SUMMARY REPORT

BUILDING 86
TANK 059/86
GM-CLCD NORTH
NAO FLINT OPERATIONS
FLINT, MICHIGAN

FACILITY ID: 0-002763

CONFIRMED RELEASE NO.: C-434-97

August 25, 1997

Prepared by:

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TABLE OF CONTENTS

ATTACHMENTS

1.0 UNDERGROUND STORAGE TANK

One underground storage tank (UST) was removed from this location.

1.1 Location

The UST was formerly located in the parking lot on the west side of Building 86. See Attachment 1.

1.2 UST Contents

The identification number, size, and contents of the USTs, detailed on the Buick Motor Division Storage Tank layout drawing number 42361-M dated 1973, are summarized as follows:

059/86	6,000-gallon	Gasoline

1.3 Installation and Removal Dates

The UST was installed in 1964, and removed in December, 1988. The confirmed release number assigned to this tank is C-434-97.

2.0 INVESTIGATION ACTIVITIES

An EDI Engineering and Science Report dated December 1988 indicated that UST removal activities began on December 8, 1988. Black core sand surrounded the UST. Soils were screened using a photoionization detector (PID). Based on elevated PID readings, impacted soil was excavated and taken to the Grand Blanc Landfill for disposal. The quantity of soil removed is unknown. Two soil samples were taken from the base of the excavation and sent to EDI for analysis. The results were unavailable for review at the time this report was generated; however, the EDI report did note that "several isolated areas continued to have readings as high as 750 ppm [on the PID]." A sump was dug into the base of the excavation and a six-inch screened well was installed in the sump. The report indicated the well was to be sampled bi-annually. Results of the bi-annual sampling were not available for review at the time this report was generated.

Based on review of the EDI report, Global Environmental Engineering, Inc., recommended sampling the sump and collecting soil and groundwater samples to establish the condition of impacted media.

2.1 Summary of Investigation Activities

On July 23, 1996, Global supervised the advancement of five Geoprobe soil borings (86-1 through 86-5). Sample locations are illustrated in Attachment 2. Soil Boring Logs are included in Attachment 6. Two soil samples were collected from each boring and submitted for laboratory analysis. Groundwater samples were collected from four of the five borings, and one from the sump, and submitted for laboratory analysis.

On June 3, 1997, Global supervised the installation of three monitoring wells (MW-1 through MW-3). Two soil samples were collected from each boring and submitted for laboratory analysis. The screened intervals and soil types for the monitoring wells are listed below; the disparate depth below ground surface between MW-1 and MW-2/MW-3 may be partially accounted for by the ground surface height differential present at the site. See also Attachment 10: Monitoring Well Logs.

Well ID	Screened Interval (feet bgs)	Soil Type
MW-1	4 - 9	Sandy Silt/Silty Sand
MW-2	5 - 10	Silty Sand/Sandy Clay
MW-3	14 - 19	Silty Clay/Sand

Groundwater samples were collected from the monitoring wells on June 10, 1997.

2.1.1 Sample Collection and Analysis

A minimum of two soil samples were collected for laboratory analysis from each soil boring based on the highest organic vapor analyzer reading (OVA) and/or the groundwater water interface, and the bottom-of-bore. Soil samples were collected from depths ranging from 5 to 23 feet below ground surface. Actual sample depths are given in Attachment 3. OVA results can be found on the soil boring logs, Attachment 6.

Each of the soil samples collected was placed into an unpreserved four-ounce container and transported at four degrees Celsius (4°C) using chain-of-custody procedures to Fire & Environmental Consulting Laboratories, Inc., in East Lansing, Michigan. Samples were analyzed in accordance with recommendations contained in *Environmental Response Division Operation Memorandum #6, Revision #4*, dated September 13, 1995.

Groundwater samples were collected from Geoprobe borings whenever possible using a screen point sampler attachment. The screen point sampler was driven to the desired sampling depth and an inner core, consisting of stainless steel wire screen, was pushed into the borehole allowing water to collect in the sampler. Monitoring wells were developed prior to sampling using a stainless steel bailer until water clarity stabilized. Approximately 48 hours following development, the monitoring wells were sampled. At the time of sampling, the monitoring wells were purged a minimum of three well volumes to ensure sample clarity.

Each of the groundwater samples collected for laboratory analysis was placed in laboratory-prepared glass bottles. Samples to be analyzed for dissolved lead were filtered in the field and preserved with nitric acid. Samples to be analyzed for volatile organics were preserved with hydrochloric acid. Each sample was transported at 4°C using chain-of-custody procedures to Fire & Environmental Consulting Laboratories, Inc., in East Lansing, Michigan. Samples were analyzed in accordance with recommendations contained in *Environmental Response Division Operational Memorandum #6, Revision #4*, dated September 13, 1995.

2.2 Summary of Geological Information

There are four basic rock formations comprising the bedrock of Genesee County: the Coldwater, Marshall, Michigan, and Saginaw formations. The Coldwater formation consists of sandy shale, and is a poor water producer. The Marshall formation consists of white to gray sandstone of varying grain size in the lower portion, and Napoleon Sandstone and Marshall Sandstone in the upper portion; and yields high quality groundwater. The Michigan formation consists of a gray shale and some thick dolostone layers, and is not a principal water bearing formation. The Saginaw formation is the youngest formation, and consists of sandstone, shale, sandy shale, limestone, and coal layers. Groundwater may be obtained from the sandstone layers within the Saginaw formation. Glacial drift material overlies the bedrock.

2.3 Summary of Hydrogeological Information

2.3.1 Depth to usable aquifer

The City of Flint is on a municipal water system. Most of the potable water wells within Genesee County are located beneath the glacial

drift in the Saginaw Formation. The depth to the Saginaw Formation varies throughout the county, but is located roughly 300 feet below ground surface.

2.3.2 *Local Groundwater Flow Direction*

Based on static water level measurements obtained from the groundwater monitoring wells, groundwater flow is to the northwest. Although this would be consistent with the regional groundwater flow direction in Genesee County determined using peizometer data[1], this flow direction is suspect due to the variability of the well screen depths and soil types encountered in the screened intervals. See Attachment 11.

2.3.3 *Hydraulic Gradient*

The hydraulic gradient, also based on static water level measurements of on-site wells, was estimated to be 0.09 ft/ft.

2.3.4 *Hydraulic Conductivity*

Slug test data obtained using a Hermit 2000© and analyzed using Aqtesolv© software indicated an average hydraulic conductivity of 0.00095 ft/min. See Attachment 12.

2.3.5 *Natural Groundwater Velocity (Seepage Velocity)*

The monitoring wells were screened in silty sand, silty clay, silty sand, and sand. The effective porosity of this water bearing unit is assumed to be 20% based on recommendations contained in MDEQ *Operational Memorandum No. 10, Attachment 2*, dated November 6, 1996. The natural groundwater velocity was estimated to be approximately 225 ft/yr.

3.0 SOIL SAMPLE ANALYTICAL RESULTS

Soil samples were submitted to Fire & Environmental Consulting Laboratories, Inc., located in East Lansing, Michigan for analysis. Based on the former UST contents, the samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), and lead. The initial soil samples obtained from the Geoprobe borings

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[1] See Dr. Chester H. Wilson, *Geology of Genesee County*, (1972).

were not analyzed for lead. Analysis indicated the presence of the following constituents in concentrations exceeding the Tier I Soil Leaching to Groundwater Risk-Based Screening Levels (RBSLs): ethylbenzene and xylenes. Additional constituents were detected in concentrations that did not exceed the RBSLs. No exceedances of the Tier I Direct Contact RBSLs were noted. See Attachment 3 for a summary of soil analytical results, Attachment 4 for a Tier I comparison table, and Attachment 5 for soil concentration maps.

4.0 GROUNDWATER SAMPLE ANALYTICAL RESULTS

Groundwater samples were submitted to Fire & Environmental Consulting Laboratories, Inc., located in East Lansing, Michigan for analysis. Based on the former UST contents, the samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), and lead. The initial groundwater samples obtained from the Geoprobe borings and sump were not analyzed for lead. Analysis indicated the presence of the following constituents in concentrations exceeding the Tier I Residential Health-Based Drinking Water and/or the Groundwater-Surface Water Interface RBSLs: benzene and ethylbenzene. Additional constituents were detected in concentrations that did not exceed RBSLs. No exceedances of the Tier I Direct Contact RBSLs were noted. See Attachment 7 for a summary of groundwater analytical results, Attachment 8 for a Tier I comparison table, and Attachment 9 for groundwater concentration maps.

5.0 CONCLUSION

Soil concentrations exceeding the Tier I Soil Leaching to Groundwater RBSLs are present; however, the concentrations do not exceed the Tier I Direct Contact RBSLs. As the site is under pavement, exposure to impacted soil is not expected.

Groundwater concentrations exceeding the Tier I Residential Health-Based Drinking Water RBSLs are noted.

5.1 Sensitive Receptors

The Flint River is located in excess of 2000 feet east of the former UST. See Attachment 1. Current data indicates it is unlikely that impacted groundwater emanating from the former tank farm has or will reach the river.

The City of Flint is on a municipal water system. Most of the potable water wells within Genesee County are located beneath the glacial drift in the Saginaw Formation. The depth to the Saginaw Formation varies throughout the county, but is located roughly 300 feet below ground surface. It is unlikely that impacted groundwater will reach this aquifer.

5.2 Delineation

According to MDEQ Guidelines as established in the Memorandum dated January 19, 1996, the extent of contamination both horizontally and vertically must be delineated to below the Tier I residential unrestricted values.

Soil impacted with BTEX constituents is fully delineated both horizontally and vertically. See Attachment 5a - 5e.

Groundwater impacted with BTEX constituents is not delineated to the west; however, the concentration in MW-3 is 6 parts per billion (ppb) and the Tier I Residential Health-Based Drinking Water RBSL is 5 ppb. See Attachment 9a.

5.3 Closure Potential

The site is fully delineated with respect to soil.

Exceedances of the Tier I Residential Health-Based Drinking Water RBSL are noted in only one well, MW-3. Sample analytical results indicated that MW-3 exceeded the RBSL for benzene by 1 ppb. (The RBSL is 5 ppb, and 6 ppb of benzene were noted in MW-3.)

5.4 Future Work

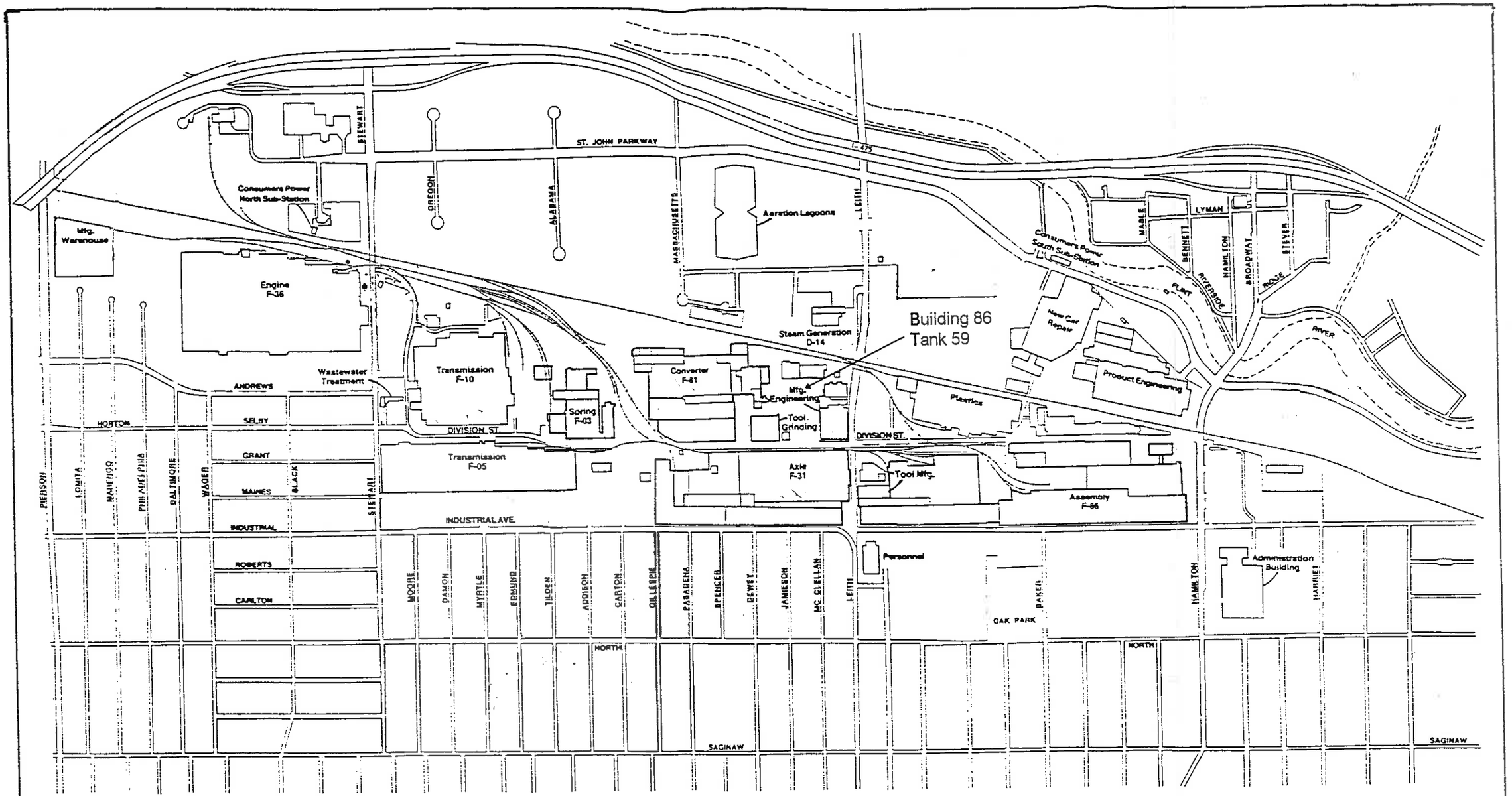
Global recommends the following activities:

1. As the benzene concentration in MW-3 exceeds the Tier I Residential Health-Based Drinking Water RBSL by only 1 ppb, Global recommends quarterly sampling until such time as the well exhibits concentrations below 5 ppb. The MDEQ will require two consecutive monthly sampling events below the applicable RBSL prior to closure.

2. If an unrestricted residential closure is desired, Global recommends removing those soils which exceed the Tier I Soil Leaching to Groundwater RBSLs.

These recommendations may change based on negotiations with the MDEQ and the development of the site-wide remedial action plan.

