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Occidental Chemical Corporation

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CHEMICALS GROUP

INFORMATION REPORT NO. 2

102nd Street Landfill Remedial Investigation

Niagara Falls, New York

000678

June 1987
Ref. No. 1431

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INFORMATION REPORT #2

During the course of the 102nd Street Landfill Site Remedial Investigation considerable information was collected concerning the geologic stratigraphy and hydrogeologic character of the site.

Information Report #2 presents the data collected during the well installation phase of the program and a compilation of relevant historical data to assist in the characterization of the site conditions. The figures, tables and appendices presented herein summarize the available information.

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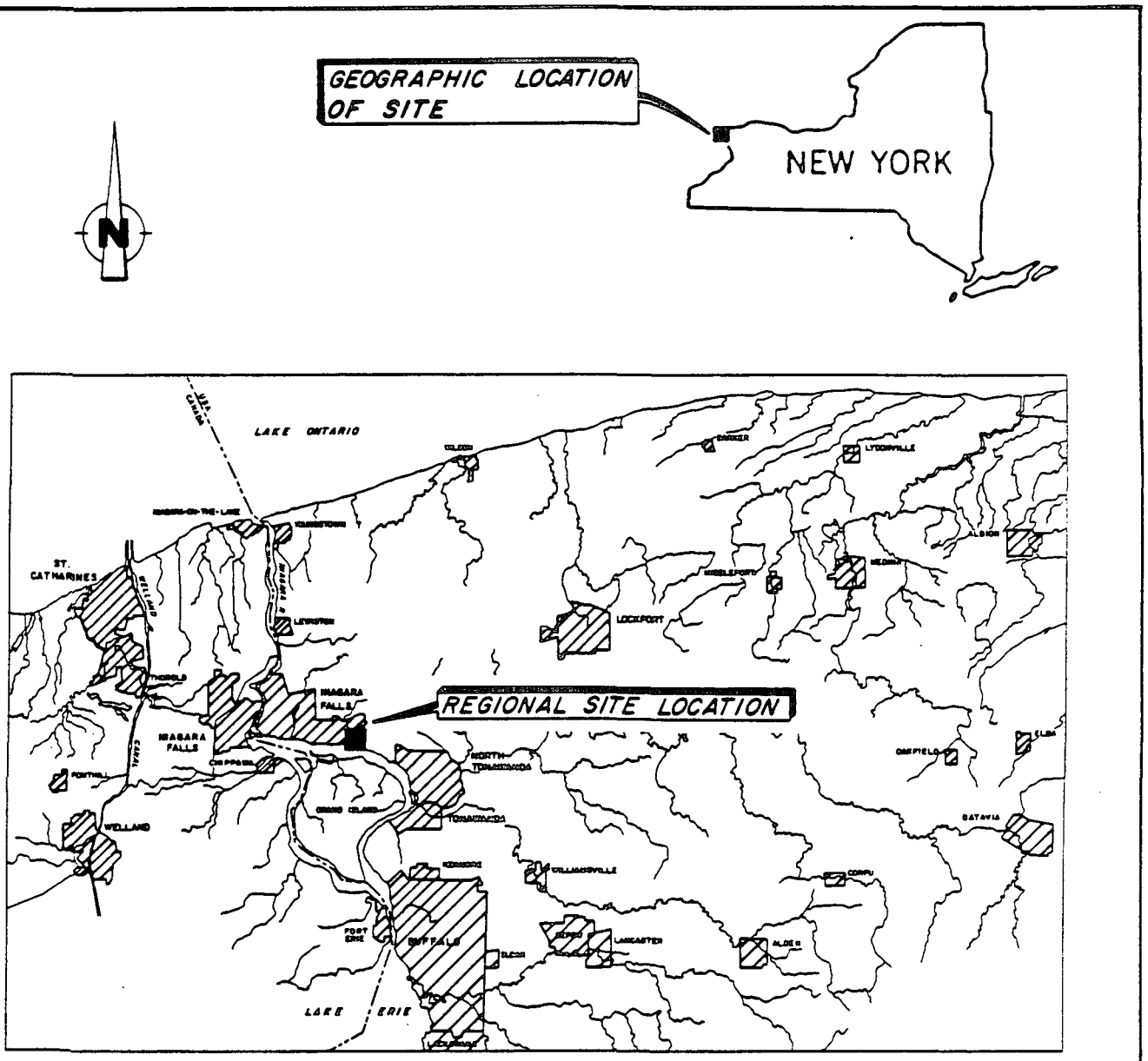

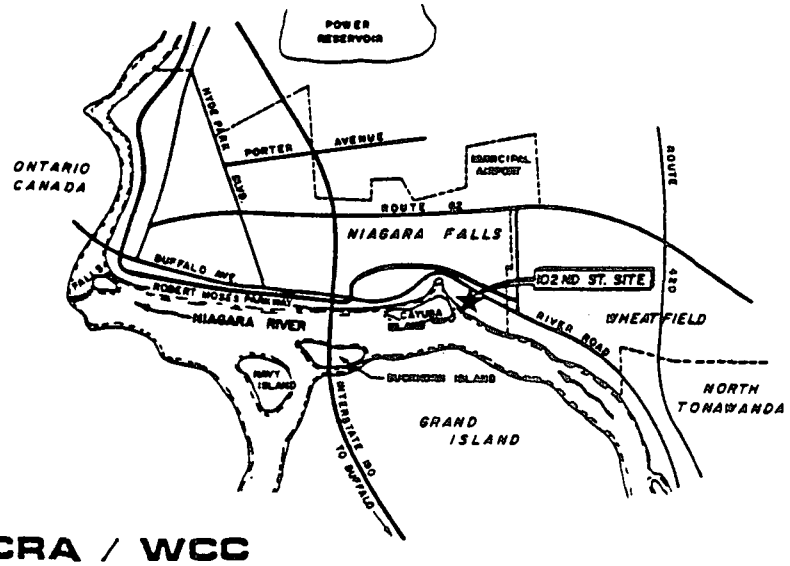

figure 1

KEY MAP

102nd Street Landfill Site

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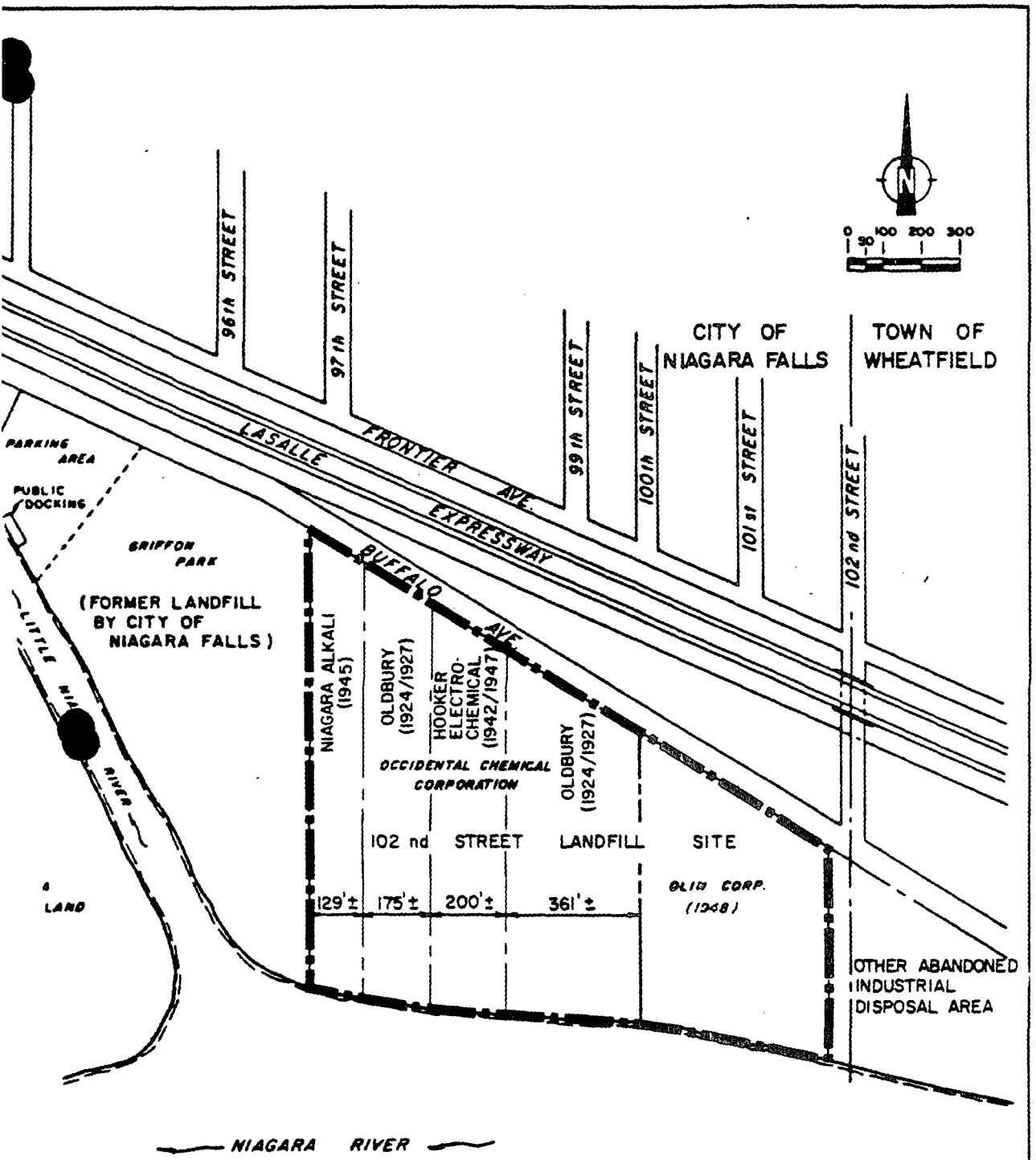

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SITE BOUNDARY

figure 2

SITE LOCATION

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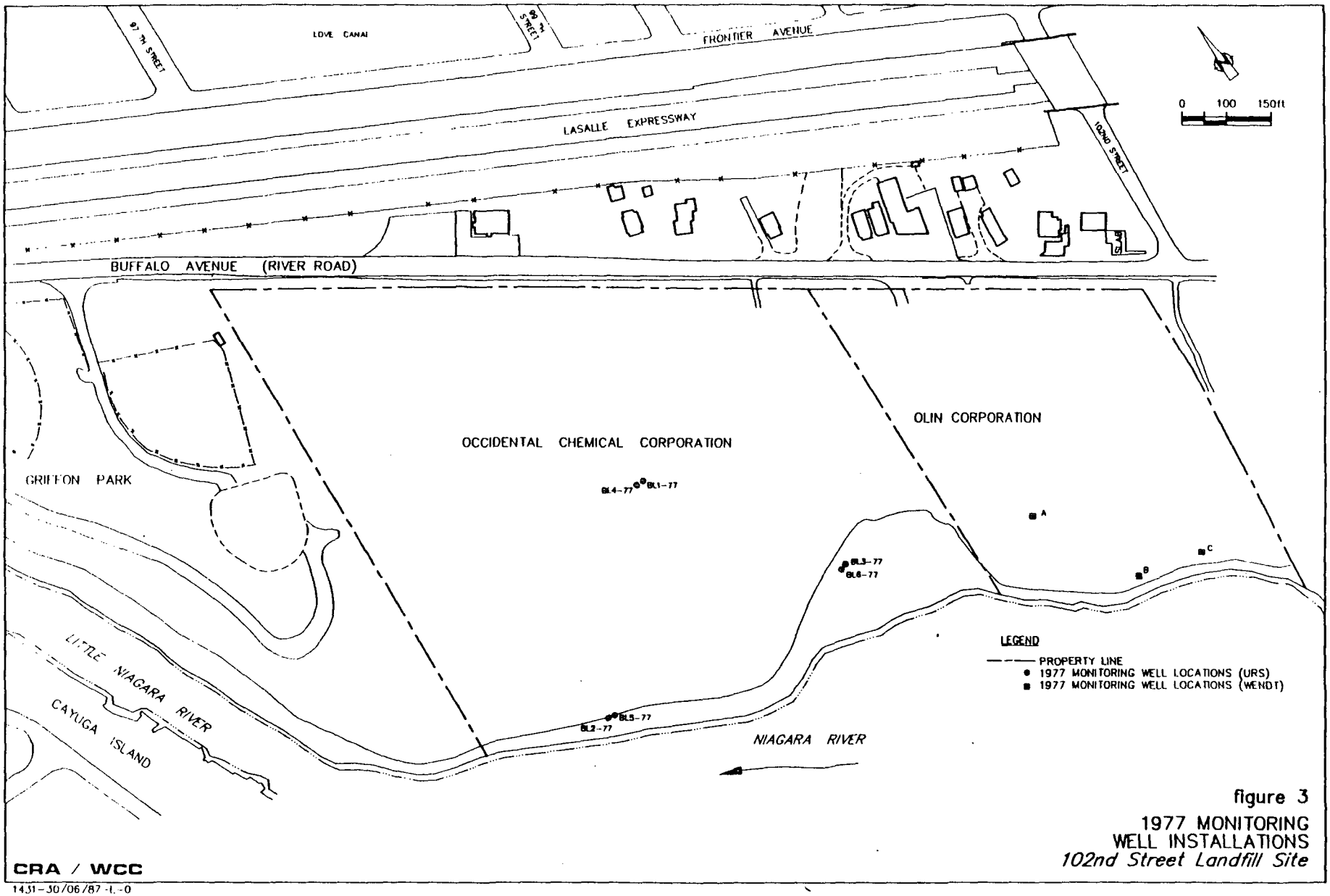

figure 3
1977 MONITORING WELL INSTALLATIONS
102nd Street Landfill Site

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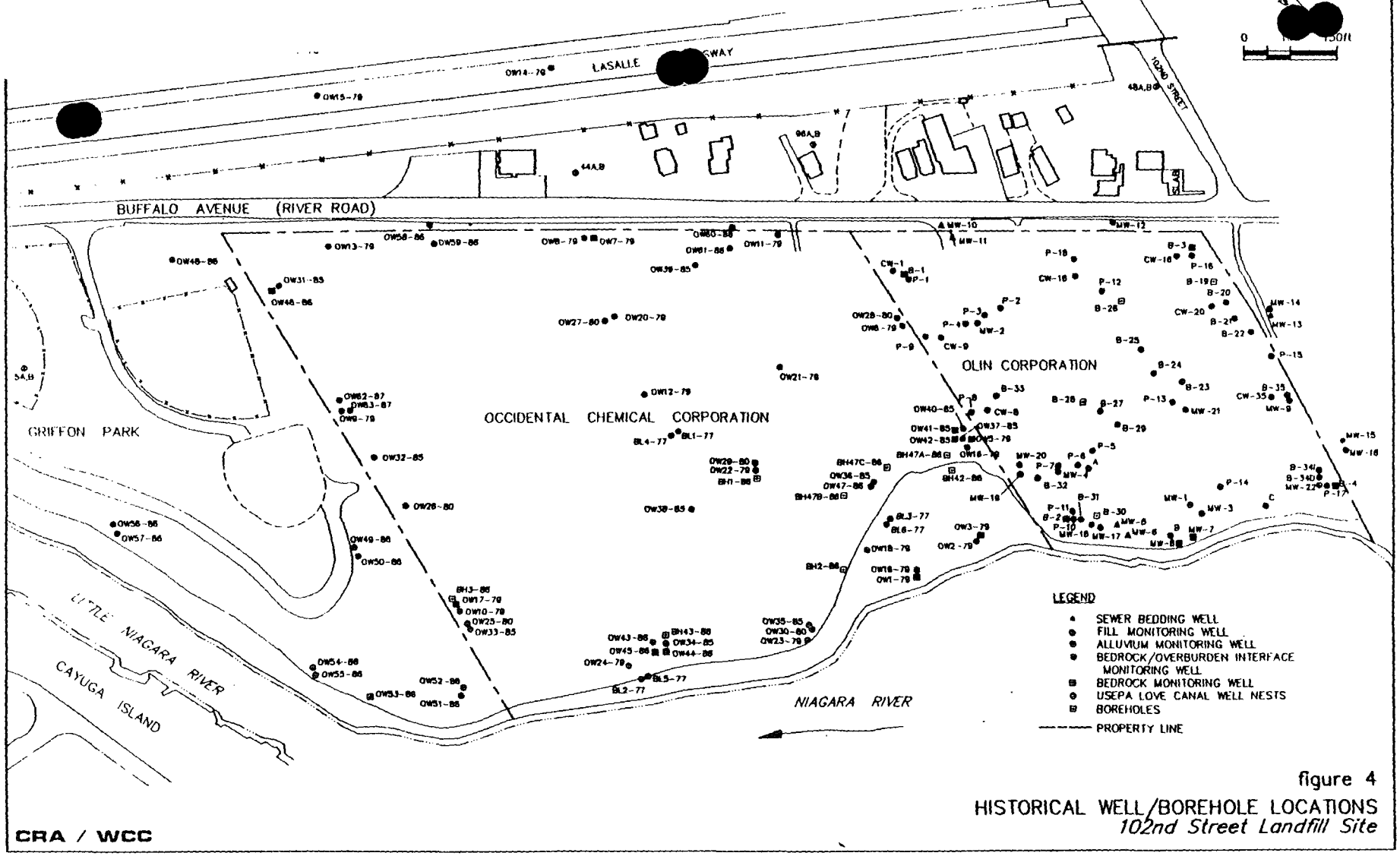

figure 4

HISTORICAL WELL/BOREHOLE LOCATIONS

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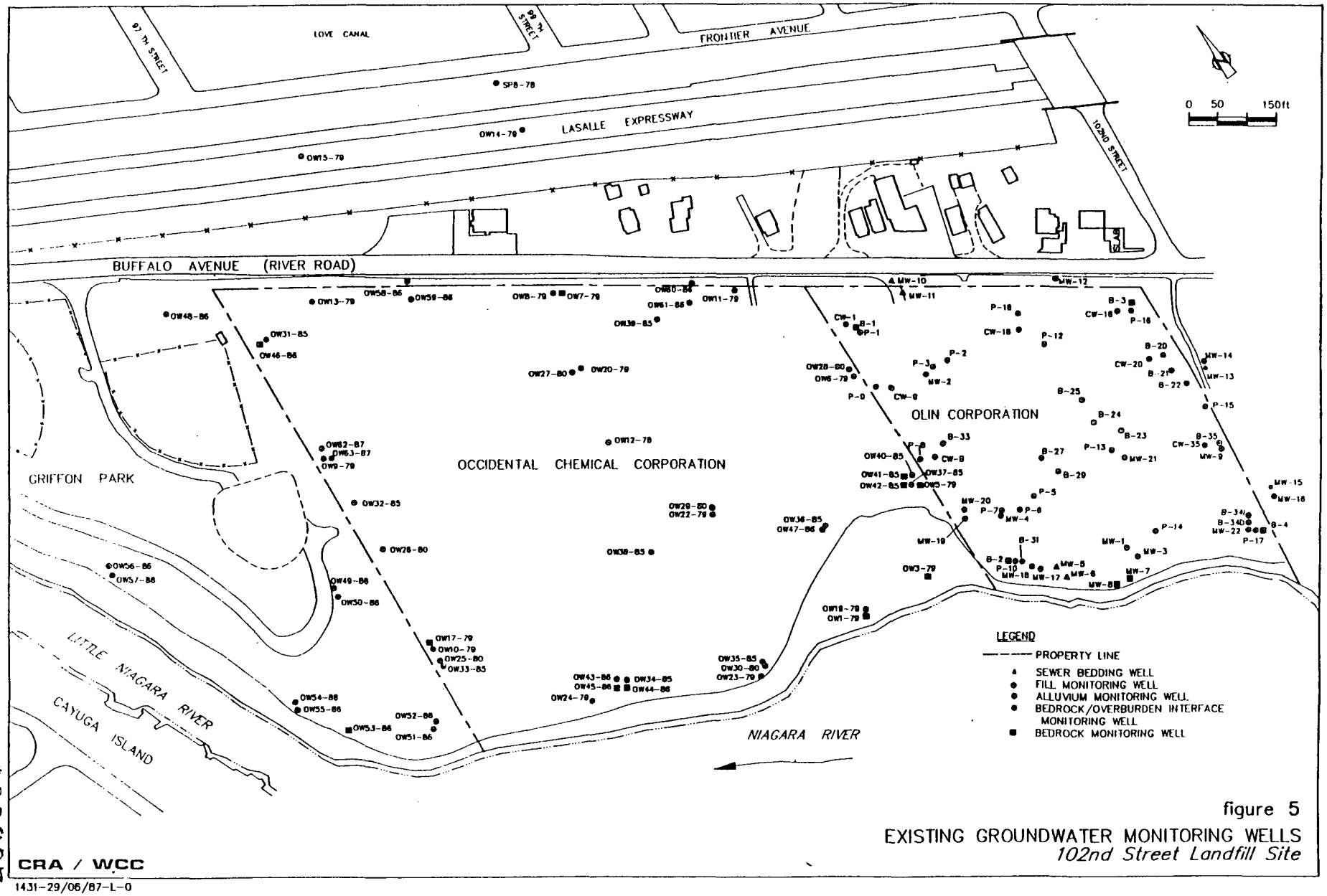

figure 5

EXISTING GROUNDWATER MONITORING WELLS

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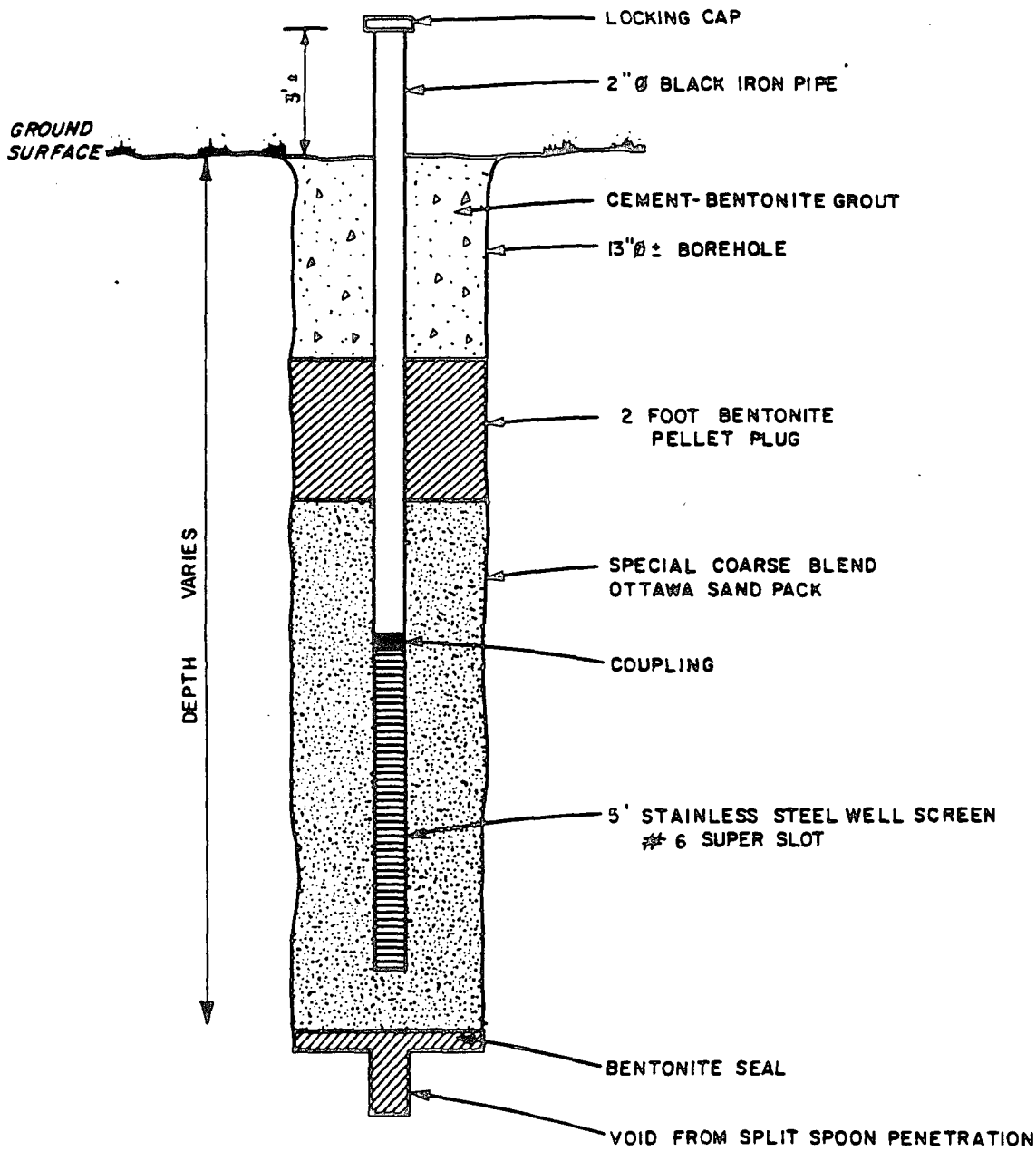

figure 6

TYPICAL OVERBURDEN WELL INSTALLATION
102nd Street Landfill Site

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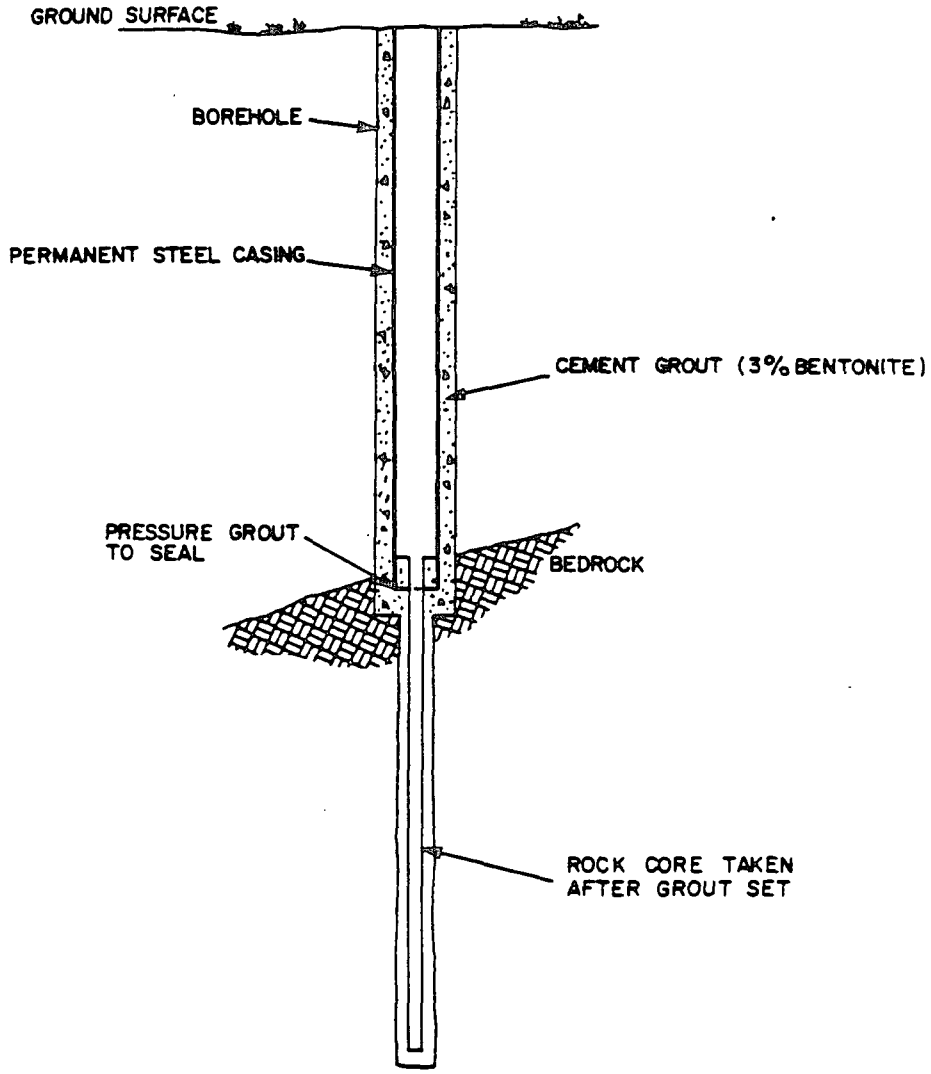

BEDROCK WELL

figure 7

BEDROCK CASING INSTALLATION
102nd Street Landfill Site

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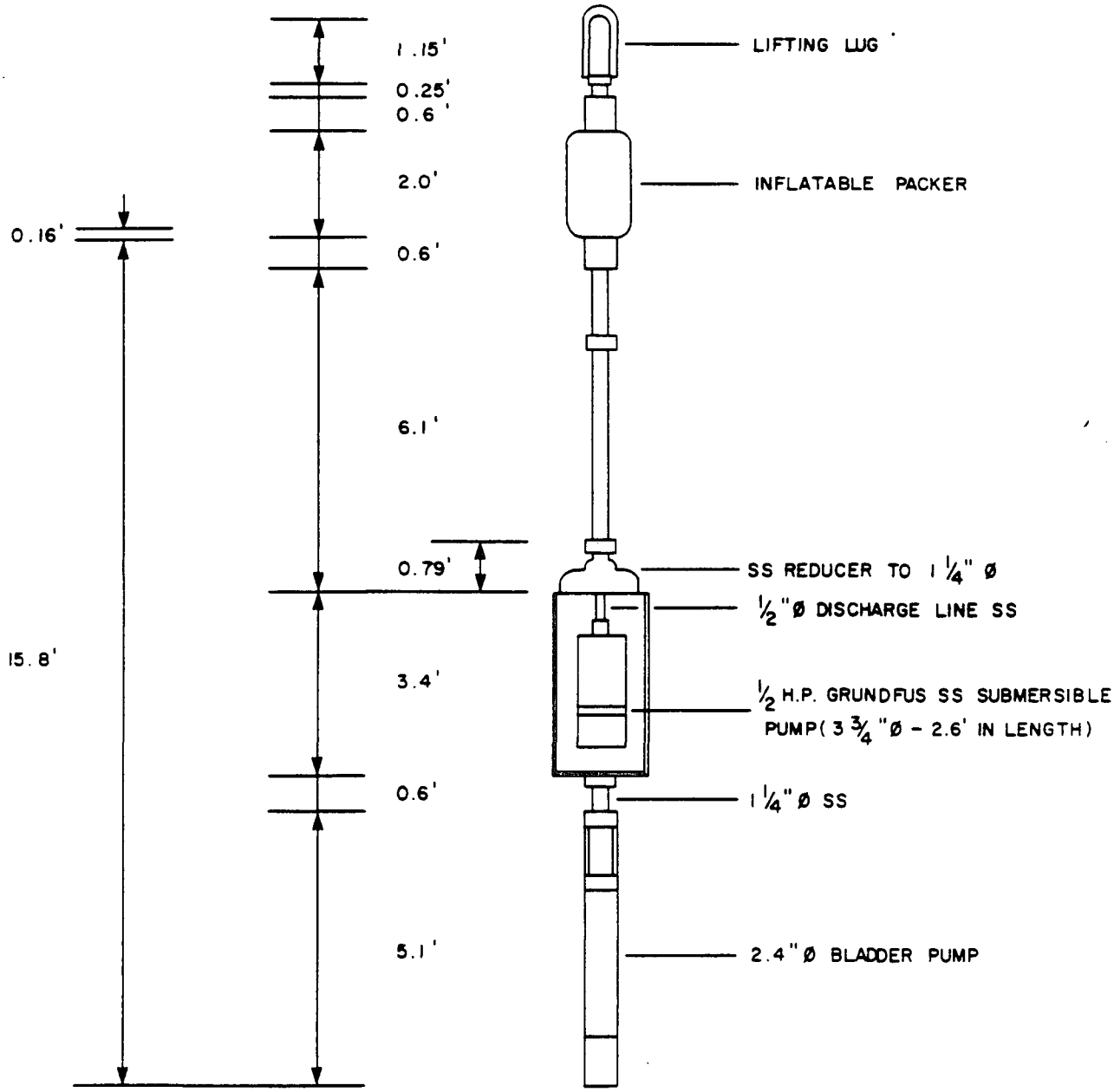

BOREHOLE STORAGE LENGTH WHEN PACKER IS INFLATED — 15.80 + 0.16 = 15.96'

WHEN INFLATED IT IS ESTIMATED THAT BLADDER SLIDES 2 INCHES.

figure 8

TYPICAL SUBMERSIBLE PACKER/PUMP ASSEMBLY

102nd Street Landfill Site

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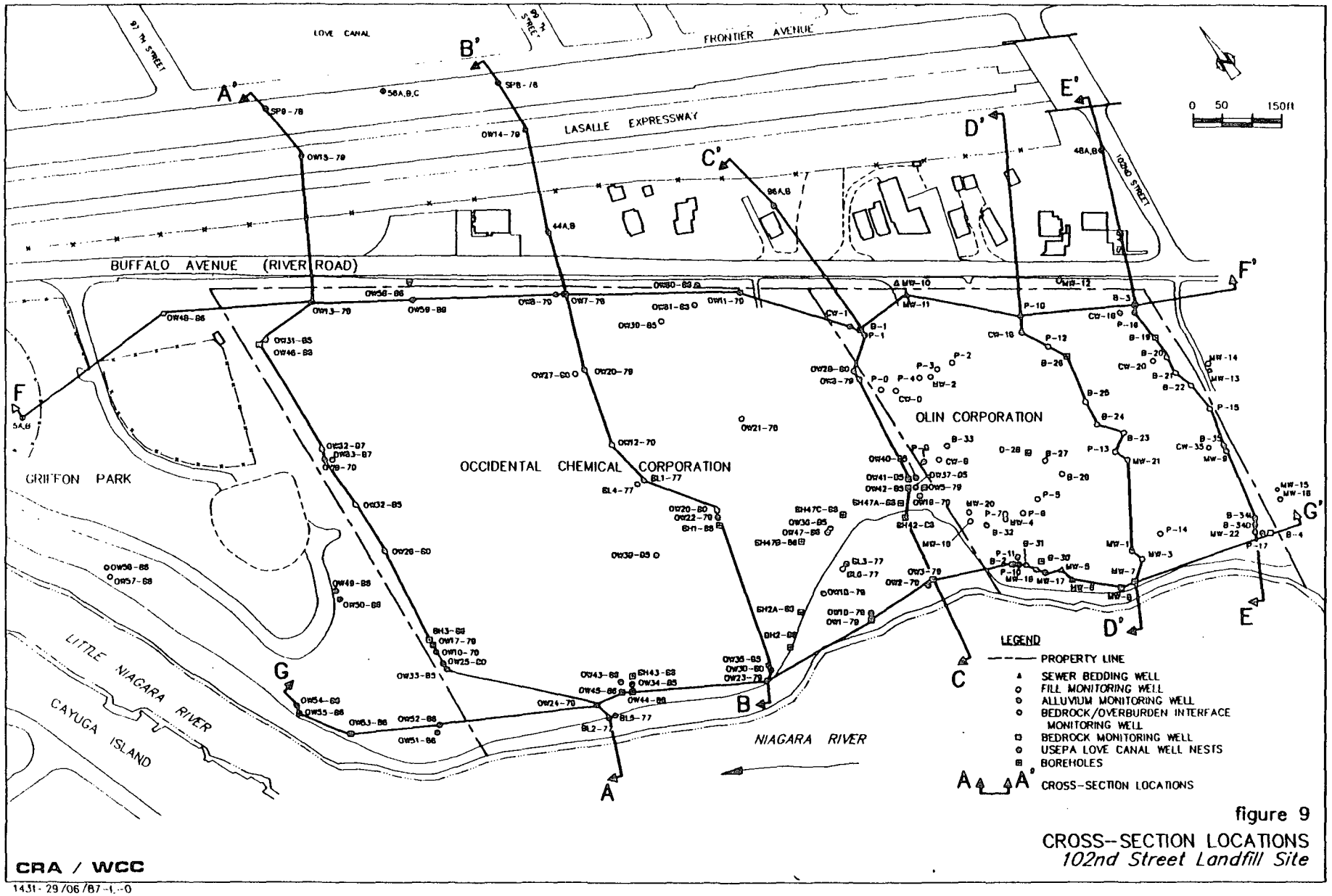

figure 9

CROSS-SECTION LOCATIONS
102nd Street Landfill Site

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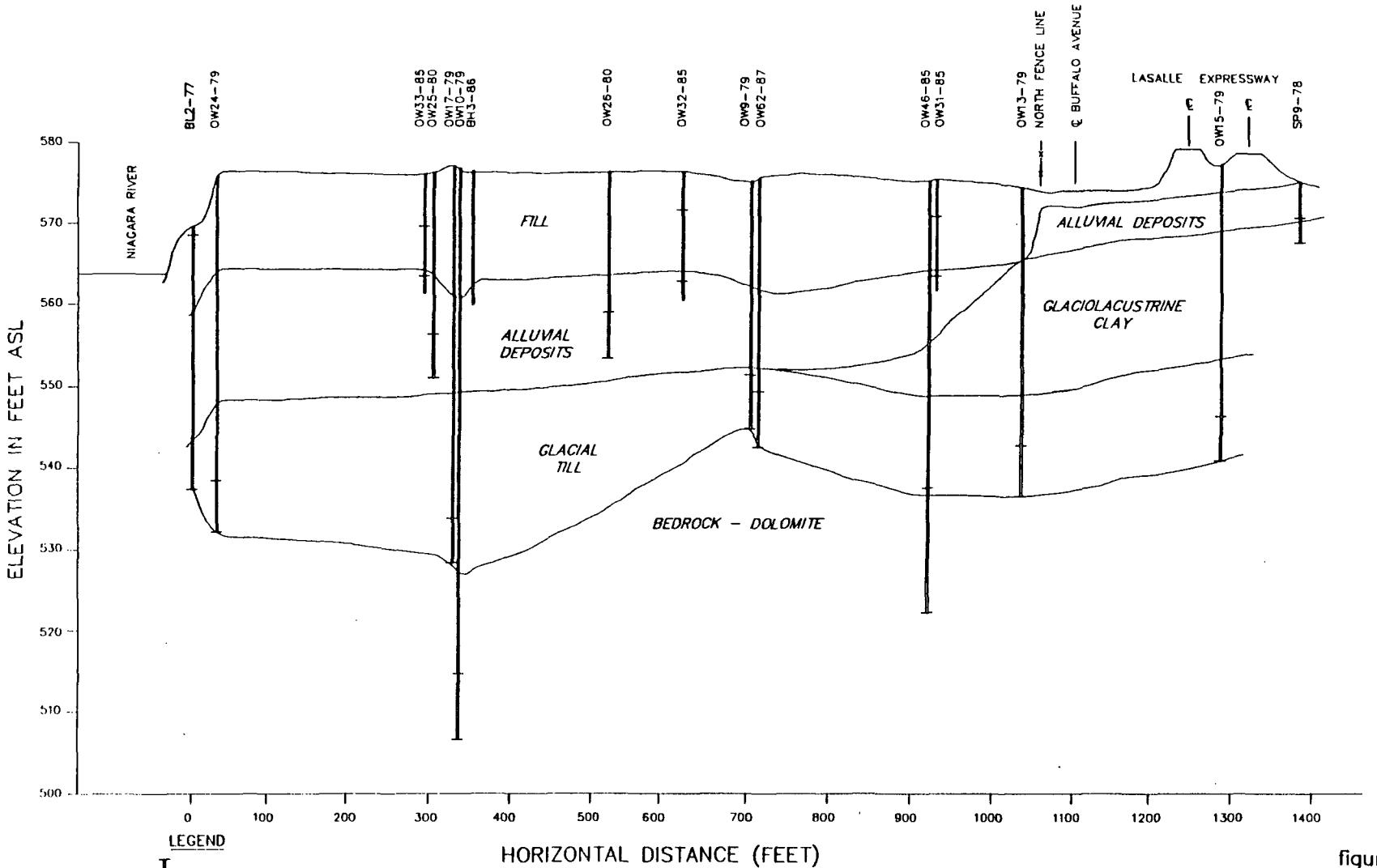

figure 10

NORTH-SOUTH CROSS-SECTION A-A'
102nd Street Landfill Site

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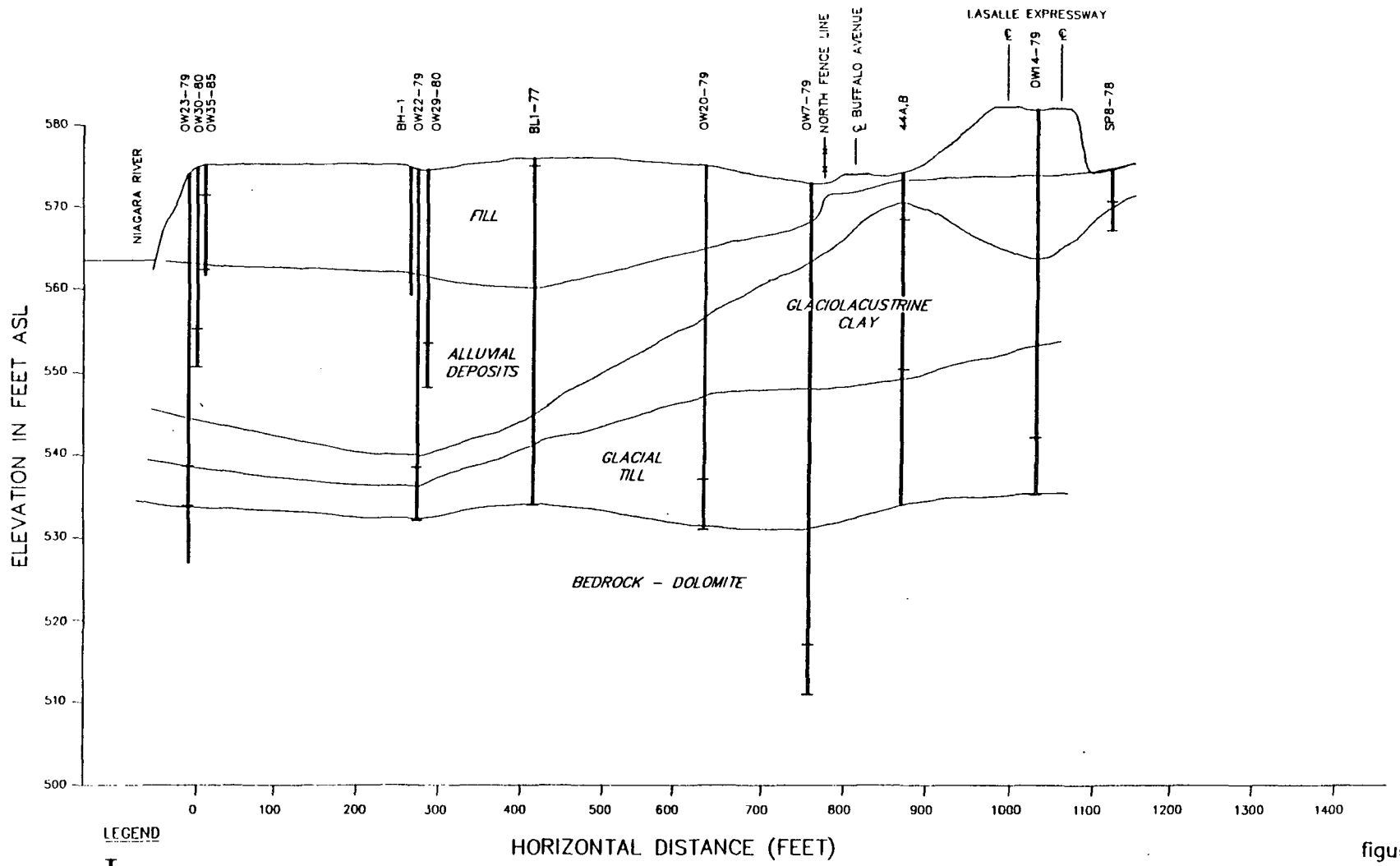

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I MONITORING INTERVAL

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figure 11

NORTH-SOUTH CROSS-SECTION B-B'

102nd Street Landfill Site

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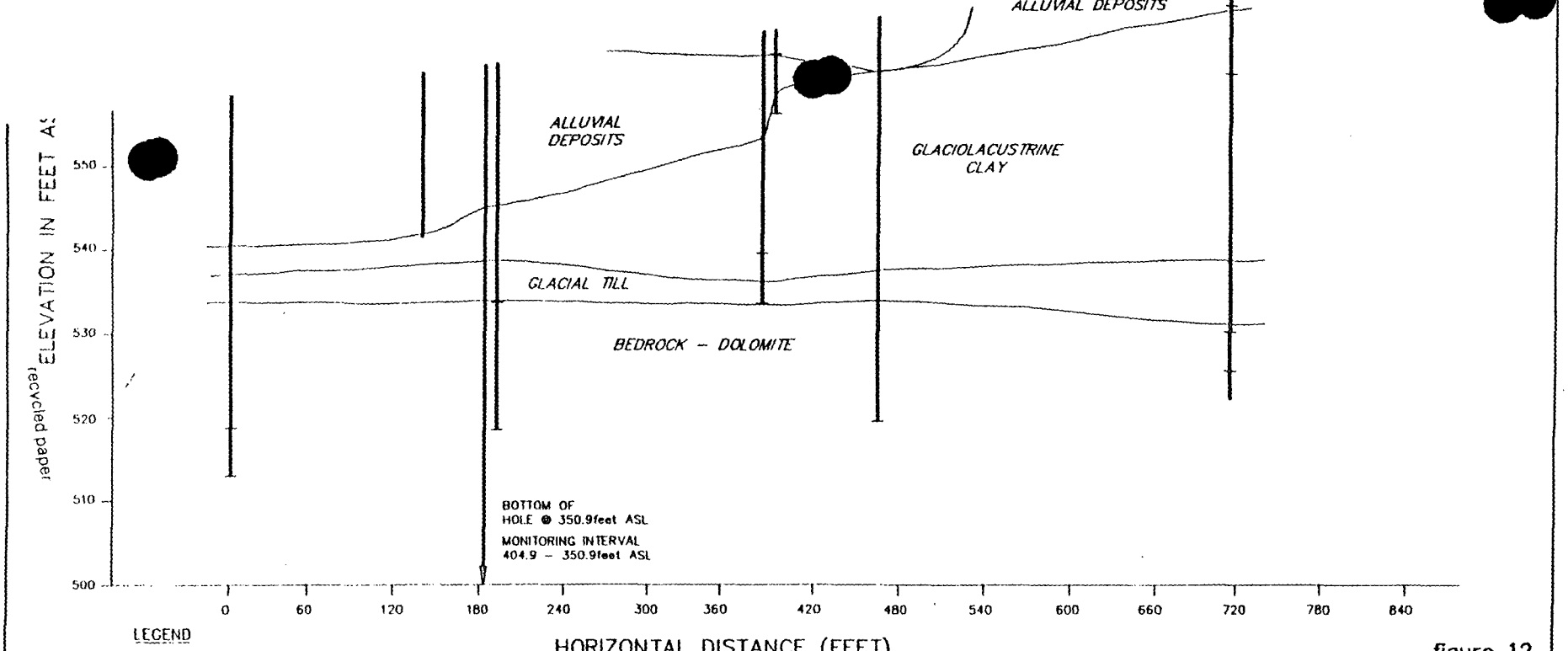

figure 12

NORTH-SOUTH CROSS-SECTION C-C'
102nd Street Landfill Site

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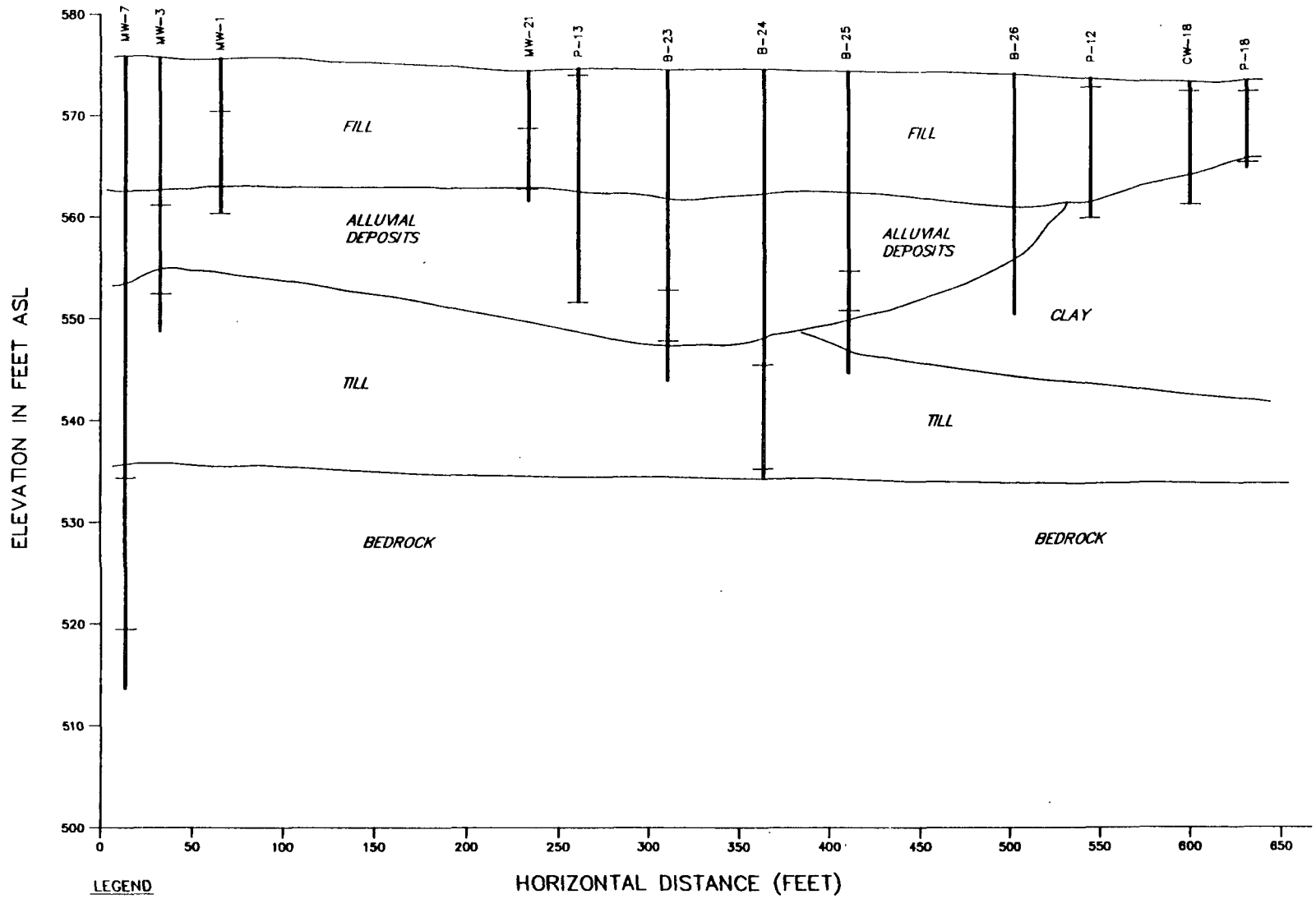

LEGEND

MONITORING INTERVAL

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figure 13

NORTH-SOUTH CROSS-SECTION D-D'

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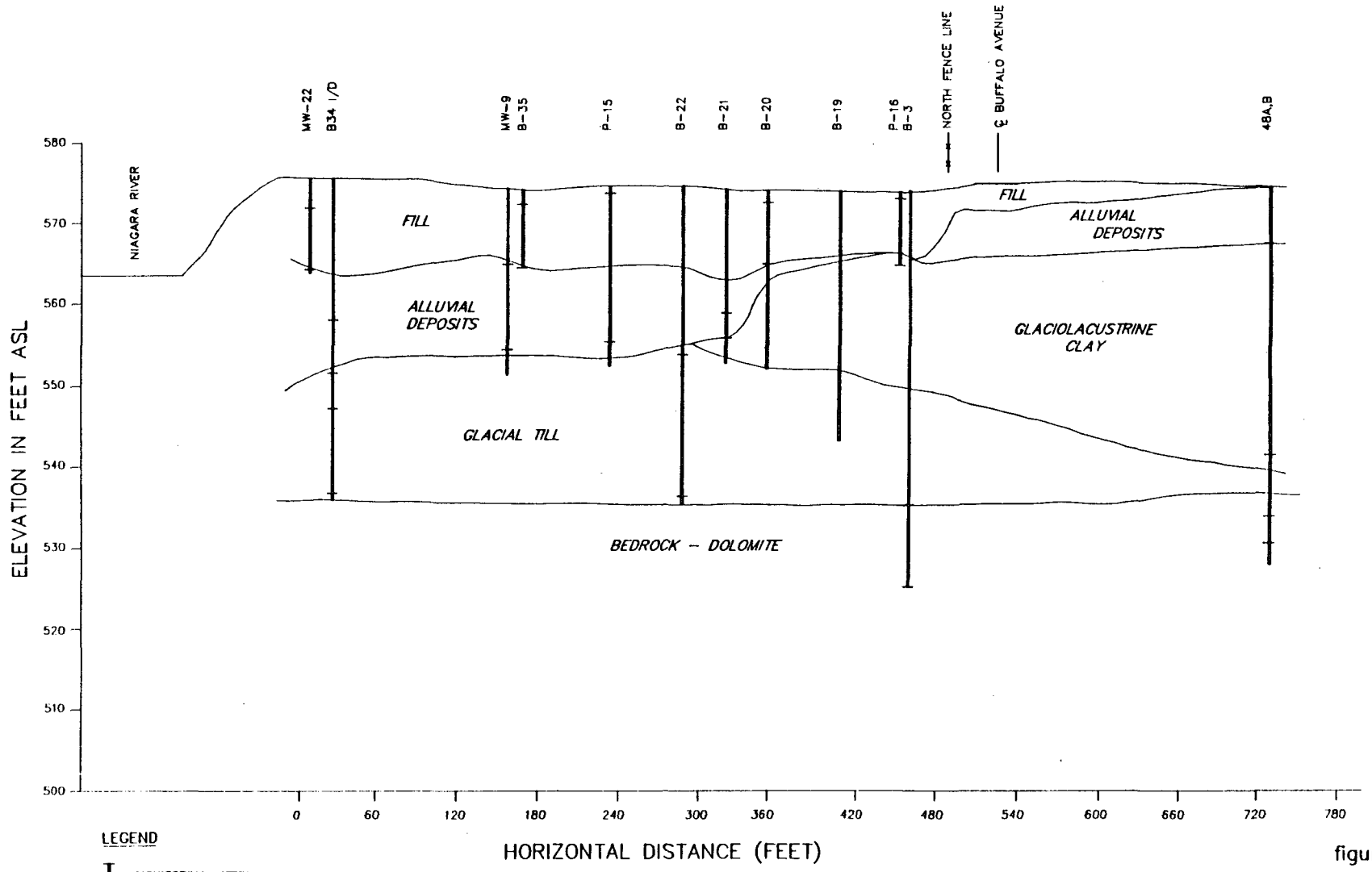

LEGEND

I MONITORING INTERVAL

figure 14

NORTH–SOUTH CROSS–SECTION E–E'

102nd Street Landfill Site

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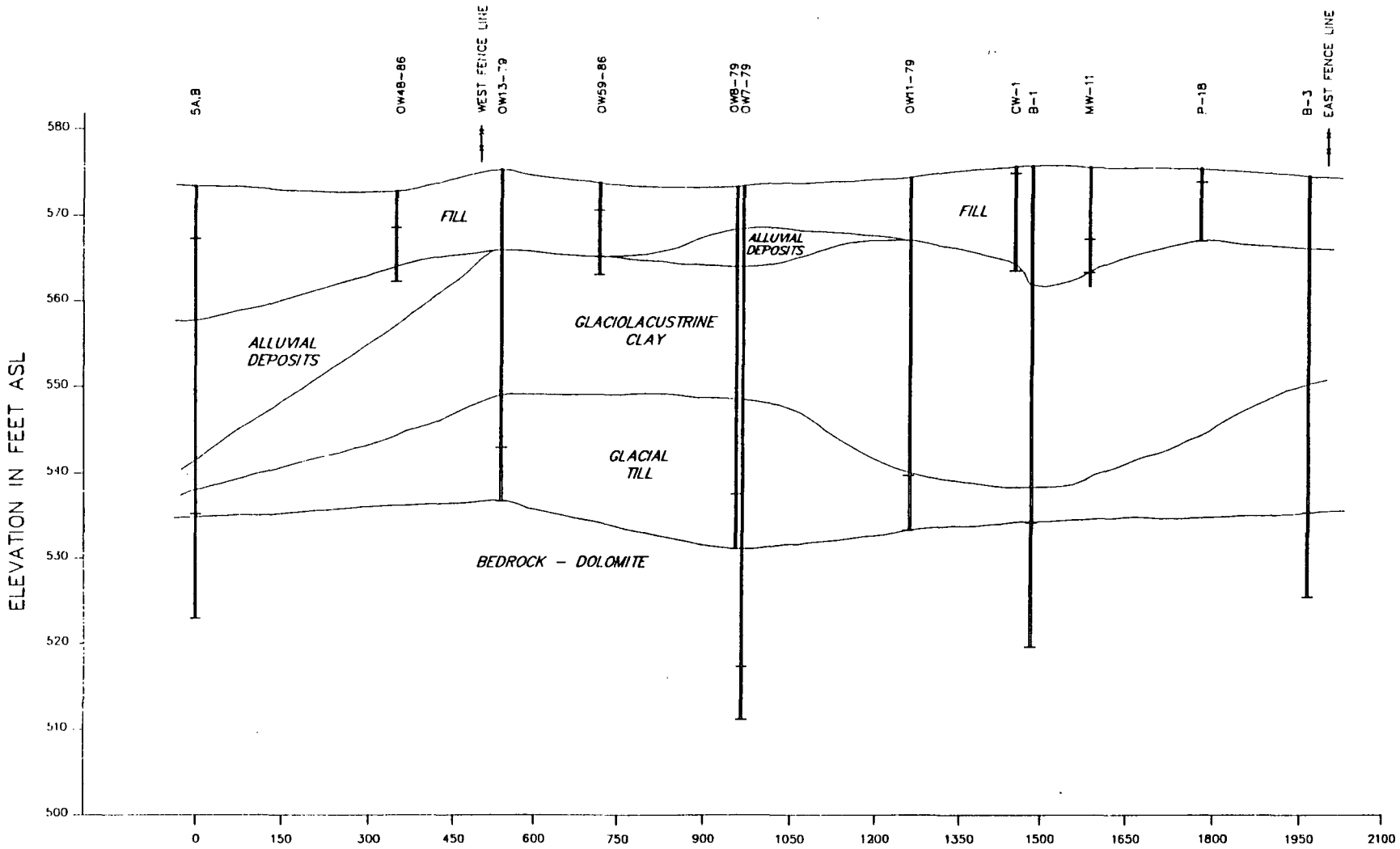

figure 15

EAST-WEST CROSS-SECTION F-F'

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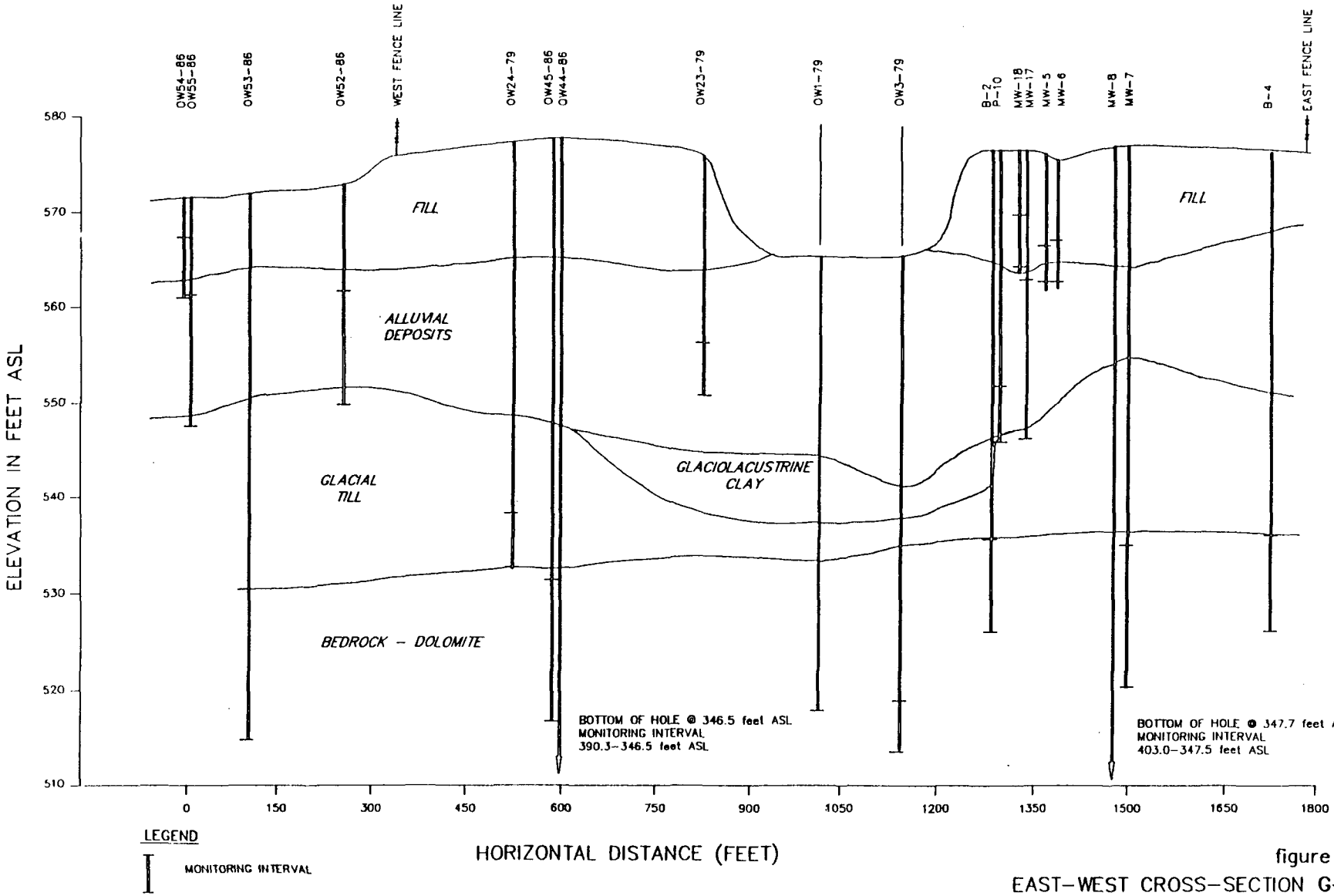

figure 16

EAST-WEST CROSS-SECTION G-G'

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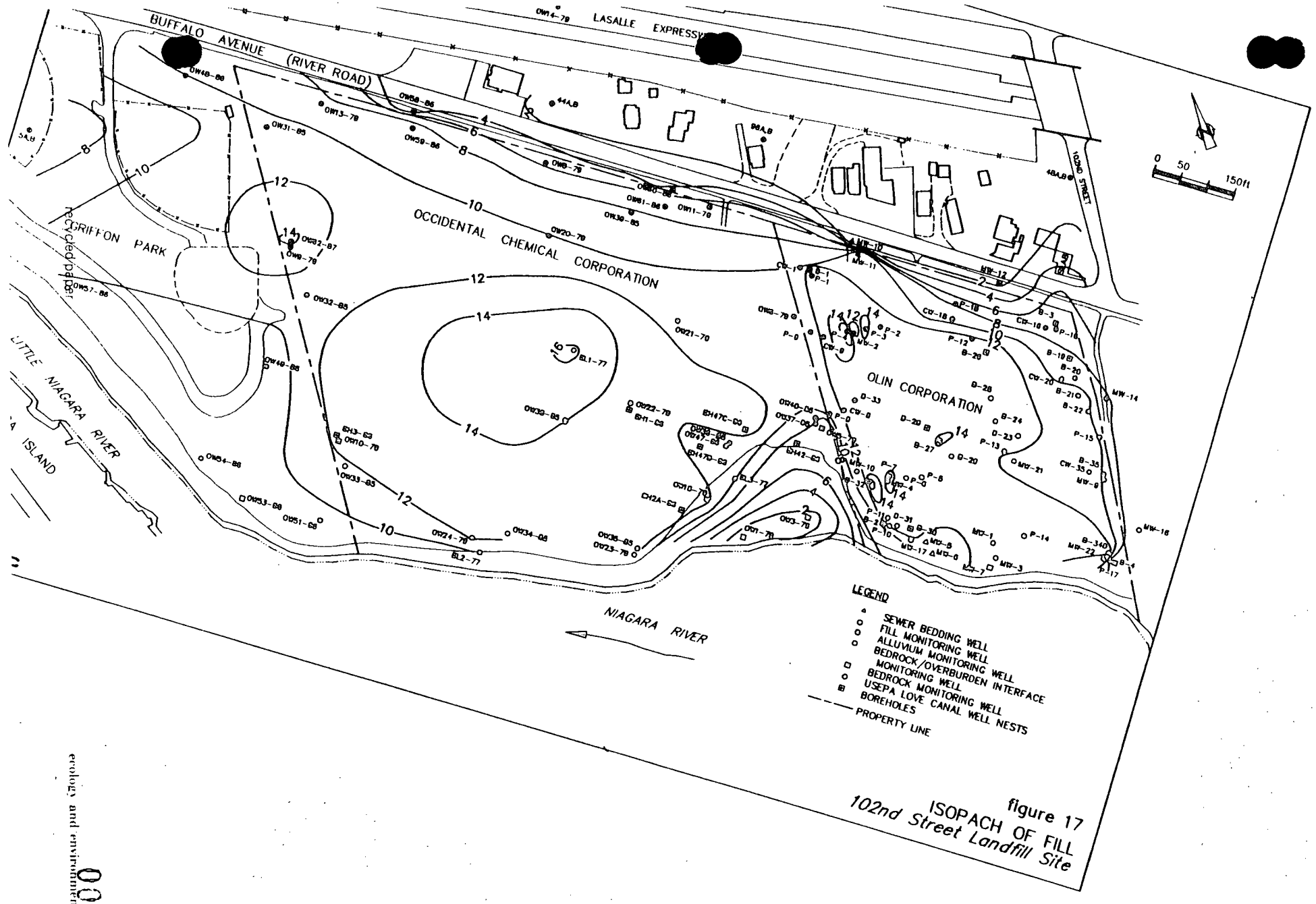

figure 17
ISOPACH OF FILL
102nd Street Landfill Site

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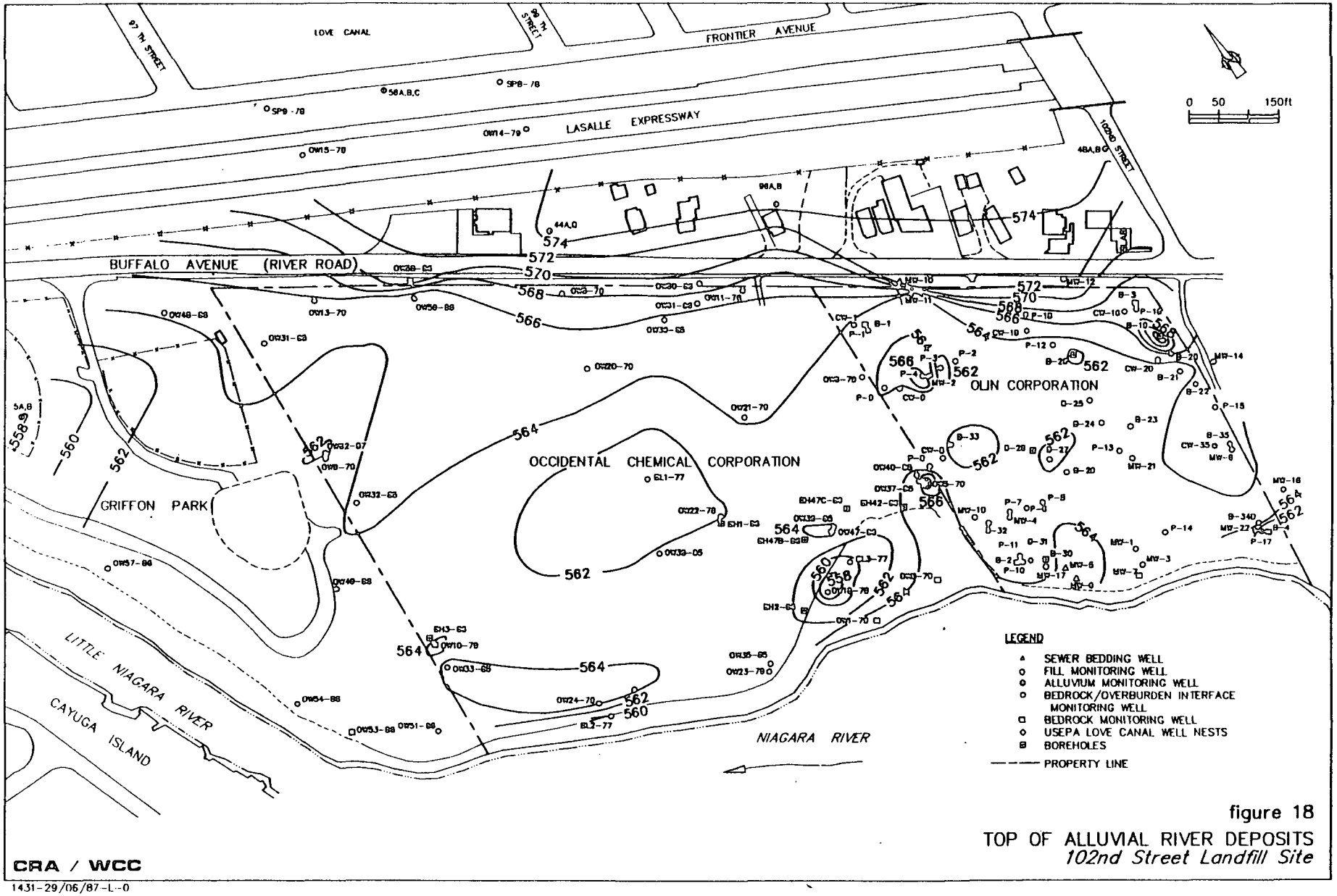

figure 18

TOP OF ALLUVIAL RIVER DEPOSITS

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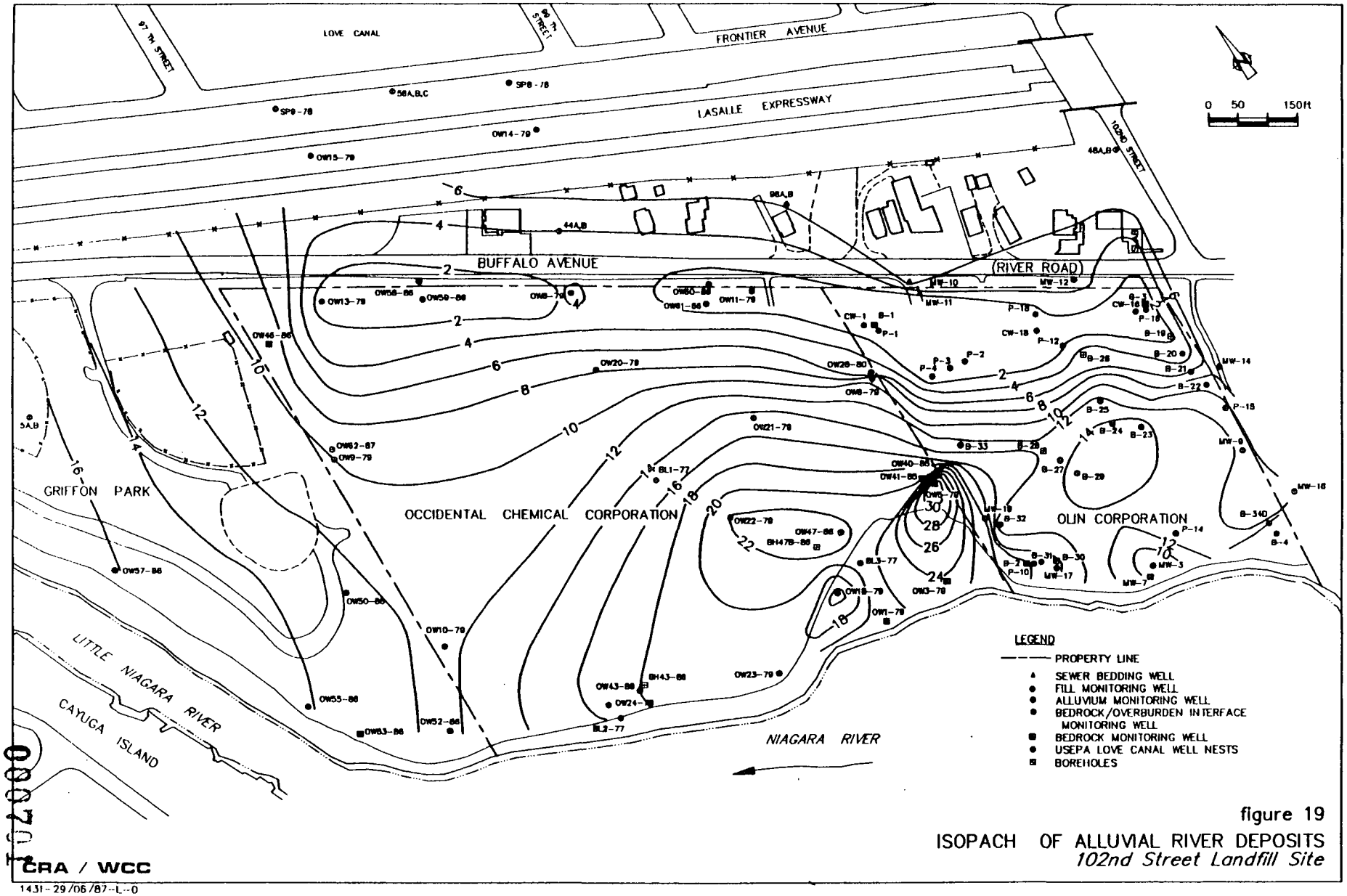

figure 19

ISOPACH OF ALLUVIAL RIVER DEPOSITS

102nd Street Landfill Site

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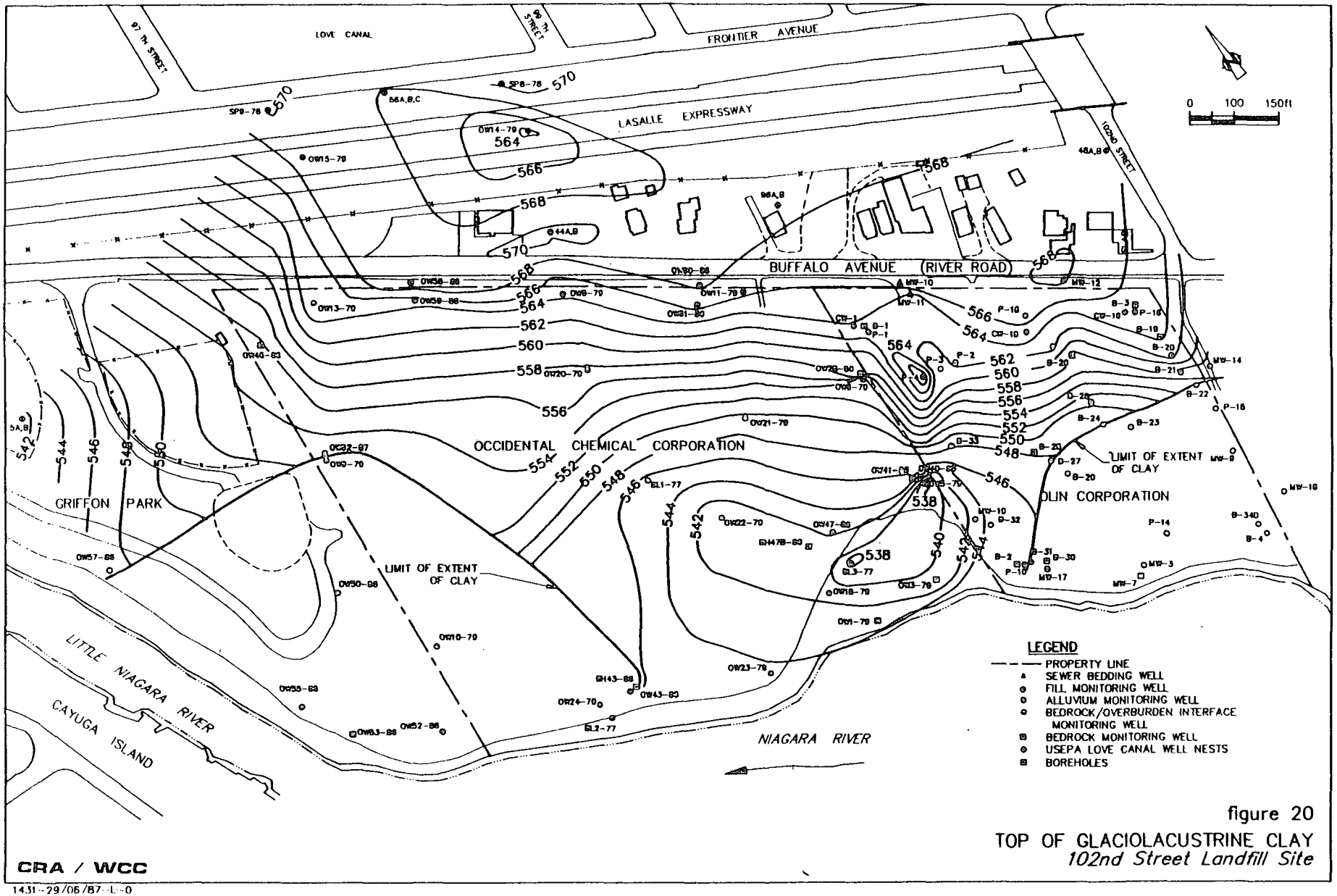

figure 20

TOP OF GLACIOLACUSTRINE CLAY

102nd Street Landfill Site

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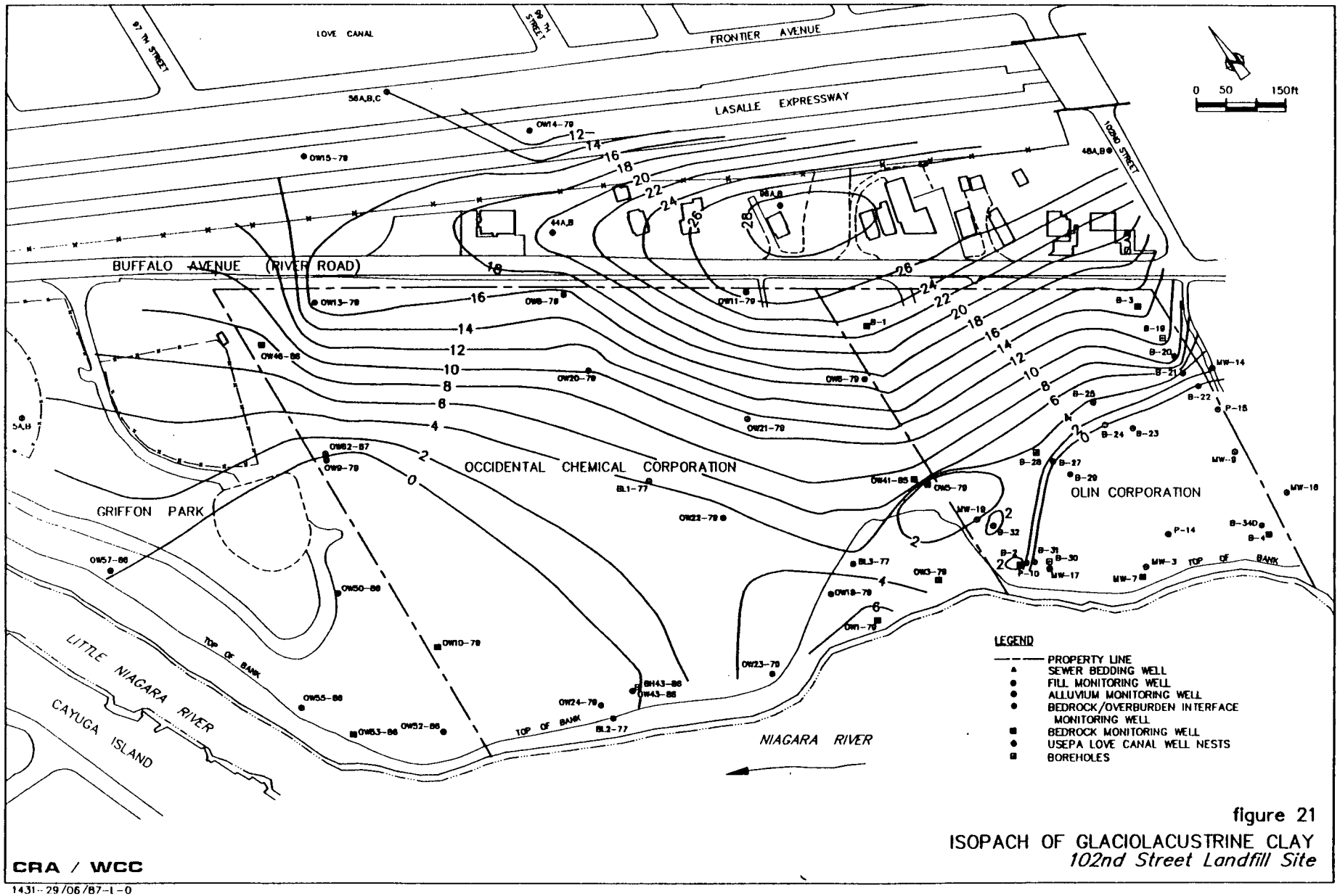

figure 21

ISOPACH OF GLACIOLACUSTRINE CLAY

102nd Street Landfill Site

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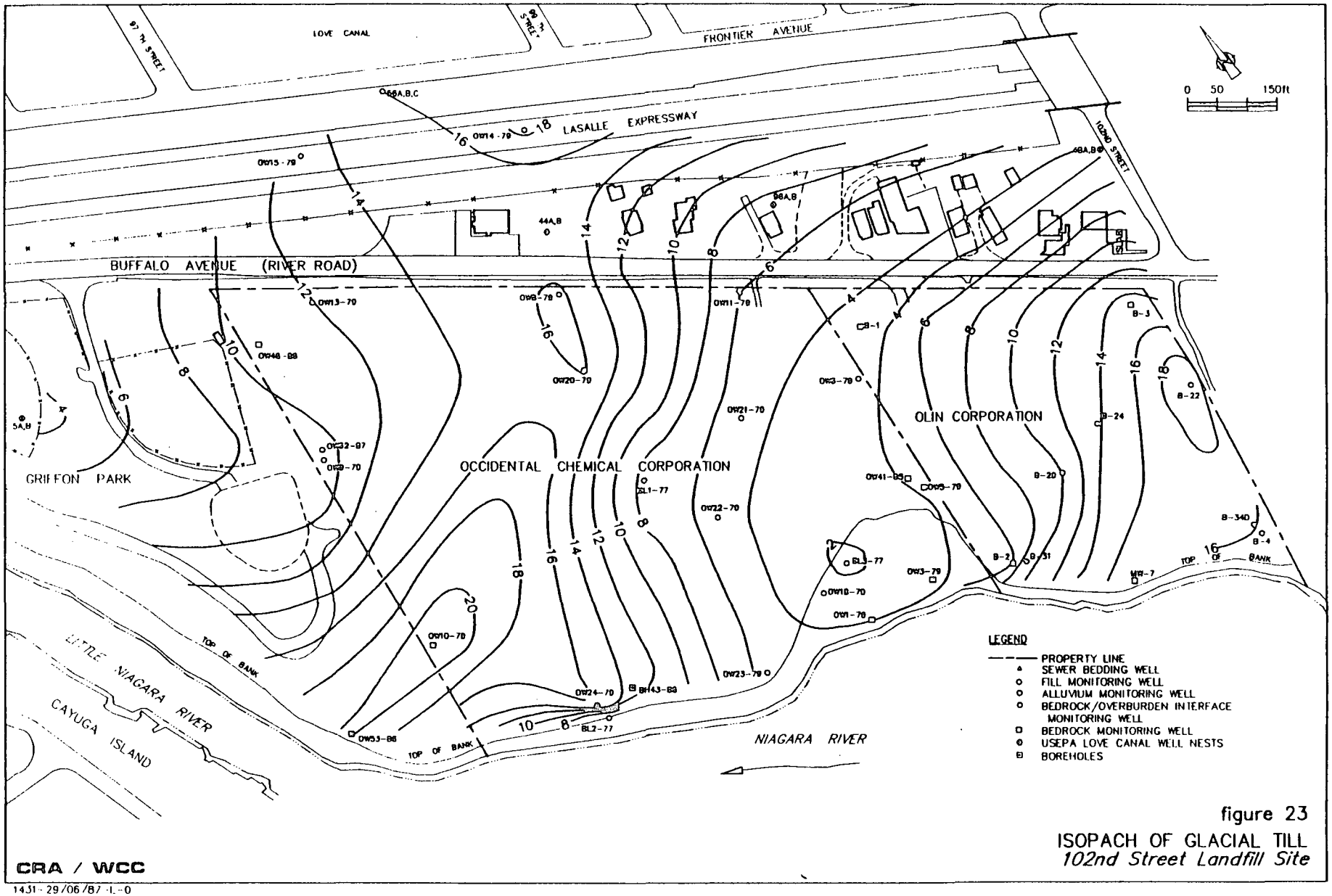

figure 23
ISOPACH OF GLACIAL TILL
102nd Street Landfill Site

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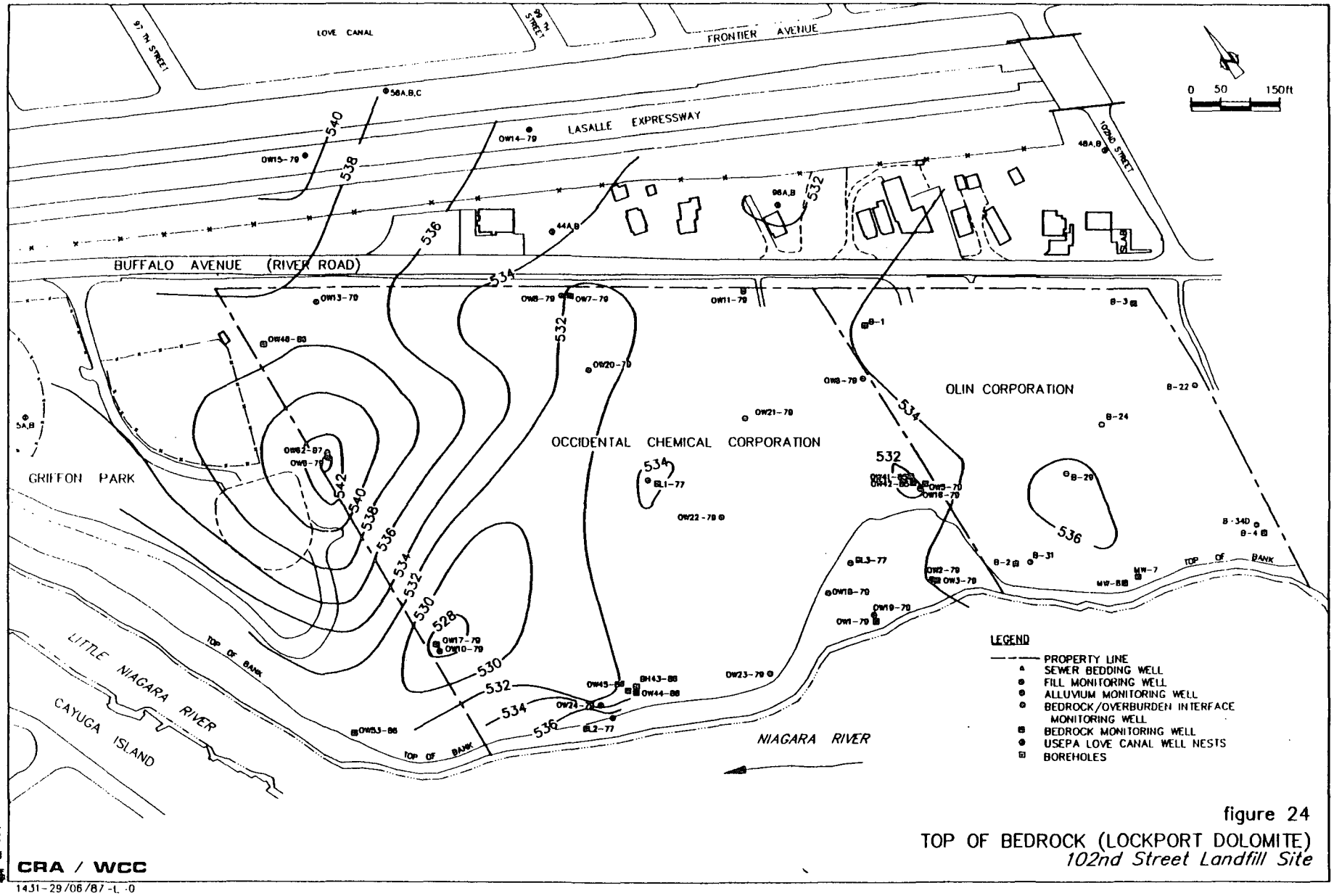

figure 24

TOP OF BEDROCK (LOCKPORT DOLOMITE)

