Date: 7-1-93
Client: ARCs- Albion
Project No.: 04011.02

K. Ostermann, C. Cotton

MW01SG - 31.34
MW01WB - 31.80
MW01SB - 31.81
MW02SG - 26.73
MW02WB - 26.50
MW02SB - 27.68
MW03SG - ~~26.73~~ 30.79 (R)
MW03WB - 31.10
MW03SB - 30.47
MW04SG - 30.47
MW04WB - 30.19
MW04SB - 30.56
MW04DB - 30.02
MW05SG - 20.19
MW05SB - 21.59
MW06SG - 20.80
MW06WB - 22.65
MW06SB - 22.21
MW07SG - 15.70
MW07WB - 16.17
MW07SB - 15.41
MW08SG - 24.26
MW08WB - 33.17
MW08SB - 34.25
MW09SG - 12.26
MW09WB - 12.26
MW09SB - 12.53
MW10SG - 3.56
MW11SG - 4.24
MW12SG - 3.50
MW13SG - ~~Did not get~~ NA

L.F.01 - 35.69
L.F.02 - 19.61
L.F.03 Dry
MW-W - 27.13
MW-E - 22.79
MW-S - 12.95
SG-E 17.85
SG-W - 10.45
~~MW13 - Did not get.~~ (R)
Did not get DNR wells
No Key.

GRS-1/MW-1 NA
GRS-2/MW-2 NA
GRS-3/MW-3 NA
GRS-4A/MW-4 NA

US EPA RECORDS CENTER REGION 5
471046

Date: April 28, 1993
Client: ABCS - Albion L.F.
Project No.: 04011.03

Water levels — KTO, MVC

MW01	WB	31.86		SG West	10.35
	SG	31.45		* SG East	15.30 — 16.7
	SB	31.90			
MW02	WB	26.62	GRS-2/MW-2	DNR-mw-2	37.88 —
	SG	26.83	GRS-4A/MW-4	DNR-mw-4	36.72 —
	SB	27.20			
MW03	WB	31.11		West	27.17
	SG	30.80		East	22.51
	SB	30.50		South	12.67
MW04	WB	30.10			
	SG	30.40		LF 01	35.73
	SB	30.42		LF 02	17.19
	DB	29.96		LF 03	Dry
MW05	SB	21.66			
	SG	20.05			
MW06	WB	22.62			
	SG	20.42			
	SB	22.20			
MW07	WB	16.18			
	SG	15.48			
	SB	15.41			
MW08	WB	33.18			
	SG	34.35			
	SB	34.09			
MW09	WB	12.20			
	SG	12.20			
	SB	12.55			
MW10		3.61			
MW11		4.33			
MW12		3.48			
MW13					

* SG-E was covered with debris and could not be read accurately, also was miss read it should be 16.7 not 15.3.

Footer: arr - Albion Twp. 04011.03 a:\ALBWATER.XLS

WW Engineering & Science, Inc.
Environmental Services Division

Water Level and Field Record Form

Client: ARCS - Albion
Project No.: 04011.02
Date: Aug. 10, 1993

Job Description:

Well No.	(a) Elevation Top of Casing (T.O.C.)	(b) Point Held On Tape (ft.)	(c) Distance Wet On Tape	(d) Depth To Water Below T.O.C. (b-c)	(e) Elevation Of Water (a-d)	Time of Meas.	Remarks (weather, etc.)
01-SG	982.36			31.52'	950.84		
01-WB	982.20			32.10'	950.10		
01-SB	982.20			32.13'	950.07		
02-SG	977.93			26.96'	950.97		
02-WB	977.33			26.80'	950.53		
02-SB	977.62			27.42'	950.20		
03-SG	978.88			31.15'	947.73		Lock & Pro-casing Shot By Bullet. (Riser Pipe is Damaged)
03-WB	978.65			31.49'	947.16		
03-SB	978.15			30.82'	947.33		
04-SG	978.03			30.87'	947.16		
04-WB	977.73			30.57'	947.16		
04-SB	978.03			30.88'	947.15		
04-DB	977.80			30.37'	947.43		
05-SG	970.69			20.55'	950.14		
05-SB	970.01			21.94'	948.07		
06-SG	969.73			21.23'	948.50		
06-WB	969.81			23.01	946.80		
06-SB	969.77			22.59'	947.18		
07-SG	963.91			16.20'	947.71		
07-WB	963.64			15.81'	947.83		
07-SB	962.88			16.56'	946.32		
08-SG	980.58			24.44'	956.14		
08-WB	980.93			33.52'	947.41		
08-SB	981.83			34.63'	947.20		
09-SG	959.47			12.64'	946.83		
09-WB	959.48			12.63'	946.85		
09-SB	960.06			12.90'	947.16		
10-SG	949.98			3.69'	946.29		Pro-casing Hinge is Broken
11-SG	949.13			4.62'	944.51		
12-SG	950.57			4.25'	946.32		
13-SG	949.49	— NO WAIVERS - to Access well — NO WATER LEVEL Collected —					

WW Engineering & Science, Inc.
Environmental Services Division

Water Level and Field Record Form

Client: ARCS- Albion
Project No.: 04011.02
Date: Aug. 10, 1993

Job Description:

Well No.	(a) Elevation Top of Casing (T.O.C.)	(b) Point Held On Tape (ft.)	(c) Distance Wet On Tape	(d) Depth To Water Below T.O.C. (b-c)	(e) Elevation Of Water (a-d)	Time of Meas.	Remarks (weather, etc.)
LF-01	985.95			35.99'	949.96		
LF-02	976.77			— DRY —			
LF-03	983.52			— DRY — *			* methane venting *
MW-W	977.48			27.42'	950.06		
MW-E	972.53			23.10'	949.43		
MW-9	961.17			13.45'	947.72		
SG-E	945.07			9.70' *	935.37		* Stream Guage is Bent @ 5° angle
SG-W	943.26			10.35'	932.91		

ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW01SG / MS/MSD

INSPECTION

2" PVC casing
Is cap locked? (YES)/NO
Label on well? MW1SG
Condition of well: GOOD
Condition of Locking Cap: GOOD
Weather: CLOUDY
Air Temperature: 20°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1205
Depth of Well: 40.00 ft
Top of Casing: ____ ft
Depth to Water: - 31.98 ft
Water Elevation: = ____ ft
Depth to Water was measured with:
(electronic tape)
chalk & steel tape
Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-15-93 Time: 11:00
Method: TEFLON BAILER
CALCULATION OF 3 CASING VOLUMES
Length of well 40.0 ft
Depth to water - 31.98 ft
Length of water column = 8.02 ft
conversion factor (2" well) x 0.49
minimum 3 casing volumes = 3.93 gal

YIELD: (HIGH)/LOW
If low, record recovery time: ____
(units mL/hr or L/hr)
Volume purged prior to sampling: .5 GAL
Did the well purge dry? YES/(NO)
Notes: ____

SAMPLING PERSONNEL

Name: M CHRISTENSEN
Date: 3-15-93
Company: WWES

SAMPLE COLLECTION

Date: 3-15-93 Time: 12:30
Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:
Steam-cleaned prior to arrival in field YES
Steam-cleaned in field: ____
Other: ____
Appearance of Sample: BROWN CLOUDY
Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (~~if separate~~)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-15-93 Time: 12:30
Ground water temperature:
1) 9.1
2) 8.7 7.6
3) 5.0

pH Meter Calibration:
Time: 11:00
pH measured of:
standard 4: 4.0 s.u.
standard 10: 10.07 s.u.
check 7: 7.02 s.u.
SAMPLE pH: 1) 7.47 s.u.
2) 7.35 s.u.
7.37 3) 7.30 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .528	1) 758
2) .535	2) 777
3) .526	3) ~~1,175~~ 851

does the instrument correct for temp.?
YES/NO

Eh measured:
1) 181.0 mV
2) 221.2 mV 210.5
3) 229.2 mV

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW01 WB

INSPECTION

2" PVC casing

Is cap locked? (YES) NO

Label on well? YES

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: OVERCAST 31° SNOW

Air Temperature: 31°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1207

Depth of Well: 61.5 ft

Top of Casing: ____ ft

Depth to Water: - 32.24 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-9-93 Time: 8100 Am

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well	61.5	ft
Depth to water	- 32.24	ft
Length of water column	= 29.26	ft
conversion factor (2" well)	x 0.49	
minimum 3 casing volumes	= 14.34	gal

YIELD: HIGH (LOW) Bailed Dry 10 Gal

If low, record recovery time: Baled 15 Gal (units mL/hr or L/hr)

Volume purged prior to sampling: 15 Gal

Did the well purge dry? (YES) NO

Notes: Bailed Dry AT 10 GAL MAINTAINED 1 Bailer Full after 5 min

SAMPLING PERSONNEL

Name: Eric Meyers

Date: 3-9-93

Company: WW Eng. & Science

SAMPLE COLLECTION

Date: ~~8:45 Am~~ 3/9/93 Time: 8:45 Am

Sampling Equipment: T. Bailer - Spicket END FOR VOA'S

Decontamination Method and Location:

Steam-cleaned prior to arrival in field YES

Steam-cleaned in field: NO

Other: ____

Appearance of Sample: Cloudy

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury~~ (if separate)		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS ~~AND MERCURY~~

FIELD ANALYSES

Date: 3-9-93 Time: 8:30 Am

Ground water temperature:

1) 9.7
2) 7.0
3) 9.9

pH Meter Calibration:

Time: 7:50 Am

pH measured of:

standard 4:	4.03	s.u.
standard 10:	10.00	s.u.
check 7:	7.01	s.u.
SAMPLE pH: 1)	6.84	s.u.
2)	7.31	s.u.
7.14 3)	7.27	s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .900 - 9.7c	1) 786
2) .881 - 7.0c	2) 745
3) .889 - 9.9c	3) 800

777

does the instrument correct for temp.?

YES (NO)

Eh measured:

1) 382. mV
2) 350. mV
3) 255. mV

329

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW01SB

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? Yes

Condition of well: OK

Condition of Locking Cap: OK

Weather: Cloudy

Air Temperature: 20 ±

STATIC WATER LEVEL

Date: 3-8-93 Time: 1210

Depth of Well: 75.0 ft

Top of Casing: ____ ft

Depth to Water: - 32.41 ft

Water Elevation: = [illegible] ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-15-93 Time: 1200

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well 75.0 ft

Depth to water - 32.41 ft

Length of water column = 42.59 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 20.87 gal

YIELD: HIGH/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 21.0

Did the well purge dry? YES/NO

Notes: ____

SAMPLING PERSONNEL

Name: B. Pushaw

Date: 3-15-93

Company: WWES

SAMPLE COLLECTION

Date: 3-15-93 Time: 1230

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field Yes

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: Clear

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/15/93 Time: 1:00

Ground water temperature:

1) 9.8

2) 9.5

3) 9.4

pH Meter Calibration:

Time: 1100

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.07 s.u.

check 7: 7.02 s.u.

SAMPLE pH: 1) 8.03 s.u.

2) 7.46 s.u.

3) 7.45 s.u.

7.65

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .622	1) .918
2) .631	2) .896
3) .640	3) .912

909

does the instrument correct for temp.? YES/NO

Eh measured:

1) 25.5 mV

2) 13.8 mV

3) 14.3 mV

17.87

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW02SG

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? YES

Condition of well: FINE

Condition of Locking Cap: FINE

Weather: OVERCAST

Air Temperature: 32°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1332

Depth of Well: 37.5 ft

Top of Casing: ____ ft

Depth to Water: - 31.16 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3/9/93 Time: 8:10 A.M.

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well		37.5 ft
Depth to water	-	31.16 ft
Length of water column	=	6.34 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	3.11 gal

YIELD: HIGH/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 4.0 G.

Did the well purge dry? YES/NO

Notes: ____

SAMPLING PERSONNEL

Name: BILL RUSHAW

Date: 3/9/93

Company: WW Eng & Science

SAMPLE COLLECTION

Date: 3/9/93 Time: 8:50

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: CLOUDY, BROWN

Sample Parameter Checklist: MS/MSD

4	ABN, BNA, Pest/PCB ✓	4	VOC's ✓
2	TKN Nitrogen ✓	2	Chloride ✓
	~~Mercury (if separate)~~	2	Sulfate ✓
2	Ammonia ✓	1	Metals ✓
2	Oil and Grease ✓	1	Cyanide ✓
2	Nitrate/nitrite ✓		
	FIELD FILTER METALS ~~AND MERCURY~~		

FIELD ANALYSES

Date: 3/9/93 Time: 8:35

Ground water temperature:

1) 9.8°

2) 9.8°

3) 9.7°

pH Meter Calibration:

Time: 7:40

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.04 s.u.

check 7: 7.05 s.u.

SAMPLE pH: 1) 7.58 s.u.

7.48 2) 7.44 s.u.

3) 7.43 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) 604 9.8°	1) 1,175
2) 630 9.8°	2) 1,127 1143
3) 628 9.7°	3) 1,127

does the instrument correct for temp.?

YES/NO

Eh measured:

1) 310 mV

2) 310.2 mV 309

3) 308 mV

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW02WB

INSPECTION

2" PVC casing

Is cap locked? (YES)/NO

Label on well? MW02 WB

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: CLOUDY 30°+

Air Temperature: 30°+

STATIC WATER LEVEL

Date: 3-8-93 Time: 1157

Depth of Well: 55.5 ft

Top of Casing: ____ ft

Depth to Water: - 27.15 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-9-93 Time: 8:30 AM

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well		55.5 ft
Depth to water	-	27.15 ft
Length of water column	=	28.35 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	13.89 gal

YIELD: (HIGH)/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 14 GAL.

Did the well purge dry? YES/(NO)

Notes: ____

SAMPLING PERSONNEL

Name: MARK CHRISTENSEN

Date: 3-9-93

Company: WW Eng. & Science

SAMPLE COLLECTION

Date: 3-9-93 Time: 9:00

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field YES

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: MUDDY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS ~~AND MERCURY~~

FIELD ANALYSES

Date: 3-9-93 Time: 9:07

Ground water temperature:

1) 8.2

2) 8.0

3) 8.0

pH Meter Calibration:

Time: 7:40 AM

pH measured of:

standard 4: 4.0 s.u.

standard 10: 10.04 s.u.

check 7: 7.05 s.u.

SAMPLE pH: 1) 7.68 s.u.

2) 7.68 s.u.

3) 7.68 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .604	1) 1,124
2) .603	2) 1,119
3) .594	3) 1,136

1126

does the instrument correct for temp.? YES/NO

Eh measured: 222.6

1) ~~.603~~ mV

2) ~~.594~~ 218.4 mV

3) — 218.2 mV

3-9-93

219.7

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — SAMPLE ID MW025B

INSPECTION

2" PVC casing
Is cap locked? YES/NO
Label on well? YES
Condition of well: GOOD

Condition of Locking Cap: GOOD
Weather: 12° Cold Clear
Air Temperature: 12°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1155

Depth of Well:	67.5	ft
Top of Casing:		ft
Depth to Water:	- 27.74	ft
Water Elevation:	=	ft

Depth to Water was measured with:
electronic tape
chalk & steel tape
Steam Clean Equipment

Notes:

WELL PURGING

Date: 3-15-93 Time: 1030
Method:

CALCULATION OF 3 CASING VOLUMES

Length of well	67.5	ft
Depth to water	- 27.74	ft
Length of water column	= 39.76	ft
conversion factor (2" well)	x 0.49	
minimum 3 casing volumes	= 19.48	gal

YIELD: HIGH/LOW
If low, record recovery time:
(units mL/hr or L/hr)
Volume purged prior to sampling: 20.0 gal
Did the well purge dry? YES/NO
Notes:

SAMPLING PERSONNEL

Name: Eric Meyers
Date: 3-15-93
Company: WWES

SAMPLE COLLECTION

Date: 3-15-93 Time: 1045
Sampling Equipment: T. Bailer

Decontamination Method and Location:
Steam-cleaned prior to arrival in field X
Steam-cleaned in field: NO
Other:
Appearance of Sample: Clear

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (~~if separate~~)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-15-93 Time: 1045
Ground water temperature:
1) 11.1
2) 10.7
3) 10.6

pH Meter Calibration:
Time: 9:45AM
pH measured of:
standard 4: 4.00 s.u.
standard 10: 10.01 s.u.
check 7: 7.01 s.u.
SAMPLE pH: 1) 7.46 s.u.
2) 7.46 s.u.
3) 7.47 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .807 - 11.1	1) 1.099
2) .691 - 10.7	2) 950 1005
3) .700 - 10.6C	3) 965

does the instrument correct for temp.?
YES/NO

Eh measured:
1) 182.1 mV
2) 170.2 mV 171.7
3) 162.9 mV

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** mw03SG

INSPECTION

2" PVC casing
Is cap locked? (YES)/NO
Label on well? 3SG
Condition of well: GOOD

Condition of Locking Cap: GOOD
Weather: SNOW
Air Temperature: 30°+

STATIC WATER LEVEL

Date: 3-8-93 Time: 1332
Depth of Well: 46.5 ft
Top of Casing: ____ ft
Depth to Water: - 31.16 ft
Water Elevation: = ____ ft

Depth to Water was measured with:
electronic tape
chalk & steel tape
Steam Clean Equipment

Notes:

WELL PURGING

Date: 3-10-93 Time: 8:45
Method: TEFLON BAIL

CALCULATION OF 3 CASING VOLUMES

Length of well		46.5 ft
Depth to water	-	31.16 ft
Length of water column	=	15.34 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	7.51 gal

YIELD: (HIGH)/LOW
If low, record recovery time: ____ (units mL/hr or L/hr)
Volume purged prior to sampling: 8 GAL.
Did the well purge dry? YES/(NO)
Notes:

SAMPLING PERSONNEL

Name: BILL PUSHAW
Date: 3/10/93
Company: WW Eng & Science

SAMPLE COLLECTION

Date: 3/10/93 Time: 9:25
Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:
Steam-cleaned prior to arrival in field ✓
Steam-cleaned in field: ____
Other: ____

Appearance of Sample: SLIGHTLY CLOUDY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS ~~AND MERCURY~~

FIELD ANALYSES

Date: 3/10/93 Time: 9:39

Ground water temperature:
1) 11.2° C
2) 11.0° C
3) 10.6° C

pH Meter Calibration:
Time: 7:45 am

pH measured of:
standard 4: 4.02 s.u.
standard 10: 10.01 s.u.
check 7: 6.99 s.u.
SAMPLE pH: 1) ~~7.28~~ s.u.
2) 7.15 s.u.
3) 7.15 s.u.
7.19

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) 1.103	1) 1.498
2) 1.155	2) 1.568
3) 1.14	3) 1.572

1.546

does the instrument correct for temp.?
YES/NO

Eh measured:
1) 117.6 mV
2) 114.8 mV
3) 105.2 mV
112.5

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW03WB

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? MW3WB

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: CLOUDY

Air Temperature: 30°F

STATIC WATER LEVEL

Date: 3-8-93 Time: 1330

Depth of Well: 61.5 ft

Top of Casing: _____ ft

Depth to Water: - 31.40 ft

Water Elevation: = _____ ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: _____

WELL PURGING

Date: 3-9-93 Time: 3:30

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well 61.5 ft

Depth to water - 31.40 ft

Length of water column = 30.10 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 14.75 gal

YIELD: HIGH/LOW

If low, record recovery time: _____ (units mL/hr or L/hr)

Volume purged prior to sampling: 15 GAL.

Did the well purge dry? YES/NO

Notes: _____

SAMPLING PERSONNEL

Name: MARK CHRISTENSEN

Date: 3-9-93

Company: WW Eng. & Science

SAMPLE COLLECTION

Date: 3-10-93 Time: 8:00

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field YES

Steam-cleaned in field: _____

Other: _____

Appearance of Sample: CLOUDY ~~BROWN~~ GRAY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS ~~AND MERCURY~~

FIELD ANALYSES

Date: 3-10-93 Time: 9:00 AM

Ground water temperature:

1) 9.3

2) 9.3

3) 9.6

pH Meter Calibration:

Time: 7:45

pH measured of:

standard 4: 4.02 s.u.

standard 10: 10.01 s.u.

check 7: 6.99 s.u.

SAMPLE pH: 1) 7.33 s.u.

2) 7.27 s.u.

3) 7.23 s.u.

7.28

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) 1.137	1) 1624
2) 1.133	2) 1618
3) 1.136	3) 1609

1134

does the instrument correct for temp.? YES/NO

Eh measured:

1) -011.4 mV

2) -020.1 mV

3) 022.7 mV

-18.07

Notes: _____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW035B & Field Blank

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? YES

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: 34° Rain

Air Temperature: 34°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1335

Depth of Well: 67.5 ft

Top of Casing: ____ ft

Depth to Water: - 30.83 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-16-93 Time: 8:30

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well 67.5 ft

Depth to water - 30.83 ft

Length of water column = 36.67 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 17.97 gal

YIELD: HIGH/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 18.0

Did the well purge dry? YES/NO

Notes: ____

SAMPLING PERSONNEL

Name: Eric Meyers

Date: 3-16-93

Company: WWES

SAMPLE COLLECTION

Date: 3-16-93 Time: 9:05 AM

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field X

Steam-cleaned in field: NO

Other: ____

Appearance of Sample: Clear

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-16-93 Time: 8:55

Ground water temperature:

1) 10.7

2) 11.6

3) 10.5

pH Meter Calibration:

Time: 8:20 AM

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.02 s.u.

check 7: 7.01 s.u.

SAMPLE pH: 1) 7.14 s.u.

2) 7.30 s.u.

7.26 3) 7.34 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .776 - 10.7c	1) 1067
2) .732 - 11.6c	2) 984
3) .691 10.5c	3) 956

1002

does the instrument correct for temp.?

YES/NO

Eh measured:

1) 238.7 mV

2) 208.6 mV 211.5

3) 187.2 mV

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW04SG

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? YES

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: 30° SNOW

Air Temperature: 30°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1320

Depth of Well: 39.0 ft

Top of Casing: ____ ft

Depth to Water: - 30.77 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-10-93 Time: 10 AM

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well 39.0 ft

Depth to water - 30.77 ft

Length of water column = 8.23 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 4.03 gal

YIELD: HIGH/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 4.25

Did the well purge dry? YES/NO

Notes: ____

SAMPLING PERSONNEL

Name: Eric Meyers

Date: 3-10-93

Company: WW Eng. & Science

SAMPLE COLLECTION

Date: 3-10-93 Time: 1025

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field yes

Steam-cleaned in field: NO

Other: ____

Appearance of Sample: ____

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS ~~AND MERCURY~~

FIELD ANALYSES

Date: 3-10-93 Time: 10:25 Am

Ground water temperature:

1) 10.5
2) 11.0
3) 10.8

10.8

pH Meter Calibration:

Time: 10:20 Am

pH measured of:

standard 4: 4.03 s.u.

standard 10: 10.01 s.u.

check 7: 7.01 s.u.

SAMPLE pH: 1) 6.85 s.u.

2) 7.29 s.u.

3) 7.45 s.u.

7.20

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) 399 10.5C	1) 552
2) 394 11.0	2) 545
3) 380 10.8	3) 521

539

does the instrument correct for temp.? YES/NO

Eh measured:

1) 93.2 mV

2) 56.2 mV

3) 64.0 mV

71.1

Notes: ____

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Purge Water must be Saved !!!

ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW04WB

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? YES

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather:

Air Temperature:

STATIC WATER LEVEL

Date: 3-8-93 Time: 1325

Depth of Well: 63.5 ft

Top of Casing: ft

Depth to Water: - 30.48 ft

Water Elevation: = ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes:

WELL PURGING

Date: 3-9-93 Time: 3:30pm

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well		63.5 ft
Depth to water	-	30.48 ft
Length of water column	=	33.02 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	16.18 gal

YIELD: HIGH/LOW

If low, record recovery time:

(units mL/hr or L/hr)

Volume purged prior to sampling: 16.50

Did the well purge dry? YES/NO

Notes:

SAMPLING PERSONNEL

Name: Eric Meyers

Date: 3/10/93

Company: WW Eng & Science

SAMPLE COLLECTION

Date: 3/10/93 Time: 8:15 AM

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field yes

Steam-cleaned in field: NO

Other:

Appearance of Sample:

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/10/93 Time: 7:50 AM

Ground water temperature:

1) 10.9 C

2) 9.6

3) 9.4

pH Meter Calibration:

Time: 7:45 AM

pH measured of:

standard 4: 4.02 s.u.

standard 10: 10.01 s.u.

check 7: 6.99 s.u.

SAMPLE pH: 1) ~~6.92~~ 7.08 s.u.

2) 7.12 s.u.

3) 7.19 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .818 - 10.9 C	1) ~~6.92~~ ~~833~~ 1,119
2) .793 9.6 C	2) 1,123
3) .837 9.4 C	3) 1,192 1145

does the instrument correct for temp.?

YES/NO

Eh measured:

1) 230. mV

2) 203. mV 207

3) 187. mV

Notes:

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Purge Water must be Saved!!!

ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — SAMPLE ID MW4SB

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? YES

Condition of well: FINE

Condition of Locking Cap: FINE

Weather: SNOW 28°

Air Temperature: 28°

STATIC WATER LEVEL

Date: 3·8·93 Time: 1327

Depth of Well: 75.5 ft

Top of Casing: . ft

Depth to Water: - 30.79 ft

Water Elevation: = ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes:

WELL PURGING

Date: 3/9/93 Time: 4:00

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well		75.5 ft
Depth to water	-	30.79 ft
Length of water column	=	44.71 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	21.91 gal

YIELD: HIGH/LOW

If low, record recovery time: (units mL/hr or L/hr)

Volume purged prior to sampling: 22 Gal.

Did the well purge dry? YES/NO

Notes:

SAMPLING PERSONNEL

Name: BILL PUSHAW

Date: 3/10/93

Company: W W Eng. & Science

SAMPLE COLLECTION

Date: 3/10/93 Time: 8:30 A.

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field:

Other:

Appearance of Sample: SLIGHTLY CLOUDY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/10/93 Time: 8:30 A.

Ground water temperature:

1) 10.9°

2) 9.3°

3) 9.8°

pH Meter Calibration:

Time: 7:45am

pH measured of:

standard 4: 4.02 s.u.

standard 10: 10.01 s.u.

check 7: 6.99 s.u.

SAMPLE pH: 1) 7.18 s.u.

2) 7.19 s.u.

3) 7.18 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) 1.192	1) 1631
2) 1.185	2) 1692
3) 1.195	3) 1684

1669

does the instrument correct for temp.? YES/NO

Eh measured:

1) 92.5 mV

2) 86.7 mV

3) 83.8 mV

82.5

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW04DB

INSPECTION

2" PVC casing

Is cap locked? (YES)/NO

Label on well? MW 04 DB

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: SNOW - WIND - COLD - NASTY

Air Temperature: 30°F CLOUDY

STATIC WATER LEVEL

Date: 3-8-93 Time: 1322

Depth of Well: 102.5 ft

Top of Casing: _____ ft

Depth to Water: - 30.41 ft

Water Elevation: = _____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes: _____

WELL PURGING

Date: 3-16-93 Time: 8:30

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well		102.5 ft
Depth to water	-	30.41 ft
Length of water column	=	72.09 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	35.32 gal

YIELD: (HIGH)/LOW

If low, record recovery time: _____ (units mL/hr or L/hr)

Volume purged prior to sampling: 36 GAL

Did the well purge dry? YES/(NO)

Notes: _____

SAMPLING PERSONNEL

Name: M CHRISTENSEN

Date: 3-16-93

Company: WWES

SAMPLE COLLECTION

Date: 3-16-93 Time: 9:30

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: _____

Other: _____

Appearance of Sample: CLEAR

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-16-93 Time: 9:30

Ground water temperature:

1) 8.8
2) 9.2
3) 9.3

pH Meter Calibration:

Time: 8:20

pH measured of:

standard 4:	4.00	s.u.
standard 10:	10.02	s.u.
check 7:	7.01	s.u.
SAMPLE pH: 1)	7.94	s.u.
2)	7.77	s.u.
3)	7.61	s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:	
1) .476	1) 684	
2) .448	2) 633	658
3) .460	3) 657	

does the instrument correct for temp.? YES/NO

Eh measured:

1) 162.5 mV
2) 156.8 mV 157.6
3) 153.5 mV

Notes: _____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW05SG

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? MW 5 SG

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: PARTLY CLOUDY

Air Temperature: 30°F

STATIC WATER LEVEL

Date: 3-8-93 Time: 1150

Depth of Well: 30.5 ft

Top of Casing: ____ ft

Depth to Water: - 20.66 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3/11/93 Time: 8:45

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well 30.5 ft

Depth to water - 20.66 ft

Length of water column = 9.84 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 4.82 gal

YIELD: HIGH/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 5.0 G.

Did the well purge dry? YES/NO

Notes: ____

SAMPLING PERSONNEL

Name: MARK CHRISTENSEN

Date: 3/11/93

Company: WW Eng & Science

SAMPLE COLLECTION

Date: 3-11-93 Time: 9:15

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: ____

Sample Parameter Checklist: ms/msd & Duplicate

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (If separate)~~		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-11-93 Time: 9:45

Ground water temperature:

1) 8.5

2) 9.6

3) 9.5

pH Meter Calibration:

Time: 8:00

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.05 s.u.

check 7: 7.04 s.u.

SAMPLE pH: 1) 7.95 s.u.

2) ~~7.80~~ 7.7 s.u.

7.78 3) 7.69 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .469	1) .685
2) .472	2) .669
3) .465	3) .660

does the instrument correct for temp.? YES/NO

Eh measured:

1) 236.7 mV

2) 230.4 mV

3) 222.0 mV

229.7

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW05SB

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? YES

Condition of well: FINE

Condition of Locking Cap: FINE

Weather: RAIN 32°

Air Temperature: 32°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1155

Depth of Well: 77.5 ft

Top of Casing: ____ ft

Depth to Water: - 22.05 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3/16/93 Time: 8:30

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well		77.5 ft
Depth to water	-	22.05 ft
Length of water column	=	55.45 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	27.17 gal

YIELD: HIGH/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 28 GAL

Did the well purge dry? YES/NO

Notes: ____

SAMPLING PERSONNEL

Name: BILL PUSHAW

Date: 3/16/93

Company: WWES

SAMPLE COLLECTION

Date: ~~9/15~~ 3/16 Time: 9:15

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: SLIGHTLY CLOUDY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/16/93 Time: 10:00

Ground water temperature:

1) 10.4
2) 10.4
3) 10.4

pH Meter Calibration:

Time: 8:00

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.06 s.u.

check 7: 7.02 s.u.

SAMPLE pH: 1) 7.63 s.u.
2) 7.58 s.u.
3) 7.65 s.u.

7.62

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .504	1) 699
2) .511	2) 709
3) .510	3) 707

705

does the instrument correct for temp.? YES/NO

Eh measured:

1) 148.2 mV
2) 138.5 mV
3) 138.1 mV

141.6

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — SAMPLE ID MW06SG

INSPECTION

2" PVC casing

Is cap locked? YES/NO (YES circled)

Label on well? YES

Condition of well: FINE

Condition of Locking Cap: FINE

Weather: OVERCAST 23°

Air Temperature: 23°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1315

Depth of Well: 30.5 ft

Top of Casing: ____ ft

Depth to Water: - 21.18 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape circled)

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3/11/93 Time: 8:35

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well 30.5 ft

Depth to water - 21.18 ft

Length of water column = 9.32 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 4.57 gal

YIELD: HIGH/LOW (HIGH circled)

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 5 G.

Did the well purge dry? YES/NO (NO circled)

Notes: ____

SAMPLING PERSONNEL

Name: BILL PUSHAW

Date: 3/11/93

Company: WW Eng. & Science

SAMPLE COLLECTION

Date: 3/11/93 Time: 900

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: ____

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/11/93 Time: 9:15

Ground water temperature:

1) 9.5

2) 9.9

3) 8.9

pH Meter Calibration:

Time: 8:00 A.

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.05 s.u.

check 7: 7.04 s.u.

SAMPLE pH: 1) 8.77 s.u.

2) 8.20 s.u.

3) 8.07 s.u.

8.35

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .287	1) 408
2) .300	2) 424
3) .282	3) 467

413

does the instrument correct for temp.? YES/NO

Eh measured:

1) 261.1 mV

2) 268.4 mV

3) 265.5 mV

265

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW06WB

INSPECTION

2" PVC casing
Is cap locked? YES/NO
Label on well? Yes
Condition of well: Good

Condition of Locking Cap: Good
Weather: Rain
Air Temperature: 34°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1310
Depth of Well: 53.5 ft
Top of Casing: ____ ft
Depth to Water: - 22.89 ft
Water Elevation: = ____ ft

Depth to Water was measured with:
electronic tape
chalk & steel tape
Steam Clean Equipment

Notes:

WELL PURGING

Date: 3-16-93 Time: 1005
Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well		53.5 ft
Depth to water	-	22.89 ft
Length of water column	=	30.61 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	15.0 gal

YIELD: HIGH/LOW
If low, record recovery time: ____ (units mL/hr or L/hr)
Volume purged prior to sampling: 15.0
Did the well purge dry? YES/NO
Notes:

SAMPLING PERSONNEL

Name: Eric Meyers
Date: 3-16-93
Company: WWES

SAMPLE COLLECTION

Date: 3-16-93 Time: 10:30 AM
Sampling Equipment: T. Bailer

Decontamination Method and Location:
Steam-cleaned prior to arrival in field X
Steam-cleaned in field: NO
Other:
Appearance of Sample: Gray

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-16-93 Time: 10:25
Ground water temperature:
1) 10.5 c
2) 10.3 c
3) 9.9 c

pH Meter Calibration:
Time: 9:50 AM
pH measured of:
standard 4: 4.00 s.u.
standard 10: 10.03 s.u.
check 7: 7.00 s.u.
SAMPLE pH: 1) 7.30 s.u.
7.39 2) 7.40 s.u.
3) 7.48 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .782	1) 1.081
2) .784	2) 1.090 1.119
3) .796	3) 1.186

does the instrument correct for temp.?
YES/NO

Eh measured:
1) 2.4 mV
2) 6.8 mV 8.57
3) 16.5 mV

Notes:

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Purge Water must be Saved !!!

ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW06SB & Field Blank

INSPECTION

2" PVC casing
Is cap locked? (YES)/NO
Label on well? Yes
Condition of well: GOOD

Condition of Locking Cap: GOOD
Weather: 28° OVERCAST
Air Temperature: 28°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1312
Depth of Well: 77.5 ft
Top of Casing: ____ ft
Depth to Water: - 22.49 ft
Water Elevation: = ____ ft

Depth to Water was measured with:
(electronic tape)
chalk & steel tape
Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3/11/93 Time: 8:30 AM
Method: ____

CALCULATION OF 3 CASING VOLUMES

Length of well		77.5 ft
Depth to water	-	22.49 ft
Length of water column	=	55.01 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	26.95 gal

YIELD: (HIGH)/LOW
If low, record recovery time: ____ (units mL/hr or L/hr)
Volume purged prior to sampling: 27 gal
Did the well purge dry? YES/(NO)
Notes: ____

SAMPLING PERSONNEL

Name: Eric Meyers
Date: 3/11/93
Company: WW Eng. & Science

SAMPLE COLLECTION

Date: 3/11/93 Time: 9:30 AM
Sampling Equipment: T. Bailer

Decontamination Method and Location:
Steam-cleaned prior to arrival in field YES
Steam-cleaned in field: NO
Other: ____
Appearance of Sample: Clear

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: ~~3-25-93~~ 3/11/93 Time: 9:25 AM

Ground water temperature:
1) 11.0
2) 10.8
3) 10.8

pH Meter Calibration:
Time: ~~[illegible] AM~~ 8 AM
pH measured of:
standard 4: 4.00 s.u.
standard 10: 10.03 s.u.
check 7: 7.00 s.u.
SAMPLE pH: 1) 7.14 s.u.
7.25 2) 7.33 s.u.
3) 7.27 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:		Corrected:	
1) 913	11.0	1) 1,246	
2) 928	10.8	2) 1,273	1263
3) 926	10.8	3) 1,271	

does the instrument correct for temp.?
YES/NO

Eh measured:
1) 152.2 mV
2) 127.2 mV 130.7
3) 112.8 mV

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW07SG

INSPECTION

2" PVC casing

Is cap locked? (YES)/NO

Label on well? Yes

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: Clear Cold

Air Temperature: 3°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1230

Depth of Well: 22.5 ft

Top of Casing: ____ ft

Depth to Water: - 16.03 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-12-93 Time: ____

Method: ____

CALCULATION OF 3 CASING VOLUMES

Length of well 22.5 ft

Depth to water - 16.03 ft

Length of water column = 6.47 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 3.17 gal

YIELD: (HIGH)/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: ____

Did the well purge dry? YES/(NO)

Notes: ____

SAMPLING PERSONNEL

Name: Eric Meyers

Date: 3-12-93

Company: W.W. Eng + Science

SAMPLE COLLECTION

Date: 3-12-93 Time: 8:15 Am

Sampling Equipment: T. Bailey

Decontamination Method and Location:

Steam-cleaned prior to arrival in field yes

Steam-cleaned in field: No

Other: ____

Appearance of Sample: Slight Rust Color

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (If separate)~~	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-12-93 Time: 8:00 Am

Ground water temperature:

1) 6.9

2) 7.1

3) 6.8

pH Meter Calibration:

Time: 7:45 AM

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.03 s.u.

check 7: 7.02 s.u.

SAMPLE pH: 1) 7.19 s.u.

2) 7.32 s.u.

3) 7.29 s.u.

7.27

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .629 @ 6.9C	1) 961
2) .627 - 7.1C	2) 953
3) .628 - 6.8	3) 963

959

does the instrument correct for temp.?

YES/(NO)

Eh measured:

1) 237.2 mV

2) 222.7 mV

3) 201.7 mV

220.5

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW07WB

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? YES

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: Cold Snow Flurries

Air Temperature: 18°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1232

Depth of Well: 49.5 ft

Top of Casing: ____ ft

Depth to Water: - 16.33 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-17-93 Time: 9:50

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well 49.5 ft

Depth to water - 16.33 ft

Length of water column = 33.17 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 16.25 gal

YIELD: HIGH/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 17.00

Did the well purge dry? YES/NO

Notes: ____

SAMPLING PERSONNEL

Name: Eric Meyers

Date: 3-17-93

Company: W.W. Eng + Science

SAMPLE COLLECTION

Date: 3-17-93 Time: 10:25

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field X

Steam-cleaned in field: NO

Other: ____

Appearance of Sample: Gray

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-17-93 Time: 10:17

Ground water temperature:

1) 8.0

2) 7.1

3) 7.8

pH Meter Calibration:

Time: 9:45 Am

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.01 s.u.

check 7: 7.03 s.u.

SAMPLE pH: 1) 7.53 s.u.

2) 7.68 s.u.

7.64 3) 7.70 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .397 - 8.0	1) 588
2) .385 - 7.1	2) 585
3) .378 - 7.8	3) 563

579

does the instrument correct for temp.?

YES/NO

Eh measured:

1) 156.7 mV

2) 128.9 mV 132.9

3) 113.2 mV

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW07SB

INSPECTION

2" PVC casing

Is cap locked? (YES) NO

Label on well? YES

Condition of well: FINE

Condition of Locking Cap: FINE

Weather: SUNNY

Air Temperature: 25°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1235

Depth of Well: 62.5 ft

Top of Casing: ____ ft

Depth to Water: - 15.68 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3/17/93 Time: 11:00

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well 62.5 ft

Depth to water - 15.68 ft

Length of water column = 46.82 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 22.94 gal

YIELD: (HIGH) LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 23 G.

Did the well purge dry? YES (NO)

Notes: ____

SAMPLING PERSONNEL

Name: BILL PUSHAW

Date: 3/17/93

Company: WWES

SAMPLE COLLECTION

Date: 3/17/93 Time: 11:30

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: CLEAR

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/17/93 Time: 11:45

Ground water temperature:

1) 9.8

2) 9.6

3) 9.3

pH Meter Calibration:

Time: 9:45

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.01 s.u.

check 7: 7.03 s.u.

SAMPLE pH: 1) 7.75 s.u.

2) 7.71 s.u.

7.71 3) 7.66 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:	
1) .422	1) 595	
2) .406	2) 575	580
3) .400	3) 571	

does the instrument correct for temp.? YES/NO

Eh measured:

1) 145.6 mV

2) 138.7 mV 141.9

3) 141.4 mV

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING SAMPLE ID MW08SG

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? MW08SG

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: PARTLY CLOUDY

Air Temperature: 25°±

STATIC WATER LEVEL

Date: 3-8-93 Time: 1338

Depth of Well: 33.5 ft

Top of Casing: ft

Depth to Water: - 24.39 ft

Water Elevation: = ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes:

WELL PURGING

Date: 3-17-93 Time: 8:30

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well 33.5 ft

Depth to water - 24.39 ft

Length of water column = 9.11 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 4.46 gal

YIELD: HIGH/LOW

If low, record recovery time:

(units mL/hr or L/hr)

Volume purged prior to sampling: 5 GALS

Did the well purge dry? YES/NO

Notes:

SAMPLING PERSONNEL

Name: M CHRISTENSEN

Date: 3-17-93

Company: WWES

SAMPLE COLLECTION

Date: 3-17-93 Time: 9:30

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field YES

Steam-cleaned in field:

Other:

Appearance of Sample:

Sample Parameter Checklist: MS/MSD

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-17-93 Time: 9:30

Ground water temperature:

1) 8.9

2) 9.3

3) 9.1

pH Meter Calibration:

Time: 8:00

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.03 s.u.

check 7: 7.01 s.u.

SAMPLE pH: 1) 8.31 s.u.

2) 8.31 s.u.

3) 8.35 s.u.

8.32

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .199	1) 287
2) .202	2) 288
3) .199	3) 286

287

does the instrument correct for temp.?

YES/NO

Eh measured:

1) 170.2 mV

2) 175.4 mV

3) 179.7 mV

175.1

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — SAMPLE ID MW08WB

INSPECTION

2" PVC casing

Is cap locked? (YES) NO

Label on well? YES

Condition of well: FINE

Condition of Locking Cap: FINE

Weather: SUNNY 25°

Air Temperature: 25°

STATIC WATER LEVEL

Date: 3·8·93 Time: 1340

Depth of Well: 60.5 ft

Top of Casing: ____ ft

Depth to Water: - 33.52 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes:

WELL PURGING

Date: 3/17/93 Time: 9:00

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well 60.5 ft

Depth to water - 33.52 ft

Length of water column = 26.98 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 13.22 gal

YIELD: (HIGH) LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 14.0

Did the well purge dry? YES (NO)

Notes:

SAMPLING PERSONNEL

Name: BILL PUSHAW

Date: 3/17/93

Company: WWES

SAMPLE COLLECTION

Date: 3/17/93 Time: 9:30

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: CLOUDY GRAY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/17/93 Time: 9:45

Ground water temperature:

1) 9.1

2) 9.1

3) 9.1

pH Meter Calibration:

Time: 8:00 A.M.

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.03 s.u.

check 7: 7.01 s.u.

SAMPLE pH: 1) 8.34 s.u.

2) 8.23 s.u.

8.24 3) 8.16 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:	
1) .272	1) 391	370
2) .248	2) 356	338
3) .252	3) 362	

does the instrument correct for temp.? YES/NO

Eh measured:

1) 29.0 mV

2) 20.8 mV 15.9

3) -2.1 mV

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — SAMPLE ID MW085B

INSPECTION

2" PVC casing

Is cap locked? YES/NO (YES circled)

Label on well? Yes

Condition of well: GOOD

Condition of Locking Cap: GOOD

Weather: Cold-Snow

Air Temperature: 18°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1342

Depth of Well: 72.5 ft

Top of Casing: ____ ft

Depth to Water: - 34.54 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

electronic tape (circled)

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-17-93 Time: 8:15

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well 72.5 ft

Depth to water - 34.54 ft

Length of water column = 37.96 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 18.60 gal

YIELD: HIGH/LOW (HIGH circled)

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 19.0

Did the well purge dry? YES/NO (NO circled)

Notes: ____

SAMPLING PERSONNEL

Name: Evie Meyers

Date: 3-17-93

Company: W.W. Eng + Science

SAMPLE COLLECTION

Date: 3-17-93 Time: 9:00 AM

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field: X

Steam-cleaned in field: NO

Other: ____

Appearance of Sample: GRAY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-17-93 Time: 8:50

Ground water temperature:

1) 8.3

2) 7.8

3) 8.9

pH Meter Calibration:

Time: 8:1 AM

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.03 s.u.

check 7: 7.01 s.u.

SAMPLE pH: 1) 7.52 s.u.

7.55 2) 7.63 s.u.

3) 7.51 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .628 - 8.3	1) 922
2) .617 - 7.8	2) 919
3) .615 - 8.7	3) 893

911

does the instrument correct for temp.? YES/NO

Eh measured:

1) 71.2 mV

2) 70.0 mV 26.5

3) 9.6 mV

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING SAMPLE ID MW09SG

INSPECTION

2" PVC casing
Is cap locked? (YES)/NO
Label on well? 09SG
Condition of well: GOOD

Condition of Locking Cap: GOOD
Weather: CLEAR 20°
Air Temperature: 20°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1350
Depth of Well: 20.5 ft
Top of Casing: ____ ft
Depth to Water: - 12.45 ft
Water Elevation: = ____ ft

Depth to Water was measured with:
(electronic tape)
chalk & steel tape
Steam Clean Equipment

Notes:

WELL PURGING

Date: 3-18-93 Time: 8:30
Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well		20.5 ft
Depth to water	-	12.45 ft
Length of water column	=	8.05 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	3.94 gal

YIELD: HIGH/(LOW)
If low, record recovery time: ____ (units mL/hr or L/hr)
Volume purged prior to sampling: 5 GAL
Did the well purge dry? YES/(NO)
Notes:

SAMPLING PERSONNEL

Name: M CHRISTENSEN
Date: 3-18-93
Company: WWES

SAMPLE COLLECTION

Date: 3-18-93 Time: 9:30
Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:
Steam-cleaned prior to arrival in field X
Steam-cleaned in field: ____
Other: ____

Appearance of Sample: Grey, Cloudy

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-18-93 Time: 9:30
Ground water temperature:
1) 6.9
2) 6.9
3) 6.6

pH Meter Calibration:
Time: 8:30
pH measured of:
standard 4: 4.0 s.u.
standard 10: 10.03 s.u.
check 7: 7.03 s.u.
SAMPLE pH: 1) 7.81 s.u.
7.84 2) 7.85 s.u.
3) 7.86 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:	
1) .306	1) 468	
2) .304	2) 465	467
3) .303	3) 467	

does the instrument correct for temp.?
YES/NO

Eh measured:
1) 129.0 mV
2) 143.9 mV 139.2
3) 144.7 mV

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW09WB

INSPECTION

2" PVC casing
Is cap locked? YES/NO
Label on well? YES
Condition of well: FINE

Condition of Locking Cap: FINE
Weather: SUNNY
Air Temperature: 20°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1347

Depth of Well:	50.5	ft
Top of Casing:		ft
Depth to Water:	- 12.47	ft
Water Elevation:	=	ft

Depth to Water was measured with:
electronic tape
chalk & steel tape
Steam Clean Equipment

Notes:

WELL PURGING

Date: 3/18/93 Time: 9:00
Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well	50.5	ft
Depth to water	- 12.47	ft
Length of water column	= 38.03	ft
conversion factor (2" well)	x 0.49	
minimum 3 casing volumes	= 18.63	gal

YIELD HIGH/LOW
If low, record recovery time: _____ (units mL/hr or L/hr)
Volume purged prior to sampling: 19.0
Did the well purge dry? YES/NO
Notes:

SAMPLING PERSONNEL

Name: BILL PUSHAW
Date: 3/18/93
Company: WWES

SAMPLE COLLECTION

Date: 3/18/93 Time: 9:30
Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:
Steam-cleaned prior to arrival in field ✓
Steam-cleaned in field:
Other:

Appearance of Sample: SLIGHTLY CLOUDY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/18/93 Time: 9:45

Ground water temperature:
1) 6.9
2) 8.0
3) 7.8

pH Meter Calibration:
Time: 830

pH measured of:

standard 4:	4.0	s.u.
standard 10:	10.03	s.u.
check 7:	7.03	s.u.
SAMPLE pH: 1)	7.72	s.u.
2)	7.63	s.u.
3)	7.62	s.u.

7.66

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .724	1) 1,106
2) .726	2) 1,075
3) .720	3) 1,072

1084

does the instrument correct for temp.? YES/NO

Eh measured:
1) 80.6 mV
2) 75.6 mV
3) 71.6 mV

75.93

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW09SB

INSPECTION

2" PVC casing

Is cap locked? (YES) NO

Label on well? Yes

Condition of well: Good

Condition of Locking Cap: Good

Weather: Cold Clear

Air Temperature: 11°

STATIC WATER LEVEL

Date: 3-8-93 Time: 1345

Depth of Well: 62.5 ft

Top of Casing: ____ ft

Depth to Water: - 12.81 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes:

WELL PURGING

Date: 3-18-93 Time: 8:45 AM

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well		62.5 ft
Depth to water	-	12.81 ft
Length of water column	=	49.69 ft
conversion factor (2" well)	x	0.49
minimum 3 casing volumes	=	24.35 gal

YIELD (HIGH)/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 25 Gal

Did the well purge dry? YES (NO)

Notes:

SAMPLING PERSONNEL

Name: E. Meyers

Date: 3-18-93

Company: W.W.B.S.

SAMPLE COLLECTION

Date: 3-18-93 Time: 9:40

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field Yes

Steam-cleaned in field: No

Other:

Appearance of Sample: Slightly Cloudy

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-18-93 Time: 9:30

Ground water temperature:

1) 9.5 C
2) 9.1
3) 8.9

pH Meter Calibration:

Time: 8:40 AM

pH measured of:

standard 4:	4.00	s.u.
standard 10:	10.03	s.u.
check 7:	7.03	s.u.
SAMPLE pH: 1)	7.24	s.u.
2)	7.34	s.u.
3)	7.35	s.u.

7.31

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) .947 - 9.5 C	1) 1,280
2) .935 - 9.1	2) 1,343
3) .899 - 8.9	3) 1284

1302

does the instrument correct for temp.?

YES (NO)

Eh measured:

1) 151 mV
2) 142.6 mV
3) 100.8 mV

131.46

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** MW10SG

INSPECTION

2" PVC casing

Is cap locked? (YES)/NO

Label on well? yes

Condition of well: ok

Condition of Locking Cap: ok

Weather: Sunny 40±

Air Temperature: 40±

STATIC WATER LEVEL

Date: 3-8-93 Time: 1125

Depth of Well: 8.0 ft

Top of Casing: ____ ft

Depth to Water: - 3.50 ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes:

WELL PURGING

Date: 3-22-93 Time: 10:00

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well 8.0 ft

Depth to water - 3.50 ft

Length of water column = 4.50 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 2.20 gal

YIELD: (HIGH)/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 2.5

Did the well purge dry? YES/(NO)

Notes:

SAMPLING PERSONNEL

Name: KTO + DJJ

Date:

Company: WW Eng. + Science

SAMPLE COLLECTION

Date: 3-22-93 Time: 1120

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: silty

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY ✓

FIELD ANALYSES

Date: 3-22-93 Time: 10:20 ②

Ground water temperature:

1) 7.6

2) 7.7

3) 7.9

pH Meter Calibration:

Time: 10:40

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.03 s.u.

check 7: 7.05 s.u.

SAMPLE pH: 1) 8.45 s.u.

8.01 2) 7.82 s.u.

3) 7.76 s.u.

Specific Conductivity measured (mmhos/cm):

~~Uncorrected~~			Corrected:	
1)	.483	7.6	1)	~~.649~~
.435 2)	.438	7.7	2)	~~.654~~
3)	.435	7.9	3)	~~.646~~ .650

does ~~the instrument~~ correct for temp.?

YES/NO

These are corrected values as per KTO 4/16/93

Eh measured:

1) -43.3 mV

2) -56.2 mV -52.3

3) -57.5 mV

Notes:

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — **SAMPLE ID** mw11SG

INSPECTION

2" PVC casing

Is cap locked? (YES)/NO

Label on well? _____

Condition of well: OK

Condition of Locking Cap: OK

Weather: Cloudy

Air Temperature: 40±

STATIC WATER LEVEL

Date: 3-8-93 Time: 1130

Depth of Well: 8.0 ft

Top of Casing: _____ ft

Depth to Water: - _____ ft

Water Elevation: = _____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes: _____

WELL PURGING

Date: 3-22-93 Time: 12:40

Method: _____

CALCULATION OF 3 CASING VOLUMES

Length of well 8.0 ft

Depth to water - 4.38 ft

Length of water column = 3.62 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 1.77 gal

YIELD: (HIGH)/LOW

If low, record recovery time: _____ (units mL/hr or L/hr)

Volume purged prior to sampling: 2.5

Did the well purge dry? YES/(NO)

Notes: _____

SAMPLING PERSONNEL

Name: DJJ. & KTO.

Date: 3-22-93

Company: WW Engineering & Science

SAMPLE COLLECTION

Date: 3-22-93 Time: 1300

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: _____

Other: _____

Appearance of Sample: Silty

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-22-93 Time: 1300

Ground water temperature:

1) 7.4

2) 7.4

3) 7.5

pH Meter Calibration:

Time: 1040

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.05 s.u.

check 7: 7.05 s.u.

SAMPLE pH: 1) 7.54 s.u.

2) 7.51 s.u.

7.50 3) 7.46 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:		Corrected:	
1) .413	7.4	1) ~~.622~~	
4.12 2) .411	7.4	2) ~~.619~~	6.19
3) .410	7.5	3) ~~.616~~	

does the instrument correct for temp.?

YES/NO

These are the corrected values as per KTO 4/16/93

Eh measured:

1) 221.0 mV

2) 222.0 mV 221.7

3) 222.0 mV

Notes: _____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING SAMPLE ID MW12SG /

INSPECTION

2" PVC casing

Is cap locked? (YES) NO

Label on well? yes

Condition of well: OK

Condition of Locking Cap: OK

Weather: Cloudy, rainy

Air Temperature: 40±

STATIC WATER LEVEL

Date: 3-8-93 Time: 1135

Depth of Well: 8.0 ft

Top of Casing: ____ ft

Depth to Water: - ____ ft

Water Elevation: = ____ ft

Depth to Water was measured with:

(electronic tape)

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-23-93 Time: 8:55

Method: T. Bailer

CALCULATION OF 3 CASING VOLUMES

Length of well 8.0 ft

Depth to water - 3.45 ft

Length of water column = 4.55 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 2.23 gal

YIELD: (HIGH) LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 3.0

Did the well purge dry? YES (NO)

Notes: ____

SAMPLING PERSONNEL

Name: DJJ + KTO.

Date: 3-23-93

Company: LIWES

SAMPLE COLLECTION

Date: 3-23-93 Time: 9:00

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: ____

Sample Parameter Checklist: MS/MSD

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

(FIELD FILTER METALS AND MERCURY)

FIELD ANALYSES

Date: 3-23-93 Time: 9:00

Ground water temperature:

1) 6.1

2) 6.3

3) 6.2

pH Meter Calibration:

Time: 8:40

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.05 s.u.

check 7: 7.05 s.u.

SAMPLE pH: 1) 9.90 s.u.

9.92 2) 9.93 s.u.

3) 9.94 s.u.

Specific Conductivity measured (mmhos/cm):

~~Uncorrected~~: Corrected:

1) ____ 1) .430

2) ____ 2) .440 .440

3) ____ 3) .449

does the instrument correct for temp.?

YES/NO

Eh measured:

1) 6.0 mV

2) -30.5 mV -11.8

3) -11.1 mV

Notes: ____

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ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING SAMPLE ID MW13SG

INSPECTION

2" PVC casing

Is cap locked? YES/NO

Label on well? yes

Condition of well: OK

Condition of Locking Cap: OK

Weather: Cloudy rain

Air Temperature: 40±

STATIC WATER LEVEL

Date: 3-8-93 Time: 13:45

Depth of Well: 8.0 ft

Top of Casing: ____ ft

Depth to Water: - ____ ft

Water Elevation: = ____ ft

Depth to ~~Water was~~ measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: ____

WELL PURGING

Date: 3-23-93 Time: 10:25

Method: ____

CALCULATION OF 3 CASING VOLUMES

Length of well 8.0 ft

Depth to water - 2.95 ft

Length of water column = 5.05 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = 2.47 gal

YIELD: HIGH/LOW

If low, record recovery time: ____ (units mL/hr or L/hr)

Volume purged prior to sampling: 3.0

Did the well purge dry? YES/NO

Notes: ____

SAMPLING PERSONNEL

Name: DJJ & KTO

Date: 3-23-93

Company: WWES

SAMPLE COLLECTION

Date: 3-23-93 Time: 1030

Sampling Equipment: T. Bailer

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: ____

Other: ____

Appearance of Sample: ____

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
Mercury (if separate)	✓	Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3-23-93 Time: 10:30

Ground water temperature:

1) 10.0

2) 9.8

3) 9.9

pH Meter Calibration:

Time: 10:30

pH measured of:

standard 4: 4.00 s.u.

standard 10: 10.05 s.u.

check 7: 7.04 s.u.

SAMPLE pH: 1) 7.64 s.u.

2) 7.63 s.u.

7.58 3) 7.47 s.u.

Specific Conductivity measured (mmhos/cm):

~~Uncorrected:~~ Corrected:

1) ____ 1) .539

2) ____ 2) .541 .547

3) ____ 3) .562

does the instrument correct for temp.?

YES/NO

Eh measured:

1) 67.0 mV

2) 50.9 mV 59.0

3) 59.1 mV

Notes: ____

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Purge Water Must be Saved !!!

ARCS - ALBION-SHERIDAN TOWNSHIP LANDFILL, ALBION, MICHIGAN

SECOND ROUND GROUND WATER SAMPLING — SAMPLE ID LF01 ms/msd Dup/ FB

INSPECTION

2" PVC casing

Is cap locked? (YES)/NO

Label on well? LF01

Condition of well: Good

Condition of Locking Cap: Good

Weather: Snow Cloudy

Air Temperature: 30°+

STATIC WATER LEVEL

Date: _____ Time: _____

Depth of Well: 37.5 ft

Top of Casing: _____ ft

Depth to Water: - 36.29 ft

Water Elevation: = _____ ft

Depth to Water was measured with:

electronic tape

chalk & steel tape

Steam Clean Equipment

Notes: _____

WELL PURGING

Date: 3-11-93 Time: 3:30

Method: TEFLON BAILER

CALCULATION OF 3 CASING VOLUMES

Length of well 37.5 ft

Depth to water - 36.29 ft

Length of water column = 1.21 ft

conversion factor (2" well) x 0.49

minimum 3 casing volumes = .59 gal

YIELD: HIGH/(LOW)

If low, record recovery time: _____ (units mL/hr or L/hr)

Volume purged prior to sampling: 3 GAL

Did the well purge dry? YES/(NO)

Notes: _____

SAMPLING PERSONNEL

Name: M CHRISTENSEN

Date: 3-12-93

Company: WW Eng & Science

SAMPLE COLLECTION

Date: 3/12/93 Time: 9:20

Sampling Equipment: TEFLON BAILER

Decontamination Method and Location:

Steam-cleaned prior to arrival in field ✓

Steam-cleaned in field: _____

Other: _____

Appearance of Sample: GREENISH-GRAY

Sample Parameter Checklist:

ABN, BNA, Pest/PCB	✓	VOC's	✓
TKN Nitrogen	✓	Chloride	✓
~~Mercury (if separate)~~		Sulfate	✓
Ammonia	✓	Metals	✓
Oil and Grease	✓	Cyanide	✓
Nitrate/nitrite	✓		

FIELD FILTER METALS AND MERCURY

FIELD ANALYSES

Date: 3/12/93 Time: 9:25

Ground water temperature:

1) 9.7

2) 9.7 9.5

3) 9.2

pH Meter Calibration:

Time: 7:35

pH measured of:

standard 4: _____ s.u.

standard 10: _____ s.u.

check 7: _____ s.u.

SAMPLE pH: 1) 7.38 s.u.

2) 7.26 s.u.

Ave = 7.33 3) 7.34 s.u.

Specific Conductivity measured (mmhos/cm):

Uncorrected:	Corrected:
1) 9.49	1) _____
2) 9.50	2) 13.424
3) 9.37 Ave: 9.45	3) _____

does the instrument correct for temp.?

YES/NO

Eh measured:

1) 28.6 mV

2) 22.9 mV

3) 21.0 mV

Notes: _____

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WW Engineering & Science, Inc.
Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ALBION LANDFILL
Project No.: 04011.03
Date: 1-18-94

Job Description:
CHRISTENSEN / OSTERMAN

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
MW08SG	980.58	25.21	955.37		
MW08WB	980.93	33.44	947.49		
MW08SB	981.83	34.89	946.94		
MW09SG	959.47	12.86	946.61		
MW09WB	959.48	12.91	946.57		
MW09SB	960.06	13.17	946.89		
MW10SG	949.98	FROZEN			
MW11SG	949.13	FROZEN			
MW12SG	950.57	FROZEN			
MW13SG	949.49	FROZEN			
LF01	985.95	36.31	949.64		
LF02	976.77	DRY			
LF03	983.52	DRY			
MW-W	977.48	27.79	949.69		
MW-E	972.53	23.39	949.14		
MW-S	961.17	13.77	947.40		
GRS-1/MW1	976.26	30.44	945.82		
GRS2/MW2	985.16	38.36	946.80		
GRS3/MW3	987.89	41.30	946.59		
GRS 4A/MW4A	984.47	37.30	947.17		
SG-E	945.07	17.20	927.87		
SG-W	943.26	SURROUNDED BY ICE	—		

WW Engineering & Science, Inc.
Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ALBION LANDFILL
Project No.: 04011.03
Date: 1-18-94

Job Description: CHRISTENSEN - OSTERMAN

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
MW01SG	982.36	31.94	950.42		
MW01WB	982.20	32.38	949.82		
MW01SB	982.20	32.42	949.78		
MW02SG	977.93	27.35	950.58		
MW02WB	977.33	27.12	950.21		
MW02SB	977.62	27.71	949.91		
MW03SG	978.88	31.46	947.42		
MW03WB	978.65	31.75	946.90		
MW03SB	978.15	31.12	947.03		
MW04 SG(WB)	978.03	31.13	946.90		
MW04 WB(SB1)	977.73	30.84	946.89		
MW04 SB(SB2)	978.03	31.15	946.88		
MW04 DB	977.80	30.70	947.10		
MW05SG	970.69	20.89	949.80		
MW05SB	970.01	22.25	947.76		
MW06SG	969.73	21.91	947.82		
MW06WB	969.81	23.27	946.54		
MW06SB	969.77	22.85	946.92		
MW07SG	963.91	16.52	947.39		
MW07WB	963.64	16.79	946.85		
MW07SB	962.88	16.04	946.84		

Date: 1-17/18/19-94
Client: ALBION LANDFIL
Project No.: 04011.03

DNR MONITOR WELL #1 WAS LOCATED FOR THE FIRST TIME. THE KEY WE RECEIVED FROM THE DNR IN DECEMBER 1993 DID NOT FIT THE LOCK. THE KEY BROKE OFF IN THE LOCK SO WE CUT THE LOCK OFF. THE EXPANDABLE PLUG WOULD NOT COME OUT BECAUSE THE GALVANIZED CASING WAS NOT REAMED, AT INSTALLATION, LEAVING A BURR IN THE CASING. WE BROKE THE PLUG OUT AND INSTALLED OUR STANDARD J-PLUG AND A 2402 LOCK. MDNR WELLS 2-3 & 4 ALSO HAD DIFFERENT LOCKS THAN IN DEC. 93. WE CUT THESE AND INSTALLED 2402 LOCKS AS PER INSTRUCTIONS FROM LIZ BARTZ.

SURVEY OF WELL CLUSTERS AND SUBSIDENCE MONUMENTS WAS NOT DONE DUE TO ADVERSE WEATHER CONDITIONS (-20°F & 2'± SNOW COVER). SURVEY WILL BE MORE ACCURATE IN MORE FAVORABLE CONDITIONS. WE WERE UNABLE TO LOCATE BENCH MARK WEST UNDER THE SNOW.

WW Engineering & Science

Environmental Services Division
Field Services
Effective Date: January 1991

Client ALBION LANDFILL
Project No. 04011.03
Location ALBION, MI
Technician MVC
Billing Manager LIZ BARTZ

Equipment Fee

DATE	ITEM #	ITEM NAME	RATE PER UNIT	NO. OF UNITS	TOTAL
1-18-94	130	J-PLUG	30.00	1	30.00
1-18-94	119	24oz PADLOCK	7.50	4	30.00

Table 21
Water Level Elevations
Albion-Sheridan Township Landfill
Albion, Michigan

Units in feet

Site Id Date Measured	TOC Elev.	December 22, 1992 Depth to Water	December 22, 1992 Elev. of Water	January 28, 1993 Depth to Water	January 28, 1993 Elev. of Water	March 8, 1993 Depth to Water	March 8, 1993 Elev. of Water	April 28, 1993 Depth to Water	April 28, 1993 Elev. of Water
MW01SG 31.94	982.36	32.56	949.80	32.13	950.23	31.98	950.38	31.45	950.91
MW01WB 32.38	982.20	32.97	949.23	32.39	949.81	32.24	949.96	31.86	950.34
MW01SB 32.42	982.20	33.01	949.19	32.52	949.68	32.41	949.79	31.90	950.30
MW02SG 27.35	977.93	27.90	950.03	27.51	950.42	27.37	950.56	26.83	951.10
MW02WB 27.12	977.33	27.75	949.58	27.30	950.03	27.15	950.18	26.62	950.71
MW02SB 27.71	977.62	28.35	949.27	27.85	949.77	27.74	949.88	27.20	950.42
MW03SG 31.46	978.88	31.65	947.23	31.09	947.79	31.16	947.72	30.80	948.08
MW03WB 31.75	978.65	31.46	947.19	31.32	947.33	31.40	947.25	31.11	947.54
MW03SB 31.12	978.15	31.07	947.08	30.77	947.38	30.83	947.32	30.50	947.65
MW04SG(WB) 31.13	978.03	30.96	947.07	30.70	947.33	30.77	947.26	30.40	947.63
MW04WB(SB1) 30.84	977.73	30.59	947.14	30.41	947.32	30.48	947.25	30.10	947.63
MW04SB(SB2) 31.15	978.03	30.92	947.11	30.73	947.30	30.79	947.24	30.42	947.61
MW04DB 30.70	977.80	30.69	947.11	30.36	947.44	30.41	947.39	29.96	947.84
MW05SG 20.89	970.69	21.00	949.69	20.52	950.17	20.66	950.03	20.05	950.64
MW05SB 22.25	970.01	22.53	947.48	22.11	947.90	22.05	947.96	21.66	948.35
MW06SG 21.91	969.73	21.33	948.40	20.55	949.18	21.18	948.55	20.42	949.31
MW06WB 23.27	969.81	23.20	946.61	22.83	946.98	22.89	946.92	22.62	947.19
MW06SB 22.85	969.77	22.83	946.94	22.44	947.33	22.49	947.28	22.20	947.57
MW07SG 16.52	963.91	16.28	947.63	15.77	948.14	16.03	947.88	15.48	948.43
MW07WB 16.79	963.64	16.70	946.94	16.44	947.20	16.33	947.31	16.18	947.46
MW07SB 16.04	962.88	15.97	946.91	15.68	947.20	15.68	947.20	15.41	947.47
MW08SG 25.21	980.58	23.98	956.60	24.52	956.06	24.39	956.19	24.35	956.23
MW08WB 33.84	980.93	33.44	947.49	33.51	947.42	33.52	947.41	33.18	947.75
MW08SB 34.89	981.83	34.77	947.06	34.52	947.31	34.54	947.29	34.09	947.74
MW09SG 12.86	959.47	12.75	946.72	12.45	947.02	12.45	947.02	12.20	947.27
MW09WB 12.91	959.48	12.72	946.76	12.45	947.03	12.47	947.01	12.20	947.28
MW09SB 13.17	960.06	13.08	946.98	12.77	947.29	12.81	947.25	12.55	947.51
MW10SG FROZEN	949.98	NA	- -	3.63	946.35	3.50	946.48	3.61	946.37
MW11SG "	949.13	NA	- -	4.39	944.74	4.38	944.75	4.33	944.80
MW12SG "	950.57	NA	- -	3.52	947.05	3.45	947.12	3.48	947.09
MW13SG "	949.49	NA	- -	3.08	946.41	2.95	946.54	NA	- -
LF01 36.31	985.95	36.85	949.10	36.39	949.56	36.29	949.66	35.73	950.22
LF02 DRY	976.77	DRY	- -	DRY	- -	DRY	- -	17.19	959.58
LF03 DRY	983.52	DRY	- -	DRY	- -	DRY	- -	DRY	- -
MW-W 27.79	977.48	NA	- -	NA	- -	27.77	949.71	27.17	950.31
MW-E 23.39	972.53	NA	- -	NA	- -	23.16	949.37	22.51	950.02
MW-S 13.77	961.17	NA	- -	NA	- -	13.24	947.93	12.67	948.50
GRS-1/MW-1 30.44	976.26	NA	- -	NA	- -	NA	- -	NA	- -
GRS-2/MW-2 38.34	985.16	NA	- -	37.62	947.54	38.38	946.78	37.88	947.28
GRS-3/MW-3 41.30	987.89	NA	- -	NA	- -	NA	- -	NA	- -
GRS-4A/MW-4 37.30	984.47	NA	- -	36.68	947.79	37.2	947.27	36.72	947.75
SG-E 17.2	*945.07	NA	- -	17.28	945.35	17.24	945.31	***16.70	***944.8
SG-W ICED IN	**943.26	NA	- -	10.45	943.71	10.28	943.54	10.35	943.61

38.34
41.30

* The TOC elevation given for staff gauge SG-E is the elevation of the 17.00-foot mark.
** The TOC elevaton given for staff gauge SG-W is the elevation of the 10.00-foot mark.
***The April 28, 1993 measurement for SG-E was estimated because debris covered the staff gauges at the water line.
NA = Not Available

WW Engineering & Science, Inc.
Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ALBION LANDFILL
Project No.: 04011.03
Date: 1-18-94

Job Description: CHRISTENSEN - OSTERMAN

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
MW01SG	982.36	31.94	950.42		
MW01WB	982.20	32.38	949.82		
MW01SB	982.20	32.42	949.78		
MW02SG	977.93	27.35	950.58		
MW02WB	977.33	27.12	950.21		
MW02SB	977.62	27.71	949.91		
MW03SG	978.88	31.46	947.42		
MW03WB	978.65	31.75	946.90		
MW03SB	978.15	31.12	947.03		
MW04 SG(WB)	978.03	31.13	946.90		
MW04 WB(SB1)	977.73	30.84	946.89		
MW04 SB(SB2)	978.03	31.15	946.88		
MW04 DB	977.80	30.70	947.10		
MW05SG	970.69	20.89	949.80		
MW05SB	970.01	22.25	947.76		
MW06SG	969.73	21.91	947.82		
MW06WB	969.81	23.27	946.54		
MW06SB	969.77	22.85	946.92		
MW07SG	963.91	16.52	947.39		
MW07WB	963.64	16.79	946.85		
MW07SB	962.88	16.04	946.84		

disk

WW Engineering & Science, Inc.
Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ALBION LANDFILL
Project No.: 04011.03
Date: 1-18-94

Job Description: CHRISTENSEN / OSTERMAN

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
MW08SG	980.58	25.21	955.37		
MW08WB	980.93	~~33.44~~ 33.84	~~947.49~~		
MW08SB	981.83	34.89	946.94		
MW09SG	959.47	12.86	946.61		
MW09WB	959.48	12.91	946.57		
MW09SB	960.06	13.17	946.89		
MW10SG	949.98	FROZEN			
MW11SG	949.13	FROZEN			
MW12SG	950.57	FROZEN			
MW13SG	949.49	FROZEN			
LF01	985.95	36.31	949.64		
LF02	976.77	DRY			
LF03	983.52	DRY			
MW-W	977.48	27.79	949.69		
MW-E	972.53	23.39	949.14		
MW-S	961.17	13.77	947.40		
GRS-1/MW1	976.26	30.44	945.82		
GRS2/MW2	985.16	38.36	946.80		
GRS3/MW3	987.89	41.30	946.59		
GRS 4A/MW4A	984.47	37.30	947.17		
SG-E	945.07	17.20	~~927.87~~	944.87	
SG-W	943.26	SURROUNDED BY ICE	—		

disk

Table 21
Water Level Elevations
Albion-Sheridan Township Landfill
Albion, Michigan

Units in feet

Site Id Date Measured	TOC Elev.	December 22, 1992 Depth to Water	December 22, 1992 Elev. of Water	January 28, 1993 Depth to Water	January 28, 1993 Elev. of Water	March 8, 1993 Depth to Water	March 8, 1993 Elev. of Water	April 28, 1993 Depth to Water	April 28, 1993 Elev. of Water
MW01SG 31.94	982.36	32.56	949.80	32.13	950.23	31.98	950.38	31.45	950.91
MW01WB 32.38	982.20	32.97	949.23	32.39	949.81	32.24	949.96	31.86	950.34
MW01SB 32.42	982.20	33.01	949.19	32.52	949.68	32.41	949.79	31.90	950.30
MW02SG 27.35	977.93	27.90	950.03	27.51	950.42	27.37	950.56	26.83	951.10
MW02WB 27.12	977.33	27.75	949.58	27.30	950.03	27.15	950.18	26.62	950.71
MW02SB 27.71	977.62	28.35	949.27	27.85	949.77	27.74	949.88	27.20	950.42
MW03SG 31.46	978.88	31.65	947.23	31.09	947.79	31.16	947.72	30.80	948.08
MW03WB 31.75	978.65	31.46	947.19	31.32	947.33	31.40	947.25	31.11	947.54
MW03SB 31.12	978.15	31.07	947.08	30.77	947.38	30.83	947.32	30.50	947.65
MW04SG(WB)31.13	978.03	30.96	947.07	30.70	947.33	30.77	947.26	30.40	947.63
MW04WB(SB1)30.84	977.73	30.59	947.14	30.41	947.32	30.48	947.25	30.10	947.63
MW04SB(SB2)31.15	978.03	30.92	947.11	30.73	947.30	30.79	947.24	30.42	947.61
MW04DB 30.70	977.80	30.69	947.11	30.36	947.44	30.41	947.39	29.96	947.84
MW05SG 20.89	970.69	21.00	949.69	20.52	950.17	20.66	950.03	20.05	950.64
MW05SB 22.25	970.01	22.53	947.48	22.11	947.90	22.05	947.96	21.66	948.35
MW06SG 21.91	969.73	21.33	948.40	20.55	949.18	21.18	948.55	20.42	949.31
MW06WB 23.27	969.81	23.20	946.61	22.83	946.98	22.89	946.92	22.62	947.19
MW06SB 22.85	969.77	22.83	946.94	22.44	947.33	22.49	947.28	22.20	947.57
MW07SG 16.52	963.91	16.28	947.63	15.77	948.14	16.03	947.88	15.48	948.43
MW07WB 16.79	963.64	16.70	946.94	16.44	947.20	16.33	947.31	16.18	947.46
MW07SB 16.04	962.88	15.97	946.91	15.68	947.20	15.68	947.20	15.41	947.47
MW08SG 25.21	980.58	23.98	956.60	24.52	956.06	24.39	956.19	24.35	956.23
MW08WB 33.84	980.93	33.44	947.49	33.51	947.42	33.52	947.41	33.18	947.75
MW08SB 34.89	981.83	34.77	947.06	34.52	947.31	34.54	947.29	34.09	947.74
MW09SG 12.86	959.47	12.75	946.72	12.45	947.02	12.45	947.02	12.20	947.27
MW09WB 12.91	959.48	12.72	946.76	12.45	947.03	12.47	947.01	12.20	947.28
MW09SB 13.17	960.06	13.08	946.98	12.77	947.29	12.81	947.25	12.55	947.51
MW10SG FROZEN	949.98	NA	- -	3.63	946.35	3.50	946.48	3.61	946.37
MW11SG "	949.13	NA	- -	4.39	944.74	4.38	944.75	4.33	944.80
MW12SG "	950.57	NA	- -	3.52	947.05	3.45	947.12	3.48	947.09
MW13SG "	949.49	NA	- -	3.08	946.41	2.95	946.54	NA	- -
LF01 36.31	985.95	36.85	949.10	36.39	949.56	36.29	949.66	35.73	950.22
LF02 DRY	976.77	DRY	- -	DRY	- -	DRY	- -	17.19	959.58
LF03 DRY	983.52	DRY	- -	DRY	- -	DRY	- -	DRY	- -
MW-W 27.79	977.48	NA	- -	NA	- -	27.77	949.71	27.17	950.31
MW-E 23.39	972.53	NA	- -	NA	- -	23.16	949.37	22.51	950.02
MW-S 13.77	961.17	NA	- -	NA	- -	13.24	947.93	12.67	948.50
GRS-1/MW-1 30.44	976.26	NA	- -	NA	- -	NA	- -	NA	- -
GRS-2/MW-2 38.34	985.16	NA	- -	37.62	947.54	38.38	946.78	37.88	947.28
GRS-3/MW-3 41.30	987.89	NA	- -	NA	- -	NA	- -	NA	- -
GRS-4A/MW-4 37.32	984.47	NA	- -	36.68	947.79	37.2	947.27	36.72	947.75
SG-E 17.2	*945.07	NA	- -	17.28	945.35	17.24	945.31	***16.70	***944.8
SG-W ICED IN	**943.26	NA	- -	10.45	943.71	10.28	943.54	10.35	943.61

38.34
41.30

* The TOC elevation given for staff gauge SG-E is the elevation of the 17.00-foot mark.
** The TOC elevaton given for staff gauge SG-W is the elevation of the 10.00-foot mark.
***The April 28, 1993 measurement for SG-E was estimated because debris covered the staff gauges at the water line.
NA = Not Available

WW Engineering & Science, Inc.
Environmental Services Division

Water Level and Field Record Form

Client: ALBION-Sheridan L.F.
Project No.: 04011.02
Date: 3-8-93

Job Description: Water Levels
Round 2

Well No.	(a) Elevation Top of Casing (T.O.C.)	(b) Point Held On Tape (ft.)	(c) Distance Wet On Tape	(d) Depth To Water Below T.O.C. (b-c)	(e) Elevation Of Water (a-d)	Time of Meas.	Remarks (weather, etc.)
MW01 SG				31.98		12:05	
MW01 WB				32.24		12:07	
MW-1 SB				32.41		12:10	
MW-2 SG				SM ~~27.34~~ 27.37		11:59	
MW-2 WB				27.15		11:57	
MW-2 SB				27.74		11:55	
MW-3 SG				31.16		1:32	
MW-3 WB				31.40		1:30	
MW-3 SB				30.83		1:35	
MW-4 SG (WB)				30.77		1:20	
MW-4 WB (SB1)				30.48		1:25	
MW-4 SB (SB2)				30.79		1:27	
MW-4 DB				30.41		1:22	
MW-5 SG				20.66		11:50	
MW-5 SB				22.05		11:55	
MW-6 SG				21.18		1:15	
MW-6 WB				22.89		1:10	
MW-6 SB				22.49		1:12	
MW-7 SG				16.03		12:30	
MW-7 WB				16.33		12:32	
MW-7 SB				15.68		12:35	
MW-8 SG				24.39		1:38	
MW-8 WB				33.52		1:40	
MW-8 SB				34.54		1:42	
MW09 SG				12.45		1:50	
MW-9 WB				12.47		1:47	
MW-9 SB				12.81		1:45	
MW-10 SG				3.50		11:25	
MW-11 SG				4.38		11:30	
MW-12 SG				3.45		11:35	
MW-13 SG				2.95		2:45	

WW Engineering & Science, Inc.
Environmental Services Division

Water Level and Field Record Form

Client: ALBION-SHERIDAN L.F. Job Description: Water Levels
Project No.: 04011.02
Date: 3/8/93

Well No.	(a) Elevation Top of Casing (T.O.C.)	(b) Point Held On Tape (ft.)	(c) Distance Wet On Tape	(d) Depth To Water Below T.O.C. (b-c)	(e) Elevation Of Water (a-d)	Time of Meas.	Remarks (weather, etc.)
LF-1				36.29		12:15	
LF-2				Dry		12:20	
LF-3				Dry		12:25	
MW-W	977.48			27.77		2:30	
MW-E	972.53			23.16		2:40	
MW-S	961.17			13.24		3:20	
MDNR							
1	976.26						
2	985.16			38.38		2:50	
3	987.89						
4	984.47			37.20		3pm	
SG-E				17.24		11:45	
SG-W				10.28		11:32	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: B PUSHAW
Method:

Project Name and Number: ALBION 04011.03 Date: 1-25-94 Page: 1/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
3.64	984.75		981.11	BM W.	
		6.73	978.02	4SB	978.03 ↓0.01
4.58	982.60			TP 4SB	
		4.88	977.72	4WB	977.73 ↓ 0.01
4.85	982.57			TP 4WB	
		4.55	978.02	4 SG	978.03 ↓ 0.01
4.65	982.67			TP 4SG	
		4.88	977.79	4 DB	977.80 ↓ 0.01
5.11	982.90			TP 4DB	
		5.00	977.90	TP LOG	
2.21	980.11	2.02	978.09	3 SB	978.15 ↓ 0.06
+1.95	980.04			TP 3SB	
		1.45	978.59	3 WB	978.65 ↓ 0.06
1.35	979.94			TP3WB	
		2.05	977.89	TP	

3 SG BROKEN CASING DID NOT SHOOT.

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: B PUSHAW
Method:

Project Name and Number: Date: 1-25-94 Page: 2/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.89	TP LOG	
5.98	983.87	6.09	977.78	TP 4 DB	
+6.80	984.58	3.49	981.09	BM W	981.11 .02 ✓
			981.11	BM W	
3.49	984.60	10.58	974.02	TP LOG	
1.22	975.24	5.54	969.70	6 SG	969.73 ↓ 0.03
5.52	975.22			TP 6 SG	
		5.49	969.73	6 SB	969.77 ↓ 0.04
5.54	975.27			TP 6 SB	
		5.51	969.76	6 WB	969.81 ↓ 0.05
5.54	975.30			TP 6 WB	
		1.29	974.01	TP LOG	
9.23	983.24	2.14	981.10	BM W	981.11 .01 ✓

Table ~~20~~ 21
Water Level Elevations
Albion-Sheridan Township Landfill
Albion, Michigan
Units in feet

Nov. 30, 1993 water levels

Site Id Date Measured	TOC Elevation	December 22, 1992 Depth to Water	December 22, 1992 Elevation of Water	January 28, 1993 Depth to Water	January 28, 1993 Elevation of Water	March 8, 1993 Depth to Water	March 8, 1993 Elevation of Water	April 28, 1993 Depth to Water	April 28, 1993 Elevation of Water	July 1, 1993 Depth to Water	July 1, 1993 Elevation of Water	
MW01SG	982.36	32.56	949.80	32.13	950.23	31.98	950.38	31.45	950.91	31.34	951.02	31.61
MW01WB	982.20	32.97	949.23	32.39	949.81	32.24	949.96	31.86	950.34	31.80	950.40	32.02
MW01SB	982.20	33.01	949.19	32.52	949.68	32.41	949.79	31.90	950.30	31.81	950.39	32.07
MW02SG	977.93	27.90	950.03	27.51	950.42	27.37	950.56	26.83	951.10	26.73	951.20	27.03
MW02WB	977.33	27.75	949.58	27.30	950.03	27.15	950.18	26.62	950.71	26.50	950.83	26.78
MW02SB	977.62	28.35	949.27	27.85	949.77	27.74	949.88	27.20	950.42	27.08	950.54	27.35
MW03SG	978.88	31.65	947.23	31.09	947.79	31.16	947.72	30.80	948.08	30.79	948.09	31.06
MW03WB	978.65	31.46	947.19	31.32	947.33	31.40	947.25	31.11	947.54	31.10	947.55	31.36
MW03SB	978.15	31.07	947.08	30.77	947.38	30.83	947.32	30.50	947.65	30.47	947.68	30.75
MW04SG(WB)	978.03	30.96	947.07	30.70	947.33	30.77	947.26	30.40	947.63	30.47	947.56	30.73
MW04WB(SB1)	977.73	30.59	947.14	30.41	947.32	30.48	947.25	30.10	947.63	30.19	947.54	30.45
MW04SB(SB2)	978.03	30.92	947.11	30.73	947.30	30.79	947.24	30.42	947.61	30.50	947.53	30.74
MW04DB	977.80	30.69	947.11	30.36	947.44	30.41	947.39	29.96	947.84	30.02	947.78	30.18
MW05SG	970.69	21.00	949.69	20.52	950.17	20.66	950.03	20.05	950.64	20.19	950.50	20.55
MW05SB	970.01	22.53	947.48	22.11	947.90	22.05	947.96	21.66	948.35	21.59	948.42	21.80
MW06SG	969.73	21.33	948.40	20.55	949.18	21.18	948.55	20.42	949.31	20.80	948.93	21.36
MW06WB	969.81	23.20	946.61	22.83	946.98	22.89	946.92	22.62	947.19	22.65	947.16	22.89
MW06SB	969.77	22.83	946.94	22.44	947.33	22.49	947.28	22.20	947.57	22.21	947.56	22.45
MW07SG	963.91	16.28	947.63	15.77	948.14	16.03	947.88	15.48	948.43	15.70	948.21	16.03
MW07WB	963.64	16.70	946.94	16.44	947.20	16.33	947.31	16.18	947.46	16.17	947.47	16.43
MW07SB	962.88	15.97	946.91	15.68	947.20	15.68	947.20	15.41	947.47	15.41	947.47	15.67
MW08SG	980.58	23.98	956.60	24.52	956.06	24.39	956.19	24.35	956.23	24.26	956.32	24.88
MW08WB	980.93	33.44	947.49	33.51	947.42	33.52	947.41	33.18	947.75	33.17	947.76	33.38
MW08SB	981.83	34.77	947.06	34.52	947.31	34.54	947.29	34.09	947.74	34.25	947.58	34.50
MW09SG	959.47	12.75	946.72	12.45	947.02	12.45	947.02	12.20	947.27	12.26	947.21	12.53
MW09WB	959.48	12.72	946.76	12.45	947.03	12.47	947.01	12.20	947.28	12.26	947.22	12.55
MW09SB	960.06	13.08	946.98	12.77	947.29	12.81	947.25	12.55	947.51	12.53	947.53	12.76
MW10SG	949.98	NA	- -	3.63	946.35	3.50	946.48	3.61	946.37	3.56	946.42	3.61
MW11SG	949.13	NA	- -	4.39	944.74	4.38	944.75	4.33	944.80	4.24	944.89	4.60
MW12SG	950.57	NA	- -	3.52	947.05	3.45	947.12	3.48	947.09	3.50	947.07	3.75
MW13SG	949.49	NA	- -	3.08	946.41	2.95	946.54	NA	- -	NA	- -	NA
LF01	985.95	36.85	949.10	36.39	949.56	36.29	949.66	35.73	950.22	35.69	950.26	35.92
LF02	976.77	DRY	- -	DRY	- -	DRY	- -	17.19	959.58	19.61	957.16	DRY
LF03	983.52	DRY	- -	DRY	- -	DRY	- -	DRY	- -	DRY	- -	DRY

Table 20
Water Level Elevations
Albion-Sheridan Township Landfill
Albion, Michigan
Units in feet

Nov. 30, 1993 water levels

Site Id Date Measured	TOC Elevation	December 22, 1992 Depth to Water	December 22, 1992 Elevation of Water	January 28, 1993 Depth to Water	January 28, 1993 Elevation of Water	March 8, 1993 Depth to Water	March 8, 1993 Elevation of Water	April 28, 1993 Depth to Water	April 28, 1993 Elevation of Water	July 1, 1993 Depth to Water	July 1, 1993 Elevation of Water	
MW-W	977.48	NA	- -	NA	- -	27.77	949.71	27.17	950.31	27.13	950.35	27.41
MW-E	972.53	NA	- -	NA	- -	23.16	949.37	22.51	950.02	22.79	949.74	23.1
MW-S	961.17	NA	- -	NA	- -	13.24	947.93	12.67	948.50	12.95	948.22	13.37
GRS-1/MW-1	976.26	NA	- -	NA	- -	NA	- -	NA	- -	NA	- -	NA
GRS-2/MW-2	985.16	NA	- -	37.62	947.54	38.38	946.78	37.88	947.28	NA	- -	37.95
GRS-3/MW-3	987.89	NA	- -	NA	- -	NA	- -	NA	- -	NA	-	4.66
GRS-4A/MW-4	984.47	NA	- -	36.68	947.79	37.2	947.27	36.72	947.75	NA	- -	36.77
SG-E	*945.07	NA	- -	17.28	945.35	17.24	945.31	***16.70	***944.8	17.85	***927.2	17.60
SG-W	**943.26	NA	- -	10.45	943.71	10.28	943.54	10.35	943.61	10.45	932.81	10.20

* The TOC elevation given for staff gauge SG-E is the elevation of the 17.00-foot mark.
** The TOC elevaton given for staff gauge SG-W is the elevation of the 10.00-foot mark.
***The April 28, 1993 measurement for SG-E was estimated because debris covered the staff gauges at the water line.
NA = Not Available

Should be 40.66 not 4.66

Date: SEPT. 30, 1993

Client: ARCS - ALBION LANDFILL

Project No.: 04011.02

	DEPTH TO WATER	T.O.C	ELEVATION OF WATER
MW01 SG	31.58	982.36	950.78
MW01 WB	31.99	982.20	950.21
MW01 SB	31.99	982.20	950.21
MW02 SG	27.04	977.93	950.89
MW02 WB	26.78	977.33	950.55
MW02 SB	27.46	977.62	950.16
MW03 SG	31.01	978.88	947.87
MW03 WB	31.24	978.65	947.41
MW03 SB	30.59	978.15	947.56
MW04 SG	30.09	978.03	947.94
MW04 WB	30.30	977.73	947.43
MW04 SB	30.60	978.03	947.43
MW04 DB	30.15	977.80	947.65
MW05 SG	20.55	970.69	950.14
MW05 SB	21.81	970.01	948.20
MW06 SG	21.50	969.73	948.23
MW06 WB	22.08	969.81	947.73
MW06 SB	22.30	969.77	947.47
MW07 SG	16.00	963.91	947.63
MW07 WB	16.28	963.64	947.36
MW07 SB	15.53	962.88	947.35
MW08 SG	24.83	980.58	955.75
MW08 WB	33.30	980.93	947.63
MW08 SB	34.20	981.83	947.63
MW09 SG	12.34	959.47	947.13
MW09 WB	12.35	959.48	947.13
MW09 SB	12.62	960.06	947.44
MW10 SG	3.68	949.98	946.30
MW11 SG	4.41	949.13	944.72
MW12 SG	3.52	950.57	947.05
MW13 SG	N A	949.49	—

Date:

Client:

Project No.:

	DEPTH TO WATER	TOC	ELEVATION OF WATER
LF 01	35.96	985.95	949.99
LF 02	18.00	976.77	958.77
LF 03	DRY	983.52	—
MW - W	27.40	977.48	950.08
MW - E	23.14	972.53	949.39
MW - S	13.24	961.17	947.93
GRS 1/MW1	NA		
GRS 2/MW2	NA		
GRS 3 MW3	NA		
GRS 4A/MW4	NA		
SG-E	NA		
SG-W	NA		

Date: 10-1-93
Client: ARCS - ALBION LANDFILL
Project No.: 04011.02

LIZ BARTZ

ON WEDNESDAY 9-29-93 AND THURSDAY 9-30-93 THE SITE WAS DEMOBILIZED. WASTE MANAGEMENT REMOVE THE DUMPSTER, THE PORTA-JON WAS REMOVED, PHONE AND ELECTRIC POWER WAS DISCONNECTED. THE OFFICE TRAILER WAS EMPTIED AND REMOVED FROM THE SITE.
APPROX. 3 DOZEN SOIL SAMPLES AND ROCK CORES REMAIN ON SITE AS PER CARL MALSOM.
I TOOK A ROUND OF WATER LEVELS ON THURSDAY 9-30-93.
MICHIGAN DNR WAS ON SITE BOTH DAYS.
I CHARGED A TOTAL OF 23 HOURS FOR ON SITE WORK AND PAPER WORK.

