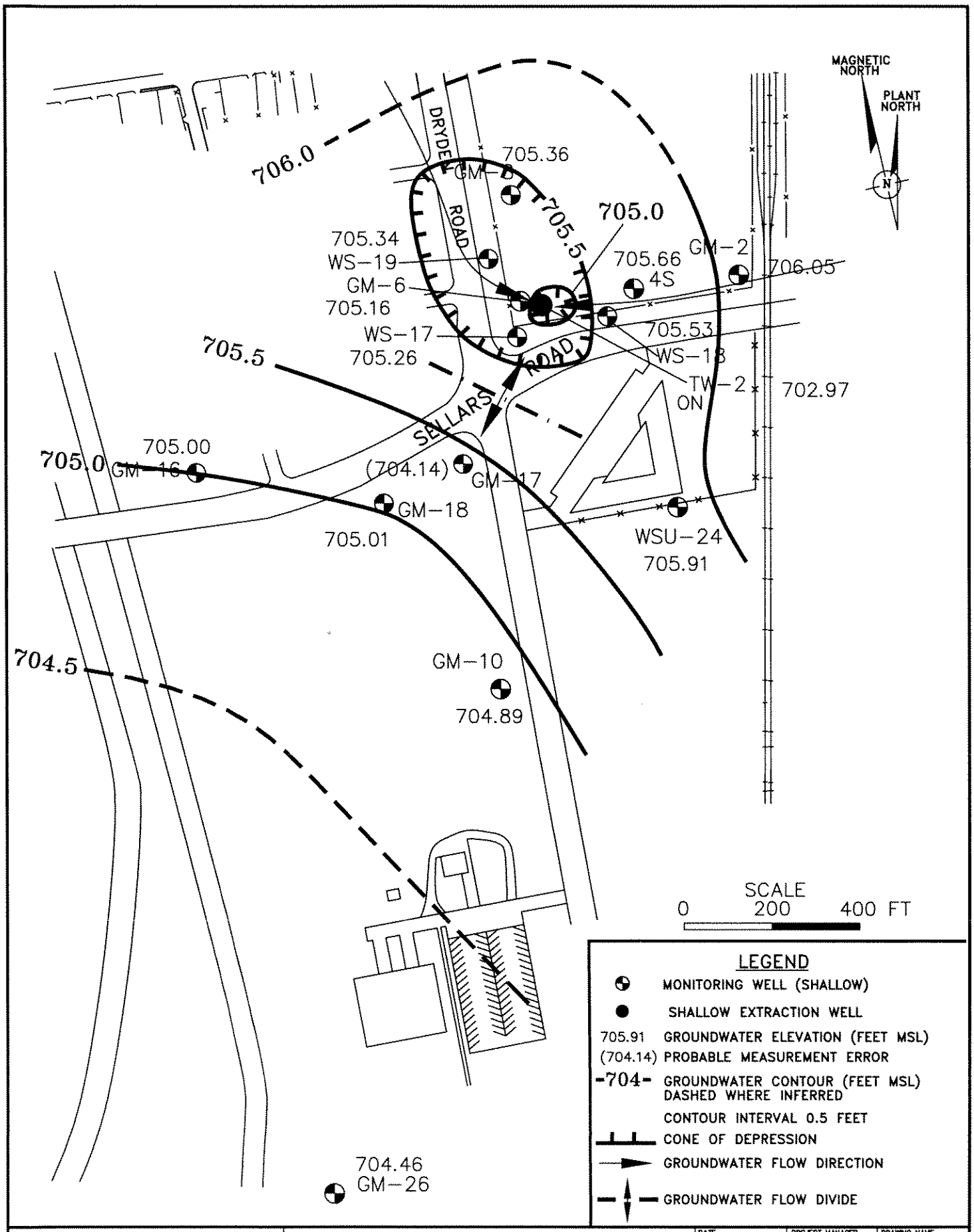

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WATER-TABLE SURFACE - SHALLOW ON JULY 30, 1998, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