ATTACHMENT 1



LEGEND

F-36	Factory Number
D-14	Division Number
□	Hazardous Waste Storage Area
38	Building Number
—	Property Line
■	Gate House
●	Pedestrian Entrance
×—×—	Fence

0 400 800 1200
Scale in Feet

Adapted from
EDI Engineering & Science

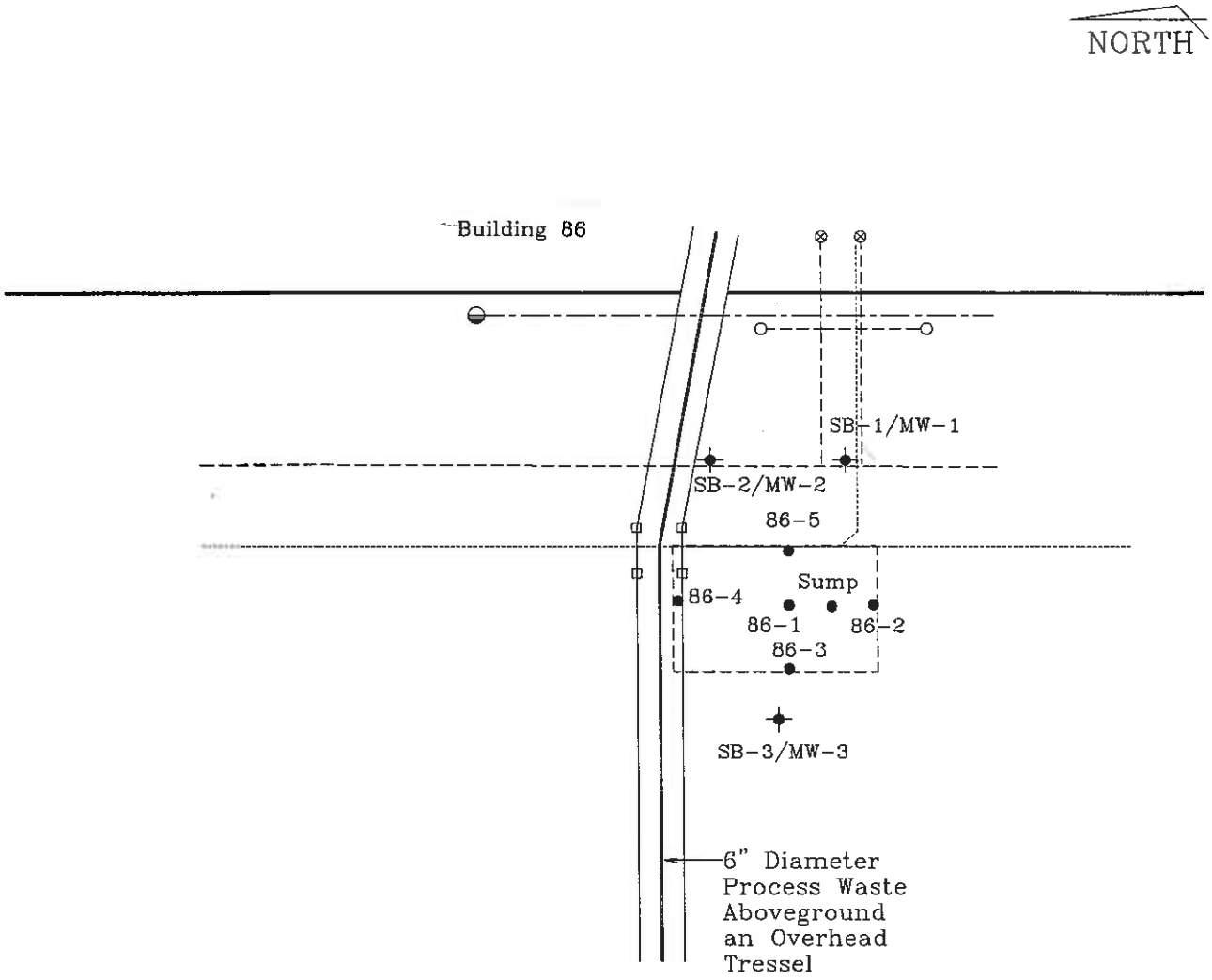
BOC FLINT OPERATIONS (BUICK SITE)

TANK FARM LOCATION/SITE DIAGRAM
ATTACHMENT 1

June, 1989

21080

ATTACHMENT 2



LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: SAMPLE LOCATIONS DIAGRAM
BUILDING 86 - TANK 59
FLINT, MICHIGAN

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 2
	PROJECT NUMBER: F174

ATTACHMENT 3

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 3
LABORATORY RESULTS SOIL
FACILITY NAME: FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	BLD 86-1		BLD 86-1		BLD 86-2		BLD 86-2		BLD 86-3	
Sample Depth (feet BGS)	8-9		9-10		11-15		17-19		15-17	
Date Collected	7/23/96		7/23/96		7/23/96		7/23/96		7/23/96	
Date Extracted	7/26/96		7/26/96		7/26/96		7/26/96		7/26/96	
Date Analyzed	7/26/96		7/26/96		7/26/96		7/26/96		7/26/96	
Analytical Method No.	8260		8260		8260		8260		8260	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Toluene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Ethylbenzene	ND	10	ND	10	1100	10	ND	10	3300	10
☐ Total Xylenes	ND	10	ND	10	2200	10	ND	10	6600	10
☐ MTBE	ND	100	ND	100	ND	100	ND	100	ND	100
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

ATTACHMENT NO. 3
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	BLD 86-3		BLD 86-4		BLD 86-4		BLD 86-5		BLD 86-5	
Sample Depth (feet BGS)	19-21		15-17		21-23		13-15		19-21	
Date Collected	7/23/96		7/23/96		7/23/96		7/23/96		7/23/96	
Date Extracted	7/26/96		7/26/96		7/26/96		7/26/96		7/26/96	
Date Analyzed	7/26/96		7/26/96		7/26/96		7/26/96		7/26/96	
Analytical Method No.	8260		8260		8260		8260		8260	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10	ND	10	ND	10	ND	500	ND	10
☐ Toluene	ND	10	ND	10	ND	10	ND	500	ND	10
☐ Ethylbenzene	ND	10	ND	10	ND	10	2300	500	ND	10
☐ Total Xylenes	ND	10	20	10	ND	10	15,300	500	ND	10
☐ MTBE	ND	100	ND	100	ND	100	ND	5000	ND	100
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 3
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	SB1/MW1		SB1/MW1		SB2/MW2		SB2/MW2		SB3/MW3	
Sample Depth (feet BGS)	7-9		9-11		5-7		9-11		15-17	
Date Collected	06/03/97		06/03/97		06/03/97		06/03/97		06/03/97	
Date Extracted	06/03/97		06/03/97		06/03/97		06/03/97		06/03/97	
Date Analyzed	06/11/97		06/11/97		06/11/97		06/11/97		06/11/97	
Analytical Method No.	8260		8260		8260		8260		8260	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10	ND	10	80	10	ND	10	10	10
☐ Toluene	ND	10	ND	10	90	10	10	10	ND	10
☐ Ethylbenzene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Total Xylenes	ND	10	ND	10	ND	10	ND	10	20	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

ATTACHMENT NO. 3
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene										
☐ Dibenzo(a,h)anthracene										
☐ Fluoranthene										
☐ Fluorene										
☐ Indeno(1,2,3- cd)pyrene										
☐ Naphthalene										
☐ 2-Methylnaphthalene										
☐ Phenanthrene										
☐ Pyrene										
METALS										
Sample ID	SB1/MW1		SB1/MW1		SB2/MW2		SB2/MW2		SB3/MW3	
Sample Depth (feet BGS)	7-9		9-11		5-7		9-11		15-17	
Date Collected	06/03/97		06/03/97		06/03/97		06/03/97		06/03/97	
Date Extracted	06/03/97		06/03/97		06/03/97		06/03/97		06/03/97	
Date Analyzed	06/09/97		06/09/97		06/09/97		06/09/97		06/09/97	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	5,000	100	4,600	100	3,800	100	5,100	100	4,400	100

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 3
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	SB3/MW3									
Sample Depth (feet BGS)	19-21									
Date Collected	06/03/97									
Date Extracted	06/03/97									
Date Analyzed	06/11/97									
Analytical Method No.	8260									
Collection Method*	GP									
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10								
☐ Toluene	ND	10								
☐ Ethylbenzene	ND	10								
☐ Total Xylenes	ND	10								
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 3
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene										
☐ Dibenzo(a,h)anthracene										
☐ Fluoranthene										
☐ Fluorene										
☐ Indeno(1,2,3- cd)pyrene										
☐ Naphthalene										
☐ 2-Methylnaphthalene										
☐ Phenanthrene										
☐ Pyrene										
METALS										
Sample ID	SB3/MW3									
Sample Depth (feet BGS)	19-21									
Date Collected	06/03/97									
Date Extracted	06/03/97									
Date Analyzed	06/09/97									
Analytical Method No.	8020									
Collection Method*	GP									
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	1,800	100								

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

ATTACHMENT 4

ATTACHMENT NO. 4
TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

☐ **Residential** ☐ **Commercial III** ☐ **Commercial IV** ☑ **Industrial**
Exposure Codes

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion (ug/kg)		
				Tier I Soil Leaching to Groundwater RBSLs	Tier I Residential Direct Contact	Tier I Residential Infinite Source VSIC
VOLATILES						
☐ Benzene	SB2/MW2 (5-7')	06/03/97	80	100	88,000	9600
☐ Toluene	SB2/MW2 (5-7')	06/03/97	90	16,000	>620,000	2E+6
☐ Ethylbenzene	Bldg 86-3 (15-17')	07/23/96	3300	1500	>380,000	6.7E+6
☐ Total Xylenes	Bldg 86-3 (15-17')	07/23/96	6600	5600	>400,000	3.2E+7
☐ MTBE			ND	240	1,700,000	ID
POLYNUCLEAR AROMATICS						
☐ Acenaphthene			NA			
☐ Acenaphthylene			NA			
☐ Anthracene			NA			
☐ Benzo(a)anthracene			NA			
☐ Benzo(a)pyrene			NA			
☐ Benzo(b)fluoranthene			NA			
☐ Benzo(g,h,i)perylene			NA			
☐ Benzo(k)fluoranthene			NA			
☐ Chrysene			NA			
☐ Dibenzo-(a,h)anthracene			NA			
☐ Fluoranthene			NA			
☐ Fluorene			NA			
☐ Indeno(1,2,3- cd)pyrene			NA			
☐ Naphthalene			NA			
☐ Phenanthrene			NA			
☐ Pyrene			NA			

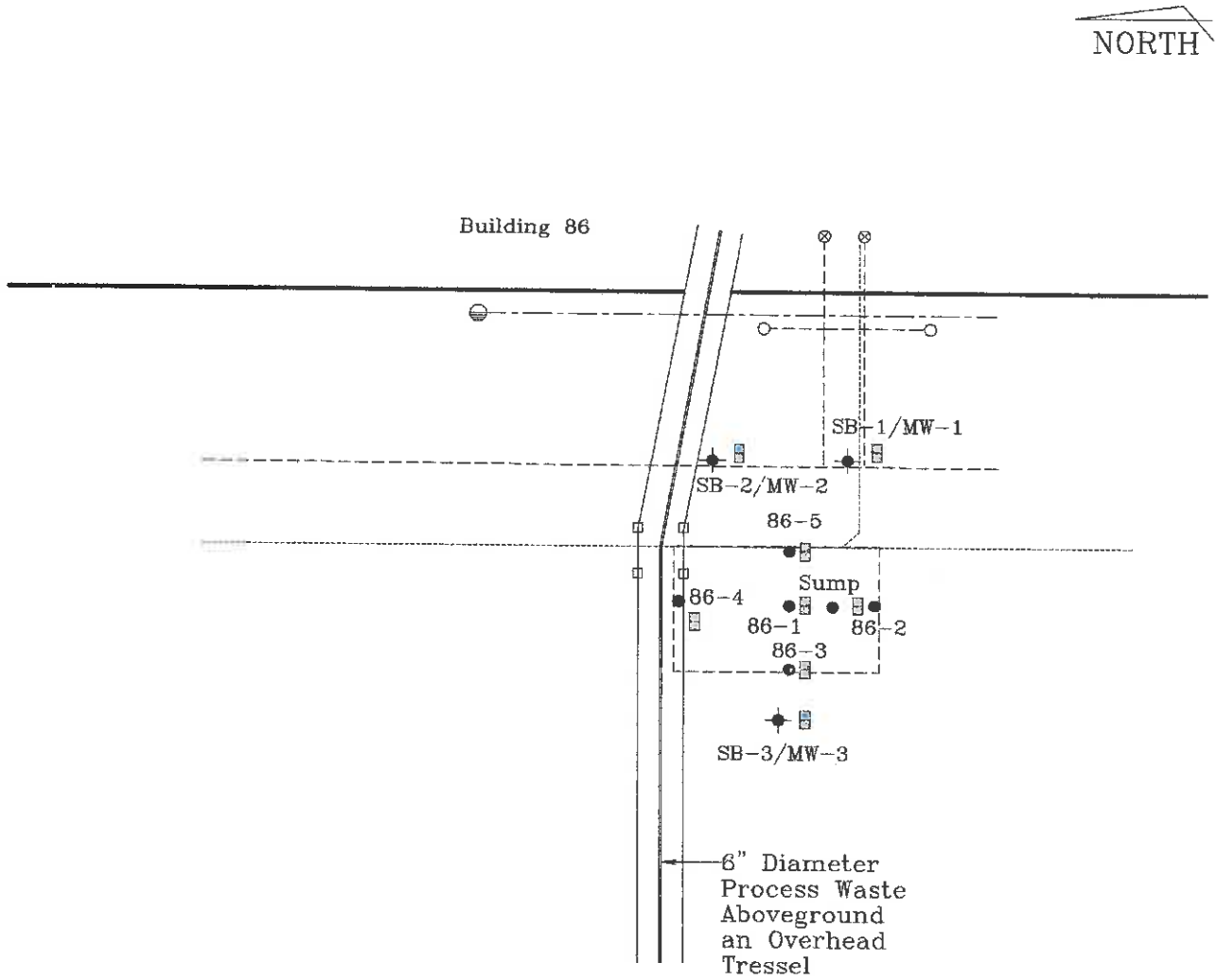
"ND" = Non-detect
"NA" = Not analyzed
"ID" = Insufficient Data