MARK CHRISTENSEN

EDI Engineering & Science
Environmental Engineering, Geology, Biology and Chemistry
3555 Glenwood Hills Parkway, SE, Grand Rapids, MI 49508, (616) 942-9600

Groundwater Sampling Field Record Form

033

Client: ARCS ALBION LANDFILL
Project No: 04011.02
Date: 9-30-93

Job Description: WORK SHT.

Well No.	Date Sampled	Priming Water Used (gal.)	Pumping Rate (gpm.)	Time Pumped (min.)	Volume Discharged (gal.)	Sampling Method	Remarks
7SG	16.0						
7WB	16.28						
7SB	15.53						
LF2	18.00						
LF1	35.96						
1SB	31.99						
1WB	31.99						
1SG	31.58						
4SG	30.09						
4DB	30.15						
4SB	30.60						
4WB	30.30						
3SG	31.01						
3SB	30.59						
3WB	31.24						
6WB	22.08						
6SG	21.50						
6SB	22.30						
9WB	12.35						
9SG	12.34						
9SB	12.62						
8SB	34.20						
8WB	33.30						
8SG	24.83						
5SG	20.55						
5SB	21.81						
2SG	27.04						
2WB	26.78						
2SB	27.46						
MW 10	3.68						
MW 11	4.41						
MW 12	3.52						
MW 13	ACROSS RIVER						
LF3	DRY						
MW-W	27.40						
MW-E	23.14						
MW-S	13.24						

EDI Engineering & Science
Environmental Engineering, Geology, Biology and Chemistry
5556 Glenwood Hills Parkway, SE, Grand Rapids, MI 49508, (616) 942-9600

Groundwater Sampling Field Record Form

Client: ARCS ALBION LANDFILL
Project No: C4011.02
Date: 9-30-93

Job Description: WORK SHT.

Well No.	Date Sampled	Priming Water Used (gal.)	Pumping Rate (gpm.)	Time Pumped (min.)	Volume Discharged (gal.)	Sampling Method	Remarks
7SG	16.0						
7WB	16.28						
7SB	15.53						
LF2	18.00						
LF1	35.96						
1SB	31.99						
1WB	31.99						
1SG	31.58						
4SG	30.09						
4DB	30.15						
4SB	30.60						
4WB	30.30						
3SG	31.01						
3SB	30.59						
3WB	31.24						
6WB	22.08						
6SG	21.50						
6SB	22.30						
9WB	12.35						
9SG	12.34						
9SB	12.62						
8SB	34.20						
8WB	33.30						
8SG	34.83						
5SG	20.55						
5SB	21.81						
2SG	27.04						
2WB	26.78						
2SB	27.46						
MW 10	3.68						
MW 11	4.41						
MW 12	3.52						
MW 13	ACROSS RIVER						
LF3	DRY						
MW-W	27.40						
MW-E	23.14						

MW-S 13.24

WW Engineering & Science, Inc.
Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ARCS-Albion/Sheriden LF Job Description: Water levels
Project No.: 04011.02
Date: 1-28-93

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
1-SG	982.36	32.13	950.23	2:15 PM	OVERCAST
1-WB	982.20	32.39	949.81	2:20 PM	
1-SB	982.20	32.52	949.68	2:10 PM	
2-SG	977.93	27.51	950.42	2:35 PM	
2-WB	977.325	27.30	950.025	2:30 PM	
2-SB	977.62	27.85	949.77	2:25 PM	
3-SG	978.875	31.09	947.785	8:15 AM	
3-WB	978.65	31.32	947.33	8:20 AM	
3-SB	978.145	30.77	947.375	8:10 AM	
4-SG	978.03	30.70	947.33	8:25 AM	
4-WB	977.73	30.41	947.32	8:30 AM	
4-SB	978.025	30.73	947.295	8:35 AM	
4-DB	977.80	30.36	947.44	8:40 AM	
5-SG	970.69	20.52	950.17	4:30 PM	
5-SB	970.005	22.11	947.895	4:25 PM	
6-SG	969.73	20.55	949.18	8:50 AM	
6-WB	969.81	22.83	946.98	9:AM	
6-SB	969.77	22.44	947.33	8:55 AM	
7-SG	963.905	15.77	948.18	2:50 PM	
7-WB	963.635	16.44	947.195	2:45 PM	
7-SB	962.88	15.68	947.20	2:40 PM	

WW Engineering & Science, Inc.
Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ARCS-Albion/Sheriden LF
Job Description: Water levels
Project No.: 04011.02
Date: 1-28-93

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
8-SG	980.58	24.52	956.06	11:00 AM	OVERCAST
8-WB	980.93	33.51	947.42	11:05 AM	
8-SB	981.83	34.52	947.31	11:10 AM	
9-SG	959.47	12.45	947.02	9:45 AM	
9-WB	959.48	12.45	947.03	9:50 AM	
9-SB	960.06	12.77	947.29	9:55 AM	
LF-1	985.95	36.39	949.56	2:05 PM	
LF-2	976.77	19.88	956.89	2:00 PM	
LF-3	983.52	34.92 Dry	948.60	8:45 AM	
MW-10	949.98	3.63	946.26	3:10 PM	
MW-11	949.13	4.39	944.74	3:00 PM	
MW-12	950.57	3.52	947.05	3:05 PM	
MW-13	949.49	3.08	946.41	3:25 PM	
		TJT 2/1/93	TJT 2/1/93		
S.G.W	943.26=10.00	10.45	943.71	2:55 PM	
S.G.E	945.07=17.00	17.28	945.35	4:15 PM	
DNR MW-2	985.16	37.62	947.54	3:30 PM	M.C.
DNR MW-4	984.47	36.68	947.79	3:45 PM	M.C.

W Engineering & Science, Inc.
Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ARCS-Albion/Sheriden LF Job Description: Water levels
Project No.: 04011.02
Date: 1-28-93 Round 18

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
1-SG	982.36	32.13	950.23	2:15 PM	OVERCAST
1-WB	982.28	32.39	949.81	2:20 PM	
1-SB	982.20	32.52	949.68	2:10 PM	
2-SG	977.93	27.51	950.42	2:35 PM	
2-WB	977.325	27.30	950.025	2:30 PM	
2-SB	977.62	27.85	949.77	2:25 PM	
3-SG	978.875	31.09	947.785	8:15 AM	
3-WB	978.65	31.32	947.33	8:20 AM	
3-SB	978.145	30.77	947.375	8:10 AM	
4-SG	978.03	30.70	947.33	8:25 AM	— WB
4-WB	977.73	30.41	947.32	8:30 AM	— SB1
4-SB	978.025	30.73	947.295	8:35 AM	— SB2
4-DB	977.80	30.36	947.44	8:40 AM	
5-SG	970.69	20.52	950.17	4:30 PM	
5-SB	970.005	22.11	947.895	4:25 PM	
6-SG	969.73	20.55	949.18	8:50 AM	
6-WB	969.81	22.83	946.98	9:AM	
6-SB	969.77	22.44	947.33	8:55 AM	
7-SG	963.905	15.77	948.18	2:50 PM	
7-WB	963.635	16.44	947.195	2:45 PM	
7-SB	962.88	15.68	947.20	2:40 PM	

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Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ARCS-Albion/Sheriden LF Job Description: Water levels
Project No.: 04011.02
Date: 1-28-93

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
8-SG	980.58	24.52	956.06	11:00 AM	OVERCAST
8-WB	980.93	33.51	947.42	11:05 AM	
8-SB	981.83	34.52	947.31	11:10 AM	
9-SG	959.47	12.45	947.02	9:45 AM	
9-WB	959.48	12.45	947.03	9:50 AM	
9-SB	960.06	12.77	947.29	9:55 AM	
LF-1	985.95	36.39	949.56	2:05 PM	
LF-2	976.77	19.88	956.89	2:00 PM	This is also dry. there may be a small amount of water in the end cap of well.
LF-3	983.52	34.92 Dry	~~948.60~~	8:45 AM	
MW-10	949.98	3.63	946.26	3:10 PM	
MW-11	949.13	4.39	944.74	3:00 PM	
MW-12	950.57	3.52	947.05	3:05 PM	
MW-13	949.49	3.08	946.41	3:25 PM	
		TJT 2/1/93	TJT 2/1/93		
S.G.W	943.26=10.00	10.45	943.71	2:55 PM	
S.G.E	945.07=17.00	17.28	945.35	4:15 PM	
DNR MW-2	985.16	37.62	947.54	3:30 PM	M.C. ? why only 2 ?
DNR MW-4	984.47	36.68	947.79	3:45 PM	M.C.

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Water Level and Field Record Form

Client: ARCS-Albion/Sheriden LF Job Description: Water levels
Project No.: 04011.02
Date: 1-28-93

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1-WB	982.20	32.39	949.81	2:20 PM	
1-SB	982.20	32.52	949.68	2:10 PM	
2-SG	977.93	27.51	950.42	2:35 PM	
2-WB	977.325	27.30	950.025	2:30 PM	
2-SB	977.62	27.85	949.77	2:25 PM	
3-SG	978.875	31.09	947.785	8:15 AM	
3-WB	978.65	31.32	947.33	8:20 AM	
3-SB	978.145	30.77	947.375	8:10 AM	
4-SG	978.03	30.70	947.33	8:25 AM	
4-WB	977.73	30.41	947.32	8:30 AM	
4-SB	978.025	30.73	947.295	8:35 AM	
4-DB	977.80	30.36	947.44	8:40 AM	
5-SG	970.69	20.52	950.17	4:30 PM	
5-SB	970.005	22.11	947.895	4:25 PM	
6-SG	969.73	20.55	949.18	8:50 AM	
6-WB	969.81	22.83	946.98	9:AM	
6-SB	969.77	22.44	947.33	8:55 AM	
7-SG	963.905	15.77	948.18	2:50 PM	
7-WB	963.635	16.44	947.195	2:45 PM	
7-SB	962.88	15.68	947.20	2:40 PM	

WW Engineering & Science, Inc.
Environmental Services Division
Field Services Group

Water Level and Field Record Form

Client: ARCS-Albion/Sheriden LF
Job Description: Water levels
Project No.: 04011.02
Date: 1-28-93

Well No.	Elevation Top Of Casing (T.O.C.)	Depth To Water Below T.O.C.	Elevation of Water	Time of Meas.	Remarks (weather, etc.)
8-SG	980.58	24.52	956.06	11:00 AM	OVERCAST
8-WB	980.93	33.51	947.42	11:05 AM	
8-SB	981.83	34.52	947.31	11:10 AM	
9-SG	959.47	12.45	947.02	9:45 AM	
9-WB	959.48	12.45	947.03	9:50 AM	
9-SB	960.06	12.77	947.29	9:55 AM	
LF-1	985.95	36.39	949.56	2:05 PM	
LF-2	976.77	19.88	956.89	2:00 PM	
LF-3	983.52	34.92 Dry	948.60	8:45 AM	
MW-10	949.98	3.63	946.26	3:10 PM	
MW-11	949.13	4.39	944.74	3:00 PM	
MW-12	950.57	3.52	947.05	3:05 PM	
MW-13	949.49	3.08	946.41	3:25 PM	
S.G.W	943.26=10.00	.45	933.71	2:55 PM	
S.G.E	945.07=17.00	17.28	945.35	4:15 PM	
DNR MW-2		37.62		3:30 PM	M.E.
DNR MW-4		36.68		3:45 PM	M.C.

FIELD DATA SAMPLING FORM

CLIENT ALBION LANDFILL ARCS

PROJECT NO. 04011.02

DATE FEB / 4 /199~~2~~3

MONITORING WELL MW 10

GENERAL

SAMPLED BY CHRISTENSEN K. OSTERMAN

WEATHER & CONDITONS CLEAR 40°±

WITNESSES NONE

WATER LEVEL MEASUREMENT

DEPTH OF WELL ~~3.65~~ 8 FEET

DEPTH OF WATER FROM TOC 3.65 FEET

DATE & TIME MEASURED 2 / 4 /199~~2~~3 12:00 ~~AM PM~~ NOON

METHOD USED TO MEASURE ELECTRIC TAPE

SS TAPE

PURGE

HEIGHT OF WATER COLUMN 4.35 FEET

3 CASING VOLUMES

2" WELL * .49 2.1 GALS

4" WELL * 1.96 — GALS

VOLUME PURGED BEFORE SAMPLING 4 GALS

APPEARANCE OF PURGE WATER CLOUDY

SAMPLING

DATE & TIME SAMPLED 2 / 4 /199~~2~~3 12:00 ~~AM PM~~ NOON

METHOD USED TO SAMPLED (T. BAILER) KECK PUMP SUB. PUMP

APPEARANCE OF SAMPLE CLOUDY

SAMPLE BOTTLES FILLED

2 - 40 ML VIALS

___ - ___ ML PLASTIC-NON PRES.

___ - ___ ML PLASTIC-NUTRIENTS

___ - ___ ML PLASTIC-METALS FILTERED Y OR N

___ - ___ ML PLASTIC-CYANIDS

___ - ___ ML

___ - ___ ML

FIELD MEASUREMENTS

MEASURED CONDUCTIVITY .476 .473 .494 CORRECTED x673 x670 x698 Ave = 680

TEMPERATURE OF SAMPLE 9.7

STANDARDIZED PH METER YES MEASURED PH BUFFER #7 = 7.02

MEASURED PH OF SAMPLE _____ TEMP. BELOW

COMMENTS

Ph 7.87 TEMP 8.20 Eh -022.1

Ph 7.83 TEMP 8.40 Eh -022.3

Ph 7.82 TEMP 8.50 Eh -022.1

Ave 7.84 -22.2

FIELD DATA SAMPLING FORM

CLIENT ARCS ALBION

PROJECT NO. 04011.02

DATE 2 / 4 /1993

MONITORING WELL MW11

GENERAL

SAMPLED BY CHRISTENSEN K. OSTERMAN

WEATHER & CONDITONS CLEAR 40°+

WITNESSES NONE

WATER LEVEL MEASUREMENT

DEPTH OF WELL 8.0 FEET

DEPTH OF WATER FROM TOC 4.65 FEET

DATE & TIME MEASURED ~~1/15~~ 2 / 4 /1992 1:45 AM (PM)

METHOD USED TO MEASURE ELECTRIC TAPE

SS TAPE

PURGE

HEIGHT OF WATER COLUMN 3.35 FEET

3 CASING VOLUMES

2" WELL * .49 1.64 GALS

4" WELL * 1.96 _____ GALS

VOLUME PURGED BEFORE SAMPLING 6 GALS

APPEARANCE OF PURGE WATER CLOUDY

SAMPLING

DATE & TIME SAMPLED 2 / 4 /1993 1:45 AM (PM)

METHOD USED TO SAMPLED (T. BAILER) KECK PUMP SUB. PUMP

APPEARANCE OF SAMPLE CLOUDY

SAMPLE BOTTLES FILLED

2 - 40 ML VIALS

_____ - _____ ML PLASTIC-NON PRES.

_____ - _____ ML PLASTIC-NUTRIENTS

_____ - _____ ML PLASTIC-METALS FILTERED Y OR N

_____ - _____ ML PLASTIC-CYANIDS

_____ - _____ ML

_____ - _____ ML

FIELD MEASUREMENTS

MEASURED CONDUCTIVITY _____ CORRECTED SEE BELOW

TEMPERATURE OF SAMPLE _____

STANDARDIZED PH METER YES MEASURED PH BUFFER #7 = 7.02

MEASURED PH OF SAMPLE _____ TEMP. _____

COMMENTS

Eh	128.0	Ph	7.47	TEMP	8.3	CORRECTED CONDUCTIVITY	603	TEMP 8.9
Eh	120.2	Ph	7.46	TEMP	8.1		609	8.9
Eh	123.7	Ph	7.42	TEMP	8.3		603	8.9
Ave	~~120~~ 124.0		7.45		8.2		605	

FIELD DATA SAMPLING FORM

CLIENT ARCS - ALBION

PROJECT NO. 04011.02

DATE 2 / 4 /1993

MONITORING WELL 11 DUPLICATE

GENERAL

SAMPLED BY CHRISTENSEN K. OSTERMAN

WEATHER & CONDITONS CLEAR 40°+

WITNESSES NONE

WATER LEVEL MEASUREMENT

DEPTH OF WELL 8.0 FEET

DEPTH OF WATER FROM TOC 4.65 FEET

DATE & TIME MEASURED 2 / 4 /1993 1:45 AM PM

METHOD USED TO MEASURE ELECTRIC TAPE

SS. TAPE

PURGE

HEIGHT OF WATER COLUMN 3.35 FEET

3 CASING VOLUMES

2" WELL * .49 1.64 GALS

4" WELL * 1.96 GALS

VOLUME PURGED BEFORE SAMPLING 6 GALS

APPEARANCE OF PURGE WATER CLOUDY

SAMPLING

DATE & TIME SAMPLED 2 / 4 /1993 1:45 AM PM

METHOD USED TO SAMPLED T. BAILER KECK PUMP SUB. PUMP

APPEARANCE OF SAMPLE CLOUDY

SAMPLE BOTTLES FILLED

2 - 40 ML VIALS

- ML PLASTIC-NON PRES.

- ML PLASTIC-NUTRIENTS

- ML PLASTIC-METALS FILTERED Y OR N

- ML PLASTIC-CYANIDS

- ML

- ML

FIELD MEASUREMENTS

MEASURED CONDUCTIVITY BELOW CORRECTED SEE BELOW

TEMPERATURE OF SAMPLE BELOW

STANDARDIZED PH METER YES MEASURED PH BUFFER #7 = 7.02

MEASURED PH OF SAMPLE _____ TEMP. BELOW

COMMENTS

			CORRECTED		
Eh 142.8	Ph 7.48	Temp 10.3	COND. 662	Temp	10.5
144.0	7.42	10.3	622		10.5
144.6	7.40	10.5	612		10.5

FIELD DATA SAMPLING FORM

CLIENT ARCS Albion

PROJECT NO. 04011.02

DATE 2 / 3 /1993

MONITORING WELL 12 ms|msd

GENERAL

SAMPLED BY K. OSTERMAN

WEATHER & CONDITONS Sunny 30°

WITNESSES NONE

WATER LEVEL MEASUREMENT

DEPTH OF WELL 8.1 FEET

DEPTH OF WATER FROM TOC 3.88 FEET

DATE & TIME MEASURED 2 / 3 /1993 900 (AM) PM

METHOD USED TO MEASURE ELECTRIC TAPE

PURGE

HEIGHT OF WATER COLUMN 4.22 FEET

3 CASING VOLUMES

2" WELL * .49 2.07 GALS

4" WELL * 1.96 GALS

VOLUME PURGED BEFORE SAMPLING 15.0 GALS

APPEARANCE OF PURGE WATER silty.

SAMPLING

DATE & TIME SAMPLED 2 / 3 /1993 1000 (AM) PM

METHOD USED TO SAMPLED (T. BAILER) KECK PUMP SUB. PUMP

APPEARANCE OF SAMPLE silty

SAMPLE BOTTLES FILLED

see Btl. List

10 - 40 ML VIALS

- ML PLASTIC-NON PRES.

- ML PLASTIC-NUTRIENTS

- ML PLASTIC-METALS FILTERED (Y) OR N

- ML PLASTIC-CYANIDS

- ML

- ML

FIELD MEASUREMENTS

MEASURED CONDUCTIVITY _____ CORRECTED See below

TEMPERATURE OF SAMPLE _____

STANDARDIZED PH METER (YES) MEASURED PH BUFFER #4 = 4.00 10-10.01

MEASURED PH OF SAMPLE see below TEMP. _____

COMMENTS

pH 7.53	Temp 6.4	uncorrect Cond - ~~.244~~ .378	Temp 6.4
pH 7.45	Temp 6.3	Cond - .391	Temp 6.4
pH 7.68	Temp 6.4	Cond - .389	Temp 6.4

Eh

598.69

FIELD DATA SAMPLING FORM

CLIENT ARCS- Albion

PROJECT NO. 04011.02

DATE 2 / 3 /1993

MONITORING WELL 13

GENERAL

SAMPLED BY CHRISTENSEN K. OSTERMAN

WEATHER & CONDITONS Sunny 40°

WITNESSES None

WATER LEVEL MEASUREMENT

DEPTH OF WELL 8.0 FEET

DEPTH OF WATER FROM TOC 3.05 FEET

DATE & TIME MEASURED 2 / 3 /1993 2:00 AM (PM)

METHOD USED TO MEASURE ELECTRIC TAPE

PURGE

HEIGHT OF WATER COLUMN 4.95 FEET

3 CASING VOLUMES

2" WELL * .49 2.42 GALS

4" WELL * 1.96 ____ GALS

VOLUME PURGED BEFORE SAMPLING 5.0 GALS

APPEARANCE OF PURGE WATER Silty

SAMPLING

DATE & TIME SAMPLED 2 / 3 /1993 2:30 AM (PM)

METHOD USED TO SAMPLED (T. BAILER) KECK PUMP SUB. PUMP

APPEARANCE OF SAMPLE Silty

SAMPLE BOTTLES FILLED

see BL List.

2 - 40 ML VIALS

____ - ____ ML PLASTIC-NON PRES.

____ - ____ ML PLASTIC-NUTRIENTS

____ - ____ ML PLASTIC-METALS FILTERED Y OR N

____ - ____ ML PLASTIC-CYANIDS

____ - ____ ML

____ - ____ ML

FIELD MEASUREMENTS

MEASURED CONDUCTIVITY ____ CORRECTED See below

TEMPERATURE OF SAMPLE ____

STANDARDIZED PH METER YES MEASURED PH BUFFER #4 = 4.00

MEASURED PH OF SAMPLE See below TEMP. ____

COMMENTS

			Corrected		
PH 7.36	Temp	9.9	Cond. .631	Temp	9.9
PH 7.33	Temp	9.9	Cond. .621	Temp	9.9
PH 7.38	Temp	10.10	Cond. .642	Temp	10.10
Ave 7.36			.631		

FIELD DATA SAMPLING FORM

CLIENT_____

PROJECT NO._____

DATE_____/_____/1992 _

MONITORING WELL_____

GENERAL

SAMPLED BY K. OSTERMAN
WEATHER & CONDITONS _____
WITNESSES _____

WATER LEVEL MEASUREMENT

DEPTH OF WELL _____FEET
DEPTH OF WATER FROM TOC _____FEET
DATE & TIME MEASURED _____/_____/1992 _____AM PM
METHOD USED TO MEASURE ELECTRIC TAPE

PURGE

HEIGHT OF WATER COLUMN _____FEET
3 CASING VOLUMES
2" WELL * .49 _____GALS
4" WELL * 1.96 _____GALS
VOLUME PURGED BEFORE SAMPLING _____GALS
APPEARANCE OF PURGE WATER _____

SAMPLING

DATE & TIME SAMPLED _____/_____/1992 _____AM PM
METHOD USED TO SAMPLED T. BAILER KECK PUMP SUB. PUMP
APPEARANCE OF SAMPLE _____
SAMPLE BOTTLES FILLED
__2__-__40__ML VIALS
_____-_____ML PLASTIC-NON PRES.
_____-_____ML PLASTIC-NUTRIENTS
_____-_____ML PLASTIC-METALS FILTERED Y OR N
_____-_____ML PLASTIC-CYANIDS
_____-_____ML
_____-_____ML

FIELD MEASUREMENTS

MEASURED CONDUCTIVITY _____ CORRECTED _____
TEMPERATURE OF SAMPLE _____
STANDARDIZED PH METER YES MEASURED PH BUFFER #7 =____
MEASURED PH OF SAMPLE _____TEMP._____

COMMENTS

_____
_____
_____
_____

WW Engineering & Science, Inc.
Environmental Services Division

Water Level and Field Record Form

Client: ARCS-Albion Sheridan L.F. Job Description: Water levels
Project No.: 04011.02
Date: 12/22/92 Round 1A

Well No.	(a) Elevation Top of Casing (T.O.C.)	(b) Point Held On Tape (ft.)	(c) Distance Wet On Tape	(d) Depth To Water Below T.O.C. (b-c)	(e) Elevation Of Water (a-d)	Time of Meas.	Remarks (weather, etc.)
1-SG	982.36'	Elec. W.L.	Indicator	32.56'	949.80'	PM	
1-WB	982.20'	Self-reading		32.97'	949.23'		
1-SB	982.26'			33.01'	949.19'		
2-SG	977.93'			27.90'	950.03'		
2-WB	977.325'			27.75'	949.575'		
2-SB	977.62'			28.35'	949.27'		
3-SG	978.575'			31.65'	947.225'		
3-WB	978.65'			31.46'	947.19'		
3-SB	978.145'			31.07'	947.075'		
4-SG	978.03'			30.96'	947.07'		
4-WB	977.73'			30.59'	947.14'		
4-SB	978.025'			30.92'	947.105'		
4-DB	977.80'			30.69'	947.11'		
5-SG	970.69'			21.00'	949.69'		
5-SB	970.005'			22.53'	947.475'		
6-SG	969.73'			21.33'	948.40'		
6-WB	969.81'			23.20'	946.61'		
6-SB	969.77'			22.83'	946.94'		
7-SG	963.905'			16.28'	947.625'		
7-WB	963.635'			16.70'	946.935'		
7-SB	962.88'			15.97'	946.91'		
8-SG	980.58'			23.98'	956.60'		
8-WB	980.93'			33.44'	947.49'		
8-SB	981.83'			34.77'	947.06'		
9-SG	959.47'			12.75'	946.72'		
9-WB	959.48'			12.72'	946.76'		
9-SB	960.06'			13.08'	946.98'		
LF-1	985.95'			36.85'	949.1'		
LF-2	976.77'			Dry > 20.1'	< 956.67		
LF-3	983.52'			Dry > 35.0'	< 948.5		

Well Sampling
Field Record Form

Client ARCS - Albion
Project No. 04011.02
Date 12/92

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

1	Well Identification	1-SG	1-WB	1-SB	2-SG	2-WB	2-SB	3-SG	3-WB
	Casing Size	2"	2"	2"	2"	2"	2"	2"	2"
	Cap Type (Footnote A)	1	1	1	1	1	1	1	1
2	Well Depth	40.0'	61.5'	75.0'	37.5'	55.5'	67.5'	46.5'	61.5'
	Gallonage of Prime H_2O Used	—	—	—	—	—	—	—	—
	Purge Method	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer
	Purge Rate	—	—	—	—	—	—	—	—
	Purge Time	9:30 A	9:15 A	12:00 P	11:00 A	9:20 A	10:00 A	11:00 A	11:00 A
	Purge Duration	—	—	—	—	—	—	—	—
4 5	Volume Purged	5.0	16.0	30.0	5.5	18.0	21.0	8.0	15.0
3	Depth to Water Level	32.57'	32.98'	33.01'	27.92'	27.75'	28.36'	31.66'	31.48'
	Depth to Liquid Level	"	"	"	"	"	"	"	"
	Floating Product (Y or N)	N	N	N	N	N	N	N	N
	Floating Product Sampling Method	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Water Sampling Method	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer
Skip	Time of Sampling	10:10 A	10:30 A	1:40 P	2:30 P	9:20 A	2:20 P		
Keep 6	~~Quantity of Sample~~ DATE SAMPLED:	12/10/92	12/10/92	12/10/92	12/7/92	12/8/92	12/8/92	12/17/92	12/17/92
	Type of Preservative (Footnote B)	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
	Field Filtering (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y
7	pH	7.14	7.17	7.09	7.82	6.66	6.43	6.70	6.90
8	Conductivity	69.3	1,106	910	449	878	949	1,474	1,487
9	Sample Temperature (°F)	13.6°	13.4°	15.2°	9.9°	14.4°	12.1°	11.5°	11.1°
	Ambient Temperature (°F)	30°	30°	30°	32°	30°	30°	38°	38°
	Turbidity	Silty/Br.	Cloudy/Gr.	Clear	Silty/Br.	Cloudy/Gr.	Clear	Silty/Br.	Cloudy/Gr.
10	~~Dissolved Oxygen (mg/l)~~ EH (mV)	231.9	53.9	10.6	209.1	231.8	66.7	132.5	23.3

Observers to the Event Bob Delaney - DNR (12/15/92)
Type and Color of Sample Containers Plastic/Amber glass, 40ml clear vials
Equipment Decontamination Procedures Steam clean bailers, TSP wash/DI rinse Filter pump
Disposal Method of Purge Water Background wells - on ground; All other water to disposal tank.
Split Samples With N/A
Field Observations

Sampled By (ESD Personnel) Dudley Pierce, Pat Graves, Cathie Cotton, Bill Pushaw, Mark Nederveld, Mark Christensen

Footnote A:
1. Standard Threaded Cap OR "J" plug
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

Well Sampling
Field Record Form

Client ARCS-Albion
Project No. 04011.02
Date 12/92

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

Well Identification	3-SB	4-SG	4-WB	4-SB	4-DB	5-SG	5-SB	6-SG
Casing Size	2"	2"	2"	2"	2"	2"	2"	2"
Cap Type (Footnote A)	1	1	1	1	1	1	1	1
Well Depth approx (below TOC)	67.5'	39.0'	63.5'	75.5'	102.5'	30.5'	78.0'	30.5'
Gallonage of Prime H_2O Used	—	—	—	—	—	—	—	—
Purge Method	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer
Purge Rate	—	—	—	—	—	—	—	—
Purge Time	11:00 A	11:45 A	8:30 A	10:00 A	1:30 P	11:15 A	10:30 A	9:30 A
Purge Duration	—	—	—	—	—	—	—	—
Volume Purged (Gal.)	20.0	4.0	16.0'	23.0'	35.0	6.0	37.0	5.0
Depth to Water Level	31.08'	30.98'	30.61'	30.93'	30.70'	21.01'	22.55'	21.34'
Depth to Liquid Level	"	"	"	"	"	"	"	"
Floating Product (Y or N)	N	N	N	N	N	N	N	N
Floating Product Sampling Method	—	—	—	—	—	—	—	—
Water Sampling Method	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer
Time of Sampling		12:00 P	9:00 A	10:35 A	2:10 P	11:40 A	11:15 A	10:00 A
~~Quantity of Sample~~ DATE	12/17/92	12/16/92	12/16/92	12/16/92	12/16/92	12/9/92	12/9/92	12/15/92
Type of Preservative (Footnote B)	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
Field Filtering (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y
pH	6.96	6.95	7.13	6.99	7.30	7.41	7.19	7.09
Conductivity	964	479	1,167	1,696	724	681	725	395
Sample Temperature (°F)	12.6°	12.4°	13.5°	12.5°	9.9	14.5°	13.3°	14.4°
Ambient Temperature (°F)	35°	35°	35°	35°	35°	32°	32°	30°
Turbidity	Clear	Silty/Br.	Cloudy/Gr.	Clear	Clear	Silty/Br.	Clear	Silty/Br.
~~Dissolved Oxygen (mg/l)~~ EH (mV)	79.7	134.9	49.4	-26.6	68.4	133.8	26.0	109.7

Observers to the Event Bob Delaney-DNR (12/15/92)
Type and Color of Sample Containers Plastic, Amber Glass, 40 ml Clear Vials
Equipment Decontamination Procedures Steam clean bailers, TSP wash/DI Rinse Filter Pump.
Disposal Method of Purge Water All water collected in disposal/waste water tank.
Split Samples With N/A
Field Observations

Sampled By (ESD Personnel) Dudley Pierce, Pat Graves, Cathie Cotton, Bill Pushaw, Mark Nederveld, Mark Christensen

Footnote A:
1. Standard Threaded Cap — "J" Plug
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

Well Sampling
Field Record Form

Client ARCS-Albion
Project No. 04011.02
Date 12/92

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

Well Identification	6-WB	6-SB	7-SG	7-WB	7-SB	8-SG	8-WB	8-SB
Casing Size	2"	2"	2"	2"	2"	2"	2"	2"
Cap Type (Footnote A)	1	1	1	1	1	1	1	1
Well Depth	53.5'	77.5'	22.5'	49.5'	62.5'	33.5'	60.5'	72.5'
Gallonage of Prime H_2O Used	—	—	—	—	—	—	—	—
Purge Method	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer
Purge Rate	—	—	—	—	—	—	—	—
Purge Time	12:15 P	1:15 P	9:00 A	9:00 A	10:00 A	1:45 P	11:00 A	9:00 A
Purge Duration	—	—	—	—	—	—	—	—
Volume Purged	18.0	30.0	5.0	18.0	25.0	4.0	15.0	18.0
Depth to Water Level	23.21'	22.83'	16.31'	16.72'	15.98'	24.00'	33.45'	34.77
Depth to Liquid Level	"	"	"	"	"	"	"	"
Floating Product (Y or N)	N	N	N	N	N	N	N	N
Floating Product Sampling Method	—	—	—	—	—	—	—	—
Water Sampling Method	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer	T.Bailer
Time of Sampling	1:10 P	2:00 P	11:40 A		12:00 P	2:05 P	11:30 A	9:50 A
Quantity of Sample	12/9/92	12/9/92	12/22/92	12/22/92	12/21/92	12/15/92	12/15/92	12/15/92
Type of Preservative (Footnote B)	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
Field Filtering (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y
pH	7.29	7.05	7.13	7.58	7.32	8.10	7.87	7.24
Conductivity	1,059	1,147	1,197	580	794	277	357	989
Sample Temperature (°F)	13.0°	12.3°	9.5°	10.9°	11.4°	11.8°	10.9°	7.0°
Ambient Temperature (°F)	32°	32°	38°	38°	38°	30°	30°	30°
Turbidity	Cloudy/Gr.	Clear	Silty/Br.	Cloudy/Gr.	Clear	Silty/Br.	Cloudy/Gr.	Clear
Dissolved Oxygen (mg/l)	42.2	38.9	234.7	199.0	182.0	150.1	105.2	89.8

Observers to the Event Bob Delaney - DNR (12/15/92)
Type and Color of Sample Containers Plastic, Amber glass, 40 ml clear vials
Equipment Decontamination Procedures Steam clean bailers, TSP wash/DI Rinse Filter pump
Disposal Method of Purge Water Background wells - on ground; all other purge H_2O in disposal tank
Split Samples With N/A
Field Observations

Sampled By (ESD Personnel) Dudley Pierce, Pat Graves, Cathie Cotton, Bill Pushaw, Mark Nederveld
Mark Christensen

Footnote A:
1. Standard Threaded Cap
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

Well Sampling
Field Record Form

Client ARCS-Albion
Project No. 04011.02
Date 12/92

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

Well Identification	9-SG	9-WB	9-SB	LF-1				
Casing Size	2"	2"	2"	2"				
Cap Type (Footnote A)	1	1	J Plug	1				
Well Depth ~approx/Below TOC	20.5'	50.5'	62.5'	37.5'				
Gallonage of Prime H_2O Used	—	—	—	—				
Purge Method	T.Bailer	T.Bailer	T.Bailer	T.Bailer				
Purge Rate	—	—	—	—				
Purge Time	1:00 P	9:30 A	9:30 A	10:15 A				
Purge Duration	—	—	—	—				
Volume Purged	4.0	20.0	25.0	1.0				
Depth to Water Level	12.75'	12.73'	13.10'	36.83'				
Depth to Liquid Level	"	"	"	"				
Floating Product (Y or N)	N	N	N	N				
Floating Product Sampling Method	—	—	—	—				
Water Sampling Method	T.Bailer	T.Bailer	T.Bailer	T.Bailer				
Time of Sampling		10:00 A	10:15 A	11:30 A				
~~Quantity of Sample~~ DATE	12/22/92	12/21/92	12/15/92	12/16/92				
Type of Preservative (Footnote B)	1-5	1-5	1-5	1,4				
Field Filtering (Y or N)	Y	Y	Y	Y				
pH	7.71	7.45	7.14	7.08				
Conductivity	476	985	1,235	11,203				
Sample Temperature (°F)	12.8	11.3°	13.9°	11.9°				
Ambient Temperature (°F)	35°	38°	30°	38°				
Turbidity	Silty/Br.	Cloudy/Gr.	Clear	Little Cloudy				
~~Dissolved Oxygen (mg/l)~~ EH (mV)	192.7	78.9	65.4	-49.7				

Observers to the Event Bob Delaney-DNR (12/15/92)
Type and Color of Sample Containers Plastic, Amber Glass 40ml clear vials
Equipment Decontamination Procedures Steam clean bailers, TSP wash/DI Rinse Filter Pump.
Disposal Method of Purge Water All water collected in disposal/waste water tank.
Split Samples With N/A
Field Observations

Sampled By (ESD Personnel) Dudley Pierce, Pat Graves, Cathie Cotton, Bill Pushaw, Mark Nederveld, Mark Christensen

Footnote A:
1. Standard Threaded Cap - or
2. Vented Threaded Cap J Plug
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

Well / Boring Log Management System Submittal Form

(Please complete the following carefully. Your entries will be used to enter your logs into the well log managment system)

Project number: 04011.02

Client name: Albion

Are all the logs attached to this sheet located in the same:

county:	☒ Yes	☐ No
township:	☒ Yes	☐ No
fraction:	☐ Yes	☒ No
section:	☒ Yes	☐ No

Date and time needed (approximately): ~2/24

Have all of the logs been reviewed for completeness:

☒ **Yes** ☐ No

Is there a USCS symbol designated for every description:

☒ **Yes** ☐ No

Survey origin is **survey / witness.** *(circle one)*

Will the well / boring data be cross referenced with an analytical database?

☒ Yes ☐ No

Do you want these logs committed to the permanent database at this time?

☐ Yes ☒ **No**

Do you want to review the output files before the logs are committed to the permanent database?

☒ **Yes** ☐ No

Do you want the original logs entered or a set of marked up copies?

☐ Originals ☒ **Copies**

Will more information be entered later (such as survey information)?

☐ Yes ☒ No

Do you want an electronic copy of the output file?

☐ Yes ☒ **No**

Was the same contractor used for all the well / borings?

☐ Yes ☒ No

How do you want the contractor(s) name and address lines completed:

Contractor 1 Name:
Address:

Contractor 2 Name:
Address:

Additional Notes: Global "Concrete Cap"

Project manager: Liz Uhl

Logs submitted to data management staff by: Jeff Cargill **Date:** 2/22/93

Well / Boring Log Management System Submittal Form

(Please complete the following carefully. Your entries will be used to enter your logs into the well log managment system)

Project number: 04011.02

Client name: Albion

Are all the logs attached to this sheet located in the same:

county:	☒ Yes	☐ No
township:	☒ Yes	☐ No
fraction:	☐ Yes	☒ No
section:	☒ Yes	☐ No

Date and time needed (approximately): 2/12

Have all of the logs been reviewed for completeness:

☒ **Yes** ☐ No

Is there a USCS symbol designated for every description:

☒ **Yes** ☐ No

Survey origin is **survey / witness.** *(circle one)*

Will the well / boring data be cross referenced with an analytical database?

Had much time

☒ Yes ☐ No

Do you want these logs committed to the permanent database at this time?

☐ Yes ☒ **No**

Do you want to review the output files before the logs are committed to the permanent database?

☒ **Yes** ☐ No

Do you want the original logs entered or a set of marked up copies?

☐ Originals ☒ **Copies**

Will more information be entered later (such as survey information)?

☐ Yes ☒ No

Do you want an electronic copy of the output file?

☐ Yes ☒ **No**

Was the same contractor used for all the well / borings?

~~☒ Yes~~ ☒ No

MW-10, 11, 12 + 13 are different

How do you want the contractor(s) name and address lines completed:

Contractor 1 Name:

Address:

Contractor 2 Name:

Address:

(1) PID/FID TITLES SHOULD HAVE (ppm) ADDED WHERE THEY OCCUR

Additional Notes: MW-9 WB + MW-9SB will arrive by 2/9/93

(2) GLOBAL - REPLACE DASH IN WELL NAME WITH Ø

Project manager: Liz Uhl

Logs submitted to data management staff by: Jeff Cargill **Date:** 2/8/93

Well / Boring Log Management System Submittal Form

(Please complete the following carefully. Your entries will be used to enter your logs into the well log managment system)

Project number: 04011.02

Client name: ALBION - SHERIDAN TWP LF

Are all the logs attached to this sheet located in the same:

county:	☐ Yes	☒ No
township:	☐ Yes	☒ No
fraction:	☐ Yes	☒ No
section:	☐ Yes	☒ No

Date and time needed (approximately): 1/13 PM

Have all of the logs been reviewed for completeness:

☒ **Yes** ☐ No

Is there a USCS symbol designated for every description:

☐ **Yes** ☒ No

Survey origin is **survey / witness.** *(circle one)*

Will the well / boring data be cross referenced with an analytical database?

☒ Yes ☐ No

Do you want these logs committed to the permanent database at this time?

☐ Yes ☒ No

Do you want to review the output files before the logs are committed to the permanent database?

☒ **Yes** ☐ No

Do you want the original logs entered or a set of marked up copies?

☐ Originals ☒ **Copies**

Will more information be entered later (such as survey information)?

☒ Yes ☐ No

Do you want an electronic copy of the output file?

☐ Yes ☒ **No**

Was the same contractor used for all the well / borings?

☒ Yes ☐ No

How do you want the contractor(s) name and address lines completed:

Contractor 1 Name: R&R INTERNATIONAL, INC.
Address: 1234 CLEVELAND, MASSILON Road
AKron, OH 44321

Contractor 2 Name:
Address:

Additional Notes: Please use following format for all well log id #'s: "MW-55G". Feel free to ask questions.

Project manager: LIZ UHL

Logs submitted to data management staff by: RICK TRIPPEL **Date:** 1-8-93

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW # 1 SG
Client: Arcs Albion
Project No.: # 04011.02
Date: Started: 10/22/92 Finished: 10/22/92
Time: Started: 3:30p Finished: 5:40p

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R
Address:
Location: 4642 E + 7158 N

Equipment: CME 750
Crew Chief: ED PUCCI
WW Supervisor: DON JOHNSON

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-38'

Grouting/Seal

Depth/To	Material/Method
— See Reverse Side —	

Remarks:

Water Level: 30.0 ft. Below Surface

See MW # 1 SB Log.

~~Thickness (feet)~~	~~Depth to base (feet)~~	USCS	Lithologic Description
			GRASS, Top Soil
			Note
2.0'-4.0'			Clay Fill material (well mixed)
10'-11'			SAND fine to V. fine - TAN - Dry
11.-11.1'			COAL
11.1'	12'		SAND - fine to V. fine - lt. brown - Dry
26'	28'		SAND - fine to V. fine - lt. brown - Dry

Sample Depth	Blow Counts 6"	12"	18"	24"	OVM PID Headspace	~~Background~~ RS Spec
2'-4'	6	5	6	9		Ø
10'-12'	14	18	19	21		Ø
18'-20'	11	15	19	19		Ø
26'-28'	10	42	42	109/5"		Ø

WW Engineering & Science
Environmental Services Division

Project Name: ARCS- Albion Sheridan Twp. Landfill

Project No: 04011.02

Log of Well Installation

Well Number: MW#1 SG

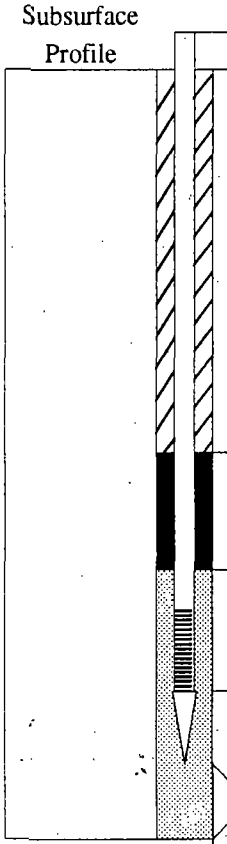
Top of Casing Elevation (feet): 982.36

Ground Surface Elevation (feet): 979.9'

Water Level Data

Date	Water Level Below TOC
10/26/92	Predevelopment: 32.73'
11/20/92	Postdevelopment: 32.74'
12/10/92	Stable: 32.57'

Generalized Subsurface Profile



2.9' Length of Casing Above Ground Surface

Concrete Cap (Y / N)

1.0' Depth to Top of Grout or Backfill (Circle One) 10/23/92

Material (Grout or Backfill) Cement/Bentonite Grout

28' Depth to Top of Bentonite Pellets/Slurry (Circle One)

31' Depth to Top of Filter Pack - Type Best/Silica

37.5' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

38' Total Depth of Borehole

Development: Bailed approx 78 gal - Silty to little cloudy.

Survey Reference: BM# N - See survey.

Well Casing	Diameter:	2"
	Total Length:	~~38~~ 35'
	Material:	PVC
	Cap Type:	Standard threaded
Well Screen	Diameter:	2"
	Length:	5'
	Slot/Type:	10-Slot /
	Material:	PVC
Protective well casing	Material:	Aluminum Dia. 4" square
	Height Above Ground:	3.4'
	Lock Type:	2402 master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#1WB
Client: ARCS - Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 11/19/92 Finished: 11/20/92
Time: Started: 2:00pm Finished: 12:00pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	6	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 4642E + 7148N

Drilling Method(s)	Depth
4 1/4" ID HSA	59.0'

Grouting/Seal

Depth/To	Material/Method
59.0'-52.0'	6x20 cs. grade silica sand
52.0'-51.0'	20x40 f. grade silica sand
51.0'-43.0'	Bentonite pellets & slurry
43.0'-1.0'	Cement/Bentonite grout
1.0'-0.0'	Redimix concrete pad

Water Level: 30.0 ft. Below Surface

Remarks: No splitspoons collected except for CEC sample collected @ 32.0'-34.0'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			See log for MW#1SB for lithologic description from splitspooning.
	59.0'		Auger refusal - EOB

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
32.0'-34.0'	3	4	5	11		

WW Engineering & Science
Environmental Services Division

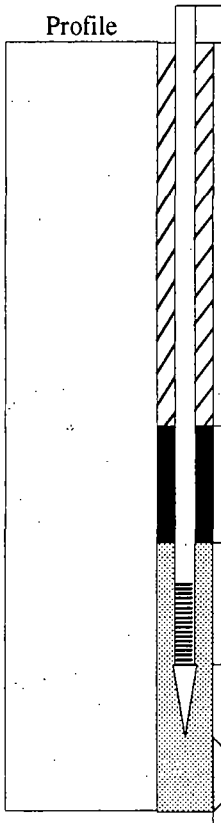
Project Name: ARCS-Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#1WB

Generalized Subsurface Profile



2.4' Length of Casing Above Ground Surface

Concrete Cap (Y) N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement, Bentonite Powder

43.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

51.0' 20x40 fine grade Silica Sand

52.0' Depth to Top of Filter Pack

Type 6x20 cs. grd. Silica Sand

59.0' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

59.0' Total Depth of Borehole

Top of Casing Elevation (feet): 982.20'

Ground Surface Elevation (feet): 979.6'

Water Level Data

Date	Water Level Below TOC
11/20/92	Predevelopment : 32.95'
11/25/92	Postdevelopment - 32.92'
12/10/92	Stabilized - 32.98'

Development: Pumped -80 gal. Surged several times - Very silty to cloudy-gray

Survey Reference: BM#4 - See survey

Well Casing
- Diameter: 2"
- Total Length: 56.5'
- Material: Schedule 40 PVC
- Cap Type: Pressure tight "J" plug

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 2.9'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 2
Well/Boring No. MW-1 - SB
Client: Albion/Sheridan Twp. Landfill
Project No.: 04011
Date: Started: 9/22/92 Finished: 10/7/92
Time: Started: 1400 hrs Finished: 3:50 PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International **Location:** 4642 E + 7138.4 N
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 750
Crew Chief: Ed Pucci
WW Supervisor: K. Ootanappan

Drilling Method(s)	Depth
4 1/4" ID HSA	58.0'
Dbl. Barrel rock core	75.0'

Grouting/Seal

Depth/To	Material/Method
75.0'-63.7'	Cs. grd. Silica Sand
63.7'-61.7'	Bentonite Pellets
61.7'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Concrete Pad

Water Level: 30.8 ft. Below Surface

Remarks: methane test with Dragger Tube every 5.0'
Continuous monitoring with P.I.D/F.I.D in breathing zone

Methane Test: 4-6' No color change
8-10' No color change
14-16' No color change
18-20' No color change

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
2.0	2.0	SW	Sand, med to fine, some fine gravel, Black, moist
31.0'	29'	SW	Sand, med to fine, some fine coarse gravel, Brown, moist
	—		29' Very moist
10.0	39'	SP	Sand, fine, silty, wet
9.0	40'	SW/GW	Sand, med to coarse, gravel - 2 inch, occ. cobbles, 6 inch
7.0	47'	GW	Sand, very coarse, gravel, 1-2 inch, occ. cobbles, 6 inch
10.5'	57.5'	GW/WBR	Sandstone/cobble layers, weathered bedrock
0.5+	58.0'+	BR	Bedrock - Sandstone (auger refusal).
			Set 6" PVC casing @ 58' through
			8 1/4" ID HSA - grouted to surface through
			tremmie pipe inside HSAs - 9/29/92.
			10/1/92 - Set up 75 CME Truck rig @ 1:00pm
			7.0'-8.0' Concrete inside 6" casing to be cored.
			See pg. 2 for continuation
			of boring below 58.0' CC

Kurt - Need to fix!

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace (PID OVA)	Background
0-2'	3	7	8	8	0	0
2-4'	4	4	4	6	0	0
4-6'	8	10	10	7	0	0
6-8'	6	6	7	8	0	0
8-10'	7	7	7	8	0	0
10-12'	5	7	11	17	0	0
12-14'	7	13	14	15	0	0
14-16'	10	14	16	19	0	0
16-18'	7	11	14	19	0	0
18-20'	6	12	16	22	0	0
20-22'	8	10	17	25	0	0
22-24'	10	14	25	43	0	0
24-26'	33	27	28	38	0	0
26-28'	14	19	29	34	0	0
28-30'	10	15	15	10	0	0
30-32'	4	10	14	24	—	—
32-34'	2	13	24	30	—	—
34-36'	20	20	22	20	—	—
36-38'	21	16	16	25	—	—
38-40	15	40	46	26	—	—
40-42'	25	14	18	45	—	—
42-44'	17	27	28	39	—	—
44-46'	17	28	22	23	—	—
46-47	50/5"					

WW Engineering & Science
Environmental Services Division

Project Name: _____

Project No: _____

Log of Well Installation

Well Number: See pg 2 of 2

Generalized Subsurface Profile

Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 2 of 2
Well/Boring No. MW# 1SB
Client: ARCS: Albion-Sheridan L.F.
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 10/7/92
Time: Started: 2:00pm Finished: 3:50pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International **Location:** 4642 E + 7138.4 N
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
Air coring	70.0'
Water coring	75.0'

Grouting/Seal

Depth/To	Material/Method
75.0'-63.7'	Cs.grd. Silica Sand
63.7'-61.7'	Bentonite Pellets
61.7'-1.0'	Cement/Bent. Grout
1.0'-0.0'	Concrete Pad

Water Level: 30.7 ft. Below Surface

Remarks: After 1st core from 59.0'-65.0' core hole remained open to 65.0'.
Cored 2nd 5.0' core from 65.0'-70.0': some binding occurred - core jammed in hole as it was being removed - lost core barrel bit @ approx. 65'. 10/5/92: Attempt to retrieve bit with spear - successful. Rotary drilled w/3 7/8" button bit to 70.0, Cored to 75.0'. 4 1/2" button rotary bit used to ream hole to 75.0' for well installation.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
6.0'	65.0	BR	SANDSTONE, fine to very fine, heavily fractured, vertical fracture @ 64.6'-64.9', well cemented to 64.0', moderately cemented to 65.0'; lt. gray, wet. one 45° fracture from 60.25' to 60.4'; all other fractures are nearly horizontal. Grains are well rounded.	59.0'-65.0'	5.0' recovery - 1 piece 4.0" long - RQD = 6%					83%
				65.0'-70.0'	4.8' recovery 22" total: pieces over 4"					96% 37%
5.0'	70.0'	BR	SANDSTONE, fine to very fine, some horizontal fractures, moderately cemented, lt. gray, wet - grains are subrounded/subangular.	70.0'-75.0'	4.6' recovery - 1 piece 5.5" long -					92% 9%
5.0'	75.0'	BR	SANDSTONE, fine, several horizontal fractures, vertical fracture from 70.30'-70.58', vertical fracture from 70.90'-71.59', moderate to poorly cemented from 70.0' to 72.0'; moderate to well cemented from 72.0'-75.0', subrounded to subangular, gray with trace of clear & brown quartz							
			EOB @ 75.0'							

WW Engineering & Science
Environmental Services Division

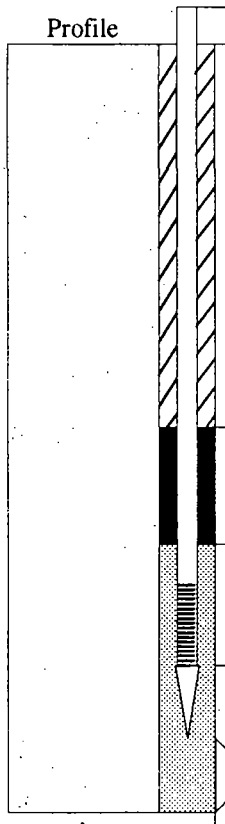
Project Name: ARCS- Albion/Sheridan Twp. Landfill

Project No: 04011.02

Log of Well Installation

Well Number: MW#1SB

Generalized Subsurface Profile



2.5'	Length of Casing Above Ground Surface
Concrete Cap (Y/N)	
1.0'	Depth to Top of Grout or Backfill (Circle One)
Material (Grout or Backfill): Cement/Bentonite Grout	
61.7'	Depth to Top of Bentonite Pellets/Slurry (Circle One)
63.7'	Depth to Top of Filter Pack
Type 6x20 Best Silica Sand	
72.5'	Depth to Bottom of Well Screen
Natural Collapsed Soil	Borehole Backfill Material
75.0'	Total Depth of Borehole

Top of Casing Elevation (feet): 982.20

Ground Surface Elevation (feet): 979.6'

Water Level Data

Date	Water Level Below TOC
4:30pm 10/6/92	Predevelopment: 33.39'
10/21/92	Removed 80 gal: 33.31'
12/10/92	Stabilized: 33.01'

Development: Bailed & Grundfos pumped 80 gal 10/16/92
Rock pumped 500 gal. Grundfos pumped 1020 gal. 10/22-10/23/92

Survey Reference: BM#N = 977.54'

Well Casing
- Diameter: 2"
- Total Length: 70.0'
- Material: Schedule 40 PVC
- Cap Type: Pressure tight "J" Plug
- Casing has small vent hole drilled in side.

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: .010 (10 slot) with threaded plug.
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Sq.
- Height Above Ground: 3.1'
- Lock Type: 2402 Master lock

General Notes: MW#1SB has 6" I.D. Schedule 80 PVC outer casing set from 0.0'-59.0' below surface - grouted in place through 8¼" ID HSA's prior to bedrock coring and permanent well installation.

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW-1-SB
Client: ARCS - ALBION
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 10/7/92
Time: Started: 2 PM Finished: 3:50 PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE 1/4	36	2S	4W

Contractor:
Address:

Location:

Equipment:
Crew Chief:
WW Supervisor:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Remarks: Following core description by Rick Trippel

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			Sandstone, qtz, gray, v. fine to fine-grained, well cemented. Horizontal fractures throughout, many appear to be induced. 45° fractures 60.3 - 60.4, Vertical fractures 70.3 - 70.6 & 70.9 - 71.6. Porosity generally not visible throughout. V. slight trace of mica & slight trace pyrite throughout. Porosity & pyrite greater in vertical fracture zones. Grains subangular to subrounded

Sample Depth	RQD (%) / Recovery (%) 6"	12"	18"	24"	PID Headspace	PID Background
59.0-65.0	100	7				
65.0-70.0	96	37				
70.0-75.0	92	9				

WW Engineering & Science
Environmental Services Division

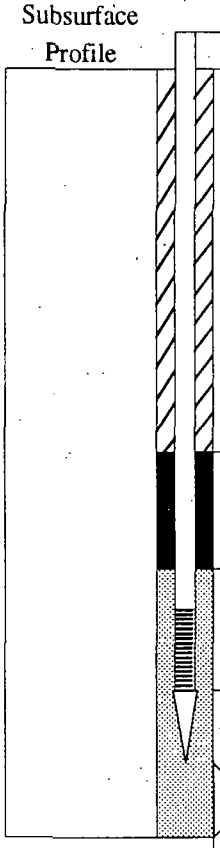
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

_____

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW-2 SG (Shallow Glacial)
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/10/92 Finished: 11/10/92
Time: Started: 9:00 Finished: 12:30

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	SE 1/4	36	2 S	4 W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH.
Equipment: CME 750 (ATV)
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Location: Approx: 5192 E + 7190 N

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-35'

Grouting/Seal

Depth/To	Material/Method
35'-27'	Cs. grd. silica sand
27'-25'	Bentonite Pellets
25'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Concrete Pad

Water Level: 26.8' ft. Below GD.
—Inside Augers—

Remarks: No PID/FID used, based on MW#2 SB Findings

See Lithology for MW#2 SB to

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background	
—	—		"General-Log": (~~[illegible]~~)								
0.5	0.5	SM/OL	Grasses, Top Soil	4'-6'	11	11	10	11			9:05
3'	3.5'	SC/CL	Clay-brown, Some Sand, Little Gravel								
0.5'	—	SW	Sand-Fine to med., Some CSE Sand, Trace								
—	4.0'		fine Gravel - Dry								
1.5'	5.5'	SW	Sand-med. to CSE, Some fine to med. Gravel								
3'	8.5'	SW	Sand-fine to med., Little V. fine Sand-Dry	8'-10' (+Duplicate)	8	6	5	6			9:15
3'	11.5'	SW	Sand-fine to med, Some CSE Sand-brown-Dry								
3'	14.5'	SP/SM	Sand-V. fine to fine, Some med. Sand-brown-Dry	12'-14'	4	6	6	6			9:25
2.5'	17'	SW	Sand-med. to CSE, Tan-Dry								
1.0'	18'	SP	Sand-fine to V. fine, Trace med. Sand-brown Dry	16'-18'	3	4	4	3			9:40
↓	↓ 27'		?								
2'	29'	SW	Sand-med. to CSE, wet, ~~Some~~ fine Sand-wet	27'-29' (CEC)	11	12	13	14			9:55

WW Engineering & Science
Environmental Services Division

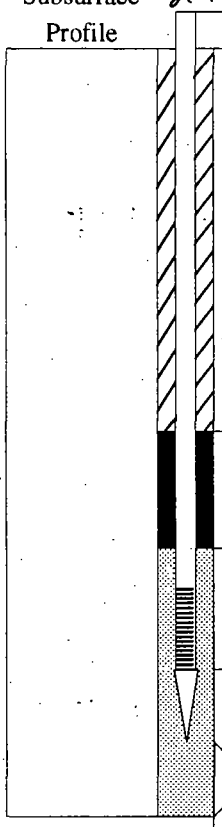
Project Name: ARCS-Albion

Project No: 04011.02

Log of Well Installation

Well Number: MW# 2SG (Shallow Glacial)

Generalized Subsurface Profile



Length of Casing Above Ground Surface: ~~2.5'~~ ~~3.0'~~ 2.75' Re-measured (cut casing) 11/10/92

Concrete Cap (Y / N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement/Bentonite Tremmie Grouted

25' Depth to Top of Bentonite Pellets/Slurry (Circle One) Hydrated w/H2O (1 gal.)

27' Depth to Top of Filter Pack

Type: Best

35' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

35' Total Depth of Borehole

Top of Casing Elevation (feet): 977.93'

Ground Surface Elevation (feet): 975.2'

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelop: 28.03'
12/7/92	Stabilized: 27.92'

Development: Pumped 300 gal: Very silty - Surged several times: Cloudy/brown

Survey Reference: BM# N - See survey

Well Casing

Diameter: 2"

Total Length: ~~37.5'~~ ~~38'~~ 32.75'

Material: PVC

Cap Type: ~~Standard~~ "J" Plug

Well Screen

Diameter: 2"

Length: 5'

Slot/Type: 10-Slot / ~~Continuous Wound~~

Material: PVC

Protective well casing

Material: Aluminum Dia. 4" Square

Height Above Ground: ~~3.5'~~ ± 3.2'

Lock Type: Master # 2402

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW# 2 WB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/19/92 Finished: 11/19/92
Time: Started: 1:45p Finished: 5:45p

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI.	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International **Location:** Approx: 5091E + 7180N
Address: 1234 S. Cleveland/Massillon Rd. Akron, OH.
Equipment: CME 750 (ATV)
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-54'

Grouting/Seal

Depth/To	Material/Method
-See Reverse Side-	

Remarks: * Split Spoon Refusal @ 50'-52' for CEC Analysis. - No Sample Collected/No Sample Recovery

Water Level: ≈ 26' ft. Below GD.

See Lithology for MW#2 SB to 54'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background
50'-52'	*100 for 0"				—	—

N/A ~~PID~~

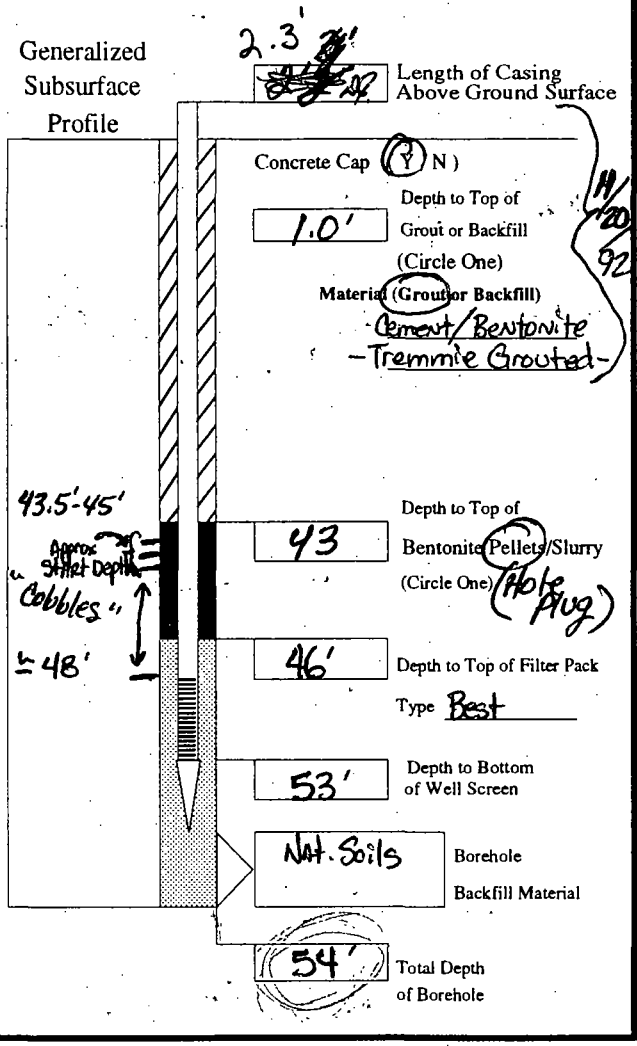
WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW #2 WB

Generalized Subsurface Profile



Top of Casing Elevation (feet): 977.325'

Ground Surface Elevation (feet): 975.0'

Water Level Data

Date	Water Level Below TOC
11/19/92	Predevelop: ≈ 28.0'
11/25/92	Post develop: 27.80'
12/8/92	Stabilized: 27.75'

Development: Pumped 600 gal - surged several times. Silty to cloudy gray

Survey Reference: BM # 4 - See survey

Well Casing	Diameter:	2"
	Total Length:	50'
	Material:	PVC
	Cap Type:	J-plug
Well Screen	Diameter:	2"
	Length:	5' (60")
	Slot/Type:	10-Slot/Continuous wound
	Material:	
Protective well casing	Material:	Aluminum Dia. 4" Sq.
	Height Above Ground:	~~3.0'~~ 2.7'
	Lock Type:	MASTER # 2402

General Notes: Cobbles/Boulders encountered 43.5'-45' (Approx. Start Depth) to Approx. 47.5'-48'.

WW Engineering & Science
Environmental Services Division

Page: 1 of 2
Well/Boring No. MW-2-SB
Client: ARCS-Albion
Project No.: 04011
Date: Started: 9/23/92 Finished: 10/20/92
Time: Started: 1345 Finished: 4:30pm

Gen 8

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE1/4	36	T2S	R4W

Contractor: R&R
Address: 1234 S. Cleveland/Massillon Rd
Akron, OH 44321
Equipment: 750 CME
Crew Chief: Ed
WW Supervisor: K. Ostrosman

Location: 5090.5' E + 7171 N

Drilling Method(s)	Depth
4 1/4" ID HSA	50.0'
(See back "remarks" for details)	

Grouting/Seal

Depth/To	Material/Method
65.5'-65.0'	Settled cuttings
65.0'-56.0'	Csgrd. silica Sand
56.0'-50.0'	Bentonite slurry
50.0'-1.0'	Cement/Bentonite grout
1.0'-0.0'	Concrete pad

Water Level: 25.1 ft. Below Ground
1/2 hour

Remarks:

4-6'	No Color change	(1)
10-12'	No Color Change	(2)
14-16'	No Color change	(3)
20-22'	No Color change	(4)
24-26	Sample Came up wet	(5)

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
3.0	3.0	SW	Sand, med to fine, Loose, Some coarse gravel,
—	—	—	Black, moist.
22.0'	25.0'	SW	Sand, med to fine, Loose, Brown, moist
0.5'	25.5'	SP	Sand, Coarse to very coarse, some sm gravel,
—	—	—	Brown, wet.
1.5'	27.0'	SW	Sand, med to fine, Brown, wet
1.0'	28.0	SW	Sand, med to fine, Black Stains, sm coal
—	—		0.0ppm OVA readings.
11.0'	39.0	SP	Sand, med, little coarse, Brown, wet
1.0'	40'	SP	Sand, Coarse to v. coarse, Brown wet
2.0'	42.0	SP/GW	Sand, fine, gravel, & coarse, sm. cobbles
			42-44 lg boulder in tip of spoon
			(Continued on pg. 2 of 2)

Sample Depth	Blow Counts 6"	12"	18"	24"	PID OVA Headspace	Background
0-2'	1	2	4	4	0	0
2-4'	1	6	5	6	0	0
4-6'	4	6	7	6	0	0
6-8'	4	6	5	6	0	0
8-10'	5	4	5	7	0	0
10-12'	5	5	4	5	0	0
12-14'	6	6	7	6	0	0
14-16'	5	4	4	7	0	0
16-18'	3	2	4	4	0	0
18-20'	4	5	5	5	0	0
20-22	4	4	4	5	0	0
22-24'	8	14	25	35	0	0
24-26'	17	9	7	7	0	0
26-28	5	4	4	9	0	0
28-30	11	9	15	50/5"	0	
30-32'	6	30	50/5"	—	0	0
32-34'	3	3	6	14		
34-36'	2	15	43	50/5"	0	0
36-38'	17	16	23	23		
38-40'	16	16	14	18		
40-42'	6	20	43	50/5"		
42-44'	45/5"	Lg	Rock down			
44-46'	43	49	50/3			
46-48'	45	50/5"				

WW Engineering & Science
Environmental Services Division

Project Name: _____

Project No: _____

Log of Well Installation

Well Number: MW#25B (See pg 2 of 2)

Generalized Subsurface Profile

Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: 4 1/4" ID HSA w/continuous split spoon sampling to 50.0'. Augers were removed. 8 1/4" ID HSA's were then advanced to 50.5', and 6" PVC (Schedule 80) casing was grouted in place from surface to 50.5'. A core run was completed after rotary clean out of PVC, from 50.5' to 55.5', however collapsed soil/rock would not allow continuation of core sample runs. Several attempts were made to rotary wash hole to 55.5', but collapsing continued to be a problem. 4" flush joint drive casing was then advanced to 55.5' to hold hole open so coring could continue. Core runs from 55.5'-60.5' & 60.5' to 65.5' were taken without problem.

WW Engineering & Science
Environmental Services Division

Page: 2 of 2
Well/Boring No. MW-2 SB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 9/23/92 Finished: 10/20/92
Time: Started: 1345 Finished: 4:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.						

Contractor: R&R
Address:
Location:

Equipment: CME 750
Crew Chief: ED
WW Supervisor: KTO/DJT

Drilling Method(s)	Depth
4¼ ID HSA	0.0'-50'*

Grouting/Seal

Depth/To	Material/Method
0.0-50'	6" PVC / Grouted
0.0-55.5'	4" Flush Joint Steel (Driven)

Water Level: 27' ft. Below GD.

