



**CONESTOGA-ROVERS
& ASSOCIATES**

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July 9, 2004

Reference No. 17303

Mr. Peter Masson
Department of Environmental Quality
Jackson District Office
301 East Louis Glick Highway
Jackson, Michigan 48201-1556

Dear Mr. Masson:

Re: General Motors Company Vehicle Operations (CVO) Facility (Site)
Ypsilanti, Washtenaw County, Michigan

Conestoga-Rovers & Associates (CRA), on behalf of ENCORE, a wholly owned subsidiary of General Motors (GM), requests that the Michigan Department of Environmental Regulation (MDEQ), acknowledge that groundwater in the upper sand unit at the CVO Facility is not "groundwater in an aquifer" nor is it reasonably expected to transport a hazardous substance into an aquifer in a concentration that would exceed generic residential criteria. Therefore, pursuant to Rule 710(1) of the Administrative Rules for Part 201 of 1994 PA Act 451 as amended, exposure to groundwater by ingestion is not a relevant pathway that may otherwise need response activities at this location.

1.0 Introduction

The CVO Facility is approximately 15 acres in Ypsilanti, located on the eastern side of Washtenaw County, as shown in Figure 1 (Site). This location has been the subject of previous interim response activities to address environmental conditions at the Site. Numerous investigations and other response activities have also been undertaken to address conditions at other properties in the area.

A conclusion that groundwater at this location is "not in an aquifer" is appropriate given that per Part 201, as defined by Rule 101(d), an "aquifer" means a geological formation, group of formations, or part a formation capable of yielding a *significant* amount of water to wells or springs (*emphasis added*). Due to both site-specific hydrogeologic conditions, and other factors, groundwater at this location is clearly not significant in this context.

2.0 Hydrogeologic Conditions

Various direct observations of conditions at the Site, made through both site-specific and regional studies, provide evidence that groundwater is of very low yield, and not significantly connected to aquifers. Attachment 1 to this letter is a technical memorandum presenting these details and evidence of this condition.



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Reference No. 17303

3.0 Availability of More Reliable, Efficient, & Economical Alternate Water Supply Sources

Largely due to the low yield and low reliability of local groundwater at this location to serve as an adequate supply of water for consumption and other purposes, the Site and surrounding area is served by a municipal water supply by the Ypsilanti Community Utilities Authority.

4.0 Regulations Prohibiting Use of Shallow Groundwater

Michigan Water Well Construction and Pump Installation Code (1994 Revision, Part 127 of Act 368) requires that a minimum of 25 feet of coring be used in a water supply well (R325.1632 (3)), as does Michigan Department of Community Health (Rule 325.10818). Since the water-bearing unit is less than 25 feet thick, it would be a violation of State code to install a water supply well in the area of the Site.

Washtenaw County Engineering Guidelines for On-Site Sewage Disposal and Water Supply (May, 1976, Rev 5/77) requires that any water supply well be capable of yielding a minimum of seven gallons per minute for 2 hours of continuous pumping (X11.B.4.a). Based on data collected at the Site it is apparent that a supply well would not be capable of meeting this yield requirement and this would not be allowed according to County guidelines.

5.0 Adjacent Groundwaters Previously Acknowledged to Not be Aquifers

Groundwater at the Willow Run Creek Site, immediately north and east of the Site, and the Fons/Old Wayne Site, immediately to the south of the Site, exhibit groundwater conditions of similar character, which have been acknowledged by the state to not be aquifers.

6.0 Conclusion

Groundwater of the upper sand unit at the Site is not "in an aquifer" in the context of Part 201 of 1994 PA 451 as amended. Therefore, actions to address a potential for exposure to substances in the local groundwater through consumption are not required Part 201 response activities.



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We look forward to your concurrence with this conclusion, and welcome any opportunity to discuss any questions you may have regarding the issue.

Yours truly,

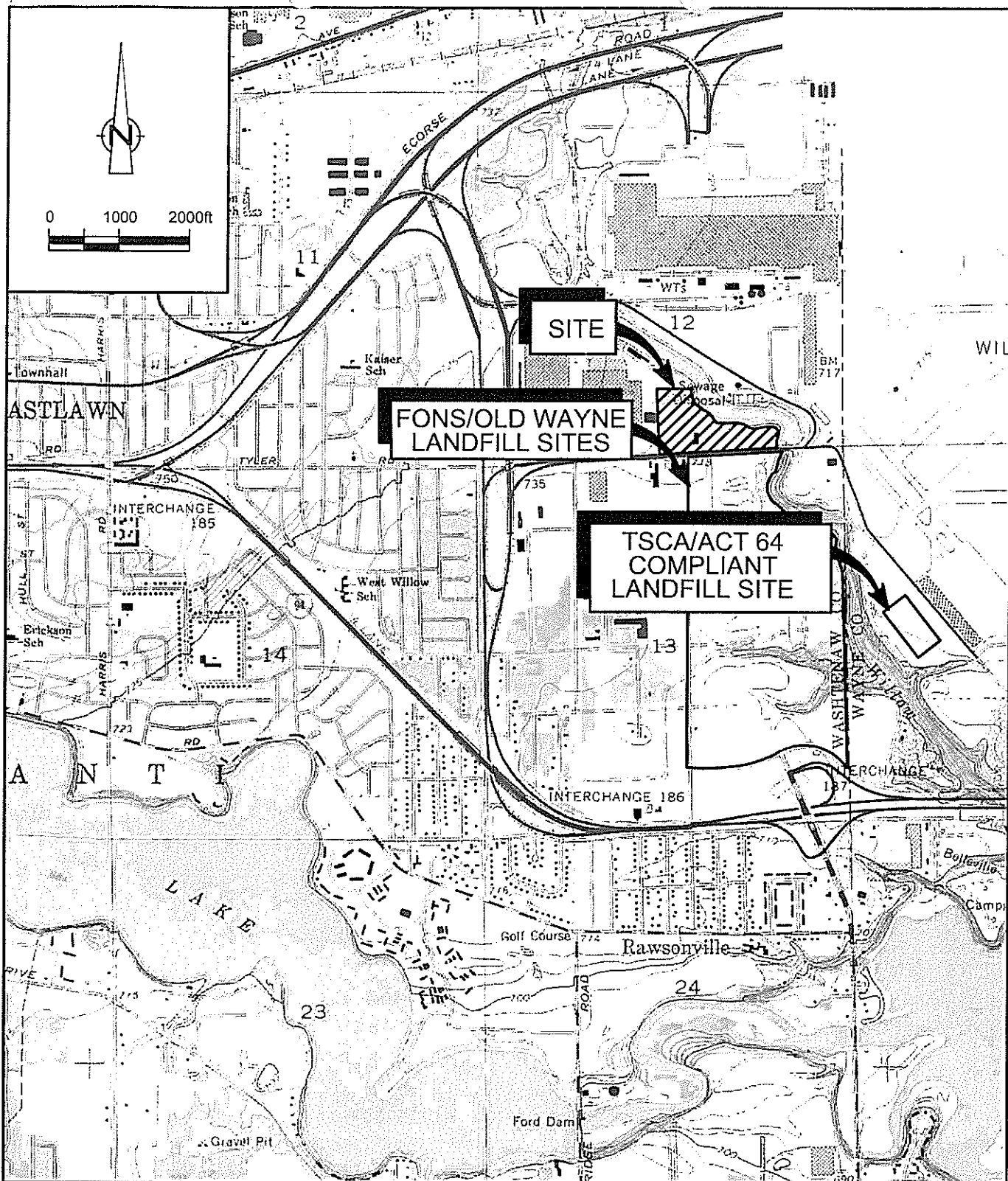
CONESTOGA-ROVERS & ASSOCIATES



Fred W. Bickle P.E.