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 4
TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion (ug/kg)		
				Tier I Soil Leaching to Groundwater RBSLs	Tier I Residential Direct Contact	Tier I Residential Infinite Source VSIC
METALS						
☐ Cadmium			NA			
☐ Chromium III			NA			
☐ Chromium VI			NA			
☐ Total Lead			NA			
PCBs						
☐ Aroclor 1016			NA			
☐ Aroclor 1221			NA			
☐ Aroclor 1232			NA			
☐ Aroclor 1242			NA			
☐ Aroclor 1248			NA			
☐ Aroclor 1254			NA			
☐ Aroclor 1280			NA			
HALOGENATED HYDROCARBONS						
☐ Carbon Tetrachloride			NA			
☐ 1,1-Dichloroethane			NA			
☐ 1,2-Dichloroethane			NA			
☐ 1,1-Dichloroethylene			NA			
☐ cis-1,2-Dichloroethylene			NA			
☐ trans-1,2-Dichloroethylene			NA			
☐ Tetrachloroethylene			NA			
☐ 1,1,2-Trichloroethane			NA			
OTHER*						
☐						
☐						
☐						

ATTACHMENT 5



- Not Analyzed
- Not Detected
- Elevated levels below the Soil Leaching to Groundwater RBSLs
- Elevated levels above the Soil Leaching to Groundwater RBSLs

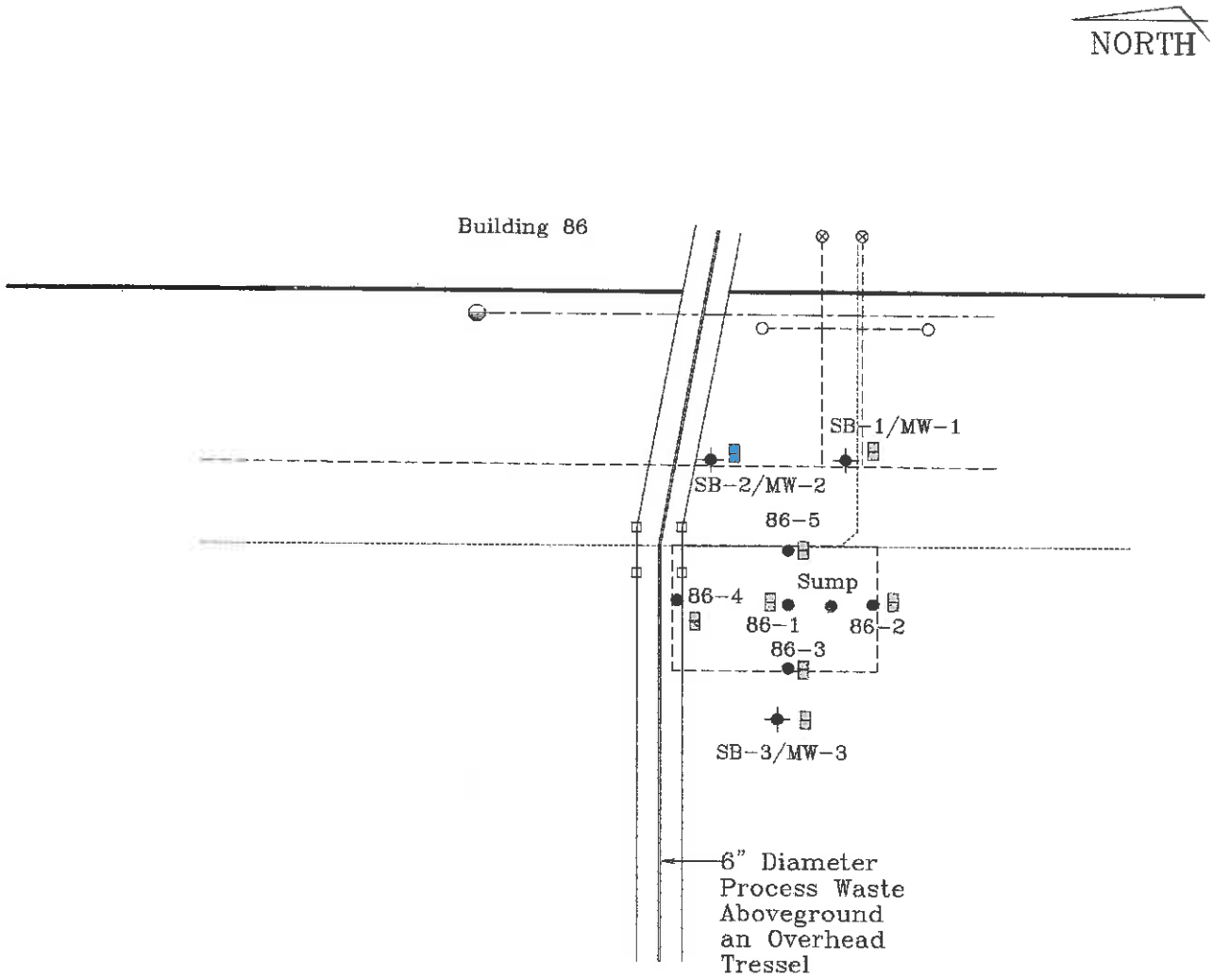
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: BENZENE
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5a
	PROJECT NUMBER: F174



- Not Analyzed
- Not Detected
- Elevated levels below the Soil Leaching to Groundwater RBSLs
- Elevated levels above the Soil Leaching to Groundwater RBSLs

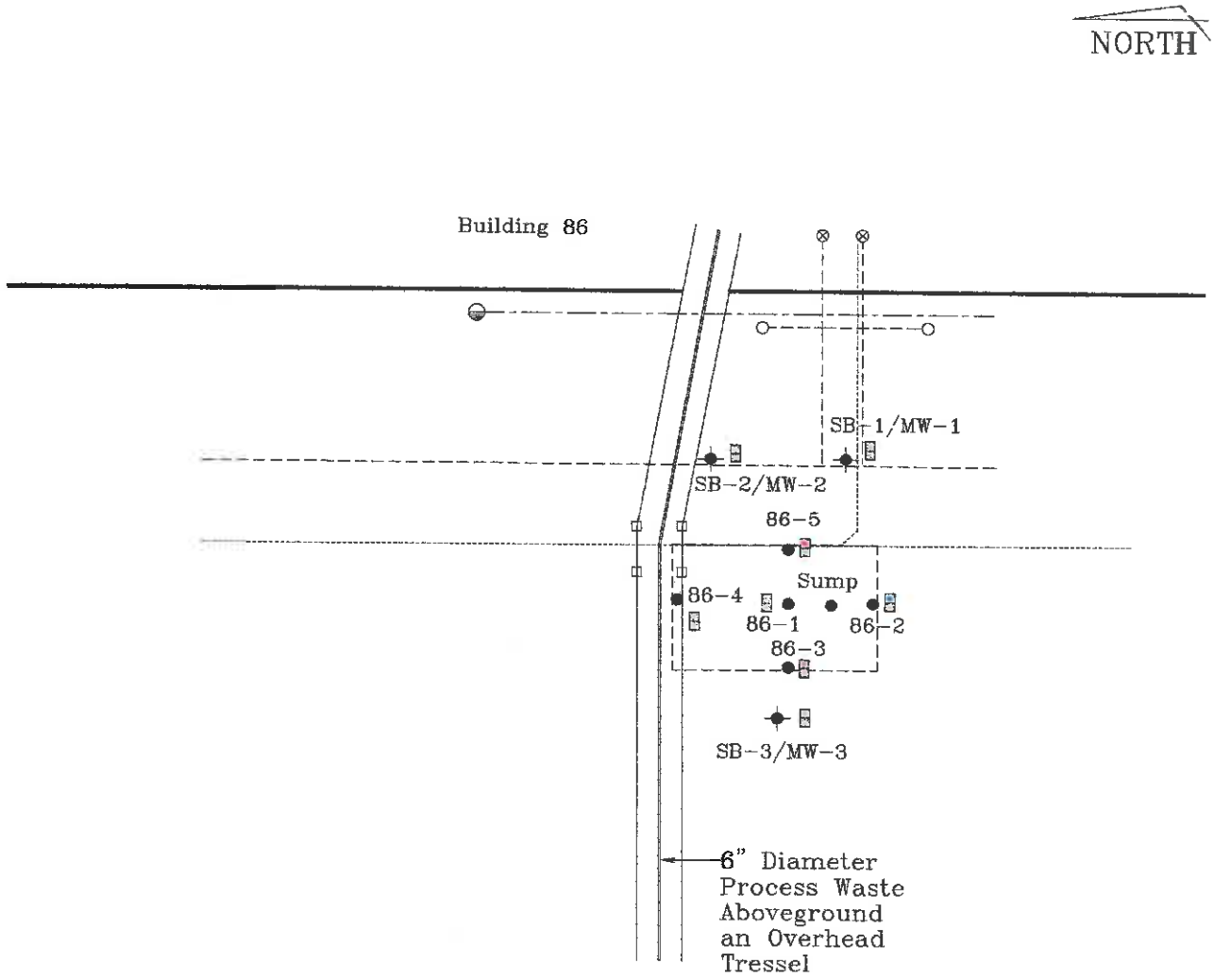
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: TOLUENE
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5b
	PROJECT NUMBER: F174



- Not Analyzed
- Not Detected
- Elevated levels below the Soil Leaching to Groundwater RBSLs
- Elevated levels above the Soil Leaching to Groundwater RBSLs

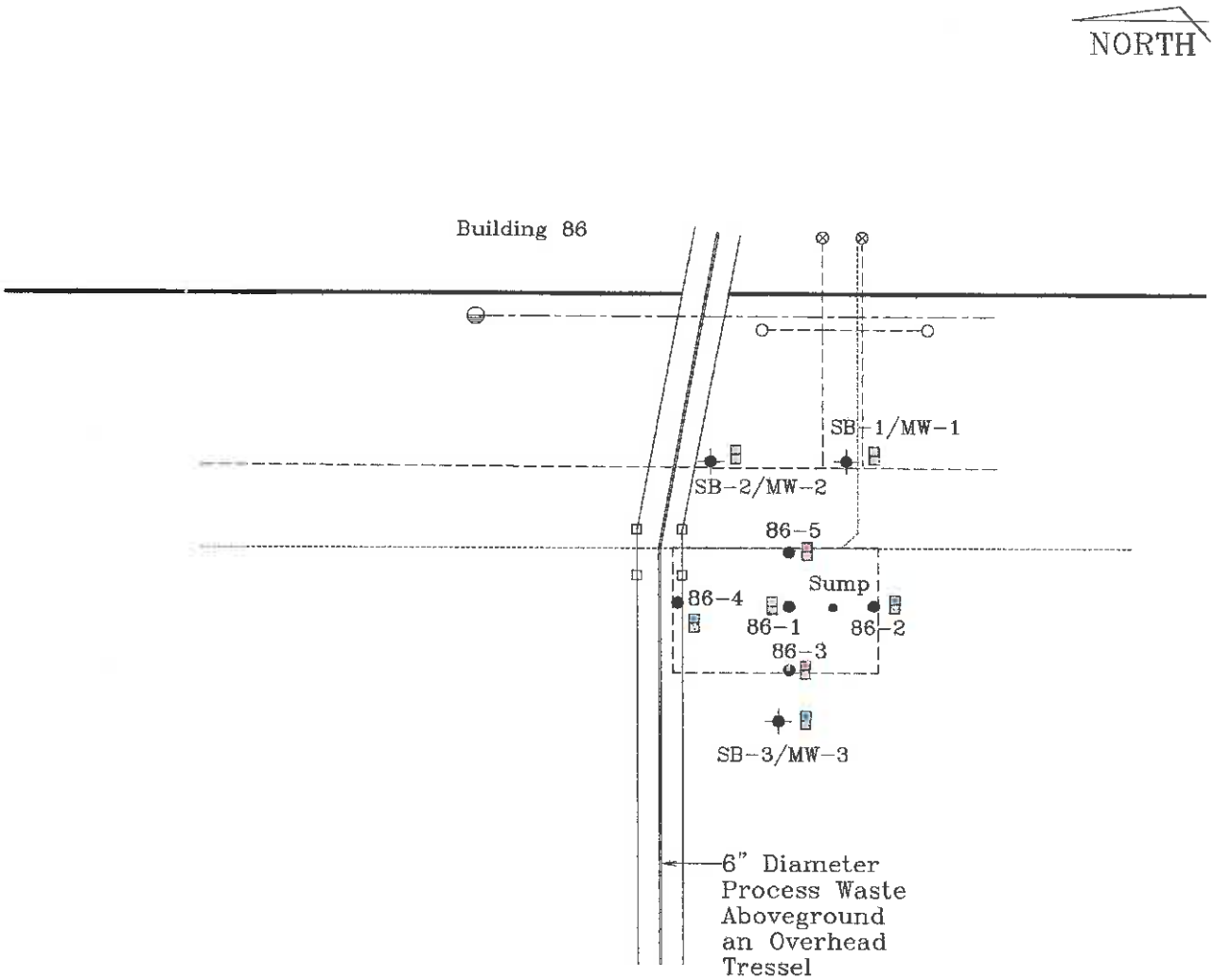
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: ETHYLBENZENE
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5c
	PROJECT NUMBER: F174



- Not Analyzed
- Not Detected
- Elevated levels below the Soil Leaching to Groundwater RBSLs
- Elevated levels above the Soil Leaching to Groundwater RBSLs

