ROBERTA L. JENNINGS
BELINDA STAUROWSKY
CONSULTING HYDROGEOLOGISTS

2926 N. SHOREWOOD DRIVE
McHENRY, ILLINOIS 60050-0340
815 / 344-0017

A.I.P.G. CPGS 6440
IND. CPG 257

US EPA RECORDS CENTER REGION 5
473880

May 3, 1995

Tom Hilbert
Winnebago Reclamation Services
8403 Lindenwood Road
Rockford, IL 61109

re: Field Investigation Report

Dear Tom,

Enclosed is the final Field Investigation Report for Winnebago Reclamation Services - Pagel Landfill. A complete copy has also been express mailed to Dan Burnell at GEOTRANS.

Thank you for the opportunity to work with you again. I wish you a speedy and successful end to your project.

Sincerely,

Belinda Staurowsky

Belinda Staurowsky
Consulting Hydrogeologist

ROBERTA L. JENNINGS
BELINDA STAUROWSKY
CONSULTING HYDROGEOLOGISTS

2926 N. SHOREWOOD DRIVE
McHENRY, ILLINOIS 60050-0340
815 / 344-0017

A.I.P.G. CPGS 6440
IND. CPG 257

FIELD INVESTIGATION REPORT
FOR
WINNEBAGO RECLAMATION SERVICE - PAGEL LANDFILL
February and March, 1995

At the request of Winnebago Reclamation Services (WRS), Jennings & Staurowsky (J&S) were onsite to perform tasks for a field program at Pagel Landfill conducted in February and March, 1995. The investigation was designed to provide additional information on the hydrogeology and geology west and northwest of the the present fill area, which may constitute a significant portion of a groundwater management zone, as defined by GEOTRANS and WRS. Layne Northwest Company was contracted by WRS to perform all drilling, well construction and well development. The field program was carried out in two phases. Phase 1 consisted of drilling five boreholes from which grab samples of groundwater were obtained. Information derived from Phase 1 was then utilized to select the locations and depths of nine groundwater monitoring wells to be installed during Phase 2. Both Phase 1 and Phase 2 activities were conducted under the direction of WRS personnel. Figure 1 shows the location of the borings and monitor wells. Geologic logs for borings are included in Attachment A, as are geologic logs and construction details for the newly installed monitor wells. Specifics of the field program are as follows.

Phase 1 consisted of drilling five test boreholes, designated TB1, TB2, TB3, TB4, and TB5, using an Ingersoll-Rand TH-60 drill rig. The borings were advanced using dual tube reverse air circulation through 4 1/2 inch hollow stem augers and utilizing a 4 3/4 inch tricone roller bit. Dual tube reverse air circulation proceeds by means of a flush-jointed, double-walled drill pipe which precludes contact of the drilling air with the surrounding formation everywhere except at the drill bit. Formation material was observed and logged at the air discharge point after

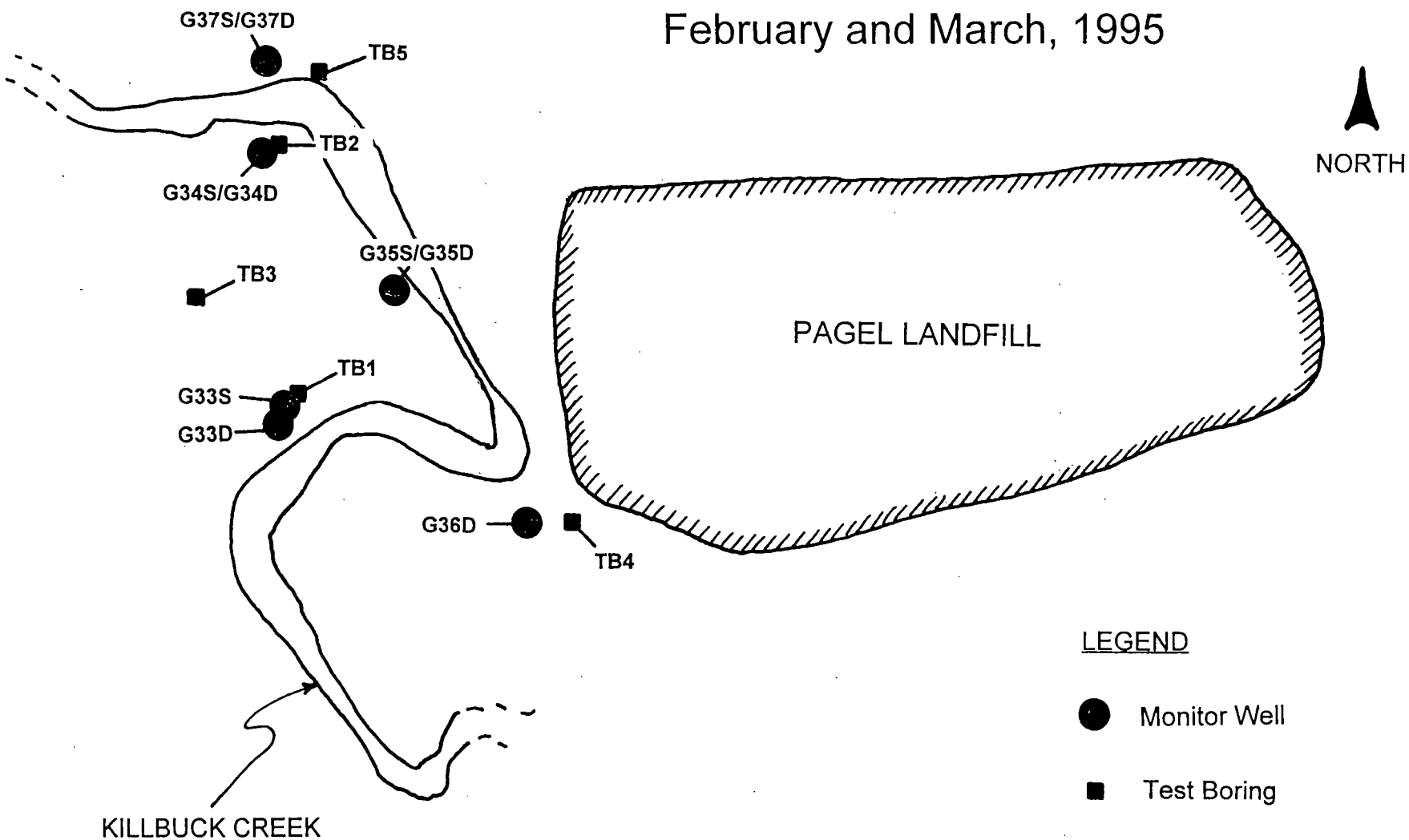
passing through a cyclone. Uphole velocity of the air ranged from 60 to 80 feet per second, which allows instantaneous observation of materials from the bottom of the borehole. Additionally, this drilling method permits sampling of groundwater without removing the drill pipe. Groundwater samples were collected in the boreholes after purging approximately 10 to 20 volumes of the drill pipe with a Grundfos submersible pump. Samples were collected at five to ten feet above bedrock and at 35 to 50 feet below ground surface, depending on borehole geology. WRS and Belinda Staurowsky of J&S oversaw the drilling and performed sampling procedures.

Drilling and installation of nine monitor wells composed the scope of work for Phase 2 of the field program at Pagel Landfill. The nine monitor wells were divided into four shallow-deep well groups designated G33S/G33D, G34S/G34D, G35S/G35D, and G37S/G37D, with a singular deep well designated G36D. Figure 1 shows their respective locations. A CME 850 track-mounted drill rig was used for drilling and advanced the borings via hollow stem augering. The hollow stem augers were of an 8 1/2 inch outside diameter, with the lead auger possessing a bullet-toothed cutting head of 9 1/2 inch outside diameter. Deep borings for the wells were continuously sampled, while the shallow wells, located within a 10 feet radius of the deep boring, were sampled throughout the respective screen interval only. Sampling was performed through the use of a split-spoon barrel sampler measuring approximately two feet in length with an inside diameter of two inches. The sampler would be introduced into the borehole on the end of two-inch diameter drill rods. Once the sampler rested on the bottom of the borehole, a 140-pound hydraulic hammer would then be fitted over the top of the drill rod. The hammer would fall from an approximate height of four feet, striking the rod and pounding the sampler through the geologic materials. Upon retreiving the sampler, the the geologic material would be logged, noting type of material, color, moisture, etc. Thin-walled Shelby tube samples were taken where possible in order to analyze cohesive materials. Representative samples of geologic material were selected to be tested for some or all of the following parameters: porosity, grain size, fraction of organic carbon, vertical permeability, horizontal permeability, and cation exchange capacity. The results of these tests can be found in Attachment B.

All monitor wells were constructed of schedule 316 stainless steel risers with ten feet long schedule 316 stainless steel screens with 0.10 slot, with two exceptions. Due to a substantial thickness of silt and clays at the G37 location, G37S was fitted with a five feet screen of 0.10 slot. Monitor well G37D was fitted with a ten feet screen of 0.06 slot due to the siltier nature of the sands and gravels encountered at that location. Annular space materials consisted of: Colorado Silica Sand size 20-40 to fill the space throughout the screen interval to two feet

above the top of screen; Cetco Pure Gold Bentonite chips (medium) or Enviroplug Bentonite chips (medium) to form two to three feet of annular seal; Naturalgel Bentonite mixed with potable water for grouting the annular space above the seal to within two feet of surface; and, Portland cement for a cap. Two exceptions should be noted. First, all shallow wells received bentonite chips as the vertical annular space was relatively thin. Second, G33D received a cement-bentonite grout. See Attachment A for all monitor well details.

FIGURE 1: Location of Test Borings and Monitor Wells Drilled and Installed February and March, 1995



DRAWING PREPARED BY BGS OF JENNINGS & STAUROWSKY

ATTACHMENT A

Geologic Logs of Borings for Test Borings and Monitor Wells

and

Monitor Well ConstructionDetails

Geologic Logs of Borings for Test Borings and Monitor Wells

GEOLOGIC LEGEND FOR LOGS

- TOPSOIL OR LOAM
- ORGANICS
- BROWN CLAY
- BLACK CLAY
- GRAY CLAY
- CLAYEY
- SILT
- FINE - COARSE SAND
- SMALL - LARGE GRAVEL
- COBBLES
- WEATHERED BEDROCK

DRAWING PREPARED BY BGS OF JENNINGS & STAUROWSKY

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB1		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001699.00 E 798744.00	1 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711 ft. MSL	2-20-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
646 ft. MSL	2-20-95	T. Hilbert	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Gu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Dark brown silty LOAM				
5					Light brown coarse sandy GRAVEL	706.0			
15					Light brown fine-medium SAND, well sorted	696.0			

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB1		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001699.00 E 798744.00	2 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711 ft. MSL	2-20-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
646 ft. MSL	2-20-95	T. Hilbert	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Light brown medium-coarse SAND and small-large GRAVEL				
21									
22									
23									
24					at approximately 24.0', contains silt				
25						686.0			
					Light brown gravelly SILT				
26									
27									
28									
29									
30						681.0			
					Light brown silty, gravelly SAND				
31									
32									
33						678.0			
					Light brown silty, sandy GRAVEL				
34									
35						676.0			
					Light brown gravelly SAND (Water sample obtained at 35.0')				
36									
37									
38									
39									
40									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB1		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001699.00 E 798744.00	3 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711 ft. MSL	2-20-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
646 ft. MSL	2-20-95	T. Hilbert	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Light brown gravelly SAND				
41									
42									
43						668.0			
					Buff fine-medium silty SAND				
44						667.0			
					Light brown coarse SAND and GRAVEL				
45						666.0			
					Light orange-brown coarse sandy GRAVEL				
46									
47									
48									
49						662.0			
					Light brown gravelly SAND				
50						661.0			
					Medium SAND, well sorted				
51									
52									
					below 52.5, contains gravel				
53									
54									
55						656.0			
					Buff gravelly coarse SAND				
56									
57					between 57' and 59', sand becomes well sorted and medium grain				
58									
59									
60									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB1		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001699.00 E 798744.00	4 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711 ft. MSL	2-20-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
646 ft. MSL	2-20-95	T. Hilbert	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Orange coarse SAND and GRAVEL, grades to:				
61					Light brown gravelly SAND	650.0			
62									
63					BEDROCK (dolomite) (Water sample obtained at approximately 63')	648.0			
64									
65					End of boring = 65.0' Boring grouted upon completion	646.0			
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB2		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002433.00 E 798701.00	1 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
710 ft. MSL	2-21-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
635 ft. MSL	2-21-95	B. Staurowsky	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Black wet silty clay TOPSOIL				
5					Brown fine-coarse SAND and large GRAVEL	705.0			
12					Brown fine-coarse SAND and small-large GRAVEL, angular to subangular, diverse mineralogical composition	697.5			
18					Tan SILT	692.0			

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB2		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002433.00 E 798701.00	2 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
710 ft. MSL	2-21-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
635 ft. MSL	2-21-95	B. Staurowsky	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Tan SILT and fine SAND				
21									
22									
23									
24									
25						685.0			
					Gray CLAY, little silt, appears devoid of sand and gravel				
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB2		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002433.00 E 798701.00	3 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
710 ft. MSL	2-21-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
635 ft. MSL	2-21-95	B. Staurowsky	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Gray CLAY, little silt, appears devoid of sand and gravel				
41									
42									
43									
44									
45					Brown fine-coarse SAND and small-large GRAVEL, little silt, subangular to rounded, diverse mineralogy	665.0			
46									
					(Water sample obtained at 45.0')				
47									
48									
49									
50									
51									
52									
53					between 53.0'-55.0', grades in and out of fine-medium sand				
54									
55					below 55.0', contains rusty brownish tan silt				
56									
57									
58									
59									
60									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB2		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002433.00 E 798701.00	4 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
710 ft. MSL	2-21-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
635 ft. MSL	2-21-95	B. Staurowsky	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Fine-coarse SAND and small GRAVEL, little medium-large gravel				
61									
62									
63									
64									
65									
66									
67									
68					below 68.0', contains small-large gravel, sorted				
69									
70					(Water sample obtained at approximately 70')				
71									
72						638.0			
					Weathered BEDROCK (dolomite)				
73									
74									
75						635.0			
					End of boring = 75.0'				
					Boring grouted upon completion				
76									
77									
78									
79									
80									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB3		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002122.00 E 798600.00	1 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
710.2 ft. MSL	2-21-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
641.2 ft. MSL	2-21-95		

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Black clayey organic TOPSOIL				
4					Small-large GRAVEL, angular to subround (large gravel is as much as 1" in diameter)	706.2			
15					below 15.0', predominantly coarse sand and small gravel				

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB3		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation – Pagel Landfill	N 2002122.00 E 798600.00	2 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
710.2 ft. MSL	2-21-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
641.2 ft. MSL	2-21-95		

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Medium-large GRAVEL, trace-little fine-coarse sand and small gravel				
21									
22									
23									
24									
25									
26									
27									
						682.7			
					Fine-coarse SAND and small GRAVEL, little medium-large gravel				
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38						672.2			
					Fine-coarse SAND and small-large GRAVEL, poorly sorted				
39									
40									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB3		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002122.00 E 798600.00	3 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
710.2 ft. MSL	2-21-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
641.2 ft. MSL	2-21-95		

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Fine-coarse SAND and small-large GRAVEL, poorly sorted				
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55					Fine-coarse SAND and small GRAVEL, high percentage of dark minerals in both sand and gravel, appears rounded to subrounded	655.2			
56									
57									
58									
59									
60									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB3		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002122.00 E 798600.00	4 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
710.2 ft. MSL	2-21-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
641.2 ft. MSL	2-21-95		

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Gu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
61					Fine-coarse SAND and small GRAVEL, high percentage of dark minerals in both sand and gravel, appears rounded to subrounded				
62									
63									
64					(Water sample obtained from approximately 65')				
65									
66									
67									
68									
69					End of Boring = 69.0'	641.2			
70					Boring grouted upon completion.				
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB4		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001400.00 E 799500.00	1 of 2

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
712.3 ft. MSL	2-22-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
672.3 ft. MSL	2-22-95	B. Staurowsky	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					No return (ground too porous to get tight seal for reverse air circulation				
10					Fine-coarse SAND and small-large GRAVEL, rounded to subrounded	702.3			
17					(Water sample obtained from approximately 17')				
19					Tan SILT and fine SAND	693.3			

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB4		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001400.00 E 799500.00	2 of 2