Remarks:* Rock Core from 50'-55' (≈ 4.35' Recovery)
1st Run-RQD = 1.1'

Cemented in 6" PVC Casing to 50' below Grade 9/28/92
Attempted Wash Rotary Drilling to Clean-out the Casing & Begin Rock Coring - Heaving Problems. - Need to Case-off to Proceed. (10/12/92)

Drove 4" Flush Joint Casing from 50.5'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	PID 6"	12"	18"	24"	Headspace	Background
4.0'	46'	WBR	Sand-Stone - Lt. Green - Weathered - Dense (Large Piece)	46-48	57	35	39	19	-	-
3'	49'	WBR	Sandstone Very Weathered - Greenish/Gray	48-48.5'	65	for	6"	—	—	—
16.5'	65.5'	BR	Sandstone - Dense, Fractures	50-50.1'	90	for	1"	—	—	—
			EOB @ 65.5'							
			1st Run: Rock Core Description: (50-55') (4.35' Recovery)							
			Very fine to fine Grained brownish/Green well to Fairly well Cemented throughout	RQD:	1.1'			Recovery 4.35'		
			Vertical Fracture from 50.1' to 56.45'							
			Horizontal Fractures throughout							
			Veins of Iron deposits, periodically throughout							
			52.3' to 52.8' - Gray, fine to very fine Grained, Rounded, fairly well Cemented Sandstone							
55.5'			2nd Run:							
60.5'	10/14/92		10' Sandstone: Very fine to fine Grained, Greenish Gray, Several "Iron-type" Deposits (veins), Heavily fractured throughout (59.5'-60.5'. Had fine to med. Grained Sand Stone, Not very well Cemented.							
			10' Run							
65.5'			~~3rd Run~~							
			10' Run - 8.8" between 1.1' (over 4" total)							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion
Sheridan Twp. Landfill
Project No: 04011.02

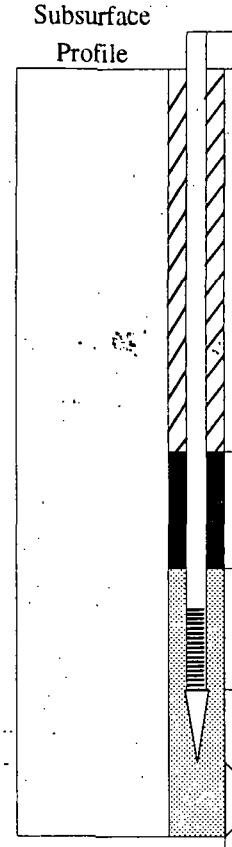
Log of Well Installation

Well Number: MW # 2 SB

Top of Casing Elevation (feet): 977.62

Ground Surface Elevation (feet): 975.4'

Generalized Subsurface Profile



~~3.0'~~ Length of Casing Above Ground Surface — AF the well cut to 2.2'

Concrete Cap (Y / N)

~~1.0~~ Depth to Top of Grout or Backfill (Circle One) — AF

Material (Grout or Backfill) Cement/Bentonite (3% Bent.)

50' * Depth to Top of Bentonite Pellets/Slurry (Circle One)

56' Depth to Top of Filter Pack

Type Silica #2

65' Depth to Bottom of Well Screen

Nat. Soils Borehole Backfill Material

65.5' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 28.34'
12/8/92	Stabilized: 28.36'

Development: Grundfos pump - 1900 gal: from silty to clear. Good recovery

Survey Reference: BM # 4 - See survey.

Well Casing
- Diameter: 2"
- Total Length: 68'
- Material: PVC
- Cap Type: "J" plug

Well Screen
- Diameter: 2"
- Length: 5'
- Slot/Type: 10-slot
- Material: PVC

Protective well casing
- Material: Aluminum Dia. 4" square
- Height Above Ground: ~~3.5'~~ 2.7'
- Lock Type: 2402 master lock

General Notes: * Bentonite Slurry (thick) used in place of Pellets, due to Limited Distance Between the 4" Casing & the 2" PVC Casing (well) (Approx. 1" of Clearance would Cause Pellets to Bridge).

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW-2-SB
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 9/23/92 Finished:
Time: Started: 1:45P Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	JACKSON	PARMA				

Contractor: R&R
Address: AKRON, OH
Equipment:
Crew Chief:
WW Supervisor:

Location:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Remarks: Following core description by Rick TRIPPEL.

Water Level: ____ ft. Below ____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	~~Blow Counts~~ ~~PID~~ RQD (%) Recovery (%) 6"	12"	18"	24"	Headspace	Background
			Sandstone, lt gray, becoming lt-gray to greenish gray 53.5-55, v. fine grained, well cemented. Heavily fractured throughout. Vertical fracture 50.2-50.4. 30° fracture 52.10-52.11. Most fractures appear natural - worked by solution, breaks don't appear fresh. Some iron-staining throughout. Brown throughout.	50-55	87	0				
			Sandstone, lt gray to greenish-gray throughout, well cemented, v. fine to fine-grained. Fractured throughout; Most horizontal, nearly vertical 0-0.5, 4.35-4.6 from top of run. Most appear maybe induced, many may be natural. Some iron-staining throughout. General coarsening downward.	55.5-65.5	88	0				

WW Engineering & Science
Environmental Services Division

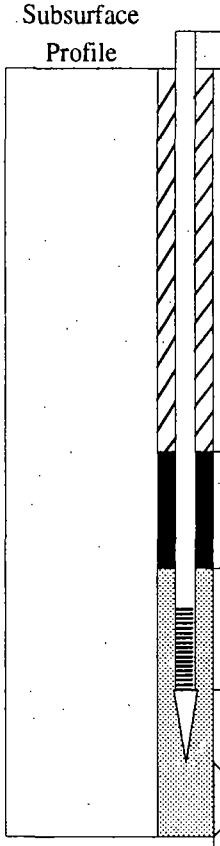
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

_____

_____

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

_____

Survey Reference: _____

_____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW # 3-SG-
Client: ARCS- Albion
Project No.: 04011.02
Date: Started: 11/17/92 Finished: 11/18/92
Time: Started: 11:10 AM Finished: 11:30 AM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	SE 1/4	36	2S	4W

Contractor: R&R International
Address: 1234 S. Cleveland/Massillon Rd. Akron, OH.
Equipment: CME 750
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Location: ~~10' South of~~ ~~North of MW # 3SB~~ SG
Approx: 6136 N + 4348 E

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-~~42'~~ 45'

Grouting/Seal
Depth/To — Material/Method
- See Reverse Side

Remarks: No Split Spoons Collected w/the exception of the Saturated Soils from the "Screened" interval for CEC Analysis from the 37'-42' zone.

Water Level: 30.5 ft. Below GD

See Lithology for MW # 3-SB (Abandoned Boring) to 42'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace (N/A ~~PID~~)	Background
			Sand- med. to CSE, Some Fine Gravel, Gray Wet	38'-40'	5	5	6	8	—	12:20

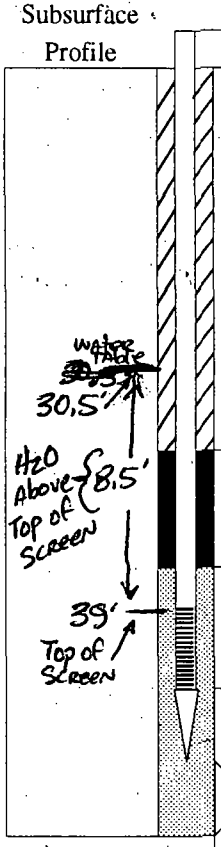
WW Engineering & Science
Environmental Services Division

Project Name: ARCS-Albion Sheridan twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW# 3-SG (Shallow Glacial)

Generalized Subsurface Profile



2.0' Length of Casing Above Ground Surface

Concrete Cap (Y / N)

1.0' Depth to Top of Grout or Backfill (Circle One) 11/18/92

Material (Grout or Backfill): Cement/Bentonite -Tremmie Grouted-

35' Depth to Top of Bentonite Pellets/Slurry (Circle One)

37' Depth to Top of Filter Pack
Type Best (Brand)

44' Depth to Bottom of Well Screen

Nat. Sands -Cave-in Borehole Backfill Material

45' Total Depth of Borehole

Top of Casing Elevation (feet): 978.875

Ground Surface Elevation (feet): 976.9'

Water Level Data

Date	Water Level Below TOC
11/25/92	Post development: 31.42'
12/17/92	Stabilized: 31.66'

Development: Pumped 250 gal. with grundfos pump - Very silty to cloudy/brown

Survey Reference: MW# 3 SB (T.O.C.) Elev. = 978.145

Well Casing
- Diameter: 2"
- Total Length: 41.0'
- Material: PVC
- Cap Type: J-plug

Well Screen
- Diameter: 2"
- Length: 5' (60")
- Slot/Type: 10-Slot / [illegible]
- Material: PVC

Protective well casing
- Material: Aluminum Dia. 4" sq.
- Height Above Ground: ~~3.5'~~ 2.5'
- Lock Type: Master #2402

General Notes: Heaving Sands Caused well to Stop at 40.5' on First well Setting Attempt. - Pulled well, pulled Back Augers, Re-drilled to 45', pulled Back to 44', Set well. - Sand Packed and Sealed Before Heaving Sands Created another Problem.
* Top of Well Screen (39') is 8.5' below water Table *

* GD. Elevation is 1.4' Higher, than, the GD. at MW#3 SB *

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW# 3-WB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/16/92 Finished: 11/16/92
Time: Started: 12:30p Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T 2S	R 4W

Contractor: R&R International **Location:** Approx 6136 N + 4340 E
Address: Akron, OH
Equipment: CME 750
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID. HSA	0.0'-60'

Grouting/Seal

Depth/To	Material/Method
-See Reverse Side-	

Remarks: * Started Drilling Very Slow/Hard from 47' to 60', in Layers. (Weathered Bedrock) - Used 4 1/4" ID Augers only... No Rotary Drilling ~~[illegible]~~ DQ (approx. 30 mins to drill 13')
* Hardest Area is 37'-38.5' in Depth (Slowest Drilling)

Water Level: 29.0 ft. Below GD

See Boring Log for M.W.# 3SB to 60', for Lithology

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			* See "Remarks" for 47'-60' info. *

Blow Counts: Sample Depth	6"	12"	18"	24"	Headspace	Background
N/A ~~PID~~						

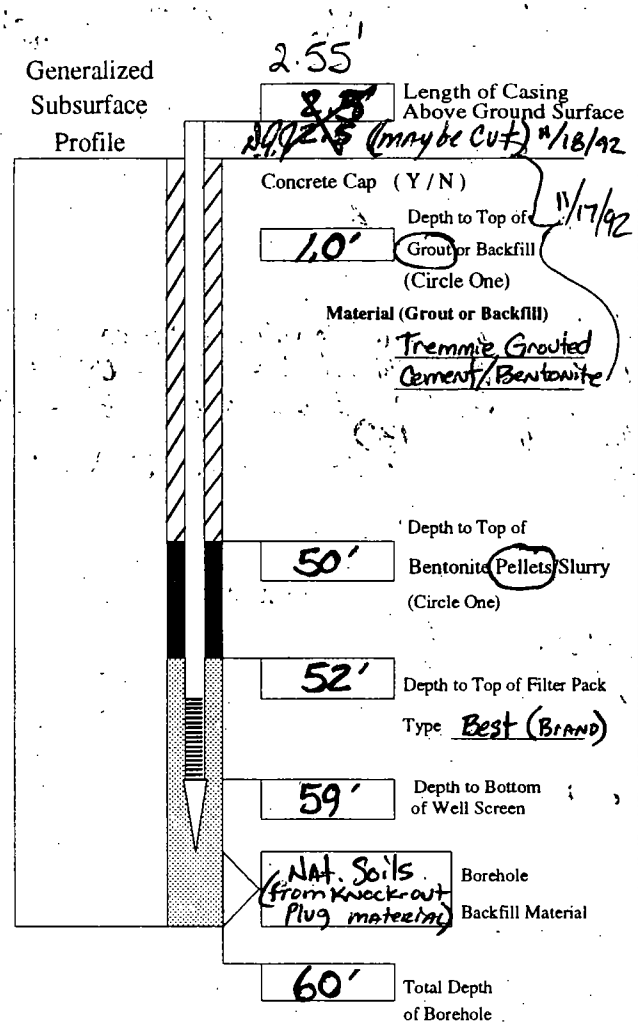
WW Engineering & Science
Environmental Services Division

Project Name: ARCS- Albion Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW # 3-WB

Generalized Subsurface Profile



Top of Casing Elevation (feet): 978.65'

Ground Surface Elevation (feet): 976.1'

Water Level Data

Date	Water Level Below TOC
11/25/92	Postdevelopment: 31.51'
12/17/92	Stabilized = 31.48'

Development: Pumped 500 gal. w/ grundfos pump - Silty gray to trace cloudy.

Survey Reference: BM# W1 - See Survey

Well Casing
- Diameter: 2"
- Total Length: 56.5'
- Material: PVC
- Cap Type: J-plug

Well Screen
- Diameter: 2"
- Length: 5' (60")
- Slot/Type: 10-slot / ~~[illegible]~~
- Material: PVC

Protective well casing
- Material: Aluminum Dia. 4" sq.
- Height Above Ground: 3.0' ~~[illegible]~~
- Lock Type: Master # 2402

General Notes: Knock out plug used on 4 1/4" ID Augers (wooden) - over-drilled to 60' to Allow Room for ~~the~~ Plugged Soils in the End of the Lead Auger.

* Hole (annulas around 2" well) is taking a lot of Grout, ie: possible Void, or, Very Coarse material, or, Possible Fractures. *

WW Engineering & Science
Environmental Services Division

Page: 1 of 2
Well/Boring No. MW#3SB
Client: Albion/Sheridan Twp. Landfill
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 9/25/92
Time: Started: 2:00pm Finished: 2:30pm

ABANDONED HOLE

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: L. Cotton

Location: N 6114
E 4345

Drilling Method(s)	Depth
4¼" ID HSA	47.0'

Methane drager: 5' = 2:24 pm
10' = 2:40 pm
15' = 2:55 pm
20' = 3:20 pm
25' = 3:50 pm

Grouting/Seal

Depth/To	Material/Method
47.0'-42.0'	Caved natural soil
42.0'-0.0'	Cement/Bentonite Grout Tremmied from bottom to surface inside HSA's

Water Level: 28.0 ft. Below Surface

Remarks: Methane test with Drager tube every 5.0'
Continuous monitoring with PID/FID in breathing zone.
Vertical sampling in Upper aquifer every 5.0' to bedrock.
6" outer casing set 2.0' into bedrock with packer, then grouted in place - 24 hr. grout set.
Air rotary - take core sample @ 5.0' intervals.
Grease in hole @ 47.0' - Noted on temp. well casing.
Abandoned hole and redrilled - See log for MW#3SBA

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
2.0'	2.0'	SM	SAND, fine to med. fine, little silt, dk gray/brown, little moist.
0.5'	2.5'	ML	SILT & CLAY, little fine sand trace c.s. gravel & cobbles, hard & crumbly, lt. brown, trace moist-dry
3.0'	5.5'	GM	SAND & GRAVEL, well graded, some silt, tightly compacted & crumbly, brown, trace moist-dry
5.0'	10.5'	SP	SAND, fine, little med fine to med. coarse sand, trace fine gravel, loose, lt. brown to blonde, dry.
3.1'	13.6'	SP	SAND med. to fine, occ. small layer of c.s. sand & fine gravel, loose, red/brown, dry to moist.
2.4'	16.0'	SP	SAND, fine, loose, blonde, moist - Some small layers of med. fine to coarse sand
3.5'	19.5'	SW	SAND, poorly sorted fine to coarse, little s.lt, little fine gravel, loose, brown, moist
0.2'	19.7'	ML	SILT, little clay, trace of fine gravel, soft, crumbly, gray, moist
1.1'	20.8'	CL	CLAY, some silt, fine sand, little cs. sand & fine gravel, soft, crumbly, brown, very moist
5.9'	26.7'	SC/GC	SAND & CLAY, little fine to coarse gravel, soft

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
0.0'-2.0'	1	2	3	4	0	
2.0'-4.0'	5	12	18	30 Rock	0	
4.0'-6.0'	22	20	13	9	0	
6.0'-8.0'	4	6	5	4	0	
8.0'-10.0'	5	5	4	4	0	
10.0'-12.0'	5	3	5	4	0	
12.0'-14.0'	4	4	5	3	0	
14.0'-16.0'	3	3	5	4	0	
16.0'-18.0'	4	4	5	4	0	
18.0'-20.0'	4	6	6	7	0	
20.0'-22.0'	1	3	13	9	0	
22.0'-24.0'	2	4	3	4	0	
24.0'-26.0'	1	3	5	7	0	
26.0'-28.0'	5	7	4	10	0	
28.0'-30.0'	6	8	9	9	No	H.S.
30.0'-32.0'	1	4	7	9	Blow	H_2O
Temp Well #1 - 28.0'-33.0'						
33.0'-35.0'	1	2	4	5		
35.0'-37.0'	1	1	2	2		
Temp Well #2 - 32.5'-37.5'						
37.5'-39.5'	2	3	5	4		
40.0'-42.0'	3	3	6	9		
45.0'-47.0'	29	31	32	20		

WW Engineering & Science
Environmental Services Division

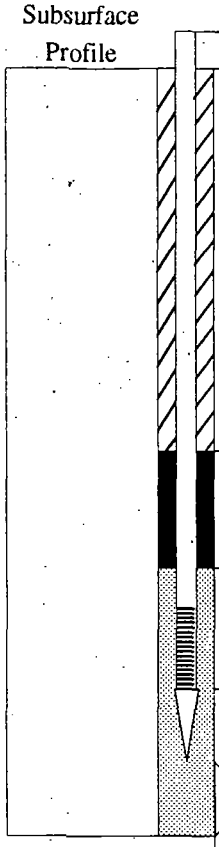
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: ~~MW~~ - RJT ~~SB~~-3 SB RJT MW

Generalized Subsurface Profile



Length of Casing Above Ground Surface: _____

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One): _____

Material (Grout or Backfill) _____

Depth to Top of Bentonite Pellets/Slurry (Circle One): _____

Depth to Top of Filter Pack: _____

Type _____

Depth to Bottom of Well Screen: _____

Borehole Backfill Material: _____

Total Depth of Borehole: _____

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: W.L. in Temp well #1 = 29.9' below TOC (stable). Well has 2.0' S.U. Began bailing @ 6:00pm

6:55pm: pH buffer 9.0 = 10.04
(25 gal) 7 = 7.02
Sample = 6.29 temp = 13.2
EH = 206.4 mV
Cond. = 1.295 @ 13.7°

7:10pm pH 7 buffer = 7.02
(35 gal) Sample = 6.60 temp 12.6
EH = 213.9 mV
cond. = 1.128 @ 12.4

7:02pm: pH 7 buffer = 6.98
(30 gal) Sample = 6.70 temp = 12.7°
EH = 207.8 mV
cond. = 1.113 @ 12.7°

7:20pm pH 7 buffer = 7.03
(40 gal.) Sample = 6.63 temp = 12.3°
EH = 265.2 mV
cond. = 1.115 @ 11.4°

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Environmental Services Division

Page: 2 of 2
Well/Boring No. MW#36B
Client: Albion-Sheridan Landfill
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 9/25/92
Time: Started: 2:00pm Finished: 2:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE1/4	36	T2S	R4W

Contractor: R&R International, Inc.
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truckrig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location:

Drilling Method(s)	Depth
4 1/4" ID HSA's	47.0'

Grouting/Seal

Depth/To	Material/Method
47.0'-42.0'	Caved natural soils
42.0'-0.0'	Cement/Bentonite Grout Tremmied from bottom to surface inside HSA's

Water Level: 28.0 ft. Below Surface

Remarks: Temp Well #1 W.L. = 29.90' below TOC T.D. = 33.0' (1.9 Stickup) Sampled @ 9/23 8:42A
Temp Well #2 W.L. = 30.88' below TOC T.D. = 37.5' (2.9 Stickup) 9/23 1:40P
Temp Well #3 W.L. = 31.63' below TOC T.D. = 42.6' (3.3 Stickup) 9/23 5:25P
Temp. Well #4 W.L. = 31.00' below TOC T.D. = 47.0' (3.0 Stickup) 9/24 3:40 pm
Found grease on casing when 4th TW was pulled. Must have fallen into HSAs from rig. Grouted and abandoned boring. Thorough decon of all drilling materials - Dispose well materials.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			some fine layers of damp sand, gray, very moist.
0.8'	27.5'	SM/GM	SAND, poorly sorted, some silt, little fine to med. gravel, loose, brown, very moist
4.5'	32.0'	SW	SAND, med. to coarse, some fine to med. gravel, little silt, loose, brown, damp to wet @ 28.5' +/-
4.0'	36.0'	SM	SAND, fine to med., some silt, little cs. sand, trace of fine-med. gravel, loose, brown, wet
2.0'	38.0'	SW	SAND, med. to coarse, some fine gravel, little med. fine sand, loose, gray, wet
3.6'	41.6'	SW	SAND, med to coarse, some silt, occ. layer of fine to med. gravel, loose, dk. gray & brown, wet
4.2'	45.8	SM	SAND, fine, some silt, loose, gray, wet
0.4'	46.2	SW	SAND, fine to coarse, little fine gravel, loose, dk brown, wet
0.8'+	47.0'+	ML	SANDSTONE, very weathered, friable, soft, easily crumbled, lt. gray, little moist
			EOB @ 47.0'

Sample Depth	Blow Counts 6"	12"	18"	24"	PID	Headspace	Background

WW Engineering & Science
Environmental Services Division

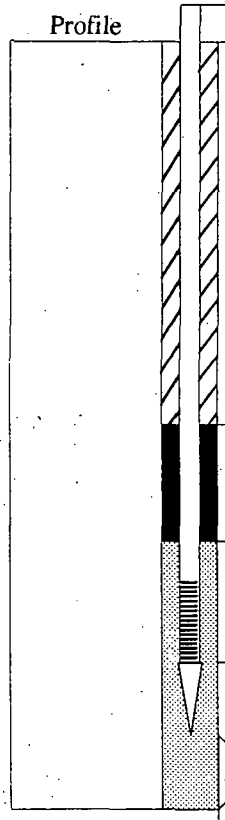
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW #3 SB-A
Client: Albion/Sheridan Twp. Landfill
Project No.: 04011.02
Date: Started: 10/11/92 Finished: 10/12/92
Time: Started: 4:00p Finished: 12:30p

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi	Calhoun	Sheridan	SE 1/4	36	2 S	4 W

Contractor: R&R International **Location:** Offset 12.5' North of MW#3 SB Location.
Address: 1234 S. Cleveland-Massillon Rd. 6126 N / 4345 E
Akron, OH 44321
Equipment: CME 750 (ATV)
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" I.D. HSA	0.0'-55.5'
*3 7/8" Roller Bit	0.0' 70.5'

Grouting/Seal

Depth/To	Material/Method
70.5'-69.5'	Settled cuttings
69.5'-62.5'	Cs. grd. silica sand
62.5'-62.1'	Bentonite Pellets
62.1'-59.0'	Bentonite Slurry
59.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Concrete Cap

Water Level: 29' ft. Below Surf.

Remarks: * Rock Cored @ 55.5'-60.5', 60.5'-65.5', & 65.5'-70.5'. Runs, then, Reamed Core hole to 3 7/8" Dia. to 70.5'

* Split Spoon Refusal (Possibly Cobble Stuck in Lead Auger) Ran Augers Down w/a 3" Split Spoon as a Center Plug. — Accumulated Pieces of Sandstone (weathered) in Spoon, which was described for Lithology/No other Split Spoons Collected.

See MW#3SB (Abandoned) for litho to 47.0'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
3.8'	46.2'	WBR	Sandstone: Soft, weathered, Poorly Cemented, Friable, Gray, Crumbles (Previously Logged to 47' by C.C. 9/22-9/25/92)	45-47*	100	Be	1"	—		
	50'									
5'	—	WBR	Sandstone: weathered, Poorly Cemented, Some hard Layers, Gray							
—	55'									
0.5'	—	BR	Sand Stone: Hard, Gray well to Fairly well Cemented (Auger Refusal							
—	55.5									
			* Rock Core #1 (5' Run) 55.5'-60.5': 3.85' Recovery (≈3'10") - Sand Stone, Gray, Poorly Cemented, Very fine to fine Grain, Little Seams of Fairly well Cemented Sand Stone, Several Horizontal Fractures throughout Core. (Low RQD)							
	60.5'									
			* 2nd (5' Run) 60.5'-65.5' (4'10" Recovery) - Sandstone Gray, Fairly well Cemented, fine Grained to Very fine Grained Sands, Less Fractured, trace veins of weathered Sandstone (Higher RQD)							
	65.5'									
			* 3rd (5' Run) 65.5'-70.5' (4'10" Recovery) - Sandstone: Gray, well Cemented, fine to Very fine Grained, trace Fractures w/Poorly Cemented Sandstone							
	70.5'									
			E.O.B. @ 70.5'							

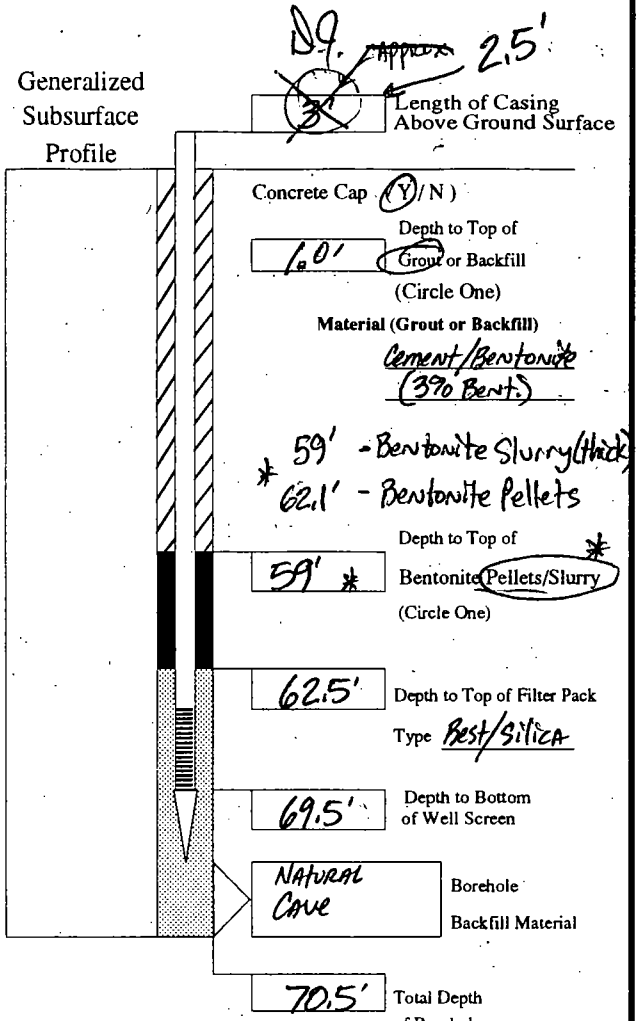
WW Engineering & Science
Environmental Services Division

Project Name: ARCS-Albion Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW#3 SB-A

Generalized Subsurface Profile



Top of Casing Elevation (feet): 978.14

Ground Surface Elevation (feet): 975.6'

Water Level Data

Date	Water Level Below TOC
11/25/92	Postdevelopment: 30.97'
12/17/92	Stabilized: 31.08'

Development: Pumped approx. 1500 gal. with Grundfos - silty to clear.

Survey Reference: BM#W - See survey notes.

Well Casing
- Diameter: 2"
- Total Length: ~~[illegible]~~ 67.0'
- Material: PVC
- Cap Type: "J" plug

Well Screen
- Diameter: 2"
- Length: 5' (60")
- Slot/Type: 10-Slot
- Material: PVC

Protective well casing
- Material: Aluminum Dia. 4" Square
- Height Above Ground: ≈3.0'
- Lock Type: 2402 master lock

General Notes: * Bentonite Pellets Started "Bridging" @ 34' below Grade inside the Augers. (10/12/92) - Switched to a Thick Bentonite Slurry (approx 4" of Pellets)

Vertical H2O Samples: (2" PVC)

(≈17' W.L.) 42'-47' (Screen Depth)

Gals. Removed	pH/Temp	COND./Temp
15 gals.	7.01/12.4°C	1,216 µm/12.3°C
18.5 gals.	7.06/12.1°C	1,242 µm/12.2°C
20 gals.	7.06/12.1°C	1,243 µm/12.2°C
25 gals.	7.07/12.2°C	1,250 µm/12.3°C
30 gals.	7.07/12.1°C	1,248 µm/12.2°C

* Purged w/ Teflon Bailer - Sediment free

47'-52' (Screen Depth)

Gals. Removed	pH/Temp (°C)	Conductivity/Temp
15 gals	7.19/13.5	1254/13.4°C
20 gals	7.06/13.3	1257/13.4°C
30 gals	7.05/13.2	1259/13.3°C
50 gals	7.06/13.2	1262/13.3°C
70 gals	7.06/13.4	1258/13.4°C

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Environmental Services Division

Page: 1 of 1
Well/Boring No. MW-3-SBA
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/12/92
Time: Started: 4 PM Finished: 12:30 PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE 1/4	36	2S	4W

Contractor: R&R
Address: AKRON, OH
Equipment:
Crew Chief:
WW Supervisor:

Location:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Water Level: ____ ft. Below ____

Remarks: Following core description by Rick TRIPPER.

In general core is very fractured w/possible natural fractures throughout. General coarsening downward w/slight increase in iron-staining with depth. Grains sub-angular to sub-rounded throughout.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	~~Blow Counts~~ Sample Depth	RQD (%) / Recovery (%) ~~6"~~	~~12"~~	18"	24"	PID Headspace	PID Background
		Qtg	Sandstone, gray, v. fine to fine grained, well cemented. Horizontal fractures throughout - most appear to be induced. Coarser-grained zones at 0.6' and 3.2-3.9' from top have much greater porosity w/slight trace of pyrite. Zone at 3.2-3.9 also has slight iron-staining w/45° fracture.	55.5-60.5	70	1				
			Sandstone, as above. Horizontal fractures throughout, appear to be induced. Very slight trace of mica & pyrite throughout. Porous throughout with zone of higher porosity and coarser-grains 60.5-60.8 and	60.5-65.5	98	67				
			Sandstone, as above. Generally coarser, more porous, w/more slight trace iron-staining throughout than sections described above. Fractures horizontal - most appear induced. Fractures at 69.1, 70.0 & 70.2 appear to be natural due to irregularities and appearance of water erosion thru these zones.	65.5-70.5	98	43				

WW Engineering & Science
Environmental Services Division

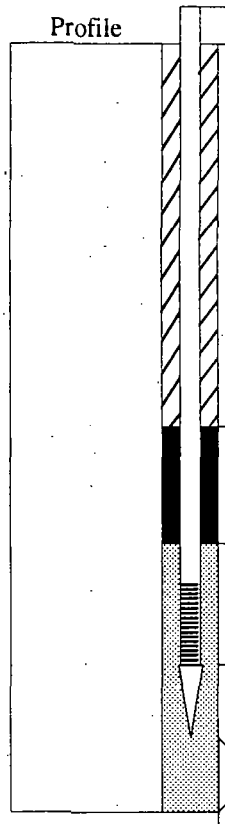
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#4SG
Client: ARCS - Albion/Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 11/30/92 Finished: 11/30/92
Time: Started: 3:00pm Finished: 5:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truckrig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: N of MW#4WB

Drilling Method(s)	Depth
4 1/4" ID HSA	38.0'

Grouting/Seal

Depth/To	Material/Method
38.0'-29.5'	Cs. Grade 6x20 Silica Sand
29.5'-27.5'	Bentonite Hole plug
27.5'-1.0'	Cement/Bentonite Hole plug
1.0'-0.0'	Redimix Concrete Pad

Water Level: 29.0 ft. Below Surface

Remarks: No splitspoon samples collected.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
	38.0'		See log for MW#4SB for lithologic description.
			EOB @ 38.0'

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background

WW Engineering & Science
Environmental Services Division

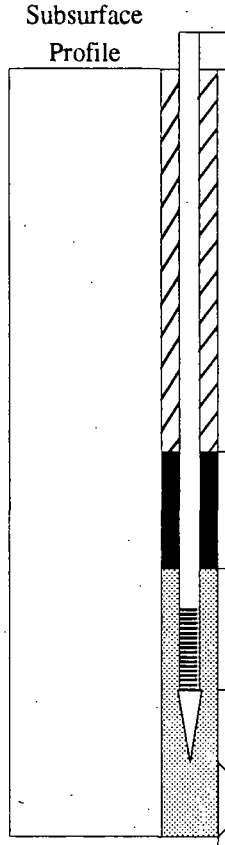
Project Name: ARCS-Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#4SG

Generalized Subsurface Profile



2.35' Length of Casing Above Ground Surface

Concrete Cap (Y / N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement Powdered Bentonite

27.5' Depth to Top of Bentonite Pellets/Slurry (Circle One)

29.5' Depth to Top of Filter Pack

Type 6x20 cs.gd. Silica Sand

36.5' Depth to Bottom of Well Screen

6x20 cs.gd. Silica Sand & nat. soil collapse Borehole Backfill Material

38.0' Total Depth of Borehole

Top of Casing Elevation (feet): 978.03'

Ground Surface Elevation (feet): 975.7'

Water Level Data

Date	Water Level Below TOC
12/1/92	Predevelopment: 31.00'
12/16/92	Stable/Post devel.: 30.98

Development: Pumped 405 gal - Very silty to cloudy brown - good recovery

Survey Reference: BM# W = 981.11'

Well Casing
- Diameter: 2"
- Total Length: 34.0'
- Material: Schedule 40 PVC
- Cap Type: Pressure tight "J" plug

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 2.8'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#4WB
Client: ARCS - Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 11/18/92 Finished: 11/19/92
Time: Started: 7:00AM Finished: 11:30AM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: N of MW#4SB

Drilling Method(s)	Depth
4 1/4" ID HSA -	35.0'
3 7/8" Tricone Rotary -	68.0'

Grouting/Seal

Depth/To	Material/Method
68.0'-63.0'	Natural collapsed cuttings
63.0'-54.0'	6x20 cs. grd. silica sand
54.0'-53.0'	20x40 f. grd. silica sand
53.0'-45.0'	Bentonite slurry
45.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix concrete pad

Water Level: 29.0 ft. Below Surface

Remarks: No splitspoons collected

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
35.0'	35.0'		See log for MW#4SB for litho description per splitspoon sampling
33.0'	68.0'	WBR/BR	weathered sandstone layered very hard & soft - several fractures, may be layered with conglomerate, some layers of loose sands & gravels (causing hole collapse), gray & dk. gray, wet
			EOB @ 68.0'

Sample Depth	PID 6"	12"	18"	24"	Headspace	Background

WW Engineering & Science
Environmental Services Division

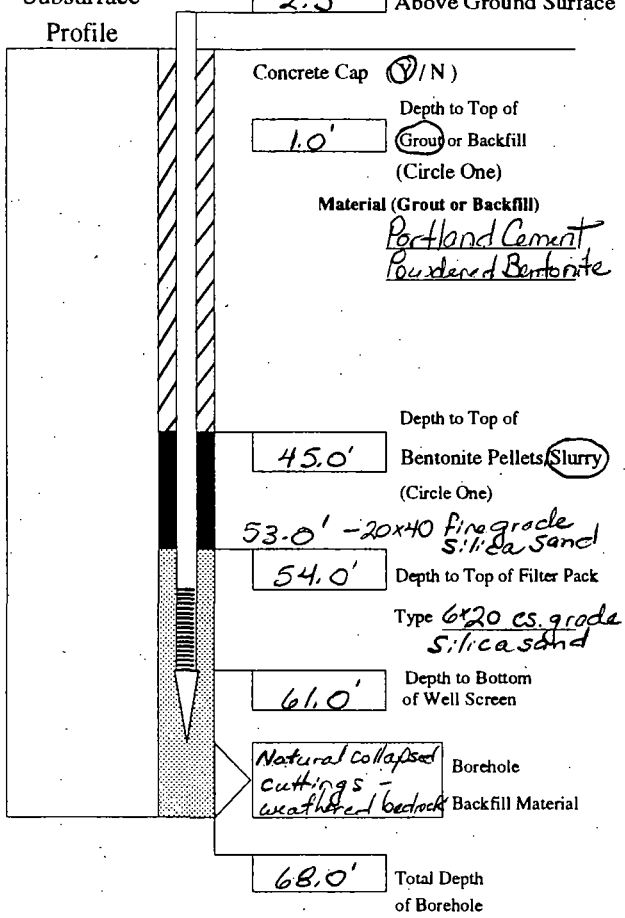
Project Name: ARCS- Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#4WB

Generalized Subsurface Profile



Top of Casing Elevation (feet): 977.73'

Ground Surface Elevation (feet): 975.5'

Water Level Data

Date	Water Level Below TOC
11/20/92	Predevelopment: 30.72'
11/25/92	Postdevelopment: 30.59'
12/16/92	Stabilized: 30.61'

Development: Pumped 1700 gal. with grundfos - silty gray to trace cloudy.

Survey Reference: B.M. #W

Well Casing
- Diameter: 2"
- Total Length: 58'
- Material: Schedule 40 PVC
- Cap Type: Pressure tight "J" plug

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 2.8'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 2 3
Well/Boring No. MW#4 SB
Client: ARCS- Albion Sheridan L.F.
Project No.: 04011.02
Date: Started: 9/28/92 Finished: 10/20/92
Time: Started: 1:00pm Finished: 2:00pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck Rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 5601 N
4313.5 E

Drilling Method(s)	Depth
4 1/4" ID HSA/cont.sp.sp.	54.5'
8 1/4" ID HSA	55.0'

Continued on pg. 2

Grouting/Seal

Depth/To	Material/Method
54.0'-1.5'	6" dia. Sched. 80 pvc casing - cement/bentonite grout through 8 1/4" HSA's tremmied from bottom to surface.

Continued on pg. 2

Water Level: 29.0' ft. Below Surface

Remarks: TW#1 = 29.0'-34.0' W.L. = 30.5' below TOC 1.5' Stickup
Pumped 90 gal to develop. Bailed 15 gal - Still very sandy/silty
Solids settled prior to sampling @ 6:05pm - 9/28 for G.C.
TW#2 = 33.0'-38.0' W.L. = 29.97' below TOC 2.0' Stickup
Pumped 185 Gal. Let settle for 30-45 min.
Sampled @ 2:48 PM for GC analysis - 9/29

*Note 18 ppm in headspace @ 28.0'-30.0' probably due to moisture.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
4.0	4.0'	SP	SAND, med. fine, little fine gravel; loose, brown, moist.
2.5'	6.5'	SW	SAND, med. fine to med., some cs. sand, little fine gravel, loose, red/brown, moist - d
5.5'	12.0'	SP	SAND, fine, trace of med-cs. sand, loose, blonde, little moist
3.8'	15.8'	SP	SAND fine well sorted loose blonde moist
2.2'	18.0'	SW/SM	SAND, med. to coarse, some fine grav. loose, Some silt, dk. brown, moist
5.5'	23.5'	SP	SAND, med. fine to med. loose, brown, moist
1.3'	24.8'	CL/SM	CLAY, some silt little fine sand, trace of fine gravel, soft, brown, very moist
3.5'	28.3'	SM/GC	SAND, fine Some Silt, some clay, little fine to med. gravel, very soft, occ. fine layers of wet sand, brown, damp.
0.7'	29.0'	CL	CLAY, little silt, soft, cohesive, smooth, gray, moist
1.0'	30.0'	SP	SAND, med. fine, some silt little med-cs sand, loose, gray, damp-wet
2.5'	32.5'	ML	SANDSTONE, very weathered, friable - some small cemented fragments, light, gray, wet.
3.7'	36.2'	SW/SM	SAND, fine to coarse, some silt, some cemented conglomerate layers, loose, gray, wet.

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace (~~PID~~ FID OVA 108)	Background
0.0'-2.0'	1	2	3	4	0	5
2.0'-4.0'	4	4	5	6	3	5
4.0'-6.0'	7	5	5	5	2	5
6.0'-8.0'	6	4	5	6	2	5
8.0'-10.0'	3	4	5	8	2	5
10.0'-12.0'	7	5	4	6	2	5
12.0'-14.0'	4	6	12	16	5	5
14.0'-16.0'	6	8	7	10	3	5
16.0'-18.0'	3	7	7	7	6	5
18.0'-20.0'	2	5	5	6	2	5
20.0'-22.0'	4	3	6	13	4	5
22.0'-24.0'	2	5	5	2	1	5
24.0'-26.0'	1	3	5	5	2	5
26.0'-28.0'	4	3	3	2	2	5
28.0'-30.0'	7	18	15	21	*18	5
30.0'-32.0'	22	23	17	21	No	H.S.
32.0'-34.0'	23	65	53	25	Below	W.T.
34.0'-36.6'	2	5	26	34		
36.0'-38.0'	11	8	28	50/5		
39.0'-40.0	68	143	—	—		
41.0'-43.0	34	22	18	23		
44.0'-46.0'	8	104	12/1"	—		
46.0'-48.0'	23	66	245/3"	—		
49.0'-51.0'	123	100/4"	—	—		

Red on Table

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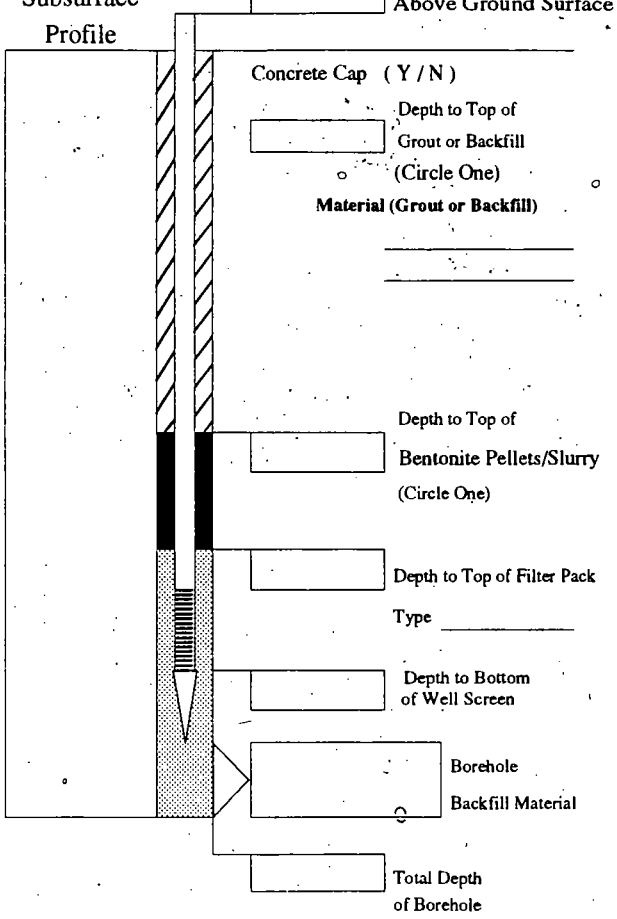
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: See pg 2 of 2

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

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Environmental Services Division

Page: 2 of ~~2~~ 3 RJ
Well/Boring No. MW# 45B
Client: ARCS- Albion-Sheridan L.F.
Project No.: 04011.02
Date: Started: 9/28/92 Finished: 10/20/92
Time: Started: 1:00 pm Finished: 2:00 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd. Akron OH 44321
Equipment: CME 75 Truck Rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 5601 N
4313.5 E

Drilling Method(s)	Depth
4" Black Steel casing driven	58.0'
Dbl. barrel rock core w/water	73.0'

Grouting/Seal

Depth/To	Material/Method
See pg 1 of 2	

Water Level: 29.0 ft. Below Surface

Remarks: TW#3 = 38.5'-43.5' WL = 30.72 Below TOC. 1.5' Stickup
Pumped 100 gal. - Still very silty. Let settle overnight
9/30 @ 8:50 AM - Collected sample for GC
TW#4 = 43.5'-48.5' W.L. = 30.9 below TOC 1.5' stickup
Bailed 4 Gal - dry. Slow recovery Bailed 8 Gal before starting field tests. Sampled after removing 11 gal (Stable tests) @ 12:10 pm for GC
TW#5 - 47.5'-52.5' - very poor recovery. See note book for details.
Sampled for GC analysis: 10/1/92 @ 8:35 AM.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
3.8'	40.0'	ML	SANDSTONE fine grained, very weathered, friable, soft gray, wet - some cemented layers.
1.5'	41.5'	SP	SAND, med. fine, some silt, loose, gray, wet (active).
12.5'	54.0'	ML	SANDSTONE, very weathered, some fractures, occ. fine cemented layers, soft gray, wet.
0.5'	55.0	ML/BR	SANDSTONE WITH SHALE, weathered, becoming harder, more cemented, gray to dk. gray, wet.
			(Auger refusal @ 55.0'. Set 6" PVC @ 54.0'. Drove 4" Steel casing to 58.0' due to recurring collapse)
6.3'	61.3'	BR	CONGLOMERATE, SANDSTONE, SHALE, CHURT & SILTSTONE, very fractured, poorly cemented, gray & dk. gray, wet - hole not staying open
11.7'+	73.0+	BR	SANDSTONE fine to med. fine, subrounded grains, trace of shale, very fractured, poorly cemented, gray, wet.
			EOB @ 73.0'
			58.0'-63.0': 10 fractures RQD = 50%
			63.0'-68.0': 42 fractures RQD = 7%
			68.0'-73.0': 37 fractures RQD = 8%

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
51.0'-53.0'	145	10 0/3"	-	-		
54.0'-56.0'	200	-	-	-		

	Recovery	Total over 4"
58.0'-63.0'	36"	18"
63.0'-68.0'	54"	4"
68.0'-73.0'	58"	4.5"

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Environmental Services Division

Project Name: ARCS - Albion / Sheridan Twp. Landfill
Project No: 04011.02

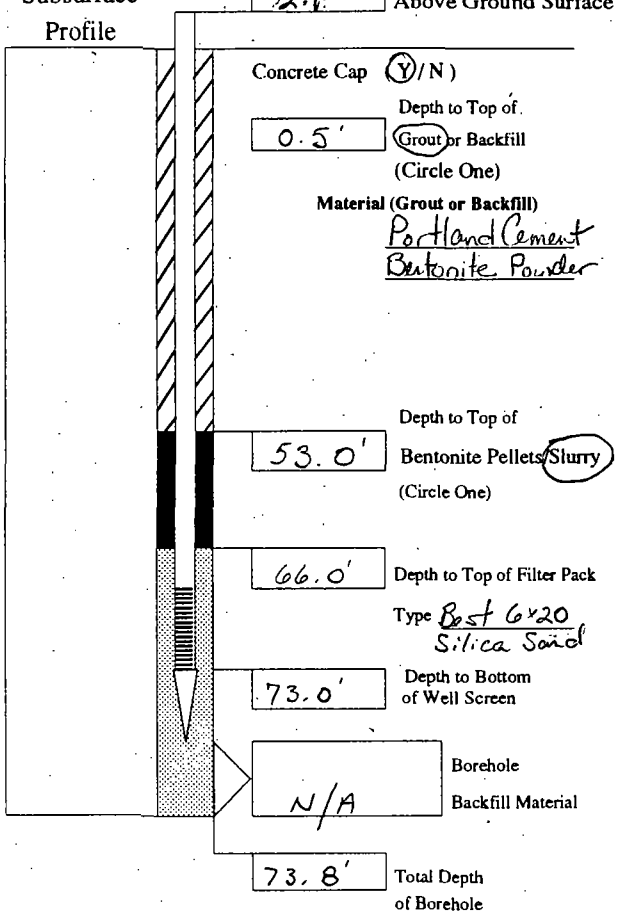
Log of Well Installation

Well Number: MW#45B

Top of Casing Elevation (feet): 978.025

Ground Surface Elevation (feet): 975.9'

Generalized Subsurface Profile



Water Level Data

Date	Water Level Below TOC
10/19/92	Predevelopment: 31.30'
10/22/92	After 25gal. purged: 31.32'
10/23/92	Stable: 31.34'
12/16/92	" : 30.98'

Development: Bailed 25gal. with teflon bailer.

Survey Reference: BM#W: See survey notes.

Well Casing
- Diameter: 2"
- Total Length: 70.0'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC Cap

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: .010 (10 slot)
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Sq.
- Height Above Ground: 2.6'
- Lock Type: 2402 Master lock

General Notes: 4" casing was driven from 53.0' (1.0' of collapse inside 6" PVC) to 58.0'. Rotary drilled 7.0' of sands from inside 4" to 58.0' prior to coring. Sands consist of quartz, granite, sandstone, trace of shale - some very coarse, may be some gravels - broken, angular appearance to larger grains. Materials still washing out of hole after several minutes - not due to circulating water. Pulled rods - hole open to 58.0'. Ran core barrel down hole. Cored 58.0'-63.0'. Lost circulation/recovery @ 61.3'. Hole only open to 59.0' - Reamed to 63.0'. Cored 63.0'-68.0'. Hole open to 68.0'. Cored 68.0'-73.0'. Reamed hole to 73.0' with 3 7/8" rotary bit. Set well.

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Page: 3 of 3
Well/Boring No. MW# 4 SB
Client: ARCS-Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 10/5/92 Finished:
Time: Started: 4:00p Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	SE 1/4	36	T.2S	R 4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH. 44321
Equipment: CME 750 (ATV)
Crew Chief: ED
WW Supervisor: Don Johnson

Location: 5601 N
4313.5 E

Drilling Method(s)		Depth
4¼" ID HSA	9/28/92	54.5'
8¼" ID HSA	10/5/92	55'

Grouting/Seal

Depth/To	Material/Method

Water Level: _____ ft. Below _____

Remarks: Rock-Core Drilling/Sampling Started @ 54.5' below Grade.

6" Casing Set from +2' to 53.5' Deep.
-Grouted-in place-

54.5'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
0.5	55'		Sandstone/Bedrock - Very Hard (Auger Refusal)

Sample Depth	Blow Counts 6"	12"	18"	24"	PID	Headspace	Background

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Environmental Services Division

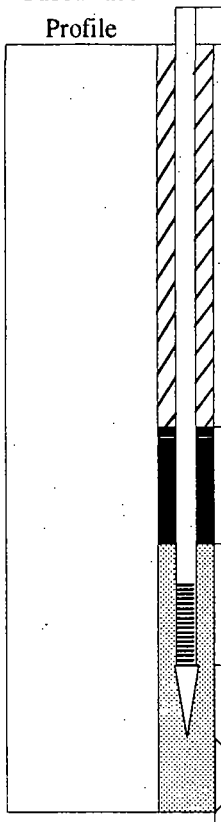
Project Name: ARCS-Albion

Project No: 04011.02

Log of Well Installation

Well Number: MW-4SB ~~BR~~ RST

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type.

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet):

Ground Surface Elevation (feet):

Water Level Data

Date	Water Level Below TOC

Development:

Survey Reference:

Well Casing	Diameter:	6"
	Total Length:	55.5'
	Material:	PVC (SCH. 80)
	Cap Type:	N/A
Well Screen	Diameter:	N/A
	Length:	
	Slot/Type:	
	Material:	
Protective well casing	Material:	N/A Dia.
	Height Above Ground:	
	Lock Type:	

General Notes:

* 6" PVC Casing from +2.' to 53.5', Grouted in Place for Deeper Rotary Drilling & Rock Coring. At A Later Date. *

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Page: 1 of 1
Well/Boring No. MW-4-5B
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 9/28/92 Finished: 10/20/92
Time: Started: 1:00P Finished: 2:00P

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE 1/4	36	2S	4W

Contractor: R&R
Address: AKRON, OH
Equipment:
Crew Chief:
WW Supervisor:

Location:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Remarks: Following core description by Rick Tripper.

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	~~Blow Counts~~ ~~6"~~	~~12"~~	18"	24"	PID Headspace	PID Background
			Sandstone, qtz, gray, fine-grained upper 1.1' v. well cemented, rest well cemented. Vugy w/ occasional gravel nodule & coal in upper 1.1'. This zone includes some chert, chert nodules & traces of coal. Some vugs lined w/ quartz crystals, v. slight trace of pyrite. Rock in this zone more broken w/ very irregular fractures. Lower portion of core contains horizontal fractures that appear to be induced.	58-73	RQD(%) 62	Recovery(%) 30				
			Sandstone, qtz, m. gray, fine grained, well cemented. Higher porosity than 58-73. Nearly vertical fracture 1.75-1.85' from top, rest of fractures horizontal & most appear to be induced. V. slight trace of coal & pyrite scattered throughout	63-68	90	7				
			Sandstone, as above. More porous than preceding core (63-68'). Horizontal fractures throughout - mostly appear induced. Possible natural fracture at 68.5-68.6. Some traces of mica throughout.	~~68-73~~ 68-73	~~97~~ 97	~~8~~ 8	RST			
			Trace to little pyrite in pores from approximately 67-73'.							

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Environmental Services Division

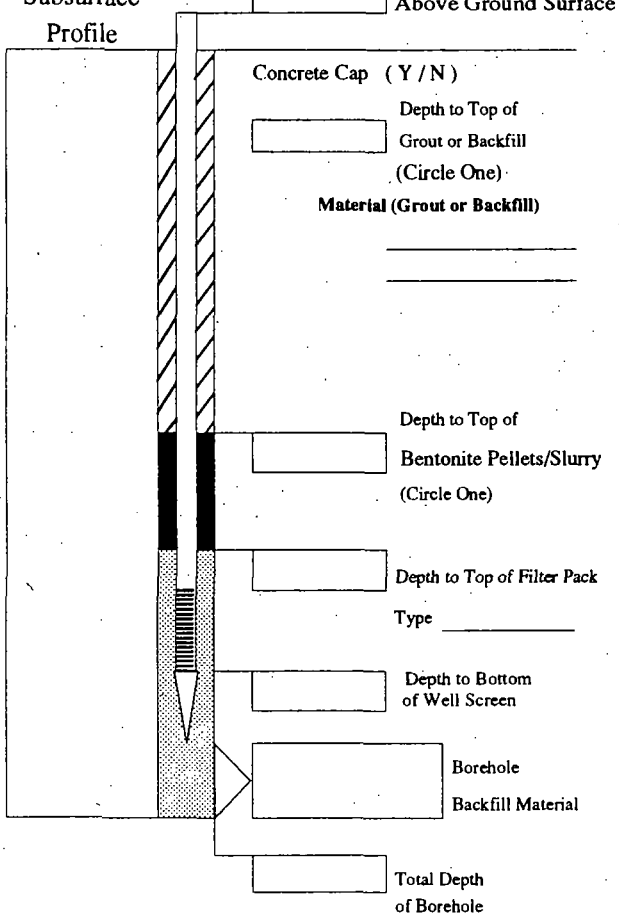
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#4DB
Client: ARCS - Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 11/16/92 Finished: 11/17/92
Time: Started: 12:00PM Finished: 3:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** NW of MW#4SB
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4 1/4" ID HSA	44.0'
3 7/8" Tricone Rotary	100.5'

Grouting/Seal

Depth/To	Material/Method
100.5'-100.0'	Natural cuttings
100.0'-93.0'	6x20 cs. gd. Silica Sand
93.0'-92.2'	20x40 f. gd. Silica Sand
92.2'-90.0'	Bentonite Pellets & Slurry
90.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix Concrete cap

Water Level: 29.0 ft. Below Surface

Remarks: No split spoons taken from this boring
Auger refusal @ 44.0'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / PID: Sample Depth	6"	12"	18"	24"	Headspace	Background
32.0'	32.0'		See log for MW#4SB for litho description per split spoon sampling.							
1.5'	33.5'	WBR	Conglomerate - cemented sand & gravel - very hard, fractured, layered in sandstone - dk gray, wet							
1.5'	35.0'	WBR	Weathered sandstone, poorly cemented, fine, soft, gray, wet							
1.5'	36.5'	WBR	Conglomerate - cemented sand & gravel - very hard, fractured, layered in sandstone, dk. gray, wet							
7.5'	44.0'	WBR	Weathered sandstone, fine, poorly cemented, soft, gray, wet							
56.5'+	100.5'+	BR	Bedrock, sandstone, fine to med. fine, very fractured, moderately cemented, gray, wet. Some harder, well cemented layers with depth - fractured throughout.							
			EOB @ 100.5'							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

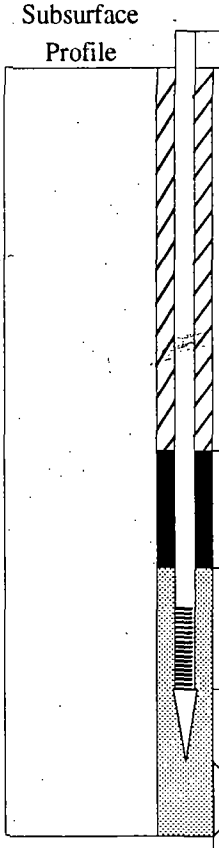
Log of Well Installation

Well Number: MW#4DB

Top of Casing Elevation (feet): 977.80'

Ground Surface Elevation (feet): 975.4'

Generalized Subsurface Profile



2.4' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement Powdered Bentonite

90.0' Depth to Top of Bentonite Pellets + Slurry ~~(Circle One)~~

92.2' - 20x40 fine grade Silica Sand

93.0' Depth to Top of Filter Pack

Type 6x20 Coarse grade Silica Sand

100.0' Depth to Bottom of Well Screen

Native cuttings Borehole Backfill Material

100.5' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/18/92	Predevelopment: 30.89'
11/25/92	Post development: 30.71'
12/16/92	Stable: 30.70'

Development: Pumped 2600 gal. with grundfos little cloudy to clear.

Survey Reference: BM#W = 981.11'

Well Casing
- Diameter: 2"
- Total Length: 97.5'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC Cap

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Sq.
- Height Above Ground: 3.2'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW# 5SG (Shallow Glacial)
Client: ARCS-Albion
Project No.: #04011.02
Date: Started: 11/11/92 Finished: 11/11/92
Time: Started: 8:00a Finished: 11:25a

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International **Location:** 18.5' East of MW#5SB
Address: 1234 S. Cleveland/Massillon Rd
Akron, OH
Equipment: CME 750 (ATV)
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0-28' * 2' of overdrill to 30'

Grouting/Seal

Depth/To	Material/Method
-See Reverse Side-	

Remarks: * Only 1- Split Spoon Collected throughout Boring.

Water Level: 19.2' ft. Below GD. Inside Augers

See log for MW#5SB to 30'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	Headspace	Background
2'	* 27'	SW/SP 1	Sand, Med. to CSE, Little Fine Gravel, trace fine Sand, brownish-Gray-wet	25'-27'	10	15	20	30	—	—
			- over Drilled to 30' for well Placement. -							

N/A ~~PID~~

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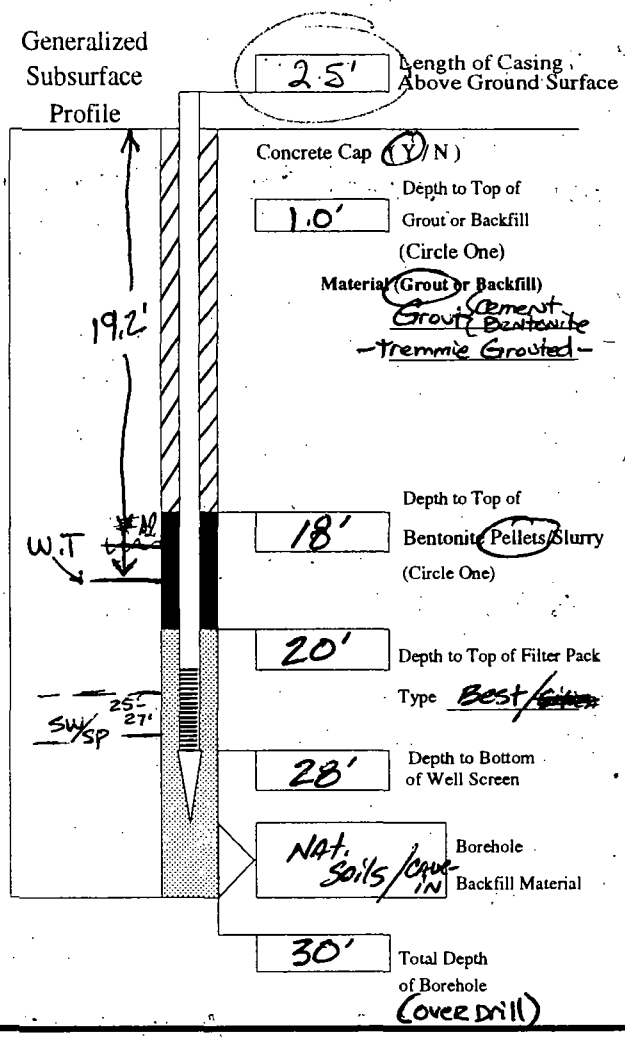
Environmental Services Division

Project Name: ARCS- ALBION
SHERIDAN TWP. LANDFILL.
Project No: 04011.02

Log of Well Installation

Well Number: MW # 5 SB Shallow Glacial

Generalized Subsurface Profile



2.5'	Length of Casing Above Ground Surface
Concrete Cap (Y / N)	
1.0'	Depth to Top of Grout or Backfill (Circle One)
Material (Grout or Backfill)	Grout (Cement, Bentonite) -Tremmie Grouted-
18'	Depth to Top of Bentonite Pellets/Slurry (Circle One)
20'	Depth to Top of Filter Pack
Type	Best/~~[illegible]~~
28'	Depth to Bottom of Well Screen
NAT. Soils/CAVE-IN	Borehole Backfill Material
30'	Total Depth of Borehole (Cover Drill)

Top of Casing Elevation (feet): 970.69'

Ground Surface Elevation (feet): 968.2'

Water Level Data

Date	Water Level Below TOC
11/11/92	Predevelopment ~21.7'
11/25/92	Post development: 21.09'
12/9/92	Stabilized: 21.01'

Development: Pumped 405 gal. with grundfos pump. - Silty to cloudy brown

Survey Reference: MW # 5 SB (T.O.C.) Elev. = 970.005

Well Casing	Diameter:	2"
	Total Length:	25.5'
	Material:	PVC
	Cap Type:	J-plug (Casing vented)
Well Screen	Diameter:	2"
	Length:	5'
	Slot/Type:	10-slot / Continuous wound
	Material:	PVC
Protective well casing	Material:	Aluminum Dia. 4" sq.
	Height Above Ground:	~~[illegible]~~ + 3.1'
	Lock Type:	MASTER # 2402

General Notes: Water Table is @ 19.2' / Top of Screen is Approx 3.8' below water Table (23'-28')

WW Engineering & Science
Environmental Services Division

Well/Boring No. MW#5SB
Client: ARCS - Albion Sheridan L.F.
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/13/92
Time: Started: 9:00AM Finished: 1:00pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Jackson	Parma	SW 1/4	31	T 2 N	R 3 W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Joe Zielinski
WW Supervisor: Cathie Cotton

Location: Approx: 57.00 N & 5300 E

Drilling Method(s)	Depth
4 1/4" ID HSA/Split spoon cont. to	60.5'
Dbl. Barrel clear water core to	75.5'

Drager Tube Methane Test
4.0'-6.0' @ 9:50 A None
8.0'-10.0' @ 10:15 A "
14.0'-16.0' @ 10:52 A "
18.0'-20.0' @ 11:25 A "

Grouting/Seal

Depth/To	Material/Method
75.5'-67.8'	Cs grade silica sand
67.8'-65.4'	Bentonite Pellets
65.4'-1.0'	Cement/Bentonite Grout

Tremmied from 60.0' to surface inside HSAs.

Water Level: 18.5 ft. Below Surface

Remarks: Augers @ 20.0' - waited 20 min for water level to stabilize: 18.5'. No split spoon recovery @ 24.0'-26.0': may have driven a cobble. Note stained area 1.0'-2.0' above water table. No readings on OVA in sample spoon were encountered: no odor detected. Split spoon refusal @ 56.9'. HSA refusal @ 60.5'. Reamed out augers to 60.2' with 3 7/8" tricone bit prior to rock coring. Reamed from 60.5' to 75.5' with 3 7/8" tricone bit after coring.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
1.8'	1.8'	SW	SAND, fine to med., some fine gravel, trace of silt, trace of organics - roots, wood, loose, dk. brown, moist.
2.1'	3.9'	SP	SAND, med. fine, well sorted, loose, lt. brown, little moist
0.9'	4.8'	SW	SAND, fine to coarse, little fine gravel, loose, lt. brown, little moist
2.2'	7.0'	SP	SAND, med. fine, well sorted, loose, lt. brown, little moist
4.9'	11.9'	SP	SAND, fine to med. fine, occ. small layers of coarse sand & fine gravel, loose, lt. brown, little moist *fine 0.01'-0.02' layer of coal @ 10.5' & 11.8'.
3.6'	15.5'	SP	SAND, med. fine, well sorted, loose, lt. brown, moist
1.3'	16.8'	SW	SAND, med. to coarse, little fine gravel, trace of clayey silt masses, loose, dk brown & multicolored, little moist.
0.9'	17.7'	SP	SAND, med. fine, loose, lt. brown, moist
0.2'	17.9	SP	SAND, med. fine, loose, dk gray/brown, very moist Appears stained - no noticeable odor.
0.8'	18.7'	GM	GRAVEL, fine - med., some silt, loose, rust colored, wet
2.3'	21.0'	SM	SAND, med. fine, some silt, little med-cs. sand - some black stained streaks from 18.7 to 19.5' +/-, little compacted, dirty rust to lt. rust, wet

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
0.0'-2.0'	2	1	3	6	0	5
2.0'-4.0'	6	4	5	5	Blip	5
4.0'-6.0'	5	6	7	10	0	5
6.0'-8.0'	7	8	12	14	Blip	5
8.0'-10.0'	8	8	8	9	0	5
10.0'-12.0'	5	7	5	13	0	5
12.0'-14.0'	9	9	8	12	0	5
14.0'-16.0'	7	9	8	11	Blip	5
16.0'-18.0'	6	6	9	13	7	5
18.0'-20.0'	11	9	9	11	8	5
20.0'-22.0'	8	9	8	16	18	5
22.0'-24.0'	0	0	5	10	25	5
24.0'-26.0'	3	5	7	11		
26.0'-28.0'	4	3	5	8		
28.0'-30.0'	5	7	8	9		
30.0'-32.0'	3	4	6	6		
32.0'-34.0'	8	6	4	6		
34.0'-36.0'	5	5	6	5		
36.0'-38.0'	6	5	8	11		
38.0'-40.0'	9	5	5	9		
40.0'-42.0'	0	3	5	6		
42.0'-44.0'	6	9	13	15		
44.0'-46.0'	6	8	9	13		
46.0'-48.0'	10	11	11	8		

Below Water

WW Engineering & Science
Environmental Services Division

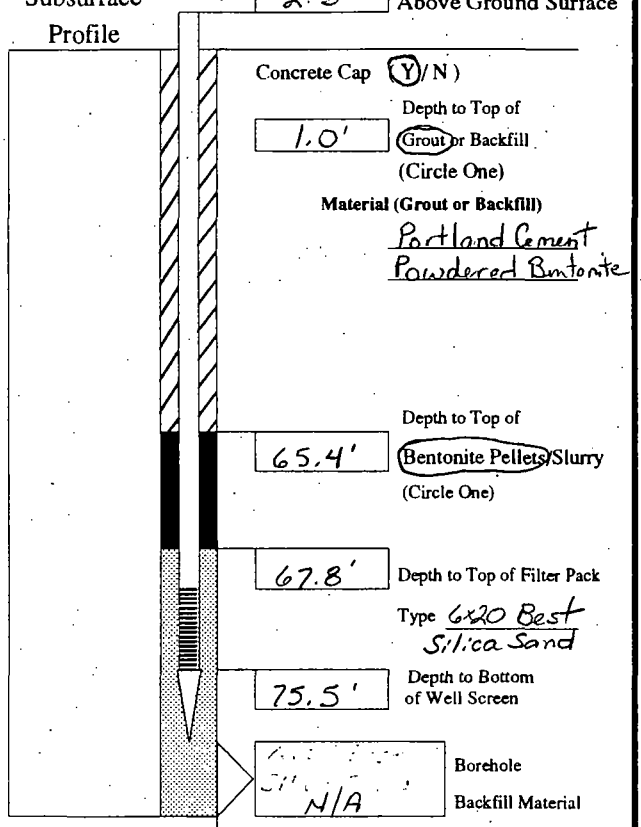
Project Name: ARCS - Albion/Sheridan Twp. LF.

Project No: 04011.02

Log of Well Installation

Well Number: MW# 5SB

Generalized Subsurface Profile



2.5' Length of Casing Above Ground Surface

Concrete Cap (Y)/N)

1.0' Depth to Top of (Grout) or Backfill (Circle One)

Material (Grout or Backfill) Portland Cement Powdered Bentonite

65.4' Depth to Top of (Bentonite Pellets)/Slurry (Circle One)

67.8' Depth to Top of Filter Pack

Type 6x20 Best Silica Sand

75.5' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

75.5' Total Depth of Borehole

Top of Casing Elevation (feet): 970.005

Ground Surface Elevation (feet): 967.5'

Water Level Data

Date	Water Level Below TOC
10/14/92	Predevelopment: 22.81'
10/21/92	After 25 gal purged: 22.78'
10/22/92	Stable: 22.80'
11/25/92	" : 22.43' 12/7/92 = 22.55'

Development: Bailed 50 gal. w/Teflon bailer

Survey Reference: BM#N: See survey notes

Well Casing
- Diameter: 2"
- Total Length: 72.5'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC, vented cap

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: .010 (10 slot)
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Alum. Dim. 4" Sq.
- Height Above Ground: 3.2'
- Lock Type: #2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 2 of 3
Well/Boring No. MW#5 S8
Client: ARCS-Albion Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/13/92
Time: Started: 9:00 AM Finished: 1:00 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Jackson	Parma	SW 1/4	31	T2N	R3W

Contractor: R&R International Inc
Address: 1234 S. Cleveland-Massillon Rd. Akron OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Joe Zielinski
WW Supervisor: Cathie Cotton

Location: See pg. 1 of 3

Drilling Method(s)	Depth
4 1/4" ID HSA/Split spoon cont. to	60.5'
Dbl. Barrel clear water core to	75.5'

Grouting/Seal

Depth/To	Material/Method
See pg. 1 of 3	

Remarks:

Water Level: 18.5 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
2.4'	23.4'	SP	SAND, fine to med., trace of cs. sand & fine gravel, loose, brown, wet.
2.6'	26.0'	SP	SAND, med. fine to med., little silt, gray/brown, wet
2.0'	28.0'	SP	SAND, fine to med. fine, loose, lt. gray with some black grains, appears natural, wet
1.8'	29.8'	SP	SAND, fine to very fine, little silt, lightly compacted, lt. gray, wet
1.9'	31.7'	SP/SC	SAND, fine to med. fine, occ. fine lense of gray clay, loose, gray, wet
0.3'	32.0'	SC/CL	CLAY, very sandy, soft, cohesive, gray, very moist
4.6'	36.6'	SP	SAND, fine to very fine, loose, brownish gray, wet
1.4'	38.0'	ML	SILT, some very fine sand, compacted, medium gray with occ. fine black streaks, wet
4.0'	42.0'	SP	SAND, fine - very fine, loose, gray/brown, wet.
3.8'	45.8'	SP	SAND, fine, becoming well compacted, lt. brown with several multicolored quartz grains, wet.
0.2'	46.0'	SW	SAND, fine to med. coarse, little fine gravel, loose, brown, wet
6.0'	52.0'	GW	GRAVEL, fine to med., some coarse gravel & cobbles, little med. to coarse sand, loose, multi. colored, wet. - trace of silt & very fine sand.

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
48.0'-50.0'	3	6	9	10		
50.0'-52.0'	7	8	7	17		
52.0'-54.0'	2	3	3	5		
54.0'-56.0'	5	20	30	42		
56.0'-58.0'	50	1 50/5"	–	–		

WW Engineering & Science
Environmental Services Division

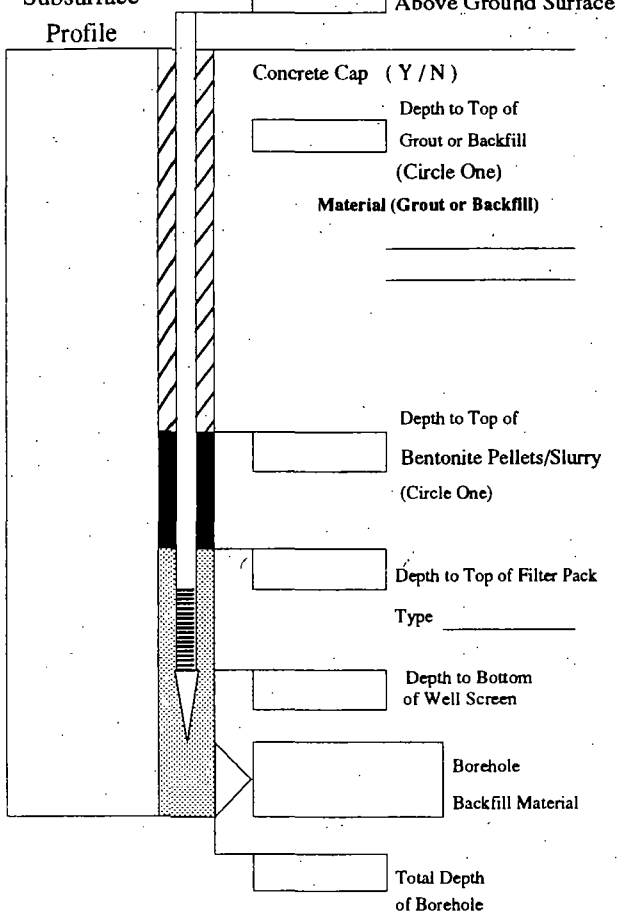
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 3 of 3
Well/Boring No. MW #5SB
Client: ARCS-Albion Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 10/7/92 Finished:
Time: Started: 9:00 AM Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Jackson	Parma	SW 1/4	31	T2N	R3W

Contractor: R&R International Inc
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Joe Zielinski
WW Supervisor: Cathie Cotton

Location: See pg 1 of 3

Drilling Method(s)	Depth
4 1/4" ID HSA/Splitspoon -	60.5'
Dbl. Barrel clear water core	75.5'

Grouting/Seal

Depth/To	Material/Method
See pg. 1 of 3	

Remarks: Bore hole was reamed after coring with 3 7/8" tricone rotary bit from 60.5'-75.5'.

Water Level: 18.5 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / PID: Sample Depth	6"	12"	18"	24"	Headspace	Background
2.2'	54.2'	CL	CLAY, little fine sand, little fine to med. gravel, soft, cohesive, gray, moist							
4.8'	59.0'	WBR	WEATHERED SANDSTONE, fine to med. fine, friable with poorly cemented layers, lt. gray, moist							
16.5'	75.5'	BR	SANDSTONE, well fractured throughout - mainly horizontal with some fractures ranging from 10°-45°, subrounded with some subangular grains, gray with trace of black, brown & clear quartz, trace of micaceous fragments throughout, predominantly fine to med. fine grained, moderately cemented layers interbedded with fine to very fine, well cemented layers, occasional trace of iron deposit.							
				Recovery	Total over 4"					
			60.2-65.5': 19 fractures. RQD = 46%	5'4"		29.5"				
			65.5'-70.5': 14 fractures. RQD = 76%	4'10"		44.0"				
			70.5'-75.5': 12 fractures. RQD = 78%	4'7"		43.0"				
			EOB @ 75.5'							

WW Engineering & Science
Environmental Services Division

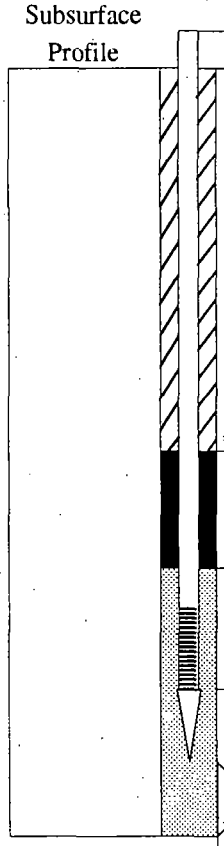
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill) _____

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW-5-SB
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/13/92
Time: Started: 9 AM Finished: 1 PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	JACKSON	PARMA	SW/4	31	2N	3W

Contractor: R&R
Address: AKRON, OH
Equipment:
Crew Chief:
WW Supervisor:

Location:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Remarks: Following core description by Rick Tripp.

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
	75.5		Sandstone, qtz., gray, v. fine to fine-grained, well cemented. Horizontal fractures throughout appear to be mostly induced. Trace of pyrite in pores throughout. Occasional trace of iron-staining & mica throughout. Porous throughout, least porous from 65.7-67.4. 45° fracture 66.3-66.4 & 66.5-66.6.

Sample Depth	RQD (%) / Recovery (%) 6"	12"	18"	24"	PID Blows/6 inches	Headspace	Background
60.2-65.5	100	49					
65.5-70.5	97	73					
70.5-75.5	92	72					

WW Engineering & Science
Environmental Services Division

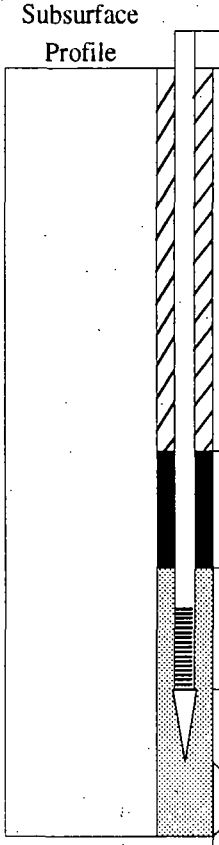
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

_____

_____

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): [ ]

Ground Surface Elevation (feet): [ ]

Water Level Data

Date	Water Level Below TOC

Development: _____

_____

Survey Reference: _____

_____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW# 6 SB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/19/92 Finished: 11/19/92
Time: Started: 7:45 AM Finished: 11:15 AM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International **Location:**
Address: Akron, OH.
Equipment: CME 750 (ATV)
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-30'

Grouting/Seal

Depth/To	Material/Method
- See Reverse Side -	

Remarks: Split Spooned 25'-27' for CEC Analysis (Wet soils)

Water Level: 20.6 ft. Below GD.

See Lithology for MW#6 SB to 30'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background
25'-27'	2	5	13	15	—	8:35

N/A ~~PID~~

WW Engineering & Science
Environmental Services Division

Project Name: ARCS- Albion Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW#6 SG

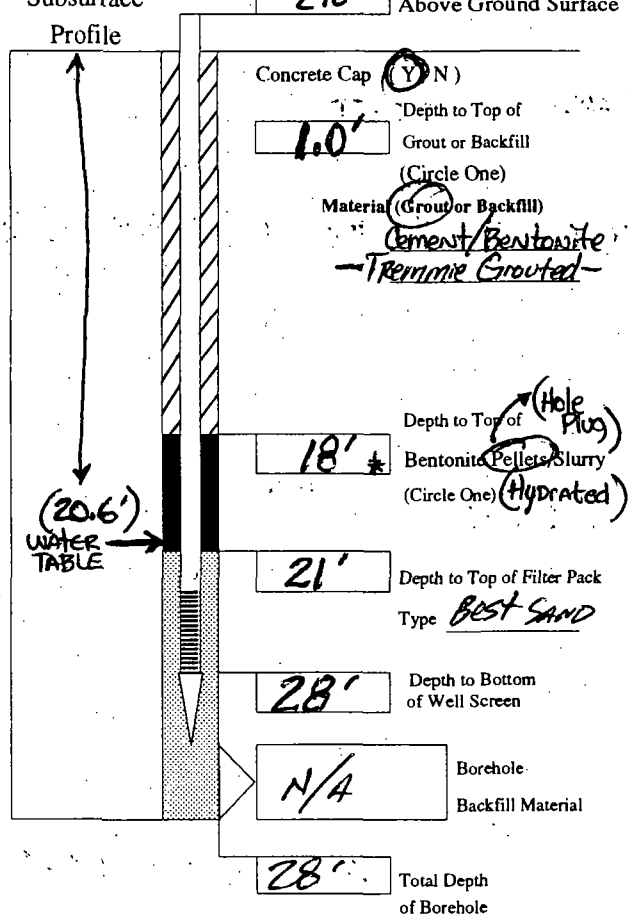
Top of Casing Elevation (feet): 969.23'

Ground Surface Elevation (feet): 967.7'

Water Level Data

Date	Water Level Below TOC
11/25/92	Post development: 21.47'
12/15/92	Stabilized: 21.34'

Generalized Subsurface Profile



2.0' Length of Casing Above Ground Surface

Concrete Cap (Y N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill) Cement/Bentonite —Tremmie Grouted—

18'* Depth to Top of Bentonite Pellets/Slurry (Circle One) (Hole Plug) (Hydrated)

21' Depth to Top of Filter Pack

Type BEST SAND

28' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

28' Total Depth of Borehole

Development: Bailed 18.5 gal - Very poor recovery - Some silt.