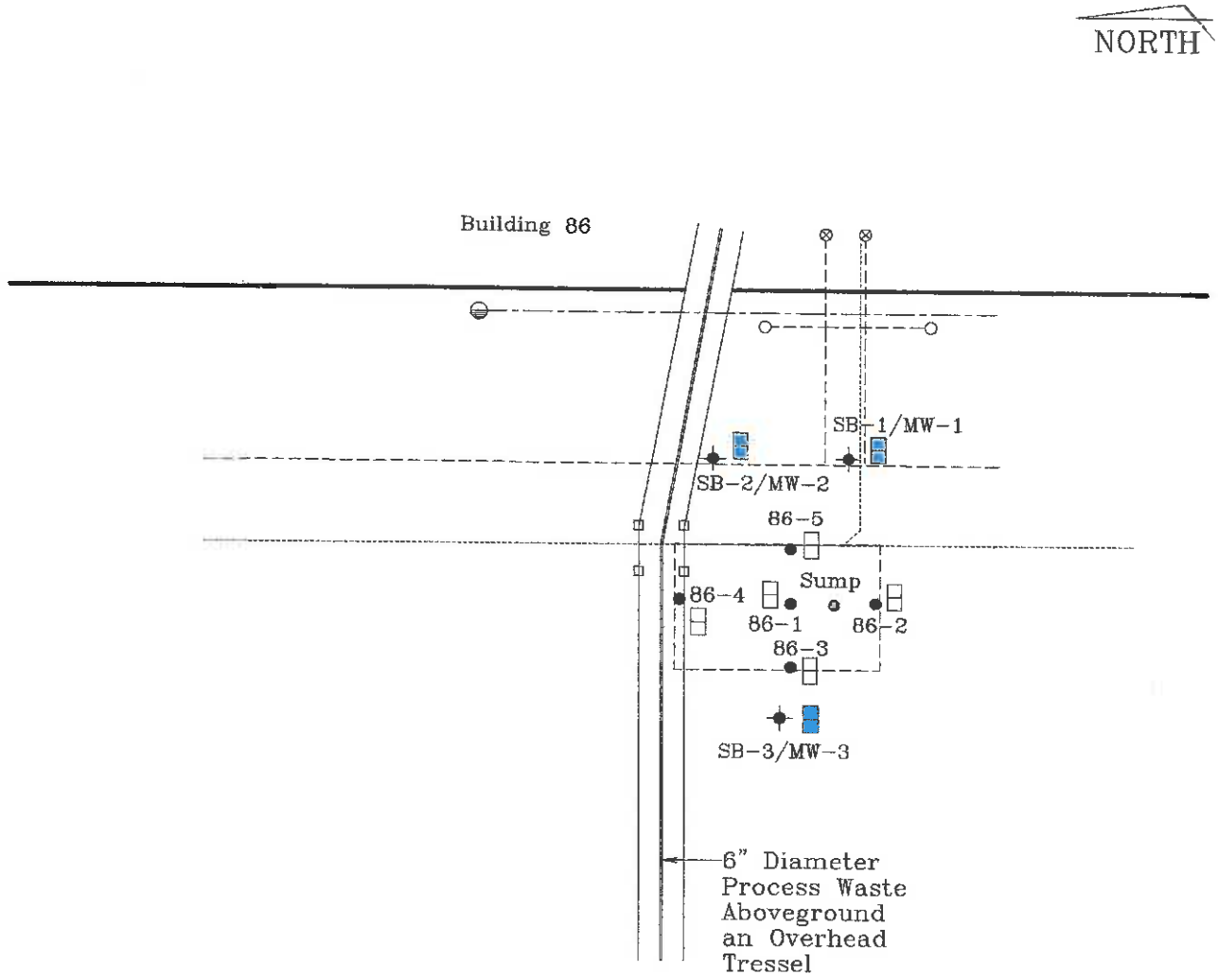
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: XYLENE
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5d
	PROJECT NUMBER: F174



- Not Analyzed
- Not Detected
- Elevated levels below the MERA Type A Default Criteria
- Elevated levels above the MERA Type A Default Criteria

LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: LEAD
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5e
	PROJECT NUMBER: F174

ATTACHMENT 6

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 86-1	Project:	GM CLCD North UST Closure
Date:	7/23/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:		Depth Drilled:	10'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
Fluid Used:			None
Driller:			Ken
Helper:			N/A
Weight/Drop:			N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Brown, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5				ND	
	GP-2						
		6					
		7				ND	
		8					
	[X]						
		9				1.0	
	GP-3						
	[X]	10			Sample Refusal	30.0	
			E.O.B	End of Boring 10'			
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 86-2	Project:	GM CLCD North UST Closure
Date:	7/23/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	9:20	Depth Drilled:	19'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
Fluid Used:			None
Driller:			Ken
Helper:			N/A
Weight/Drop:			N/A

Boring Methods

- Hollow Stem Auger
- Hand Auger
- X Geoprobe

Groundwater Information

GW Encountered at

Monitor Wells Installed: Yes / No

Penetration ons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete/Asphalt			
		1		Stone			
	GP-1		SP	Sand	Dark Brown, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5				ND	
	GP-2						
		6					
		7				ND	
		8					
		9				ND	
	GP-3						
		10	CL	Sandy Clay	No Fractures		
		11		Clay	Brown/Gray, Fractures	10	
		12					
	[X]	13				820	
	GP-4		SM	Silty Sand	Black/Gray, Moist, Fine/Medium		
		14	ML	Silt	Gray		
		15	SM	Silty Sand	Black/Gray	20	
	GP-5		SP	Sand	Brown		
		16					
		17				20.0	
	GP-6						
		18					
	[X]	19				8.0	
			E.O.B	End of Boring 19'			
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

lobal Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 86-3	Project:	GM CLCD North UST Closure
Date:	7/23/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	11:00	Depth Drilled:	21'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
Groundwater Information		Fluid Used:	None
GW Encountered at	14'	Driller:	Ken
Monitor Wells Installed		Helper:	N/A
Yes	No	Weight/Drop:	N/A

Boring Methods

- Hollow Stem Auger
- Hand Auger
- X Geoprobe

Penetration Rate ns/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete/Asphalt			
		1		Stone			
	GP-1		SP	Sand	Dark Brown, Moist, Fine/Medium		
		2					
		3				6.0	
		4					
		5				8.0	
	GP-2						
		6					
		7				28.0	
		8					
		9				4.0	
	GP-3						
		10					
		11			Brown	3.0	
		12					
			CL	Clay	Brown/Gray, Fractures		
		13				32.0	
	GP-4				Brown/Green, Fine/Medium		
		14					
					Brown/Gray, 3" Silty Sand, Wet		
		15				7.0	
		16					
	[X]						
		17			2" Black Sand Lens, Wet	>1000	
			SP	Sand	Brown		
		18					
		19				26.0	
			ML	Silt	Gray, Moist		
		20					
	[X]	21				ND	
			E.O.B	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
N No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

lobal Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 86-4	Project:	GM CLCD North UST Closure
Date:	7/23/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	13:00	Depth Drilled:	23'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	17'	Fluid Used:	None
Monitor Wells Installed		Driller:	Ken
Yes	No	Helper:	N/A
		Weight/Drop:	N/A

Penetration ns/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Asphalt			
		1					
	GP-1		SP	Sand	Dark Brown, Moist, Fine/Medium		
		2					
		3					
						ND	
		4					
		5					
	GP-2					ND	
		6					
		7					
						ND	
		8					
		9					
	GP-3				Brown	ND	
		10					
		11					
						ND	
		12	SM	Sandy Silt	Brown/Gray, No Fractures, Mottled		
		13					
	GP-4			Silty Sand	Brown, Fine/Medium	8.0	
		14	CL	Clay	No Fractures		
		15				7.0	
		16	SP	Sand			
	[X]	17	CL	Clay		>1000	
	GP-5		SM	Silty Sand	Wet		
		18					
			ML	Silt	Moist		
		19				42.0	
	GP-6						
		20			Gray		
		21				18.0	
	GP-7						
		22					
	[X]	23				ND	
			E.O.B	End of Boring 23'			
		24					
		25					

SS-Split Spoon
-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 86-5	**Project:**	GM CLCD North UST Closure
Date:	7/23/96	**Project #:**	F174
Drilling Contractor:	YECI	**Location:**	Hamilton & Industrial Ave.
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	14:55	**Depth Drilled:**	21'
Time Completed:		**Hole Diameter:**	2"
Length Coring Device:	2'	**Coring Device:**	2"

Boring Methods		Groundwater Information			
	Hollow Stem Auger	GW Encountered at		Driller:	Ken
	Hand Auger	Monitor Wells Installed		Helper:	N/A
X	Geoprobe	Yes	No	Weight/Drop:	N/A

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1					
	GP-1		SP	Sand	Dark Brown, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5			Brown	ND	
	GP-2						
		6			Dark Brown		
		7				ND	
		8					
		9				ND	
	GP-3				Brown		
		10					
		11				ND	
		12					
		13				ND	
	GP-4						
		14					
	[X]	15				>1000	
			CL	Clay	Brown/Gray, Moist, Fractures		
		16					
		17				620	
	GP-5		SM	Silty Sand	Brown, Fine/Medium		
		18					
			ML	Silt	Gray		
		19				28.0	
	GP-6						
		20			Gray		
	[X]	21				3.0	
			E.O.B	End of Boring 21'			
		22					
		23				ND	
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB-1/MW-1	**Project:**	**GM - Building 86**
Date:	6/2/97	**Project #:**	F329
Drilling Contractor:	GEEI	**Location:**	
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	16:00	**Depth Drilled:**	11'
Time Completed:		**Hole Diameter:**	8.25"
Length Coring Device:	4'	**Coring Device:**	4.5"

Boring Methods		**Groundwater Information**			
X	**Hollow Stem Auger**	**GW Encountered at**		**Driller:**	Norm
	Hand Auger	**Monitor Wells Installed**		**Helper:**	Ash
	Geoprobe	**Yes** X	**No**	**Weight/Drop:**	140lb/30"

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	PID	GC
				Concrete			
		1.					
	SS		SP	Sand	Black, Moist, Fine/Medium, Slag fill		
	SS	2.					
	SS						
	SS	3.				2.0	
	SS				No Samples Collected 3'-4.5'		
	SS	4.					
	SS						
	SS	5.					
	SS		SM	Sandy Silt	Wet		
	SS	6.					
	SS						
	SS	7.				10.0	
	SS			Silty Sand	Green		
	SS	8.					
	SS				2" Black Lens		
	SS-[X]	9.				220.0	
	SS						
	SS	10.					
	SS						
	SS-[x]	11.				125.0	
			E.O.B.	End of Boring 11'			
		12.					
		13.					
		14.					
		15.					
		16.					
		17.					
		18.					
		19.					
		20.					
		21.					
		22.					
		23.					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB-2/MW-2	**Project:**	**GM - Building 86**
Date:	6/3/97	**Project #:**	F329
Drilling Contractor:	GEEI	**Location:**	
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	8:25	**Depth Drilled:**	11'
Time Completed:		**Hole Diameter:**	8.25"
Length Coring Device:	4'	**Coring Device:**	4.5"
Groundwater Information		**Fluid Used:**	None
GW Encountered at		**Driller:**	Norm
Monitor Wells Installed		**Helper:**	Ash
Yes X	**No**	**Weight/Drop:**	140lb/30"

	Boring Methods
X	**Hollow Stem Auger**
	Hand Auger
	Geoprobe

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	PID	GC
				Concrete 10"			
		1.					
	SS		SP	Sand	Black, Moist, Fine/Medium		
	SS	2.					
	SS						
	SS	3.		Black		ND	
	SS						
	SS	4.					
	SS						
	SS	5.				ND	
	SS-[X]				Brown		
	SS-[X]	6.					
	SS-[X]		SM	Silty Sand	Wet		
	SS-[X]	7.				1.0	
	SS						
	SS	8.					
	SS		CL	Sandy Clay	Moist, No Fractures		
	SS	9.				1.0	
	SS-[X]						
	SS-[X]	10.			2" Silty Sand Lens, Wet		
	SS-[X]						
	SS-[X]	11.				ND	
			E.O.B.	End of Boring 11'			
		12.					
		13.					
		14.					
		15.					
		16.					
		17.					
		18.					
		19.					
		20.					
		21.					
		22.					
		23.					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB-3/MW-3	**Project:**	**GM - Building 86**
Date:	6/3/97	**Project #:**	F329
Drilling Contractor:	GEEI	**Location:**	
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:		**Depth Drilled:**	21'
Time Completed:		**Hole Diameter:**	8.25"
Length Coring Device:	4'	**Coring Device:**	4.5"

Boring Methods		**Groundwater Information**		**Fluid Used:**	None
X	**Hollow Stem Auger**	**GW Encountered at**		**Driller:**	Norm
	Hand Auger	**Monitor Wells Installed**		**Helper:**	Ash
	Geoprobe	**Yes** X	**No**	**Weight/Drop:**	140lb/30"

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	PID	GC
				Concrete 10"			
		1.					
	SS		SP	Sand	Black, Moist, Fine/Medium, Fill		
	SS	2.					
	SS						
	SS	3.				ND	
	SS						
	SS	4.					
	SS						
	SS	5.				2.0	
	SS						
	SS	6.					
	SS						
	SS	7.				3.0	
	SS		SM	Silty Sand	Gray, Wet		
	SS	8.					
	SS						
	SS	9.	CL	Silty Clay	Greenish, Moist, No Fractures	26.0	
	SS				No Recovery 9'-10.5'		
	SS	10.					
	SS						
	SS	11.				NA	
	SS				Brown/Gray, Fractures		
	SS	12.					
	SS				<.25" Sand Lens		
	SS	13.			<.25" Sand Lens	120.0	
	SS						
	SS	14.			3" Silty Sand Lens, Wet		
	SS				2" Sand Lens, Wet		
	SS	15.				160.0	
	SS		SP	Sand	Gray, Wet, Fine/Medium		
	SS	16.	CL	Silty Clay	Moist, No Fractures		
	SS-[X]		SP	Sand	Brown, Wet, Fine/Medium	580.0	
	SS	17.					
	SS						
	SS	18.					
	SS				6" Brown Clay Lens	20.0	
	SS	19.					
	SS						
	SS	20.					
	SS						
	SS-[X]	21.				16.0	
			E.O.B.	End of Boring 21'			
		22.					
		23.					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

ATTACHMENT 7

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 7
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	BLD 86-2 H_2O		BLD 86-3 H_2O		BLD 86-4 H_2O		BLD 86-5 H_2O		BLD 86 SUMP	
Sample Depth (feet BGS)	-		-		-		-		-	
Date Collected	7/23/96		7/23/96		7/23/96		7/23/96		7/23/96	
Date Extracted	7/26/96		7/26/96		7/26/96		7/26/96		7/26/96	
Date Analyzed	7/26/96		7/26/96		7/26/96		7/26/96		7/26/96	
Collection Method*	GP		GP		GP		GP		Bailer	
Analytical Method No.	8260		8260		8260		8260		8260	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	1	ND	1	ND	1	ND	1	ND	1
☐ Toluene	21	1	ND	1	ND	1	ND	1	ND	1
☐ Ethylbenzene	ND	1	ND	1	ND	1	86	1	ND	1
☐ Total Xylenes	23	1	13	1	14	1	203	1	ND	1
☐ MTBE	ND	10	ND	10	ND	10	ND	10	ND	10
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										
☐ Chrysene										
☐ Dibenzo(a,h)anthracene										

BGS=Below Ground Surface

D.L. = Detection Limit
* Collection Method Codes (Select all that apply): Bailer (BL), Geoprobe (GP), Purge Pump (PP), Cone Penetrometer (CP), Hydropunch (HP)
If Other (OT), specify here: _____