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
712.3 ft. MSL	2-22-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
672.3 ft. MSL	2-22-95	B. Staurowsky	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Tan SILT and fine SAND				
21									
22									
23									
24					from 24.0'-25.0', fine-coarse sand and small gravel				
25					*Fine-coarse SAND and small-large GRAVEL*	687.3			
26									
27									
28									
29					@ 29.0', 1.0' large gravel				
30									
31									
32									
33									
34									
35					@ 35.0', hit boulder				
					Fine-coarse SAND, well sorted	676.8			
36									
37					Fine-coarse SAND and small-large GRAVEL	675.3			
38									
39					(Water sample obtained from approximately 39')				
					Weathered BEDROCK	672.8			
40									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB5		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002610.00 E 799900.00	1 of 4

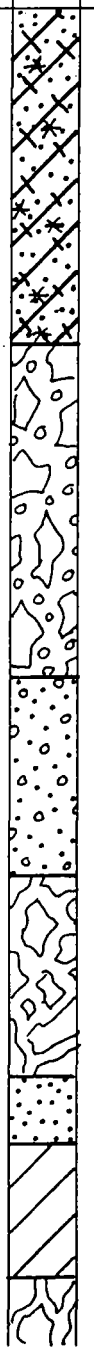
DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708 ft. MSL	2-23-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
633 ft. MSL	2-23-95	T. Hilbert	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Black organic SILTS and CLAYS				
5					Sandy GRAVEL	703.0			
10					Fine sandy SILT	698.0			
13					GRAVEL	695.0			
16					SILT	692.0			
17					CLAY	691.0			
19					GRAVEL	689.0			



BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB5		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002610.00 E 799900.00	2 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708 ft. MSL	2-23-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
633 ft. MSL	2-23-95	T. Hilbert	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Fine sandy SILT				
21									
22									
23									
24									
25					Gray CLAY	683.0			
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB5		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002610.00 E 799900.00	3 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708 ft. MSL	2-23-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
633 ft. MSL	2-23-95	T. Hilbert	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Gu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Dark gray CLAY				
41									
42									
43									
44									
45									
46						662.0			
					GRAVEL				
47									
48						660.0			
					Coarse sandy GRAVEL				
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
TB5		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002610.00 E 799900.00	4 of 4

DRILLER	RIG	METHOD
Layne Northwest	Ingersoll-Rand TH-60	Dual Tube Reverse (Air) Circulation

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708 ft. MSL	2-23-95		While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
633 ft. MSL	2-23-95	T. Hilbert	

NOTES: *This boring was done to obtain grab samples of groundwater. No well was installed.*

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Coarse sandy GRAVEL				
61									
62									
63									
64									
65					@ 65.0', 1.0' gravelly sand				
66									
67					(Water sample obtained from approximately 67')				
68					CLAY and GRAVEL	640.0			
69									
70					below 70.0', clay turns orange				
71									
72									
73									
74									
75					Orange CLAY and fine SAND, overlying weathered BEDROCK	633.0			
76					End of boring = 75.0'	632.3			
					Boring grouted upon completion				
77									
78									
79									
80									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G33S		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001702.28 E 798774.36	1 of 1

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.1 ft. MSL	3-1-95	G33S	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
694.1 ft. MSL	3-1-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
1–6					Blind drilled to 7.0'. See G133D log for description of 0.0'-7.0'.				Cement Cap 709.1; Stainless Steel Riser; Holeplug Pellet Seal 706.1
7						704.1			704.1
8	SS-1	4 6 6 4	0.67'		Gray fine-coarse SAND and small GRAVEL, poorly sorted, loose				Stainless Steel Screen; Silica Sand Pack
9					below 9.0', trace clay inclusions and silt				
10	SS-2	3 3 9 6	0.83'						
11						700.1			
12	SS-3	8 8 11 7	0.5'		Gray fine-coarse SAND and small-medium GRAVEL, trace silt and cobbles, oxidized in spots, medium dense to very dense				
13					@ 13.0', hit cobble				
14	SS-4	8 25 22 13	0.17'						
15						696.1			
16	SS-5	8 18 9 8	1.1'		Brown fine SAND grading to fine-medium, trace small gravel, medium dense				
17						694.1			694.1 / 694.1
18–20					End of Boring = 17.0' Monitor well set upon completion.				

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G33D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001658.17 E 798763.33	1 of 3

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.0 ft. MSL	2-27-95	G33D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
663.0 ft. MSL	2-28-95	R. Jennings	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Black silty fine SAND, organics, grades to:	710.5			Cement Cap 709.0
1	SS-1	1 2 2 2	0.8'		Brown silty fine-medium SAND, little coarse sand and small-large gravel				
2						709.0			
3	SS-2	5 6 7 7	0.9'		Light brown fine SAND, trace large gravel and medium-coarse sand	708.6			
					Dark brown clayey fine SAND				
4						707.0			
5	SS-3	2 2 2 2	1.25'		Brown fine-medium SAND, trace coarse sand, very loose to loose				
6									
7	SS-4	1 3 8 4	1.16'		below 6.8', contains some coarse sand and small-medium gravel				
8						703.0			
9	SS-5	3 6 4 2	1.0'		Brown fine-coarse SAND and small-large GRAVEL, poorly sorted-sorted, loose to medium dense				Stainless Steel Riser; Cement Bentonite Grout
10									
11	SS-6	3 3 3 2	0.67'						
12					below 12.0', no large gravel				
13	SS-7	5 13 11 8	0.42'						
14					below 14.0', gravel concentrated in horizons				
15	SS-8	12 9 7 4	1.5'						
16					@ 16.0'-16.3', some coarse sand and small gravel				
17	SS-9	13 14 12 10	1.25'						
18						693.0			
19	SS-10	18 13 28 49	2.0'		Brown fine-medium SAND, trace coarse sand and small-medium gravel				
20									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G33D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001658.17 E 798763.33	2 of 3

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

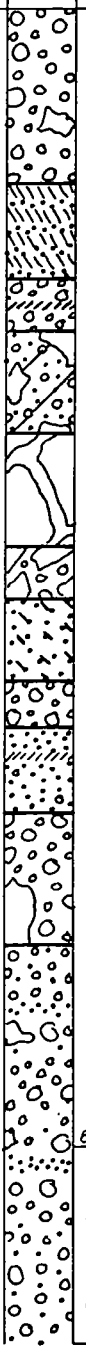
GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.0 ft. MSL	2-27-95	G33D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
663.0 ft. MSL	2-28-95	R. Jennings	

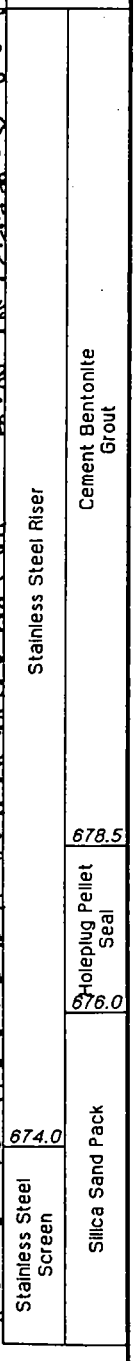
NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT
21	SS-11	6 6 8 9	1.1'		Brown fine-medium SAND, trace coarse sand and small-medium gravel, loose		
22							
23	SS-12	6 6 34 24	1.25'		Brown CLAY laminated with silt partings @ 22.8', 3" brown silt with clay partings with trace oxidation along laminae	688.4	
24						687.0	
25	SS-13	18 10 24 38	1.25'		Brown fine-medium SAND, trace coarse sand and small gravel @ 24.6', 3" fine sand with silt and clay seams Silty CLAY, fine SAND, and small-large GRAVEL	686.2	
26						684.7	
27	SS-14	13 42 31 25	1.0'		Pale orange buff COBBLE, trace red oxidation		
28						683.0	
29	SS-15	24 53 42 29	1.1'		Oxidized fine-coarse SAND and small-large GRAVEL, dense, trace small cobble, poorly sorted @ 28.3', sand and gravel becomes silty Light brown to buff clayey SILT	682.2	
30						681.0	
31	SS-16	46 22 31 32	2.0'		Brown fine-medium SAND, occasional large gravel Brown SILT, trace clay seams, trace fine sand, laminated	680.3	
32						679.0	
33	SS-17	19 87 55 for 2"	0.75'		Brown fine-medium SAND, trace cobble		
34						677.0	
35	SS-18	11 11 24 24	1.25'		Brown fine SAND, occasional silt, trace medium-coarse sand and gravel, thinly bedded, sorted, dense to very dense @ 35.4', 3" silt with trace clay and fine sand		
36					below 36.0', fine-medium sand, trace coarse sand and small-medium gravel		
37	SS-19	19 68 58 63	1.8'		@ 37.5', 4" fine sandy SILT		
38					below 38.0', sand contains some silt		
39	SS-20	50 50 for 3"	0.3'				
40							

GRAPHIC LOG



WELL/PIEZ DETAILS



BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G33D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001658.17 E 798763.33	3 of 3

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.0 ft. MSL	2-27-95	G33D	While Drilling: · @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
663.0 ft. MSL	2-28-95	R. Jennings	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
41	SS-21	7 11 30 37	1.1'		Brown fine-coarse SAND and large GRAVEL, little to occasional small- medium gravel, dense, poorly sorted, dense to very dense				Stainless Steel Screen; Silica Sand Pack
42									
43	SS-22	16 55 40 for 1"	0.67'						
44					below 44.0', cobbles are occasional				
45	SS-23	25 50 28 for 3"	0.75'						
46									
47	SS-24	26 100 for 6"	0.67'						664.0
48						663.0			663.0
49					End of Boring = 48.0'				
50					Monitor well set upon completion.				
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G34D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002432.65 E 798707.15	1 of 4

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
709.9 ft. MSL	3-2-95	G34D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
647.9 ft. MSL	3-3-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
1	SS-1	3 1 1 2	0.6'		Black sandy CLAY, organic				Cement Cap
2						707.9			707.9
3	SS-2	5 4 3 1	0.2'		Black clayey SAND, loose to very loose				Stainless Steel Riser; Bentonite Grout
4					below 4.0', becomes fine-coarse sand with some small gravel, poorly sorted, wet				
5	SS-3	2 1 1 6	0.7'						
6					below 6.0', sand is predominantly fine with only trace medium-coarse, trace gravel and is clayey				
7	SS-4	1 6 1 3	0.7'						
8					below 8.0', changes to brown fine-coarse sand and small gravel				
9	SS-5	1 4 4 6	1.2'						
10						699.9			
11	SS-6	3 3 5 5	2.0'		Brown very fine sandy SILT, oxidized, loose				
12					Fine-coarse SAND and small-large GRAVEL, poorly sorted, medium dense	698.4			
13	SS-7	4 6 9 8	1.0'		below 12.0', sand and gravel becomes oxidized and contains little silt				
14						695.9			
15	SS-8	4 6 9 10	0.1'		Brown fine SAND (NOTE: drove rock resulting in low recovery)				
16						693.9			
17	SS-9	5 8 8 9	1.3'		Brown fine-coarse SAND and small-medium GRAVEL, little large gravel, medium dense				
18					below 18.0', silty and increase in large gravel content				
19	SS-10	7 8 10 11	0.9'						
20									

BORING NUMBER G34D	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002432.65 E 798707.15	2 of 4

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
709.9 ft. MSL	3-2-95	G34D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
647.9 ft. MSL	3-3-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
21	SS-11	17 15 16 17	1.0'		Brown very fine SAND, dense				Stainless Steel Riser; Bentonite Grout
22						687.9			
23	SS-12	15 19 17 19	1.7'		Brown SILT, little-trace clay, very thinly laminated, dense				
24						685.9			
25	SS-13	3 6 10 7	1.3'		Brown silty very fine SAND, signs of oxidation, thinly laminated, medium dense				
26						683.9			
27	SS-14	8 12 4 6	1.7'	0.75	Gray very silty CLAY, soft				
28					below 28.0', clay becomes laminated				
29	SS-15	4 2 4 5	1.5'		@ 29.0', 1.0' gray silt with trace clay				
30						679.9			
31	SS-16	3 4 7 7	2.0'	1.25	Gray silty to very silty CLAY, laminated, stiff				
32						677.9			
33	SS-17	5 5 6 6	2.0'	1.0	Brownish gray clayey SILT thinly interbedded with silty CLAY, stiff to soft, very moist				
34					below 34.0', becomes more very silty clay with trace silt partings, laminated				
35	SS-18	4 5 10 13	1.8'	0.5					
36									
37	SS-19	8 9 8 7	2.0'	1.25					
38									
39	SS-20	4 6 4 6	2.0'	0.75					
40									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G34D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002432.65 E 798707.15	3 of 4

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
709.9 ft. MSL	3-2-95	G34D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
647.9 ft. MSL	3-3-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
41	SS-21	5 6 6 7	2.0'		Gray very silty CLAY, laminated, some silt partings, silt is wet and clay is moist, medium stiff to stiff				
42									
43	SS-22	4 5 4 6	2.0'	1.4					Bentonite Grout
44					below 44.0', includes trace oxidized fine sand partings				
45	SS-23	4 7 11 19	2.0'	0.75					
46									
47	SS-24	7 10 11 17	No Rec.						Stainless Steel Riser; 662.9
48						661.9			
49	SS-25	5 7 19 30	1.3'		Brown small-medium GRAVEL, trace large gravel, fining downward to fine SAND, well-graded, medium dense to very dense				660.9
50									
51	SS-26	33 50 for 5"	No Rec.						658.6
52						657.9			
53	SS-27	18 24 36 28	1.2'		Light brown coarse SAND and small GRAVEL, some medium sand and medium gravel				
54					below 54.0', trace cobble, little fine sand and silt				
55	SS-28	15 21 28 23	1.3'						Stainless Steel Screen; Sand Pack
56									
57	SS-29	10 29 54 45	1.3'						
58					below 58.0', some medium sand and only trace small gravel				
59	SS-30	39 57 for 4"	0.5'						
60									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G34D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002432.65 E 798707.15	4 of 4

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
709.9 ft. MSL	3-2-95	G34D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
647.9 ft. MSL	3-3-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Gu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
61	SS-32	44 76 for 6"	1.0'		Light brown fine SAND, some medium sand, trace silt, coarse sand, and small gravel, very dense				648.6 Sand Pack 647.9
62					End of Boring = 62.0' Monitor well set upon completion.	647.9			
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G34S		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002425.49 E 798714.01	1 of 1

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
709.9 ft. MSL	3-6-95	G34S	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
692.9 ft. MSL	3-6-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
1, 2, 3, 4, 5, 6					Blind drilled to 7.0'. See G134D log for description of 0.0'-7.0'.				Cement Cap; 707.9; Bentonite Pellet Seal; 704.9; Stainless Steel Riser; 702.9; Silica Sand Pack
7, 8	SS-1	3 3 2 3	0.5'		Brown silty fine-coarse SAND and small-medium GRAVEL, some cobbles, oxidized, loose	702.9			Stainless Steel Screen
9, 10	SS-2	1 5 3 3	0.25'						
11, 12	SS-3	4 8 7 8	0.7'		Brown fine SAND, little-trace medium-coarse sand, oxidized in spots, medium dense	698.9			
13, 14	SS-4	4 5 7 8	0.85'		Brown fine-coarse SAND and small-medium GRAVEL, poorly sorted	696.4			
15, 16	SS-5	4 5 6 10	0.5'		Brown silty fine SAND, well-sorted, medium dense	694.9			
17, 18, 19, 20					End of Boring = 17.0' Monitor well set upon completion.	692.9			692.6; 692.6

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G135D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002037.10 E 799089.33	1 of 3

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.3 ft. MSL	3-7-95	G135D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
663.3 ft. MSL	3-7-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
1	SS-1	1 2 2 2	0.3'		Black CLAY, little silt and fine sand, occasional organics, soft				Cement Cap; 709.3
3	SS-2	1 2 1 2	0.5'		@ 4.0', some oxidized sand and small gravel	707.3			
5	SS-3	2 2 4 5	0.5'		Brownish black fine-coarse SAND and small GRAVEL, occasional silt, trace clay, wet, loose to medium dense				Stainless Steel Riser; Bentonite Grout
7	SS-4	3 4 6 4	0.5'		below 6.0', sand and gravel are brown, with trace medium-large gravel				
9	SS-5	4 4 4 5	0.8'		below 8.0', medium-large gravel content increases to some, as does silty clay content				
11	SS-6	4 3 3 3	1.0'						
13	SS-7	6 6 5 3	1.3'		below 12.0', sand and gravel exhibits crude bedding and sorting; clay is absent; little silt				
15	SS-8	3 3 3 3	1.0'						
17	SS-9	4 2 2 4	0.8'		below 16.0', fine sand content decreases to little, and small-large gravel content decreases to some				
19	SS-10	3 3 4 6	1.0'		below 18.0', appears crudely bedded				

BORING NUMBER G135D	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002037.10 E 799089.33	2 of 3