05MAR98	R.A.	QTR98-S
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
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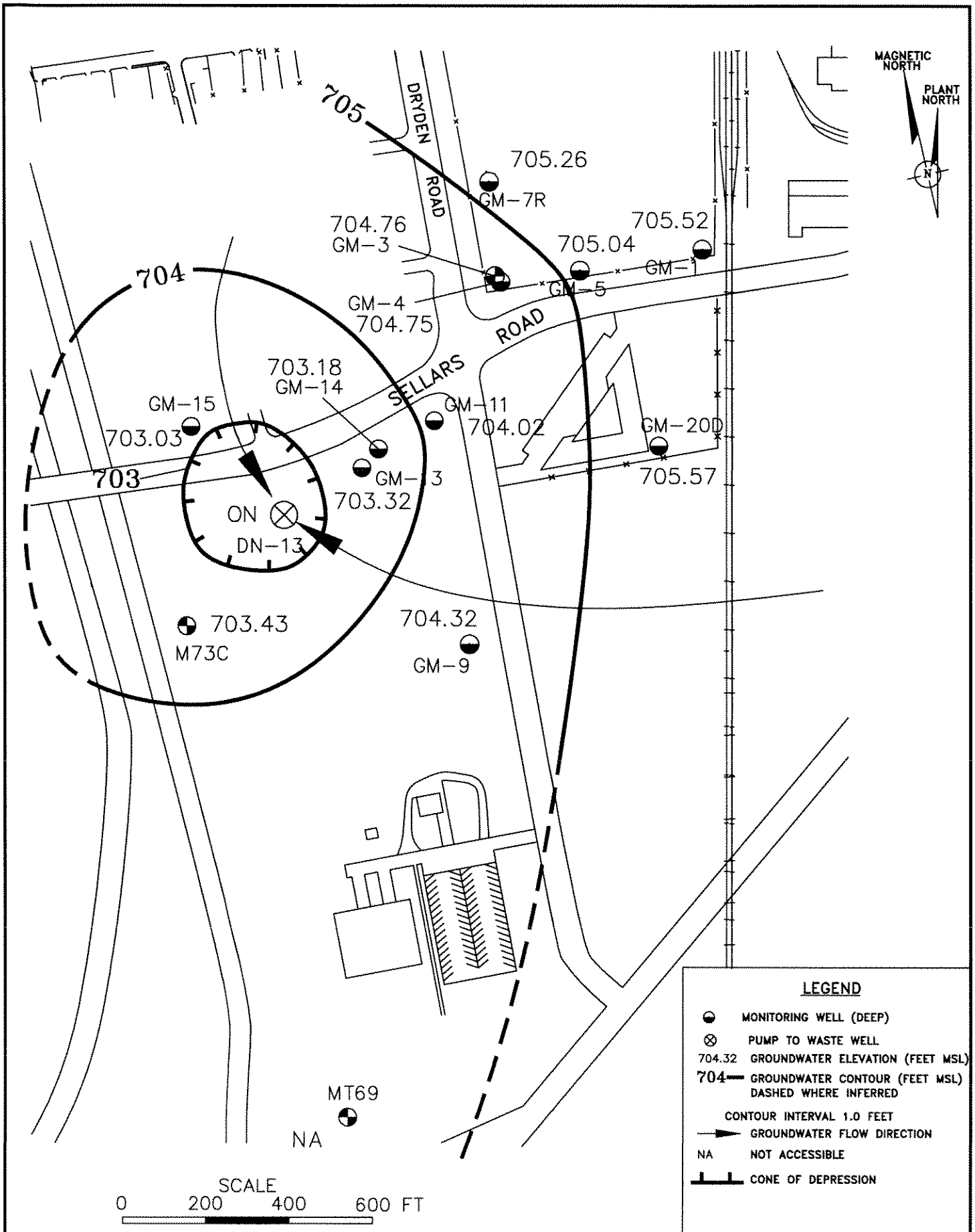