GK/bw/1/Lan.
Encl.

cc: Ken Richards, GM
Gary Klepper, CRA
Beth Landale, CRA



SOURCE: USGS QUADRANGLE MAP;
YPSILANTI EAST, MICHIGAN

figure 1

SITE LOCATION
EVALUATION AND ASSESSMENT OF UPPER SAND UNIT
CVO FACILITY
GENERAL MOTORS CORPORATION
Ypsilanti, Michigan

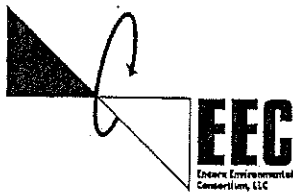


ATTACHMENT 1

TECHNICAL MEMORANDUM

GM CVO FACILITY
YPSILANTI, MICHIGAN

MEMORANDUM



To: Ken Richards/ENCORE

Date: May 21, 2004

From: Fred Blickle/
Gordon Hotchkiss/bw/45/Det.

cc: Gary Klepper/CRA
Beth Landale/CRA

Re: Groundwater Not In An Aquifer Evaluation
Assessment of Upper Sand Unit
GM CVO Facility, Ypsilanti, Michigan

Introduction

This technical memorandum was prepared by Conestoga-Rovers & Associates (CRA) for ENCORE, a wholly owned subsidiary of General Motors (GM) Corporation, to summarize hydrogeologic data collected from the GM Company Vehicle Operations (CVO) property in Ypsilanti, Michigan (Site). Specifically this information supports a "groundwater not in an aquifer" (GWNIAA) classification for shallow groundwater encountered in the upper sand unit at the Site (Figure 1).

This GWNIAA classification is based on documentation that demonstrates that an insignificant amount of water is present within the upper sand unit at the Site. The GWNIAA classification for the upper sand unit augments and supplements the GWNIAA classification obtained for the lower sand unit identified at the Fons/Old Wayne Landfill Sites that border the CVO Site to the south (CRA, 1995).

The GWNIAA classification for the upper sand unit is based on documentation that demonstrates that shallow groundwater, where present, is laterally discontinuous and not in hydraulic communication with groundwater in an aquifer. The majority of information used to support the GWNIAA was obtained during environmental investigations conducted at or adjacent to the Site.

Site Geology

The general geology at the CVO Site consists of five basic units. These units and their thickness are as follows, proceeding downward from land surface:

	<u>Unit Name</u>	<u>Unit Thickness (Range)</u>
1	a surficial fill	0 to 11.5 feet
2	an upper sand unit	8 to 15 feet
3	a lacustrine clay unit	50 to 85 feet

	<u>Unit Name</u>	<u>Unit Thickness (Range)</u>
4	a lower sand unit ^a	8 to 28 feet
5	a bedrock unit (Antrim Shale) ^b	> 100 feet

^a Thickness range based on investigations on the adjacent Fons/Old Wayne property

^b Thickness range based on published literature in the Hydrogeologic Atlas of Michigan

As shown, the upper sand unit, the lacustrine clay, the lower sand unit, and the Antrim Shale are present across the entire Site. The stratigraphic relationships between these units are depicted in the general geologic cross sections presented in Appendix A.

The composition of uppermost two units varies across the Site. The fill unit varies from fill sands and clays to construction debris and historical waste material. The upper sand unit generally consists of fine to medium grained sands with silts and gravels. Typical grain size distributions for the upper sand unit are presented on Table 1. The composition of the lacustrine clay generally consists of silty clays (Table 2). Based on off-Site investigation data, the lower sand unit in the vicinity of the Site is predominately a silty sand.

Site Hydrogeology

Two of the five units at the Site are considered water bearing (the upper and lower sand units) and two others are considered aquitards/aquicludes (the lacustrine clay and the Antrim Shale). The upper sand unit is the subject of investigation at the Site.

The upper sand unit contains limited groundwater that is typically encountered in unconfined conditions at very shallow depths (i.e., 8 to 10 feet). The saturated thickness varies with seasonal precipitation with a typical maximum thickness of approximately 8 feet. Due to engineering activities that dammed Willow Run Creek (creating Tyler Pond) and construction activities that built compacted clay banks along the edge of Tyler Pond, the horizontal hydraulic gradient of groundwater in the upper sand unit at the CVO Site is relatively flat. As shown on the cross sections in Appendix A, the horizontal hydraulic gradients range between 0.005 and 0.015 feet per foot. Based on 1999 slug tests conducted in wells screened in the upper sand unit the estimated hydraulic conductivity ranged from 4.31×10^{-8} centimeters per second (MW-12) to 1.12×10^{-2} centimeters per second (MW-14).

The lower sand unit contains limited groundwater that is encountered under semi-confined conditions at depths approximately 80 feet below grade. The saturated thickness near the Site is

up to 8 feet. Previous correspondence to the MDEQ has demonstrated that the saturated conditions of the lower sand unit were classified as GWNIAA (CRA, 1995).

A lacustrine clay unit (shown as Clay/Till Unit on Figure A-2) occurs between the upper and lower sand units. This unit is a poor source of groundwater and exhibits very slow percolation rates and very low recharge rates and acts as an aquitard/aquiclude for the lower sand unit. As shown in the boring logs for the three deepest soil borings completed at the Site (i.e., SB19-01, SB19-02, SB19-03), and a deeper boring completed directly adjacent to the Site (i.e., MW-6D-93), no water bearing horizons were observed in the clay-rich deposits (Appendix B).

The Antrim Shale is not a water bearing unit but the underlying limestone and dolomite bedrock formations of the Traverse Group are considered bedrock aquifers. Groundwater quality in these bedrock aquifers range from potable to highly mineralized depending on the depth of the source. Greater depths generally yield greater mineralized water.

Demonstration of No Hydraulic Communication

The lacustrine clay unit (Clay/Till Unit) acts as a low permeability layer that retards vertical migration of groundwater encountered in the upper sand unit. Based on off-Site laboratory testing, the typical vertical permeabilities of the lacustrine clay range from 1.26×10^{-8} to 4.31×10^{-8} centimeters per second (Table 3). The vertical permeabilities of the clay unit are low enough to act as a base to several hazardous waste landfills in the area (TSCA/Act 64 Compliant Landfill). Horizontal migration of groundwater in the upper sand unit is also limited by the flat hydraulic gradient and the clay banks of Tyler Pond. The base of Tyler Pond is at least 150 feet above the top of the first bedrock aquifer and separated from the potable water supply by the low permeability lacustrine clay and the Antrim Shale, which acts as a second aquitard protecting the bedrock aquifer. Based on investigation data, the groundwater of the upper sand unit does not recharge a drinking water aquifer and is not hydraulically connected to a drinking water aquifer.