102nd Street Landfill Site

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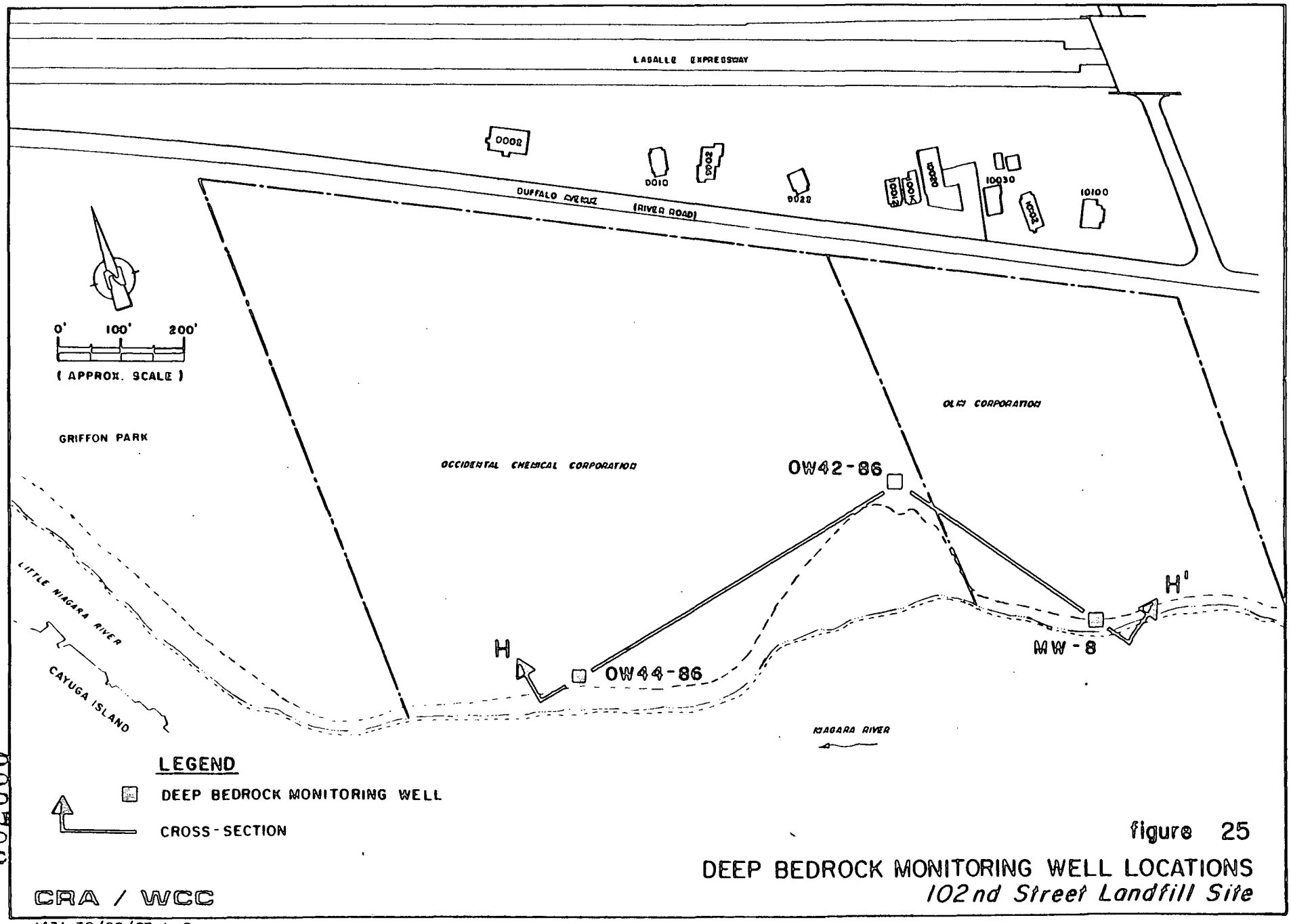

figure 25

DEEP BEDROCK MONITORING WELL LOCATIONS

102nd Street Landfill Site

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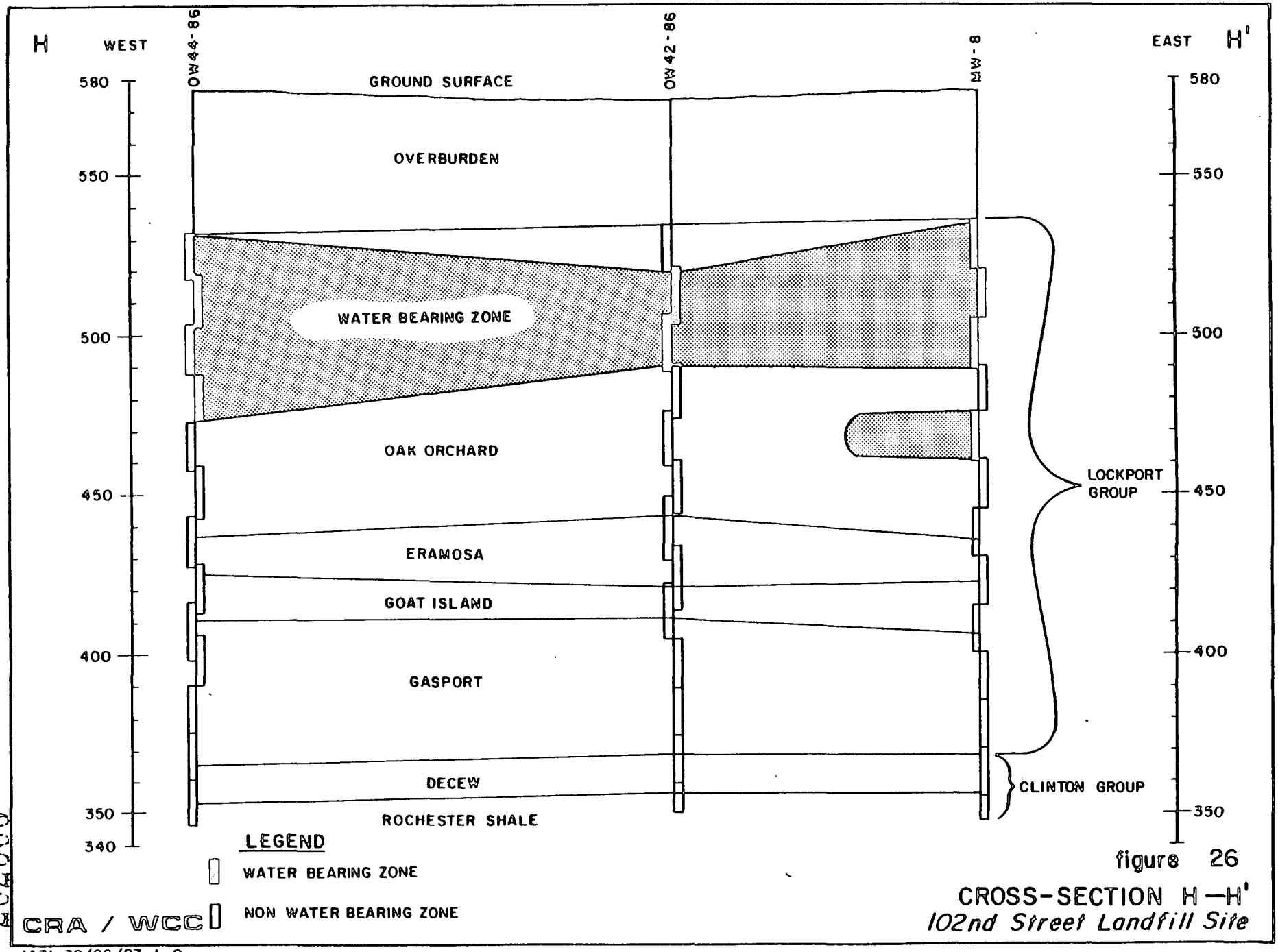

figure 26

CROSS-SECTION H—H'
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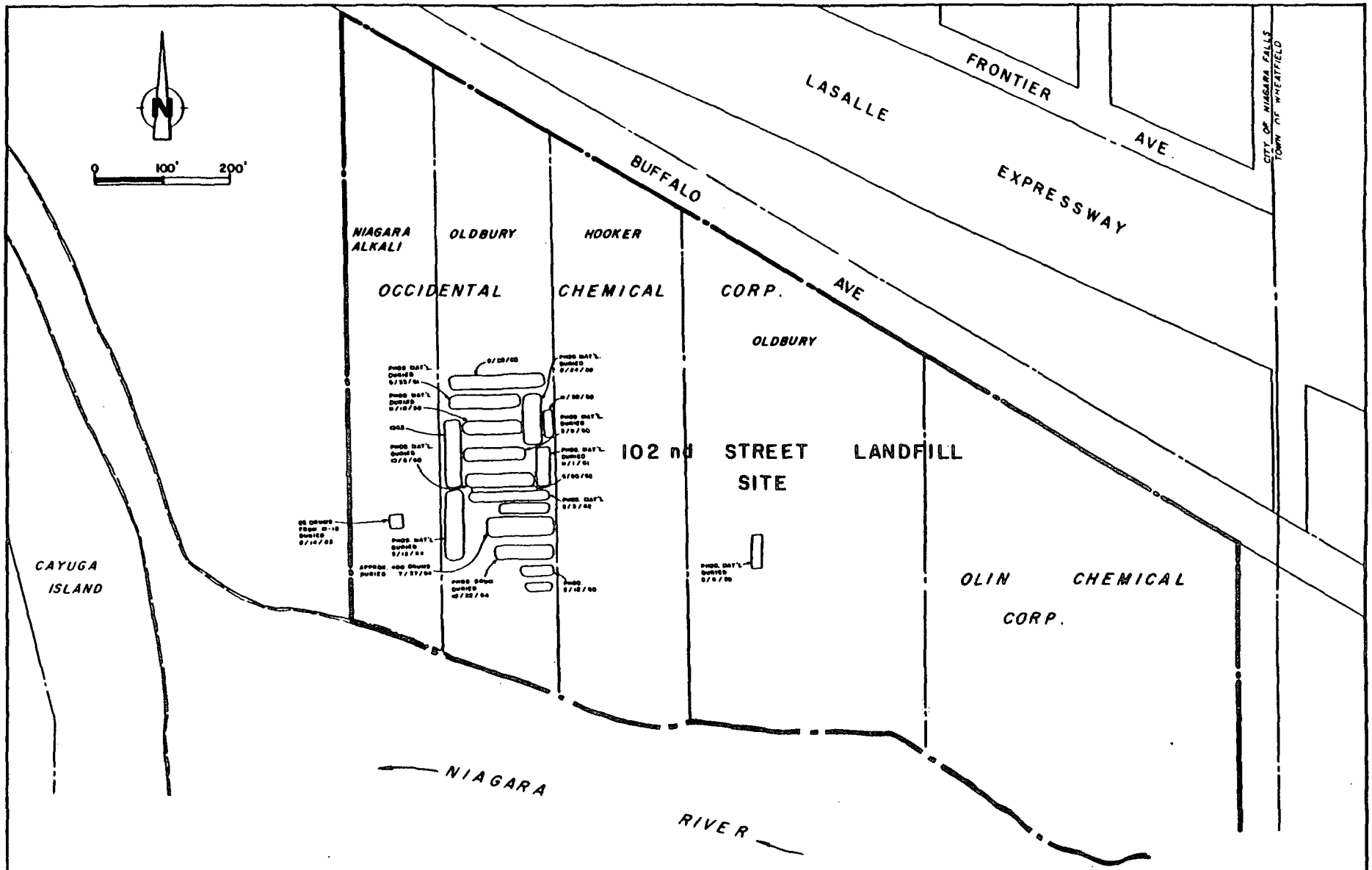

figure 27

PHOSPHORUS BURIAL AREAS
102nd Street Landfill Site

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TABLES

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TABLE 1

HISTORIC SUBSURFACE EXPLORATION PROGRAMS

1973	Olin	Pittsburg Testing Laboratory, three borings for proposed bulkhead construction
1977	Olin	Wendt wells installed (3) - subsequently abandoned
1977	OCC	URS/overburden wells subsequently removed in 1979
1978	Olin	RECRA/Wehran, shallow bedrock wells (4)
1978	Olin	RECRA/Wehran, overburden piezometers (17)
1979	Olin	RECRA/Wehran, overburden piezometers (1) RECRA/Wehran, overburden couplet wells (5)
1979	OCC	CRA/overburden wells (18)
1979	OCC	CRA/bedrock wells (5)
1980	Olin	RECRA/Wehran, overburden couplet wells (2)
1980	Olin	RECRA/Wehran, overburden exploration borings (5)
1980	Olin	RECRA/Wehran, overburden monitoring wells (12)
1980	OCC	CRA/overburden wells (6)

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TABLE 2

MONTHLY TEMPERATURE AND PRECIPITATION
BUFFALO, NEW YORK

Month	Mean Daily Temperature (°F)	Mean Monthly Precipitation (inches)
January	23.7	2.90
February	24.4	2.55
March	32.1	2.85
April	44.9	3.15
May	55.1	2.97
June	65.7	2.23
July	70.1	2.93
August	68.4	3.53
September	61.6	3.25
October	51.5	3.01
November	39.8	3.74
December	27.9	3.00
Annual	47.0	36.11

Climatological data obtained from the Buffalo Weather Station for the data years 1939 to 1978.

TABLE 3

DEEP WELL TESTING SUMMARY - OW42-86
- 1 -

Interval	A	B	C	D	E	F	G
Drilled Depth	39.3-55.1 ft.	55.1-70.2 ft.	70.2-85.0 ft.	85.0-100.0 ft.	100.0-115.0 ft.	115.0-130.0 ft.	130.0-145.0 ft.
Elevation	534.3-518.5 ft.	518.5-503.4 ft.	503.4-488.6 ft.	488.6-473.6 ft.	473.6-458.6 ft.	458.6-443.6 ft.	443.6-428.6 ft.
Tested Depth	39.3-54.5 ft.	52.9-70.2 ft.	67.3-85.0 ft.	82.8-100.0 ft.	97.7-115.0 ft.	112.8-130.0 ft.	124.3-145.0 ft.
Elevation	534.3-519.1 ft.	520.7-503.4 ft.	506.3-488.6 ft.	490.8-473.6 ft.	475.9-458.6 ft.	460.8-443.6 ft.	449.3-428.6 ft.
Pump Rate	0.12 gpm	4.5 gpm	7.0 gpm	0.51 gpm	0.45 gpm	0.37 gpm	0.08 gpm
Estimated Infiltration Rate	0.12 gpm	4.5 gpm	7.0 gpm	0.51 gpm	0.45 gpm	0.37 gpm	0.08 gpm
Water Bearing	No	Yes	Yes	No	No	No	No
Water Loss During Coring	600 gal	1918 gal	2340 gal	67 gal	52 gal	136 gal	377 gal
Water Removed (including test)	909 gal	681 gal	910 gal	229 gal	214 gal	740 gal	210 gal
Final Tracer Concentration	45/1000	84/1000	67/1000	72/1000	49/1000	74/1000	283/1000
Sample Collected	No	Yes	Yes	Yes[1]	Yes[1]	No	No

Note:

1. Although the estimated infiltration rate was less than 0.6 gpm and therefore, by definition, the tested interval was non-water bearing, samples were still collected since the infiltration rate was within the reasonable range of the definition of water bearing.

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TABLE 3

DEEP WELL TESTING SUMMARY - OW42-86

- 2 -

Interval	H	I	J	K	L	M
Drilled Depth	145.0-160.0 ft.	160.0-169.3 ft.	169.3-184.3 ft.	184.3-199.3 ft.	199.3-214.3 ft.	214.3-223.4 ft.
Elevation	428.6-413.6 ft.	413.6-404.3 ft.	404.3-389.3 ft.	389.3-374.3 ft.	374.3-359.3 ft.	359.3-350.2 ft.
Tested Depth	139.7-160.0 ft.	152.1-169.3 ft.	169.3-184.3 ft.	169.3-199.3 ft.	169.3-214.3 ft.	169.3-223.4 ft.
Elevation	433.9-413.6 ft.	421.5-404.3 ft.	404.3-389.3 ft.	404.3-374.3 ft.	404.3-359.3 ft.	404.3-350.2 ft.
Pump Rate	0.34 gpm	0.16 gpm	0 gpm	0.19 gpm	0.42 gpm	0.40 gpm
Estimated Infiltration Rate	0.34 gpm	0.16 gpm	0 gpm	0.19 gpm	0.42 gpm	0.40 gpm
Water Bearing	No	No	No	No (30 ft. tested interval)	No (45 ft. tested interval)	No. (54.1 ft. tested interval)
Water Loss During	254 gal	134 gal	207 gal	0 gal	58 gal	60 gal
Removed (during test)	240 gal	104 gal	60 gal±	254 gal±	187 gal±	72 gal±
Tracer Concentration	146/1000	233/1000	NM	NM	NM	NM
Collected	No	No	No	No	No	No

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TABLE 3

DEEP WELL TESTING SUMMARY - OW44-86
- 3 -

Interval	A	B	C	D	E	F	G
Drilled Depth	44.0- 59.4 ft.	59.4- 74.4 ft.	74.4- 89.4 ft.	89.4-104.4 ft.	104.4-119.4 ft.	119.4-134.4 ft.	134.4-149.4 ft.
Elevation	533.2-517.8 ft.	517.8-502.8 ft.	502.8-487.8 ft.	487.8-472.8 ft.	472.8-457.8 ft.	457.8-442.8 ft.	442.8-427.8 ft.
Tested Depth	44.0- 59.4 ft.	59.1- 74.4 ft.	74.0- 89.4 ft.	89.4-104.4 ft.	104.4-119.4 ft.	118.0-134.4 ft.	133.7-149.4 ft.
Elevation	533.2-517.8 ft.	518.1-502.8 ft.	503.2-487.8 ft.	487.8-472.8 ft.	472.8-457.8 ft.	459.2-442.8 ft.	443.5-427.8 ft.
Pump Rate	0.32 gpm	0.24 gpm	0.11 gpm	0.87 gpm	0.20 gpm	0.09 gpm	0 gpm
Estimated Infiltration Rate	>0.32 gpm	>0.24 gpm	>0.11 gpm	0.87 gpm	0.20 gpm	0.09 gpm	9 gpm
Water Bearing	Yes	Yes	Yes	Yes	No	No	No
Water Loss During Coring	5,150 gallons	1,679 gallons	1,800 gallons	45 gallons	37 gallons	55 gallons	178 gallons
Water Removed (including test)	6,595 gallons	2,558 gallons	2,715 gallons	403 gallons	117 gallons	285 gallons	306 gallons
Final Tracer Concentration	67/1,000	42/1,000	67/1,000	35/1,000	134/1,000	161/1,000	94/1,000
Sample Collected	Yes	Yes	Yes	Yes	No	No	No

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TABLE 3

DEEP WELL TESTING SUMMARY - OW44-86
- 4 -

Interval	H	I	J	K	L	M
Drilled Depth	149.4-164.4 ft.	164.4-179.4 ft.	179.4-186.9 ft.	186.7-201.7 ft.	201.7-216.7 ft.	216.7-230.7 ft.
Elevation	427.8-412.8 ft.	412.8-397.8 ft.	397.8-390.3 ft.	390.5-375.5 ft.	375.5-360.5 ft.	360.5-346.5 ft.
Tested Depth	148.7-164.4 ft.	160.8-179.4 ft.	171.0-186.9 ft.	186.7-201.7 ft.	186.7-216.7 ft.	186.7-230.7 ft.
Elevation	428.5-412.8 ft.	416.4-397.8 ft.	406.2-390.3 ft.	390.5-375.5 ft.	390.5-360.5 ft.	390.5-346.5 ft.
Pump Rate	0.05 gpm	0 gpm	0 gpm	0.05 gpm	0.03 gpm	0.02 gpm
Estimated Infiltration Rate	0.05 gpm	0 gpm	0 gpm	0.05 gpm	0.03 gpm	0.02 gpm
Water Bearing	No	No	No	No	No (30 ft. tested interval)	No (44 ft. tested interval)
Water Loss During Coring	63 gallons	0 gallons	0 gallons	89 gallons	97 gallons	223 gallons
Water Removed (including test)	120 gallons	10 gallons	189 gallons	20 gallons	121 gallons	92 gallons
Final Tracer Concentration	591/1,000	NM	NM	56/1,000	NM	NM
Sample Collected	No	No	No	Yes (1)	No	No

(1) Since it could not be determined whether the poor water return was a function of the bladder pump's capability from such depths or the infiltration rate, samples were collected as a precautionary measure. However, subsequent testing of intervals K, L and M with the submersible pump proved all three intervals to be non-water bearing.

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	A	B	C	D	E	F	G
Depth	40.5- 55.5 ft.	55.5- 70.5 ft.	70.5- 85.5 ft.	85.5-100.5 ft.	100.5-115.5 ft.	115.5-130.5 ft.	130.5-145.5 ft.
on	536.0-521.0 ft.	521.0-506.0 ft.	506.0-491.0 ft.	491.0-476.0 ft.	476.0-461.0 ft.	461.0-446.0 ft.	446.0-431.0 ft.
Depth							
on							
te	5.33 gpm	17.2 gpm	3.4 gpm	0.33 gpm	16.8 gpm	0.4 gpm	0.25 gpm
ed Infiltration	5.33 gpm	17.2 gpm	3.4 gpm	0.33 gpm	16.8 gpm	0.4 gpm	0.25 gpm
aring	Yes	Yes	Yes	No	Yes	No	No
ose During	147 gallons	598 gallons	52 gallons	63 gallons	372 gallons	486 gallons (1)	88 gallons
emoved ling test)	454 gallons	1,049 gallons	387 gallons	35 gallons	1,007 gallons	28 gallons	31 gallons
racer Concentration	74/1,000	52/1,000	54/1,000	230/1,000	43/1,000	NM	NM
Collected	Yes	Yes	Yes	No	Yes	No	No

cessive water loss was attributed to a large fracture reopening at 107 feet (Interval E).

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TABLE 3

DEEP WELL TESTING SUMMARY - MW8

Interval	H	I	J	K	L	M
Drilled Depth	145.5-160.5 ft.	160.5-175.5 ft.	175.5-190.5 ft.	190.5-205.5 ft.	205.5-220.5 ft.	220.5-229.0 ft.
Elevation	431.0-416.0 ft.	416.0-401.0 ft.	401.0-386.0 ft.	386.0-371.0 ft.	371.0-356.0 ft.	356.0-347.5 ft.
Tested Depth						
Elevation						
Pump Rate	0.004 gpm	0.02 gpm	0.006 gpm	0.1 gpm	0.07 gpm	0.03 gpm
Estimated Infiltration Rate	0.004 gpm	0.02 gpm	0.006 gpm	0.1 gpm	0.07 gpm	0.03 gpm
Water Bearing	No	No	No	No	No	No
Water Loss During Coring	58 gallons	0 gallons	50 gallons	15 gallons	4 gallons	
Water Removed (including test)	11 gallons	43 gallons	1 gallon	6 gallons	4 gallons	3 gallons
Final Tracer Concentration	NM	NM	NM	NM	NM	NM
Sample Collected	No	No	No	No	No	No

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TABLE 4

HYDRAULIC CONDUCTIVITY TEST ANALYSIS METHODS

METHOD	EQUATION
A.	$K = \frac{r^2 \ln (L/R)}{2\ L\ T_o}$ $L/R > 8$
B.	$K = \frac{r^2 \ln (L/R) \ln (y_1/y_2)}{2L\ (t_2 - t_1)}$ $L/R > 8$
C.	$K = \frac{r^2 \ln (Re/R)}{2L} \frac{1}{t} \ln (y_o/y_t)$
D.	Laboratory Tests
E.	In-Situ - Equation Unknown

Where: L = length of saturated interval (cm)
r = radius of opening (pipe) where water levels were monitored (cm)
R = radius of borehole at interval "L" (cm)
Re = effective radius, the equivalent radial distance over which head loss y is dissipated
T_o = elapsed time where $\frac{H-h_t}{H-H_o} = 0.37$ (sec) in the flow system
H = water level at equilibrium
Ho = initial water level when slug was introduced/removed
h_t = water level at time t
t_1 = elapsed time at H_1
t_2 = elapsed time at H_2
y_1 and y_2
= difference from static water level at times t_1 and t_2 respectively
$y_o = H - H_o$
$y_t = H - h_t$

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B. Design Manual, Soil Mechanics, Foundations and Earth Structures, Navdocks DM-7, Dept. of the Navy, Bureau of Yards and Docks, Washington 25, D.C. 1962.

C. Bouwer, H. and R.C. Rice, "A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells", W.R.R., 12(3), pp423-428, June 1976.

TABLE 5

SUMMARY OF HYDRAULIC CONDUCTIVITY ESTIMATES
- 1 -

Well/Borehole Number	Tested Interval (ft. BGS)	Hydraulic Conductivity (cm/sec.)	Analysis Method	Data Source
FILL				
OW31-85	5.0 - 12.0	1.1×10^{-2}	A	CRA, 1987
OW32-85	5.0 - 13.5	4.9×10^{-3} (1) / 2.8×10^{-3}	A/C	CRA, 1987
OW33-85	5.9 - 11.5	3.2×10^{-3} (1) / 2.6×10^{-3}	A/C	CRA, 1987
OW34-85	5.0 - 12.0	5.5×10^{-4} (1) / 7.4×10^{-4}	A/C	CRA, 1987
OW35-85	4.5 - 13.0	1.0×10^{-2} (1) / 3.4×10^{-3}	A/C	CRA, 1987
OW36-85	4.5 - 11.5	1.3×10^{-2} (1) / 7.9×10^{-3}	A/C	CRA, 1987
OW37-85	3.0 - 11.5	1.3×10^{-3}	A	CRA, 1987
OW38-85	6.5 - 14.5	Insufficient Water		CRA, 1987
OW39-85	2.5 - 9.0	2.9×10^{-2}	A	CRA, 1987
OW48-86	4.0 - 10.0	2.3×10^{-2} (1) / 1.2×10^{-2}	A/C	CRA, 1987
OW49-86	3.7 - 12.0	4.8×10^{-2} (1) / 1.9×10^{-2}	A/C	CRA, 1987
OW51-86	3.7 - 10.0	2.1×10^{-2} (1) / 1.7×10^{-2}	A/C	CRA, 1987
OW54-86	4.0 - 10.0	1.8×10^{-2}	A	CRA, 1987
OW56-86	4.0 - 10.0	5.5×10^{-2} (1) / 2.8×10^{-2}	A/C	CRA, 1987
OW63-87	5.8 - 14.5	2.2×10^{-3}	A	CRA, 1987
Geometric Mean =		9.0×10^{-3}		
ALLUVIAL DEPOSITS				
P-11	13.0 - 14.5	6.0×10^{-7}	D	Wehran, 1978
B-21	13.5 - 15.5	2.2×10^{-5}	D	Wehran, 1981
B-24	13.5 - 15.5	5.7×10^{-6}	D	Wehran, 1981

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TABLE 5

SUMMARY OF HYDRAULIC CONDUCTIVITY ESTIMATES
- 2 -

Well/Borehole Number	Tested Interval (ft. BGS)	Hydraulic Conductivity (cm/sec.)	Analysis Method	Data Source
ALLUVIAL DEPOSITS (cont'd)				
B-29	14.0 - 16.0	5.8×10^{-6}	D	Wehran, 1981
B-31	13.5 - 15.5	8.2×10^{-7}	D	Wehran, 1981
B-33	15.5 - 17.5	2.7×10^{-6}	D	Wehran, 1981
MW-3	14.5 - 23.0	2.7×10^{-4}	E	WCC, 1986
MW-9	9.4 - 20.0	1.2×10^{-4}	E	WCC, 1986
MW-17	13.0 - 30.0	4.2×10^{-3}	E	WCC, 1986
MW-19	13.0 - 32.0	2.3×10^{-2}	E	WCC, 1986
OW12-79	17.2 - 23.0	3.1×10^{-6}	B	CRA, 1983
OW25-80	19.1 - 25.0	3.2×10^{-4}	A	CRA, 1987
OW26-80	17.7 - 23.0	7.8×10^{-5}	A	CRA, 1987
OW27-80	10.8 - 16.0	7.9×10^{-5}	A	CRA, 1987
OW28-80	11.1 - 18.0	7.9×10^{-5}	B	CRA, 1987
OW29-80	21.1 - 27.0	2.0×10^{-5}	A	CRA, 1987
OW30-80	19.8 - 25.0	2.0×10^{-4}	A	CRA, 1987
OW40-85	11.0 - 29.0	5.8×10^{-4}	A	CRA, 1987
OW43-85	14.0 - 32.0	6.9×10^{-4}	A	CRA, 1987
OW47-85	12.0 - 35.5	2.1×10^{-4}	A	CRA, 1987
OW50-86	10.0 - 22.0	5.7×10^{-5}	A	CRA, 1987
OW52-86	11.0 - 22.0	8.0×10^{-5}	A	CRA, 1987

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TABLE 5

SUMMARY OF HYDRAULIC CONDUCTIVITY ESTIMATES

- 3 -

Well/Borehole Number	Tested Interval (ft. BGS)	Hydraulic Conductivity (cm/sec.)	Analysis Method	Data Source
ALLUVIAL DEPOSITS (cont'd)				
OW55-86	10.0 - 24.0	1.3×10^{-5}	A	CRA, 1987
OW57-86	12.0 - 29.0	2.5×10^{-5}	A	CRA, 1987
OW58-86	2.5 - 10.0	1.6×10^{-3}	A	CRA, 1987
OW59-86	3.0 - 10.0	7.5×10^{-3}	A	CRA, 1987
OW60-86	2.5 - 10.0	9.2×10^{-4}	A	CRA, 1987
OW61-86	3.5 - 10.0	5.6×10^{-4}	A	CRA, 1987
Geometric Mean =		2.2×10^{-4}		
GLACIOLACUSTRINE CLAY				
B-1	17.0 - 18.5	2.1×10^{-8}	D	Wehran, 1981
OW6-79	30.0 - 31.5	5.6×10^{-9}	D	CRA, 1980
OW13-79	15.0 - 16.5	8.8×10^{-9}	D	CRA, 1980
Geometric Mean =		1.0×10^{-8}		
GLACIAL TILL				
OW2-79	23.7 - 30.5	2.7×10^{-7}	A	CRA, 1983
OW3-79	25.0 - 26.5	6.7×10^{-9}	D	CRA, 1980
OW6-79	34.9 - 40.5	4.5×10^{-5}	A	CRA, 1983
OW8-79	35.6 - 41.5	1.3×10^{-4}	A	CRA, 1983

TABLE 5

SUMMARY OF HYDRAULIC CONDUCTIVITY ESTIMATES

- 4 -

Well/Borehole Number	Tested Interval (ft. BGS)	Hydraulic Conductivity (cm/sec.)	Analysis Method	Data Source
GLACIAL TILL (cont'd)				
OW8-79	29.0 - 30.5	1.5×10^{-8}	D	CRA, 1980
OW9-79	24.1 - 30.5	5.8×10^{-7} / 2.3×10^{-5}	A/A	CRA, 1983/87
OW10-79	35.0 - 36.5	1.5×10^{-8}	D	CRA, 1980
OW11-79	34.1 - 40.0	4.9×10^{-7}	A	CRA, 1983
OW13-79	31.8 - 38.0	6.1×10^{-5}	A	CRA, 1983
OW14-79	39.2 - 46.2	1.2×10^{-6}	A	CRA, 1983
OW15-79	30.9 - 36.5	1.4×10^{-6}	A	CRA, 1983
OW16-79	32.8 - 39.5	4.2×10^{-5}	A	CRA, 1983
OW17-79	42.3 - 48.0	1.9×10^{-4}	A	CRA, 1983
OW18-79	28.9 - 35.3	8.1×10^{-6}	A	CRA, 1983
OW19-79	24.7 - 32.0	4.3×10^{-7}	A	CRA, 1983
OW20-79	38.5 - 44.2	2.4×10^{-7}	A	CRA, 1983
OW21-79	35.3 - 42.0	3.3×10^{-4}	A	CRA, 1983
OW22-79	36.9 - 42.7	3.2×10^{-6}	A	CRA, 1983
OW23-79	36.5 - 41.6	Insufficient Data(4)		
OW24-79	38.3 - 44.5	1.0×10^{-4}	A	CRA, 1983
OW62-87	27.1 - 33.3	1.0×10^{-5}	A	CRA, 1987
B-22	21.0 - 38.5	5.6×10^{-6}	E	Wehran, 1981
B-24	29.5 - 39.5	3.0×10^{-7}	E	Wehran, 1981

TABLE 5

SUMMARY OF HYDRAULIC CONDUCTIVITY ESTIMATES

- 5 -

Well/Borehole Number	Tested Interval (ft. BGS)	Hydraulic Conductivity (cm/sec.)	Analysis Method	Data Source
GLACIAL TILL (cont'd)				
B-29	30.5 - 37.5	1.0×10^{-7}	E	Wehran, 1981
B-31	34.5 - 40.0	7.8×10^{-9}	E	Wehran, 1981
B-34D	28.5 - 39.0	1.2×10^{-4}	E	Wehran, 1981
Geometric Mean =		5.0×10^{-6}		
SHALLOW BEDROCK				
OW1-79	32.0 - 47.0	4.8×10^{-4}	A	CRA, 1987
OW3-79	45.6 - 51.5	1.4×10^{-3}	A	CRA, 1987
OW5-79	53.1 - 60.0	2.1×10^{-3}	A	CRA, 1987
OW7-79	56.1 - 62.0	1.3×10^{-3}	A	CRA, 1987
OW10-79	61.0 - 68.5	6.9×10^{-6}	A	CRA, 1987
OW41-85	39.7 - 55.3	3.3×10^{-5}	A	CRA, 1987
OW45-86	45.7 - 60.9	(2)		
OW46-86	38.0 - 53.2	(3)		
OW53-86	41.3 - 57.3	(2)		
B-1	40.8 - 55.8	2.8×10^{-3}	E	WCC, 1987
B-2	40.5 - 50.0	1.1×10^{-3}	E	WCC, 1987
B-3	39.0 - 49.0	2.4×10^{-2}	E	WCC, 1987
B-4	40.0 - 50.1	9.4×10^{-2}	E	WCC, 1987
MW-7	41.5 - 56.1	4.1×10^{-4}	E	WCC, 1987
Geometric Mean =		1.0×10^{-3}		

TABLE 5

SUMMARY OF HYDRAULIC CONDUCTIVITY ESTIMATES

sureable drawdown occurred.
oot drawdown at end of pumping.
cent recovery with 3 minutes.
is methods are presented on Table 5.

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TABLE 6

LABORATORY HYDRAULIC CONDUCTIVITY DETERMINATIONS

Well Number	Sample Number	Depth of Sample (ft.)	Remoulded Permeability k cm/sec	Liquid Limit	Plastic Limit
Glaciolacustrine Clay					
OW6-79	7	30.0 - 31.5	5.6×10^{-9}	40.3	18.9
OW13-79	4	15.0 - 16.5	8.8×10^{-9}	32.2	21.8
	Geometric Mean = 7.4×10^{-9}				
Glacial Till					
OW3-79	6	25.0 - 26.5	6.7×10^{-9}	29.5	19.4
OW8-79	7	29.0 - 30.5	1.5×10^{-8}	13.6	17.8
OW10-79	9	35.0 - 36.5	1.5×10^{-8}	16.2	14.3
	Geometric Mean = 1.1×10^{-8}				

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TABLE 7

SUMMARY OF GRAIN SIZE DETERMINATIONS

Designation	Sample Depth (ft.)	Percent Gravel (>4.5 mm)	Percent Sand (4.5-0.075 mm)	Percent Silt (0.075-0.002 mm)	Percent Clay (<0.002 mm)
Alluvium					
OW3-79	20.0 - 21.5	1.9	90.1	8.0	0.0
OW25-80	23.0 - 25.0	0.0	46.0	48.0	6.0
OW27-80	14.0 - 16.0	0.0	30.0	62.0	8.0
OW30-80	23.0 - 25.0	0.5	56.5	38.5	4.5
Clay					
OW6-79	30.0 - 31.5	0.0	1.0	36.0	63.0
OW11-79	10.0 - 11.5	1.0	10.0	34.0	55.0
OW13-79	15.0 - 16.5	0.0	0.5	56.5	43.0
Glacial Till					
OW3-79	25.0 - 26.5	2.0	14.0	37.0	47.0
OW6-79	39.0 - 40.5	18.0	36.0	42.0	4.0
OW8-79	29.0 - 30.5	20.0	28.0	39.5	12.5
OW10-79	30.0 - 31.5	16.5	32.5	40.0	11.0
OW10-79	35.0 - 36.5	6.0	24.0	52.0	18.0

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TABLE 8

STRATIGRAPHIC SUMMARY - OVERBURDEN
102ND STREET LANDFILL
- 1 -

Well Number	Sampled Depth (ft.BG)	Monitored Regime	Fill Depth (ft. BG)	Fill Elev. (ft. AMSL)	Fill Thickness (ft.)	Alluvium Depth (ft. BG)	Alluvium Elev. (ft. AMSL)	Alluvium Thickness (ft.)	Clay Depth (ft. BG)	Clay Elev. (ft. AMSL)	Clay Thickness (ft.)	Till Depth (ft. BG)	Till Elev. (ft. AMSL)	Till Thickness (ft.)
OCC														
BL1-77	42.0	Till	0	576.4	16.3	16.3	560.1	14.7	31.0	545.4	4.2	35.2	541.2	6.8
BL2-77	32.0	Till	0	569.6	10.0	10.0	559.6	16.2	-	-	0	26.2	543.4	5.8
BL3-77	36.0	Till	0	568.7	10.0	10.0	558.7	21.0	31.0	537.7	3.5	34.5	534.2	1.5
BL4-77*	16.5	Fill	0	576.4	16.3	16.3	560.1	>0.2						
BL5-77*	17.0	Fill	0	569.6	10.0	10.0	559.6	>7.0						
BL6-77*	16.0	Fill	0	568.7	10.0	10.0	558.7	>6.0						
OW 1-79	47.0	Bedrock	-	-	0	0	564.8	21.0	21.0	543.8	7.0	28.0	536.8	4.0
OW 2-79*	30.5	Till	-	-	0	0	564.7	24.0	24.0	540.7	3.0	27.0	537.7	3.5
OW 3-79	51.5	Bedrock	-	-	0	0	564.6	24.0	24.0	540.6	3.0	27.0	537.7	3.5
OW 5-79	60.0	Bedrock	0	573.6	3.5	3.5	570.1	32.5	-	-	0	36.0	537.6	4.0
OW 6-79	40.5	Till	0	574.4	11.0	11.0	563.4	10.0	21.0	553.4	17.0	38.0	536.4	2.5
OW 7-79*	62.0	Bedrock	0	573.1	5.0	5.0	568.1	4.5	9.5	563.6	15.5	25.0	548.1	17.0
OW 8-79	41.5	Till	0	573.5	5.0	5.0	568.5	4.5	9.5	564.0	15.5	25.0	548.5	16.5
OW 9-79	30.5	Till	0	575.6	13.0	13.0	562.6	10.0	-	-	0	23.0	552.6	7.5
OW10-79	68.5	Bedrock	0	575.5	15.0	15.0	560.5	11.5	-	-	0	26.5	549.0	22.0
OW11-79	40.0	Till	0	573.6	7.0	-	-	0	7.0	566.6	27.0	34.0	539.6	6.0
OW12-79	0.0	Alluvium	No Stratigraphic Information - No Split Spoon Sampling											
OW13-79	38.0	Till	0	574.8	9.0	-	-	0	9.0	565.8	17.0	26.0	548.8	12.0
OW14-79	46.2	Till	0	581.7	8.0	8.0	573.7	10.0	18.0	563.7	10.0	28.0	553.7	18.2
OW15-79	36.5	Till	0	577.4	3.2	3.2	574.2	5.3	8.5	568.9	15.0	23.5	553.9	13.0
OW16-79*	39.5	Till	0	573.5	3.5	3.5	570.0	32.5	-	-	0	36.0	537.5	3.5
OW17-79	48.0	Till	0	576.4	15.0	15.0	561.4	11.5	-	-	0	26.5	549.9	21.5
OW18-79	35.3	Till	0	568.7	13.0	13.0	555.7	15.0	28.0	540.7	4.5	32.5	536.2	2.8
OW19-79	32.0	Till	-	-	0	0	564.7	21.0	21.0	543.7	7.0	28.0	536.7	4.0
OW20-79	44.2	Till	0	575.5	10.0	10.0	565.5	8.0	18.0	557.5	10.0	28.0	547.5	16.2
OW21-79	42.0	Till	0	575.3	11.0	11.0	564.3	15.0	26.0	549.3	11.5	37.5	537.8	4.5

*Partial or full stratigraphy taken from immediately adjacent well/borehole

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TABLE 8

STRATIGRAPHIC SUMMARY - OVERBURDEN
102ND STREET LANDFILL
- 2 -

Well Number	Sampled Depth (ft.BG)	Monitored Regime	Fill Depth (ft. BG)	Fill Elev. (ft. AMSL)	Fill Thickness (ft.)	Alluvium Depth (ft. BG)	Alluvium Elev. (ft. AMSL)	Alluvium Thickness (ft.)	Clay Depth (ft. BG)	Clay Elev. (ft. AMSL)	Clay Thickness (ft.)	Till Depth (ft. BG)	Till Elev. (ft. AMSL)	Till Thickness (ft.)
OW22-79	42.7	Till	0	574.9	13.0	13.0	561.9	22.0	35.0	539.9	3.0	38.0	536.9	4.7
OW23-79	41.6	Till	0	575.5	12.0	12.0	563.5	19.0	31.0	544.5	5.5	36.5	539.0	5.1
OW24-79	44.5	Till	0	576.8	12.0	12.0	564.8	16.5	-	-	0	28.5	548.3	16.0
OW25-80*	25.0	Alluvium	0	575.6	15.0	15.0	560.6	>10.0						
OW26-80	23.0	Alluvium	No Stratigraphic Information - Only 1 Split Spoon Sample Taken											
OW27-80*	21.0	Alluvium	0	575.8	10.0	10.0	565.8	>11.0						
OW28-80*	18.0	Alluvium	0	574.6	11.0	11.0	563.6	4.5	15.5	559.2	>2.5			
OW29-80*	27.0	Alluvium	0	575.1	13.0	13.0	562.1	>14.0						
OW30-80*	25.0	Alluvium	0	575.8	12.0	12.0	563.8	>13.0						
OW31-85	14.0	Fill	0	575.8	11.0	11.0	564.8	>3.0						
OW32-85	16.0	Fill	0	576.6	12.1	12.1	564.5	>3.9						
OW33-85	14.0	Fill	0	575.4	11.0	11.0	564.4	>3.0						
OW34-85	15.0	Fill	0	577.4	12.5	12.5	564.9	>2.5						
OW35-85	14.0	Fill	0	575.9	12.5	12.5	563.4	>1.5						
OW36-85	12.0	Fill	0	575.4	11.0	11.0	564.4	>1.0						
OW37-85	12.0	Fill	0	573.7	10.0	10.0	563.7	>2.0						
OW38-85	20.0	Fill	0	576.2	14.0	14.0	562.2	>6.0						
OW39-85	10.5	Fill	0	574.1	8.5	8.5	565.6	>2.0						
OW40-85*	29.0	Alluvium	0	573.7	9.0	9.0	564.7	19.5	28.5	545.2	>0.5			
OW41-85*	55.3	Bedrock	0	573.7	9.0	9.0	564.7	19.0	28.0	545.7	7.0	35.0	538.7	4.5
OW42-85*	223.3	Deep Bedrock	0	573.6	9.0	9.0	564.6	19.0	28.0	545.6	7.0	35.0	538.6	4.3
OW43-85*	32.0	Alluvium	0	577.2	12.5	12.5	564.7	18.0	-	-	0	30.5	546.7	>1.5
OW44-86*	230.7	Deep Bedrock	0	577.2	12.5	12.5	564.7	18.0	-	-	0	30.5	546.7	14.0
OW45-86*	60.9	Bedrock	0	577.2	12.5	12.5	564.7	18.0	-	-	0	30.5	546.7	14.5

*Partial or full stratigraphy taken from immediately adjacent well/borehole.

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TABLE

STRATIGRAPHIC SUMMARY - OVERBURDEN

102ND STREET LANDFILL

Well Number	Sampled Depth (ft.BG)	Monitored Regime	Fill Depth (ft. BG)	Fill Elev. (ft. AMSL)	Fill Thickness (ft.)	Alluvium Depth (ft. BG)	Alluvium Elev. (ft. AMSL)	Alluvium Thickness (ft.)	Clay Depth (ft. BG)	Clay Elev. (ft. AMSL)	Clay Thickness (ft.)	Till Depth (ft. BG)	Till Elev. (ft. AMSL)	Till Thickness (ft.)
OW46-86*	53.2	Bedrock	0	575.6	11.0	11.0	564.6	9.0	20.0	555.6	7.0	27.0	548.6	11.6
OW47-86	35.5	Alluvium	0	575.4	10.5	10.5	564.9	22.5	33.0	542.4	>2.5			
OW48-86	10.0	Fill	0	572.6	8.6	8.6	564.0	>1.4						
OW49-86	12.0	Fill	0	572.4	8.5	8.5	563.9	>3.5						
OW50-86*	22.0	Alluvium	0	572.4	8.5	8.5	563.9	13.0	-	-	0	21.5	550.9	>0.5
OW51-86	10.0	Fill	0	572.2	9.0	9.0	563.2	>1.0						
OW52-86	22.0	Alluvium	0	572.2	9.0	9.0	563.2	11.5	-	-	0	20.5	551.7	>1.5
OW53-86	57.3	Bedrock	0	571.6	8.0	8.0	563.6	13.0	-	-	0	21.0	550.6	20.3
OW54-86	10.0	Fill	0	571.0	8.3	8.3	562.7	>1.7						
OW55-86*	24.0	Alluvium	0	571.1	8.3	8.3	562.8	14.2	-	-	0	22.5	548.6	>1.5
OW56-86*	10.0	Fill	0	573.0	9.5	9.5	563.5	>0.5						
OW57-86	29.0	Alluvium	0	573.1	9.5	9.5	563.6	16.0	-	-	0	25.5	547.6	>3.5
OW58-86	10.0	Alluvium	0	573.7	2.3	2.3	571.4	1.8	4.1	569.6	>5.9			
OW59-86	10.0	Alluvium	0	573.1	8.5	-	-	0	8.5	564.6	>1.5			
OW60-86	10.0	Alluvium	0	573.4	4.0	4.0	569.4	1.0	5.0	568.4	>5.0			
OW61-86	10.0	Alluvium	0	573.6	7.0	-	-	0	7.0	566.6	>3.0			
OW62-87	33.3	Till	0	576.2	14.5	14.5	561.7	9.5	-	-	0	24.0	552.2	9.3
OW63-87*	14.5	Alluvium	0	575.9	14.5	14.5	561.4							
SP8-78**	8.0	Alluvium	-	-	0	0	575.2	5.0	5.0	570.2	>3.0			
SP9-78**	8.0	Alluvium	-	-	0	0	575.7	5.5	5.5	570.2	>2.5			
BH1-86	16.0	--------	0	575.3	13.0	13.0	562.3	>3.0						
BH2-86	14.0	--------	0	575.0	13.3	13.3	561.7	>0.7						
BH3-86	16.0	--------	0	575.9	12.8	12.8	563.1	>3.2						
BH42-86	29.0	--------	0	570.4	6.3	6.3	564.1	>22.7						
BH43-86*	44.3	--------	0	577.2	12.5	12.5	564.7	18.0	-	-	0	30.5	546.7	13.8
BH47B-86	35.0	--------	0	574.7	11.0	11.0	563.7	22.8	33.8	540.9	>1.2			
BH47C-86	15.0	--------	0	575.1	13.0	13.0	562.1	>2.0						

* Partial or full stratigraphy taken from immediately adjacent well/borehole.

** Stratigraphic information is approximate.

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TABLE 8

STRATIGRAPHIC SUMMARY - OVERBURDEN

102ND STREET LANDFILL

- 4 -

Well Number	Sampled Depth (ft.BG)	Monitored Regime	Fill Depth (ft. BG)	Fill Elev. (ft. AMSL)	Fill Thickness (ft.)	Alluvium Depth (ft. BG)	Alluvium Elev. (ft. AMSL)	Alluvium Thickness (ft.)	Clay Depth (ft. BG)	Clay Elev. (ft. AMSL)	Clay Thickness (ft.)	Till Depth (ft. BG)	Till Elev. (ft. AMSL)	Till Thickness (ft.)
OLIN														
MW-1	14.0	Fill	0	576.2	12.5	12.5	563.7	>1.5						
MW-2	12.0	Fill	0	575.8	10.4	10.4	565.4	>1.6						
MW-3	26.0	Alluvium	0	576.1	12.6	12.6	563.5	8.3	-	-	0	20.9	555.2	>5.1
MW-4	14.0	Fill	0	575.2	11.0	11.0	564.2	>3.0	-	-	0			
MW-5	14.0	Sewer Bedding	0	575.9	11.0	11.0	564.9	>3.0						
MW-6	12.0	Sewer Bedding	0	574.9	10.5	10.5	564.4	>1.5						
MW-7	56.1	Bedrock	0	576.3	13.0	13.0	563.3	9.5	-	-	0	22.5	553.8	18.0
MW-8*	229.0	Deep Bedrock	0	576.5	13.0	13.0	563.5	9.5	-	-	0	22.5	554.0	18.0
MW-9	23.0	Alluvium	0	574.3	8.6	8.6	565.7	11.9	-	-	0	20.5	553.8	>2.5
MW-10	8.0	Sewer Bedding	0	575.0	1.5	1.5	573.5	6.0	7.5	567.5	>0.5			
MW-10A	16.5	-------	0	575.0	11.5	-	-	0	11.5	563.5	>0.5			
MW-11	13.0	Sewer Bedding	0	574.7	11.0	-	-	0	11.0	563.7	>2.0			
MW-12	8.0	Alluvium	0	574.2	1.0	1.0	573.2	5.0	6.0	568.2	>2.0			
MW-13*	8.5	Fill	0	572.5	8.0	8.0	564.5	>0.5						
MW-14	18.0	Alluvium	0	572.5	8.0	8.0	564.5	7.2	15.2	557.3	2.0	17.2	555.3	>0.8
MW-15*	7.0	Fill	0	569.9	6.5	6.5	563.4	>0.5						
MW-16	18.0	Alluvium	0	569.9	6.5	6.5	563.4	10.5	-	-	0	17.0	552.9	>1.0
MW-17	30.0	Alluvium	0	575.8	12.5	12.5	563.3	16.5	-	-	0	29.0	546.8	>1.0
MW-18*	12.5	Fill	0	575.8	12.5	12.5	563.3							
MW-19	34.0	Alluvium	0	575.0	11.5	11.5	563.5	20.0	-	-	0	31.5	543.5	>2.5
MW-20*	12.0	Fill	0	575.0	11.5	11.5	563.5	>0.5						
MW-21	13.0	Fill	0	575.4	11.8	11.8	563.6	>1.2						
MW-22	12.0	Fill	0	575.9	11.0	11.0	564.9	>1.0						

*Partial or full stratigraphy taken from immediately adjacent well/borehole.

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TABLE 8

STRATIGRAPHIC SUMMARY - OVERBURDEN

102ND STREET LANDFILL

- 5 -

Well Number	Sampled Depth (ft.BG)	Monitored Regime	Fill Depth (ft. BG)	Fill Elev. (ft. AMSL)	Fill Thickness (ft.)	Alluvium Depth (ft. BG)	Alluvium Elev. (ft. AMSL)	Alluvium Thickness (ft.)	Clay Depth (ft. BG)	Clay Elev. (ft. AMSL)	Clay Thickness (ft.)	Till Depth (ft. BG)	Till Elev. (ft. AMSL)	Till Thickness (ft.)
OLIN														
B-1	55.8	Bedrock	0	575.1	14.0	-	-	0	14.0	561.1	23.5	37.5	537.6	3.3
B-2	50.0	Bedrock	0	575.8	12.0	12.0	563.8	18.0	30.0	545.8	5.0	35.0	540.8	5.5
B-3	49.0	Bedrock	0	574.0	8.5	-	-	0	8.5	565.5	15.5	24.0	550.0	15.0
B-4	50.1	Bedrock	0	575.8	8.0	8.0	567.8	17.0	-	-	0	25.0	550.8	15.0
B-19***	30.5	-------	0	574.1	8.5	8.5	565.6	1.0	9.5	564.6	12.8	22.3	551.8	>8.2
B-20	22.2	Fill	0	574.1	9.0	9.0	565.1	2.0	11.0	563.1	11.0	22.0	552.1	>0.2
B-21	21.5	Alluvium	0	574.1	11.5	11.5	562.6	6.5	18.0	556.1	2.7	20.7	553.4	>0.8
B-22	39.5	Till	0	574.6	10.0	10.0	564.6	9.5	-	-	0	19.5	555.1	20.0
B-23	30.5	Alluvium	0	575.6	13.0	13.0	562.6	14.5	-	-	0	27.5	548.1	>3.0
B-24	40.5	Till	0	575.6	12.5	12.5	563.1	14.0	-	-	0	26.5	549.1	14.0
B-25	29.5	Alluvium	0	575.2	12.0	12.0	563.2	13.0	25.0	550.2	3.5	28.5	546.7	>1.0
B-26***	23.5	-------	0	575.0	13.5	13.5	561.5	4.2	17.7	557.3	>5.8			
B-27	29.5	Alluvium	0	575.3	14.5	14.5	560.8	13.0	27.5	547.8	1.0	28.5	546.8	>1.0
B-28***	31.5	-------	0	575.2	13.0	13.0	562.2	14.0	27.0	548.2	3.8	30.8	544.4	>0.7
B-29	38.5	Till	0	575.5	12.5	12.5	563.0	16.0	-	-	0	28.5	547.0	10.0
B-30***	32.5	-------	0	575.7	13.0	13.0	562.7	16.5	-	-	0	29.5	546.2	>3.0
B-31	41.0	Till	0	576.2	12.5	12.5	563.7	18.0	30.5	545.7	1.4	31.9	544.3	9.1
B-32***	36.5	Alluvium	0	574.9	18.0	18.0	556.9	12.5	30.5	544.4	5.0	35.5	539.4	>1.0
B-33	28.5	Alluvium	0	575.2	14.0	14.0	561.2	13.5	27.5	547.7	>1.0			
B-34D/B-34I	40.0	Till/Alluvium	0	575.9	12.5	12.5	563.4	10.5	-	-	0	23.0	552.9	17.0
B-35	10.0	Fill	0	574.4	9.8	9.8	564.6	>0.2						

* Partial or full stratigraphy taken from immediately adjacent well/borehole.

*** Adjusted to USGS Datum (estimated 1.3 feet higher than indicated on the logs

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TABLE 8

STRATIGRAPHIC SUMMARY - OVERBURDEN

102ND STREET LANDFILL

- 6 -

Well Number	Sampled Depth (ft.BG)	Monitored Regime	Fill Depth (ft. BG)	Fill Elev. (ft. AMSL)	Fill Thickness (ft.)	Alluvium Depth (ft. BG)	Alluvium Elev. (ft. AMSL)	Alluvium Thickness (ft.)	Clay Depth (ft. BG)	Clay Elev. (ft. AMSL)	Clay Thickness (ft.)	Till Depth (ft. BG)	Till Elev. (ft. AMSL)	Till Thickness (ft.)
OLIN														
P-1	13.0	Fill	0	575.3	12.5	-	-	0	12.5	562.8	>0.5			
P-2	13.0	Fill	0	575.2	12.5	-	-	0	12.5	562.7	>0.5			
P-3	15.0	Fill	0	575.1	14.8	-	-	0	14.8	560.3	>0.2			
P-4***	20.0	Fill	0	575.9	17.0	17.0	568.9	1.0	18.0	567.9	>2.0			
P-5	14.0	Fill	0	576.1	12.0	12.0	564.1	>2.0	-	-	0			
P-6	15.0	Fill	0	575.7	14.0	14.0	561.7	>1.0						
P-7	12.5	Fill	0	575.3	11.0	11.0	564.3	>1.5						
P-8	14.0	Fill	0	574.4	12.0	12.0	562.4	>2.0						
P-9	11.0	Fill	0	574.5	10.0	10.0	564.5	>1.0						
P-10	30.5	Alluvium	0	575.9	12.0	12.0	563.9	17.5	-	-	0	29.5	546.4	>1.0
P-11***	14.5	Fill	0	575.6	13.0	13.0	562.6	>1.5						
P-12	13.5	Fill	0	574.6	12.0	-	-	0	12.0	562.6	>1.5			
P-13	23.0	Fill	0	575.6	12.5	12.5	563.1	>10.5						
P-14	26.5	Alluvium	0	575.7	13.0	13.0	562.7	13.0	-	-	0	26.0	549.7	>0.5
P-15	22.5	Alluvium	0	574.7	10.0	10.0	564.7	11.5	-	-	0	21.5	553.2	>1.0
P-16	9.5	Fill	0	574.0	7.5	-	-	0	7.5	566.5	>2.0			
P-17	11.5	Fill	0	575.9	8.0	8.0	567.9	>3.5						
P-18	8.0	Fill	0	574.6	7.8	-	-	0	7.8	566.8	>0.2			
CW-1	11.5	Fill	0	574.9	11.0	-	-	0	11.0	563.9	>0.5			
CW-8	13.0	Fill	0	575.0	12.0	12.0	563.0	>1.0						
CW-9	14.5	Fill	0	575.4	13.5	13.5	561.9	>1.0						
CW-16	8.0	Fill	0	574.10	7.5	-	-	0	7.5	566.5	>0.5			
CW-18	12.5	Fill	0	574.5	9.5	-	-	0	9.5	565.0	>3.0			
CW-20	11.0	Fill	0	574.2	9.5	9.5	564.7	>1.5						
CW-35	13.0	Fill	0	576.1	11.0	11.0	565.1	>2.0						
16***	6.5	------	0	574.1	6.0	6.0	568.1	>0.5						

* Partial or full stratigraphy taken from immediately adjacent well/borehole.

***Adjusted to USGS Datum (estimated 1.3 feet higher than indicated on the logs)

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TABLE 8

STRATIGRAPHIC SUMMARY - OVERBURDEN

102ND STREET LANDFILL

Well Number	Sampled Depth (ft.BG)	Monitored Regime	Fill Depth (ft. BG)	Fill Elev. (ft. AMSL)	Fill Thickness (ft.)	Alluvium Depth (ft. BG)	Alluvium Elev. (ft. AMSL)	Alluvium Thickness (ft.)	Clay Depth (ft. BG)	Clay Elev. (ft. AMSL)	Clay Thickness (ft.)	Till Depth (ft. BG)	Till Elev. (ft. AMSL)	Till Thickness (ft.)
LOVE CANAL														
5A	17.0	Fill	0	573.4	16.0	16.0	557.4	>1.0						
5B	46.5	Bedrock	0	573.4	15.2	15.2	558.2	16.8	32.0	541.4	3.0	35.0	538.4	3.0
44A	26.0	Clay	-	-	0	0	574.6	4.0	4.0	570.6	21.5	25.5	549.1	>0.5
44B	45.9	Bedrock	-	-	0	0	574.6	4.0	4.0	570.6	21.5	25.5	549.1	14.5
48A	33.0	Clay	-	-	0	0	574.6	7.0	7.0	567.6	>26.0			
48B	43.9	Bedrock	-	-	0	0	574.6	7.0	7.0	567.6	28.0	35.0	539.6	3.5
56A	23.0	Clay	-	-	0	0	574.9	7.0	7.0	567.9	14.0	21.0	553.9	>2.0
56B,C	225.7	Deep Bedrock	-	-	0	0	574.9	7.0	7.0	567.9	14.0	21.0	553.9	16.2
96A	14.8	Clay	-	-	0	0	574.1	6.0	6.0	568.1	>8.8			
96B	48.2	Bedrock	-	-	0	0	574.1	6.0	6.0	568.1	29.5	35.5	538.6	>.1

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TABLE 9

STRATIGRAPHIC SUMMARY - BEDROCK

102ND STREET LANDFILL

- 1 -

Well Number	Total Depth (ft.BG)	Lockport Dolomite-Oak Orchard			Lockport Dolomite - Eramosa			Lockport Dolomite-Goat Island		
		Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)	Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)	Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)
OCC										
OW1-79	47.0	32.0	532.8	>15.0						
OW2-79	30.5	30.5	534.2							
OW3-79	51.5	30.5	534.1	>21.0						
OW5-79	60.0	40.0	533.6	>20.0						
OW6-79	40.5	40.5	533.9							
OW7-79	62.0	42.0	531.1	>20.0						
OW8-79	41.5	41.5	532.0							
OW9-79	30.5	30.5	545.1							
OW10-79	68.5	48.5	527.0	>20.0						
OW11-79	40.0	40.0	533.6							
OW13-79	38.0	38.0	536.8							
OW14-79	46.2	46.2	535.5							
OW15-79	36.5	36.5	540.9							
OW16-79	39.5	39.5	534.0							
OW17-79	48.0	48.0	528.4							
OW18-79	35.3	35.3	533.4							
OW19-79	32.0	32.0	532.7							
OW20-79	44.2	44.2	531.3							
OW21-79	42.0	42.0	533.3							
OW22-79	42.7	42.7	532.2							
OW23-79	41.6	41.6	533.9							
OW24-79	44.5	44.5	532.3							
OW41-85	55.3	39.5	534.2	>15.8						
OW42-85	223.3	39.3	534.3	91.2	130.5	443.1	22.0	152.5	421.1	9.5
OW44-85	230.7	44.5	532.7	95.5	140.0	437.2	12.1	152.1	425.1	14.3

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TABLE 9

STRATIGRAPHIC SUMMARY - BEDROCK
102ND STREET LANDFILL
- 2 -

Well Number	Total Depth (ft.BG)	Lockport Dolomite-Oak Orchard Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)	Lockport Dolomite - Eramosa Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)	Lockport Dolomite-Goat Island Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)
OCC										
OW45-85	60.9	45.0	532.2	>15.9						
OW46-86	53.2	38.6	537.0	>14.6						
OW53-86	57.3	41.3	530.3	>16.0						
OW62-86	33.3	33.3	542.9							
BH43-86	44.3	44.3	532.9							
OLIN										
BL1-77	42.0	42.0	534.4							
BL2-77	32.0	32.0	537.6							
BL3-77	36.0	36.0	532.7							
MW-7	56.1	40.5	535.8	>15.6						
MW-8	229.0	40.5	536.0	100.1	140.6	435.9	13.4	154.0	422.5	16.2
B-1	55.8	40.8	534.3	>15.0						
B-2	50.0	40.5	535.3	>9.5						
B-3	49.0	39.0	535.0	>10.0						
B-4	50.1	40.0	535.8	>10.1						
B-22	39.5	39.5	535.1							
B-24	40.5	40.5	535.1							
B-29	38.5	38.5	537.0							
B-31	41.0	41.0	535.2							
B-34D	40.0	40.0	535.9							

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TABLE 9

STRATIGRAPHIC SUMMARY - BEDROCK
102ND STREET LANDFILL
- 3 -

Well Number	Total Depth (ft.BG)	Lockport Dolomite-Oak Orchard			Lockport Dolomite - Eramosa			Lockport Dolomite-Goat Island		
		Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)	Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)	Depth (ft. BG)	Elev. (ft. MSL)	Thickness (ft.)
OCC										
OW42-85	223.3	162.0	411.6	42.8	204.8	368.8	12.0	216.8	356.8	>6.5
OW44-85	230.7	166.4	410.8	43.6	210.0	367.2	14.0	224.0	353.2	>6.7
OLIN										
MW8	229.0	170.2	406.3	37.8	208.0	368.5	12.0	220.0	356.5	>9.0
LOVE CANAL										
5B	46.5	38.0	535.4	>8.5						
44B	45.9	40.0	534.6	>5.9						
48B	43.9	38.5	536.1	>5.4						
56B,C	225.7	37.2	537.7	96.3	133.5	441.4	21.4	154.9	420.0	8.4
56C	225.7	163.3	411.6	25.7	189.0	385.9	13.0	202.0	372.9	>23.7
96B	48.2	42.6	531.5	>5.6						

NOTE: All elevations given are top of formation elevations.

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APPENDIX A

STRATIGRAPHIC & INSTRUMENTATION LOGS

HISTORIC

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REPORT

PROPOSED BULKHEAD CONSTRUCTION

NIAGARA FALLS, NEW YORK

PITTSBURGH TESTING LABORATORY

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ILE-087-0 (REV.) 2/0/00

PITTSBURGH TESTING LABORATORY

LOG OF BORING

Job No. BF-6736

Client OLIN CORP., NIAGARA FALLS, N. Y.

Project PROPOSED BULKHEAD CONST., NIAGARA FALLS

Boring No. 1 Date 6-1-73 Sheet 1

Type of Boring S.STEM Rig B401

Casing used _____ Size _____ Drilling mud used _____

Boring begun 6-1-73 Boring completed 6-1-

Ground Elevation GRADE, referred to _____

Field Party: DOAK

Location of Boring: AS DIRECRED BY CLIENT

Water Level	-9.50'
Time	COMPLETION OF BORING
Date	6-1-73

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	ID of Sampler (inches)	Tot. length of recov. sample	Length of Lab. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION (Soil type, color, texture, consistency, sampler driving notes blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.)
							0		
							1		LOOSE MIXED FILL OF
							2		PLANT WASTE, STONE,
		1.5							PEN. TEST.
	1	3.0	3				3		2/6 2/6 1/6 FOUNDRY SAND,
							4		CINDERS AND
							5		GENERAL DEBRIS
		5.0							
	2	6.5	2				6		P.T. 1/6 1/6 1/6
							7		
		8.0					8		
	3	9.5	2				9		P. T. 1/6 1/6 1/6
							10		-9.50' LOOSE BLACK FINE SILT AND SAND
							11		-11.00' SOFT BROWN ORGANIC SILT
							12		AND CLAY, WITH BROWN SI
		11.5							AND FINE SAND LENSES,
	4	13.0	5				13		P.T. 2/6 2/6 3/6 TRACES OF PEAT AND WOOD.
							14		-13.50'
									LOOSE FINE BROWN
		15.0					15		
	5	16.5	9				16		P.T. 4/6 4/6 5/6 SILTY SAND
							17		
							18		-17.60'
							19		LOOSE GREY
							20		
							1		

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ILC-007-0 (REV.) 3/0/00

PITTSBURGH TESTING LABORATORY

LOG OF BORING

Job No. BF-6736

Client

Project

Location of Boring:

Water Level	
Time	
Date	

Boring No. 1 Date 6-1-73 Sheet 2

Type of Boring Rig

Casing used Size Drilling mud used

Boring begun Boring completed

Ground Elevation referred to

Field Party:

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	ID of Sampler (inches)	Tot. length of recov. sample	Length of Lab. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
		20.0					20		
	6	21.5	5				21		P.T. 2/6 2/6 3/6 FINE SAND,
							22		SOME SILT
							23		
							24		~~23.20'~~
									LOOSE GREY SAND,
		25.0					25		SOME SILT, SOME FINE
	7	26.5	8				26		P.T. 2/6 3/6 5/6 GRAVEL, TRACES OF
							27		MARINE SHELLS
							28		
							29		~28.60'
									VERY SOFT REDDISH
		30.0					30		
	8	31.5	2				31		P.T. 1/6 1/6 1/6 BROWN CLAY,
							32		SOME SILT,
							33		TRACE OF GRAVEL
							34		
		35.0					35		
	9	36.5	3				36		P.T. 1/6 1/6 2/6
							7		~36.50 BORING STOPPED
							8		
							9		
							0		
							1		

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BLC-007-3 (REV.) 2/5/50

PITTSBURGH TESTING LABORATORY

LOG OF BORING

Job No. BF-6736

Client OLIN CORPORATION, NIAGARA FALLS, N.Y.
Project PROPOSED BULKHEAD CONST. NIAGARA FALLS, N.Y.