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POTENTIOMETRIC SURFACE – DEEP ON JULY 30, 1998, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
03MAR97	R.A.	QRT98-D
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
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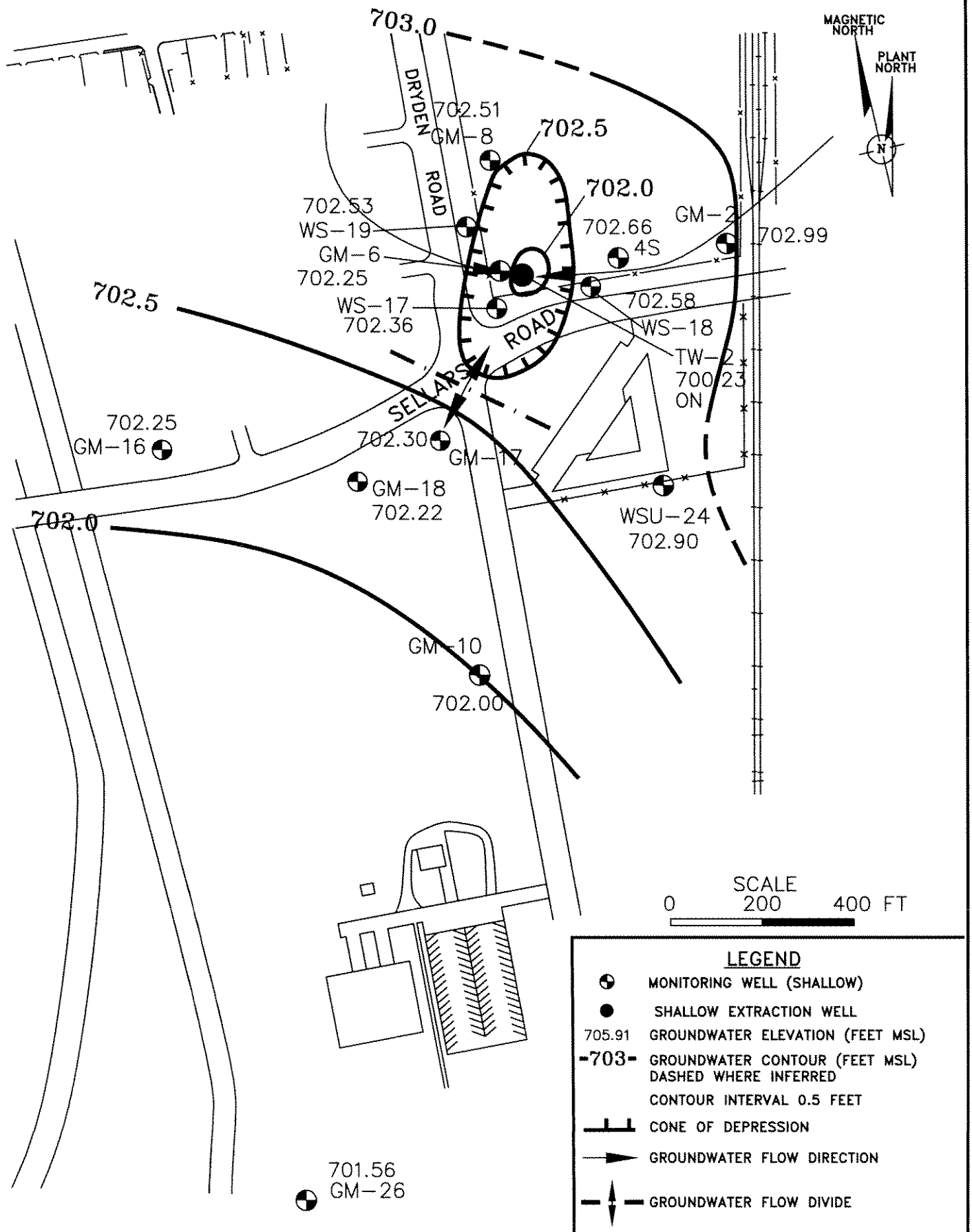