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 7
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	MW-1		MW-2		MW-3					
Sample Depth (feet BGS)										
Date Collected	06/01/97		06/01/97		06/01/97					
Date Extracted	06/13/97		06/13/97		06/13/97					
Date Analyzed	06/13/97		06/13/97		06/13/97					
Collection Method*	Bailer		Bailer		Bailer					
Analytical Method No.	8260		8260		8260					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	1	ND	1	6	1				
☐ Toluene	2	1	ND	1	ND	1				
☐ Ethylbenzene	ND	1	ND	1	12	1				
☐ Total Xylenes	3	1	ND	1	10	1				
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										
☐ Chrysene										
☐ Dibenzo(a,h)anthracene										

BGS=Below Ground Surface

D.L. = Detection Limit
* Collection Method Codes (Select all that apply): Bailer (BL), Geoprobe (GP), Purge Pump (PP), Cone Penetrometer (CP), Hydropunch (HP)
If Other (OT), specify here: _____

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 7
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY NUMBER: 0-002763

DUPLICATE TABLE AS NEEDED

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Fluoranthene										
☐ Fluorene										
☐ Indeno(1,2,3- cd)pyrene										
☐ Naphthalene										
☐ 2-Methylnaphthalene										
☐ Phenanthrene										
☐ Pyrene										
METALS - FILTERED										
Sample ID	MW-1		MW-2		MW-3					
Sample Depth (feet BGS)										
Date Collected	06/01/97		06/01/97		06/01/97					
Date Extracted	06/16/97		06/16/97		06/16/97					
Date Analyzed	06/16/97		06/16/97		06/16/97					
Collection Method*	Bailer		Bailer		Bailer					
Analytical Method No.	200.8		200.8		200.8					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	ND	3	ND	3	ND	3				

BGS=Below Ground Surface

D.L. = Detection Limit
* Collection Method Codes (Select all that apply): Bailer (BL), Geoprobe (GP), Purge Pump (PP), Cone Penetrometer (CP), Hydropunch (HP)
If Other (OT), specify here: _____

ATTACHMENT 8

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 8
TIER I RBSL/TIER II OR TIER III SSTL
COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME: NAO OPERATIONS (TANK 059/86)
FACILITY ID NO. 0-002763

☑ **Residential** ☐ **Commercial** ☑ **Industrial**

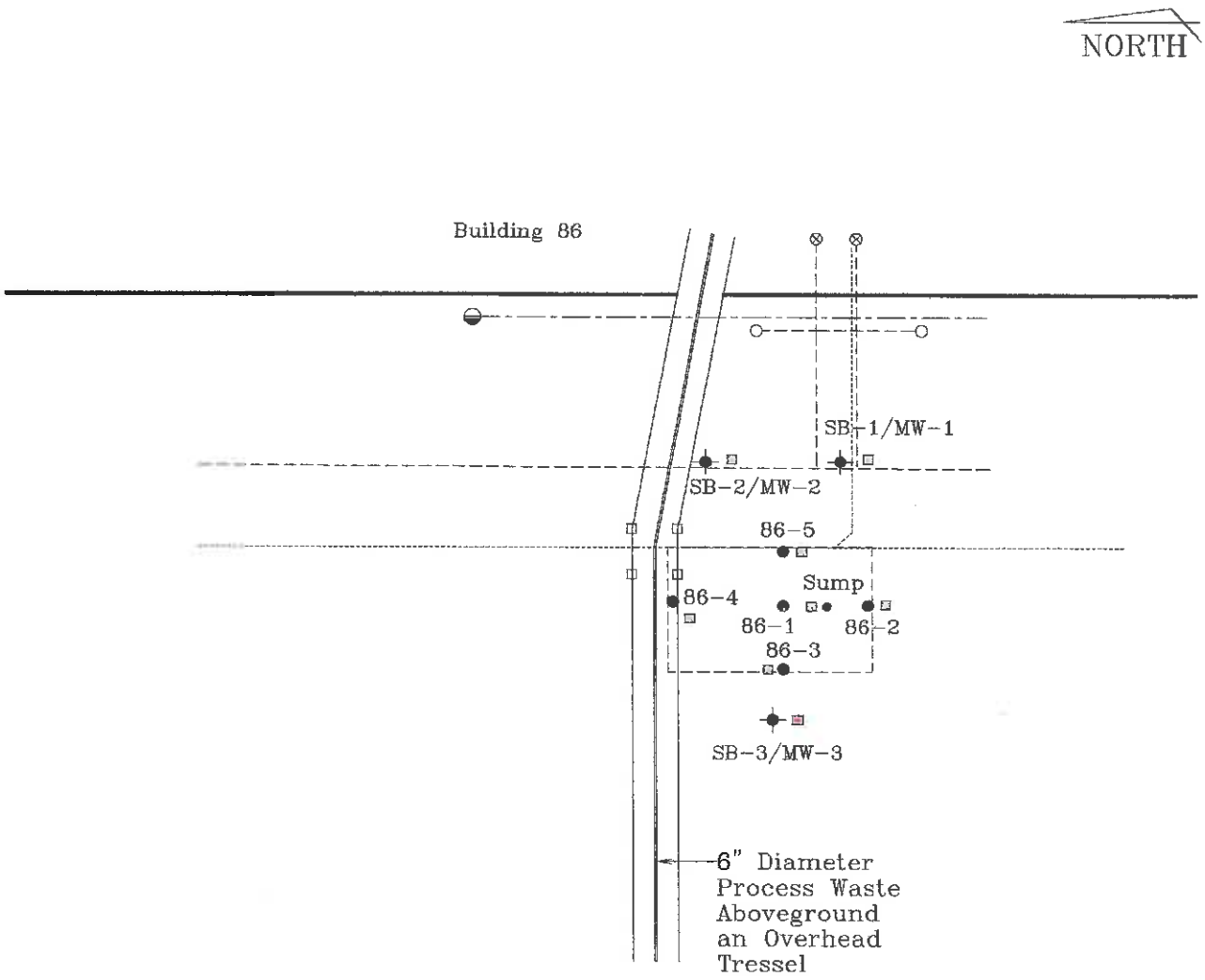
Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion (ug/l)		
				Tier I Residential Health-Based Drinking Water RBSL	Tier I Industrial Health-Based Drinking Water	Tier I Direct Contact RBSL
VOLATILES						
☐ Benzene	MW-3	06/10/97	6	5	5	9,300
☐ Toluene	BLD 86-2 H_2O	07/23/96	21	790	790	526,000
☐ Ethylbenzene	BLD 86-5 H_2O	07/23/96	86	74	74	169,000
☐ Total Xylenes	BLD 86-5 H_2O	07/23/96	203	280	280	186,000
☐ MTBE			ND	240	690	48,000,000
POLYNUCLEAR AROMATICS (PNAs)						
☐ Acenaphthene			NA			
☐ Acenaphthylene			NA			
☐ Anthracene			NA			
☐ Benzo(a)anthracene			NA			
☐ Benzo(a)pyrene			NA			
☐ Benzo(b)fluoranthene			NA			
☐ Benzo(g,h,i)perylene			NA			
☐ Benzo(k)fluoranthene			NA			
☐ Chrysene			NA			
☐ Dibenzo-(a,h)anthracene			NA			
☐ Fluoranthene			NA			
☐ Fluorene			NA			
☐ Indeno(1,2,3-cd)pyrene			NA			
☐ Naphthalene			NA			
☐ Phenanthrene			NA			
☐ Pyrene			NA			

BUILDING 86/TANK 59
SUMMARY REPORT

ATTACHMENT NO. 8
TIER I RBSL/TIER II OR TIER III SSTL
COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (TANK 059/86)
FACILITY ID NO. 0-002763

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion (ug/l)		
				Tier I Residential Health-Based Drinking Water RBSL	Tier I Industrial Health-Based Drinking Water	Tier I Direct Contact RBSL
METALS - FILTERED						
☐ Cadmium			NA			
☐ Chromium III			NA			
☐ Chromium VI			NA			
☐ Total Lead			**ND**			
PCBs						
☐ Aroclor 1016			NA			
☐ Aroclor 1221			NA			
☐ Aroclor 1232			NA			
☐ Aroclor 1242			NA			
☐ Aroclor 1248			NA			
☐ Aroclor 1254			NA			
☐ Aroclor 1280			NA			
HALOGENATED HYDROCARBONS						
☐ Carbon Tetrachloride			NA			
☐ 1,1-Dichloroethane			NA			
☐ 1,2-Dichloroethane			NA			
☐ 1,1-Dichloroethylene			NA			
☐ cis-1,2-Dichloroethylene			NA			
☐ trans-1,2-Dichloroethylene			NA			
☐ Tetrachloroethylene			NA			
☐ 1,1,2-Trichloroethane			NA			
OTHER *						
☐						

ATTACHMENT 9



- Not Analyzed
- Not Detected
- Elevated levels below the Tier I Residential Health-Based Drinking Water RBSLs
- Elevated levels above the Tier I Residential Health-Based Drinking Water RBSLs

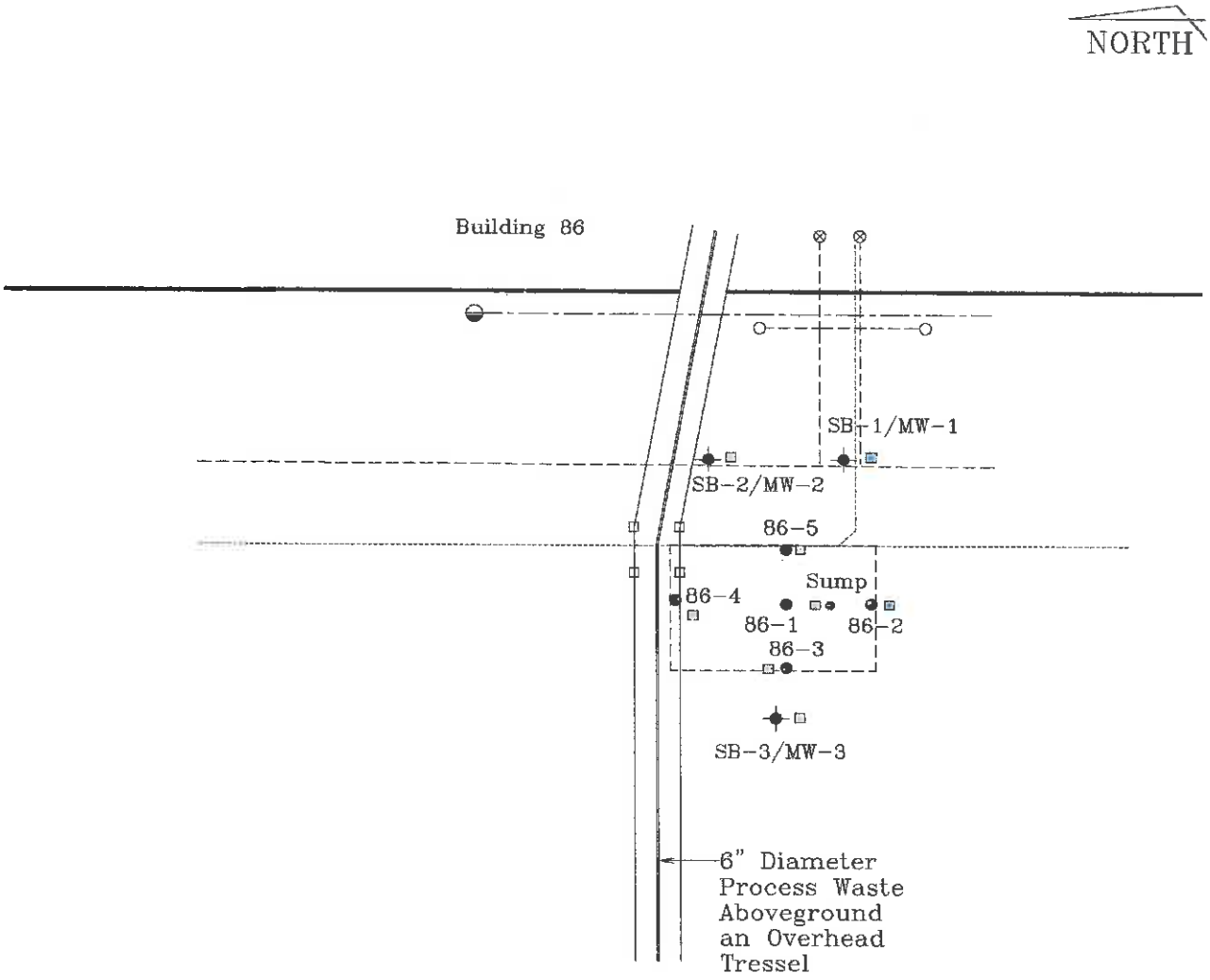
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: BENZENE
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9a
	PROJECT NUMBER: F174



- Not Analyzed
- Not Detected
- Elevated levels below the Tier I Residential Health-Based Drinking Water RBSLs
- Elevated levels above the Tier I Residential Health-Based Drinking Water RBSLs