Survey Reference: BM# W - See survey

Well Casing	Diameter:	2"
	Total Length:	25'
	Material:	PVC
	Cap Type:	J-plug
Well Screen	Diameter:	2"
	Length:	5' (60")
	Slot/Type:	10-Slot/ ~~Continuous wound~~
	Material:	PVC
Protective well casing	Material:	Aluminum Dia. 4" sq
	Height Above Ground:	~~3.0'~~ 2.4'
	Lock Type:	MASTER # 2402

General Notes: * Used "Hole-plug" instead of (Bentonite) Pellets as seal between the Sand Pack material & the Grout. (3' seal; Hydrated w/ 1 gal. H2O (DI water) prior to Grouting.)

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW# 6WB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/18/92 Finished: 11/18/92
Time: Started: 1:20p Finished: 5:45p

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International **Location:**
Address: 1234 S. Cleveland/Massillon Rd. Akron, OH.
Equipment: CME 750 (ATV)
Crew Chief: ED Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-52'

Grouting/Seal
Depth/To Material/Method
- See Reverse Side -

Remarks: Ground Elevation Appears to be About the Same As MW# 6SB
* Started Drilling Hard/Slow @ 41' (Layered weathered Sandstone) 1000-1200 psi - Down Pressure / Split Spoon Refusal @ 48'-50' Depth. - No CEC Sample Collected in this Borehole - Bedrock -

Water Level: 20.8' ft. Below GD.

See Lithology for MW# 6SB to 52'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background
48'-50'	100	for	1/2"	—	* No Sample Recovered for CEC Analysis *	

N/A PID

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW # 6 WB

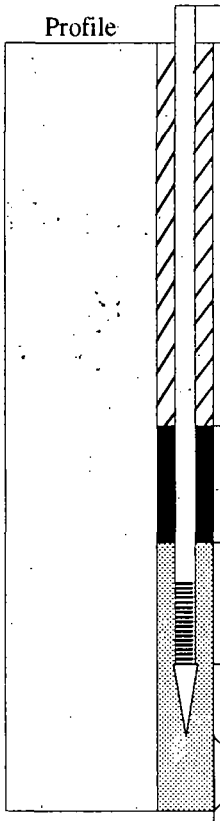
Top of Casing Elevation (feet): 969.81

Ground Surface Elevation (feet): 967.2'

Water Level Data

Date	Water Level Below TOC
11/16/92	23.42' (Pre-development)
11/25/92	Postdevelopment: 22.60'
12/9/92	stabilized: 23.21'

Generalized Subsurface Profile



2.6' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement/Bentonite - Tremmie Grouted - (from 39')

38' Depth to Top of Bentonite Pellet/Slurry (Circle One)

42' - Vi Fine Silica

43 Depth to Top of Filter Pack

Type Best (Brand)

51' * Depth to Bottom of Well Screen

Nat. Soils Borehole Backfill Material

52' Total Depth of Borehole

Development: Pumped 225 gal. with Grundfos pump - silty to little cloudy

Survey Reference: BM # W - See survey

Well Casing	Diameter:	2"
	Total Length:	48.6'
	Material:	PVC
	Cap Type:	J-plug
Well Screen	Diameter:	2"
	Length:	5' (60")
	Slot/Type:	10-slot / ~~Continuous wound~~
	Material:	PVC
Protective well casing	Material:	Aluminum Dia. 4" sq.
	Height Above Ground:	3.5' ±
	Lock Type:	Master # 2402

General Notes: Projected Depth was 46.5' to 51.5' Deep. / Well Came-up 6" During Sand Packing of Screen. (Loss of 6" in Depth of well)

WW Engineering & Science
Environmental Services Division

Well/Boring No. MW#6DB (Changed to MW#6SB)
Client: ARCS-Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 10/26/92 Finished: 11/9/92
Time: Started: 9:00 AM Finished: 3:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Ed Pucci
WW Supervisor: Cathie Cotton

Location:

Drilling Method(s)	Depth
4 1/4" ID HSA	55.0'
3" dia. Core barrel	75.0'

Grouting/Seal

Depth/To	Material/Method
75.3'-68.0'	Cs. grade silica sand
68.0'-64.0'	Bentonite Pellets
64.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Concrete Pad

Water Level: 20.0 ft. Below Surface

Remarks: Methane draeger tubes:
4.0'-6.0' @ 9:35 AM - Clean
8.0'-10.0' @ 9:55 AM - "
14.0'-16.0' @ 10:30 AM - "
18.0'-20.0' @ 10:45 AM - "

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
3.6'	3.6'	SM/GM	SAND, fine to med. fine, some silt, little fine to med. gravel, loose, layered lt. & dk. brown, moist.
0.6'	4.2'	SP	SAND, med. fine, little silt, trace of fine gravel, loose, lt. brown, little moist.
0.3'	4.5'	SC/CL	CLAY, some fine sand & silt, little fine gravel, firm, crumbly, little cohesive, dk. brown, moist
1.4'	5.9'	SM/GM	SAND & SILT, poorly sorted, little fine gravel, trace of clay, dk. brown, moist.
2.3'	8.2'	SP	SAND, fine to very fine, little med. fine sand, loose, lt. brown, moist
3.8'	12.0'	SW	SAND, poorly sorted, fine to coarse, fine layer of coal @ 8.5' +/-, loose, lt. brown, moist
0.4'	12.4'	SP	SAND, fine to med. fine, loose, blonde, moist.
2.6'	15.0'	GW/SW	SAND & GRAVEL, poorly sorted, loose, lt. brown, little moist.
1.3'	16.3'	SP	SAND, med. fine, trace of coarse sand & fine gravel, loose, blonde, little moist.
1.7'	18.0'	GW/SW	SAND & GRAVEL, poorly sorted, trace of silt, loose, dk. brown, little moist.
5.0'	23.0'	SM	SAND, med. fine, some silt, loose, brown, moist to damp.
2.3'	25.3'	SW	SAND, fine to coarse, very silty, loose, brown, wet.
0.9'	26.2'	CL	CLAY, very silty, some fine sand, little fine gravel, (Cont. on pg. 2 of 3)

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace (PID OVM 580 B)	Background
0.0'-2.0'	4	3	5	6		
2.0'-4.0'	3	4	5	6		
4.0'-6.0'	4	4	4	6		
6.0'-8.0'	8	8	7	7		
8.0'-10.0'	6	6	6	9		
10.0'-12.0'	4	8	11	16		
12.0'-14.0'	4	9	13	13		
14.0'-16.0'	4	6	6	9		
16.0'-18.0'	6	12	13	12		
18.0'-20.0'	4	4	6	6		
20.0'-22.0'	2	1	1	0		
22.0'-24.0'	0	0	0	1		
24.0'-26.0'	4	7	8	7		
26.0'-28.0'	6	7	5	5		
29.0'-31.0'	5	3	4	5		
31.0'-33.0'	1	2	4	4		
34.0'-36.0'	20	38	60/4"	-		
36.0'-38.0'	100	—	—	—		
39.0'-41.0'	10 0/2"					
41.0'-43.0'	10 0/3"					

WW Engineering & Science
Environmental Services Division

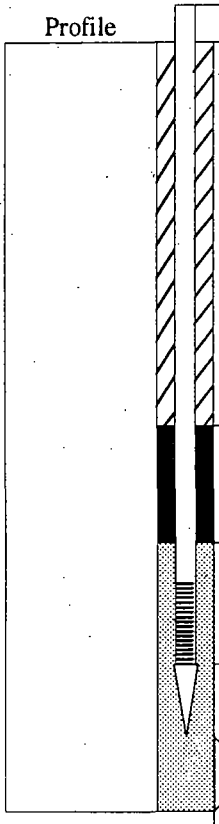
Project Name: ARCS-Albion/Sheriden Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: See pg. 3 of 3

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet):

Ground Surface Elevation (feet):

Water Level Data

Date	Water Level Below TOC

Development:

Survey Reference:

Well Casing
- Diameter:
- Total Length:
- Material:
- Cap Type:

Well Screen
- Diameter:
- Length:
- Slot/Type:
- Material:

Protective well casing
- Material: Dia.
- Height Above Ground:
- Lock Type:

General Notes: Temp. Well #1 - 19.0'-24.0' : 1.5 hrs. to develop & sample. Removed 20 gal. Sampled @ 11:30 AM.

Temp. Well #2 - 24.0'-29.0' : 1.5 hrs to develop & sample. Removed 30 gal. Sampled @ 1:30 PM.

Temp. Well #3 - 29.0'-34.0' : 1.0 hr. to develop & sample. Silty/Clayey zone - very poor recovery. Removed one well volume - 2 gal. prior to sampling. Sampled @ 3:30 PM.

Temp. Well #4 - 34.0'-39.0'. Flushed augers with ±50 gal. of water prior to installing well, to remove silts & clays. Pumped well with 2" grundfos to develop well - slow recovery. Removed 60 gal. prior to sampling. Sampled @ 10:30 AM, 10/27/92.

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Page: 2 of 3
Well/Boring No. MW#6DB (Changed to MW#6S8)
Client: ARCS-Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 10/26/92 Finished: 11/9/92
Time: Started: 9:00 AM Finished: 3:30 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International **Location:**
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Ed Pucci
WW Supervisor: C. Cotton

Drilling Method(s)	Depth
4 1/4" ID HSA -	55.0'
3" dia. corebarrel -	75.0'

Grouting/Seal

Depth/To	Material/Method

Water Level: 20.0 ft. Below Surface

Remarks: WBR = Weathered bedrock
BR = Unweathered bedrock
TW#1 = 19-24'
TW#2 = 24'-29'
TW#3 = 29'-34'
TW#4 = 34'-39'
TW#5 = 39'-44' (11/2/92)
TW#6 = 44'-49'
* Bedrock @ 49'. Drilled augers to 55'.
Cored 55'-65' (Top of packer to bottom of 5' x 1 1/4" screen = 9.0')
TW#7 = 55'-65' (" " " ")
TW#8 = 65'-75' (" " " ")

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / PID: Sample Depth	6"	12"	18"	24"	Headspace	Background
			firm, crumbly, brown, moist							
0.8'	27.0'	SC	CLAY & SAND soft, crumbly, gray, moist							
2.2'	29.2'	SM	SAND, very fine to fine, silty, semi compacted, gray, wet							
1.8'	31.0'	SC/SM	CLAY & SAND, some silt, trace fine gravel, soft, some fine layers of loose sand, gray, damp							
2.5'	33.5'	SM/SW	SAND & SILT, poorly sorted - little cs. sand, trace of clay, soft, gray, damp							
1.0'	34.5'	SC/SM	SAND & CLAY, some silt little fine gravel, soft, little cohesive, gray/brown, moist							
14.5'	49.0'	WBR	WEATHERED SANDSTONE, fine - med. fine, very poorly cemented, some layers of loose fine to coarse sand, lt. gray, wet - becoming harder with depth - trace of fine-med. gravel in loose sand fractures.							
			*Note - Very loose active sands heaving into augers after spooning 44.0'-46.0' - 95' of blow-in in augers. Drilled to 49.0' to bypass active zone. After Temp Well @ 49.0', heaving sand & gravel still flowing into augers due to pulling back 5' to expose screen. Advanced augers to 55' to seal off loose, active materials							

WW Engineering & Science
Environmental Services Division

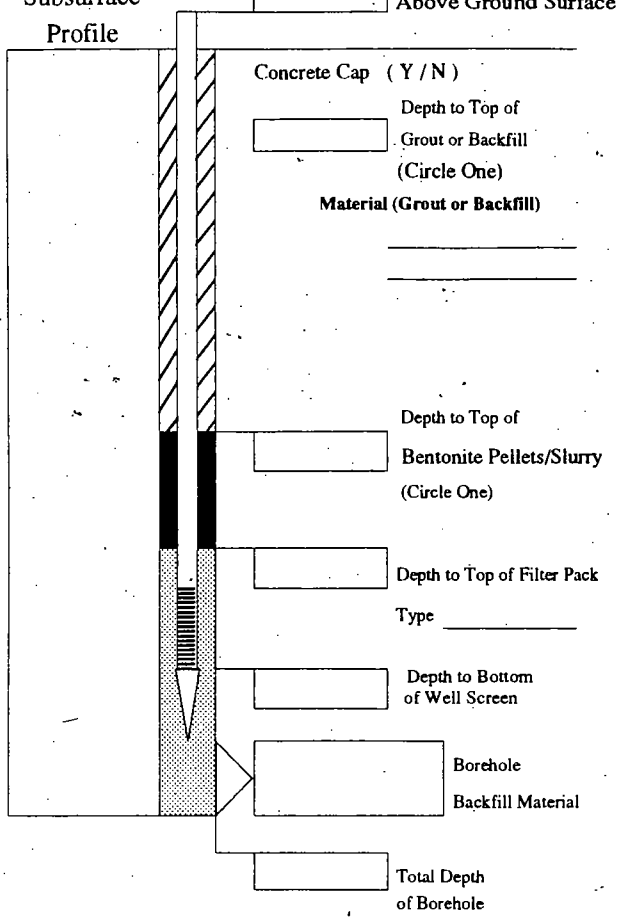
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Well/Boring No. MW#6DB (Changed to MW#6SB)
Client: ARCS - Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 10/26/92 Finished: 11/9/92
Time: Started: 9:00 AM Finished: 3:30 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Ed Pucci
WW Supervisor: C. Cotton

Location:

Drilling Method(s)	Depth
4¼" ID HSA	55.0'
3" dia. Core barrel	75.0'

Grouting/Seal

Depth/To	Material/Method

Remarks: Used 500 gal to core 65'-75'

Water Level: 20.0 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / PID Sample Depth	6"	12"	18"	24"	Headspace	Background
	75.0'	BR	SANDSTONE, very fine to fine, some small layers of med. fine grain - very poorly cemented sandstone, majority of core is moderate to poorly cemented, grains are subrounded gray quartz with trace of white, clear & brown quartz & trace of black shale(?), Heavily fractured, evenly throughout - all fractures are vertical with one 45° fracture @ 56.5' and one horizontal fracture @ 59.5'. Fractures appear to have very fine, free flowing gray sands within. 0.05' layer of gray clay @ 69.0' - firm, smooth, cohesive. Trace of mica beginning @ 64.0'.	55'-65' - 108" Recovery RQD = 9%						
				65'-75' - 108" Recovery RQD = 0%						

WW Engineering & Science
Environmental Services Division

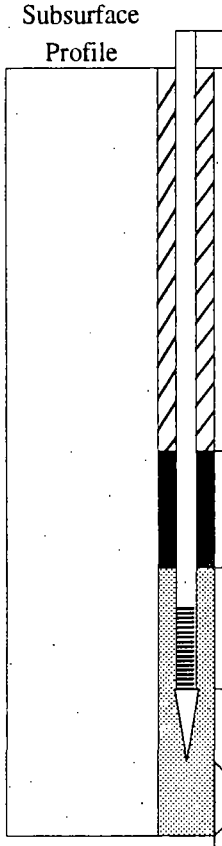
Project Name: ARCS-Albion

Project No: 04011.02

Log of Well Installation

Well Number: MW #6 SB

Generalized Subsurface Profile



2.6' Length of Casing Above Ground Surface

Concrete Cap (Y / N)

1.0' Depth to Top of Grout or Backfill (Circle One) 11/9

Material (Grout or Backfill): Cement Grout, Bentonite

64' 11/9/92 ~~65'~~ Depth to Top of Bentonite Pellets/Slurry (Circle One)

68' Depth to Top of Filter Pack

Type 6x20 Silica Sand

75.3' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

75.3' Total Depth of Borehole

Top of Casing Elevation (feet): 969.77'

Ground Surface Elevation (feet): 967.3'

Water Level Data

Date	Water Level Below TOC
11/9/92	Postdevelopment: 22.99'
11/25/92	Stabilized: 22.91'
12/9/92	" 22.83'

Development: 250 gals w/ Keck pump & Grundfos pump - Sediment free

Survey Reference: BM # W - See survey

Well Casing
- Diameter: 2"
- Total Length: 72.8'
- Material: PVC
- Cap Type: J-plug

Well Screen
- Diameter: 2"
- Length: 5'
- Slot/Type: 10-slot
- Material: PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 2.95'
- Lock Type: 2402 master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW-6-SB
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 10/26/92 Finished: 11/10/92
Time: Started: 9 Am Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE/4	36		

Contractor: R&R International **Location:**
Address:
AKRON, OH
Equipment: CME 75
Crew Chief: E. PUCCI, J. MCCURDY
WW Supervisor:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Remarks: Following core description by Rick Tuppel

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	~~6"~~	~~12"~~	18"	24"	Headspace	Background
	58.1	—	Sandstone, gray, v. fine to fine-grained, well cemented. Horizontal fractures throughout - most appear to be induced. 45° fracture from 55.4 - 56.5. V. slight trace of pyrite throughout. Porous.	55.0-65.0	90	9				
	69.0		Sandstone, med. gray, well cemented. Horizontal fractures throughout - most appear to be induced. Trace of pyrite throughout. Slight trace of iron staining throughout							
	69.1		Clay, lt. gray, soft							
	75+		Sandstone, as above.							

Blow Counts
PID
RQD (%)
Recovery (%)

WW Engineering & Science
Environmental Services Division

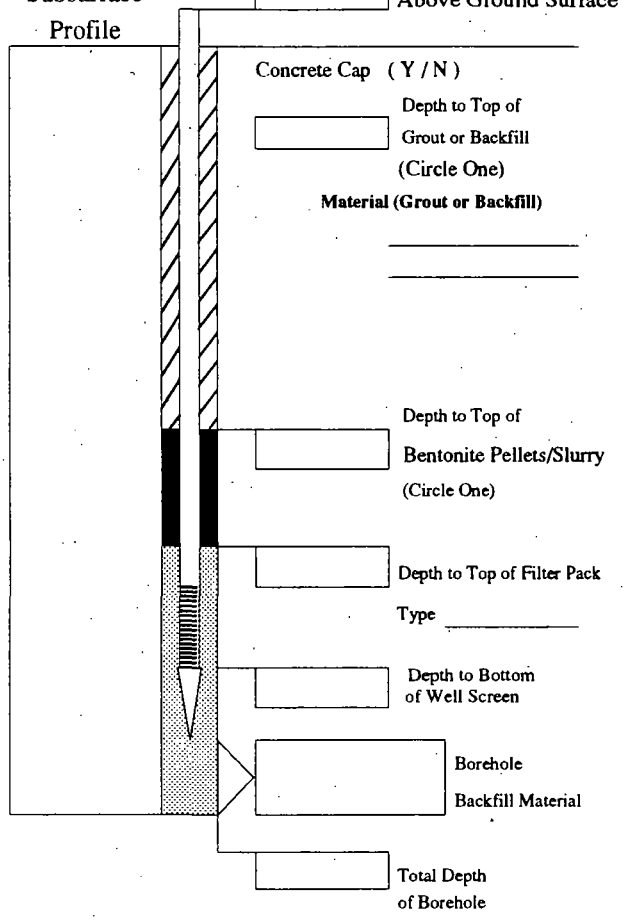
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#7SG
Client: ARCS - Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 12/10/92 Finished: 12/10/92
Time: Started: 3:30pm Finished: 4:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** 5144 N + 4688.5 E
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Trucking
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4 1/4" ID HSA	20.0'

Grouting/Seal

Depth/To	Material/Method
20.0'-12.3'	6x20 cs.gd. Silica Sand
12.3'-10.0'	Bentonite Pellets
10.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix Concrete pad

Remarks: No splitspoon samples collected.
No water used for drilling.

Water Level: 13.0 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
	20.0'		See log for MW#7SB for lithologic description
			EOB @ 20.0'

Sample Depth	Blow Counts 6"	12"	18"	24"	PID	Headspace	Background

WW Engineering & Science
Environmental Services Division

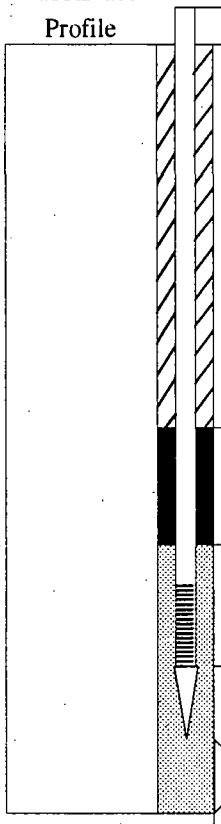
Project Name: ARCS- Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW# 7SG

Generalized Subsurface Profile



3.1' Length of Casing Above Ground Surface

Concrete Cap (Y N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement Powdered Bentonite

10.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

12.3' Depth to Top of Filter Pack

Type 6x20 cs. gid. Silica Sand

20.0' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

20.0' Total Depth of Borehole

Top of Casing Elevation (feet): 963.905

Ground Surface Elevation (feet): 960.8'

Water Level Data

Date	Water Level Below TOC
12/11/92	Predevelopment: 16.30'
12/18/92	Post development = 16.31'
12/22/92	Stabilized = 16.31'

Development: Bailed/Surge Block - 65 gal. removed. Silty/Sandy to silty

Survey Reference: R.R. Spike in P. Pole @ SW cor. support area, N. side. E. Erie

Well Casing
- Diameter: 2"
- Total Length: 18'
- Material: Schedule 40 PVC
- Cap Type: Pressure tight "J" plug

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Sq
- Height Above Ground: 3.6'
- Lock Type: 2402 master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW # 7WB
Client: ARCS - Albion/Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 12/9/92 Finished: 12/10/92
Time: Started: 12:45pm Finished: 3:00pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 5144N + 4678E

Drilling Method(s)	Depth
4 1/4" ID HSA	47.0'

Grouting/Seal

Depth/To	Material/Method
47.0'-40.0'	6x20 cs. grd. Silica Sand
40.0'-38.0'	Bentonite Hole plug
38.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix concrete pad

Water Level: 12.5 ft. Below Surface

Remarks: No split spoon samples collected. Cobbles jammed in augers while attempting to sand pack well. Had to pull augers & well, then re-fill hole. Lost screen in hole while pulling augers & well - unable to retrieve. Drilled out screen with rotary button bit - washed hole clean. Reset well, sand packed, sealed & grouted. Water used to wash hole: 200 gal.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
	47.0'		See log for MW # 7SB for lithologic description
			EOB @ 47.0'

Blow Counts: Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background

WW Engineering & Science
Environmental Services Division

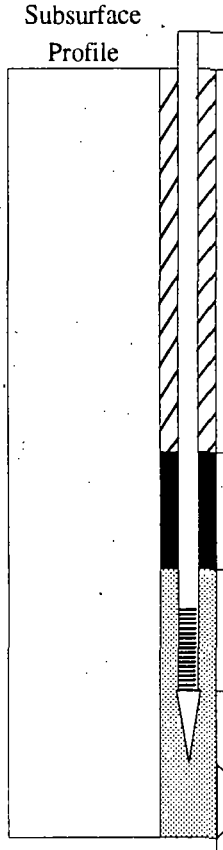
Project Name: ARCS-Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#7WB

Generalized Subsurface Profile



2.9' Length of Casing Above Ground Surface

Concrete Cap (Y)/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement Powdered Bentonite

38.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

40.0' Depth to Top of Filter Pack

Type 6x20 cs.gd. Silica Sand

47.0' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

47.0' Total Depth of Borehole

Top of Casing Elevation (feet): 963.635

Ground Surface Elevation (feet): 960.7'

Water Level Data

Date	Water Level Below TOC
12/11/92	Predevelopment: 16.79
12/14/92	Postdevelopment = 16.74'
12/22/92	Stabilized = 16.72'

Development: Pumped with 2" Grundfos submersible, surged several times. Removed 200gal. Silty to cloudy.

Survey Reference: R.R. Spike in P.Pole @ SW cor. of support area, N. side of E. Erie St.

Well Casing
- Diameter: 2"
- Total Length: 45.0'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 3.2'
- Lock Type: 2402 master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 2
Well/Boring No. MW#7SB
Client: ARCS- Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 12/7/92 Finished: 12/9/92
Time: Started: 1:45pm Finished: 12:15pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc **Location:** 5144N + 4668E
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4 1/4" ID HSA	43.5'
3 7/8" Rotary w/Tricone Button Bit	61.0'

Grouting/Seal

Depth/To	Material/Method
61.0'-60.0'	Settled cuttings
60.0'-53.0'	6x20 cs.gd. Silica Sand
53.0'-51.0'	Bentonite Hole plug
51.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix Concrete Pad

Water Level: 12.2 ft. Below Surface

Remarks: Sheen noted on water in wash bucket after 3 or 4 spoons had been deconned. Changed wash water & bucket slight sheen noted again after 2 or 3 more spoons deconned.
Solid spoon refusal @ 39.0'
Auger refusal @ 43.5'

900 gal. H_2O used to rotary drill

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
8.0'	8.0'	SP	SAND, fine to med. fine, little med-cs. sand, trace fine-med. gravel, trace silt; loose, red/brown, moist
1.2'	9.2'	SM/GM	SILT, some fine sand, some med-cs. gravel, becoming more compact, yellow/brown, trace moist
1.3'	10.5'	SW	SAND, fine to med, little cs. sand & fine-med. gravel, moderately compacted, rust/brown, moist.
14.2'	24.7'	SW	SAND, med. to coarse, some fine-med. grav, little cs. gravel, little silt, loose, dk. rust/brown with trace of black staining @ water table, moist to wet @ 12.2'
1.3'	26.0'	SC	SAND & CLAY, very soft, little fine gravel, dk. gray/brown, very moist
3.8'	29.8'	SM/GM	SAND & SILT, some fine gravel, very soft, gray, wet
0.7'	30.5'	GM	SILT & GRAVEL, some fine sand, loose, gray, wet
1.5'	32.0'	GW	GRAVEL, med to coarse, some fine gravel, loose, multicolored, wet
2.5'	34.5	WBR	WEATHERED SANDSTONE, friable - no cementation, soft, gray, wet ~~trace shale~~
9.0'	43.5'	WBR	WEATHERED SANDSTONE, poorly cemented, gray, wet

PID - OVM 580B

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background	
1.0-2.5'	2	2	2		4.0	0	
3.5'-5.0'	1	1	1		5.0	2.6	
6.0'-7.5'	2	5	6		6.0	3.0	
8.5'-10.0'	6	25	19		6.7	2.6	
11.0'-12.5'	5	8	9		5.5	3.2	
13.5'-15.0'	3	5	7		7.9	3.2	W.T.
18.5'-20.0'	5	8	11		6.1	3.2	
23.5'-25.0'	5	3	2		—		
28.5'-30.0'	3	4	4		—		
33.5'-35.0'	13	18	26		—		
38.5'-40.0'	50	for	5"		—		

WW Engineering & Science
Environmental Services Division

Project Name: ARCS-Albion/Sheridan Trap. L.F.

Project No: 04011.02

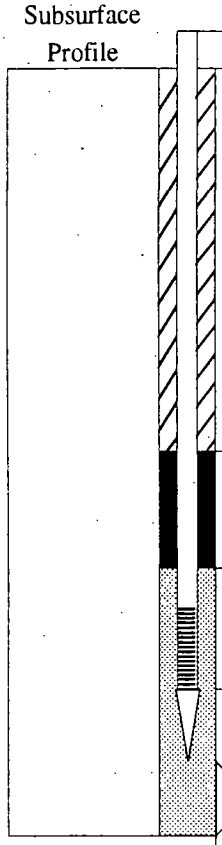
Log of Well Installation

Well Number: MW#7SB

Top of Casing Elevation (feet): 962.88

Ground Surface Elevation (feet): 960.3'

Generalized Subsurface Profile



2.6' Length of Casing Above Ground Surface

Concrete Cap (Y) N)

1.0' Depth to Top of (Grout) or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement Powdered Bentonite

51.0' Depth to Top of (Bentonite Pellets)/Slurry (Circle One)

53.0' Depth to Top of Filter Pack

Type 6x20 cs. gd. Silica Sand

60.0' Depth to Bottom of Well Screen

Settled Cuttings Borehole Backfill Material

61.0' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
12/10/92	Predevelopment: 16.03'
12/18/92	Postdevelopment: 15.99'
12/21/92	Stabilized: 15.98'

Development: Removed 900 gal. with Grundfos 2" submersible pump, surging several times. Silty to clear.

Survey Reference: R.R. Spike in P.Pole @ SW cor. of support area, N. side of E. Erie St.

Well Casing
- Diameter: 2"
- Total Length: 58.0'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC Cap

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 3.1'
- Lock Type: 2402 master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 2 of 2
Well/Boring No. MW#7SB
Client: ARCS-Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 12/7/92 Finished: 12/9/92
Time: Started: 1:45pm Finished: 12:15pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: See pg. 1 of 2

Drilling Method(s)	Depth
See pg 1 of 2	

Grouting/Seal

Depth/To	Material/Method
See pg. 1 of 2	

Remarks: See pg. 1 of 2

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts: Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
17.5+	61.0+	BR	SANDSTONE, fine - very fine, moderately cemented, some coal shale - detected by black foamy film on circulated drilling water return, some small fractures to 48.0' - loss of circulation occuring past 48.0' due to larger fractures, 6" drop of drilling rods @ 58.0' - large fracture, gray, wet.							
			EOB @ 61.0'							

WW Engineering & Science
Environmental Services Division

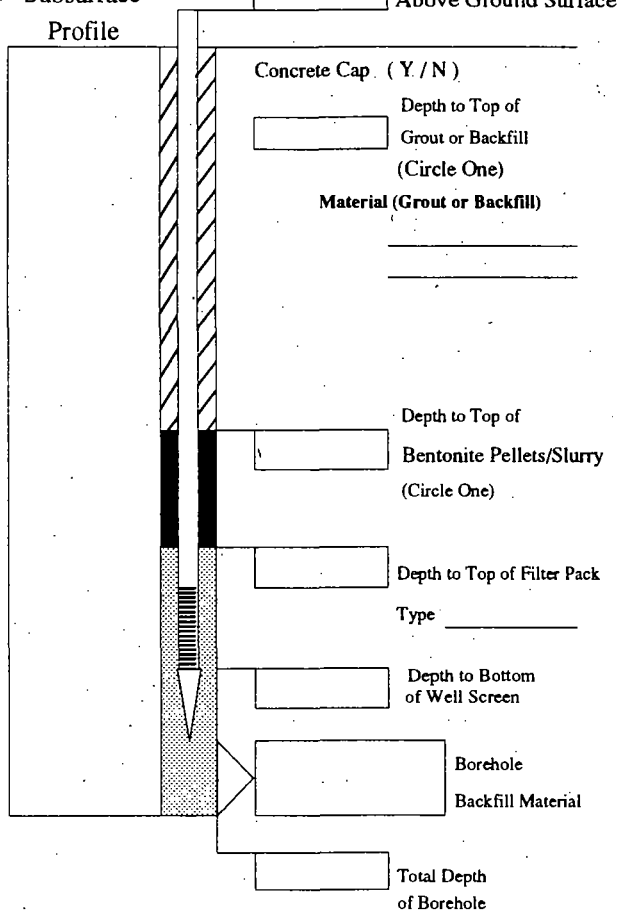
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#8SG
Client: ARCS- Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 11/30/92 Finished: 11/30/92
Time: Started: 9:30 AM Finished: 1:45 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 12345 Cleveland/Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 3770 E + 5647 N

Drilling Method(s)	Depth
4 1/4" ID HSA	33.0'

Grouting/Seal

Depth/To	Material/Method
33.0'-31.0'	Natural Sand Collapse
31.0'-24.0'	6x20 cs.gd. Silica Sand
24.0'-22.0'	Bentonite Holeplug
22.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix Concrete Pad

Water Level: 24.0 ft. Below Surface

Remarks: No splitspoon samples collected

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
	33.0'		See log for MW#8WB for lithologic description.
			EOB @ 33.0'.

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background

WW Engineering & Science
Environmental Services Division

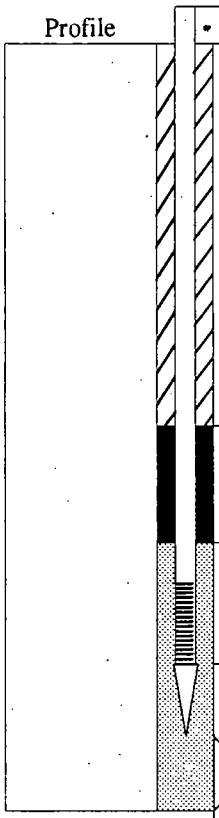
Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#8SG

Generalized Subsurface Profile



2.2' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement Powdered Bentonite

22.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

24.0' Depth to Top of Filter Pack

Type 6x20 cs. grade Silica Sand

31.0' Depth to Bottom of Well Screen

Natural Sand Collapse — Borehole Backfill Material

33.0' Total Depth of Borehole

Top of Casing Elevation (feet): 980.58'

Ground Surface Elevation (feet): 978.4'

Water Level Data

Date	Water Level Below TOC
12/1/92	Predevelopment: 25.24
12/15/92	Post devel/Stable: 24.00'

Development: Pumped & Bailed 150 gal - fair recovery - silty/brown

Survey Reference: BM#W = 981.11'

Well Casing
- Diameter: 2"
- Total Length: 28.0'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC cap

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 Slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 2.7'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

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Page: 1 of 2
Well/Boring No. MW# 8 WB
Client: ARCS- Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 11/24/92 Finished: 11/24/92
Time: Started: 9:30 AM Finished: 5:30 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan		36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 3760 E + 5645 N

Drilling Method(s)	Depth
4 1/4" ID HSA	55.0'
3 7/8" Rotary Tricone Button Bit	60.0'

Grouting/Seal

Depth/To	Material/Method
60.0'-51.0'	Cs. grd Silica Sand 6x20
51.0'-49.0'	Bentonite Hole plug
49.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix Concrete Pad

Water Level: 24.3 ft. Below Surface

Remarks: Spoon refusal @ 54.0'
Auger refusal @ 55.0'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
5.5'	5.5'	SW	SAND, poorly sorted, fine to coarse, little fine to med. gravel, loose, dk. brown to brown, moist.
3.4'	8.9'	SP/SW	SAND, med. fine, little med & cs. sand trace of fine gravel, fine layer of coal bits @ 7.3', loose, tan, moist.
4.1'	13.0'	SP	SAND, fine, trace of med fine - med. sand, trace of coal seams - very fine, and coal bits - fine gravel size, loose, tan, moist - occasional small layer of cs. sand with gravel.
2.5'	15.5'	SW	SAND, med. to coarse, little med fine sand some fine gravel, trace of silt, firmly compacted, brown, little moist.
3.1'	18.6'	SW	SAND & GRAVEL, poorly sorted, med. fine to coarse, little silt, moderately compacted, brown, moist
0.8'	19.4'	SW	SAND, med. to coarse, little fine gravel, trace of silt, moderately compacted, brown, moist
1.1'	20.5	SP/SW	SAND, med. fine, some cs. sand, little coal & fine gravel, moderately compacted, tan, moist
3.5'	24.0'	SW	SAND, med. to coarse, some fine gravel, little silt trace of coal, mod. compact, brown, little moist to damp

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
1.0'-2.5'	3	3	4		0	1.5
3.5'-5.0'	7	6	6		1	1.5
6.0'-7.5'	2	3	7		2	1.5
8.5'-10.0'	4	6	8		2	1.5
11.0'-12.5'	4	5	8		1	1.5
13.5'-15.0'	10	15	36		2	1.5
16.0'-17.5'	15	20	20		2	1.5
18.5'-20.0'	9	17	18		3	1.5
21.0'-22.5'	15	19	19		7	1.5
23.5'-25.0'	20	19	7		4	1.5
25.0'-26.5'	6	8	9		1	1.5
28.5'-30.0'	3	3	6		0	1.5
33.5-35.0'	13	17	17			
38.5'-40.0'	9	7	8			
43.5'-45.0'	8	13	30			
48.5'-50.0'	19	21	26			
53.5'-55.0	50	—				

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW # 8WB

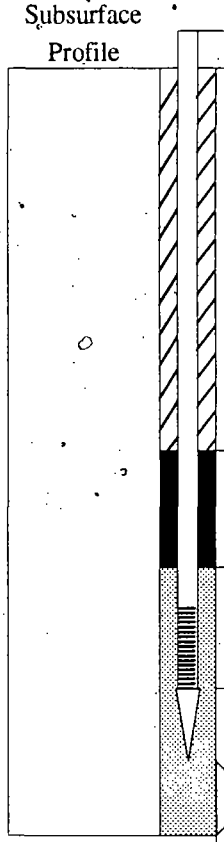
Top of Casing Elevation (feet): 980.93

Ground Surface Elevation (feet): 978.5'

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 33.78'
12/15/92	Post develop/Stable: 33.45'

Generalized Subsurface Profile



2.4' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement-Portland Powdered Bentonite

49.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

51.0' Depth to Top of Filter Pack

Type 6x20 cs. grade silica Sand

58.0' Depth to Bottom of Well Screen

Filter Pack — Borehole Backfill Material

60.0' Total Depth of Borehole

Development: Pumped 16.5 gal - Silty gray to trace cloudy.

Survey Reference: BM# W - See survey

Well Casing
- Diameter: 2"
- Total Length: 55.0'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 2.75'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 2 of 2
Well/Boring No. MW# 8WB
Client: ARCS - Albion/Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 11/24/92 Finished: 11/24/92
Time: Started: 9:30 AM Finished: 5:30 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
mi	Calhoun	Sheridan		36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 3760 E 5645 N

Drilling Method(s)	Depth
4 1/4" ID HSA	55.0'
3 7/8" Rotary Tricon	

Grouting/Seal

Depth/To	Material/Method
60.0'-51.0'	6x20 Cs grd. Silica Sand
51.0'-49.0'	Bentonite Hole plug
49.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix Concrete Pad

Water Level: 24.3 ft. Below Surface

Remarks:

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / PID Sample Depth	6"	12"	18"	24"	Headspace	Background
0.8'	24.8'	GM	GRAVEL, med to coarse, some silt, little cs. sand & fine gravel, loose, red/brown, wet.							
0.5'	25.3'	CL	CLAY, some silt, firm, cohesive, brown, little moist.							
9.1'	34.4'	SM	SAND, fine to very fine, some silt, trace of coal fragments, loose to firmly compact, lt brown, wet							
0.2'	34.6'	Shale	COAL SHALE, smooth, hard, black, fractured.							
2.4'	37.0'	SP/SW	SAND, fine, some med-cs. sand, trace of fine gravel, little shale fragments, loose, gray/brown, wet.							
5.0'	42.0'	SM	SAND, fine, some silt, trace of fine-med. gravel, loosely compacted, gray, wet.							
6.7'	48.7'	SC	SAND, fine, some clay, some silt, trace fine gravel, firm, cohesive, gray, little moist							
6.3'	55.0'	WBR	WEATHERED SANDSTONE, fine to very fine, some silt, poorly cemented, some micaceous fragments, easily crumbled, gray, moist trace of coal & coal shale lenses							
5.0+	60.0+	BR	SANDSTONE, fine to very fine, some fractures, moderately cemented, gray, wet.							
			EOB @ 60.0'							

WW Engineering & Science
Environmental Services Division

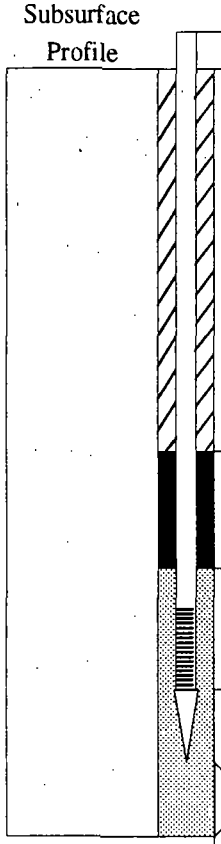
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Length of Casing Above Ground Surface

Concrete Cap (Y / N)

Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill) _____

Depth to Top of Bentonite Pellets/Slurry (Circle One)

Depth to Top of Filter Pack

Type _____

Depth to Bottom of Well Screen

Borehole Backfill Material

Total Depth of Borehole

Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW# 8SB
Client: ARCS-ALBION/SHERIDAN L.F.
Project No.: 04011.02
Date: Started: 11/23/92 Finished: 11/23/92
Time: Started: 8:45 AM Finished: 6:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International, Inc.
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 3750 E
5643 N

Drilling Method(s)	Depth
4 1/4" ID HSA	55.0'
3 7/8" Rotary Tricone Button Bit	72.0'

Grouting/Seal

Depth/To	Material/Method
72.0'-65.0'	6×20 csgd. Silica sand
65.0'-63.0'	Bentonite Hole plug
63.0'-1.0'	Cement/Bentonite grout
1.0'-0.0'	Redimix concrete pad

Water Level: 31.0 ft. Below Surface

Remarks: 500 gal. water lost in formation during drilling.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			See log for MW# 8WB for lithologic description.
		37.0'	Water table.
		47.0'	Weathered Bedrock.
		55.0'	Unweathered Bedrock - Note: Auger refusal @ 55.0'. Rotary drilling return showed evidence of coal shale during initial 5.0' run - very soft drilling through this layer. Sandstone bedrock is hard & less fractured than previous bedrock well locations. Circulation of drilling water was not lost to formation as before - all wash water recovered from borehole was collected for disposal.
		70.0'	EOB

Sample Depth	Blow Counts 6"	12"	18"	24"	PID	Headspace	Background

WW Engineering & Science
Environmental Services Division

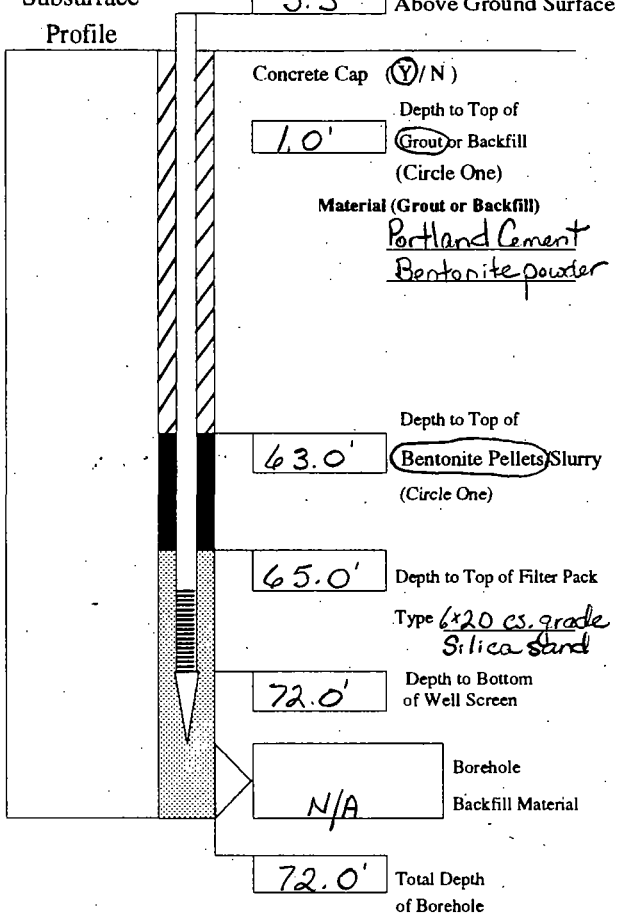
Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#8SB

Generalized Subsurface Profile



3.3' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement Bentonite powder

63.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

65.0' Depth to Top of Filter Pack

Type 6x20 cs. grade Silica sand

72.0' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

72.0' Total Depth of Borehole

Top of Casing Elevation (feet): 981.83'

Ground Surface Elevation (feet): 978.5'

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 34.66
12/15/92	Postdevelop/Stable: 34.77'

Development: Pumped 550 gal. - little silty to clear.

Survey Reference: BM# W - See survey

Well Casing
- Diameter: 2"
- Total Length: 70.0'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 3.8'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. 9 SG
Client: ARCS - ALBIAN/SHERIDAN TWP. L.F.
Project No.: 04011.02
Date: Started: 11/24/92 Finished: 11/24/92
Time: Started: 1:30 Finished: 4:00

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI.	CALHOUN	SHERIDAN	SE 1/4	36	T2S	R4W

Contractor: R&R INTERNATIONAL INC.
Address: 1234 S. CLEVELAND MASSILON RD.
AKRON OHIO 44321
Equipment: CME 750 ATV
Crew Chief: ED PUCCI
WW Supervisor: BILL PUSHAW

Location: 35.0' EAST OF MW 9-SB
22.0' EAST OF MW 9-WB

Drilling Method(s)	Depth
4 1/4" I.D. H.S.A.	20.0

Grouting/Seal

Depth/To	Material/Method
20.0 - 11.0	SAND
11.0 - 8.0	HOLEPLUG
8.0 - 1.0	CEM/BENT. GROUT
1.0 - 0.0	CEMENT

Water Level: 10.5 ft. Below Surf.

Remarks:

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			SEE MW 9WB LOG FOR LITHOLOGIC DESCRIPTION.
			300.-

Blow Counts / PID	Sample Depth	6"	12"	18"	24"	Headspace	Background

WW Engineering & Science
Environmental Services Division

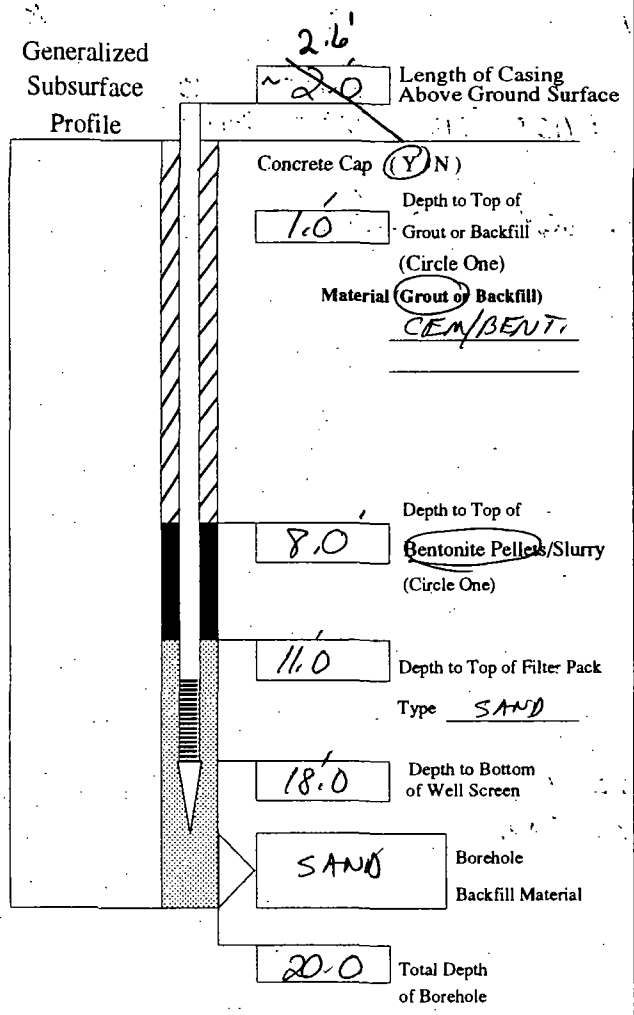
Project Name: ARCS ALBION/SHERIDAN TWP. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW-9SG

Generalized Subsurface Profile



Top of Casing Elevation (feet): 959.47'

Ground Surface Elevation (feet): 956.9'

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 11.20'
12/22/92	Postdevelop/stable: 12.75'

Development: Bailed 34.5 gal - Very slow recovery. Silty/sandy to silty

Survey Reference: BM#W

Well Casing	Diameter:	2"
	Total Length:	15.0
	Material:	PVC
	Cap Type:	J-PLUG
Well Screen	Diameter:	2"
	Length:	5.0'
	Slot/Type:	10
	Material:	PVC
Protective well casing	Material:	Anodized Aluminum ~~METAL~~ Dia. 4"
	Height Above Ground:	~~~2.5'~~ 3.1'
	Lock Type:	~~PS06~~ 2402

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. 9-WB
Client: ARCS-ALDION/SHERIDAN TWP. L.F.
Project No.: 04011.02
Date: Started: 11/23/92 Finished: 11/24/92
Time: Started: 1:30 Finished: 12:30

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI.	CALHOUN	SHERIDAN	SE ¼	36	T2S	R4W

Contractor: R&R INTERNATIONAL **Location:** 13.0' EAST OF MW 9-SB
Address: 1234 S. CLEVELAND MASSILON RD.
AKRON, OHIO 44321
Equipment: CME 750 ATV
Crew Chief: ED PUCCI
WW Supervisor: BILL PUSHAW

Drilling Method(s)	Depth
4¼" H.S.A. (I.D.)	48.0'

Grouting/Seal

Depth/To		Material/Method
48.0 -	39.5'	SAND
39.5' -	37.5'	HOLEPLUG
37.5' -	1.0'	CEMENT GROUT
1.0	0.0	CEMENT

Water Level: 13.04 ft. Below T.O.C.

Remarks: at ~20.0' we hit a sandy precursor to bedrock; it appeared in a loose sand form. Our 25.0 spoon yielded more of a "cemented" form of bedrock pieces. No more split spoons were taken after this point, we just augered down to our final depth 48'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
.3'	.3'	SW	SAND; FINE-MED, DARK BROWN, ORG. DEBRI; ROOTS, LEAVES, MOIST
4.7'	5.0'	SP/SM	SAND; MED, BROWN, TRACE GRAVEL; FINE-MED (2mm - 10mm) SOME SILT, MOIST
8.8'	13.8'	SM/GM	SAND & SILT, FINE-MED, BROWN, SOME GRAVEL; FINE-MED (2mm - 20mm), VERY MOIST
6.2'	20.0	SP	SAND, MED, GRAY, SOME GRAVEL; FINE-MED; (2mm - 18mm) V. MOIST/WET
5.0'	25.0	WBR	WEATHERED BEDROCK AND/OR SAND FINE, SOME GRAVEL; FINE-MED (2mm - 22mm) VERY MOIST
20.0	45 ~~48.0~~	WBR	WEATHERED BEDROCK.
3	48		Bedrock
			E.O.B. 48.0'
			300 gal

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
0-2'	3	2	2	2	.9	.3
2.5-4.5'	2	4	5	7	.9	.9
5.0'-7.0'	2	3	2	4	1.5	1.5
7.5'-9.5'	2	8	10	8	1.5	1.5
10.0-12.0'	7	10	11	23	2.8	1.5
12.5-14.0'	14	14	14		.9	.9
15.0-16.5'	7	6	4		.3	.3
20.0-21.5'	3	4	7		.3	.3
25.0-26.5'	94	24	18		.3	.3

WW Engineering & Science
Environmental Services Division

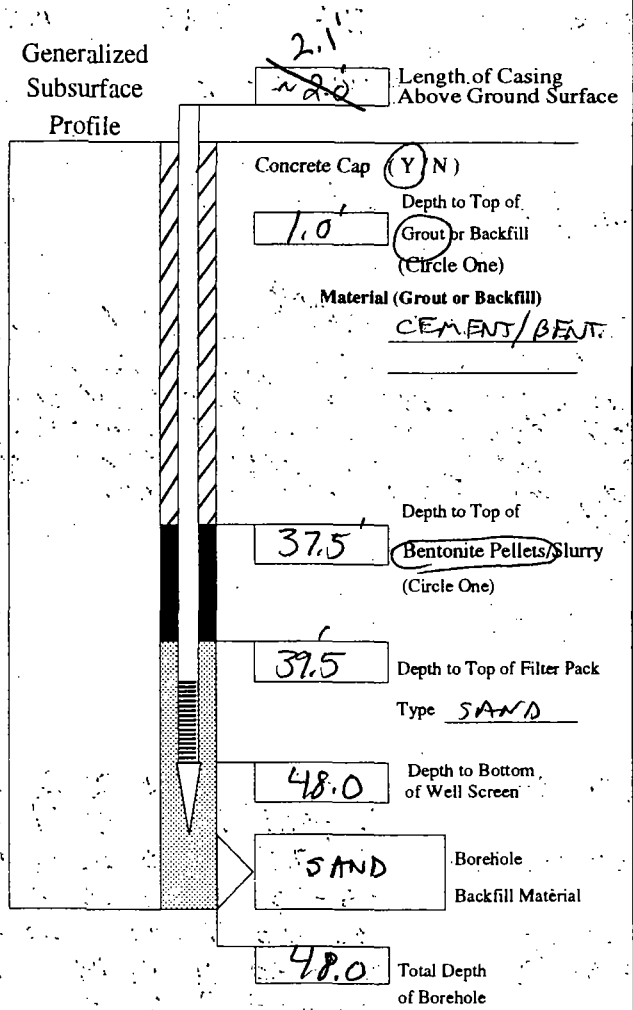
Project Name: ARCS - ALBIAN/SHERIDAN TWP. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: 9 WB

Generalized Subsurface Profile



Top of Casing Elevation (feet): 959.48'

Ground Surface Elevation (feet): 957.4'

Water Level Data

Date	Water Level Below TOC
11/24/92	Predevelop: 13.04
11/25/92	Predevelop/Stable: 12.51'
12/21/92	Postdevelop/Stable: 12.73'

Development: Pumped 300 gal. with grundfos pump - Silty to little cloudy-gray

Survey Reference: BM# W-See survey

Well Casing
- Diameter: 2"
- Total Length: 45'
- Material: PVC
- Cap Type: J-PLUG

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10
- Material: PVC

Protective well casing
- Material: METAL Dia. 4"
- Height Above Ground: ~~2.5'~~ 2.6'
- Lock Type: 2402

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#9SB
Client: ARCS-Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 11/20/92 Finished: 11/23/92
Time: Started: 2:30 pm Finished: 1:00

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland Massillon Rd, Akron, OH 44321
Equipment: CME 750 ATV
Crew Chief: Ed Pucci
WW Supervisor: Cathie Cotton

Location:

Drilling Method(s)	Depth
4 1/4" ID HSA	45' ~~60.0~~
3 7/8" tri cone bit	60'

Grouting/Seal

Depth/To		Material/Method
60.0	53.0	SAND
53.0	50.0	HOLE PLUG
50.0	0.0	CEM/BENT GROUT
1.0	0.0	CEM.

Remarks:

Water Level: 12.5 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
			See log for MW#9WB for lithologic description							
			W.L. = 22' 23'-28'							
			W.B. = 28' 38'-43'							
			B.R. = 40.0 50'-55'							
			60' well depth							
			53' sand							
			50' hole plugged in cement/bentonite mix grouted in by dropping hose in auger flights!							
			600 gal.							

6

WW Engineering & Science
Environmental Services Division

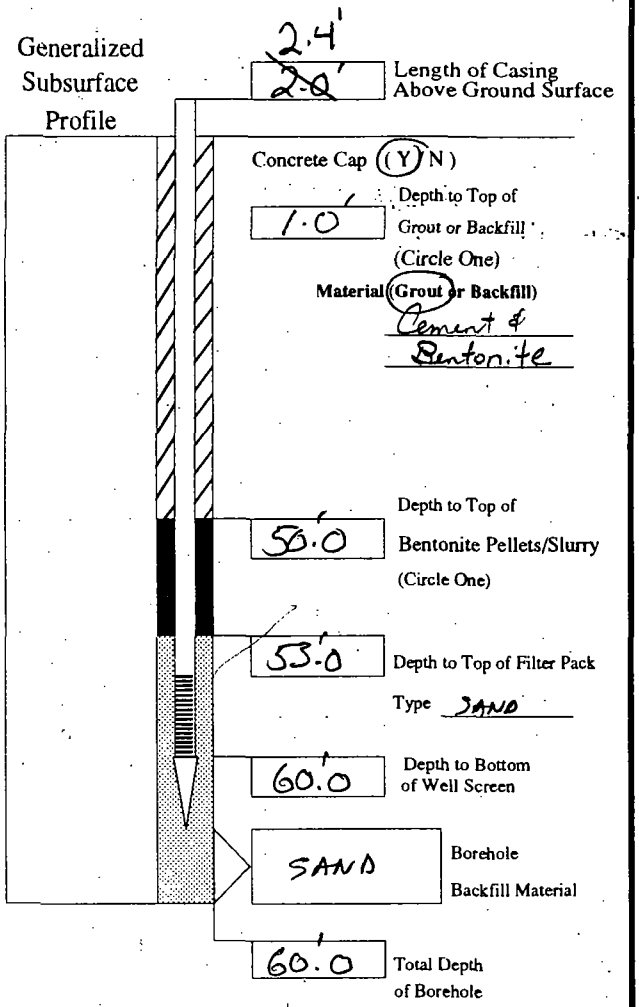
Project Name: ARCS, ALBION/SHERIDAN TWP L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW 9SB

Generalized Subsurface Profile



Top of Casing Elevation (feet): 960.06'

Ground Surface Elevation (feet): 957.7'

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 12.92'
12/15/92	Postdevelop/Stable: 13.10'

Development: Pumped 600 gal. with groundfos pump - silty to clear.

Survey Reference: BM#W - See survey

Well Casing
- Diameter: 2"
- Total Length: 57'
- Material: PVC
- Cap Type: J-PLUG

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10
- Material: PVC

Protective well casing
- Material: METAL Dia. 4" SQ.
- Height Above Ground: ~~2.5'~~ 2.85'
- Lock Type: 2402

General Notes:

WW Engineering & Science, Inc.
Environmental Services Division

MW10SG

Page: _____ of _____
Well/Boring No.: ~~MW-10SG~~
Client: ARCS - Albion - Sheridan
Project No.: 04011.02
Date:
Started: 1-26-93 Finished: 1-26-93

Well/Boring Log Sheet

MI County	Township	Fraction	Section	T	R
Calhoun	Sheridan	SW1/4 SE 1/4 SE1/4	36	2S	4W

Contractor W.W.E.S.
Address: 5555 Glenwood Hills
Grand Rapids, MI
Equipment: Hand Auger
Crew Chief: Eric Meyers
WW Supervisor: Eric Meyers

Drilling Method(s) Hand Auger **Depth** 5'

Location

N 4898, E 4390

Grouting/Seal

Depth/To	Material/Method
0 - 0.5	Concrete cap
0.5 - 1.5	bentonite Pellets
1.5 - 5.0	Sand Pack

Remarks

Water Level _____ Ft. Below _____

Thickness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Blow Counts / Sample Depth	6"	12"	18"	24"	PID/FID Response	PID/FID Background
.8	.8	Loam, Moist, black, humus							
3.2	4.0	peat, wet, brown, oder							
1.0	5.0	Sand, Wet, Gray, Septic oder							
		E.O.B. 5.0							

disk

WW Engineering & Science

Project Name: ARCS-ALBION/Sheridan

Project No: 04011.02

Log of Well Installation

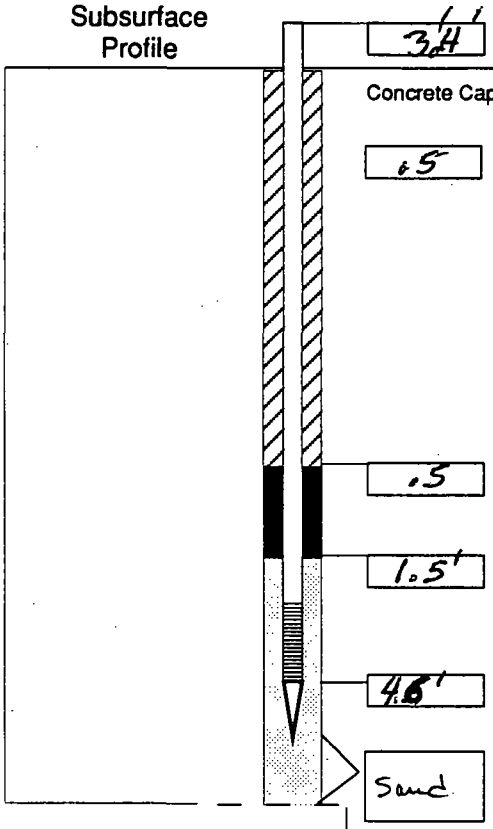
Well Designation: ~~MW-10~~ MW10SG

Date(s) of Installation: 1-26-93 To: 1-26-93

Top of Casing Elevation: ~~949.98~~ 950.03

Ground Surface Elevation: 946.65

Generalized Subsurface Profile



3.4'	Length of Casing Above Ground Surface
	Concrete Cap (Y/N)
.5	Depth to Top of Grout/Backfill (circle one) Grout Material: Benoite Pellets
.5	Depth to Top of Bentonite Pellets/Slurry (Circle One)
1.5'	Depth to Top of Filter Pack Type: Sand
4.6'	Depth to Bottom of Well Screen
Sand	Borehole Backfill Material
5.0	Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
1-28-93	3.63

Development: 5 gal.

Survey Reference: B.M.-5 945.59

Well Casing
- Diameter: 2"
- Total Length: 5'
- Material: P.V.C.
- Cap Type: P.V.C.

Well Screen
- Diameter: 2"
- Length: 3'
- Slot/Type: 10
- Material: PVC

Protective Well Casing
- Material: ALUM. Dia. 4"
- Height Above Ground: 3.6'
- Lock Type: 2402

General Notes: The well casing moved during slug testing. Prior to 2/3/93 the TOC elevation was 949.98

Figure

WW Engineering & Science, Inc.
Environmental Services Division

Page: _____ of _____
Well/Boring No.: ~~MW-115G~~ MW11SG
Client: ARCS-Albion/Sheridan
Project No.: 04011.02
Date:
Started: 1-26-93 Finished: 1-26-93

Well/Boring Log Sheet

	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SW1/4 SE 1/4 SE1/4	36	25	4W

Contractor W.W.E.S.
Address: 5555 Glenwood Hills
Grand Rapids, MI
Equipment: Hand Auger
Crew Chief: Eric Meyers
WW Supervisor: Eric Meyers

Drilling Method(s) Hand Auger **Depth** 5'

Location: N 4935, E 3880

Grouting/Seal

Depth/To	Material/Method
0 - 0.5	Concrete cap
0.5 - 1.5	bentonite Pellets
1.5 - 5	Sand Pack

Remarks

Water Level _____ Ft. Below _____

USCS	Thickness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth	Blow Counts 6"	12"	18"	24"	~~PID/FID~~ Response	Background
~~PT~~	1.0	1.0	Loam, Moist, black, humas							
SP	2.2'	3.2'	Sand, Medium, Wet, Gray							
SW	1.8'	5'	Sand, Medium to Coarse, Round Cobles, Yellow Brown							

disk

WW Engineering & Science

Project Name: ARCS - Albion/Sheridan

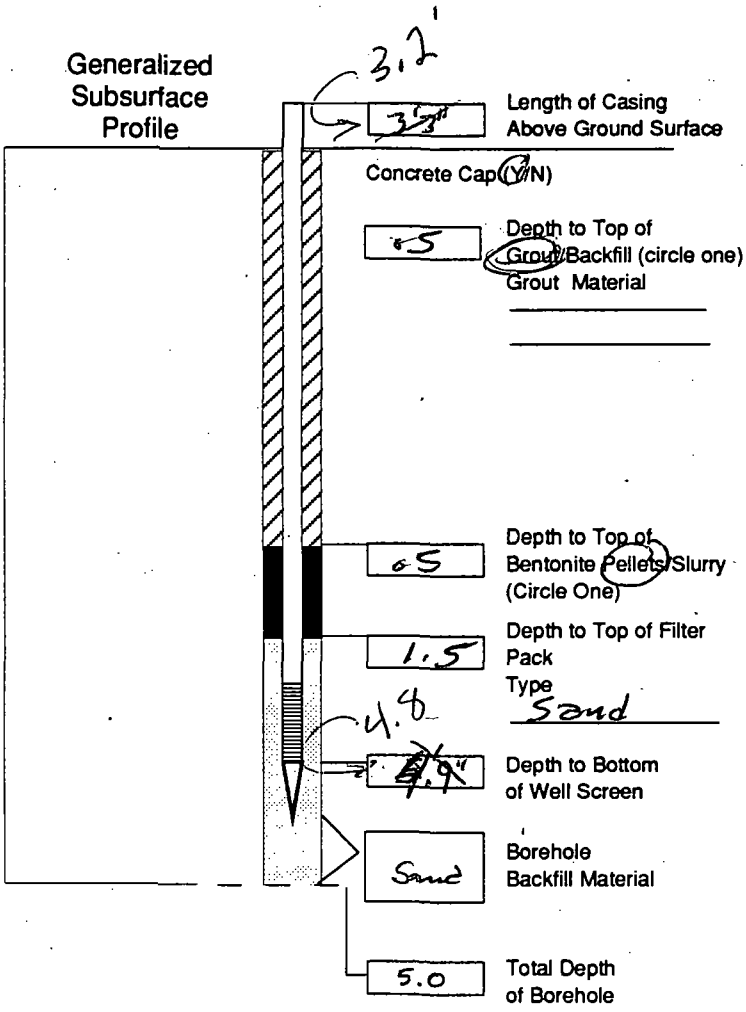
Project No: 04011.02

Log of Well Installation

Well Designation: ~~MW-11~~ MW11SG

Date(s) of Installation: 1-26-93 To: 1-26-93

Generalized Subsurface Profile



Top of Casing Elevation: 949.13

Ground Surface Elevation: 945.88

Water Level Data

Date	Water Level Below TOC
1-28-93	4.39

Development: S. Gel

Survey Reference: BM-S 945.59

Well Casing
- Diameter: 2"
- Total Length: 5'
- Material: PVC.
- Cap Type: PVC

Well Screen
- Diameter: 2"
- Length: 3'
- Slot/Type: 10
- Material: PVC

Protective Well Casing
- Material: ~~Alum~~ Dia. 4"
- Height Above Ground: 3'6"
- Lock Type: 2402

General Notes:

Figure

WW Engineering & Science, Inc.
Environmental Services Division

Page: _____ of _____
Well/Boring No.: ~~MW-12SG~~ MW12SG
Client: ARCS - Albion/Sheridan
Project No.: 04011.02
Date:
Started: 1-27-93 Finished: 1-27-93

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
MI Calhoun	Sheridan	SW1/4 SE 1/4 SE1/4	36	2S	4W

Contractor WW ES
Address: Glenwood Hills pkwy
Grand Rapids, MI
Equipment: Hand Auger
Crew Chief: Eric Meyers
WW Supervisor: Eric Meyers

Drilling Method(s) Hand Auger **Depth** 5'

Location
N 4880, E 3580

Grouting/Seal

Depth/To	Material/Method
0 - 0.5	concrete cap
0.5 - 1.5	Bentonite Pellets
1.5 - 5	Sand Pack

Remarks

Water Level _____ Ft. Below _____

Thickness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Blow Counts / Sample Depth	6"	12"	18"	24"	~~PID/FID~~ Response	Background
SW-SM ~~SP~~ .8	.8	Loam, Moist, Humas, Black							
SP 2.4'	3.2	Sand, Fine/medium, Wet, Gray							
SP 1.8'	5	Sand, medium, Wet, Yellow/Brown some Cobbles							

disk

WW Engineering & Science

Project Name: ARCS-Albion/Sheridan

Project No: 04011.02

Log of Well Installation

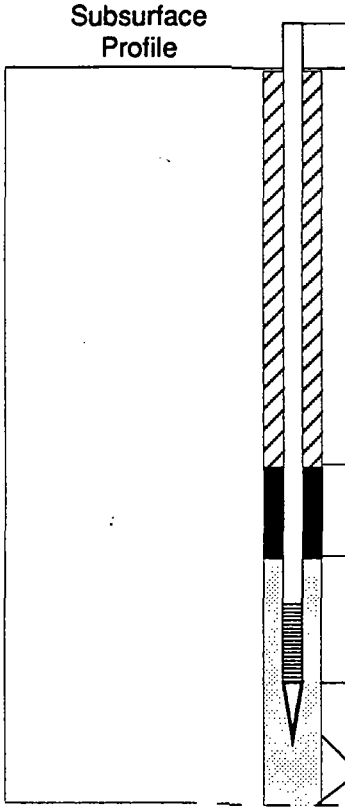
Well Designation: ~~MW-12~~ MW12SG

Date(s) of Installation: 1-27-93 To: 1-27-93

Top of Casing Elevation: ~~950.57~~ 950.72

Ground Surface Elevation: 947.74

Generalized Subsurface Profile



~~2'10"~~ 2.8	Length of Casing Above Ground Surface
Concrete Cap (Y/N)	
.5	Depth to Top of Grout/Backfill (circle one) Grout Material: Bentonite Pellets
.5	Depth to Top of Bentonite Pellets/Slurry (Circle One)
1.5	Depth to Top of Filter Pack Type: Sand
~~5'2"~~ 5.2	Depth to Bottom of Well Screen
NA	Borehole Backfill Material
5	Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
1-28-93	3.52

Development: 5 gal

Survey Reference: BM-5 945.59

Well Casing
- Diameter: 2"
- Total Length: 5'
- Material: PVC
- Cap Type: PVC

Well Screen
- Diameter: 2"
- Length: 3'
- Slot/Type: 10
- Material: PVC

Protective Well Casing
- Material: ALUM Dia: 4"
- Height Above Ground: 3' 3"
- Lock Type: 2402

General Notes: The well casing moved during slug testing. Prior to 2/3/93 the TOC elevation was 950.57

Figure

WW Engineering & Science, Inc.
Environmental Services Division

Page: _____ of _____
Well/Boring No.: ~~MW-1 SG~~ MW13SG
Client: ARCS-Albion/Sheridan
Project No.: 0401-02
Date:
Started: 1-27-93 Finished: 1-27-93

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Calhoun	Sheridan	SW1/4 SE 1/4 SE 1/4	36	2S	4W

Contractor: W.W.E.S.
Address: Glenwoods Hills Pkwy Grand Rapids, MI
Equipment: Hand Auger
Crew Chief: D. Meyers
WW Supervisor: Eric Meyers

Location: N 4700, E 4110

Drilling Method(s)	Depth
Hand Auger	5'

Grouting/Seal Depth/To	Material/Method
0-0.5	Concrete cap
0.5-1.5	Bentonite Pellets
1.5-5	Sand Pack

Remarks

Water Level _____ Ft. Below _____

	Thickness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth	Blow Counts 6"	12"	18"	24"	~~PID/FID~~ Response	Background
SW-SM										
~~SPE~~	.5	.5	Loam, Moist, Humas, Black							
~~SPE~~	4.1	4.6	Loam, Wet, Humas, Black							
SP	.4	5.	Sand, Medium, Wet, Gray							

disk

250 ml

WW Engineering & Science

Project Name: ARCS-Albion/Sheridan L.F.

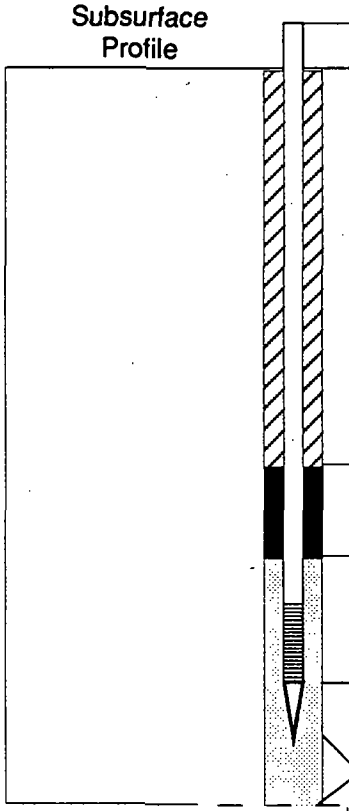
Project No: 04011.02

Log of Well Installation

Well Designation: ~~AMW-13~~ MW13SG

Date(s) of Installation: 1-27-93 To: 1-27-93

Generalized Subsurface Profile



3'	Length of Casing Above Ground Surface
Concrete Cap (Y/N)	
.5	Depth to Top of Grout/Backfill (circle one) Grout Material: Bentonite pellets
.5	Depth to Top of Bentonite Pellets/Slurry (Circle One)
1.5	Depth to Top of Filter Pack Type: Sand
5'	Depth to Bottom of Well Screen
NA	Borehole Backfill Material
5'	Total Depth of Borehole

Top of Casing Elevation: ~~949.49~~ okay

Ground Surface Elevation: 946.49

Water Level Data

Date	Water Level Below TOC
1-28-93	3.08

Development: 3 gal

Survey Reference: BM-5 945.59

Well Casing
- Diameter: 2"
- Total Length: 5'
- Material: PVC
- Cap Type: PVC

Well Screen
- Diameter: 2"
- Length: 3'
- Slot/Type: 10
- Material: PVC

Protective Well Casing
- Material: ALUM Dia. 4"
- Height Above Ground: 3'.5"
- Lock Type: 2402

General Notes:

Figure

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. LF-1
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 10/21/92 Finished: 10/22/92
Time: Started: 3:40pm Finished: 5:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	SE 1/4	36	2 S	4 W

Contractor: R&R International **Location:** 6400 N + 4600 E
Address: 1234 S. Cleveland-Massillon Rd.
Akron, Ohio 44321
Equipment: CME 750
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-38'

Grouting/Seal

Depth/To	Material/Method
— See Reverse Side —	

Water Level: ≈ 28' ft. Below GD.

Remarks: Little Sample Recovery @: 2'-4' (2-4oz + H.S.), 4'-6' (2-4oz + HS.) 6'-8' (Same) 8'-10' (3-4oz + HS), 10'-12' (3-4oz + HS), 18'-20' (1-4oz), 20'-22' (2-4oz + HS), 22'-24' (N.S.R.) 24'-26' (3-4oz + HS), 26'-28' (NSR - H.S. only), 28'-30' (4-4oz + HS) 30'-32' (1-4oz + HS), 32'-34' (1-4oz + HS) 34'-36' (2-4oz + HS)
* 6-4oz + Headspace Sample Collected @ 14'-16', 16'-18' & 36'-38' *
(Headspace Sample)
* 14'-16' Description was Labled Wrong during transfer from "Field" Copy to Final Copy.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
1.0	1.0	SW	Sand - fine to med., Little fine Gravel - brown - Dry
0.8'	1.8'	SW	Sand - Dark Gray - med. to fine, T. fine Gravel - Dry
0.4'	2.2'	SW	Sand - brownish Gray, fine to med. - moist
1.8'	4.0'	FILL	Paper, Plastic, occas. Pieces of tin (Rubbish)
0.3'	4.3'	SW	Sand - Drk. Gray, med. to fine - Damp.
3.2'	7.5'	FILL	Plastic, Cloth, Paper, Cardboard, (Rubbish)
2'	9.5'	SP	Sand - med., brown to Drk. brown, Little Plastic - moist
3'	12.5'	FILL	Paper, Plastic, Cardboard, moist (226ppm)
1.5'	14'	SW/FILL	Sand - med. to fine, brown to Gray, T. Rubbish - moist
2'	16'	SW/FILL	~~Paper, Plastic, Rubbish~~ Sand - med to fine, Gray - T. Rubbish - Dry
2'	18'	SW	Sand - ~~med~~ to fine, brown, Little black Stained Soils - moist
1'	19'	SW/FILL	Sand - Drk Gray, med. to fine, Little Rubbish - Damp
4'	23'	FILL	Cloth, Newsprint, Little Drk brown Sand - moist
3'	26'	SW/FILL	Sand - brownish - Gray - fine to med - moist, T. Rubbish
2'	28'	FILL	Plastic, Paper, Pieces of tin, Little Sand - Dry
5'	33'	SW/FILL	Sand - Dark Gray - fine to med., T. Rubbish - moist.
1'	34'	SP/FILL	Sand - Drk Gray to black, very wet, Sloppy (Very Little Recovery)
1'	~~35'~~	FILL	Old Tire (Steel Belted), Shoe, Rubbish, wet
—	35'		- Sloppy
3'	—	SP	Sand - fine, Little med, Some V. fine - brownish Gray,
—	38'		Moist to wet - No Rubbish
			(Native Soils - Terminated Boring @ 38')

Sample Depth	Blow Counts 6"	12"	18"	24"	OVM (PID) ppm Headspace	Split Spoon Background	
0-2	3	8	13	8	2	Ø	4:05p
2-4	15	50	50	50/3"	20	Ø	4:15p
4-6	100/4"				7	2	4:25p
6-8	22	25	70	100/3"	193	18	4:35p
8-10	14	41	100/4"		290	182	4:45p
10-12	100/4"				279	226	4:55p
12-14	100/3"				273	166	5:05p
14-16	18	26	12	13	358	299	5:15p
16-18	14	18	9	62	230	37	5:30p
18-20	100/4"				—	NSR	5:40p
20-22	100/5"				195	5	5:45p
22-24	32	50	100/2"		60	NSR	—
24-26	18	42	40	18	900	48	6:00p
26-28	10	36	46	50	280	20	6:10p
28-30	100/5"				1500	5	6:20p
30-32	100/5"				105	81	6:30p
32-34	100/5"				177	20	6:40p
34-36	100/5"				220	5	6:45p
10/22/92:							10/22
36'-38'	4	27	24	28	95	Ø	8:30A

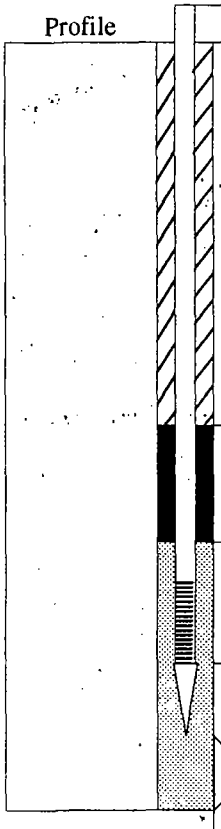
WW Engineering & Science
Environmental Services Division

Project Name: ARCS- Albion Sheridan Twp. Landfill
Project No: #04011.02

Log of Well Installation

Well Number: LF-1

Generalized Subsurface Profile



2.68' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement/Bentonite Grout

20.5' Depth to Top of Bentonite Pellets/Slurry (Circle One)

22.5' Depth to Top of Filter Pack Type (Best) Silica

35' Depth to Bottom of Well Screen

Nat. Soils Cave-in — Borehole Backfill Material

38' Total Depth of Borehole

Top of Casing Elevation (feet): 985.95

Ground Surface Elevation (feet): 983.3'

Water Level Data

Date	Water Level Below TOC
11:00 10/22/92	36.61' (Pre-Grout/Pre Development)
10/28/92	36.87' - Post development
12/16/92	36.83' - Stable

Development: Bailed 8gal - very slow recharge. Approx. 18' of water

Survey Reference: BM#N - See Survey

Well Casing
- Diameter: 2"
- Total Length: 27.7' ~~38'~~ (~~32.68'~~)
- Material: PVC
- Cap Type: Standard Threaded

Well Screen
- Diameter: 2"
- Length: 10' (120")
- Slot/Type: 10-Slot
- Material: PVC

Protective well casing
- Material: Aluminum Dia. 4" Square
- Height Above Ground: 3.3'
- Lock Type: 2402 master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. LF-2
Client: ARCS-Albion/Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 12/2/92 Finished: 12/2/92
Time: Started: 9:45AM Finished: 1:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** N5950 + E 4760
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4 1/4" HSA	20.0'
3" dia. splitspoon	22.0'

Grouting/Seal

Depth/To	Material/Method
22.0'-20.0'	Nat. soil collapse
20.0'-5.0'	6x20 cs. grade silica sand
5.0'-1.0'	Holeplug (Bentonite)
1.0'-0.0'	Redimix concrete pad

Remarks: No spoon recovery @ 4.0'-6.0' (head space only)
6.0'-8.0'
8.0'-10.0' (organics & headspace only)
14.0'-16.0' (headspace only)
18.0'-20.0'

Water Level: 6.2 ft. Below Surface

Methane draeger tube samples collected from augers @ 5.0' & 10.0'
Slight indication of methane. - CGI reading was 2% LEL.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	PID - OVM 580B Headspace	Background	
3.0'	3.0'	SW	SAND, med. fine to med., little fine to coarse gravel, brown to gray, moist	0.0'-2.0'	9	10	10	11	47	0	9:55
				2.0'-4.0'	3	7	11	11	198	0	10:05
5.0'	8.0'	SP/FILL	SAND, fine to very fine, some leather, wood, nails, glass, metal, wire, lt. gray, moist.	4.0'-6.0'	11	8	7	4	272	0	
				6.0'-8.0'	11	9	3	7	NO Samp.	—	
1.5'	9.5'	FILL	WOOD, some cardboard, little odor.	8.0'-10.0'	8	20	45	13	123	0	10:25
2.5'	12.0'	SP/FILL	SAND, med. fine, little wood & cardboard, brown to gray/green, moist.	10.0'-12.0'	11	8	7	11	169	0	10:35
				12.0'-14.0'	5	4	3	12	66	0	10:50
4.0'	16.0'	FILL	FILL - paper, wood, cardboard, metal, some sand, leachate odor - sheen, very moist	14.0'-16.0'	14	22	12	8	44	0	
				16.0'-18.0'	2	3	3	12	25	0	11:25
0.1'	16.1'	SP/FILL	FOUNDRY SAND, fine, black, metallic sheen, wet.	18.0'-20.0'	20	50 for 2"	—		No Samp.	—	
5.9'+	22.0'+	SW	SAND, fine to med., little fine to med. gravel, loose, brown, little moist.	20.0'-22.0'	8	9	10	10	4	0	11:50
			EOB @ 22.0'								

WW Engineering & Science
Environmental Services Division

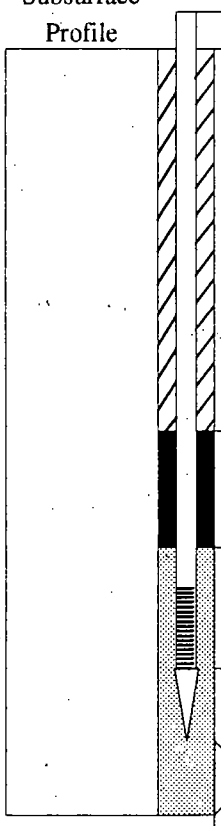
Project Name: ARCS- Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: LF-2

Generalized Subsurface Profile



3.1' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

N/A Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

1.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

5.0' Depth to Top of Filter Pack

Type 6x20 cs grade Silica Sand

17.0' Depth to Bottom of Well Screen

Silica Sand Borehole Backfill Material

22.0' Total Depth of Borehole

Top of Casing Elevation (feet): 976.77'

Ground Surface Elevation (feet): 973.8'

Water Level Data

Date	Water Level Below TOC
12/3/92	Predevelopment : 19.83'
12/7/92	Dry

Development: No recovery - Dry well

Survey Reference: BM#E - See Survey

Well Casing
- Diameter: 2"
- Total Length: 10'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC cap

Well Screen
- Diameter: 2"
- Length: 10.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 3.6'
- Lock Type: 2402 master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 2
Well/Boring No. LF-3
Client: ARCS-Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 12/2/92 Finished: 12/4/92
Time: Started: 3:15pm Finished: 2:40pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International **Location:** N5500 + E4600
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4 1/4" ID HSA with continuous 3" dia. splitspoon	36.0'

Grouting/Seal

Depth/To	Material/Method
36.0'-20.0'	6x20 cs. gd. Silica Sand
20.0'-1.0'	Bentonite Pellets
1.0'-0.0'	Redimix concrete pad

Water Level: N/A ft. Below

Remarks: No sample recovery from: 4.0'-8.0'; Headspace samples only from: 8.0'-18.0' Methane hit in augers @ 18.0'-20.0' spoon depth. Added water to continue drilling (Level C) - total water added @ EOB - 30 gal (approx.). % LEL held below 10% on CGI with use of water. OVA readings from 5,000-10,000 ppm.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
1.0'	1.0'	SW	SAND, fine to med., little fine to med. gravel, little silt, grass & roots @ surface, loose, red/brown, moist.
2.8'	3.8'	SW	SAND, fine to coarse, some fine gravel, loose, gray, moist
0.2'	4.0'	SW/FILL	SAND, poorly sorted, little fill material - plastic, wire, sponge (house hold refuse), loose, moist.
9.5'	13.5'	FILL	FILL - household refuse: plastic, styrofoam, tin cans, paper, garbage, black charred paper, newspaper, rags, string, copper wire, little fine to med. sand, loose, "garbage-leachate" odor
0.5'	14.0'	SP/FILL	SAND, foundry sand (?), med. fine, black, sticky, wet - may be due to added water.
4.0'	18.0'	FILL	FILL - Plastic, wood, styrofoam, metal stripping, tree root, little sand.
3.5'	21.5'	SW	SAND, fine to med., loose, black, moist
2.3'	23.8'	FILL	FILL - plastic, wood, purple crystalline material, tin, paper, some sand & gravel, black & brown mottled, loose, moist.
2.7'	26.5'	SW	SAND, fine to coarse, little fine to med.