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WATER-TABLE SURFACE – SHALLOW ON OCTOBER 30, 1998, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
05MAR98	R.A.	QTR98-5
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
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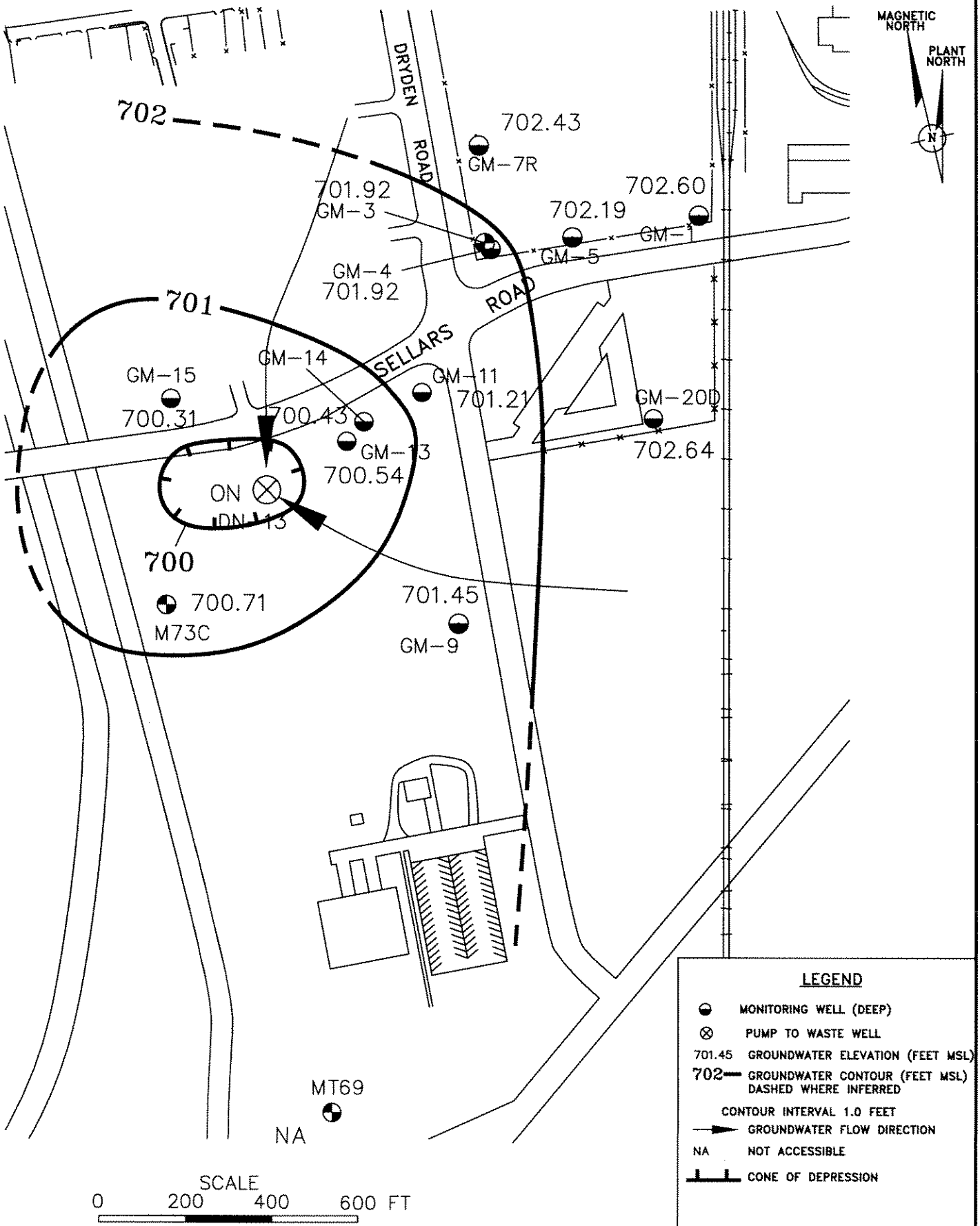