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.3 ft. MSL	3-7-95	G135D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
663.3 ft. MSL	3-7-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
21	SS-11	5 6 8 5	0.75'		Brown fine-coarse SAND and small-medium GRAVEL, little silt, crudely bedded, sorted to poorly sorted, loose to medium dense				Stainless Steel Riser; Bentonite Grout
22									
23	SS-12	6 15 11 10	1.0'						
24									
25	SS-13	5 7 5 7	0.8'						
26					below 26.0', oxidized in areas				
27	SS-14	5 5 10 9	1.0'						
28									
29	SS-15	6 3 4 6	0.8'						
30									
31	SS-16	5 14 11 13	0.7'						
32									
33	SS-17	No Sample	No Rec.						678.3
34					from 34.0'-36.0', gravel content decreases to only trace small gravel; silt content decreases trace				Pellet Seal; 676.3
35	SS-18	5 7 9 8	0.75'						
36									
37	SS-19	10 9 8 6	1.0'						674.3; Stainless Steel Screen; Silica Sand Pack
38									
39	SS-20	8 14 11 9	0.8'						
40									

BORING NUMBER G135D	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002037.10 E 799089.33	3 of 3

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.3 ft. MSL	3-7-95	G135D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
663.3 ft. MSL	3-7-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
41	SS-21	7 14 20 11	0.7'		Brown fine-coarse SAND, trace small gravel, trace silt, medium dense to dense				Stainless Steel Screen; Silica Sand Pack
42									
43	SS-22	8 17 10 9	0.9'						
44									
45	SS-23	4 10 14 12	1.5'						
46									
47	SS-24	8 16 19 10	1.5'		Brown fine-medium SAND, trace coarse sand, dense	664.8			664.3; 664.0
48					End of Boring = 48.0'	663.3			
49					Monitor well set upon completion.				
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G35S		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002038.94 E 799084.49	1 of 1

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.3 ft. MSL	3-7-95	G35S	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
694.3 ft. MSL	3-7-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
1, 2, 3, 4, 5, 6					Blind drilled to 7.0'. See G135D log for description 0.0'-7.0'.				Cement Cap (709.3); Bentonite Pellet Seal (706.3); Stainless Steel Riser
7						704.3			704.3
8	SS-1	3 4 5 4	0.6'		Brown fine-coarse SAND, some small gravel, oxidized, loose to medium dense				Stainless Steel Screen; Silica Sand Pack
9									
10	SS-2	3 5 4 4	0.5'						
11					below 11.0', some medium gravel content				
12	SS-3	5 4 4 5	0.7'						
13									
14	SS-4	6 6 4 5	0.5'						
15									
16	SS-5	5 7 6 6	0.5'						
17					End of Boring = 17.0'	694.3			694.0 694.0
18					Monitor well set upon completion.				
19									
20									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G36D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001359.84 E 799423.28	1 of 2

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.3 ft. MSL	3-15-95	G36D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
673.3 ft. MSL	3-15-95	B. Staurowsky	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
1	SS-1	2 2 2 2	0.3'		Black CLAY, little silt, organics, soft to medium stiff				Cement Cap 709.3
3	SS-2	2 3 4 4	0.5'						
5	SS-3	3 2 1 1	1.0'		Brown fine SAND, occasional black clayey horizons, generally massive, well sorted, loose	706.9			
7	SS-4	2 7 8 5	0.6'		Medium-large GRAVEL, little fine-coarse sand and small-medium gravel, highly oxidized, medium dense	705.3			
9	SS-5	2 9 4 3	0.5'		Small COBBLES and large GRAVEL, little fine-coarse sand and small- medium gravel, high oxidized	703.3			Stainless Steel Riser
11	SS-6	3 11 8 8	0.6'		Brown fine-coarse SAND, little small-medium gravel, trace cobble, poorly sorted, medium dense	701.3			Bentonite Grout
13	SS-7	5 41 41 15	1.2'		Fine-coarse SAND and small-medium GRAVEL, trace small cobble, little silt, trace oxidized horizon, sorted to poorly sorted, dense to very dense below 14.0', crude bedding occurs	698.8			
15	SS-8	6 10 14 18	1.0'						
17	SS-9	30 21 23 22	1.7'		below 17.2', gravel shows iron staining; sand and gravel is generally poorly sorted				
19	SS-10	11 27 17 9	0.5'						

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G36D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2001359.84 E 799423.28	2 of 2

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
711.3 ft. MSL	3-15-95	G36D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
673.3 ft. MSL	3-15-95	B. Staurowsky	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Gu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
21	SS-11	5 11 17 9	0.7'		Fine-coarse SAND and small-large GRAVEL, little silt, sorted in crude bedding to poorly sorted, medium dense to very dense				Stainless Steel Riser; Bentonite Grout
22					below 22.0', trace cobble				
23	SS-12	9 11 14 11	0.8'						
24									687.3
25	SS-13	7 14 16 15	0.6'						
26									685.3
27	SS-14	25 64 for 6"	No Rec.						Silica Sand Pack
28					below 28.0', no cobbles				683.3
29	SS-15	12 16 16 10	0.3'						Stainless Steel Screen
30					below 30.0', coarse sand and gravel content decrease; silty to little silt content; massive but trace bedding				
31	SS-16	11 11 25 23	0.8'						
32									
33	SS-17	11 17 27 20	0.8'						
34									
35	SS-18	7 10 20 31	0.7'						
36						675.0			
37	SS-19	17 35 25 40	0.6'		Brown fine-very fine SAND, laminated, very well sorted, very dense				673.3
38					End of Boring = 38.0'	673.3			673.0
39					Monitor well set upon completion.				
40									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G37D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002691.61 E 798738.16	1 of 5

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708.3 ft. MSL	3-8-95	G37D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
625.8 ft. MSL	3-9-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
1	SS-1	2 1 2 2	1.5'		Black CLAY, SILT, and fine SAND, few organics, turns oxidized brown at 2.0', very loose to medium dense				Cement Cap
2					below 2.0', occasional sand, large gravel, and cobbles				706.3
3	SS-2	6 10 12 7	1.0'						
4						704.3			
5	SS-3	10 17 17 17	0.5'		Black and brown medium-large GRAVEL, some fine-coarse sand, trace silt and cobbles, poorly sorted, medium dense to dense				Stainless Steel Riser; Bentonite Grout
6					below 6.0', increase in fine-coarse sand and small gravel content; silty				
7	SS-4	7 10 13 7	0.7'						
8									
9	SS-5	10 9 9 8	0.7'						
10					below 10.0', gravel content decreases to little				
11	SS-6	2 3 3 3	0.8'						
12					below 12.0', predominantly coarse sand and small gravel, some medium sand, trace fine sand and medium-large gravel, poorly sorted				
13	SS-7	2 4 3 5	1.0'						
14						694.3			
15	SS-8	2 8 12 17	0.75'	3.75	Brown silty CLAY, feathery structure, very stiff				
16					below 16.0', structure is blocky				
17	SS-9	1 1 8 6	0.6'	3.25					
18					below 18.0', color becomes brownish pink				
19	SS-10	1 7 12 14	2.0'	3.75					
20									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G37D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002691.61 E 798738.16	2 of 5

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708.3 ft. MSL	3-8-95	G37D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
625.8 ft. MSL	3-9-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
21	SS-11	6 8 12 16	0.7'	0.8	Gray CLAY, little silt, laminated in areas, 0.5" sandy clay @ 20.3', medium stiff				Stainless Steel Riser; Bentonite Grout
22									
23	SS-12	3 4 8 10	1.2'		Brown fine SAND, oxidized	685.3			
24						684.3			
25	SS-13	2 2 4 5	1.5'	0.75	Gray very silty CLAY, occasional silt parting, laminated but massive between laminae, moist, medium stiff				
26						682.3			
27	SS-14	5 3 5 6	1.7'	1.5	Brownish gray CLAY, little silt, feathery structure, moist, stiff				
28						680.3			
29	SS-15	2 3 2 2	2.0'		Gray SILT, little-trace clay, very finely laminated, moist, very soft to medium stiff				
30					below 30.0', becomes clayey silt/silty clay, still thinly laminated				
31	SS-16	1 1 3 4	2.0'	<0.25					
32					below 32.0', clay grades into and out of silty phases randomly; very moist but not wet				
33	SS-17	1 for 24"	0.5'						
34									
35	SS-18	1 for 24"	0.5'						
36									
37	SS-19	1 for 24"	0.5'						
38									
39	SS-20	1 for 24"	0.5'						
40									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G37D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002691.61 E 798738.16	3 of 5

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708.3 ft. MSL	3-8-95	G37D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
625.8 ft. MSL	3-9-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Gu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
41	ST-21		2.0'		Gray clayey SILT thinly interbedded with silty CLAY				Stainless Steel Riser; Bentonite Grout
42									
43	ST-22		2.0'						
44									
45	SS-23	1 2 4 4	2.0'		Black fine-medium SAND, loose	663.8			
46						662.3			
47	SS-24	4 4 11 13	1.7'		Gray SILT, little clay, slightly laminated, interbedded with more clayey phases, wet, medium dense				
48						660.3			
49	SS-25	4 11 18 25	1.5'		Brown very fine sandy SILT, highly oxidized, laminated, wet, medium dense to very dense				
50					@ 50.0'-52.0', becomes silty very fine sand, wet				
51	SS-26	8 11 13 17	0.8'						
52					below 52.0', very fine sand is absent; trace cobble				
53	SS-27	11 32 51 for 4"	1.0'						
54					below 54.0', becomes silty very fine sand				
55	SS-28	8 17 28 23	2.0'						
56									
57	SS-29	17 28 37 39	1.4'						
58									
59	SS-30	8 18 32 44	1.5'						
60									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G37D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002691.61 E 798738.16	4 of 5

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708.3 ft. MSL	3-8-95	G37D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
625.8 ft. MSL	3-9-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
61	SS-31	5 12 17 27	1.7'		Grayish brown silty very fine SAND/very fine sandy SILT, medium dense				
62						646.3			
63	SS-32	6 8 8 9	1.5'		Brown silty fine-coarse SAND and small GRAVEL, medium dense				Bentonite Grout
64					below 64.0', silt content increases to some; trace clay				
65	SS-33	5 8 6 7	1.7'						Stainless Steel Riser
66									642.3
67	SS-34	8 23 11 28	1.5'			641.3			Bentonite Pellet Seal
68					Brown fine-medium SAND and small GRAVEL, some-occasional coarse sand, little large gravel, poorly sorted, oxidized in spots				
69	SS-35	13 22 7 18	1.4'		Pinkish brown SILT/CLAY/fine SAND, trace small gravel, multicolored in browns and trace green, oxidized in spots, massive	639.8			639.3
70						638.3			
71	SS-36	22 26 34 34	0.75'		Brown fine-coarse SAND and small-medium GRAVEL in silty CLAY matrix, very dense				637.3
72						636.3			
73	SS-37	60 for 6"	0.5'		Brown silty fine SAND, trace coarse sand and small gravel, massive, very dense				Silica Sand Pack
74						634.3			
75	SS-38	21 31 20 20	1.0'		Brown fine-coarse SAND and small-large GRAVEL, occasional cobble, trace silt and clay, oxidized in areas poorly sorted, very dense				Stainless Steel Screen
76									
77	SS-39	10 25 31 34	1.25'						
78					below 78.0', medium-large gravel and cobbles are absent				
79	SS-40	28 61 for 4"	0.5'						
80									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G37D		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002691.61 E 798738.16	5 of 5

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708.3 ft. MSL	3-8-95	G37D	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
625.8 ft. MSL	3-9-95	J. O'Donnell	

NOTES:

DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
81	SS-41	22 20 41 44	1.6'		Brown fine-coarse SAND and small GRAVEL, trace silt and clay, very dense				627.3 Silica Sand Pack
82									625.8
83	SS-42	hit rock @ 82.5'	No Rec.		BEDROCK End of Boring = 82.5' Monitor well set upon completion.	625.8			
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

BORING NUMBER	GEOLOGIC LOG OF BORING	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS
G37S		

PROJECT	COORDINATES	SHEET
Winnebago Reclamation - Pagel Landfill	N 2002691.63 E 798732.91	1 of 1

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

GROUND SURFACE ELEV.	DATE STARTED	WELL/PIEZOMETER CROSS REF.	WATER LEVELS: (ft. below ground surface)
708.5 ft. MSL	3-15-95	G37S	While Drilling: @ Completion:

END OF BORING ELEV.	DATE COMPLETED	LOGGED BY	PROJECT NUMBER
693.5 ft. MSL	3-15-95	B. Staurowsky	

NOTES:

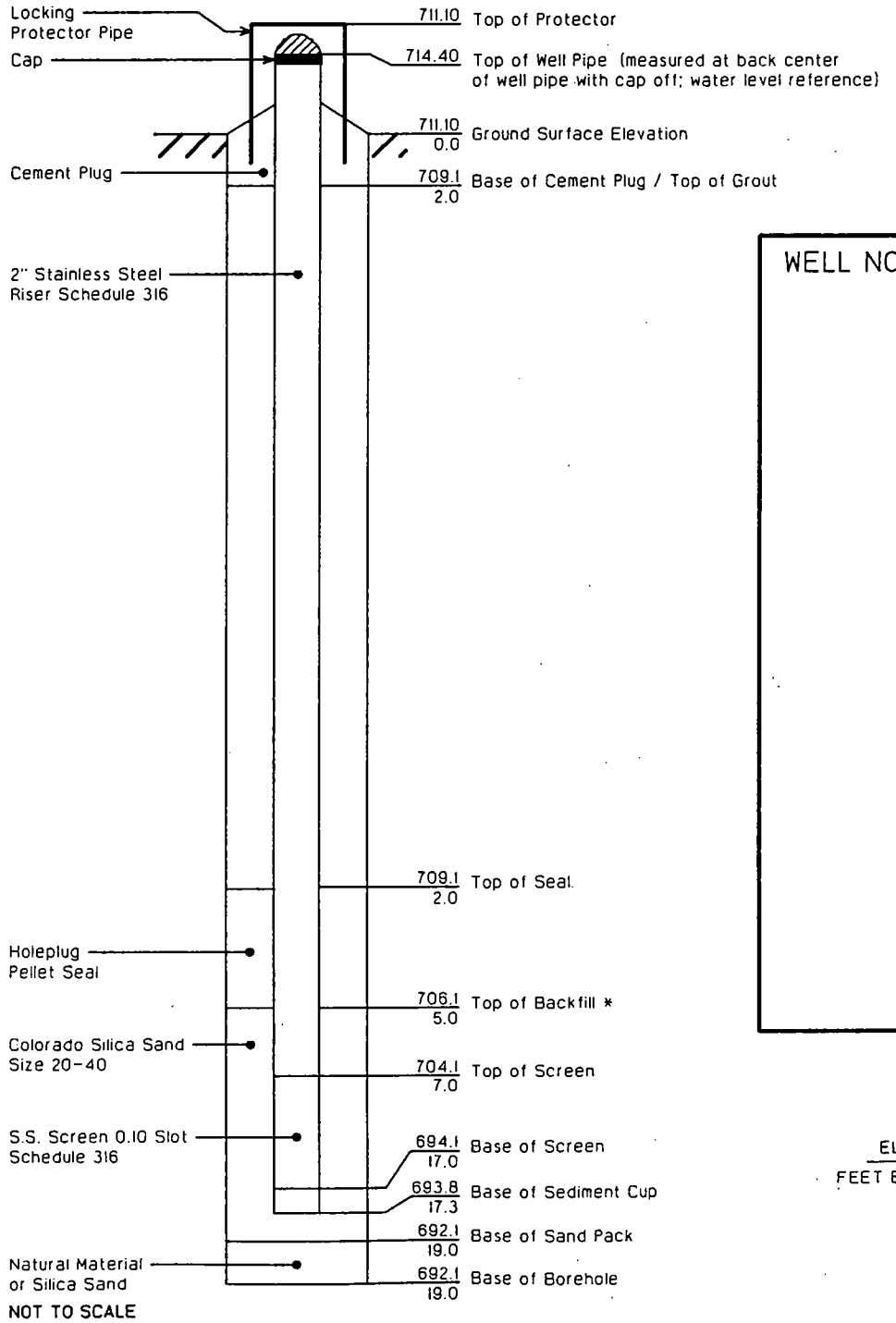
DEPTH (ft.)	SAMPLE NUMBER	BLOWS	REC.	Qu	SOIL DESCRIPTION	UNIT ELEV.	GEOLOGIC UNIT	GRAPHIC LOG	WELL/PIEZ DETAILS
					Blind drilled to 9.0'. See G137D log for description of 0.0'-9.0'.				Cement Cap; 706.5; Stainless Steel Riser; Bentonite Pellet Seal; 700.5
9					Brown fine SAND, some medium-coarse, becomes clayey, wet	699.5; 699.2			
10	SS-1	5 7 9 7	0.6'		Brown fine-coarse SAND, slightly oxidized				698.5; Silica Sand Pack
11					Brown fine SAND, well graded to coarse SAND and small-medium GRAVEL, little fine-medium sand and large gravel, massive, medium dense	697.5			
12	SS-2	5 5 5 8	1.4'						Stainless Steel Screen
13					below 13.0', becomes fine-coarse sand and small-large gravel				
14	SS-3	2 5 17 14	1.2'						
15					End of Boring = 15.0'	693.5			693.5; 693.5
					Monitor well set upon completion.				
16									
17									
18									
19									
20									