Boring No. 2 Date 6-1-73 Sheet 1
Type of Boring S. STEM Rig B40L
Casing used - Size - Drilling mud used
Boring begun 6-1-73 Boring completed 6-1
Ground Elevation GRADE, referred to

Field Party: DOAK

Location of Boring: AS DIRECTED BY CLIENT	
Water Level	-9.80'
Time	COMPLETION OF BORING
Date	6-1-73

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	ID of Sampler (inches)	Tot. length of recov. sample	Length of Lab. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION Soil type, color, texture, consistency, sampler driving notes: blows per foot on casing, depths wash water lost, observ fluctuations in water level, notes on drilling ease, etc.
							0		
							1		LOOSE MIXED FILL OF
							2		
	1	2.0 3.5	30				3		PEN. TEST 10/6 25/6 5/6 STONE, SILT, CLAY,
							4		CINDERS, BRICKS
							5		
	2	5.0 6.5	7				6		PEN. TEST 12/6 5/6 2/6 CONCRETE AND WOOD
							7		
							8		
	3	8.0 9.5	7				9		PEN. TEST 5/6 5/6 2/6 -8.90'
							10		LOOSE BROWN FINE
							11		SILTY SAND,
	4	11.0 12.5	2				12		PEN. TEST 1/6 1/6 1/6 TRACES OF ORGANIC
							13		
							14		MATTER AND DECOMPOSED
							15		PEN. TEST 1/6 5/6 2/6 WOOD
	5	15.0 16.5	12				16		-15.70' MEDIUM BROWN FINE SAND,
							17		SOME SILT, TRACE OF
							18		GRAVEL
							19		-18.60'
							20		VERY SOFT

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DLC-007-S (REV.) 2/0/00

PITTSBURGH TESTING LABORATORY

LOG OF BORING

Job No. BF-6736

Client

Project

Location of Boring:

Water Level

Time

Date

Boring No. 2 Date 6-1-73 Sheet 2

Type of Boring Rig

Casing used Size Drilling mud used

Boring begun Boring completed

Ground Elevation referred to

Field Party:

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	ID of Sampler (inches)	Tot. length of recov. sample	Length of Lab. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION Soil type, color, texture, consistency, sampler driving notes blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
							20		
	6	20.0 21.5	2				21		P.T. 1/6 1/6 1/6 REDDISH BROWN SILTY CLAY,
							22		TRACES OF GRAVEL
							23		
							24		
	7	23.5 25.0	3				25		P.T. 1/6 1/6 2/6
									-25.0' BORING STOPPED
							6		
							7		
							8		
							9		
							0		
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							0		
							1		

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DLC-007-0 (REV.) 3/0/00

PITTSBURGH TESTING LABORATORY

LOG OF BORING

Job No. BF-6736

Client OLIN CORP., NIAGARA FALLS, N. Y.
Project PROPOSED BULKHEAD CONST., NIAGARA FALL

Boring No. 3 Date 6-1-73 Sheet
Type of Boring STEM Rig B40L
Casing used Size Drilling mud used
Boring begun 6-1-73 Boring completed 6-1
Ground Elevation GRADE / referred to
Field Party: DOAK

Location of Boring:	AS DIRECTED BY CLIENT
Water Level	-10.50'
Time	COMPLETION OF BORING
Date	6-1-73

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	ID of Sampler (inches)	Tot. length of recov. sample	Length of Lab. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION (Soil type, color, texture, consistency, sampler driving not blows per foot on casing, depths wash water lost, obser fluctuations in water level, notes on drilling ease, etc.)
							0		
							1		DENSE TO VERY
							2		
	1	2.0 3.5	34				3		PEN. TEST. 25/6 19/6 15/6 LOOSE MIXED FILL
							4		OF CINDERS, ASHES,
							5		
	2	5.0 6.5	2				6		P.T. 2/6 1/6 1/6 WOOD, SILT,
							7		BITUMINOUS WASTE
							8		
	3	8.0 9.5	2				9		P.T. 1/6 1/6 1/6
							10		
							11		-11.30'
	4	11.0 12.5	6				12		P.T. 2/6 3/6 3/6 MEDIUM BLACK ORGANIC S
									-11.90' MEDIUM GREY SILTY CLAY, WITH FINE SILTY SAND LENSES
							13		-12.90'
							14		VERY LOOSE
							15		
	5	15.0 16.5	3				16		P.T. 1/6 2/6 1/6 BROWN
							17		
							18		
							19		
							20		
							1		

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JLC-867-8 (REV.) 3/8/80

PITTSBURGH TESTING LABORATORY

LOG OF BORING

Job No. BF-6736

Client

Project

Location of Boring:

Water Level

Time

Date

Boring No. 3 Date 6-1-73 Sheet 2

Type of Boring Rig

Casing used Size Drilling mud used

Boring begun Boring completed

Ground Elevation referred to

Field Party:

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	ID of Sampler (inches)	Tot. length of recov. sample	Length of Lab. sample	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION (Soil type, color, texture, consistency, sampler driving notes: blows per foot on casing, depths wash water lost, observe fluctuations in water level, notes on drilling ease, etc.)
		20.0					20		
	6	21.5	4				21		P.T. 1/6 2/6 2/6 SILTY SAND
							22		
							23		-22.50' LOOSE BROWN SILTY SA SOME FINE GRAVEL WET
							24		-23.90'
		25.0					25		SOFT TO MEDIUM
	7	26.5	5				26		P.T. 2/6 2/6 3/6 BROWN SILTY CLAY,
							27		SOME FINE TO MEDIUM
							28		GRAVEL
		28.5					29		
	8	30.0	7				30		P.T. 2/6 3/6 4/6
									-30.00' BORING STOPPED
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							0		
							1		

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J. GENTILE, MANAGER
BUFFALO DISTRICT

3/OLIN CORPORATION

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SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel - sand mixtures, little or no fi
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel - sand - silt mixtures.
			GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

No. 200 No. 40 No. 10 No. 4 ¾ in. 3 in. (12 in.)

U.S STANDARD SIEVE SIZE

RELATIVE DENSITY (sand-silt)

Very Loose — Less than 4 blows per foot
Loose — 4 to 10 blows/ft.
Medium — 10 to 30 blows/ft.
Dense — 30 to 50 blows/ft.
Very Dense — More than 50 blows/ft.

CONSISTENCY (clay)

Very Soft — Less than 2 blows per foot
Soft — 2 to 4 blows/ft.
Medium — 4 to 8 blows/ft.
Stiff — 8 to 15 blows/ft.
Very Stiff — 15 to 30 blows/ft.
Hard — More than 30 blows/ft.

KEY TO BORING LOGS

25 22 — Number of blows of a 140-lb. weight falling 30 in. in req'd. to drive st'd. spoon one foot.

10 WL — Free ground water level

30 S — Thin-wall Shelby tube undisturbed sampler used

20 90% REC. — Percent core recovery from rock core-drilling operations

Sample not recovered

Fill

Limestone

Sandstone

Igneous Rock

Shale

000741A

June 28, 1977

To: Olin
2400 Buffalo Avenue
Niagara Falls, NY
No. OM-NF-4181
Requisition No. C-370933

Logs of Drilling Beginning 6/9/77:

Hole #1 @ River:

0-18" grit
18"-12' clay and rip rap rock
WELL C 12½'-18' soft clay and black grit
18'-25' reddish putty-like clay and drilling stopped
26'6" of 6" pipe in well
pipe slotted 6" above bottom and 10' from top river level 10'

Hole #2 @ River (6/10/77):

0-4' clay and rip rap fill
4'-11½' clay, small stones and black grit
WELL B 11½'-18½' soft muddy clay and gravel and black grit
18½'-25'2" reddish clay and drilling stopped
26'7" of pipe in well
pipe slotted 6" above bottom and 10' from top river level 10'

Hole #1 on Top of Fill Near Storm Sewer Line:

0-5' black fill dirt and stones with mixture of bricks
5'-18' black sandy-like soil - very soft
WELL A 18'-21' slight chemical odor
23' soil gets firmer and blackish loam same to 27'
27'-30'4" earth got firm and gravelly and produced water
31'7" of pipe in well
pipe slotted 6" above bottom and 15' from top river level 16'

Marvin W. Wendt
5704 Town Line at Saunder
Settlement Road
Sanborn, NY 14132

The above well logs were retyped verbation from the original. The Well A-C designations have been added.

URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

PROJECT Subsurface Investigations and Well Installations

LOCATION Buffalo Avenue Niagara Falls, New York

DATE STARTED 8-25-77

DATE FINISHED 8-25-77

HOLE NO. BL 1

SURF. ELEV. 576.39

METHOD OF INVESTIGATION client specification

DEPTH-FT	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
		1	8	12		20		medium brown moist clay, little silt, trace of organic material.	Installed 3" I.D. monitoring well to 42.0'
			14	16		30			
								miscellaneous fill material consisting of compact to firm brown/black silt, cinders, ashes, chemical residue.	1.0' stickup
5									Groundwater level
		2	6	5		11			36.0' 8-25-77
			7	12		19		firm black damp ashes. -fill-	15.0' 8-29-77
									EL. 565.19 9-8-77
10									
		3	4	4		8		miscellaneous fill material consisting of loose black/brown wet ashes, chemical residue, cinders, wood.	
			3	2		5			
15									
		4	4	6		10		-fill-	
			8	8		16		firm brown/black wet silt and very fine sand, little organic matter, little chemical residue, trace of clay. -fill-	
20									
		5	3	3		6		loose dark gray wet very fine sand and silt, traces of chemical residue, organic material, clay.	
			3	3		6			
25									
		6	3	3		6		loose dark gray wet.	
			4	3		7			
30									
		7	11	5		16		firm dark gray saturated.	
			4	4		8		loose to firm red brown silt, some medium to fine gravel and coarse to fine sand, trace of clay.	
35									
		8	23	41	72	113		very dense red brown wet coarse to fine gravel and coarse to medium sand, little fine sand, trace of silt.	
40									

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N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.

SHEET 1 OF 2

URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

PROJECT Subsurface Investigations and Well Installations

LOCATION Buffalo Avenue Niagara Falls, New York

DATE STARTED 8-25-77

DATE FINISHED 8-25-77

HOLE NO. BL 1

SURF ELEV 576.39

METHOD OF INVESTIGATION: client specification

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
		9	75	75	100	175		very dense red brown wet	
								Boring terminated at 42.0' (refusal)	
45									

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URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

PROJECT: Subsurface Investigations and Well Installations

LOCATION: Buffalo Avenue, Niagara Avenue

DATE STARTED: 8-25-77

DATE FINISHED: 8-26-77

HOLE NO.: BL 2

SURF. ELEV.: 569.59

METHOD OF INVESTIGATION: client specification

DEPTH FT	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
		1	3	3		6		medium brown damp clayey silt, traces of sand and fine gravel, trace of organic material. -fill-	Installed 3" I.D. monitoring well to 32.0'
			4	4		8			1.0' stickup
5									Groundwater level
		2	9	100/0				miscellaneous fill material consisting of firm brown/black damp cinders, ashes, silt, sand, traces of chemical residue, glass. Cobble 5.5'-6.0'-fill-	6.7' 8-26-77 6.0' 8-29-77
10									EL. 564.09 9-8-77
		3	5	7		12		stiff brown/dark gray wet silty clay and ashes, little sand, little organic material. -fill-	
			8	9		17			
15									
		4	6	7		13		firm dark gray saturated fine sand, trace to little silt, trace of chemical residue.	
			9	9		18			
20								firm dark gray saturated -fill-	
		5	7	7		14		firm dark gray saturated medium to fine sand, little cinders and ashes, trace of fine gravel and coarse sand, trace of silt.	
			9	10		10			
25									
		6	9	11		20		firm dark gray saturated -fill-	
			14	16		30		compact to dense red brown wet silt, some medium to fine gravel and coarse to fine sand, trace of clay.	
30									
		7	19	22	34	56		dense to very dense red brown wet.	
35								Boring terminated at 32'0" (refusal)	
40									

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* = No. blows to drive 2 " spoon 12 " with 140 lb. hin wt. falling 30 " per blow

SHEET 1 OF 1

URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

PROJECT Subsurface Investigations and Well Installations

LOCATION Buffalo Ave. Niagara Falls, N.Y.

DATE STARTED 8-29-77

DATE FINISHED 8-29-77

HOLE NO. BL 3

SURF. ELEV. 569.09

METHOD OF INVESTIGATION: client specification

DEPTH	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
		1	9	12		21		stiff red brown damp silty clay, little gravel and sand.	Installed 3" I.D. monitoring well to 36.0'
			17	19		36			1.0' stickup
								miscellaneous fill material consisting of brown/gray damp cinders, ashes, chemical residue.	Groundwater level
5									
		2	21	22		43		dense to very dense gray wet.	24.0' 8-29-77
			41	54		95			18.0' 8-29-77
								-fill-	EL. 563.52 9-8-77
10									
		3	4	4		8		loose dark brown wet silt and very fine sand, trace of chemical residue.	
			3	4		7			
15									
		4	2	2		4		loose dark brown wet.	
			1	2		3			
								-fill-	
20									
		5	6	5		11		firm dark brown wet medium to fine sand, traces of silt, ashes, gravel, chemical residue.	
			5	6		11			
25									
		6	9	11		20		firm dark brown wet. -fill-	
			21	26		47		dense dark brown wet medium to fine sand, little medium to fine gravel, traces of silt, ashes, chemical residue. -fill-	
30									
		7	2	2		4		loose dark brown saturated silt and very fine sand. -fill-	
			1	1		2		very soft red brown saturated silty clay.	
35									
		8	70	100		170		very dense red brown damp medium to fine gravel and coarse to medium sand, little fine sand, trace to little silt.	
								Boring terminated at 36.0' (refusal)	
40									

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* No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.

SHEET 1 OF 1

URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

PROJECT Subsurface Investigations and Well Installations

LOCATION Buffalo Avenue Niagara Falls, N.Y.

DATE STARTED 8-25-77

DATE FINISHED 8-25-77

HOLE NO. BL 4

SURF. ELEV. 576.39

METHOD OF INVESTIGATION: client specification

DEPTH	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
								No samples at owners request.	Installed 3" I.D. monitoring well to 16.5' 1.0' stickup No groundwater at time of installation 14.0' 8-29-77 El. 565.79 9-8-77
5									
10									
15									
								Boring terminated at 16'6"	
20									

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* No. blows to drive _____ "spoon _____ "with _____ lb. bin wt. falling _____ "per blow

SHEET 1 OF 1

URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

PROJECT: Subsurface Investigations and Well Installations

LOCATION: Buffalo Avenue, Niagara Falls, N.Y.

DATE STARTED: 8-26-77

DATE FINISHED: 8-26-77

HOLE NO.: BL 5

SURF. ELEV.: 569.59

METHOD OF INVESTIGATION: client specification

DEPTH FT	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C.	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
									Installed 3" I.D. monitoring well to 17'0"
									1.0' stickup
5									Groundwater level 7.0' 8-26-77 6.0' 8-29-77
									EL. 564.09 9-8-77
10									
15									
								Boring terminated at 17'0"	
20									

recycled paper

ecology and environment

000745

N = No. blows to drive _____"spoon _____"with _____lb pin wt. falling _____"per blow

URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

PROJECT Subsurface Investigations and Well Installations

LOCATION Buffalo Avenue Niagara Falls, N.Y.

DATE STARTED 8-29-77

DATE FINISHED 8-29-77

HOLE NO. BL 6

SURF. ELEV. 569.09

METHOD OF INVESTIGATION: client specification

DEPTH-FT	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
									Installed 3" I.D. Monitoring well to 16.0'
									1.0' stickup
5									No groundwater at time of installation
									14.0' 8-29-77
									EL. 563.99 9-8-77
10									
15									
								Boring terminated at 16'0"	
20									

000745A

N = No. blows to drive ____ "spoon ____ "with ____ lb. pin wt. falling ____ "per blow

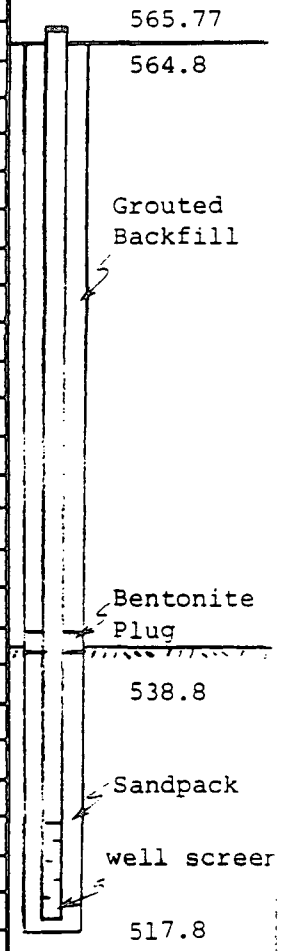
SHEET 1 OF 1

Project Name: 102nd Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8"Ø Hollow Stem Auger - rock triconed
Location: Buffalo Ave. Niagara Falls

Borehole No. OW 1-79
Date Completed July 27, 1979
Geologist/Engineer Jim Kay
Elevation 564.8

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
			1	SS	2	
560	ARD	Black Silt and Fine Sand	2	SS	2	
	ARD	Black Silt and Fine to Medium Sand Wet	3	SS	4	
550	ARD	Black Silt and Fine to Medium Sand with Some Fine Gravel - Wet	4	SS	7	
			5	SS	4	
540	GC	Brownish Gray Silty Clay - Wet	6	SS	2	
	GT	Reddish Brown Silt, Sand with Fine to Medium Gravel, very Difficult to auger Stone encountered between 29 and 31'				
530		Bedrock - Dolomite				
520						
510		NOTE: Augers - 8" dia. Tricone - 6" dia. Well Screen - 5' - #10 slot - 2" dia. Well Pipe - 2" dia. Black Steel				

Piezometer or Standpipe Installation

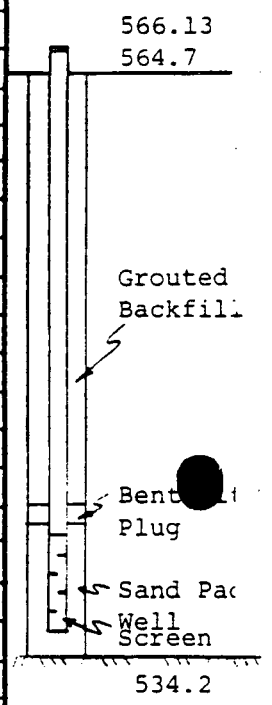


Project Name: 102nd Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8"Ø Hollow Stem Auger
Location: Buffalo Avenue Niagara Falls, N.Y.

Borehole No. OW 2-79
Date Completed July 26, 19
Geologist/Engineer Jim Kay
Elevation 564.7

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
560	ARD	Black Silt and Fine Sand - Damp - Some gravel				
550	ARD	Black, Fine to Medium Sand with Tiny Shells (River Sediments) - Wet - little silt				
	ARD	Brownish Gray Sand and Gravel - Wet				
540	GC	Reddish Brown Silty Clay				
	GT	Reddish Brown Silty Clay with Fine to Medium Gravel, Gray Clay				
530		NOTE: Augers - 8" dia. Well Screen - 5' - #10 slot 2" dia. Well Pipe - 2" dia. Black Steel				

Piezometer or Standpipe Installation



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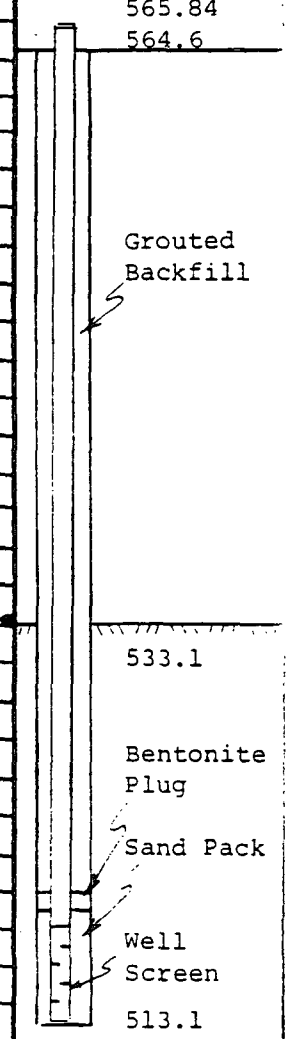
000746A

Project Name: 102nd Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8"Ø Hollow Stem Auger - Rock Triconed
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW 3-79
Date Completed July 25, 1979
Geologist/Engineer Jim Kay
Elevation 564.6

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
560	ARD	Black Silt and Fine Sand - Damp - Some Gravel	1	SS	--	
			2	SS	4	
			3	SS	5	
550	ARD	Black, Fine to Medium Sand with tiny shells (river sediments) - Wet - little silt	4	SS	1	
	ARD	Brownish-Gray Sand & Gravel - Wet	5	SS	28	
540	GC	Reddish-brown silty clay	6	SS	5	
	GT	Reddish Brown Silty Clay with Fine to Medium Gravel, gray clay				
530		Bedrock - Dolomite				
520						
510		NOTE: Augers - 8" dia. Tricone - 6" dia. Well Screen - 5' - #10 slot 2" dia. Well Pipe - 2" dia. Black Steel				



000747

recycled paper

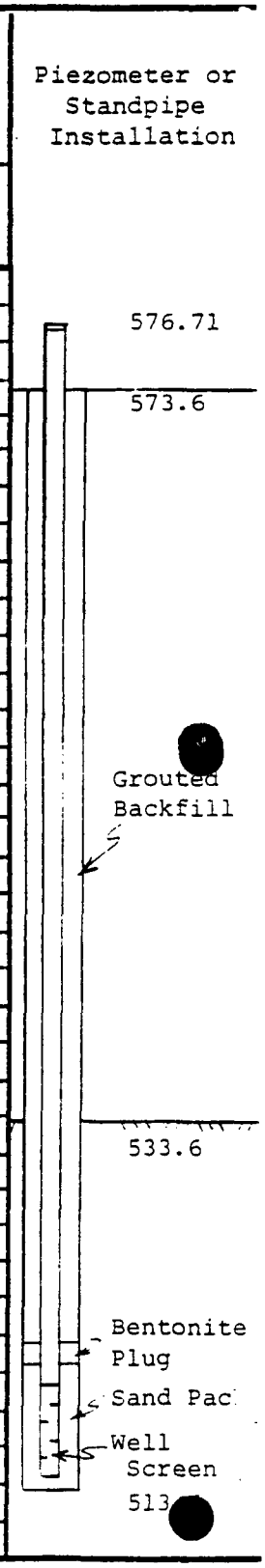
Converse Rovers & Associates

Project Name: 102nd Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8"Ø Hollow Stem Augers - Rock triconed
Location: Buffalo Avenue Niagara Falls, N.Y.

Borehole No. OW 5-79
Date Completed June 29, 19[illegible]
Geologist/Engineer Jim Ka[illegible]
Elevation 573.6

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Blows/Foot
	F	Medium Brown Cover Material	1	Sh	--
570	ARD	Black Silty Sand, Becomes Sandier with Depth, Wet at approximately 10'	2	SS	33
			3	SS	5
560			4	SS	2
			5	SS	2
550	ARD	Black Silty Sand with Tiny Shells (River Sediment)	6	SS	2
			7	SS	4
540	GT	Reddish Brown Silt, Clay with Gravel, and Sand	8	SS	20
530		Bedrock Dolomite			
520		NOTE: Augers - 8" dia. Tricone - 6" dia. Well Screen - 5' - #10 Slot - 2" dia. Well Pipe - 2" dia. Black Steel			

Penetration Test Blows/Foot: 20 40 60 80



Conestoga - Rovers & Associates

000747A

Project Name: 102nd Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8"Ø Hollow Stem Augers
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW 6-79
Date Completed July 4, 19
Geologist/Engineer Jim Kay
Elevation 574.4

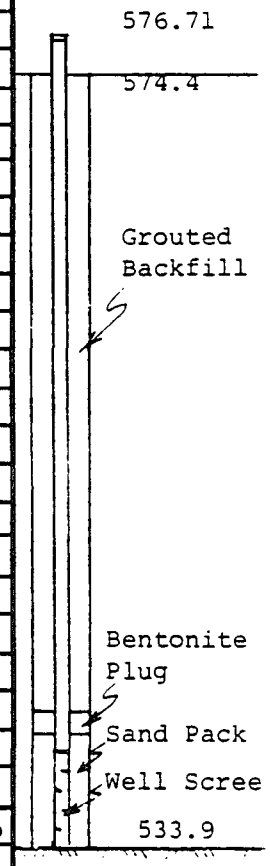
Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Type	Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Sandy Silt				
	F	Brown Sandy Silt, White Lime, Glass and Cinders	1	SS	12	
570			2	SS	2	
	F	White Lime - Wet and Brown Silt and Sand	3	SS	4	
560	ARD	Grayish Brown Silty Sand - Moist	4	SS	10	
			5	SS	1	
550	GC	Grayish Brown Clayey Silt - Moist	6	SS	3	
			7	SS	2	
540	GC	Reddish Brown Clayey Silt - Moist	8	SS	1	
	GT	Medium Dense Brown Fine Sand & Silt with Some Medium & Coarse Gravel	9	SS	96	
	GT	Gray Fine Sand and Silt with some medium and coarse Gravel				
530						

NOTE: Augers - 8" dia.

Well Screen - 5' - #10 Slot
- 2" dia.

Well Pipe - 2" dia. Black Steel

Piezometer or Standpipe Installation



Project Name: 102nd Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8"Ø Hollow Stem Auger - Rock Triconed
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW 7-79
Date Completed July 20, [illegible]9
Geologist/Engineer Jim[illegible]y
Elevation 573.1

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installatio
		Topsoil					576.68
570	F	Fill Material, Reddish Brown Clay, Rock & Gravel, Grayish Brown Sandy Silt, Roots, Cinders					573.1
	ARD	Light Brown Silty Sand					
	ARD	Gray Silty Sand, Wet					
560	GC	Brown Clayey Silt, turns to Reddish Brown Silty Clay by 14'					Grouted Back[illegible]l
550		Rock - Drilled Through					
	GT	Brown Silt and Sand with Medium to Fine Gravel					
540	GT	Brown Silt and Fine Sand with Coarse to Fine Gravel					
530		Bedrock					531.1
520		NOTE: Augers - 8" dia. Tricone - 6" dia. Well Screen - 5' - #10 Slot - 2" dia. Well Pipe - 2" dia. Black Steel					Bentonit Plug Sand Pac[illegible] Well Screen 511.[illegible]

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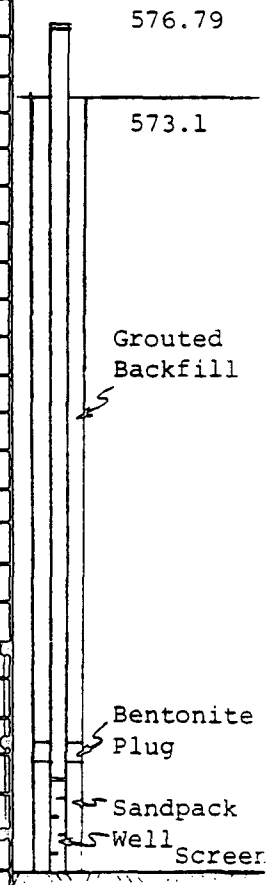
Project Name: 102nd Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8"Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. Ow 8-79
Date Completed July 17, 1979
Geologist/Engineer Jim Kay
Elevation 573.5

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Topsoil	1	SS	82	
570	F	Fill Material, Reddish Brown Clay, Rock and Gravel, Grayish Brown Sandy Silt, Roots, Cinders	2	SS	22	
	ARD	Light Brown Silty Sand				
	ARD	Gray Silty Sand, Wet	3	SS	42	
560	GC	Brown Clayey Silt, Turns to Reddish Brown Silty Clay by 14'	4	SS	17	
			5	SS	13	
550		Rock Drilled Through	6	SS	--	
	GT	Brown Silt and Sand with Medium to Fine Gravel	7	SS	151	
540	GT	Brown Silt and Sand with Coarse to Fine Gravel	8	SS	104	
			9	SS	106	
530						
520		NOTE: Augers - 8" dia. Well Screen - 5' - #10 Slot - 2" dia. Well Pipe - 2" dia. Black Steel				

Piezometer or Standpipe Installation



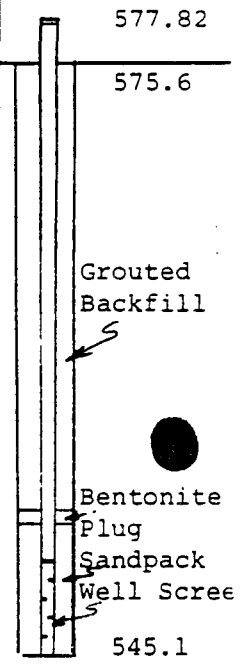
Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW9-79
Date Completed July 4, [illegible]9
Geologist/Engineer Jim K[illegible]
Elevation 575.6

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Type	Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Brown Silty Sand Cover Material	1	SS	5	
570	F	Black Silt & Fine Sand -Wet -Hit a Brick at 5' -Gravel -Cinders	2 3	SS SS	10 2	
560	ARD	Brownish Gray Silt & Fine Sand & Clay -Wet	4 5	SS SS	11 6	
550	GT	Brown Silty Sand and Clay and Gravel - Wet	6	SS	4	
	GT	Medium Brown Silt & Sand with medium gravel - boulder or rock encountered during split spooning	7	SS	50+	
540						

NOTE: Augers - 8" dia.

Well Screen - 5' #10 Slot - 2" dia.
Well Pipe - 2" dia. Black Steel



Piezometer o Standpipe Installation

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger - Rock Triconed
Location: Buffalo Avenue, Niagara Falls, New York

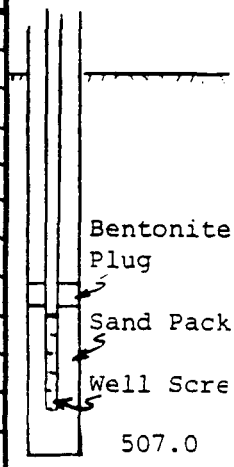
Borehole No. OW10-79
Date Completed July 12, 1979
Geologist/Engineer Jim Kay
Elevation 575.5

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Type	Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
							579.09
	F	Topsoil					
	F	Brown Silt & Fine Sand with -some coarse & medium gravel -dry	1	SS	14		575.5
570	F	Lime & Black Flyash with -medium gravel & silt & sand -damp	2	SS	14		
	F	Brown Silt and Sand - Trace Clay - Wet	3	SS	3		
560	ARD	Brown Silt & Fine Sand with lime & black flyash, grass and small pebbles	4	SS	8		
	ARD	Brownish Gray - Fine Sand - Moist Some Gravel	5	SS	4		Grouted Backfill
550	ARD	Gray Sand and Fine Gravel - Wet	6	SS	5		
			7	SS	70		
	GT	Reddish Brown Silt & Fine Sand with fine gravel - damp	8	SS	33		
540	GT	Red Silt with traces of fine sand & clay & fine gravel - moist	9	SS	55		
	GT	Reddish brown fine sand with some silt, fine to medium gravel, moist	10	SS	105		
530	GT	Gray silt with coarse to fine sand, coarse to fine gravel	11	SS	75		
		Bedrock - Dolomite					527.0
520							

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger - rock triconed
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW10-79 cont'd
Date Completed July 12, [illegible]
Geologist/Engineer Jim Ka[illegible]
Elevation 575.5

Profile			Sample			Penetration Test Blows/Foot	Piezometer or Standpipe Installatio
Depth (Elev.)	Stratigraphy	Description & Remarks	Number	Type	Blows/Foot	20 40 60 80	
520		Bedrock - Dolomite					Bentonite Plug
							Sand Pack
510							Well Scre
							507.0
500		NOTE: Augers - 8" dia. Tricone - 6" dia. Well Screen - 5" - # 10 slot - 2" dia. Well Pipe - 2" dia. Black Steel					

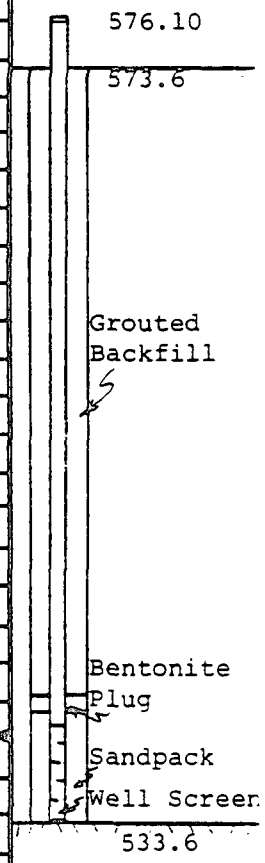


Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW11-79
Date Completed July 19, 1979
Geologist/Engineer Jim Kay
Elevation 573.6

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot
	F	White Lime and Sand - Dry	1	SS	7
570	F	Medium Brown Silt & Fine Sand with white lime and Cinders - Dry	2	SS	6
560	GC	Medium Brown Clayey Silt with traces of sand - Damp	3	SS	20
			4	SS	10
550	GC	Brownish Gray Silty Clay - wet	5	SS	5
			6	SS	6
540			7	SS	6
	GT	Reddish Brown Sandy Silt with fine to medium gravel	8	SS	100

Penetration Test Blows/Foot: 20 40 60 80



NOTE: Augers - 8" dia.

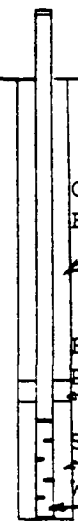
Well Screen - 5' - # 10 Slot - 2" dia.

Well Pipe - 2" dia. Black Steel

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW12-79
Date Completed August 1[illegible]9
Geologist/Engineer Jim Kay[illegible]
Elevation 576.7

Profile			Sample			Penetration Test Blows/Foot	Piezometer or Standpipe Installatio
Depth (Elev.)	Stratigraphy	Description & Remarks	Number	Type	Blows/Foot	20 40 60 80	
580							580.16
							576.7
570							Grouted Backfill
		NO SAMPLING					
560							Bentonite Plug
							Sand Pack
							Well Scree
							553.7
550							
		NOTE: Augers - 8" dia.					
		Well Screen - 5' - # 10 slot - 2" dia.					
		Well Pipe - 2" dia. Black Steel					



Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW13-79
Date Completed July 19, 1979
Geologist/Engineer Jim Kay
Elevation 574.8

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
	F	Topsoil and Silty Sand	1	SS	4		578.10 / 574.8
570	F	Fill Material with medium brown Sandy Silt - white lime - gray flyash	2	SS	2		
			3	SS	8		
560	GC	Reddish Brown Clayey Silt - Damp	4	SS	15		Grouted Backfill
			5	SS	3		
550	GC	Grayish Brown Silty Clay - wet & loose	6	SS	15		
540	GT	Reddish Brown Silt with medium to fine sand & gravel	7	SS	100		Bentonite Plug
			8	SS	100		Sand Pack; Well Screen
530		NOTE: Augers - 8" dia. Well Screen - 5' - #10 slot - 2" dia. Well Pipe - 2" dia. Black Steel					536.8

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: LaSalle Expressway, Niagara Falls, New York

Borehole No. OW14-79
Date Completed October 23, 19
Geologist/Engineer Jim Kay
Elevation 581.7

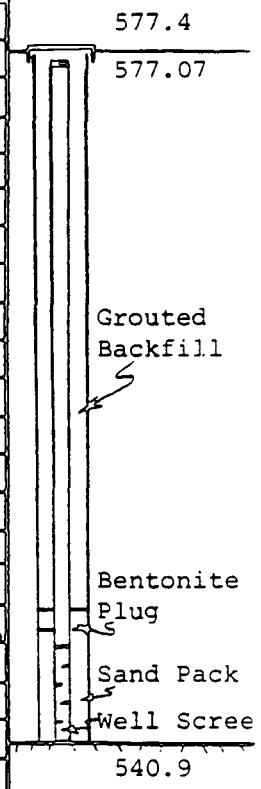
Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
	F	Topsoil					581.7
580	F	Fill - reddish-brown silt clay and sand and gravel Traces	1	SS	48		581.26
			2	SS	74		
570	ARD	Gray Silt and Fine Sand	3	SS	10		
	ARD	Brown and Gray Silt - Clay and Fine Gravel	4	SS	29		
560	GC	Brownish-Gray Clay and Silt - plastic	5	SS	5		Grout Backfill
			6	SS	3		
550	GT	Reddish-Brown Silt and Fine Sand and Fine Gravel, some Clay	7	SS	53		
			8	SS	76		Bentonite Plug
540			9	SS	73		Sand Pack
			10	SS	160		Well Screen
							535.5
530		NOTE: Augers - 8" dia. Well Screen - 5' - # 10 slot - 2" dia. Well Pipe - 2" dia. Black Steel					

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: LaSalle Expressway, Niagara Falls, New York

Borehole No. OW15-79
Date Completed October 25, 197
Geologist/Engineer Jim Kay
Elevation 577.4

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Type	Blows/Foot
	F	Topsoil			
	F	Fill - medium brown and orange silt and clay with fine gravel and Sand	1	SS	33
		Topsoil			
	ARD	Medium Brown Silt and Fine Sand	2	SS	25
570					
	GC	Dark Reddish-brown Silt & Clay with trace of fine sand and fine gravel	3	SS	36
			4	SS	7
560					
	GC	Dark Reddish-brown Silty Clay	5	SS	4
	GT	Reddish-brown Silty Clay with traces of sand and gravel	6	SS	4
550					
	GT	Reddish-brown Silt - Clay and Gravel	7	SS	97
	GT	Reddish-brown Silt - Clay and Gravel with some sand	8	SS	90
540					

Penetration Test Blows/Foot: 20 40 60 80



NOTE: Augers - 8" dia.

Well Screen - 5' - # 10 slot - 2" dia.

Well Pipe - 2" dia. Black Steel

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW16-79
Date Completed July 3, [illegible]9
Geologist/Engineer Jim Ka[illegible]
Elevation 573.5

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
							576.53
	F	Medium Brown Cover Material					573.5
570							
	ARD	Black Silty Sand, become sandier with depth, wet at approximately 10'					
560							
							Grout Backfill
	ARD	Black Silty Sand with tiny shells (river sediment)					
550							
							Bentonite Plug
540							Sand Pack
	GT	Reddish Brown Silt, Clay with Gravel and Sand					Well Screen
							534.0
530							
520		NOTE: Augers - 8" dia. Well Screen - 5' - # 10 slot - 2" dia. Well Pipe - 2" dia. Black Steel					

000753A

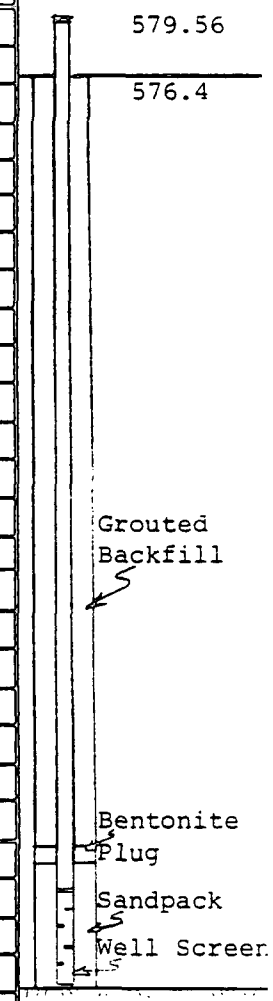
Conestoga - Rovers & Associa

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW17-79
Date Completed July 11, 1979
Geologist/Engineer Jim Kay
Elevation 576.4

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Topsoil				
	F	Brown Silt & Fine Sand with some coarse & medium gravel - dry				
570	F	Lime & Black Flyash with medium gravel and wilt and sand - damp				
	F	Brown Silt and Sand - Wet - Trace Clay				
560	ARD	Brown Silt & Fine Sand with lime & black flyash, grass and small pebbles				
	ARD	Brownish Gray Fine Sand - Moist - Some Gravel				
550	ARD	Gray Sand and Fine Gravel - Wet				
	GT	Reddish Brown Silt & Fine Sand with fine gravel - damp				
540	GT	Red Silt with traces of fine sand & clay & fine gravel - moist				
	GT	Reddish brown fine sand with some silt, fine to medium gravel, moist				
530	GT	Gray silt with coarse to fine sand, coarse to fine gravel				
520		NOTE: Augers - 8" dia. Well Screen - 5' - # 10 slot - 2" dia. Well Pipe - 2" dia. Black Steel				

Piezometer or Standpipe Installation



Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW18-79
Date Completed July 17, [illegible]79
Geologist/Engineer Jim Ka[illegible]
Elevation 568.7

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
570							573.13
	F	Medium Brown Fine Sand & Silt with rock & stones	1	Sh	--		568.7
	F	Fill Material with brown silt & sand traces of lime (white), rock, damp	2	SS	5		
560	F	Grayish Brown Silt & Sand with stones, wet	3	SS	7		Grouted Backfill
	ARD	Black Sand -wet -Trace Gravel	4	SS	4		
550			5	SS	30		
			6	SS	16		Bentonite Plug
540	GC	Brownish Gray Silty Clay with some Sand and Silt - Wet	7	SS	14		Sand Pack
	GT	Reddish Brown Sand and Gravel - Little Silt	8	SS	150		Well Screen
530							533.4

NOTE: Augers - 8" dia.

Well Screen - 5' - # 10 slot - 2" dia.

Well Pipe - 2" dia. Black Steel

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW19-79
Date Completed July 30, 1979
Geologist/Engineer Jim Kay
Elevation 564.7

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
							565.54
	ARD	Black Silt and Fine Sand					564.7
560							
	ARD	Black Silt and Fine to Medium Sand - wet					
550	ARD	Black Silt and Fine to Medium Sand with some Fine Gravel - wet					Grouted Backfill
540	GC	Brownish Gray Silty Clay - wet					Bentonite Plug
	GT	Reddish-brown Silt, Sand with Fine to Medium Gravel, very difficult to auger Stone encountered between 29 & 31'					Sand Pack Well Screen
530		Bedrock - Dolomite					532.7

NOTE: Augers - 8" dia.

Well Screen - 5' - # 10 slot - 2" dia.

Well Pipe - 2" dia. Black Steel

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

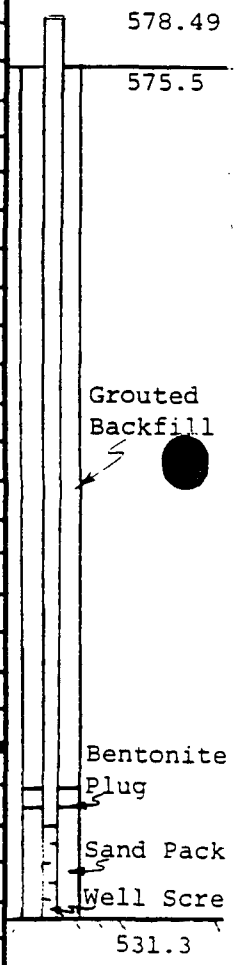
Borehole No. OW20-79
Date Completed October 1[illegible]1
Geologist/Engineer Jim K[illegible]
Elevation 575.5

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Topsoil				
	F	Fill, Silt, Sand and Clay with tar paper, wood, brick, gravel	1	SS	12	
570			2	SS	24	
	ARD	Brownish-grey Silt and Fine Sand with fine roots	3	SS	4	
560			4	SS	15	
	GC	Medium Brown Silty Clay	5	SS	0	
550	GC	Reddish-brown Silty Clay	6	SS	0	
	GT	Reddish-brown Silt and Sand and Clay and Gravel	7	SS	35	
		Rock - Augered through				
540	GT	Reddish-brown Silt and Sand and Gravel				
		Rock - augered through	8	SS	100	
	GT	Reddish-brown Silt and Sand and Gravel	9	SS	72	
530						

NOTE: Augers - 8" dia.

Well Screen - 5' - # 10 slot - 2" dia.

Well Pipe - 2" dia. Black Steel



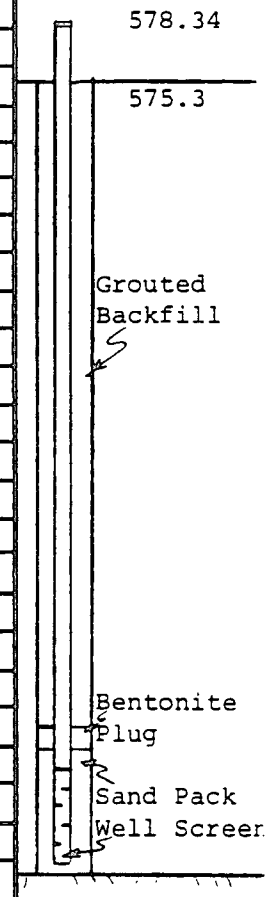
Piezometer or Standpipe Installatio..

Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW21-79
Date Completed October 15, 197
Geologist/Engineer Jim Kay
Elevation 575.3

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Topsoil	1	SS	22	
570	F	Fill - gray silt, sand, gravel and lime with wood and tar paper	2	SS	9	
			3	SS	16	
560	ARD	Gray Silt and Sand with Fine Roots	4	SS	4	
			5	SS	3	
550	ARD	Gray Silt and Sand with Gravel				
	GC	Gray Silty Clay with Reddish-brown Clay	6	SS	2	
540	GC	Reddish-brown Silty Clay	7	SS	0	
			8	SS	0	
	GT	Reddish-gray Silt with Sand and Gravel with Trace of Clay	9	SS	26	
530		NOTE: Augers - 8" dia. Well Screen - 5' - # 10 slot - 2" dia. Well PIpe - 2" dia. Black Steel				

Piezometer or Standpipe Installation



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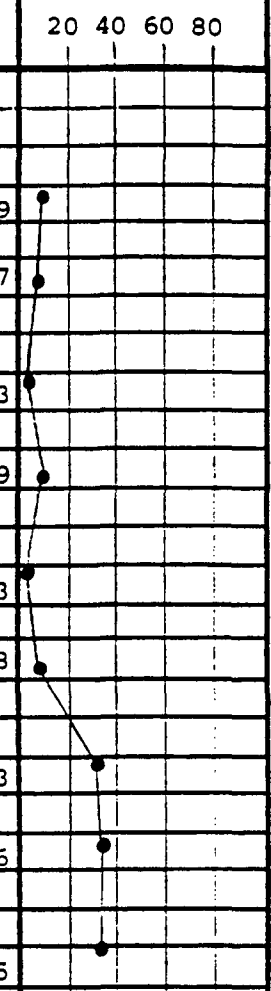
Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

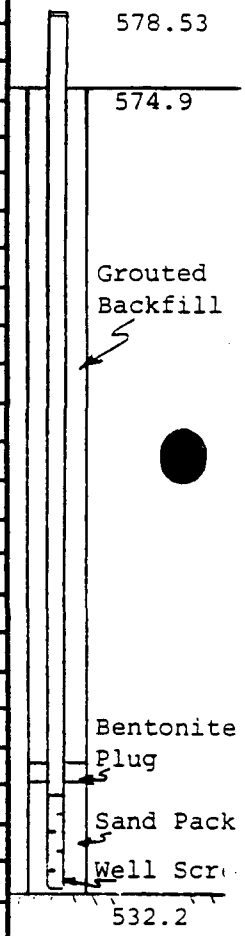
Borehole No. OW22-79
Date Completed October
Geologist/Engineer Jim Ka
Elevation 574.9

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Type	Blows/Foot
	F	Topsoil			
570	F	Fill with cinders and clay and silt, sand, glass wood, stone	1	SS	9
			2	SS	7
	F	Brown Silt and Sand with black liquid	3	SS	3
560	ARD	Grayish-brown Silt and Fine Sand with glass, rock fragments - wet	4	SS	9
	ARD	Grayish-brown Silt and Fine Sand and Fine Gravel - wet	5	SS	3
550	ARD	Brownish-gray Silt and Fine Sand - wet	6	SS	8
	ARD	Brownish-gray Silt and Fine Sand with fine to coarse gravel, shell fragments - wet	7	SS	33
540	GC	Reddish-brown Silty Clay and Gravel	8	SS	36
	GT	Medium Brown Silt with trace of clay trace of fine sand	9	SS	35
530		NOTE: Augers - 8" dia. Well Screen - 5' - # 10 slot - 2" dia. Well Pipe - 2" dia. Black Steel			

Penetration Test Blows/Foot



Piezometer or Standpipe Installation



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Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

Borehole No. OW23-79
Date Completed October 17,
Geologist/Engineer Jim Kay
Elevation 575.5

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Type	Blows/Foot
	F	Topsoil	1	SS	26
	F	Fill - silt and sand with wood, gravel, glass, cinders	2	SS	25
			3	SS	22
570			4	SS	5
			5	SS	4
	F	Black Silt and Sand and Gravel with cinders - wet	6	SS	12
	ARD	Black Clay & Silt with tiny roots	7	SS	13
			8	SS	13
560	ARD	Black Silt and Fine Sand	9	SS	18
			10	SS	20
	ARD	Black Silt - wet	11	SS	19
	ARD	Black fine to medium sand - wet	12	SS	9
550	ARD	Black Silt and Fine Sand - wet	13	SS	13
			14	SS	6
	ARD	Grayish-black Silt and with tiny shells - wet	15	SS	9
			16	SS	2
	GC	Reddish-brown Silty Clay	17	SS	0
540			18	SS	10
	GT	Reddish-brown Silt with Sand, Gravel - little Clay	19	SS	55
			20	SS	28
			21	SS	191
530					

Penetration Test Blows/Foot: 20 40 60 80

Piezometer or Standpipe Installation:
578.95
575.5
Grouted Backfill
Bentonite Plug
Sand Pack
Well Screen
533.9

NOTE: Augers - 8" dia.

Well Screen - 5' - #10 Slot
- 2" dia.
Well Pipe - 2" dia. Black Steel

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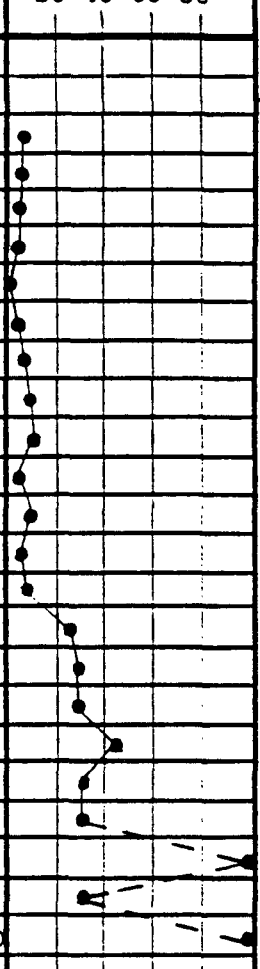
Project Name: 102ND Street Landfill Site
Job No. 978-537
Client: Hooker Chemicals & Plastics Corp.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, New York

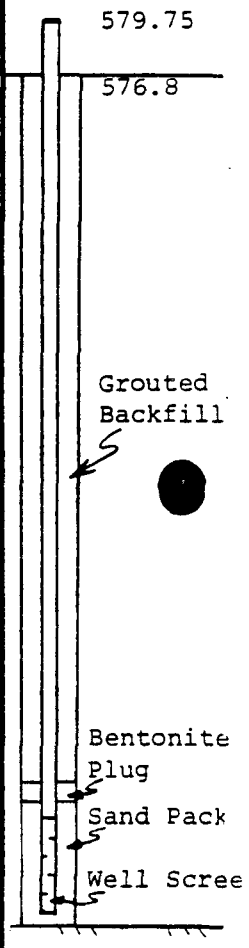
Borehole No. OW24-79
Date Completed October 1[illegible]
Geologist/Engineer Jim Ka[illegible]
Elevation 576.8

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Type	Blows/Foot
	F	Fill - silt, clay, sand and gravel - odorous (a 6" seam of yellow crystals was encountered at 3.5')	1	SS	7
			2	SS	5
			3	SS	4
570			4	SS	3
	F	Black Silt and Sand	5	SS	0
			6	SS	2
	ARD	Black and Brown Silt and Sand with tiny roots, marsh vegetation	7	SS	7
			8	SS	10
560	ARD	Grayish-brown Fine to Coarse Sand and Silt - Wet	9	SS	12
			10	SS	4
			11	SS	11
			12	SS	7
			13	SS	9
550	ARD	Grayish-brown silt and sand and gravel	14	SS	23
	GT	Reddish-brown Clay and Silt and Fine Sand - wet	15	SS	28
			16	SS	28
	GT	Reddish-brown Clay and Silt and Sand and Gravel	17	SS	45
540			18	SS	32
			19	SS	32
	GT	Reddish-brown Silt & Sand & Gravel	20	SS	100
	GT	Gray Silt and Sand and Gravel with rock fragments	21	SS	32
			22	SS	100
530					

Penetration Test Blows/Foot



Piezometer or Standpipe Installation



NOTES: Augers - 8" dia.

Well Screen - 5' - #10 Slot
- 2" dia.

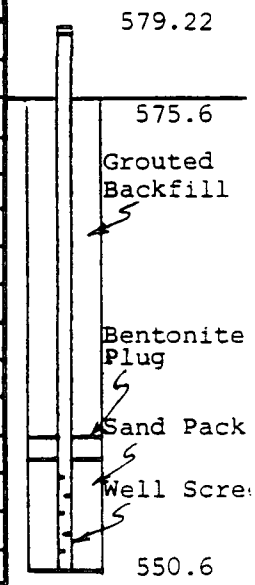
Well Pipe - 2" dia. Black Steel

Project Name: 102nd STREET LANDFILL SITE
Job No. 978-537
Client: HOOKER CHEMICALS & PLASTICS CORP.
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW25-80
Date Completed July 31, 1980
Geologist/Engineer Jim Kay
Elevation 575.6

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Topsoil				
	F	Brown silt & fine sand with some coarse & medium gravel - dry				
570	F	Lime & black flyash with medium gravel & silt & sand - damp				
	F	Brown silt & sand - trace clay - wet				
560	ARD	Brown silt & fine sand with lime & black flyash - grass and small pebbles				
	ARD	Brownish gray fine sand - some gravel - moist				
	ARD	Gray silt - some fine gravel	1	SS	10	•
550	GT	Approximate glacial till elevation				
540		NOTE: Augers - 8" dia. Well Screen - 5' - #10 Slot - 2" dia. Well Pipe - 2" dia. Black Steel				

Piezometer or Standpipe Installation



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Project Name: 102nd STREET LANDFILL SITE
Job No. 978-537
Client: HOOKER CHEMICALS & PLASTICS CORP
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW26-80
Date Completed July 30, [illegible]0
Geologist/Engineer Jim Kay
Elevation 576.7

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
580							580.71
	F	Approximate Extent of Fill Material					576.7
570							Grouted Backfill
							Bentonite Plug
							Sand Pac[illegible]
560	ARD	Approximate Extent of Alluvial River Deposits	1	SS	8	•	Well Screen
							553.7
550	GT	Approximate Glacial Till Elevation					

NOTE: Augers - 8" dia.
Well Screen - 5' - #10 Slot
- 2" dia.
Well Pipe - 2" dia. Black Steel

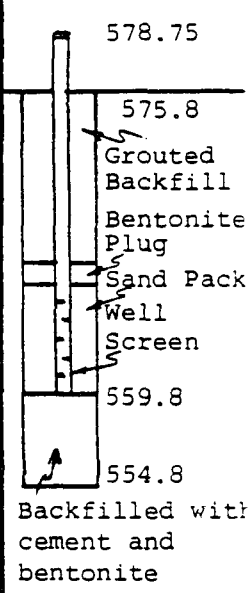
Sample 1 Description - Gray Silt and Fine to Medium Sand

Project Name: 102nd STREET LANDFILL SITE
Job No. 978-537
Client: HOOKER CHEMICALS & PLASTICS CORP
Borehole Type: 8: Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW27-80
Date Completed July 28, 1980
Geologist/Engineer Jim Kay
Elevation 575.8

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Topsoil				
570	F	Fill - silt, sand and clay with tar paper, wood, brick and gravel				
560	ARD	Gray silt & fine to medium sand - some fine roots @ 559 to 560	1	SS	5	
			2	SS	20	
			3	SS	13	
			4	SS	2	
550	GC	Approximate glaciolacustrine clay elevation				
540		NOTE: Augers - 8" dia. Well Screen - 5' - #10 Slot - 2" dia. Well Pipe - 2" dia. Black Steel				

Piezometer or Standpipe Installation



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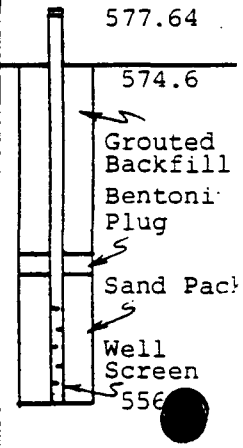
Project Name: 102nd STREET LANDFILL SITE
Job No. 978-537
Client: HOOKER CHEMICALS & PLASTICS CORP
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW28-80
Date Completed July 29, [illegible]0
Geologist/Engineer Jim Kay
Elevation 574.6

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
	F	Sandy silt					
570	F	Brown sandy silt, white lime, glass & cinders					
	F	White lime & brown silt & sand - wet					
560	ARD	Grayish brown silty sand - moist					
	GC	Reddish brown clayey silt	1	Shelby			
550		NOTE: Augers - 8" dia. Well Screen - 5' #10 Slot - 2" dia. Well Pipe - 2" dia. Black Steel					



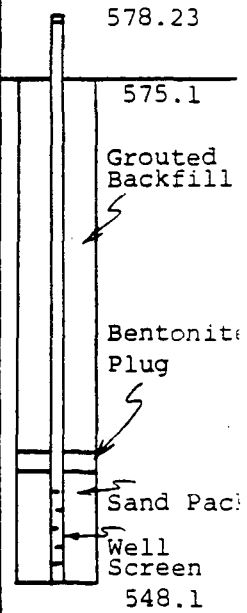
Project Name: 102nd STREET LANDFILL SITE
Job No. 978-537
Client: HOOKER CHEMICALS & PLASTICS CORP
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW29-80
Date Completed July 30, 1980
Geologist/Engineer Jim Kay
Elevation 575.1

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)
	F	Topsoil				
570	F	Fill with cinders and clay and silt, sand, glass, wood, stone				
	F	Brown silt & sand with black liquid				
560	ARD	Grayish brown silt & fine sand with glass, rock fragments - wet				
	ARD	Grayish brown silt & fine sand & fine gravel - wet				
550	ARD	Brownish gray silt & fine sand - wet				
540	GC	Approximate glaciolacustrine clay elevation				

NOTE: Augers - 8" dia.
Well Screen - 5' - #10 Slot
- 2" dia.
Well Pipe - 2" dia. Black Steel

Piezometer or Standpipe Installation



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Project Name: 102nd STREET LANDFILL SITE
Job No. 978-537
Client: HOOKER CHEMICALS & PLASTICS CORP
Borehole Type: 8" Ø Hollow Stem Auger
Location: Buffalo Avenue, Niagara Falls, N.Y.

Borehole No. OW30-80
Date Completed July 31, 19[illegible]
Geologist/Engineer Jim Kay
Elevation 575.8

Depth (Elev.)	Stratigraphy	Description & Remarks	Sample Number	Sample Type	Sample Blows/Foot	Penetration Test Blows/Foot (20 40 60 80)	Piezometer or Standpipe Installation
	F	Topsoil					578.92
	F	Fill - silt & sand with wood, gravel, glass, cinders					575.8 Grouted Backfill
570							
	F	Black silt & sand & gravel with cinders - wet					
	ARD	Black clay & silt with tiny roots					
560	ARD	Black silt & fine sand					Bentoni Plug
	ARD	Black silt - wet					
	ARD	Black fine to medium sand - wet					Sand[illegible]a
	ARD	Black silt & fine sand - wet	1	SS	--		Well Screen 550.8
550							
		Approximate glaciolacustrine clay elevation					
540							

NOTE: Augers - 8" dia.
Well Screen - 5' - #10 Slot
- 2" dia.
Well Pipe - 2" dia. Black Steel

KEY TO VISUAL SOILS IDENTIFICATION

A. Granular Soils - Particle Size Classification

Material		Symbol	Fractions	Sieve Limit	
				Upper	Lower
BOULDERS	Material retained on the 9 in. sieve	Bldr			9 in.
COBBLES	Material passing the 9 in. sieve and retained on the 3 in. sieve	Cbl		9 in.	3 in.
GRAVEL	Material passing the 3 in. sieve and retained on the No. 10 sieve	G	coarse (c) medium (m) fine (f)	3 in. 1 in. 3/8 in.	1 in. 3/8 in. No. 10
SAND	Material passing the No. 10 sieve and retained on the No. 200 sieve	S	coarse (c) medium (m) fine (f)	No. 10 No. 30 No. 60	No. 30 No. 60 No. 200
SILT	Material passing the No. 200 sieve that is non-plastic in character and exhibits little or no strength when air-dried	$		No. 200	

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B. Clay Soils - Plasticity Classification

Material*	Symbol	Degree of Overall Plasticity	Overall Plasticity Index Sand - Silt - Clay Components
Clayey SILT	Cy $	Slight	1 to 5
SILT & CLAY	$ & C	Low	5 to 10
CLAY & SILT	C & $	Medium	10 to 20
Silty CLAY	$y C	High	20 to 40
CLAY	C	Very high	40 and greater

*Soils passing the No. 200 sieve which can be made to exhibit plasticity and clay qualities within a certain range of moisture content, and which exhibits considerable strength when air-dried.

C. Terms Identifying Gradation of Sand & Gravel Soils

Written	Symbol	Defining Proportions by Weight
No modifier		Approximately equal amounts of coarse, medium, and fine components
medium to fine	mf	Somewhat more medium than fine, less than 10 percent coarse
fine to medium	fm	Somewhat more fine than medium, less than 10 percent coarse
coarse to medium	cm	Somewhat more coarse than medium, less than 10 percent fine
medium to coarse	mc	Somewhat more medium than coarse, less than 10 percent fine
fine	f	Predominantly fine, less than 10 percent medium and coarse
medium	m	Predominantly medium, less than 10 percent fine and coarse
coarse	c	Predominantly coarse, less than 10 percent fine and medium

D. Terms Identifying Composition of Soil

Written*	Symbol	Defining Range of Percentage by Weigh
and	a	35 to 50
some	s	20 to 35
little	l	10 to 20
trace	t	0 to 10

*Plus (+) or minus (-) sign used after identifying term denotes extremes of range; e.g., "some (-) Gravel" indicates 20 to 24 percent Gravel; "some (+) Gravel" indicates 31 to 35 percent Gravel.

E. Miscellaneous Descriptive Terms

Color	Soil Deposition	Size	Miscellaneous
rd - red	vvd - varved	lge - large	veg - vegetation
br - brown	ptg - parting	sm - small	Ss - sandstone
bk - black	pkt - pocket	thk - thick	Sh - shale
gy - gray	lyr - layer	thn - thin	fr - fragment
or - orange	lns - lens		jnk - junk
tn - tan	mtld- mottled		F - fill
yl - yellow			org - organic
dk - dark			Ts - topsoil
lt - light			occ - occasional
			desic-desiccated

NOTE: In writing soil description, the primary soil component is placed first and is capitalized; lesser components have first letter only capitalized; e.g., "rd br fm S, l S, t G, occ Bldr" indicates red-brown fine to medium SAND, little Silt, trace Gravel, occasional Boulder.

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WEHRAN ENGINEERING

TEST BORING '

Project No. 9004 Client OLIN CORPORATION Boring No. [redacted]1

Project Olin 102nd Street Landfill Date Start 10/2[illegible]

Location Niagara Falls, New York Date Finish 10/2[illegible]

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6"	Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 573.8	Remark
									Topsoil & brown Clayey SILT 0'-11"	
			1	SS	10 / 15	12 / 15		F	Miscellaneous Fill Flyash, brick, wood, & rock fragments 7'-0"	
5			2	SS	21 / 7	10				
								F	White, fine-grained Industrial Waste 14'-0"	Saturat
10			3	SS	1 / 5	3				
15			4	SS	5 / 8	9			Brown CLAY finely laminated Upper 5 feet preconsolidated and firm to stiff (CH) Becoming @ 22'; Laminated red-brown, and grey CLAY	
			5	US	18"P	16"P / 2				
20			6	SS	2	3				
25			7	SS	Wt. of rods			Qlc	Very soft, occ. lamination of Silt	
30			8	SS	Wt. of rods					
35			9	SS	Wt. of rods				000762A 37'-6"	
								Qt	Red-brown of SAND, some Gravel, some Silt (SM-GM)	Very dens saturated

Su = 2'-1"

4" diam. Steel Casing

Cement Grout

Cement Grout

2' Bentonite Seal (to 40'-0")

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. B-1

Project Olin 102nd Street Landfill Date Start 10/23/

Location Niagara Falls, New York Date Finish 10/25/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "O" Elev. = 574.6	Remarks
	Bentonite Seal		10A, 10A	SS	46	50/3-1/2"			Becoming grey with depth 40'-10"	Very dens
			R-1	CORE DRILLING NX	60" 100%	Rec.			Lockport Dolomite: Gray laminated Dolomite	
45	Rock								broken & solution pitted 40'-10" - 41'-8"	Lost wate during coring
			R-2		53" 88%	Rec.		S1	sound below 41'-8"	
50									vertical fractures: 42'-11" - 44'-0" 54'-5" - 54'-10"	
			R-3		60" 100%	Rec.			horizontal gypsum seams 45'-0" - 50'-11" 55'-10"	
55									End of boring	

000763

ecology and environment

recycled paper

WEHRAN ENGINEERING

TEST BORING

Project No. 9004 Client OLIN CORPORATION Boring No. [illegible]-2

Project Olin 102nd Street Landfill Date Start 10/28

Location Niagara Falls, New York Date Finish 10/30/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.0	Remarks
SU=2'2"								F	Dark gray miscellaneous fill 1'-0"	
			1	SS	4 6	4		F	BROWN Clayey SILT 2'-0"	
5			2	SS	2 2	2		F	Dark gray fine-grained INDUSTRIAL WASTE	
10			N.R	SS	4 1				traces white INDUSTRIAL WASTE 12'-0"	
			3 & 3A		1 2 2 2			RA	Gray organic Clayey SILT little Peat (OL-Pt) Grey-brown SILT (ML) some + fine Sand 17'-0"	m[illegible]t saturat
15			4	SS	2 2	3				
20			5	SS	2 2	2		RA	Gray-brown fine SAND some Silt becoming gray-brown fine SAND little Silt, trace f. Gravel (SM) 27'-0"	
25			6	SS	2 4	3				
								RA	Gray c/f SAND trace f. Gravel (SW) trace Silt 30'-0"	
30			7	SS	Wt. of rods			Qlc	Red-brown finely laminated CLAY to CLAY & SILT trace Sand (CH) Very soft 35'-0"	
35			8	SS	15 24	21		Qt	Red-brown c/f+ SAND some Gravel, some Silt occasional cobble (SM-GM) 40'-6"	

Cement Grout

4" Diam. Steel Casing

Cement Grout

2' Bedrock (40'-6")

000763A

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. B-2

Project Olin 102nd Street Landfill Date Start 10/28

Location Niagara Falls, New York Date Finish 10/30

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = _____	Remark
			9	SS	75				40'-6"	
Rrhynite fill									Lockport Dolomite Gray laminated Dolomite solution pitted to 42'-2"	Some wat loss dur coring
	rock		R-1	NX core DRILLING	49"	Rec.				
					91%					
45								S1	sound below 44'-0"	
	rock								vertical fractures: 40'-6" - 40'-10" 42'-10" - 43'-0" 45'-0" - 45'10"	
			R-2		60"	Rec.				
					100%					
50									horizontal gypsum seams: 41'-6"-42'-2" & 46'-4"-46'-8" 50'-0"	
									End of boring	

000764

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ecology and environment

WEHRAN ENGINEERING

TEST BORIN[illegible]

Project No. 9004 Client OLIN CORPORATION Boring No. [illegible]

Project Olin 102nd Street Landfill Date Start 11/[illegible]

Location Niagara Falls, New York Date Finish 11/6/[illegible]

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6"	Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 572.7	Remar
Surface										
			1	SS	3	3			Dark gray miscellaneous FILL	
					3					
								F		
5			2	SS	2	1				
					0					
									8'-6"	
10			3	SS	10	13			Brown and red-brown finely laminated CLAY to Silty CLAY w/occasional seams of less plastic material, hard, Preconsolidated	S-3 hi blows to someth driven ahe spoon
					19					
15			4	SS	4	5		Olc	becoming brown CLAY finely laminated	
					6				(CH)	
20			5	SS	1	1				
					1					
									24'-0"	
25			6	SS	5	2			Red-brown c/f+ SAND some Gravel some Silt	
					2				(SM-GM)	
30			NR	SS	3	24		Qt		
					11	14			Cobbles & boulders from 33.0'	
			7	SS	22	22				
35			NR	SS	100					
									39'-0"	
			R-1							

4" Diam. Steel Casing

Cement Grout

Cement Grout

2' Bentonite Seal

000764A

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. B-3

Project Olin 102nd Street Landfill Date Start

Location Niagara Falls, New York Date Finish 11/2/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector 11/6/

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.	Rec.	Average Blows/ft	Log	Classification "0" Elev. =	Remarks
			R-1	NX Core Drilling	41"	Rec.			Lockport Dolomite:	
					97%					No Water
			R-2		18"	Rec.			Gray laminated DOLOMITE solution pitted to 40'-6"	
					100%			S1		Return after 42'
45			R-3						vertical fractures: 39'-6" - 39'-11" 40'-6" - 40'-7" horizontal gypsum seams 47'-6" - 49'-0"	
					52"	Rec.				
					86%					
50									Clay seams: 43'-8" - 44'-0" 45'-0" - 45'-4" 49'-0"	
									End of boring	
5										
0										
5										
0										
5										

000765

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TEST BORIN[illegible] 1

Project No. 9004 Client OLIN CORPORATION Boring No. [illegible]-4

Project Olin 102nd Street Landfill Date Start 11/[illegible]

Location Niagara Falls, New York Date Finish 11/[illegible]

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.9	Remark
5.u.=2'-0"			1	SS	6 13	11		F	Dark grey miscellaneous FILL 8'-0"	
5			2	SS	1 1	1				
10			3	SS	2 2	2		RA	Gray organic Clayey SILT some fine grained Peat soft, snail-like shells (OL-Pt) 15'-0"	
15			4	SS	3 4	4		RA	Gray fine SAND (SP) loose, trace vegetation grading w/ trace to some silt, stratified (SM) 25'-0"	saturat highly permeal
20			5	SS	2 2	2				
25			6	SS	19 15	12		Qt	Red c/f+ SAND some Gravel some Clayey Silt (SM-GM) Cobbles & boulders from 29.5'	saturat
30			7	SS	90					
35			8	SS	70	120			000765A 40'-0"	

Cement Grout

4" diam. Steel Casing

Cement Grout

2' Bentonite Seal

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. B-4

Project Olin 102nd Street Landfill Date Start 11/6/

Location Niagara Falls, New York Date Finish 11/7/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. =	Remark
			R-1	NX CORE DRILLING	57"	Rec.		S1	Lockport Dolomite Gray laminated Dolomite sound from 42'-7" solution pitted 41-6" - 42'-5"	lost wate during coring @ 47'-0"
					94%					
45									minor horizontal solution pitting 46'-5" & 47'-11"	no water return after 48'-
			R-2		58"	Rec.			horizontal gypsum seams @ 47'-10", 49'-11" & 50'-0" Vertical fracture 40'-1" - 40'-7" 60° fracture 47'-4" - 47'-5"	
					96%					
50									50'-1"	
									End of boring	
5										
0										
5										
0										
5										

000766

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WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. [redacted]-1

Project Olin 102nd Street Landfill Date Start 10/2[illegible]

Location Niagara Falls, New York Date Finish 10/2[illegible]

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 574.2	Remarks
							F	Dark gray FILL flyash, brick fragments 5'-0"	
5							F	INDUSTRIAL WASTE 12'-6"	
10							Clc	Gray & red-brown CLAY (CH) firm, finely laminated 13'-0"	
15								End of boring	
0									
5									
0									
5									

S.U.=n'S' concrete seal

1½" steel casing

Sand Backfill

Steel Wellpoint

000766A

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. P-2

Project Olin 102nd Street Landfill Date Start 10/2

Location Niagara Falls, New York Date Finish 10/2

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Sample Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 574.1	Remark
							F	Black miscellaneous FILL 4'-0"	
5							F	Black INDUSTRIAL WASTE	Noticeab odor oily sample taken
10									
							Clc	Brown CLAY firm (CH) 12'-6" 13'-0"	
15								End of boring	
0									
5									
0									
5									

S.O. = 2'-3"
concrete seal
Sand Backfill
Steel Casing
1 1/4"
Steel well point

000767

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ecology and environment

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. [illegible]3

Project Olin 102nd Street Landfill Date Start 10/2

Location Niagara Falls, New York Date Finish 10/2

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Sample Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 574.1	Remark
							F	Dark gray miscellaneous FILL 5'-0"	
5							F	Hard White INDUSTRIAL WASTE 14'-9"	very st odor sample taken
10							Clc	Brown CLAY (CH) 15'-0"	
15								End of boring	
0									
5									
0									
5									

Site = 2' sh. Concrete Seal

Sand Backfill

1 1/4" Steel Casing

Steel Wellpoint

000767A

WEHRAN ENGINEERING

TEST BORING L(

Project No. 9004 Client OLIN CORPORATION Boring No. P-4

Project Olin 102nd Street Landfill Date Start 10/26

Location Niagara Falls, New York Date Finish 10/26

Type of Rig CME H. S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Sample Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "O" Elev. = 574.6	Remarks
							F	Dark gray miscellaneous FILL 4'-6"	
5							F	Fill: INDUSTRIAL WASTE 17'-0"	very stro odor belo 10'
10									
15							RA	Gray organic Clayey SILT (OL) 18'-0"	Sample taken
20							Olc	Brown CLAY (CH) 20'-0"	Sample taken
								End of boring	
5									
0									
5									

Surface Concrete Seal

Sand Backfill

1¼" Steel Casing

Steel Wellpoint

000768

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WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No.