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POTENTIOMETRIC SURFACE – DEEP ON OCTOBER 30, 1998, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
03MAR97	R.A.	QR797-D
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
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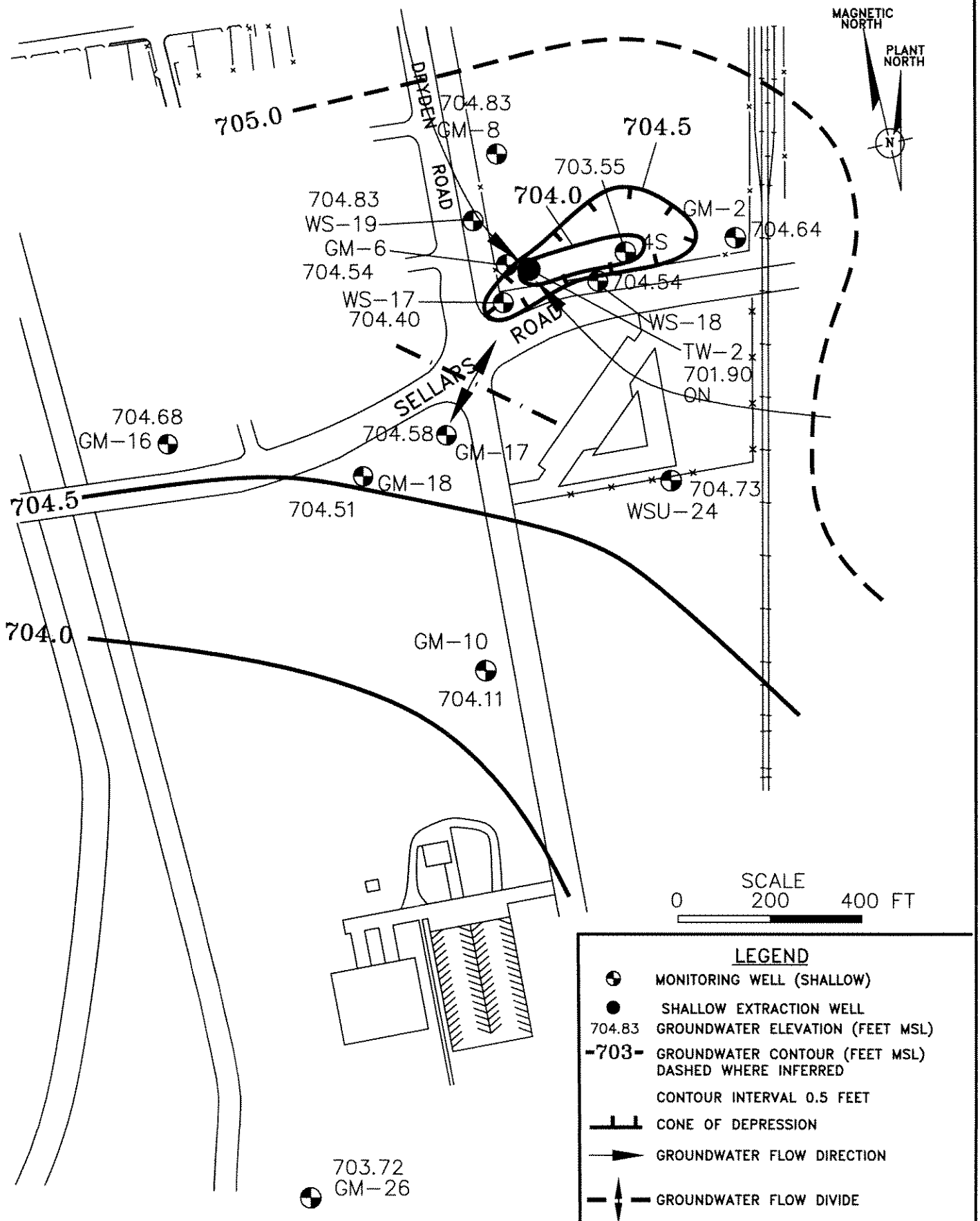