Monitor Well Construction Details

WELL NUMBER	MONITOR WELL CONSTRUCTION DETAIL	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS McHENRY, ILLINOIS
G33S		

PROJECT			COORDINATES
Winnebago Reclamation - Pagel Landfill			N 2001702.28 E 798774.36
DRILLER	RIG		METHOD
Layne Northwest Company	Track-mounted CME 850		Rotary
BORING CROSS REFERENCE	INSTALLATION DATE	WATER LEVEL REFERENCE ELEVATION	BOREHOLE DIAMETER
G33S	3-2-95	714.40 ft. MSL	8.5"

NOTES:



NOT TO SCALE

WELL NOTES

ELEVATION (Ft. MSL)
FEET BELOW GROUND SURFACE

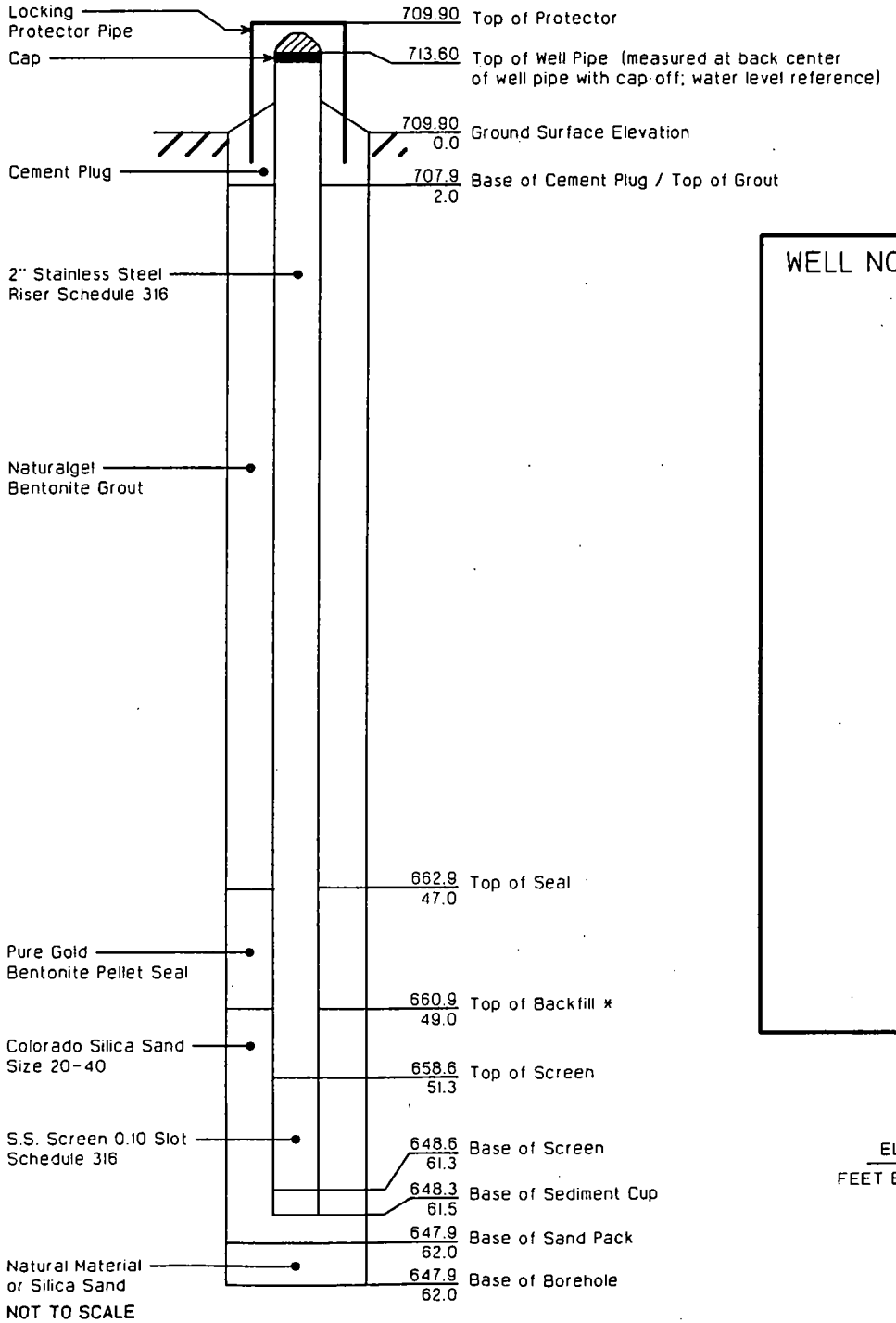
WELL NUMBER	MONITOR WELL CONSTRUCTION DETAIL	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS McHENRY, ILLINOIS
G34D		

PROJECT	COORDINATES
Winnebago Reclamation - Pagel Landfill	N 2002432.65 E 798707.15

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

BORING CROSS REFERENCE	INSTALLATION DATE	WATER LEVEL REFERENCE ELEVATION	BOREHOLE DIAMETER
G34D	3-3-95	713.52 ft. MSL	8.5"

NOTES:



NOT TO SCALE

WELL NOTES

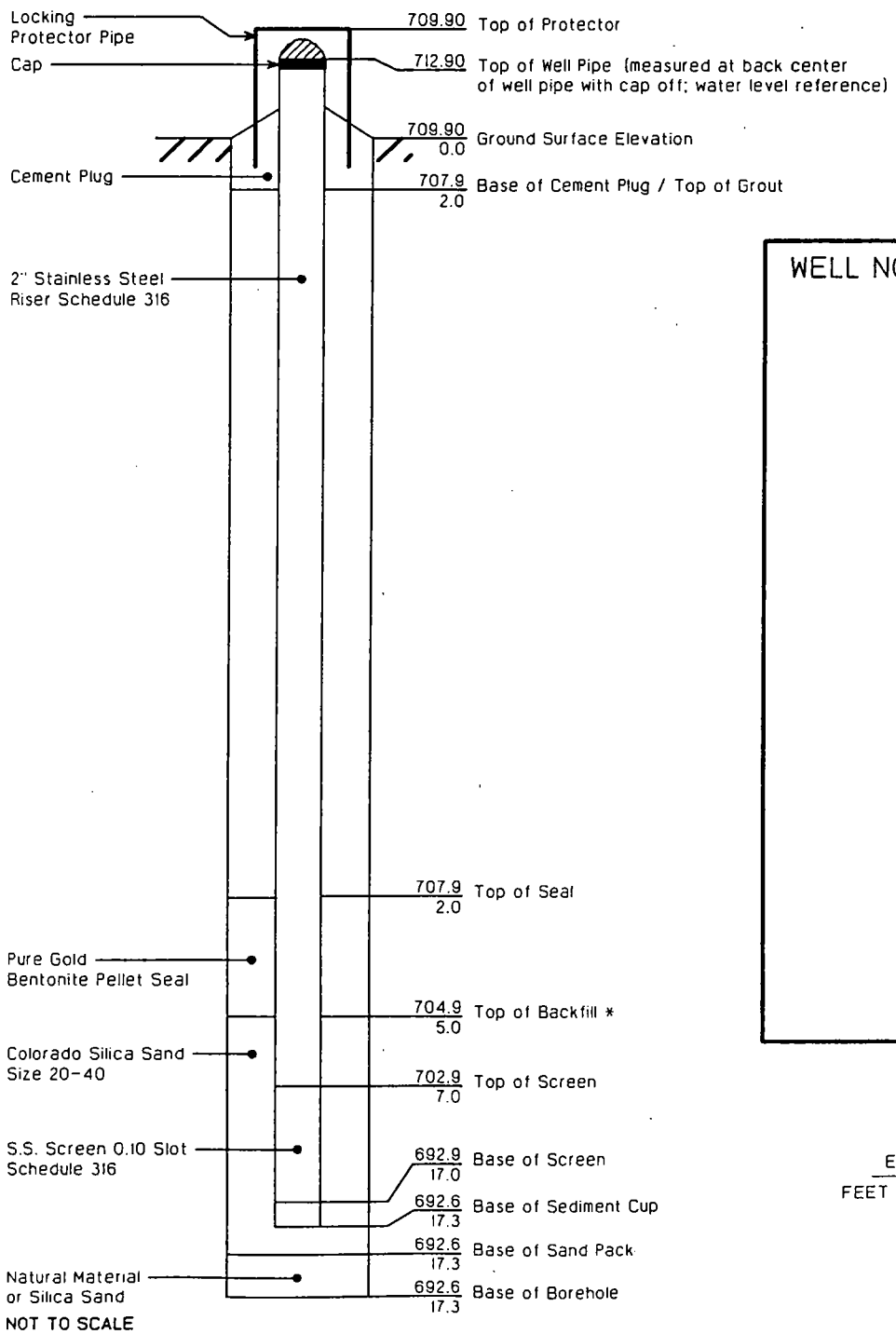
ELEVATION (Ft. MSL)
FEET BELOW GROUND SURFACE

WELL NUMBER	MONITOR WELL CONSTRUCTION DETAIL	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS McHENRY, ILLINOIS
G34S		

PROJECT		COORDINATES
Winnebago Reclamation - Pagel Landfill		N 2002425.49 E 798714.01
DRILLER: Layne Northwest Company	RIG: Track-mounted CME 850	METHOD: Rotary

BORING CROSS REFERENCE	INSTALLATION DATE	WATER LEVEL REFERENCE ELEVATION	BOREHOLE DIAMETER
G34S	3-6-95	712.47 ft. MSL	8.5"

NOTES:



WELL NOTES

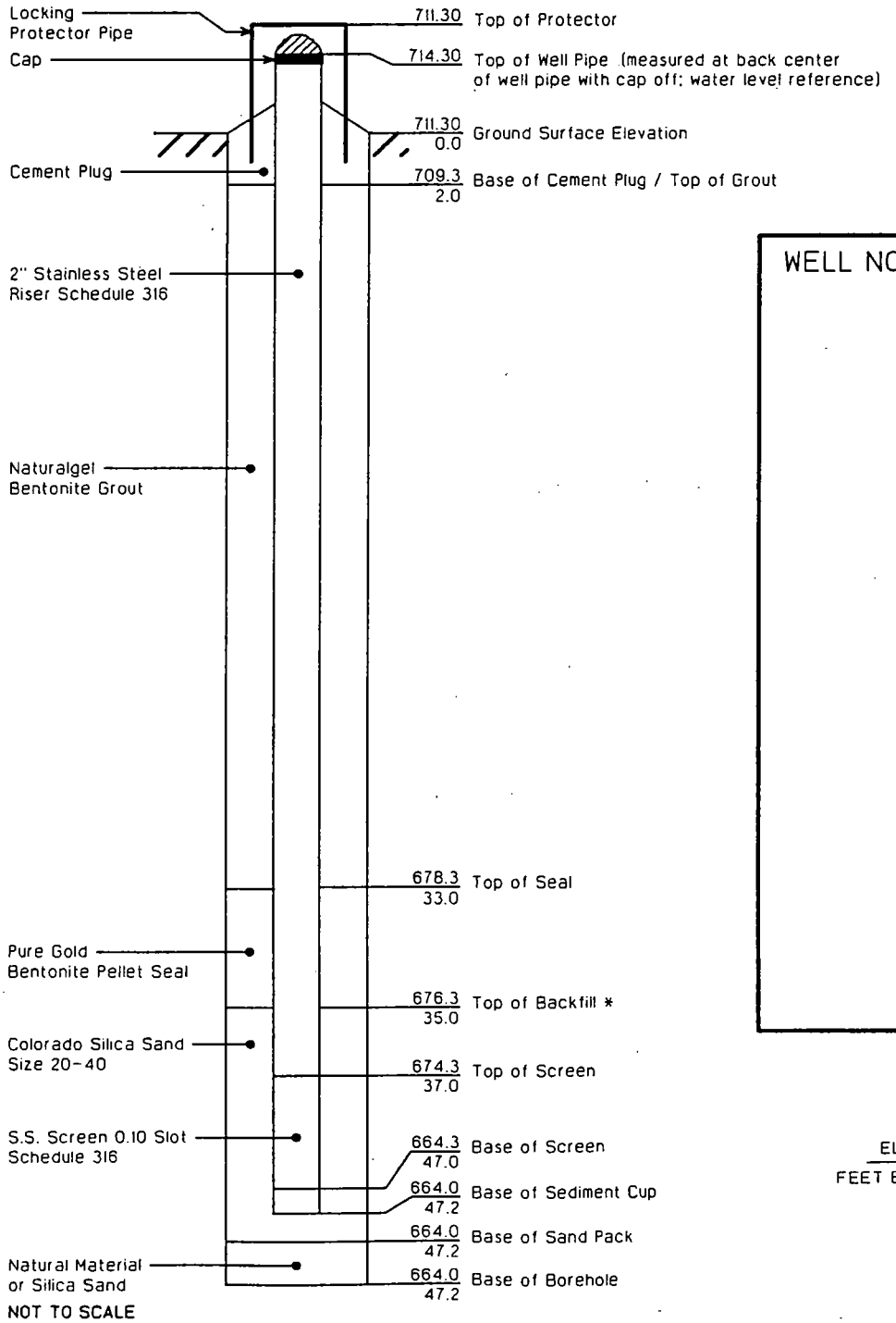
ELEVATION (Ft. MSL)
FEET BELOW GROUND SURFACE

WELL NUMBER	MONITOR WELL CONSTRUCTION DETAIL	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS McHENRY, ILLINOIS
G135D		

PROJECT		COORDINATES
Winnebago Reclamation - Pagel Landfill		N 2002037.10 E 799089.33
DRILLER: Layne Northwest Company	RIG: Track-mounted CME 850	METHOD: Rotary

BORING CROSS REFERENCE	INSTALLATION DATE	WATER LEVEL REFERENCE ELEVATION	BOREHOLE DIAMETER
G135D	3-7-95	714.19 ft. MSL	8.5"

NOTES:



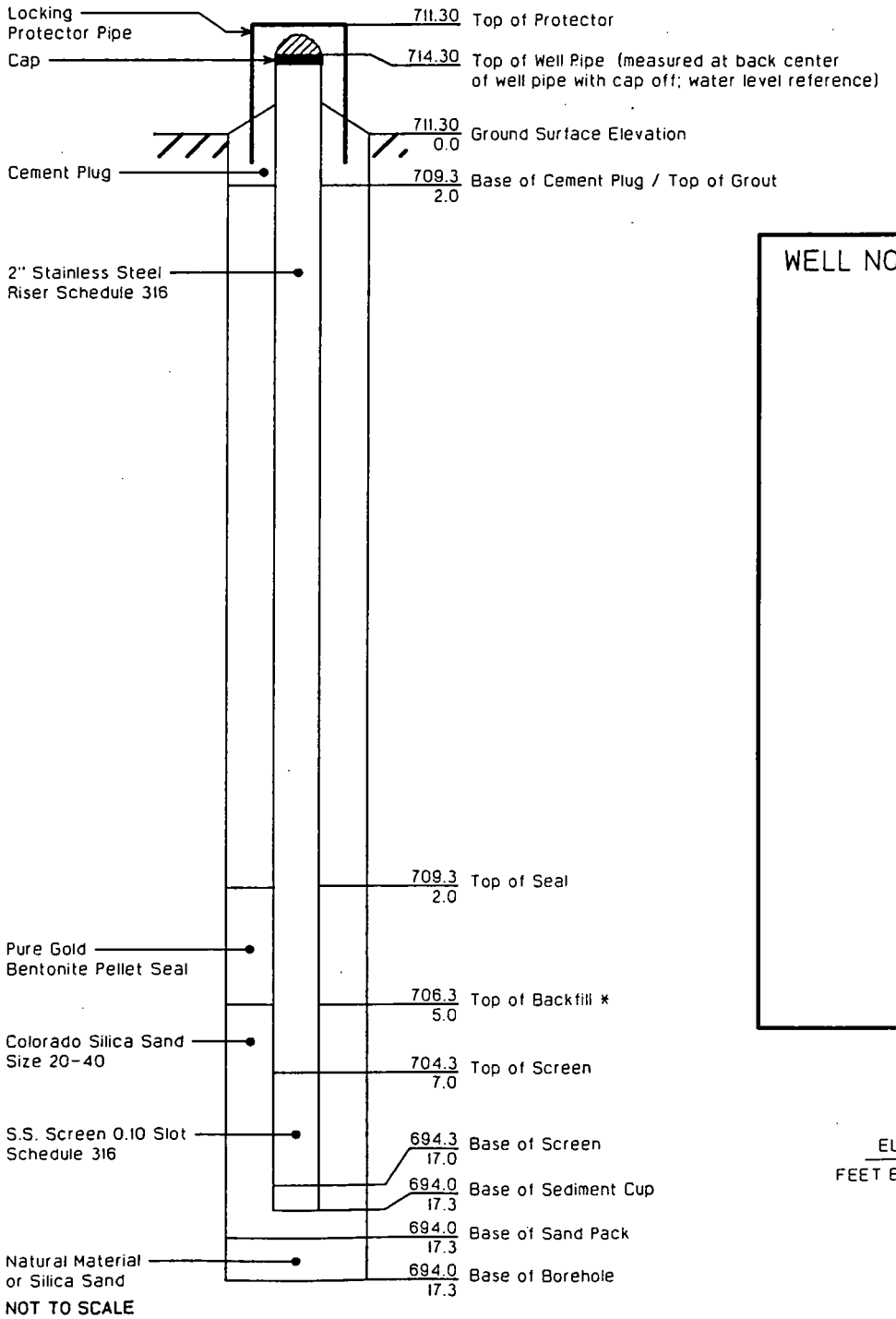
WELL NOTES

ELEVATION (Ft. MSL)
FEET BELOW GROUND SURFACE

WELL NUMBER	MONITOR WELL CONSTRUCTION DETAIL	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS McHENRY, ILLINOIS
G35S		

PROJECT: Winnebago Reclamation - Pagel Landfill			COORDINATES: N 2002038.94 E 799084.49
DRILLER: Layne Northwest Company	RIG: Track-mounted CME 850		METHOD: Rotary
BORING CROSS REFERENCE: G35S	INSTALLATION DATE: 3-8-95	WATER LEVEL REFERENCE ELEVATION: 714.11 ft. MSL	BOREHOLE DIAMETER: 8.5"

NOTES:



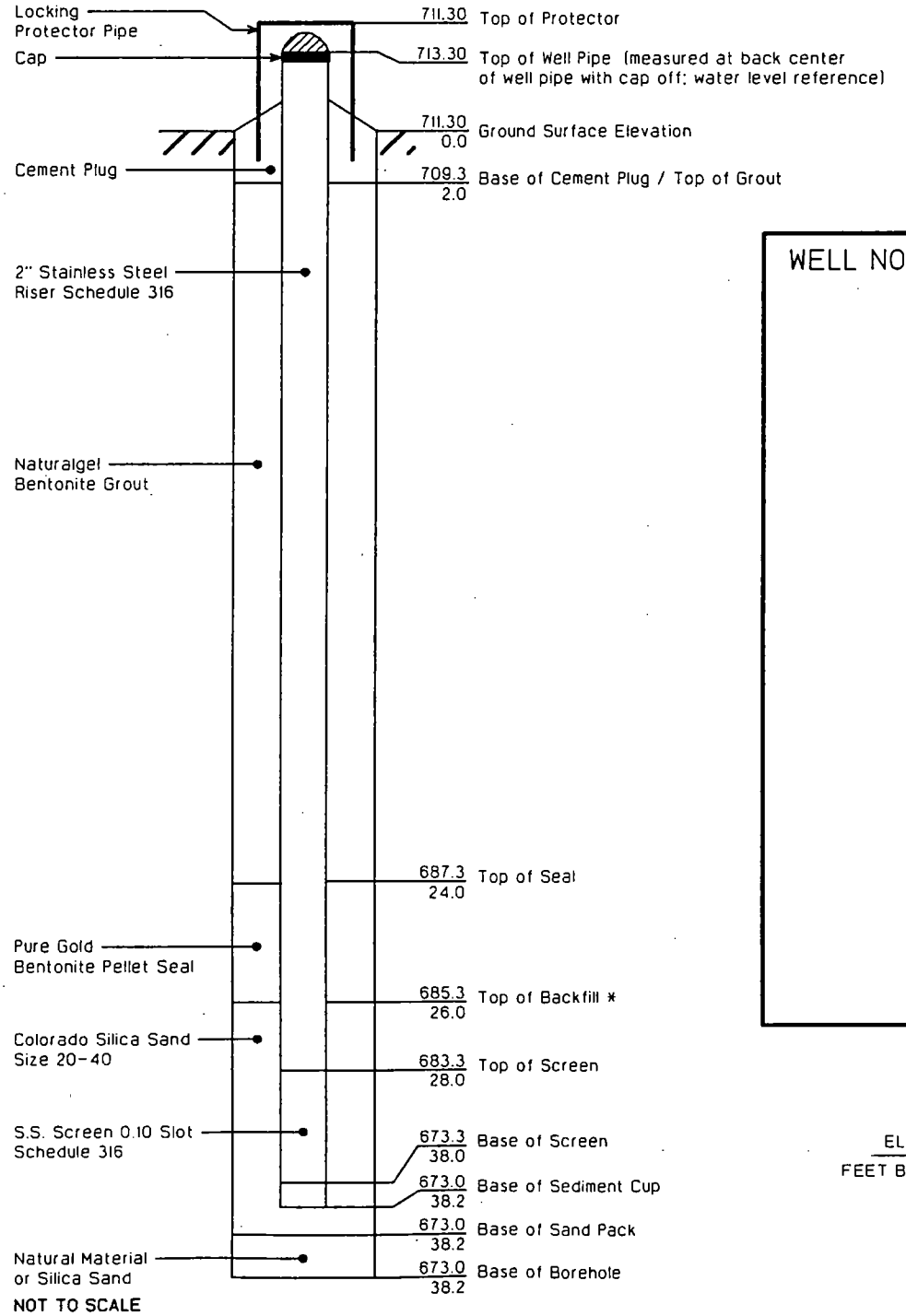
WELL NOTES

ELEVATION (Ft. MSL)
FEET BELOW GROUND SURFACE

WELL NUMBER	MONITOR WELL CONSTRUCTION DETAIL	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS McHENRY, ILLINOIS
G36D		

PROJECT: Winnebago Reclamation - Pagel Landfill			COORDINATES: N 2001359.84 E 799423.28
DRILLER: Layne Northwest Company	RIG: Track-mounted CME 850		METHOD: Rotary
BORING CROSS REFERENCE: G36D	INSTALLATION DATE: 3-16-95	WATER LEVEL REFERENCE ELEVATION: 713.32 ft. MSL	BOREHOLE DIAMETER: 8.5"

NOTES:



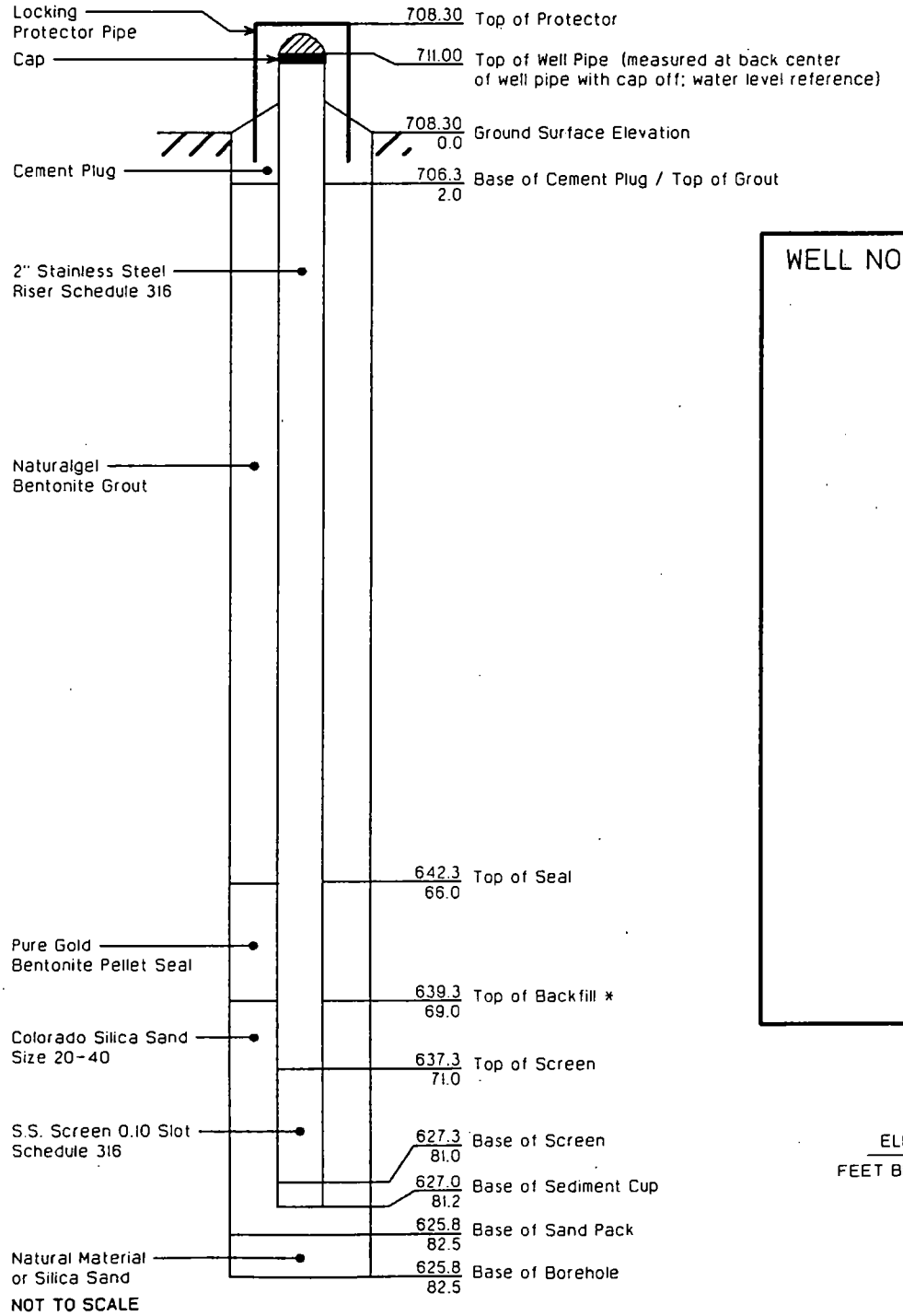
WELL NOTES

ELEVATION (Ft. MSL)
FEET BELOW GROUND SURFACE

WELL NUMBER	MONITOR WELL CONSTRUCTION DETAIL	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS McHENRY, ILLINOIS
G37D		

PROJECT: Winnebago Reclamation - Pagel Landfill			COORDINATES: N 2002691.61 E 798738.16
DRILLER: Layne Northwest Company	RIG: Track-mounted CME 850		METHOD: Rotary
BORING CROSS REFERENCE: G37D	INSTALLATION DATE: 3-14-95	WATER LEVEL REFERENCE ELEVATION: 711.04 ft. MSL	BOREHOLE DIAMETER: 8.5"

NOTES:



NOT TO SCALE

WELL NOTES

ELEVATION (Ft. MSL)
FEET BELOW GROUND SURFACE

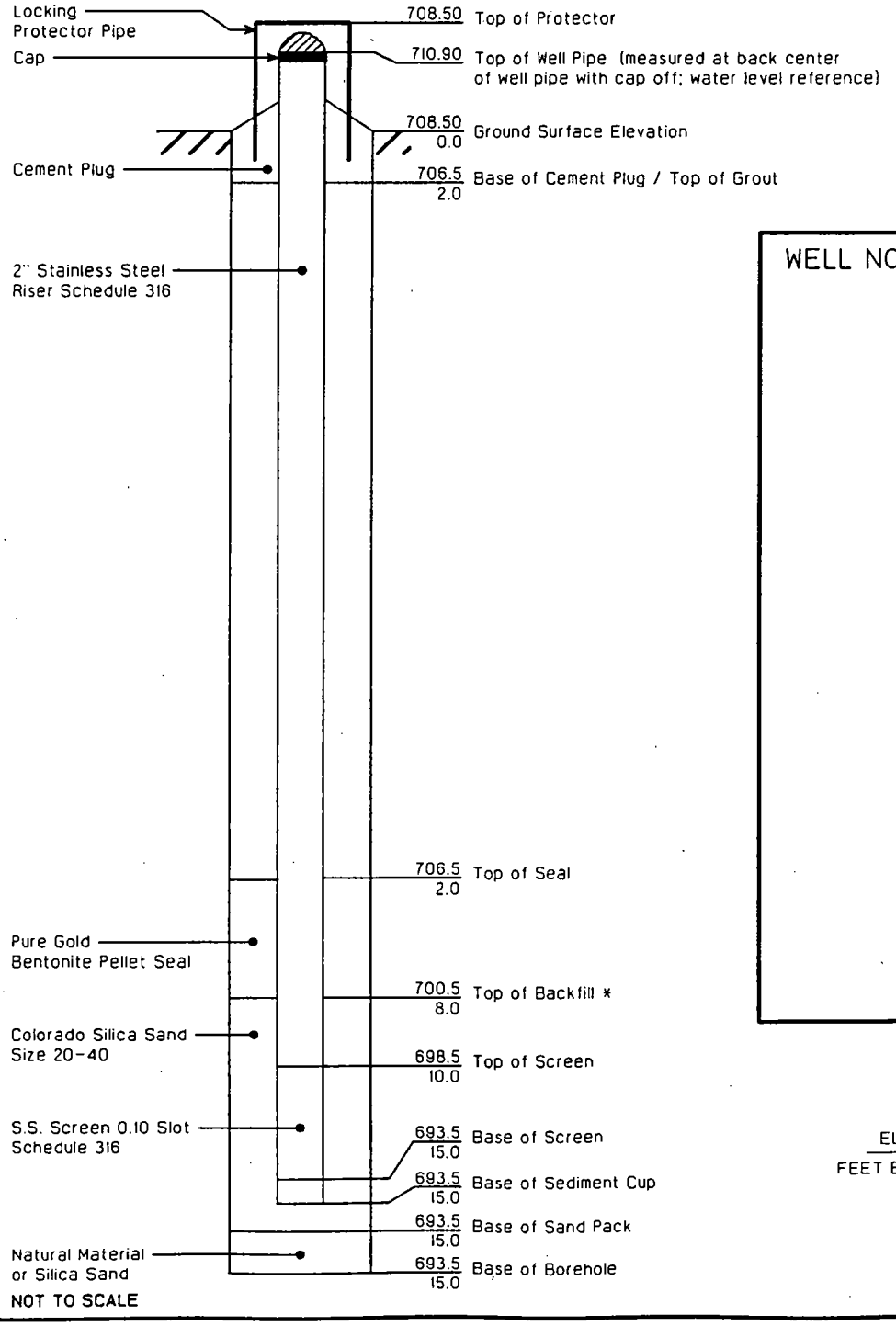
WELL NUMBER	MONITOR WELL CONSTRUCTION DETAIL	JENNINGS AND STAUROWSKY CONSULTING HYDROGEOLOGISTS McHENRY, ILLINOIS
G37S		

PROJECT	COORDINATES
Winnebago Reclamation - Pagel Landfill	N 2002691.63 E 798732.91

DRILLER	RIG	METHOD
Layne Northwest Company	Track-mounted CME 850	Rotary

BORING CROSS REFERENCE	INSTALLATION DATE	WATER LEVEL REFERENCE ELEVATION	BOREHOLE DIAMETER
G37S	3-15-95	710.91 ft. MSL	8.5"

NOTES:



NOT TO SCALE

WELL NOTES

ELEVATION (Ft. MSL)
FEET BELOW GROUND SURFACE

ATTACHMENT B

Results of Laboratory Tests

TSC
TESTING SERVICE CORPORATION

Geotechnical Engineering
Environmental Services
Construction Materials Engineering & Testing
Laboratory Testing of Soils & Materials
Subsurface Exploration

Carol Stream, Illinois

April 27, 1995

Roberta L. Jennings
Belinda Staurowski
Consulting Hydrogeologists
2926 North Shorewood Drive
McHenry, Illinois 60050-0340

Re: L-37,151
Report 1
Pagel Landfill
Laboratory Testing

Dear Ms. Staurowski:

The result of the hydraulic conductivity, grainsize, porosity, cation exchange, and fractional organic content you requested is contained in the enclosed sheets. The tests were run using current I.E.P.A. and ASTM methodology. If you have any questions or require additional information, please call.