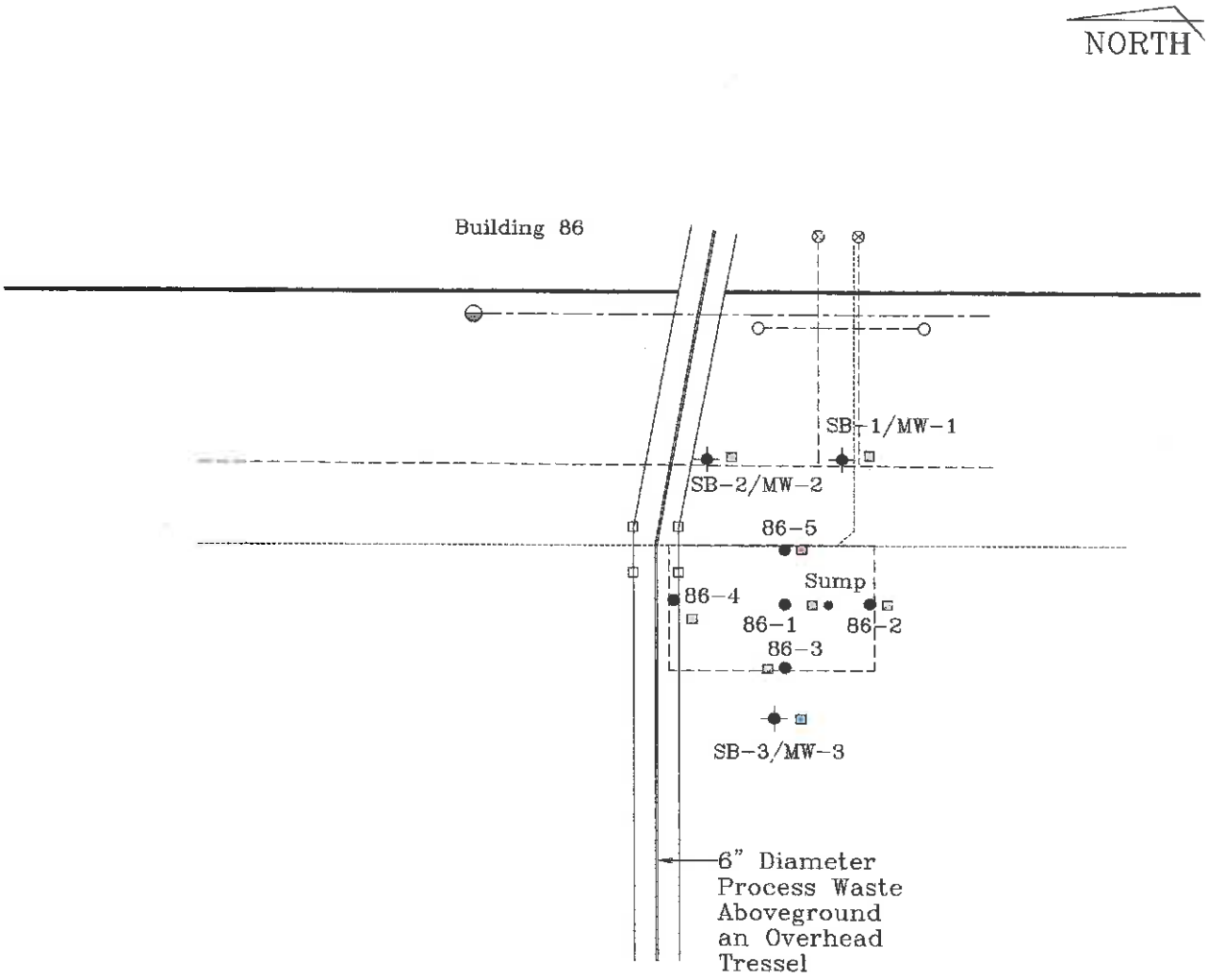
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: TOLUENE
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9b
	PROJECT NUMBER: F174



- Not Analyzed
- Not Detected
- Elevated levels below the Tier I Residential Health-Based Drinking Water RBSLs
- Elevated levels above the Tier I Residential Health-Based Drinking Water RBSLs

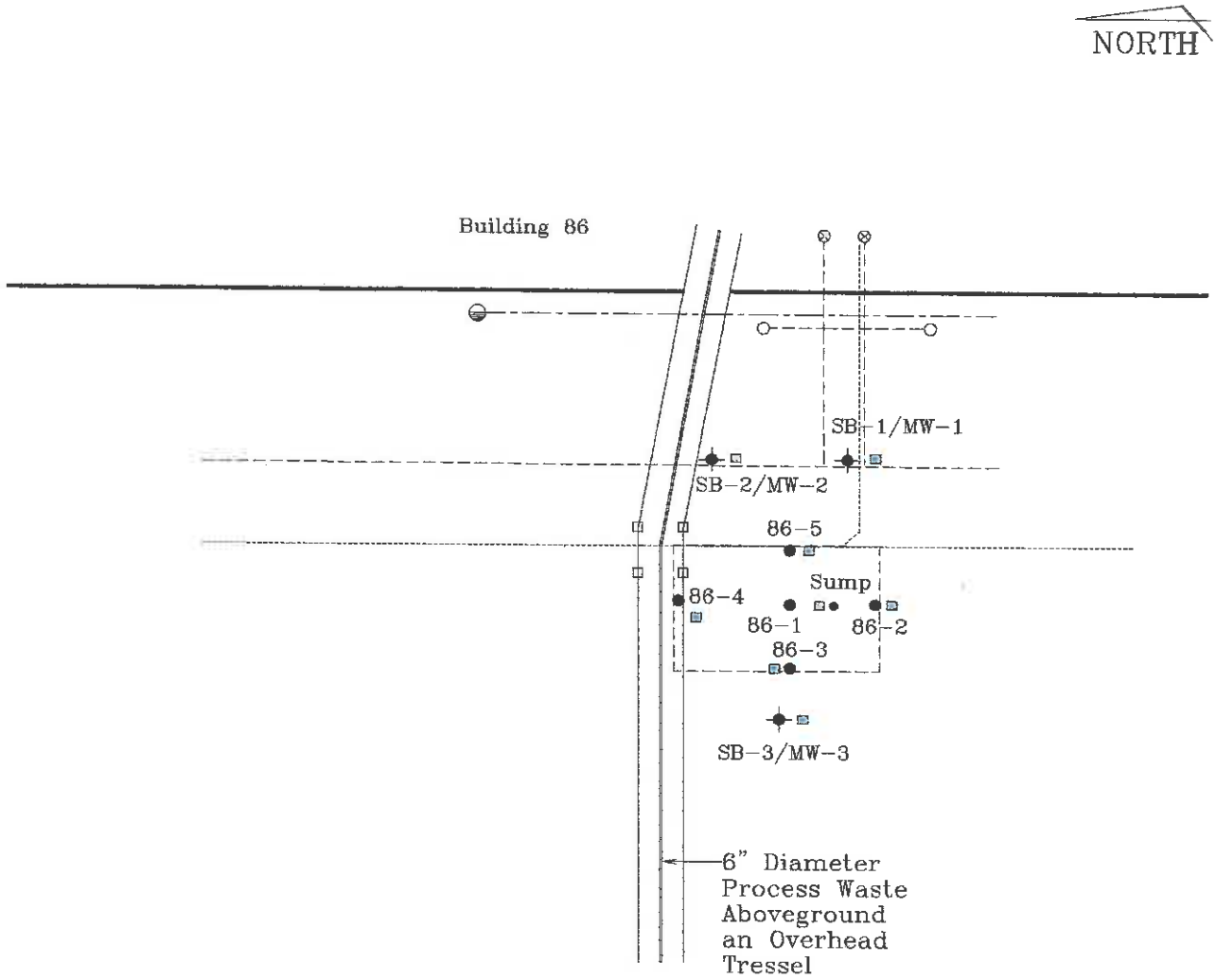
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP:
ETHYLBENZENE
GM-CLCD NORTH - BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9c
	PROJECT NUMBER: F174



- Not Analyzed
- Not Detected
- Elevated levels below the Tier I Residential Health-Based Drinking Water RBSLs
- Elevated levels above the Tier I Residential Health-Based Drinking Water RBSLs

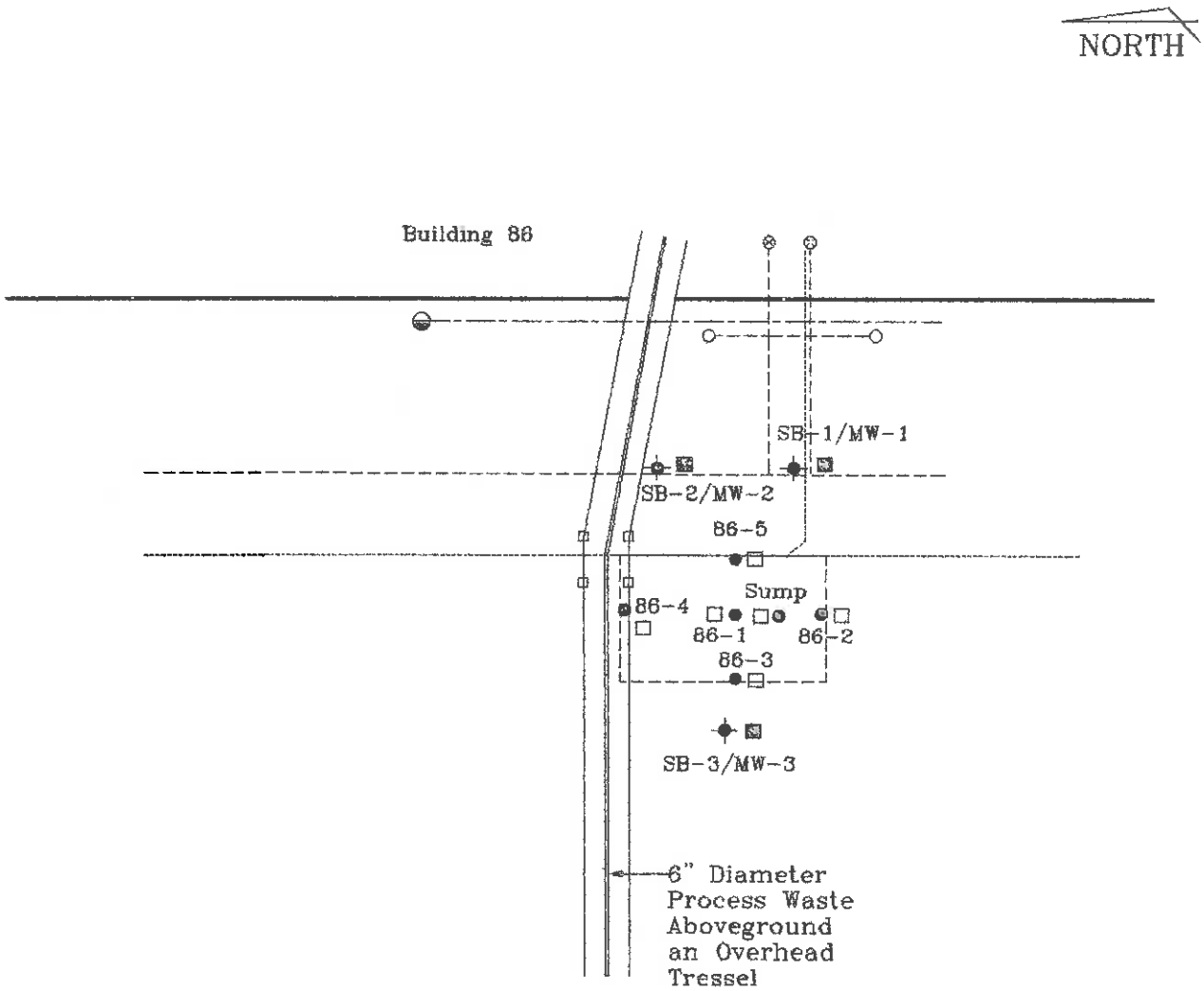
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: XYLENES
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9d
	PROJECT NUMBER: F174



□ Not Analyzed

■ Not Detected

■ Elevated levels below the Tier I Residential Health-Based Drinking Water RBSLs

■ Elevated levels above the Tier I Residential Health-Based Drinking Water RBSLs

LEGEND:

- ✦ Monitoring Well Locations
- ● Geoprobe Sample Locations
- ---- Fire Protection Line (8")
- ——— Sanitary Sewer Line (12")
- —·— Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: LEAD
GM-CLCD NORTH
BUILDING 86 - TANK 59

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9e
	PROJECT NUMBER: F174

ATTACHMENT 10

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	SB-1/MW-1	Project Name:	GM - BUILDING 86
Date:	6/2/97	Project No.:	F329
Contractor:	GEEI	Location:	
Prepared By:	ALK	Twp/Range/Sec.:	
Time Started:	16:00	Depth Drilled:	12'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Norm
		Helper:	Ash

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation
6/10/97	5.45

WELL SPECIFICATIONS

Well Casing Cover:

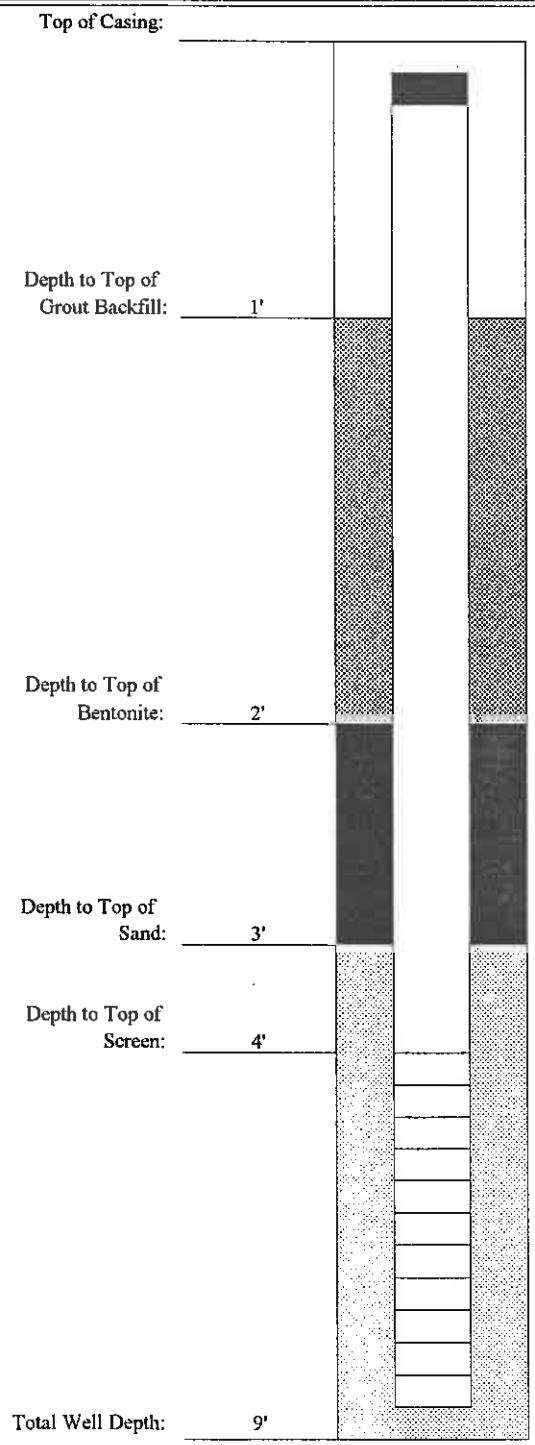
Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	9'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen:

Diamater:	2"
Length:	5'
Slotsize:	0.01
Material:	PVC
Well Screen Interval:	4'-9'
Filter Pack:	Sand



SOIL PROFILE

0 - 1.5' Concrete
1.5 - 5' Sand
5 - 7.5' Sandy Silt
7.5 - 11' Silty Sand

Groundwater Encountered at 5.5'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	SB-2/MW-2	Project Name:	GM - BUILDING 86
Date:	6/3/97	Project No.:	F329
Contractor:	GEEI	Location:	
Prepared By:	ALK	Twp/Range/Sec.:	
Time Started:	8:25	Depth Drilled:	11'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Norm
		Helper:	Ash

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation
6/10/97	6.95

WELL SPECIFICATIONS

ell Casing Cover:

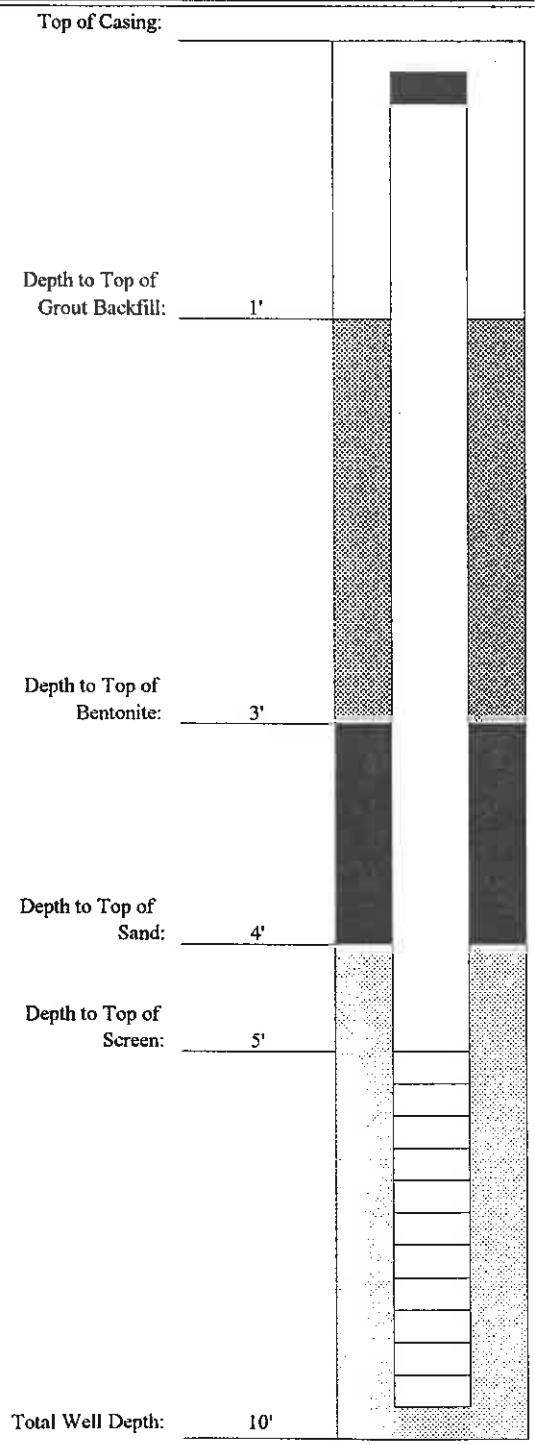
Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

ell Casing:

Diamater:	2"
Length:	10'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

ell Screen:

Diamater:	2"
Length:	5'
Slotsize:	0.01
Material:	PVC
Well Screen Interval:	5'-10'
Filter Pack:	Sand



SOIL PROFILE

0 - 10" Concrete
10" - 6' Sand
6 - 8' Silty Sand
8 - 11' Sandy Clay

Groundwater Encountered at 6.5'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	SB-3/MW-3	Project Name:	GM - BUILDING 86
Date:	6/3/97	Project No.:	F329
Contractor:	GEEI	Location:	
Prepared By:	ALK	Twp/Range/Sec.:	
Time Started:	10:30	Depth Drilled:	21'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Norm
		Helper:	Ash

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation
6/10/97	13.67

WELL SPECIFICATIONS

Well Casing Cover:

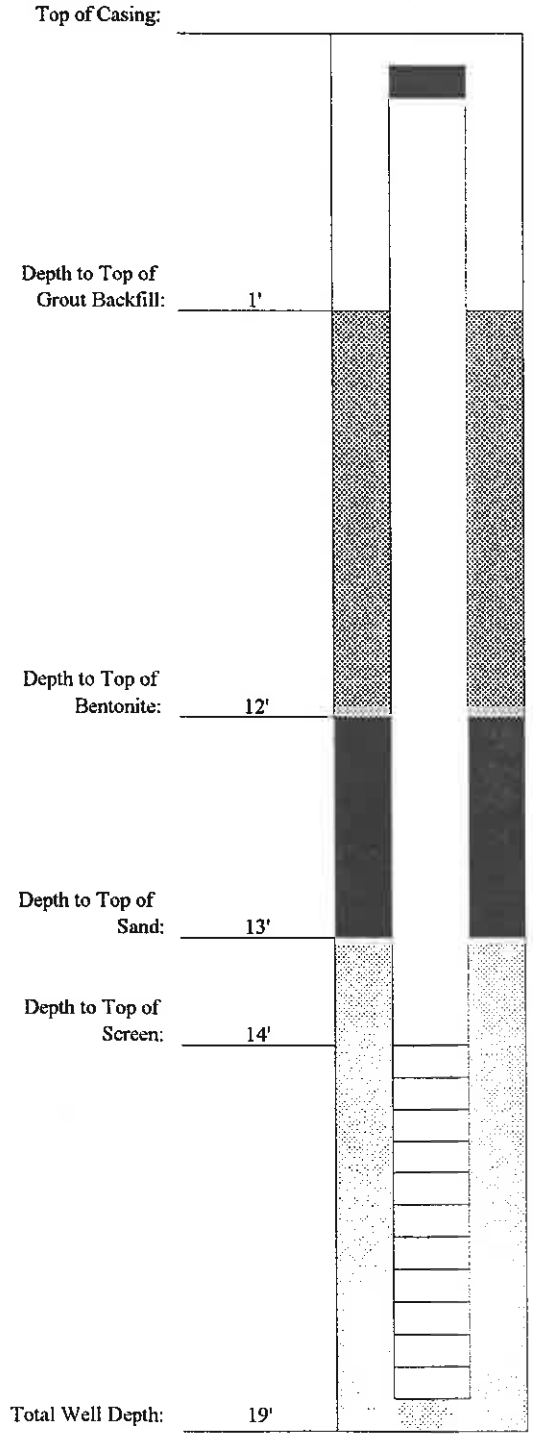
Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	19'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen:

Diamater:	2"
Length:	5'
Slotsize:	0.01
Material:	PVC
Well Screen Interval:	14'-19'
Filter Pack:	Sand

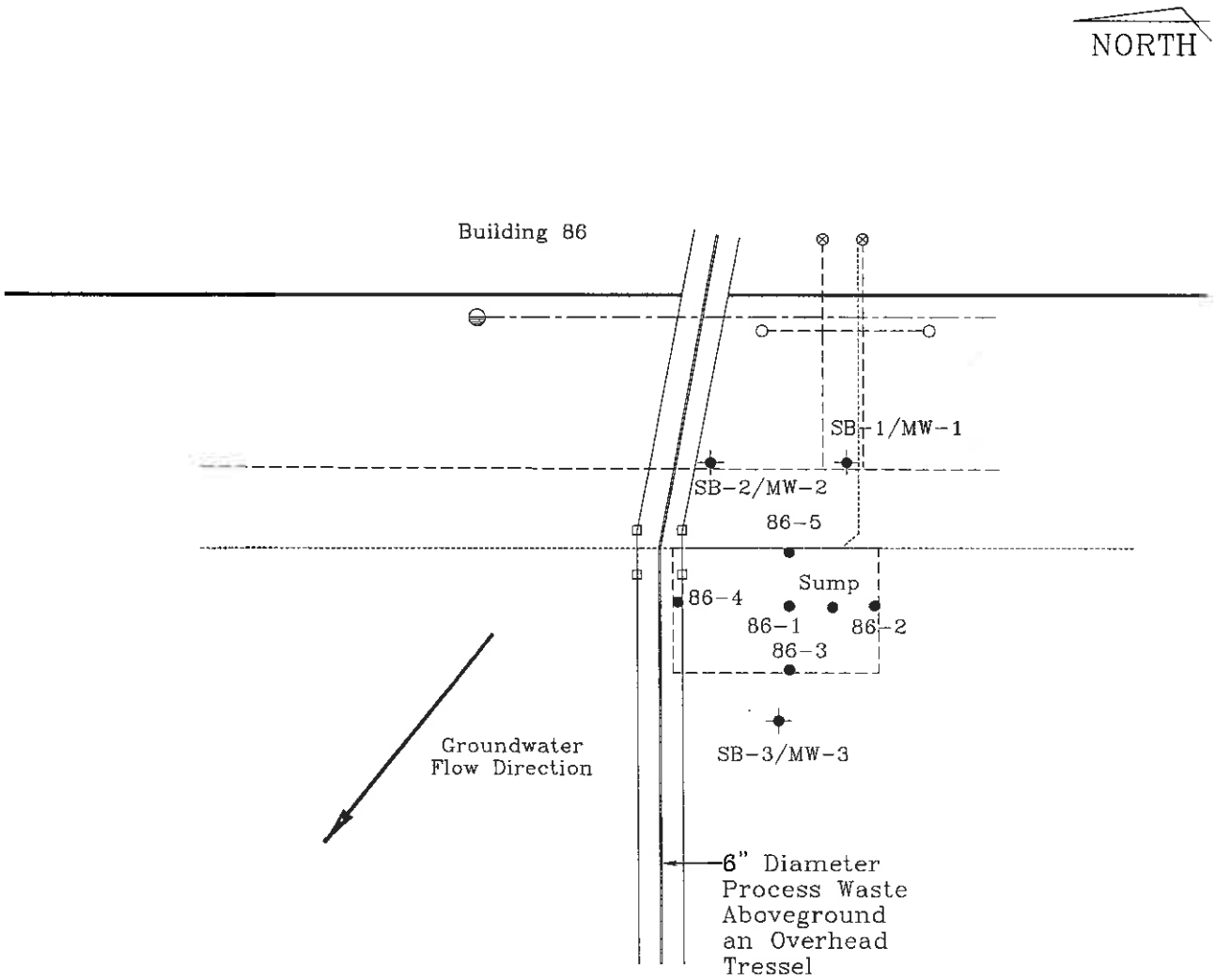


SOIL PROFILE

0 - 10" Concrete
10" - 7' Sand
7 - 8.5' Silty Sand
8.5 - 15' Silty Clay
15 - 15.5' Sand
15.5 - 16' Silty Clay
16 - 21' Sand

Groundwater Encountered at 16.5'

ATTACHMENT 11



LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line (8")
- Sanitary Sewer Line (12")
- Storm Sewer Line (8")

GM-CLCD NORTH

TITLE: GROUNDWATER FLOW DIRECTION DIAGRAM
BUILDING 86 - TANK 59
FLINT, MICHIGAN

SCALE: 1"=40'	DATE: 8/13/96
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 11
	PROJECT NUMBER: F174

ATTACHMENT 12

AQTESOLV RESULTS
Version 1.10

07/25/97 15:00:16

TEST DESCRIPTION

Data set..... gm86mw2n.dat
Data set title..... BUILDING 86 - MW2

Knowns and Constants:
- No. of data points..... 127
- Radius of well casing..... 0.08333
- Radius of well..... 0.3333
- Aquifer saturated thickness..... 6
- Well screen length..... 5
- Static height of water in well..... 2.65
- Log(Re/Rw)..... 1.405
- A, B, C..... 2.021, 0.301, 0.000

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.3748E-003	+/-	7.3405E-005
y0 =	6.1736E-001	+/-	1.5037E-002

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals..... 127
- Number of estimated parameters.... 2
- Degrees of freedom..... 125
- Residual mean..... 0.0293
- Residual standard deviation..... 0.05803
- Residual variance..... 0.003368

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.0083	0.674	0.61018	0.063819	1
0.0166	0.661	0.60309	0.057912	1
0.025	0.642	0.59599	0.046007	1
0.0333	0.633	0.58906	0.043935	1
0.0416	0.62	0.58222	0.037783	1
0.05	0.611	0.57537	0.035632	1
0.0583	0.602	0.56868	0.033321	1
0.0666	0.592	0.56207	0.029932	1
0.075	0.583	0.55546	0.027544	1
0.0833	0.573	0.549	0.024001	1
0.0916	0.564	0.54262	0.021383	1
0.1	0.554	0.53623	0.017766	1
0.1083	0.545	0.53	0.015	1
0.1166	0.539	0.52384	0.015161	1
0.125	0.529	0.51768	0.011323	1
0.1333	0.52	0.51166	0.0083412	1
0.1416	0.51	0.50571	0.0042891	1
0.15	0.504	0.49976	0.0042383	1
0.1583	0.494	0.49395	4.788E-005	1
0.1666	0.485	0.48821	-0.00321	1
0.175	0.479	0.48247	-0.0034667	1
0.1833	0.472	0.47686	-0.0048582	1
0.1916	0.463	0.47131	-0.0083148	1
0.2	0.457	0.46577	-0.0087703	1
0.2083	0.447	0.46036	-0.013356	1
0.2166	0.441	0.455	-0.014004	1
0.225	0.435	0.44965	-0.014652	1
0.2333	0.428	0.44442	-0.016425	1
0.2416	0.419	0.43926	-0.020258	1
0.25	0.416	0.43409	-0.018091	1
0.2583	0.406	0.42904	-0.023045	1
0.2666	0.4	0.42406	-0.024057	1
0.275	0.394	0.41907	-0.025068	1
0.2833	0.387	0.4142	-0.027197	1
0.2916	0.381	0.40938	-0.028382	1
0.3	0.375	0.40457	-0.029566	1
0.3083	0.368	0.39986	-0.031863	1
0.3166	0.365	0.39521	-0.030215	1
0.325	0.359	0.39057	-0.031565	1
0.3333	0.353	0.38603	-0.033025	1
0.35	0.34	0.37705	-0.037049	1
0.3666	0.331	0.36833	-0.037334	1
0.3833	0.318	0.35977	-0.041769	1
0.4	0.309	0.3514	-0.042404	1
0.4166	0.299	0.34328	-0.044282	1
0.4333	0.29	0.3353	-0.0453	1