Project Olin 102nd Street Landfill Date Start 10/

Location Niagara Falls, New York Date Finish 10/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Sample Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 574.7	Remarks
							F	Topsoil & brown Silty CLAY 0'-10"	
5							F	Gray INDUSTRIAL WASTE 12'-0"	Sampl 5'-6' & 10'-12'
							RA	Gray organic Clayey SILT (OL) 14'-0"	Sample 12'-1'
15								End of boring	

S.U. = 1'-0" Concrete Seal

Sand Backfill

1¼" Steel Casing

Steel well/well

000768A

WEHRAN ENGINEERING

TEST BORING L(

Project No. 9004 Client OLIN CORPORATION Boring No. P-6

Project Olin 102nd Street Landfill Date Start 10/27

Location Niagara Falls, New York Date Finish 10/27

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Sample Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 574.6	Remarks
							F	Topsoil & brown Silty CLAY 0'-7"	
								fill: white INDUSTRIAL WASTE 3'-0"	sample
5									
10							F	Black INDUSTRIAL WASTE 14'-0"	sample 5'-6'
15							RA	Gray organic Clayey SILT (OL) 15'-0"	
								End of boring	
0									
5									
0									
5									

Sid: 2½" Concrete Seal

Sand Backfill

1¼" Steel Casing

Steel Well point

recycled paper

ecology and environment

000769

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. [redacted]7

Project Olin 102nd Street Landfill Date Start 10/2[illegible]

Location Niagara Falls, New York Date Finish 10/2

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Sample Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 574.4	Remark
								Topsoil & brown Clayey SILT 0'-7"	
5							F	Dark gray INDUSTRIAL WASTE 11'-0"	Sampl 5'-6
10							RA	Gray organic Clayey SILT (OL) 12'-6"	Sampl
15								End of boring	
0									
5									
0									
5									

S.U. = 1'-11"

Concrete Seal

1 1/4" Steel Casing

Sand backfill

Steel wellpoint

000769A

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. P-8

Project Olin 102nd Street Landfill Date Start 10/27

Location Niagara Falls, New York Date Finish 10/27

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Sample Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. 573.3	Remarks
							F	Black INDUSTRIAL WASTE 7'-6"	sample 5'- saturat @ 7'-6'
							F	white INDUSTRIAL WASTE . 12'-0"	sample 1(
							RA	Gray organic Clayey SILT (OL) 14'-0"	sample 12
								End of boring	

Silt Fill
Concrete Seal
5
1¼" Steel Casing
Sand Backfill
10
Steel Well point
15
0
5
0
5

000770

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WEHRAN ENGINEERING

TEST BORIN[illegible]

Project No. 9004 Client OLIN CORPORATION Boring No. [illegible]-9

Project Olin 102nd Street Landfill Date Start 10/2[illegible]

Location Niagara Falls, New York Date Finish 10/28/[illegible]

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Sample Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 573.2	Remar
							F	Topsoil & brown Clayey SILT 0'-4"	
								Fill: white INDUSTRIAL WASTE 2'-0"	
5							F	Black INDUSTRIAL WASTE 10'-0"	sample 5'-6'
10							RA	Gray organic clayey SILT (OL) 11'-0"	sampl
								End of boring	
15									
0									
5									
0									
5									

Surface Seal
Concrete
1 1/4" Steel Casing
Sand Backfill
Steel Wellpoint

000770A

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. P-10

Project Olin 102nd Street Landfill Date Start 10/31

Location Niagara Falls, New York Date Finish 10/31

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Seconds blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.0	Remarks
								F	Topsoil & dark gray FILL 0'-10"	
			1	SS	2 / 6	10		F	Fill: Red-brown Clayey SILT 2'-0"	
5			2	SS	4 / 1	1		F	Dark gray & White INDUSTRIAL WASTE 10'-6"	
10			3	SS	29 / 1	2		F	White INDUSTRIAL WASTE 12'-0"	
			4	SS	3 / 6	5		RA	Brown CLAY and SILT (OH) little fine Sand, trace roots 15'-6"	
15			5	ST	18"P	4"R				
			6	SS	1	1 / 2		RA	Mottled gray & brown (SM) fine SAND, some Silt grading at 17':	saturate
20			7	SS	1 / 1	1		RA	Gray fine SAND (SP) loose 24'-0"	saturate permeable
25			8	SS	1 / 1	2		RA	Dark gray c/m SAND trace f. Gravel (SW) white snail-like shells 29'-6"	loose & highly permeable
30			9	SS	100			Qt	variegated c/f SAND & GRAVEL little Silt (SM-GM) 30'-6"	
5									End of boring @ 30'-6"	

Sd = 3'5"

Cement Grout

1¼" Steel casing

Cement Grout

Bentonite Seal

Sand Pack

Steel Wellpoint

000771

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ecology and environment

WEHRAN ENGINEERING

TEST BORIN[illegible]

Project No. 9004 Client OLIN CORPORATION Boring No. P-11

Project Olin 102nd Street Landfill Date Start 10/3

Location Niagara Falls, New York Date Finish 10/31

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.3	Remarks
								F	Topsoil - Red-brown Clayey SILT 1'-6"	
			1	SS	2	20				
					22					
5								F	Dark gray miscellaneous Fill	
			2	SS	5	4			wood & cardboard fragments 7'-9'	
					3				9'-0"	
10									Wet White INDUSTRIAL WASTE	
			3	SS	1	0		F		
					1				13'-0"	
			4	ST	18"P	15"R		RA	Gray organic Clayey SILT (OL) firm, preconsolidated	
15									14'-6"	
									End of boring	
0										
5										
0										
5										

S.U. = 2'-1"

Cement Seal

Sand Backfill

1¼" steel casing

Steel Wellpoint

000771A

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. P-12

Project Olin 102nd Street Landfill Date Start 11/1

Location Niagara Falls, New York Date Finish 11/1

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.3	Remark
								F	Topsoil & brown Clayey SILT 1'-0"	
			1	SS	9	7		F	Dark gray miscellaneous FILL w/rock fragments & ashes 6'-0"	
5			2	SS	3	6		F	Dark gray INDUSTRIAL waste w/wood fragments 12'-0"	saturate @ 12'-0
10			3	SS	4	4				
			4	SS	4	6		Olc	Brown CLAY to Silty CLAY (CH) laminated 13'-6"	chemical odor
15					12				End of boring @ 13'-6"	
0										
5										
0										
5										

Sil: 2'-2" Concrete Seal

Sand Back Fill

1¼" Steel Casing

Steel Lifjpoint

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ecology and environment

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TEST BORIN[illegible]L

Project No. 9004 Client OLIN CORPORATION Boring No. P-1[illegible]

Project Olin 102nd Street Landfill Date Start 11/1

Location Niagara Falls, New York Date Finish 11/1[illegible]

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "O" Elev. = 574.3	Remar
								F	Topsoil & brown Clayey SILT 1'-0"	
			1	SS	7 / 7	18		F	Dark gray miscellaneous Fill	
5			2	SS	4 / 6	5			Dark brown cork	
10			3	SS	1 / 1	1			Ashes 12'-6"	saturat
			4	SS	1 / 3	2		RA	Dark gray organic Clayey SILT, some to and fine Sand trace-Peat (OL-SP)	
15			5	SS	1 / 0	0				
			6	SS	1 / 1	1			21'-0"	
20			7	SS	1 / 2	1 / 3		RA	Dark fine SAND, and to some organic Clayey Silt (SP-OL) 23'-0"	
			8	SS	3	13				
25									End of boring	
30										
35										

Sand Backfill

Cement Seal

Sand Backfill

Steel Casing

Steel Wellpoint

Bentonite Seal

Sand Backfill

000772A

WEHRAN ENGINEERING

TEST BORING L(

Project No. 9004 Client OLIN CORPORATION Boring No. P-14

Project Olin 102nd Street Landfill Date Start 11/1/

Location Niagara Falls, New York Date Finish 11/1/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.4	Remarks
									Topsoil & brown Clayey SILT 0'-7"	
5			1	SS	22 12	17		F	Dark gray BRINE SLUDGE (wood fragments 4'-5') 8'-0"	
			2	SS	100					
10			3	SS	5 1	2		F	Black INDUSTRIAL WASTE 13'-0"	saturated
15			4	SS	1 2	1		RA	Mottled gray-brown fine SAND some Silt, trace vegetation (SM) Grading: Gray fine SAND little Silt 23'-0"	saturated
20			5	SS	1 2	1				
25			6	SS	1 1	1		RA	Dark gray c/f SAND (SW) white gastropod shells 26'-0"	
									Red-brown c/f+ SAND, (GM) some Gravel, some Silt 26'-6"	
									End of boring	
30										
5										

Concrete seal

Sand Backfill

1¼" Steel Casing

Steel wellpoint

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ecology and environment

WEHRAN ENGINEERING

TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. P-15

Project Olin 102nd Street Landfill Date Start 11/1/

Location Niagara Falls, New York Date Finish 11/1/7

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.0	Remark
									Topsoil & dark gray miscellaneous fill 2'-0"	
Concrete Seal			1	SS	7	7			Black FLYASH	
5					7			F		saturat
			2	SS	5	4				
					2				10'-0"	
10			3	SS	2	5			Gray-brown fine SAND trace organic Silt 13'-0"	
Sand Backfill					7			RA		
									Gray-brown fine SAND	sat permeab
15			4	SS	3	5				
					5			RA	Gray-brown fine SAND trace + Silt	
Steel Casing 1½"									(SP)	
20			5	SS	6	19				
					4	1			21'-6"	
					1	2		Qt		
			6	SS	4				Red c/f+ SAND and CLAYEY SILT, little Gravel (ML-GM) 22'-6"	saturat
5									End of boring	
0										
5										

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TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. P-16

Project Olin 102nd Street Landfill Date Start 11/6/

Location Niagara Falls, New York Date Finish 11/6/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 572.8	Remarks
			1	SS	13	22		F	Dark gray INDUSTRIAL WASTE	
					13					
5			2	SS	1	2				
					1				7'-6"	
			3	SS	3	7		Olc	Brown, gray-brown and red crudely-laminated CLAY to Clayey SILT (CH) very stiff 9'-6"	saturate
10					13					
									End of boring	
15										
0										
5										
0										
5										

SD: 2'7" Concrete Seal

1/4" Steel Casing

Sand Backfill

Steel Wellpoint

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TEST BORIN[illegible] I

Project No. 9004 Client OLIN CORPORATION Boring No. P-17

Project Olin 102nd Street Landfill Date Start 11/[illegible]

Location Niagara Falls, New York Date Finish 11/8/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector ASK

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 571.9	Remar
			1	SS	3	5		F	Dark gray miscellaneous fill	
					9					
5			2	SS	2	3				
					4	6			Black INDUSTRIAL WASTE 8'-0"	
			3	SS	6	4				
10			4	SS	3	1		RA	Gray organic Clayey SILT (OL) soft, snail-like shells 11'-6"	
					3				End of boring	
15										
0										
5										
0										
5										

Surface 2'5"
Concrete Seal
Sand Backfill
Steel Wellpoint
Steel Casing

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TEST BORING LO

Project No. 9004 Client OLIN CORPORATION Boring No. P-18
Project Olin 102nd Street Landfill - Phase II Date Start 10/25
Location Niagara Falls, New York Date Finish 10/25
Type of Rig CME 45 Trailer Auger Driller Empire Soils Inspector RCM

Depth (S.U.=1.65)	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "O" Elev. = 573.1	Remarks
	Cement Plug; 1 1/4" Steel Csg							F	Black INDUSTRIAL WASTE	
5			1	ss	1	0				
					1	2				
	Sand Backfill		2	ss	2	3			7'10"	
10	Steel Well point								Qlc Grey m SAND changing to brown CLAY	Saturated
									8'0"	
									End of Boring	
5										
0										
5										
0										
5										
0										

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SHEET 1 OF 1

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TEST BORING LOG

Project No. 9004 Client OLIN CORPORATION Boring No. 16

Project Olin 102nd Street Landfill - Phase II Date Start 10/25

Location Niagara Falls, New York Date Finish 10/25

Type of Rig CME 45 Auger Driller Empire Soils Inspector RCM

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "O" Elev. = 572.8	Remarks
	–							F	INDUSTRIAL WASTE	
5			1	ss	1 2	2			6'0"	
									RA Grey-brown SILT trace f Sand	
10									6'6"	
									End of Boring	
15										
20									NOTE: insufficient saturated thickness encountered therefore moved to another location to install well.	
5										
0										
5										
0										

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SHEET 1 OF 1

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TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. B-19

Project Olin 102nd Street Landfill - Phase II Date Start 2/11/8

Location Niagara Falls, New York Date Finish 2/11/

Type of Rig CME H.S. Auger Driller Empire Soil's Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 572.8	Remark
								F	Miscellaneous Fill black & gray ashes, cinders 8'6"	odorous saturated from 6'
5						4				
			1	ss	2	4				
					3	4				
			2	ss	4	4				
					2	1		RA	Gray fine SAND, little Silt 9'6"	saturated loose
10			3	ss	2	4				
					5	4				
			4	ss	7	11				
					20					
15						4		Qlc	Red-brown Silty CLAY w/occ. seams of gray Clayey Silt laminated 22'4"	wet, very stiff to firm
			5	ss	8	9				
					14	11				
			6	ss	15	13				
					11	1				
20			7	ss	2	3				
					4	1				
			8	ss	3	6				
					9	5		Qt	Red-brown Clayey SILT, and fine Sand, little c-f Gravel 30'6"	wet, stiff to very stif
			9	ss	5	5				
					5	5				
25			10	ss	6	6				
					6	10				
			11	ss	12	10				
					12	9				
			12	ss	10	16				
30					21					
									End of Boring Hole was backfilled to grade with cement grout.	
35										
40										

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TEST BORING LOG

Project No. 9004 Client Olin Corporation Boring No. B-20

Project Olin 102nd Street Landfill - Phase II Date Start 2/18

Location Niagara Falls, New York Date Finish 2/18/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.0	Remarks
	Cement Sealed 1¼" steel casing							F	Miscellaneous Fill	saturate from 5'
5	Sand Pack									
			1	ss	2 / 2	2 / 2			9'0"	
10	Bentonite & Cement Grout		2	ss	2 / 3	3 / 7		RA	Black Organic SILT grading to gray Clayey SILT, some fine Sand	moist to wet firm
			UD 1		Press					
15			3	ss	4 / 6	5 / 5			11'0"	
			4	ss	WH / 1	WH / 1		Qlc	Red-brown Silty CLAY thinly laminated	wet, stiff t very sof
			5	ss	2 / 2	3 / 3				
20			6	ss	WH / WH	WH / WH				
			7	ss	1 / 30/2"	2			22'0"	
25								Qt	Red-brown Clayey SILT, and fine Sand, trace c-f Gravel 22'2"	wet very de
									End of Boring	WH = Weight o Hammer
30										
35										
40										

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TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. B-21

Project Olin 102nd Street Landfill - Phase II Date Start 2/19/

Location Niagara Falls, New York Date Finish 2/19/8

Type of Rig CME H.S. Auger Driller Empire Soil's Inspector JLM

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Sample 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 572.9	Remarks
	Cement Seal									
5	Cement Grout							F	Miscellaneous Fill including Industrial Waste mixed w/ black Organic SILT @ 11'	odorous saturate from 6'+
	Steel Casing 1 1/4"					1				
			1	ss	1	1				
10					1	1				
			2	ss	1	1				
					1	3				
			3	ss	2	2				
					2					
15			UD-1		Press			RA	Gray Clayey SILT, and fine Sand @ 17', grading fine SAND, some Silt	wet very loo
						1				
			4	ss	2	2				
					2	WH				
			5	ss	WH	WH				
					WH	1		Qlc	18'0"	saturate
20			6	ss	2	4				
	Bentonite Seal				3			Qt	Red-brown Silty CLAY w/infreq. gray Silt partings 20'8"	wet very sof
25									Red-brown CLAY & SILT, some fine Sand, trace c-f Gravel 21'6"	wet firm
									End of Boring	
30										
35										
40										

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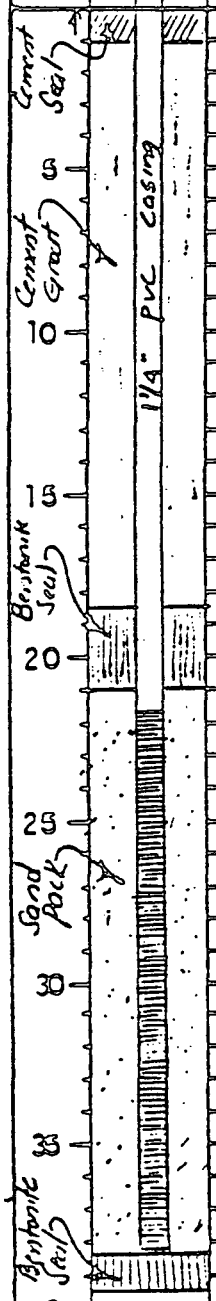
TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. B-22

Project Olin 102nd Street Landfill - Phase II Date Start 2/15

Location Niagara Falls, New York Date Finish 2/15/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM



Depth	Elevation	Casing Blows	Sample No.	Type	Sample 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.5	Remarks
								F	Black Industrial Waste & Miscellaneous Fill	odorous
						2			10'0"	
10			1	ss	6	8		RA	Black Organic SILT 11'0"	odorous
					10	10				
			L	ss	7	3		RA	Gray Clayey SILT, some fine Sand	wet, loose
					4	3				
			2	ss	3	2			@16'-6" grading fine SAND, some (+) Silt	sat[illegible]
15					3	3				
			3	ss	4	3				
					4	3				
			4	ss	4	4				
					5	2			19'6"	
20			5	ss	2	2		Qt	Red-brown Clayey SILT, some (-) fine Sand, trace m-f Gravel	wet firm
					4	4				
			6	ss	4	5				
					9					
25										
30										
35										
									39'6"	
40									End of Boring - BEDROCK	

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TEST BORING L(

Project No. 9004 Client Olin Corporation Boring No. B-23

Project Olin 102nd Street Landfill - Phase II Date Start 2/11/

Location Niagara Falls, New York Date Finish 2/12/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Type	Spoon Blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.7	Remarks
								F	Miscellaneous Fill	Odorous, saturated from 6'±
						WR				
10			1	SS	WR	WR				
					WH	2				
			2	SS	3	2			13'0"	
					3	1		RA	Gray Clayey SILT, and fine Sand, w/trace roots	Saturated very loos
15			3	SS	3	1				
					2	1				
			4	SS	2	2			@ 20', grading fine SAND, and Silt	
					2	WH				
			5	SS	WH	WH				
					WH	WH			@ 22', grading c-f SAND, little f Gravel, trace Silt	
20			6	SS	WH	WH				Medium Dense
					WH	1				
			7	SS	7	12				
					19	24				
25			8	SS	11	4				
					4	3				
			9	SS	3	3			27' 6"	
					3	4		QT	Red-brown Clayey SILT, and fine Sand, little f-m Gravel	Wet, Stiff
			10	SS	4	5				
					7	3				
30			11	SS	5	8				
					8				30'6"	
35									END OF BORING	
40										WR = wt. of r WH = wt. of hammer

Cement Seal
Cement Grout
Bentonite Seal
Sand Pack
Bentonite Seal
1¼" Steel Casing

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TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. B-2

Project Olin 102nd Street Landfill - Phase II Date Start 2/1

Location Niagara Falls, New York Date Finish 2/14

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.3	Remar
	Cement Seal							F	Black Industrial Waste	Odorous, saturate from 6'
5										
						1				
10			1	ss	2	1				
					3	2				
			2	ss	3	4			12'6"	
					4			RA	Gray Clayey SILT, some fine Sand	Saturate very loos
			UD 1		Press					
15						1				
	Cement Grout		3	ss	2	1				
					2	WH				
		1¼" PVC Casing	4	ss	2	2				
					2	1			20'0"	
20			5	ss	2	1		RA	Dark gray fine SAND, little Silt @ 23'6" grading m-f SAND, trace c-m Gravel, trace Silt	Highly odorous, saturate loose to dense
					2	2				
			6	ss	2	6				
					13	9				
			7	ss	15	17				
25					3	5			26'6"	
	Bentonite Seal		8	ss	2	1		QT	Red-brown Clayey Silt, little (+) fine Sand, trace m-f Gravel	Wet Firm
					1	1				
			9	ss	2	2				
30					2					
35										
	Sand Pack									
40									40'6"	
	Bentonite Seal								End of Boring - BEDROCK	

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TEST BORING LOG

Project No. 9004 Client Olin Corporation Boring No. B-25

Project Olin 102nd Street Landfill - Phase II Date Start 2/13/80

Location Niagara Falls, New York Date Finish 2/14/80

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.3	Remarks
	Cement Seal							F	Black Industrial Waste & Miscellaneous Fill	highly odorous, saturated from 6'±
5		1¼" Steel Casing								
10	Cement Grout					5				
			1	ss	4	2			12'0"	
					7	9				
			2	ss	6	5		RA	Gray Clayey SILT, and fine Sand, trace (-) fine Gravel	odorous, saturated loose
					6	3				
15			3	ss	3	2				
					4	1				
			4	ss	1	2				
					4	3				
			5	ss	5	4			19'6"	
					4	WR				
20			6	ss	1	2		RA	Dark gray fine SAND, some (+) Silt, trace (-) fine Gravel	brown oily residue on sample, saturated loose
	Sand Rock				4	7				
			7	ss	7	7				
					10	2				
			8	ss	1	2			25'0"	
25					1	WH				
	Bedrock Soil		9	ss	WH	WH		Qlc	Red-brown CLAY to Silty CLAY -laminated	wet, very soft
					WH	1				
			10	ss	2	4			28'6"	
					2					
30								Qt	Red-brown Clayey SILT, and fine Sand, trace m-f Gravel w/infreq. 1/4" CLAY lenses	wet, firm
35									29'6"	
									END OF BORING	
40										

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TEST BORIN[redacted] L

Project No. 9004 Client Olin Corporation Boring No. B-2

Project Olin 102nd Street Landfill - Phase II Date Start 2/1[illegible]

Location Niagara Falls, New York Date Finish 2/12

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Sample Type	Sample Blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.7	Remar
								F	Industrial Waste & Miscellaneous Fill	highly odorous saturat from 8
5										
10						3				
			1	ss	1	2				
					2	4				
			2	ss	4	4			13'6"	
					4	3		RA	Gray fine SAND, little (+) Silt	sa[redacted]a loose
15			3	ss	4	4				
					4	3				
			4	ss	3	3			17'8"	
					3	1		Qlc	Red-brown Silty CLAY laminated w/freq. gray SILT partings	wet, very so
			5	ss	1	1				
20					1	WH				
			6	ss	WH	WH				
					1	1				
			7	ss	1	1			23'6"	
					1					
25									END OF BORING	
30									Hole was backfilled to grade with cement grout	
35										
40										

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TEST BORING LO

Project No. 9004 Client Olin Corporation Boring No. B-27

Project Olin 102nd Street Landfill - Phase II Date Start 2/19/8

Location Niagara Falls, New York Date Finish 2/20/8

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.0	Remarks
1	Cement Seal									
5								F	Black Industrial Waste and Miscellaneous Fill	highly odorous, saturate from 6'-
10	1/4" Steel Casing					1				
			1	ss	1	2				
					5	7				
	Cement Grout		2	ss	5	4				
					5	3			14'6"	
15			3	ss	3	5				
					3	1			Gray Clayey SILT, some (-) fine Sand w/trace roots	highly odorous, to 19'6"
			4	ss	2	1				
					2	WH			Oil residue, 15'6" - 17'6"	saturate loose
			5	ss	WH	WH				
20					WH	WH		RA		
			6	ss	WH	1			@ 19'6" grading fine SAND, some Silt	
					2	WH			@ 24' grading	
	Bentonite Seal		7	ss	2	3			c-f SAND, trace c-f Gravel	
					2	7			trace (-) Silt,	
25			8	ss	14	18			w/infreq. shell fragments	
					20	5				
	Sand Pack		9	ss	13	24		Qlc	27'6"	
					18	WR				
			10	ss	WR	6				
30	Bentonite Seal				3			Qt	Red-brown Silty CLAY 28'6"	very sof
35									Red-brown Clayey SILT, and fine Sand, trace fine Gravel 29'6"	wet, firm
40									END OF BORING	

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TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. B-2

Project Olin 102nd Street Landfill - Phase II Date Start 2/20/

Location Niagara Falls, New York Date Finish 2/20/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Sample Type	Seven blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.9	Remarks
								F	Industrial Waste	odorous, saturate from 6' oily fi 9.5 - 11
5										
10			1	ss	2	2				
					2	1				
									13' 0"	
15			2	ss	1	1		RA	Gray Clayey SILT, little fine Sand	odorous to wet to saturate very lo
					2	2			@ 21' grading fine SAND, little (+) Silt	
20			3	ss	WH	WH			@ 24'6" grading c-f SAND, trace m-f Gravel w/occ. shell fragments	@ 24'6" bec med. de
			4	ss	WH	1				
					1	1				
			5	ss	1	3				
25					6	15				
			6	ss	18	2				
					13	12			27'0"	wet soft
			7	ss	2	1		Qlc	Red-brown Silty CLAY	
					1	2			30'9"	
30			8	ss	1	1		Qt	Red-brown Clayey SILT, and m-f Sand trace fine Gravel	wet very lo
					1				31'6"	
35									END OF BORING	
									Hole was backfilled to grade with cement grout	
40										

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TEST BORING LO

Project No. 9004 Client Olin Corporation Boring No. B-29

Project Olin 102nd Street Landfill - Phase II Date Start 2/20/8

Location Niagara Falls, New York Date Finish 2/21/8

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.1	Remarks
								F	Black Miscellaneous Waste	odorous
5									6'±	
									Black Industrial Waste	
10			1	SS	4	2 3				
			2	SS	4 3	3 3			12'6"	
			UD-1		4 Press			RA	Blackish gray Clayey SILT w/trace Peat	wet
15									17'6"	
20			3	SS	1 1	WR 1		RA	Gray fine SAND, some (-) Silt	odorous, to 23' saturate very loc
									@ 23' grading c-f SAND, trace c-f Gravel	bec. med. der
25			4	SS	10 18	5 18			(sand running up in auger)	
			5	SS	18 3	20 4 1			28'6"	
30			6	SS	2 2	3		QT	Red-brown Clayey SILT, little fine Sand, trace (+) fine Gravel becoming hard @ 34'6"	wet, loose
			7	SS		1				
35			8	SS	2 2	1 7				@ 34'6" moist, very dens
			9	SS	13 38	17 41				
			10	SS	43					
			11	SS	100/6" ref				38'6"	
40									END OF BORING - BEDROCK	

Cement Seal; Bentonite & Cement Grout; Bentonite Grout; 1¼" PVC Casing; Bentonite Seal; Sand Pack; Bentonite Seal

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TEST BORIN[illegible] L

Project No. 9004 Client Olin Corporation Boring No. B-30

Project Olin-102nd Street Landfill - Phase II Date Start 2/21

Location Niagara Falls, New York Date Finish 2/21

Type of Rig CME H.S. Auger Driller Empire Soils Inspector

Depth	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.4	Remarks
								F	Miscellaneous Fill	
5									6'±	
									Black Industrial Waste	hard, difficu to auger
									9'±	
10			1*	ss	1	3			White Industrial Waste	
					1	1			13'0"	
15			2	ss	4	2		RA	Gray Clayey SILT, little fine Sand, trace (-) fine Gravel, w/ trace (-) peat	moist loose
					3	2			18'0"	
20			3	ss	5	4		RA	Gray fine SAND, trace (+) Silt	Saturate medium to very den
					9	8			@ 23', grading	
25			4	ss	20	18			c-f SAND, little m-f Gravel	
					34	30				
			5	ss	31	25				
					37	48				
			6	ss	2	3				
30					22	15			29'6"	
			7	ss	5	20		Qt	Red-brown Clayey SILT, some (-) m-f Gravel, little fine Sand	wet, med. den
					6	5			32'6"	
35									End of Boring	
									Hole was backfilled to grade with cement grout.	*[illegible] 1[illegible] hammer
40										

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TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. B-31

Project Olin 102nd Street Landfill - Phase II Date Start 2/25/

Location Niagara Falls, New York Date Finish 2/26/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Seven blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.5	Remarks
	Cement Seal									
5	Cement Grout									
						19				
10			1	ss	4	1				
					3	1				
			2	ss	2	3				
					4					
15			UD-1		Press			RA	Blackish gray Clayey SILT, little (-) fine Sand w/trace roots 17'6"	saturated
						4			Gray fine SAND, some Silt	saturated loose
20			3	ss	3	2				
	Bentonite Grout				3			RA	@ 23' grading c-f SAND, some m-f Gravel	bec. med. dense, w/oily residue
						6				
25			4	ss	7	10				
					11	10				
			5	ss	14	18			@ 30'-30'6": fine GRAVEL and c-m Sand	
					20	29				
			6	ss	13	4			30'6"	
30					2	2		Qlc	Red-brown Silty CLAY laminated 31'11"	firm
			7	ss	3	2				
	Bentonite Seal				3	2				
			8	ss	6	7				
					6	7		Qt	Red-brown Clayey SILT, and fine Sand, trace m-f Gravel	moist med. dens to very dense
35			9	ss	12	7				
			—	-	8	34				
	Sand Pack		10	ss	50					
					9	14				
			11*	ss	35	26				
40									41'0"	
	Bentonite Seal								End of Boring - BEDROCK	*300 lb. hammer

Casing 1¼" PVC

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TEST BORIN[illegible]

Project No. 9004 Client Olin Corporation Boring No. B-32

Project Olin 102nd Street Landfill - Phase II Date Start 2/27

Location Niagara Falls, New York Date Finish 2/27

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.6	Remar
	Cement Seal							F	Black Industrial Waste mixed w/ Miscellaneous Fill	
5										
			1	ss		2				highly odorous
10	Cement Grout	1 1/4" PVC Casing			2	50/0"				
						9				
15			2	ss	3	3				
					4				18'0"	
						2		RA	Gray Clayey SILT, and fine Sand grading to Gray fine SAND, and Silt	odorous, wet loose
20			3	ss	2	2				
					2				23'0"	
						6		RA	Black c-f SAND, trace (-) c-f Gravel w/occ. shell fragments	odorous saturat dense t very den
25			4	ss	15	20				
	Sand Pack				15	7				
			5	ss	11	17				
					22					
			6	ss	30	30				
30					28	1				
			7	ss	1	2		Qlc	@ 29' grading w/little (-) Gravel	running sand @ 26'6"
					2	WH				
			8	ss	3	2				
					3	WH			30'6"	
35			9	ss	WH	5		Ot	Red-brown Silty CLAY laminated	wet soft
					8				35'6"	
40									Red-brown Clayey SILT, some (+) c-f Sand, trace fine Gravel	stiff
									36'6"	
									End of Boring Hole was backfilled to grade with cement grout	000782A

Note: Well was constructed in adjacent borehole.

SHEET 1 OF 1

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TEST BORING LO

Project No. 9004 Client Olin Corporation Boring No. B-33
Project Olin 102nd Street Landfill - Phase II Date Start 2/28/8
Location Niagara Falls, New York Date Finish 3/3/80
Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "O" Elev. = 573.9	Remarks
								F	Miscellaneous Fill gray ashes from 7' ±	Odorous
5	Cement Grout	1¼" Steel Casing								
10			1	SS	9	5 3			11' 0"	
			2	SS	3 2	3 2			White Industrial Waste 14' 0"	
			3	SS	3 2	3 2				
15			UD-1		3 Press			RA	Gray Clayey SILT, some fine Sand	Wet to Saturated
	Bedrock Soil		5	SS	1	1 1				
20			6	SS	2 2	2 1			@ 18' 6" grading fine SAND, and Silt	Very Loose
	Good Rock								@ 25' grading c - f SAND, trace c-f Gravel	Becoming Medium Dense
25			7	SS	10	1 13				
	Bedrock Soil		8	SS	22 2 1	9 1			27' 6"	
30								Qlc	Red-brown Silty CLAY 28' 6"	Wet Very Soft
35									END OF BORING	
40										

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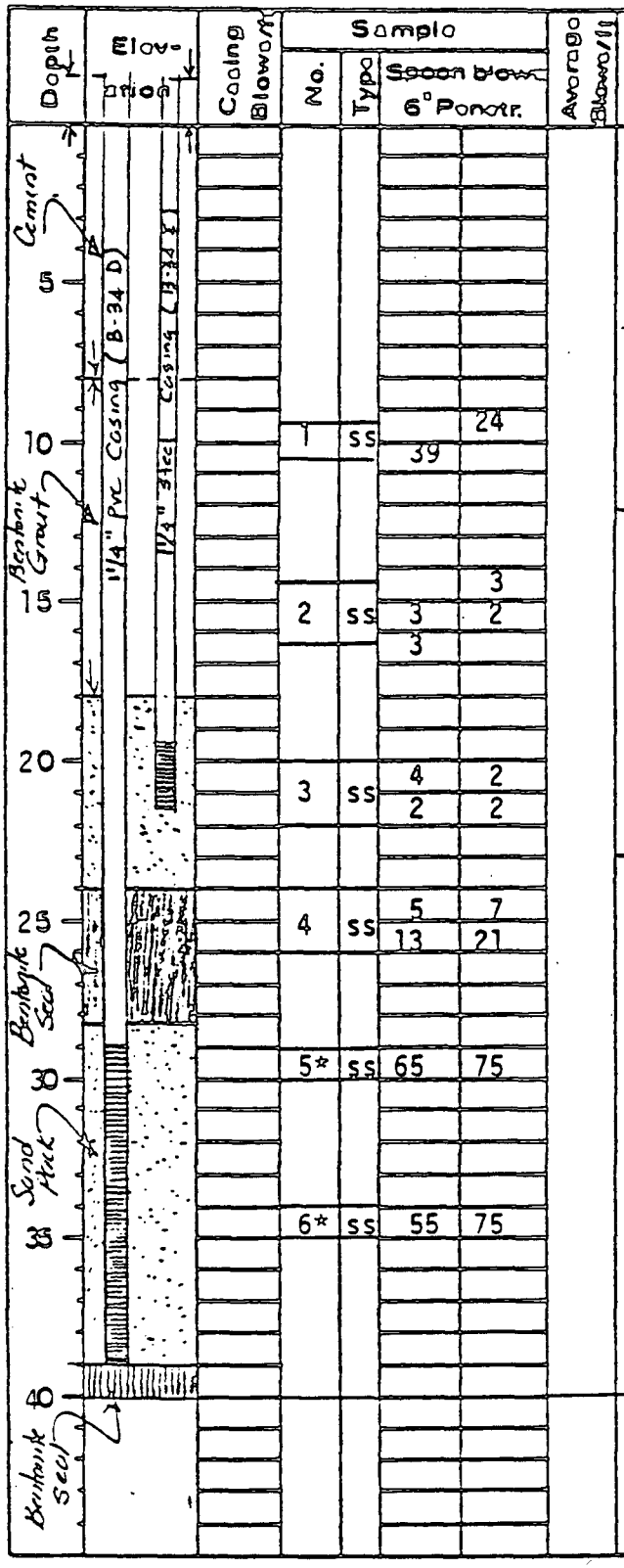
TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. [illegible]34

Project Olin 102nd Street Landfill - Phase II Date Start 3/3/

Location Niagara Falls, New York Date Finish 3/6/8

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM



Depth	Elevation	Casing Blows	Sample No.	Type	Sample 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 574.0	Remarks
							F	Black Miscellaneous Granular Fill	Saturated from 7' ±
			1	SS	24 39			12' 6"	
			2	SS	3 3 3 2		RA	Gray Clayey SILT, some fine Sand w/trace fine roots @ 18' grading fine SAND, little (+) Silt	Slightly Odorous, Saturated Loose
			3	SS	4 2 2 2			23' 0"	
			4	SS	5 7 13 21		QT	Red-brown Clayey Silt, some fine Sand, trace c-f Gravel	
								27'-6"	
			5*	SS	65 75			Red-brown fine SAND, some Silt, trace (+) c-f Gravel 8" boulder @ 27'	Moist, Very Dense
			6*	SS	55 75			40' 0"	
								END OF BORING - BEDROCK	*300 lb. Hammer

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TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. B-35

Project Olin 102nd Street Landfill - Phase II Date Start 3/6/8

Location Niagara Falls, New York Date Finish 3/6/8

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth ft	Elevation	Casing Blows/ft	Sample No.	Sample Type	Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 573.1	Remark
							F	Brown Miscellaneous Fill	Saturated from 7' ±
5								6' ±	
			1	SS	1 2 / 1 2			Black Industrial Waste	
10							RA	9' 10"	
								Dark gray Clayey SILT, trace (-) fine Sand	Saturated Loose
								10' 0"	
15								END OF BORING	
20									
25									
30									
35									
40									

Cement Seal

1 1/4" Steel Casing

Sand Pack

000784

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TEST BORING 1

Project No. 9004 Client OLIN CORPORATION Boring No. [redacted]-1

Project Olin 102nd Street Landfill - Phase II Date Start 10/2

Location Niagara Falls, New York Date Finish 10/2

Type of Rig CME Trailer Auger Driller Empire Soils Inspector WSP/

Depth	Elevation	Casing Blows	Sample No.	Sample Type	Spoon blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 574.2	Remark
1							F	Miscellaneous Granular Fill, w/rubble. 4'±	
5							F	Industrial Waste FILL Black-brown cinders & ashes, w/Silt, little gravel 11'-0"	Loose Satura
			1	SS	2 3 7			Q/c Brown & Gray Silty CLAY - irreg. thin lamination 11'-6"	Stiff Mo[redacted]
15								Bottom of Boring	
0									
5									
0									
5									
0									

Cuttings · Cement plug · 4" Steel Csg. · 3/8" Gravel pack · Screened interval

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SHEET 1 OF 1

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TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. CW-8

Project Olin 102nd Street Landfill - Phase II Date Start 10/24

Location Niagara Falls, New York Date Finish 10/25

Type of Rig CME Trailer Auger Driller Empire Soils Inspector WSP/RM

Depth	Elevation	Casing Blows	Sample No.	Sample Type	Sample Blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.8	Remarks
								F	Miscellaneous Granular FILL	
5			1	ss	3 4	3			8'±	wet med-den.
10			2	ss	1 1	1 2		F	Gray Industrial Waste FILL - (Strong Chemical Odor) 12'-0"	saturat
			3	ss	4	4		RA	Gray-brown fine SAND, some Silt, w/trace roots 13'-0"	wet
15									Bottom of Boring	
0										
5										
0										
5										
0										

Grout cuttings

3/8" Grout pack

Screened lotable

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TEST BORING I

Project No. 9004 Client OLIN CORPORATION Boring No. [redacted]9

Project Olin 102nd Street Landfill - Phase II Date Start 10/24

Location Niagara Falls, New York Date Finish 10/[illegible]

Type of Rig EME Trailer Auger Driller Empire Soils Inspector WSP/R[illegible]

Depth	Elevation	Casing Blows/ft	Sample No.	Type	Spoon blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 574.3	Remark
	Cuttings Cement plug	4" Steel Casing						F	Miscellaneous Granular Fill, w/brick fragments 8'±	moist med-dens
5	3/8" Gravel Pack		1	SS	2 7	5				
10	Screened Intake		2	SS	1 1	1 2		F	Industrial Waste - FILL Grey-black Cinders, ashes (strong chemical odor) 13'-6"	Loose t med-dens saturate
			3	SS	3	4				
			4	SS	3 3	3		RA	Brown & Grey fine SAND, some Silt, trace med-fine Gravel. 14'-6"	med-dens mois[redacted]
15									Bottom of Boring	
0										
5										
0										
5										
0										

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SHEET 1 OF 1

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TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. CW-16

Project Olin 102nd Street Landfill - Phase II Date Start 10/25

Location Niagara Falls, New York Date Finish 10/25

Type of Rig CME 45 Trailer Auger Driller Empire Soils Inspector RCM

Depth	Elevation	Casing Blows	Sample No.	Type	Seven blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 572.6	Remarks
								F	Fill: INDUSTRIAL WASTE	
			1	SS	1	3				
					5	2				
			2	SS	2	2			7'-6"	
10									Qle Grey-brown CLAY	Firm, we
									8'-0"	
5									End of Boring	
0										
5										
0										
5										
0										

Cement Plug
3/8" Gravel Pack
4" Steel Casing
Screened Interval

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TEST BORING L

Project No. 9004 Client OLIN CORPORATION Boring No. [illegible]-1

Project Olin 102nd Street Landfill - Phase II Date Start 10/25

Location Niagara Falls, New York Date Finish 10/2

Type of Rig CME 45 Trailer Auger Driller Empire Soils Inspector RCM

Depth	Elevation	Casing Blowers	Sample No.	Type	Seven blows 6" Penetr.		Average Blows/ft	Log	Classification "0" Elev. = 573.1	Remark
	Grout plug	4" Steel Casing						F	Miscellaneous Fill cinders, wood and brick fragments	
5			1	ss	3	3			@6' 14" white industrial waste	
					2	1				
	3/8" Gravel pack		2	ss	0	2			Miscellaneous Fill 9'-6"	
			3	ss	1	2				
					2	3				
10	Screened interval		4	ss	5	8		Qlc	Dark brown Sandy Topsoil @ top Grading @ 10'-0" to; Grey-brown, mottled CLAY Laminated, with grey silt partings 12'-6"	Stiff Wet
					12	15				
			5	ss	18					
15										
20									End of Boring	
5										
0										
5										
0										

SHEET 1 OF 1

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TEST BORING L

Project No. 9004 Client Olin Corporation Boring No. CW-20

Project Olin 102nd Street Landfill - Phase II Date Start 3/10/8

Location Niagara Falls, New York Date Finish 3/10/

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Sample Type	Sample Blows 6" Penetr.	Average Blows/ft	Log	Classification "0" Elev. = 572.9	Remarks
	Cement Seal; 4" Steel Casing; Pea Gravel Pack; Bentonite Seal						F	Black Industrial Waste	odorous
								9'6"	
10			1	SS	7 3 / 2 3		RA	Gray Clayey SILT, little fine Sand	wet to saturate firm
								11'0"	
								End of Boring	
15									
20									
25									
30									
35									
40									

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TEST BORING LOG

Project No. 9004 Client Olin Corporation Boring No. CW-3

Project Olin 102nd Street Landfill - Phase II Date Start 3/7

Location Niagara Falls, New York Date Finish 3/7

Type of Rig CME H.S. Auger Driller Empire Soils Inspector JLM

Depth	Elevation	Casing Blows	Sample No.	Sample Type	Sample Blows (Seven blows / 6" Penetr.)		Average Blows/ft	Log	Classification "0" Elev. = 573.3	Remarks
	Cement Seal; 4" Steel Casing							F	Black Miscellaneous Fill & Industrial Waste	Odorous. Oily Fi on Samp
5	Pea Gravel Pack									
10			1	SS	1 / 2	1 / 3			11' 0"	
	Bentonite Seal		2	SS	11 / 8	10 / 7		RA	Gray fine SAND, little (+) Silt 13' 0"	Saturat Med. Den
15									END OF BORING	
20										
25										
30										
35										
40										

000787A

JRB ASSOCIATES, INC.
8400 Westpark Drive, McLean, Virginia 22102

WELL LOG

PROFILE	DESCRIPTION
LAND SURFACE	
	FILL MATERIAL BLACK AND GRAY. SAND, GRAVEL, BROKEN GLASS.
16'	
17'	SANDY CLAY. BLACK

PROJECT: Love Canal

OWNER: City of Niagara Falls

WELL NO.: 5-A

LOCATION: 260' S. Hiway 384 (Buffalo Ave.) in park just west of 102nd St. dump

	Date	Time
DRILLING STARTED	9/4/80	14:00
DRILLING COMPLETED	9/5/80	10:2

DRILLER: Mike Warner

GEOLOGIST: D. Conover

RIG TYPE: CME - 55

REFERENCE POINT: land surface

R.P. ELEVATION: not yet surveyed 573.4

TOPO POSITION: flat lying

PROFILE BY: D. Conover

FIELD BOOK NO. 8 PAGES 5-9

WELL DATA

HOLE DIAMETER: 6"

HOLE DEPTH: 17'

CASING DIAMETER: 2" ID

CASING LENGTH: 2' Tail, 12½' Main

SCREEN DIAMETER: 2"

SCREEN SETTING: Between 13, 15 feet

SCREEN SLOT/TYPE: Vertical slot .0001"

PUMP TEST DATA

STATIC DEPTH TO WATER: 7.2'

DATE MEASURED: 9/8/80

PUMPING DEPTH TO WATER:

TEST DURATION:

PUMPING RATE:

TEST DATE:

TEST TYPE:

PUMP SETTING:

SPECIFIC CAPACITY:

REMARKS

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SCALE: 1 in = 5 ft.

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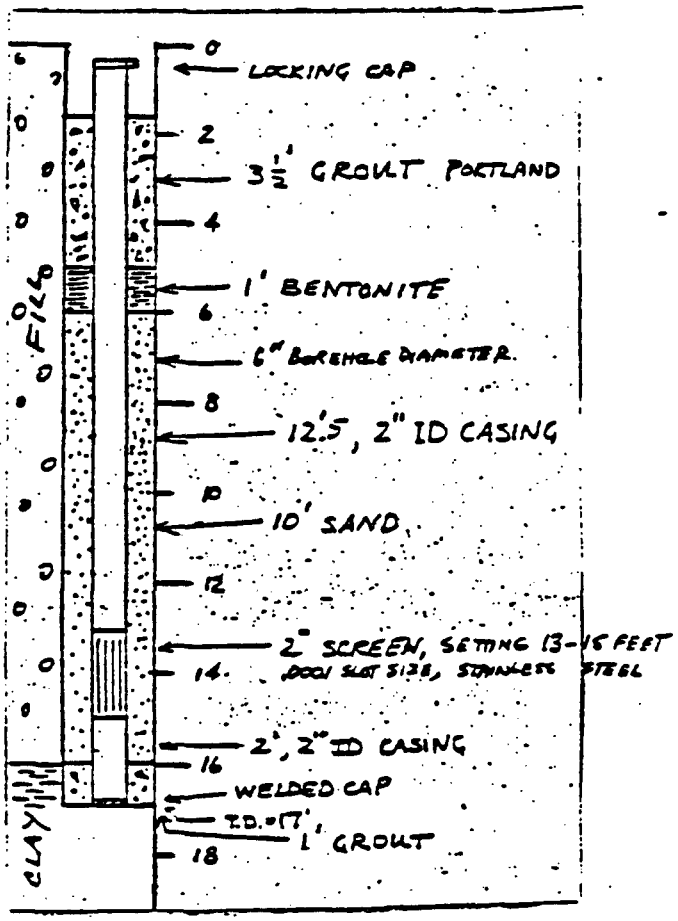
AS-BUILT DRAWING



CHECKLIST

- Land Surface Elevation
- Casing Height Above L-S
- Total Depth
- Borehole Diameter
- Casing Diameter
- Casing Thickness
- Casing Lengths
- Screen Data
  - Material
  - Diameter
  - Slot Openings
  - Settings
- Centralizers
- Grout Type
- Gravel Pack
- K-Fittings
- Packers
- Cement Baskets

Rig Type CME-55

Driller Mike Warner

Supervisory Geologist Dave Conover

Well No. 5-A

Project Love Canal

Location 260' south of Hiway 384 (Buffalo Ave.) in park just west of 102nd St. dump

Date 9/5/80

Prepared By: Dave Conover

Scale: 1"=4'

JRB ASSOCIATES, INC.
8400 Westpark Drive, McLean, Virginia 22102

WELL LOG

LAND SURFACE	PROFILE	DESCRIPTION
		FILL MATERIAL BLACK AND DARK GRAY
15.2'		SANDY CLAY. RANGES FROM BLACK TO LIGHT GRAY
32'		RED CLAY, WITH SOLID INCLUSIONS
38'		LOCKPORT DOLOMITE
46.5'		

SCALE: 1 in = 5 ft.

PROJECT: Love Canal
OWNER: City of Niagara Falls
WELL NO.: S-B
LOCATION: 260' S. Hiway 384 (Buffalo Ave.) just west of 102nd St. dump

	Date	Time
DRILLING STARTED	9/5/80	08:00
DRILLING COMPLETED	9/8/80	16:00

DRILLER: Mike Warner
GEOLOGIST: D. Conover
RIG TYPE: CME-55
REFERENCE POINT: land surface
R.P. ELEVATION: not yet surveyed 573.4
TOPO POSITION: flat lying
PROFILE BY: D. Conover
FIELD BOOK NO. 8 PAGES 7-17

WELL DATA

HOLE DIAMETER: 6", 3" in dolomite
HOLE DEPTH: 46.5'
CASING DIAMETER: 2" ID
CASING LENGTH: 38.8'
SCREEN DIAMETER: none
SCREEN SETTING: "
SCREEN SLOT/TYPE: " .0001"
DEPTH TO BEDROCK: 38'

PUMP TEST DATA

STATIC DEPTH TO WATER: 9.1'
DATE MEASURED: 9/8/80
PUMPING DEPTH TO WATER: not tested
TEST DURATION:
PUMPING RATE:
TEST DATE:
TEST TYPE:
PUMP SETTING:
SPECIFIC CAPACITY:

REMARKS 000789

Considerable sloughing from till zone. Hole caved from 37.5 to 21' after removing augers.

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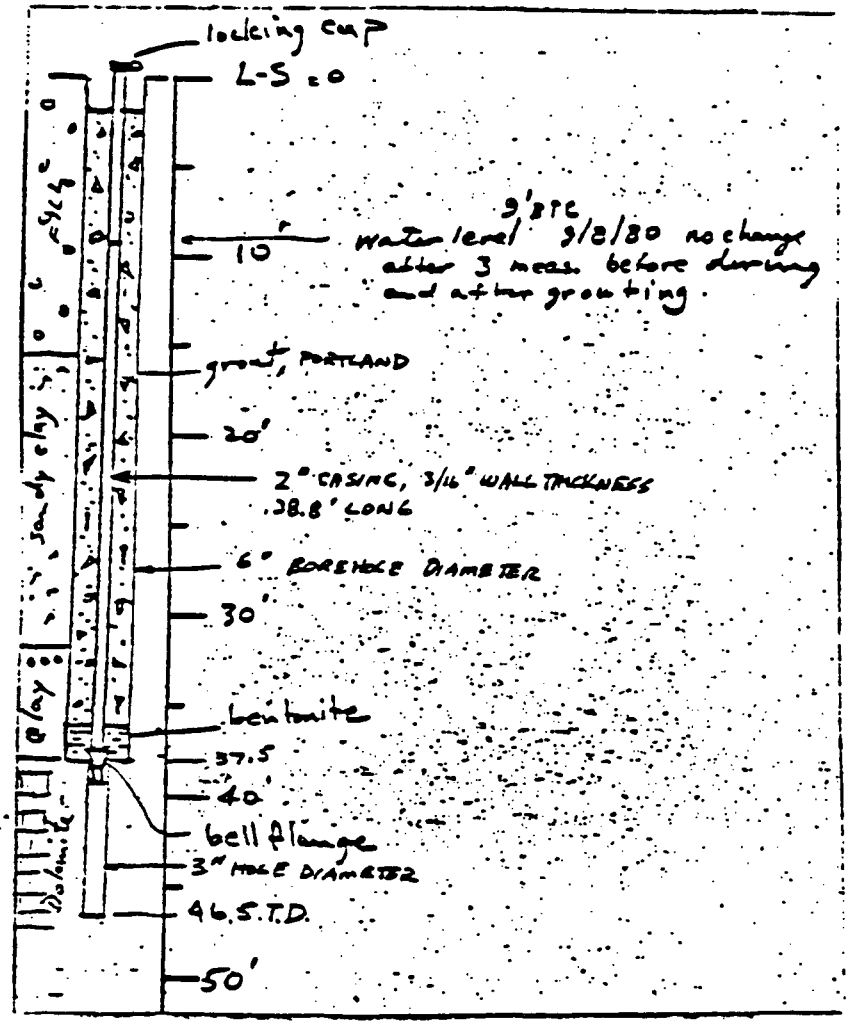
AS-BUILT DRAWING



CHECKLIST

- Land Surface Elevation
- Casing Height Above L-S
- Total Depth
- Borehole Diameter
- Casing Diameter
- Casing Thickness
- Casing Lengths
- Screen Data
  - Material
  - Diameter
  - Slot Openings
  - Settings
- Centralizers
- Grout Type
- Gravel Pack
- K-Fittings
- Packers
- Cement Baskets

Rig Type CME-55

Driller Mike Warner

Supervisory Geologist Dave Conover

Well No. 5-B

Project Love Canal

Location 260' south of Hiway 384 (Buffalo Ave.) just west of 102nd St. dump

Date 9/8/80

Prepared By: Dave Conover

Scale: 1"=10'

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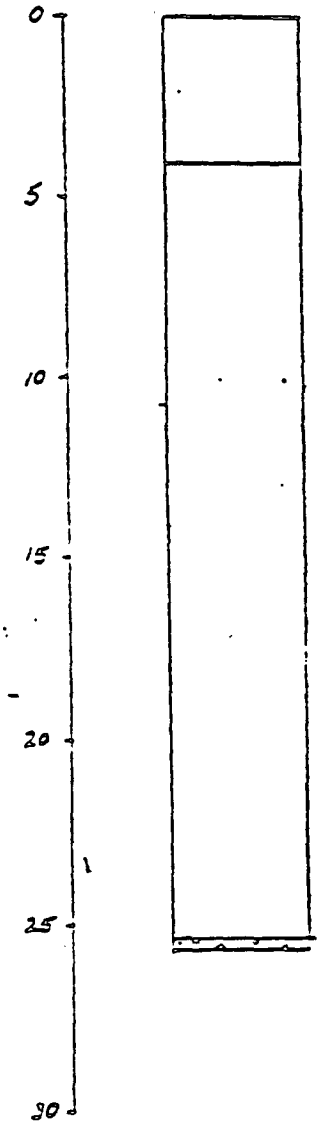
WELL LOG

PROFILE | DESCRIPTION



PROJECT: Love Canal

OWNER: Duke Vaughn

WELL NO.: 44-A

LOCATION: Immediately west of 99th Buffalo Ave.

	Date	Time
DRILLING STARTED	9/19/80	0945
DRILLING COMPLETED	9/19/80	1100

DRILLER: Mike Warner

GEOLOGIST: Dave Conover

RIG TYPE: CME-55

REFERENCE POINT: land surface

R.P. ELEVATION: unknown 574.6

TOPO POSITION: flat lying, local depression

PROFILE BY: Dave Conover

FIELD BOOK NO. 8 PAGES 53-54

WELL DATA

HOLE DIAMETER: 6"

HOLE DEPTH: 26'

CASING DIAMETER: 2" ID

CASING LENGTH: 22', 2'

SCREEN DIAMETER: 2"

SCREEN SETTING: 22'-24'

SCREEN SLOT/TYPE: Horz. slot, stainless .020" slots

PUMP TEST DATA

STATIC DEPTH TO WATER: Dry

DATE MEASURED: 9/19/80

PUMPING DEPTH TO WATER:

TEST DURATION:

PUMPING RATE:

TEST DATE:

TEST TYPE:

PUMP SETTING:

SPECIFIC CAPACITY:

REMARKS: 100790

PAGE 1 of 5

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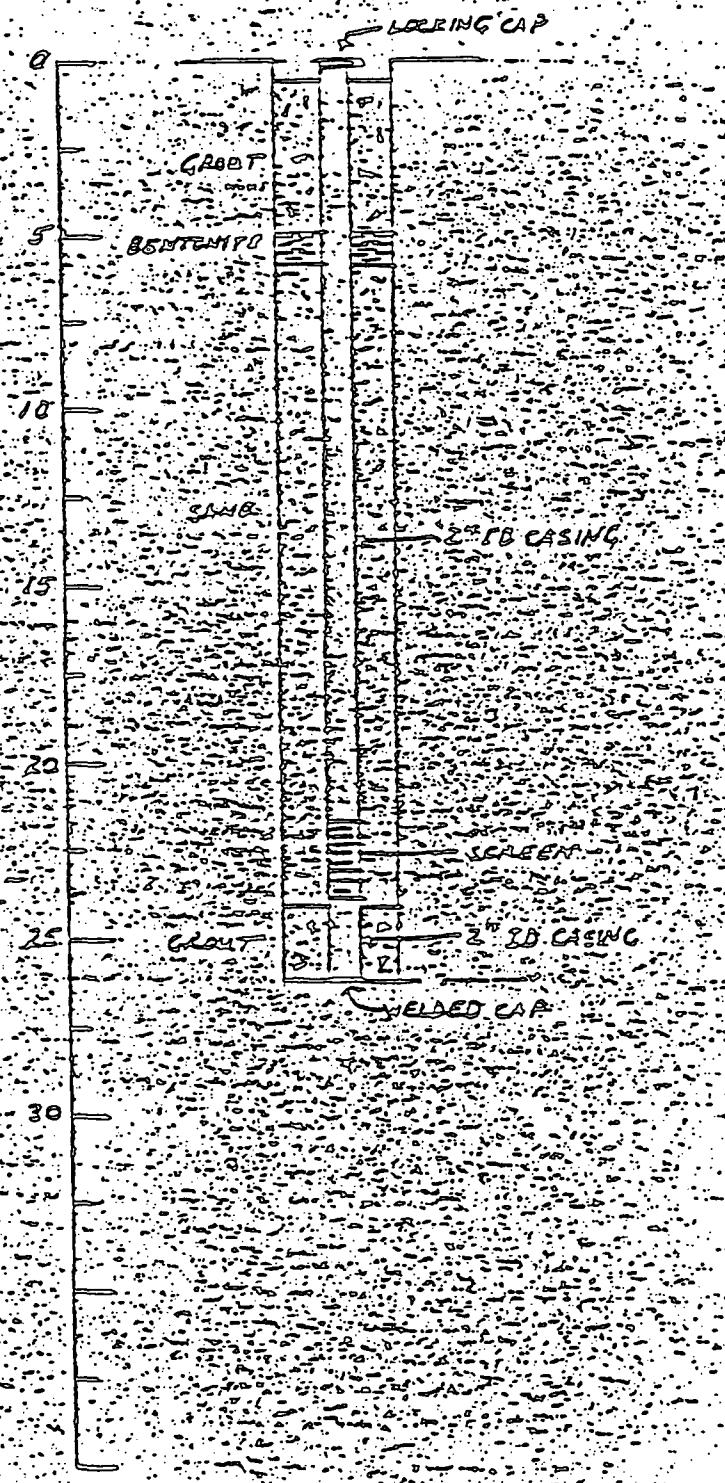
JRB-600/01

AS-BUILT DRAWING



CHECKLIST

Land Surface Elevation

Casing Height Above L-S 2" & 5

Total Depth 25'-2"

Borehole Diameter 6"

Casing Diameter 2" ID

Casing Thickness 3/16"

Casing Lengths 22'-2"

Screen Data

Material Stainless

Diameter 2"

Slot Openings .0007"

Seitings 22-24'

Centralizers none

Grout Type Portland Cement

Gravel Pack Quarrite Sand #4

K-Fittings none

Packers none

Cement Baskets none

Rig Type CME-55

Driller Mike Warner

Supervisory Geologist Dave Conover

Well No. 44-1

Project Love Canal

Location Immediately east of 9813 Buffalo Ave.

Prepared By: Dave Conover

Scale: 1"=5'

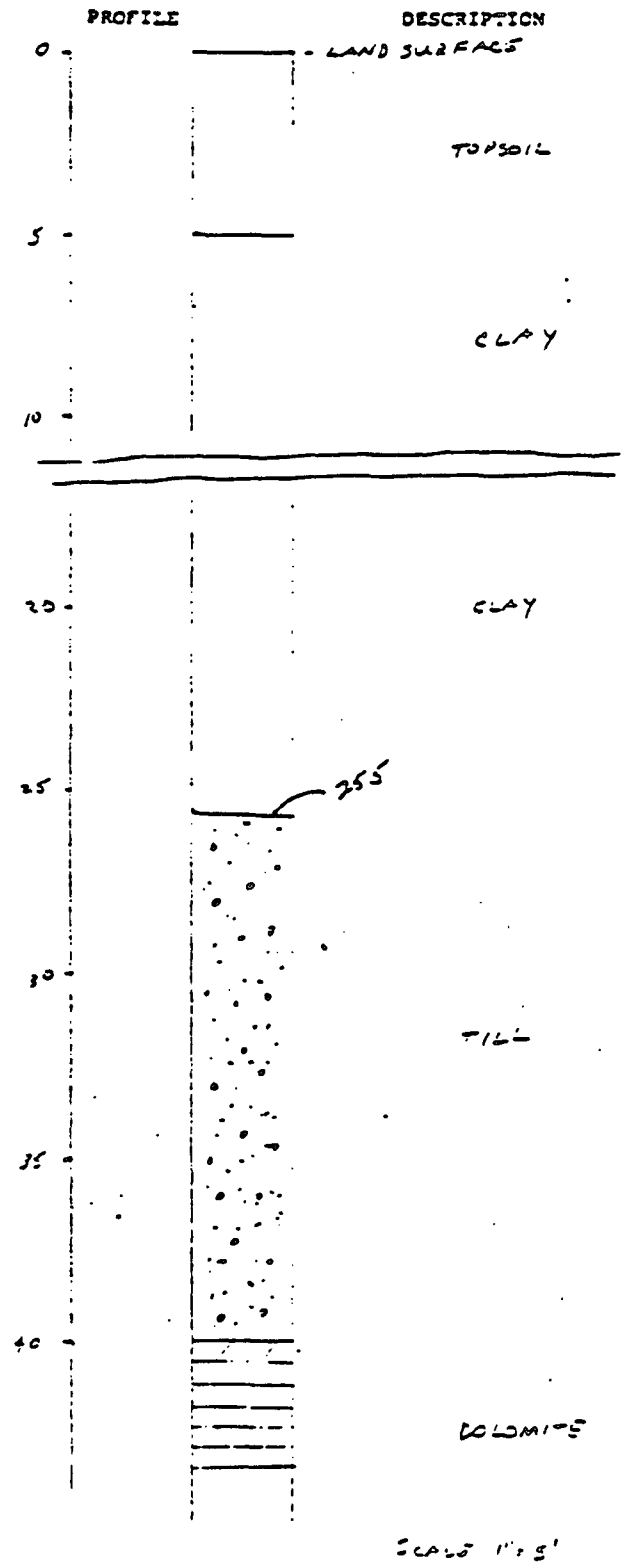
Date 9/19/80

30-600/03-8

000790A

JRB ASSOCIATES, INC.
8400 Westpark Drive, McLean, Virginia 22102

WELL LOG



PROJECT: Love Canal.

OWNER: Ruby Maulis

WELL NO.: 44-B

LOCATION: Lot immediately west of 9818 Buffalo Ave.

	Date	Time
DRILLING STARTED	9/18/80	0755
DRILLING COMPLETED	9/23/80	1345

DRILLER: Mike Warner

GEOLOGIST: Dave Conover

RIG TYPE: CME-55

REFERENCE POINT: land surface

R.P. ELEVATION: unknown 574.6

TOPO POSITION: flat lying & local depression

PROFILE BY: Dave Conover

FIELD BOOK NO. 8 PAGES 51-54

WELL DATA

HOLE DIAMETER: 6"

HOLE DEPTH: 45.92'

CASING DIAMETER: 4"

CASING LENGTH: 40.5'

SCREEN DIAMETER: none used

SCREEN SETTING: none used

SCREEN SLOT/TYPE: none used

DEPTH TO BEDROCK: 40'

PUMP TEST DATA

STATIC DEPTH TO WATER: not measured

DATE MEASURED:

PUMPING DEPTH TO WATER:

TEST DURATION:

PUMPING RATE:

TEST DATE:

TEST TYPE:

PUMP SETTING:

SPECIFIC CAPACITY:

REMARKS

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JRB-600/01

JRB ASSOCIATES, INC.
8400 Westpark Drive, McLean, Virginia 22102

WELL LOG

PROFILE	DESCRIPTION
0 – 5	Brown topsoil
5 – 10	Clay loam, silty
10 – 30	Soft Clay
30 – 33	silty zone at 31'
33	bottom of well

0 5 10 15 20 25 30 35 40

PROJECT: Love Canal
OWNER: Angelo Fama
WELL NO.: 48-A
LOCATION: Lot - 10114 Buffalo Ave.

	Date	Time
DRILLING STARTED	9/22/80	1300
DRILLING COMPLETED	9/23/80	1030

DRILLER: Pat Parmentier
GEOLOGIST: Tom Farmer, Al Wickline
RIG TYPE: Mobile B-56
REFERENCE POINT: land surface
R.P. ELEVATION: not surveyed 574.6
TOPO POSITION: flat
PROFILE BY: Tom Farmer
FIELD BOOK NO.: 11 PAGES 1-6

WELL DATA

HOLE DIAMETER: 6"
HOLE DEPTH: 33'
CASING DIAMETER: 2"
CASING LENGTH: 33'
SCREEN DIAMETER: 2"
SCREEN SETTING: 29'-31'
SCREEN SLOT/TYPE: .0001" stainless

PUMP TEST DATA

STATIC DEPTH TO WATER: 2.55'
DATE MEASURED: 9/23/80
PUMPING DEPTH TO WATER: not measured
TEST DURATION:
PUMPING RATE:
TEST DATE:
TEST TYPE:
PUMP SETTING:
SPECIFIC CAPACITY:

REMARKS

JRB-600/01

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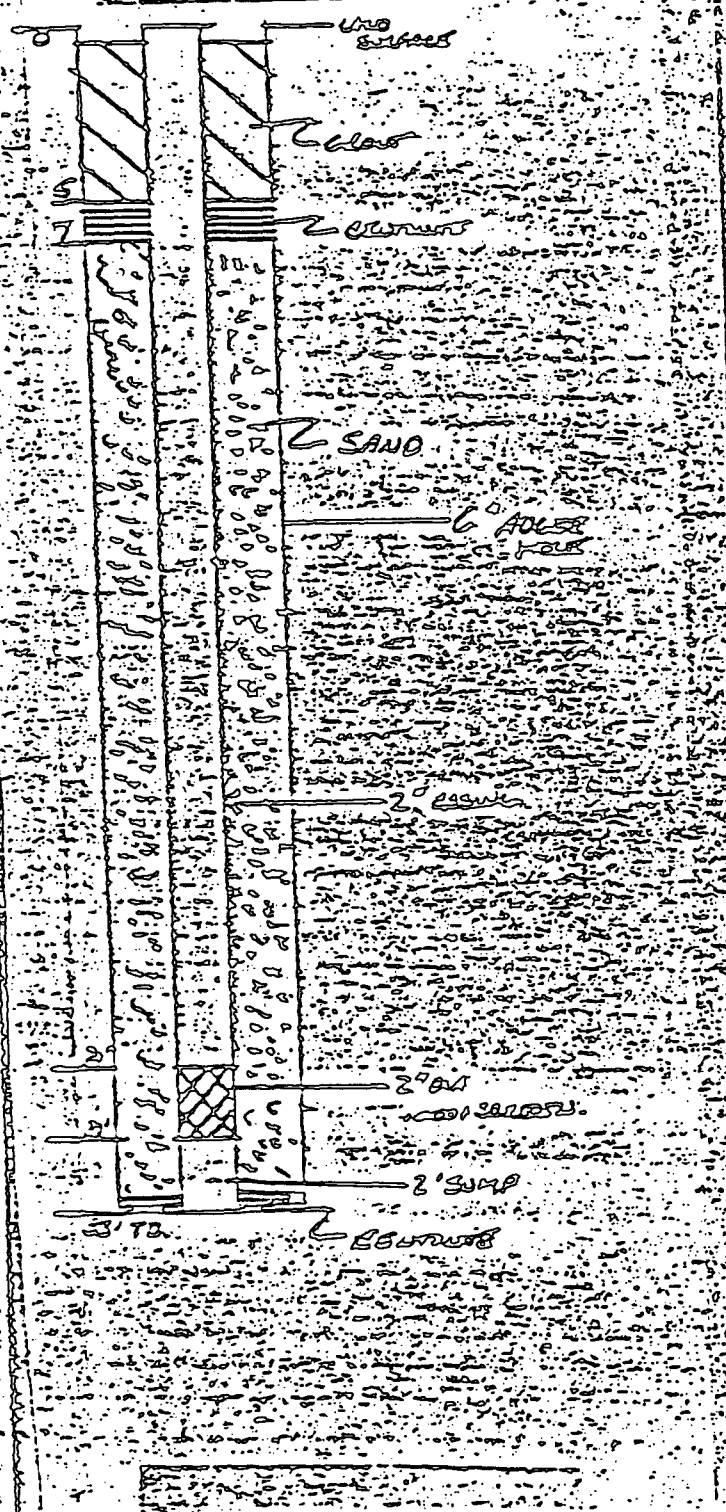
AS-BUILT DRAWING



CHECKLIST

- Land Surface Elevation
- Casing Height Above L-S
- Total Depth
- Borehole Diameter
- Casing Diameter
- Casing Thickness
- Casing Lengths
- Screen Data
  - Material
  - Diameter
  - Slot Openings
  - Settings
- Centralizers
- Grout Type
- Gravel Pack
- K-Fittings
- Packers
- Cement Baskets

Rig Type Mobile B-56

Driller [illegible]

Supervisory Geologist Alfred Wickline / Tom Farmer

Hole No. 48-A

Project Love Canal

Location Lot - [illegible]

Prepared By: Alfred Wickline & Tom Farmer

Scale 1"=5'

Date 9-23-80

Recycled paper

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WELL LOG

PROFILE	DESCRIPTION
	LAND SURFACE
3'	DARK BROWN SILT LOAM TOPSOIL
	BROWN SILT LOAM SUBSOIL INCREASE IN MOISTURE NEAR BOTTOM OF THIS LAYER
	REDDISH BROWN CLAY LOAM Gradual increase in moisture
	GRAY CLAY SILT STRINGERS VERY STICKY INCREASE IN MOISTURE NEAR BOTTOM
	GRAY CLAY INCREASE IN SAND CONTENT AND MOISTURE
	TILL
	BEDROCK DOLOMITE

PROJECT: Love Canal
OWNER: Angelo Fama
WELL NO.: 48-B
LOCATION: Lot 10114 Buffalo Ave.

	Date	Time
DRILLING STARTED	9/22/80	1300
DRILLING COMPLETED	9/23/80	1310

DRILLER: Mike Warner
GEOLOGIST: Alfred Wickline & Tom Farmer
RIG TYPE: CME-55
REFERENCE POINT: land surface
R.P. ELEVATION: not been surveyed 574.6
TOPO POSITION: flat lying
PROFILE BY: Alfred Wickline
FIELD BOOK NO.: 6 & 11 PAGES: 61-63/5,

WELL DATA

HOLE DIAMETER: 4"
HOLE DEPTH: 43.9'
CASING DIAMETER: 4"
CASING LENGTH: 38'
SCREEN DIAMETER: N/
SCREEN SETTING: N/A
SCREEN SLOT/TYPE: N/A
DEPTH TO BEDROCK: 38.5' -

PUMP TEST DATA

STATIC DEPTH TO WATER: not measured
DATE MEASURED:
PUMPING DEPTH TO WATER:
TEST DURATION:
PUMPING RATE:
TEST DATE:
TEST TYPE:
PUMP SETTING:
SPECIFIC CAPACITY:

REMARKS

A-600/01

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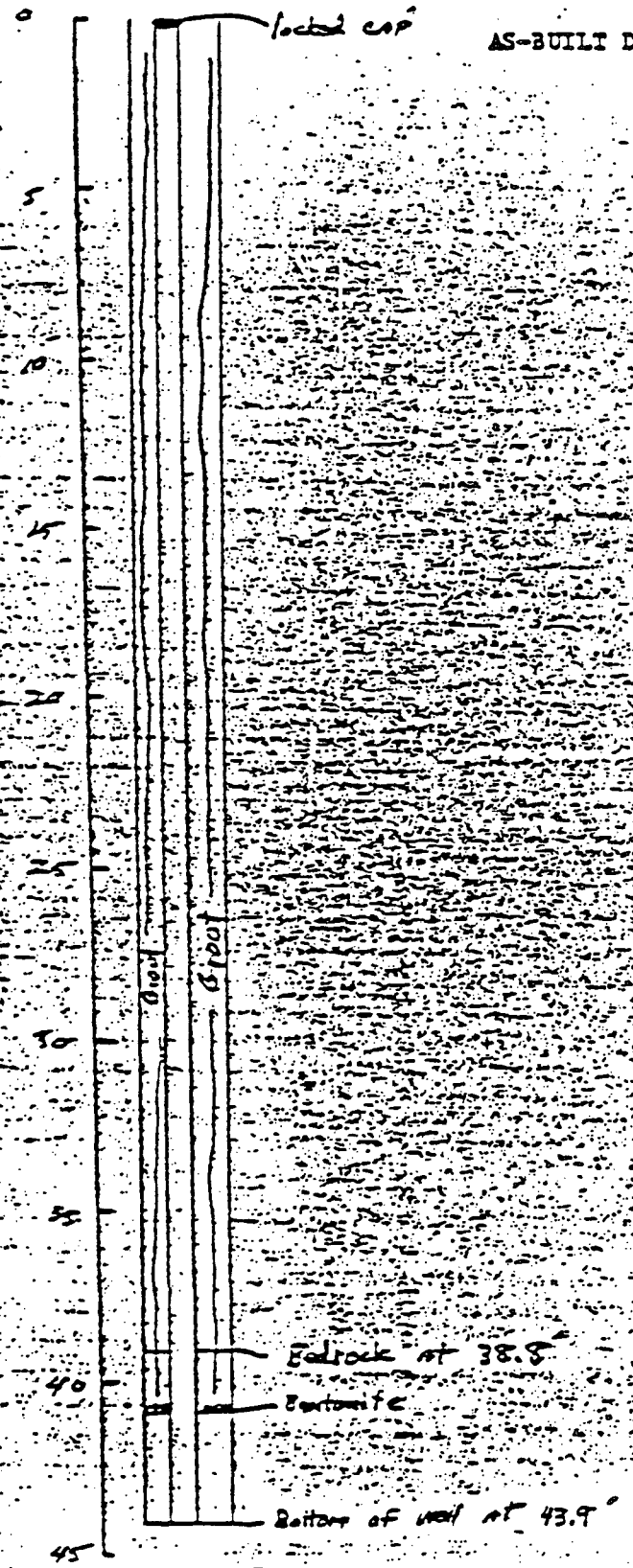
AS-BUILT DRAWING



CHECKLIST

- Land Surface Elevation
- Casing Height Above L-S
- Total Depth
- Borehole Diameter
- Casing Diameter
- Casing Thickness
- Casing Lengths
- Screen Data
  - Material
  - Diameter
  - Slot Openings
  - Settings
- Centralizers
- Grout Type
- Gravel Pack
- K-Fittings
- Packers
- Cement Baskets

Rig Type CME-55

Driller Ron Bush

Supervisory Geologist Tom Farmer

Well No. 148-3

Project Love Canal

Location Lot 10114 Buffalo Ave.

Prepared By: Tom Farmer

Scale: 1"=5'

Date 9/30/80

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ecology and environment

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WELL LOG

PROFILE	DESCRIPTION
LAND SURFACE	
Topsoil	Dark brown loam to silty loam
Dark Grey Clayey Silt	Dark Grey to black sand and silt with some clay
5 Brown Clayey Silt	yellow brown and grey clayey silt with stringers of black silt
Reddish brown Silty Clay (10, 15, 20)	Mixture of medium brown clayey silt and reddish brown clay at the top of the unit grading into a reddish brown silty clay towards the middle
Till	Reddish brown till with small, rounded pebbles in matrix of silty clay. Soft at the top of the unit but hard within 2 feet of the contact.