Respectfully submitted,

TESTING SERVICE CORPORATION

Larry Lockwald
Laboratory Manager

LL:cn
Enc. 16 Pages

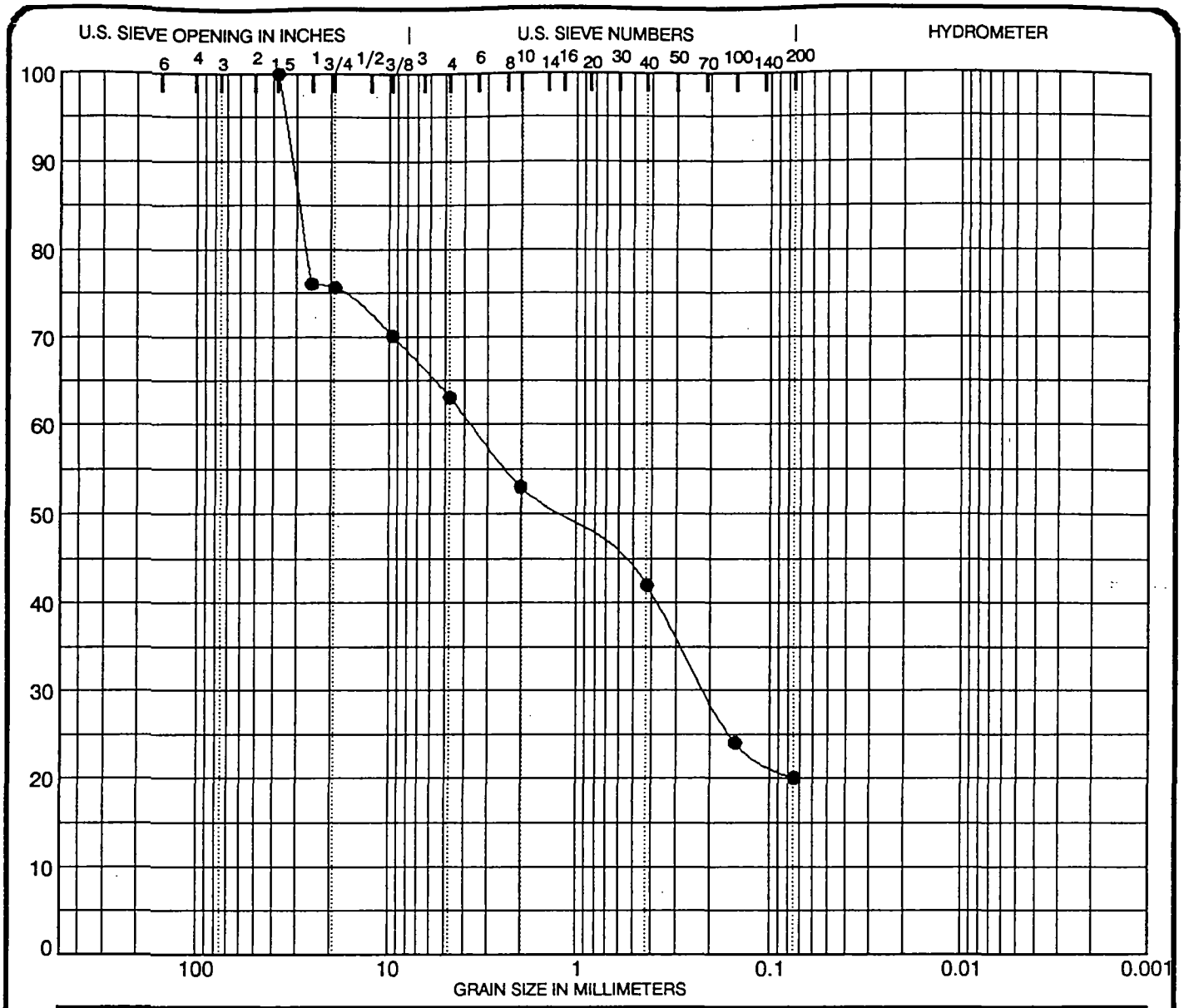
CAROL STREAM, IL 60188-2492
457 E. GUNDERSEN DRIVE
(708) 653-3920
FAX (708) 653-2726

BLOOMINGTON, IL 61704-8141
2911 GILL STREET, SUITE A1
(309) 662-2215
FAX (309) 662-2138

CARY, IL 60013-2978
209 CLEVELAND STREET, UNIT C
(708) 516-0505
FAX (708) 516-0527

GURNEE, IL 60031-5906
401 RIVERSIDE DRIVE, UNIT 10
(708) 249-6040
FAX (708) 249-6042

TINLEY PARK, IL 60477-1755
16646 S. OAK PARK AVENUE
(708) 429-2080
FAX (708) 429-2144



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 133 D	3"	100	
SS - 13	2"	100	
24'- 26'	1-1/2"	100	
	1"	76	
NOTES:	3/4"	76	
POROSITY (%): 24.9	3/8"	70	
	#4	63	
	#10	53	
	#40	42	
	#100	24	
	#200	20.0	

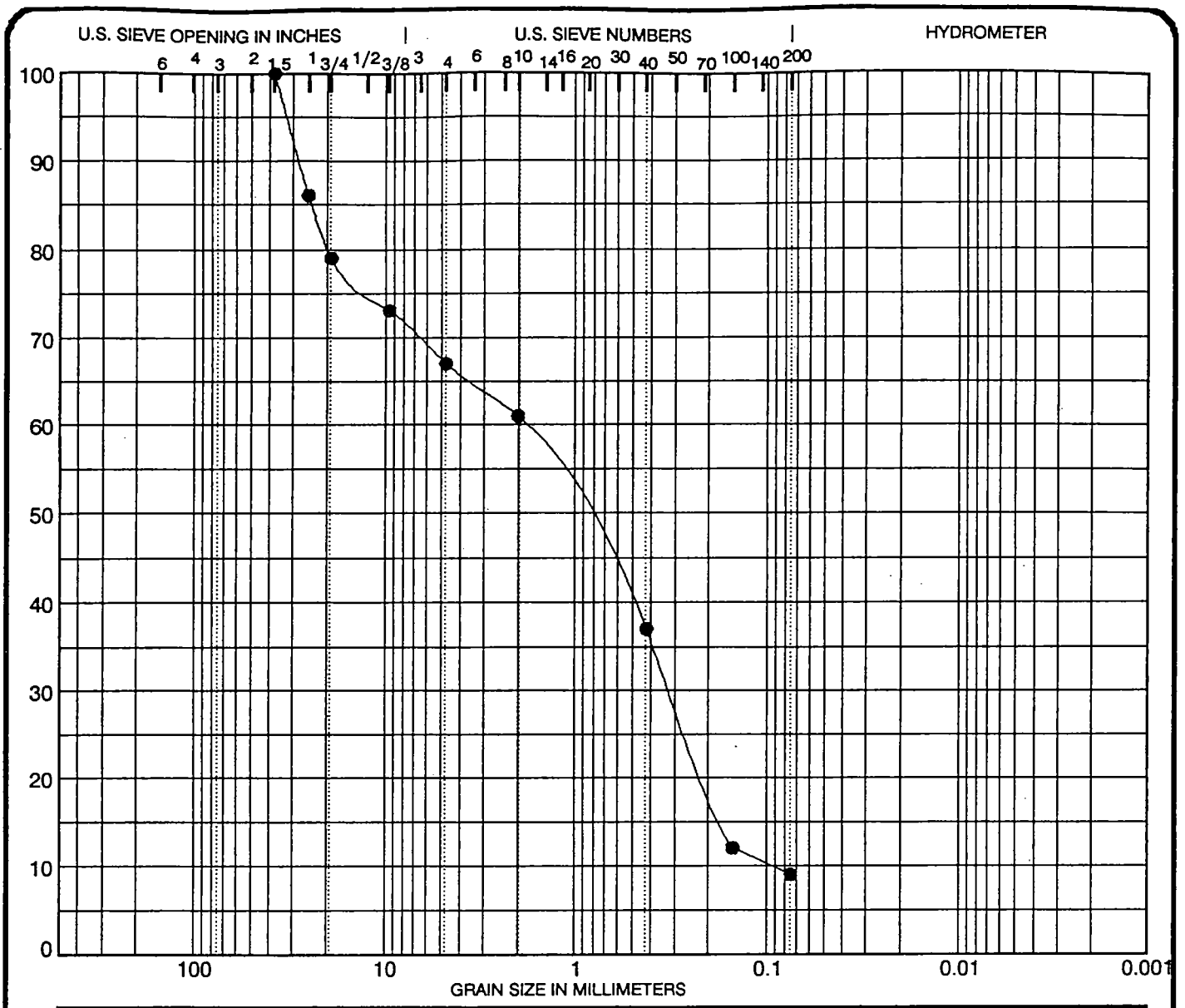
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

5

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 133 D	3"	100	
SS - 22	2"	100	
42'- 44'	1-1/2"	100	
	1"	86	
NOTES:	3/4"	79	
POROSITY (%): 33.0	3/8"	73	
	#4	67	
	#10	61	
	#40	37	
	#100	12	
	#200	9.0	

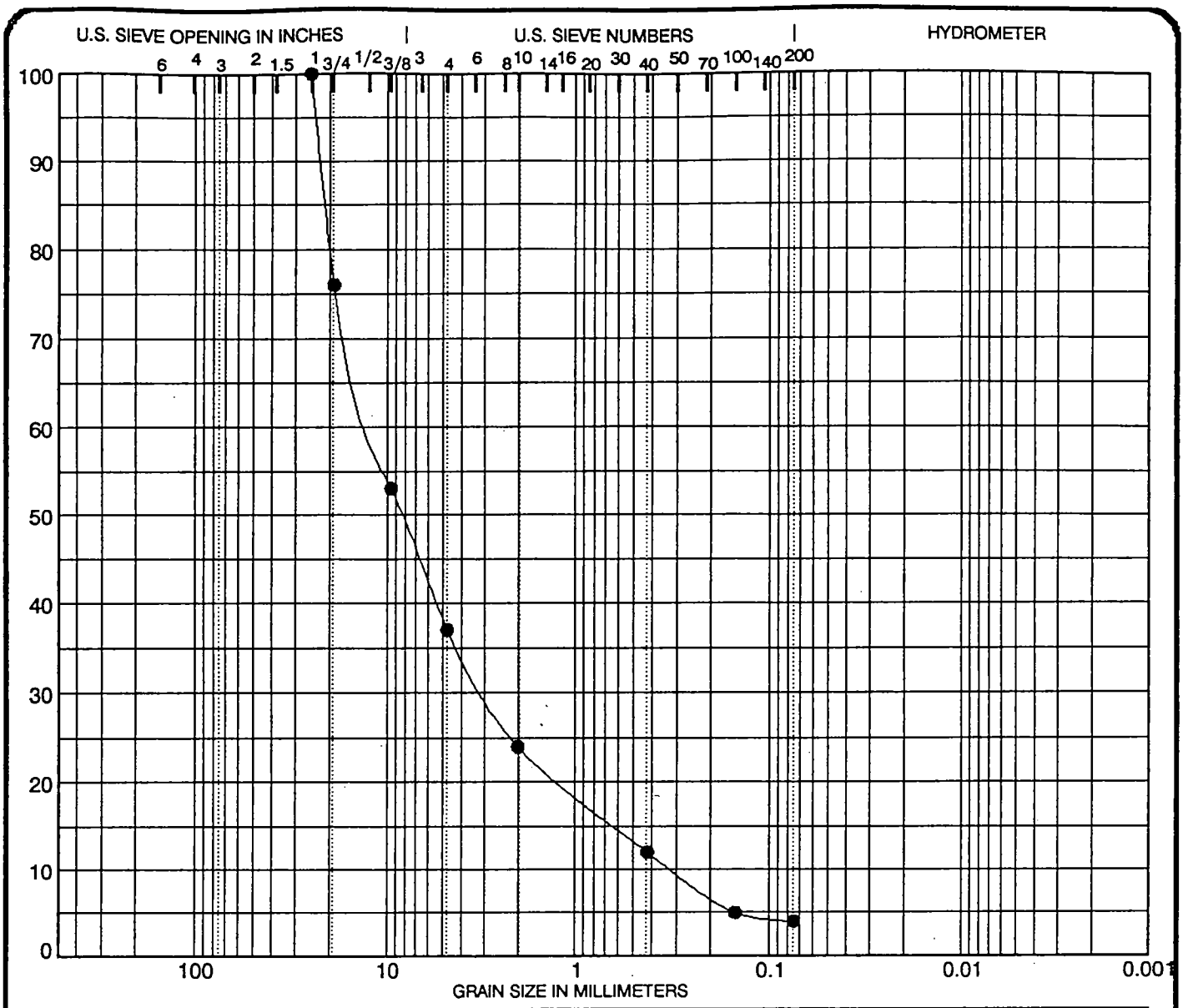
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

6

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 133 S	3"	100	
SS - 3	2"	100	
11'- 13'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	76	
POROSITY (%): Not Poss	3/8"	53	
	#4	37	
	#10	24	
	#40	12	
	#100	5	
	#200	4.0	

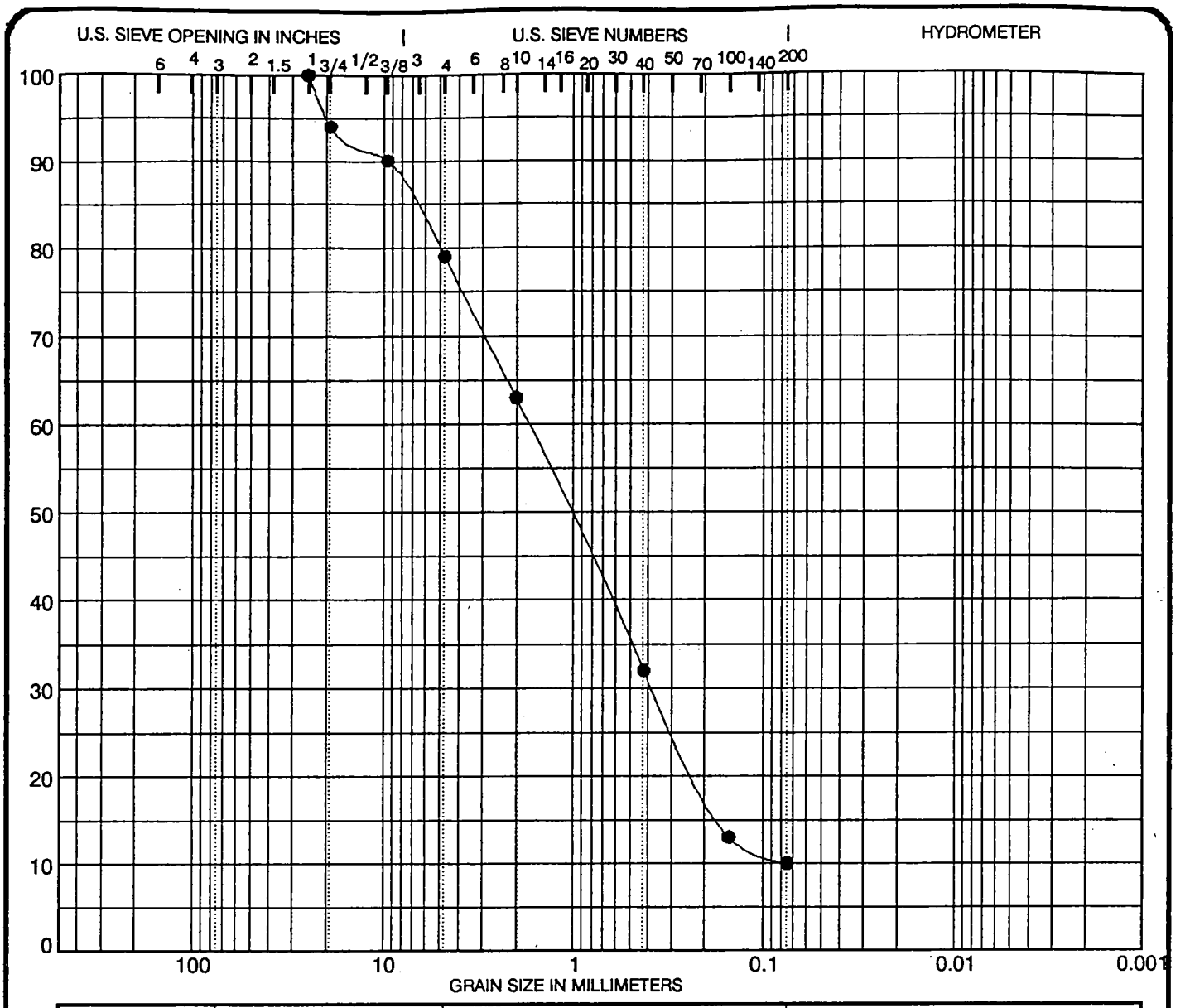
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