0.45	0.283	0.3275	-0.044503	1
0.4666	0.277	0.31993	-0.042933	1
0.4833	0.271	0.31249	-0.041494	1
0.5	0.264	0.30523	-0.041228	1
0.5166	0.261	0.29817	-0.037173	1
0.5333	0.258	0.29124	-0.03324	1
0.55	0.255	0.28447	-0.029468	1
0.5666	0.252	0.27789	-0.025893	1
0.5833	0.246	0.27143	-0.025431	1
0.6	0.242	0.26512	-0.02312	1
0.6166	0.239	0.25899	-0.019992	1
0.6333	0.236	0.25297	-0.01697	1
0.65	0.233	0.24709	-0.014087	1
0.6666	0.227	0.24138	-0.014376	1
0.6833	0.227	0.23576	-0.0087637	1
0.7	0.223	0.23028	-0.0072817	1
0.7166	0.22	0.22496	-0.0049589	1
0.7333	0.217	0.21973	-0.0027282	1
0.75	0.214	0.21462	-0.00061905	1
0.7666	0.214	0.20966	0.0043417	1
0.7833	0.211	0.20478	0.0062167	1
0.8	0.208	0.20002	0.0079783	1
0.8166	0.208	0.1954	0.012602	1
0.8333	0.205	0.19085	0.014145	1
0.85	0.205	0.18642	0.018583	1
0.8666	0.201	0.18211	0.018892	1
0.8833	0.201	0.17787	0.023126	1
0.9	0.198	0.17374	0.024262	1
0.9166	0.198	0.16972	0.028278	1
0.9333	0.195	0.16578	0.029224	1
0.95	0.195	0.16192	0.033079	1
0.9666	0.195	0.15818	0.036822	1
0.9833	0.192	0.1545	0.0375	1
1	0.192	0.15091	0.041092	1
1.2	0.179	0.11385	0.065146	1
1.4	0.17	0.085898	0.084102	1
1.6	0.16	0.064806	0.095194	1
1.8	0.154	0.048894	0.10511	1
2	0.148	0.036888	0.11111	1
2.2	0.142	0.027831	0.11417	1
2.4	0.135	0.020997	0.114	1
2.6	0.132	0.015841	0.11616	1
2.8	0.129	0.011952	0.11705	1
3	0.126	0.009017	0.11698	1
3.2	0.12	0.006803	0.1132	1
3.4	0.116	0.0051326	0.11087	1
3.6	0.113	0.0038723	0.10913	1
3.8	0.11	0.0029215	0.10708	1
4	0.107	0.0022041	0.1048	1
4.2	0.107	0.0016629	0.10534	1

4.4	0.104	0.0012546	0.10275	1
4.6	0.101	0.00094655	0.10005	1
4.8	0.097	0.00071413	0.096286	1
5	0.097	0.00053878	0.096461	1
5.2	0.094	0.00040649	0.093594	1
5.4	0.091	0.00030668	0.090693	1
5.6	0.091	0.00023138	0.090769	1
5.8	0.088	0.00017456	0.087825	1
6	0.085	0.0001317	0.084868	1
6.2	0.085	9.9363E-005	0.084901	1
6.4	0.082	7.4965E-005	0.081925	1
6.6	0.082	5.6558E-005	0.081943	1
6.8	0.079	4.2671E-005	0.078957	1
7	0.075	3.2193E-005	0.074968	1
7.2	0.075	2.4288E-005	0.074976	1
7.4	0.072	1.8325E-005	0.071982	1
7.6	0.072	1.3825E-005	0.071986	1
7.8	0.069	1.0431E-005	0.06899	1
8	0.069	7.8694E-006	0.068992	1
8.2	0.066	5.9371E-006	0.065994	1
8.4	0.066	4.4793E-006	0.065996	1
8.6	0.063	3.3794E-006	0.062997	1
8.8	0.063	2.5497E-006	0.062997	1
9	0.06	1.9236E-006	0.059998	1
9.2	0.06	1.4513E-006	0.059999	1
9.4	0.056	1.0949E-006	0.055999	1
9.6	0.056	8.2608E-007	0.055999	1
9.8	0.056	6.2324E-007	0.055999	1
10	0.053	4.7021E-007	0.053	1
11	0.05	1.1494E-007	0.05	1
12	0.038	2.8096E-008	0.038	1

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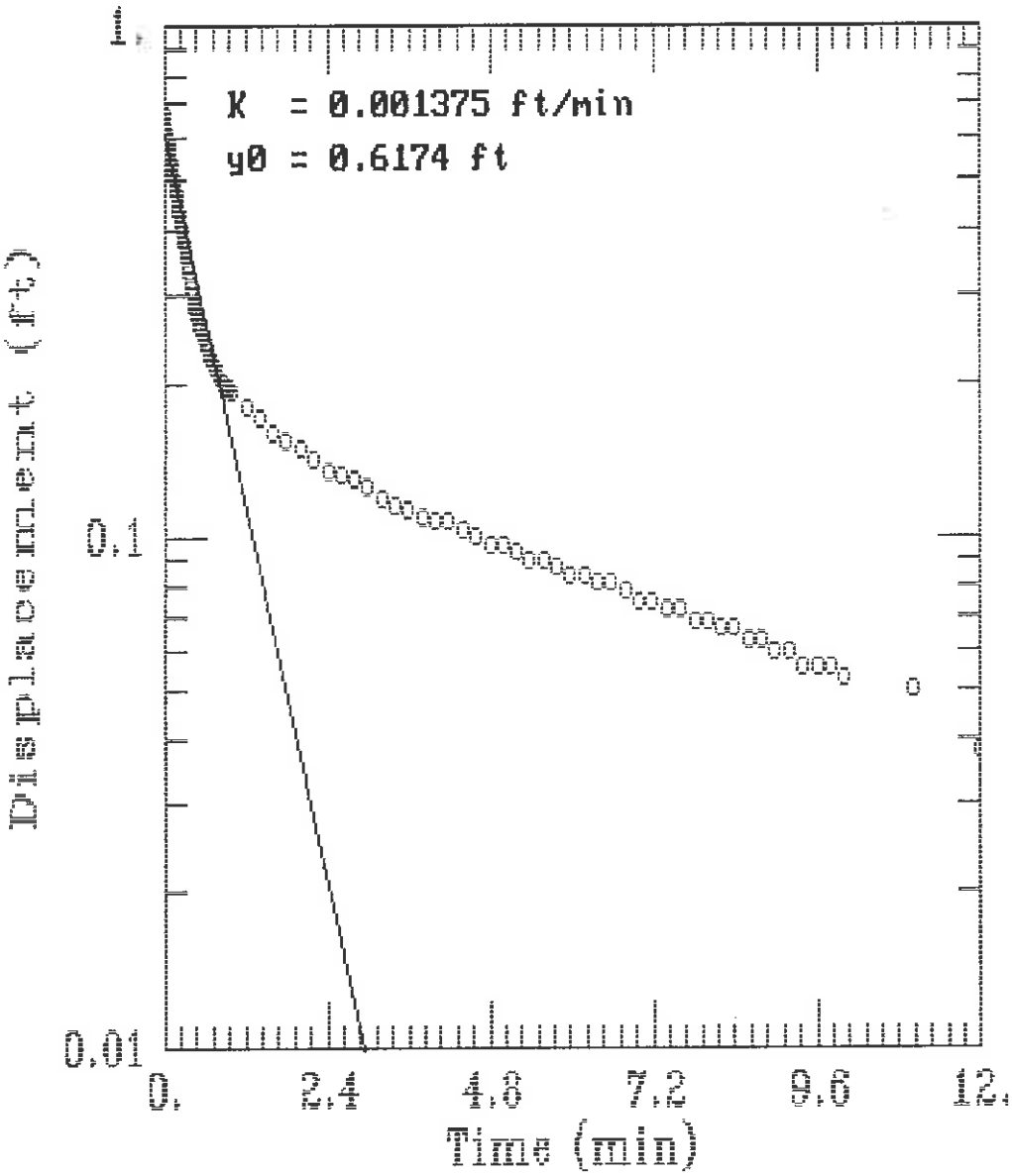
RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate
K = 1.3748E-003
y0 = 6.1736E-001

BUILDING 86 - MW2



A Q T E S O L V   R E S U L T S
Version 1.10

07/25/97   14:58:51

= =

TEST DESCRIPTION

Data set........... gm86mw3n.dat
Data set title..... BUILDING 86 - MW3

Knowns and Constants:
  No. of data points.................. 117
  Radius of well casing.............. 0.08333
  Radius of well...................... 0.3333
  Aquifer saturated thickness......... 6
  Well screen length.................. 5
  Static height of water in well...... 5.03
  Log(Re/Rw).......................... 1.781
  A, B, C............................. 2.021, 0.301, 0.000

= =

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

= =

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	5.2913E-004	+/-	2.4608E-006
y0 =	1.3920E+000	+/-	1.9031E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
  Number of residuals............... 117
  Number of estimated parameters.... 2
  Degrees of freedom................ 115
  Residual mean..................... -0.002201
  Residual standard deviation....... 0.01045
  Residual variance................. 0.0001092

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.05	1.397	1.3625	0.034493	1
0.0583	1.371	1.3577	0.013322	1
0.0666	1.371	1.3529	0.018134	1
0.075	1.362	1.348	0.013987	1
0.0833	1.352	1.3432	0.0087651	1
0.0916	1.343	1.3385	0.0045262	1
0.1	1.333	1.3337	-0.00067262	1
0.1083	1.349	1.3289	0.020055	1
0.1166	1.324	1.3242	-0.00023508	1
0.125	1.318	1.3195	-0.0014849	1
0.1333	1.311	1.3148	-0.0038081	1
0.1416	1.305	1.3101	-0.0051478	1
0.15	1.302	1.3054	-0.0034482	1
0.1583	1.296	1.3008	-0.0048211	1
0.1666	1.292	1.2962	-0.0042104	1
0.175	1.286	1.2916	-0.0055607	1
0.1833	1.283	1.287	-0.0039829	1
0.1916	1.277	1.2824	-0.0054212	1
0.2	1.274	1.2778	-0.0038211	1
0.2083	1.267	1.2733	-0.0062919	1
0.2166	1.264	1.2688	-0.0047787	1
0.225	1.258	1.2642	-0.0062275	1
0.2333	1.255	1.2597	-0.0047465	1
0.2416	1.251	1.2553	-0.0042814	1
0.25	1.245	1.2508	-0.0057786	1
0.2583	1.242	1.2463	-0.0043453	1
0.2666	1.239	1.2419	-0.0029276	1
0.275	1.233	1.2375	-0.0044727	1
0.2833	1.229	1.2331	-0.0040866	1
0.2916	1.223	1.2287	-0.0057159	1
0.3	1.22	1.2243	-0.0043084	1
0.3083	1.217	1.22	-0.0029689	1
0.3166	1.211	1.2156	-0.0046448	1
0.325	1.207	1.2113	-0.0042842	1
0.3333	1.201	1.207	-0.0059908	1
0.35	1.192	1.1984	-0.0063985	1
0.3666	1.185	1.1899	-0.0049182	1
0.3833	1.176	1.1814	-0.0054473	1
0.4	1.166	1.173	-0.0070368	1
0.4166	1.16	1.1647	-0.004736	1
0.4333	1.151	1.1564	-0.0054444	1
0.45	1.144	1.1482	-0.0042119	1
0.4666	1.135	1.1401	-0.0050868	1
0.4833	1.125	1.132	-0.0069707	1
0.5	1.119	1.1239	-0.0049124	1
0.5166	1.11	1.116	-0.0059592	1

0.5333	1.103	1.108	-0.0050148	1
0.55	1.097	1.1001	-0.0031271	1
0.5666	1.088	1.0923	-0.0043422	1
0.5833	1.081	1.0846	-0.003566	1
0.6	1.075	1.0768	-0.0018451	1
0.6166	1.065	1.0692	-0.004225	1
0.6333	1.059	1.0616	-0.0026134	1
0.65	1.053	1.0541	-0.0010559	1
0.6666	1.047	1.0466	0.00040296	1
0.6833	1.037	1.0391	-0.0021465	1
0.7	1.031	1.0317	-0.00074899	1
0.7166	1.024	1.0244	-0.00044797	1
0.7333	1.015	1.0172	-0.0021551	1
0.75	1.009	1.0099	-0.00091414	1
0.7666	1.002	1.0028	-0.00076763	1
0.7833	0.996	0.99563	0.0003709	1
0.8	0.99	0.98854	0.0014586	1
0.8166	0.984	0.98155	0.0024539	1
0.8333	0.977	0.97456	0.0024413	1
0.85	0.971	0.96762	0.0033791	1
0.8666	0.961	0.96077	0.00022629	1
0.8833	0.958	0.95393	0.0040659	1
0.9	0.949	0.94714	0.0018568	1
0.9166	0.946	0.94044	0.0055591	1
0.9333	0.936	0.93375	0.0022539	1
0.95	0.933	0.9271	0.0059011	1
0.9666	0.924	0.92054	0.0034616	1
0.9833	0.917	0.91399	0.0030148	1
1	0.911	0.90748	0.0035213	1
1.2	0.842	0.83306	0.0089366	1
1.4	0.775	0.76475	0.01025	1
1.6	0.715	0.70204	0.012961	1
1.8	0.656	0.64447	0.01153	1
2	0.605	0.59162	0.013378	1
2.2	0.558	0.54311	0.014892	1
2.4	0.514	0.49857	0.015428	1
2.6	0.473	0.45769	0.015312	1
2.8	0.435	0.42016	0.014844	1
3	0.397	0.3857	0.011297	1
3.2	0.365	0.35407	0.010926	1
3.4	0.334	0.32504	0.0089608	1
3.6	0.306	0.29839	0.0076148	1
3.8	0.28	0.27392	0.006083	1
4	0.258	0.25146	0.0065448	1
4.2	0.236	0.23084	0.0051647	1
4.4	0.214	0.21191	0.0020938	1
4.6	0.195	0.19453	0.00047055	1
4.8	0.179	0.17858	0.00042241	1
5	0.16	0.16393	-0.0039338	1
5.2	0.145	0.15049	-0.0054909	1

5.4	0.132	0.13815	-0.0061503	1
5.6	0.119	0.12682	-0.0078216	1
5.8	0.107	0.11642	-0.009422	1
6	0.094	0.10688	-0.012875	1
6.2	0.085	0.098111	-0.013111	1
6.4	0.075	0.090066	-0.015066	1
6.6	0.066	0.08268	-0.01668	1
6.8	0.06	0.0759	-0.0159	1
7	0.05	0.069676	-0.019676	1
7.2	0.044	0.063963	-0.019963	1
7.4	0.037	0.058718	-0.021718	1
7.6	0.031	0.053903	-0.022903	1
7.8	0.028	0.049482	-0.021482	1
8	0.025	0.045425	-0.020425	1
8.2	0.022	0.0417	-0.0197	1
8.4	0.019	0.03828	-0.01928	1
8.6	0.015	0.035141	-0.020141	1
8.8	0.012	0.03226	-0.02026	1
9	0.009	0.029614	-0.020614	1
9.2	0.006	0.027186	-0.021186	1
9.4	0.003	0.024957	-0.021957	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	5.2913E-004
y0 =	1.3920E+000

BUILDING 86 - MW3