Demonstration of Insignificant Yield

The combination of fine grained sand material, limited recharge rates, limited saturated thickness, limited lateral extent (saturation), and low migration potential make the groundwater of the upper sand unit unsuitable for potable water supply. These insignificant yields have been documented during monitoring well sampling activities that show perched groundwater is easily removed by pumping the fine grained sands and silts to temporarily dry conditions, suggesting that water in storage it is not easily replaced by a continuous groundwater yield from the formation.

May 21, 2004

Conclusions

Based on the information presented in this memorandum, the hydrogeologic conditions identified at GM's CVO Site meet two basic criteria to assign a GWNIAA classification to the groundwater encountered in the upper sand unit, which are:

- a demonstration that groundwater encountered in the upper sand unit at the Site yields an insignificant amount of water; and,
- a demonstration that groundwater within the upper sand unit is not in hydraulic communication with groundwater in the underlying bedrock aquifer.

It is intended that this document will be referenced in future investigation submittals to the MDEQ to eliminate the drinking water exposure pathways, including those associated with the "drinking water protection criteria".

May 21, 2004

References

Conestoga-Rovers & Associates. Hydrogeological Review of the Classification of the Intermediate Sand/Silt as an Aquifer. CRA Project No. 4048, Memorandum No. 29, 1995

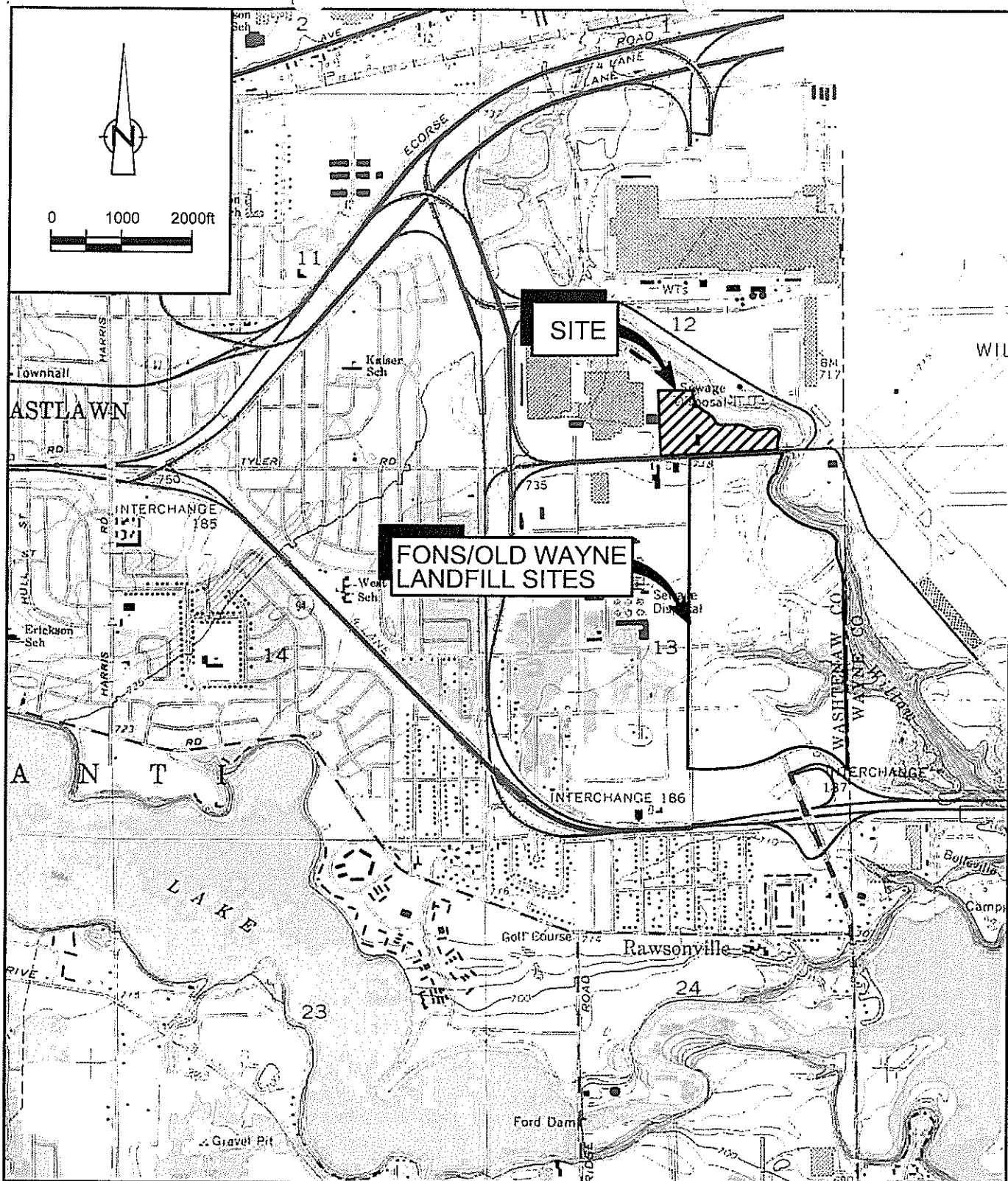
Farrand, W.R. Quaternary Geology of Michigan, 1982.

Lusch et al. Aquifer Vulnerability to Surface Contamination in Michigan. Michigan State University, 1992.

Twenter, F.R. Southeastern Michigan Water Resources Study, 1975.

United States Department of Agriculture. Soil Survey of Washtenaw County. Soil Conservation Service, 1977.

Western Michigan University. Hydrogeologic Atlas of Michigan, 1981.



SOURCE: USGS QUADRANGLE MAP;
YPSILANTI EAST, MICHIGAN

figure 1



YPSILANTI

ENCORE

EVALUATION AND ASSESSMENT OF UPPER SAND UNIT
CVO FACILITY
GENERAL MOTORS CORPORATION
Ypsilanti, Michigan

TABLE 1

UPPER SAND UNIT GRAIN SIZE DISTRIBUTION
GWNIAA EVALUATION AND ASSESSMENT OF UPPER SAND UNIT
GM CVO FACILITY
YPSILANTI, MICHIGAN