7

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 134 D	3"	100	
SS - 28	2"	100	
54'- 56'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	94	
POROSITY (%): 32.2	3/8"	90	
	#4	79	
	#10	63	
	#40	32	
	#100	13	
	#200	10.0	

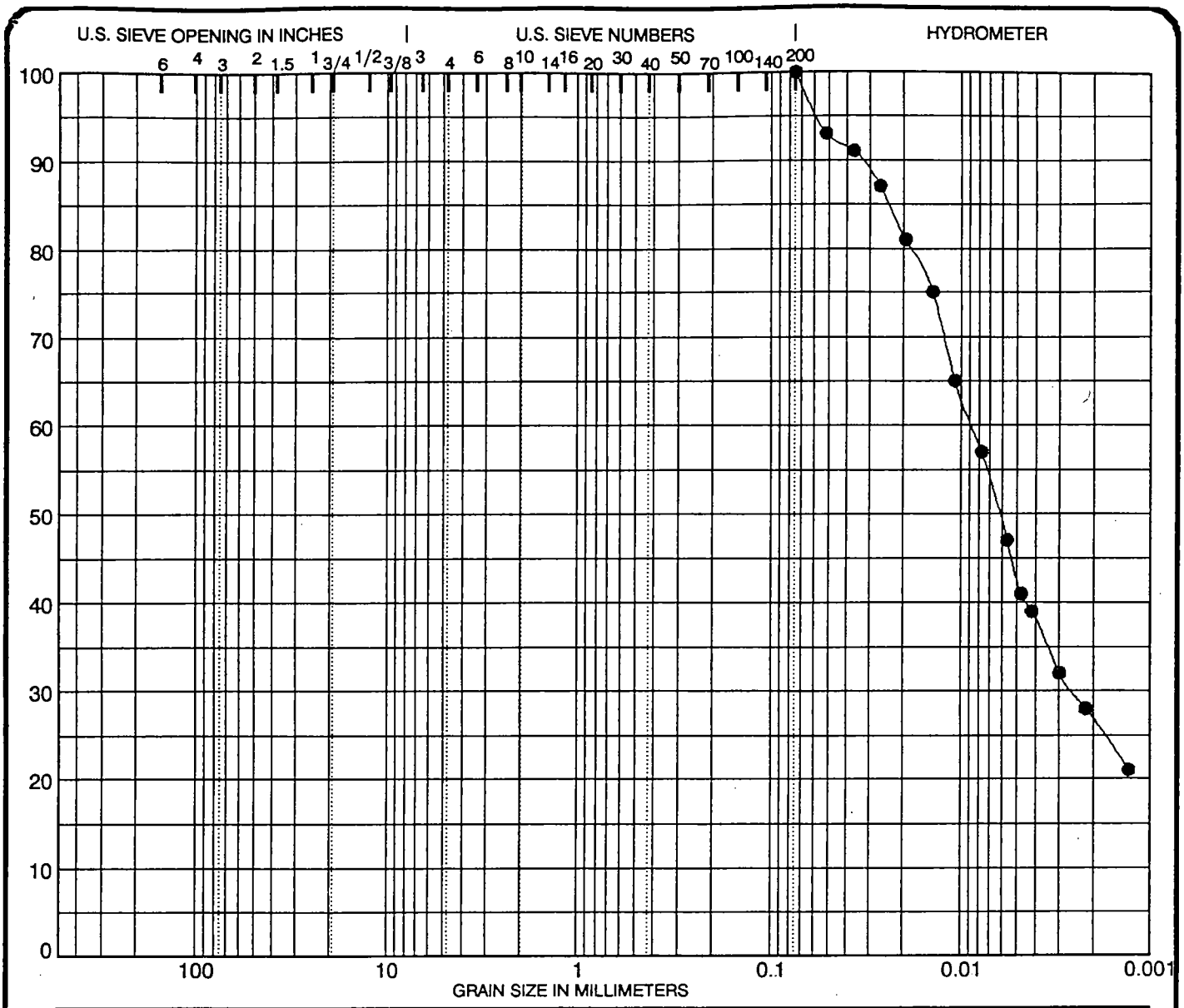
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

8

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 134 D	3"	100	
ST - 1	2"	100	
30'- 32'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	100	
POROSITY (%): 35.5	3/8"	100	
HORIZONTAL Kt (cm/sec): 1.6X10-6	#4	100	
VERTICAL Kt (cm/sec): 2.0X10-7	#10	100	
CEC (meg/100gm): 9.4	#40	100	
FOC (ppm): 507.2	#100	100	
	#200	100.0	

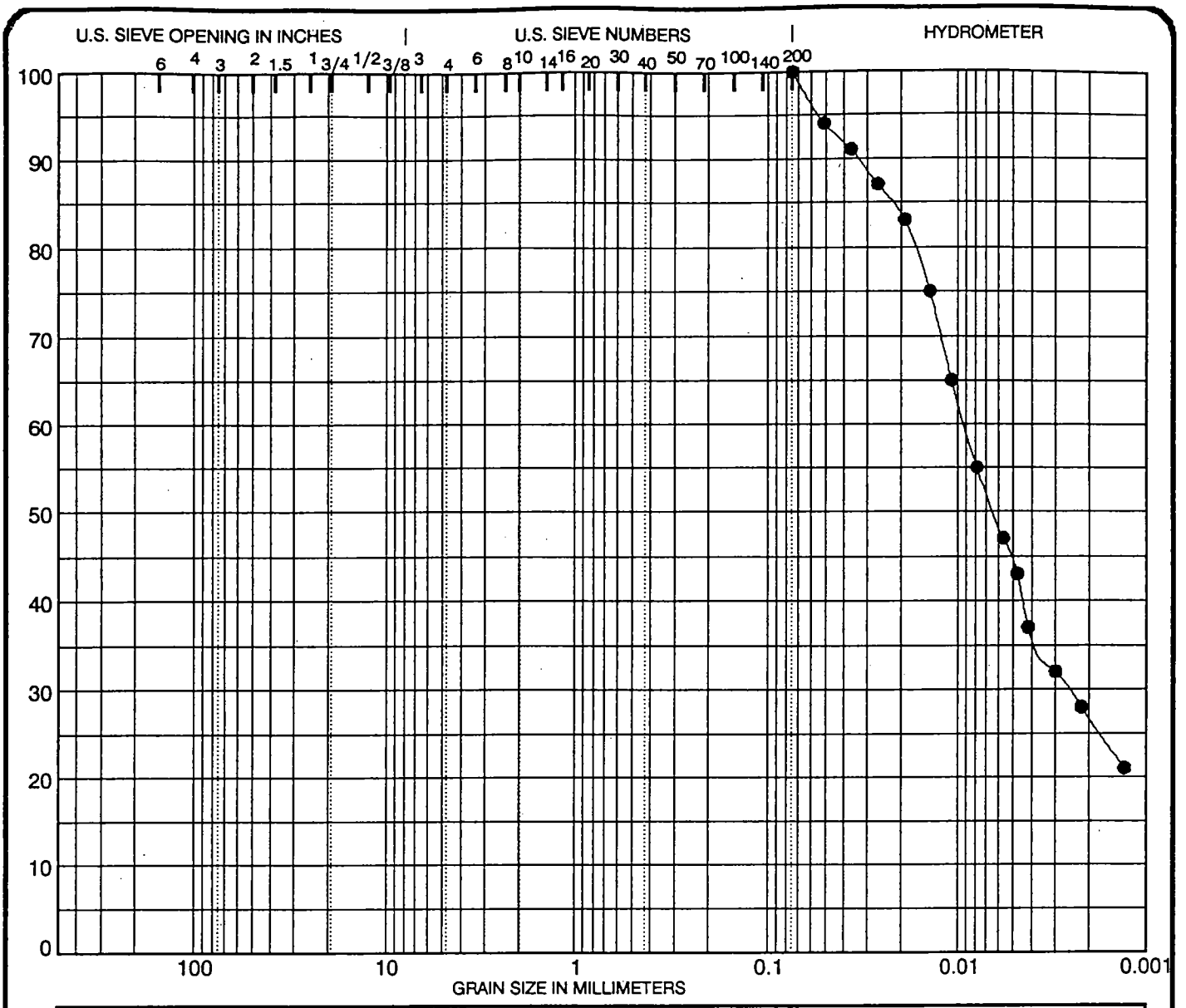
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

1

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 134 D	3"	100	
ST - 2	2"	100	
40'- 42'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	100	
POROSITY (%): 36.3	3/8"	100	
HORIZONTAL Kt (cm/sec): 1.6X10-7	#4	100	
VERTICAL Kt (cm/sec): 1.2X10-7	#10	100	
CEC (meg/100gm): 10.4	#40	100	
FOC (ppm): 657.7	#100	100	
	#200	100.0	

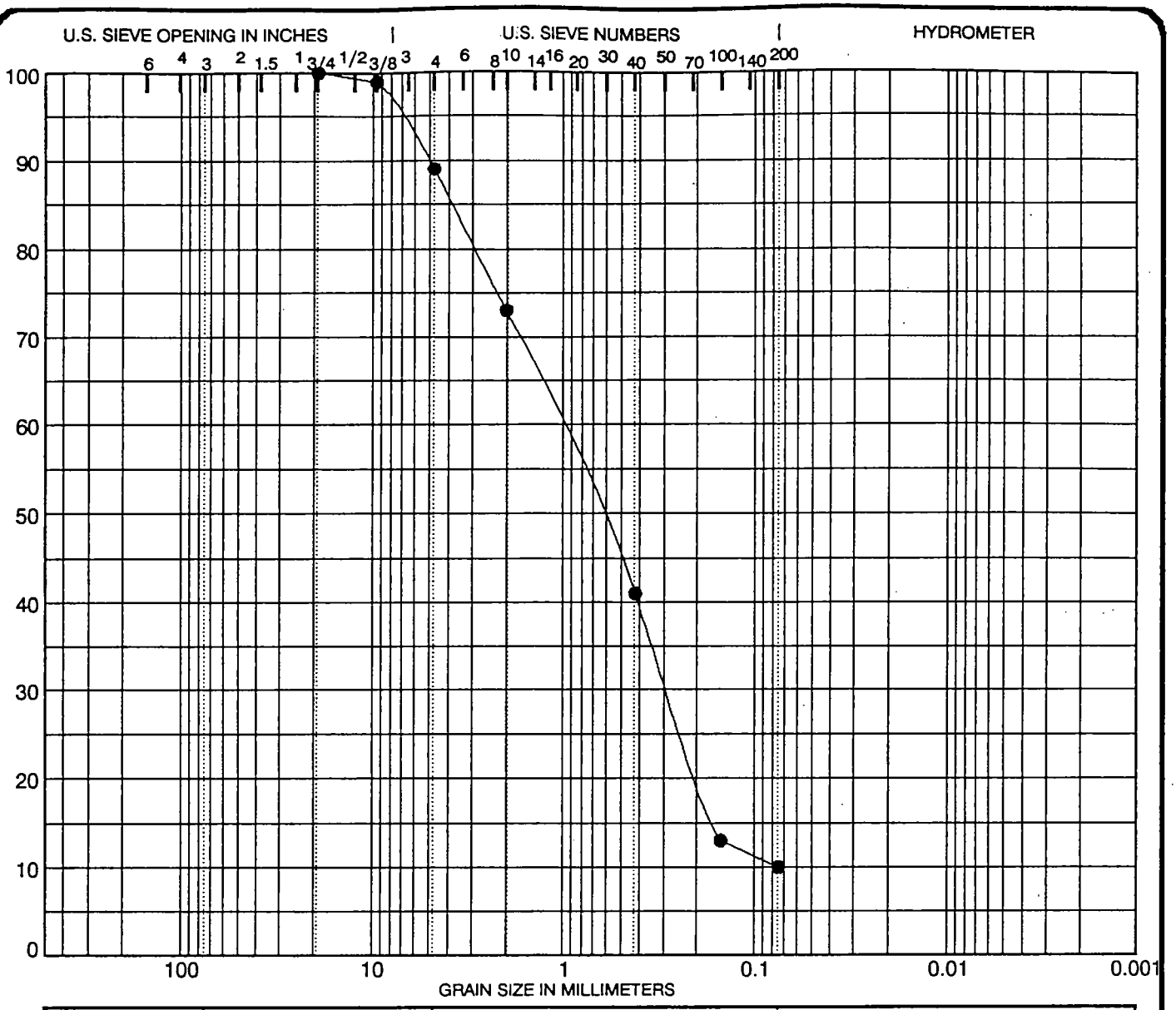
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

2

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 134 S	3"	100	
SS - 3	2"	100	
11'- 13'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	100	
POROSITY (%): 33.3	3/8"	99	
	#4	89	
	#10	73	
	#40	41	
	#100	13	
	#200	10.0	

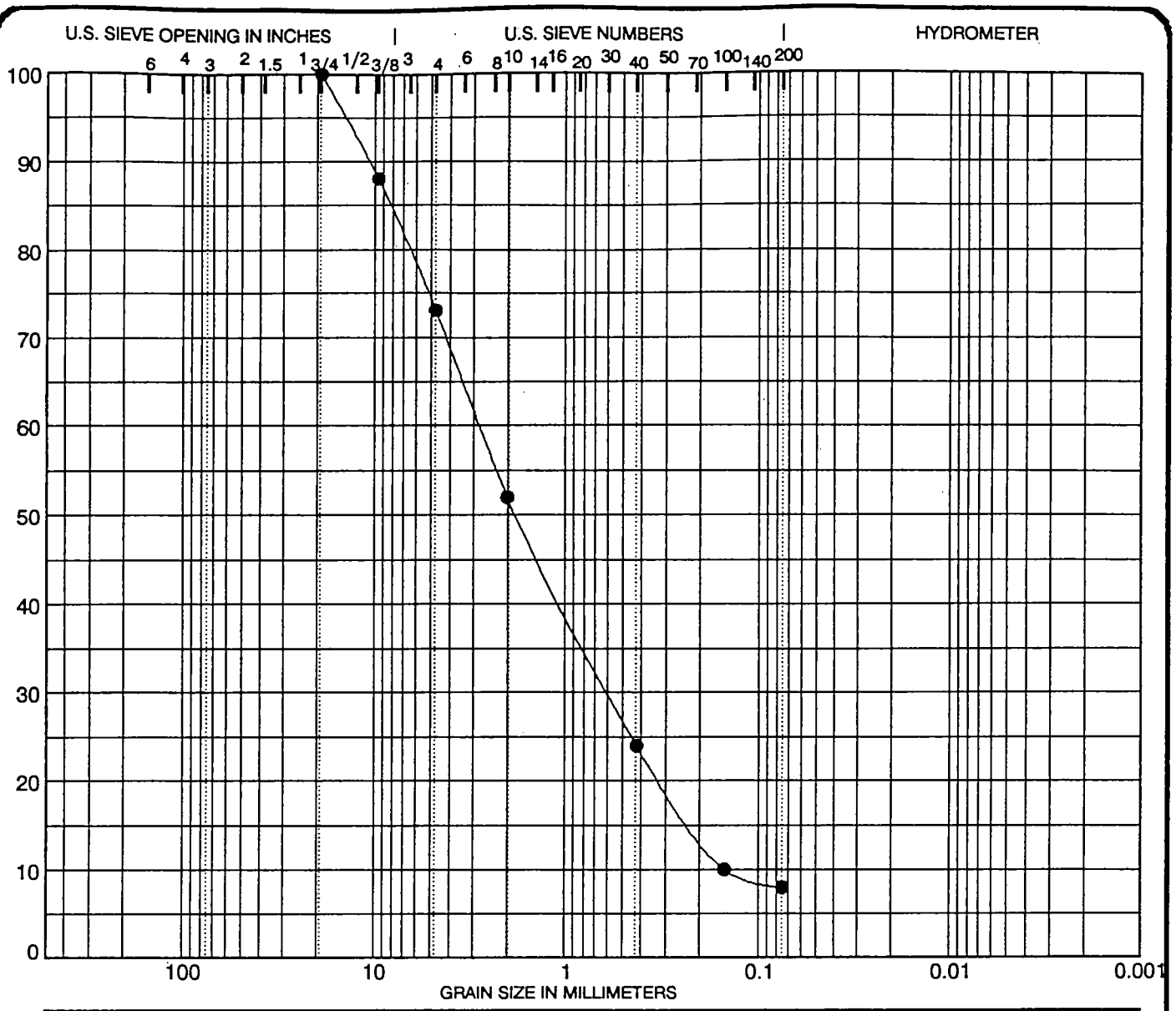
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