PROJECT: Love Canal

OWNER: N.Y.S. Dept. of Transportation

WELL NO.: 56-A

LOCATION: on Frontier Ave. south of Love Canal

	Date	Time
DRILLING STARTED	9/30/80	0945
DRILLING COMPLETED	9/30/80	1230

DRILLER: Joe Jensen

GEOLOGIST: Charlie Kurs

RIG TYPE: CME-55

REFERENCE POINT: land surface

R.P. ELEVATION: not yet measured

TOPO POSITION: flat lying lacustrian plain

PROFILE BY: C. Kurs

FIELD BOOK NO. 3 PAGES 72

WELL DATA

HOLE DIAMETER: 6"

HOLE DEPTH: 23' BLS

CASING DIAMETER: 2"

CASING LENGTH: 23'

SCREEN DIAMETER: 2"

SCREEN SETTING: 19' BLS - 21' BLS

SCREEN SLOT/TYPE: 10 slot/SS .001 stainless

PUMP TEST DATA

STATIC DEPTH TO WATER: not yet measured

DATE MEASURED:

PUMPING DEPTH TO WATER:

TEST DURATION:

PUMPING RATE:

TEST DATE:

TEST TYPE:

PUMP SETTING:

SPECIFIC CAPACITY:

REMARKS

JRB-600/01

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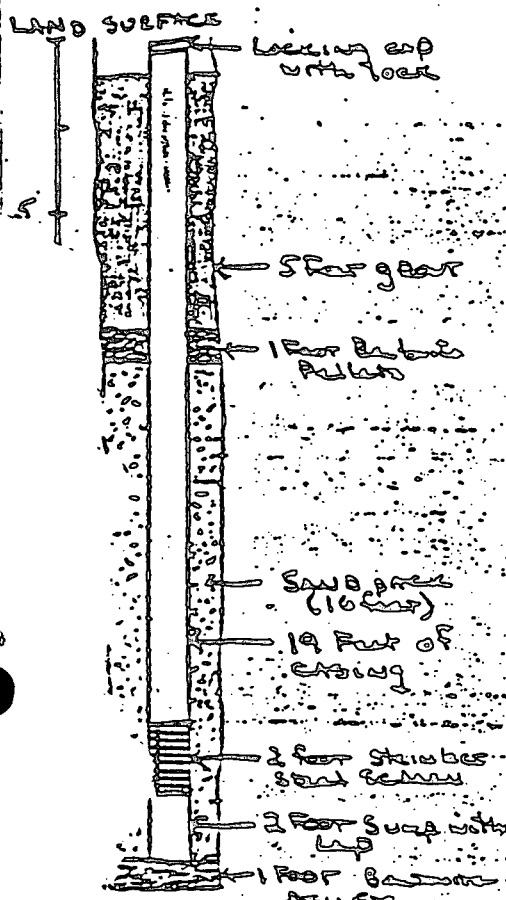
56A

AS-BUILT DRAWING



CHECKLIST

- Land Surface Elevation
- Casing Height Above L-S
- Total Depth
- Borehole Diameter
- Casing Diameter
- Casing Thickness
- Casing Lengths
- Screen Data
  - Material
  - Diameter
  - Slot Openings
  - Settings
- Centralizers
- Grout Type
- Gravel Pack
- K-Fittings
- Packers
- Cement Baskets

Rig Type CME-55

Driller Joe Jensen

Supervisory Geologist Charlie Kufs

Well No. 56-A

Project Love Canal

Location on Frontier Ave. south of Love Canal

Date 9/30/80

Prepared By: C. Kufs

Scale: 1"=5'

recycled paper

ecology and environment

000794

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WELL LOG

PROFILE	DESCRIPTION
Topsoil	
← 2' BLS	
Grey Clayey Silt	
← 3.5' BLS	
Brown Clayey Silt	
← 7' BLS	
Reddish Brown Silty Clay	See Well Log for Well 56A and Soil Evaluation Report for a detailed description of the Overburden
← 21' BLS	
← 37.2' BLS	See Core Log for Description of Bedrock
← 202' BLS	

PROJECT: Love Canal

OWNER: New York Dept. of Transportation

WELL NO.: 56-B/C

LOCATION: on Frontier St. just south of Love Canal

	Date	Time
DRILLING STARTED	9/29/80	1155
DRILLING COMPLETED	10/6/80	1100

DRILLER: Joe Jensen

GEOLOGIST: Charlie Kurs

RIG TYPE: CME-55

REFERENCE POINT: land surface

R.P. ELEVATION: not yet measured 574.9

TOPO POSITION: flat lying lacustrian plain

PROFILE BY: Charlie Kurs

FIELD BOOK NO.: 3 PAGES: 70-102

WELL DATA

HOLE DIAMETER: 4" to bedrock, 2 15/16 into rock

HOLE DEPTH: 225.7'

CASING DIAMETER: 4"

CASING LENGTH: 37'

SCREEN DIAMETER: N/A

SCREEN SETTING: N/A

SCREEN SLOT/TYPE: N/A

DEPTH TO BEDROCK: 37.2'

PUMP TEST DATA

STATIC DEPTH TO WATER: 9.80' BLS

DATE MEASURED: 10/5/80 @ 0756

PUMPING DEPTH TO WATER: 19.34' at end of pumping

TEST DURATION: 8.5 hrs. pumping/1 hr recovery

PUMPING RATE: 10 GPM

TEST DATE: 10/5/80

TEST TYPE: Drawdown/Recovery

PUMP SETTING: land surface

SPECIFIC CAPACITY: not yet calculated

REMARKS

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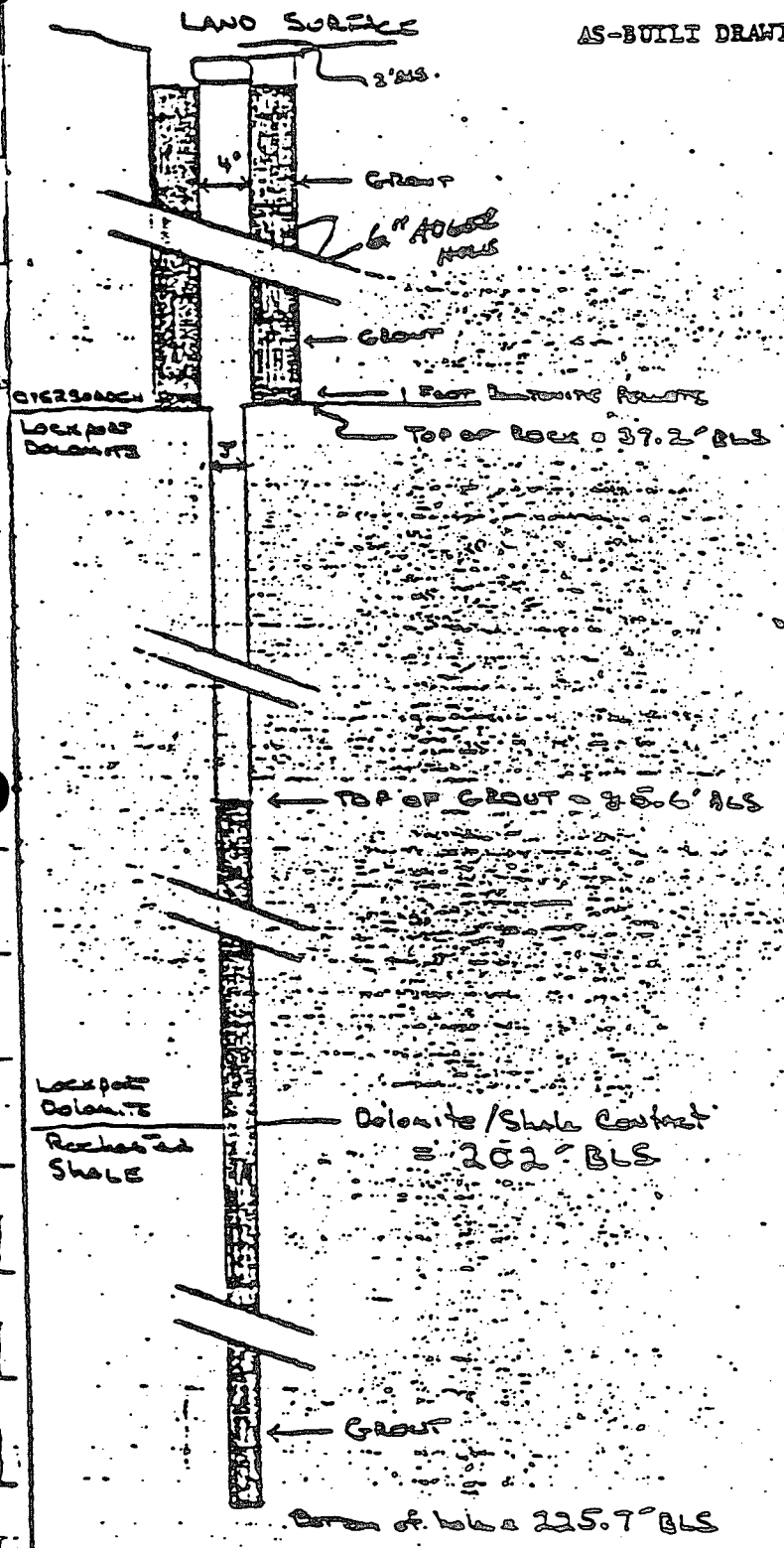
AS-BUILT DRAWING



CHECKLIST

- Land Surface Elevation
- Casing Height Above L-S
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- Casing Diameter
- Casing Thickness
- Casing Lengths
- Screen Data
  - Material
  - Diameter
  - Slot Openings
  - Settings
- Centralizers
- Grout Type
- Gravel Pack
- K-Fittings
- Packers
- Cement Baskets

Rig Type CME-55

Driller Joe Jensen

Supervisory Geologist Charlie Kufs

Well No. 56-B/C

Project Love Canal

Location on Frontier St. just south of Love Canal

Date 9/6/80

Prepared By: Charlie Kufs

Scale: 1"=5'

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ecology and environment

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CORE LOG

DESCRIPTION	THICKNESS (FEET)	DEPTH (FEET)
Medium gray, fine grained, cross-bedded Dolomite	1.6'	37.2'-38.8'
Light to medium gray, medium grained Dolomite, a few shaley partings	7.0'	38.8'-45.8'
Light to medium gray, medium to fine grained Dolomite. Small vugs in upper .5'. Vuggy in lower 1'. Fossil coral noted in lower .1'	3.5'	45.8'-49.3'
Medium grained, mottled, fossiliferous with tabulate corals	1.2'	49.3'-50.5'
Medium grained, medium gray thinly bedded Dolomite. A few vugs from 1.1'-1.3'	2.0'	50.5'-52.5'
Mottled gray, vuggy zone. Vugs up to .2' in width	7.4'	52.5'-59.9'
Light gray, medium grained vuggy Dolomite	.7'	59.9'-60.6'
Medium to dark gray, medium grained, vuggy Dolomite	1.6'	60.6'-62.2'
Mottled, medium gray to dark brown, medium grained Dolomite	1.9'	62.2'-64.1'
Calcite vein	.3'	64.1'-64.4'
Mottled, medium gray to dark brown, medium grained Dolomite	.8'	64.4'-65.2'
Medium gray, medium grained Dolomite with a few shale partings	2.8'	65.2'-68.0'

CORE LOG

DESCRIPTION	THICKNESS (FEET)	DEPTH (FEET)
Light gray, medium to fine grained Dolomite with small vugs	1.0'	68.0'-69.0'
Light gray, medium grained vuggy Dolomite with calcite	11.2'	69.0'-80.2'
crystals at 7.1'		
Light to dark gray, medium grained vuggy Dolomite.	8.3'	80.2'-88.5'
Tabulate coral at 7.7' - "bryozoan ghosts"		
Light to dark gray, vuggy, medium grained Dolomite with	5.2'	88.5'-93.7'
selimite Gypsum at .9' and from 1.9'-2.6'		
Light gray, medium grained Dolomite with small vugs	3.9'	93.7'-97.6'
Mottled white and dark brown medium grained Dolomite with	2.5'	97.6-100.1
a few shaley partings		
Light gray to mottled, vuggy, medium grained	3.9'	100.1'104.0
Medium to light gray, medium grained Dolomite with shaley	1.8'	104.0-105.8
partings		
Light gray to light brown, medium to fine grained Dolomite	6.8'	105.8-112.6
with vugs filled with Gypsum		
Medium gray and medium grained to fine grained, cross-	1.7'	112.6-114.3
bedded Dolomite		

CORE LOG

DESCRIPTION	THICKNESS (FEET)	DEPTH (FEET)
Medium gray, medium to fine grained Dolomite with shaley partings and Gypsum filled vugs. One vug from 3.9'-4.0'	12.0'	114.3-126.3
Medium to dark gray, vuggy Dolomite with large vugs filled with calcite. Some algal structures	7.2'	126.3-133.5
Medium to light gray, fine grained Dolomite with shaley partings	4.7'	133.5-138.2
Light to medium gray, medium grained vuggy Dolomite	4.6'	138.2-142.8
Medium gray, fine grained with vugs filled with calcite and shaley partings	12.1'	142.8-154.9
Medium gray, fossiliferous, Dolomite with a few shaley partings	4.9'	154.9-159.8
Light gray, medium to coarse grained Dolomite with small vugs scattered throughout	3.5'	159.8-163.3
Medium to dark brownish gray, medium to coarse grained fossiliferous Dolomite - small vugs scattered throughout	16.8'	163.3-180.1
Medium to brownish gray, fine grained Dolomite, a few shaley partings from 2'-3'	5.8'	180.1-185.9

CORE LOG

DESCRIPTION	THICKNESS (FEET)	DEPTH (FEET)
Medium to coarse grained Dolomite, pelmetozoan fragments	.8'	185.9-186.7
Mottled, medium gray to brown, medium grained Dolomite	2.3'	186.7-189.0
with fossil fragments		
Medium to dark gray, fine grained, evenly bedded Dolomite	12.9	189.0-201.9
Brown, very fine grained argillite	.1'	201.9-202.0

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WELL LOG

PROFILE	DESCRIPTION
0'	BLACK SILTY SANDY LOAM
	YELLOW BROWN FINE SILTY SAND RED BROWN CLAY BANDS
	REDDISH BROWN SILTY CLAY VARVED RED, GRAY, BROWN ALSO MOTTLED WITH GRAY SILT INCLUSIONS
	GRAY CLAY, RED BANDS

PROJECT: Love Canal

OWNER: City of Niagara Falls

WELL NO.: 96-A

LOCATION: Buffalo Ave., between 10002 and 9922 along city sewer

	Date	Time
DRILLING STARTED	10/8/80	0830
DRILLING COMPLETED	10/8/80	1130

DRILLER: Mike Warner

GEOLOGIST: Dennis Stanczuk

RIG TYPE: CME-55

REFERENCE POINT: land surface

R.P. ELEVATION: 574.1

TOPO POSITION: flat

PROFILE BY: Dennis Stanczuk

FIELD BOOK NO.: 2 PAGES: 94-96

WELL DATA

BOLE DIAMETER: 6.5"

HOLE DEPTH: 14.8'

CASING DIAMETER: 2"

CASING LENGTH: 14.3'

SCREEN DIAMETER: 2"

SCREEN SETTING: 12.6'-10.6'

SCREEN SLOT/TYPE: 10 slot stainless steel

PUMP TEST DATA

STATIC DEPTH TO WATER: Dry hole

DATE MEASURED: 10/8/80

PUMPING DEPTH TO WATER: not tested

TEST DURATION:

PUMPING RATE:

TEST DATE:

TEST TYPE:

PUMP SETTING:

SPECIFIC CAPACITY:

REMARKS

Screen set just below bottom of city sewer which is 10'. The sewer is about 10' from the hole. Log drawn from continuous split-spoon samples.

-600/01

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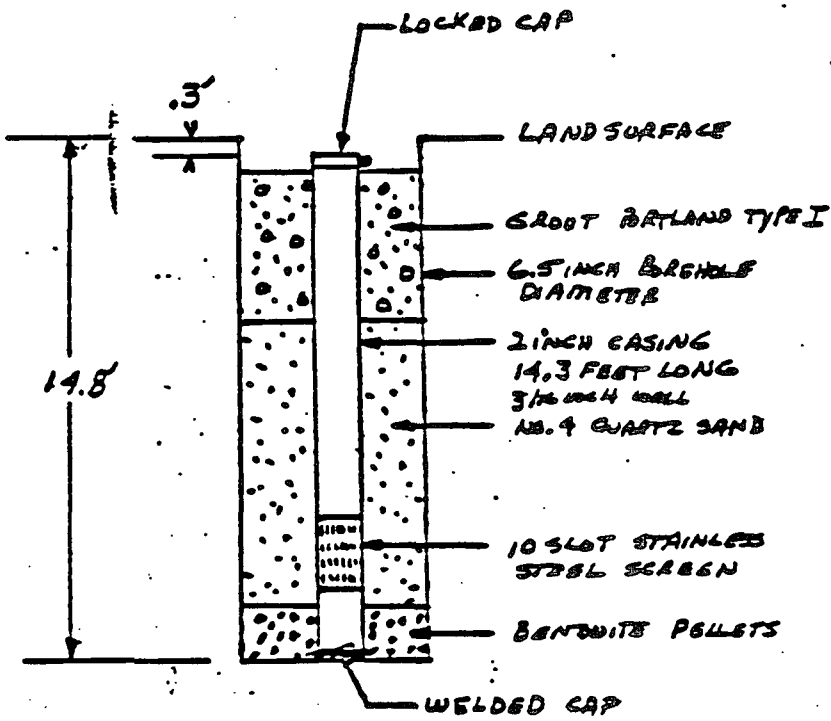
AS-BUILT DRAWING



CHECKLIST

- Land Surface Elevation
- Casing Height Above L-S
- Total Depth
- Borehole Diameter
- Casing Diameter
- Casing Thickness
- Casing Lengths
- Screen Data
  - Material
  - Diameter
  - Slot Openings
  - Settings
- Centralizers
- Grout Type
- Gravel Pack
- K-Fittings
- Packers
- Cement Baskets

Rig Type CME-55

Driller Mike Warner

Supervisory Geologist Dennis Stancruk

Well No. 96-A

Project Love Canal

Location Buffalo Ave. between 10002 and 9922 along city sewer

Prepared By: Dennis Stancruk

Scale: 1"=5'

Date 10/8/80

JRB ASSOCIATES, INC.
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WELL LOG

PROFILE	DESCRIPTION
1.5'	BLACK SANDY SILTY LOAM.
4.5'	YELLOW BROWN FINE SAND SILT DRY
6'	YELLOW BROWN SILT CLAY
7'	REDDISH BROWN SILTY CLAY
11'	REDDISH BROWN CLAY
35.5'	REDDISH GRAY CLAY VERY SOFT, PLASTIC
42.6'	TILL, GRAVEL
48.2'	DOLOMITE

PROJECT: Love Canal

OWNER: City of Niagara Falls

WELL NO.: 96-B

LOCATION: Buffalo Ave., between 10002 and 9922 along city sewer line (15')

	Date	Time
DRILLING STARTED	10/6/80	1450
DRILLING COMPLETED	10/11/80	1430

DRILLER: Mike Warner

GEOLOGIST: Dennis Stanczuk

RIG TYPE: CME-55

REFERENCE POINT: land surface

R.P. ELEVATION: 574.1

TOPO POSITION: flat

PROFILE BY: Dennis Stanczuk

FIELD BOOK NO. 2 PAGES 90-93,105

WELL DATA

HOLE DIAMETER: 6.5"/2 15/16"

HOLE DEPTH: 42.6'/ 48.2'

CASING DIAMETER: 4"

CASING LENGTH: 43'

SCREEN DIAMETER: N/A

SCREEN SETTING: N/A

SCREEN SLOT/TYPE: N/A

DEPTH TO BEDROCK: 42.6'

PUMP TEST DATA

STATIC DEPTH TO WATER: 15.1' after augers were pulled

DATE MEASURED: 10/7/80

PUMPING DEPTH TO WATER: not tested

TEST DURATION:

PUMPING RATE:

TEST DATE:

TEST TYPE:

PUMP SETTING:

SPECIFIC CAPACITY:

REMARKS

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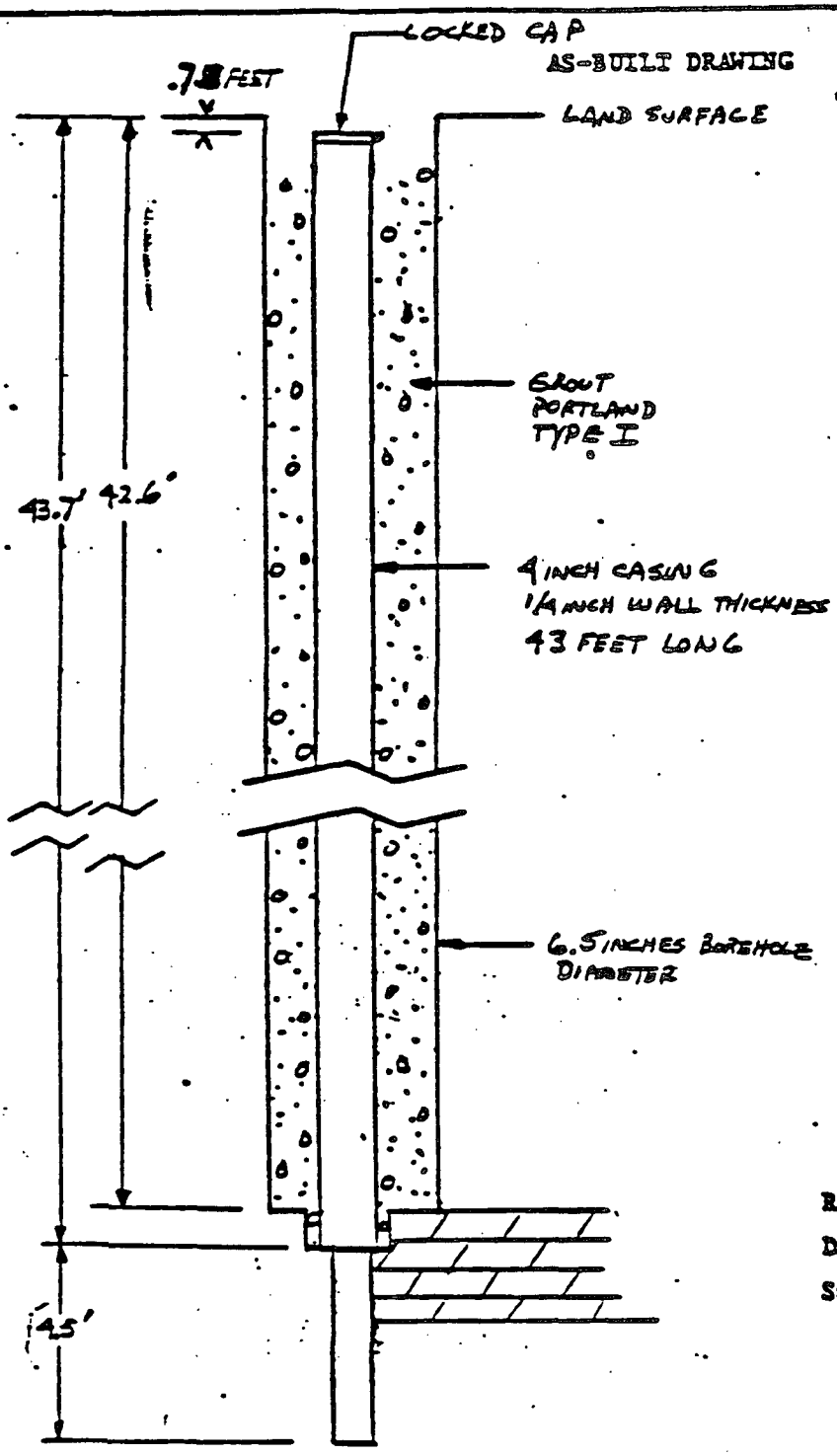

CHECKLIST

- Land Surface Elevation
- Casing Height Above L-S
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- Casing Diameter
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  - Material
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  - Slot Openings
  - Settings
- Centralizers
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- Gravel Pack
- K-Fittings
- Packers
- Cement Baskets

Rig Type CME-55

Driller Mike Warner

Supervisory Geologist Dennis Stanczuk

Well No. 96-B

Project Love Canal

Location Buffalo Ave. between 10002 and 9922 along city sewer line (15')

Date 10/11/80

Prepared By: Dennis Stanczuk

Scale: 1"=5'

recycled paper

ecology and environment

APPENDIX B

STRATIGRAPHIC & INSTRUMENTATION LOGS

REMEDIAL INVESTIGATION

recycled paper

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: BH1-86 (BOREHOLE)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 2, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NEAR WELL OW22-79 (CENTRAL AREA OF SITE)

CRA SUPERVISOR: R. HOEKSTRA GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Light brown silty CLAY - much vegetation, some pebbles (FILL)	Moist	4 3/4" Ø BH	1	SS	7	
	Red-brown silty CLAY - much vegetation, grading to sandy clay (FILL)	Moist				14	
	Brown silty SAND - some plastic, pebbles increasing with depth (FILL)	Moist		2	SS	11	
	Black silty CLAY - some white flyash (FILL)	Moist				19	
	Brown silty SAND - some flyash, many large stones, 2" pocket of white waste material at 5.5' (FILL)	Moist		3	SS	22	
5						12	
			CEM/BEN BKFL	4	SS	2	
						2	
	Gray-black sandy SILT - much flyash, many pebbles & stones, some white waste material, trace vegetation, white ceramic material at 7.5', trace wood, trace newspaper, trace glass, becoming saturated with depth (FILL)	Wet		5	SS	4	
						5	
10				6	SS	7	
						10	
				7	SS	5	
	Gray-brown CLAY - some silt, trace vegetation (NATIVE)	Wet				6	
	Gray-brown silty SAND - trace clay, trace vegetation, some black staining 14.0'-16.0'	Wet		8	SS	5	
15						5	
			16.0'				
	NOTES: - Borehole grouted to surface.						
20							

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH2-86

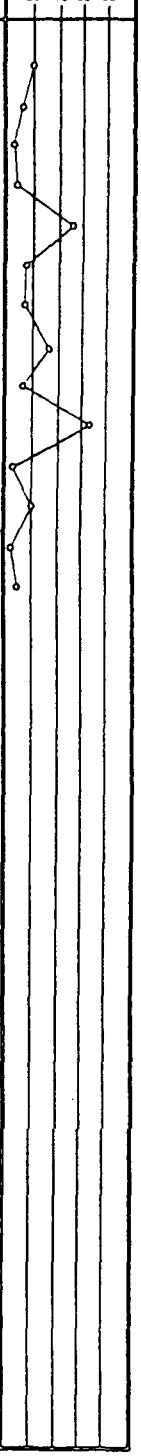
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 26, 1986

HOLE TYPE: HOLLOW STEM AUGER (4-3/4" DIAMETER) LOCATION: TOP OF EMBANKMENT WEST OF OW47-85

CRA SUPERVISOR: C. PADGINTON GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE: DEPTH (FEET)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0	Red-brown silty CLAY - some vegetation, some gravel, becoming siltier with depth, brown & black mottling 2.0'-4.0' (FILL)	Wet	4 3/4" Ø BH	1	SS	20
						13
				2	SS	5
						7
				3	SS	52
5	Gray-brown clayey, sandy SILT - some gravel (FILL)	Wet				17
	Black-gray sandy SILT - some clay, some crushed red stone (FILL)	Wet		4	SS	15
			CEM/BEN BKFL			33
				5	SS	13
	Black SILT - some vegetation (FILL)	Wet				65
10	Black sandy SILT - some crushed pink stone, some white waste material (FILL)			6	SS	4
	Black SILT - some vegetation, crushed pink stone, orange brick pieces, small white stones & large stones (FILL)	Wet				20
				8	SS	4
						9
	Dark gray-black silty CLAY - some vegetation (NATIVE)		14.0'			
15	Brown sandy SILT - trace vegetation, trace black clay					
	NOTES: - Auger refusal at 10.8', move rig & auger to 10.0'; second refusal, repeat twice. - Borehole grouted to surface.					
20						

PENETRATION TEST BLOWS / FOOT



* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH3-86 (BOREHOLE)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 25, 1986

HOLE TYPE: HOLLOW STEM AUGER (4-3/4" DIAMETER) LOCATION: NORTH OF OW10-79 (WEST SIDE OF SITE)

CRA SUPERVISOR: C. PADGINTON GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE: DEPTH	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Dark brown sandy SILT - some clay, some vegetation, trace gravel, rock in end of spoon (FILL)	Wet	4 3/4" Ø BH	1	SS	4, 4	
	Gray gravelly SAND (FILL)	Dry		2	SS	70, 21	
5	Mottled white, brown, black, green, & gray FLYASH - some white waste material, some gravel, some brick, becoming saturated with depth (FILL)	Wet	CEM/BEN BKFL	3	SS	13, 10	
				4	SS	8, 7	
				5	SS	9, 6	
10				6	SS	3, 3	
	Green-black clayey SILT - some vegetation some wood pieces, plastic (FILL)	Wet		7	SS	4, 3	
	Green-black clayey SILT - some vegetation many fine roots (NATIVE)	Wet		8	SS	3, 7	
15	Gray fine silty SAND	Wet	16.0'				
	NOTES: - Borehole grouted to surface.						
20							

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: BH42-86

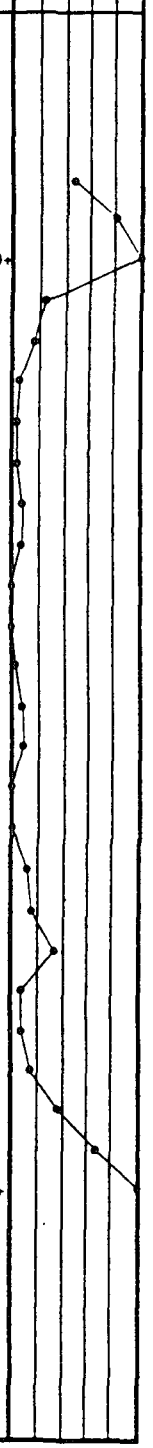
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MARCH 10, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: RIPRAP TERRACE, SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 570.4 TOP OF PIPE ELEVATION: *

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0			570.4			
	Augered through					
	Red-brown & dark brown SILT - some vegetation, some fine sand, some gravel (FILL)	Wet		1	SS	44
						81
5	Gray-green STONE & ROCK -occasional white shell, becoming gray-white at 6.0' (FILL)	Moist		2	SS	100+
	Black FLYASH & VEGETATIVE MATTER - rotting organic odor (FILL)	Moist				23
	Dark brown SILT & VEGETATIVE MATTER - strong rotting vegetation odor (NATIVE)	Moist				17
			13" Ø BH	3	SS	4
	Gray fine SAND & SILT - vegetation throughout, black mottling decreasing with depth	Moist-wet				3
10				4	SS	3
	Gray SILT & fine SAND - occasional vegetation decreasing with depth, occasional pebble	Wet	CEM/BEN BKFL			6
						5
				5	SS	WOR
						WOH
15				6	SS	2
						6
	Gray fine to medium SAND - some silt, occasional pebble, trace vegetation (roots)	Wet				7
				7	SS	WOR
	No recovery					WOR
20				8	SS	13
						17
	Dark gray coarse to medium SAND - some sub-rounded gravel, occasional white shell fragment	Wet				34
				9	SS	7
						7
25	Gray, brown & black fine sub-rounded GRAVEL - some coarse sand, occasional white shell fragment	Wet		10	SS	15
						37
	Gray & brown-gray medium SAND & sub-rounded GRAVEL - some silt, some white shell fragments, brown-gray fine gravel & coarse sand lense at 27.5', NAPL present in lense only (0.15' depth), chemical odor	Wet				67
				11	SS	100+
			29.0'			
30	NOTES: Auger refusal at 28.0'; grinding slow augering to 29.0'. Abandoned borehole and grouted to surface.					

PENETRATION TEST BLOWS / FOOT



* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000802A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH43-85

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 4, 1985

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID, 8" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:*

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Brown TOPSOIL - some vegetation (FILL)	Moist	577.2				
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist	8" Ø BH				
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist					
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist					
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Wet	CEM/BEN BKFL				
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft waste material, piece of wood (FILL)	Moist					
10	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist					
	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist					
	Augered through to 13.0'						
	Dark gray silty CLAY with vegetation (NATIVE)	Moist					
	Dark gray silty fine SAND with vegetation	Moist					
	Dark gray SILT - some fine sand	Wet					
15	Gray clayey SILT - vegetation throughout	Moist-wet		1	SS	7	
	Gray fine sandy SILT - vegetation throughout	Moist-wet				11	
	Gray silty fine SAND - occasional pebble, vegetation throughout	Moist		2	SS	11	
						13	
				3	SS	6	
20	Gray fine SAND - trace silt, trace vegetation	Wet				5	
				4	SS	14	
	Gray medium to coarse SAND & GRAVEL - trace silt	Wet				11	
	Gray SAND - trace silt	Wet		5	SS	12	
						17	
25	Gray fine SAND & SILT	Wet		6	SS	8	
						16	
				7	SS	11	
						14	
				8	SS	10	
30	Gray medium SAND - some shells	Wet				8	
	Brown clayey SILT - trace fine gravel (TILL)	Wet		9	SS	47	
						30	
	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet		10	SS	17	

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: BH43-85 Page 2 of 2

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 4, 1985

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID, 8" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR : D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:*

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
						28	
35	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet	8" Ø BH	11	SS	15	
						30	
				12	SS	42	
						96	
			CEM/BEN BKFL	13	SS	49	
40	Gray-brown silty CLAY - trace fine sand, trace small pebbles	Wet				28	
	Gray medium to fine SAND	Moist		14	SS	26	
	Gray silty, sandy CLAY	Moist					
	Gray SILT, fine to medium SAND & STONE	Moist-wet				63	
	Gray GRAVEL & medium SAND	Wet					
			43.8'	15	SS	100	
	Gray fine to medium SAND & GRAVEL	Wet					
			44.3				
45							

NOTES:
Stratigraphy 0-15.0' from OW34-85.
Grouted borehole to surface.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: BH47B-86 (BOREHOLE)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: APRIL 30, 1986

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID) LOCATION: 50' WEST OF OW47-86

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 574.7 TOP OF PIPE ELEVATION:*

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Red-brown silty CLAY, VEGETATION & GRAVEL (FILL)	Moist	574.7	1	SS	13	
	Dark gray & white FLYASH - some sand, some gravel (FILL)	Moist				22	
	Mottled brown & yellow-brown SILT - some clay, some sand, occasional gravel (FILL)	Dry				30	
	Dark gray FLYASH & white WASTE MATERIAL - piece of slag or steel in tip of spoon (FILL)	Dry		2	SS	12	
	White WASTE MATERIAL - dark gray & dark brown flyash, some dark brown sand (FILL)	Moist-dry				6	
5			13" Ø BH	3	SS	WOR	
	No recovery Water level encountered at approximately 5.0', irridescent sheen on water surface					1	
						2	
				4	SS	WOR	
						WOR	
10	Black & gray FLYASH & white WASTE MATERIAL - irridescent sheen, piece of plastic (FILL)	Wet		5	SS	6	
	Dark gray mat of ROOTS & LEAVES decreasing with depth - some silt, trace sand, trace clay (NATIVE)	Moist				12	
						22	
	Gray-brown SILT - some sand, occasional pebble, occasional root fiber	Moist		6	SS	4	
	Mottled golden brown & gray-brown fine SAND & SILT, vegetation throughout	Moist				7	
15				7	SS	10	
	Gray fine SAND - some silt, occasional rounded & sub-rounded pebble, occasional root fibers decreasing with depth	Wet				10	
						15	
				8	SS	5	
			CEM/BEN BKFL				
	Gray fine SAND - trace silt	Wet				3	
20				9	SS	7	
						6	
						10	
				10	SS	8	
						14	
25	Gray fine SAND - trace silt, white shell fragments (23-25'), occasional fine gravel lense (25-28'), occasional pebble (28-30')	Wet		11	SS	16	
						29	
			8" Ø BH			39	
				12	SS	14	
						36	
30				13	SS	12	
	Fine, medium & coarse SAND & fine GRAVEL - occasional fine gravel lense, occasional white shell fragments, trace NAPL at tip, trace red-brown silt	Wet				54	
						100	
	Coarse SAND & GRAVEL - occasional white shell fragment, brown NAPL	Wet		14	SS	12	
	Red-brown CLAY - some silt, highly plastic	Wet				13	
35			35.0'				

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH47B-86

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: APRIL 30, 1986

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID) LOCATION: 50' WEST OF OW47-86

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 574.7 TOP OF PIPE ELEVATION:*

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	NOTES: Borehole terminated at 35.0' grouted to surface.					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH47C-86 (BOREHOLE)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MAY 2, 1986

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID) LOCATION: 50' EAST OF OW47-86

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 575.1 TOP OF PIPE ELEVATION:*

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS	MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
		575.1				
0	Brown & red-brown CLAY - vegetation & silty topsoil at surface, occasional stone & brick fragment, some fine sand (FILL) Moist	8" Ø BH	1	SS	16	
					31	
					33	
	Gray FLYASH - occasional stone (FILL) Dry		2	SS	6	
					4	
5	Gray & dark gray FLYASH &/or FOUNDRY SAND - occasional small stone, light brown NAPL (10-13') similar to hydraulic fluid Wet	CEM/BEN BKFL	3	SS	2	
					2	
					2	
			4	SS	2	
					3	
10			5	SS	28	
					10	
					16	
	Gray fine SAND - some silt, occasional yellow & dark gray mottling, some root fibers, occasional rounded pebble (NATIVE) Moist		6	SS	7	
					11	
15		15.0'				

NOTES:
Borehole terminated at 15.0', grouted to surface.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

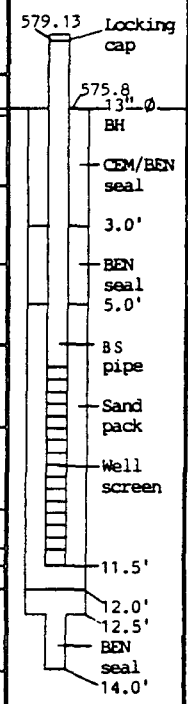
PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW31-85 (FILL WELL)

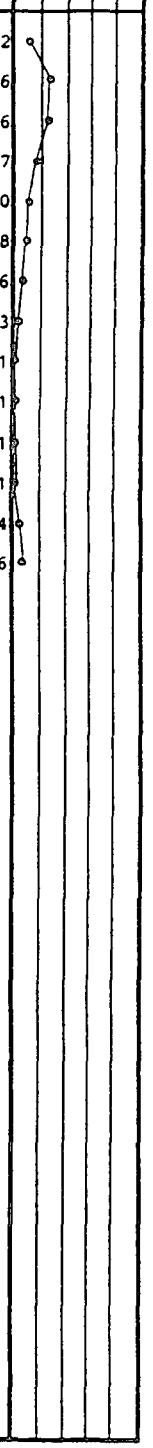
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 17, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NORTHWEST CORNER OF SITE

CRA SUPERVISOR : D. MILLARD GROUND ELEVATION:* 575.8 TOP OF PIPE ELEVATION:* 579.13

DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE NUMBER	SAMPLE TYPE	BLOWS / FOOT
0	Dark brown TOPSOIL - trace vegetation (FILL)	Moist	1	SS	12
	Brown SILT - some clay, some fine sand, gray stone in spoon tip (FILL)	Moist			26
	Gray FLYASH/CINDER material - occasisonal stone (FILL)	Dry	2	SS	26
					17
	Gray-black CINDERS & FLYASH - occasional gravel, occasional fibrous material (FILL)	Dry	3	SS	10
5					8
	Black CINDER/FLYASH - some hardened tar, trace fibrous material (FILL)	Dry	4	SS	6
					3
	Black CINDER/FLYASH - some fibrous material (FILL)	Dry-moist	5	SS	1
					1
10	Black FLYASH - irridescent sheen on water (FILL)	Moist-wet	6	SS	1
	Black TOPSOIL - some silt, some vegetation (NATIVE)	Wet			1
	Dark gray SILT - some clay, some fine sand, some clay, occasional vegetation	Moist	7	SS	4
	Gray very fine SAND - some silt, occasional vegetation	Moist			6
15					





NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000805A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW32-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 21, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NORTHWEST BOUNDARY OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 576.6 TOP OF PIPE ELEVATION:* 579.46

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown TOPSOIL - trace vegetation (FILL)	Moist	579.46 Locking cap; 576.6; 13"-Ø BH	1	SS	8	
	Mottled red-brown & brown silty CLAY - trace sand (FILL)	Moist				18	
	Yellow-brown SILT & fine SAND (FILL)	Moist-dry	CEM/BEN seal	2	SS	16	
	Black FLYASH - some cinders, occasional stone, trace fibrous material, trace brick, trace slag (FILL)	Dry				13	
			4.0' BEN seal	3	SS	13	
5			5.0'			7	
	Black FLYASH & CINDERS - occasional slag, occasional brick, trace fibrous material (FILL)	Dry	BS pipe	4	SS	4	
						6	
	Black FLYASH & CINDERS - occasional slag, occasional brick, some cinders, trace fibrous material (FILL)	Dry-moist	Sand pack	5	SS	10	
						3	
10	Black FLYASH - trace glass, occasional vegetation (FILL)	Wet	Well screen	6	SS	1	
						2	
	Dark gray clayey SILT - some fine sand, occasional vegetation (NATIVE)	Wet-moist	12.1'	7	SS	4	
						6	
	Mottled gray & dark gray fine SAND - some silt, occasional vegetation	Moist	13.5' 14.0'	8	SS	1	
15	Gray fine SAND - some silt, occasional vegetation	Moist-wet	BEN/ sand seal 16.0'			3	

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW33-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 12, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: SOUTHWEST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 575.4 TOP OF PIPE ELEVATION:* 579.53

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	TYPE	BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Dark brown TOPSOIL & VEGETATION (FILL)	Moist-dry	Locking cap; 579.53; 575.4; 13" Ø BH	1	SS	5	
	Brown TOPSOIL & silty SAND - occasional stone, occasional cinder (FILL)	Moist-dry				17	
	Black & white FLYASH (FILL)	Moist	CEM/BEN seal	2	SS	19	
	Gray-white soft WASTE MATERIAL - occasional blue discoloration (FILL)	Moist				26	
	Light gray FLYASH - occasional stone, fissile red-brown rock fragments in tip (FILL)	Moist	3.9'	3	SS	23	
5	Mottled black & white WASTE MATERIAL & FLYASH (FILL)	Moist	BEN seal			12	
			5.9'	4	SS	5	
	White chalk-like WASTE MATERIAL - becoming wet at 8.0' (FILL)	Moist	Sand pack			10	
			Well screen	5	SS	7	
						7	
10				6	SS	4	
			10.9'				
	Black fibrous VEGETATION & silty TOPSOIL - black wood fragment at 11.5' (NATIVE)	Moist				8	
			11.5'; 12.0'	7	SS	3	
	Dark gray SILT with fibrous roots	Moist	BEN seal			12	
			14.0'				
15							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW34-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 24, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: TOP OF RIVER BANK - WEST SIDE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 577.4 TOP OF PIPE ELEVATION:* 580.23

PROFILE: DEPTH	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
0	Brown TOPSOIL - some vegetation (FILL)	Moist	580.23 Locking cap; 577.4 13"-Ø BH	1	SS	20	
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist				14+	
	Stone or boulder at 1.5', hard augering to 2.1'		CEM/BEN seal	2	SS	6	
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist	3.1'			13	
			BEN seal	3	SS	5	
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist	5.0'			9	
			BS pipe	4	SS	13	
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Moist				16	
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft material, piece of wood (FILL)	Moist	Well screen	5	SS	5	
	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist				7	
10			Sand pack	6	SS	7	
	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist				8+	
			12.0'				
	Augered through to 13.0'		12.5'				
	Dark gray silty CLAY with vegetation (NATIVE)	Moist	13.0'	7	SS	5	
	Dark gray silty fine SAND with vegetation	Moist	BEN seal			8	
	Dark gray SILT - some fine sand	Wet					
15			15.0'				

NOTES:
Split spoon bouncing at 11.8' and 12.0', augered to 13.0'.

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW35-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 28, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: TOP OF RIVER BANK - CENTRAL AREA

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION: * 575.9 TOP OF PIPE ELEVATION: * 578.38

PROFILE: DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	TYPE	BLOWS / FOOT
0	Brown fine sandy SILT - some vegetation, trace clay (FILL)	Moist-dry	1	SS	13
	Black FLYASH - occasional stone (FILL)	Moist-dry			21
	Brown sandy SILT - some vegetation (FILL)	Moist-dry			
	Black FLYASH, occasional cinder (FILL)	Dry	2	SS	9
	Black FLYASH (FILL)	Dry			9
	Black & rust colored FLYASH & hardened tarlike WASTE MATERIAL - occasional cinder, trace yellow powder (FILL)	Dry	3	SS	10
5					11
	Black & red-brown FLYASH - occasional stone, occasional brick fragment, wood & plastic in tip of spoon (FILL)	Moist	4	SS	6
					6
	Black CINDERS & FLYASH - some wood, some tarlike waste material, white waxlike waste material at 9.5' (FILL)	Moist	5	SS	7
					12
10	Black conglomerate of FLYASH & VEGETATION - occasional stone (FILL)	Wet	6	SS	12
					8
	Black FLYASH, WOOD & VEGETATION - occasional stone (FILL)	Wet	7	SS	3
	Dark gray silty CLAY - occasional vegetation (NATIVE)	Wet-moist			8
	Dark gray fine sandy SILT - occasional vegetation, irridescent sheen on water	Moist			
15					

MONITOR INSTALLATION:

578.38 Locking cap
575.9
13"-Ø BH
CEM/BEN seal 2.5'
BEN seal 4.5'
BS pipe
Sand pack
Well screen
12.5'
13.0'
13.5'
BEN seal 14.0'

PENETRATION TEST BLOWS / FOOT: 20 40 60 80

NOTES:
Resampled 10.0-12.0' at EPA request; 1" recovery of stone and flyash.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000807A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW36-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 29, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: TOP OF RIVER BANK - CENTRAL AREA

CRA SUPERVISOR : D. MILLARD GROUND ELEVATION:* 575.4 TOP OF PIPE ELEVATION:* 579.45

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Brown sandy TOPSOIL - some vegetation, occasional stone (FILL)	Moist-dry	579.45 Locking cap; 575.4; 13" Ø BH	1	SS	10	
	Brown silty CLAY - some sand, some stone (FILL)	Moist-dry	CEM/BEN seal			12	
	Gray-brown fine SAND & SILT - trace vegetation (FILL)	Moist-dry	2.0'; BEN seal	2	SS	9	
	Brown-black & white conglomerate of FLYASH, CLAY & SILT - occasional white waste material, trace vegetation, trace stone (FILL)	Moist-dry	14" Ø SC 4.5'	3	SS	WOR	
5	Grinding during augering at 3.0-4.0'.		BS pipe	4	SS	WOR	
	No recovery		Sand pack; Well screen				
10	Black FLYASH - occasional stone, occasional paper, trace oily globules, irridescent sheen on water surface (FILL)	Wet	11.0'	5	SS	2	
	Dark gray clayey SILT with vegetation - trace NAPL in soil partings (NATIVE)	Wet	11.5'; 12.0' BEN seal			4	

NOTES:
Apparent void from 4.0-10.0'; recovered 1" wet black flyash at 9.5'. During well placement began losing sand at 4.6', installed 14" Ø steel casing 6" into sand pack, installed well inside large casing.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW37-85 (FILL WELL)

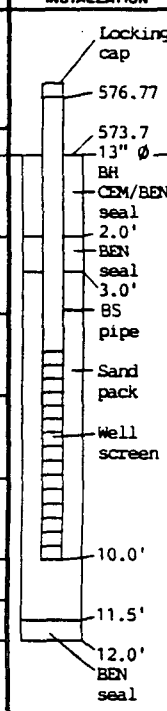
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 31, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 573.7 TOP OF PIPE ELEVATION: * 576.77

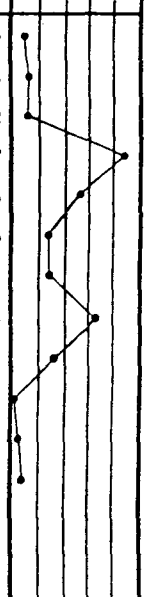
PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS	
0	Dark gray SILT - some gravel, some flyash, trace vegetation (FILL)	Moist
	Black CINDERS & FLYASH (FILL)	Moist
5	Black FLYASH & CINDERS - piece of plastic, 1/4" lense of gray material at 5.9' (FILL)	Moist
	Black FLYASH & CINDERS - occasional stone, trace gray material at 6.8', 3" wood at 7.6' (FILL)	Wet
	Dark gray FLYASH & fine SAND - trace fine gravel, wood fibers & steel fragments at 8.0-8.2', 3" concrete at 9.8' (FILL)	
10	Mottled dark gray & black clayey SILT & VEGETATION (NATIVE)	Moist
	Dark gray sandy SILT	Moist

MONITOR INSTALLATION



SAMPLE: NUMBER	TYPE	BLOWS / FOOT
1	SS	9
		13
2	SS	12
		87
3	SS	53
		26
4	SS	28
		65
5	SS	33
		2
6	SS	5
		8

PENETRATION TEST BLOWS / FOOT



NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000808A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW38-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 1, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: SOUTH CENTRAL AREA OF SITE ("FORMER DITCH")

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 576.2 TOP OF PIPE ELEVATION:* 579.34

PROFILE: DEPTH	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Red-brown silty CLAY - trace vegetation, trace topsoil (FILL)	Moist	579.34 Locking cap; 576.2 13" Ø BH	1	SS	8, 19	
	Mottled brown & gray-brown clayey SILT & fine SAND - occasional stone (FILL)	Moist	CEM/BEN seal	2	SS	6, 19	
	Gray SILT - occasional cinder, occasional coal pieces, occasional medium stone (FILL)	Moist	BS pipe	3	SS	3, 3	
5	Black FLYASH (FILL)	Dry	4.5' BEN seal	4	SS	1, 1	
	Black FLYASH - trace paper, trace glass, trace stone (FILL)	Wet	6.5'	5	SS	18, 10	
	Black & red-brown FLYASH - occasional piece of glass, occasional paper (FILL)	Wet	Sand pack	6	SS	1, 2	
10	Black FLYASH - occasional piece of glass, trace irridescent sheen on water (FILL)	Wet	Well screen	7	SS	2, 5	
	Black FLYASH - piece of plastic (FILL)			8	SS	5, 6	
	Black clayey SILT - some fine sand, occasional vegetation (NATIVE)	Moist	14.0' 14.5' BEN seal	9	SS	4, 10	
15	Black fine SAND - some silt	Moist					
	Black fine SAND & SILT - occasional vegetation, occasional minor lense of saturated coarse sand	Wet	18.0'	10	SS	4, 4	
	Black fine SAND & SILT - becoming gray at tip, occasional vegetation, occasional saturated lense, irridescent sheen on water	Wet	20.0'				
20							

NOTES:
14.0-16.0' split spoon sample lost before EPA examination; made two unsuccessful attempts to resample.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length. #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW39-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 7, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NORTH SIDE OF SITE - 200' E. OF FORMER DITCH

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 574.1 TOP OF PIPE ELEVATION:* 577.22

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Brown silty TOPSOIL - occasional vegetation piece of concrete, piece red clay tile (FILL)	Moist	577.22 Locking cap; 574.1; 13"-Ø BH; CEM/BEN seal 2.0'; BEN seal 2.5'; BS pipe; Sand pack; Well screen 8.5'; 9.0'; BEN seal 10.5'	1	SS	25	
	White soft WASTE MATERIAL (FILL)	Moist				6	
	Gray-brown coarse to medium SAND - some stone (FILL)	Moist		2	SS	1	
	Mottled red-brown silty CLAY - trace cinders (FILL)	Moist				2	
5	Mottled silty CLAY - trace cinders, trace gravel, trace sand (FILL)	Moist		3	SS	1	
	Gray coarse to medium SAND & CINDERS - trace silty clay (FILL)	Wet				2	
	Gray-white soft WASTE MATERIAL - piece of wood (FILL)	Wet		4	SS	5	
	Black sandy TOPSOIL - occasional vegetation (NATIVE)	Moist				10	
	Gray silty fine SAND	Moist		5	SS	4	
10	Mottled red-brown silty CLAY	Moist				7	

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000809A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW40-85 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 13, 1985

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST/ENGINEER: D. MILLARD GROUND ELEVATION:* 573.7 TOP OF PIPE ELEVATION:* 576.76

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE NUMBER	TYPE	BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
			Locking cap 576.76; 573.7				
0	Dark gray SILT - some gravel, some flyash, trace vegetation (FILL)	Moist	BS pipe				
	Black CINDERS & FLYASH (FILL)	Moist	CEM/BEN BKFL				
5	Black FLYASH & CINDERS - piece of plastic, 1/4" lense of gray material at 5.9' (FILL)	Moist	13" Ø BH				
	Black FLYASH & CINDERS - occasional stone, trace gray material at 6.8', 3" wood at 7.6' (FILL)	Wet					
	Dark gray FLYASH & fine SAND - trace fine gravel		8.0'				
	Mottled brown-black TOPSOIL & VEGETATION, becoming clayey silt (NATIVE)	Moist	BEN seal	1	SS	3	
10	Mottled brown & dark gray SAND & SILT with vegetation	Moist				3	
	Mottled brown & dark gray fine sandy SILT with vegetation throughout	Moist-wet	11.0'	2	SS	6	
	Gray-brown fine sandy SILT with vegetation throughout, occasional fine sandy lense	Moist-wet				6	
				3	SS	2	
	Gray fine SAND & SILT -some vegetation throughout, occasional shell fragment	Moist-wet	SD pack			6	
15				4	SS	1	
	Dark gray fine SAND & SILT with occasional black layering	Wet				1	
				5	SS	WOR	
	Gray & dark gray fine SAND & SILT -small stone, trace shell, trace silt	Wet				5	
				6	SS	2	
20						3	
				7	SS	10	
						22	
	Gray medium to coarse SAND & GRAVEL - occasional white shell, trace silt	Wet		8	SS	7	
			SS screen			11	
25				9	SS	6	
						11	
	Dark gray coarse SAND & GRAVEL - occasional white shell	Wet		10	SS	17	
			28.2'			11	
	Red-brown CLAY, plastic - irridescent sheen on water at clay contact	Wet	28.7'; 29.0'				
30							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa Sand

Stratigraphy 0-9.0' from OW37-85.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW41-85 (SHALLOW BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: APRIL 2, 1986

HOLE TYPE: HOLLOW STEM AUGER (6-1/4" ID/11" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 573.7 TOP OF PIPE ELEVATION: * 576.16

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
			576.16				
0			573.7				
	Dark gray SILT - some gravel, some flyash, trace vegetation (FILL)	Moist					
	Black CINDERS & FLYASH (FILL)	Moist	CEM/BEN BKFL				
5	Black FLYASH & CINDERS - piece of plastic, 1/4" lense of gray material at 5.9' (FILL)	Moist					
	Black FLYASH & CINDERS - occasional stone, trace gray material at 6.8', 3" wood at 7.6' (FILL)	Wet	5" Ø SC				
	Dark gray FLYASH & fine SAND - trace fine gravel (FILL)						
	Mottled brown-black TOPSOIL & VEGETATION, becoming clayey silt (NATIVE)	Moist					
10	Mottled brown & dark gray SAND & SILT with vegetation	Moist	13" Ø BH				
	Mottled brown & dark gray fine sandy SILT with vegetation throughout	Moist-wet					
	Gray-brown fine sandy SILT with vegetation throughout - occasional fine sandy lense	Moist-wet					
	Gray fine SAND & SILT -some vegetation throughout, occasional shell fragment	Moist-wet					
15	Dark gray fine SAND & SILT with occasional black layering	Wet					
	Gray & dark gray fine SAND & SILT -small stone, trace shell, trace silt	Wet					
20							
	Gray medium to coarse SAND & GRAVEL - occasional white shell, trace silt	Wet					
25							
	Dark gray coarse SAND & GRAVEL - occasional white shell	Wet		1	SS	42	
	Red-brown CLAY	Wet				3	
	Augered to 30.0'						
30				2	SS	WOR	
						WOR	
	Red-brown CLAY -occasional silty lenses increasing with depth, occasional small stone	Wet		3	SS	WOR	
						WOR	

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000810A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW41-85 Page 2. of 3

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 25, 1985

HOLE TYPE: HOLLOW STEM AUGER (6-1/4" ID/11" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 573.7 TOP OF PIPE ELEVATION:* 576.16

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	Red-brown CLAY - occasional silty lenses increasing with depth, occasional small stone Wet	13" Ø BH	4	SS	WOR	
35					4	
	Red-brown SAND, SILT & CLAY -some gravel (TILL) Wet	CEM/BEN BKFL	5	SS	66	
	Brown SAND, SILT & GRAVEL -trace clay Wet				73	
		5" Ø SC	6	SS	36	
					100	
40		39.5'				

NOTES:
Stratigraphy 0-28.0' from OW40-85.

Well Pipe: 5" diameter black steel

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: TOP OF BANK AT SOUTHEAST CORNER OF SITE

HOLE DESIGNATION:

DATE COMPLETED:

DRILLING METHOD:

CRA SUPERVISOR:

DEPTH ft BG	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY %	RQD %	DRILLING WATER RETURN %	WATER PRESSURE TEST cm/s
40		1	39.7	100	48.6	18	
45	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): gray, fine to medium grained, thinly bedded, numerous shaly & carbonaceous partings, vuggy and pitted with some secondary gypsum replacement	2	45.7	91	20.3	12	
		3	49.0	110	43.0	75	
50							
		4	53.3	96	28.9	83	5.
	- bioherm from 54.1'-54.3'						
55			55.3				51

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000811A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW42-85 (DEEP BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 15, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 573.6 TOP OF PIPE ELEVATION:* 577.04

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Dark gray SILT - some gravel, some flyash, trace vegetation (FILL)	Moist	577.04; 573.6				
	Black CINDERS & FLYASH (FILL)	Moist	CEM/BEN BKFL				
5	Black FLYASH & CINDERS - piece of plastic, 1/4" lense of gray material at 5.9' (FILL)	Moist					
	Black FLYASH & CINDERS - occasional stone, trace gray material at 6.8', 3" wood at 7.6' (FILL)	Wet	6"ø SC				
	Dark gray FLYASH & fine SAND - trace fine gravel (FILL)						
	Mottled brown-black TOPSOIL & VEGETATION, becoming clayey silt (NATIVE)	Moist					
10	Mottled brown & dark gray SAND & SILT with vegetation	Moist					
	Mottled brown & dark gray fine sandy SILT with vegetation throughout	Moist-wet	13" ø BH				
	Gray-brown fine sandy SILT with vegetation throughout - occasional fine sandy lense	Moist-wet					
	Gray fine SAND & SILT, some vegetation throughout - occasional shell fragment	Moist-wet					
15	Dark gray fine SAND & SILT with occasional black layering	Wet					
	Gray & dark gray fine SAND & SILT, small stone, trace shell, trace silt	Wet					
20			4"ø SC				
	Gray medium to coarse SAND & GRAVEL, occasional white shell, trace silt	Wet					
25							
	Dark gray coarse SAND & GRAVEL, occasional white shell	Wet					
	Red-brown CLAY Augered through	Wet					
30							
	Red-brown CLAY, occasional silty lense increasing with depth, occasional small stone	Wet					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW42-85 Page 2 of 6

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 15, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.6 TOP OF PIPE ELEVATION:* 577.04

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	Red-brown CLAY - occasional silty lenses increasing with depth, occasional small stone Wet					
35	Red-brown SAND, SILT & CLAY, some gravel (TILL) Wet	13" Ø BH				
	Brown SAND, SILT & GRAVEL, trace clay Wet	CEM/BEN BKFL				
		6" Ø SC				
40	NOTES: Stratigraphy from OW41-85.	39.3' 39.9' 40.2'				
		4"Ø SC				

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000812A

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: SOUTHEAST AREA OF SITE

HOLE DESIGNATION: OH42-86

DATE COMPLETED: JANUARY 15, 1987

DRILLING METHOD: 3" DIA. NX CORE

CRA SUPERVISOR: R HOEKSTRA/C PADGINTON

DEPTH ft BG	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY %	RQD %	DRILLING RETURN %	WATER PRESSURE TEST cm/s	ELEVATION ft AMSL	MONITOR INSTALLATION
		1	39.3	90	72			534.3 533.7 533.4	13"Ø BH 6"Ø SC CEM/BEN BKFL
40	DOLOMITE (LOCKPORT GROUP-OAK ORCHARD FORMATION): medium to dark gray, aphanitic to medium grained; some banding, medium bedding, bituminous, few fractures, gypsum filled, trace partings, fossiliferous								
45		2	48.6	74				525.0	
50	- trace weathered fractures								5-3/4" Ø BH
55		3	55.1	131	100	60		518.5	
	- highly fractured, slight weathering								
60	- highly fractured 62.9' to 68.75'	4	62.9	100	29	22		510.7	4"Ø SC
65	- trace weathered fractures								
70		5	70.2	102	100	37		503.4	
	- several gypsum masses, stromatolites								
75									
		6	78.3	91	100	23		495.3	
80	- calcite & sphlalerite filled vugs at 81.25'								
85		7	85.0	110	100	98		488.6	
90									

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

STRATIGRAPHIC AND IN

(BEDROC

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: SOUTHEAST AREA OF SITE

DEPTH ft BG	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY %	%	
90	Dolomite (as above)	8	93.3	99	100	
95						
100		9	100.0	95	92	
105						
110		10	108.4	102	100	9
115		11	115.0	98	99	87
120						
125		12	123.3	101	100	93
130		13	130.0 130.5	98	70	65
135	DOLOMITE (LOCKPORT GROUP - ERAMOSA FORMATION): light to olive gray, fine to medium grained, very thin to medium bedding, frequent carbonaceous partings, trace weathered fractures					
140		14	139.3	107	100	86
145	- cherty	15	145.0	83	100	67

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT E

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000813A

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW42-86

PROJECT NO.: 9-1431

DATE COMPLETED: JANUARY 15, 1987

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: SOUTHEAST AREA OF SITE

CRA SUPERVISOR: R HOEKSTRA/C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY	RQD	DRILLING RATE	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
145	- cherty;								5-3/4" Ø BH
150	- massive chert nodules								4" Ø SC
			152.5					421.1	
	DOLOMITE (LOCKPORT GROUP - GOAT ISLAND FORMATION): light to medium gray, fine to medium grained, thick bedded, stylolitic, cherty, vuggy with gypsum or carbonate or limonite coatings, frequent shaly partings	16	154.0	120	100	99		419.6	
155									CEM/ BEN BKFL
160		17	160.0	113	96	88		413.6	
	- sharp conformable contact		162.0					411.6	
165	DOLOMITE (LOCKPORT GROUP - GASPORT FORMATION): gray to olive gray, fine to medium grained, thin to thick bedding bituminous, fossiliferous, numerous shaly partings, vuggy & pitted; few fractures	18	169.3	93	52	86		404.3	
170			170.0					403.6	3" Ø NX
175	DOLOMITIC SHALE: black, very fine to fine grained, thin to thick bedding, vugs with gypsum &/or sphalerite, trace weathering on fractures								
		19	178.9	75	--	72		394.7	
180		20	179.3	106	86	100		394.3	
		21	184.3	96	100	100		389.3	
185			186.0					387.6	
	DOLOMITE: as above, coarse grained, some porosity, banded								
190	- trace limonitic staining								
		22	194.3	40	30	100		379.3	
195	- weathered fracture at 194.75'	23	195.9	112	100	86		377.7	
200									

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: SOUTHEAST AREA OF SITE

HOLE DESIGNATION: OW42-86

DATE COMPLETED: JANUARY 15, 1987

DRILLING METHOD: 3" DIA. NX CORE

CRA SUPERVISOR: R HOEKSTRA/C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY	RQD	DRILLING RATE	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
- 200	Dolomite (as above)								
- 205	- conformable, gradational contact		204.8					368.8	3"Ø NX
- 210	DOLOMITE (CLINTON GROUP - DECEW FORMATION): gray to dark gray, fine to medium grained, argillaceous, massive bedding - few carbonaceous partings from 209.3', occasional vug,	25	209.3	192	100	85		364.3	
- 215	- clay seam		213.8					359.8	
- 220	- clay seam contact SHALE (CLINTON GROUP - ROCHESTER FORMATION): black fine grained, dolomitic, massive bedding. several fractured & weathered zones		216.8					356.8	
- 225			223.3					350.3	

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000814A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW43-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 30, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 580.22

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0	Brown TOPSOIL - some vegetation (FILL)	Moist			
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist			
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist			
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist			
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Wet			
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft waste material, piece of wood (FILL)	Moist			
	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist			
10	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist			
	Augered through to 13.0'				
	Dark gray silty CLAY with vegetation (NATIVE)	Moist			
	Dark gray silty fine SAND with vegetation	Moist			
	Dark gray SILT - some fine sand	Wet			
15	Gray clayey SILT - vegetation throughout	Moist-wet			
	Gray fine sandy SILT - vegetation throughout	Moist-wet			
	Gray silty fine SAND - occasional pebble, vegetation throughout	Moist			
20	Gray fine SAND - trace silt, trace vegetation	Wet			
	Gray medium to coarse SAND & GRAVEL - trace silt	Wet			
	Gray SAND - trace silt	Wet			
25	Gray fine SAND & SILT	Wet			
	Gray fine to medium SAND & GRAVEL -	Wet	1	SS	40 / 16 / 20
30	Red-brown SILT & fine SAND - trace clay, occasional gravel (TILL)	Moist			

MONITOR INSTALLATION:

- Locking cap 580.22
- 577.2
- 13" Ø BH
- CEM/BEN BKFL
- BS pipe
- 12.0'
- BEN seal
- 14.0'
- SD pack
- 26.5'
- SS screen
- 31.5'
- 32.0'

PENETRATION TEST BLOWS / FOOT: 20 40 60 80

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW43-86 Page 2 of 2

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 30, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 580.20

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	NOTES: Well Pipe: 2" diameter black steel Well Screen: 2" diameter, 5' length, #6 slot, stainless steel Sand Pack: Special coarse blend Ottawa sand Stratigraphy 0-29.0' from BH43-85.					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000815A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW44-86 (DEEP BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 27, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID, 13" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 579.93

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
			579.93 577.2				
0	Brown TOPSOIL - some vegetation (FILL)	Moist					
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist	13" Ø BH				
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist					
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist	6" Ø SC				
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Wet					
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft waste material, piece of wood (FILL)	Moist					
10	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist					
	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist					
	Augered through to 13.0'						
	Dark gray silty CLAY with vegetation (NATIVE)	Moist					
	Dark gray silty fine SAND with vegetation	Moist					
	Dark gray SILT - some fine sand	Wet					
15	Gray clayey SILT - vegetation throughout	Moist-wet					
	Gray fine sandy SILT - vegetation throughout	Moist-wet	CEM/BEN BKFL				
	Gray silty fine SAND - occasional pebble, vegetation throughout	Moist					
20	Gray fine SAND - trace silt, trace vegetation	Wet					
	Gray medium to coarse SAND & GRAVEL - trace silt	Wet					
	Gray SAND - trace silt	Wet	4"Ø SC				
25	Gray fine SAND & SILT	Wet					
	Gray medium SAND - some shells	Wet					
30	Brown clayey SILT - trace fine gravel (TILL)	Wet					
	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW44-86

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 27, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 579.93

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
35	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet	CEM/BEN BKFL; 13" Ø BH				
40	Gray-brown silty CLAY - trace fine sand, trace small pebbles	Wet	6" Ø SC				
	Gray medium to fine SAND	Moist					
	Gray silty, sandy CLAY	Moist					
	Gray SILT, fine to medium SAND & STONE	Moist-wet	4" Ø SC				
	Gray GRAVEL & medium SAND	Wet					
	Gray fine to medium SAND & GRAVEL	Wet	44.0' 44.5'				
45							

NOTES:
Well Casing: 4" and 6" diameter black steel

Stratigraphy from BH43-85.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000816A

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW44-86

PROJECT NO.: 9-1431

DATE COMPLETED: OCTOBER 27, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: TOP OF EMBANKMENT, SOUTHWEST QUADRANT

CRA SUPERVISOR: C PADGINTON

DEPTH (ft BG)	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY (%)	RQD (%)	DRILLING WATER RETURN (%)	WATER PRESSURE TEST (cm/s)	ELEVATION (ft AMSL)	MONITOR INSTALLATION
								533.2	
		1	44.4	97		32		532.8	
45	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): dark gray & brown-gray, some banding, weathers light gray, very fine to fine grained, thick bedding, carbonaceous, occasional weathered zone, highly fractured, close to very close spacing, fracture surfaces weathered or with calcareous coatings, slightly pitted, fossiliferous								13" Ø BH 6" Ø SC
50									CEM/ BEN BKFL
55		2	53.7	113	6	0		523.5	
60	- becomes shaly, argillaceous shaly partings, calcite & gypsum coatings, close to very close spacing	3	59.4	93	68	43		517.8	5-3/4" Ø BH
65		4	67.2	102	75	0		510.0	
70	- weathered fractures - fine to medium grained inclined medium bedding								
75	- bituminous, saccharoidal stylolitic, thick to massive bedding, banded, fewer fractures, close to moderate spacing	5	74.4	97	97	03		502.8	4" Ø SC
80									
85	- secondary galena, fluorite in cavities, highly fossiliferous - less vugs & pitting at 87'	6	83.7	104	100	0		493.5	
90	- vugs & pitting return	7	89.4	102	100	100		487.8	
95									

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

recycled paper

ecology and environment

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: C344-86

PROJECT NO.: 9-1431

DATE COMPLETED: OCTOBER 27, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: TOP OF EMBANKMENT, SOUTHEAST QUADRANT

CRA SUPERVISOR: C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY	RQD	DRILLING RATE	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
	DOLOMITE (as above)								
		8	98.7	70	100	97		478.5	
100	- vugs, fossils decrease with depth								5-3/4" BH
		9	104.4	115	100	100		472.8	
105									
110									
		10	113.3	110	100	96		463.9	
115									
	- vertical fracture/joint, open, secondary calcite coatings (117'-122')	11	119.4	102	100	96		457.8	CEM/ BEN BKFL
120									
	- calcite filled voids								
125									
130	- calcite & sphalerite deposits 128.4'-140.0'								
		13	134.4	91	95	92		442.8	4" Ø SC
135	- occasional stromatolites								
140	- lower unit contact, sharp, conformable		140.0					437.2	
	DOLOMITE (LOCKPORT GROUP - ERAMOSA FORMATION): dark gray, fine grained, thin to medium bedding, saccharoidal, banded, bituminous, frequent shaley partings. occasional galena mineralization	14	142.7	108	100	94		434.5	
145									
		15	149.4	98	91	97		427.8	
150									

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000817A

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW44-86 PAGE 5 OF 6

PROJECT NO.: 9-1431

DATE COMPLETED: OCTOBER 27, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: TOP OF EMBANKMENT, SOUTHEAST QUADRANT

CRA SUPERVISOR: C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY	RQD	DRILLING WATER RETURN	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
- 150	DOLOMITE (as above)								
			152.1					425.1	5-3/4" Ø BH
	DOLOMITE (LOCKPORT GROUP - GOAT ISLAND FORMATION): dark gray, fine to medium grained, thin to medium bedded, saccharoidal, carbonaceous, shaly partings, fossiliferous, oolitic								
- 155		16	158.7	101	99	84		418.5	
- 160									
		17	163.7	97	86	96		413.5	
	- gradational contact								CEM/ BEN BKFL
- 165	DOLOMITE (LOCKPORT GROUP - GASPORT FORMATION): light to medium gray, fine to medium grained, medium to thick bedded		166.4					410.8	
			167.9					409.3	
- 170	LIMESTONE: medium gray, thin to medium bedding, aphanitic, some gypsum, biohermic								
		18	173.3 174.2	61	57	96		403.9 403.0	4" Ø SC
- 175	DOLOMITE: olive gray, fine grained to aphanitic, shaly partings & fractures, stylolites, gypsum seams, bioherm								
		19	179.4	144	100	82		397.8	
- 180									
- 185									
		20	186.9	100	85	88		390.3	
- 190									
			192.7					384.5	
	DOLOMITE: medium to dark gray to brown-gray medium to coarse grained, medium to thick bedding, some pitting, no evidence of fossils, banded - fossiliferous, gypsum replacement (198')								3" Ø NX
- 195		21	196.7	99	99	92		380.5	
- 200		22	201.7	100	100	87		375.5	

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW44-86

PROJECT NO.: 9-1431

DATE COMPLETED: OCTOBER 27, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: TOP OF EMBANKMENT, SOUTHEAST QUADRANT

CRA SUPERVISOR: C. PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY	RQD	DRILLING RATE	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
- 205	DOLOMITE (as above)								
- 210	- conformable, sharp contact	-	210.0					367.2	3" Ø NX
	DOLOMITE (CLINTON GROUP-DECEW FORMATION): medium to dark gray, thick to massive bedding fine to medium grained, few partings, trace fossils	23	211.7	60	100	87		365.5	
- 215		24	216.7	124	100	71		360.5	
- 220	- void with gypsum & sphalerite	25	221.7	91	79	90		355.5	
	- gradational contact	--	224.0					353.2	
- 225	SHALE (CLINTON GROUP - ROCHESTER FORMATION): black, fine grained, dolomitic, massive bedding, several fractured & weathered zones								
- 230			230.7					346.5	
- 235									

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000818A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW45-86 (SHALLOW BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: APRIL 1, 1986

HOLE TYPE: HOLLOW STEM AUGER (6-1/4" ID/11" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: ✡ 577.2 TOP OF PIPE ELEVATION: ✡ 579.10

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
			579.10 / 577.2				
0	Brown TOPSOIL - some vegetation (FILL)	Moist					
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist	11"Ø BH				
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist					
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist	5" Ø SC				
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Wet					
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft waste material, piece of wood (FILL)	Moist					
10	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist					
	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist					
	Augered through to 13.0'						
	Dark gray silty CLAY with vegetation (NATIVE)	Moist					
	Dark gray silty fine SAND with vegetation	Moist					
	Dark gray SILT - some fine sand	Wet					
15	Gray clayey SILT - vegetation throughout	Moist-wet					
	Gray fine sandy SILT - vegetation throughout	Moist-wet	CEM/BEN BKFL				
	Gray silty fine SAND - occasional pebble, vegetation throughout	Moist					
20	Gray fine SAND - trace silt, trace vegetation	Wet					
	Gray medium to coarse SAND & GRAVEL - trace silt	Wet					
	Gray SAND - trace silt	Wet					
25	Gray fine SAND & SILT	Wet					
30	Gray medium SAND - some shells	Wet					
	Brown clayey SILT - trace fine gravel (TILL)	Wet					
	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet					

✡ REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW45-86 Page 2. of 3

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 5, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR : D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 579.10

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
35	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet	11" Ø BH				
			5" Ø SC				
40	Gray-brown silty CLAY - trace fine sand, trace small pebbles	Wet	CEM/BEN BKFL				
	Gray medium to fine SAND	Moist					
	Gray silty, sandy CLAY	Moist					
	Gray SILT, fine to medium SAND & STONE	Moist-wet					
	Gray GRAVEL & medium SAND	Wet					
	Gray fine to medium SAND & GRAVEL	Wet					
45			45.0'				

NOTES:
Well Casing: 6" diameter black steel

Stratigraphy from BH43-85

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000819A

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: CS45-86 PAGE 3 OF 3

PROJECT NO.: 9-1431

DATE COMPLETED: APRIL 1, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" Ø NX CORE

LOCATION: TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. HILLARD/C. PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECORE RECOVERY	RQD	DRILLING RATE	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft ASL	
45		1	45.7	93	0	0		531.5	11" Ø BH; 5" Ø SC; CEM/BEN BKFL
50	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): brown-gray, medium grained, thinly bedded, numerous weathered partings, few shaly laminations, few vugs, occasional thin zones with weathered dolostone or stromatolite fragments	2	47.4	93	15.6	0		529.8	
		3	52.4	95	13.3	0		524.8	
55									3" Ø BH
		4	57.4	87.5	12.6	0		519.8	
60			60.9					516.3	
65									
70									

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000820

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW46-85 (SHALLOW BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 7, 1985

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: NORTHWEST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 575.6 TOP OF PIPE ELEVATION:* 578.89

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
			578.89				
0	Dark brown TOPSOIL - trace vegetation (FILL)	Moist	575.6				
	Brown SILT - some clay, some fine sand, gray stone in spoon tip (FILL)	Moist	13" Ø BH				
	Gray FLYASH/CINDER material - occasional stone (FILL)	Dry					
5	Gray-black CINDERS & FLYASH - occasional gravel, occasional fibrous material (FILL)	Dry					
	Black CINDER/FLYASH - some hardened tar, trace fibrous material (FILL)	Dry					
	Black CINDER/FLYASH - some fibrous material (FILL)	Dry-moist					
10	Black FLYASH - irridescent sheen on water (FILL)	Moist-wet	5" Ø SC				
	Black TOPSOIL - some silt, some vegetation (NATIVE)	Wet					
	Dark gray SILT - some clay, some fine sand, some clay, occasional vegetation	Moist					
	Gray fine SAND - some silt, occasional vegetation	Moist		1	SS	WOR	
						8	
	Gray SILT & fine SAND	Wet					
15				2	SS	8	
	Gray SILT & fine SAND - becoming black, occasional vegetation decreasing with depth	Wet	CEM/BEN BKFL			7	
				3	SS	3	
						7	
				4	SS	5	
20						5	
				5	SS	WOR	
	Red-brown CLAY - highly plastic, occasional gray silty lense	Wet				WOR	
				6	SS	WOR	
						WOR	
25				7	SS	WOR	
	Brown & red-brown CLAY	Wet				6	
				8	SS	WOR	
						35	
	Red-brown SILT, fine SAND & GRAVEL, trace clay (TILL)	Moist		9	SS	47	
30						87	
				10	SS	72	
						91	
				11	SS	40	

PENETRATION TEST BLOWS / FOOT: 20 40 60 80

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000820A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW46-85

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 7, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NORTHWEST CORNER OF SITE OF SITE

CRA SUPERVISOR : D. MILLARD GROUND ELEVATION:* 575.6 TOP OF PIPE ELEVATION:* 578.89

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
35	Red-brown & brown-gray SILT, fine SAND & GRAVEL - trace clay (TILL) Moist	36.2'	12	SS	44 41 100	
	Augered to 37.0'					
	Brown-gray silty SAND Wet					
	Augered to 37.6'					
	Gray angular GRAVEL (Dolomite) Wet	38.6'				
	Augered to 38.6'					

NOTES:
Well Casing: 5" diameter black steel

Stratigraphy 0-13.0' from OW31-85.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OM46-85 PAGE 3 OF 3

PROJECT NO.: 9-1431

DATE COMPLETED: APRIL 4, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" Ø NX CORE

LOCATION: NORTHWEST CORNER OF SITE

CRA SUPERVISOR: D. HILLARD/C. PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY	RQD	DRILLING RETURN	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
35									13" Ø BH; 5" Ø SC
		1	38.0	90	0	100		537.6	CEM/BEN BKFL
		2	39.2	100	48.5	100		536.4	
40	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): medium gray, thinly bedded, shaly laminations & partings, occasional calcereous shale pebbles								
45	- becomes brown-gray, fine to medium grained								3" Ø BH
		3	49.2	94.2	10.4	100		526.4	
50			53.2					522.4	
55									

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000821A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW47-85 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 14, 1985

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 575.4 TOP OF PIPE ELEVATION:* 578.14

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE NUMBER	TYPE	BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
			Locking cap 578.14				
0			575.4				
	Augered through		13" Ø BH				
			BS pipe				
	Dark gray CINDERS & FLYASH - wood chips brick fragments (FILL)	Moist-wet	CEM/BEN BKFL	1	SS	10	
5						8	
	Dark gray CINDERS & SLAG - some flyash, white brine sludge (FILL)	Wet		2	SS	17	
						9	
	Dark gray CINDERS, SAND & GRAVEL (FILL)	Wet		3	SS	5	
						50+	
10	Dark gray CINDERS - fibrous waste material (FILL)	Wet	10.0'	4	SS	5	
	Dark gray to black SILT - vegetation throughout (NATIVE)	Wet	BEN seal			10	
			12.0'	5	SS	6	
						10	
	Dark gray to black fine to medium SAND - some silt	Wet	SD pack	6	SS	7	
15						13	
				7	SS	8	
						14	
				8	SS	1	
						5	
20	Dark gray to black SILT & fine to medium SAND - trace vegetation	Moist		9	SS	6	
						17	
				10	SS	2	
						11	
				11	SS	15	
25	Gray fine to medium SAND - some silt, trace vegetation	Wet				18	
				12	SS	12	
						21	
	Gray medium SAND - some fine sand	Wet		13	SS	3	
						14	
30			SS screen	14	SS	15	
	Gray medium to coarse SAND & GRAVEL - trace silt, irridescent sheen on water, trace brown oily liquid, strong chemical odor (NAPL)	Wet				45	
				15	SS	43	
			33.0'			17	
	Red-brown CLAY	Wet					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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OCCIDENTAL CHEMICAL CORPORATION DATE C

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: SOUTHEAST C OF

CRA SUPERVISOR : D. MILLARD GROUND ELEVATION:* 575.4 TOP OF

PROFILE		MONITOR INSTALLATION
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS	
35	Red-brown CLAY Wet	SD pack 13" Ø BH 35.5'

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000822A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW48-86 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 12, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: NORTHEAST CORNER OF GRIFFON PARK

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 572.6 TOP OF PIPE ELEVATION:* 572.28

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Mottled brown SILT, trace clay, trace vegetation	Dry	Protective cover; Locking cap; 572.6; 572.28	1	SS	17	
	Black, brown & white FLYASH & CINDERS, some green glass, some slag, trace coal (FILL)	Dry	CEM/BEN BKFL			6	
	Brown, red-brown & black SILT & CINDERS, slag & flyash throughout, occasional stone, some glass, trace fine sand, wet at 3.8' (FILL)	Dry	BS pipe 3.0'; BEN seal 4.0'	2	SS	25	
						35	
				3	SS	6	
5	Black & dark gray CINDERS & FLYASH, occasional brown silt, some fine sand, some stone, trace glass (FILL)	Moist	13" Ø BH; SD PK			2	
				4	SS	1	
	Black FLYASH, some stone, piece red clay tile, trace irridescent sheen on water (FILL)	Wet	SS screen			3	
	Black FLYASH, trace stone, trace glass, trace irridescent sheen on water (FILL)	Wet		5	SS	5	
	Dark gray fine sandy SILT, trace vegetation (NATIVE)	Moist				13	
10	Mottled brown & gray-brown silty CLAY, plastic stiff	Moist	9.5'; 10.0'				

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW49-86 (FILL WELL)

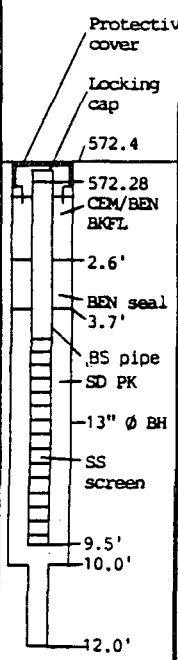
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 18, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: EAST CENTRAL AREA OF GRIFFON PARK

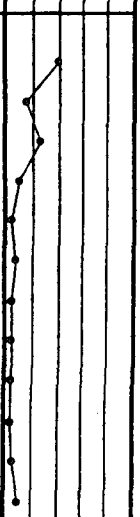
GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 572.4 TOP OF PIPE ELEVATION:* 572.28

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0	Brown SILT - some fine sand, some gray rock, red clay tile fragments, trace vegetation (FILL)	Dry	1	SS	39
					15
	Black, dark gray, brown, & white FLYASH & CINDERS - some glass, silt, wood fragments, piece of porcelain, rusty metal fragments, piece of concrete in tip (FILL)	Dry			24
			2	SS	10
	Red-brown, white, gray, & black FLYASH & CINDERS - some glass, occasional wood fragments occasional piece of rusted metal, moist at 4.0' (FILL)	Dry			4
5					7
	Black CINDERS & FLYASH - some glass & wood fragments, irridescent sheen on water, asphalt odor (FILL)	Wet	3	SS	4
					3
					3
	Dark gray SILT - fibrous roots & vegetation, rotting odor (NATIVE)	Wet	4	SS	4
10	Gray SILT - dark gray discoloration along some root channels, some fine sand, root fibers & occasional small stone	Wet			5
					11

MONITOR INSTALLATION



PENETRATION TEST BLOWS / FOOT



NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000823A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW50-86 (ALLUVIUM WELL)

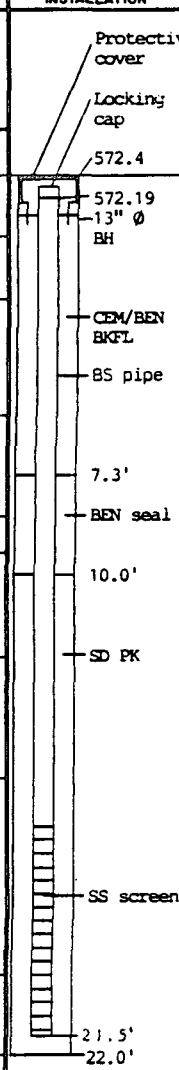
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 20, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: EAST CENTRAL AREA OF GRIFFON PARK

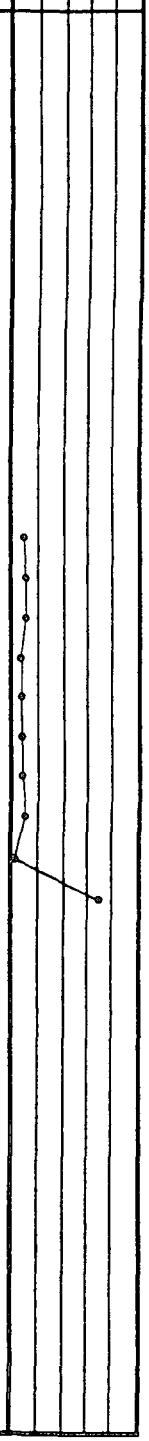
GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 572.4 TOP OF PIPE ELEVATION:* 572.19

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	TYPE	BLOWS / FOOT
0	Brown SILT - some fine sand, some gray rock, red clay tile fragments, trace vegetation (FILL)	Dry			
	Black, dark gray, brown, & white FLYASH & CINDERS - some glass, silt, wood fragments, piece of porcelain, rusty metal fragments, piece of concrete in tip (FILL)	Dry			
5	Red-brown, white, gray, & black FLYASH & CINDERS - some glass, occasional wood fragments occasional piece of rusted metal, moist at 4.0' (FILL)	Dry			
	Black CINDERS & FLYASH - some glass & wood fragments, irridescent sheen on water asphalt odor (FILL)	Wet			
	Dark gray SILT - fibrous roots & vegetation, rotting odor (NATIVE)	Wet			
10	Gray SILT - dark gray discoloration along some root channels, some fine sand, root fibers & occasional small stone	Wet			
	Dark gray SILT - root fibers throughout with slight yellow mottling along root fibers to 13.0', fine sand & silt occasional pebble	Wet	1	SS	10, 12, 12
15	Dark gray fine SAND & SILT - occasional darker gray lenses, occasional small pebble, trace root fibers, increasing sand with depth, irridescent sheen on water	Wet	2, 3	SS	4, 5, 5, 8, 12
20	Dark gray coarse SILT & fine SAND - some gravel at 21.0', trace red-brown silt & sand (TILL) at tip, alluvium/till contact at ± 21.5' based on increasing blow counts	Wet	4	SS	2, 70+

MONITOR INSTALLATION:



PENETRATION TEST BLOWS / FOOT (20 40 60 80)



NOTES:
- Sampled 20.0-22.0' interval twice; once with 2' spoon and once with 3' spoon.
- Stratigraphy 0-12.0' from OW49-86.
- Stainless steel tape weight was lost in the well installation during sand placement.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW51-86 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 20, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: SOUTHEAST SECTOR OF GRIFFON PARK

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 572.2 TOP OF PIPE ELEVATION:* 572.00

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Brown & red-brown SILT, some sand, some clay, some vegetation, occasional pebble, metal fragments, cinders (FILL)	Moist	Protective cover Locking cap 572.2 572.00 BS pipe CEM/BEN BKFL 2.7' BEN seal 3.7'	1	SS	16	
						11	
				2	SS	5	
	Red-brown SILT, cinders, some stone, piece of glass (FILL)	Wet				3	
	Gray, black & brown FLYASH, PAPER, & SILT, piece of tinfoil (FILL)	Wet		3	SS	WOR	
5			SD pack			4	
	Black PAPER, multilayered & very thin, piece of wood (FILL)	Dry	SS screen 13" Ø BH	4	SS	6	
						6	
	Black SILT, flyash, some wood, some paper, some glass fragments, trace irridescent sheen odor (asphalt) (FILL)	Wet		5	SS	3	
						4	
10	Dark brown sandy SILT, vegetation (NATIVE)	Moist	9.5' 10.0'				

NOTES:
- Augers became entangled in steel cable at 5.0', moved ahead 3.0'; resampled 2.0-4.0' interval.