PID - OVM 580B

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background	12/2 thru 12/4
0.0'-2.0'	3	10	8	9	14	0	3:25
2.0'-4.0'	13	7	7	7	32	0	3:35
4.0'-6.0'	37	30	50 for 5"		–	–	—
6.0'-8.0'	10	10	9	8	–	–	—
8.0'-10.0'	13	13	11	6	141	0	4:00
10.0'-12.0'	14	23	50 for 3"		1130	0	1:20
12.0'-14.0'	12	12	50 for 5"		145	0	1:30
14.0'-16.0'	9	10	50	–	408	0	1:35
16.0'-18.0'	50 for 1"				178	0	1:45
18.0'-20.0'	13	36	18	25	96	0	1:50
20.0'-22.0'	8	14	22	7	576	0	9:10
22.0'-24.0'	18	15	17	13	116	0	9:20
24.0'-26.0'	9	8	8	5	58	0	9:25
26.0'-28.0'	9	10	11	10	226	0	9:45
28.0'-30.0'	10	7	13	11	89	0	9:55
30.0'-32.0'	11	28	50 for 5"		91	0	10:10
32.0'-34.0'	44	50 for 5"			17	0	10:40
34.0'-36.0'	44	50 for 5"			7	0	10:45

WW Engineering & Science
Environmental Services Division

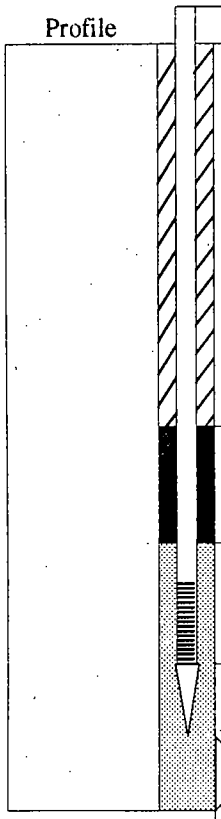
Project Name: ARCS- Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: LF-3

Generalized Subsurface Profile



3.0'	Length of Casing Above Ground Surface
Concrete Cap	(Y/N)
N/A	Depth to Top of Grout or Backfill (Circle One)
Material (Grout or Backfill)	
1.0'	Depth to Top of Bentonite Pellets/Slurry (Circle One)
20.0'	Depth to Top of Filter Pack
Type	6x20 cs. gd. Silica Sand
32.0'	Depth to Bottom of Well Screen
Silica Sand	Borehole Backfill Material
36.0'	Total Depth of Borehole

Top of Casing Elevation (feet): 983.52'

Ground Surface Elevation (feet): 980.5'

Water Level Data

Date	Water Level Below TOC
12/8/92	Predevelopment: 34.91 (dry)
12/10/92	Dry

Development: N/A - Dry well

Survey Reference: BM#E - See survey

Well Casing
- Diameter: 2"
- Total Length: 25'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC cap

Well Screen
- Diameter: 2"
- Length: 10.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 3.4'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 2 of 2
Well/Boring No. LF-3
Client: ARCS-Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 12/2/92 Finished: 12/4/92
Time: Started: 3:15pm Finished: 2:40pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** N 5500 + E 4600
Address: 1234 S. Cleveland-Massillon Rd.
Akron OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4 1/4" ID HSA with	
Cont. 3" dia. splitspoon :	36.0'

Grouting/Seal

Depth/To	Material/Method
See pg 1 of 2	

Remarks:

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
			gravel, loose, brown mottled, becoming black, moist							
0.5'	27.0	FILL	FILL - cardboard, plastic, paper							
1.5'	28.5'	SP/MH	SAND, med. fine to med., little weathered gray sandstone, loose, brown/gray, moist.							
0.5'	29.0	FILL	FILL - plastic, glass, wood, white crystalline material, metal screen							
2.7'	31.7'	SW/FILL	SAND, fine to med., loose, streaked brown & black, small layer of cardboard, tin, glass & plastic @ 30.4-30.6' & 31.2'-31.5', very moist							
0.3'	32.0	SM	SAND & SILT, fine to very fine, some black streaks, gray, moist							
4.0+	36.0+	SW	SAND, med. fine to coarse, some fine to coarse gravel, loose, brown, moist to wet.							
			EOB @ 36.0'							

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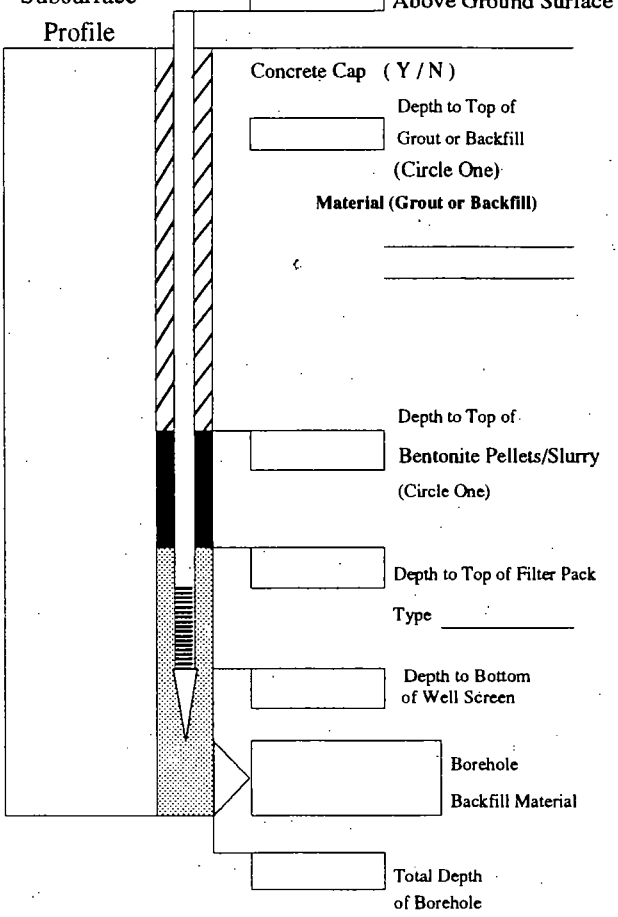
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. LF-1
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 10/21/92 Finished: 10/22/92
Time: Started: 3:40pm Finished: 5:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	NE 1/4 SE 1/4	36	2 S	4 W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd.
Akron, Ohio 44321
Equipment: CME 750
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Location: N 6400 ~~W~~ ~~X~~ 4600 ~~E~~ E

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-38'

Leave highlight remarks

Grouting/Seal

Depth/To	Material/Method
~~See Reverse Side~~	
0.0 - 1.0	Concrete Cap
1.0 - 20.5	Cement/Bentonite Grout
20.5 - 22.5	Bentonite Pellets
22.5 - 35	~~Best Sand~~ Silica Sand (Best)
35 - 38	Native Soil

Water Level: ~~≈~~ 28' ft. Below ~~GS~~ Ground

Remarks: ~~Little Sample Recovery @: 2'-4' (2-4oz + H.S.), 4'-6' (2-4oz + H.S.) 6'-8' (Some 8'-10' (7-4oz + HS), 10'-12' (3-4oz + HS), 18'-20' (1-4oz), 20'-22' (2-4oz + HS 22'-24' (N.S.R.) 24'-26' (3-4oz + HS), 26'-28' (NSR-H.S. only), 28'-30' (4-4oz + 30'-32' (1-4oz + HS), 32'-34' (1-4oz + HS) 34'-36' (2-4oz + HS)~~
~~* 6-4oz + Headspace Sample Collected @ 14'-16', 16'-18' & 36'-38' *~~
~~* 14'-16' Description was labled wrong during transfer from "field" copy to Final Copy.~~

Headspace Sample ✓

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
1.0	1.0	SW/Fill	Sand - fine to med., Little fine Gravel - brown - Dry
0.8'	1.8'	SW/Fill	Sand - Dark Gray - med. to fine, Little fine Gravel - Dry
0.4'	2.2'	SW/Fill	Sand - brownish Gray, fine to med. - moist
1.8'	4.0'	FILL	Paper, Plastic, occas. Pieces of tin (Rubbish)
0.3'	4.3'	SW/Fill	Sand - Drk. Gray, med. to fine - Damp.
3.2'	7.5'	~~FILL~~ Fill	Plastic, Cloth, Paper, Cardboard, (Rubbish)
2'	9.5'	SP/Fill	Sand - med., brown to Drk. brown, Little Plastic - moist
3'	12.5'	FILL	Paper, Plastic, Cardboard, moist (226 ppm)
1.5'	14'	SW/Fill	Sand - med. to fine, brown to Gray, T. Rubbish - moist
2'	16'	SW/Fill	~~Paper, Plastic, Rubbish~~ Sand - med to fine, Gray - T. Rubbish - Dry
2'	18'	SW/Fill	Sand - med to fine, brown, Little black Stained Soils - moist
1'	19'	SW/FILL	Sand - Drk Gray, med to fine, Little Rubbish - Damp
4'	23'	FILL	Cloth, Newsprint, Little Drk brown Sand - moist
3'	26'	SW/FILL	Sand - brownish Gray - fine to med. - moist, T. Rubbish
2'	28'	FILL	Plastic, Paper, Pieces of tin, Little Sand - Dry
5'	33'	SW/FILL	Sand - Dark Gray - fine to med., T. Rubbish - moist
1'	34'	SP/FILL	Sand - Drk Gray to black, very wet, Sloppy (Very Little Recovery)
1'	~~35~~	FILL	Old Tire (Steel Belted), Shoe, Rubbish, wet
—	35'		- Sloppy
3'	—	SP	Sand - fine, Little med, Some V. fine - brownish Gray
—	38'		Moist to wet - No Rubbish
			~~(Native Soils Terminated Boring)~~
			EOB @ 38'

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	~~OVM (PID) ppm~~ PID - OVM (ppm)	~~OVM Background~~
0-2	3	8	13	8	2	Ø	9:05
2-4	15	50	50	50/3"	20	Ø	9:15
4-6	100/4"		—		7	2	9:25
6-8	22	25	70	100/3"	193	18	9:35
8-10	14	41	100/4"		290	182	9:45
10-12	100/4"		—		279	226	9:55
12-14	100/3"		—		273	166	10:05
14-16	18	26	12	13	358	299	10:15
16-18	14	18	9	62	230	37	10:35
18-20	100/4"		—		—	NSR	10:45
20-22	100/5"		—		195	5	10:45
22-24	32	50	100/2"		60	NSR	—
24-26	18	42	40	18	900	48	6:00
26-28	10	36	46	50	280	20	6:10
28-30	100/5"		—		1500	5	6:20
30-32	100/5"		—		105	81	6:30
32-34	100/5"		—		177	20	6:40
34-36	100/5"		—		220	5	6:45
10/22/92:							10:45
36'-38'	4	27	24	28	95	Ø	8:30

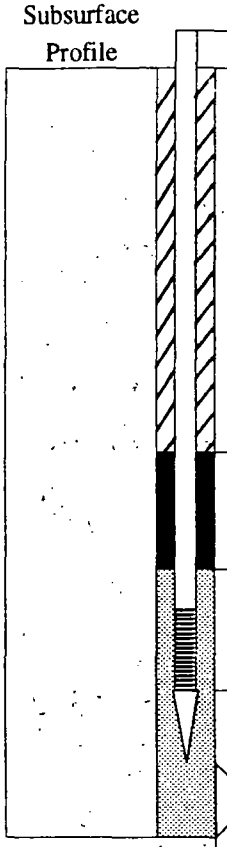
WW Engineering & Science
Environmental Services Division

Project Name: ARCS- Albion Sheridan Twp. Landfill
Project No: #04011.02

Log of Well Installation

Well Number: LF-1

Generalized Subsurface Profile



2.68' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement/Bentonite ~~Grout~~

20.5' Depth to Top of Bentonite Pellets/Slurry (Circle One)

22.5' Depth to Top of Filter Pack

Type (Best) Silica ~~Silica~~ Silica Sand (620 Best)

35' Depth to Bottom of Well Screen

~~Nat. Soils~~ Native Borehole ~~Cave-in~~ ~~Material~~ Soil Backfill Material

38' Total Depth of Borehole

Top of Casing Elevation (feet): 985.95

Ground Surface Elevation (feet): 983.3'

Water Level Data

Date	Water Level Below TOC
~~11/22~~ 10/22/92	36.61' (Pre-Grout/Pre Development)
10/28/92	36.87' - Post development
12/16/92	36.83' ~~Stable~~

Development: Bailed 8gal - very slow recharge. Approx. 18' of water

Survey Reference: BM#N & ~~See Survey~~ Site grid

Well Casing
- Diameter: 2"
- Total Length: 27.7' ~~38~~ (~~32.68'~~)
- Material: Schedule 40 PVC
- Cap Type: ~~Standard~~ Threaded PVC

Well Screen
- Diameter: 2"
- Length: 10' (120")
- Slot/Type: ~~10-Slot~~ factory cut
- Material: PVC schedule 40

Protective well casing
- Material: ANODIZED Aluminum Dia. 4" Square
- Height Above Ground: approx. 3.3'
- Lock Type: ~~2409~~ master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. LF-2
Client: ARCS-Albion/Sheridan Twp L.1
Project No.: 04011.02
Date: Started: 12/2/92 Finished: 12/2/92
Time: Started: 9:45AM Finished: 1:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	~~1~~ 2S	R4W

Contractor: R&R International Inc. **Location:** N5950, ~~X~~ E 4760
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4 1/4" HSA	0 - 20.0'
3" dia. split spoon	0 - 22.0'

Grouting/Seal

Depth/To	Material/Method
~~17.0-22.0'~~	~~Natural collapse~~
~~20.0-5.0'~~	~~6x20 engrade silica sand~~
~~5.0'-1.0'~~	~~Hole plug~~ Bentonite pellets
~~1.0-0.0'~~	~~Radium~~ concrete pad Cap

Remarks: No spoon recovery @ 4.0'-6.0' (head space only)
6.0'-8.0'
8.0'-10.0' (organics & headspace only)
14.0'-16.0' (headspace only)
18.0'-20.0'

Water Level: 6.2 ft. Below Surface Ground

Methane drager tube samples collected from augers @ 5.0' & 10.0'
Slight indication of methane - CGI reading was 2% LEL.

PID - OVM 5808 (ppm)

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background	
3.0'	3.0'	~~SW~~ Fill	SAND, med. fine to med., little fine to coarse gravel, brown to gray, moist	0.0'-2.0'	9	10	10	11	47	0	9:5
				2.0'-4.0'	3	7	11	11	198	0	10:0
5.0'	8.0'	SP/FILL	SAND, fine to very fine, some leather, wood, nails, glass, metal, wire, lt. gray, moist	4.0'-6.0'	11	8	7	4	272	0	
				6.0'-8.0'	11	9	3	7	No Samp.	—	
1.5'	9.5'	FILL	WOOD, some cardboard, little odor.	8.0'-10.0'	8	20	45	13	123	0	10:2
2.5'	12.0'	SP/FILL	SAND, med. fine, little wood & cardboard, brown to gray/green, moist.	10.0'-12.0'	11	8	7	11	169	0	10:3
				12.0'-14.0'	5	4	3	12	66	0	10:5
4.0	16.0'	FILL	FILL - paper, wood, cardboard, metal, some sand, leachate odor - sheen, very moist	14.0'-16.0'	14	22	72	8	44	0	
				16.0'-18.0'	2	3	3	12	25	0	11:2
0.1'	16.1'	SP/FILL	FOUNDRY SAND, fine, black, metallic sheen, wet.	18.0'-20.0'	20	~~50/2~~	—		No Samp	—	
5.9'+	22.0'+	SW	SAND, fine to med., little fine to med. gravel, loose, brown, little moist.	20.0'-22.0'	8	9	10	10	4	0	11:25
							50/3				
			EOB @ 22.0'								

17.0-22.0' Natural collapse
5.0-20.0' 6x20 engrade silica sand
1.0-5.0' Bentonite pellets
0.0-1.0' concrete pad Cap

Lithologic description from 0.0 to 22.0

05

WW Engineering & Science
Environmental Services Division

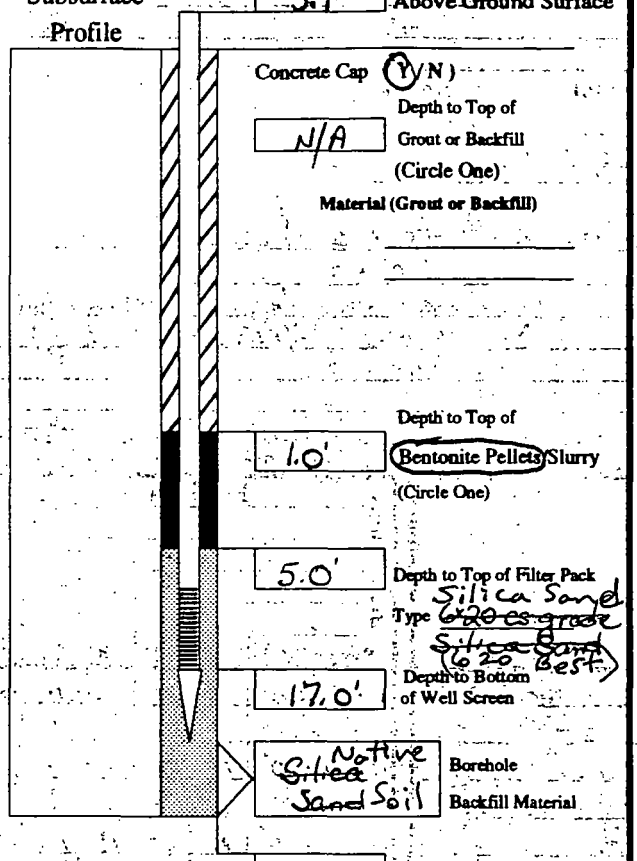
Project Name: ARCS-Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: LF-2

Generalized Subsurface Profile



3.1' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

N/A Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

1.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

5.0' Depth to Top of Filter Pack

Type Silica Sand ~~#20 cs grade~~ ~~Silica Sand~~ (#20 Best)

17.0' Depth to Bottom of Well Screen

~~Silica Sand~~ Native Soil Borehole Backfill Material

22.0' Total Depth of Borehole

Top of Casing Elevation (feet): 976.77'

Ground Surface Elevation (feet): 973.8'

Water Level Data

Date	Water Level Below TOC
12/3/92	Predevelopment: 19.83'
12/7/92	Dry

Development: No recovery. Dry Well

Survey Reference: BM# ~~E~~ ~~See Survey~~ site Grid

Well Casing
- Diameter: 2"
- Total Length: 10'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC ~~cap~~

Well Screen
- Diameter: 2"
- Length: 10.0'
- Slot/Type: 10 ~~slot~~ factory Cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: approx. 3.6'
- Lock Type: ~~2402~~ master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 2
Well/Boring No. LF-3
Client: ARCS - Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 12/2/92 Finished: 12/4/92
Time: Started: 3:15pm Finished: 2:40pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	~~T~~2S	~~R~~4W

Contractor: R&R International Location: N5500, E4600
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4¼" ID HSA ~~with~~	0.0 - 36.0
~~Continuous 3" dia. splitspoon~~	36.0'

Grouting/Seal

Depth/To	Material/Method
20.0-36.0' ~~20.0'-6~~	20 cs gd. Silica Sand (Best)
1.0-20.0' ~~1.0'~~	Bentonite Pellets
0.0-1.0' ~~0.0'~~	~~Redimix concrete pad~~ Cap

~~Slot~~ Slot from 0.0 to 36.0

Water Level: N/A ft. Below

Remarks: No sample recovery from: 4.0'-8.0'
Headspace samples only from: 8.0'-18.0'
Methane hit in augers @ 18.0'-20.0' spoon depth.
Added water to continue drilling (Level C) - total water added @ EOB - 30 gal (approx.) - % LEL held below 10% on CGI with use of water. OVA readings from 5,000 - 10,000 ppm

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
1.0'	1.0'	SW fill	SAND, fine to med., little fine to med. gravel, little silt, grass & roots @ surface, loose, red/brown, moist.
2.8'	3.8'	SW fill	SAND, fine to coarse, some fine gravel, loose, gray, moist
0.2'	4.0'	SW/FILL	SAND, poorly sorted, little fill material - plastic, wire, sponge (house hold refuse), loose moist
4.0	8.0		No sample recovery
9.5' ~~5.5~~	13.5'	FILL	FILL - household refuse: plastic, styrofoam, tin cans, paper, garbage, black charred paper, newspaper rags, string, copper wire, little fine to med. sand, loose, "garbage-leachate" odor
0.5'	14.0'	SP/FILL	SAND, foundry sand (?), med. fine, black, sticky, wet - may be due to added water.
4.0'	18.0'	FILL	FILL - Plastic, wood, styrofoam, metal strapping, tree root, little sand.
3.5'	21.5'	SW fill	SAND, fine to med., loose, black, moist
2.3'	23.8'	FILL	FILL - plastic, wood, purple crystalline material, tin, paper, some sand & gravel, black & brown mottled, loose, moist.
2.7'	26.5'	SW	SAND, fine to coarse, little fine to med.

Sample Depth	Blow Counts 6"	12"	18"	24"	PID ~~FID~~ - OVM ~~580B~~ (ppm) Headspace	Background	
0.0'-2.0'	3	10	8	9	14	0	12/
2.0'-4.0'	13	7	7	7	32	0	3:35
4.0'-6.0'	37	30	50 for 5"		–	–	
6.0'-8.0'	10	10	9	8	–	–	
8.0'-10.0'	13	13	11	6	141	0	4:0
10.0'-12.0'	14	23	50 for 3"		1130	0	1:2
12.0'-14.0'	12	12	50 for 5"		145	0	1:3
14.0-16.0	9	10	50	–	408	0	1:3
16.0'-18.0'	50 for 1"				178	0	1:4
18.0'-20.0'	13	36	18	25	96	0	1:5
20.0'-22.0'	8	14	22	7	576	0	9:1
22.0'-24.0'	18	15	17	13	116	0	9:2
24.0'-26.0'	9	8	8	5	58	0	9:2
26.0'-28.0'	9	10	11	10	226	0	9:4
28.0'-30.0'	10	7	13	11	89	0	9:5
30.0'-32.0'	11	28	50 for 5"		91	0	10:
32.0'-34.0'	44	50 for 5"			17	0	10:
34.0'-36.0'	44	50 for 5"			7	0	10:

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Environmental Services Division

Page: 2 of 2
Well/Boring No. LF-3
Client: ARCS-Albion/Sheridan Twp. LF
Project No.: 04011.02
Date: Started: 12/2/92 Finished: 12/4/92
Time: Started: 3:15pm Finished: 2:40pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** N 5500 + E 4600
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4¼" ID HSA with cont. 3" dia. splitspoon	36.0'

Grouting/Seal

Depth/To	Material/Method
See pg 1 of 2	

Remarks:

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts: Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
			gravel, loose, brown mottled, becoming black, moist							
0.5'	27.0	FILL	FILL - cardboard, plastic, paper							
1.5'	28.5'	SP/~~MH~~	SAND, med. fine to med., little weathered gray sandstone, loose, brown/gray, moist.							
0.5'	29.0	FILL	FILL - plastic, glass, wood, white crystalline material, metal screen							
2.7'	31.7'	SW/FILL	SAND, fine to med., loose, streaked brown & black, small layer of cardboard, tin, glass & plastic @ 30.4'-30.6' & 31.2'-31.5', very moist							
0.3'	32.0	SM	SAND & SILT, fine to very fine, some black streaks, gray, moist							
4.0+	36.0+	SW	SAND, med. fine to coarse, some fine to coarse gravel, loose, brown, moist to wet.							
			EOB @ 36.0'							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: LF-3

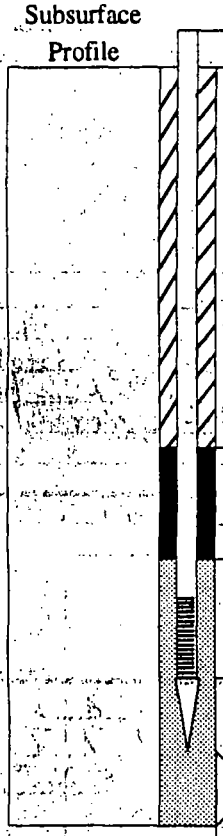
Top of Casing Elevation (feet): 983.52'

Ground Surface Elevation (feet): 980.51'

Water Level Data

Date	Water Level Below TOC
12/8/92	Predevelopment: 34.91 (dry)
12/10/92	Dry

Generalized Subsurface Profile



3.0' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

N/A Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

1.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

20.0' Depth to Top of Filter Pack

Type ~~6x20 cs. gd.~~ Silica Sand (620 BEST)

32.0' Depth to Bottom of Well Screen

Silica Sand (620 BEST) Borehole Backfill Material

36.0' Total Depth of Borehole

Development: N/A - Dry well

Survey Reference: BM#E ~~See Survey~~ Site Grid

Well Casing
- Diameter: 2"
- Total Length: 25'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC ~~cap~~

Well Screen
- Diameter: 2"
- Length: 10.0'
- Slot/Type: 10 slot/factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: 3.4'
- Lock Type: ~~2402~~ Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#1 SG
Client: Arcs Albion
Project No.: #04011.02
Date: Started: 10/22/92 Finished: 10/22/92
Time: Started: 3:30p Finished: 5:40p

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	NE¼ SE¼	36	T2S	R4W

Contractor: R&R
Address:
Location: ✓ E4642 ~~N+7158N~~ N7158,

Equipment: CME 750
Crew Chief: ED PUCCI
WW Supervisor: DAN JOHNSON

Drilling Method(s)	Depth
4¼" ID HSA	0.0'-38'

Grouting/Seal

Depth/To	Material/Method
~~See Reverse Side~~	
0.0 - 1.0	Concrete Cap
1.0 - 28'	Cement/Bentonite Grout
28 - 31'	Bentonite Pellets
31 - 37.5	Silica Sand (Best)
37.5 - 38	Native Soil

Water Level: 30.0 ft. Below Surface

Remarks:

See MW#1 SB Log

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace ~~PID~~ OVM (ppm)	~~Background~~
			~~Grass~~ Top Soil							
			~~Topsoil~~	2'-4'	6	5	6	9		Ø
				10'-12'	14	18	19	21		Ø
2.0'	7.0'	other	Clay Fill material (well mixed)							
10'	11'	SP	SAND fine to V. fine - TAN - Dry							
11.	11.1'	other	COAL							
11.1'	12'	SP	SAND - fine to V. fine - lt. brown - Dry	18'-20'	11	15	19	19		Ø
26'	28'	SP	SAND - fine to V. fine - lt. brown - Dry	26'-28'	10	42	42	100/5"		Ø
0	0	N/A	(see well/boring log sheet for detailed lithologic description).							
			MW-1SB							
			EOB @ 38'							

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Environmental Services Division

Project Name: ARCS - ALBION SHEEDAN TWP. LANDFILL
Project No: 04011.02

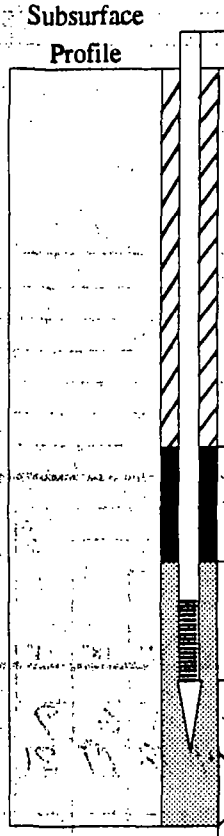
Log of Well Installation

Well Number: MW#1 SG

Top of Casing Elevation (feet): 982.36

Ground Surface Elevation (feet): 979.9'

Generalized Subsurface Profile



2.9' — Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' — Depth to Top of Grout or Backfill (Circle One) 10/23/92

Material (Grout or Backfill): Cement/Bentonite Grout

28' — Depth to Top of Bentonite Pellets/Slurry (Circle One)

31' — Depth to Top of Filter Pack

Type: Best Silica Sand (620 Best)

37.5' — Depth to Bottom of Well Screen

Borehole Backfill Material: Native Soil

38' — Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
10/26/92	Predevelopment 32.73'
11/20/92	Postdevelopment 32.74'
12/10/92	Stable 32.57'

Development: Bailed approx 75 gal - Silty to little cloudy.

Survey Reference: BM# N/A See survey site grid

Well Casing
- Diameter: 2"
- Total Length: 35.4'
- Material: PVC Schedule 40
- Cap Type: Threaded PVC

Well Screen
- Diameter: 2"
- Length: 5'
- Slot/Type: 10 Slot factory cut
- Material: PVC Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Square
- Height Above Ground: 3.4'
- Lock Type: master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#1WB
Client: ARCS - Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 11/19/92 Finished: 11/20/92
Time: Started: 2:00pm Finished: 12:00pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	6	T2S	R4W

Contractor: R&R International Inc
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: E 4642 ~~N 7148~~

Drilling Method(s)	Depth
4 1/4" ID HSA	0-59.0'

Grouting/Seal

Depth/To	Material/Method
~~59.0'-52.0'~~ 51.0'	~~6x20 coarse~~ silica sand (Best) ~~(20)~~
~~52.0'-51.0'~~	~~20x40 fine silica sand~~ (Best 20/40)
51.0'-43.0'	Bentonite pellets & slurry
43.0'-1.0'	Cement/Bentonite grout
1.0'-0.0'	Portland concrete pad

Water Level: 30.0 ft. Below Surface

Remarks: No splitspoons collected except for CEC sample collected @ 32.0'-34.0'

"Well/Boring Log Sheet" detailed

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	~~PID~~ Headspace	~~Background~~
			See log for MW#1SB for lithologic description from split spooning.	32.0'-34.0'	3	4	5	11		
	59.0'		Auger refusal - EOB							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS-Albion/Sheridan Twp. L.F.

Project No: 04011.02

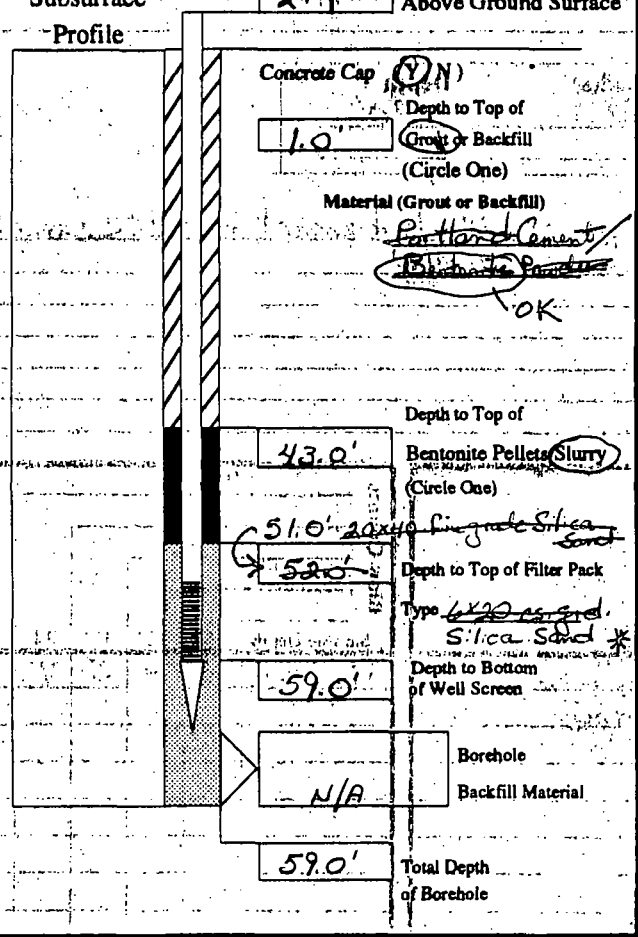
Log of Well Installation

Top of Casing Elevation (feet): 982.20'

Well Number: MW#1WB

Ground Surface Elevation (feet): 979.6'

Generalized Subsurface Profile



2.4' Length of Casing Above Ground Surface

Concrete Cap (Y/N) Y

1.0' Depth to Top of Grout or Backfill (Circle One) Grout

Material (Grout or Backfill): ~~Portland Cement~~ ~~Bentonite Powder~~ OK

43.0' Depth to Top of Bentonite Pellets/Slurry (Circle One) Slurry

51.0' ~~20x40 fine grade Silica Sand~~

52.0' Depth to Top of Filter Pack

Type ~~6x20 coarse~~ Silica Sand *

59.0' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

59.0' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/20/92	Predevelopment 32.95'
11/25/92	Postdevelopment - 32.92'
12/10/92	Stabilized - 32.98'

Development: Pumped - 80 gal. Surged several times - Very silty to cloudy - gray

Survey Reference: BM# ~~NE Sec survey~~ Site grid

Well Casing
- Diameter: 2"
- Total Length: 56.5'
- Material: Schedule 40 PVC
- Cap Type: ~~Pressure tight~~ "J" plug

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot Type: ~~10 slot~~ factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: approx. 2.9'
- Lock Type: 2402 Master lock

General Notes: * Best 2040 from 51.0-52.0, Best 620 from 52.0-59.0.

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Environmental Services Division

Page: 1 of 23
Well/Boring No.: MW-1 & SB
Client: Albion/Sheridan Twp Landfill
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 10/7/92
Time: Started: 2 pm ~~1400 hrs~~ Finished: 3:50 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	NE/4 SE 1/4	36	~~T2S~~	~~R4W~~

Contractor: R&B International **Location:** ~~4642 E + 7138.4 N~~ N 7138, E 4642
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 750 / CME 75
Crew Chief: Ed Pucci / J. McCurdy
WW Supervisor: K. Ottinger / C. Cotton

Drilling Method(s)	Depth
4¼" ID HSA	0-58.0'
~~Dol Barrel rock core~~	~~58.0-75.0'~~

Rotary Coring / Drilling

72.5-75.0 Rock cuttings

Grouting/Seal Depth/To	Material/Method
63.7 ~~75.0-72.5~~	~~Coarse~~ Silica Sand (Best)
61.7-63.7' ~~61.7~~	Bentonite Pellets
1.0-61.7' ~~1.0'~~	Cement/Bentonite Grout
0.0-1.0' ~~0.0'~~	Concrete ~~Foot~~ Cap.

Water Level: 30.8 ft. Below Surface
type from 0.0 down.

Remarks: methane test with Dragger Tube every 5.5'
Continuous monitoring with PID/FID in breathing zone
Methane Test: 4-6' No Color change
8-10' No Color change
14-16' No Color change
18-20' No Color change
Auger refusal at 28'.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
~~2.0~~	2.0	SW	Sand, med to fine, some fine gravel, Black, moist
~~31.0~~	29'	SW	Sand, med to fine, some fine coarse gravel, Brown, moist
	—		~~29'~~ Very moist at 29'
~~10.0~~	39'	~~SP~~ SM	Sand, fine silty, wet
~~9.0~~	40'	SW/GW	Sand, med to coarse, gravel - 2 inch, occ. cobbles, 6 inch
~~7.0~~	47'	GW	Sand, very coarse, gravel, 1-2 inch, occ. cobbles, 6 inch
~~10.5~~	57.5	GW/WBR	Sandstone/cobble layers, weathered bedrock
~~0.5+~~	58.0+	BR	Bedrock, Coarse (auger refusal).
			Set 6" PVC casing @ 58' through 8¼" ID HSA - grouted to surface through tremmie pipe inside HSAs - 9/29/92.
			10/1/92 - Set up 75 CME Truck rig @ 1:00 pm
			70-8.0' concrete inside 6" casing to be cored.
			See pg. 2 for continuation of boring below 58.0' CC

Sample Depth	Blow Counts 6"	12"	18"	24"	FID-~~PID~~ OVA (ppm) Headspace	Background
0-2'	3	7	8	8	0	0
2-4'	4	4	4	6	0	0
4-6'	8	10	10	7	0	0
6-8'	6	6	7	8	0	0
8-10'	7	7	7	8	0	0
10-12'	5	7	11	17	0	0
12-14'	7	13	14	15	0	0
14-16'	10	14	16	19	0	0
16-18'	7	11	14	19	0	0
18-20'	6	12	16	22	0	0
20-22'	8	10	17	25	0	0
22-24'	10	14	25	43	0	0
24-26'	33	27	28	38	0	0
26-28'	14	19	29	34	0	0
28-30'	10	15	15	10	0	0
30-32'	4	10	14	24	—	—
32-34'	2	13	24	30	—	—
34-36'	20	20	22	20	—	—
36-38'	21	16	16	25	—	—
38-40	15	40	46	26	—	—
40-42'	25	14	18	45	—	—
42-44'	17	27	28	39	—	—
44-46'	17	29	22	23	—	—
46-47	9/5"					

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Environmental Services Division

Well/Boring No. MW# 1SB
Client: ARCS Albion-Sheridan L.F.
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 10/7/92
Time: Started: 2:00pm Finished: PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T 2 S	R 4 W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location:

Drilling Method(s)	Depth
Air coring	70.0'
Water coring	75.0'

add to remarks
leave remarks

Grouting/Seal

Depth/To	Material/Method
75.0'-63.7'	Cs. grad. Silica Sand.
63.7'-61.7'	Bentonite Pellets
61.7'-1.0'	Cement/Bent. Grout
1.0'-0.0'	Concrete Pad

Water Level: 30.7 ft. Below Surface

Remarks: After 1st core from 59.0'-65.0' core hole removed open to 65.0'. Cored 2nd 5.0' core from 65.0'-70.0': some binding occurred. Core jammed in hole as it was being removed - lost core barrel bit @ approx. 68'. 10/5/92: Attempt to retrieve bit with spear - successful. Rotary drilled w/ 3 7/8" button bit to 70.0, Cored to 75.0'. 4 1/2" button rotary bit used to ream hole to 75.0' for well installation.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
6.0'	65.0	BR	SANDSTONE, fine to very fine, heavily fractured, vertical fracture @ 64.6'-64.9', well cemented to 64.0', moderately cemented to 65.0'; lt. gray, wet. One 45° fracture from 60.25' to 60.4', all other fractures are nearly horizontal. Grains are well rounded.	59.0'-65.0'	5.0' recovery - 1 piece 4.0" long - RQD = 6%					
				65.0'-70.0'	4.8' recovery 22" total pieces over 4"					
5.0'	70.0'	BR	SANDSTONE, fine to very fine, some horizontal fractures, moderately cemented, lt. gray, wet - grains are subrounded/subangular.	70.0'-75.0'	4.6' recovery - 1 piece 5.5" long					
5.0'	75.0'	BR	SANDSTONE, fine, several horizontal fractures, vertical fracture from 70.30'-70.58', vertical fracture from 70.90'-71.59', moderate to poorly cemented from 70.0' to 72.0'; moderate to well cemented from 72.0'-75.0', subrounded to subangular, grey with trace of clear & brown quartz							
			EOB @ 75.0'							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS- Albion/Sheridan Twp. Landfill

Project No: 04011.02

Log of Well Installation

Well Number: ~~MW#15B~~ MW-15B

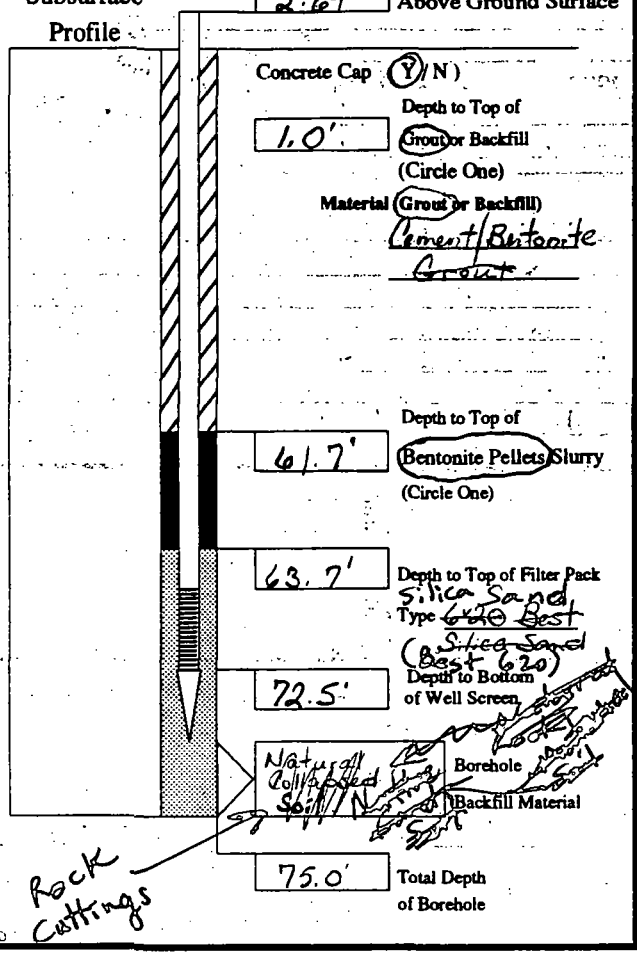
Top of Casing Elevation (feet): 982.20

Ground Surface Elevation (feet): 979.6'

Water Level Data

Date	Water Level Below TOC
4:30pm 10/6/92	Predevelopment: 33.39'
10/21/92	~~[illegible]~~ multi-tier removed, 80 gal: 33.31

Generalized Subsurface Profile



2.64' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill) Cement/Bentonite Grout

61.7' Depth to Top of Bentonite Pellets Slurry (Circle One)

63.7' Depth to Top of Filter Pack Silica Sand Type ~~620 Best~~ (Silica Sand Best 620)

72.5' Depth to Bottom of Well Screen

Natural Collapsed Soil/Rock Borehole Backfill Material

75.0' Total Depth of Borehole

Development: Bailed & Grundfos pumped 80 gal 10/16/92
Rock pumped 500 gal. Grundfos pumped 1020 gal. 10/22-10/23/92

Survey Reference: BM# N = 977.54' & Site Grid

Well Casing
- Diameter: 2"
- Total Length: 70.0'
- Material: Schedule 40 PVC
- Cap Type: ~~Pressure tight~~ "J" Plug & ~~(Casing has small vent hole drilled inside)~~ ?

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: ~~0.010 slot~~ 10, factory cut. ~~with threaded plug~~
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Sq.
- Height Above Ground: approx. 3.1'
- Lock Type: ~~#2402~~ Master ~~lock~~ - OK

General Notes: MW#15B has 6" I.D. Schedule 80 PVC outer casing set from 0.0'-59.0' below surface - grouted in place through 8¼" ID HSA's prior to bedrock coring and permanent well installation.

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Environmental Services Division

Page: 13 of 13
Well/Boring No. MW-1-SB
Client: ARCS - ALBION
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 10/7/92
Time: Started: 2 PM Finished: PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE/4	36	2S	4W

Contractor:
Address:

Location:

Equipment:
Crew Chief:
WW Supervisor:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Remarks: Following core description by Rick Tippel

Water Level: ____ ft. Below

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
28+	75.0+	rock	Quartz Sandstone, ~~light~~ gray, v. fine to fine-grained, well cemented. Horizontal fractures throughout; many appear to be induced. 45° fractures 60.3 - 60.4, Vertical fractures 70.3 - 70.6' & 70.9 - 71.6. Porosity generally not visible throughout. V. slight trace of mica & slight trace pyrite throughout. Porosity & pyrite greater in vertical fracture zones. Grains subangular to ~~subrounded~~ subrounded.
			EOB @ 75.0'

Sample Depth	RQD (%)	Recovery (%)	18"	24"	Headspace	Background
59.0-65.0	100	7				
65.0-70.0	96	37				
70.0-75.0	92	9				

WW Engineering & Science
Environmental Services Division

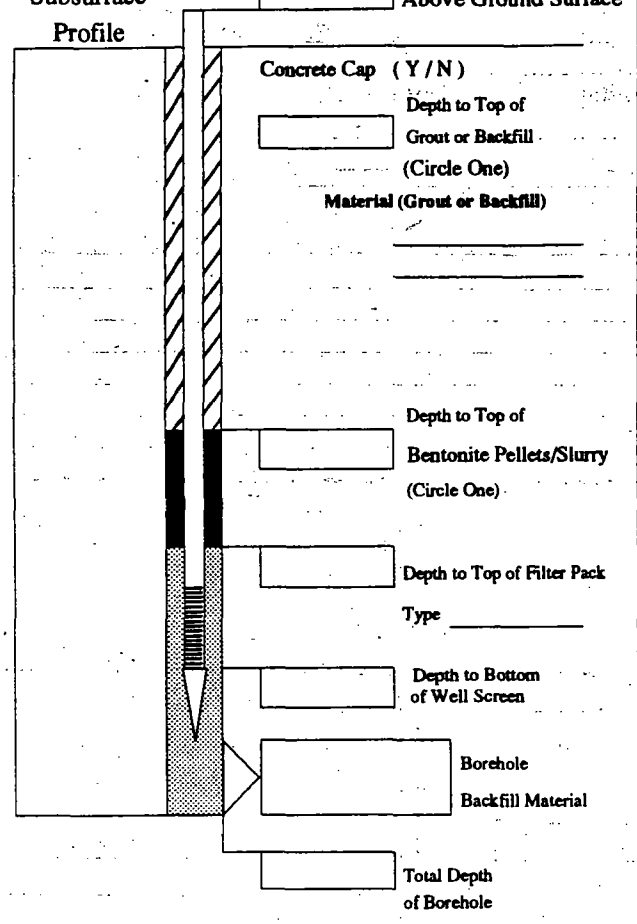
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1

Well/Boring No. MW-2 SG (Shallow ~~Glacial~~)

Client: ARCS-Albion

Project No.: 04011.02

Date: Started: 11/10/92 Finished: 11/10/92

Well/Boring Log Sheet

Time: Started: 900 Finished: 12:30

State	County	Township	Fraction	Section	T	R
Mi.	JACKSON / CALHOUN	PARMA / SHERIDAN	~~SE 1/4~~ NW 1/4 SW 1/4	36 31	2 S	3/4 W

Contractor: R&R INTERNATIONAL
Address: 1234 S. Cleveland-Massillon Rd. AKRON, OH.
Equipment: CME 750 (ATV)
Crew Chief: ED PUCCI
WW Supervisor: DON JOHNSON

Location: Approx: ~~5192 E 7~~ N 7190 N, E 5192

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-35'

Grouting/Seal

Depth/To	Material/Method
35'-27'	Cs. grd. silcasand (Best)
27'-25'	Bentonite Pellets
25'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Concrete Pad

Remarks: NO PID/FID used, based on MW#2 SB ~~findings~~ results

Water Level: 26.8' ft. Below ~~GD~~ ground
INSIDE AUGERS

~~See Lithology for MW#2 SB to~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	~~Headspace~~	~~Background~~	
—	—		"General-Log": ([redacted])								
0.5	0.5	SM/OL	Grasses, Top Soil	4'-6'	11	11	10	11			9:0
3'	3.5'	SC/CL	Clay-brown, Some Sand, Little Gravel								
0.5'	—	SW	Sand-Fine to med., Some CSE Sand, Trace								
—	4.0'		Fine Gravel - Dry								
1.5'	5.5'	SW/S	Sand-med. to CSE, Some fine to med. Gravel								
3'	8.5'	SW	Sand-fine to med., Little V. fine Sand-Dry	8'-10' (+Duplicate)	8	6	5	6			9:1
3'	11.5'	SW	Sand-fine to med, Some CSE Sand-brown-Dry								
3'	14.5'	SP/SM	Sand-V. fine to fine, Some med. Sand-brown-Dry	12'-14'	4	6	6	6			9:2
2.5'	17'	SW	Sand-med. to CSE, Tan-Dry								
1.0'	18'	SP	Sand-fine to V. fine, Trace med. Sand-brown Dry	16'-18'	3	4	4	3			9:4
2'	29'	SW	Sand-med. to CSE, wet, fine Sand-wet	27'-29' (CEC)	11	12	13	14			9:5
			EOB @ 35'								
0	0	N/A	(See "Well/Boring Log Sheet" for MW-2SB for detailed lithologic description).								

WW Engineering & Science
Environmental Services Division

Project Name: ARCS-Albion

Project No: 04011.02

Log of Well Installation

Well Number: MW-2SG ~~MW#2SG (Shallow Glacial)~~

Top of Casing Elevation (feet): 977.93'

Ground Surface Elevation (feet): 975.2'

Generalized Subsurface Profile

Length of Casing Above Ground Surface: 2.75' → ~~2.5'~~ ~~2.0'~~ ~~Re-measured (cut casing) 11/10/92~~

Concrete Cap (Y) N

Depth to Top of Grout or Backfill (Circle One): 1.0'

Material (Grout or Backfill): ~~Cement/Bentonite~~ ~~Tremie Grouted~~

Depth to Top of Bentonite Pellets/Slurry (Circle One): 25'* ~~hydrated w/H2O (Gal.)~~

Depth to Top of Filter Pack: 27'

Type: Best

Depth to Bottom of Well Screen: ~~35'~~ 35'

Borehole Backfill Material: N/A

Total Depth of Borehole: ~~35'~~ 35'

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelop: 28.03'
12/7/92	Stabilized: 27.92'

Development: Pumped 300 gal: Very silty - Surged several times: Cloudy/brown

Survey Reference: BM# N/E ~~See survey~~ Site grid

Well Casing
- Diameter: 2"
- Total Length: ~~37.5'~~ ~~38'~~ 32.75'
- Material: PVC schedule 40
- Cap Type: ~~Threaded~~ "T" Plug

Well Screen
- Diameter: 2"
- Length: 5'
- Slot/Type: 10 ~~slot~~ factory cut
- Material: PVC Schedule 40

Protective well casing
- Material: ~~Anodized~~ Anodized Aluminum Dia. 4" Square
- Height Above Ground: ~~3.5'~~ approx. +13.2'
- Lock Type: MASTER ~~#2402~~ Lock

General Notes: * pellets hydrated w/approx total water

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW# 2 WB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/19/92 Finished: 11/19/92
Time: Started: 1:45p Finished: 5:45p

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	~~Calhoun~~ JACKSON	~~SHERIDAN~~ PARMA	NW 1/4 ~~SE 1/4~~ SW 1/4	~~36~~ 31	~~T2S~~	~~R4W~~ 3

Contractor: R&R International **Location:** Approx E509 E + N718 N
Address: 1234 S. Cleveland/Massillon Rd. Akron, OH
Equipment: CME 750 (ATV) OK
Crew Chief: ED Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-54'

Grouting/Seal

Depth/To	Material/Method
~~See Reverse Side~~	
0-1.0	Concrete Cap
1.0-43	Bentonite Chips
43-46	Cement/Bentonite Grout
46-53	Silica Sand (Best)
53-54	Native Soils

Water Level: ≈ 26' ft. Below ~~GD.~~ ground

Remarks: * Split Spoon Refusal @ 50'-52' for CEC Analysis. - No Sample Collected / No Sample Recovery

~~See Lithology for MW#2 SB to 54'~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			See Well/Boring Log Sheet ~~for~~ MW-2 SB for

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace ~~N/A PID~~	~~Background~~
50'-52'	* 100/~~for 0~~"	—			—	—

CONT

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - ALBION SHERIDAN TWP. LANDFILL
Project No: 04011.02

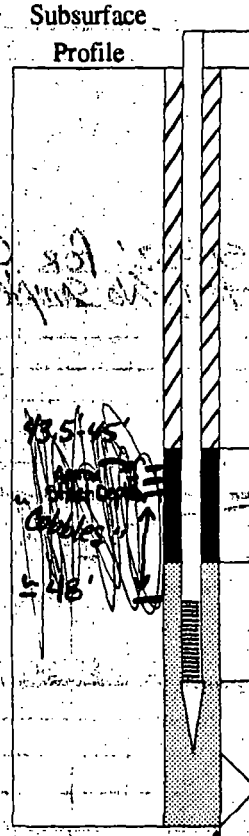
Log of Well Installation

Well Number: MW #2 WB

Top of Casing Elevation (feet): 977.33

Ground Surface Elevation (feet): 975.0'

Generalized Subsurface Profile



Length of Casing Above Ground Surface: 2.3'

Concrete Cap (Y) N

Depth to Top of Grout or Backfill: 1.0'

(Circle One)

Material (Grout or Backfill): Cement/Bentonite ~~Teremite Grouted~~

Depth to Top of Bentonite Pellets/Slurry (Circle One) Chips Plug: 43

Depth to Top of Filter Pack: 46'

Type: Silica Sand Best (620)

Depth to Bottom of Well Screen: 53'

Borehole Backfill Material: Nat Soils

Total Depth of Borehole: 54'

43.5-45' Cobbles

~48'

Water Level Data

Date	Water Level Below TOC
11/19/92	Predevelop: 28.0'
11/25/92	Post develop: 27.80'
12/8/92	Stabilized: 27.75'

Development: Pumped 600 gal - Surged several times. Silty to cloudy gray

Survey Reference: BM #1 ~~See survey~~ Site Grid

Well Casing	Diameter:	2"
	Total Length:	~~50'~~ 50.3'
	Material:	~~PVC~~ Schedule 40 PVC
	Cap Type:	J-plug
Well Screen	Diameter:	2"
	Length:	5' ~~(60')~~
	Slot/Type:	~~10-Slot/Continuous Wound~~ 10/factory cut
	Material:	Schedule 40 PVC
Protective well casing	Material:	Aluminum Dia. 4" Sq.
	Height Above Ground:	~~3.0'~~ approx 2.7'
	Lock Type:	MASTER ~~#2402~~ LOCK

General Notes: Cobbles/Boulders encountered 43.5'-45' (Approx. Start Depth) to Approx. 47.5'-48'. May be mixed in with top portion of sand pack & throughout the bentonite seal, to a certain extent. ?

Cobbles

WW Engineering & Science
Environmental Services Division

Page: 1 of 2
Well/Boring No. MW-2-SB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 9/23/92 Finished: 10/20/92
Time: Started: 1:45p Finished: 4:30pm

Gen

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	~~Calhoun~~ JACKSON	~~Sheridan~~ PARMA	~~SE 1/4~~ NW 1/4 SW 1/4	36 31	~~1~~ 2S	~~R4W~~ 3W

Contractor: R&R
Location: ~~5080.5' E + 7171~~ N 7171, E 5091
Address: 1234 S. Cleveland/Massillon Rd Akron, OH 44321
Equipment: 750 CME
Crew Chief: Ed Pucci
WW Supervisor: K. Ostermann/D. JOHNSON

Drilling Method(s)	Depth
4 1/4 HD HSA & 8 1/4"	0-50.0'
~~(See back "remarks" for details)~~	
Rotary coring/drilling	50-65.5

Grouting/Seal

Depth/To	Material/Method
65.0-65.5 ~~65.0~~'	Rock ~~Settled~~ cuttings
56.0-65.0 ~~55.0~~'	Grnd. Silica Sand (Bast
50.0-56.0 ~~55.0~~'	Bentonite slurry
1.0-50.0'	do' Cement/Bentonite grout
0.0-1.0'	~~0.20~~' Concrete pad

Water Level: ~~25.127~~ ft. Below Ground ~~42 hour~~

Remarks:
Drove 4" casing from 50.5 to 55.5' with a C300 lb. hammer.
Draeger Methane results:
4-6' No Color change (1)
10-12' No Color Change (2)
14-16' No Color change (3)
20-22 No Color change (4)
24-26 sample ~~came up wet~~ (5)

type from 0.0 down

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
3.0	3.0	SW	Sand, med to fine, Loose, some coarse gravel, Black, moist
—	—	—	
22.0'	25.0'	SW	Sand, med to fine, Loose, Brown, moist
0.5'	25.5'	~~SP~~ SW	Sand, coarse to very coarse, some sm gravel, Brown, wet
—	—	—	
1.5'	27.0	SW	Sand, med to fine, Brown, wet
1.0'	28.0	SW	Sand, med to fine, Black, trace Staines, sm coal
—	—	—	0.0 ppm OVA readings
11.0'	39.0	SP	Sand, med, little coarse, Brown, wet
1.0'	40'	SP	Sand, Coarse to v. coarse, Brown, wet
2.0'	42.0	SP/GW	Sand, fine, gravel, + coarse, sm cobbles
			42-44 lg boulder in tip of spoon
			~~(Continued on pg 2 of 2)~~

Sample Depth	Blow Counts 6"	12"	18"	24"	FID ~~PID~~ OVA (ppm) Headspace	Background
0-2'	1	2	4	4	0	0
2-4'	1	6	5	6	0	0
4-6'	4	6	7	6	0	0
6-8'	4	6	5	6	0	0
8-10'	5	4	5	7	0	0
10-12'	5	5	4	5	0	0
12-14'	6	6	7	6	0	0
14-16'	5	4	4	7	0	0
16-18'	3	2	4	4	0	0
18-20'	4	5	5	5	0	0
20-22	4	4	4	5	0	0
22-24'	8	14	25	35	0	0
24-26'	17	9	7	7		
26-28	5	4	4	9		
28-30	11	9	15	50/5"		
30-32'	6	30	50/5"	—	0	
32-34'	5	3	6	14		
34-36'	2	15	43	50/5"	0	
36-38'	17	16	23	23		
38-40	16	16	14	18		
40-42'	6	20	43	50/5"		50/5
42-44'	49/5"	Lg Rock in spoon				
44-46'	43	49	50/3			
46-48'	95	50/5				

WW Engineering & Science
Environmental Services Division

Page: 2 of 3
Well/Boring No. MW-2 SB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 9/23/92 Finished: 10/ /92
Time: Started: 1345 Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.						

Contractor: R&R
Address:
Location:

Equipment: CME 750
Crew Chief: ED
WW Supervisor: KTO/DJJ

Drilling Method(s)	Depth
4¼ ID HSA	0.0'-50'*

Grouting/Seal

Depth/To	Material/Method
0.0-50'	6" PVC / Grouted
0.0-55.5'	4" Flush Joint Steel (Driven)

Water Level: 27' ft. Below GD

Remarks: * Rock Core from 50'-55' (≈ 4.35' Recovery)
1st Run-RQD = 1.1'
Cemented in 6" PVC Casing to 50' below Grade 9/23/92
Attempted Wash Rotary Drilling to Clean-out the Casing & Begin Rock Coring - Heaving Problems. - Need to Case-off to Proceed. (10/12/92)

Drove 4" Flush Joint Casing from 50.5'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
↑	46'		Sand-Stone: Lt. Green - weathered - Dense (Large Piece)	46-48	57	35	39	19	-	-
3'	49'		Sandstone Very weathered - Greenish/Gray	48-48.5'	65	for	6"	—	—	—
6'	55'		Sandstone - Dense, Fractures	50-50.1'	90	for	1"	—	—	—
			1st Run: Rock Core Description: (50-55') (4.35' Recovery)				Recovery			
			Very fine to fine Grained Brownish/Green well to Fairly well Cemented throughout	RQD:	1.1'			4.35'		
			Vertical Fracture from 50.1' to 50.45'							
			Horizontal Fractures throughout							
			Veins of Iron deposits, periodically throughout							
			* 52.3' to 52.8' - Grey, fine to very fine Grained, Rounded, Fairly well Cemented Sandstone *							
55'			10/14/92							
60.5'			2nd Run: 10' Sandstone: Very fine to fine Grained, Greenish Grey, Several "Iron-type" Deposits (veins), Heavily fractured throughout (59.5'-60.5') Hard fine to med. Grained Sand Stone, Not very well cemented.							
			10' Run							
65.5'			3rd Run							
			10' Run - 8.8" Return 1.1' (over 4" total)							

WW Engineering & Science
Environmental Services Division

Project Name: Akron-Albion - Sheridan Twp. Landfill
Project No: 04011.02

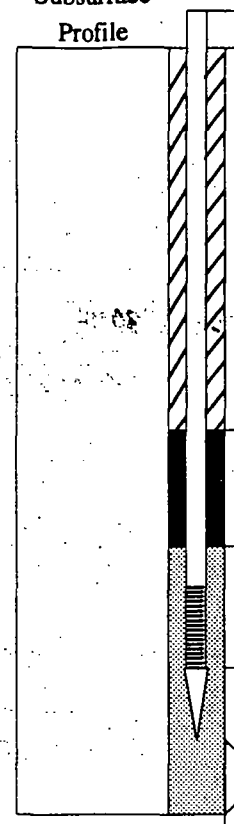
Log of Well Installation

Well Number: MW#2 SB

Top of Casing Elevation (feet): 977.62

Ground Surface Elevation (feet): 975.4

Generalized Subsurface Profile



~~3.0'~~ 2.2' Length of Casing Above Ground Surface

Concrete Cap (Y / N)

~~4~~ 1.0 Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement/Bentonite ~~(3% Bent.)~~

* Depth to Top of 50' Bentonite Pellets/Slurry (Circle One)

56' Depth to Top of Filter Pack

Type ~~Silica~~ #5 Sand (Best 620)

65' Depth to Bottom of Well Screen

Native Soils ~~Material~~ Borehole Backfill Material

65.5' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment 28.34
12/8/92	Stabilized 28.36

Development: Grundfos pump - 1900 gal. Silty to clear, good recovery.

Survey Reference: BM ~~N 6927.54~~ & site grid

Well Casing
- Diameter: 2"
- Total Length: ~~68'~~ 62.2
- Material: PVC
- Cap Type: ~~#~~ J-plug

Well Screen
- Diameter: 2"
- Length: 5'
- Slot/Type: ~~10 Slot~~ Factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Square
- Height Above Ground: ~~3.5'~~ approx. 2.7'
- Lock Type: ~~*~~ Master Lock

General Notes: ~~* Bentonite Slurry (thick) used in place of Pellets, due to Limited Distance Between the 4" Casing & the 2" PVC Casing (well) (Approx. 1" of Clearance would Cause Pellets to Bridge).~~

Leave notes

WW Engineering & Science
Environmental Services Division

Page: x3 of x3
Well/Boring No. MW-2-5B
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 9/23/92 Finished:
Time: Started: 1:45P Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	JACKSON	PARMA				

Contractor: R&R
Address: AKRON, OH
Equipment:
Crew Chief:
WW Supervisor:

Location:

Drilling Method(s)	Depth

Grouting/Seal Depth/To	Material/Method

Water Level: ____ ft. Below ____

Remarks: ~~Following core description by Rick TRIPPEL.~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	~~Blow Counts~~ ~~PID~~ RQD (%) Recovery (%) 6"	12"	18"	24"	Headspace	Background
13 ~~10.5~~	~~60.5~~ 55	rock	Quartz Sandstone, gray, becoming lt-gray to greenish gray 53.5-55, v. fine-fine grained, well cemented. Heavily fractured throughout. Vertical fracture 50.2-50.4. 30° fracture 52.10-52.11. Most fractures appear natural - worked by solution, breaks don't appear fresh. Some iron-staining throughout. Brown throughout.	50-55	87	0				
55.5	65.5+	rock	Quartz Sandstone, lt gray to greenish-gray throughout, well cemented, v. fine to fine-grained. Fractured throughout; Most horizontal, nearly vertical 0-0.5, 4.35-4.6 from top of run. Most appear ~~maybe~~ induced, many may be natural. Some iron-staining throughout. General coarsening downward.	55.5-65.5	88	0				

WW Engineering & Science
Environmental Services Division

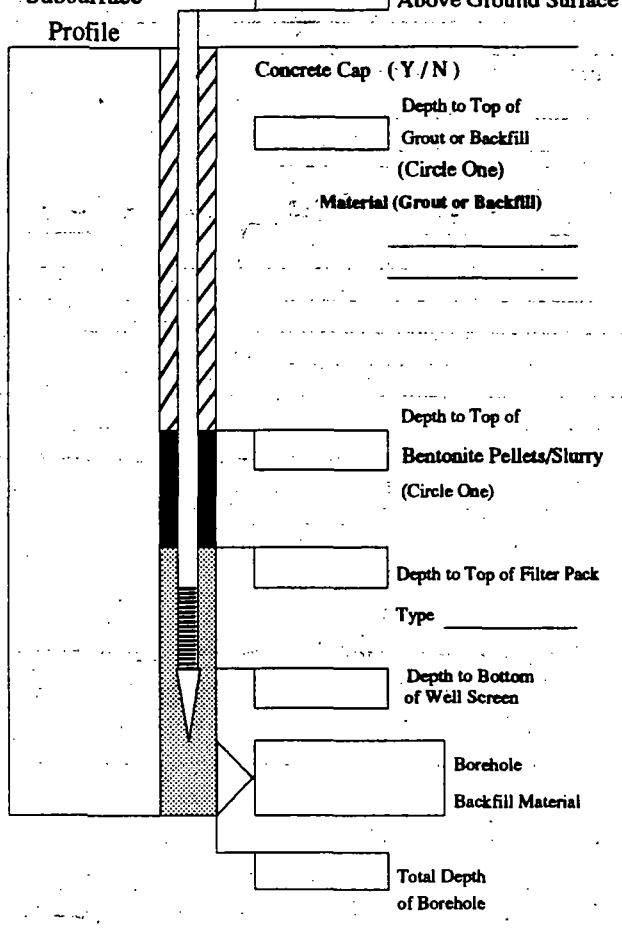
Project Name: _____

Project No: _____

Log of Well Installation

Well Number: _____

Generalized Subsurface Profile



Top of Casing Elevation (feet): _____

Ground Surface Elevation (feet): _____

Water Level Data

Date	Water Level Below TOC

Development: _____

Survey Reference: _____

Well Casing
- Diameter: _____
- Total Length: _____
- Material: _____
- Cap Type: _____

Well Screen
- Diameter: _____
- Length: _____
- Slot/Type: _____
- Material: _____

Protective well casing
- Material: _____ Dia. _____
- Height Above Ground: _____
- Lock Type: _____

General Notes: _____

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW #-3 SG-
Client: ARCS- Albion
Project No.: 04011.02
Date: Started: 11/17/92 Finished: 11/18/92
Time: Started: 11:10 AM Finished: 11:30 AM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	NE/4 SE 1/4	36	2S	4W

Contractor: R&R International
Address: 12345 Claude Mossillon Rd. Akron, OH.
Equipment: CME 750
Crew Chief: Ed Pucci
WW Supervisor: Dan Johnson

Location: ~~At South of North of MW# 3SB~~
Approx: N 6136 + 4348, E 4348

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'- ~~45~~ 45'

Grouting/Seal

Depth/To	Material/Method
~~See Reverse Side~~	
0-1.0	Concrete Cap
1.0-35	Bentonite Pellets
35-37	Cement/Bentonite Grout
37-44	Silica Sand (Best)
44-45	Native Soil

Water Level: 30.5 ft. Below ~~GS~~ ground

Remarks: No Split Spoons Collected w/the exception of the Saturated Soils from the "Screened" interval for CEC ANALYSIS from the 37'-42' zone.

~~See Lithology for MW# 3-SB (ABANDONED Boring) to 42'~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background
0	0	N/A	See "Well/Boring Log Sheet" for MW-3SB (abandoned boring) for detailed lithologic description							
45	45	SW+	Sand med. to CSE, Some Fine Gravel, Gray wet	38'-40'	5	5	6	8		
			EOB @ 45'							

N/A ~~PID~~

45

?

12.2

WW Engineering & Science
Environmental Services Division

Project Name: ABCS-Albion Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW#3 SG (Shallow Glacial)

Top of Casing Elevation (feet): 978.875

Ground Surface Elevation (feet): 976.9

Generalized Subsurface Profile

2.0' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement/Bentonite ~~Tremmie Grouted~~

30.5' H2O

8.5' H2O Above Top of Screen

35' Depth to Top of Bentonite Pellets/Slurry (Circle One)

39' Top of Screen

37' Depth to Top of Filter Pack: Silica Sand Type: Best (Brand) 620

44' Depth to Bottom of Well Screen

Native Soils Borehole

Native Soils Backfill Material

45' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/25/92	Post development: 31.42'
12/17/92	Stabilized: 31.66'

Development: Pumped 250 gal. with grundfos pump - Very silty to cloudy/brown

Survey Reference: MW#3 SB (T.O.C.) Elev. = 978.145 site grid

Well Casing	Diameter:	2"
	Total Length:	41.0'
	Material:	PVC Schedule 40
	Cap Type:	J-plug
Well Screen	Diameter:	2" factory cut
	Length:	5' ~~(60")~~
	Slot/Type:	10-slot / ~~[illegible]~~
	Material:	Schedule 40 PVC
Protective well casing	Material:	Anodized Aluminum Dia. 4" sq.
	Height Above Ground:	~~3.5'~~ approx. 2.5'
	Lock Type:	Master #2402 Lock

General Notes: Heaving Sands Caused well to Stop at 40.5' on First well Setting Attempt. - Pulled well, pulled Back Augers, Re-drilled to 45', pulled Back to 44', Set well. - Sand Packed and Sealed Before Heaving Sands Created another Problem.

* Top of Well Screen (39') is 8.5' below water Table. *

~~* GD. Elevation is 1.4' higher, than, the GD. at MW#3 SB *~~

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW# 3-WB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/16/92 Finished: 11/16/92
Time: Started: 1230p Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	NE 1/4 SE 1/4	36	2S	4W

Contractor: R&R International Location: Approx ~~6136 N 4340 E~~ N 6136, E 4340
Address: Akron, OH
Equipment: CME 750
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4¼" I.D. HSA	0.0'-60'

Grouting/Seal

Depth/To	Material/Method
~~See Reverse Side~~	
0-1.0	Concrete Cap
1.0-50	Cement/Bentonite Grout
50-52	Bentonite Pellets
52-59	Silica Sand (Best)
59-60	Native Soil

Water Level: 29.0 ft. Below ~~BD~~ ground

Remarks: * Started Drilling Very Slow/Hard from 47' to 60', in Layers (Weathered Bedrock) - Used 4¼" ID Augers only... No Rotary Drilling ~~Backward~~ (Approx. 30 min to drill 13') * Hardest Area is 37'-38.5' in Depth (Slowest Drilling)

~~See Boring Log for M.W. 3SB to 60', for Lithology~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	Headspace	Background
			* See "Remarks" for 47'-60' info. *							
			See "Well Boring/Log Sheet" for MW-3SB ~~Abandoned~~ for detailed lithologic description to 60'							
			EOB @ 60'							

~~N/A PID~~

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion Sheridan Twp. Landfill
Project No: 04011.02

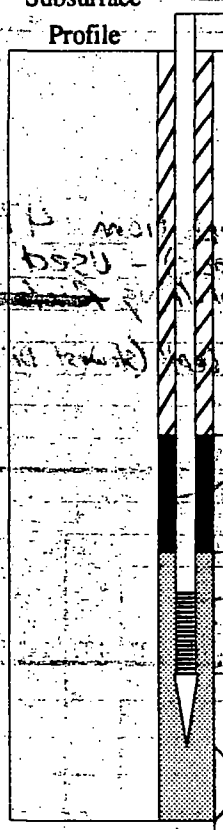
Log of Well Installation

Well Number: MW #3-WB

Top of Casing Elevation (feet): 978.65'

Ground Surface Elevation (feet): 976.11'

Generalized Subsurface Profile



2.55 / ~~2.25~~	Length of Casing Above Ground Surface ~~(Jagge cut) 2/18/92~~
	Concrete Cap (Y/N)
1.0'	Depth to Top of Grout or Backfill (Circle One)
	Material (Grout or Backfill) ~~Tremmie Grouted (Cement/Bentonite)~~
50'	Depth to Top of Bentonite Pellets Slurry (Circle One)
52'	Depth to Top of Filter Pack Silica Sand Type (Best (Brand) 620)
59'	Depth to Bottom of Well Screen
~~Nat. Soils (from knock out plug material)~~ Native Soil	Borehole Backfill Material
60'	Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/25/92	Postdevelopment = 31.51'
12/17/92	Stabilized = 31.48'

Development: Pumped 500 gal. w/ Grundfos pump. Silty gray to tan & cloudy.

Survey Reference: BM# WE ~~See Survey~~ site grid

Well Casing	Diameter:	2"
	Total Length:	56.5'
	Material:	PVC Schedule 40
	Cap Type:	J-plug
Well Screen	Diameter:	2"
	Length:	5' ~~(60")~~
	Slot/Type:	~~10 slot/[illegible]~~ 18/factory cut
	Material:	PVC Schedule 40
Protective well casing	Material:	Anodized Aluminum Dia. 4" sq.
	Height Above Ground:	approx. 3.0'
	Lock Type:	Master ~~#2402~~ Lock

General Notes: Knock out plug used on 4¼" ID Augers (wooden) - over-drilled to 60' to allow room for Plugged Soils in the end of the lead auger.