Sample Location	Sample Depth (ft bgs)	Description	Soil Classification			
			% Gravel	% Sand	% Silt	% Clay
SB19-01	12-13.4	SAND, trace gravel, trace silt	9	84	7	0
	13.4-15	SAND, trace gravel, trace silt	1	92	5	2
	21-23	Clayey SAND, little gravel	16	35	30	19
SB19-02	10.5-15	SAND, little silt	0	90	10	0
SB19-03	10.5-16	SAND, trace, gravel, little silt	7	81	10	2
SB19-04	10-15	SAND, little silt	0	85	15	0
	10.5-15	SAND, trace gravel, little silt	2	78	18	2
	13-16	SAND, little silt	0	83	15	2
SB19-05	9-11	SAND, some gravel, trace silt	30	60	9	1
SB19-06	5-7	SAND, trace gravel, little silt, SP-SM	9	76	13	2
SB19-07	9-11	SAND, trace gravel, some silt and clay	2	65	23	10
SB19-08	12-13	SAND, little gravel, little silt and clay	10	68	16	6
SB19-09	11-12'7"	SAND, little silt	0	83	15	2
SB19-10	12-15	SAND, trace silt	0	91	9	0
SB19-11	14-18	SAND, little silt	0	84	14	2
SB19-14	11'10" - 13'4"	SAND, some silt	0	72	26	2
	16'4"-18'9"	SAND, some silt	0	80	20	0
	10-15	Silty SAND	0	51	45	4
SB19-16	3-5	SAND, trace gravel, little silt	3	84	11	2
MW19-14	11-13	Gravelly SAND, little silt	35	50	14	1
MW19-15	9.5-13.5	SAND, trace gravel, trace silt	7	85	6	2
	12-15	SAND, trace gravel, little silt	2	86	10	2
MW19-23	12'9" - 14'4"	SAND, little silt	0	90	10	0
SB18-62	1.7-5.2	SAND, trace gravel, little silt	6	80	12	2
Geometric Mean (%):			6	75	13	3

TABLE 2

LACUSTRINE CLAY GRAIN SIZE DISTRIBUTION
 GWNIAA EVALUATION AND ASSESSMENT OF UPPER SAND UNIT
 GM CVO FACILITY
 YPSILANTI, MICHIGAN

Sample Location	Sample Depth (ft bgs)	Description	Soil Classification			
			% Gravel	% Sand	% Silt	% Clay
SB19-01	21-23	Clayey SAND, little gravel	16	35	30	19
SB19-02	17-19	Silty CLAY, trace sand	0	8	56	36
SB19-03	17-19	Silty CLAY and SAND, trace gravel	8	35	38	19
SB19-05	0-2	Silty CLAY and SAND, trace gravel	3	45	35	17
SB19-07	11-12	Silty CLAY and SAND, trace gravel	6	37	35	22
	11-13	Silty CLAY, some sand, trace gravel	1	22	54	23
SB19-09	0.6-5	Silty CLAY and SAND	0	42	40	18
SB19-14	13'4"-15	Silty CLAY and SAND	0	35	59	6
	15-20	Silty CLAY, little sand	0	15	55	30
MW19-23	16-20	Silty CLAY, some sand, trace gravel	1	33	40	26
SB18-61	6-10	Silty CLAY, some sand, trace gravel	1	22	54	23
Geometric Mean (%):			3	27	44	20

LACUSTRINE CLAY PERMEABILITY SUMMARY
 GWNIAA EVALUATION AND ASSESSMENT OF UPPER SAND UNIT
 GM CVO FACILITY
 YPSILANTI, MICHIGAN

Sample Location	Sample Depth (ft bgs)	Soil Description	Permeability (cm/sec)
SB18-61	6-10	Silty CLAY, some sand, trace gravel	2.48E-08
SB19-01	21-23	Clayey SAND, little gravel	2.38E-08
SB19-03	17-19	Silty CLAY and SAND, trace gravel	4.31E-08
SB19-07	11-13	Silty CLAY, some sand, trace gravel	1.26E-08
SB19-14	15-20	Silty CLAY, little sand	3.34E-08
MW19-15	9.5-13.5	Silty CLAY and SAND, little gravel	3.10E-08 **
MW19-23	16-20	Silty CLAY, some sand, trace gravel	1.35E-08
Geometric Mean:			2.60E-08

Notes:

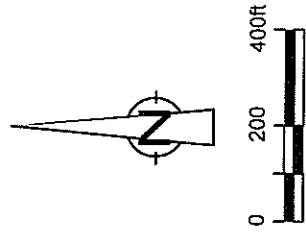
** Two distinct soil types were identified in MW19-15, 9.5 -13.5 ft bgs.

Each soil was tested separately, except that only the clay fraction was tested for permeability.

APPENDIX A

GENERAL GEOLOGIC CROSS SECTIONS
GWNIAA EVALUATION & ASSESSMENT OF
UPPER SAND UNIT

GM CVO FACILITY
YPSILANTI, MICHIGAN



LEGEND

- MW-8U-93 MONITORING WELL LOCATION
- MW-10-93 UPPER MONITORING WELL
- MW-4U/4D-93 UPPER/DEEP MONITORING WELL
- MW-7-99 DEEP MONITORING WELL
- MW-1-89 SHALLOW MONITORING WELL
- MW-2-89 SHALLOW MONITORING WELL
- BH-6-88 BOREHOLE LOCATION
- LB-1-94 LANDFILL BOREHOLE LOCATION