Well Pipe: 2" diameter, black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW52-86 (ALLUVIUM WELL)

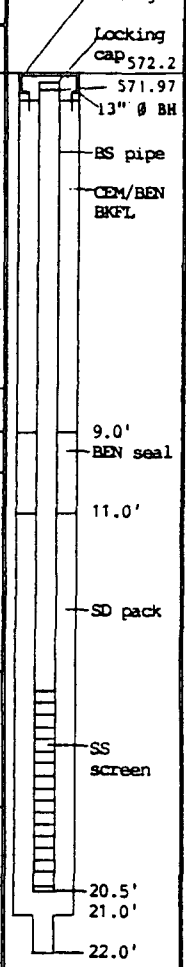
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 21, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: SOUTHEAST SECTOR OF GRIFFON PARK

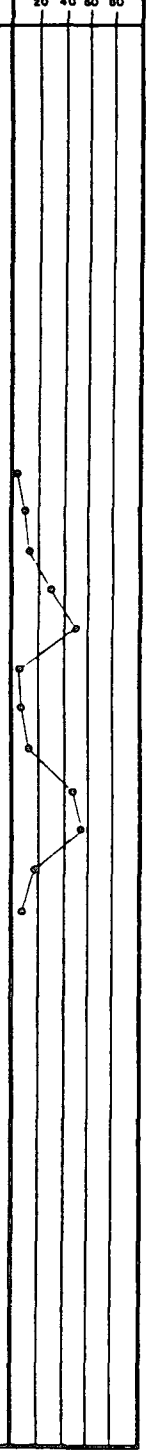
CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 572.2 TOP OF PIPE ELEVATION:* 571.97

PROFILE: DEPTH	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0	Brown & red-brown SILT, some sand, some clay, some vegetation, occasional pebble, metal fragments, cinders (FILL)	Moist			
	Red-brown SILT, cinders, some stone, piece of glass (FILL)	Wet			
5	Gray, black & brown FLYASH, PAPER & SILT, piece of tinfoil (FILL)	Wet			
	Black PAPER, multilayered & very thin, piece of glass, piece of wood (FILL)	Dry			
	Black SILT, flyash, some wood, some paper, some glass fragments, trace irridescent sheen odor (asphalt) (FILL)	Wet			
10	Dark brown sandy SILT, vegetation (NATIVE)	Moist	1	SS	3
	Dark brown SILT & fine sand increasing with depth, vegetation throughout, occasional small pebble, irridescent sheen on water	Wet			11
			2	SS	15
	Gray-brown medium-coarse SAND & silt, occasional root fiber, shell fragment	Wet			30
					47
15			3	SS	4
	Gray fine to medium SAND & silt, occasional pebble, occasional black coarse sand lense	Wet			6
			4	SS	12
					45
	Dark brown coarse SAND & gravel, some silt occasional shell fragment	Wet			55
20			5	SS	18
	Red-brown sandy SILT, occasional gravel (TILL)	Wet			7

MONITOR INSTALLATION



PENETRATION TEST BLOWS / FOOT



NOTES:
- Stratigraphy 0-10.0' from well OW51-86. Augered to 10.0' and began split spoon sampling.
- At ± 17.0' a steel pipe wrench was lost in the borehole, recovery attempts were unsuccessful.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW53-86 (BEDROCK WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 31, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: SOUTH SECTOR OF GRIFFON PARK

GEOLOGIST / ENGINEER: D MILLARD/D OSCAR GROUND ELEVATION:* 571.6 TOP OF PIPE ELEVATION:* 571.10

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS	SAMPLE NUMBER	TYPE	BLOWS / FOOT
0	Dark gray SILT - some sand, some vegetation (FILL) Moist	1	SS	39
	Orange & dark gray SILT & FLYASH - some slag (FILL) Moist			30
				16
	Dark gray & orange SILT & flyash, trace gravel (FILL) Moist-wet	2	SS	3
				4
5	Black & dark gray SILT, sand & gravel, some clay, cloth (FILL)	3	SS	17
				19
	Black & dark gray coarse SAND & GRAVEL, some silt, some concrete fragments, some paper (FILL) Wet			20
		4	SS	6
				5
10	Dark gray-brown SILT, some sand, trace vegetation, increasing sand with depth, trace gravel, occasional dropstone (NATIVE) Wet	5	SS	11
				12
				11
		6	SS	3
				6
15	Dark gray fine to medium SAND, some silt, some gravel, trace shell fragments Wet	7	SS	6
				8
				12
		8	SS	23
				5
20	Dark gray medium to coarse SAND & fine gravel, trace white shell fragments Wet	9	SS	8
				13
		10	SS	9
				20
		11	SS	39
25				64
				94
	Red-brown fine sandy SILT, some gravel trace clay, increasing gravel with depth (TILL) Moist	12	SS	30
	Large stone blocking spoon at 31.3', auger to 31.5', becoming dry at 31.5'			62
30		13	SS	100+
				100+
		14	SS	100+
				100+
		15	SS	100+

MONITOR INSTALLATION:
- Protective cover
- Locking cap 571.6
- 571.10
- 11" Ø BH
- 5" Ø SC
- CEM/BEN BKFL

PENETRATION TEST BLOWS / FOOT (20 40 60 80)

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW53-86 Page 2 of 3

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 31, 1986

HOLE TYPE: HOLLOW STEM AUGER (6¼"ID, 11"OD) LOCATION: SOUTH SECTOR OF GRIFFON PARK

CRA SUPERVISOR: D MILLARD/D OSCAR GROUND ELEVATION:* 571.6 TOP OF PIPE ELEVATION:* 571.10

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
35	Red-brown fine sandy SILT, some gravel, trace clay. Spoon refusals at 36.8', 38.3', 39.4', 40.8', & 41.3' — Dry	11" Ø BH 5" Ø SC CEM/BEN BKFL	16	SS	100+	
			17	SS	100+	
			18	SS	100+	
40	Red-brown fine sandy SILT & gravel, becoming gray rock fragments — Wet	40.9'	19	SS	100+	
		41.3'	20	SS	100+	
	Auger refusal - 41.3'					

NOTES:
Well Casing: 5" diameter black steel

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OH53-86

PROJECT NO.: 9-1431

DATE COMPLETED: APRIL 8, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIAMETER NX CORE

LOCATION: SOUTH SECTOR OF GRIFFON PARK

CRA SUPERVISOR: D OSCAR/C PADGINTON

DEPTH (ft BG)	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY (%)	RQD (%)	DRILLING RETURN (%)	WATER PRESSURE TEST (cm/s)	ELEVATION (ft ASL)	MONITOR INSTALLATION
40									13" Ø BH; 5" Ø SC
		1	41.3	100	0.76	0		530.3	CEM/BEN BKFL
45	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): brownish-gray, medium grained argillaceous, numerous shaly partings, very thin to medium bedding, few thin gypsum seams								3" Ø BH
50		2	50.0	100	0.46	0			
55			57.3					514.3	
60									

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

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000826A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW54-86 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 17, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: SOUTHWEST SECTOR OF GRIFFON PARK

CRA SUPERVISOR: D BLACK/D MILLARD GROUND ELEVATION:* 571.0 TOP OF PIPE ELEVATION:* 570.71

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Brown silty TOPSOIL, some vegetation, some pebbles (FILL)	Dry	Protective cover; Locking cap; 571.0; 570.71; 13" Ø BH	1	SS	15	
						14	
	Brown SILT, some slag, some orange coloring, some cinders, some wood, becoming wet (FILL)	Dry	CEM/BEN BKFL 3.0'; BEN seal 4.0'	2	SS	7	
						5	
				3	SS	3	
5	Black burned PAPER, some ashes, some silt (FILL)	Wet	BS pipe			3	
			SD pack	4	SS	18	
	Black CINDERS & silt, some pebbles, some wood (FILL)	Wet				6	
	Brown fine sandy SILT, some vegetation (NATIVE)	Wet	SS screen; 9.5'; 10.0'	5	SS	2	
						5	
10							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW55-86 (ALLUVIUM WELL)

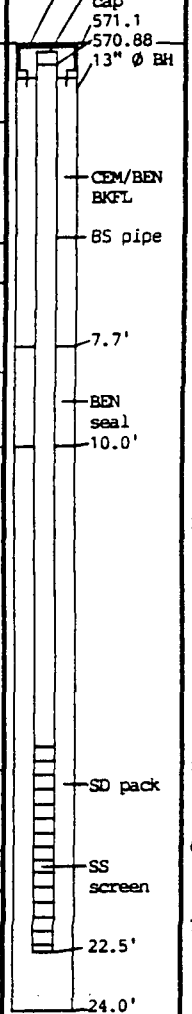
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 19, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: SOUTHWEST SECTOR OF GRIFFON PARK

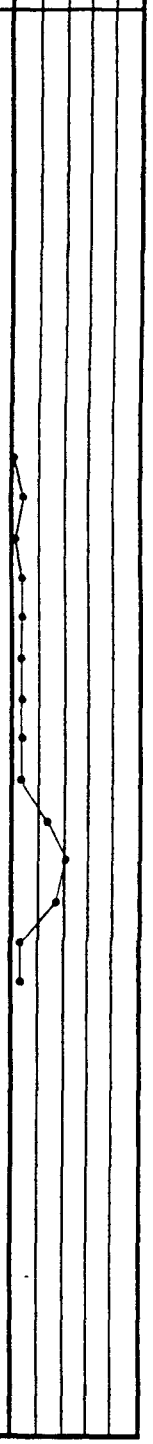
GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 571.1 TOP OF PIPE ELEVATION:* 570.88

DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE NUMBER	SAMPLE TYPE	BLOWS / FOOT
0	Brown silty TOPSOIL - some vegetation, some pebbles (FILL)	Dry			
	Brown SILT - some slag, some orange coloring, some cinders, some wood, becoming wet with depth (FILL)	Dry			
5	Black burned PAPER - some ashes, some silt (FILL)	Wet			
	Black CINDERS & SILT - some pebbles, some wood (FILL)	Wet			
	Brown fine sandy SILT - some vegetation (NATIVE)	Wet			
10	Dark gray SILT & fine SAND - occasional root fiber	Wet	1	SS	1, 9
			2	SS	2, 8
			3	SS	7, 6
15			4	SS	6, 6
			5	SS	6, 26
	Dark gray fine to medium SAND - some silt	Wet			
20	Dark gray coarse to medium SAND - some silt, occasional shell fragment, occasional pebble	Wet	6	SS	41, 36
	Light gray fine to medium SAND - some silt, some small pebbles, occasional shell fragment	Wet	7	SS	6, 6
	Dark gray fine to medium SAND & SILT	Wet			
	Red-brown SILT - some fine sand, trace pebbles, trace clay (TILL)	Wet			
25					

MONITOR INSTALLATION



PENETRATION TEST BLOWS / FOOT



NOTES:
- Stratigraphy 0-10.0' from well OW54-86.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW56-86 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 14, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: WEST SIDE GRIFFON PARK

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.0 TOP OF PIPE ELEVATION:* 572.65

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Brown & dark brown SILT & fine SAND, some vegetation, some glass, occasional stone some flyash, some cinders (FILL)	Dry	Protective casing; Locking cap; 573.0; 572.65; 13" Ø BH; CEM/BEN seal; 3.0'; BEN seal; 4.0'; BS pipe; SD pack; SS screen; 9.5'; 10.0'	1	SS	39	
	Brown & rust-brown CINDERS, flyash, fine sand & silt, increasing flyash & cinder at 2.6' (FILL)	Dry				26	
						28	
	Brown SILT, gray plastic, some glass, piece of net fabric, some stone (FILL)	Dry		2	SS	8	
						3	
5				3	SS	8	
	Piece of gray PLASTIC, some CINDERS, some flyash (FILL)	Wet				5	
						3	
	Black & dark gray FLYASH & cinders, some glass, some wood, some plastic, some blue paper (FILL)	Wet		4	SS	5	
						5	
10	Dark gray fine sandy SILT, occasional vegetation (NATIVE)	Moist		5	SS	1	

NOTES:
Stratigraphy from OW57-86.
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' long, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000828

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW57-86 (ALLUVIUM WELL)

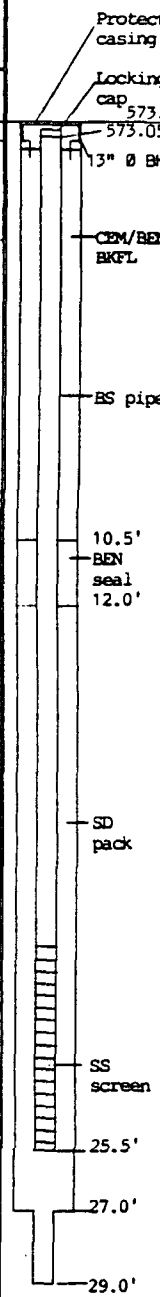
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 14, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: WEST SIDE GRIFFON PARK

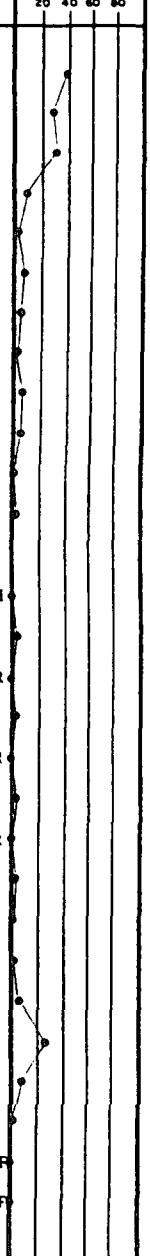
CRA SUPERVISOR: D MILLARD/C DUNNIGAN GROUND ELEVATION:* 573.1 TOP OF PIPE ELEVATION:* 573.05

DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE NUMBER	TYPE	BLOWS / FOOT
0	Brown & dark brown SILT & fine SAND, some vegetation, some glass, occasional stone	Dry	1	SS	39
	some flyash, some cinders (FILL)				26
	Brown & rust-brown CINDERS, flyash, fine sand & silt, increasing flyash & cinder at 2.6' (FILL)	Dry			28
	Brown SILT, gray plastic, some glass, piece of net fabric, some stone (FILL)	Dry	2	SS	8
					3
5			3	SS	8
	Piece of gray PLASTIC, some cinders, some flyash (FILL)	Wet			5
					3
	Black & dark gray FLYASH & CINDERS, some glass, some wood, some plastic, some blue paper (FILL)	Wet	4	SS	5
					5
10			5	SS	1
	Dark gray sandy SILT, increasing fine sand trace small pebbles, trace root fibers (NATIVE)	Wet			3
			6	SS	WOH
					3
15			7	SS	WOR
					3
			8	SS	WOR
					3
	Gray fine SAND & silt, trace vegetation	Wet	9	SS	WOR
20					3
			10	SS	1
					2
			11	SS	4
	Gray fine to medium SAND, some stone, occasional white shell	Wet			25
25			12	SS	8
	Gray coarse to medium SAND, some shell, occasional pebble	Wet			2
	Red-brown SILT, occasional pebble, trace fine sand (TILL)	Wet	13	SS	WOR
					WOR
30	NOTES: Well Pipe: 2" diameter black steel; Well Screen: 2" diameter stainless steel, #6 slot, 5' length; Sand Pack: Special coarse blend Ottawa sand				

MONITOR INSTALLATION



PENETRATION TEST BLOWS / FOOT



* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000828A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW58-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 5, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: SOUTH SIDE BUFFALO AVENUE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.7 TOP OF PIPE ELEVATION:* 573.56

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown SILT - some fine sand, trace red-brown clay, occasional vegetation, trace wood fragments (FILL)	Moist-dry	Protective cover; Locking cap; 573.7; 573.56; CEM/BEN	1	SS	9	
	Black & dark gray FLYASH - some slag, occasional red brick fragment, piece of glass (FILL)	Moist	BKFL; 2.0'; 2.5'	2	SS	14	
	White WASTE MATERIAL -chunky, loose (FILL)	Moist				18	
	Yellow-brown & red-brown layered SILT - slight mottling, some fine sand, occasional roots (NATIVE)	Moist	BEN seal; BS pipe	3	SS	25	
5	Mottled brown, red-brown & yellow CLAY - occasional thin silt lense	Moist	SD pack			8	
	Red-brown silty CLAY - occasional gray silty lense	Moist	SS screen	4	SS	24	
			13" Ø BH			23	
	Red-brown silty CLAY - occasional gray silty lense, occasional pebble, becoming more plastic with depth	Moist		5	SS	50	
10			9.5'; 10.0'			21	
						39	

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' long, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW59-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 7, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: NORTHWEST AREA OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.1 TOP OF PIPE ELEVATION:* 576.11

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
			576.11 Locking cap				
0	Dark brown silty TOPSOIL & VEGETATION - trace fine sand, occasional gravel (FILL)	Moist	573.1 CEM/BEN	1	SS	7	
	Gray-brown sandy SILT - trace clay, occasional gravel, trace vegetation, trace white waste material at tip (FILL)	Moist	BKFL BS pipe 1.9'			8	
	Light brown sandy SILT - trace clay, occasional vegetation (FILL)	Moist	BEN seal 3.0'	2	SS	6	
						21	
	White WASTE MATERIAL with black & yellow layers, silt size particles (FILL)	Moist	13" Ø BH	3	SS	7	
5						4	
	Black CINDERS & FLYASH -trace red brick fragments (FILL)	Wet	SD pack	4	SS	3	
	Dark brown CINDERS & black FLYASH -some fine sand & silt, some red brick fragments (FILL)	Wet	SS screen			2	
	Dark gray FLYASH, CINDER, SILT & fine to coarse SAND -trace brick fragment (FILL)	Moist	8.5'	5	SS	12	
	Slightly mottled brown & gray-brown silty CLAY, plastic (NATIVE)	Moist	9.0'			26	
10			10.0'				

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000829A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW60-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 5, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID, 13" OD) LOCATION: SOUTH SIDE BUFFALO AVENUE

CRA SUPERVISOR : D. MILLARD GROUND ELEVATION:* 573.4 TOP OF PIPE ELEVATION:* 573.18

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown SILT & CINDERS - some slag, occasional piece of glass & stone, trace root fibers (FILL)	Moist	Protective - cover; Locking cap; 573.4; 573.18; CEM/BEN BKFL	1	SS	7	
						6	
	Gray-brown SILT & STONE - some cinders, occasional wood fragment. (FILL)	Moist	2.0'; 2.5'; BEN seal	2	SS	17	
	Mottled gray & yellow-brown clayey SILT - layering, occasional vegetation (FILL)	Moist				22	
	Mottled brown & yellow-brown clayey SILT - occasional root fiber (NATIVE)	Moist	BS pipe	3	SS	6	
5	Brown & red-brown silty CLAY - occasional silty nodule	Moist	SD pack			26	
			13" Ø BH	4	SS	30	
						60	
	Red-brown CLAY, very stiff - some silt, moisture & plasticity increasing with depth	Moist	SS screen	5	SS	21	
						43	
10			9.5'; 10.0'				

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot,. stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW61-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 11, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID, 13" OD) LOCATION: NORTHEAST SECTOR OF LANDFILL

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.6 TOP OF PIPE ELEVATION:* 576.95

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown sandy SILT & VEGETATION - occasional pebble (FILL)	Dry-moist	576.95 Locking cap 573.6 13" Ø BH CEM/BEN BKFL	1	SS	13	
	White WASTE MATERIAL - silt size (FILL)	Dry				17	
	Red-brown fine SAND & SILT - occasional pebble & cinder (FILL)	Dry		2	SS	2	
	White WASTE MATERIAL - occasional black, yellow & brown color, trace silt, trace fine sand, occasional root fiber, becoming wet (FILL)	Moist-dry	2.5' BEN seal 3.5' BS pipe			2	
				3	SS	3	
5	Gray CINDERS & FLYASH - occasional red brick fragment (FILL)	Wet	SD pack			2	
	Dark gray CINDERS & FLYASH - trace white waste material (FILL)	Wet		4	SS	2	
	Gray-brown silty CLAY - trace root fibers, increasing plasticity with depth (NATIVE)	Dry-moist	SS screen			13	
				5	SS	14	
	Brown silty CLAY, plastic	Moist	9.5' 10.0'			38	
10							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

Well could not be installed in original borehole due to repeated bridging of sand in augers. Moved approximately 5' south, reaugered and installed well. Grouted original borehole.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW62-87

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MARCH 16, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: WEST SIDE OF LANDFILL

GEOLOGIST/ENGINEER: D. OSCAR GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE NUMBER	TYPE	BLOWS / FOOT
0	Gray fine to coarse GRAVEL - some sand, trace silt (FILL)	Wet	1	SS	9
	Black SILT - some fine sand, trace gravel, occasional sand & silt nodule (FILL)	Moist			12
	Mottled red-brown CLAY - some silt, trace fine sand, gravel, pebbles (FILL)	Moist-wet	2	SS	4
					7
	Black FLYASH - trace brick fragments, vegetation, gravel (FILL)	Dry	3	SS	8
5	Light brown WASTE MATERIAL - trace gravel ceramic fragments (FILL)	Moist			6
	Black FLYASH - trace gravel, stone fragment, brick fragment (FILL)	Moist	4	SS	1
	Black FLYASH - some vegetation, trace gravel, brick fragments, paper (FILL)	Wet			3
			5	SS	1
	Black & dark brown FLYASH - some stone fragments, trace vegetation, gravel (FILL)	Wet			10
10	Black FLYASH - trace gravel, brick fragments (FILL)	Wet	6	SS	1
					1
			7	SS	1
	Black VEGETATION - some wood, flyash, one stone fragment (FILL)	Wet			3
	Black FLYASH - trace sand, vegetation (FILL)	Wet	8	SS	2
15	Mottled gray & olive-gray fine SAND - some silt, trace vegetation (NATIVE)	Moist-wet			5
			9	SS	4
	No recovery				4
			10	SS	3
					2
20	Gray fine to medium SAND - some silt, trace vegetation, trace pebbles at 22.0'-24.0'	Wet	11	SS	1
					2
			12	SS	1
					25
	Gray fine to coarse SAND & fine to medium GRAVEL - some silt, trace shells & shell fragments, stone fragments, gravel is angular to rounded	Wet	13	SS	22
25					4
	Red-brown SILT - some clay, fine to medium subangular gravel, trace fine to medium sand increasing with depth	Wet	14	SS	2
					19
	Dark gray fine to medium SAND - some silt, trace gravel & shell fragments	Wet	15	SS	44
	Red-brown SILT - some fine to medium sand, stone fragments, trace clay, fine to medium gravel, stone & gravel ranges from angular to rounded at 30.0'-33.2', layer of stone fragments at 32.2'-32.3'	Wet			67
30			16	SS	29
					63
			18	SS	88
					100
	Spoon refusal - 33.2'; auger refusal - 33.3'				

MONITOR INSTALLATION: Locking cap; 13" Ø BH; BS pipe; CEM/BEN BKFL; 25.0' BEN seal; 27.1'; SS screen; SD pack; 33.3'

PENETRATION TEST BLOWS / FOOT: 20 40 60 80

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW62-87 Page 2 of 2

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MARCH 16, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: WEST SIDE OF LANDFILL

GEOLOGIST / ENGINEER: D. OSCAR GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	NOTES: Well Pipe: 2" diameter black steel Well Screen: 2" diameter stainless steel, #6 slot, 5' length Sand Pack: Special coarse blend Ottawa sand					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000831A

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW63-87

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MARCH 18, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: WEST SIDE OF LANDFILL

GEOLOGIST / ENGINEER: D. OSCAR GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Gray fine to coarse GRAVEL - some sand, trace silt (FILL)	Wet	Locking cap; 13" Ø BH				
	Black SILT - some fine sand, trace gravel, occasional sand & silt nodule (FILL)	Moist					
	Mottled red-brown CLAY - some silt, trace fine sand, gravel, pebbles (FILL)	Moist-wet	BS pipe				
	Black FLYASH - trace brick fragments, vegetation, gravel (FILL)	Dry	CEM/BEN BKFL 4.4'				
5	Light brown WASTE MATERIAL - trace gravel ceramic fragments (FILL)	Moist	BEN seal 5.8				
	Black FLYASH - trace gravel, stone fragment, brick fragment (FILL)	Moist					
	Black FLYASH - some vegetation, trace gravel, brick fragments, paper (FILL)	Wet	SD pack				
	Black & dark brown FLYASH - some stone fragments, trace vegetation, gravel (FILL)	Wet					
10	Black FLYASH - trace gravel, brick fragments (FILL)	Wet	SS screen				
	Black VEGETATION - some wood, flyash, one stone fragment (FILL)	Wet					
	Black FLYASH - trace sand, vegetation (FILL)	Wet	14.4'				
15			14.5'				

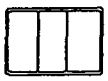
NOTES:
Stratigraphy from OW62-87

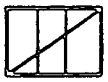
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

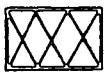
recycled paper
ecology and environment

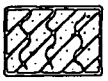
Key to Symbols

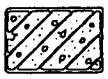

FILL

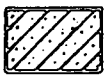

FILL, WITH RUBBLE

CHEMICAL WASTE FILL


SEWER BEDDING MATERIAL

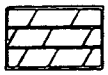

ALLUVIUM WITH VEGATIVE MATTER


ALLUVIUM - POORLY GRADED SAND AND GRAVELLY SAND


ALLUVIUM - SAND/SILT MIXTURES

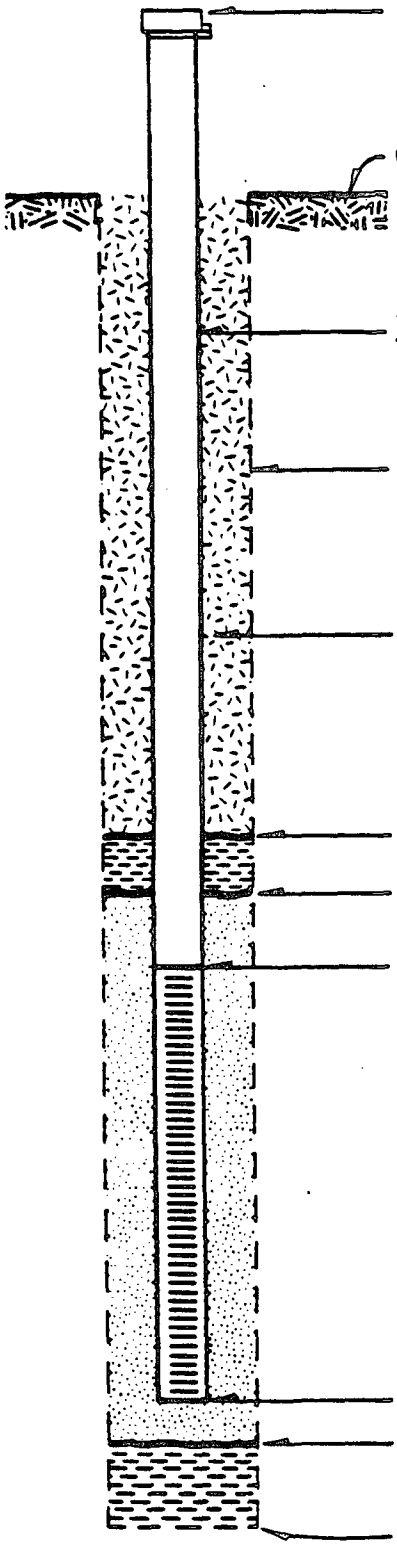
GLACIAL TILL

GLACIOLUCUSTRINE CLAY


LOCKPORT DOLOMITE

WATER ELEVATION AT TIME OF DRILLING

000832A



Elev. of top of well casing 579.09

Ground Elevation 576.24

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 573.0

Elev. of top of sand pack 571.0

Elev. of top of screen 569.0

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 564.0

Elev. of tip of sand pack 563.5

Type of backfill Bentonite

Elev. of bottom of borehole 562.2

REPORT OF MONITORING WELL NO. MW-1

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-1

DATE 11/8/85 SURFACE ELEVATION 576.24 LOCATION 102nd St. Landfill Niagara Falls,

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		16	Stiff, medium brown to medium red-brown SILTY CLAY with cinders, brick chips and subrounded gravel, moist, low plastic (CL CLAY CAP FILL)	573.74	
		10	Very stiff medium red brown SILTY CLAY with trace coarse sand and cinders, moist, medium to high plastic (CL Clay Cap Fill)	572.74	
5		53			
		80/3"			
		7	Dense, light gray to light gray-brown FLYASH, very fine grained with 1 mm laminations, dry (FILL) - becoming dark gray and moist at 9 feet to 10 feet - brick chips and gravel at 12 feet, becoming saturated		
10		10		▽564.9	
		12		563.74	
		2	Soft, olive brown SILTY CLAY with abundant vegative matter and trace fine sand, saturated, low plastic (CL ALLUVIUM)		
15					

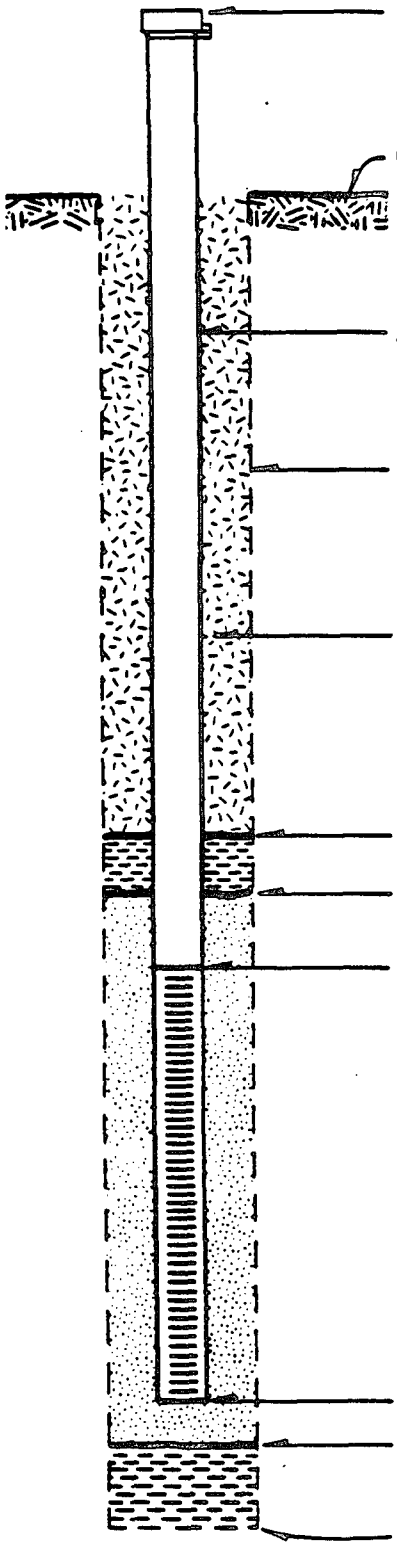
Completion Depth 562.24 Feet Water Depth 564.9 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

WCC-RP 2

000833A



Elev. of top of well casing 578.54

Ground Elevation 575.81

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 572.8

Elev. of top of sand pack 571.8

Elev. of top of screen 571.1
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 566.1

Elev. of tip of sand pack 565.6

Type of backfill Bentonite

Elev. of bottom of borehole 563.0

REPORT OF MONITORING WELL NO. MW-2

000834

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-2

DATE 8-19-86 SURFACE ELEVATION 575.81 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0			Stiff medium yellow brown SILTY CLAY with trace fine sand, brick chips, cinders, slightly moist, low plastic (CL CLAY CAP FILL)	574.81
		11		
		67	Very stiff becoming firm dark grey to black fine sandy SILTY CLAY containing chemical waste, brick chips and wood, low plastic, wet to saturated (Fill)	571.81
5		9		▽ 569.81
		13	Firm, dark gray to black very fine grained FLY ASH with medium to coarse sand and fine gravel, wood fragments, metal drum shrap, and fiberous material, wet becoming saturated. Samples have oily sheen (Fill)	
10		25		565.41
		13	- At 8 feet to 10 feet becoming very black, oily sludge with abundant metal shrap	
			Stiff light to medium mottled olive gray to olive brown SANDY SILT with trace clay, wet to saturated, low plastic (SM ALLUVIUM)	
15				

Completion Depth 563.81 Feet Water Depth 569.81 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

WCC-RP 2

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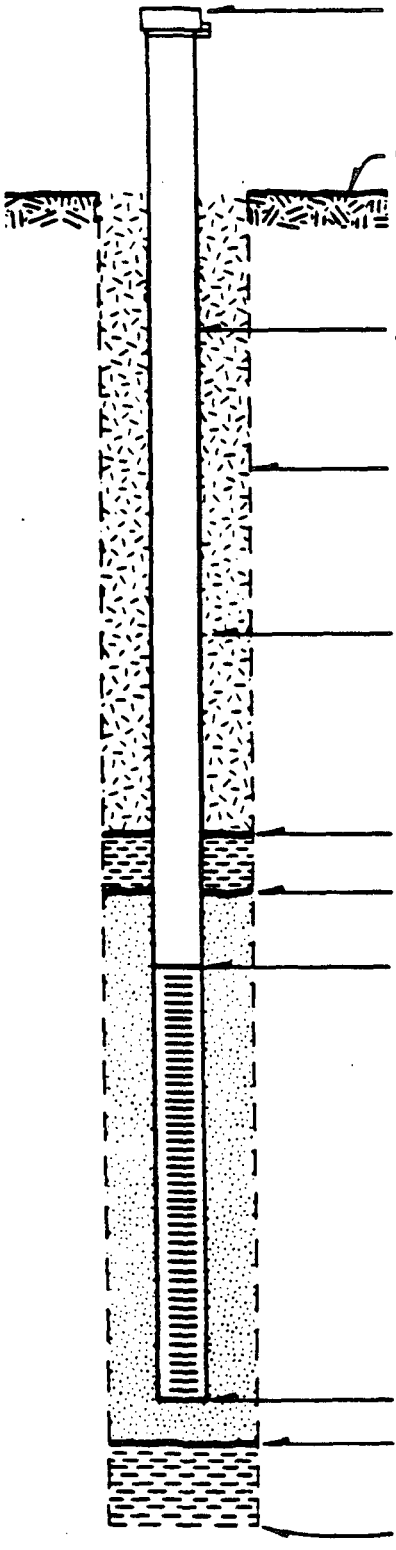

Elev. of top of well casing 579.49

Ground Elevation 576.07

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 565.1

Elev. of top of sand pack 561.6

Elev. of top of screen 558.6
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 553.6

Elev. of tip of sand pack 553.1

Type of backfill Bentonite

Elev. of bottom of borehole 552.1

REPORT OF MONITORING WELL NO. MW-3

000835

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-3

DATE 12/16/85 SURFACE ELEVATION 576.07 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0		20	Stiff, dark red-brown SILTY CLAY with brick chips, moist, low to medium plastic (CL CLAY CAP FILL)	574
		14	Firm to stiff, dark red-brown to dark brown SILTY CLAY with abundant 1 to 2 cm angular rock clasts, wood and plactic, Brick chips and cement fragments, moist, low plastic (CL DEMOLITION DEBRIS FILL)	
5		7		
		6		567.8
		10	Firm dark gray to black SLAG (chemical waste), moist nonplastic (FILL)	▽566.0
10		71	Hard, dark gray to black very fine grained FLY AND with brick, rock and wood fragments, dry, nonplastic(FILL)	563.5
		3	Firm, medium gray-brown to medium gray, fine SILTY SAND with trace clay, wet, low plastic, abundant vegative matter in upper 2 feet (SM ALLUVIUM)	
15		13		
		9		
		4		556.0
20		39	Medium dense, dark gray fine to coarse SAND with rounded fine gravel, saturated (SP/SW ALLUVIUM)	555.2
		4	Firm to stiff, salmon, SANDY SILTY CLAY with 1 mm to 2 mm angular to sub-angular gravel, saturated, low to medium plastic (CL, GLACIAL TILL)	
25		4		

STRATIGRAPHIC LOG

Completion Depth 549.5 Feet Water Depth 566.0 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

WCC-RP 2

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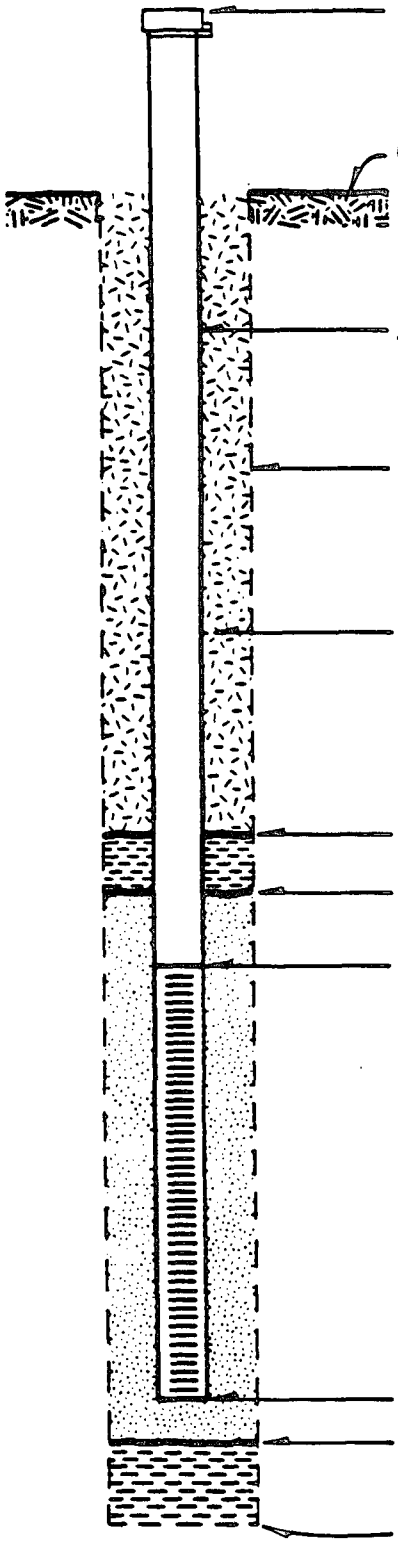

Elev. of top of well casing 578.30

Ground Elevation 575.19

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 572.2

Elev. of top of sand pack 571.2

Elev. of top of screen 570.2
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 565.2

Elev. of tip of sand pack 564.7

Type of backfill Bentonite

Elev. of bottom of borehole 560.7

REPORT OF MONITORING WELL NO. MW-4

000836

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-4

DATE 12-17-85 SURFACE ELEVATION 575.19 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0	37	Hard, dark gray CLAYEY SILT with fly ash intermixed and rock fragments, moist, low plastic (CL CLAY CAP FILL)	571.9	
	90			
5	5	Firm, dark gray to black CLAYEY SILT with fly ash, rounded pebbles, concrete fragments, brick fragments, moist, low plastic, oily sheen (FILL)	▽568.2	
	12	Soft, black oily SLUDGE with concrete and paper fragments, wet, strong odor (FILL)		
10	1		564.2	
	6	Firm, brown to red brown organic SILTY CLAY with trace fine sand, wet, low plastic (CL/OL ALLUVIUM)		
	3			
15				

Completion Depth 561.20 Feet Water Depth 568.2 Feet ATO Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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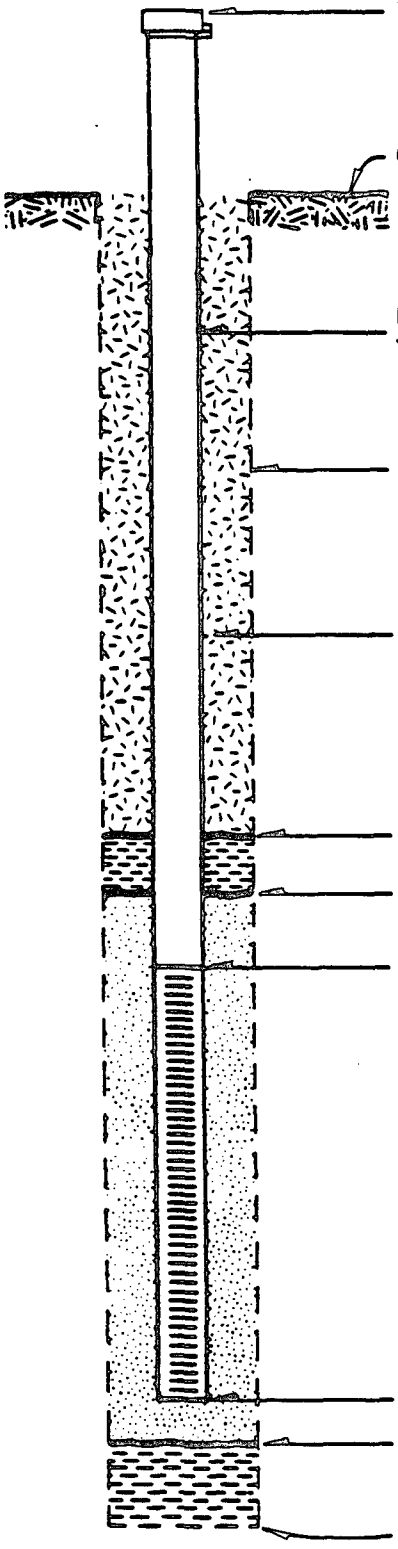

Elev. of top of well casing 578.89

Ground Elevation 575.92

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 568.1

Elev. of top of sand pack 566.1

Elev. of top of screen 564.9
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 562.9

Elev. of tip of sand pack 562.4

Type of backfill Bentonite

Elev. of bottom of borehole 561.4

REPORT OF MONITORING WELL NO. MW-5

000837

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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ecology and environment

LOG of BORING No. MW-5

DATE 12-19-86 SURFACE ELEVATION 575.92 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0		22	Hard, red brown to orange, sandy SILTY CLAY with brick, coal and rock fragments, moist, low plastic (CL CLAY CAP FILL)	573.4
		11	Firm, dark gray to black fine grained FLY ASH with coal brick fragments and cinders intermixed with black sludge, moist, nonplastic (FILL)	
5		10		569.9
		42	Hard, dark gray very fine grained FLY ASH with brick, coal and cinder fragments, dry (FILL)	
		37		565.9 ▽
10		17	Wood fragments, clay tile fragments, brick chips and gravel (SEWER BEDDING MATERIAL)	564.91
		4	Soft, black SILTY SAND with vegative matter, wet, low plastic, NAPL present in upper 1 to 1.5 feet (SM ALLUVIUM)	
15				

Completion Depth 561.9 Feet Water Depth 565.9 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

WCC-RP 2

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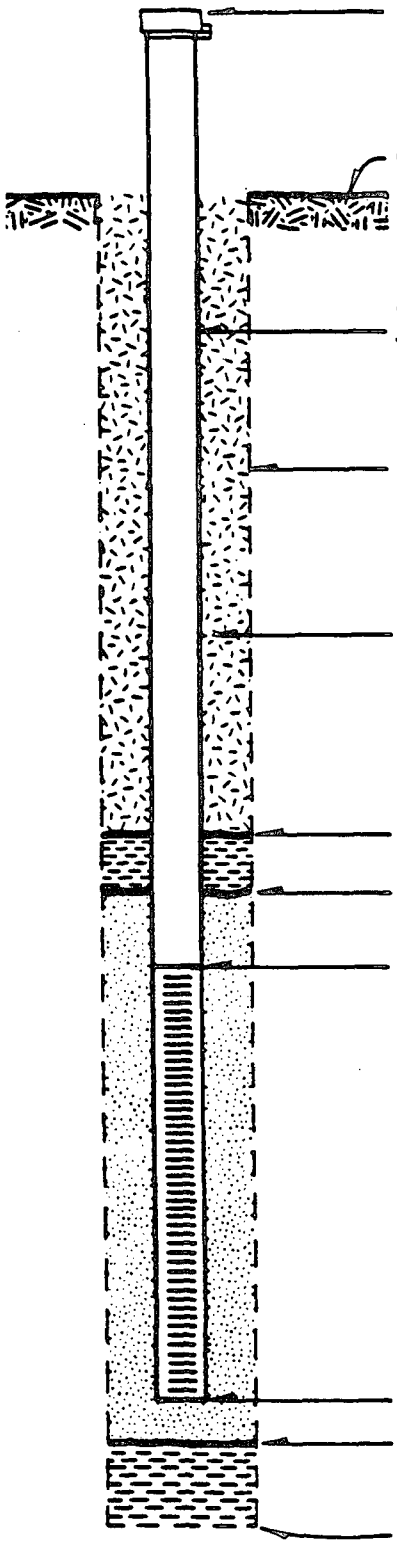

Elev. of top of well casing 578.06

Ground Elevation 574.91

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 568.9

Elev. of top of sand pack 566.9

Elev. of top of screen 564.9
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 562.9

Elev. of tip of sand pack 562.4

Type of backfill Bentonite

Elev. of bottom of borehole 561.9

REPORT OF MONITORING WELL NO. MW-6

000838

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-6

DATE 1-7-86 SURFACE ELEVATION 574.91 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0	18	Stiff, medium red brown to medium brown SILTY CLAY with trace coarse sand, moist, low plastic (CL CLAY CAP FILL)	572.5	
	18	Stiff, medium brown SILTY CLAY with trace medium to coarse sand and root debris, moist, low plastic(CL Fill)	570.4	
5	15	Firm to stiff, dark gray with red brown mottling SILTY CLAY with fly ash, rock fragments, cement fragments and abundment demolition rubble, moist, low plastic (CL LEVY FILL WITH RUBBLE)		
	65/3"		565.1	
10	30	2 inches fine to coarse sand over whole brick (SEWER BEDDING)	564.4	
15		Firm to stiff, dark gray to blue gray SILTY CLAY with trace fine sand, abundant vegative matter, moist to wet, low plastic (CL/OH ALLUVIUM)		

Completion Depth 562.9 Feet Water Depth NONE Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP 2

Woodward-Clyde Consultants

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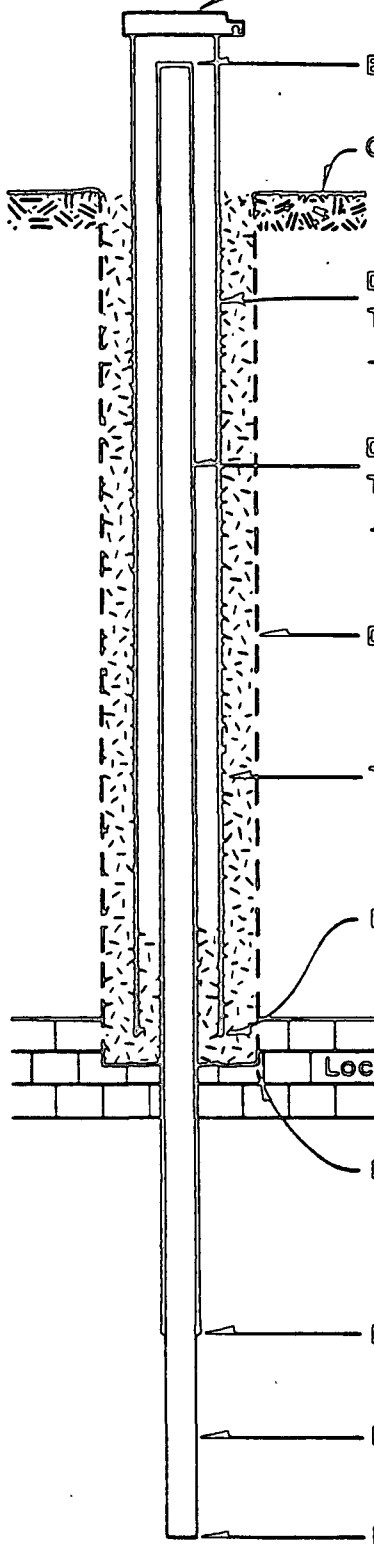

Elev. of top of outer casing	579.14
Elev. of top of inner casing	N/A
Ground Elevation	576.30
Diameter of outer casing	0.42 ft.
Type of outer casing	Steel pipe
Diameter of inner casing	N/A
Type of inner casing	N/A
Diameter of borehole	0.8 ft.
Type of backfill	Cement/Bentonite Grout
Elev. of bottom of outer casing	535.54
Elev. of top of rock	535.80
Elev. of bottom of borehole	534.80
Elev. of bottom of inner casing	N/A
NX Core	
Elev. of bottom of corehole	520.20

REPORT OF MONITORING WELL NO. MW-7

000839

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-7

DATE 1-13-86 SURFACE ELEVATION 576.30 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0		Clean crushed limestone GRAVEL (DRILLING PLATFORM BERM FILL) - Augers advanced to 4 feet without sampling	572.3
5	27	Firm to stiff, medium red brown SILTY CLAY with demolition debris and large riprap rock intermixed, moist, low plastic (LEVY FILL)	
	11		
10	60/3"	- split spoon refusal from 9.5 feet to 13 feet due to large debris	▽ 563.3
15	13	Soft to firm, dark gray to olive gray very fine SANDY SILTY, wet, low plastic, abundant vegative matter in upper portions (SM ALLUVIUM)	
	12		
20	3		554.8
	9	Loose, dark gray fine SAND and fine to medium, well rounded gravel with trace silt, wet (SP ALLUVIUM)	553.8
25	9	Firm, red brown to salmon, sandy SALTY CLAY with 1 to 5 cm. sub angular gravel, wet, low plastic (CL GLACIAL TILL)	
	10		
30	19	Becoming firm to stiff at 29 feet.	
	48	Becoming hard at 32 feet.	
35	137		
	56		
40	53		535.8
		Lockport Dolomite	

Completion Depth 535.8 Feet Water Depth 563.3 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

000839A

WCC-RP 2

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FIELD ROCK DESCRIPTION LOG

Sheet 1 of 3

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB Olin 102nd St. NO. 84C2136-5	BORING NUMBER MW-7
At 564.85 Ft. after 18 hrs.	DRILLING RIG CME 55 w/10'NX Barrel	BORING OFFSET N/A
At _____ Ft. after _____ hrs.	OPERATOR Darryl Altrogge	SURFACE ELEVATION 576.30
At _____ Ft. after _____ hrs.	INSPECTOR R. Karr	DATE START 4-16-86 FINISH 4-16-86

DEPTH BELOW SURFACE	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
								39.6'	Airspace in casing			
40	39.6/ 44.6		43%		96%		NX 13 min./ft.	41.4'	Grout at casing bottom	N/A		
42							7 min./ft.	42.9'	Dolomite, medium gray to dark gray brown, slight weathering in first 18 inches, thin to very thin bedding, numerous solution vugs, gypsum crystals in vugs, very fine crystalline structure	8	—	
43							17 min./ft.		Becoming light to olive-gray, fewer fractures, solution vugs and gypsum crystals absent, bedding thin, non-weathered	2.6	—	
44												
45	44.6/ 54.6		59.5%		98%		17 min./ft.		Medium gray, thin bedded, non-weathered, fracture surfaces are oxidized, a very fine crystalline texture, gypsum lining some fractures.	5	—	
45												

GENERAL NOTES:

Fracture and bedding dip is near horizontal or very slight

Total Depth _____

"ROCK" Drilling _____

000840

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

ecology and environment

HOLE NO.

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FIELD ROCK DESCRIPTION LOG

Sheet 2 of 3

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB Olin 102nd St. NO. 84C2136	BORING NUMBER MW-7
At _____ Ft. after _____ hrs.	DRILLING RIG CME 55 w/NX 10'	BORING OFFSET N/A
At _____ Ft. after _____ hrs.	OPERATOR Darryl Altrogge	SURFACE ELEVATION 576.30
At _____ Ft. after _____ hrs.	INSPECTOR R. Karr	DATE START 4/16/86 FINISH 4/16/

DEPTH BELOW SURFACE	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BFD C
							NX					
46										5	—	
47										—		
									Some very small solution pits or vugs at fracture boundaries	1	—	
48										—		
										4	—	
49										—		
										1	—	
50										—		
										3	—	
51									Massive, with -Solution pits and vugs throughout	—		
										5	—	
52												

GENERAL NOTES:

Total Depth _____

'ROCK' Drilling _____

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

000840A

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

Sheet 3 of 3

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB Olin 102nd St. NO. 84C2136	BORING NUMBER MW-7
At _____ Ft. after _____ hrs.	DRILLING RIG CME 55W/10' NX	BORING OFFSET N/A
At _____ Ft. after _____ hrs.	OPERATOR Darryl Attrogge	SURFACE ELEVATION 576.30
At _____ Ft. after _____ hrs.	INSPECTOR R. Karr	DATE START 4/16/86 FINISH 4/16

DEPTH BELOW SURFACE	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
52							NX			4		
53										2		
54										5		
55	54.6/ 56.1		39%		120%		NX			7		
56									Bottom of core at 56.1 feet	3		

GENERAL NOTES:

Total Depth _____

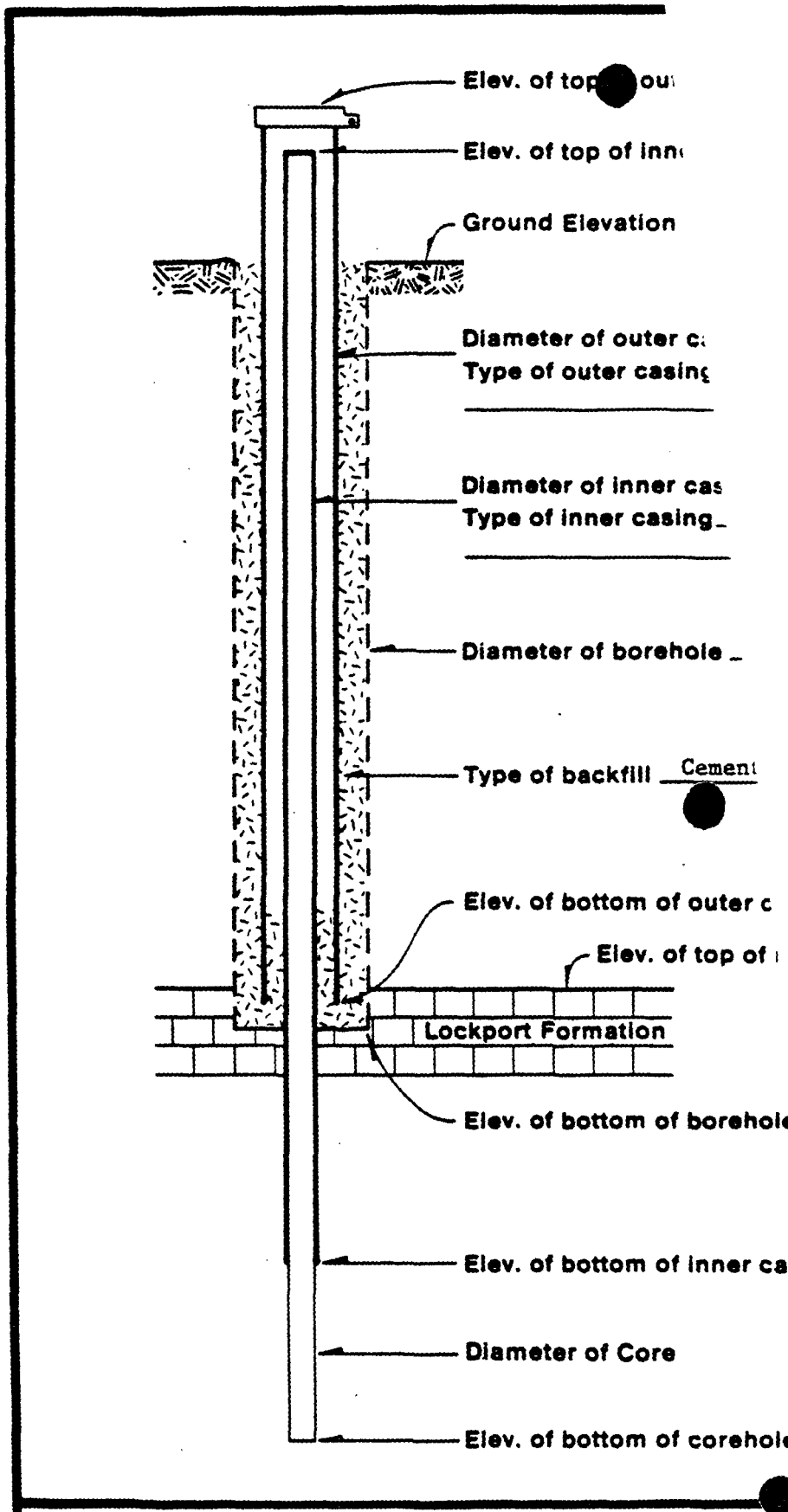
"ROCK" Drilling _____

000841

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

ecology and environment

HOLE NO.



REPORT OF MONITORING WELL

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10

LOG of BORING No. MW-8

DATE 1/20/86 SURFACE ELEVATION 576.5 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0			Clean crushed limestone GRAVEL (DRILLING PLATFORM BERM FILL)	572.3	
5, 10			Firm to stiff, medium red-brown SILTY CLAY with demolition debris and large riprap rock intermixed, moist, low plastic (LEVY FILL)	▽ 563.3	
15, 20			Soft to firm, dark gray to olive gray very fine SANDY SILT, wet, low plastic, abundant vegative matter in upper postions (SM ALLUVIUM)	554.8	
			Loose, dark gray fine SAND and fine to medium well rounded gravel with trace silt, wet (SP ALLUVIUM)	553.8	
25, 30, 35			Firm, red-brown to salmon, sandy SILTY CLAY with 1 to 5cm subangular gravel, wet, low plastic (CL GLACIAL TILL) -Becoming firm to stiff at 29 feet -Becoming hard at 32 feet		
40			Lockport Dolomite	536.0	

000842

Completion Depth 535.0 Feet Water Depth 563.3 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

recycled paper

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	DI
40												
41	Run 1 40.5' - 49.2' Interval A		5.6'/8.7' = 64%		8.7'/8.7' = 100%		4 3/4"		Light to medium gray, medium to fine grained, thin to thick bedded uniform Dolomite with some gypsum healed fractures and occasional stylolites	4		
42										3		
43										4		
44									Oak Orchard	9		
45										2	15°	
46										1		
47										1		
48										6		
49	Run 2 49.2' - 55.5' Interval A		2.2"/6.3" = 35%		5.2'/6.3' = 83%					6		
50										5		
51										1		
52												

GENERAL NOTES:

Bedding dip horizonital unless otherwise noted

000842A

Total Depth _____

"ROCK" Drilling _____

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

Sheet 3 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 83C2136	BORING NUMBER MW 8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel-PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
52							4 3/4"		Oak Orchard	1		
53										5		
54										3		
55										4		
56	Run 3 55.5' - 61.5' Interval B		31.5" / 72" = 44%		5.6' / 6.0" = 93%					6		
57										6		
58										6		
59										3		
60										2		
61										3		
62	Run 4 61.5' - 70.5' Interval B		48" / 108" = 44%		9.6' / 9.0' = 107%					4		15°
63										4		
64												15°

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

"ROCK" Drilling _____

000843

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

ecology and environment

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW 8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel-PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
							4 3/4"					
64									Light to medium gray, fine to medium grained, thinly bedded stromatolitic Dolomite with gypsum and carbonaceous partings Oak Orchard	5		15°
65										3		15°
66										8		15°
67										5		15°
68									Light gray, medium grained, thinly bedded uniform Dolomite with minor stromatolites Oak Orchard	1		
69										5		
70										3		
71	Run 5 70.5'		102"/102" = 100%		8.5'/8.5' = 100%				Dark gray to black, coarse grained massive bedded, uniform Dolomite with stylolites and gypsum filled fractures. Locally some areas of stromatolites Oak Orchard	1		45°
72	- 79.0'									1		
73	Interval C									1		
74										2		15°
75										0		
76												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

'ROCK' Drilling _____

000843A

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

Sheet 5 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW 8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel-PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/21

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
76							4 3/4"			0		
77										0		
78										1		
79	Run 6								Oak Orchard	2		15°
80	79.0' - 82.2'		36"/38.4" = 94%		3.2'/3.2' = 100%					1		15°
81	Interval C									2		30°
82												
83	Run 7									1		
84	82.2' - 85.5'		31.2"/39.6" = 79%		3.3'/3.3' = 100%					4		
85	Interval C									2		
86	Run 8									2		
87	85.5' - 93.8'		99.6"/99.6" = 100%		8.6'/8.3' = 104%				Medium gray fine to medium grained, massively bedded, porous Dolomite with stylolites and calcite crystals in vugs	0		
88	Interval D									0		

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

"ROCK" Drilling _____

000844

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

ecology and environment

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel-PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DI
88									Oak Orchard	1		
89									Dark gray, medium grained, massive bedded stylolitic Dolomite	0		
90										0		
91									Oak Orchard	0		
92									Dark gray to brown, medium to coarse grained porous Dolomite with Favosites, gypsum, sphalarite and stylolites	1		
93										1		
94	Run 9 93.8' - 100.5' Interval D		78" / 80.4" = 97%		6.5' / 6.7' = 97%				Oak Orchard	0		
95										0		
96										1		
97									Dark gray to black, medium to coarse grained, thick to massive bedded uniform Dolomite with stylolites, calcite healed vertical fractures and pinhole porosity	0		
98										0		
99									Oak Orchard	1		
100												

GENERAL NOTES:

Bedding dip horitzontal unless otherwise noted

000844A

Total Depth _____

'ROCK' Drilling _____

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

Sheet 7 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 83C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel-PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
100					-					1		
101	Run 10 100.5'		84" / 102" =		8.3' / 8.5' =					0		
102	- 108.8'		82%		98%					1		
103	Interval E									5		
104									Light gray, coarse grained, thinly bedded uniform Dolomite	3		
105									Oak Orchard			
106									Medium gray and brown, medium to coarse grained, thick to massive bedded Dolomite with locally abundant stromatolites, carconaceous partings, stylolites, calcite and occasional vugs	3 / 0		
107										1		
108									Oak Orchard	0		
109	Run 11 108.8'		80.4" / 80.9" =		6.9' / 6.7' =					0		
110	- 115.5'		100%		103%					1		
111	Interval E									0		
112												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

'ROCK' Drilling _____

000845

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

ecology and environment

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

Sheet 8 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
112										1		
113										1		
114										3		20°
115										1		
116	Run 12 115.5' - 124.0' Interval F		99.6" / 102" = 98%		8.5' / 8.5' = 100%				Medium gray and white, medium to coarse grained, massive bedded fossiliferous Dolomite with calcite	0		
117										1		
118									Oak Orchard	0		
119										1		
120										1		
121										0		
122										0		
123										0		
124												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

'ROCK' Drilling _____

000845A

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 86C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
124												
	Run 13 124.0'- 130.5' Interval F		70.8" / 78" =91%		6.5' / 6.5' =100%					1		
125									Medium grey, medium to coarse grained, thin to thick wavy bedded, gypsum Dolomite with stylolites, calcite and sphalerite	0		
126										1		
127										1		
128									Oak Orchard	1		
129										4		
130										0		
131	Run 14 130.5'- 139.0' Interval G		112" / 102" =89%		8.3' / 8.5' =98%					2		
132										2		
133										2		
134										3		
135										1		
136												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

'ROCK' Drilling _____

000846

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

recycled paper

ecology and environment

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LO

Sheet 10 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DI
136										2		
137										2		15°
138										0		
139									Medium grey, medium grained. medium to thick bedded mottled Dolomite with stylolites Oak Orchard	1		
140	Run 1 139.0'-145.5' Interval G		72.5" / 78.0" =93%		7.0' / 6.5' =108%					1		
141									Medium to light grey, medium grained medium bedded, sparsely Crynoidal Dolomite with stromatoliteo and carbonaceous seams Eramosa	3		
142										1		
143										2		
144										3		15 45
145										1		
146	Run 16 145.5'-154.0' Interval H		99.2" / 102" =98%		7.9 / 8.5 =93%					0		
147										0		
148												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted.

000846A

Total Depth ____

'ROCK' Drilling ____

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

GROUND WATER OBSERVATION	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. at Completion	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20
At _____ Ft. after _____ hrs.		

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
148										2		
149										1		
150										1		
151										0		
152										0		
153										1		
154	Run 17 154.0'-150.5' Interval H		84" / 78" =108%		7.0' / 6.5' =108%				Light to medium grey, medium grained, thick to massive bedded gypsum and cherty Dolomite with stylolites	1		
155										1		
156									Goat Island	0		
157										2		
158										1		
159										1		
160												

GENERAL NOTES:
Bedding dip horizontal unless other wise noted

Total Depth _____
"ROCK" Drilling _____

000845

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

recycled paper

ecology and environment

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

Sheet 12 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DI
160												
161	Run 18 160.5'-169.0' Interval I		98.4" / 102"	=96%	8.5' / 8.5'	=100%				1		
162										2		
										4		
163												
										3		
164												
										1		
165												
										1		
166									Light brown. medium brown. thick bedded porous Dolomite with	0		
167										1		
168									Goat Island			
										1		
169												
	Run 19 169.0'-173.3' Interval I		42" / 51.6"	=81%	4.3' / 9.3"	=100%				0		
170												
									Black, medium to fine grained medium bedded fossile ferous cherty Dolomite	3		
171												
										3		
172									Gasport			

GENERAL NOTES:
Bedding dip horizontal unless otherwise noted

000847A

Total Depth _____
'ROCK' Drilling ____

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
172										2		
173												
174	Run 20 173.3'-175.5'		28.8"/26.4" =109%		2.4'/2.2 =109%					2		
175	Interval I									2		
176	Run 21 175.5'-184.0'		96"/102" =94%		8.3/8.5 =92%		NX			0		
177	Interval J								Medium grey, medium grained, medium to thick bedded uniform Dolomite with carbonaceous partings	2		
178										1		
179									Gasport	2		
180										1		
181										0		
182										1		
183										1		
184										0		

GENERAL NOTES:
Bedding dip horizontal unless otherwise noted.

Total Depth _____
'ROCK' Drilling _____

000843

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

ecology and environment

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
184												
	Run 22 184.0'- 190.5' Interval J		79.2" / 78" =102%		6.8' / 6.5' =105%				Medium grey and white, medium grained, thick to massive bedded fossiliferous Dolomite with stylolites	1		
185										2		
186									Gasport			
										1		
187												
										1		
188												
										2		
189												
										0		
190												
										1		
191	Run 23 190.5'- 199.0' Interval K		94.8" / 102" =93%		7.9' / 8.5' =93%					0		
192												
										0		
193												
										0		
194												
										0		
195												
										0		
196												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted.

Total Depth _____

"ROCK" Drilling _____

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LOG

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 84C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET _____
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
196									Gasport	0		
197										1		
198										1		
199	Run 24 199.0'-205.5' Interval K		64.8" / 78" =83%		5.4' / 6.5' =83%					0		
200										0		
201										1		
202										0		
203										0		
204										1		
205										0		
206	Run 25 205.5'-214.5' Interval L		118.8" / 108" =110%		9.9 / 9.0 =110%					0		
207										0		
208												

GENERAL NOTES:

Lost care in run #24 (204.35 to 205.5)
recovered in run #25

Total Depth _____
"ROCK" Drilling _____

000843

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

ecology and environment

HOLE NO.

At ____ Ft. at Completion
At ____ Ft. after ____ hrs.
At ____ Ft. after ____ hrs.
At ____ Ft. after ____ hrs.

JOB 102nd Street
DRILLING RIG Acker AD2
OPERATOR Russell [redacted]del
INSPECTOR Tim Giles

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICAT WEATHERING, SEAMS
208									
209									
210									Medium grey, medium to massive bedded uniform l
211									
212									DECEW
213									
214									
215	Run 26 214.5'- 220.5'	85.8" / 72" =119%	7.15 / 6.0 =119%						
216	Interval L								
217									
218									
219									
220									

GENERAL NOTES:
Bedding dip horizontal unless otherwise noted

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

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FIELD ROCK DESCRIPTION LOG

Sheet 17 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 86C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
							NX					
220									Black, fine grained, thinly bedded dolomite shale			
221	Run 27 220.5'- 229.0'		72" / 102" =70%		6.5 / 8.5 =76%					4		
										4		
222	Interval M								Rochester Shale			
223										2		
										3		
224												
										1		
225												
										2		
226												
										2		
227												
										1		
228												
229												
230									Bottom of Boring at 229.0			
231												
232												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

'ROCK' Drilling _____

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Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

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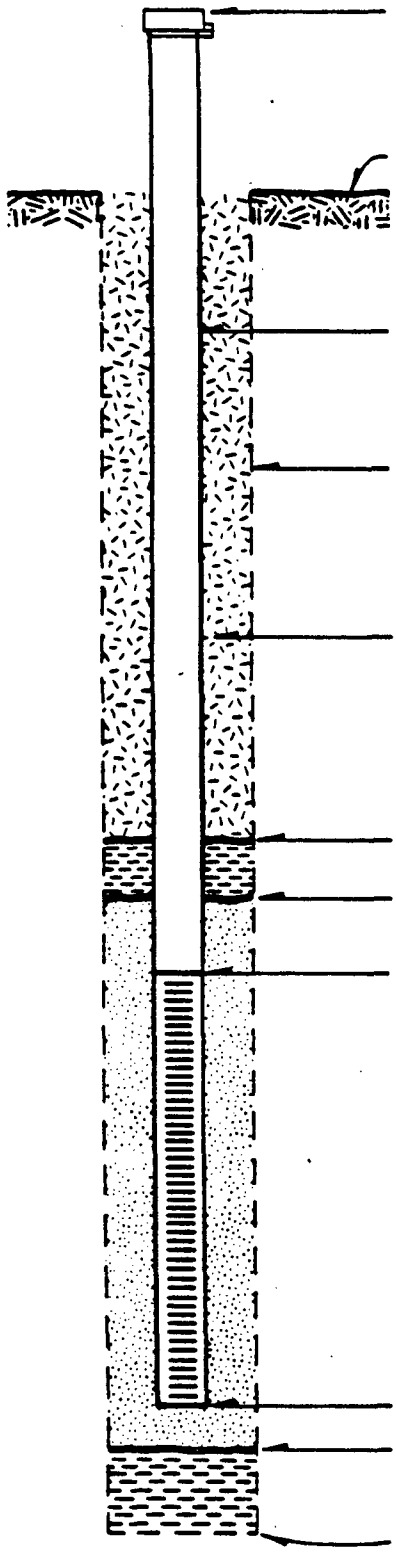
HOLE NO.



Elev. of top of well casing 577.43

Ground Elevation 574.34

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 567.8

Elev. of top of sand pack 564.9

Elev. of top of screen 559.8

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 554.8

Elev. of tip of sand pack 554.3

Type of backfill Bentonite

Elev. of bottom of borehole 551.3

REPORT OF MONITORING WELL NO. MW-9

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-9

DATE 1/22/86 SURFACE ELEVATION 574.3 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0			Firm to Stiff, medium red-brown SILTY CLAY with some angular gravel and abundant root debris, moist, low plastic (CL CLAY CAP FILL)	573.3
		55		
5		6	Firm, dark gray SANDY GRAVELLY SILT with wood, coal and brick fragments, moist, low plastic (DEMOLITION FILL)	▽569.8
		2	Soft, black, silty SLUDGE, saturated, nonplastic, with brick, tar paper fragments and NAPL (FILL)	565.7
10		7		
		17	Firm, dark gray to medium olive-gray SILTY SAND with trace clay and organic debris in upper 1 to 2 feet, wet, low plastic (SM ALLUVIUM)	
15		3		
		5		
20		6		554.8
			Medium dense medium to dark gray, fine to coarse SAND with subangular fine gravel, wet (SP ALLUVIUM)	553.8
		18		
25			Stiff, medium red-brown SILTY CLAY with some fine to coarse sand and fine subangular gravel, wet, medium plastic (CL GLACIAL TILL)	

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Completion Depth 551.3 Feet Water Depth 569.8 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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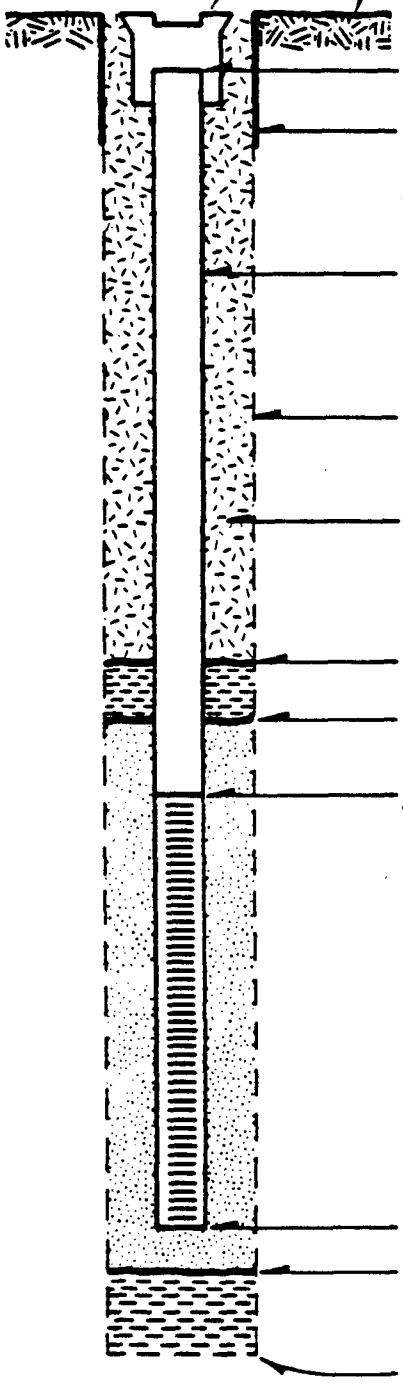

JV type water tight cover

Ground Elevation 574.95

Elev. of top of well casing 574.52

I.D. of protective casing 1.0 ft.