* Hole (annulus around 2" well) is taking a lot of Grout, ie: possible void, or, very coarse material, or, possible fractures. *

WW Engineering & Science
Environmental Services Division

Well/Boring No: MW#3SB (abandoned)
Client: Albion/Sheridan Twp Landfill
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 9/25/92
Time: Started: 2:00pm Finished: 2:30pm

ABANDONED HOLE

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	NE¼SE¼	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 ~~Footking~~
Crew Chief: Jim McCurdy
WW Supervisor: L. Cotton

Location: N 6114
E 4345

Methane dragger: ~~5: 2:24 pm~~
~~10: 2:40 pm~~
~~15: 2:55 pm~~
~~20: 3:20 pm~~
~~25: 3:50 pm~~

Drilling Method(s)	Depth
4¼" ID HSA	0 – 47.0'

Grouting/Seal

Depth/To	Material/Method
2.0 – 47.0' ~~42.0~~	~~Caved~~ Natural soil
0.0 – 42.0' ~~2.0~~	Cement/Bentonite Grout ~~Tremmied from bottom to surface inside HSAs~~

Remarks: Methane test in augers with Dragger tube every 5.0' (5', 10', 15', 20', 25'); no color change ~~Continuous monitoring with PID/FID in breathing zone~~ ~~Vertical sampling in upper aquifer every 5.0' to bedrock.~~ ~~6" outer casing set 2.0' into bedrock with packer, then grouted in place – 24 hr grout set~~ ~~Air rotary – take core sample @ 5.0' intervals.~~ Grease in hole @ 47.0' – Noted on temp. well casing. Abandoned hole and redrilled – See log for MW#3SBA

Water Level: 28.0 ft. Below ~~Surface~~ Ground

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
2.0'	2.0'	SMP	SAND, fine to med fine, little silt, dk gray/brown, little moist
0.5'	2.5'	ML	SILT & CLAY, little fine sand trace cs. gravel & cobbles, hard & crumbly, lt. brown, trace moist-dry
3.0'	5.5'	GM	SAND & GRAVEL, well graded, some silt, little compacted & crumbly, brown, trace moist-dry
5.0'	10.5'	SPW	SAND, fine, little med fine to med coarse sand, trace fine gravel, loose, lt. brown to blonde, dry
3.1'	13.6'	SPW	SAND, med to fine, occ. small layer of coarse & fine gravel, loose, red/brown, dry to moist
2.4'	16.0'	SP	SAND, fine loose blonde, moist – Some small layers of med fine to coarse sand
3.5'	19.5'	SW	SAND poorly sorted, fine to coarse, little silt little fine gravel, loose, brown, moist
0.2'	19.7'	ML	SILT little clay, trace of fine gravel, soft, crumbly, gray, moist
1.1'	20.8'	CL	CLAY some silt, fine sand little cs. sand & fine gravel, soft, crumbly, brown, very moist
5.9'	26.7'	SC/GC	SAND & CLAY, little fine to coarse gravel, soft,

Sample Depth	Blow Counts 6"	12"	18"	24"	PID (ppm) Headspace	Background
0.0'-2.0'	1	2	3	4	0	
2.0'-4.0'	5	12	18	30 Rock	0	
4.0'-6.0'	22	20	13	9	0	
6.0'-8.0'	4	6	5	4	0	
8.0'-10.0'	5	5	4	4	0	
10.0'-12.0'	5	3	5	4	0	
12.0'-14.0'	4	4	5	3	0	
~~14.0'-16.0'~~	~~3~~	~~3~~	~~5~~	~~4~~	~~0~~	
16.0'-18.0'	4	4	5	4	0	
18.0'-20.0'	4	6	6	7	0	
20.0'-22.0'	1	3	13	9	0	
22.0'-24.0'	2	4	3	4	0	
24.0'-26.0'	1	3	5	7	0	
26.0'-28.0	5	7	4	10	0	
28.0'-30.0	6	8	9	9	~~No H.S.~~	
30.0'-32.0'	1	4	7	9	Blow Hole	
~~Temp Well #1~~	~~1~~	~~28.0'~~	~~30.0'~~			
33.0'-35.0'	1	2	1	5		
35.0'-37.0'	1	1	2	2		
~~Temp Well #2~~	~~32.5'~~	~~37.5'~~				
37.5'-39.5'	2	3	5	4		
40.0'-42.0'	3	3	6	9		
45.0'-47.0'	29	31	32	20		

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Page: 2 of 2
Well/Boring No. MW-36B
Client: Albion-Sheridan Landfill
Project No.: 04011.02
Date: Started: 9/22/92 Finished: 9/25/92
Time: Started: 2:00pm Finished: 2:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International, Inc
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location:

Drilling Method(s)	Depth
4 1/4" ID HSA's	47.0'

Grouting/Seal

Depth/To	Material/Method
47.0'-42.0'	Caved natural soils
42.0'-0.0'	Cement/Bentonite Grout Trimmed from bottom to surface inside HSA's

Water Level: 28.0 ft. Below Surface

Remarks: ~~Temp Well #1 W.L. = 29.90' below TOC T.D. = 33.0' (1.9 stickup)~~ Sampled 9/23
~~Temp Well #2 W.L. = 30.88' below TOC T.D. = 37.5' (2.9 stickup)~~
~~Temp Well #3 W.L. = 31.63' below TOC T.D. = 42.0' (2.3 stickup)~~
~~Temp Well #4 W.L. = 31.00' below TOC T.D. = 47.0' (3.0 stickup)~~
temporary well
Found grease on casing when 4th TW was pulled. Must have fallen into HSAs from rig. Grouted and abandoned borehole. ~~Thorough clean of all drilling materials. Dispose well materials~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
			some fine layers of damp sand, gray, very moist.							
0.8'	27.5'	SM/GM	SAND, poorly sorted, some silt, little fine to med. gravel, loose, brown, very moist							
4.5'	32.0'	SW	SAND, med to coarse, some fine to med. gravel, little silt, loose, brown, damp to wet @ 28.5' +/-							
4.0'	36.0'	SP/W	SAND, fine to med., some silt, little coarse sand, trace of fine med. gravel, loose, brown, wet							
2.0'	38.0'	SW	SAND, med. to coarse, some fine gravel, little mid fine sand, loose, gray, wet							
3.6'	41.6'	SW	SAND, med to coarse, some silt, occ. layer of fine to med gravel, loose, dk. gray brown, wet							
0.8 4.2'	45.8	SM	SAND, fine, some silt, loose, gray, wet							
0.4'	46.2	SW	SAND, fine to coarse, little fine gravel, loose, dk brown, wet							
0.8'+	47.0'+	Bedrock	SANDSTONE, very weathered, friable, soft, easily crumbled, lt. gray, little moist							
			EOB @ 47.0'							
3.0	45		No Sample Recovered							

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Page: 1 of 1
Well/Boring No. MW#3 SB-A
Client: Albion/Sheridan Twp. LANDFILL
Project No.: 04011.02
Date: Started: 10/11/92 Finished: 10/12/92
Time: Started: 4:00 PM Finished: 12:30 PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	NE¼ SE ¼	36	2 S	4 W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd. Akron OH. 44321
Location: ~~Offset 12.5' North of MW#3 SB location~~ N 6126 N, ~~4345 E~~ E 4345

Equipment: CME 750 (ATV)
Crew Chief: ED PUCCI
WW Supervisor: DAN JOHNSON

Drilling Method(s)	Depth
4¼" ID. HSA	0.0'-55.5'
~~3⅞" Roller Bit~~	~~55.5-70.5'~~

Rotary Coring/Drilling

please leave highlighted remarks

Grouting/Seal

Depth/To	Material/Method
70.5-69.5'	Settled cuttings
69.5'-62.5'	Graded silica sand
62.5'-62.1'	Bentonite Pellets
62.1'-59.0'	Bentonite Slurry
59.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Concrete cap

Water Level: 29' ft. Below Surf. ground

Remarks: ~~* Rock Cored @ 55.5'-60.5', 60.5'-65.5', & 65.5'-70.5', Runs, then, Reamed Core hole to 3⅞" Dia. to 70.5'~~
AUGER refusal 55.5'
*Split Spoon Refusal (Possibly Cobble Stuck in lead auger)
RAN Augers Down w/a 3" Split Spoon AS A Center Plug.
Accumulated Pieces of Sandstone (weathered) in Spoon, which was described for Lithology/No other Split Spoons Collected

see pg 3. for data

put this note on 1st line, leave blanks, continue leaving

See MW#3SB (Abandoned) for lithologic description from 0-47' to 47.0'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
3.8'	46.8'	WBRock	Sandstone: ~~Silt~~, weathered, Poorly Cemented, Friable (Gray), Crumbles (Previously logged to 47' by C.C. 9/22-9/25/92)	45-47'	100	1"				
	50'				100/1					
5'	—	WBRock	Sandstone: weathered, Poorly Cemented, Some hard layers, (Gray)							
—	55'									
0.5'	—	BRock	Sand Stone: ~~Hard~~, Gray well to Fairly well Cemented ~~Auger Refusal~~							
—	55.5									
			* Rock Core #1 (5' Run) 55.5'-60.5': 3.85' Recovery (=3'10") - Sand Stone, Gray, Poorly Cemented, very fine to fine Grain, Little Seams of Fairly well Cemented Sand Stone, Several Horizontal Fractures throughout Core. (Low RQD)							
	60.5'		* 2nd (5' Run) 60.5'-65.5' (4'10" Recovery) - Sandstone Gray, Fairly well Cemented, Fine Grained to Very Fine Grained Sands, Less fractured, trace veins of weathered Sandstone (Higher RQD)							
	65.5'		* 3rd (5' Run) 65.5'-70.5' (4'10" Recovery) - Sandstone: Gray, well Cemented, Fine to Very Fine Grained, trace fractures w/Poorly Cemented Sandstone							
	70.5'		E.O.B. @ 70.5'							

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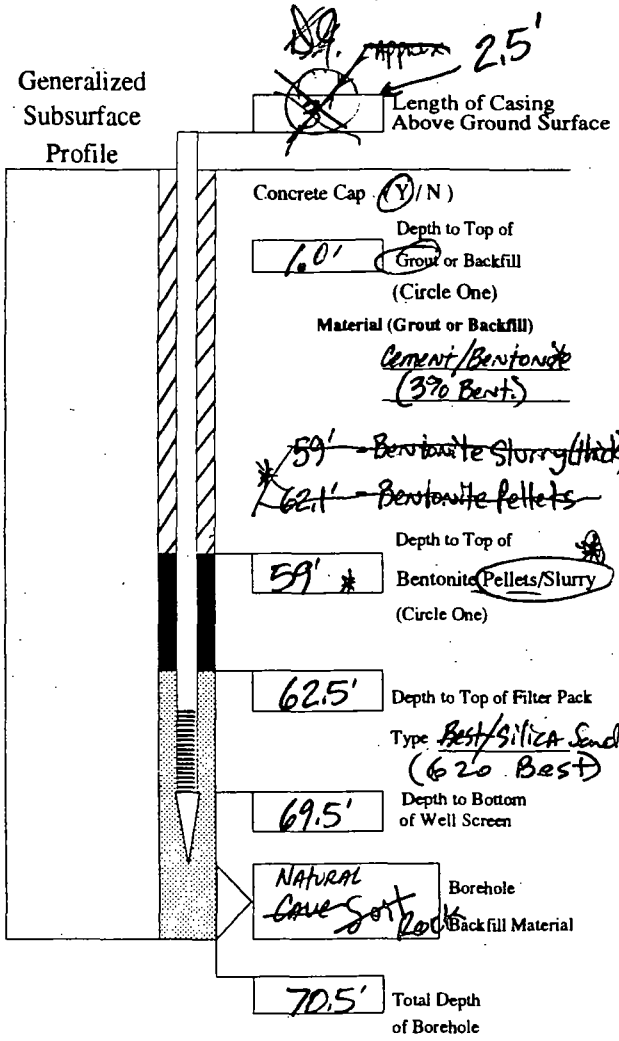
Project Name: ARCS-Albion Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW#3 SB-A

Generalized Subsurface Profile



Material (Grout or Backfill): ~~Cement/Bentonite~~ (3% Bent.)

Type ~~Best~~/Silica Sand (620 Best)

Top of Casing Elevation (feet): 978.14

Ground Surface Elevation (feet): 975.6'

Water Level Data

Date	Water Level Below TOC
11/25/92	Postdevelopment: 30.97'
12/17/92	Stabilized: 31.08'

Development: Pumped approx. 1500 gal. with Grundfos - silty to clear.

Survey Reference: BM#1 ~~See survey notes~~ site grid

Well Casing
- Diameter: 2"
- Total Length: ~~35~~ 67.0'
- Material: ~~PVC~~ Schedule 40 PVC
- Cap Type: "J" plug

Well Screen
- Diameter: 2"
- Length: 5' ~~(60")~~
- Slot/Type: 10 ~~Slot~~/factory cut
- Material: ~~PVC~~ Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Square
- Height Above Ground: ~~3.0~~ approx 3.0
- Lock Type: ~~2402~~ master lock

General Notes: * Bentonite Pellets Started Bridging @ 34' below Grade inside the Augers. (10/12/92) - Switched to a Thick Bentonite Slurry (approx 4" of Pellets)

Vertical H2O Samples: (2" PVC)
(≈17' W.L.) 42'-47' (Screen Depth)

Gals. Removed	pH/Temp	Cond./Temp
15 gals.	7.01/12.4°C	1,216 µm/12.3°C
18.5 gals.	7.06/12.1°C	1,242 µm/12.2°C
20 gals.	7.06/12.1°C	1,243 µm/12.2°C
25 gals.	7.07/12.2°C	1,250 µm/12.3°C
30 gals.	7.07/12.1°C	1,248 µm/12.2°C

* Pumped w/ Teflon Bailer - Sediment free

47'-52' (Screen Depth)

Gals. Removed	pH/Temp (°C)	Conductivity/Temp
15 gals	7.19/13.5	1254/13.4°C
20 gals	7.06/13.3	1257/13.4°C
30 gals	7.05/13.2	1259/13.3°C
50 gals	7.06/13.2	1262/13.3°C
70 gals	7.06/13.4	1258/13.4°C

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Page: 1 of 1
Well/Boring No. MW-3-SBA
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/12/92
Time: Started: 4 PM Finished: 12:30 PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE 1/4	36	2S	4W

Contractor: R&R
Address: AKRON, OH
Location:
Equipment:
Crew Chief:
WW Supervisor:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method
0.0-1.0	Concrete Cap
1.0-59	Cement/Bentonite Grout
59-62.1	Bentonite Slurry
62.1-62.5	Bentonite Pellets
62.5-69.5	Silica Sand (Best)
69.5-70.5	Natural Rock

Water Level: ft. Below

Remarks: ~~Following core description by Rick TRIPLETT.~~

In general, all 3 core samples are very fractured w/possible natural fractures throughout. General coarsening downward w/slight increase in iron-staining with depth. Grains sub-angular to sub-rounded throughout.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	~~Blow Counts~~ 6"	12"	18"	24"	PID Headspace	PID Background
					RQD (%) / Recovery (%)					
5	60.5	rock	Sandstone, gray, v. fine to fine grained, well cemented. Horizontal fractures throughout. Most appear to be induced. Coarser-grained zones at 0.6' and 3.2-3.9' from top have much greater porosity w/slight trace of pyrite. Zone at 3.2-3.9 also has slight iron-staining w/45° fracture.	55.5-60.5	70	1				
5	65.5	rock	Sandstone, as above. Horizontal fractures throughout, appear to be induced. Very slight trace of mica & pyrite throughout. Porous throughout with zone of higher porosity ~~and~~ coarser-grains 60.5-60.8. ~~and~~	60.5-65.5	98	67				
5	70.5	rock	Sandstone, as above. Generally coarser, more porous, w/more slight trace iron-staining throughout than sections described above. Fractures horizontal - most appear induced. Fractures at 69.1, 70.0 & 70.2 appear to be natural due to irregularities and ~~appearance of iron-staining through these~~	65.5-70.5	98	43				
				solution features zones.						

~~Zones~~ blank line

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Page: 1 of 1
Well/Boring No. MW#4SG
Client: ARCS - Albion/Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 11/30/92 Finished: 11/30/92
Time: Started: 3:00pm Finished: 5:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE1/4 SE1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truckrig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: ~~N of MW#4WB (N5601 E 4314)~~
approx. N5620, E 4314

Drilling Method(s)	Depth
4¼" ID HSA	38.0'

Grouting/Seal

Depth/To	Material/Method
38.0'-29.5'	~~Cs Grade 6x20~~ Silica Sand (Best
29.5'-27.5'	Bentonite ~~Hole plug Pellets~~ Chips
27.5'-1.0'	Cement/Bentonite ~~Hole plug~~ Grout
1.0'-0.0'	~~Rudimx~~ Concrete Pad

Remarks: No splitspoon samples collected.

Water Level: 29.0 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	"Well/Boring sheet" Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
	38.0'		See log for MW#4SB for detailed lithologic description.							
			EOB @ 38.0'							

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Environmental Services Division

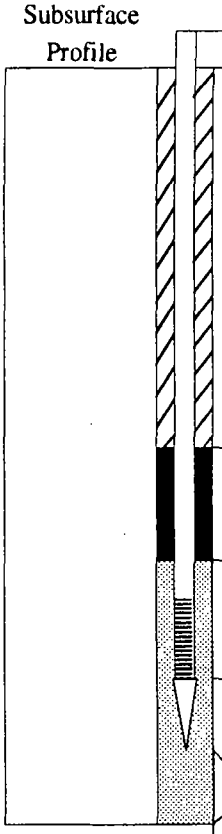
Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#4SG

Generalized Subsurface Profile



2.35' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill) ~~Portland Cement~~/ ~~Powdered Bentonite~~

27.5' Depth to Top of ~~Bentonite Pellets/Slurry~~ (Circle One) Bentonite Chips

29.5' Depth to Top of Filter Pack

Type ~~6x20 Cs gd.~~ Silica Sand (Best 620)

36.5' Depth to Bottom of Well Screen

~~6x20 cs gd.~~ Silica Sand & nat. soil ~~cuttings~~ Backfill Material

38.0' Total Depth of Borehole

Top of Casing Elevation (feet): 978.03'

Ground Surface Elevation (feet): 975.7'

Water Level Data

Date	Water Level Below TOC
12/1/92	Predevelopment: 31.00'
12/16/92	Stable/Post develo: 30.98

Development: Pumped 405 gal - Very silty to cloudy brown - good recovery

Survey Reference: BM# W ~~=980.11'~~ & site grid

Well Casing
- Diameter: 2"
- Total Length: 34.0'
- Material: Schedule 40 PVC
- Cap Type: ~~Pressure tight~~ "J" plug

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 ~~slot~~ / factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: approx. 2.8
- Lock Type: ~~2402~~ Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#4WB
Client: ARCS - Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 11/18/92 Finished: 11/19/92
Time: Started: 7:00AM Finished: 11:30AM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck Rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: ~~N of MW#4SB~~ approx. N 5610, E 4314

Drilling Method(s)	Depth
4¼" ID HSA	0-35.0'
3⅞" Tricone Rotary	35.0-68.0'

Grouting/Seal

Depth/To	Material/Method
68.0'-63.0'	Natural ~~collapsed cuttings~~ Soil
63.0'-54.0'	~~6x20 cs. grade silica sand~~
54.0'-53.0'	~~20x40 fgrade~~ silica sand (Best)
53.0'-45.0'	Bentonite slurry
45.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	~~Redimix~~ concrete pad

Water Level: 29.0 ft. Below Surface

Remarks: No splitspoons collected

Thickness (feet)	Depth to base (feet)	USCS	"Well/Boring Log Sheet" Lithologic Description	Blow Counts / PID Sample Depth	6"	12"	18"	24"	Headspace	Background
35.0'	35.0'		See log for MW#4SB for lithologic description ~~per splitspoon sampling~~ logic							
33.0'	68.0'	~~HWBR~~ rock/BR	weathered ~~sandstone~~ layered very hard & soft - several fractures, may be layered with conglomerate, some layers of loose sands & gravels (causing hole collapse), gray & lt. gray, wet							
			EOB @ 68.0'							

stopped @ "sands"

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

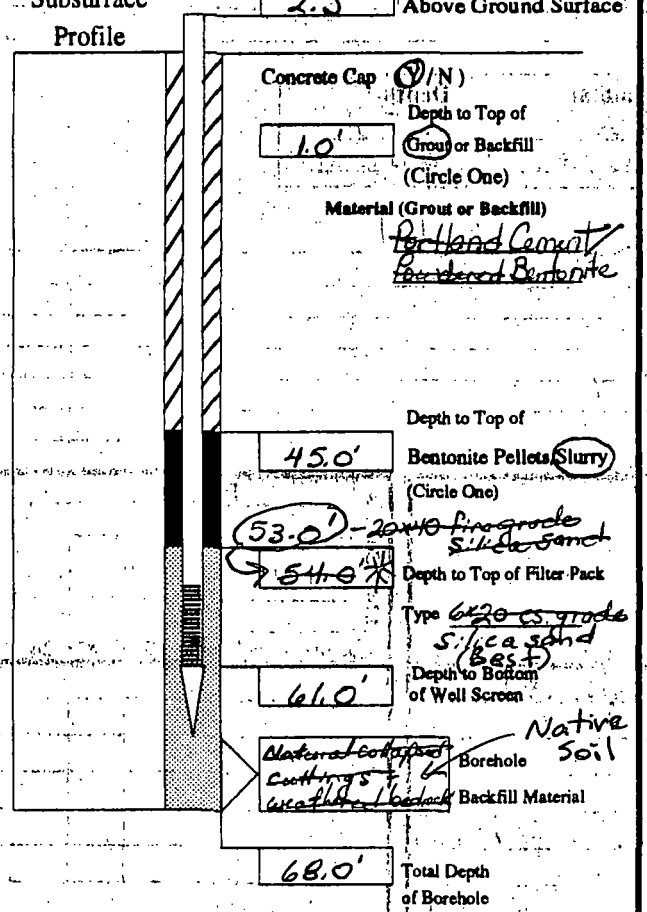
Log of Well Installation

Well Number: MW#4WB

Top of Casing Elevation (feet): 977.73'

Ground Surface Elevation (feet): 975.5'

Generalized Subsurface Profile



Water Level Data

Date	Water Level Below TOC
11/20/92	Predevelopment: 30.72'
11/25/92	Postdevelopment: 30.59'
12/16/92	Stabilized: 30.61'

Development: Pumped 1700 gal. with grundfos - silty gray to trace cloudy.

Survey Reference: B.M. & W site grid

Well Casing
- Diameter: 2"
- Total Length: ~~58'~~ 58.3
- Material: Schedule 40 PVC
- Cap Type: ~~Pressure tight~~ "J" plug

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10 ~~slot~~ factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: approx. 2.8'
- Lock Type: ~~240z~~ Master lock

General Notes: * Best 2040 from 53.0-54.0 and Best 620 from 54.0-61.0.

WW Engineering & Science
Environmental Services Division

Page: 1 of ~~2~~ 3 RT
Well/Boring No. MW#4SB
Client: ARCS-Albion Sheridan L.F.
Project No.: 04011.02
Date: Started: 9/28/92 Finished: 10/20/92
Time: Started: 1:00pm Finished: 2:00pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** N 5601, ~~N~~ E 4314
Address: 1234 S. Cleveland-Massillon Rd. ~~4313.5 E~~
Akron, OH 44321
Equipment: CME 75 ~~Truck Rig~~/CME 750
Crew Chief: ~~Jim~~ McCurdy/E. Pucci
WW Supervisor: ~~Cathie~~ Cotton/D. JOHNSON

Drilling Method(s)	Depth
4¼" ID HSA/cont sp. sp.	0-54.5'
8¼" ID HSA	0-55.0'
~~Continued on pg. 2~~	
Rotary Coring/drilling	53.5-73

Grouting/Seal

Depth/To	Material/Method
~~54.0-1.5'-6" dia. Sched 80 pvc casing = cement/bentonite grout through 8¼" HSA's tremmied from bottom to surface.~~	
~~Continued on pg. 2~~	

Remarks: ~~TW#1 = 29.0'-34.0' W.L. = 30.5' below TOC 1.5' stickup~~
~~Pumped 90 gal to develop. Bailed 15 gal. - slt/very sand/slt~~
~~Solids settled prior to sampling @ 6:05pm 9/28 for GC~~
~~TW#2 = 33.0'-38.0' W.L. = 29.97' below TOC 2.0' stickup~~
~~Pumped 185 Gal. Let settle for 30-45 min.~~
~~Sampled @ 2:48 pm for GC only, s.s. - 9/29~~
Drove 4" temporary casing through 6" casing to 58'.
*Note 18 ppm in headspace @ 28.0'-30.0' probably due to moisture.
Auger refusal @ 55'.

Water Level: 29.0' ft. Below ~~Surface~~ ground

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
4.0	4.0'	SP	SAND, med. fine, little fine gravel, loose, brown, moist
2.5'	6.5'	SW	SAND, med. fine to med. ~~cs~~ coarse, some sand, little fine gravel, loose, red/brown, moist
5.5'	12.0	SP	SAND, fine, trace of med-~~cs~~ coarse sand, loose, blonde, little moist
3.8'	15.8'	SP	SAND fine med to coarse, loose, blonde, moist
2.2'	18.0'	SW/SM	SAND, med. to coarse, some fine, loose, some silt, dk. brown, moist
5.5'	23.5'	SP	SAND, med. fine to med. loose, brown, moist
1.3'	24.8'	CL/SM	CLAY, some silt, little fine sand, trace of fine gravel, soft, brown, very moist
3.5'	28.3'	SM/GC	SAND, fine, some silt, some clay, little fine to med. gravel, very soft, occ. layers of wet sand, brown, damp.
0.7'	29.0'	CL	CLAY, little silt, soft, cohesive, smooth, gray, moist
1.0'	30.0'	SP	SAND, med. fine, some silt, little med-cs sand, loose, gray, damp to wet
2.5'	32.5'	ML	SANDSTONE, very weathered, friable - some small cemented fragments, soft, gray, wet.
3.7	36.2'	SW/SM	SAND, fine to coarse, some silt, some cemented conglomerate layers, loose, gray, wet.

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace (PID ~~FID~~ OVA 108 ppm)	Background
0.0'-2.0'	1	2	3	4	0	5
2.0'-4.0'	4	4	5	6	3	5
4.0'-6.0'	7	5	5	5	2	5
6.0'-8.0'	6	4	5	6	2	5
8.0'-10.0'	3	4	5	8	2	5
10.0'-12.0'	7	5	4	6	2	5
12.0'-14.0'	4	6	12	16	5	5
14.0'-16.0'	6	8	7	10	3	5
16.0'-18.0'	3	7	7	7	6	5
18.0'-20.0'	2	5	5	6	2	5
20.0'-22.0'	4	3	6	13	4	5
22.0'-24.0'	2	5	5	2	1	5
24.0'-26.0'	1	3	5	5	2	5
26.0'-28.0'	4	3	3	2	2	5
28.0'-30.0'	7	18	15	21	*18	5
30.0'-32.0'	22	23	17	21	~~H.O.~~	~~H.O.~~
32.0'-34.0'	23	65	53	25	~~Below~~	~~W.T.~~
34.0'-36.0'	2	5	26	34		
36.0'-38.0'	11	8	28	50/5		
39.0'-40.0	68	143	—	—		
41.0'-43.0	34	22	18	23		
44.0'-46.0'	8	104	12/1	—		
46.0'-48.0'	23	66	24/3	—		
49.0'-51.0'	123	100/4	—	—		

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Page: 2 of 2
Well/Boring No. MW#45B
Client: ARCS- Albion-Sheridan L.F.
Project No.: 04041.02
Date: Started: 9/28/92 Finished: 10/20/92
Time: Started: 1:00 pm Finished: 2:00 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck Rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 5401 N
4313.5 E

Drilling Method(s)	Depth
4" Black Steel casing driven	58.0'
DH barrel rock core w/water	73.0'

Grouting/Seal

Depth/To	Material/Method
See pg 1 of 2	

Water Level: 29.0 ft. Below Surface

Remarks: TW#3 = 38.5'-43.5' W.L. = 30.70 below TOC 1.5' stick up
Pumped 100 gal. - St. 11 very silty - Left settle overnight
9/30 @ 8:30 AM - Collected sample for GC
TW#4 = 43.5'-48.5' W.L. = 30.9 below TOC 1.5' stick up
Bailed 4 Gal - dry. Slow recovery Bailed 8 Gal before starting field tests. Sampled after removing 11 gal (Stable tests) @ 12:10 pm for GC
TW#5 - 47.5'-52.5' - very poor recovery. See notebook for details
Sampled for GC analysis: 10/1/92 @ 8:35 AM

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
3.8'	40.0'	ML	SANDSTONE fine grained, very weathered, friable, soft, gray, wet - some cemented layers
1.5'	41.5'	SP	SAND, med fine, some silt, loose, gray, wet (active).
12.5'	54.0'	ML	SANDSTONE very weathered, some fractures, occ. fine cemented layers, soft, gray, wet
0.5'	55.0	~~ML/BR~~ rock	SANDSTONE WITH SHALE, weathered, becoming harder with depth (more cemented), gray to dk gray, wet. ~~Auger refusal @ 55.0'. Set 6" PVC @ 54.0'. Drove 4" Steel casing to 58.0' due to recurring collapse.~~
6.3'	61.3'	BR rock	CONGLOMERATE, SANDSTONE, SHALE, CHURT & SILTSTONE, very fractured, poorly cemented, gray & dk. gray, wet - hole not staying open
11.7'+	73.0+	BR rock	SANDSTONE, fine to med. fine, subrounded grains, trace of shale, very fractured, poorly cemented, gray, wet
			EOB @ 73.0'
			58.0'-63.0': 10 fractures RQD = 50%
			63.0'-68.0': 42 fractures RQD = 7%
			68.0'-73.0': 37 fractures RQD = 8%

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
51.0'-53.0'	145	100/0.4	-	-		
54.0'-56.0'	200	-	-	100	3	

	Recovery	Total over 4"
58.0'-63.0'	36"	18"
63.0'-68.0'	54"	4"
68.0'-73.0'	58"	4.5'

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Page: 1 of 1
Well/Boring No. MW-4-5B
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 9/28/92 Finished: 10/20/92
Time: Started: 1:00P Finished: 2:00P

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE 1/4	36	2S	4W

Contractor: R&R
Address: AKRON, OH
Equipment:
Crew Chief:
WW Supervisor:

Location:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method
0-0.5'	Concrete Cap
0.5-53.0	Cement/Bentonite Grout
53.0-66.0	Bentonite Slurry
66.0-73.0	Silica Sand (Bed)
73.0-73.8	~~Native Soil~~ Natural Rock

Remarks: Following core description by Rick Tripper

Water Level: ____ ft. Below ____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / RQD (%) / Recovery (%) Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
5	63	rock	Sandstone, ~~gray~~, gray, fine-grained ~~upper 1.1'~~ well cemented, rest well cemented. Vuggy w/ occasional gravel nodule & coal in upper 1.1', This zone (upper 1.1') includes some chert & chert nodules. ~~& traces of coal~~. Some vugs lined w/ quartz crystals, v. slight trace of pyrite, rock in this zone (upper 1.1') broken w/ very irregular fractures. Lower portion of this core sample contains horizontal fractures that appear to be induced.	58-63	62	30				
5	68		Sandstone, ~~gray~~, m. gray, fine grained, well cemented. Higher porosity than 58-63. Nearly vertical fracture 1.75-1.85' from top, rest of fractures horizontal & most appear to be induced. V. slight trace of coal & pyrite ~~scattered throughout~~	63-68	90	7				
5+	73+		Sandstone, as above. More porous than preceding core (63-68'). ~~Horizontal fractures throughout mostly appear induced.~~ Possible natural fracture at 68.5-68.6. Some traces of mica throughout. Trace to little pyrite in pores from approximately 67-73'.	68-73	97	8				

~~68-73 97 8 RST~~

OK

EOB @ 73'

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Project Name: ARCS - Albion / Sheridan Twp. Landfill
Project No: 04011.02

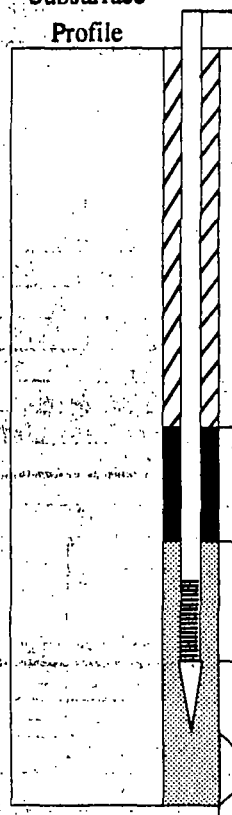
Log of Well Installation

Well Number: MW-45B

Top of Casing Elevation (feet): 978.03

Ground Surface Elevation (feet): 975.9'

Generalized Subsurface Profile



2.1' Length of Casing Above Ground Surface

Concrete Cap (Y/N) Y

0.5' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement / Bentonite ~~Powder~~

53.0' Depth to Top of Bentonite Pellets / Slurry (Circle One)

66.0' Depth to Top of Filter Pack

Type ~~Best 6x20~~ Silica Sand (Best 620)

73.0' Depth to Bottom of Well Screen

~~Native~~ Natural rock / ~~Soil~~ N/A Borehole & Backfill Material

73.8' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
10/19/92	Predevelopment: 31.30'
10/22/92	After 25 gal. purged: 31.32'
10/23/92	Stable: 31.34'
12/16/92	" : 30.98'

Development: Bailed 25 gal. with teflon bailer.

Survey Reference: BM# WE ~~See survey notes~~ site grid

Well Casing
- Diameter: 2"
- Total Length: ~~70.0'~~ 70.1'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC ~~Cap~~

Well Screen
- Diameter: 2"
- Length: ~~5'~~ 5'
- Slot/Type: ~~.010/slot~~ factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" Sq.
- Height Above Ground: approx. 2.6
- Lock Type: ~~2402~~ Master lock

General Notes: 4" casing was driven from 53.0' (1.0' of collapse inside 6" PVC) to 58.0'. Rotary drilled 7.0' of sands from inside 4" to 58.0' prior to coring. Sands consist of quartz, ~~granite~~, sandstone, trace of shale - some very coarse, may be some gravels - broken, angular appearance to larger grains. Materials still washing out of hole after several minutes - not due to circulating water. Pulled rods - hole open to 58.0'. Ran core barrel down hole. Cored 58.0'-63.0'. Lost circulation/recovery @ 61.3'. Hole only open to 59.0' - Reamed to 63.0'. Cored 63.0'-68.0'. Hole open to 68.0'. Cored 68.0'-73.0'. Reamed hole to 73.0' with 3 7/8" rotary bit. Set well.

6" I.D. Schedule 80 PVC casing grouted in place from 0 - 53.5' below ground (Grouted with cement/bentonite through tremie from bottom to surface.)

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Well/Boring No. MW#4DB
Client: ARCS - Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 11/16/92 Finished: 11/17/92
Time: Started: 12:00PM Finished: 3:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International Inc
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: ~~NW of MW#4SB~~
approx N 5610, E 4305

Drilling Method(s)	Depth
4 1/4" ID HSA	0 - 44.0'
3 7/8" Tricone Rotary	44.0 to 100.5'

Grouting/Seal
Depth/To — Material/Method
100.5-100.0' ~~Natural~~ Rock Cuttings
~~100.0'-93.0' 6-20 cs. gd Silica Sand~~
~~93.0'-92.2' 20-40 f. gd~~ Silica Sand (Best)
92.2'-90.0' Bentonite Pellets & Slurry
90.0'-1.0' Cement/Bentonite Grout 10-0.0: ~~Ready mix~~ Concrete cap
Water Level: 29.0 ft. Below Surface

Remarks: No split spoons taken from this boring
Auger refusal @ 44.0'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
32.0'	32.0		See log for MW#4SB for lithologic description per split spoon sampling.
1.5'	33.5'	~~WBR~~ rock	Conglomerate - cemented sand & gravel - very hard fractured, layered in sandstone - dk gray, wet
1.5'	35.0'	~~WBR~~ rock	Weathered sandstone, poorly cemented, fine, soft, gray, wet
1.5'	36.5'	~~WBR~~ rock	Conglomerate - cemented sand & gravel - very hard, fractured, layered in sandstone, dk gray, wet
7.5'	44.0'	~~WBR~~ rock	Weathered sandstone, fine, poorly cemented, soft, gray, wet
56.5+	100.5+	~~BR~~ rock	Bedrock, sandstone, fine to med. fine, very fractured, moderately cemented, gray, wet. Some harder, well cemented layers with depth - fractured throughout.
			EOB @ 100.5'

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background

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Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#4DB'

Top of Casing Elevation (feet): 977.80'

Ground Surface Elevation (feet): 975.4'

Water Level Data

Date	Water Level Below TOC
11/18/92	Predevelopment: 30.89'
11/25/92	Postdevelopment: 30.71'
12/16/92	Stable: 30.70'

Generalized Subsurface Profile

2.4' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): ~~Portland Cement~~/ ~~Pre-hydrated Bentonite~~

90.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

92.2 ~~20x40 fine grade Silica Sand~~

93.0* Depth to Top of Filter Pack

Type ~~6-40 Coarse grade Silica Sand~~ Silica Sand (Best)

100.0' Depth to Bottom of Well Screen

Native Soil Borehole Backfill Material

100.5' Total Depth of Borehole

Development: Pumped 2600 gal. with grundfos little cloudy to clear.

Survey Reference: BM#W = 981.11' & site grid

Well Casing	Diameter:	2"
	Total Length:	97.5'
	Material:	Schedule 40 PVC
	Cap Type:	Threaded PVC cap
Well Screen	Diameter:	2"
	Length:	5.0'
	Slot/Type:	~~10 slot~~ 10/factory cut
	Material:	Schedule 40 PVC
Protective well casing	Material:	Anodized Aluminum Dia: 4" Sq.
	Height Above Ground:	approx. 3.2'
	Lock Type:	~~Z402~~ Master lock

General Notes: * Best ~~620~~ 2040 from 92.2-93.0 and Best 620 from 93.0-100.0.

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Page: 1 of 1
Well/Boring No. MW# 5SG (~~Shallow~~ ~~Glacial~~)
Client: ARCS-Albion
Project No.: #04011.02
Date: Started: 11/11/92 Finished: 11/11/92
Time: Started: 8:00 Finished: 11:25

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI.	~~Calhoun~~ JACKSON	~~Sheridan~~ PARMA	SE¼ NW¼ SW¼	~~36~~ 31	~~T2S~~ 2S	~~R4W~~ 3W

Contractor: R&R International **Location:** ~~18.5' East of MW#5SB~~
Address: 1234 S. Cleveland/Massillon Rd approx ~~At 5300~~ N 5700 E 5319
Akron, OH
Equipment: CME 750 (ATV)
Crew Chief: ED Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4¼" ID HSA	0.0-28' * 30' ~~2' of overdrill to 30'~~

Grouting/Seal

Depth/To	Material/Method
~~See Reverse Side~~	
0 - 1.0	Concrete Cap
1.0 - 18	Cement/Bentonite Grout
18 - 20	Bentonite Pellets
20 - 28	Silica Sand (Basf)

Remarks: * Only 1 - Split Spoon Collected throughout Boring. Sample

Water Level: 19.2' ft. Below ~~GD~~ ground inside Augers

28-30 Native Soil ~~See log for MW# 5SB to 30'~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	~~Headspace~~	Background
0	0	N/A	See "Well/Boring Log Sheet" for MW-5SB ~~to 30~~ for Lithologic	~~N/A PID~~						
2'	* 27'	SW/SP l	Sand, Med. to CSE, Little Fine Gravel, trace Fine Sand, Brownish Gray - wet	25'-27'	10	15	20	30	—	
			~~Over~~ Drilled to 30' for well Placement							
			EOB @ 30'							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS-Albion Sheridan Twp. Landfill
Project No: 04011.02

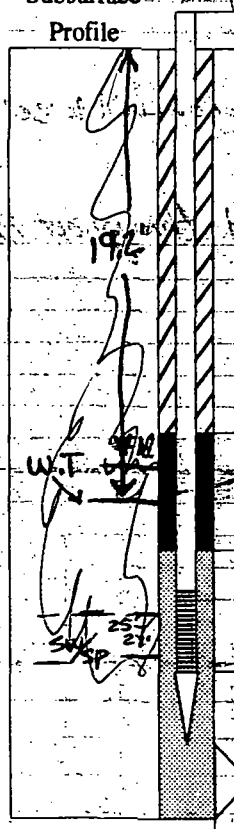
Log of Well Installation

Well Number: MW-5SG ~~MW#5 Shallow Glacial~~

Top of Casing Elevation (feet): 970.69'

Ground Surface Elevation (feet): 968.2'

Generalized Subsurface Profile



25' Length of Casing Above Ground Surface

Concrete Cap (Y / N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Grout (Development) ~~Grout Bentonite~~ ~~Thermonite Grouted~~

18' Depth to Top of Bentonite Pellets/Slurry (Circle One)

20' Depth to Top of Filter Pack Type (Silica Sand Best/~~Filter~~ 620)

28' Depth to Bottom of Well Screen

Native Soils/~~Cuttings~~ Borehole Backfill Material

30' Total Depth of Borehole (~~Cover Drill~~)

Water Level Data

Date	Water Level Below TOC
11/11/92	Predevelopment ~21.7'
11/25/92	Post development: 21.09'
12/9/92	Stabilized: 21.01'

Development: Pumped 405 gal. with grundfos pump. - Silty to cloudy brown

Survey Reference: MW#5-SB (T.O.C.) Elev. = 970.005 - OK site grid

Well Casing	Diameter:	2"
	Total Length:	25.5'
	Material:	~~PVC~~ Schedule 40 PVC
	Cap Type:	J-plug ~~(Casing dented)~~
Well Screen	Diameter:	2"
	Length:	5'
	Slot/Type:	~~10 slot / Continuous wound~~ 10 factory cut
	Material:	Schedule 40 PVC
Protective well casing	Material:	Anodized Aluminum Dia. 4" sq.
	Height Above Ground:	~~3.8'~~ approx. +3.1
	Lock Type:	~~MASTER~~ ~~#2402~~ LOCK

General Notes: Water Table is @ 19.2' / Top of Screen is Approx 3.8' below water Table. ~~(23'-28')~~

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Environmental Services Division

Well/Boring No. MW#5S8
Client: ARCS- Albion Sheridan L.F.
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/13/92
Time: Started: 9:00AM Finished: 1:00pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Jackson	Parma	NW 1/4 SW 1/4	31	2S ~~T 2N~~	R3W

Contractor: R&R International Inc. Location: Approx. N 5700 ~~N 5300 E~~ E 5300
Address: 1234 S. Cleveland Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Joe Zielinski
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4¼" ID HSA ~~Split spoon cont to~~	60.5'
~~DBL Barrel clear water core to~~	75.5'
Rotary coring/drilling	60.5-

Diagger Tube Methane Test
4.0'-6.0' @ 9:50 A None
8.0'-10.0' @ 10:15 A "
14.0'-16.0' @ 10:52 A "
18.0'-20.0' @ 11:25 A "

Grouting/Seal

Depth/To	Material/Method
75.5'-67.8'	Cs grade silica sand
67.8'-65.4'	Bentonite Pellets
65.4'-1.0'	Cement/Bentonite Grout

Trimmed from 60.0' to surface inside HSAS.

Water Level: 18.5 ft. Below ~~Surface~~ ground

Remarks: ~~Augers @ 20.0' twisted 20 min for water level to stabilize 18.5~~ ~~No split spoon recovery @ 24.0'-26.0' may have driven a cobble~~ (~17' below ground) Noted stained ~~area~~ soil 1.0'-2.0' above water table. No readings on OVA in sample spoon were encountered & no odor detected. (~~Split spoon refusal @ 56.9'. HSA refusal @ 60.5'. Reamed out.~~) ~~Augers to 60.2' with 3 7/8" tricone bit prior to rock coring. Reamed from 60.5' to 75.5' with 3 7/8" tricone bit after coring.~~ Same

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
1.8'	1.8'	SW	SAND, fine to med., some fine gravel, trace of silt, trace of organics - roots, wood, loose, dk. brown, moist.
2.1'	3.9'	SP	SAND, med. fine, well sorted, loose, lt. brown, little moist
0.9'	4.8'	SW	SAND, fine to coarse, little fine gravel, loose, lt. brown, little moist
2.2'	7.0'	SP	SAND, med. fine, well sorted, loose, lt. brown, little moist
4.9'	11.9'	SP	SAND, fine to med. fine, occ. small layers of coarse sand & fine gravel, loose, lt. brown, little moist *fine 0.01'-0.02' layer of coal @ 10.5' & 11.8'.
3.6'	15.5'	SP	SAND, med. fine, well sorted, loose, lt. brown, moist
1.3'	16.8'	SW	SAND, med. to coarse, little fine gravel, trace of clayey silt masses, loose, dk brown & multicolored, little moist.
0.9'	17.7'	SP	SAND, med. fine, loose, lt. brown, moist
0.2'	17.9	SP	SAND, med. fine, loose, dk gray/brown, very moist Appears stained - no noticeable odor.
0.8'	18.7'	GM	GRAVEL, fine - med., some silt, loose, rust colored, wet
2.3'	21.0'	SM	SAND, med. fine, some silt, little med-cs. sand, some black stained streaks from 18.7 to 19.5' +/-, little compacted, dirty rust to lt. rust, wet

Sample Depth	Blow Counts 6"	12"	18"	24"	PID (ppm) Headspace	Background
0.0'-2.0'	2	1	3	8	0	5
2.0'-4.0'	6	4	5	5	Blip	5
4.0'-6.0'	5	6	7	10	0	5
6.0'-8.0'	7	8	12	14	Blip	5
8.0'-10.0'	8	8	8	9	0	5
10.0'-12.0'	5	7	5	13	0	5
12.0'-14.0'	9	9	8	12	0	5
14.0'-16.0'	7	9	8	11	Blip	5
16.0'-18.0'	6	6	9	13	7	5
18.0'-20.0'	11	9	9	11	8	5
20.0'-22.0'	8	9	8	16	18	5
22.0'-24.0'	0	0	5	10	25	5
24.0'-26.0'	3	5	7	11		
26.0'-28.0'	4	3	5	8		
28.0'-30.0'	5	7	8	9		
30.0'-32.0'	3	4	6	6		
32.0'-34.0'	8	6	4	6		
34.0'-36.0'	5	5	6	5		
36.0'-38.0'	6	5	8	11		
38.0'-40.0'	9	5	5	9		
40.0'-42.0'	0	3	5	6		
42.0'-44.0'	6	9	13	15		
44.0'-46.0'	6	8	9	13		
46.0'-48.0'	10	11	11	8		

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Page: 2 of 3
Well/Boring No: MW#5S8
Client: ARCS - Albion Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/13/92
Time: Started: 9:00 AM Finished: 1:00 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Jackson	Parma	SW 1/4	31	T2N	R3W

Contractor: R&R International Inc. **Location:** See pg 1 of 3
Address: 1234 S. Cleveland-Massillon Rd
Akron OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Joe Zielinski
WW Supervisor: Cathie Colton

Drilling Method(s)	Depth
4 1/4" ID HSA/Split spoon cont. to	60.5'
Dbl. Barrel clear water core to	75.5'

Grouting/Seal Depth/To	Material/Method
See pg. 1 of 3	

Remarks:

Water Level: 18.5 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
2.4'	23.4'	SP	SAND, fine to med, trace of cs. sand & fine gravel, loose, brown, wet	48.0'-50.0'	3	6	9	10		
				50.0'-52.0'	7	8	7	17		
2.6'	26.0'	SP	SAND, med. fine to med., little silt, gray/brown, wet	52.0'-54.0'	2	3	3	5		
2.0'	28.0'	SP	SAND, fine to med. fine, loose, lt. gray with some black grains, appears natural, wet	54.0'-56.0'	5	20	30	42		
				56.0'-58.0'	50	100/5"	–	–		
1.8'	29.8'	SP	SAND, fine to very fine, little silt, lightly compacted, lt. gray, wet							
1.9'	31.7'	SP/SC	SAND, fine to med. fine, occ. fine lense of gray clay, loose gray, wet							
0.3'	32.0'	SC/CL	CLAY, very sandy, soft, cohesive, gray, very moist							
4.6'	36.6'	SP	SAND, fine to very fine, loose, brownish gray, wet							
1.4'	38.0'	ML	SILT, some very fine sand, compacted, medium gray with occ. fine black streaks, wet							
4.0'	42.0'	SP	SAND, fine - very fine, loose, gray/brown, wet.							
3.8'	45.8'	SP	SAND, fine, becoming well compacted, lt. brown with several multicolored quartz grains, wet.							
0.2'	46.0'	SW	SAND, fine to med. coarse, little fine gravel, loose, brown, wet							
6.0'	52.0'	GW	GRAVEL, fine to med., some coarse gravel & cobbles, little med. to coarse sand, loose, multicolored, wet, trace of silt & very fine sand.							

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Page: 1 of 1
Well/Boring No. MW-5-SB
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/13/92
Time: Started: 9 AM Finished: 1 PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	JACKSON	PARMA	SW/4	31	2N	3W

Contractor: R&R **Location:**
Address: AKRON, OH
Equipment:
Crew Chief:
WW Supervisor:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Remarks: Following core description by Rick Tripp.

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	PID 6"	12"	18"	24"	Headspace	Background
16.5+	75.5+	rock	Sandstone, qtz, gray, v. fine to fine-grained, well cemented. Horizontal fractures throughout appear to be mostly induced. Trace of pyrite in pores throughout. Occasional trace of non-staining mica throughout. Porous throughout, best porosity from 65.7-67.4. 45° fracture 66.3-66.4 & 66.5-66.6.	60.2-65.5	100	99				
				65.5-70.5	97	73				
				70.5-75.5	92	72				
			EOB @ 75.5'							

~~Blow Counts~~
RQD (%)
Recovery (%)

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Page: 3 of 3
Well/Boring No.: MW #5SB
Client: ARCS - Albion Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 10/7/92 Finished:
Time: Started: 9:00 AM Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Jackson	Parma	SW 1/4	31	T2N	R3W

Contractor: R&R International Inc
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Joe Zielinski
WW Supervisor: Cathie Cotton

Location: See pg 1 of 3

Drilling Method(s)	Depth
~~4¼" ID HSA/Solid stem~~	~~60.5'~~
~~DH Barrel/Core Barrel~~	~~75.5'~~

Grouting/Seal

Depth/To	Material/Method
0-1.0 ~~See pg. 1 of 3~~	Concrete Cap
1.0-65.4	Cement/Bentonite Grout
65.4-67.8	Bentonite Pellets
67.8-75.5	Silica Sand (Best)

Remarks: ~~Borehole was reamed after coring with 3⅞" tricone rotary bit from 60.5'-75.5'~~

Water Level: ~~18.5 ft. Below Surface~~ 18.5 ground

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / PID Sample Depth	6"	12"	18"	24"	Headspace	Background
2.2'	54.2'	CL	CLAY, little fine sand, little fine to med. gravel, soft, cohesive, gray, moist							
4.8'	59.0'	~~WBR~~	WEATHERED SANDSTONE, fine to med. fine, friable with poorly cemented layers, lt. gray, moist							
16.5'	75.5'	~~BR~~	SANDSTONE, well fractured throughout - mainly horizontal with some fractures ranging from 10°-45°, subrounded with some subangular grains, gray with trace of black, brown & clear quartz, trace of micaceous filaments throughout, predominantly fine to med. fine grained, moderately cemented layers interbedded with fine to very fine, well cemented layers, occasional trace of iron deposit.							
			60.2-65.5': 19 fractures. RQD = 46%	Recovery: 5'4"	Total over 4": 29.5"					
			65.5'-70.5': 14 fractures. RQD = 76%	4'10"	44.0"					
			70.5'-75.5': 12 fractures RQD = 78%	4'7"	43.0"					
			EOB @ 75.5'							

OK

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Environmental Services Division

Project Name: ARCS - Albion/Sheridan Twp. LF.

Project No: 04011.02

Log of Well Installation

Well Number: MW# 5SB

Top of Casing Elevation (feet): 970.005

Ground Surface Elevation (feet): 967.5'

Generalized Subsurface Profile

2.5'	Length of Casing Above Ground Surface
Concrete Cap (Y/N)	
1.0'	Depth to Top of Grout or Backfill (Circle One)
Material (Grout or Backfill)	~~Portland Cement~~/ ~~Powdered~~ Bentonite
65.4'	Depth to Top of Bentonite Pellets/Slurry (Circle One)
67.8'	Depth to Top of Filter Pack
Type	~~6x20 Besk~~ Silica Sand (62.0 Best)
75.5'	Depth to Bottom of Well Screen
N/A	Borehole Backfill Material
75.5'	Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
10/14/92	Predevelopment: 22.81'
10/21/92	After 2 5gal purged: 22.78'
10/22/92	Stable: 22.80'
11/25/92	" : 22.43'
12/7/92	= 22.55'

Development: Bailed 50 gal. w/ Teflon bailer

Survey Reference: BM # N ~~See survey notes~~ Site grid

Well Casing	Diameter:	2"
	Total Length:	72.5'
	Material:	Schedule 40 PVC
	Cap Type:	Threaded PVC, ~~vented cap~~
Well Screen	Diameter:	2"
	Length:	~~5.0'~~ 5'
	Slot/Type:	~~010 (10 slot)~~ 1.0/factory cut
	Material:	Schedule 40 PVC
Protective well casing	Material:	Anodized Alum. Dim. 4" Sq.
	Height Above Ground:	approx. 3.2'
	Lock Type:	~~#2400~~ Master lock

General Notes:

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Page: 1 of 1
Well/Boring No. MW# 6 SG
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/19/92 Finished: 11/19/92
Time: Started: 7:45AM Finished: 11:15AM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	~~Ca~~ Calhoun	Sheridan	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International Location: approx. N ~~5647~~ 5287, E 4210
Address: Akron, OH.
Equipment: CME 750 (ATV)
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-~~30'~~ 28'

Grouting/Seal

Depth/To	Material/Method
~~See Reverse Side~~	
0 - 1.0	Concrete Cap
1.0 - 18'	Cement/Bentonite Grout
18 - 21	Bentonite Chips
21 - 28	Silica Sand (Best)

Water Level: 20.6 ft. Below ~~GS~~ ground

Remarks: Split Spooned 25-27' for CEC Analysis (Wet soils)

~~See Lithology for MW# 6 SB to 30'~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	~~Headspace~~	~~Background~~
			See "Well/Boring Log sheet for MW-6SB for detailed lithological description							
			EOB @ 28'	25-27'	2	5	13	15		

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Environmental Services Division

Project Name: ARCS- Albion Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Top of Casing Elevation (feet): 969.73 ~~969.75~~

Well Number: MW# 6 SG

Ground Surface Elevation (feet): 967.7

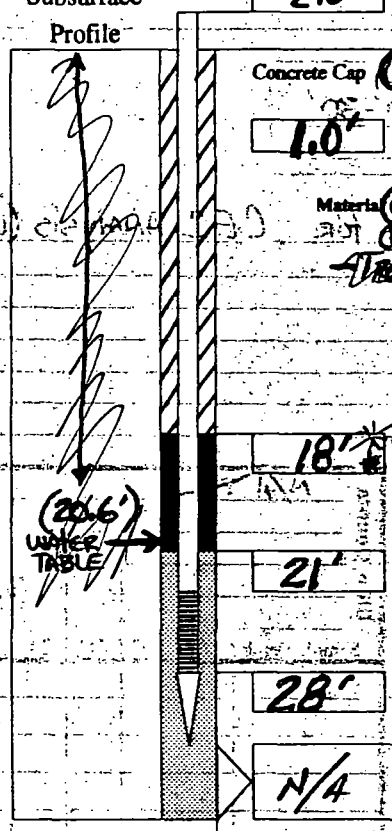
Water Level Data

Date	Water Level Below TOC
11/25/92	Post development: 21.47'
12/15/92	Stabilized (1 mo) 21.34'

Development: Bailed 18.5 gal - very poor recovery - Some silt.

Survey Reference: BM ~~SW~~ ~~See Survey~~

Generalized Subsurface Profile



2.0' Length of Casing Above Ground Surface

Concrete Cap (Y N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement/Bentonite ~~Tremmie Grouted~~

18' Depth to Top of Bentonite Pellets (Circle One) (Hydrated) (Hole Plug) Bentonite Chips

21' Depth to Top of Filter Pack

Type (Best Sand 620) Silica Sand

28' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

28' Total Depth of Borehole

Well Casing	Diameter:	2"
	Total Length:	25'
	Material:	~~PVC~~ Schedule 40 PVC
	Cap Type:	J-plug
Well Screen	Diameter:	2"
	Length:	5' ~~(60")~~
	Slot/Type:	10-Slot/ ~~Continuous wound~~
	Material:	~~PVC~~ Schedule 40 PVC
Protective well casing	Material:	Anodized Aluminum Dia. 4" Sq
	Height Above Ground:	approx. ~~[illegible]~~ 2.4'
	Lock Type:	MASTER ~~#2402~~ Lock

General Notes: * Used "Hole-plug" instead of (Bentonite) Pellets as seal between the Sand Pack material & the Grout. (3' seal; Hydrated w/ 1 gal. ~~H2O~~ DI water prior to Grouting)

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Page: 1 of 1
Well/Boring No.: ~~MW# 6WB~~ MW-6WB
Client: ARCS-Albion
Project No.: 04011.02
Date: Started: 11/18/92 Finished: 11/18/92
Time: Started: 1:20p Finished: 5:45p

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland/Massillon Rd. Akron, OH
Location: approx. N 5285, E 4190
Equipment: CME 750 (ATV)
Crew Chief: ED Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-52'

Grouting/Seal

Depth/To	Material/Method
~~See Reverse Side~~	
0-1.0	Concrete Cap
1.0-38	Cement/Bentonite Grout
38-42	Silica Sand (Best)
42-51	Bentonite Slurry
51-52	Native Soil

Water Level: 20.8' ft. Below ~~GS~~ ground

Remarks: ~~Ground Elevation Appears to be About the Same As MW# 6SB~~
* Started Drilling HARD/Slow @ 41' (Layered weathered Sandstone) 1000-1200 psi-Down Pressure / Split Spoon Refusal @ 48'-50' Depth.
-No CEC Sample Collected in this Borehole- Bedrock-

~~See Lithology for MW# 6SB to 52'~~

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			See "Well/Boring Log Sheet" for MW-6SB for detailed lithologic description.
			EOB @ 52'

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background
48'-50'	100	100/1/2			~~No Sample Recovered for CEC Analysis~~	

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Environmental Services Division

Project Name: ARCS - Albion
Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW# 6 WB

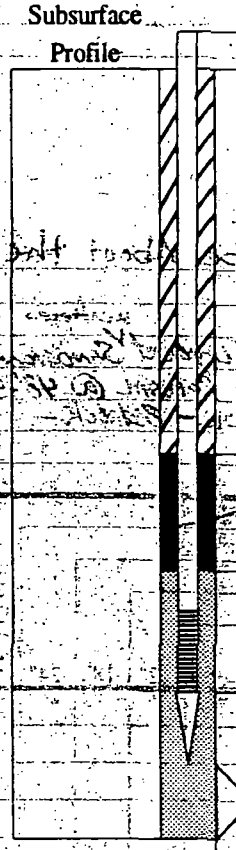
Top of Casing Elevation (feet): 969.81

Ground Surface Elevation (feet): 967.2

Water Level Data

Date	Water Level Below TOC
11/18/92	23.42 (Pre-development)
11/25/92	Postdevelopment: 22.60'
12/9/92	stabilized: 23.21'

Generalized Subsurface Profile



2.6' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): ~~Cement/Bentonite~~ ~~Tremie Grouted~~ (from 39')

38' Depth to Top of Bentonite Pellets/Slurry (Circle One)

~~42' - Fine Silica~~

~~43~~ 42* Depth to Top of Filter Pack

Type: ~~Best (Brand)~~ Silica Sand (Best)

51' Depth to Bottom of Well Screen

Native Soils Borehole Backfill Material

52' Total Depth of Borehole

Development: Pumped 225 gal with Grundfos pump - silty to little cloudy

Survey Reference: ~~BM# not Sec survey~~ BM = W

Well Casing	Diameter:	2"
	Total Length:	48.6'
	Material:	PVC Schedule 40 PVC
	Cap Type:	J-plug
Well Screen	Diameter:	2"
	Length:	5' ~~(60")~~ 10/factory cut
	Slot/Type:	~~10-Slot (Continuous Wound)~~
	Material:	PVC Schedule 40 PVC
Protective well casing	Material:	Anodized Aluminum Dia. 4" sq.
	Height Above Ground:	~~approx 2.5'~~ approx 3.0'
	Lock Type:	Master #2402

General Notes: Projected Depth was 46.5' to 51.5' Deep. / Well Came-up 6" During Sand Packing of Screen. (Loss of 6" in Depth of well)

* Best 2040 from 42-43' and Best 620 from 43-51.

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Environmental Services Division

Page: 1 of 3
Well/Boring No. ~~MW#6~~ DB (Changed to MW#6SB) MW-6SB *
Client: ARCS-ALBION/SHERIDAN L.F.
Project No.: 104011.02
Date: Started: 10/26/92 Finished: 11/9/92
Time: Started: 9:00AM Finished: 3:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd, Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Ed Pucci
WW Supervisor: C. Cotton

Location: Approx. N 5275, E 4200

Drilling Method(s)	Depth
4¼" ID HSA	0-55.0'
3" dia. Core barrel	55.0-~~75.0~~ 75.3

Rotary boring/drilling

Methane Dimerex Tubes
4.0'-6.0' - 9:55A
8.0'-10.0' - 9:55A
14.0'-16.0' - 10:30A
18.0'-20.0' - 10:45A

Grouting/Seal

Depth/To	Material/Method
75.3'-68.0'	Co. grd. silica sand
68.0'-64.0'	Bentonite Pellets
64.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Concrete Pad

Water Level: 20.0 ft. Below ~~Surface~~ ground

Remarks: Spoons being driven are the same spoons that are riding down hole as augers are being advanced - drillers believe there was not double method. Head space samples are being taken from bottom portion of spoon, however logs could be slightly off due to unknown amount of sands in spoon prior to advancing spoon w/hammer. Drillers say only 1'-2' of unwashed material after spoon was in saturated zone (?).

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
3.6'	3.6'	SM/GM	SAND, fine to med. fine, some silt, little fine to med gravel, loose, layered lt & dk brown, moist
0.6'	4.2'	SP	SAND, med. fine, little c.s., trace fine gravel, loose, lt. brown, little moist.
0.3'	4.5'	SC/CL	CLAY, some silt, some sand, little fine gravel, firm, crumbly, little cohesive, dk. brown, moist
1.4'	5.9'	SM/GM	SAND & SILT, poorly sorted, little fine gravel, trace of clay, dk. brown, moist
2.3'	8.2'	SP	SAND, very fine to fine, little med. fine sand, loose, lt. brown, moist
3.8'	12.0'	SW	SAND, poorly sorted, fine to coarse, fine layer of coal @ 8.5', loose, lt. brown, little moist
0.4'	12.4'	SP	SAND fine to med. fine, loose, blonde, moist
2.6'	15.0'	GW/SW	SAND & GRAVEL, poorly sorted, loose, lt. brn, little moist
1.3'	16.3'	SP	SAND, med. fine, trace of c.s. sand/fine gravel, loose, blonde, little moist
1.7'	18.0'	GW/SW	SAND & GRAVEL, poorly sorted, trace of silt, loose, dk. brown, little moist.
5.0'	23.0'	SM	SAND, med. fine, some silt, loose, brown, moist to damp.
2.3'	25.3'	SW	SAND, fine to coarse, very silty, loose, brown, wet
0.9'	26.2'	CL	CLAY, very silty, some fine sand, little fine gravel,

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background
0.0'-2.0'	4	3	5	6		
2.0'-4.0'	3	4	5	6		
4.0'-6.0'	4	4	4	6		
6.0'-8.0'	8	8	7	7		
8.0'-10.0'	6	6	6	9		
10.0'-12.0'	4	8	11	16		
12.0'-14.0'	4	9	13	13		
14.0'-16.0'	4	6	6	9		
16.0'-18.0'	6	12	13	12		
18.0'-20.0'	4	4	6	6		
20.0'-22.0'	2	1	1	0		
22.0'-24.0'	0	0	0	1		
24.0'-26.0'	4	7	8	7		
26.0'-28.0'	6	7	5	5		
29.0'-31.0"	5	3	4	5		
31.0'-33.0"	1	2	4	4		
34.0'-36.0'	20	38	60/4"			
36.0'-38.0'	100 - Spoon refusal					
39.0'-41.0'	~~100-2"~~			100/2		
41.0'-43.0'	~~100-3"~~					
			100/3			

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Environmental Services Division

Well/Boring No. MW#6DB (Changed to MW#6S8)
Client: ARCS - Albion/Sheridan L.F.
Project No.: 0401H.02
Date: Started: 10/26/92 Finished: 11/9/92
Time: Started: 9:00 AM Finished: 3:30 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Ed Pucci
WW Supervisor: C. Colton

Location:

Drilling Method(s)	Depth
4 1/4" ID HSA	55.0'
3" dia. corebarrel	75.0'

Grouting/Seal

Depth/To	Material/Method
0.0-1.0	Concrete Cap
1.0-64	Bentonite Pellets
64-68	Cement/Bentonite
68-75.3	Silica Sand (Best)

Water Level: 20.0 ft. Below Surface

Remarks: WBR = Weathered bedrock
BR = Unweathered bedrock
TW#1 = 19-24'
TW#2 = 24-29'
TW#3 = 29-34'
TW#4 = 34-39'
TW#5 = 39-44'
TW#6 = 44-49'
* Bedrock @ 49'. Drilled augers to 55'. Cored 55'-65' (Top of packer to bottom of 5' x 1 1/4" screen = 9.0')
TW#7 = 55'-65'
TW#8 = 65'-75' (" " " ")

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / PID: Sample Depth	6"	12"	18"	24"	Headspace	Background
			firm, crumbly, brown, moist							
0.8'	27.0	SC	CLAY & SAND, soft, crumbly, gray, moist							
2.2'	29.2'	SM	SAND, very fine-fine, silty, sm. compacted, gray, wet							
1.8'	31.0'	SC/SM	CLAY & SAND, some silt, trace fine gravel, soft, some fine layers of loose sand, gray, damp							
2.5'	33.5'	SM/SW	SAND & SILT, poorly sorted - little cs. sand, trace of clay, soft, gray, damp							
1.0'	34.5'	SC/SM	SAND & CLAY, some silt, little f. gravel, soft, little cohesive, gray/brown, moist							
14.5'	49.0'	WBR	WEATHERED SANDSTONE, fine-med. fine, very poorly cemented, some layers of loose fine to coarse sand, lt. gray, wet - becoming harder with depth. trace of fine/med. gravel in loose sand fractures. *Note: Very loose active sands heaving into augers after spooning 44.0-46.5' of blown in augers. Drilled to 49.0' to bypass active zone. After Temp well @ 49.0', heaving sand & gravel still flowing into augers due to pulling back 5' to expose screen. Advanced augers to 55' to seal off loose, active materials							

WW Engineering & Science
Environmental Services Division

Well/Boring No. MW#6DB (changed to MW#65B)
Client: ARCS - Albion/Sheridan L.F.
Project No.: 04011-02
Date: Started: 10/26/92 Finished: 11/9/92
Time: Started: 9:00 AM Finished: 3:30 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Ed Pucci
WW Supervisor: C. Cotton

Location:

Drilling Method(s)	Depth
4 1/4" ID HSA	55.0'
3" dia. Core barrel	75.0'

Grouting/Seal Depth/To	Material/Method

Remarks: Used 500 gal to core 65'-75' — add to remarks

Water Level: 20.0 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
	75.0'	BR	SANDSTONE - very fine to fine, some small layers of med. fine grain - very poorly cemented sandstone. Majority of core is moderate to poorly cemented, grains are subrounded gray quartz with trace of white clear & brown quartz & trace of black shale(?). Heavily fractured evenly throughout - all fractures are vertical with one 45° fracture @ 56.5' and one horizontal fracture @ 59.5'. Fractures appear to have very fine, free flowing gray sands within. 0.05' layer of gray clay @ 69.0' - firm, smooth, cohesive. Trace of mica beginning @ 64.0'	55'-65' - 108" Recovery RQD = 9%						
				65'-75' - 108" Recovery RQD = 0%						

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW-6-SB
Client: ARCS-ALBION
Project No.: 04011.02
Date: Started: 10/26/92 Finished: 11/10/92
Time: Started: 9 Am Finished:

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	CALHOUN	SHERIDAN	SE/4	36		

Contractor: R&R International **Location:**
Address: AKRON, OH
Equipment: CME 75
Crew Chief: E. PUCCI, J. McCURDY
WW Supervisor:

Drilling Method(s)	Depth

Grouting/Seal

Depth/To	Material/Method

Remarks: Following core description by Rick Tuppel

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	Blow Counts 12"	Blow Counts 18"	Blow Counts 24"	PID Headspace	PID Background
					RQD (%)					
					Recovery (%)					
3.1	58.1	~~soil~~ rock	Sandstone, gray, v. fine to fine-grained, well cemented. Horizontal fractures throughout - most appear to be induced. 45° fracture from 55.4 - 56.5. V. slight trace of pyrite throughout. Porous.	55.0-65.0	90	9				
				65.0-75.0	90	0				
10.9	69.0	rock	Sandstone, med. gray, well cemented. Horizontal fractures throughout - most appear to be induced. Trace of pyrite throughout. Slight trace of iron staining throughout.							
0.1	69.1	rock	Clay, lt gray, soft							
5.9	75+		Sandstone, as above.							
			EOB @ 75'							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS-Albion

Project No: 04011.02

Log of Well Installation

Well Number: MW #6 SB

Top of Casing Elevation (feet): 969.77'

Ground Surface Elevation (feet): 967.3'

Generalized Subsurface Profile

~~2.6'~~ 2.6 Length of Casing Above Ground Surface

Concrete Cap (Y) N

1.0' Depth to Top of Grout or Backfill (Circle One) 11/9

Material (Grout or Backfill) Cement / ~~Grout~~ Bentonite

64' 11/9/92 ~~65'~~ Depth to Top of Bentonite Pellets/Slurry (Circle One)

68' Depth to Top of Filter Pack

Type ~~6x20~~ Silica Sand (6x20 Best)

75.3' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

75.3' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/9/92	Post development: 22.99'
11/25/92	Stabilized: 22.91'
12/9/92	" 22.83'

Development: 250 gals w/ Heck pump & Grundfos pump - Sediment free

Survey Reference: BM #W2 ~~Site survey~~ Site Grid

Well Casing
- Diameter: 2"
- Total Length: ~~72.8'~~ 72.9
- Material: ~~PVC~~ Schedule 40 PVC
- Cap Type: J-plug

Well Screen
- Diameter: 2"
- Length: 5'
- Slot/Type: ~~10-slot~~ 10 / factory cut
- Material: ~~PVC~~ Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: approx. ~~2.95'~~ 3.0'
- Lock Type: 2402 master lock

General Notes: *This boring / well originally identified as MW-6 DB. Upon determining that well would be set at ~~depths~~ essentially same depth in bedrock in as other shallow bedrock (SB suffix) wells identifier was changed to MW-6SB. Tried to change all field notes to reflect change - prior to well installation.

(based on vertical sampling)

Well installation supervised by Don Johnson

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#75G
Client: ARCS-Albion/Sheridan Twp. LF.
Project No.: 04011.02
Date: Started: 12/10/92 Finished: 12/10/92
Time: Started: 3:30pm Finished: 4:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE/4 SE/4	36	T2S	R4W

Contractor: R&R International Inc Location: N 5144 N, ~~[illegible]~~ E 4689
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4¼" ID HSA	0-20.0'

Grouting/Seal

Depth/To	Material/Method
20.0-12.3'	~~6x20 cs gd~~ Silica Sand (Best)
12.3'-10.0'	Bentonite Pellets
10.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	~~Redimix~~ Concrete pad

Remarks: No splitspoon samples collected.
No water used for drilling.

Water Level: 13.0 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	"Well/Boring Log Sheet" Lithologic Description	Blow Counts / Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
	20.0'		See log for MW#75B for detailed description							
			EOB@ 20.0							

WW Engineering & Science
Environmental Services Division

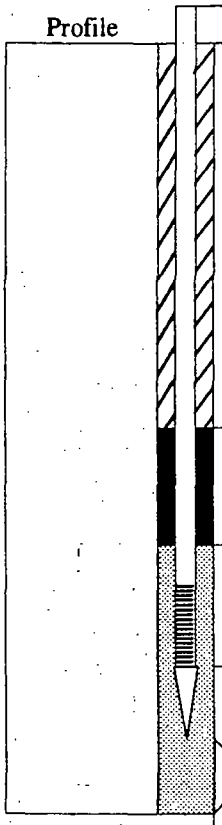
Project Name: ARCS- Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#7SG

Generalized Subsurface Profile



3.1'	Length of Casing Above Ground Surface
Concrete Cap	(Y) N)
1.0'	Depth to Top of Grout or Backfill (Circle One)
Material (Grout or Backfill)	Portland Cement Powdered Bentonite
10.0'	Depth to Top of Bentonite Pellets/Slurry (Circle One)
12.3'	Depth to Top of Filter Pack
Type	~~6x20 es. grd.~~ Silica Sand (Best 620)
20.0'	Depth to Bottom of Well Screen
N/A	Borehole Backfill Material
20.0'	Total Depth of Borehole

Top of Casing Elevation (feet): 963.905

Ground Surface Elevation (feet): 960.8'

Water Level Data

Date	Water Level Below TOC
12/11/92	Predevelopment = 16.30'
12/18/92	Post development = 16.31'
12/22/92	Stabilized = 16.31'

Development: Bailed/Surge Block - 65 gal. removed Silty/Sandy to silty

Survey Reference: R.R. Spike in P.Pole @ SW cor. Support area, N. side. E. Erie

Well Casing

Diameter:	2"
Total Length:	~~18~~ 18.1'
Material:	Schedule 40 PVC
Cap Type:	~~Pressure tight~~ "J" plug

Well Screen

Diameter:	2"
Length:	5.0'
Slot/Type:	10/~~Slot~~ factory cut
Material:	Schedule 40 PVC

Protective well casing

Material:	Anodized Aluminum Dia. 4" Sq
Height Above Ground:	approx. 3.6'
Lock Type:	~~2402~~ master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#7WB
Client: ARCS-Albion/Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 12/9/92 Finished: 12/10/92
Time: Started: 12:45pm Finished: 3:00pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: 1234 S. Cleveland-Mass. Ion Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: ~~5144N 4678E~~ N5144, E4678

Drilling Method(s)	Depth
4 1/4" ID HSA	0-47.0

Grouting/Seal

Depth/To	Material/Method
47.0'-40.0'	~~2x20 Sand Silica Sand~~ (Best)
40.0'-38.0'	~~Bentonite Holeplug~~ Pellets
38.0'-1.0'	~~Cement/Bentonite Grout~~
1.0'-0.0'	~~Portmix~~ Concrete pad

Water Level: 12.5 ft. Below Surface

Remarks: No split spoon samples collected. Cobbles jammed in augers while attempting to sand pack well. Had to pull augers & well, then re-drill hole. Lost screen in hole while pulling augers & well - unable to retrieve. Drilled out screen with rotary button bit - washed hole clean. Reset well, sand packed, sealed & grouted. Water used to wash hole: 200 gal.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
	47.0'		See Log for MW#7SB for lithologic description detailed							
			EOB @ 47.0'							

"Well/Boring Log Sheet"

WW Engineering & Science
Environmental Services Division

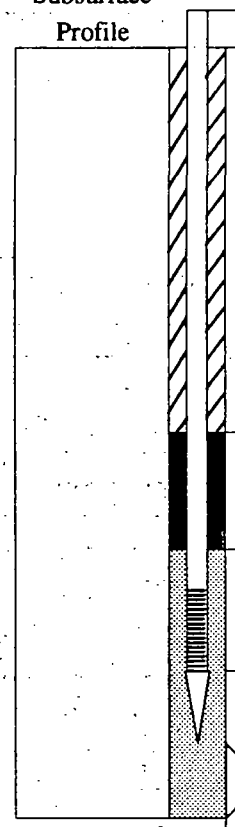
Project Name: ARCS- Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW~~2~~7SG

Generalized Subsurface Profile



3.1'	Length of Casing Above Ground Surface
Concrete Cap	(Y) N)
1.0'	Depth to Top of (Grout) or Backfill (Circle One)
Material (Grout or Backfill)	Portland Cement Powdered Bentonite
10.0'	Depth to Top of (Bentonite Pellets) Slurry (Circle One)
12.3'	Depth to Top of Filter Pack
Type	~~6x20 cs. grd.~~ Silica Sand (Best 620)
20.0'	Depth to Bottom of Well Screen
N/A	Borehole Backfill Material
20.0'	Total Depth of Borehole

Top of Casing Elevation (feet): 963.905

Ground Surface Elevation (feet): 960.8'

Water Level Data

Date	Water Level Below TOC
12/11/92	Predevelopment: 16.30'
12/18/92	Post development = 16.31'
12/22/92	Stabilized = 16.31'

Development: Bailed/Surge Block - 65 gal. removed Silty/Sandy to silty

Survey Reference: R.R. Spike in P.Pole @ SW cor. Support area, N. side E. Erie

Well Casing
- Diameter: 2"
- Total Length: 18'
- Material: Schedule 40 PVC
- Cap Type: ~~Pressure tight "J"~~ plug

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: ~~10 slot~~ 10/factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dim. 4" Sq
- Height Above Ground: approx. 3.6'
- Lock Type: ~~2402~~ master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 2
Well/Boring No. MW#7SB
Client: ARCS- Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 12/7/92 Finished: 12/8/92
Time: Started: 1:45pm Finished: 12:15pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE¼ SE¼	36	T2S	R4W

Contractor: R&R International Inc. **Location:** N 5144 E 4668E
Address: 1234 S. Cleveland Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4¼" ID HSA	0' – 43.5'
3 7/8" Rotary w/Tricone Button Bit	– 61.0'

Rotary drilling

43.5

Grouting/Seal

Depth/To	Material/Method
61.0-60.0'	Settled cuttings
60.0'-53.0'	6x20 cs. sd. Silica Sand
53.0'-51.0'	Bentonite Holeplug
51.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix Concrete Pad

Water Level: 12.2 ft. Below Surface

Remarks: Sheen noted on water in wash bucket after 3 or 4 spoons had been deconned. Changed wash water & buck. slight sheen noted again after 2 or 3 more spoons deconned
Split spoon refusal @ 39.0'
Auger refusal @ 43.5'
900 gal. H_2O used to rotary drill

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
8.0'	8.0'	SP	SAND, fine to med. fine, little med-cs sand, trace fine-med gravel, trace silt, loose, red/brown, moist
1.2'	9.2'	SM/GM	SILT, some fine sand, some med-cs. gravel, becoming more compact, yellow/brown, trace moist
1.3'	10.5'	SW	SAND, fine to med, little cs. sand & fine-med. gravel, moderately compacted, rust/brown, moist.
14.2'	24.7'	SW	SAND, med. to coarse, some fine-med. grav, little cs. gravel, little silt, loose, dk. rust/brown with trace of black staining @ water table, moist to wet @ 12.2'
1.3'	26.0'	SC	SAND & CLAY, very soft, little fine gravel, dk. gray/brown, very moist
3.8'	29.8'	SM/GM	SAND & SILT, some fine gravel, very soft, gray, wet
0.7'	30.5'	GM	SILT & GRAVEL, some fine sand, loose, gray, wet
1.5'	32.0'	GW	GRAVEL, med to coarse, some fine gravel, loose, multicolored, wet
2.5'	34.5	WBR	WEATHERED SANDSTONE, friable - no cementation, soft, gray, wet
9.0'	43.5'	WBR	WEATHERED SANDSTONE, ~~tra~~ shale, poorly cemented, gray, wet

PID - OVM ~~580B~~ (ppm)

Sample Depth	Blow Counts 6"	12"	18"	24"	Headspace	Background
1.0-2.5'	2	2	2		4.0	0
3.5'-5.0'	1	1	1		5.0	2.6
6.0'-7.5'	2	5	6		6.0	3.0
8.5'-10.0'	6	25	19		6.7	2.6
11.0'-12.5'	5	8	9		5.5	3.2
13.5'-15.0'	3	5	7		7.9	3.2
18.5'-20.0'	5	8	11		6.1	3.2
23.5'-25.0'	5	3	2		—	
28.5'-30.0'	3	4	4		—	
33.5-35.0'	13	18	26		—	
38.5'-40.0'	50	for	5"		—	

leave

L.W.T.

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Environmental Services Division

Page: 2 of 2
Well/Boring No. MW# 7SB
Client: ARCS-Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 12/7/92 Finished: 12/9/92
Time: Started: 1:45pm Finished: 12:15pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** See pg. 1 of 2
Address: 1234 S. Cleveland Massillon Rd
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s) **Depth**
See pg 1 of 2

Grouting/Seal
Depth/To Material/Method
~~See pg. 1 of 2~~ 0-1.0 Concrete Cap
1.0-51.0 cement/Bentonite Grout
51.0-53.0 Bentonite Pellets
53.0-60.0 Silica Sand (Best)
60.0-61.0 Settled Cuttings

Remarks: ~~See pg. 1 of 2~~

Water Level: _____ ft. Below _____

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
17.5+	61.0	BR rock	SANDSTONE, fine-very fine, moderately cemented, some coal shale-detected by black foamy film on circulated drilling water return, some small fractures to 48.0'-loss of circulation occurring past 48.0' due to larger fractures, 6" drop of drilling rods @ 58.0-large fracture, gray, wet.
			EOB @ 61.0'

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	Background

WW Engineering & Science
Environmental Services Division

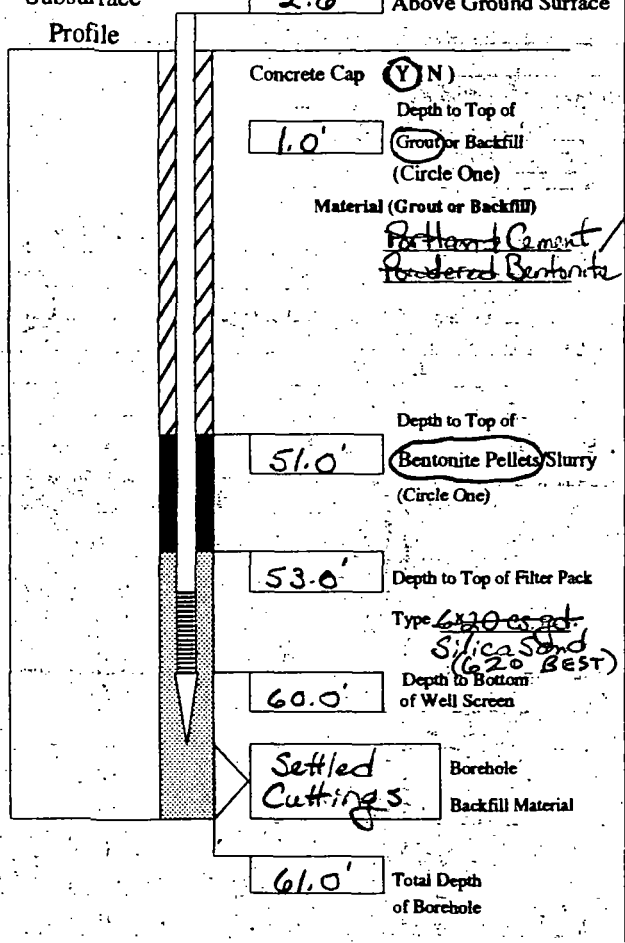
Project Name: ARCS-Albion/Sheridan Twp L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW#7SB

Generalized Subsurface Profile



Top of Casing Elevation (feet): 962.88

Ground Surface Elevation (feet): 960.3'

Water Level Data

Date	Water Level Below TOC
12/10/92	Predevelopment: 16.03'
12/18/92	Postdevelopment: 15.99'
12/21/92	Stabilized: 15.98'

Development: Removed 900 gal. with Grundfos 2" submersible pump, surging several times. Silty to clear.

Survey Reference: R.R. Spike in P.Pole @ SW cor. of support area, N. side of E. Erie St.