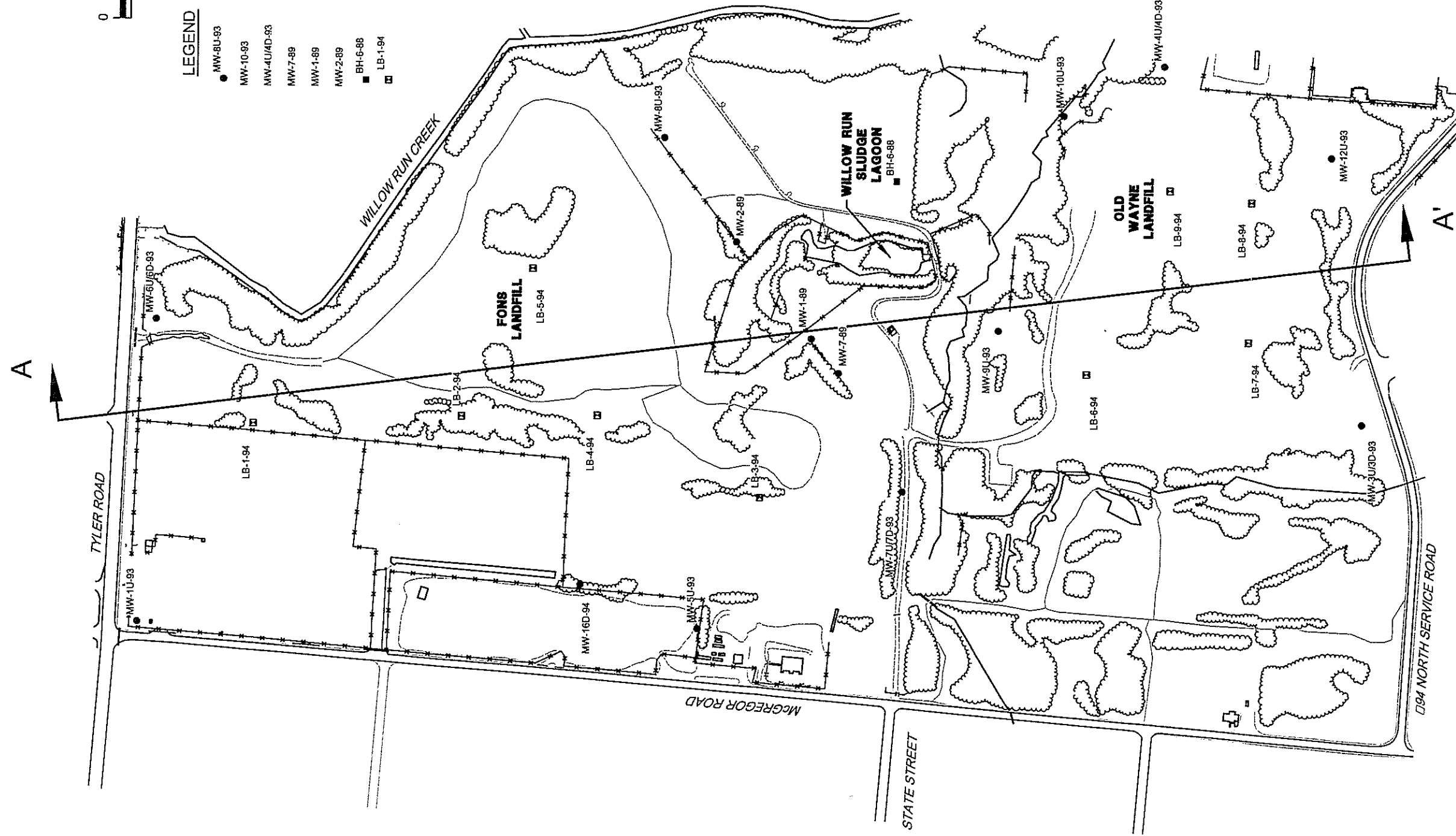


figure A-1

CROSS-SECTION LOCATION MAP
FONS/OLD WAYNE LANDFILL SITES
CVO FACILITY
GENERAL MOTORS CORPORATION
Ypsilanti, Michigan



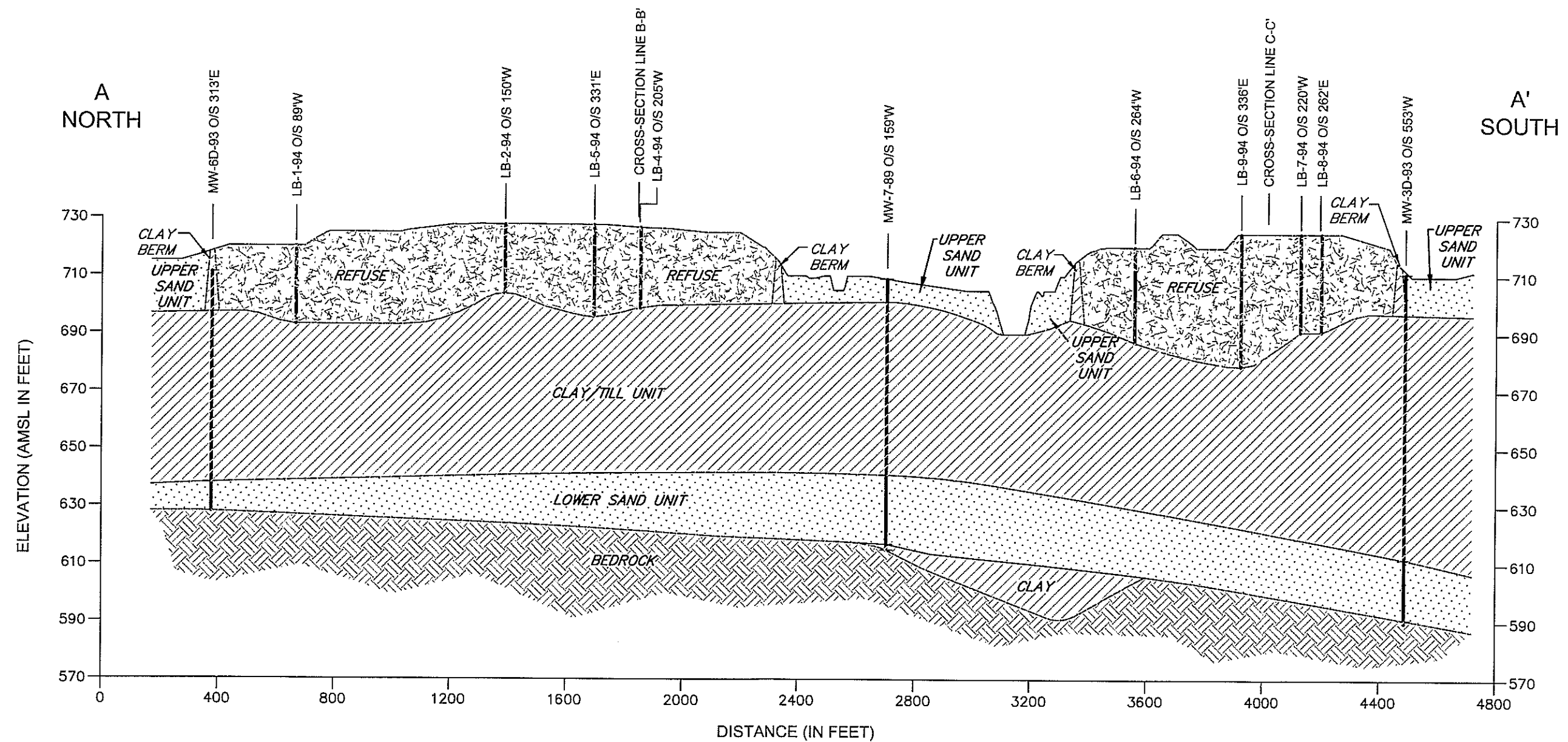
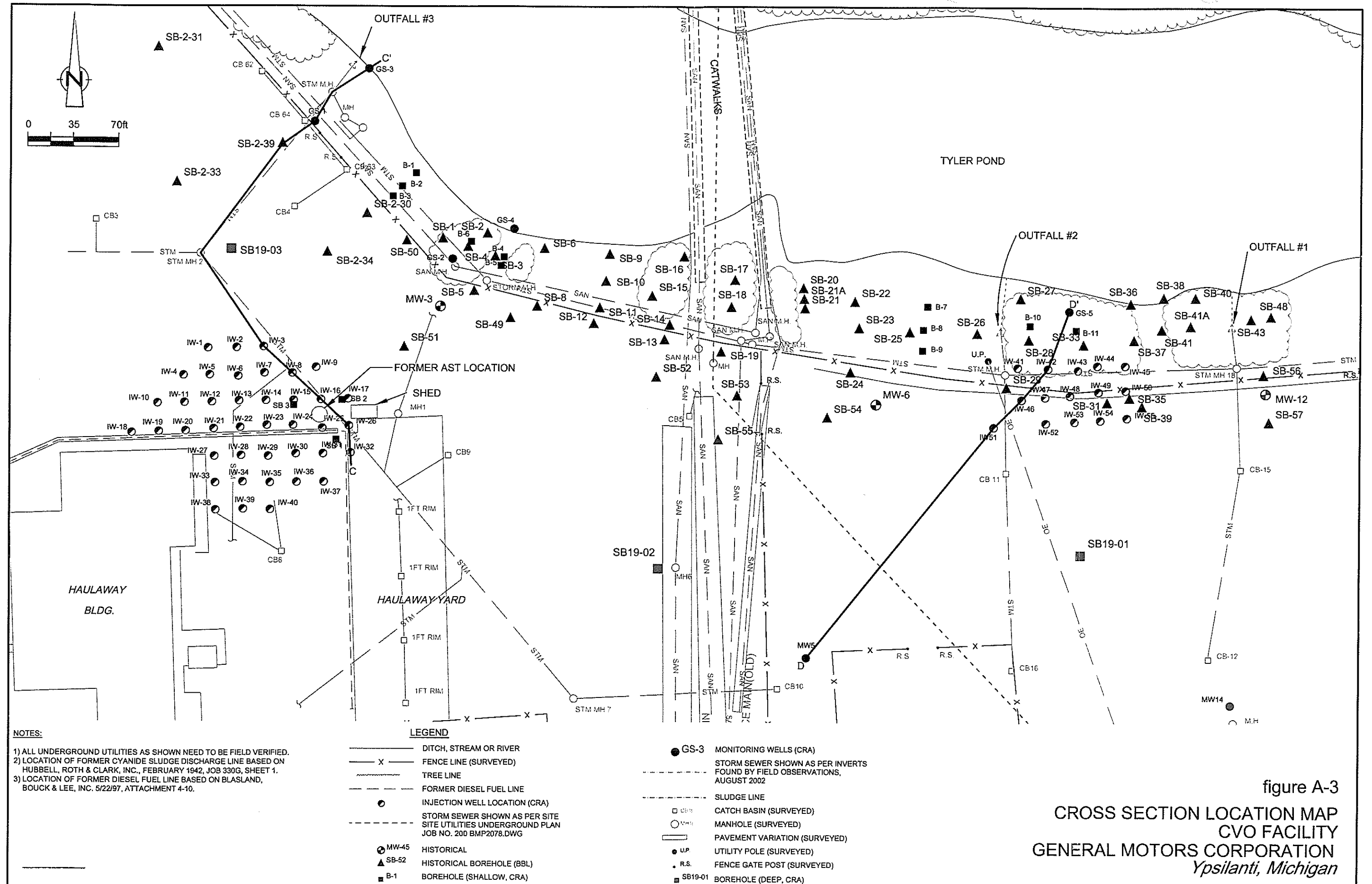