Type of protective casing Steel pipe

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 569.0

Elev. of top of sand pack 567.0

Elev. of top of screen 565.0

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 563.0

Elev. of tip of sand pack 562.5

Type of backfill Bentonite

Elev. of bottom of borehole 561.5

REPORT OF MONITORING WELL NO. MW-10

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-10

Niagara Falls

DATE 1/14/86 SURFACE ELEVATION 575 LOCATION New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
		Clean crushed limestone GRAVEL (DRIVEWAY FILL)	574	
	31	Hard, dark red brown fine sandy SILTY CLAY with abundant fine to medium gravel and brick chips, moist, low plastic (DRIVEWAY FILL)	573.5	
	17	Stiff, medium yellow brown with orange and light gray mottling, fine sandy SILTY CLAY, moist becoming saturated, low plastic (CL ALLUVIUM)	▽570 567.5	
		Very stiff, red brown with white and yellow brown mottling, SILTY CLAY, varved, moist, high plastic (CL/CH GLACIOLACUSTRINE CLAY)		

Completion Depth 567 Feet Water Depth 570 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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LOG of BORING No. MW-10A

DATE 1/14/86 SURFACE ELEVATION 575 LOCATION Niagara Falls, New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0			Clean crushed limestone GRAVEL (DRIVEWAY FILL)	573	
			Hard, dark red brown sandy SILTY CLAY with abundant rock fragments and brick chips, moist, low plastic (CL DRIVEWAY FILL)	572.5	
5		41			
		14	Stiff, medium yellow brown with gray mottling, fine sandy SILTY CLAY with pockets of silty sand intermixed, moist, medium to high plastic (CL with SM SEWER BACK-FILL)		
10		18		▽ 563.5	
		20	Very stiff, medium red brown SILTY CLAY, varved, moist, medium to high plastic (CL/CH GLACIOLACUSTRINE CLAY)		
15		19			

Completion Depth 561.5 Feet Water Depth 563.5 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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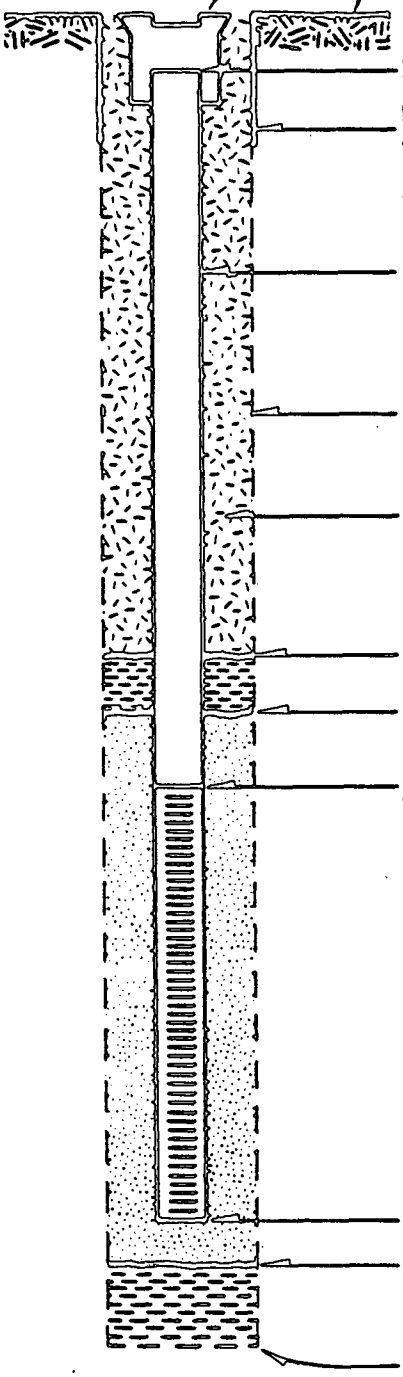

JV type water tight cover

Ground Elevation 574.69

Elev. of top of well casing 574.32

I.D. of protective casing 1.0 ft.

Type of protective casing Steel pipe

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 568.7

Elev. of top of sand pack 566.7

Elev. of top of screen 565.7

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 563.7

Elev. of tip of sand pack 563.2

Type of backfill Bentonite

Elev. of bottom of borehole 561.7

REPORT OF MONITORING WELL NO. MW-11

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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1/24/86 SURFACE ELEVATION 574.7 LOC

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION
0			Clean crushed limestone GRAVEL over geotextile WAY FILL)
		17	Red brown to black, CINDER with Fly ash intermi (FILL)
5		7	Firm, medium yellow brown with gray mottling, fi sandy SILTY CLAY, moist, low plastic, contaminat materials at base (CL SEWER BACKFILL)
		4	
10		9	
		13	Stiff, red brown with gray mottling, SILTY CLAY varved, moist, high plastic (CH GLACIOLACUSTRINE Cl
15			

Completion Depth 561.7 Feet Water Depth 567.7 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 8

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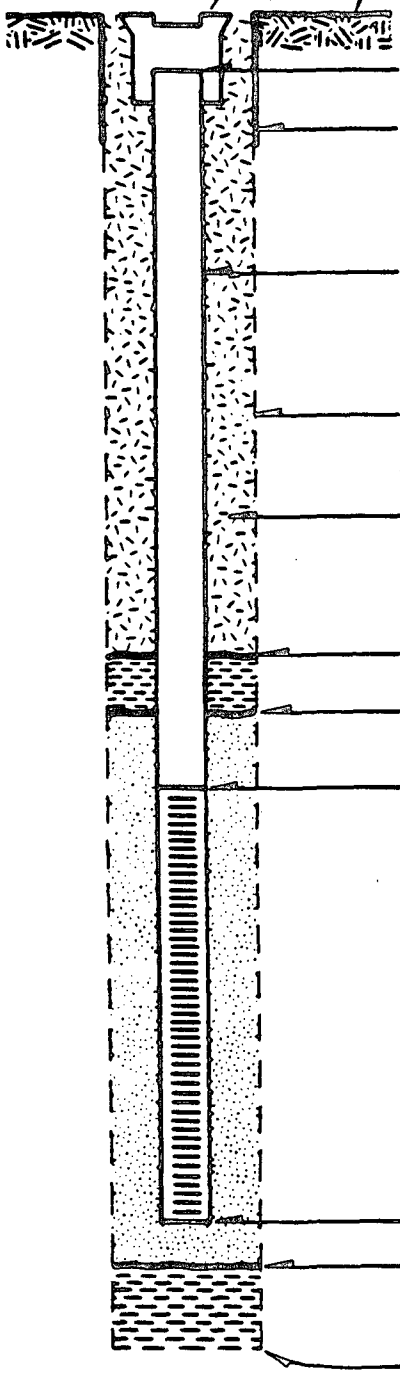

JV type water tight cover

Ground Elevation 574.24

Elev. of top of well casing 573.95

I.D. of protective casing 1.0 ft.

Type of protective casing Steel pipe

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 571.2

Elev. of top of sand pack 570.2

Elev. of top of screen 569.2

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 567.2

Elev. of tip of sand pack 566.7

Type of backfill Bentonite

Elev. of bottom of borehole 566.2

REPORT OF MONITORING WELL NO. MW-12

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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LOG of BORING No. MW-12

DATE 1-16-86 SURFACE ELEVATION 574.2 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		36	Stiff, medium red brown, SILTY CLAY with cinders asphalt fragments, sand, moist, low plastic (CL ROAD FILL)	573.2	
5		11	Firm, olive gray with gray brown mottling SILTY CLAY with charcoal and wood debris, moist, low plastic (CL ALLUVIUM)	▽ 570.2	
		46	Dense, medium gray becoming yellow brown, fine to coarse SILTY SAND with trace clay, wet, nonplastic (SM ALLUVIUM)	568.2	
10			Very stiff, medium red brown with grey mottling SILTY CLAY, varved, moist, high plastic, (CH GLACIOLACUSTRINE CLAY)		

Completion Depth 566.2 Feet Water Depth 570.2 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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Woodward-Clyde Consultants

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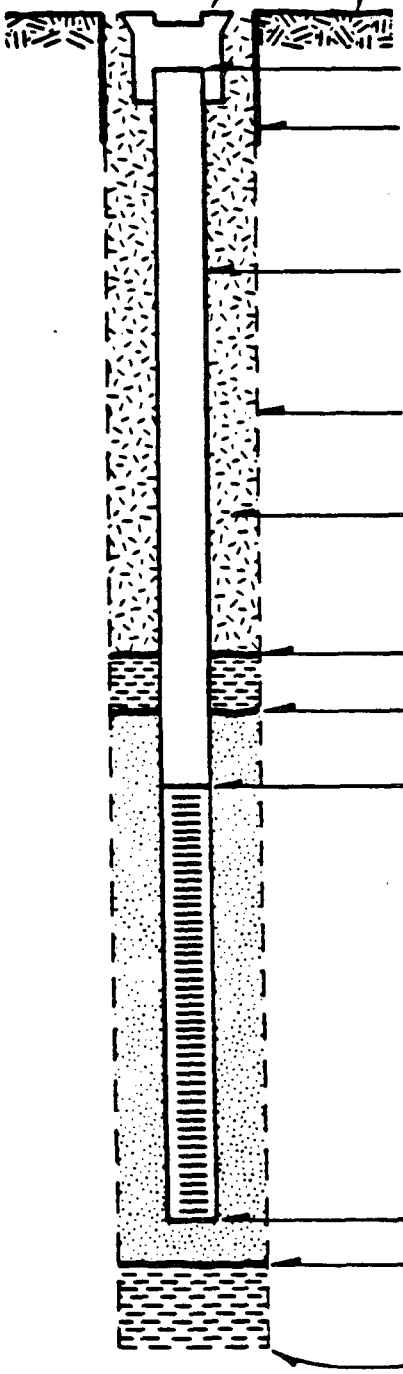

JV type water tight cover

Ground Elevation 572.50

Elev. of top of well casing 572.40

I.D. of protective casing N/A

Type of protective casing N/A

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 569.5

Elev. of top of sand pack 568.5

Elev. of top of screen 567.5

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.5 ft.

Elev. of tip of screen 565.0

Elev. of tip of sand pack 564.5

Type of backfill Bentonite

Elev. of bottom of borehole 564.0

REPORT OF MONITORING WELL NO. MW-13

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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LOG of BORING No. MW-13

DATE 4/11/86 SURFACE ELEVATION 572.5 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0			Soft, dark gray, sandy SILTY CLAY with vegative matter (CL CLAY CAP FILL)	572.0	
5			Firm to stiff, brown and dark gray SILTY CLAY with coarse gravel; wood, glass, rubber, roofing shingles fragments, and tar debris; low plastic, moist becoming wet and hard at 5 feet (DEMOLITION RUBBLE FILL)	▽ 567.5	
				564.5	
10			Firm, tan to gray, with brown mottling, fine very SILTY SAND, nonplastic wet		
15					
20					
25					
30					
35					

Completion Depth 564.0 Feet Water Depth 567.5 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

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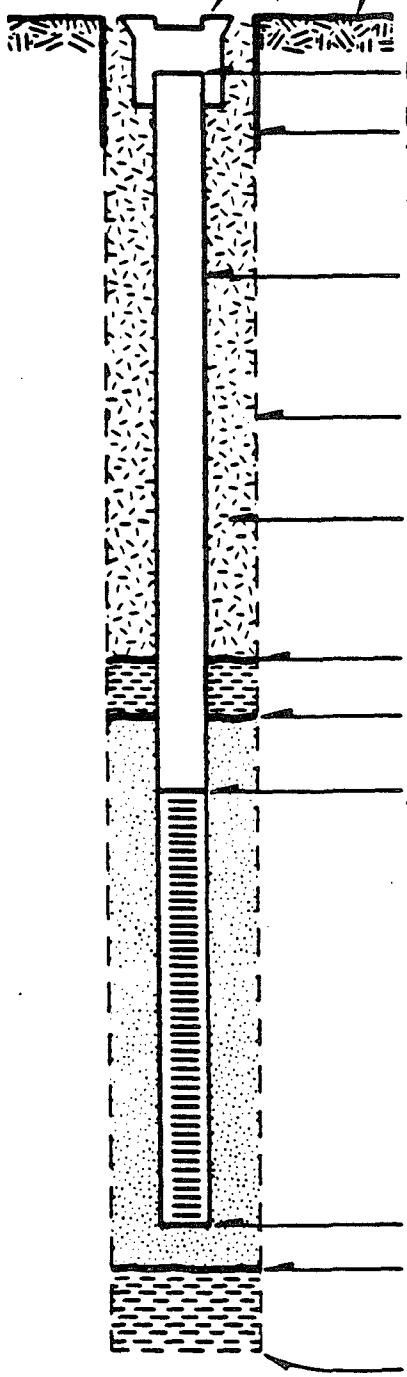

JV type water tight cover

Ground Elevation 572.53

Elev. of top of well casing 572.22

I.D. of protective casing N/A

Type of protective casing N/A

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 565.9

Elev. of top of sand pack 563.9

Elev. of top of screen 563.0

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 558.0

Elev. of tip of sand pack 557.5

Type of backfill Bentonite

Elev. of bottom of borehole 554.5

REPORT OF MONITORING WELL NO. MW-14

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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LOG of BORING No. MW-14

DATE 4-11-86 SURFACE ELEVATION 572.5' LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Soft, dark gray, sandy SILTY CLAY with vegative matter. (CL CLAY CAP FILL)	572.0	
	17	Firm to stiff, brown and dark gray SILTY CLAY with coarse gravel; wood, glass, rubber, roofing shingles fragments, and tar debris; low plastic, moist, becoming wet and hard at 5 feet. (DEMOLITION RUBBLE FILL)		
5	32		▽ 567.5	
	54		564.5	
10	6	Firm, tan to grey, with brown mottling, fine very SILTY SAND, nonplastic wet.		
	6	- vegative matter below 9.5 feet - becoming more silty with depth (SM, ALLUVIUM)		
15	3		557.3	
	10	Very stiff, medium red-brown, CLAY with small silty pockets, medium to high plastic, wet. (CH GLACIOLACUSTRINE CLAY)	555.3	
20		Firm to stiff, red-brown, SILTY SANDY CLAY with angular medium gravel, low plastic, wet. (SC/CL GLACIAL TILL)		
25				
30				
35				

Completion Depth 554.5 Feet Water Depth 567.5 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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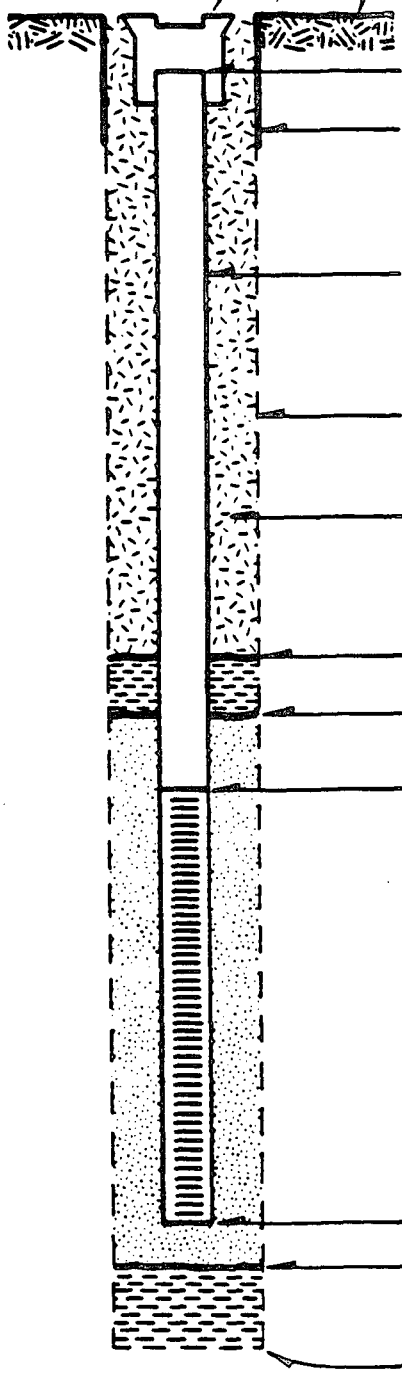

JV type water tight cover

Ground Elevation 569.87

Elev. of top of well casing 569.67

I.D. of protective casing N/A

Type of protective casing N/A

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 567.4

Elev. of top of sand pack 566.9

Elev. of top of screen 566.4

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.5 ft.

Elev. of tip of screen 563.9

Elev. of tip of sand pack 563.4

Type of backfill Bentonite

Elev. of bottom of borehole 562.9

REPORT OF MONITORING WELL NO. MW-15

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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LOG of BORING No. MW-15

DATE 4/10/86 SURFACE ELEVATION 569.90 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Soft, dark brown, sandy SILTY CLAY with vegative matter CL CLAY CAP FILL)	569.4	
		Stiff, medium-dark brown to gray SILTY CLAY with coarse gravel, wood fragments and vegative matter, low plastic, moist (CL FILL)		
5		-becoming sandy and wet at 4 feet	▽565.9	
			563.4	
		Firm, olive gray, fine SILTY SAND with trace coarse gravel and vegative matter, nonplastic, wet		
10				
15				
20				
25				
30				
35				

Completion Depth 562.9 Feet Water Depth 565.9 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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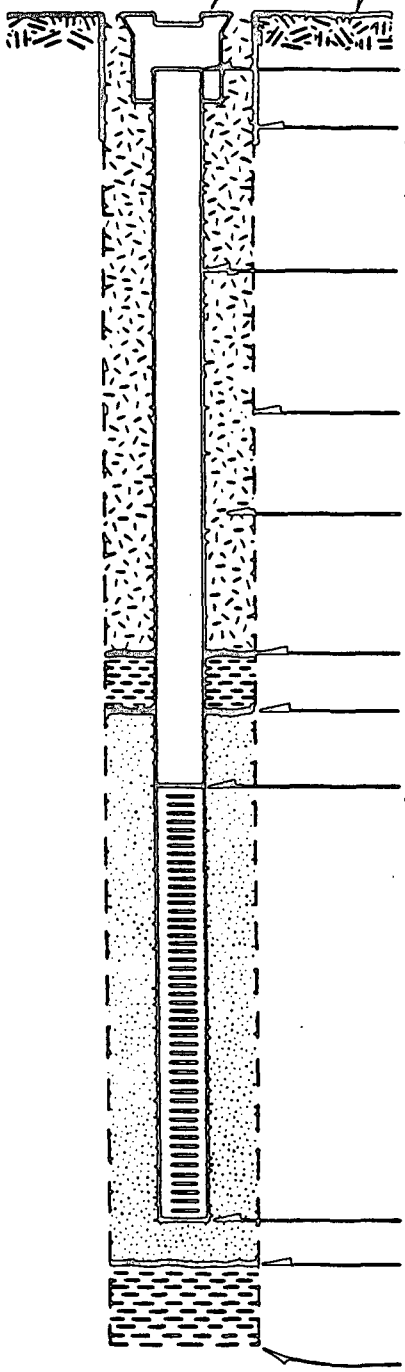

JV type water tight cover

Ground Elevation 569.90

Elev. of top of well casing 569.55

I.D. of protective casing N/A

Type of protective casing N/A

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 564.7

Elev. of top of sand pack 562.7

Elev. of top of screen 558.4

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 553.4

Elev. of tip of sand pack 552.9

Type of backfill Bentonite

Elev. of bottom of borehole 551.9

REPORT OF MONITORING WELL NO. MW-16

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-16

DATE 4/10/86 SURFACE ELEVATION 569.90 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		27	Soft, dark brown, sandy SILTY CLAY with vegative matter (CL CLAY CAP FILL)	569.4	
		10	Stiff, medium dark brown to gray SILTY CLAY with coarse gravel, wood fragments and vegative matter, low plastic, moist (CL FILL)	▽ 565.9	
5		8	-becoming sandy and wet at 4 feet	563.4	
		2	Firm, olive gray, fine SILTY SAND with trace coarse gravel and vegative matter, nonplastic, wet		
10		5	-becoming loose and more silty below 13 feet		
		2	-becoming fine to medium sand with subrounded gravel and shell fragments below 16 feet		
15		21		552.9	
			Stiff, red-brown, fine sandy SILTY CLAY with angular gravel, medium plastic, wet (CL GLACIAL TILL)		
20					
25					
30					
35					

Completion Depth 571.7 Feet Water Depth 565.9 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

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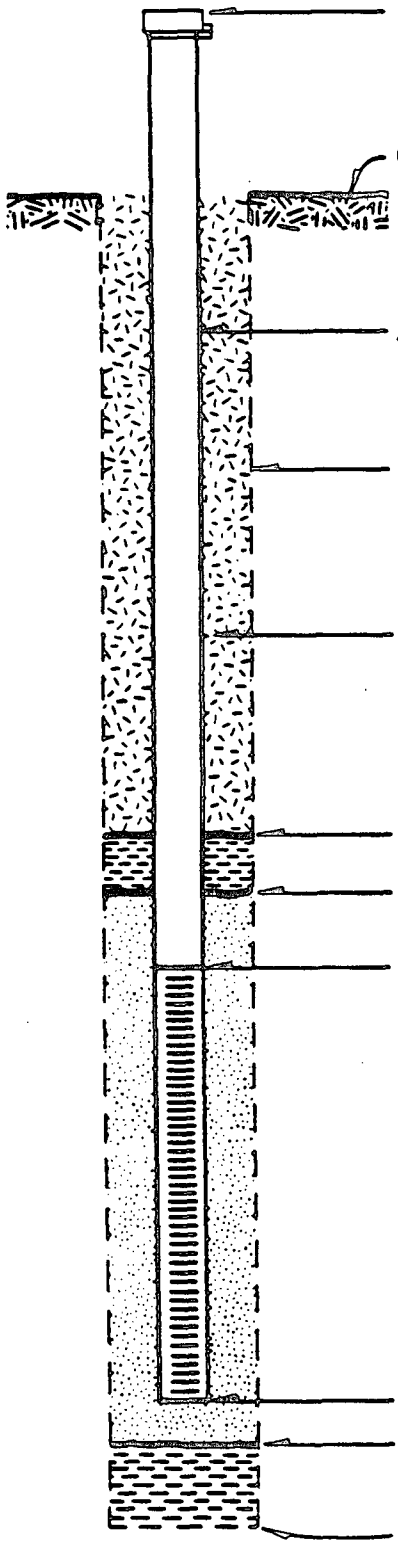

Elev. of top of well casing 579.00

Ground Elevation 575.80

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 564.8

Elev. of top of sand pack 562.8

Elev. of top of screen 552.3
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 547.3

Elev. of tip of sand pack 545.8

Type of backfill Bentonite

Elev. of bottom of borehole 543.3

REPORT OF MONITORING WELL NO. MW-17

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-17

DATE April 17, 1986 SURFACE ELEVATION 575.8 LOCATION Niagara Falls, NY

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0			Stiff, red brown, SILTY CLAY with vegative matter, low plastic, moist. (CL CLAY CAP FILL)	575.3
		22	Stiff, tan to gray, SILTY CLAY and large angular gravel low plastic, dry.	
		16	(CL FILL with RUBBLE)	
5			- becoming red-brown and slightly moist with gravel absent below 4 feet	568.3
		12		
		3	Loose, black, SILTY CLAY with cinders, fly ash, glass and wood fragments intermixed, low plastic, moist. (FILL)	563.3
10				
		12	Firm, olive gray with gray brown mottling, fine SILTY SAND with vegative matter, low plastic, wet. (SM/CL ALLUVIUM)	▽562.8
		3		
15			- becoming loose below 18 feet	
		14	- becoming firm with some coarse sand below 22 feet.	
		5		
20			- becoming dense, coarse sand and rounded gravel with shell fragments below 25 feet. (SP ALLUVIUM)	
		6		
		18		
25				
		53		546.8
		4	Stiff, medium red-brown, sandy SILTY CLAY with trace angular gravel, medium plastic, wet. (CL GLACIAL TILL)	
30				
35				

Completion Depth 542.3 Feet Water Depth 562.8 Feet Date _____

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP 2

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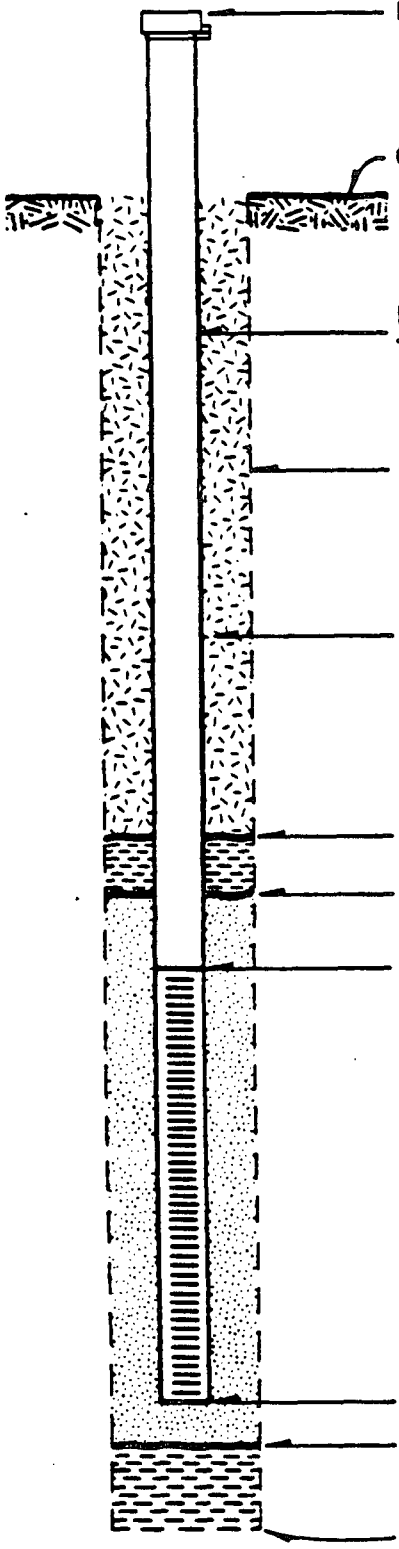

Elev. of top of well casing 578.91

Ground Elevation 575.80

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 571.8

Elev. of top of sand pack 569.8

Elev. of top of screen 569.3

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 564.3

Elev. of tip of sand pack 563.8

Type of backfill Bentonite

Elev. of bottom of borehole 563.3

REPORT OF MONITORING WELL NO. MW-18

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-18

DATE 4/17/86 SURFACE ELEVATION 575.8 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0			Stiff, red-brown, SILTY CLAY with vegative matter, low plastic, moist (CL CLAY CAP FILL)	575.3	
			Stiff, tan to gray, SILTY CLAY and large angular gravel low plastic, dry (CL FILL with RUBBLE)		
5			-becoming red-brown and slightly moist with gravel absent below 4 feet	568.3	
			Loose, black, SILTY CLAY with cinders, fly ash, glass and wood fragments intermixed, low plastic, moist (FILL)	563.3	
10			Firm, olive gray with gray brown mottling, fine SILTY SAND with vegative matter, low plastic, wet (SM/CL ALLUVIUM)	▽ 562.8	
15					
20					
25					
30					
35					

Completion Depth 563.3 Feet Water Depth 562.8 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

WCC:RP 2

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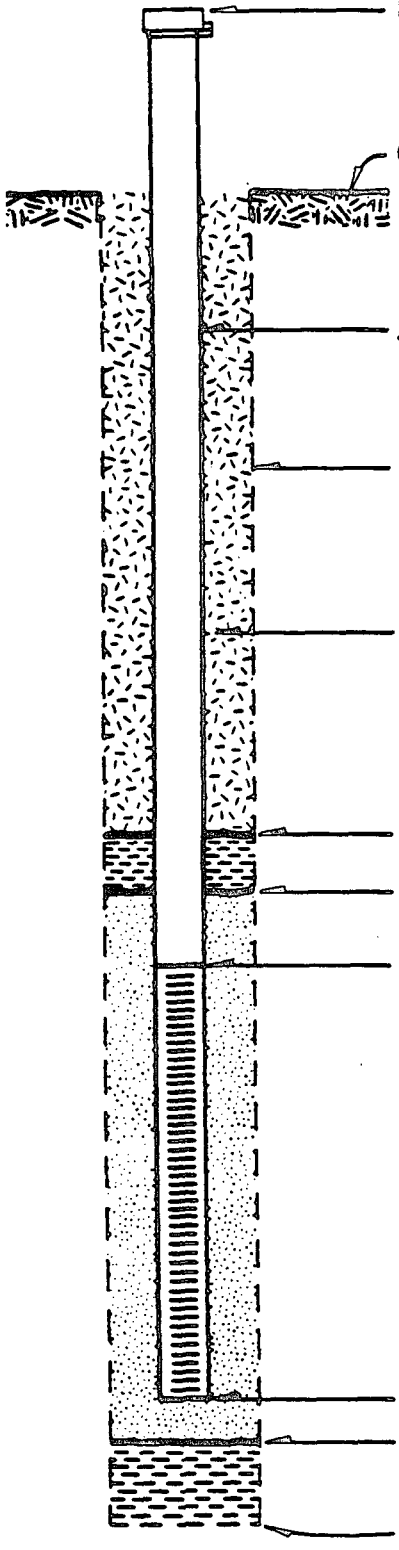

Elev. of top of well casing 578.00

Ground Elevation 575.02

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 564.0

Elev. of top of sand pack 562.0

Elev. of top of screen 548.5
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 543.5

Elev. of tip of sand pack 543.0

Type of backfill Bentonite

Elev. of bottom of borehole 541.0

REPORT OF MONITORING WELL NO. MW-19

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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LOG of BC

DATE - 4-24-86 SURFACE ELEVATIC

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESC
0			Hard, red brown, SILTY Cl low plastic, dry (CL
		76	
		10	Dense, tan to red-brown, nonplastic, dry (FILL)
5			Firm, dark gray, SILTY CL cinders, wood chips, low p
		5	
		2	
10			- Oily black NAPL below 10
		11	Firm, olive gray with brown trace clay and vegative mat (SM/CL
15		2	
			- becoming loose with shell matter absent below 14 fee
		7	
			- becoming firm, coarse sand interbedded below 26.5 fee
20		4	
			- brown, very odorous NAPL be
		30	
25		10	
		28	
30		32	
		8	Stiff, medium red-brown, sandy subrounded to angular gravel, (GI
35			

Completion Depth 541.0 Feet Water Depth

Project Name Olin 102nd Street Landfill

WCC-RP 2

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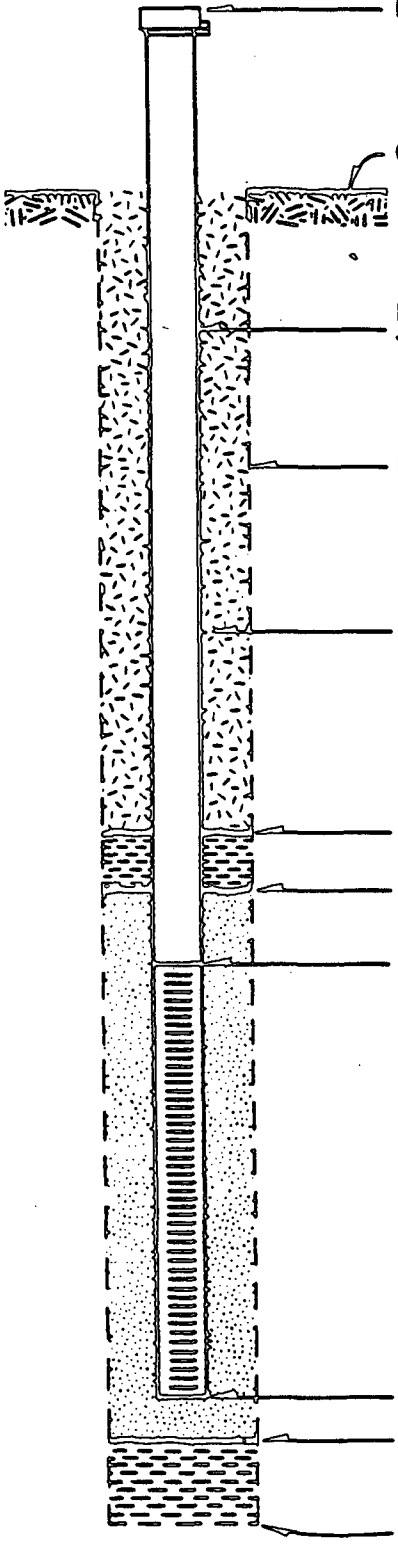

Elev. of top of well casing 577.82

Ground Elevation 575.02

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 571.0

Elev. of top of sand pack 570.0

Elev. of top of screen 569.0
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 564.0

Elev. of tip of sand pack 563.5

Type of backfill Bentonite

Elev. of bottom of borehole 563.0

REPORT OF MONITORING WELL NO. MW-20

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

Recycled paper

LOG of BORING No. MW-20

DATE 4/24/86 SURFACE ELEVATION 575.02 LOCATION Niagara Falls, New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0			Hard, red brown, SILTY CLAY with vegative matter, low plastic, dry (CL CLAY CAP FILL)	574.5	
			Dense, tan to red-brown, very SILTY SAND and gravel, nonplastic, dry (FILL)	570.5	
5			Firm, dark gray, SILTY CLAY with white fly ash, cinders, wood ships, low plastic, moist (FILL)	▽ 567.0	
10			- oily black NAPL below 10 feet	563.5	
			Firm, olive gray with brown mottling SILTY SAND with trace clay and vegative matter, low plastic, wet (SM/CL ALLUVIUM)		
15					
20					
25					
30					
35					

Completion Depth 563.0 Feet Water Depth 567.0 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

WCC-RP 2

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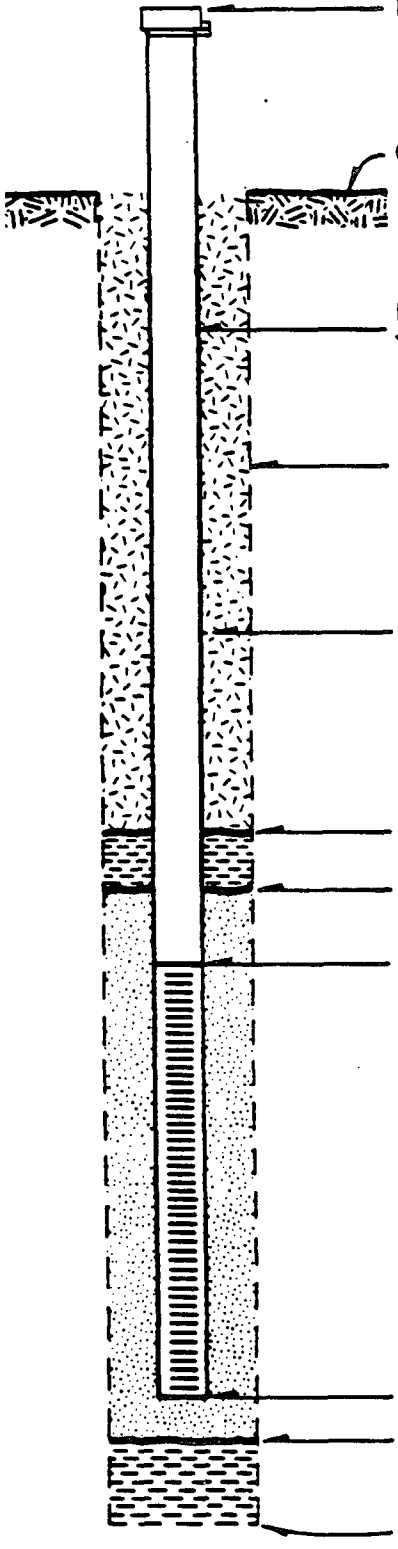

Elev. of top of well casing 578.39

Ground Elevation 575.40

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 571.4

Elev. of top of sand pack 569.4

Elev. of top of screen 568.9
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 563.9

Elev. of tip of sand pack 563.4

Type of backfill Bentonite

Elev. of bottom of borehole 562.4

REPORT OF MONITORING WELL NO. MW-21

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-21

Niagara Falls

DATE 4-22-86 SURFACE ELEVATION 575.4 LOCATION New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Stiff, red brown, SILTY CLAY with vegative matter, low plastic, moist. (CL CLAY CAP FILL)	574.6	
	23	Stiff, dark gray, SILTY CLAY with white ash, cinders glass and rubber fragments, low plastic, moist. (FILL)		
	14		▽ 570.4	
5			569.9	
	8	Firm, tan, SILTY SAND with abundant gravel, cinders, fly ash, wood and rubber fragments, nonplastic, wet. (FILL)		
	2			
10			563.6	
	7	Firm, olive gray, SILTY SAND with a trace clay, abundant vegative matter, low plastic, wet (SM/CL ALLUVIUM)		
15				
20				
25				
30				
35				

Completion Depth _____ Feet Water Depth _____ Feet Date _____

Project Name _____ Project Number _____

WCC-RP 2

Woodward-Clyde Consultants

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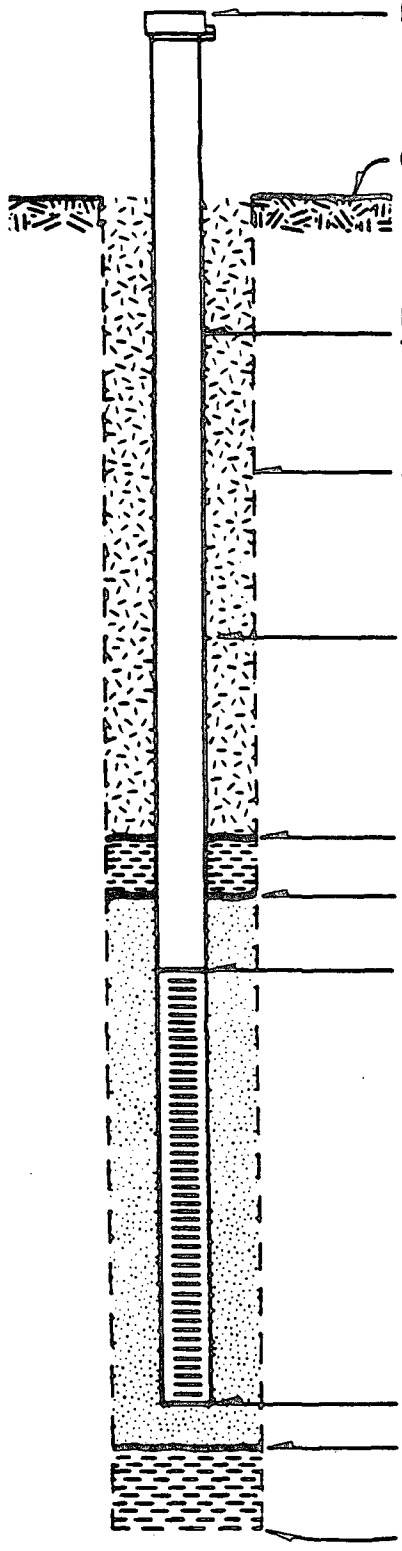

Elev. of top of well casing 579.31

Ground Elevation 575.92

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 572.7

Elev. of top of sand pack 571.7

Elev. of top of screen 567.4
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.5 ft.

Elev. of tip of screen 564.9

Elev. of tip of sand pack 564.3

Type of backfill Bentonite

Elev. of bottom of borehole 563.9

REPORT OF MONITORING WELL NO. MW-22

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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LOG of BORING No. MW-22

DATE 4-25-86 SURFACE ELEVATION 575.9 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Very stiff, gray brown, SILTY CLAY with vegative matter, low plastic, moist. (CL CLAY CAP FILL)	574.7	
	26	Stiff, red brown, sandy SILTY CLAY with gravel, cinders, fly ash, brick and glass fragments, low plastic, moist		
5	9	- becoming firm (FILL)	569.9	
		Stiff, olive gray with brown mottling, SILTY CLAY low plastic, moist. (CL FILL)	567.2	
	23	Firm, dark gray, sandy SILTY CLAY with gravel and cinders, low plastic, moist. (CL FILL)	564.9	
10	7	Firm, olive gray with brown mottling, SILTY SAND with vegative matter, low plastic, moist. (SM/CL ALLUVIUM)		
15				
20				
25				
30				
35				

Completion Depth 563.9 Feet Water Depth none enters Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

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APPENDIX C

EXISTING MONITORING WELL DETAILS

EXISTING MONITORING WELL DETAILS

102ND STREET LANDFILL

Elevations are based on USGS datum.
Well casing and ground elevations surveyed April 1986.

Well No.	Well Casing Elevation (Ft. AMSL)	Ground Elevation (Ft. AMSL)	Total Drilled Depth (Ft. BG)	Screen Setting Ft. BG	Screen Setting Ft. AMSL	Monitored Interval Ft. BG	Monitored Interval Ft. AMSL	Monitored Zone
OW1-79	565.80	564.8	47.0	41.5-46.5	523.3-518.2	32.0-47.0	532.8-517.8	Bedrock
OW3-79	565.92	564.6	51.5	46.5-51.5	518.1-513.1	45.6-51.5	519.0-513.1	Bedrock
OW5-79	576.79	573.6	60.0	54.6-59.6	519.0-514.0	53.1-60.0	520.5-513.6	Bedrock
OW6-79	578.47	574.4	40.5	35.5-40.5	538.9-533.9	34.9-40.5	539.5-533.9	Till
OW7-79	576.75	573.1	62.0	56.6-61.6	516.5-511.5	56.1-62.0	517.0-511.1	Bedrock
OW8-79	576.88	573.5	41.5	36.5-41.5	537.0-532.0	35.6-41.5	537.9-532.0	Till
OW9-79	578.93	575.6	30.5	25.5-30.5	550.1-545.1	24.1-30.5	551.5-545.1	Till
OW10-79	579.13	575.5	68.5	61.5-66.5	514.0-509.0	61.0-68.5	514.5-507.0	Bedrock
OW11-79	576.18	573.6	40.0	35.0-40.0	538.6-533.6	34.1-40.0	539.5-533.6	Till
OW12-79	580.18	576.7	23.0	18.0-23.0	558.7-553.7	17.2-23.0	559.5-553.7	Alluvium
OW13-79	578.20	574.8	38.0	33.0-38.0	541.8-536.8	31.8-38.0	543.0-536.8	Till
OW14-79	581.20	581.7	46.2	40.7-45.7	541.0-536.0	39.2-46.2	542.5-535.5	Till
OW15-79	577.11	577.4	36.5	31.5-36.5	545.9-540.9	30.9-36.5	546.5-540.9	Till
OW17-79	579.63	576.4	48.0	43.0-48.0	533.4-528.4	42.3-48.0	534.1-528.4	Till
OW19-79	565.53	564.7	32.0	25.7-30.7	539.0-534.0	24.7-32.0	540.0-532.7	Till
OW20-79	578.53	575.5	44.2	39.2-44.2	536.3-531.3	38.5-44.2	537.0-531.3	Till
OW22-79	578.27	574.9	42.7	37.7-42.7	537.2-532.2	36.9-42.7	538.0-532.2	Till
OW23-79	579.00	575.5	41.6	36.6-41.6	538.9-533.9	36.5-41.6	539.0-533.9	Till
OW24-79	579.83*	576.8	44.5	38.8-43.8	538.0-533.0	38.3-44.5	538.5-532.3	Till
OW25-80	579.34	575.6	25.0	20.0-25.0	556.0-551.0	19.1-25.0	556.9-551.0	Alluvium
OW26-80	580.84	576.7	23.0	18.0-23.0	558.7-553.7	17.7-23.0	559.0-553.7	Alluvium
OW27-80	578.84	575.8	21.0	11.0-16.0	564.8-559.8	10.8-16.0	565.0-559.8	Alluvium

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EXISTING MONITORING WELL DETAILS

102ND STREET LANDFILL

Elevations are based on USGS datum.
Well casing and ground elevations surveyed April 1986.

Well No.	Well Casing Elevation (Ft. AMSL)	Ground Elevation (Ft. AMSL)	Total Drilled Depth (Ft. BG)	Screen Setting		Monitored Interval		Monitored Zone
				Ft. BG	Ft. AMSL	Ft. BG	Ft. AMSL	
OW28-80	577.73	574.6	18.0	13.0-18.0	561.6-556.6	11.1-18.0	563.5-556.6	Alluvium
OW29-80	578.29	575.1	27.0	22.0-27.0	553.1-548.1	21.1-27.0	554.0-548.1	Alluvium
OW30-80	578.86	575.8	25.0	20.0-25.0	555.8-550.8	19.8-25.0	556.0-550.8	Alluvium
OW31-85	579.13	575.8	14.0	6.5-11.5	569.3-564.3	5.0-12.0	570.8-563.8	Fill
OW32-85	579.46	576.6	16.0	7.1-12.1	569.5-564.5	5.0-13.5	571.6-563.1	Fill
OW33-85	579.53	575.4	14.0	5.9-10.9	569.5-564.5	5.9-11.5	569.5-563.9	Fill
OW34-85	580.23	577.4	15.0	7.0-12.0	570.4-565.4	5.0-12.5	572.4-564.9	Fill
OW35-85	578.38	575.9	14.0	7.5-12.5	568.4-563.4	4.5-13.0	571.4-562.9	Fill
OW36-85	579.45	575.4	12.0	6.0-11.0	569.4-564.4	4.5-11.5	570.9-563.9	Fill
OW37-85	576.77	573.7	12.0	5.0-10.0	568.7-563.7	3.0-11.5	570.7-562.2	Fill
OW38-85	579.34	576.2	20.0	9.0-14.0	567.2-562.2	6.5-14.5	569.7-561.7	Fill
OW39-85	577.22	574.1	10.5	3.5- 8.5	570.6-565.6	2.5- 9.0	571.6-565.1	Fill
OW40-85	576.76	573.7	29.0	23.2-28.2	550.5-545.5	11.0-29.0	562.7-544.7	Alluvium
OW41-85	576.16	573.7	55.3	----	----	39.7-55.3	534.0-518.4	Bedrock
OW42-86	576.65	573.6	223.3	----	----	169.3-223.3	404.9-350.9	Deep Bedrock
OW43-85	580.22	577.2	32.0	26.5-31.5	550.7-545.7	14.0-32.0	563.2-545.2	Alluvium
OW44-86	579.98	577.2	230.7	----	----	186.9-230.7	390.3-346.5	Deep Bedrock
OW45-85	579.10	577.2	60.9	----	----	45.7-60.9	531.5-516.3	Bedrock
OW46-85	578.89	575.6	53.2	----	----	38.0-53.2	537.6-522.4	Bedrock
OW47-85	578.14	575.4	35.5	28.0-33.0	547.4-542.4	12.0-35.5	563.4-539.9	Alluvium
OW48-86	572.28	572.6	10.0	4.5- 9.5	568.2-563.2	4.0-10.0	568.7-562.7	Fill
OW49-86	572.28	572.4	12.0	4.5- 9.5	567.9-562.9	3.7-12.0	568.7-560.4	Fill
OW50-86	572.19	572.4	22.0	16.5-21.5	555.9-550.9	10.0-22.0	562.4-550.4	Alluvium

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EXISTING MONITORING WELL DETAILS

102ND STREET LANDFILL

Elevations are based on USGS datum.
Well casing and ground elevations surveyed April 1986.

Well No.	Well Casing Elevation (Ft. AMSL)	Ground Elevation (Ft. AMSL)	Total Drilled Depth (Ft. BG)	Screen Setting Ft. BG	Screen Setting Ft. AMSL	Monitored Interval Ft. BG	Monitored Interval Ft. AMSL	Monitored Zone
OW51-86	571.97	572.2	10.0	4.5- 9.5	567.7-562.7	3.7-10.0	568.5-562.2	Fill
OW52-86	572.00	572.2	22.0	15.5-20.5	556.7-551.7	11.0-22.0	561.2-550.2	Alluvium
OW53-86	571.10	571.6	61.3	---	---	41.3-57.3	530.3-514.3	Bedrock
OW54-86	570.71	571.0	10.0	4.5- 9.5	566.5-561.5	4.0-10.0	567.0-561.0	Fill
OW55-86	570.88	571.1	24.0	17.5-22.5	553.6-548.6	10.0-24.0	561.1-547.1	Alluvium
OW56-86	572.65	573.0	10.0	4.5- 9.5	568.5-563.5	4.0-10.0	569.0-563.0	Fill
OW57-86	573.05	573.1	29.0	20.5-25.5	552.6-547.6	12.0-29.0	561.1-544.1	Alluvium
OW58-86	573.56	573.7	10.0	4.5- 9.5	569.2-564.2	2.5-10.0	571.2-563.7	Alluvium
OW59-86	576.11	573.1	10.0	3.5- 8.5	569.6-564.6	3.0-10.0	570.1-563.1	Alluvium
OW60-86	573.18	573.4	10.0	4.5- 9.5	568.9-563.9	2.5-10.0	570.9-563.4	Alluvium
OW61-86	576.95	573.6	10.0	4.5- 9.5	569.1-564.1	3.5-10.0	570.1-563.6	Alluvium
OW62-87	578.99	576.2	33.3	28.3-33.3	547.9-542.9	27.1-33.3	549.1-542.9	Till
OW63-87	578.88	575.9	14.5	9.4-14.4	566.5-561.5	5.8-14.5	570.1-561.4	Alluvium
SPB-78	579.60	575.2	8.0	6.0- 8.0	569.2-567.2	4.5- 8.0	570.7-567.2	Alluvium
MW-1	579.09	576.2	14.0	7.2-12.2	569.0-564.0	5.2-12.7	571.0-563.5	Fill
MW-2	578.54	575.8	12.8	4.7- 9.7	571.1-566.1	4.0-10.2	571.8-565.6	Fill
MW-3	579.49	576.1	26.6	17.5-22.5	558.6-553.6	14.5-23.0	561.6-553.1	Alluvium
MW-4	578.30	575.2	14.5	5.0-10.0	570.2-565.2	4.0-10.5	571.2-564.7	Fill
MW-5	578.89	575.9	14.5	11.0-13.0	564.9-562.9	9.8-13.5	566.1-562.4	Sewer Bedding
MW-6	578.06	574.9	13.0	10.0-12.0	564.9-562.9	8.0-12.5	566.9-562.4	Sewer Bedding
MW-7	579.14	576.3	56.1	---	---	41.5-56.1	534.8-520.2	Bedrock
MW-8	578.50	576.5	229.0	---	---	173.5-229.0	403.0-347.5	Deep Bedrock
MW-9	577.43	574.3	23.0	14.5-19.5	559.8-554.8	9.4-20.0	564.9-554.3	Alluvium
MW-10	574.52	575.0	13.5	10.0-12.0	565.0-563.0	8.0-12.5	567.0-562.5	Sewer Bedding
MW-11	574.32	574.7	13.0	9.0-11.0	565.7-563.7	8.0-11.5	566.7-563.2	Sewer Bedding
MW-12	573.95	574.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

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EXISTING MONITORING WELL DETAILS
102ND STREET LANDFILL

Elevations are based on USGS datum.
Well casing and ground elevations surveyed April 1986.

Well No.	Well Casing Elevation (Ft. AMSL)	Ground Elevation (Ft. AMSL)	Total Drilled Depth (Ft. BG)	Screen Setting		Monitored Interval		Monitored Zone
				Ft. BG	Ft. AMSL	Ft. BG	Ft. AMSL	
MW-13	572.40	572.5	8.5	5.0- 7.5	567.5-565.0	4.0- 8.0	568.5-564.5	Fill
MW-14	572.22	572.5	18.0	9.5-14.5	563.0-558.0	8.6-15.0	563.9-557.5	Alluvium
MW-15	569.67	569.9	7.0	3.5- 6.0	566.4-563.9	3.0- 6.5	566.9-563.4	Fill
MW-16	569.55	569.9	18.0	11.5-16.5	558.4-553.4	7.2-17.0	562.7-552.9	Alluvium
MW-17	579.00	575.8	33.5	23.5-28.5	552.3-547.3	13.0-30.0	562.8-545.8	Alluvium
MW-18	578.91	575.8	12.5	6.5-11.5	569.3-564.3	6.0-12.0	569.8-563.8	Fill
MW-19	578.00	575.0	34.0	26.5-31.5	548.5-543.5	13.0-32.0	562.0-543.0	Alluvium
MW-20	577.82	575.0	12.0	6.0-11.0	569.0-564.0	5.0-11.5	570.0-563.5	Fill
MW-21	578.39	575.4	13.0	6.5-11.5	568.9-563.9	6.0-12.0	569.4-563.4	Fill
MW-22	579.31	575.9	12.0	8.5-11.0	567.4-564.9	4.2-11.6	571.7-564.3	Fill
B-1	577.07	575.1	55.8	---	---	40.8-55.8	534.3-519.3	Bedrock
B-2	577.36	575.8	50.0	---	---	40.5-50.0	535.3-525.8	Bedrock
B-3	574.95	574.0	49.0	---	---	39.0-49.0	535.0-525.0	Bedrock
B-4	577.24	575.8	50.1	---	---	40.0-50.1	535.8-525.7	Bedrock
B-20	576.31	574.1	22.2	7.0- 9.0	567.1-565.1	1.5- 9.0	572.6-565.1	Fill
B-21	576.22	574.1	21.5	16.0-18.0	558.1-556.1	15.0-18.0	559.1-556.1	Alluvium
B-22	576.99	574.6	39.5	21.5-38.5	553.1-536.1	21.0-38.5	553.6-536.1	Till
B-23	577.85	575.6	30.5	25.0-27.0	550.6-548.6	22.0-27.0	553.6-548.6	Alluvium
B-24	577.96	575.6	40.5	30.0-39.5	545.6-536.1	29.5-39.5	546.1-536.1	Till
B-25	577.72	575.2	29.5	22.0-24.0	553.2-551.2	20.0-24.0	555.2-551.2	Alluvium
B-27	577.59	575.3	29.5	25.0-27.0	550.3-548.3	24.0-27.0	551.3-548.3	Alluvium
B-29	577.61	575.5	38.5	31.5-37.5	544.0-538.0	30.5-37.5	545.0-538.0	Till
B-31	577.34*	576.2	41.0	35.0-40.0	541.2-536.2	34.5-40.0	541.7-536.2	Till

*Capped

000867A

EXISTING MONITORING WELL DETAILS

102ND STREET LANDFILL

Elevations are based on USGS datum.
Well casing and ground elevations surveyed April 1986.

Well No.	Well Casing Elevation (Ft. AMSL)	Ground Elevation (Ft. AMSL)	Total Drilled Depth (Ft. BG)	Screen Setting Ft. BG	Screen Setting Ft. AMSL	Monitored Interval Ft. BG	Monitored Interval Ft. AMSL	Monitored Zone
B-33	577.47	575.2	28.5	25.0-27.0	550.2-548.2	23.0-27.0	552.2-548.2	Alluvium
B-34D	--	575.9	40.0	29.0-39.0	546.9-536.9	28.5-39.0	547.4-536.9	Till
B-34I	578.72	575.9	40.0	19.5-21.5	556.4-554.4	18.0-24.0	557.9-551.9	Alluvium
B-35	575.97	574.4	10.0	7.5- 9.5	566.9-564.9	2.0-10.0	572.4-564.4	Fill
P-1	575.96	575.3	13.0	10.5-12.5	564.8-562.8	1.0-13.0	574.3-562.3	Fill
P-2	577.79	575.2	13.0	11.0-13.0	564.2-562.2	1.0-13.0	574.2-562.2	Fill
P-3	577.68	575.1	15.0	13.0-15.0	562.1-560.1	1.0-15.0	574.1-560.1	Fill
P-5	577.85	576.1	14.0	10.0-12.0	566.1-564.1	1.0-14.0	575.1-562.1	Fill
P-6	578.16	575.7	15.0	12.0-14.0	563.7-561.7	1.0-15.0	574.7-560.7	Fill
P-7	577.78	575.3	12.5	10.5-12.5	564.8-562.8	1.0-12.5	574.3-562.8	Fill
P-8	576.91*	574.4	14.0	10.0-12.0	564.4-562.4	1.0-14.0	573.4-560.4	Fill
P-9	577.95	574.5	11.0	8.0-10.0	566.5-564.5	1.0-11.0	573.5-563.5	Fill
P-10	578.73	575.9	30.5	28.0-30.0	547.9-545.9	24.0-30.5	551.9-545.4	Alluvium
P-12	(bent)	574.6	13.5	10.0-12.0	564.6-562.6	1.0-13.5	573.6-561.1	Fill
P-13	579.37	575.6	23.0	10.5-12.5	565.1-563.1	1.0-13.0	574.6-562.6	Fill
P-14	578.42	575.7	26.5	23.5-25.5	552.2-550.2	1.0-26.5	574.7-549.2	Alluvium
P-15	575.85	574.7	22.5	19.5-21.5	555.2-553.2	1.0-22.5	573.7-552.2	Alluvium
P-16	576.74	574.0	9.5	6.5- 8.5	567.5-565.5	1.0- 9.5	573.0-564.5	Fill
P-17	577.79	575.9	11.5	7.5- 9.5	568.4-566.4	1.0-11.5	574.9-564.4	Fill
P-18	576.02	574.6	8.0	6.0- 8.0	568.6-566.6	1.0- 8.0	573.6-566.6	Fill

*casing was cut off in early 1987

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EXISTING MONITORING WELL DETAILS

102ND STREET LANDFILL

Elevations are based on USGS datum.
Well casing and ground elevations surveyed April 1986.

Well No.	Well Casing Elevation (Ft. AMSL)	Ground Elevation (Ft. AMSL)	Total Drilled Depth (Ft. BG)	Screen Setting		Monitored Interval		Monitored Zone
				Ft. BG	Ft. AMSL	Ft. BG	Ft. AMSL	
CW-1	577.12	574.9	11.5	6.5-10.0	568.4-564.9	1.0-11.5	573.9-563.4	Fill
CW-8	577.58	575.0	13.0	7.5-11.0	567.5-564.0	1.0-13.0	574.0-562.0	Fill
CW-9	577.34	575.4	14.5	8.5-12.5	566.9-562.9	1.0-14.5	574.4-560.9	Fill
CW-16	575.60	574.0	8.0	3.0- 7.0	571.0-567.0	1.0- 8.0	573.0-566.0	Fill
CW-18	576.66	574.5	12.5	7.0-10.5	567.5-564.0	1.0-12.5	573.5-562.0	Fill
CW-20	576.17	574.2	11.0	4.5- 9.5	569.7-564.7	1.5- 9.5	572.7-564.7	Fill
CW-35	578.59	576.1	13.0	6.0-11.0	570.1-565.1	1.5-11.0	574.6-565.1	Fill

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APPENDIX D

PUMP TEST LOGS

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: CW42-86 Test Performed by: D. Millard

Interval/Depth Tested: A 39.3 - 54.5 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 9/19/86

Water Lost During Coring: 600 Gallons
Water Removed Including Pump Test: 909 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

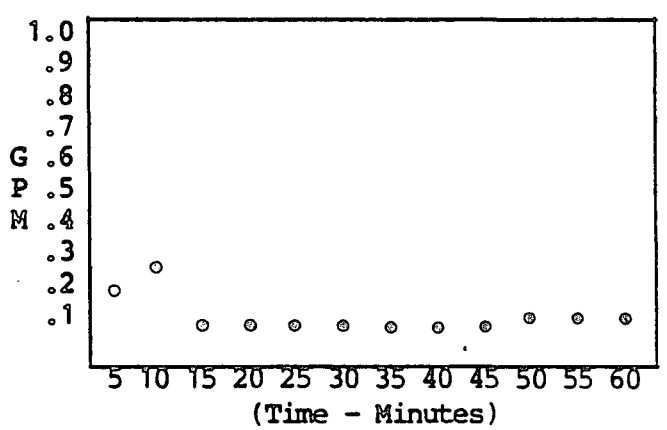
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
68	303	
202	74	
285	390	
324	46	
382	46	
432	46	
796	30	
848	63	
901	45	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: ( ) Submersible (X) Bladder

Elapsed Time	Volume Pumped
5 Min.	1.0
10 Min.	1.4
15 Min.	0.5
20 Min.	0.5
25 Min.	0.5
30 Min.	0.5
35 Min.	0.5
40 Min.	0.5
45 Min.	0.5
50 Min.	0.6
55 Min.	0.6
60 Min.	0.6

Total Gallons = 7.7



Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.12 gpm

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- Water lost during coring is estimated.
- Full pump pulses observed prior to packer infiltration.
- Pump pulses gradually diminished after packer infiltrat
- H_2S odor noted
- Initially, groundwater clear becoming dark gray with tin
- At completion, packer released and pump rate increased t
- Conductivity meter malfunction

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102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: C. Padginton

Interval/Depth Tested: B 52.9 - 70.2 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 10/31/86

Water Lost During Coring: 1,918 Gallons
Water Removed Including Pump Test: 681 Gallons

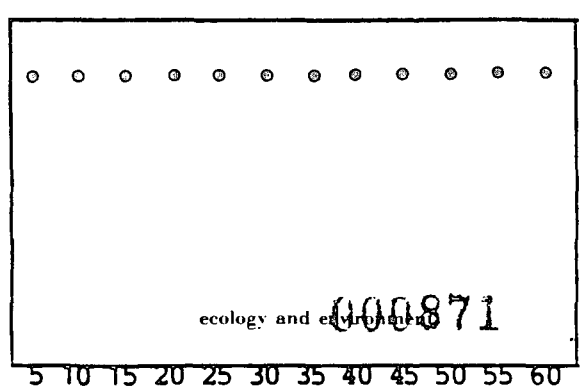
Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
4.5	323	—
31.5	391	1,810
58.5	293	2,180
91.0	185	2,450
119.0	175	2,090
249.5	128	3,230
276.5	120	3,330
375.5	116	3,690
398.0	110	3,780
425.0	109	3,920
488.0	109	4,000
519.5	103	3,890
551.0	94	4,310
618.5	90	4,840
645.5	86	—
672.5	84	—
681.0	—	6,560

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	22.5
10 Min.	22.5
15 Min.	22.5
20 Min.	22.5
25 Min.	22.5
30 Min.	22.5
35 Min.	22.5
40 Min.	22.5
45 Min.	22.5
50 Min.	22.5
55 Min.	22.5
60 Min.	22.5



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Total Gallons = 270

Samples Collected for Analysis:	Yes
Water Bearing Interval:	Yes
Estimated Infiltration Rate:	4.5 gpm

NOTES:

- Attempted to pump well head down to packer level before infiltrating packer.
- Packer inflated to 340 psi.
- Static water level prior to pump test = 9.67 ft BGS

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: C. Padginton

Interval/Depth Tested: C 67.3 - 85.0 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 11/06/86

Water Lost During Coring: 2,340 Gallons
Water Removed Including Pump Test: 910 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

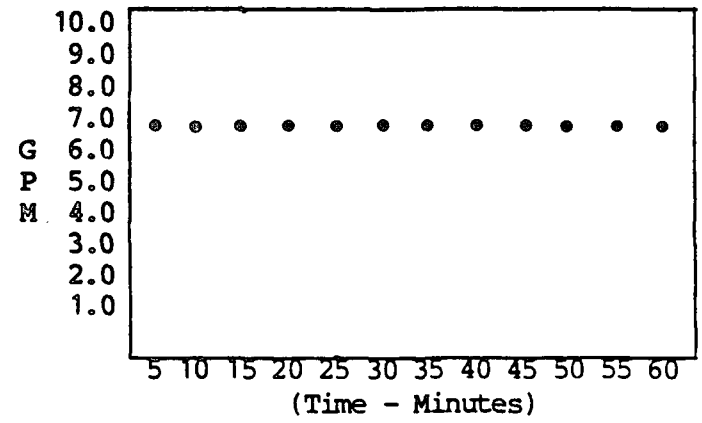
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
	145	4,200
	136	4,380
	122	4,610
	124	4,800
	120	5,600
	107	5,640
	105	5,760
	68	6,180
	65	6,140
	67	6,120

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	35
10 Min.	35
15 Min.	35
20 Min.	35
25 Min.	35
30 Min.	35
35 Min.	35
40 Min.	35
45 Min.	35
50 Min.	35
55 Min.	35
60 Min.	35

Total Gallons = 420



Samples Collected for Analysis:	Yes
Water Bearing Interval:	Yes
Estimated Infiltration Rate:	7.0 gpm

NOTES:

- 0.5 ft. of rock in bottom of borehole
- Packer inflated to 600 psi
- Pump test consisted of measuring the pumping rate
- Static water level prior to pump test = 9.55 ft. BGS
- Cuttings seized outlet meter during well puring

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: C. Padginton

Interval/Depth Tested: D 82.8 - 100.0 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 11/08/86

Water Lost During Coring: 67 Gallons
Water Removed Including Pump Test: 229 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

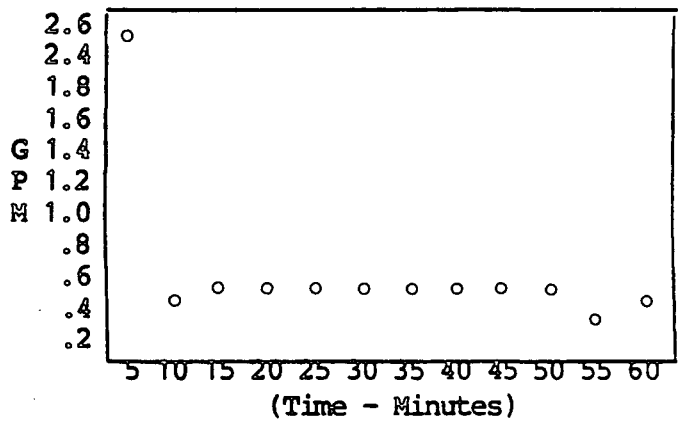
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
105	800	330
128	228	1,930
152	160	4,500
178	99	5,450
224	76	5,750
229	72	6,060

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	13.
10 Min.	2.5
15 Min.	3
20 Min.	3
25 Min.	3
30 Min.	3
35 Min.	3
40 Min.	3
45 Min.	3
50 Min.	3
55 Min.	2.2
60 Min.	2.5

Total Gallons = 44.2



Samples Collected for Analysis:	Yes*
Water Bearing Interval:	No
Estimated Infiltration Rate:	0.51 gpm

*Although the estimated infiltration rate was <0.6 gpm and therefore non-water bearing, samples were collected since the rate was within a reasonable range.

NOTES:

- Packer inflated to 600 psi.
- Static water level prior to pump test = 9.58 ft. BGS

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: R. Boekstra

Interval/Depth Tested: E 97.7 - 115.0 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 11/11/86

Water Lost During Coring: 52 Gallons
Water Removed Including Pump Test: 214 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

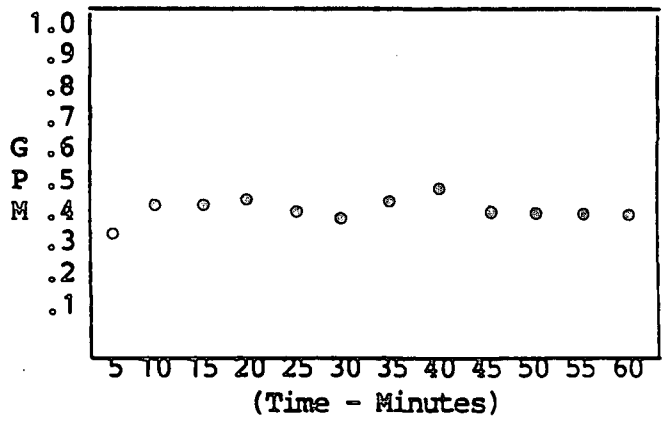
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
17	380	420
42	495	400
129	396	440
150	330	1,780
177	134	4,890
209	59	5,670
214	49	5,480

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	1.6
10 Min.	2.3
15 Min.	2.3
20 Min.	2.4
25 Min.	2.2
30 Min.	2.1
35 Min.	2.4
40 Min.	2.5
45 Min.	2.2
50 Min.	2.3
55 Min.	2.3
60 Min.	2.2

Total Gallons = 26.8



Samples Collected for Analysis: Yes*
Water Bearing Interval: No
Estimated Infiltration Rate: 0.45 gpm

* Although the estimated infiltration rate was < 0.6 gpm and therefore non-water bearing, samples were collected since the rate was within a reasonable range.

NOTES:

- 1-inch rock piece left in bottom of borehole
- Well evacuated to packer prior to pump test
- Packer inflated to 600 psi
- Static water level prior to pump test = 9.52 ft. BGS

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: R. Hoekstra

Interval/Depth Tested: F 112.8 - 130.0 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 11/11/86

Water Lost During Coring: 136 Gallons
Water Removed Including Pump Test: 740 Gallons

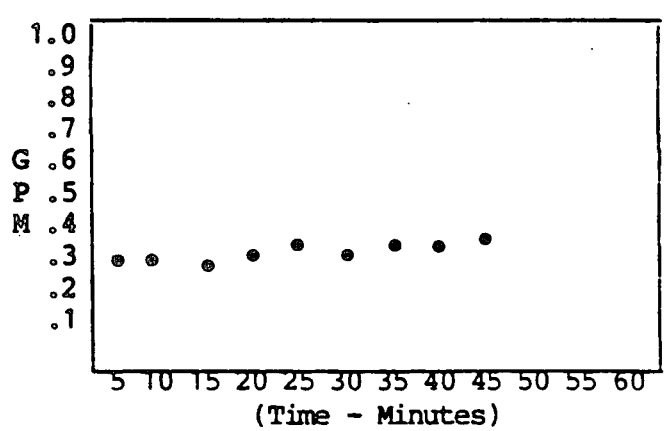
Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
55	650	480
110	700	440
165	445	1,080
200	220	4,920
215	160	4,950
265	100	6,100
315	97	6,160
365	83	5,970
445	75	6,260
495	76	6,330
545	74	6,270

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	1.6
10 Min.	1.6
15 Min.	1.5
20 Min.	1.7
25 Min.	1.8
30 Min.	1.7
35 Min.	1.8
40 Min.	1.8
45 Min.	1.9



Total Gallons = 15.4

Samples Collected for Analysis:	No
Water Bearing Interval:	No
Estimated Infiltration Rate:	0.37 gpm

NOTES:

- Packer inflated to 600 psi
- Static water level prior to pump test = 7.17 ft. BGS

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: R. Hoekstra

Interval/Depth Tested: G 124.3 - 145.0 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 11/20/86

Water Lost During Coring: 377 Gallons
Water Removed Including Pump Test: 210 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

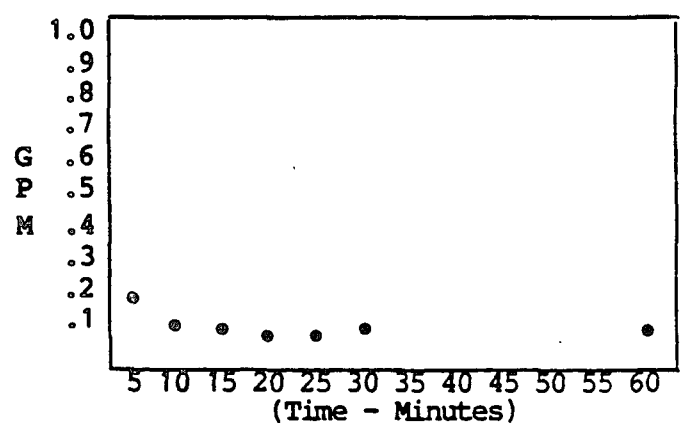
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
50	491	450
100	336	830
150	360	690
200	283	1,400

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	1.0
10 Min.	0.6
15 Min.	0.5
20 Min.	0.4
25 Min.	0.4
30 Min.	0.5
35 Min.	
40 Min.	
45 Min.	2.5
50 Min.	
55 Min.	
60 Min.	