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WATER-TABLE SURFACE - SHALLOW ON JANUARY 29, 1999, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
05MAR99	R.A.	QTR98-S
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
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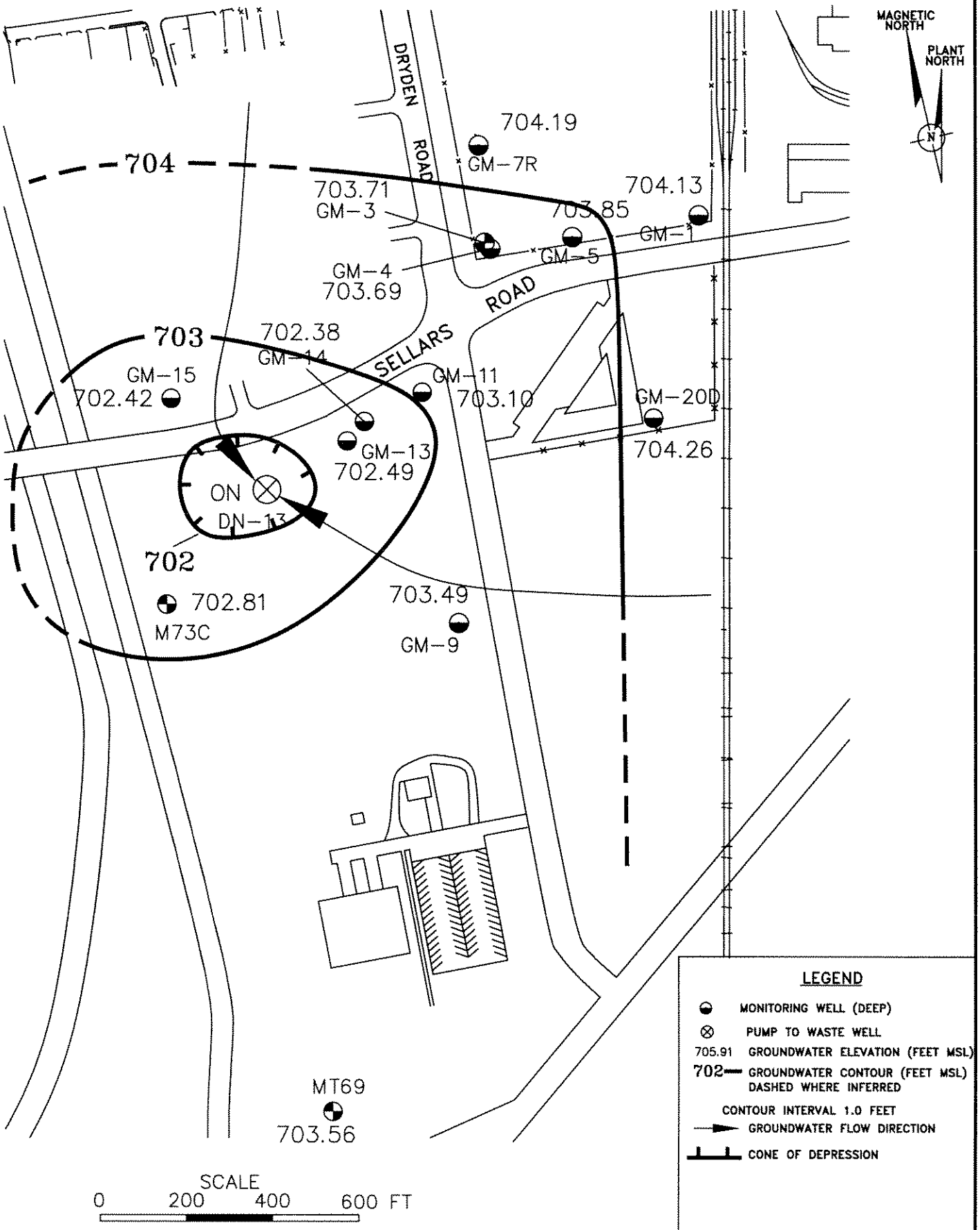