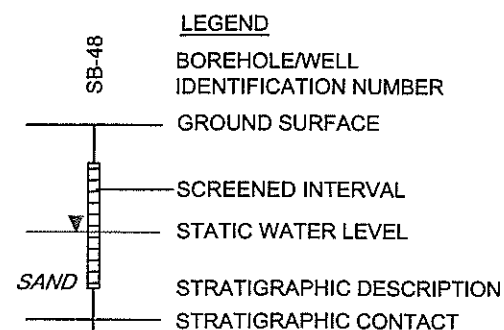
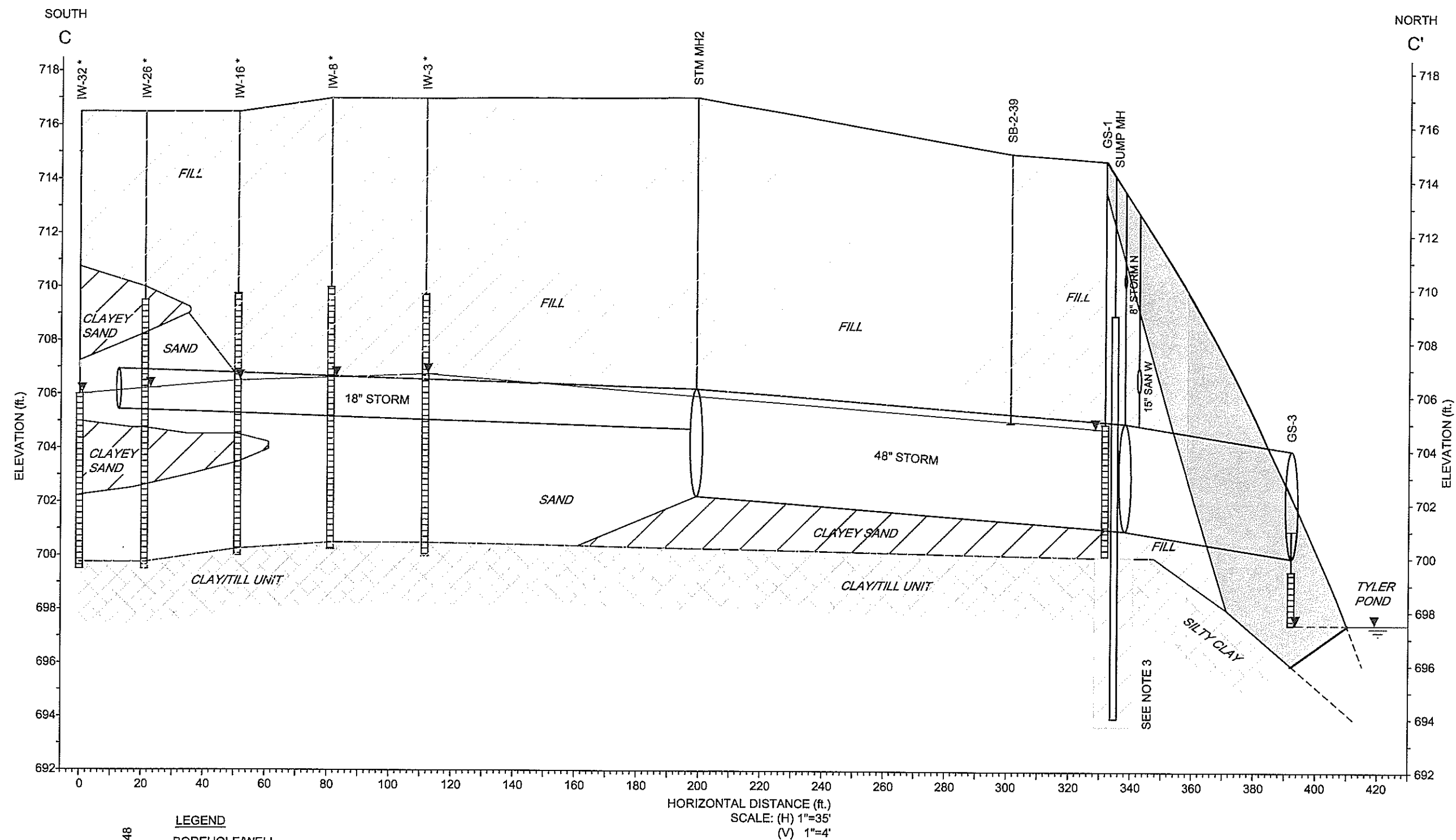


figure A-2
 GENERALIZED REGIONAL CROSS-SECTION A-A'
 FON/OLD WAYNE LANDFILL SITE
 CVO FACILITY
 GENERAL MOTORS CORPORATION
Ypsilanti, Michigan







NOTES:

1. WATER TABLE APPROXIMATED FROM WELL MEASUREMENTS AND GS-4 WATER LEVEL RECORDED JUNE 2003.

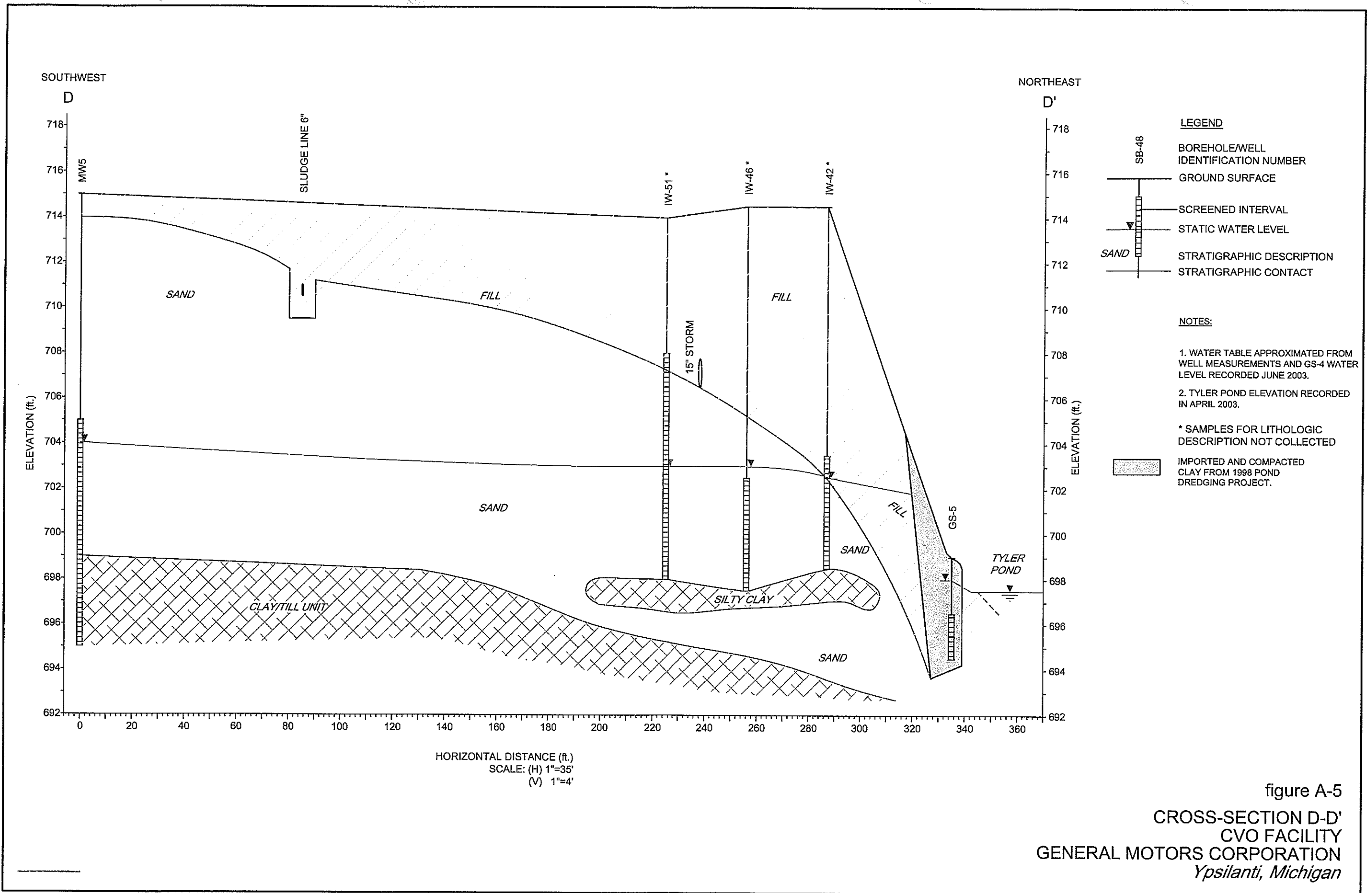
2. TYLER POND ELEVATION RECORDED IN APRIL 2003.

3. APPROXIMATE 12 FOOT RECTANGULAR SUMP VAULT.

* SAMPLES FOR LITHOLOGIC DESCRIPTION NOT COLLECTED.

IMPORTED AND COMPACTED
CLAY FROM 1998 POND DREDGING PROJECT

figure A-4
CROSS-SECTION C-C'
CVO FACILITY
GENERAL MOTORS CORPORATION
Ypsilanti, Michigan



APPENDIX B

SELECT SOIL BORING LOGS
GWNIAA EVALUATION & ASSESSMENT OF
UPPER SAND UNIT

GM CVO FACILITY
YPSILANTI, MICHIGAN

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-08)

PROJECT NAME: FONS / OLD WAYNE

PROJECT NO.: 5089

CLIENT: FOWRG

LOCATION: WASHTENAW COUNTY, MI.

HOLE DESIGNATION: MW6D-93

DATE COMPLETED: MAY 4, 1993
(Page 1 of 3)

DRILLING METHOD: 4 1/4" ID HSA

CRA SUPERVISOR: J. REID

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	HNU
	REFERENCE POINT (Top of Riser) GROUND SURFACE	713.19 711.4					
	For stratigraphy from 0.0 to 9.5 ft BGS see MW6U-93						
-2.5							
-5.0							
-7.5							
-10.0	CL-CLAY, trace pebbles and coarse sand, gray, saturated	701.9					
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES:

MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-08)

PROJECT NAME: FONS / OLD WAYNE

HOLE DESIGNATION: MW6D-93

PROJECT NO.: 5089

DATE COMPLETED: MAY 4, 1993
(Page 2 of 3)

CLIENT: FOWRG

DRILLING METHOD: 4 1/4" ID HSA

LOCATION: WASHTENAW COUNTY, MI.

CRA SUPERVISOR: J. REID

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	SITE	VALUE	UNIT
							(ppm)
35.0		675.5					
37.5			CEMENT/ BENTONITE GROUT				
40.0							
42.5			8" BOREHOLE				
45.0							
47.5							
50.0			2" STEEL CASING				
52.5							
55.0							
57.5			BENTONITE PELLET SEAL				
60.0							
62.5			CAVE				
65.0							

NOTED: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-08)

PROJECT NAME: FONS / OLD WAYNE

PROJECT NO.: 5089

CLIENT: FOWRG

LOCATION: WASHTENAW COUNTY, MI.

HOLE DESIGNATION: MW6D-93

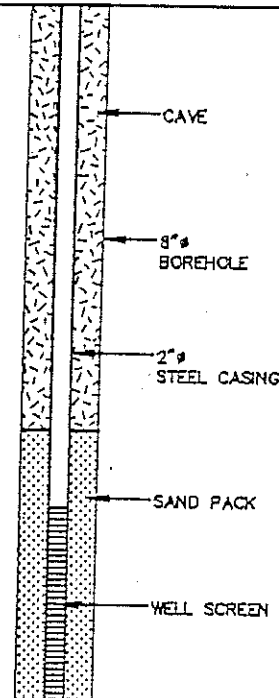
(Page 3 of 3)

DATE COMPLETED: MAY 4, 1993

DRILLING METHOD: 4 1/4" ID HSA

CRA SUPERVISOR: J. REID

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	VALUE	Hz (ppm)
67.5							
70.0							
72.5							
75.0	SAND	618.4					
77.5							
80.0							
82.5							
85.0	BEDROCK - Shale, gray END OF HOLE • 83.0 FT. BGS	628.4					
87.5							
90.0							
92.5							
95.0							
97.5							