Total Gallons = 5.9



Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.08 gpm

NOTES:

- Packer inflated to 600 psi
- 3.6 ft. of material in bottom of borehole
- Static water level prior to pump test = 19.0 ft. BGS

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102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: CW42-86 Test Performed by: R. Hoekstra

Interval/Depth Tested: H 139.7 - 160.0 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 11/21/86

Water Lost During Coring: 254 Gallons
Water Removed Including Pump Test: 240 Gallons

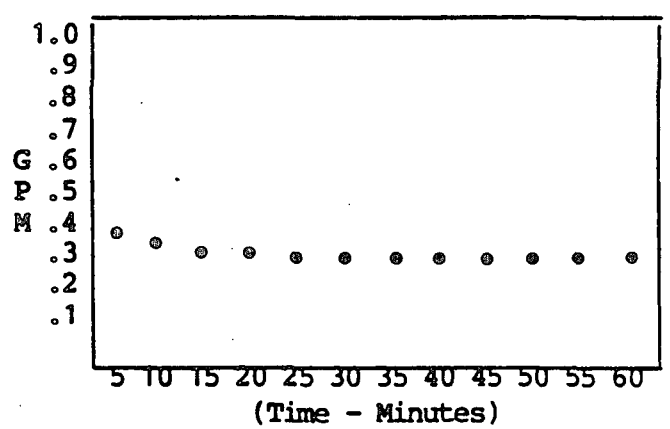
Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
50	269	340
100	377	730
150	362	920
200	272	1,050
210	209	1,480
220	146	2,230

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	2.0
10 Min.	1.8
15 Min.	1.7
20 Min.	1.7
25 Min.	1.6
30 Min.	1.6
35 Min.	1.6
40 Min.	1.6
45 Min.	1.6
50 Min.	1.6
55 Min.	1.6
60 Min.	1.6



Total Gallons = 20.0

Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.34 gpm

NOTES:

- Packer inflated to 600 psi
- 3.2 ft. of material in bottom of borehole
- Static water level prior to pump test = 8.33 ft. BGS

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: D. Millard

Interval/Depth Tested: I 152.1 - 169.3 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 11/25/86

Water Lost During Coring: 134 Gallons
Water Removed Including Pump Test: 104 Gallons

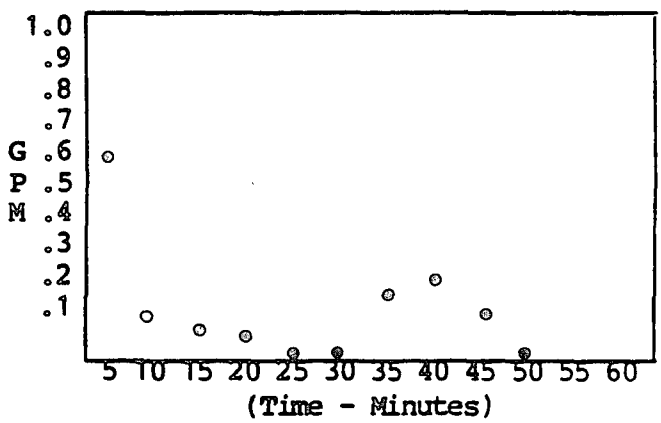
Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
50	233	>10,000

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	3.0
10 Min.	0.5
15 Min.	0.3
20 Min.	0.2
25 Min.	0.1
30 Min.	0.1
35 Min.	0.8
40 Min.	1.1
45 Min.	0.5
50 Min.	0.1



Total Gallons = 6.7

Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.16 gpm

NOTES:

- Packer inflated >600 psi
- Pump failure occurred at 50 minutes
- Static water level prior to pump test = 3.75 ft. BGS

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: R. Hoekstra

Interval/Depth Tested: J 169.3 - 184.3 ft. below ground surface
Interval Diameter: 3.50 inches
Date: 12/05/86

Water Lost During Coring: 207 Gallons
Water Removed Including Pump Test: 60+ Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

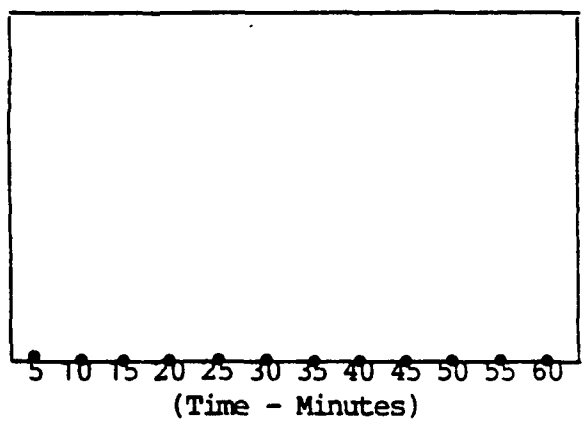
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

NOT MEASURED

One Hour Pump Test:

Packer Inflated: ( ) Yes (X) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	0.05
10 Min.	0
15 Min.	0
20 Min.	0
25 Min.	0
30 Min.	0
35 Min.	0
40 Min.	0
45 Min.	0
50 Min.	0
55 Min.	0
60 Min.	0



Total Gallons = 0.05

Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0 gpm

NOTES:

- Static water level prior to pump test = 28.83 ft. BGS

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: R. Hoekstra

Interval/Depth Tested: K 169.3 - 184.3 ft. below ground surface
Interval Diameter: 3.0/3.05 inches
Date: 1/13/87

Water Lost During Coring: 0 Gallons
Water Removed Including Pump Test: 254± Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

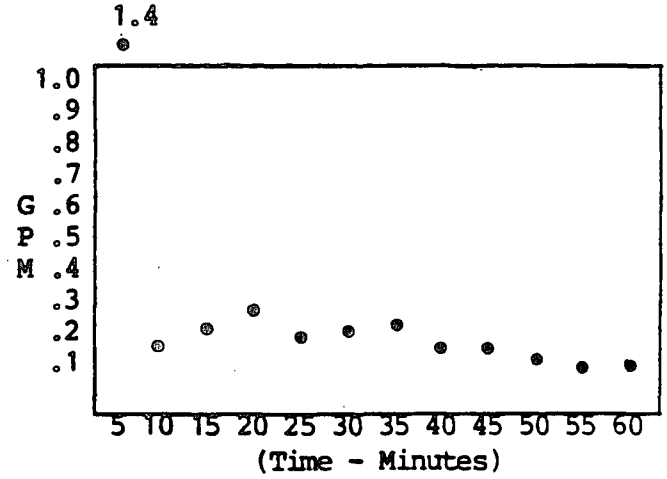
NOT MEASURED

One Hour Pump Test:

Packer Inflated: ( ) Yes (X) No
Type of Pump Used: ( ) Submersible ( ) Bladder (X) Progressive Cavity

Elapsed Time	Volume Pumped
5 Min.	7.0
10 Min.	0.9
15 Min.	1.2
20 Min.	1.3
25 Min.	1.0
30 Min.	1.1
35 Min.	1.2
40 Min.	0.9
45 Min.	0.9
50 Min.	0.8
55 Min.	0.6
60 Min.	0.6

Total Gallons = 17.5



Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.19 gpm

NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: R. Hoekstra

Interval/Depth Tested: L 169.3 - 214.3 ft. below ground surface
Interval Diameter: 3.0 inches
Date: 1/14/87

Water Lost During Coring: 58 Gallons
Water Removed Including Pump Test: 187± Gallons
Tracer Concentration in Drilling Water = 1,000 ppb

Tracer Measurements Taken:

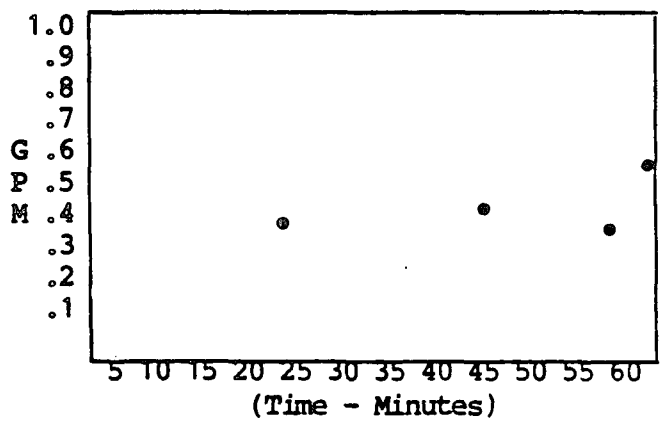
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

NOT MEASURED

One Hour Pump Test:

Packer Inflated: ( ) Yes (X) No
Type of Pump Used: ( ) Submersible ( ) Bladder (X) Progressive Cavity

Elapsed Time	Volume Pumped
24 Min.	10
45 Min.	9
58 Min.	5
64 Min.	3.5



Total Gallons = 27.5

Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.42 gpm

NOTES:

- Volume pumped determined by turning on Progressive cavity pump every several minutes

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW42-86 Test Performed by: R. Hoekstra

Interval/Depth Tested: M 169.3 - 214.3 ft. below ground surface
Interval Diameter: 3.0 inches
Date: 1/16/87

Water Lost During Coring: 60 Gallons
Water Removed Including Pump Test: 72± Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

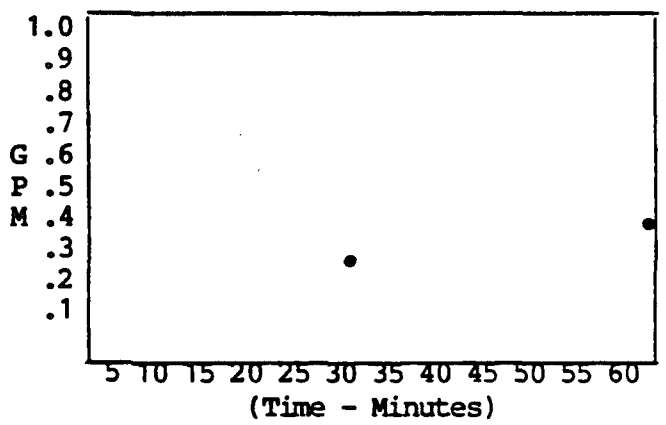
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

NOT MEASURED

One Hour Pump Test:

Packer Inflated: ( ) Yes (X) No
Type of Pump Used: ( ) Submersible ( ) Bladder (X) Progressive Cavity

Elapsed Time	Volume Pumped
31 Min.	9.1
64 Min.	13.3



Total Gallons = 22.4

Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.40 gpm

NOTES:

- Large gas pocket vented through top of well, possibly took on water
- Volume pumped determined by turning on Progressive Cavity pump every several minutes

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: D. Millard

Interval/Depth Tested: A 44.0 - 59.4 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 9/19/86

Water Lost During Coring: 5,150 Gallons
Water Removed Including Pump Test: 6,595 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
100	116	
343	90	
984	131	
1275	98	
3730	69	
5596	65	
6560	67	

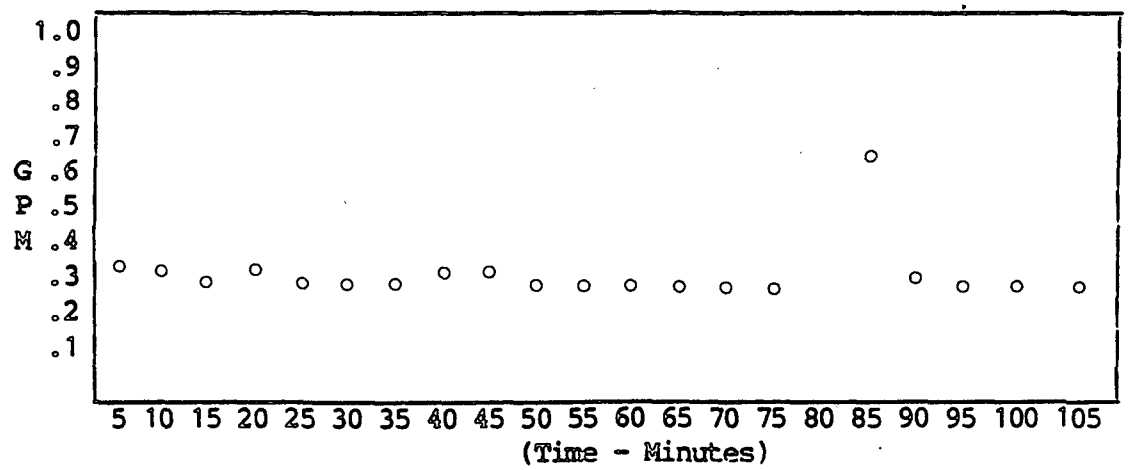
One Hour Pump Test:

Packer Inflated: ( ) Yes (X) No
Type of Pump Used: ( ) Submersible (X) Bladder

Elapsed Time	Volume Pumped
5 Min.	1.8
10 Min.	1.7
15 Min.	1.6
20 Min.	1.7
25 Min.	1.6
30 Min.	1.6
35 Min.	1.6
40 Min.	1.7
45 Min.	1.7
50 Min.	1.6
55 Min.	1.6
60 Min.	1.6
65 Min.	1.6
70 Min.	1.6
75 Min.	1.6

85 Min.	3.4
90 Min.	1.7
95 Min.	1.6
100 Min.	1.6
105 Min.	1.6

Total Gallons = 34.5



Samples Collected for Analysis: Yes
Water Bearing Interval: Yes
Estimated Infiltration Rate: >0.32 gpm*

*Since bladder pump capacity may not be greater

NOTES:

- Static water level = 13.49 ft. BGS
- Initially, packer not inflated. Observed full pump pulses.
- Pump line severed during test. Replaced line and restarted test.
- Water slightly cloudy with H_2S odor
- Extended test in order to remove two complete well volumes
- Conductivity meter malfunction

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: B 59.1 - 74.4 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 9/23/86

Water Lost During Coring: 1,679 Gallons
Water Removed Including Pump Test: 2,558 Gallons

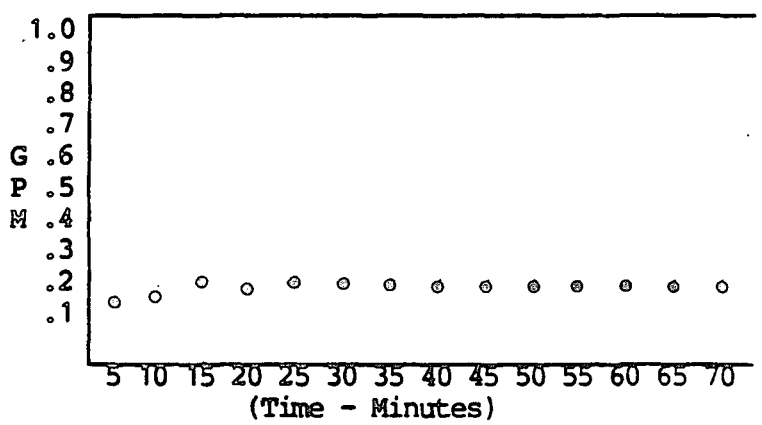
Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

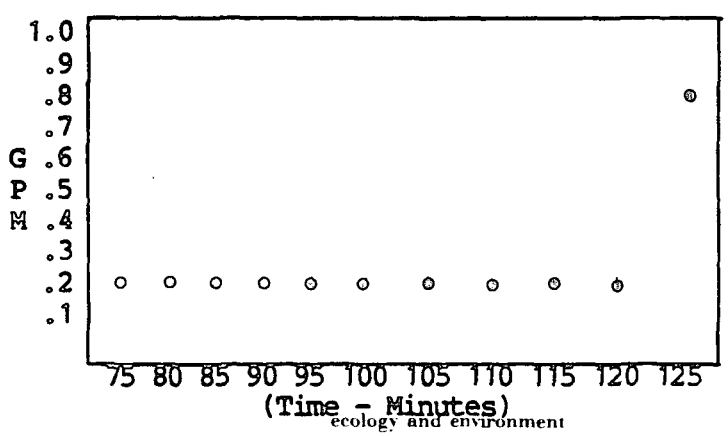
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
600	100	
800	62	
2518	42	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: ( ) Submersible (X) Bladder

Elapsed Time	Volume Pumped
5 Min.	0.9
10 Min.	1.0
15 Min.	1.2
20 Min.	1.1
25 Min.	1.2
30 Min.	1.2
35 Min.	1.2
40 Min.	1.2
45 Min.	1.2
50 Min.	1.2
55 Min.	1.2
60 Min.	1.2
65 Min.	1.2
70 Min.	1.2
75 Min.	1.2
80 Min.	1.2
85 Min.	1.2
90 Min.	1.2
95 Min.	1.2
100 Min.	1.2
105 Min.	1.2
110 Min.	1.2
125 Min.	12.2
Total Gallons =	38.0





Samples Collected for Analysis:	No
Water Bearing Interval:	No
Estimated Infiltration Rate:	$\geq$0.24 gpm*

*Since bladder pump capacity may not be greater

NOTES:

- Full pump pulses observed prior to and after packer inflation
- Initially, water dark gray with sediment, strong H_2S odor. Gradually cleared
- At completion, packer released and pumping rate remained constant.
- Conductivity meter fails to calibrate

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: C 74.0 - 89.4 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 9/25/86

Water Lost During Coring: 1,800 Gallons
Water Removed Including Pump Test: 2,715 Gallons

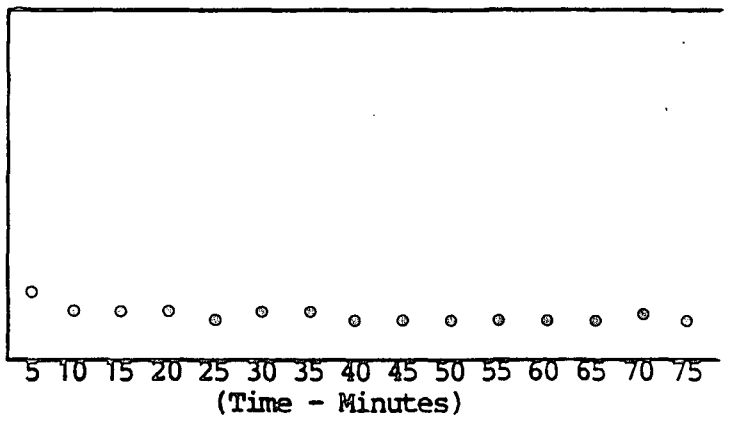
Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

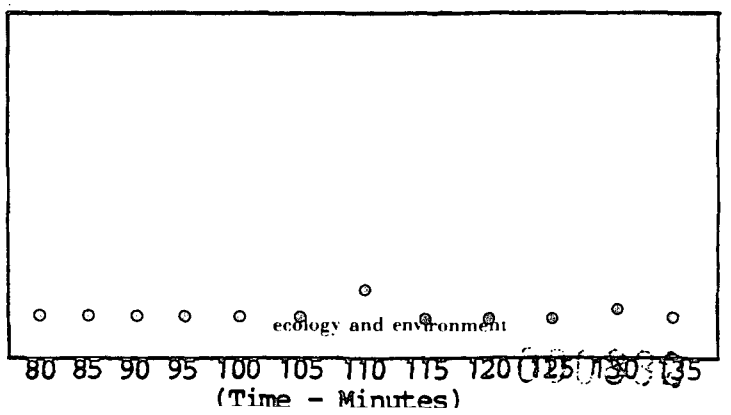
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
100	256	
200	210	
400	162	
1000	67	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: ( ) Submersible (X) Bladder

Elapsed Time	Volume Pumped
5 Min.	0.9
10 Min.	0.6
15 Min.	0.6
20 Min.	0.6
25 Min.	0.5
30 Min.	0.6
35 Min.	0.6
40 Min.	0.5
45 Min.	0.5
50 Min.	0.5
55 Min.	0.5
60 Min.	0.5
65 Min.	0.5
70 Min.	0.6
75 Min.	0.5
80 Min.	0.5
85 Min.	0.5
90 Min.	0.5
95 Min.	0.5
100 Min.	0.5
105 Min.	0.5
110 Min.	0.9





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115 Min.	0.5
120 Min.	0.5
125 Min.	0.5
130 Min.	0.6
135 Min.	0.5

Total Gallons = 15.9

Samples Collected for Analysis: Yes
Water Bearing Interval: Yes
Estimated Infiltration Rate: $\geq$0.11 gpm*

*Since bladder pump capacity may not be greater

NOTES:

- Conductivity samples destroyed

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: D. Millard

Interval/Depth Tested: D 89.4 - 104.4 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 9/30/86

Water Lost During Coring: 45 Gallons
Water Removed Including Pump Test: 403 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

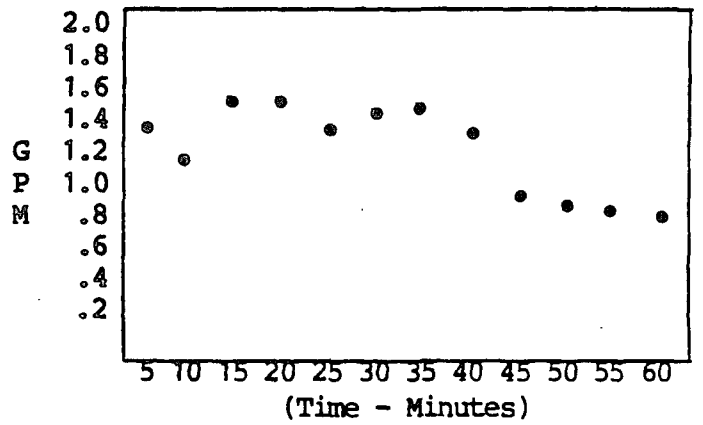
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
35	896	
91	704	
184	120	
243	86	
259	74	
305	71	
327	72	
327	68	
382	52	
399	35	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	7.0
10 Min.	6.0
15 Min.	8.0
20 Min.	8.0
25 Min.	7.0
30 Min.	7.3
35 Min.	7.8
40 Min.	6.8
45 Min.	4.8
50 Min.	4.5
55 Min.	4.3
60 Min.	4.2

Total Gallons = 75.7



Samples Collected for Analysis:	Yes
Water Bearing Interval:	Yes
Estimated Infiltration Rate:	0.87 gpm

NOTES:

- Static water level prior to pump test = 13.89 ft. BGS
- Packer inflated to 370 psi
- Twelve inches of rock left in borehole
- Many storms weathered
- Conductivity meter malfunction

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: E 104.4 - 119.4 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 10/02/86

Water Lost During Coring: 37 Gallons
Water Removed Including Pump Test: 117 Gallons

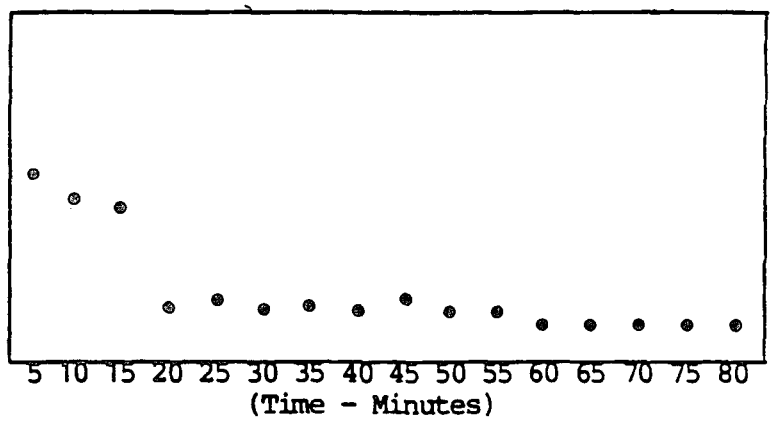
Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
5	910	
15	950	
25	950	
35	944	
45	939	
55	930	
66	291	
84	107	
100	242	
104	160	
105	105	
114	134	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	5.7
10 Min.	4.9
15 Min.	4.3
20 Min.	1.3
25 Min.	1.5
30 Min.	1.3
35 Min.	1.4
40 Min.	1.2
45 Min.	1.6
50 Min.	1.2
55 Min.	1.2
60 Min.	1.0
65 Min.	1.0



70 Min.	1.0
75 Min.	1.0
80 Min.	1.0
Total Gallons =	30.6

Samples Collected for Analysis:	No
Water Bearing Interval:	No
Estimated Infiltration Rate:	0.20 gpm

NOTES:

- Pump test was initially run for 60 minutes. An extended test was then repeated
- Static water level prior to pump test = 15.97 ft. BGS
- Packer inflated to 300 psi
- Pump rate increased to 4 gpm when packer deflated
- Conductivity readings unreliable

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: F 118.0 - 134.5 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 10/04/86

Water Lost During Coring: 55 Gallons
Water Removed Including Pump Test: 285 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

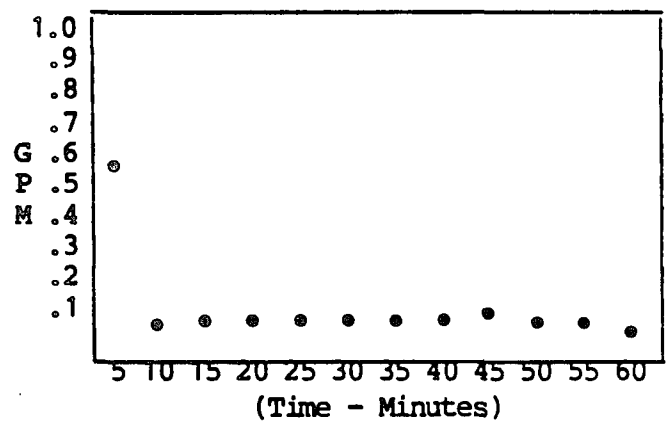
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
4.5	720	
9.0	757	
141	472	
173	172	
188	164	
284	161	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	2.9
10 Min.	0.4
15 Min.	0.5
20 Min.	0.5
25 Min.	0.5
30 Min.	0.5
35 Min.	0.5
40 Min.	0.5
45 Min.	0.6
50 Min.	0.5
55 Min.	0.4
60 Min.	0.3

Total Gallons = 8.3



Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.09 gpm

NOTES:

- During purging prior to pump test well ran dry twice and was allowed to recharge
- Pump rate increased to 3.5 gpm when packer deflated
- Conductivity meter batteries dead

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: G 133.7 - 149.4 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 10/08/86

Water Lost During Coring: 178 Gallons
Water Removed Including Pump Test: 305 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

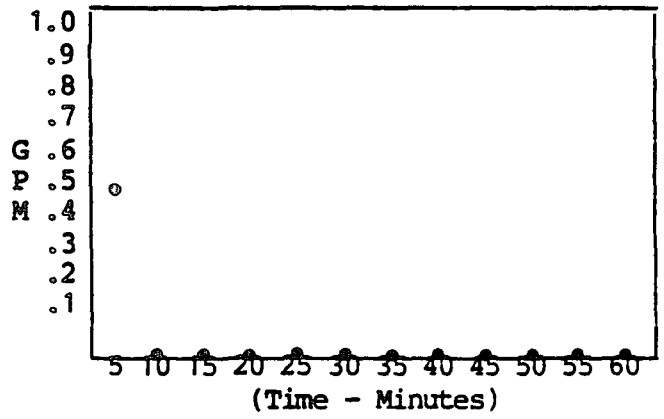
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
5	800	
14	916	
27	984	
50	920	
71	1,000	
89	927	
119	815	
149	438	
185	786	
190	268	
200	160	
303	94	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	2.5
10 Min.	0
15 Min.	0
20 Min.	0
25 Min.	0
30 Min.	0
35 Min.	0
40 Min.	0
45 Min.	0
50 Min.	0
55 Min.	0
60 Min.	0

Total Gallons = 2.5



102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: H 148.7 - 164.4 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 10/10/86

Water Lost During Coring: 63 Gallons
Water Removed Including Pump Test: 120 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

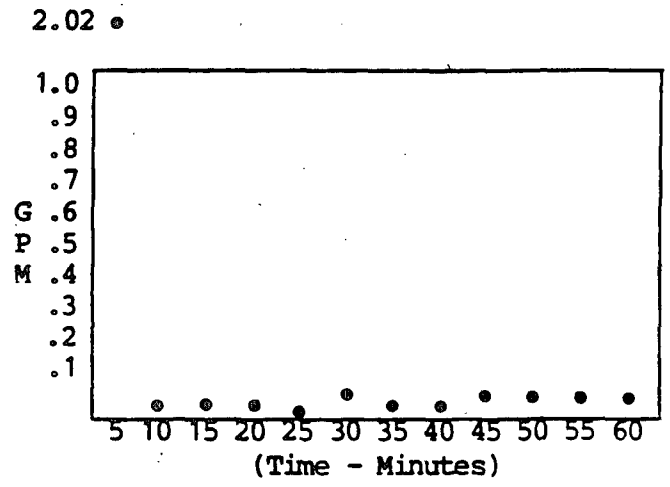
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
5	542	
10	590	
20	580	
30	612	
40	635	
50	643	
60	740	
70	671	
80	693	
90	668	
100	547	
110	591	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible (x) Bladder

Elapsed Time	Volume Pumped
5 Min.	10.1
10 Min.	0.2
15 Min.	0.2
20 Min.	0.2
25 Min.	0.1
30 Min.	0.3
35 Min.	0.2
40 Min.	0.2
45 Min.	0.3
50 Min.	0.3
55 Min.	0.3
60 Min.	0.3

Total Gallons = 12.5



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Samples Collected for Analysis:	No
Water Bearing Interval:	No
Estimated Infiltration Rate:	0.05 gpm

NOTES:

- At completion packer released and pump rate increased to 3.1 gpm
- No conductivity samples taken

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: I 160.8 - 179.4 ft. below ground surface
Interval Diameter: 5.75 inches
Date: 10/14/86

Water Lost During Coring: 0 Gallons
Water Removed Including Pump Test: 10 Gallons

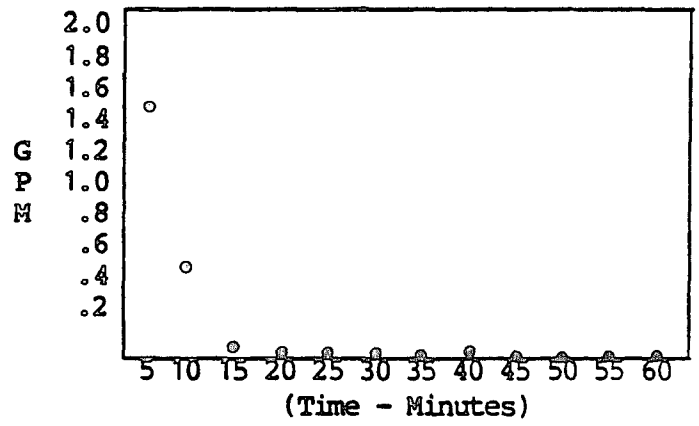
Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
	NOT MEASURED	

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	7.5
10 Min.	2.5
15 Min.	0.2
20 Min.	0.1
25 Min.	0.1
30 Min.	0.0
35 Min.	0.0
40 Min.	0.1
45 Min.	0.0
50 Min.	0.0
55 Min.	0
60 Min.	0



Total Gallons = 10.3

Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0 gpm

NOTES:

- Due to small water loss during coring, well was not purged prior to conducting pump test
- Pump rate increased to 4.5 gpm when packer deflated
- 2.5 ft. of rockcore left in borehole
- Packer inflated to 600 psi

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: K 186.7 - 201.7 ft. below ground surface
Interval Diameter: 3.0 inches
Date: 10/21/86

Water Lost During Coring: 89 Gallons
Water Removed Including Pump Test: 20 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

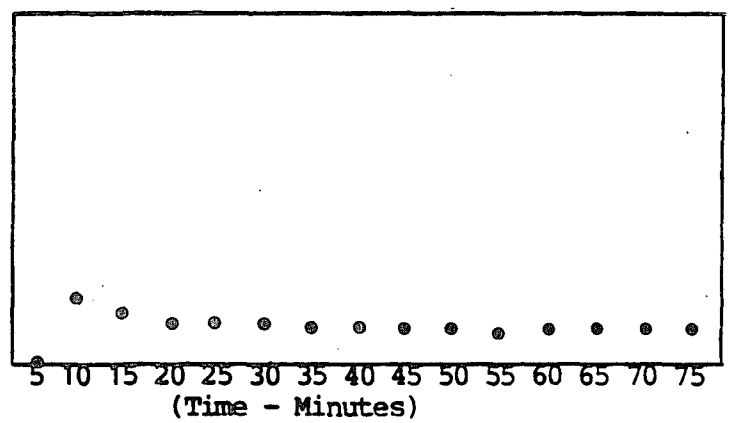
Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
10	296	7,700
17	140	7,440
23	56	>10,000

One Hour Pump Test:

Packer Inflated: (X) Yes ( ) No
Type of Pump Used: ( ) Submersible (X) Bladder

Elapsed Time	Volume Pumped
5 Min.	0
10 Min.	0.8
15 Min.	0.6
20 Min.	0.5
25 Min.	0.5
30 Min.	0.5
35 Min.	0.4
40 Min.	0.4
45 Min.	0.4
50 Min.	0.4
55 Min.	0.3
60 Min.	0.4
65 Min.	0.4
70 Min.	0.4
75 Min.	0.4

Total Gallons = 6.3



Samples Collected for Analysis: Yes (cancelled)
Water Bearing Interval: No
Estimated Infiltration Rate: 0.05 gpm

NOTES:

This interval was retested when interval L was tested and both zones combined were shown to be non-water bearing

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: L 186.7 - 216.7 ft. below ground surface
Interval Diameter: 3.0 inches
Date: 10/24/86

Water Lost During Coring: 97 Gallons
Water Removed Including Pump Test: 121 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

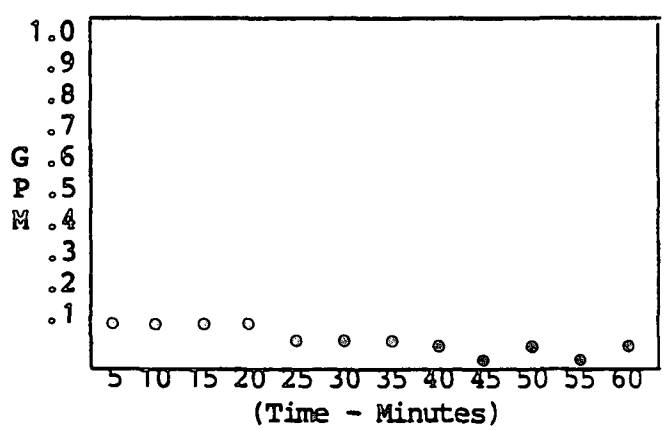
NOT MEASURED

One Hour Pump Test:

Packer Inflated: ( ) Yes (X) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	0.5
10 Min.	0.5
15 Min.	0.5
20 Min.	0.5
25 Min.	0.3
30 Min.	0.3
35 Min.	0.3
40 Min.	0.2
45 Min.	0.1
50 Min.	0.2
55 Min.	0.1
60 Min.	0.2

Total Gallons = 3.6



Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.03 gpm

NOTES:

- Submersible pumps set at top of NX corehole
- Water evacuated from well prior to pump test

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: OW44-86 Test Performed by: C. Padginton

Interval/Depth Tested: M 186.7 - 230.7 ft. below ground surface
Interval Diameter: 3.0 inches
Date: 10/27/86

Water Lost During Coring: 223 Gallons
Water Removed Including Pump Test: 92 Gallons

Tracer Measurements Taken:
Tracer Concentration in Drilling Water = 1,000 ppb

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

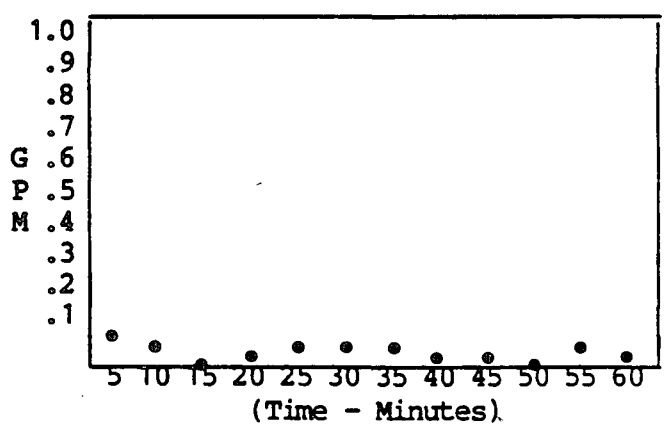
NOT MEASURED

One Hour Pump Test:

Packer Inflated: ( ) Yes (X) No
Type of Pump Used: (X) Submersible ( ) Bladder

Elapsed Time	Volume Pumped
5 Min.	0.3
10 Min.	0.2
15 Min.	0
20 Min.	0.1
25 Min.	0.2
30 Min.	0.2
35 Min.	0.2
40 Min.	0.1
45 Min.	0.1
50 Min.	0
55 Min.	0.2
60 Min.	0.1

Total Gallons = 1.4



Samples Collected for Analysis: No
Water Bearing Interval: No
Estimated Infiltration Rate: 0.02 gpm

NOTES:

- Possible error in outlet meter during coring
- Submersible pump set at top of NX corehole
- Water evacuated from well prior to pump test

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: JW/TG

Interval/Depth Tested: A 40.5 - 55.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 12/8/86

Water Lost During Coring: 147 Gallons
Water Removed Including Pump Test: 120 Gallons

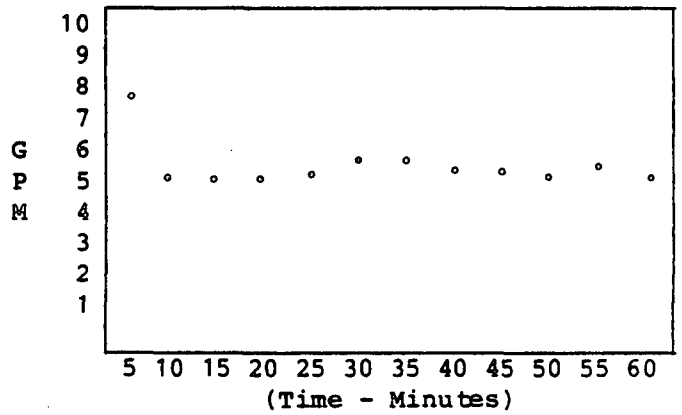
Tracer Measurements Taken:

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
171	134	2500
190	152	N/M
209	67	N/M
228	69	N/M
247	74	5000

One Hour Pump Test:

Elapsed Time	Volume Pumped
5 Min.	39
10 Min.	25
15 Min.	25
20 Min.	26
25 Min.	27
30 Min.	29
35 Min.	29
40 Min.	27
45 Min.	27
50 Min.	26
55 Min.	28
60 Min.	26

Total Gallons = 334



Samples Collected for Analysis: Yes
Water Bearing Interval: Yes

NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: JW/TG

Interval/Depth Tested: B 55.5 to 70.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 12/10/86

Water Lost During Coring: 598 Gallons
Water Removed Including Pump Test: 0 Gallons

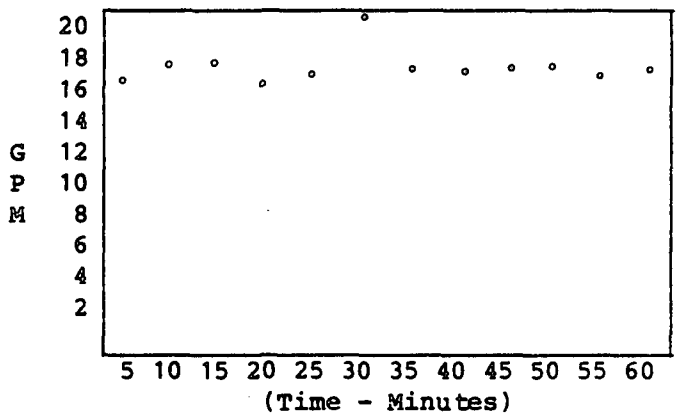
Tracer Measurements Taken:

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
877	63	2600
963	61	2600
1049	52	2600

One Hour Pump Test:

Elapsed Time	Volume Pumped
5 Min.	84
10 Min.	88
15 Min.	88
20 Min.	81
25 Min.	86
30 Min.	104
35 Min.	87
40 Min.	86
45 Min.	87
50 Min.	87
55 Min.	85
60 Min.	86

Total Gallons = 1049



Samples Collected for Analysis: Yes
Water Bearing Interval: Yes
NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: C 70.5 to 85.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 12/15/86

Water Lost During Coring: 52 Gallons
Water Removed Including Pump Test: Gallons

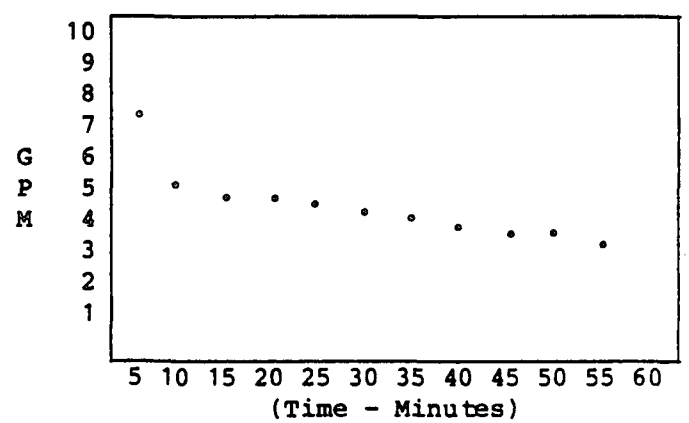
Tracer Measurements Taken:

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
216	81	N/M
235	50	N/M
252	54	4700

One Hour Pump Test:

Elapsed Time	Volume Pumped
5 Min.	37
10 Min.	26
15 Min.	24
20 Min.	24
25 Min.	23
30 Min.	22
35 Min.	21
40 Min.	20
45 Min.	19
50 Min.	19
55 Min.	17
100 Min.	135

Total Gallons = 387



Samples Collected for Analysis: Yes
Water Bearing Interval: Yes

NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: D 85.5 to 100.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 12/17/86

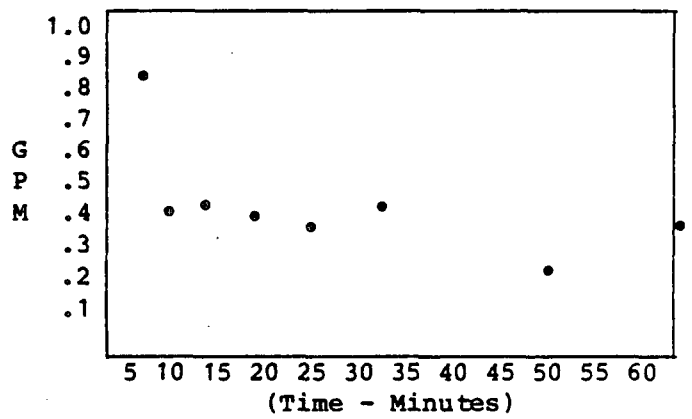
Water Lost During Coring: 63 Gallons
Water Removed Including Pump Test: 0 Gallons

Tracer Measurements Taken: Tracer Not Measured

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One Hour Pump Test:

Elapsed Time	Volume Pumped
1 Min.	11
7 Min.	5
9.5 Min.	1
13 Min.	1.5
19.5 Min.	2.5
25 Min.	2.0
33.5 Min.	4.0
49.5 Min.	4.0
65.0 Min.	4.0



Total Gallons = 35

Samples Collected for Analysis: No
Water Bearing Interval: No

NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: E 100.5 to 115.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 12/18/86

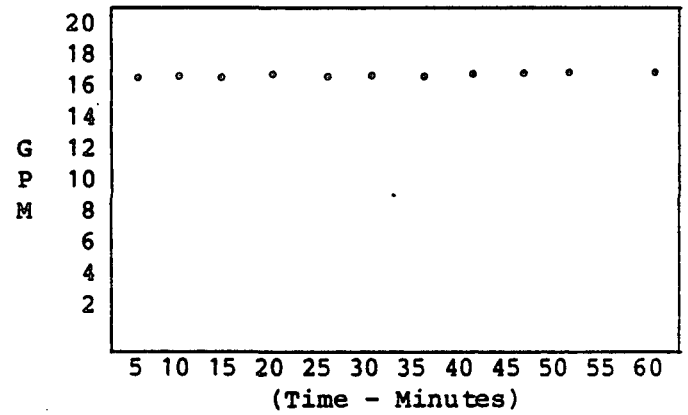
Water Lost During Coring: 372 Gallons
Water Removed Including Pump Test: 0 Gallons

Tracer Measurements Taken:

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)
839	49	N/M
923	43	N/M
1007	43	4350

One Hour Pump Test:

Elapsed Time	Volume Pumped
5 Min.	83
10 Min.	84
15 Min.	84
20 Min.	84
26 Min.	101
30 Min.	67
35 Min.	84
40 Min.	84
45 Min.	84
50 Min.	84
60 Min.	84



Total Gallons = 1007

Samples Collected for Analysis: Yes
Water Bearing Interval: No

NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: F 115.5 to 130.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 1/07/87

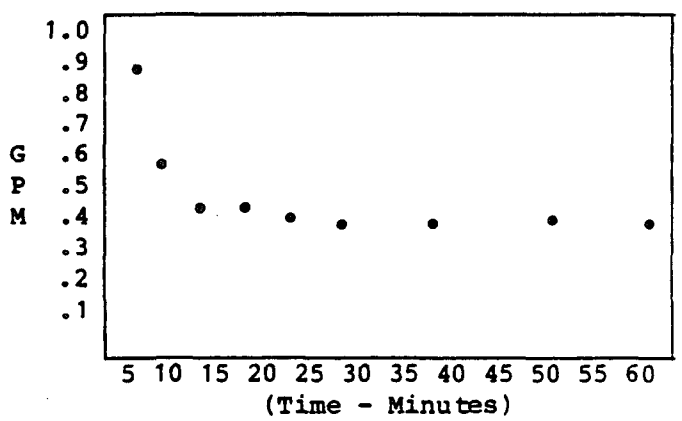
Water Lost During Coring: 486 Gallons
Water Removed Including Pump Test: 0 Gallons

Tracer Measurements Taken: N/A Non-Water Bearing

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One Hour Pump Test:

Elapsed Time	Volume Pumped
1.0 Min.	3
5.75 Min.	2
9.17 Min.	2
13.75 Min.	2
18.25 Min.	2
23.17 Min.	2
28.25 Min.	2
38.15 Min.	4
50.75 Min.	5
61.0 Min.	4



Total Gallons = 28

Samples Collected for Analysis:= No
Water Bearing Interval: No

NOTES:

Large water loss to fracture in interval E after grout failure in that interval is reason for excessive water loss during coring.

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: G 130.5 to 145.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 1/09/87

Water Lost During Coring: 88 Gallons
Water Removed Including Pump Test: 0 Gallons

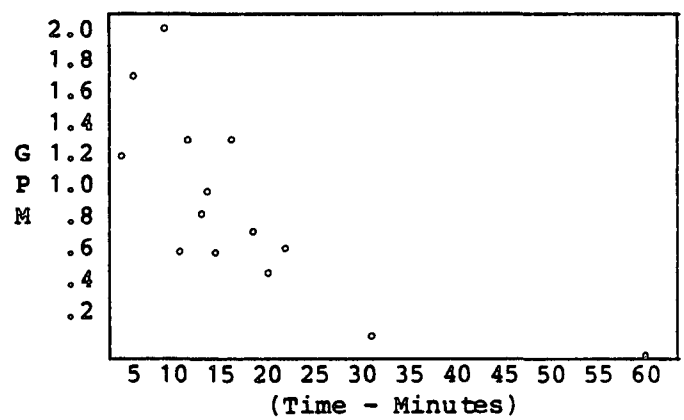
Tracer Measurements Taken: N/A Non-Water Bearing

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One Hour Pump Test:

Elapsed Time	Volume Pumped
0.3 Min.	2
1.95 Min.	2
4.3 Min.	4
4.5 Min.	4
7.95 Min.	7
9.75 Min.	1
10.5 Min.	1
11.73 Min.	1
12.76 Min.	1
14.5 Min.	1
15.3 Min.	1
18.2 Min.	2
20.54 Min.	1
22.2 Min.	1
32.0 Min.	1
60.0 Min.	0.5

Total Gallons = 31.5



Samples Collected for Analysis: No
Water Bearing Interval: No

NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: H 145.5 to 160.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 1/12/87

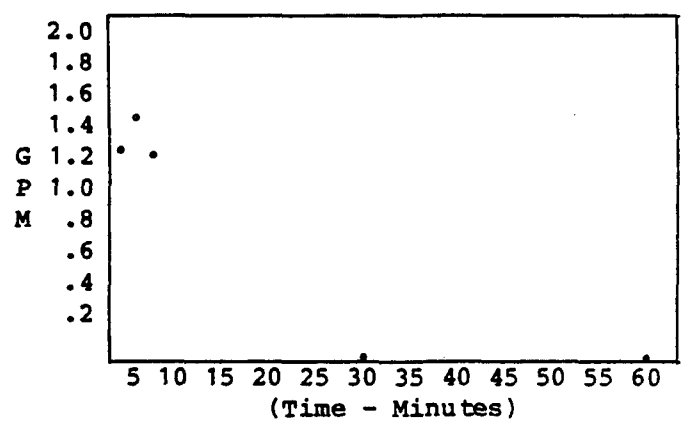
Water Lost During Coring: 58 Gallons
Water Removed Including Pump Test: 0 Gallons

Tracer Measurements Taken: N/A Non-Water Bearing

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One Hour Pump Test:

Elapsed Time	Volume Pumped
3.2 Min.	4
6.0 Min.	4
8.1 Min.	2.5
30 Min.	0.5
60 Min.	0.5



Total Gallons = 11

Samples Collected for Analysis: No
Water Bearing Interval: No

NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: I 160.5 to 175.5 ft. below ground surface
Interval Diameter: 6.0 inches
Date: 1/13/87

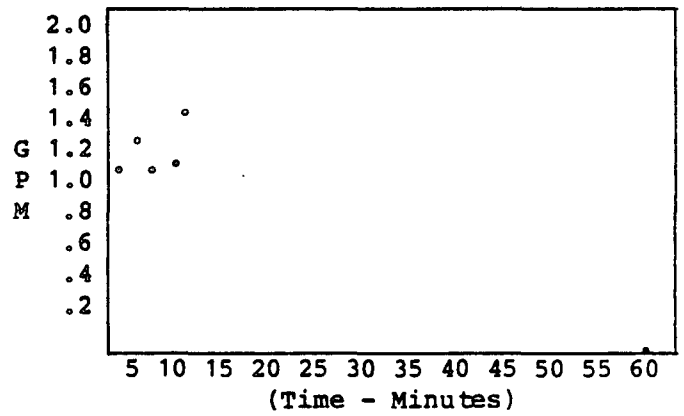
Water Lost During Coring: 0 Gallons
Water Removed Including Pump Test: 27 Gallons

Tracer Measurements Taken: N/A Non-Water Bearing

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One Hour Pump Test:

Elapsed Time	Volume Pumped
0.75 Min.	3
2.6 Min.	2
5.0 Min.	3
7.7 Min.	3
10.3 Min.	3
11.0 Min.	1
60.0 Min.	1



Total Gallons = 16

Samples Collected for Analysis: No
Water Bearing Interval: No

NOTES:

Twenty-seven (27) gallons of water removed from the boring prior to pumptest was for an initial test in which the packer ruptured.

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PR
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: J 175.5 to 190.5 ft. below ground su
Interval Diameter: 3.5 inches
Date: 1/15/87

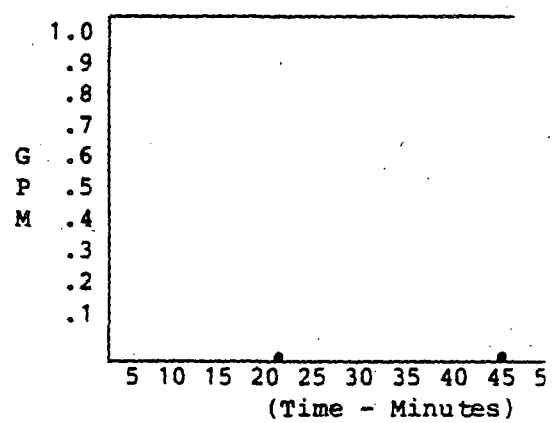
Water Lost During Coring: 50 Gallons
Water Removed Including Pump Test: 0.48 Gallons

Tracer Measurements Taken: N/A Non-Water Bearing

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One-Hour Pump Test:

Elapsed Time	Volume Pumped
22 Min.	0.25
45 Min.	0.172
60 Min.	0.094



Total Gallons = 0.52

Samples Collected for Analysis: No
Water Bearing Interval: No

NOTES:

Water was removed (0.48 gal) prior to pump test to test pump water from N

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102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: M /220.5 to 229.0 ft. below ground surface
Interval Diameter: 3.5 inches
Date: 1/20/87

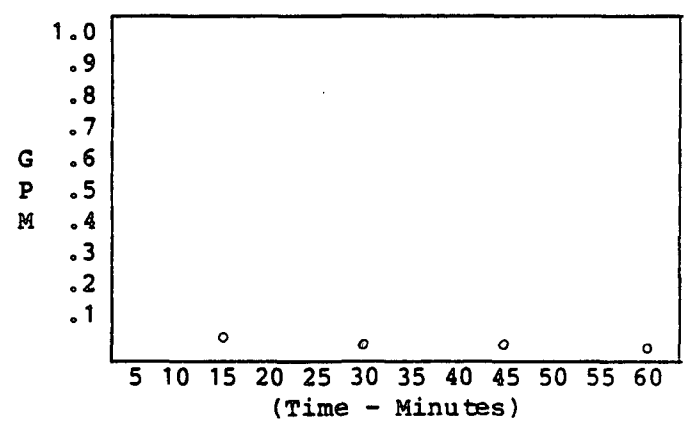
Water Lost During Coring: N/M Gallons
Water Removed Including Pump Test: 0 Gallons

Tracer Measurements Taken: N/A Non-Water Bearing

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One Hour Pump Test:

Elapsed Time	Volume Pumped
15 Min.	0.8
30 Min.	0.6
45 Min.	0.6
60 Min.	0.5



Total Gallons = 2.5

Samples Collected for Analysis: No
Water Bearing Interval: No

NOTES:

Pipeline water input and output meters frozen during coring. Therefore, no data is available on waterloss during coring.

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: L 205.5 to 220.5 ft. below ground surface
Interval Diameter: 3.5 inches
Date: 1/19/87

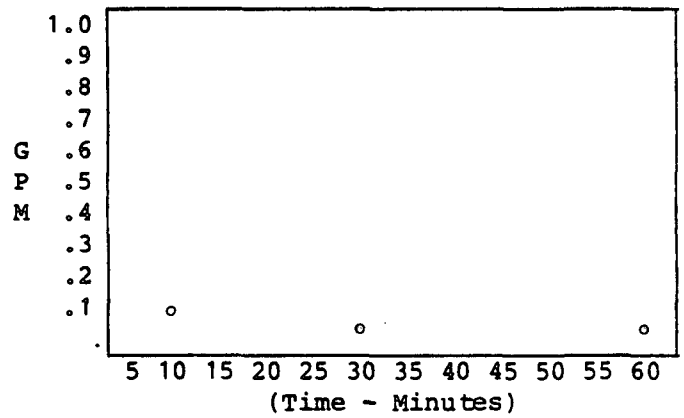
Water Lost During Coring: 4 Gallons
Water Removed Including Pump Test: 0 Gallons

Tracer Measurements Taken: N/A Non-Water Bearing

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One Hour Pump Test:

Elapsed Time	Volume Pumped
10 Min.	0.94
30 Min.	1.31
60 Min.	2.0



Total Gallons = 4.25

Samples Collected for Analysis: No
Water Bearing Interval: No

NOTES:

102ND STREET LANDFILL SITE - REMEDIAL INVESTIGATION PROGRAM
DEEP BEDROCK WELL PUMP TESTS

Well Number: MW8 Test Performed by: TG

Interval/Depth Tested: K 190.5 to 205.5 ft. below ground surface
Interval Diameter: 3.5 inches
Date: 1/16/87

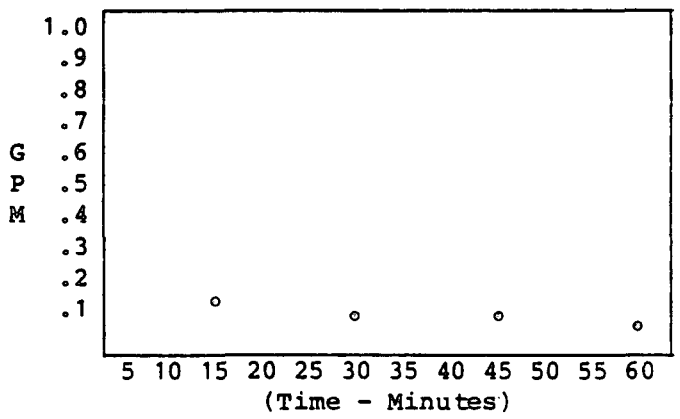
Water Lost During Coring: 15 Gallons
Water Removed Including Pump Test: 0 Gallons

Tracer Measurements Taken: N/A Non-Water Bearing

Water Volume (gal.)	Tracer Concentration (ppb)	Conductivity (umhos)

One Hour Pump Test:

Elapsed Time	Volume Pumped
15 Min.	2
30 Min.	1.5
45 Min.	1.5
60 Min.	1



Total Gallons = 6

Samples Collected for Analysis: No
Water Bearing Interval: No

NOTES:

RECOVERY SLUG TEST

OW1-79 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
11:20		1.50	
:21	0.0	3.50	1.00
:21:30	0.5	2.50	0.50
:21:22	1.0	2.09	0.30
:22:30	1.5	1.90	0.20
:21:23	2.0	1.61	0.055
:23:30	2.5	1.54	0.020
:21:24	3.0	1.52	0.010
:24:30	3.5	1.50	0.0

RECOVERY SLUG TEST

OW3-79 - MARCH 12, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
11:57		1.53	
12:03	0.0	2.12	1.00
:04	1.0	1.69	0.27
:05	2.0	1.58	0.085
:06	3.0	1.58	0.085
:07	4.0	1.58	0.085
:08	5.0	1.57	0.068
:09	6.0	1.57	0.068
:10	7.0	1.57	0.068
:11	8.0	1.57	0.068
:12	9.0	1.57	0.068
:22	19.0	1.56	0.051
:32	29.0	1.56	0.051
:42	39.0	1.55	0.034
:52	49.0	1.55	0.034
1:02	59.0	1.55	0.034
:36	93.0	1.54	0.017

RECOVERY SLUG TEST

OW5-79 - MARCH 12, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
1:11		12.42	
:25	0.0	14.15	1.00
:25:30	0.5	13.07	0.38
:26	1.0	12.75	0.17
:26:30	1.5	12.60	0.104
:27	2.0	12.50	0.046
:27:30	2.5	12.47	0.029
:28	3.0	12.45	0.017
:28:30	3.5	12.44	0.012
:29	4.0	12.44	0.012
:30	5.0	12.43	0.006
:31	6.0	12.43	0.006
:32	7.0	12.43	0.006
:35	10.0	12.43	0.006
:40	15.0	12.43	0.006
3:02	97.0	12.42	0.0

RECOVERY SLUG TEST

OW7-79 - MARCH 13, 1987

Time	Elapsed Time (minutes)	Depth (ft.)
10:02		11.91
:17	0.0	12.73
:17:30	0.5	12.24
:18	1.0	12.12
:18:30	1.5	11.98
:19	2.0	11.96
:19:30	2.5	11.94
:20	3.0	11.93
:20:30	3.5	11.93
:21	4.0	11.92

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RECOVERY SLUG TEST

OW9-79 - APRIL 2, 19

Time	Elapsed Time (minutes)	Depth (ft.)
1:52		
:53	0.0	11.80
:53:30	1.0	24.76
:54	1.5	24.56
:54:30	2.0	24.24
:55	2.5	24.15
:55:30	3.0	24.02
:56	3.5	23.87
:56:30	4.0	23.76
:57	4.5	23.62
:58	5.0	23.47
2:00	6.0	23.38
:01	8.0	23.12
:02	9.0	22.67
:07	10.0	22.33
:12	15.0	22.12
:17	20.0	21.01
:23	25.0	19.81
:39	31.0	18.63
:54	47.0	17.25
3:23	62.0	14.16
	51.00	12.45
		11.81

recycled paper

ecology and environment

RECOVERY SLUG TEST

OW10-79 - MARCH 12, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
3:42		14.96	
:56	0.0	20.18	1.00
:57	1.0	20.13	0.99
:58	2.0	20.04	0.97
:59	3.0	19.85	0.94
4:00	4.0	19.71	0.91
:01	5.0	19.66	0.90
:02	6.0	19.60	0.89
:03	7.0	19.58	0.89
:04	8.0	19.54	0.88
:05	9.0	19.49	0.87
:15	19.0	19.13	0.80
:25	29.0	18.76	0.73
:35	39.0	18.47	0.67
:45	49.0	18.19	0.62
5:00	64.0	17.71	0.53
:15	79.0	17.48	0.48
MARCH 13, 1987			
12:09	1213.0	14.78	----

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RECOVERY SLUG TEST

OW25-80 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	H-h / H-Ho
3:25		13.36	
:26	0.0	15.48	1.00
:26:30	0.5	15.02	0.78
:27	1.0	14.73	0.65
:27:30	1.5	14.50	0.54
:28	2.0	14.29	0.44
:28:30	2.5	14.17	0.38
:29	3.0	14.08	0.34
:29:30	3.5	13.93	0.27
:30	4.0	13.87	0.24
:30:30	4.5	13.83	0.22
:31	5.0	13.72	0.17
:32	6.0	13.60	0.113
:33	7.0	13.52	0.075
:34	8.0	13.47	0.052
:35	9.0	13.46	0.047
:36	10.0	13.44	0.038
:41	15.0	13.40	0.019
:46	20.0	13.36	0.0
:51	25.0	13.36	0.0

RECOVERY SLUG TEST

OW26-80 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
4:27		13.87	
:29	0.0	18.90	1.00
:29:30	0.5	18.49	0.92
:30	1.0	18.37	0.89
:30:30	1.5	18.27	0.87
:31	2.0	18.16	0.85
:31:30	2.5	18.00	0.82
:32	3.0	17.69	0.76
:32:30	3.5	17.55	0.73
:33	4.0	17.44	0.71
:33:30	4.5	17.27	0.68
:34	5.0	17.17	0.66
:35	6.0	16.96	0.61
:36	7.0	16.70	0.56
:37	8.0	16.40	0.50
:38	9.0	16.13	0.45
:39	10.0	15.80	0.38
:44	15.0	15.17	0.258
:49	20.0	14.78	0.181
:54	25.0	14.42	0.109
:59	30.0	14.22	0.069
5:14	45.0	13.97	0.020
:29	60.0	13.87	0.0

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RECOVERY SLUG TEST

OW27-80 - MARCH 13, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
9:50		7.96	
:53	0.0	10.79	1.00
:54	1.0	10.50	0.90
:55	2.0	10.06	0.74
:56	3.0	9.92	0.69
:57	4.0	9.73	0.63
:58	5.0	9.60	0.60
:59	6.0	9.46	0.53
10:00	7.0	9.33	0.48
:01	8.0	9.22	0.45
:02	9.0	9.13	0.41
:12	19.0	8.55	0.21
:22	29.0	8.29	0.12
:32	39.0	8.14	0.074
11:27	94.0	7.99	0.011
:47	114.0	7.96	0.0

RECOVERY SLUG TEST

OW28-80 - MARCH 12, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
1:42		7.63	
:51	0.0	15.73	1.00
:52	1.0	15.58	0.98
:53	2.0	15.50	0.97
:54	3.0	15.35	0.95
:55	4.0	15.25	0.94
:56	5.0	15.15	0.93
:57	6.0	15.08	0.92
:58	7.0	14.79	0.88
:59	8.0	14.75	0.88
2:00	9.0	14.66	0.87
:10	19.0	13.94	0.78
:20	29.0	13.37	0.71
:30	39.0	12.83	0.64
:40	49.0	12.32	0.58
4:22	151.0	9.23	0.20
5:20	209.0	8.52	0.11
MARCH 13, 1987			
11:33	1302.0	7.69	0.007

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RECOVERY SLUG TEST

OW29-80 - MARCH 12, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
1:59		10.61	
2:02	0.0	17.57	1.00
:02:30	0.5	17.48	0.99
:03	1.0	17.35	0.97
:03:30	1.5	17.22	0.95
:04	2.0	17.14	0.94
:04:30	2.5	17.02	0.92
:05	3.0	16.94	0.91
:06	4.0	16.82	0.89
:07	5.0	16.65	0.87
:08	6.0	16.50	0.85
:09	7.0	16.38	0.83
:10	8.0	16.15	0.80
:11	9.0	16.00	0.77
:12	10.0	15.88	0.76
:17	15.0	15.31	0.68
:22	20.0	14.77	0.60
:32	30.0	14.00	0.49
:42	40.0	13.30	0.39
:52	50.0	12.85	0.32
3:38	96.0	11.51	0.13
5:33	211.0	10.77	0.023
MARCH 13, 1987			
12:00	1318.0	10.66	

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RECOVERY SLUG TEST

OW30-80 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
1:50		13.87	
:52	0.0	16.96	1.00
:52:30	0.5	16.63	0.89
:53	1.0	16.31	0.80
:53:30	1.5	15.93	0.67
:54	2.0	15.70	0.59
:54:30	2.5	15.51	0.53
:55	3.0	15.35	0.48
:55:30	3.5	15.15	0.41
:56	4.0	15.05	0.38
:56:30	4.5	14.90	0.33
:57	5.0	14.82	0.31
:58	6.0	14.65	0.25
:59	7.0	14.54	0.22
2:00	8.0	14.42	0.178
:01	9.0	14.34	0.152
:02	10.0	14.29	0.136
:07	15.0	14.10	0.074
:12	20.0	14.04	0.055
:17	25.0	14.02	0.049
:32	40.0	14.01	0.045
5:35	223.0	14.00	0.042

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RECOVERY SLUG TEST

OW31-85 - MARCH 19, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	H-h / H-Ho
3:00		9.74	
:22	0.0	12.17	1.00
:22:30	0.5	11.46	0.71
:23	1.0	10.79	0.43
:23:30	1.5	10.31	0.23
:24	2.0	10.05	0.128
:24:30	2.5	9.88	0.058
:25	3.0	9.82	0.033
:25:30	3.5	9.76	0.008
:26	4.0	9.76	0.008
:26:30	4.5	9.75	0.004
:27	5.0	9.74	0.0
:28	6.0	9.74	0.0
:29	7.0	9.73	-----

RECOVERY SLUG TEST

OW32-85 - MARCH 12, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
3:43		11.25	
:48	0.0	13.24	1.00
:48:30	0.5	12.94	0.85
:49	1.0	12.50	0.63
:49:30	1.5	12.24	0.50
:50	2.0	12.08	0.42
:50:30	2.5	11.97	0.36
:51	3.0	11.91	0.33
:51:30	3.5	11.79	0.27
:52	4.0	11.74	0.25
:52:30	4.5	11.73	0.24
:53	5.0	11.71	0.23
:54	6.0	11.67	0.21
:55	7.0	11.62	0.19
:56	8.0	11.59	0.17
:57	9.0	11.56	0.156
:58	10.0	11.53	0.141
4:03	15.0	11.48	0.116
:08	20.0	11.39	0.070
:13	25.0	11.34	0.045
:18	30.0	11.32	0.035
:28	40.0	11.31	0.030
:38	50.0	11.28	0.015
:54	66.0	11.27	0.010
5:15	87.0	11.27	0.010

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RECOVERY SLUG TEST

OW33-85 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
3:18		12.83	
:43	0.0	14.32	1.00
:45	2.0	13.60	0.52
:46	3.0	13.46	0.42
:46:30	3.5	13.34	0.34
:47	4.0	13.27	0.30
:47:30	4.5	13.23	0.27
:48	5.0	13.14	0.21
:48:30	5.5	13.13	0.20
:49	6.0	13.13	0.20
:50	7.0	13.02	0.128
:51	8.0	12.99	0.107
:52	9.0	12.97	0.094
:53	10.0	12.95	0.081
:58	15.0	12.85	0.013
4:03	20.0	12.85	0.013
5:29	106.0	12.81	-----

RECOVERY SLUG TEST

OW34-85 - ARPIL 3, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	H-h / H-Ho
		11.79	
12:43	0.0	14.47	1.00
:43:30	0.5	14.31	0.94
:44	1.0	14.07	0.85
:44:30	1.5	13.90	0.79
:45	2.0	13.85	0.77
:45:30	2.5	13.79	0.75
:46	3.0	13.74	0.73
:46:30	3.5	13.70	0.71
:47	4.0	13.65	0.69
:47:30	4.5	13.62	0.68
:49	6.0	13.54	0.65
:50	7.0	13.45	0.62
:51	8.0	13.38	0.59
:52	9.0	13.32	0.57
:53	10.0	13.25	0.54
:58	15.0	13.06	0.47
1:06	23.0	12.84	0.39
:20	37.0	12.58	0.29
:25	42.0	12.49	0.26
:49	66.0	12.36	0.21
3:36	173.0	12.07	0.104
5:13	270.0	11.99	0.075

RECOVERY SLUG TEST

OW35-85 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	H-h / H-Ho
1:40		10.98	
:52	0.0	12.17	1.00
:53	1.0	11.49	0.43
:54	2.0	11.28	0.25
:54:30	2.5	11.20	0.185
:55	3.0	11.17	0.160
:56	4.0	11.14	0.134
:57	5.0	11.10	0.101
:58	6.0	11.08	0.084
:59	7.0	11.05	0.059
2:00	8.0	11.04	0.050
:05	13.0	11.00	0.017
:10	18.0	10.99	0.008
:15	23.0	10.98	0.0

RECOVERY SLUG TEST

OW36-85 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
1:11		10.70	
:20	0.0	12.43	1.00
:20:30	0.5	11.96	0.73
:21	1.0	11.15	0.26
:21:30	1.5	11.00	0.173
:22	2.0	10.84	0.081
:22:30	2.5	10.80	0.058
:23	3.0	10.77	0.040
:23:30	3.5	10.73	0.017
:24	4.0	10.73	0.017
:24:30	4.5	10.78	0.017
:25	5.0	10.72	0.012
:26	6.0	10.72	0.012
:27	7.0	10.71	0.006
:28	8.0	10.71	0.006
:30	10.0	10.70	0.0

RECOVERY SLUG TEST

OW37-85 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	H-h / H-Ho
10:38		7.68	
:44	0.0	9.46	1.0
:44:30	0.5	9.30	0.91
:45	1.0	9.17	0.84
:45:30	1.5	8.98	0.73
:46	2.0	8.93	0.70
:46:30	2.5	8.89	0.68
:47	3.0	8.79	0.62
:47:30	3.5	8.73	0.60
:48	4.0	8.67	0.56
:48:30	4.5	8.61	0.52
:49	5.0	8.53	0.48
:50	6.0	8.45	0.43
:51	7.0	8.35	0.38
:52	8.0	8.25	0.32
:53	9.0	8.22	0.30
:54	10.0	8.16	0.27
:59	15.0	7.99	0.174
11:04	20.0	7.88	0.112
:09	25.0	7.78	0.056
:14	30.0	7.77	0.051
:29	45.0	7.72	0.022
:34	50.0	7.70	0.011
:58	74.0	7.71	0.017
5:39		7.67	-----

RECOVERY SLUG TEST

OW38-85 - MARCH 13, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
10:51		9.83	
:54	0.0	10.84*	

*could not get plopper to sound and could not read tape.

10.84 is bottom.

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RECOVERY SLUG TEST

OW39-85 - MARCH 13, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
11:11		6.10	
:16	0.0	6.77	1.00
:17	1.0	6.30	0.30
:18	2.0	6.26	0.24
:19	3.0	6.21	0.16
:20	4.0	6.19	0.13
:21	5.0	6.17	0.104
:22	6.0	6.16	0.090
:23	7.0	6.15	0.075
:25	8.0	6.14	0.060
:25	9.0	6.14	0.060
:35	19.0	6.12	0.030
:45	29.0	6.11	0.015
:55	39.0	6.10	0.0

RECOVERY SLUG TEST

OW40-85 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
10:15		10.37	
:25	0.0	11.79	1.0
:25:30	0.5	11.00	0.44
:26	1.0	10.67	0.21
:26:30	1.5	10.51	0.099
:27	2.0	10.47	0.070
:27:30	2.5	10.45	0.056
:28	3.0	10.42	0.035
:28:30	3.5	10.41	0.028
:29	4.0	10.40	0.021
:29:30	4.5	10.39	0.014
:30	5.0	10.38	0.007
:31	6.0	10.38	0.007
:32	7.0	10.37	0.0

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RECOVERY SLUG TEST

OW41-85 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
9:44		11.86	
10:13	0.0	13.73	1.0
:14	1.0	13.69	0.98
:15	2.0	13.67	0.97
:16	3.0	13.62	0.94
:17	4.0	13.60	0.93
:18	5.0	13.59	0.93
:19	6.0	13.58	0.92
:20	7.0	13.56	0.91
:21	8.0	13.55	0.90
:22	9.0	13.53	0.89
:32	19.0	13.44	0.84
:45	32.0	13.27	0.75
11:00	47.0	13.08	0.65
:27	74.0	12.75	0.48
:59	106.0	12.43	0.30
5:40	447.0	11.88	0.011

RECOVERY SLUG TEST

OW43-86 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
2:45		15.18	
:57	0.0	16.43	1.0
:57:30	0.5	15.64	0.37
:58	1.0	15.39	0.168
:58:30	1.5	15.32	0.112
:59	2.0	15.28	0.080
:59:30	2.5	15.27	0.072
3:00	3.0	15.25	0.056
:00:30	3.5	15.23	0.040
:01	4.0	15.22	0.032
:01:30	4.5	15.22	0.032
:02	5.0	15.21	0.024
:03	6.0	15.19	0.008

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RECOVERY SLUG TEST

OW45-86 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
2:40		14.72	
3:02		14.72	

RECOVERY SLUG TEST

OW46-85 - MARCH 19[illegible]19

Time	Elapsed Time (minutes)	Depth (ft.)
2:40		14.46

Water level lowered only 3 in. after pumping minutes.

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Slug Test-26

RECOVERY SLUG TEST

OW47-85 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
11:41		11.70	
:42	0.0	13.50	1.0
:42:30	0.5	12.76	0.59
:43	1.0	12.58	0.49
:43:30	1.5	12.33	0.35
:44	2.0	12.10	0.22
:44:30	2.5	11.98	0.156
:45	3.0	11.85	0.083
:45:30	3.5	11.79	0.050
:46	4.0	11.77	0.039
:46:30	4.5	11.75	0.028
:47	5.0	11.74	0.022
:48	6.0	11.73	0.017
:49	7.0	11.72	0.011
:50	8.0	11.72	0.011
:51	9.0	11.72	0.011
1:07	165	11.71	0.056

RECOVERY SLUG TEST

OW48-86 - MARCH 20, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
12:12		5.60	
:23	0.0	6.61	1.0
:23:30	0.5	6.00	0.40
:24	1.0	5.77	0.172
:24:30	1.5	5.68	0.081
:25	2.0	5.63	0.030
:25:30	2.5	5.62	0.020
:26	3.0	5.61	0.010
:26:30	3.5	5.61	0.010
:27	4.0	5.60	0.0
:27:30	4.5	5.60	0.0
:28	5.0	5.60	0.0

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RECOVERY SLUG TEST

OW49-86 - MARCH 20, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
10:57		5.89	
11:03	0.0	6.29	1.00
:03:30	0.5	5.99	0.25
:04	1.0	5.92	0.075
:04:30	1.5	5.90	0.025
:05	2.0	5.89	0.0
:05:30	2.5	5.88	-----
:06	3.0	5.88	-----
:06:30	3.5	5.88	-----

RECOVERY SLUG TEST

OW50-86 - MARCH 20, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
11:13		5.67	
:15	0.0	7.77	1.00
:15:30	0.5	7.57	0.90
:16	1.0	7.40	0.82
:16:30	1.5	7.28	0.77
:17	2.0	7.17	0.71
:17:30	2.5	7.06	0.66
:18	3.0	7.00	0.63
:18:30	3.5	6.90	0.59
:19	4.0	6.88	0.58
:19:30	4.5	6.78	0.53
:20	5.0	6.73	0.50
:21	6.0	6.62	0.45
:22	7.0	6.52	0.40
:23	8.0	6.42	0.36
:24	9.0	6.37	0.33
:25	10.0	6.28	0.27
:30	15.0	6.03	0.171
:35	20.0	5.94	0.129
:40	25.0	5.79	0.057
:45	30.0	5.76	0.043
12:00	45.0	5.73	0.029
:34	79.0	5.66	-----

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RECOVERY SLUG TEST

OW51-86 - MARCH 27 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
		5.88	
12:13	0.0	6.58	1.00
:13:30	0.5	6.23	0.50
:14	1.0	5.94	0.086
:14:30	1.5	5.89	0.014
:15	2.0	5.88	0.0

RECOVERY SLUG TEST

OW52-86 - MARCH 27, 1987

Time	Elapsed Time (minutes)	Depth (ft)	
		6.93	
2:01	0.0	11.89	1
:01:30	0.5	11.38	0
:02	1.0	10.96	0
:03	2.0	10.41	0.
:03:30	2.5	10.08	0.
:04	3.0	9.87	0.
:04:30	3.5	9.67	0.
:05	4.0	9.45	0.
:05:30	4.5	9.26	0.
:06	5.0	9.14	0.4
:07	6.0	8.84	0.3
:08	7.0	8.60	0.3
:09	8.0	8.38	0.2
:10:30	9.5	8.15	0.2
:11	10.0	8.06	0.22
:22	21.0	7.24	0.06
:31	30.0	7.06	0.02
:46	45.0	7.00	0.01

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RECOVERY SLUG TEST

OW53-86 - APRIL 14. 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
11:18		6.36	
:30		6.36	

Pumped 5 gallons (0.42 gpm) and water level did not change.

RECOVERY SLUG TEST

OW54-86 - MARCH 18, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
		4.50	
12:30	0.0	5.42	1.00
:30:30	0.5	4.88	0.41
:31	1.0	4.73	0.25
:31:30	1.5	4.63	0.141
:32	2.0	4.61	0.120
:32:30	2.5	4.58	0.087
:33	3.0	4.56	0.065
:33:30	3.5	4.54	0.043
:34	4.0	4.54	0.043
:34:30	4.5	4.54	0.043
:35	5.0	4.53	0.033
:36	6.0	4.53	0.033
:38	8.0	4.52	0.022
:48	18.0	4.50	0.0

000914A

RECOVERY SLUG TEST

OW55-86 - APRIL 14. 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
10:46		5.66	
:47	0.0	8.92	1.00
:47:30	0.5	8.50	0.87
:48	1.0	7.90	0.69
:48:30	1.5	7.60	0.60
:49	2.0	7.33	0.51
:49:30	2.5	7.12	0.45
:50	3.0	6.93	0.39
:50:30	3.5	6.67	0.31
:51	4.0	6.57	0.28
:51:30	4.5	6.42	0.23
:52	5.0	6.34	0.209
:53	6.0	6.18	0.160
:54	7.0	6.06	0.123
:55	8.0	5.95	0.089
:56	9.0	5.88	0.067
:57	10.0	5.83	0.052
11:02	15.0	5.69	0.009
:07	20.0	5.65	-----

RECOVERY SLUG TEST

OW56-86 - MARCH 26, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
		6.68	
10:35	0.0	6.82	1.00
:35:30	0.5	6.70	0.143
:36	1.0	6.69	0.071
:36:30	1.5	6.69	0.071
:37	2.0	6.69	0.071

000915A

RECOVERY SLUG TEST

OW57-86 - APRIL 15, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
10:14		6.57	
:15	0.0	9.96	1.00
:15:30	0.5	9.49	0.86
:16	1.0	9.32	0.81
:16:30	1.5	9.18	0.77
:17	2.0	9.12	0.75
:17:30	2.5	9.03	0.73
:18	3.0	8.97	0.71
:18:30	3.5	8.87	0.68
:19	4.0	8.81	0.66
:19:30	4.5	8.73	0.64
:20	5.0	8.68	0.62
:21	6.0	8.57	0.59
:22	7.0	8.45	0.55
:23	8.0	8.35	0.53
:24	9.0	8.26	0.50
:25	10.0	8.18	0.47
:30	15.0	7.83	0.37
:35	20.0	7.59	0.30
:40	25.0	7.36	0.23
11:13	58.0	6.79	0.065
:41	86.0	6.61	0.012
1:08	173.0	6.55	-----

Time	Elapsed Time (minutes)	
12:37		
:38	0.0	
:38:30	0.5	
:39	1.0	
:39:30	1.5	
:40	2.0	
:40:30	2.5	[illegible]
:41	3.0	3
:41:30	3.5	3
:42	4.0	3
:42:30	4.5	3.
:43	5.0	3.
:44	6.0	3.
:45	7.0	3.[illegible]
:46	8.0	2.[illegible]
:47	9.0	2.9
:48	10.0	2.8
:53	15.0	2.6[illegible]
:58	20.0	2.52
1:03	25.0	2.49

000916A

RECOVERY SLUG TEST

OW59-86 - MARCH 13, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
11:34		5.84	
:35	0.0	7.94	1.00
:35:30	0.5	7.35	0.72
:36	1.0	6.92	0.51
:36:30	1.5	6.63	0.38
:37	2.0	6.33	0.23
:37:30	2.5	6.11	0.13
:38	3.0	6.03	0.090
:38:30	3.5	6.00	0.076
:39	4.0	5.93	0.043
:39:30	4.5	5.88	0.019
:40	5.0	5.86	0.010
:41	6.0	5.86	0.010
:42	7.0	5.85	0.005
:43	8.0	5.85	0.005
:44	9.0	5.84	0.0

RECOVERY SLUG TEST

OW60-86 - ARPIL 14, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
1:14		1.89	
:15	0.0	5.10	1.00
:15:30	0.5	4.89	0.93
:16	1.0	4.72	0.88
:16:30	1.5	4.58	0.84
:17	2.0	4.51	0.82
:17:30	2.5	4.40	0.78
:18	3.0	4.30	0.75
:18:30	3.5	4.21	0.72
:19	4.0	4.14	0.70
:19:30	4.5	4.04	0.67
:20	5.0	3.92	0.63
:21	6.0	3.68	0.56
:22	7.0	3.56	0.52
:23	8.0	3.38	0.46
:24	9.0	3.25	0.42
:25	10.0	3.12	0.38
:30	15.0	2.65	0.24
:35	20.0	2.33	0.137
:40	25.0	2.15	0.081
:50	35.0	1.95	0.019
2:00	45.0	1.89	0.0

000917A

RECOVERY SLUG TEST

OW61-86 - MARCH 13, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	$\frac{H-h}{H-Ho}$
10:38		6.08	
:40	0.0	7.71	1.00
:41	1.0	6.85	0.47
:42	2.0	6.42	0.21
:43	3.0	6.26	0.11
:44	4.0	6.16	0.049
:45	5.0	6.12	0.025
:46	6.0	6.09	0.006
:47	7.0	6.08	0.0
:48	8.0	6.08	0.0

RECOVERY SLUG TEST

OW62-87 - ARPIL 3, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	H-h / H-Ho
		10.95	
3:48	0.0	17.05	1.00
:48:30	0.5	16.95	0.98
:49	1.0	16.72	0.95
:49:30	1.5	16.53	0.91
:50	2.0	16.24	0.87
:50:30	2.5	16.15	0.85
:51	3.0	16.11	0.85
:51:30	3.5	16.07	0.84
:52	4.0	16.02	0.83
:52:30	4.5	15.98	0.82
:53	5.0	15.94	0.82
:54	6.0	15.91	0.81
:55	7.0	15.86	0.80
:56	8.0	15.75	0.79
:57	9.0	15.69	0.78
:58	10.0	15.65	0.77
4:03	15.0	15.26	0.71
:08	20.0	15.02	0.67
:18	30.0	14.54	0.59
5:08	80.0	12.93	0.32

000918A

RECOVERY SLUG TEST

OW63-87 - ARPIL 2, 1987

Time	Elapsed Time (minutes)	Depth (ft.)	H-h / H-Ho
		11.26	
10:52	0.0	14.27	1.00
:52:30	0.5	13.99	0.91
:53	1.0	13.81	0.85
:53:30	1.5	13.58	0.77
:54	2.0	13.31	0.68
:54:30	2.5	13.06	0.60
:55	3.0	12.87	0.53
:55:30	3.5	12.72	0.49
:56	4.0	12.50	0.41
:56:30	4.5	12.47	0.40
:57	5.0	12.36	0.365
:58	6.0	12.17	0.30
:59	7.0	12.08	0.27
11:00	8.0	12.00	0.245
:01	9.0	11.94	0.225
:02	10.0	11.87	0.203
:07	15.0	11.68	0.140
:12	20.0	11.58	0.106
:18	26.0	11.50	0.080
:22	30.0	11.47	0.070
:37	45.0	11.42	0.053
:52	60.0	11.39	0.043
1:50	178.	11.32	0.020

RECOVERY TEST RESULTS

Well No.	Average K (Permeability Factor) Cm/Sec	Equation Used
OW2-79	1.0×10^{-6}	2
OW6-79	5.0×10^{-4}	2
OW8-79	1.7×10^{-3}	2
OW9-79	7.0×10^{-6}	2
OW11-79	5.2×10^{-6}	2
OW12-79	3.9×10^{-6}	1
OW13-79	1.0×10^{-3}	2
OW14-79	1.1×10^{-5}	2
OW15-79	8.6×10^{-6}	2
OW16-79	4.9×10^{-4}	2
OW17-79	5.0×10^{-3}	2
OW18-79	7.7×10^{-5}	2
OW19-79	1.9×10^{-6}	2
OW20-79	1.9×10^{-6}	2
OW21-79	1.0×10^{-2}	2
OW22-79	8.8×10^{-6}	2
OW23-79	Insufficient data*	-
OW24-79	2.5×10^{-3}	2

* 99% recovery within 3 minutes.

NOTES: Permeability, K, calculated using one of the following variable head equations:

1) $$K = \frac{R^2}{2L\ (t_2 - t_1)} \left(\ln \left(\frac{L}{R_2}\right)\right) \left(\ln \left(\frac{H_1}{H_2}\right)\right)$$

2) $$K = \frac{\pi\ R_1}{4\ (t_2 - t_1)} \left(\ln \left(\frac{H_1}{H_2}\right)\right) \left(\frac{A_2}{A_1}\right)$$

where L = length of sand pack (cm)
R_1 = Radius of augered hole (cm)
R_2 = Radius of pipe (cm)
A_1 = Area of augered hole (cm^2)
A_2 = Area of pipe (cm^2)

Reference - Design Manual Soil Mechanics Foundations, and Earth Structures, NAVFAC DM-7, March 1971.

SUMMARY OF IN SITU (SLUG) TEST DATA

OLIN WELL #	UNIT TESTED	HYDRAULIC CONDUCTIVITY
B1	Shallow bedrock	2.810×10^{-3} cm/sec.
B2	Shallow bedrock	1.067×10^{-3} cm/sec.
B3	Shallow bedrock	2.38×10^{-2} cm/sec.
B4	Shallow bedrock	9.449×10^{-3} cm/sec.
MW7	Shallow bedrock	4.05×10^{-4} cm/sec.
MW3	Alluvium	2.658×10^{-4} cm/sec.
MW9	Alluvium	1.20×10^{-4} cm/sec.
MW17	Alluvium	4.2×10^{-3} cm/sec.
MW19	Alluvium	2.33×10^{-2} cm/sec.