Well Casing
- Diameter: 2"
- Total Length: ~~58.0~~ 57.6
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC ~~esp~~

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: ~~10 slot~~ 10/factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: approx. 3'
- Lock Type: 2402 master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#8SG
Client: ARCS-Albion/Sheridan L.F.
Project No.: 04011.02
Date: Started: 11/30/92 Finished: 11/30/92
Time: Started: 9:30 AM Finished: 1:45 PM

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T.	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** ~~3770 E 5647 N~~ 5647, E 3770
Address: 1234 S. Cleveland/Massillon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4¼" ID HSA	0-33.0'

Grouting/Seal

Depth/To	Material/Method
33.0'-31.0'	Natural Sand ~~Collapse~~ Soil
31.0'-24.0'	~~6-20 es gd~~ Silica Sand (Best)
24.0'-22.0'	Bentonite ~~Hole plug~~ ~~pellet~~ Chips
22.0'-1.0'	~~Cement/Bentonite Grout~~
1.0'-0.0'	~~Redimix Concrete Pad~~

Water Level: 24.0 ft. Below Surface

Remarks: No splitspoon samples collected

"Well/Boring Log Sheet"

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / PID: Sample Depth	6"	12"	18"	24"	Headspace	Background
	33.0		See log for MW#8WB for lithologic description. detailed							
			EOB @ 33.0'							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

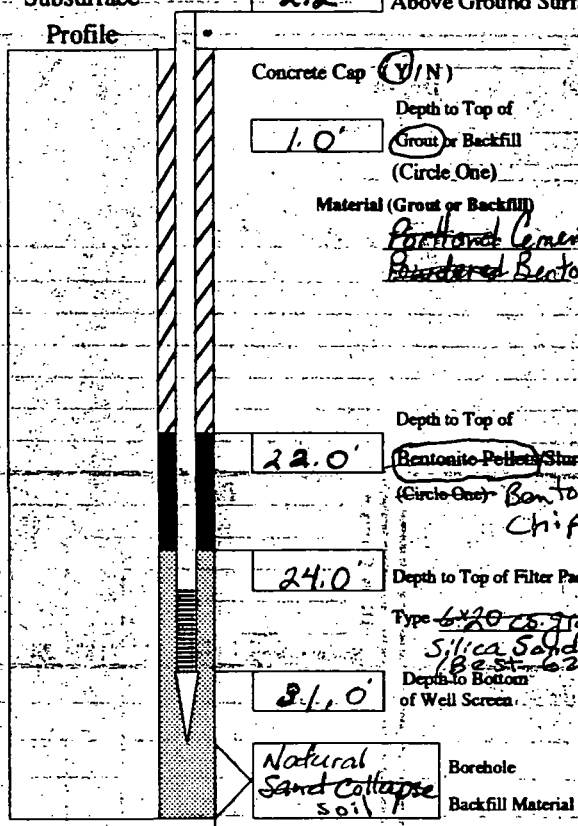
Log of Well Installation

Top of Casing Elevation (feet): 980.58'

Well Number: MW-8SG

Ground Surface Elevation (feet): 978.4'

Generalized Subsurface Profile



2.2' Length of Casing Above Ground Surface

Concrete Cap (Y/N) Y

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): ~~Portland Cement/ Powdered~~ Bentonite

22.0' Depth to Top of ~~Bentonite Pellets/Slurry~~ (Circle One) Bentonite Chips

24.0' Depth to Top of Filter Pack

Type ~~6x20 CS Grade~~ Silica Sand (Best 620)

31.0' Depth to Bottom of Well Screen

Natural ~~Sand Collapse~~ soil Borehole Backfill Material

33.0' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
12/1/92	Predevelopment: 25.24
12/15/92	Post devel/Stable: 24.00'

Development: Pumped & Bailed 150 gal - fair recovery - silty/brown

Survey Reference: BM EW = 981.11' & site grid

Well Casing
- Diameter: 2"
- Total Length: 28.0'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC ~~cap~~

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: ~~10 Slot~~ 10/factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum 4" sq.
- Height Above Ground: approx. 2.7'
- Lock Type: ~~2402~~ Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

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Page: 1 of 2
Well/Boring No. MW#8WB
Client: ARCS-Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 11/24/92 Finished: 11/24/92
Time: Started: 9:30 AM Finished: 5:30 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International Inc.
Address: ~~1234 S. Cleveland Massillon Rd.~~ Akron OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: ~~N 3760 E + 5645 N~~ N 5645, E 3760

Drilling Method(s)	Depth
4 1/4" ID HSA	0 - 55.0'
3 7/8" Rotary Tricone Button Bit	55.0 - 60.0'

Grouting/Seal

Depth/To	Material/Method
51.0 - 60.0'	~~51.0' Cs. grad~~ Silica Sand ~~6x20~~ (Bost
49.0 - 51.0' - 49.0'	Bentonite Holeplug Pellets
1.0 - 49.0' - 1.0'	Cement/Bentonite Grout
0.0 - 1.0' - 0.0'	Redimix Concrete Pad

Remarks: Spoon refusal @ 54.0'
Auger refusal @ 55.0'

Water Level: 24.3 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
5.5'	5.5	SW	SAND, poorly sorted, fine to coarse, little fine to med. gravel, loose, dk. brown to brown, moist
3.4'	8.9'	SP/SW	SAND, med. fine, little med & cs. sand trace of fine gravel, fine layer of coal bits @ 7.3', loose, tan, moist
4.1'	13.0	SP	SAND, fine, trace of med fine - med. sand, trace of coal seams - very fine, and coal bits - fine gravel size, loose, tan, moist - occasional small layer of cs. sand with gravel.
2.5'	15.5'	SW	SAND, med. to coarse, little med fine sand some fine gravel, trace of silt, firmly compacted, brown, little moist
3.1'	18.6'	SW	SAND & GRAVEL - poorly sorted, med. fine to coarse, little silt, moderately compacted, brown, moist
0.8'	19.4'	SW	SAND, med. to coarse, little fine gravel, trace of silt, moderately compacted, brown, moist
1.1'	20.5	SP/SW	SAND, med. fine, some cs. sand, little coal & fine gravel, moderately compacted, tan, moist
3.5'	24.0'	SW	SAND, med. to coarse, some fine gravel, little silt, trace of coal, mod. compact, brown, little moist to damp

Sample Depth	Blow Counts 6"	12"	18"	24"	PID (ppm) Headspace	Background
1.0'-2.5'	3	3	4		0	1.5
3.5'-5.0'	7	6	6		1	1.5
6.0'-7.5'	12	3	7		2	1.5
8.5'-10.0'	4	6	8		2	1.5
11.0'-12.5'	4	5	8		1	1.5
13.5'-15.0'	10	15	36		2	1.5
16.0'-17.5'	15	20	20		2	1.5
18.5'-20.0'	9	17	18		3	1.5
21.0'-22.5'	15	19	19		7	1.5
23.5'-25.0'	20	19	7		4	1.5
25.0'-26.5'	6	8	9		1	1.5
28.5'-30.0'	3	3	6		0	1.5
33.5-35.0'	13	17	17			
38.5'-40.0'	9	7	8			
43.5'-45.0'	8	13	30			
48.5'-50.0'	19	21	26			
53.5'-55.0	50	—				

WW Engineering & Science
Environmental Services Division

Page: 2 of 2
Well/Boring No. MW#-8WB
Client: ARCS-Albion/Sheridan Twp L.F.
Project No.: 04011.02
Date: Started: 11/24/92 Finished: 11/24/92
Time: Started: 9:30 AM Finished: 5:30 pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
mi	Calhoun	Sheridan		36	T2S	R4W

Contractor: R&R International
Address: 1234 S. Cleveland-Massillon Rd
Akron, OH 44321
Equipment: CME 75 Trucking
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: 3760 E 5645 N

Drilling Method(s)	Depth
4 1/4" ID HSA	55.0'
3 7/8" Rotary Tricon	

Grouting/Seal Depth/To	Material/Method
60.0'-51.0'	6x20 Cs grd. Silica Sand
51.0'-49.0'	Bentonite Hole plug
49.0'-1.0'	Cement/Bentonite Grout
1.0'-0.0'	Redimix Concrete Pad

Water Level: 24.3 ft. Below Surface

Remarks:

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
0.8'	24.8'	GM	GRAVEL, med to coarse, some silt, little cs. sand & fine gravel, loose, red/brown, wet							
0.5'	25.3	CL	CLAY, some silt, firm, cohesive, brown, little moist							
9.1'	34.4'	SM	SAND, fine to very fine, some silt, trace of coal fragments, loose, firmly compact, lt brown, wet							
0.2'	34.6'	Shale	COAL SHALE, smooth, hard, black, fractured.							
2.4'	37.0'	SP/SW	SAND, fine, some med-cs. sand, trace of fine gravel, little shale fragments, loose, gray/brown, wet.							
5.0'	42.0'	SM	SAND, fine, some silt, trace of fine-med. gravel, loosely compacted, gray, wet.							
6.7'	48.7'	SC	SAND, fine, some clay, some silt, trace fine gravel, firm, cohesive, gray, little moist							
6.3'	55.0'	SP/ML ~~WOR~~	WEATHERED SANDSTONE, fine to very fine, some silt, poorly cemented, some micaceous fragments, easily crumbled, gray, moist trace of coal & coal shale lenses							
5.0+	60.0+	~~BR~~	SANDSTONE, fine to very fine, some fractures, moderately cemented, gray, wet.							
			EOB @ 60.0'							

WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

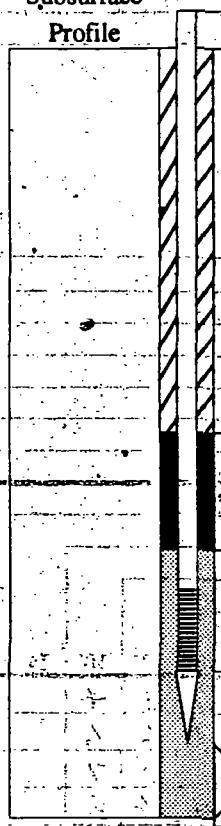
Log of Well Installation

Well Number: MW # 8WB

Top of Casing Elevation (feet): 980.93

Ground Surface Elevation (feet): 978.5'

Generalized Subsurface Profile



2.4' Length of Casing Above Ground Surface

Concrete Cap (Y) (N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement-Portland Powdered Bentonite

49.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

51.0' Depth to Top of Filter Pack

Type ~~#20 cs. grade~~ Silica Sand Best 620

58.0' Depth to Bottom of Well Screen

Filter Pack Sand Borehole Backfill Material

60.0' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 33.78'
12/15/92	Post develop/Stable: 33.45'

Development: Pumped 16.5 gal - Silty gray to trace cloudy

Survey Reference: BM# W1 ~~& See survey~~ site grid

Well Casing
- Diameter: 2"
- Total Length: ~~55.0'~~ 55.4'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: ~~10 slot~~ 10/factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dim. 4" sq.
- Height Above Ground: approx. 2.75'
- Lock Type: ~~2502~~ Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#8SB
Client: ARCS-ALBION/SHERIDAN L.F.
Project No.: 04011.02
Date: Started: 11/23/92 Finished: 11/23/92
Time: Started: 8:45 AM Finished: 6:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R International, Inc.
Address: 1234 S. Cleveland-Mass. Ilon Rd.
Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Location: ~~3750 E~~ N 5643, E 3750
~~5643 N~~

Drilling Method(s)	Depth
4 1/4" ID HSA	0 - 55.0'
3 7/8" Rotary Tricone Button Bit	55.0 - 72.0'

Grouting/Seal

Depth/To	Material/Method
65.0 - 72.0' ~~65.0~~	6x20 cssd. Silica sand (Best)
63.0 - 65.0' ~~63.0~~	Bentonite ~~Hole plug~~ Pellets
1.0 - 63.0' ~~1.0~~	Cement/Bentonite grout
0.0 - 1.0' ~~0.0~~	~~Ready mix~~ concrete pad

list from surface (0.0) down.

Remarks: 500 gal. water lost in formation during drilling. Water table encountered ~~at~~ 37.0' below ground during drilling.

Water Level: 31.0 ft. Below Surface

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description (Soils)
47.0	47.0	soil	(See log for MW#8WB for lithologic description 0 to 50.0')
~~38.0~~	~~37.0~~	~~37.0'~~	~~Water table~~
~~10.4~~	~~47.0~~	47.0' SP	Weathered Bedrock
12.0	55.0	55.0' SP	Unweathered Bedrock - Note: Auger refusal @ 55.0'. Rotary drilling returns showed evidence of ~~coal~~ shale during initial 5.0' run - very soft drilling through this layer. Sandstone bedrock is hard & less fractured than previous bedrock well locations. Circulation of drilling water was not lost to formation as before - all wash water recovered from bore hole was collected for disposal.
17.0	72.0		
	70.0'		EOB

Blow Counts / Sample Depth	PID 6"	12"	18"	24"	Headspace	Background

WW Engineering & Science
Environmental Services Division

Project Name: ARCS-Albion/Sheridan Twp L.F.

Project No: 04011.02

Log of Well Installation

Top of Casing Elevation (feet): 981.83'

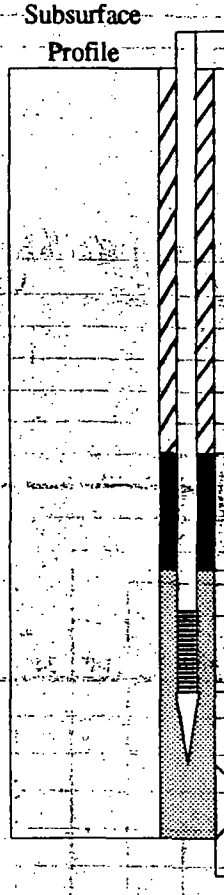
Well Number: MW#8SB

Ground Surface Elevation (feet): 978.5'

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 34.66
12/15/92	Postdevelop/Stable: 34.77'

Generalized Subsurface Profile



3.3' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Portland Cement/ Bentonite ~~powder~~

63.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

65.0' Depth to Top of Filter Pack

Type: ~~#20 Grade~~ Silica Sand (#20 Best)

72.0' Depth to Bottom of Well Screen

N/A Borehole Backfill Material

72.0' Total Depth of Borehole

Development: Pumped 550 gal. - little silty to clear

Survey Reference: BM# W/ ~~See survey~~ site grid

Well Casing
- Diameter: 2"
- Total Length: 70.0'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: ~~10 slots~~ 10/factory cut
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground: approx 3.8'
- Lock Type: 2402 Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. 9 SG
Client: ARCS - ALBIAN/SHERIDAN TWP. L.F.
Project No.: 04011.02
Date: Started: 11/24/92 Finished: 11/24/92
Time: Started: 1:30 Finished: 4:00

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI.	CALHOUN	SHERIDAN	SE 1/4	36	T2S	R4W

Contractor: R&R INTERNATIONAL INC.
Address: 1234 S. CLEVELAND MASSILLON RD. AKRON OHIO 44321
Equipment: CME 750 ATV
Crew Chief: ED PUCCI
WW Supervisor: BILL PUSIHAN

Location: (35.0' EAST OF MW 9-SBE 22.0' EAST OF MW 9-WB') Approx N5650, E3785

Drilling Method(s)	Depth
4¼" I.D. H.S.A.	0-20.0

Grouting/Seal

Depth/To	Material/Method
18.0 ~~20.0~~ - 11.0	~~SAND~~ Silica Sand (best)
11.0 - 8.0	~~HOLEPLUG~~ Bentonite ~~Pellets~~ Chips
8.0 - 1.0	CEMENT GROUT
1.0 - 0.0	~~CEMENT~~ Concrete Cap
20.0 - 18.0	Sand

Remarks:

Water Level: 10.5 ft. Below Surface

"Well/Boring Log Sheet" for

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Blow Counts / Sample Depth	PID 6"	12"	18"	24"	Headspace	Background
			SEE MW-9WB LOG FOR							
			detailed LITHOLOGIC DESCRIPTION.							
			EOB @ 20'							
			300-							

WW Engineering & Science
Environmental Services Division

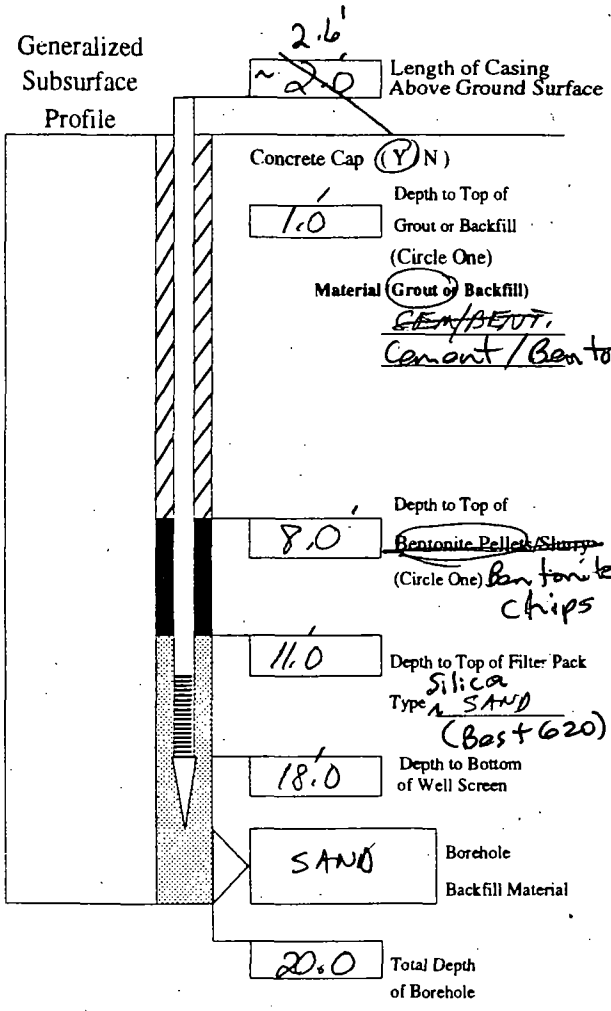
Project Name: ARCS ALBION/SHERIDAN TWP. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: ~~MW-9S~~ MW-9SG

Generalized Subsurface Profile



Top of Casing Elevation (feet): 959.47'

Ground Surface Elevation (feet): 956.9'

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 11.20'
12/22/92	Postdevelop/Stable: 12.75'

Development: Bailed 34.5 gal - Very slow recovery. Silty/sandy to silty

Survey Reference: BM#W

Well Casing
- Diameter: 2"
- Total Length: 15.0
- Material: ~~PVC~~ Schedule 40 PVC
- Cap Type: J-PLUG

Well Screen
- Diameter: 2"
- Length: 5.0
- Slot/Type: 10/factory cut
- Material: ~~PVC~~ Schedule 40 PVC

Protective well casing
- Material: ~~METAL~~ Anodized Aluminum Dia. 4"
- Height Above Ground: ~~~2.5'~~ approx. 3.1'
- Lock Type: ~~PS06~~ 2402

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No: MW-9WB
Client: ARCS-ALBION/SHERIDAN TWP. L.
Project No.: 04011.02
Date: Started: 11/23/92 Finished: 11/24/92
Time: Started: 1:30 Finished: 12:30

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI.	CALHOUN	SHERIDAN	SE 1/4 SE 1/4	36	T2S	R4W

Contractor: R&R ~~INTERNATIONAL~~ Location: ~~13.0' EAST OF MW-9-SB~~ Approx N 5650, E 3763 ~~E 3750~~
Address: 1234 S. CLEVELAND MASSILLON RD. AKRON, OHIO 44321
Equipment: CME 750 ATV
Crew Chief: ED PUCCI
WW Supervisor: BILL PUSHAW

Drilling Method(s)	Depth
4 1/4" H.S.A. (I.D.)	0-48.0'

Grouting/Seal

Depth/To	Material/Method
39.5-48.0	39.5' SilicaSAND (Bast)
37.5-39.5	37.5' ~~CHIPPLUG~~ Bentonite Pellets
1.0-37.5	1.0' CEMENT-GROUT
0.0-1.0	~~0.0~~ Concr ~~CEMENT~~ Cap

Water Level: 13.04 ft. Below T.O.C.

Remarks: at ~20.0' we hit a "sandy precursor" to bedrock; it appeared in a loose sand form. Our 25.0' spoon yielded more of a "Cemented" form of bedrock pieces. No more split spoons were taken after this point, we just augured down to our field depth (48').

Type from 0.0 downward

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
.3'	.3'	SW	SAND, FINE-MED, DARK BROWN, ORG. DEBRI; ROOTS, LEAVES, MOIST
4.7'	5.0'	SP/SM	SAND, MED, BROWN, TRACE GRAVEL; FINE-MED (2mm - 10mm) SOME SILT, MOIST
8.8'	13.8'	SM/GM	SAND & SILT, FINE-MED, BROWN, SOME GRAVEL; FINE-MED (2mm - 20mm), VERY MOIST
6.2'	20.0'	SP	SAND, MED, GRAY, SOME GRAVEL; FINE-MED; (2mm - 18mm) V. MOIST/WET
5.0'	25.0'	SW/GW WBR	WEATHERED BEDROCK AND/OR SAND FINE, SOME GRAVEL; FINE-MED (2mm - 22mm), VERY MOIST
23.0	48.0	rock WBR	WEATHERED BEDROCK.

E.O.B. 48.0'

Used 300 gal of water during rotary drilling.

Sample Depth	Blow Counts 6"	12"	18"	24"	PID (ppm) Headspace	Background
0-2'	3	2	2	2	0.9	0.3
2.5-4.5'	2	4	5	7	0.9	0.9
5.0-7.0'	2	3	2	4	1.5	1.5
7.5-9.5'	2	8	10	8	1.5	1.5
10.0-12.0'	7	10	11	23	2.8	1.5
12.5-14.0'	14	14	14		0.9	0.9
15.0-16.5'	7	6	4		0.3	0.3
20.0-21.5'	3	4	7		0.3	0.3
25.0-26.5'	94	24	18		0.3	0.3

WW Engineering & Science
Environmental Services Division

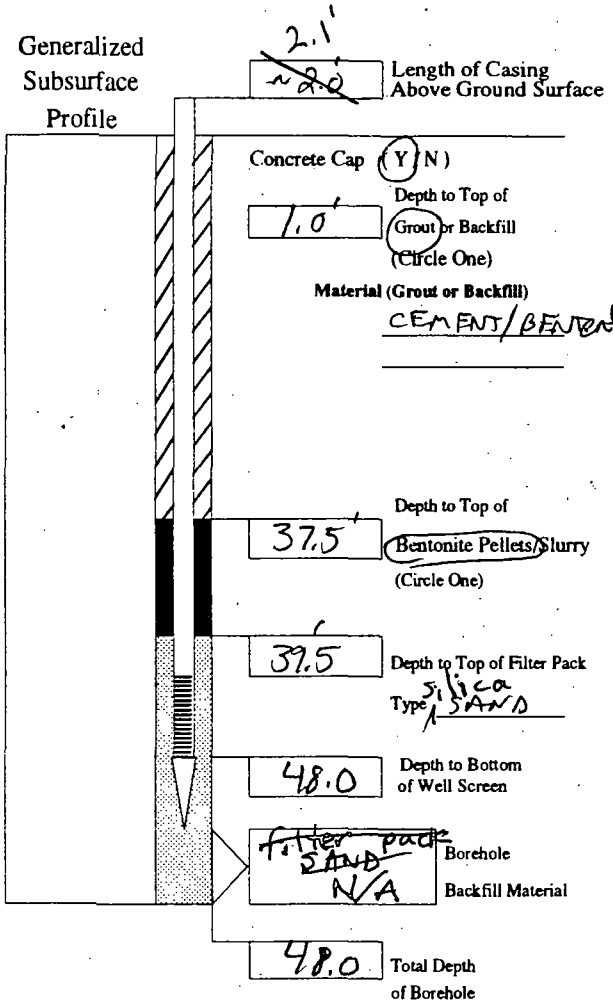
Project Name: ARCS- ALBIAN/SHERIDAN TWP. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: MW-9 WB

Generalized Subsurface Profile



~~2.0~~ 2.1' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): CEMENT/BENTONITE

37.5' Depth to Top of Bentonite Pellets/Slurry (Circle One)

39.5' Depth to Top of Filter Pack

Type: Silica SAND

48.0 Depth to Bottom of Well Screen

~~filter pack SAND~~ N/A Borehole Backfill Material

48.0 Total Depth of Borehole

Top of Casing Elevation (feet): 959.48'

Ground Surface Elevation (feet): 957.4'

Water Level Data

Date	Water Level Below TOC
11/24/92	Predevelop: 13.04
11/25/92	Predevelop/Stable: 12.51'
12/21/92	Postdevelop/Stable: 12.73'

Development: Pumped 300 gal. with grundfos pump- Silty to little cloudy-gray

Survey Reference: BM# W ~~See survey~~ Site grid

Well Casing
- Diameter: 2"
- Total Length: ~~45'~~ 45.1
- Material: ~~PVC~~ Schedule 40 PVC
- Cap Type: J-PLUG

Well Screen
- Diameter: 2"
- Length: 5.0'
- Slot/Type: 10/factory cut
- Material: ~~PVC~~ Schedule 40 PVC

Protective well casing
- Material: ~~METAL~~ Anodized Aluminum Dia. 4" sq.
- Height Above Ground: approx ~~2.5'~~ 2.6'
- Lock Type: ~~2402~~ Master lock

General Notes:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. MW#9SB
Client: ARCS-Albion/Sheridan Twp. L.F.
Project No.: 04011.02
Date: Started: 11/20/92 Finished: 11/23/92
Time: Started: 2:30pm Finished: 1:00

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc
Address: 1234 S. Cleveland Massillon Rd. Akron, OH 44321
Equipment: CME 750 ATV
Crew Chief: Ed Pucci
WW Supervisor: Cathie Cotton

Location: Approx N5650, E3763

Drilling Method(s)	Depth
4 1/4" ID HSA	0-60.0

Grouting/Seal

Depth/To		Material/Method
60.0	53.0	Silica SAND (Best)
53.0	50.0	~~HOLE PLUG~~ Bentonite ~~Pellets~~ Chips
50.0	0.0	~~CEM/BENT GROUT~~
1.0	0.0	~~CEM~~ Concrete Cap

Remarks:

Water Level: 12.5 ft. Below Surface

"Well/Boring Log Sheet"

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
			See log for MW#9WB for lithologic description detailed
			~~WL = 22'~~ ~~23'-28'~~
			~~WB = 28'~~ ~~38'-43'~~
			~~WBR = 40.0~~ ~~50'-55'~~
			~~60' well depth~~
			~~53' sand~~
			~~50' hole plug dropped in cement/bentonite mix grouted in by dropping hose in auger flights!~~
			~~600 gal.~~

Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background

05

WW Engineering & Science
Environmental Services Division

Project Name: ARCS, ALBION/SHERIDAN TWP C.F.

Project No: 04011.02

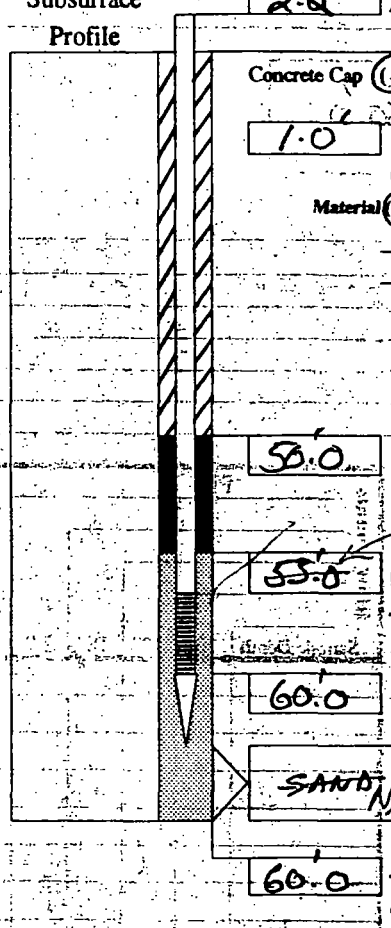
Log of Well Installation

Well Number: MW-9SB

Top of Casing Elevation (feet): 960.06'

Ground Surface Elevation (feet): 957.7'

Generalized Subsurface Profile



2.4' ~~2.0'~~ Length of Casing Above Ground Surface

Concrete Cap (Y) N

1.0' Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Cement & Bentonite

50.0' Depth to Top of ~~Bentonite Pellets/Slurry~~ (Circle One) Chips

53.0

55.0' Depth to Top of Filter Pack

Type: Silica SAND (Best 620)

60.0' Depth to Bottom of Well Screen

SAND N/A Borehole Backfill Material

60.0' Total Depth of Borehole

Water Level Data

Date	Water Level Below TOC
11/25/92	Predevelopment: 12.92'
12/15/92	Post develop/stable: 13.10'

Development: Pumped 600 gal. with grundfos pump - silty to clear.

Survey Reference: BMW ~~Set survey~~ & State Grid

Well Casing

Diameter: 2"

Total Length: ~~57.0~~ 57.4

Material: ~~PVC~~ Schedule 40 PVC

Cap Type: J-PLUG

Well Screen

Diameter: 2"

Length: 5.0'

Slot/Type: 10/factory cut

Material: PVC

Protective well casing

Material: ~~METAL~~ Anodized Aluminum Dia. 4" SQ.

Height Above Ground: approx. ~~2.5'~~ 2.85'

Lock Type: ~~2402~~ Master lock

General Notes:

Calculation Sheet

Computed by _____ Subject _____ Sheet ____ of _____
Checked by _____ _____ Job No. _____
Client _____ Date _____

	Date Completed	Total Depth Below Surf.	Developed	Stable Water level	TOC Elevation	Water Elevation	Date Sampled	TO DEVEL
MW# 1 SG	10/22/92	37.5'	Yes	32.67'	982.36'	949.69'	12/10/92	DONE
1 WB	11/20/92	59.0'	Yes	32.92'	982.20'	949.28'	12/10/92	Done 3 Vol. 8
1 SB	10/7/92	72.5'	Yes	33.13' 33.39'	982.20'	948.81'	12/10/92	DONE
2 SG	11/10/92	35.0'	Yes	28.03'	977.93'	949.90'	12/7/92	DONE 12-7 3 gal. 3 vol.
2 WB	11/20/92	53.0'	Yes	27.80'	977.325'	949.525'	12/8/92	Done 600 gal.
2 SB	10/14/92	65.0'	Yes	28.34'	977.62'	949.28'	12/8/92	DONE
3 SG	11/18/92	44.0'	Yes	31.42'	978.875'	947.455'	12/17/92	DONE 250 gal.
3 WB	11/17/92	59.0'	Yes	31.51'	978.65'	947.14'	12/17/92	DONE 500 gal.
3 SB^A	10/12/92	69.5'	Yes	30.97'	978.145'	947.175'	12/17/92	DONE
4 SG	11/30/92	36.5'	Yes	31.00'	978.03'	947.03'	12/16/92	Done 3 Vol. 1405 gal
4 WB	11/19/92	61.0'	Yes	30.59'	977.73'	947.14'	12/16/92	Done 1900 gal.
4 SB	10/20/92	73.0'	Yes	30.90 31.34'	978.025'	946.685'	12/16/92	DONE
4 DB	11/17/92	100.0'	Yes	30.71'	977.80'	947.09'	12/16/92	Done 1600 gal.
5 SG	11/11/92	28.0'	Yes	21.09'	970.69'	949.60'	12/9/92	DONE 12-7 3 vol. 1405 gal.
5 SB	10/13/92	75.5'	Yes	22.43' 22.80'	970.005'	947.205'	12/9/92	DONE
6 SG	11/19/92	28.0'	No	21.47'	969.73'	948.26'	12/15/92	18.5 3 vol.
6 WB	11/18/92	51.0'	Yes	22.60'	969.81'	947.21'	12/9/92	DONE 225 12-7 3 vol 97.
6 SB	11/2/92	75.3'	Yes	22.91'	969.77'	946.86'	12/9/92	DONE
7 SG	12/10/92	26.0'	Yes	16.30'	963.905'	947.605'	12/22/92	3 Vol. 65 gal.
7 WB	12/10/92	47.0'	Yes	16.79'	963.635'	946.845'	12/22/92	200 gal
7 SB	12/9/92	60.0'	Yes	16.03'	962.88'	946.85'	12/21/92	900 gal
8 SG	11/30/92	31.0'	Yes	25.24'	980.58'	955.34'	12/15/92	Done 3 Vol. 150
8 WB	11/24/92	58.0'	Yes	33.78'	980.93'	947.15'	12/15/92	Done 165 gal
8 SB	11/23/92	70.0'	Yes	34.66'	981.83'	947.17'	12/15/92	558 gal Done
9 SG	11/24/92	18.0'	Yes	11.20'	959.47'	948.27'	12/22/92	34.5 gal. 3 vol.
9 WB	11/24/92	48.0'	Yes	12.51'	959.48'	946.97'	12/21/92	Done 300
9 SB	11/23/92	60.0'	Yes	12.92'	960.06'	947.14'	12/15/92	Done 600 gal
10 SG								
11 SG								
12 SG								
13 SG								
LF-1	10/22/92	35.0'	Yes	36.87'	985.95'	949.08	12/16/92	DONE 8 gal.
LF-2	12/2/92	17.0'	No	Dry	976.77'	N/A	N/A	N/A
LF-3	12/4/92	32.0'	No	Dry	983.52'	N/A	N/A	N/A

50 12/8

Small dark

No Rig

used top of casing and depth to top of shallow bedrock (competent) from the SB-series wells, except MW09 Auger refusal

Date:

Client:

Project No.:

Differences in the elevation of top of shallow bedrock is a function of the variability of drilling effort + difference in elevation at the different locations within the well clusters

the combination of

	Ground Surf	Depth WB	ELEV. TOP WB	DEPTH SB	Elev top of SB	
MW01 WB	979.6	47	932.6	59	920.6	OK
MW01 SB	979.6	47	932.6	58 57.5	921.6 (922.1)	
						Base of borehole is not necessarily the top of comp. rock (?)
MW02 WB	975	43.5	931.5	54	921	
MW02 SB	975.4	42	933.4 (932)	49	926.4	Bedrock portion logged in more detail
MW03 WB	976.1	47	929.1	60	916.1	same as above
MW03 SB	975.6	47	928.6	55	920.6	
MW04 WB	975.5	35' no spoons	940.5	68	907.5	
MW04 SB	975.9	32.5	943.4	55 (54)	920.9 (921.9)	logged in more detail
MW04 DB	975.4	32 30	943.4 (942)	~~44~~ OK	931.4	probably gave up easy with the HSA + started rotary early once drilling was difficult
MW05 SB	967.5	54.2	913.3	59	908.5	
~~MW05 WB~~						
~~MW05 SB~~						
MW06 WB	967.2	34.5	932.7	52	915.2	
MW06 SB	967.3	34.5	932.8	49	918.3	Bedrock logged in more detail
MW07 WB	960.7	32	928.7	47	913.7	
MW07 SB	960.3	32	928.3	43.5	916.8	as above
MW08 WB	978.5	48.7	929.8	55	923.5	
MW08 SB	978.5	47 37	931.5 (930)	55	923.5	
MW09 WB	957.4	25	932.4	45	912.4	
MW09 SB	957.7	28	929.7	~~40~~	~~919.7~~	

we raised the top of rock based on color change

this is total length drilled through W.B.

total B.R. drilled (WBR + SB)

WW Engineering & Science, Inc.
Environmental Services Division

Person:
Instrument Man: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS-ALBION 04011.02 Date: 10/21/92 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.54 ✓	BM#N	N 7079.36 E 4983.94
6.22	983.76				
		6.14	977.62 ✓	MW#2SB	TOC
5.87	983.49				
		5.96	977.5~~4~~3	BM#N	0.01 ~~0.00~~ error ✓
			981.11 ✓	BM#W	N 5542.16 E 4351.59
0.69	981.80				
		3.775	978.025 ✓	MW#4SB	TOC
3.685	981.71				
		1.50	980.21	TP	
1.89	982.10				
		3.955	978.145 ✓	MW#3SB	TOC
3.12	981.265				
		1.53	979.735	TP	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument ~~Man~~ Person: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS-ALBION 04011.02 Date: 10/21/92 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			979.735 ✓	TP	
2.045	981.78				
		3.75	978.03 ✓	MW#4SB	TOC
4.69	982.72				
		1.605	981.115 ✓	BM#W	+0.005 error ✓
					ck'd 10/21/92 Rick Trippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M. CHRISTENSEN
Rod Man: D. JOHNSON
Method: 30° WINDY - SNOW

Project Name and Number: ARCS-HILBION 04011.02 Date: 11-13-92 Page: 1/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
6.60	979.90 ✓		973.30 ✓	BM-E	
		5.62	974.28 ✓	SM-1	974.31 (+0.03)
11.19 ~~9.76~~	985.47 ✓ ~~984.04~~		974.28 ✓	TP (SM1)	
3.09		3.09	982.38 ✓	SM 2	982.31 (+0.07)
~~4.26~~		4.26	981.21 ✓	SM-3	~~(981.19~~ (+ RST 981.19 (+0.02) ground level at 983.3'
9.06	990.27 ✓		981.21	TP (SM3)	
		4.74	985.53 ✓	SM 4	988.53 (+3.0)
4.20	989.73 ✓		985.53	TP (SM4)	
		6.80	982.93 ✓	SM 5	982.93 (✓)
		3.78	985.95 ✓	LF-1	
1.49	987.44 ✓	~~10.66~~	985.95	TP (LF1)	
		10.66	976.~~74~~ 78 ✓	SM 6	976.74 (+0.04)
5.12	981.90 ✓ ~~982.01~~		976.~~74~~ 78	TP (SM6)	
	981.90 ~~982.01~~	5.65	976.~~30~~ 25 ✓	TP: STAKE	
			976.~~30~~ 25	TP. STAKE	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS/ALBION 04011.02 Date: 11-13-92 Page: 2/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
4.65	980.90 ✓ ~~[illegible]~~		976.25 ~~[illegible]~~	T.P. STAKE	
		3.33	977.57 ✓ ~~[illegible]~~	BM. N	977.54 ✓ ERROR .03 ✓

LF-01
MW-5
SM - 1
2
3
4
5
6

Date: 11-13-92
Client:
Project No.:

BM-E	973.30	LF-01			
		MW-5			
BM-W	981.11	SM	1	974.31	974.28
			2	982.31	982.38
BM-N	977.54		3	981.19	981.21
		CHECK ORIGINAL NOTE →	4	988.53	985.53
BM-S	945.59		5	982.93	982.93
			6	976.74	976.78

WW Engineering & Science, Inc.
Environmental Services Division

Person
Instrument ~~Man~~: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS - ALBION 04011.02 Date: 10/13/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.54 ✓	BM#N	N 7079.36 E 4983.94
6.11	983.65				
		1.45	982.20 ✓	MW#18B	TOC
1.65	983.85				
		6.31	977.54 ✓	BM#N	0.00' error ✓
					ck'd ~~10/14/92~~ RJT 10/21/92 Erik Tuppel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Don Johnson
Rod ~~Man~~ Person: C. Cotton
Method:

Project Name and Number: ARCS-Albion #04011.02 Date: Nov. 20, 1992 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				981.11 ✓	BM-W
1.87	982.98 ✓				Shot BM-W for Instrument Height.
		4.96	978.02 ✓		MW#4 SB (T.O.C.)
1.88	979.90				TURN (MW 4 SB)
		2.17	977.73 ✓		MW # 4 WB (T.O.C.)
2.99	980.72				TURN (MW 4 WB)
		2.92	977.80 ✓		MW# 4 DB (T.O.C.)
0.72	978.52				TURN (MW 4 DB)
		7.13	971.39 ✓		T.P.-1 (Rock)
3.24	974.63				TURN (T.P.-1)
		4.90	969.73 ✓		MW # 6 SG (T.O.C.)
3.53	973.26				TURN (MW 6 SG)
		3.49	969.77 ✓		MW # 6 SB (T.O.C.)
3.15	972.92				TURN (MW# 6 SB)
		3.11	969.81 ✓		MW# 6 WB (T.O.C.)

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Don Johnson
Rod ~~Man:~~ Person: C. Cotton
Method:

Project Name and Number: ARCS-Albion #04011.02 Date: Nov. 20, 1992 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				969.81 ✓	MW# 6WB (T.O.C) (Continued from pg 1)
4.69	974.50				TURN (MW#6WB)
		3.10	971.40 ✓		T.P.-2 (Rock)
12.28	983.68				TURN (T.P.-2)
		2.57	981.11	981.11 ✓	BM-W (close)
					+0.00' ERROR + ✓
					checked. 12/9/92 Rick Trappel

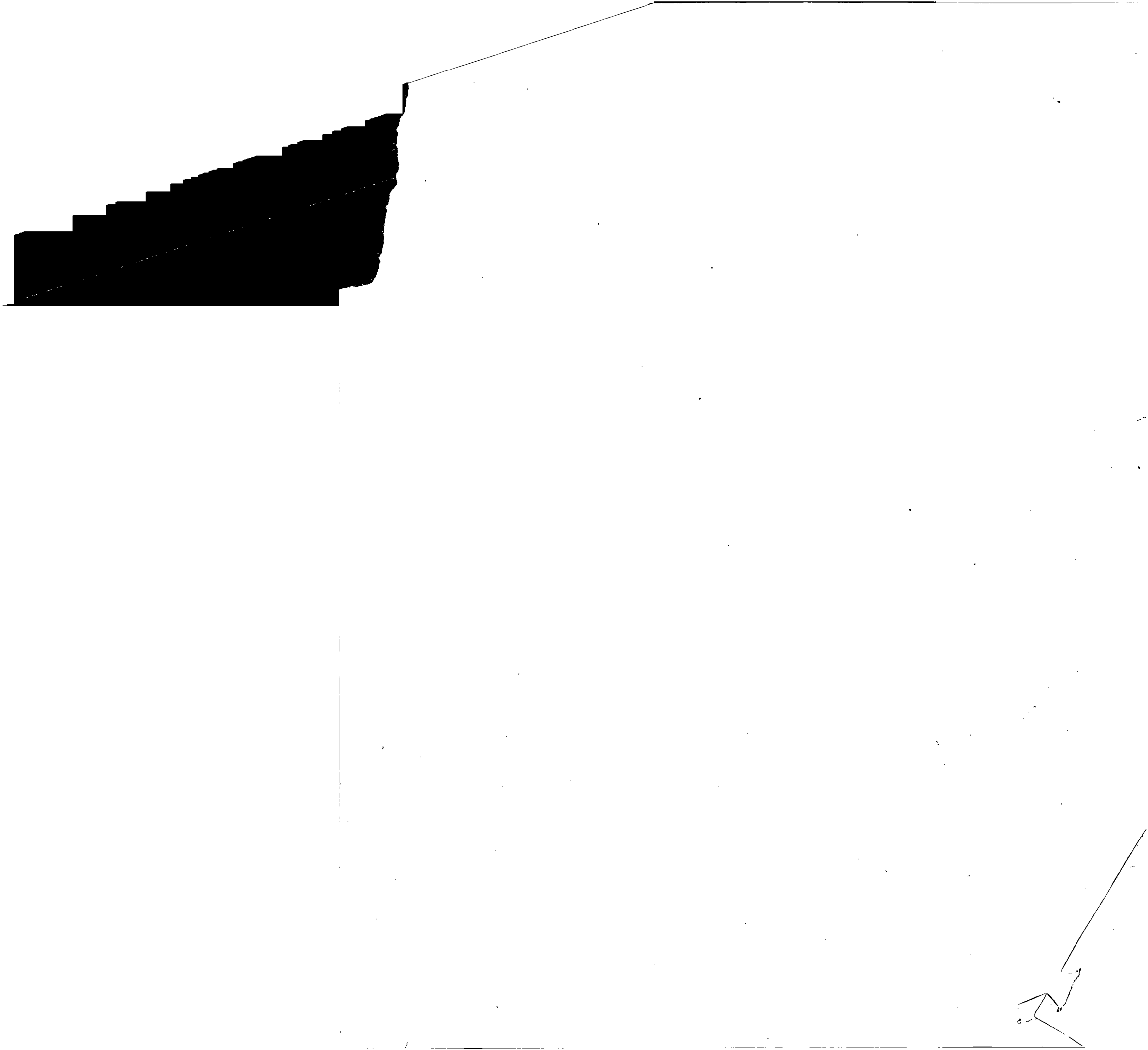
WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Don Johnson
Method:

Project Name and Number: ARCS-Albion/Sheridan Twp. L.F. 04011.02 Date: 12/1/92 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			970.005	MW#5SB	TOC Survey Ref.: BM-N = 977.54
3.12	973.125				
		2.435	970.69	MW#5SG	TOC
2.365	973.055				
		3.05	970.005	MW#5SB	TOC 0.00 error
			977.62	MW#2SB	TOC Survey Ref.: BM-N = 977.54
2.38	980.00				
		2.675	977.325	MW#2WB	TOC
2.94	980.265				
		2.335	977.93	MW#2SG	TOC
2.15	980.08				
		2.46	977.62	MW#2SB	TOC 0.00 error
			982.20	MW#1SB	TOC Survey Ref.: BM-N = 977.54
2.68	984.88				
		2.68	982.20	MW#1WB	TOC

Continued pg. 2 of 2



WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Don Johnson
Method:

Project Name and Number: ARCS-Albion/Sheridan Twp. L.F. 04011.02 Date: 12/1/92 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			982.20	MW# 1WB	TOC
2.875	985.075				
		2.875	982.20	MW# 1SB	TOC 0.00 error
					checked 12/28/92 Rick Trippel

Date: Nov. 20, 1992
Client: ARCS-Albion
Project No.: 04011.02

T.O.C. Elevations taken 11/20/92

* Elevations taken at "Highest" Point on PVC casing *

Well ID:	T.O.C. Elevation
mw #4 ~~SG~~ WB	977.73
mw #4 SB	978.02
mw #4 DB	977.80
mw #6 SG	969.73
mw #6 WB	969.81
mw #6 SB	969.77

* Bench mark # BM-W (elev.= 981.11) used as starting point. *

LF-01
MW-5
SM - 1
2
3
4
5
6

Date: 11-13-92
Client:
Project No.:

BM-E	973.30	LF-01			
		MW-5			
BM-W	981.11	SM	1	974.31	974.28 -.03
			2	982.31	982.38 +.07
BM-N	977.54		3	981.19	981.21 +.02
		CHECK ORGINAL NOTE →	4	988.53	983.53 -5.0
BM-S	945.59		5	982.93	982.93
			6	976.74	976.78 +.40

Cathie & Don

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man:

Rod Man:

Method: Stadia & (auto level?)

Project Name and Number: ALBION 04011.02 Date: 10/2/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				972.53	MW-E (T.O.C.) (Highest Point)
5.03	977.56				Shot T.O.C for Height of Instrument
		4.26	973.30	973.30	BM-E
4.08	977.38				moved / Re-Shot for New HI
		4.85	972.53		MW-E T.O.C. - Close
					0.00' ERROR
					checked 12/14/92
					Rick Tripp

WW Engineering & Science, Inc.
Environmental Services Division

Instrument ~~Man~~ Person: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS-ALBION 04011.02 Date: 10/13/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.54 ✓	BM#N	N 7079.36 E 4983.94
6.11	983.65				
		1.45	982.20 ✓	MW#1SB	TOC
1.65	983.85				
		6.31	977.54 ✓	BM#N	0.00' error ✓
					checked 10/21/92 Rick Trippel
					checked 10/21/92 Rick Trippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Jim Wise
Rod Man: Rick Trippel
Method: auto level & Stadia Rod

Project Name and Number: 0401 1.02 ARCS - Albion Date: 10/15/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
6.53	979.06		972.53 ✓		MW-E highest point on T.O.C. HI
		4.11	974.95		Elevation / CP-4
5.60	980.55				Turn CP-4
		7.24	973.31 ✓		Elevation BM-E
3.70	977.00				Turn BM-E
		4.47	972.54		Close MW-E
					(ERROR +0.01) ✓
					checked 10/15/92
					Rick Trippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument ~~Man~~ Person: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS-ALBION 04011.02 Date: 10/20/92 Page: 1 of 3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.54 ✓	BM# N	N 7079.36 E 4983.94
2.16	979.70				
		2.02	977.68	TP	
2.285	979.965				
		7.40	972.565	TP	
4.37	976.935				
		5.33	971.605	TP	
3.30	974.905				
		5.015	969.89 ✓	TBM#1	TOP OF GUY WIRE STAKE TO P. POLE E. SIDE
5.095	974.985				
		3.39	971.595	TP	
5.485	977.08				
		3.535	973.545	TP	
6.335	979.88				
		2.69	977.19	TP	

WW Engineering & Science, Inc.
Environmental Services Division

Person
Instrument ~~Man~~: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS-ALBION 04011.02 Date: 10/20/92 Page: 2 of 3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.19 ✓	TP	
3.00	980.19				
		2.65	977.54 ✓	BM#N	0.00 error ✓
			969.89 ✓	TBM#1	See pg. 1
2.35	972.24				
		2.81	969.43	TP	(Top Fire Hydrant valve stem @
2.79	972.22				
		4.785	967.435	TP	
5.59	973.025				
		3.02	970.005 ✓	MW#5SB	TOC
3.09	973.095				
		5.55	967.545	TP	
4.365	971.91				
		3.81	968.10 ✓	TBM#2	"X" on NW'ly Hex bolt on middle of fire hydrant @ NE cor. of

WW Engineering & Science, Inc.
Environmental Services Division

Instrument ~~Man~~ Person: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS - ALBION 04011.02 Date: 10/20/92 Page: 3 of 3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			968.10 ✓	TBM #2	See pg. 2
4.29	972.39				
		2.50	969.89 ✓	TBM #1	See pg. 1 0.00 error ✓
					checked 10/21/92 Rick Trippel checked 10/21/92 Rick Trippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Don Johnson
Rod ~~Man~~ Person: Cathie Cotton
Method:

Project Name and Number: ARCS - Albion # 04011.02 Date: 10/23/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				959.60	Telephone Pole w/R.R. Spike (ID# CPC071)
3.90	963.50				Height of Instrument
		2.33	961.17		MW-5 (T.O.C.)
1.925	963.095				moved Inst. / Re-Shot MW-5 for new H.I.
		3.495	959.60		R.R. Spike (ID# CPC071) Close
					Close = 0.00' ERROR
					Ck'd 10/23/92
					Rick Trippel

Person:
Instrument ~~Man~~: C. COTTON
Rod Man: D. JOHNSON
Method:

WW Engineering & Science, Inc.
Environmental Services Division

Project Name and Number: ARCS-ALBION 04011.02 Date: 10/21/92 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.54 ✓	BM#N	N 7079.36 E 4983.94
6.22	983.76				
		6.14	977.62 ✓	MW#2SB	TOC
5.87	983.49				
		5.96	977.5~~4~~3	BM#N	0.01' ~~0.00~~ error ✓ RWT
			981.11 ✓	BM#W	N 5542.16 E 4351.59
0.69'	981.80				
		3.775	978.025 ✓	MW#4SB	TOC
3.685	981.71				
		1.50	980.21	TP	
1.89	982.10				
		3.955	978.145 ✓	MW#3SB	TOC
3.12	981.265				
		1.53	979.735	TP	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument ~~Man~~ Person: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS-ALBION 04011.02 Date: 10/21/92 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			979.735 ✓	TP	
2.045	981.78				
		3.75	978.03 ✓	MW #4SB	TOC
4.69	982.72				
		1.605	981.115 ✓	BM #W	+0.005 error ✓
					checked 10/21/92
					Rick Trippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M. CHRISTENSEN
Rod Man: D. JOHNSON
Method: 30° WINDY - SNOW

Project Name and Number: ARCS-ALBION 04011.02 Date: 11-13-92 Page: 1/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
6.60	979.90		973.30 ✓	BM-E	
		5.62	974.28 ✓	SM-1	
11.19 ~~9.76~~	985.47 ~~984.04~~		974.28	TP. (SM 1)	
3.09		3.09	982.38 ✓	SM 2	
4.26		4.26	981.21 ✓	SM-3	
9.06	990.27		981.21	TP (SM 3)	
		4.74	985.53 ✓	SM 4	
4.20	989.73		985.53	TP (SM 4)	
		6.80	982.93 ✓	SM 5	
		3.78	985.95 ✓	LF-1	
1.49	987.44	~~10.66~~	985.95	TP (LF1)	
		10.66	976.~~88~~ 78 ✓	SM 6	
5.12	981.90 ~~982.01~~		976.~~88~~ 78	TP. (SM 6)	
	981.90 ~~982.01~~	5.65	976.~~36~~ 25	TP. STAKE	
			976.~~36~~ 25	T.P. STAKE	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS/ALBION 04011.02 Date: 11-13-92 Page: 2/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
4.65	980.90 ~~981.01~~		976.25 ~~976.34~~	T.P. STAKE	
		3.33	977.57 ~~977.60~~ ✓	BM. N 977.54	ERROR .03 ✓
					checked 12/14/92 Rick Tripp

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Don Johnson
Rod ~~Man~~ Person: C. Cotton
Method:

Project Name and Number: ARCS-Albion #04011.02 Date: Nov. 20, 1992 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				981.11	BM-W
1.87	982.98				Shot BM-W for Instrument Height.
		4.96	978.02		mw#4 SB (T.O.C.)
1.88	979.90				Turn (mw 4 SB)
		2.17	977.73		mw # 4 WB (T.O.C.)
2.99	980.72				Turn (mw 4 WB)
		2.92	977.80		mw# 4 DB (T.O.C.)
0.72	978.52				Turn (mw 4 DB)
		7.13	971.39		T.P.-1 (Rock)
3.24	974.63				Turn (T.P.-1)
		4.90	969.73		mw# 6 SG (T.O.C.)
3.53	973.26				Turn (mw 6 SG)
		3.49	969.77		mw # 6 SB (T.O.C.)
3.15	972.92				Turn (mw# 6 SB)
		3.11	969.81		mw# 6 WB (T.O.C.)

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Don Johnson
Rod ~~Man:~~ Person: C. Cotton
Method:

Project Name and Number: ARCS-Albion #04011.02 Date: Nov. 20, 1992 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				969.81 ✓	MW# 6 WB (T.O.C) (Continued from pg 1)
4.69	974.50				TURN (MW#6WB)
		3.10	971.40 ✓		T.P.-2 (Rock)
12.28	983.68				TURN (T.P.-2)
		2.57	981.11	981.11 ✓	BM-W (close)
					+0.00' ERROR + ✓
					checked 12/9/92
					Rick Trippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument ~~Man:~~ Person: C. Cotton
Rod Man: Don Johnson
Method:

Project Name and Number: ARCS-Albion #04011.02 Date: Dec. 1, 1992 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				977.73✓	mw # 4 WB (T.O.C.)
3.41	981.14				Shot mw# 4WB for Instrument Height
		3.11	978.03✓		mw # 4 SG (T.O.C.)
3.13	981.16				Turn (mw# 4 SG)
		3.43	977.73✓		mw# 4 WB (T.O.C.) / Close
					(0.00' ERROR) ✓
					checked 12/14/92
					Rick Tippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Don Johnson
Rod Man: Rick Trippel
Method:

Project Name and Number: ARCS-Albion # 04011.02 Date: Dec. 1, 1992 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				978.145	mw # 3 SB (T.O.C.)
2.825	980.97				mw#3 SB for Instrument Height.
		2.095	978.875		mw # 3 SG (T.O.C.)
1.605	980.48				Turn (mw# 3 SB)
		1.83	978.65		m.w.# 3-WB (T.O.C.)
2.48	981.13				Turn (mw# 3WB)
		2.985	978.145		mw# 3 SB (close)
					— 0.00' ERROR —
					checked 12/1/92
					Rick Trippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Don Johnson
Method:

Project Name and Number: ARCS-Albion/Sheridan Twp. L.F. 04011.02 Date: 12/1/92 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			970.005 ✓	MW#5SB	TOC Survey Ref.: BM-N = 977.54 ✓
3.12	973.125				
		2.435	970.69 ✓	MW#5SG	TOC
2.365	973.055 ✓				
		3.05	970.005 ✓	MW#5SB	TOC 0.00 error ✓
			977.62 ✓	MW#2SB ✓	TOC Survey Ref.: BM-N = 977.54 ✓
2.38	980.00				
		2.675	977.325 ✓	MW#2WB	TOC
2.94	980.265				
		2.335	977.93 ✓	MW#2SG	TOC
2.15	980.08				
		2.46	977.62 ✓	MW#2SB	TOC 0.00 error ✓
			982.20 ✓	MW#1SB	TOC Survey Ref.: BM-N = 977.54 ✓
2.68	984.88				
		2.68	982.20 ✓	MW#1WB	TOC

Continued pg. 2 of 2

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Don Johnson
Method:

Project Name and Number: ARCS-Albion/Sheridan Twp. L.F. 04011.02 Date: 12/1/92 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			982.20 ✓	MW# 1WB	TOC
2.875	985.075				
		2.875	982.20 ✓	MW# 1SB	TOC 0.00 error ✓
					checked 12/28/92 Rick Tripped

Instrument ~~Man~~ Person: C. Cotton

Rod Man: Don Johnson

Method:

WW Engineering & Science, Inc.
Environmental Services Division

Project Name and Number: ARCS-Albion #04011.02 Date: Dec. 1, 1992 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				969.77 ✓	mw# 6 SB (T.O.C.)
0.14	969.91				Shot mw#6SB (T.O.C.) for instrument Height
		13.61	956.30		T.P.-1 (Rock)
4.79	961.09				Turn (T.P.-1)
		1.62	959.47 ✓		mw # 9 SG (T.O.C.)
4.15	963.62				Turn (mw# 9 SG)
		3.56	960.06 ✓		mw# 9 SB (T.O.C.)
3.83	963.89				Turn (mw#9SB)
		4.41	959.48 ✓		mw# 9 WB (T.O.C.)
12.61	972.09				Turn (mw# 9WB)
		1.12	970.97		T.P.-2 (Rock)
8.43	979.40				Turn (T.P.-2)
		1.05	978.35		T.P.-3 (Cement Pad @ mw# 8 SG)
3.26	981.61				Turn (T.P.-3)
		1.03	980.58 ✓		mw# 8 SG (T.O.C.)

WW Engineering & Science, Inc.
Environmental Services Division

Instrument ~~Man:~~ Person: C. Cotton
Rod Man: Don Johnson
Method:

Project Name and Number: ARCS-Albion #04011.02 Date: Dec. 1, 1992 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
		1.03	980.58 ✓		*Continued from pg. 1* (mw# 8 SG) (T.O.C.)
1.28	981.86				Turn (mw# 8 SG)
		0.93	980.98 ~~8~~ 3 RW		mw# 8 WB (T.O.C.)
2.15	983.08				Turn (mw# 8WB)
		1.25	981.83 ✓		mw# 8 SB (T.O.C.)
1.02	982.85				Turn (mw# 8SB)
		9.19	973.66		T.P.-4 (Rock)
1.28	974.94				Turn (T.P-4)
		8.90	966.04		T.P-5 (Rock)
5.15	971.19				Turn (T.P.-5)
		1.41	969.78 ✓	969.77	mw# 6 SB (T.O.C.) / CLOSE
					(+0.01' Error) ✓
					checked 12/14/92
					Rick Trippel

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Mark Nederveld (WW-Livonia)
Method:

Project Name and Number: ARCS-Albion 04011.02 Date: 12/18/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS			
			973.30 ✓	BM-E	(Original Surveyors)	difference	(W&W Survey Date: 11/13/92)	difference
7.665	980.965	6.69	974.275 ✓	SM-1	(974.31)	-.035 ✓	(974.28)	-.005 ✓
9.52	983.795	0.275	983.52 ✓	LF-3	TOC			
2.865	986.385	4.055	982.33 ✓	SM-2	(982.31)	+.02 ✓	(982.38)	-.05 ✓
5.12	987.45	6.29	981.16 ✓	SM-3	(981.19)	-.03 ✓	(981.21)	-.05 ✓
3.40	984.56	7.79	976.77 ✓	LF-2	TOC			
5.89	982.66	0.53	982.13 ✓	TP				
6.46	988.59	3.09	985.50 ✓	SM-4	(985.53)	-.03 ✓	(985.53)	-.03 ✓
4.145	989.645	6.725	982.92 ✓	SM-5	(982.93)	-.01 ✓	(982.93)	-.01 ✓
2.88	985.80	9.02	976.78 ✓	SM-6	(976.74)	+.04 ✓	(976.78)	0.00 ✓
4.76	981.54	6.20	975.34	TP				
6.85	982.19	6.075	976.115	TP				
4.81	980.925	3.345	977.58 ✓	BM-N	977.54 (+.04 error)	✓	977.57	(+.01) ✓
					Checked 1/6/92 Rick Tripp			

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Mark Nederveld (WW-Livonia)
Method:

Project Name and Number: ARCS - Albion 04011.02 Date: 12/18/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			959.60 ✓	R.R. Spike in P. Pole @ SW cor	(pole ID # CPC071) of support area; N. side of E. Erie St.
5.385	964.985				
		1.08	963.905 ✓	MW#7SG	TOC
1.33	965.235				
		1.60	963.635 ✓	MW#7WB	TOC
1.445	965.08				
		2.20	962.88 ✓	MW#7SB	TOC
2.155	965.035				
		5.435	959.60 ✓	See above	0.00' error ✓
					checked 1/6/92
					Richard J. Tripp

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Mark Nederveld (WW-Livonia)
Method:

Project Name and Number: ARCS-Albion 04011.02 Date: 12/18/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS			
			973.30 ✓	BM-E	(Original Surveyors)	difference	(W&W Survey Date: 11/13/92)	difference
7.665	980.965	6.69	974.275 ✓	SM-1	(974.31)	-.035 ✓	(974.28)	-.005 ✓
9.52	983.795	0.275	983.52 ✓	LF-3	TOC			
2.865	986.385	4.055	982.33 ✓	SM-2	(982.31)	+.02 ✓	(982.38)	-.05 ✓
5.12	987.45	6.29	981.16 ✓	SM-3	(981.19)	-.03 ✓	(981.21)	-.05 ✓
3.40	984.56	7.79	976.77 ✓	LF-2	TOC			
5.89	982.66	0.53	982.13 ✓	TP				
6.46	988.59	3.09	985.50 ✓	SM-4	(985.53)	-.03 ✓	(985.53)	-.03 ✓
4.145	989.645	6.725	982.92 ✓	SM-5	(982.93)	-.01 ✓	(982.93)	-.01 ✓
2.88	985.80	9.02	976.78 ✓	SM-6	(976.74)	+.04 ✓	(976.78)	0.00 ✓
4.76	981.54	6.20	975.34	TP				
6.85	982.19	6.075	976.115	TP				
4.81	980.925	3.345	977.58 ✓	BM-N	977.54 (+.04 error) ✓		977.57	(+.01) ✓
					Checked 1/6/92 Rick Tripp			

BM N
977.54

WILLIAMS & WORKS
ENGINEERS / SURVEYORS / PLANNERS / GEOLOGISTS
Subsidence Monuments

PAGE

DATE 3-19-93

PROJECT ALBION LANDFILL

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	Rt.
7.50	980.8		973.30	B.M. E		
		6.54	974.26	SM1		
10.61 ~~10.08~~	984.87 ~~984.34~~	2.60	982.17	SM 2		
		3.74	981.13	SM 3		
9.05	990.18		981.13	TP SM3		
		4.74	985.44	SM 4		
5.50	990.94			TP SM4		
		8.10	982.84	SM 5		
4.62	987.46			TP SM5		
		10.74	976.72	SM 6		
3.97	980.69			TP SM6		
		4.68	976.01	TP GRD.		
5.11	981.12		~~981.12~~			
		3.59	977.53	BM N		

3.58

WW s1

CHRISTENSEN
PUSHAW

PROJECT _____ DATE _____ PAGE _____

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	Rt.

WW s1

WILLIAMS & WORKS

ENGINEERS / SURVEYORS / PLANNERS / GEOLOGISTS

CHRISTENSEN
OSTERMAN

PROJECT ALBION LANDFILL 04011.02 DATE 4-29-93 PAGE 1/1

														3.06		
														981.21		
												1.56	2.33			
												978.65	978.88	978.15		
												MW03 WB KNOWN	MW SG03	MW SB03 KNOWN		
														CHECK ELEVATION OF MW 03 SG		

WW s1

PROJECT _____ DATE _____ PAGE _____

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	Rt.

WW s1

PAGE

PROJECT

DATE

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	
	959.36	3.60			TP RR SPIKE	
3.91			955.76			
	959.67	14.07	945.60	BM-S	.01 ERROR	

MW 10

43+90 E
48+98 N

MW 13
4110 E
4700 N

MW 11
3880 E
4935 N

MW 12
3580 E
4880 N

WILLIAMS & WORKS
ENGINEERS / SURVEYORS / PLANNERS / GEOLOGISTS

PROJECT _____ DATE 2/3/93 PAGE _____

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	Rt.
14.18			945.59	BM-S		
	959.77	4.02			TP RR SPIKE	
5.05			955.75			
	960.80	10.77				
		10.75	950.03		MW 10	
	960.78	5.17			TP MW 10	
3.37			955.61		TP RR SPIKE	
	958.98	3.88				
3.85			955.10		TP. RR SPIKE	
	958.95	8.23				
8.13	~~958.85~~		950.72		MW 12	
	958.85	3.77			TP MW 12	
3.66			955.08		TP RR SPIKE	
	958.74	3.14				
3.74			955.69		TP RR SPIKE	

MW 1

(MW 10 949.97)

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: MARK CHRISTENSEN

Rod Man: ERIC MEYERS

Method:

9

949.13
6.39
955.52

Project Name and Number: ALBION LANDFILL 04011.02 Date: 1-29-93 Page: 1/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
13.96	959.55		945.59	Bm S	
		3.67	955.88		T.P. RR TIE
3.06	958.94				~~MW 10~~
	3.40 955.54	8.96	949.98		MW 10
		3.40	955.54 3.23		TP. RR TIE
3.23	958.77				
		9.65	949.12		MW 11
9.81	958.93				TP MW 11
		4.10	954.83		TP RR TIE
3.80	958.63				~~MW 12~~
		8.06	950.57		MW 12
8.02	958.59				TP MW12
		3.53	955.06		TP RR TIE
3.80	958.86				
		9.73	949.13	✓	MW 11

12-1

7-9

WILLIAMS & WORKS
ENGINEERS / SURVEYORS / PLANNERS / GEOLOGISTS

PROJECT HLBION 04011.20 DATE 1-29-93 PAGE 2/2

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	Rt.
6.39	955.52				TP MW11	
		6.03	949.49		MW 13	
	~~955.88~~	6.39	949.13		MW 11	
		.28	955.24		TP RR TIE	
	959.01	3.13	955.88		TP RRTIE	
4.11	959.99					
		14.39	945.60		BM S	

WW s1

PAGE _____

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	Rt.

WW s 1

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: ERIC MEYERS
Method:

Project Name and Number: ALBION LANDFILL 04011.02 Date: 1-27-93 Page: 1 OF 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
13.90	959.49		~~959.49~~	945.59	BM S
		3.52	955.97		TP RR TIE
3.22	959.19				
		9.22	949.97		MW 10
9.40	959.37				TP MW10
		3.40	955.97		TP RP TIE
3.39	959.36				
		13.76	945.60		B.M. S

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: MVC
Rod Man: EM
Method:

Project Name and Number: Date: 1-28-93 Page: 2/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				969.81 (18, 99)	MW6 WB
.18	969.99				
		13.44	956.55		TP
4.52	961.07				
		.98	960.09	✓	SB 9
		1.57	959.50	✓	WB 9
		1.57	959.50	✓	SG 9
				959.48	9 WB
13.11	972.59				TP
		1.43	971.16		
10.10	981.26	—	—		8 SB
		.34	980.92	✓	8 WB
		.69	980.57	✓	8 SG
2.11	983.03			980.92 (21, 11, 3)	TP 8WB
		1.20	981.83	✓	8 SB

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: CHRISTENSEN
Rod Man: E MEYERS
Method:

Project Name and Number: ALBION LANDFILL 04011.20 Date: 1-28-93 Page: 1/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				981.11	BM W
2.08	983.19				
		5.16	978.03		4SB
		5.39	977.80		4DB
		5.16	978.03		4SG
		5.46	977.73		4WB
5.23	982.96				TP 4WB
		1.84		981.12	✓
				981.11	BM W
1.91	983.02				
		11.83	971.19		TP
2.14	973.33				
		3.57	969.76		MW 6 SG
		3.54	969.79		6SB

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: MARK CHRISTENSEN
Rod Man: ERIC MEYERS
Method:

Project Name and Number: ALBION LANDFILL 04011.20 Date: 1-28-93 Page:

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
				973.30	BM E
7.48	980.78				
		6.52	974.26		SM #1
10.35	984.61				
		3.47	981.14		SM #3
		1.10	983.51		TP-LF #3
4.40	987.91				
		5.60	982.31		SM 2
		6.83	981.08	✓	BM W 981.11 ✓ ERROR .03
6.83	987.94			981.11	BM W
		2.32	985.62		TP
5.15	990.77				
		5.29	985.48		SM #4
3.87	~~989.05~~ 989.35				TP SM 4
		6.46	~~982.39~~ 982.89		SM #5

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: MVC
Rod Man: EM
Method:

Project Name and Number: ALBION LANDFILL 04011.20 Date: 1-28-93 Page: 2/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
3.67	986.~~26~~ 56		982.89 ~~982.59~~		SM #5 TP
		9.80	976.~~46~~ 76		SM #6
5.13	981.~~59~~ 89				TP SM #6
		7.07	974.~~52~~ 82		TP
6.64	981.~~46~~ 46				
		3.89	977.~~[illegible]~~		BMN 977.54
			977.57		ERROR .03

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: B PUSHAW
Method:

Project Name and Number: ALBION LANDFILL SUBSIDENCE Date: 1-25-94 Page: 1/1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
7.34	980.64		973.30	B.M. EAST	
		6.43	974.21	SM #1	
11.02	985.23	2.97	974.21	TP SM#1	
			982.26	SM #2	
5.68	987.94	6.85		TP SM#2	
			981.09	SM #3	
10.56	991.65	6.27		TP SM 3	
			985.38	SM4	
4.85	990.23			TP SM 4	
		7.44	982.79	SM5	
4.35	987.14			TP SM5	
		10.41	976.73	SM6	
5.41	982.14			TP SM6	
		8.94	973.20	TP METAL BOX	
7.76	980.96	3.43	977.53	B.M. N.	977.54 .01 ✓

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: C PTAK
Method:

B.M.
E. 973.30
S. 945.59
W. 981.11
N. 977.54

Project Name and Number: ALBION ARCS **Date:** 11-29-93 **Page:** 1/3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
6.93	980.23		973.30	B.M. (E)	
		6.00	674.23	SM1	
9.93	684.16		674.23	TP (SM1)	
		3.04	681.12	SM2	
6.63	687.75		681.12	TP (SM3)	
		-5.47	982.28	SM 2	
9.56	991.84		982.28	TP SM 2	
		5.46	986.38	TP RR SPIKE	
3.75	990.13		986.38	TP RR SPIKE	
		4.73	985.40	SM 4	
5.87	991.27		985.40	TP (SM4)	
		9.82	981.45	TP RR SPIKE	
5.59	987.04		981.45	T.P.	
		~~4.03~~ ~~4.05~~	982.81 ~~H~~	SM 5	
		7.75	979.29	TP - RR SPIKE	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: CHRISTENSEN
Rod Man: C PTAK
Method:

Project Name and Number: ALBION ARCS 04011.02 Date: 11-29-93 Page: ~~1~~ 2/3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
3.05	982.34		979.29	TP RR spike	
		6.00	976.34	sm 6	
4.79	981.13		976.34	TP sm 6	
		4.15	976.98	TP. Rock	
3.45	980.43		976.98	TP Rock	
		3.28	977.15	B.M. N	
3.28	980.82		977.54	BM. N	
		3.45	977.37	T.P Rock	
3.60	980.97	-4.23	976.74	sm 6	
8.90	985.64	-2.82	982.82	sm 5	
7.19	990.01		982.82	TP(sm 5)	
		-4.60	985.41	sm 4	
6.35	991.76		985.41	TP sm 4	
		10.65	981.11	sm 3	
6.31	987.42		981.11	TP sm 3	

77.54

28
15
13

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: C PTAK
Method:

Project Name and Number: Date: 11-29-93 Page: 3/3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
	987.42	5.15	982.27	SM 2	
		3.95	983.47	MW LF3	
.21	983.68		983.47	TP LF3	
		9.46	974.22	SM 1	
6.17	980.39		974.22	TP SM 1	
		7.09	973.30	B.M. E	ACTUAL 973.30 ✓

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: D. Johnson
Rod Man: C. Cotton
Method: ARCS - Albion Bench loop

Project Name and Number: ARCS - Albion Proj. # 04011.02 Date: 8/9/93 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.54	BM-N	
3.66	981.20				
		3.46	977.74	TP-1	
3.48	981.22				
		4.49	976.73	SM-6	
8.93	985.66				
		2.84	982.82	SM-5	
7.65	990.47				
		5.06	985.41	SM-4	
5.11	990.52				
		9.40	981.12	SM-3	
9.66	990.78				
		8.51	982.27	SM-2	
3.81	986.08				
		11.85	974.23	SM-1	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: D. Johnson
Rod Man: C. Cotton
Method: ARCS - Albion Bench loop

Project Name and Number: ARCS - Albion Proj. #04011.02 Date: 8/9/93 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			974.23	SM-1	
6.69	980.92				
		7.63	973.29	BM-E	-0.01 error

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: C. COTTON
Rod Man: K. OSTERMAN
Method: BENCH LOOP

Project Name and Number: Albion L.F. 04011.02 Date: 7/1/93 Page: 2 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			985.425'	SM-4	Previous Elev. 985.44
4.27'	989.695'				
		6.83'	982.865'	SM-5	982.85'
2.815'	985.68'				
		8.96'	976.72'	SM-6	976.72'
4.505'	981.225'				
		3.96'	977.535'	TP	
2.84'	980.375'				
		2.82'	977.555'	BM-N	977.54' (+.015' error)

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: C. COTTON
Rod Man: K. OSTERMAN
Method: BENCH LOOP

Project Name and Number: Albion L.F. 04011.02 Date: 7/1/93 Page: 1 of 2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			973.30	BM-E	
6.71	980.01				Previous Elev.:
		5.75	974.26	SM-1	974.26'
10.29	984.55				
		1.91	982.64	TP	
2.86	985.50				
		3.19	982.31	SM-2	982.31'
5.285	987.595				
		7.45	980.145	TP	
6.175	986.32				
		5.175	981.145	SM-3	981.14'
4.40	985.545				
		8.225	977.32	TP	
11.98	989.30				
		3.875	985.425	SM-4	985.44'

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M. CHRISTENSEN
Rod Man: D. JOHNSON
Method: 30° WINDY - SNOW

Project Name and Number: ARCS-ALBION 04011.02 Date: 11-13-92 Page: 1/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
6.60	979.90		973.30 ✓	BM-E	
		5.62	974.28 ✓	SM-1	
11.19 ~~9.76~~	985.47 ~~984.04~~		974.28	TP (SM1)	
~~3.09~~		3.09	982.38 ✓	SM 2	
~~4.26~~		4.26	981.21 ✓	SM-3	
9.06	990.27		981.21	TP (SM3)	
		4.74	985.53 ✓	SM 4	
4.20	989.73		985.53	TP (SM4)	
		6.80	982.93 ✓	SM 5	
		3.78	985.95 ✓	LF-1	
1.49	987.44	~~10.66~~	985.95	TP (LF1)	
		10.66	976.~~88~~ 78 ✓	SM6	
5.12	981.90 ~~982.01~~		976.~~88~~ 78	TP (SM6)	
	981.90 ~~982.01~~	5.65	976.~~36~~ 25	TP. STAKE	
			976.~~36~~ 25	T.P. STAKE	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS/ALBION 04011.02 Date: 11-13-92 Page: 2/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
4.65	980.90 ~~981.01~~		976.25 ~~976.36~~	T.P. STAKE	
		3.33	977.58 ~~977.68~~ ✓	B.M. N 977.54	ERROR .03 ✓
					checked 12/14/92 Rick Tripped

WILLIAMS & WORKS
ENGINEERS / SURVEYORS / PLANNERS / GEOLOGISTS

B.M. N 977.54
B.M. E. 973.30

PROJECT ALBION LANDFILL 04011.02 DATE 4-30-93 PAGE

Subsidence Survey

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	Rt.
6.89			973.30	B.M. EAST		
	980.19	5.93	974.26	SM-1		
10.54	~~98~~		974.26	TP SM1		
	984.80	3.66	981.14	SM3		
6.79			981.14	TP SM3		
	987.93	5.62	982.31	SM 2		
9.10	991.41		982.31	TP SM2		
		5.78	985.63	TP Rock		
4.84	990.47 ~~980.79~~	5.03	985.44 ~~975.76~~	SM 4		
4.19	989.63 ~~979.95~~			TP SM4		
		6.78	982.85 ~~973.17~~	SM 5		
3.37	986.22 ~~976.54~~			T.P. SM5		
		9.50	976.72 ~~967.04~~	SM 6		
4.47	981.19 ~~971.51~~			TP SM6		
		3.68	977.51 ~~967.83~~	TP Rock 2		

WW s1

PAGE ____

DATE ____

PROJECT ____

+S	H.I.	−S	ELEV.	B.M. or STA.	Lt.	Rt.

WW sl

WILLIAMS & WORKS

ENGINEERS / SURVEYORS / PLANNERS / GEOLOGISTS

PROJECT ALBION LANDFILL DATE 4-30-93 PAGE 2/2

+S	H.I.	-S	ELEV.	B.M. or STA.	Lt.	Rt.
3.06	980.57 ~~970.89~~		977.51 ~~967.83~~	T.P Rock 2		
		3.05	977.52	Bm N	977.54 .02	

WW s1

PAGE ______

DATE ______

PROJECT ______

+S	HI.	−S	ELEV.	B.M. or STA.	Lt.	Rt.

WW s1

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Mark Nederveld (WW-Livonia)
Method:

Project Name and Number: ARCS - Albion 04011.02 Date: 12/18/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			959.60 ✓	R.R. Spike in P.Pole @ SW cor	(pole ID # CPC071) of support area; N. side of E. Erie St.
5.385	964.985				
		1.08	963.905 ✓	MW#7SG	TOC
1.33	965.235				
		1.60	963.635 ✓	MW#7WB	TOC
1.445	965.08				
		2.20	962.88 ✓	MW#7SB	TOC
2.155	965.035				
		5.435	959.60 ✓	See above	0.00' error ✓
					checked 1/6/92
					Richard J. Tripp

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Cathie Cotton
Rod Man: Mark Nederveld (WW-Livonia)
Method:

Project Name and Number: ARCS-Albion 04011.02 Date: 12/18/92 Page: 1 of 1

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS			
			973.30 ✓	BM-E	(Original Surveyors)	difference	(W&W Survey Date: 11/13/92)	difference
7.665	980.965	6.69	974.275 ✓	SM-1	(974.31)	-.035 ✓	(974.28)	-.005 ✓
9.52	983.795	0.275	983.52 ✓	LF-3	TOC			
2.865	986.385	4.055	982.33 ✓	SM-2	(982.31)	+.02 ✓	(982.38)	-.05 ✓
5.12	987.45	6.29	981.16 ✓	SM-3	(981.19)	-.03 ✓	(981.21)	-.05 ✓
3.40	984.56	7.79	976.77 ✓	LF-2	TOC			
5.89	982.66	0.53	982.13 ✓	TP				
6.46	988.59	3.09	985.50 ✓	SM-4	(985.53)	-.03 ✓	(985.53)	-.03 ✓
4.145	989.645	6.725	982.92 ✓	SM-5	(982.93)	-.01 ✓	(982.93)	-.01 ✓
2.88	985.80	9.02	976.78 ✓	SM-6	(976.74)	+.04 ✓	(976.78)	0.00 ✓
4.76	981.54	6.20	975.34	TP				
6.85	982.19	6.075	976.115	TP				
4.81	980.925	3.345	977.58 ✓	BM-N	977.54 (+.04 error) ✓		977.57	(+.01) ✓
					Checked 1/5/92 Rick Tripp			

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M. CHRISTENSEN
Rod Man: D. JOHNSON
Method: 30° WINDY - SNOW

Project Name and Number: HRCS-ALBION 04011.02 Date: 11-13-92 Page: 1/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
6.60	979.90		973.30 ✓	BM-E	
		5.62	974.28 ✓	SM-1	
11.19 ~~9.76~~	985.47 ~~984.04~~		974.28	TP. (SM1)	
3.09		3.09	982.38 ✓	SM 2	
~~4.26~~		4.26	981.21 ✓	SM-3	
9.06	990.27		981.21	TP (SM3)	
		4.74	985.53 ✓	SM 4	
4.20	989.73		985.53	TP (SM4)	
		6.80	982.93 ✓	SM 5	
		3.78	985.95 ✓	LF-1	
1.49	987.44	~~10.66~~	985.95	TP (LF1)	
		10.66	976.~~88~~ 78 ✓	SM6	
5.12	981.90 ~~982.01~~		976.~~80~~ 78	TP. (SM6)	
	981.90 ~~982.01~~	5.65	976.~~30~~ 25	TP. STAKE	
			976.~~30~~ 25	T.P. STAKE	

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: M CHRISTENSEN
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS/ALBION 04011.02 Date: 11-13-92 Page: 2/2

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
4.65	980.90 ~~981.01~~		976.25 ~~976.34~~	T.P. STAKE	
		3.33	977.57 ~~977.68~~ ✓	BM. N 977.54	ERROR .03 ✓
					Checked 12/14/92 Rick Thrapp

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1980

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MW-S

1 LOCATION OF WELL

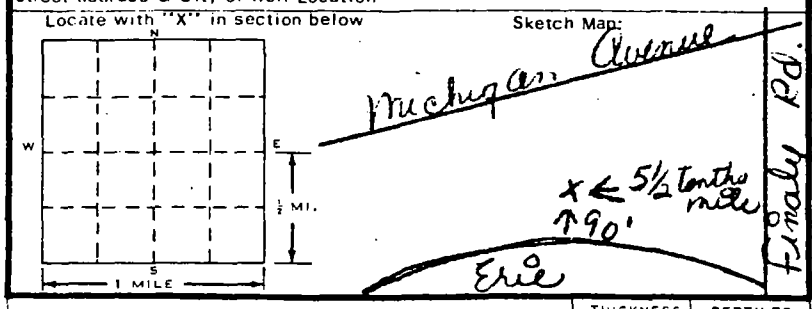
County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	¼ ¼ ¼	36	T2S N/S.	R4W E/W.