SCREEN DETAILS:
 Screened Interval:
 78.0 to 83.0' BGS
 Length -5.0'
 Diameter -2.0"
 Slot # 10
 Material -Stainless Steel
 Sand pack interval:
 76.0 to 83.0' BGS
 Material -Natural

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



WATER FOUND



STATIC WATER LEVEL





STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: GM - CVO

HOLE DESIGNATION: SB19-01

PROJECT NUMBER: 17303

DATE COMPLETED: November 17, 2003

CLIENT: GENERAL MOTORS CORPORATION

DRILLING METHOD: DIRECT PUSH

LOCATION: YPSILANTI, MICHIGAN

FIELD PERSONNEL: D. DEITNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE INSTALLATION	SAMPLE				
				NUMBER	INTERVAL	REC (%)	"N" VALUE	PID (ppm)
36	- trace coarse grained gravels at 39.0ft BGS			SMC		100		0.0
38						100		0.0
40						100		0.0
42				SMC		100		0.0
44						100		0.0
46	END OF BOREHOLE @ 50.0ft BGS	50.00		10MC		100		0.0
48						100		0.0
50						100		0.0
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



GRAIN SIZE ANALYSIS



OVERBURDEN LOG: 17303.GPJ CRA CORP.GDT 12/23/03



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: GM - CVO

HOLE DESIGNATION: SB19-02

PROJECT NUMBER: 17303

DATE COMPLETED: November 17, 2003

CLIENT: GENERAL MOTORS CORPORATION

DRILLING METHOD: DIRECT PUSH

LOCATION: YPSILANTI, MICHIGAN

FIELD PERSONNEL: D. DEITNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE INSTALLATION	SAMPLE				
				NUMBER	INTERVAL	REC (%)	"N" VALUE	PID (ppm)
	ASPHALT	0.40						
	GW-SANDS AND GRAVELS, trace silts (FILL), compact, fine grained, angular, poorly graded, light gray, dry	0.90						
2								
	SM-SILTY SANDS, (FILL), compact, fine grained, poorly graded, dark brown, moist	3.00		1MC 0-2 -234		70		0.0
4								
	SP-SANDS, trace silts (FILL), compact, fine grained, poorly graded, yellowish brown, moist							
6			4" PVC CASING			70		0.0
	- 1" lens silts at 6.2ft BGS							
8				2MC 0-5-10.5 -235		100		0.0
	- light brown at 7.2ft BGS							
	- 2" lens fine grained gravels at 8.4ft BGS							
10			CEMENT BENTONITE GROUT			100		0.0
	- wet at 10.5ft BGS							
12			BACKFILLED WITH CEMENT BENTONITE GROUT	3MC		90		0.0
14						90		0.0
16								
	CI-SILTY CLAY, trace fine grained sands, trace fine grained rounded gravels, stiff, medium plasticity, gray, moist, homogeneous	16.70	CLAY	4MC		100		0.0
18								
	- 1" lens sands and gravels at 17.1ft BGS							
20			2-1/2" BOREHOLE			100		0.0
22			BACKFILLED WITH CEMENT BENTONITE GROUT	5MC		100		0.0
24						100		0.0
26						100		0.0
28				6MC		100		0.0
30						100		0.0
32								
34				7MC		100		0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



GRAIN SIZE ANALYSIS



OVERBURDEN LOG 17303 CPM CRA CORE CDT 12/23/03



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: GM - CVO

HOLE DESIGNATION: SB19-02

PROJECT NUMBER: 17303

DATE COMPLETED: November 17, 2003

CLIENT: GENERAL MOTORS CORPORATION

DRILLING METHOD: DIRECT PUSH

LOCATION: YPSILANTI, MICHIGAN

FIELD PERSONNEL: D. DEITNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE INSTALLATION	SAMPLE				
				NUMBER	INTERVAL	REC (%)	"N" VALUE	P/D (ppm)
36	- sandy clay, very moist to wet at 35.2ft BGS - silty clay, trace fine grained gravels, moist at 36.0ft BGS					100		0.0
38	- trace coarse grained gravels at 38.5ft BGS			SMC		100		0.0
40						100		0.0
42								
44				SMC		100		0.0
46						100		0.0
48				SCMC		100		0.0
50	END OF BOREHOLE @ 50.0ft BGS	50.00				100		0.0
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



GRAIN SIZE ANALYSIS



OVERBURDEN LOG 17303 GRI GPA CORP GDT 12/23/03



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME: GM - CVO

PROJECT NUMBER: 17303

CLIENT: GENERAL MOTORS CORPORATION

LOCATION: YPSILANTI, MICHIGAN

HOLE DESIGNATION: SB19-03

DATE COMPLETED: November 17, 2003

DRILLING METHOD: DIRECT PUSH

FIELD PERSONNEL: D. DEITNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE INSTALLATION	SAMPLE				
				NUMBER	INTERVAL	REC (%)	"N" VALUE	PID (ppm)
	ASPHALT	0.40						
	GM-SILTY SANDS AND GRAVELS, (FILL), compact, fine grained angular, poorly graded, light brown, dry	1.00						
2				1MC 0-2 -22s	80			0.0
4	SP-SANDS, trace silts (FILL), compact, fine grained, poorly graded, light brown, moist - 1/2" piece slag at 4.1ft BGS		4" PVC CASING		80			0.0
6								
8	- 3" lens clayey sands, very moist at 8.0ft BGS - medium grained, grayish brown at 8.5ft BGS			2MC 1.5-2.5 -23s	90			0.0
10	- wet at 9.5ft BGS - fine grained at 10.0ft BGS		CEMENT BENTONITE GROUT		90			0.0
12								
14	- dark gray at 13.0ft BGS		BACKFILLED WITH CEMENT BENTONITE GROUT	3MC	100			0.0
16					100			0.0
18	CI-SILTY CLAY, (natural), stiff, medium plasticity, gray, moist, homogeneous	16.10	CLAY	4MC	100			0.0
20			2-1/2" BOREHOLE		100			0.0
22			BACKFILLED WITH CEMENT BENTONITE GROUT	5MC	100			0.0
24					100			0.0
26								
28				6MC	100			0.0
30					100			0.0
32								
34				7MC	100			0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



GRAIN SIZE ANALYSIS



OVERBURDEN LOG 17303.GPJ CRA CORP GDT 12/23/03



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 2 of 2

PROJECT NAME: GM - CVO

HOLE DESIGNATION: SB19-03

PROJECT NUMBER: 17303

DATE COMPLETED: November 17, 2003

CLIENT: GENERAL MOTORS CORPORATION

DRILLING METHOD: DIRECT PUSH

LOCATION: YPSILANTI, MICHIGAN

FIELD PERSONNEL: D. DEITNER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE INSTALLATION	SAMPLE				
				NUMBER	INTERVAL	REC (%)	"N" VALUE	PID (ppm)
36						100		0.0
38				34C		100		0.0
40						100		0.0
42	- trace coarse grained gravels at 42.5ft BGS			34C		100		0.0
44						100		0.0
46						100		0.0
48				194C				0.0
50	END OF BOREHOLE @ 50.0ft BGS	50.00						0.0
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



GRAIN SIZE ANALYSIS



OVERBURDEN LOG 17303.GPJ CRA CORP.GDT 12/23/03