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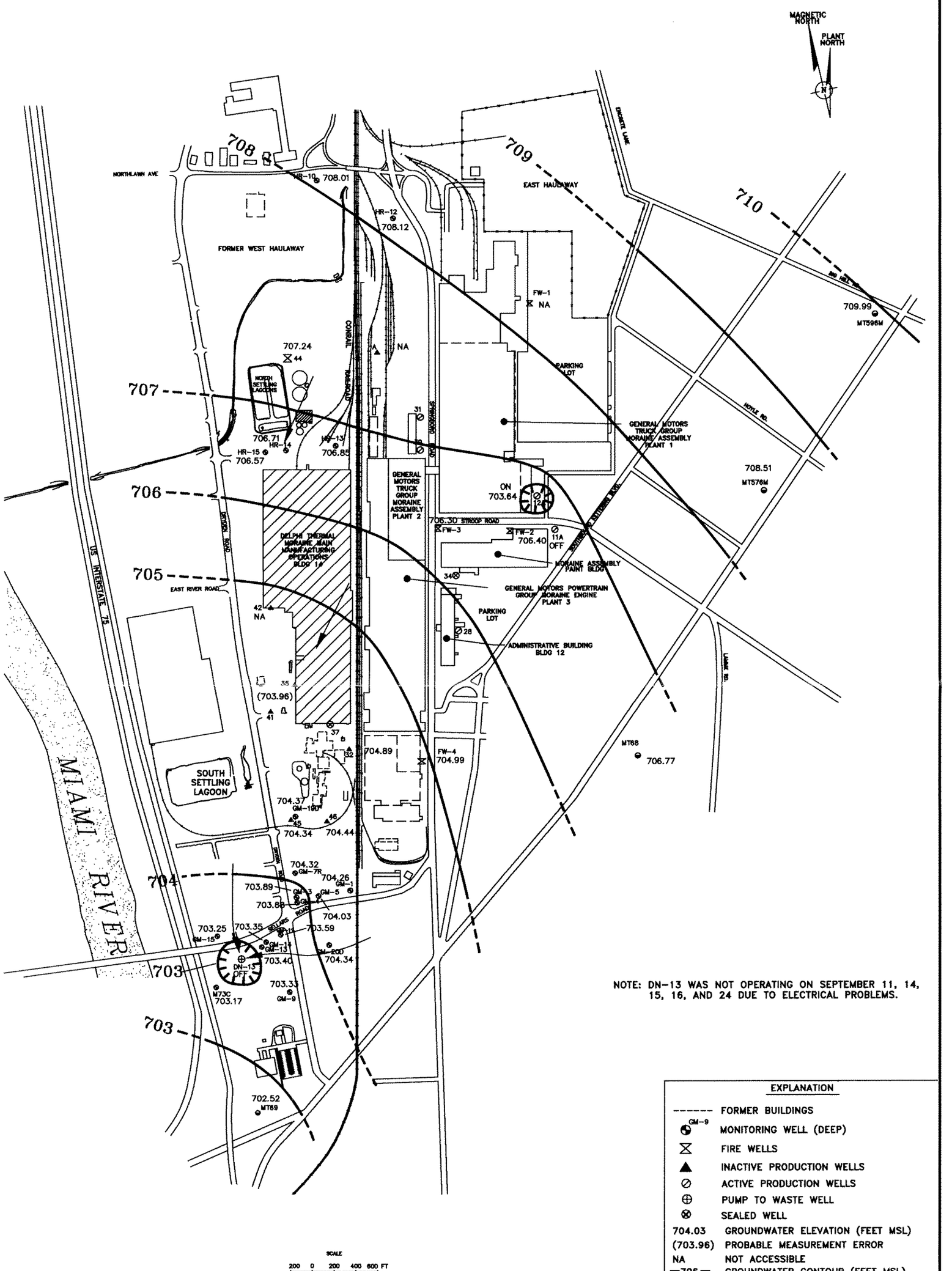
POTENTIOMETRIC SURFACE - DEEP ON JANUARY 29, 1999, CAPTURE ZONE MONITORING

DELPHI HARRISON THERMAL SYSTEMS, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
03MAR97	R.A.	GRT98-D
DRAWN	LEAD DESIGN PROF.	CHECKED
R.S.	J.R.	R.A.
PROJECT NUMBER		DRAWING NUMBER
0H000486.0001.0001		10

Appendix A

Potentiometric Surface, September 14, 1998



NOTE: DN-13 WAS NOT OPERATING ON SEPTEMBER 11, 14, 15, 16, AND 24 DUE TO ELECTRICAL PROBLEMS.

EXPLANATION

- FORMER BUILDINGS
- GM-9 MONITORING WELL (DEEP)
- FIRE WELLS
- INACTIVE PRODUCTION WELLS
- ACTIVE PRODUCTION WELLS
- PUMP TO WASTE WELL
- SEALED WELL
- 704.03 GROUNDWATER ELEVATION (FEET MSL)
- (703.96) PROBABLE MEASUREMENT ERROR
- NA NOT ACCESSIBLE
- —706— GROUNDWATER CONTOUR (FEET MSL) (DASHED WHERE INFERRED)
- CONE OF DEPRESSION
- GROUNDWATER FLOW DIRECTION
- CONTOUR INTERVAL = 1 FOOT

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POTENTIOMETRIC SURFACE ON SEPTEMBER 14, 1998

GENERAL MOTORS CORPORATION,
MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
15APR98	J. REID	HARR\DEEP98
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH		R. ASTLE
PROJECT NUMBER		DRAWING NUMBER
0H000486.0001.0002		12