Distance And Direction from Road Intersections
90' North of Erie
5 1/2 Tenths West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL: Gordon Stevick
Address Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 27 ft. Date of Completion 3-28-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐ Height: Above ~~Below~~ Surface 17" ft.
Diam. Galv.
2 in. to 21 ft. Depth Weight 3.75 lbs./ft.
____ in. to ____ ft. Depth Drive Shoe? Yes ☐ No ☒

8 SCREEN:
Type: stainless steel Dia.: 2"
Slot Size ~~XXX~~ #10 Length 4' 8"
Set between 19 ft. and 23 ft.
Fittings: 2" coupling and 2" cap

9 STATIC WATER LEVEL
12 ft. below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

2 FORMATION

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel	22	22
Gray clay	4	26
Sandstone	1	27
TOC 961.17		
CLOSE TO		
N5104.09		
E 4641.99		
ADDED INFO BY DRILLER, ITEM #11		
*CORRECTED BY		
**ADDITION BY		
ELEVATION		
DEPTH TO ROCK		

USE 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Development time 1 1/2 hours
Sheridon-Albion Landfill monitoring wells

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address 1154 S. Jefferson, Mason, Michigan 48854
Signed S. W. Hart — AUTHORIZED REPRESENTATIVE
Date 4-11-80

D67d 100M (Rev. 12-68) APR 17 1980

36-4

Jackson County Health Department

GEOLOGICAL SURVEY COPY

2-VVM

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1980

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

MW-E

1 LOCATION OF WELL

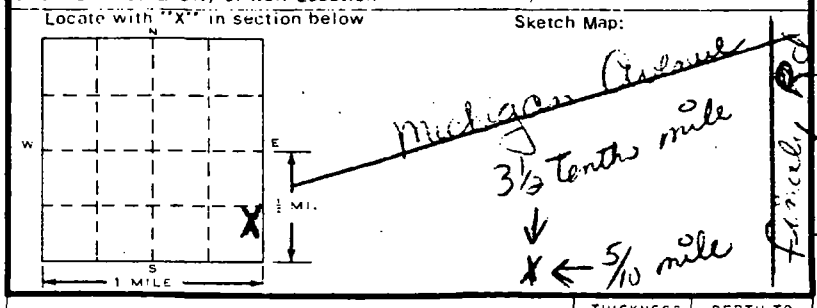
County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	¼ ¼ ¼	36	T2S N/S.	R4W E/W.

Distance And Direction from Road Intersections
3 1/2 Tenths mile South of Michigan Avenue
5/10 mile West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL: Gordon Stevick
Address Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 30 ft. Date of Completion 3-28-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Height: Above Surface 14" ft.
Diam. 2 in. to Galv 23'3" ft. Depth
____ in. to ____ ft. Depth
Weight 3.75 lbs./ft.
Drive Shoe? Yes ☐ No ☒

8 SCREEN:
Type: stainless steel Dia.: 2"
Slot Size #10 Length 4' 8"
Set between 22 ft. and 26 ft.
Fittings: 2" coupling and 2" cap

9 STATIC WATER LEVEL 22' 6" ft. below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

2 FORMATION

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel	26	26
Gray clay	3	29
Sandstone	1	30

N 5605.82 E 4988.82
TOC 972.53

*ADDED INFO BY DRILLER, ITEM MIL
*CORRECTED BY
**ADDITION BY
ELEVATION
DEPTH TO ROCK

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Sheridan-Albion Landfill monitoring wells
Development time 1 1/2 hours

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address 1154 S. Jefferson, Mason, Michigan 48854
Signed S. W. Hart — AUTHORIZED REPRESENTATIVE
Date 4-11-80

D67d 100M (Rev. 12-68)

36-5

Calhoun County Health Dept.

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1980

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH MW-W

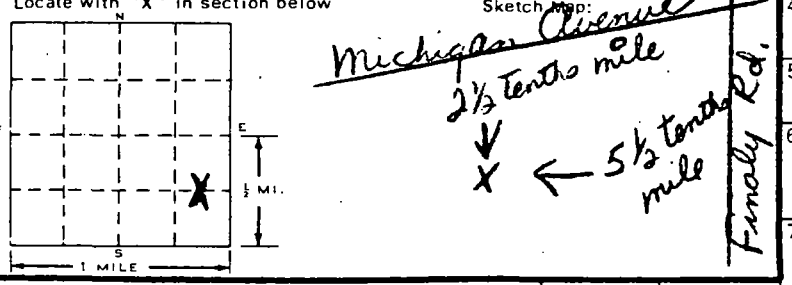
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	¼ ¼ ¼	36	T2S N/S.	R4W E/W.

Distance And Direction from Road Intersections
2 1/2 Tenths mile South of MIchigan Avenue
5 1/2 Tenths mile West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below — Sketch Map:



3 OWNER OF WELL: Gordon Stevick
Address: Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 50 ft. Date of Completion 3-27-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐ Height: Above ~~Below~~ Surface 28" ~~Ft.~~
Diam. Galv.
2 in. to 39 ft. Depth Weight 3.75 lbs./ft.
____ in. to ____ ft. Depth Drive Shoe? Yes ☐ No ☒

8 SCREEN:
Type: Stainless steel Dia.: 2"
Slot ~~Gauze~~ #7 Length 3' 6"
Set between 37 ft. and 40 ft.
Fittings: 2" coupling & 2" cap.

9 STATIC WATER LEVEL
26 ft. below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

2 FORMATION

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel with coal strips	36	36
Brown, white and green sandstone	14	50

N 6644.84 E 4535.02
TOC 977.48

[redacted] DRILLER, ITEM NO. [redacted] BY [redacted] ON [redacted]

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Development time 2 hours
Sheridan-Albion Landfill monitoring wells

RECEIVED APR 17 1980

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address: 1154 S. Jefferson, Mason, Michigan 48854
Signed: S. W. Hart — AUTHORIZED REPRESENTATIVE
Date: 4-9-80

D67d 100M (Rev. 12-68)

36-6

Calhoun County Health Department

GEOLOGICAL SURVEY COPY

DAYS INN

FAX TRANSMITTAL SHEET

DATE: 12/3/92 TIME: 1:00 PM

NUMBER OF PAGES: 3 (including this cover sheet)

ATTN: Rick Tripp FAX#: (616) 942-6499

AT: WWES
Glenwood Hills PKwy SE
Grand Rapids, MI

FROM: Cathie Cotton

IN CASE OF A PROBLEM, CALL Cathie Cotton AT (517) 629-9411
FAX # (517) 629-8960

COMMENTS:

WW Engineering & Science
Environmental Services Division

Page: 1 of 1
Well/Boring No. LF-2
Client: ARCS-Albion/Sheridan Twp L.1
Project No.: 04011.02
Date: Started: 12/2/92 Finished: 12/2/92
Time: Started: 9:45AM Finished: 1:30pm

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
MI	Calhoun	Sheridan	SE 1/4	36	T2S	R4W

Contractor: R&R International Inc. **Location:** N5950 + E 4760
Address: 1234 S. Cleveland-Massillon Rd. Akron, OH 44321
Equipment: CME 75 Truck rig
Crew Chief: Jim McCurdy
WW Supervisor: Cathie Cotton

Drilling Method(s)	Depth
4 1/4" HSA	20.0'
3" dia. split spoon	22.0'

Grouting/Seal Depth/To	Material/Method
22.0'-20.0'	Nat. soil collapse
20.0'-5.0'	6-20 sand/gravel
5.0'-1.0'	Holeplug (Bentonite)
1.0'-0.0'	Redimix concrete pad

Remarks: No sample recovery @ 4.0'-6.0' (headspace only)
6.0'-8.0'
8.0'-10.0' (organics & headspace only)
14.0'-16.0' (headspace only)
18.0'-20.0'

Water Level: 6.2 ft. Below Surface

Methane detector tube samples collected from auger @ 5.0' & 10.0'. Slight indication of methane - OVI reading was 2% LEL.

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description	Sample Depth	Blow Counts 6"	12"	18"	24"	PID Headspace	PID Background	
3.0'	3.0'		SAND, med. fine to med., little fine to coarse gravel, brown to gray, moist	0.0'-2.0'	9	10	10	11	47	0	9:5
				2.0'-4.0'	3	7	11	11	198	0	10:00
5.0'	8.0'		SAND, fine to very fine, little wood, nails, glass, metal, some lt. gray, moist	4.0'-6.0'	11	8	7	4	272	0	
				6.0'-8.0'	11	9	3	7	No Sample		
1.5'	9.5'		Wood, some cardboard, little soil	8.0'-10.0'	8	20	45	13	123	0	10:[illegible]
2.5'	12.0'		SAND, med. fine, little wood, cardboard, brown to gray-brown, moist	10.0'-12.0'	11	2	7	11	169	0	10:[illegible]
				12.0'-14.0'	5	4	3	12	66	0	10:[illegible]
1.0'	16.0'		FILL - [illegible] wood, cardboard, metal, some sand, [illegible]	14.0'-16.0'	14	22	12	8	44	0	
				16.0'-18.0'	2	3	3	12	25	0	11:[illegible]
0.1'	16.1'		FORMSTONE, some fine, black metallic [illegible]	18.0'-20.0'	20	Sample			No Sample		
5.9'	22.0'		SAND, fine to med., little fine to med. gravel, loose, brown, little moist	20.0'-22.0'	8	9	10	10	4	0	11:[illegible]
			EOB @ 22.0'								

WW Engineering & Science
Environmental Services Division

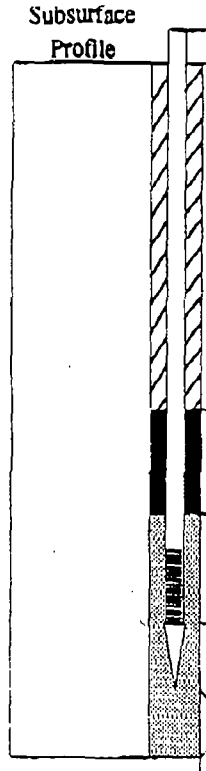
Project Name: ARCS - Albion/Sheridan Twp. L.F.

Project No: 04011.02

Log of Well Installation

Well Number: LF-2

Generalized Subsurface Profile



3.0' Length of Casing Above Ground Surface

Concrete Cap (Y/N)

N/A Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill)

1.0' Depth to Top of Bentonite Pellets/Slurry (Circle One)

5.0' Depth to Top of Filter Pack

Type 6x20 commercial Silica Sand

17.0' Depth to Bottom of Well Screen

Silica Sand Borehole Backfill Material

22.0' Total Depth of Borehole

Top of Casing Elevation (feet):

Ground Surface Elevation (feet):

Water Level Data

Date	Water Level Below TOC
12/3/92	Pre development 19.83

Development:

Survey Reference:

Well Casing
- Diameter: 2"
- Total Length: 10'
- Material: Schedule 40 PVC
- Cap Type: Threaded PVC cap

Well Screen
- Diameter: 2"
- Length: 10.0'
- Slot/Type: 10 slot
- Material: Schedule 40 PVC

Protective well casing
- Material: Anodized Aluminum Dia. 4" sq.
- Height Above Ground:
- Lock Type: 2402 master lock

General Notes:

WW Engineering & Science, Inc.
Environmental Services Division

Water Level and Field Record Form

Client: ARCS-Albion Sheridan L.F. Job Description: Water levels
Project No.: 04011.02
Date: 12/22/92

Well No.	(a) Elevation Top of Casing (T.O.C.)	(b) Point Held On Tape (ft.)	(c) Distance Wet On Tape	(d) Depth To Water Below T.O.C. (b-c)	(e) Elevation Of Water (a-d)	Time of Meas.	Remarks (weather, etc.)
1-SG	982.36'	Elec. W.L.	Indicator	32.56'	949.80'	PM	
1-WB	982.20'	Self-reading		32.97'	949.23'		
1-SB	982.20'			33.01'	949.19'		
2-SG	977.93'			27.90'	950.03'		
2-WB	977.325'			27.75'	949.575		
2-SB	977.62'			28.35'	949.27'		
3-SG	978.875'			31.65'	947.225'		
3-WB	978.65'			31.46'	947.19'		
3-SB	978.145'			31.07'	947.075'		
4-SG	978.03'			30.96'	947.07'		
4-WB	977.73'			30.59'	947.14'		
4-SB	978.025'			30.92'	947.105'		
4-DB	977.80'			30.69'	947.11'		
5-SG	970.69'			21.00'	949.69'		
5-SB	970.005'			22.53'	947.475		
6-SG	969.73'			21.33'	948.40'		
6-WB	969.81'			23.20'	946.61'		
6-SB	969.77'			22.83'	946.94'		
7-SG	963.905'			16.28'	947.625'		
7-WB	963.635'			16.70'	946.935'		
7-SB	962.88'			15.97'	946.91'		
8-SG	980.58'			23.98'	956.60'		
8-WB	980.93'			33.44'	947.49		
8-SB	981.83'			34.77'	947.06		
9-SG	959.47'			12.75'	946.72'		
9-WB	959.48'			12.72'	946.76'		
9-SB	960.06'			13.08'	946.98'		
LF-1	985.95'			36.85'	949.1'		
LF-2	976.77'			Dry	—		
LF-3	983.52'			Dry	—		

Rick - here's the information you were looking for.

Subsurface soil samples

Analyzed for organics and inorganics

MW1 (2-4')
MW1 (10-12')
MW1 (18-20')
MW1 (26-28')

MW2 (4-6')
MW2 (8-10') and a duplicate of this interval
MW2 (12-14')
MW2 (16-18')

LF1 (16-18')

LF2 (2-4')
LF2 (10-12')
LF2 (20-22')

LF3 (2-4')
LF3 (20-22')
LF3 (34-36')

Cation Exchange Capacity

MW2 (27-29') and duplicate from this interval
MW3 (38-40')
MW5 (25-27')
MW6 (27-29')
MW1 (32-34')
MW8 (28.5-30')

Calculation Sheet

Computed by RJT Subject Proposed LF Sheet 1 of 1
Checked by _____ Cap Sampling Locs. Job No. 04011.02
Client ARCS-ALBION Date 11/11/92

MEASURE THICKNESS & COLLECT PARTICLE SIZE SAMPLE (COMPOSITE) at:

N6500 E 4800 ✓

N 6400 E 4600 LF-1

N 6000 E 4500 ✓

N 5700 E 4400

N 5700 E 4700 ✓

N 5500 E 4500 ✓

N 6000 E 4800 ✓

N 5400 E 4800 ✓

Set well at MW-4 at ~~450~~ 95-100 ft. below ground level at MW-4SB.

FAX

WW Engineering & Science
A Summit Company

5010 Stone Mill Road
Bloomington, IN 47408
812/336-0972 Fax 812/336-3991

Date: 10-27-92

Leadsheet + 2 Page(s)

Name of Recipient(s): [redacted]

Company: W.W. Engineering Division: Grand Rapids

FAX Number: 616 942-6499 Phone Number: (616) 942-9600

Name of Sender: Britt Luther

Division:

Project No.: 57000.00

FAX Number 812/336-3991

Subject:

Comments:

Initials of FAX Operator: B.M Date: 10/27/92 Time: 4:08

Telephone Memorandum

Project No.: 57488 Client: Grand Rapids Date: 10/20/92

Subject: Soil Analysis - Quote

Your Name: BL Outside Party: Rick Trippe - Greenwood Office

Made Call ( ) (616) 942-9100 (Gr. Office)

Rec'd Call (x) (517) 629-3630 (Site)

Comments

Summary of Conversation:

Grain Size Analysis : Size Below
Turn Around : 2 Weeks *
Long Time : None
Sample Size : < No 4 Sieve 0.25# to 1.0#

Grain Size D422 48.00$/Sample
Constant Head Perm D2434 150.00$/Sample
Atterberg Limits D4318 37.00$/Sample

2B Total Samples

* Testing Period Bushes 2 Weeks / Actual Reporting May Take 2-3 days Later Depending On Work Load.

CC: Jim Barnes/Lab

WW Engineering & Science
Environmental Services Division

Page: 1 of
(~~Temp~~ AQ) Well/Boring No. MW # 3 SB-A
Client: Albion/Sheridan Twp. Landfill
Project No.: 04011.02
Date: Started: 10/7/92 Finished: 10/12/92
Time: Started: 4:00p Finished: 12:30p

Well/Boring Log Sheet

State	County	Township	Fraction	Section	T	R
Mi.	Calhoun	Sheridan	SE 1/4	36	T 2 S	R 4 W

Contractor: R&R International **Location:**
Address: 1234 S. Cleveland-Massillon Rd.
Akron, OH. 44321
Equipment: CME 750 (ATV)
Crew Chief: Ed Pucci
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
4 1/4" ID HSA	0.0'-55.5'
** 3 7/8" Tri-cone Roller Bit	0.0'-70.5'

pH/Temp	Cond./Temp.	Gals. Purge
7.01/12.4°C	1,216/12.3°C	15
7.06/12.1	1242/12.2°C	18.5
7.06/12.1	1249/12.2	20

Grouting/Seal
Depth/To Material/Method

Water Level: _____ ft. Below _____

Remarks: * Re-drilling of MW#3 SB / off Set 12.5' North
** Rock Cored 55.5' to 70.5' in 3-5' Runs.

46.2'

Thickness (feet)	Depth to base (feet)	USCS	Lithologic Description
3.8'	—		Sandstone; Soft, weathered, Poorly Cemented,
—	50'		Friable, Gray, Crumbles
5'	—		Sandstone: weathered, Poorly Cemented, Some
—	55'		hard Layers, Gray.
↓	55'	~~55'~~	Sandstone: Hard, Gray, Fairly well Cemented
0.5'	55.5'	~~55.5'~~	/-Auger Refusal
	↓		Rock Core:
	60.5'		1st 5' = 3.85' of Recovery (3'10")
	↓		Sandstone: Gray, Poorly Cemented to Fairly well Cemented
	65.5'		Fine to very fine Grain Several Horizontal
			Fractures (Low RQD)
			2nd 5' Run = 58" of Recovery (4'10")
	↓		Sandstone: Gray, Fairly well Cemented,
			Fine Grain to V. Fine Grained Sands, Less Fractures
			trace Veins of weathered
	70.5		3rd 5' Run = 58" Recovery (4'10")
			Sandstone: Gray, well Cemented, Fine to
			Very Fine Grains, trace fractures w/ Poorly
			Cemented Rocks. through (Higher RQD)

Blow Counts / Sample Depth	6"	12"	18"	24"	PID Headspace	PID Background
1st						
0-3						
0-3 1/2						
0-1/2						
0-1						
0-1						
0-1 1/2						
0-4						
0-1						
0-1/2						
0-2 1/4						
0-1/2						
0-4						
0-1/2						
0-1 1/2						
0-2						
0-1 3/4						
0-2 1/2						
0-1/2						
0-2 3/4						
0-2 3/4						
0-1						
0-4 1/2						

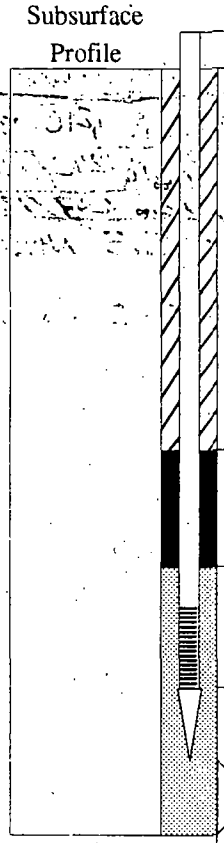
WW Engineering & Science
Environmental Services Division

Project Name: ARCS - Albion
Sheridan Twp. Landfill
Project No: 04011.02

Log of Well Installation

Well Number: MW #3 SB - A

Generalized Subsurface Profile



3' — Length of Casing Above Ground Surface

Concrete Cap (Y / N)

1.0 — Depth to Top of Grout or Backfill (Circle One)

Material (Grout or Backfill): Grout

59'* — Bentonite Slurry
62.1' — Bentonite Pellets

59'* — Depth to Top of Bentonite Pellets / Slurry (Circle One)

62.5' — Depth to Top of Filter Pack
Type Best/Silica

69.5' — Depth to Bottom of Well Screen

NATURAL CAVE * — Borehole Backfill Material

70.5' — Total Depth of Borehole

Top of Casing Elevation (feet):

Ground Surface Elevation (feet):

Water Level Data

Date	Water Level Below TOC

Development:

Survey Reference:

Well Casing
- Diameter: 2"
- Total Length: 72.5'
- Material: PVC
- Cap Type:

Well Screen
- Diameter: 2"
- Length: 5' (60")
- Slot/Type: 10-slot / [illegible]
- Material: PVC

Protective well casing
- Material: Aluminum Dia. 4" sq.
- Height Above Ground:
- Lock Type:

General Notes: *

Well Sampling
Field Record Form

Client Albion
Project No. 04011.02
Date 12-7-12

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

	12-7-92	12-8-92	12-6-92					
Well Identification	MW 2 SG	MW 2 KB	MW 2 SB					
Casing Size	2"	2"	2"					
Cap Type (Footnote A)	J-Plug	"J" Plug	"J" Plug					
Well Depth	35'	53'	65'					
Gallonage of Prime H_2O Used	—	—	—					
Purge Method	"T" Bailer	T Bailer	T Bailer					
Purge Rate	—	—	—					
Purge Time	11:00	9:20	10:20					
Purge Duration	—	—	—					
Volume Purged	5.5	18	21					
Depth to Water Level	27.92'	27.75	28.36					
Depth to Liquid Level	—	—	—					
Floating Product (Y or N)	N	N	N					
Floating Product Sampling Method	—	—	—					
Water Sampling Method	"T" Bailer	"T" Bailer	"T" Bailer					
Time of Sampling	2:30	9:20A	2:20Pm					
Quantity of Sample								
Type of Preservative (Footnote B)	1	1	1					
Field Filtering (Y or N)	Y	Y	Y					
pH								
Conductivity								
Sample Temperature (°F)	See Arcs Field Book							
Ambient Temperature (°F)								
Turbidity								
Dissolved Oxygen (mg/l)								

Observers to the Event
Type and Color of Sample Containers Plastic & Ambers
Equipment Decontamination Procedures Steam Cleaned
Disposal Method of Purge Water On Ground
Split Samples With
Field Observations

Sampled By (ESD Personnel) D.P. / P.G.

Footnote A:
1. Standard Threaded Cap
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

Well Sampling
Field Record Form

Client Albion
Project No. 04011.02
Date 12-9-92

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

Well Identification	~~MW-2~~ 6 SB	~~MW-2~~ 5 SB	~~MW-6~~ 5 SG	~~MW-1~~ 6 WB				
Casing Size	2"	2"	2"	2"				
Cap Type (Footnote A)	J-Plug	J-Plug	J-Plug	J-Plug				
Well Depth	75.3'	75.5'	28'	51'				
Gallonage of Prime H_2O Used	—	—	—	—				
Purge Method	T Bailer	T Bailer	T Bailer	T Bailer				
Purge Rate	—	—	—	—				
Purge Time	11:15 AM	10:00	10:50	12:15				
Purge Duration	—							
Volume Purged	30	37	6	18				
Depth to Water Level	~~23.21'~~	22.55'	21.01'	23.21'				
Depth to Liquid Level 22.83		—	—	—				
Floating Product (Y or N)	N	N	N	N				
Floating Product Sampling Method	—							
Water Sampling Method	T Bailer	T Bailer	T Bailer	T Bailer				
Time of Sampling	2:00 PM	11:15	11:40	1:10				
Quantity of Sample								
Type of Preservative (Footnote B)	1	1	1	1				
Field Filtering (Y or N)	Y	Y	Y	Y				
pH								
Conductivity								
Sample Temperature (°F)	See Accs Field Book							
Ambient Temperature (°F)								
Turbidity								
Dissolved Oxygen (mg/l)								

Observers to the Event
Type and Color of Sample Containers Plastic & Ambers
Equipment Decontamination Procedures Steam Cleaned
Disposal Method of Purge Water On Ground
Split Samples With
Field Observations

Sampled By (ESD Personnel) A.P. / P.G.

Footnote A:
1. Standard Threaded Cap
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

Well Sampling
Field Record Form

Client Albion
Project No. 04011.02
Date 12-10-92

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

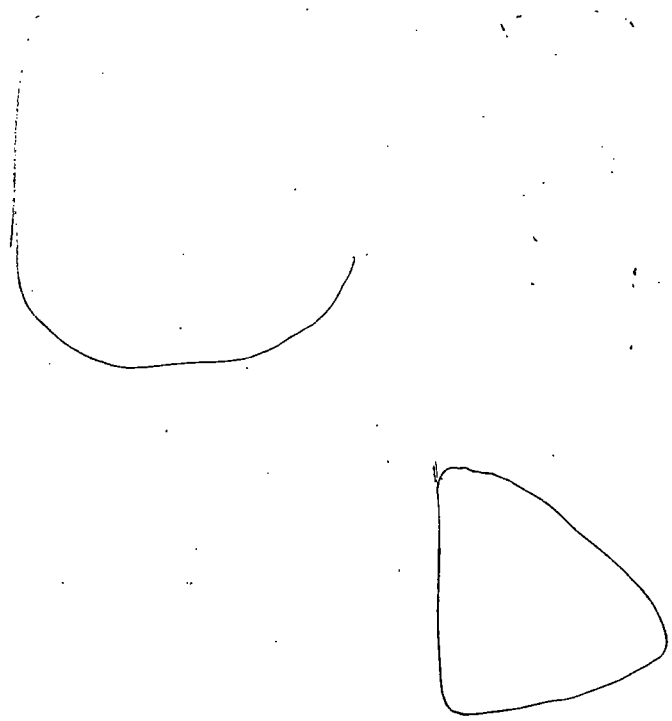
Well Identification	MW#1 SG	MW#1 WB	MW#1 SB					
Casing Size	2"	2"	2"					
Cap Type (Footnote A)	1	~~[illegible]~~	Lip Plug	1				
Well Depth	37.5	59	72.5					
Gallonage of Prime H_2O Used	—	—	—					
Purge Method	Bailer	Bailer	Bailer					
Purge Rate	—	—						
Purge Time	9:30	9:15	12:00					
Purge Duration	—	—	—					
Volume Purged	5	16	30					
Depth to Water Level	32.57'	32.98'	33.13					
Depth to Liquid Level	—	—	—					
Floating Product (Y or N)	N	N	N					
Floating Product Sampling Method	—	—						
Water Sampling Method	T Bailer	T Bailer	T Bailer					
Time of Sampling	10:10	10:30	12:40					
Quantity of Sample								
Type of Preservative (Footnote B)	1	1	1					
Field Filtering (Y or N)	Y	Y	Y					
pH								
Conductivity								
Sample Temperature (°F)	See Arcs Field Book							
Ambient Temperature (°F)								
Turbidity								
Dissolved Oxygen (mg/l)								

Observers to the Event ☒
Type and Color of Sample Containers Plastic & Ambers
Equipment Decontamination Procedures Steam Clean
Disposal Method of Purge Water On Ground
Split Samples With
Field Observations MW#1 WB Bailed Dry 2 times Then Sampled

Sampled By (ESD Personnel) D.P. / R.G.

Footnote A:
1. Standard Threaded Cap
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH



Well Sampling
Field Record Form

Client ARCS - Albion
Project No. 04011.02
Date 12/15/92

Purging 12/14 Test Sample

12/16 Sampling

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy. SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

Well Identification	LF-1			LF-1				
Casing Size	2"			2"				
Cap Type (Footnote A)	1			1				
Well Depth	38.0'			38.0				
Gallonage of Prime H_2O Used	—			—				
Purge Method	T.Bailer			T.Bailer				
Purge Rate	—			—				
Purge Time	11:00A			10:00A				
Purge Duration	—			—				
Volume Purged	2 Gal			1.0 Gal				
Depth to Water Level	36.83			36.86'				
Depth to Liquid Level	"			"				
Floating Product (Y or N)	N			N				
Floating Product Sampling Method	—			—				
Water Sampling Method	T.Bailer			T.Bailer				
Time of Sampling								
Quantity of Sample								
Type of Preservative (Footnote B)				1&4				
Field Filtering (Y or N)	7.01	7.04	7.01	Y				
pH	6.87	6.88	6.82					
Conductivity	10.18	10.15	10.04					
Sample Temperature (°F)	7.9	12.5	12.2					
Ambient Temperature (°F)								
Turbidity				Amber				
~~Dissolved Oxygen (mg/l)~~ EH (mV)	-106.2	-106.3	-117.2					

Observers to the Event _____
Type and Color of Sample Containers _____
Equipment Decontamination Procedures _____
Disposal Method of Purge Water _____
Split Samples With _____
Field Observations _____

Sampled By (ESD Personnel) _____

Footnote A:
1. Standard Threaded Cap
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

9SB 101 - 10:15A

Well Sampling Field Record Form

14.
27.5
19.5
38.4
47

Client _____
Project No. _____
Date _____

12/15 12.92 12/15 21.47 12/17 12.3 12/17 12/8/92 12/21 10:00A 12/21 12:00 12/2

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

Well Identification	9SB	6SG	3-SG	3-WB	3-SB	9-WB	7-SB	7-WB
Casing Size	2"	2"	2"	2"				
Cap Type (Footnote A)	1	1						
Well Depth	62.5'	30.5'	44.0	59.0	69.5	50.5	63.0	50.0
Gallonage of Prime H_2O Used								
Purge Method								
Purge Rate								
Purge Time								
Purge Duration								
Volume Purged								
Depth to Water Level	25G.	5.0	8.0	19.0	20.0	20.0	25.0	18.0
Depth to Liquid Level	13.10	21.34	31.66	31.48	31.08	12.73	15.98	16.72
Floating Product (Y or N)								
Floating Product Sampling Method								
Water Sampling Method								
Time of Sampling	10:15							
Quantity of Sample								
Type of Preservative (Footnote B)								
Field Filtering (Y or N)								
pH								
Conductivity								
Sample Temperature (°F)								
Ambient Temperature (°F)								
Turbidity								
Dissolved Oxygen (mg/l)								

Observers to the Event _____
Type and Color of Sample Containers _____
Equipment Decontamination Procedures _____
Disposal Method of Purge Water _____
Split Samples With _____
Field Observations _____

Sampled By (ESD Personnel) _____

Footnote A:
1. Standard Threaded Cap
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

47.4

4SB 10:35
4SG 12:00 - & DUP
4DB 2:10
4WB 9:00

Well Sampling Field Record Form

Client ALBION L.F.
Project No. 94011.02
Date 12/16/92

& DUP

WW Engineering & Science, Inc.
555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

Well Identification	4SB	4WB	4SG	4DB				
Casing Size	2"	2"	2"	2"				
Cap Type (Footnote A)	J PLUG	J PLUG	J PLUG	J PLUG				
Well Depth	75.00	60.00	36.5	100.00				
Gallonage of Prime H_2O Used	—	—	—	—				
Purge Method	BAILER	BAILER	BAILER	BAILER				
Purge Rate	—	—	—	—				
Purge Time	—	—	—	—				
Purge Duration	—	—	—	—				
Volume Purged	23	16	35	4				
Depth to Water Level	30.93	30.61	30.98	30.17				
Depth to Liquid Level	—	—	—	—				
Floating Product (Y or N)	N	N	N	N				
Floating Product Sampling Method	—	—	—	—				
Water Sampling Method	BAILER	BAILER	BAILER	BAILER				
Time of Sampling	1035	0900	1200	1410				
Quantity of Sample DATE SAMPLED	12/16	12/16	12/16	12/16				
Type of Preservative (Footnote B)								
Field Filtering (Y or N)	Y	Y	Y	Y				
pH								
Conductivity								
Sample Temperature (°F)								
Ambient Temperature (°F)								
Turbidity								
Dissolved Oxygen (mg/l)								

Observers to the Event _____
Type and Color of Sample Containers _____
Equipment Decontamination Procedures _____
Disposal Method of Purge Water _____
Split Samples With _____
Field Observations _____

Sampled By (ESD Personnel) Bill Rustowicz, Mark Nederveld

Footnote A:
1. Standard Threaded Cap
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

Well Sampling
Field Record Form

FIELD BL. ALSO

Client ALBION LANDFILL
Project No. 04011.02
Date 12/15/92

WW Engineering & Science, Inc.
5555 Glenwood Hills Pkwy SE • P.O. Box 874 • Grand Rapids, MI 49512-0874

Well Identification	8SB	8SG	8WB					
Casing Size	2"	2"	2"					
Cap Type (Footnote A)	J PLUG	J PLUG	J PLUG					
Well Depth	70.0	31.0	58.0					
Gallonage of Prime H_2O Used	—	—	—					
Purge Method	BAILER	BAILER	BAILER					
Purge Rate	—	—	—					
Purge Time	—	—	—					
Purge Duration	—	—	—					
Volume Purged	18 G.	15 G.	4 GAL.					
Depth to Water Level	—	—	—					
Depth to Liquid Level	—	—	—					
Floating Product (Y or N)	N	N	N					
Floating Product Sampling Method	—	—	—					
Water Sampling Method	BAILER	BAILER	BAILER					
Time of Sampling	0950	1405	1130					
Quantity of Sample DATE SAMPLED	12/15	12/15	12/15					
Type of Preservative (Footnote B)								
Field Filtering (Y or N)	Y	Y	Y					
pH								
Conductivity								
Sample Temperature (°F)								
Ambient Temperature (°F)								
Turbidity								
Dissolved Oxygen (mg/l)								

Observers to the Event _____
Type and Color of Sample Containers _____
Equipment Decontamination Procedures _____
Disposal Method of Purge Water _____
Split Samples With _____
Field Observations _____

Sampled By (ESD Personnel) Bill Bushow, Cathie Cotton, Mark Nederveld

Footnote A:
1. Standard Threaded Cap
2. Vented Threaded Cap
3. Threaded, Locking Plug
4. Threaded Cap with Hasp
5. Flush Mount Locking Cap

Footnote B:
1. Refrigeration
2. Nitric Acid, HNO_3
3. Sulfuric Acid, H_2SO_4
4. Hydrochloric Acid: HCl
5. Sodium Hydroxide: NaOH

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: C. COTTON
Rod Man: D. JOHNSON
Method: Stadia

Project Name and Number: ARCS-ALBION 04011.02 Date: 10/20/92 Page: 1 of 3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.54 ✓	BM# N	N 7079.36 E 4983.94
2.16	979.70				
		2.02	977.68	TP	
2.285	979.765				
		7.40	972.565	TP	
4.37	976.935				
		5.33	971.605	TP	
3.30	974.905				
		5.015	969.89	TBM#1 ✓	TOP OF GUY WIRE STAKE TO P. POLE E. SIDE
5.095	974.985				
		3.39	971.595	TP	
5.485	977.08				
		3.535	973.545	TP	
6.335	979.88				
		2.69	977.19	TP	

WW Engineering & Science, Inc.
Environmental Services Division

Person Instrument Man: C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS. ALBION 04011.02 Date: 10/20/92 Page: 2 of 3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			977.19 ✓	TP	
3.00	980.19				
		2.65	977.54 ✓	BM #N	0.00 error ✓
			969.89 ✓	TBM #1	See pg. 1
2.35	972.24				
		2.81	969.43	TP	Top Fire Hydrant valve stem @
2.79	972.22				
		4.785	967.435	TP	
5.59	973.025				
		3.02	970.005	MW #5SB	✓ TOC
3.09	973.095				
		5.55	967.545	TP	
4.365	971.91				
		3.81	968.10 ✓	TBM #2	"X" on NW "Tu" Hex bolt on middle of fire hydrant @ NE cor. of Olympian & Canton Street

WW Engineering & Science, Inc.
Environmental Services Division

Instrument Man: Person C. COTTON
Rod Man: D. JOHNSON
Method:

Project Name and Number: ARCS - ALBION 040:1.02 Date: 10/20/92 Page: 3 of 3

+S	HI	-S	ELEV.	BM. or STA.	ELEVATION POINT DESCRIPTIONS AND COMMENTS
			968.10 ✓	TBM#2	See pg. 2
4.29	972.39				
		2.50	969.89 ✓	TBM#1	See pg. 1 0.00 error ✓
					Ck'd 10/21/92
					Rick Trippel

Table 1
Static Water Level
Albion-Sheridan Towr
Albion, Michi

LOG

NORTH	EAST	Well ID	Reference Point Elev.(ft)*	10/23/92 Depth to Water(ft)	10/23/92 Water Elev.(ft)	11/6/ Depth to Water(ft)
7158	4642	MW-1SG	982.36	--	--	32.86
7148	4642	MW-1WB	982.20			
7138	4642	MW-1SB	982.20	33.27	948.93	33.26
7190	5192	MW-2SG	977.93			
7180	5091	MW-2WB	977.33			
7171	5090	MW-2SB	977.62	28.53	949.09	--
6136	4348	MW-3SG	978.88			
6136	4340	MW-3WB	978.65			
6127	4345	MW-3SBA	978.14	31.38	946.76	31.27
6114	4345	MW-3SB				
5620	4314	MW-4SG	978.02			
5610	4314	MW-4WB	977.73			
5601	4314	MW-4-SB	978.03 2?	31.34	946.69	31.24
5610	4305	MW-4-DB	977.80			
5700	5319	MW-5-SG	970.69			
5700	5300	MW-5-SB	970.01	22.76	947.25	22.68
		approx				
5287	4210	MW-6SG	969.73 81?			
5285	4190	MW-6WB	969.77 ?			
5275	4200	MW-6SB	969.76	--	--	--
		approx.				
5144	4689	MW-7SG				
5144	4678	MW-7WB				
5144	4668	MW-7SB				
5647	3770	MW-8SG	980.58			
5645	3760	MW-8WB	980.93			
5643	3750	MW-8SB	981.83			
5650	3785	MW-9SG	959.47			
5650	3763	MW-9WB	945.48			
5650	3750	MW-9SB	960.06			
		approx.				
6400	4600	LF-1	985.95			
5950	4760	LF-2				
5500	4600	LF-3				
		MW-W	977.48	28.54	948.94	28.56
		MW-E	972.53	23.97	948.56	23.89
		MW-S	961.17	14.04	947.13	[illegible]

Well # 2

DRILLER'S RECORD SHEET FOR NEW WELL

Name of Owner PARDEVCO

Address 2410 Clinton Rd Jackson, Michigan

Location of Property Where Well is Located Ambertón Village Parma Township Section 31 Jackson County Corner of Michigan Ave & Finley Rd

Size and Kind of Casing Used 12" Black 51 lbs/ft.

Contractor's Name R. M. BREWER & SON, Inc.

Driller's Name Theron Brewer

Helper's Name Milton Railer Drive Shoe 12" x 16" lg

Date Drilling Started 9/14/67 Date Well Completed 9/21/67

Depth of Well Complete 350' Depth to Water in Well 31' 3"

Yield in Gal. Per Hour/[redacted]. 1200 Drawdown in Ft. 2' 6"

Kind and Size of Screen

Type and Make of Pump Installed Test pumped only

Remarks Formation & Pump Test same as well # 1

Signed T. R. Brewer

RECORD ALL OTHER INFORMATION ON BACK OF THIS FORM

From Feet	To Feet	Description of Soil or Rock Encountered	Length of Casing Installed
			22' 10"
			20' 8"
			17' 10"
			18' 6"
			15' 8"
			95' 6"

Michigan State Health Department, Lansing, Mich.

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1980

WATER WELL RECORD

ACT 294 PA 1965

MW-E

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

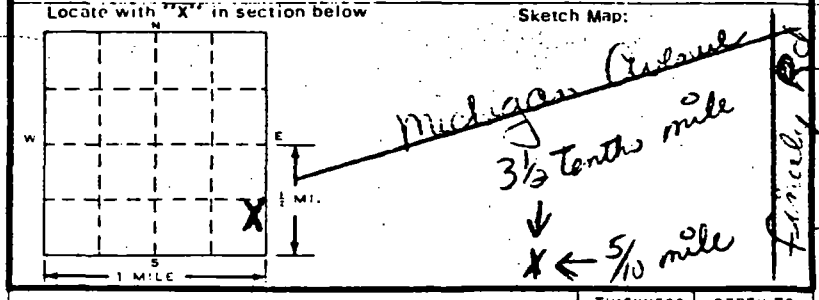
County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	¼ ¼ ¼	36	T2S N/S.	R4W E/W.

Distance And Direction from Road Intersections
3 1/2 Tenths mile South of Michigan Avenue
5/10 mile West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:
Gordon Stevick
Address Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 30 ft. Date of Completion 3-28-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐
Diam. 2 in. to 23'3" ft. Depth (Galv)
____ in. to ____ ft. Depth
Height: Above Surface 14" ft.
Weight 3.75 lbs./ft.
Drive Shoe? Yes ☐ No ☒

8 SCREEN:
Type: stainless steel Dia.: 2"
Slot ~~Size~~ #10 Length 4' 8"
Set between 22 ft. and 26 ft.
Fittings 2" coupling and 2" cap

9 STATIC WATER LEVEL
22' 6" below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

2

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel	26	26
Gray clay	3	29
Sandstone	1	30

*ADDED INFO BY DRILLER, ITEM #11
*CORRECTED BY
**AUDITION BY
ELEVATION
DEPTH TO ROCK
USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Sheridan-Albion Landfill monitoring wells
Development time 1 1/2 hours

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address 1154 S. Jefferson, Mason, Michigan 48854
Signed S. W. Hart — AUTHORIZED REPRESENTATIVE
Date 4-11-80

D67d 100M (Rev. 12-68) APR 1 7 1980

36-5

Calhoun County Health Dept.

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1980

WATER WELL RECORD

ACT 294 PA 1965

MW-W

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

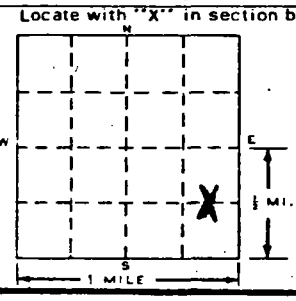
County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	¼ ¼ ¼	36	T2S N/S.	R4W E/W.

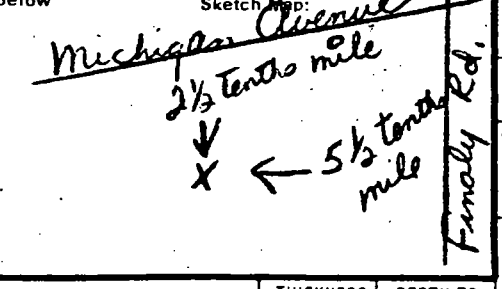
Distance And Direction from Road Intersections
2 1/2 Tenths mile South of Michigan Avenue
5 1/2 Tenths mile West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:





3 OWNER OF WELL: Gordon Stevick
Address Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 50 ft. Date of Completion 3-27-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐
Diam. Galv.
2 in. to 39 ft. Depth
___ in. to ___ ft. Depth
Height: Above Surface 28" in.
Weight 3.75 lbs./ft.
Drive Shoe? Yes ☐ No ☒

2 FORMATION

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel with coal strips	36	36
Brown, white and green sandstone	14	50

8 SCREEN:
Type: Stainless steel Dia.: 2"
Slot #7 Length 3' 6"
Set between 37 ft. and 40 ft.
Fittings: 2" coupling & 2" cap.

9 STATIC WATER LEVEL
26 ft. below land surface

10 PUMPING LEVEL below land surface
___ ft. after ___ hrs. pumping ___ g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ___ Chlorides (Cl) ___
Hardness ___ Other ___

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ___ ft. to ___ ft.

14 Nearest Source of possible contamination
___ feet ___ Direction ___ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ___
Model Number ___ HP ___ Volts ___
Length of Drop Pipe ___ ft. capacity ___ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

[redacted] DRILLER, ITEM NO.
[redacted] BY
[redacted]
[redacted]

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Development time 2 hours
Sheridan-Albion Landfill monitoring wells

RECEIVED APR 17 1980

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address 1154 S. Jefferson, Mason, Michigan 48854
Signed S. W. Hart — AUTHORIZED REPRESENTATIVE
Date 4-9-80

D67d 100M (Rev. 12-68)

36-6

Calhoun County Health Department

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1980

WATER WELL RECORD
ACT 294 PA 1965

MW-S

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

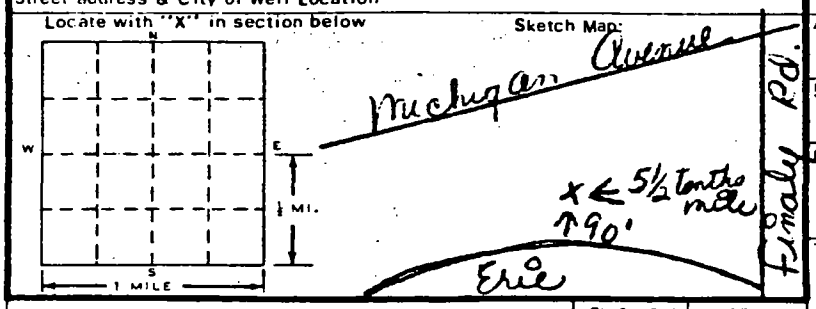
County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	¼ ¼ ¼	36	T2S N.S.	R4W E/W.

Distance And Direction from Road Intersections
90' North of Erie
5 1/2 Tenths West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL: Gordon Stevick
Address Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 27 ft. Date of Completion 3-28-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐ Height: Above ~~Below~~ Surface 17" ft.
Diam. Galv.
2 in. to 21 ft. Depth Weight 3.75 lbs./ft.
____ in. to ____ ft. Depth Drive Shoe? Yes ☐ No ☒

2 FORMATION

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel	22	22
Gray clay	4	26
Sandstone	1	27

8 SCREEN:
Type: stainless steel Dia.: 2"
Slot ~~Diam.~~ #10 Length 4' 8"
Set between 19 ft. and 23 ft.
Fittings: 2" coupling and 2" cap

9 STATIC WATER LEVEL
12 ft. below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

ADDED INFO BY DRILLER, ITEM NO.
*CORRECTED BY
**ADDITION BY
ELEVATION
DEPTH TO ROCK
USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Development time 1 1/2 hours
Sheridon-Albion Landfill monitoring wells

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address 1154 S. Jefferson, Mason, Michigan 48854
Signed S. W. Hart — AUTHORIZED REPRESENTATIVE
Date 4-11-80

D67d 100M (Rev. 12-68)

36-4

Jackson County Health Dept.

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Jackson	Parma	¼ ¼ ¼	31	2 ☒S.	3 ☒W.

Distance And Direction from Road Intersections: Plot on the S.W. corner of Michigan Ave & Finley Rd. New Subdivision

OWNER No.

Street address & City of Well Location

3 OWNER OF WELL: Parma Development Co

Address: 2410 Clinton Rd, Jackson, Michigan

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gravely-clay	0	14
Muddy-sand	37	51
" Gravel-fine	4	55
Blue Clay-sandy	13	68
Course Gravel	14	82
Brown Sand-muddy	5	87
Soft Grey Sandrock	3	90
Med-Clean White Sandrock	93	183
Muddy-Med-Hard "	62	245
Clean White Sandrock-water-bearing	30	275
Blue Grey " fine-hard	75	350

4 WELL DEPTH: (completed) 350 ft. Date of Completion 8/3/67

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ___

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ___

7 CASING: Diam. 12 in. to 94'5" ft. Depth; Threaded ☒ Welded ☐; Height: Above/Below surface 1 ft.; Weight 51 lbs/ft.; Drive Shoe? Yes ☒ No ☐; ___ in. to ___ ft. Depth

8 SCREEN: Type: ___ Dia.: ___ Slot/Gauze ___ Length ___ Set between ___ ft. and ___ ft. Fittings:

9 STATIC WATER LEVEL 31' 3" ft. below land surface

10 PUMPING LEVEL below land surface 28' ft. after 3½ hrs. pumping 1200 g.p.m.; ___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ___ Chlorides (Cl) ___ Hardness ___

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 GROUTING: Well Grouted? ☐ Yes ☒ No; Material: ☐ Neat Cement ☐ ___; Depth: From ___ ft. to ___ ft.

14 SANITARY: Nearest Source of possible contamination 200 feet ___ Direction None as yet; Well disinfected upon completion ☒ Yes ☐ No

15 PUMP: Manufacturer's Name Not installed at this date. Model Number ___ Length of Drop Pipe ___ ft. capacity ___ G.P.M. Type: ☐ Submersible ☐ Jet ☐ Reciprocating ☐ ___

16 Remarks, elevation, source of data, etc.

well # 1

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

R M Brewer & Son Inc — REGISTERED BUSINESS NAME

106 — REGISTRATION NO.

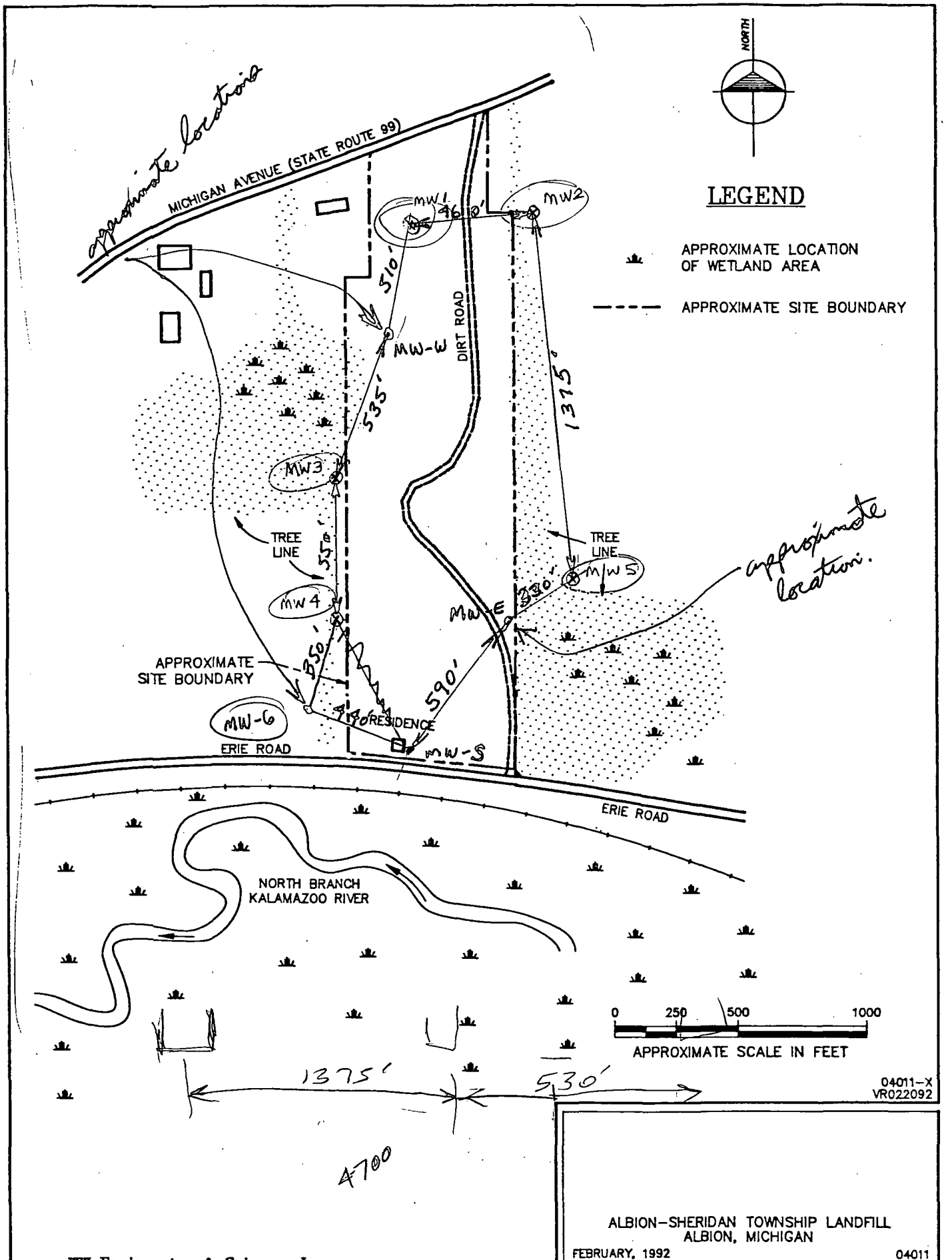
Address: Rt 1 Parma, Michigan 49269

Signed ___ Date ___

AUTHORIZED REPRESENTATIVE

D67D 100M 6-66

DRILLING CONTRACTOR COPY



ALBION–SHERIDAN TOWNSHIP LANDFILL
ALBION, MICHIGAN

FEBRUARY, 1992 04011

WW Engineering & Science, Inc.

Calculation Sheet

Computed by _____ Subject _____ Sheet ___ of _____
Checked by _____ _____ Job No. _____
Client _____ Date 10/30/92

DON:

GOT BACK AT 4:00pm - YOU WERE ALREADY GONE.

HERE ARE NOTE BOOKS AND LOG FOR MW#6DB SO FAR. NOTES PERTAINING TO MW#6DB BEGIN ON PAGE 73, BOOK 1.

HERE'S BASIC DETAILS:

WEATHERED ROCK @34.0'

BEDROCK @ 49.0' +/-

AUGERS ARE AT 55.0'

1ST CORE RUN = 55.0'-65.0'

2" WELL SET @65.0', HOLE DEVELOPED OF ALL ADDED WATER

PACKER WELL SET @ 65.0' (TOP OF PACKER AT 56.0'), PURGED, SAMPLED, PULLED.

2ND CORE RUN = 65.0'-75.0'

2" WELL SET @ 74.5'. NEEDS 500 gal. TOTAL DEVELOPED OUT.

I PURGED 330 gal. FRIDAY. 10 DRUMS BY HOLE - 6 FULL, 4 EMPTY.

SO.... YOU NEED TO FINISH DEVELOPING THE 2" WELL, THEN INSTALL THE 1 1/4" WELL, INFLATE PACKER, PURGE 3 CORE HOLE VOLUMES, SAMPLE TILL STABLE READINGS, PULL GC SAMPLE. THEN SIT AND WAIT FOR DON MORAN TO TELL YOU IF THEY'RE CLEAN OR NOT. TOO BAD I COULDN'T HAVE STAYED LATER THIS PM AND PULLED THAT SAMPLE FOR DON, SO HE'D

Calculation Sheet

Computed by _____ Subject _____ Sheet ___ of _____
Checked by _____ _____ Job No. _____
Client _____ Date 10/30/92

HAVE THE WEEKEND TO RUN THEM.

IF BOTH SAMPLES (55'-65' & 65'-75') ARE CLEAN, I PRESUME THAT IS THE BOTTOM OF THE HOLE, AND YOU CAN START THE PERMEABILITY PACKER TESTING. IF YOU HAVE TO CORE SOME MORE, THE CORE BOXES ARE UNDER THE TRAILER - BOX 2 ISN'T FULL YET.

TELL JIMMY THE KEYS TO THE 75 ARE IN THE CUBBY HOLE IN THE DASH OF TRUCK #41. I BOUGHT 100 PLASTIC TIES FOR ATTACHING THE TUBING FOR PACKER TO 1¼" CASING. - DON'T KNOW WHERE OL' ED PUT THEM THOUGH. TRUE VALUE HARDWARE SELLS THEM.

1" S.S. Bailer for BAILING 1¼" WELL IS SOMEWHERE AROUND DECON PAD I GUESS, UNLESS MIKE PUT IT INSIDE.

WELL DON'T KNOW WHERE I'LL BE MONDAY - NO BOOK IN MIKE'S OFFICE, BUT TRY TO CALL ME IF I LEFT ANY UNANSWERED QUESTIONS.

SEE ya!
Cathi

P.S. THE AUGERS ARE IN TIGHT!! JIM IS GOING TO HAVE TO PROVE JUST HOW GOOD A DRILLER HE IS TO GET THOSE OUT!! GOOD LUCK.

P.S.S. I DIDN'T ORDER A WASTE HAULER FOR DEV. H_2O REMOVAL - YOU MAY WANT TO DO THIS - NEED NEW MANIFESTS FROM RICK (NO DATE BY SIGNATURE)

Telephone Memorandum

Project No.: 04011.02 Client: Albion Date: 10/9/92

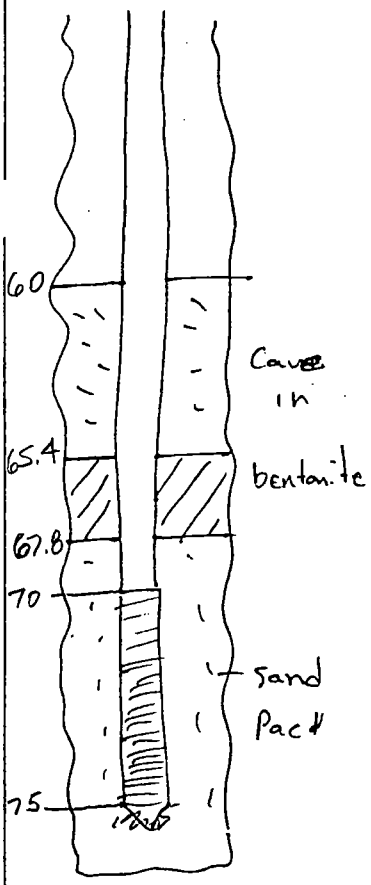
Subject: Drilling Question

Your Name: Tom Timmerman Outside Party: Cathie Cottom

Made Call ( )

Rec'd Call (X)

Comments



Summary of Conversation:

MW 5 screen @ 70-75
Bedrock @ 60.5
Sand pack & ~~bentonite~~ bentonite in
Auger Got Stuck worked them
up a few feet
5 ft of Cave in on bentonite
60 - 65.4 Cavin of weathered bedrock.
67.8 Sand pack top
67.8 - 65.4 bentonite

Cathy asked if well should be abandoned and redrilled or if it would be okay to grout with ~5 ft of ~~cavin~~ Cave in above bentonite. Cave in couldn't be washed out.

I decided the cave in shouldn't cause problems in this situation and the well should be kept and grouted above the Cave in

cc: Liz Uhl
Rick Trippel

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1980

WATER WELL RECORD
ACT 294 PA 1965

MW-W

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

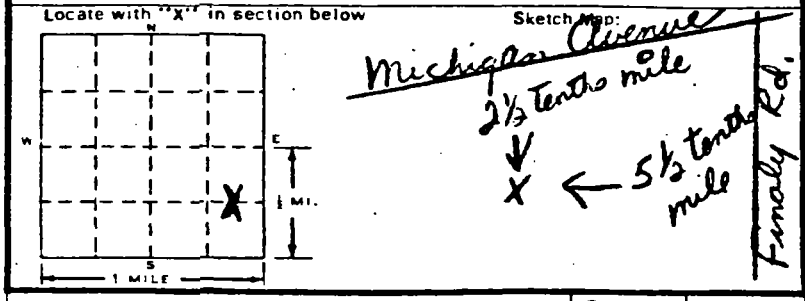
County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	¼ ¼ ¼	36	T2S N/S.	R4W E/W.

Distance And Direction from Road Intersections
2 1/2 Tenths mile South of Michigan Avenue
5 1/2 Tenths mile West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL: Gordon Stevick
Address: Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 50 ft. Date of Completion 3-27-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐
Diam. Galv.
2 in. to 39 ft. Depth
____ in. to ____ ft. Depth
Height: Above ~~Below~~ Surface 28" ~~ft.~~
Weight 3.75 lbs./ft.
Drive Shoe? Yes ☐ No ☒

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel with coal strips	36	36
Brown, white and green sandstone	14	50

8 SCREEN:
Type: Stainless steel Dia.: 2"
Slot ~~Code~~ #7 Length 3' 6"
Set between 37 ft. and 40 ft.
Fittings: 2" coupling & 2" cap.

9 STATIC WATER LEVEL
26 ft. below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

[redacted] DRILLER, ITEM NO.
[redacted] BY
[redacted]
USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Development time 2 hours
Sheridan-Albion Landfill monitoring wells

RECEIVED APR 17 1980

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address: 1154 S. Jefferson, Mason, Michigan 48854
Signed: S. W. Hart — AUTHORIZED REPRESENTATIVE
Date: 4-9-80

D67d 100M (Rev. 12-68)

36-6

Calhoun County Health Department

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1990

WATER WELL RECORD

ACT 294 PA 1965

MW-E

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

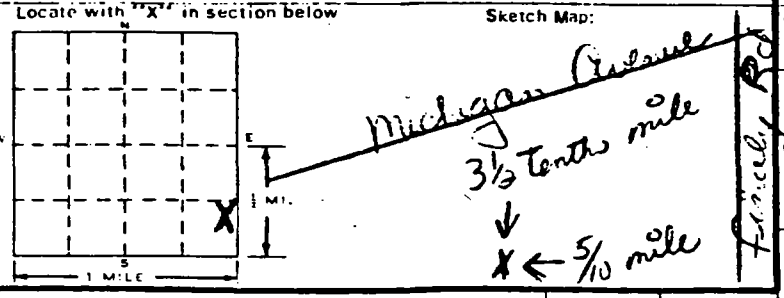
County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	¼ ¼ ¼	36	T2S N/S.	R4W E/W.

Distance And Direction from Road Intersections
3 1/2 Tenths mile South of Michigan Avenue
5/10 mile West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL:
Gordon Stevick
Address Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 30 ft. Date of Completion 3-28-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐
Diam. 2 in. to 23'3" ft. Depth (Galv)
____ in. to ____ ft. Depth
Height: Above Surface 14" ft.
Weight 3.75 lbs./ft.
Drive Shoe? Yes ☐ No ☒

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel	26	26
Gray clay	3	29
Sandstone	1	30

8 SCREEN:
Type: stainless steel Dia.: 2"
Slot ~~Gauge~~ #10 Length 4' 8"
Set between 22 ft. and 26 ft.
Fittings 2" coupling and 2" cap

9 STATIC WATER LEVEL
22' 6" ft. below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

*ADDED INFO BY DRILLER, ITEM #11
*CORRECTED BY
**ADDITION BY
ELEVATION
DEPTH TO ROCK
USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Sheridan-Albion Landfill monitoring wells
Development time 1 1/2 hours

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address 1154 S. Jefferson, Mason, Michigan 48854
Signed S. W. Hart — AUTHORIZED REPRESENTATIVE
Date 4-11-80

D67d 100M (Rev. 12-68)

36-5

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

APR 23 1980

WATER WELL RECORD
ACT 294 PA 1965

MW-S

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

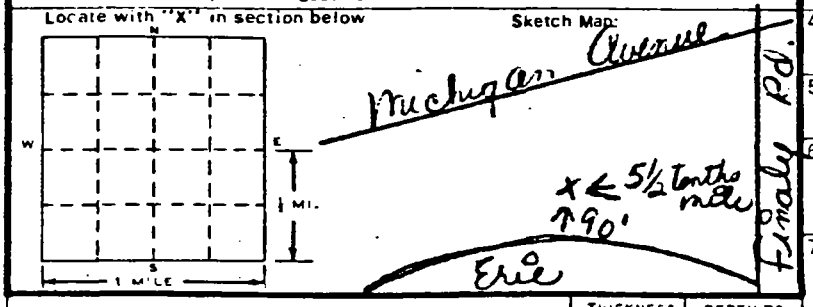
County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoum	Sheridan	¼ ¼ ¼	36	T2S N.S.	R4W E/W.

Distance And Direction from Road Intersections
90' North of Erie
5 1/2 Tenths West of Finaly Rd.

Street address & City of Well Location

Locate with "X" in section below

Sketch Map:



3 OWNER OF WELL: Gordon Stevick
Address Lot #1, Crystal Lake
Cement City, Michigan 49233

4 WELL DEPTH: (completed) 27 ft. Date of Completion 3-28-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☒ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐ Diam. Galv. 2 in. to 21 ft. Depth; ____ in. to ____ ft. Depth
Height: Above ~~Below~~ Surface 17" ft.
Weight 3.75 lbs./ft.
Drive Shoe? Yes ☐ No ☒

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel	22	22
Gray clay	4	26
Sandstone	1	27

8 SCREEN:
Type: stainless steel Dia.: 2"
Slot ~~Diam~~ #10 Length 4' 8"
Set between 19 ft. and 23 ft.
Fittings: 2" coupling and 2" cap

9 STATIC WATER LEVEL
12 ft. below land surface

10 PUMPING LEVEL below land surface
____ ft. after ____ hrs. pumping ____ g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

ADDED INFO BY DRILLER, ITEM ___
*CORRECTED BY
**ADDITION BY
ELEVATION
DEPTH TO ROCK
2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.
Development time 1 1/2 hours
Sheridan-Albion Landfill monitoring wells

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Hart Well Drilling Company — REGISTERED BUSINESS NAME
522 — REGISTRATION NO.
Address 1154 S. Jefferson, Mason, Michigan 48854
Signed S. W. Hart — AUTHORIZED REPRESENTATIVE
Date 4-11-80

D67d 100M (Rev. 12-68)

36-4

Ingham County Health Dept.

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Jackson	Parma	¼ ¼ ¼	31	2 ☒ S.	3 ☒ W.

Distance And Direction from Road Intersections: Plot on the S.W. corner of Michigan Ave & Finley Rd. New Subdivision

OWNER No.

Street address & City of Well Location

3 OWNER OF WELL: Parma Development Co

Address: 2410 Clinton Rd, Jackson, Michigan

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gravely-clay	0	14
Muddy-sand	37	51
" Gravel-fine	4	55
Blue Clay-sandy	13	68
Course Gravel	14	82
Brown Sand-muddy	5	87
Soft Grey Sandrock	3	90
Med-Clean White Sandrock	93	183
Muddy-Med-Hard "	62	245
Clean White Sandrock-water-bearing	30	275
Blue Grey " fine-hard	75	350

4 WELL DEPTH: (completed) 350 ft. Date of Completion 8/3/67

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ___

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ___

7 CASING: Diam. 12 in. to 94'5" ft. Depth; Threaded ☒ Welded ☐; ___ in. to ___ ft. Depth

Height: Above/Below surface 1 ft.; Weight 51 lbs/ft.; Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: ___ Dia.: ___

Slot/Gauze ___ Length ___

Set between ___ ft. and ___ ft.

Fittings:

9 STATIC WATER LEVEL 31' 3" ft. below land surface

10 PUMPING LEVEL below land surface

28' ft. after 3½ hrs. pumping 1200 g.p.m.

___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) ___ Chlorides (Cl) ___

Hardness ___

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 GROUTING:

Well Grouted? ☐ Yes ☒ No

Material: ☐ Neat Cement ☐ ___

Depth: From ___ ft. to ___ ft.

14 SANITARY:

Nearest Source of possible contamination 200 feet ___ Direction ___ Type None as yet

Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

Manufacturer's Name Not installed at this date.

Model Number ___

Length of Drop Pipe ___ ft. capacity ___ G.P.M.

Type: ☐ Submersible ☐ ___ ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

well # 1

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

H M Brewer & Son Inc — REGISTERED BUSINESS NAME

106 — REGISTRATION NO.

Address: Rt 1 Parma, Michigan 49269

Signed ___ AUTHORIZED REPRESENTATIVE Date ___

D67D 100M 6-66

DRILLING CONTRACTOR COPY

Well # 2

DRILLER'S RECORD SHEET FOR NEW WELL

Name of Owner PARDEVCO

Address 2410 Clinton Rd Jackson, Michigan

Location of Property Where Well is Located Amberton Village Parma Township Section 31 Jackson County Corner of Michigan Ave & Finley Rd

Size and Kind of Casing Used 12" Black 51 lbs/ft.

Contractor's Name R. M. BREWER & SON, Inc.

Driller's Name Theron Brewer

Helper's Name Milton Railer Drive Shoe 12" x 16" lg

Date Drilling Started 9/14/67 Date Well Completed 9/21/67

Depth of Well Complete 350' Depth to Water in Well 31' 3"

Yield in Gal. Per Hour/[redacted] 1200 Drawdown in Ft. 2' 6"

Kind and Size of Screen

Type and Make of Pump Installed Test pumped only

Remarks Formation & Pump Test same as well # 1

Signed T. R. Brewer

RECORD ALL OTHER INFORMATION ON BACK OF THIS FORM

From Feet	To Feet	Description of Soil or Rock Encountered	Length of Casing Installed
			22' 10"
			20' 8"
			17' 10"
			18' 6"
			15' 8"
			95' 6"

Michigan State Health Department, Lansing, Mich.

GEOLOGICAL SURVEY SAMPLE No.

SEP 07 1972

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

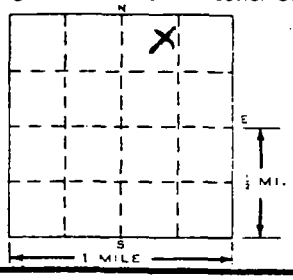
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	NE NW NE	34	2 N.S.	4 W.

Distance And Direction from Road Intersections: 8 Miles west on M 99 on south of Mich Ave

Street address & City of Well Location

Locate with "X" in section below — Sketch Map:



3 OWNER OF WELL: Albion Building Center

Address: Albion

4 WELL DEPTH: (completed) 100 ft. Date of Completion: July 12 1972

5 ☑ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐

7 CASING: Threaded ☑ Welded ☐ Height: Above/~~Below~~ Surface 2 ft.

Diam. 4 in. to 22 ft. Depth — Weight 11 lbs./ft.

____ in. to ____ ft. Depth — Drive Shoe? Yes ☑ No ☐

2

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
brown sand and gravel	65	65
gray sandy clay	4	69
soft gray sandrock	10	79
medium hard gray sandrock	21	100

USE A 2ND SHEET IF NEEDED

8 SCREEN:

Type: ____ Dia.: ____

Slot/Gauze ____ Length ____

Set between ____ ft. and ____ ft.

Fittings: NONE

9 STATIC WATER LEVEL 40 ft. below land surface

10 PUMPING LEVEL below land surface

50 ft. after 1 hrs. pumping 30 g.p.m.

____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million: Unknown

Iron (Fe) ____ Chlorides (Cl) ____

Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☑ 12" Above Grade

13 Well Grouted? ☐ Yes ☑ No

☐ Neat Cement ☐ Bentonite ☐ ____

Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination

____ feet ____ Direction Septic Tile Field Type

Well disinfected upon completion ☑ Yes ☐ No

15 PUMP: ☐ Not installed

Manufacturer's Name [illegible]

Model Number [illegible] HP 1 Volts 230

Length of Drop Pipe 45 ft. capacity ____ G.P.M.

Type: ☑ Submersible ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

ITEM 8 ADDITION

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Leonard Well Drilling Co — 0464

REGISTERED BUSINESS NAME — REGISTRATION NO.

Address: Spring Port

Signed: M. Leonard — Date: 7-15-72

AUTHORIZED REPRESENTATIVE

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO. JUL 15 1983

WATER WELL AND PUMP RECORD

PART 127 ACT 368 P.A. 1978

PERMIT NUMBER 6

1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Calhoun	Sheridan	SE SE SE ¼	36	2 N/S	4 E/W

Distance And Direction From Road Intersection: ½ mile east of Exley Road on north side of Eckel Road

Street Address & City of Well Location

3 OWNER OF WELL: Gordon Stevens Address: Crystal Lake Cement City

Address Same As Well Location? ☐ Yes ☑ No

Locate with "X" in Section Below — Sketch Map

4 WELL DEPTH (completed): 80 ft — Date of Completion: 10-22-82

5 ☐ Cable tool ☑ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐

6 USE ☑ Domestic ☐ Type I Public ☐ Type II Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐

7 CASING Diameter 4 in to 54 ft depth; ☑ Steel ☑ Threaded ☐ Plastic ☐ Welded

Grouted Drill Hole Diameter ____ in to ____ ft depth

Height Above/Below Surface 1 ft; Weight 11 lbs/ft; Drive Shoe ☑ Yes ☐ No

2 FORMATION DESCRIPTION

Formation Description	Thickness of Stratum	Depth to Bottom of Stratum
Sand & Gravel	38	38
Sandrock	42	? 80

8 SCREEN ☐ Not installed

Type ____ Diameter ____ Slot/Gauze ____ Length ____ Set between ____ ft and ____ ft

FITTINGS ☐ K-Packer ☐ Lead Packer ☐ Bremer Check ☐ Blank above screen ____ ft Other ____

9 STATIC WATER LEVEL: 13 ft below land surface ☐ Flow

10 PUMPING LEVEL below land surface: 23 ft after 1 hrs pumping at 30 GPM; ____ ft after ____ hrs pumping at ____ GPM

11 WELL HEAD COMPLETION ☑ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved other

12 WELL GROUTED? ☑ No ☐ Yes From ____ to ____ ft ☐ Neat cement ☐ Bentonite ☐ Other ____ No of bags of cement ____ Additives ____

13 Nearest source of possible contamination: Type Septic Distance 40 ft Direction N

Well disinfected upon completion? ☐ Yes ☐ No

14 PUMP ☐ Not installed ☑ Pump installation On's

Manufacturer's name Tuth; Model number 50L310 HP ½ Volts 110V; Length of Drop Pipe 30 ft capacity ____ GPM

TYPE ☑ Submersible ☐ Jet

PRESSURE TANK Manufacturer's name Tuth; Model number 202 Capacity 21 Gallons

ADDED INFO BY DRILLER, ITEM NO.
*CORRECTED BY
**ADDITION BY
ELEVATION
DEPTH TO ROCK

RECEIVED
Mich. Dept. of Public Health
JUN 21 1983
Environmental and Occupational Health Services Administration

USE A 2ND SHEET IF NEEDED

15 Remarks, elevation, source of data, etc.

16 WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Leonard Well Drilling — REGISTERED BUSINESS NAME — 6404 REGISTRATION NO.

Address Springfield

Signed M. Leonard — AUTHORIZED REPRESENTATIVE — Date 11/6/82

D67d (Rev 10-80)

GEOLOGICAL SURVEY SAMPLE No.

WATER WELL RECORD

ACT 294 PA 1965

well #1

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Jackson	Parma	NE ¼ SE ¼ NW ¼	31	2 N/S.	3 E/W.

Distance And Direction from Road Intersections: Plot on the S.W. corner of Michigan Ave & Finley Rd. New Subdivision

OWNER No.

Street address & City of Well Location

3 OWNER OF WELL: Parma Development Co
Address 2410 Clinton Rd
Jackson, Michigan

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gravely-clay	0	14
Muddy-sand	37	51
" Gravel-fine	4	55
Blue Clay-sandy	13	68
Course Gravel	14	82
Brown Sand-muddy	5	87
Soft Grey Sandrock	3	90
Med-Clean White Sandrock	93	183
Muddy-Med-Hard "	62	245
Clean White Sandrock-water-bearing	30	275
Blue Grey " fine-hard	75	350

4 WELL DEPTH: (completed) 350 ft. Date of Completion 8/3/67

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ___

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ___

7 CASING: Threaded ☒ Welded ☐
Diam. 12 in. to 94'5" ft. Depth
___ in. to ___ ft. Depth
Height: Above/~~Below~~ surface 1 ft.
Weight 51 ~~84~~ lbs/ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN:
Type: ___ Dia.: ___
Slot/Gauze ___ Length ___
Set between ___ ft. and ___ ft.
Fittings:

9 STATIC WATER LEVEL 31' 3" ft. below land surface

10 PUMPING LEVEL below land surface
28' ft. after 3½ hrs. pumping 1200 g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ___ Chlorides (Cl) ___
Hardness ___

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 GROUTING:
Well Grouted? ☐ Yes ☒ No
Material: ☐ Neat Cement ☐ ___
Depth: From ___ ft. to ___ ft.

14 SANITARY:
Nearest Source of possible contamination
200 feet ___ Direction None as yet
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:
Manufacturer's Name Not installed at
Model Number this date.
Length of Drop Pipe ___ ft. capacity ___ G.P.M.
Type: ☐ Submersible ☐ ___ ☐ Jet ☐ Reciprocating

Intake 60'
Intake 60'

16 Remarks, elevation, source of data, etc.

ADDED INFO. BY DRILLER, ETC.

Pump in Well #1:
Pump in Well #2:
Tank 72" X 26'
w/ 100 lb. working pressure 150 test pressure

CORRECTED BY:

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

R M Brewer & Son Inc — REGISTERED BUSINESS NAME
106 — REGISTRATION NO.
Address Rt 1 Parma, Michigan 49269
Signed Douglas Brewer — AUTHORIZED REPRESENTATIVE
Date 10-12-67

531-3022

D67D 100M 6-66

31-4

OCT 23 1967

GEOLOGICAL SURVEY COPY

Calculation Sheet

Computed by DJJ #526
Checked by

Subject HEADSPACE READINGS ON MW 6 DB SOILS. Sheet 1 of 1
Job No. 04011.02
Client ARCS-ALBION Date 11/4/92

MW # 6 ~~DB~~ SB:

HEADSPACE ANALYSIS 11/4/92 @ 3:30pm

(Collected) 10/26/92

Depth:	OVM (PPM):
0.0'-2.0'	0
2.0'-4.0'	
4.0'-6.0'	
6.0'-8.0'	
8.0'-10.0'	
10.0'-12.0'	
12.0'-14.0'	
14.0'-16.0'	
16.0'-18.0'	
18.0'-20.0'	
20.0'-22.0'	

10/27/92 (collected) - Heaving SAND: "WASH-OUT" MATERIAL from 30'-45' / 0.0ppm (wet)

10/28/92 (collected) - CRUSHED STONE: "WASH-OUT MATERIAL from 45'-50' / 0.0ppm (wet)

Date: Nov. 20, 1992
Client: ARCS-Albion
Project No.: 04011.02

T.O.C. Elevations taken 11/20/92

* Elevations taken at "Highest" Point on PVC casing *

Well ID:	T.O.C. Elevation
mw # 4 ~~SG~~ WB	977.73 ✓
mw # 4 SB	978.02 ✓
mw # 4 DB	977.80 ✓
mw # 6 SG	969.73 ✓
mw # 6 WB	969.81 ✓
mw # 6 SB	969.77 ✓

* Bench mark # BM-W (elev.= 981.11) used as starting point. *

Calculation Sheet

Computed by RJT Subject PRELIMINARY BORING SUMMARY Sheet 1 of 1

Checked by _____ Client ARCS-ALBION Job No. 04011.02

Date 10/28/92

WELL	DEPTH TO (ft): WATER	DEPTH TO (ft): BDRK	THICKNESS OF (ft): GLACIAL AQ	THICKNESS OF (ft): WEATH. BDRK	GROUND SURFACE ELEV. (ft)	STICKUP
MW-1-SB					979.6	
MW-2-SB					977.62 - 2.2?	2.3'
MW-3-SBA					978.14 - 2.5?	
MW-4-SB					975.9	
MW-5-SB					967.5	
MW-6-DB						
MW-1-SG						
MW-W						2.2'
MW-E						
MW-S						