9

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 135 D	3"	100	
SS - 13	2"	100	
24'- 26'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	100	
POROSITY (%): 31.9	3/8"	88	
	#4	73	
	#10	52	
	#40	24	
	#100	10	
	#200	8.0	

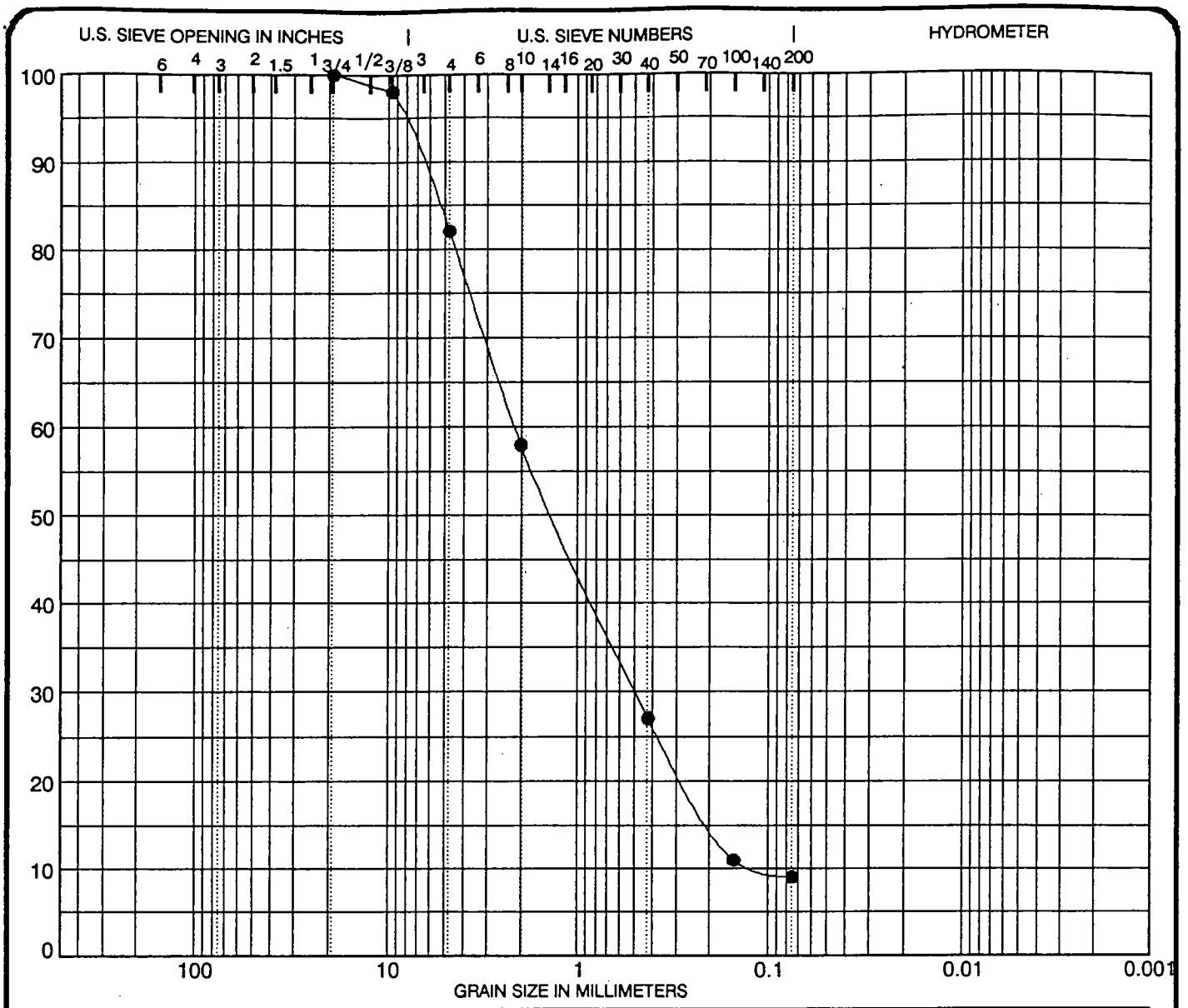
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

10

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 135 D	3"	100	
SS - 22	2"	100	
42'- 44'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	100	
POROSITY (%): 27.2	3/8"	98	
	#4	82	
	#10	58	
	#40	27	
	#100	11	
	#200	9.0	

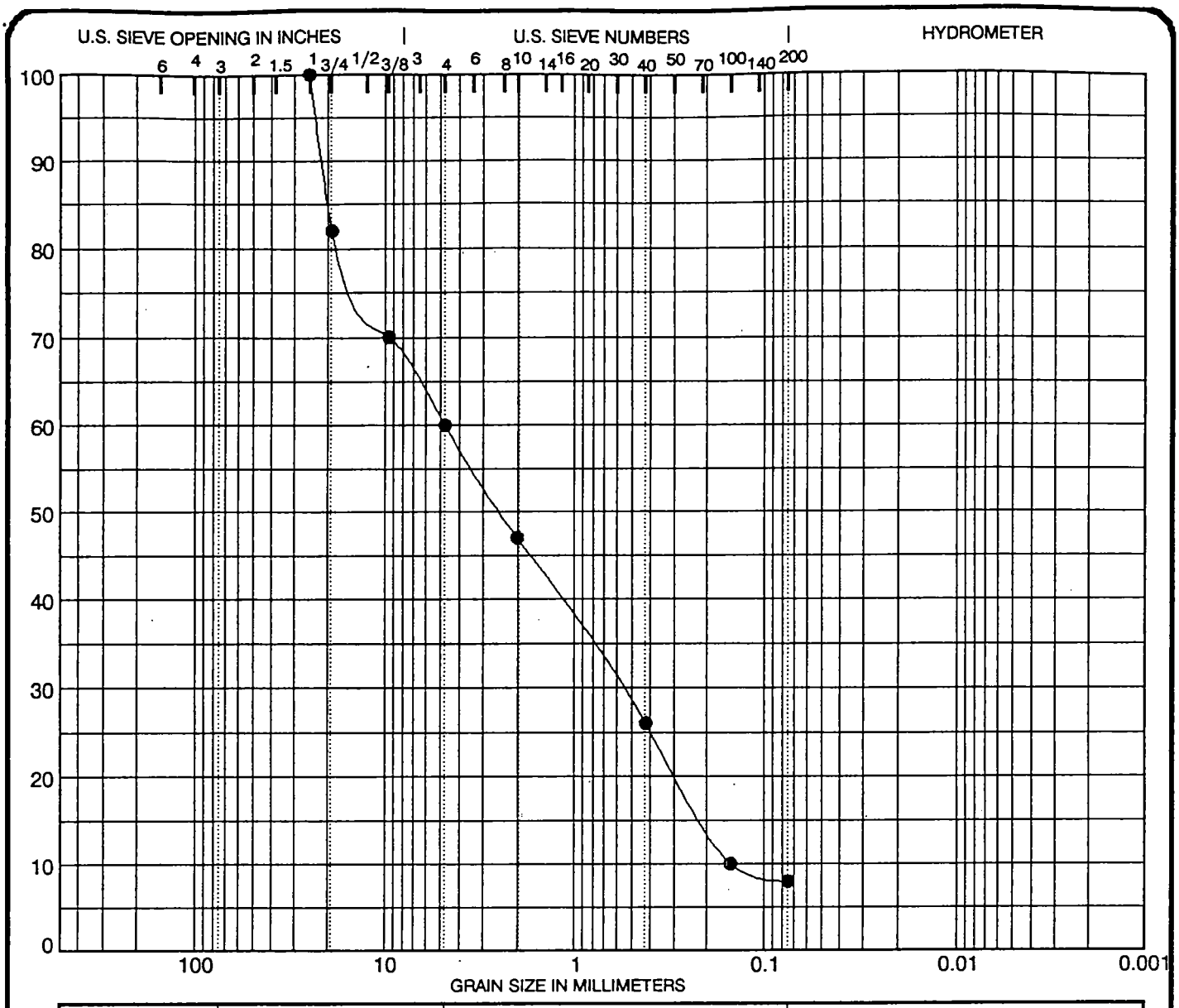
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

11

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 135 S	3"	100	
SS - 3	2"	100	
11'- 13'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	82	
POROSITY (%): 32.2	3/8"	70	
	#4	60	
	#10	47	
	#40	26	
	#100	10	
	#200	8.0	

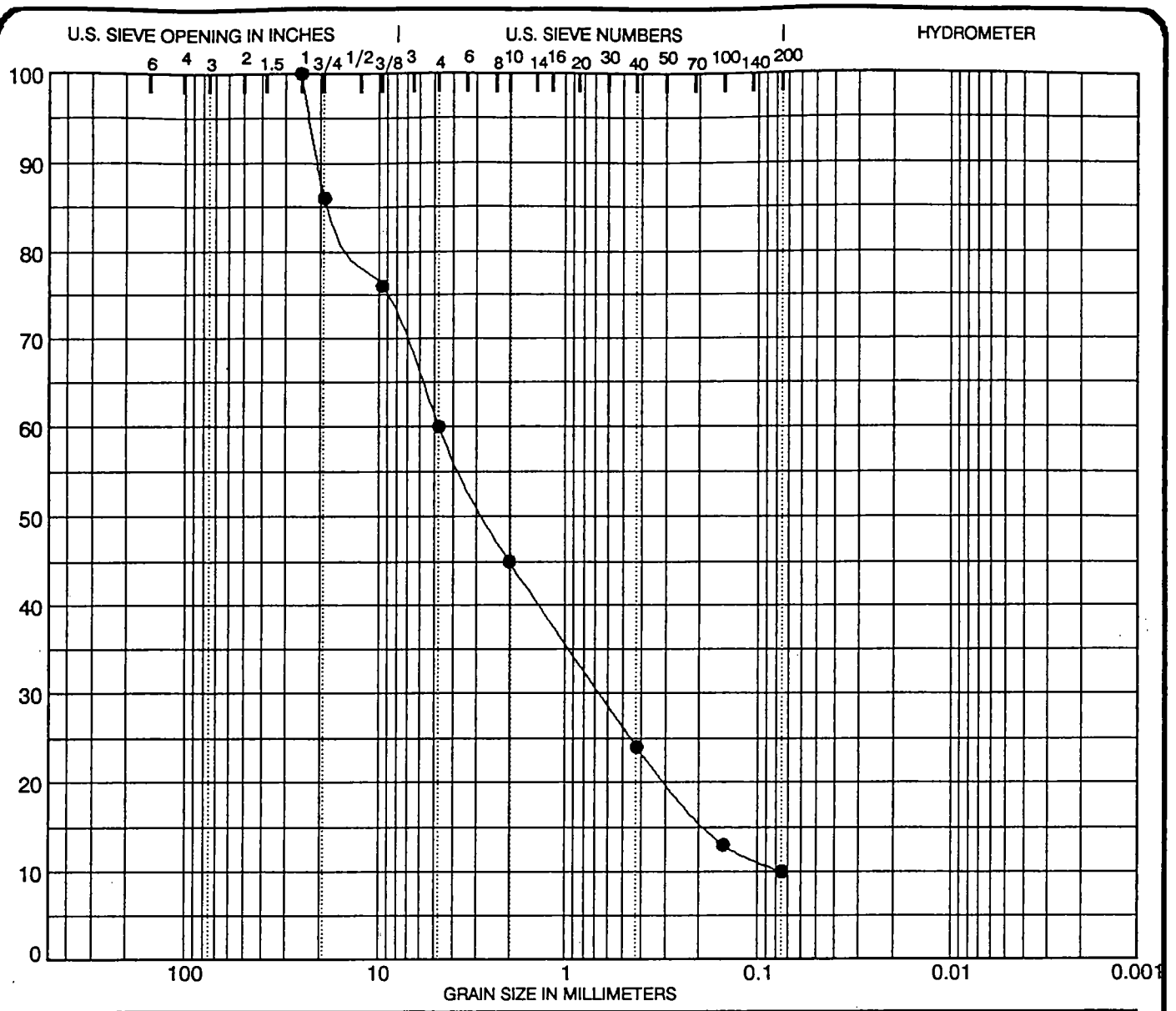
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

12

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 136 D	3"	100	
SS - 7	2"	100	
12'- 14'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	86	
POROSITY (%): 25.5	3/8"	76	
	#4	60	
	#10	45	
	#40	24	
	#100	13	
	#200	10.0	

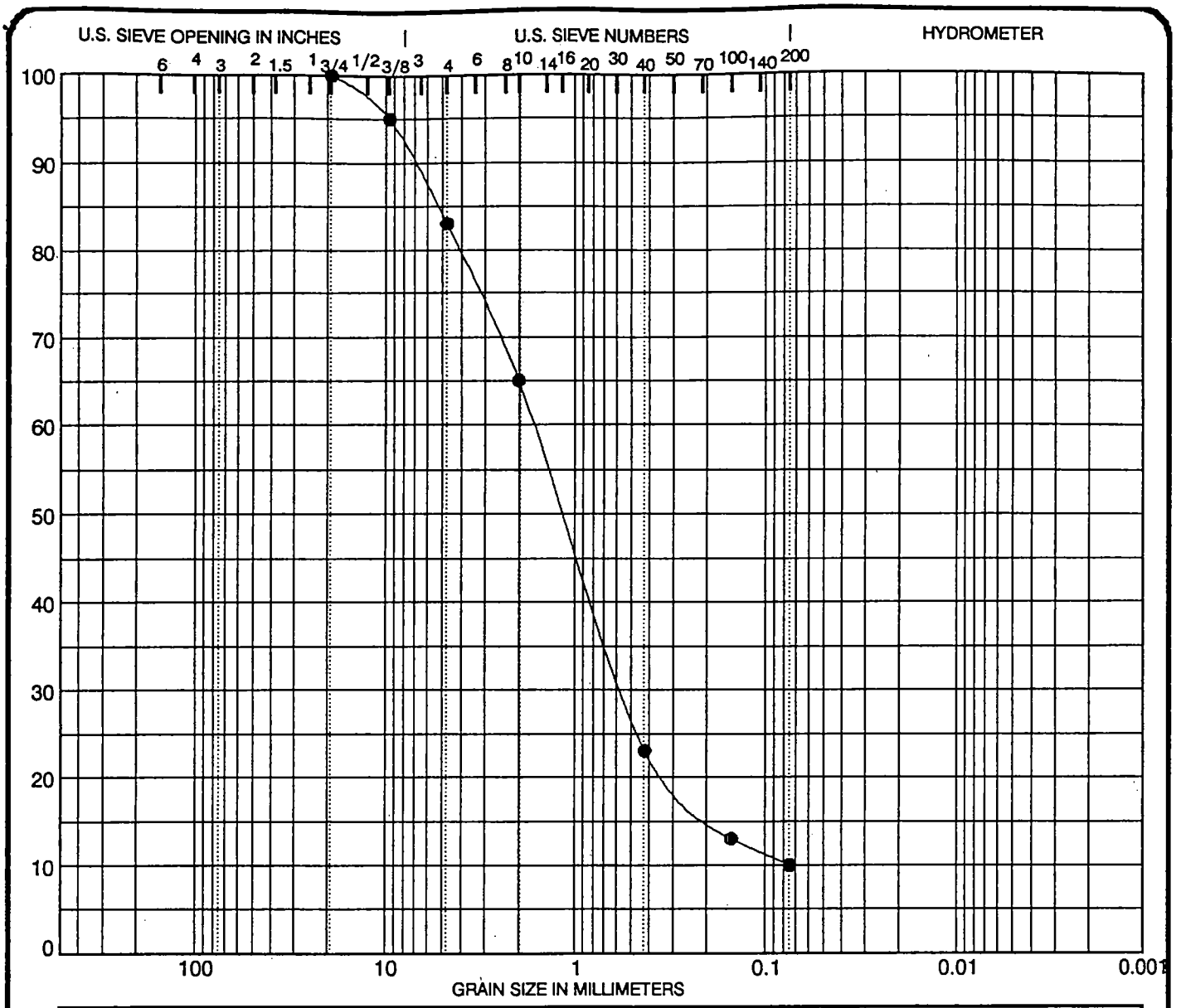
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

13

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 136 D	3"	100	
SS - 16	2"	100	
30'- 32'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	100	
POROSITY (%): 30.4	3/8"	95	
	#4	83	
	#10	65	
	#40	23	
	#100	13	
	#200	10.0	

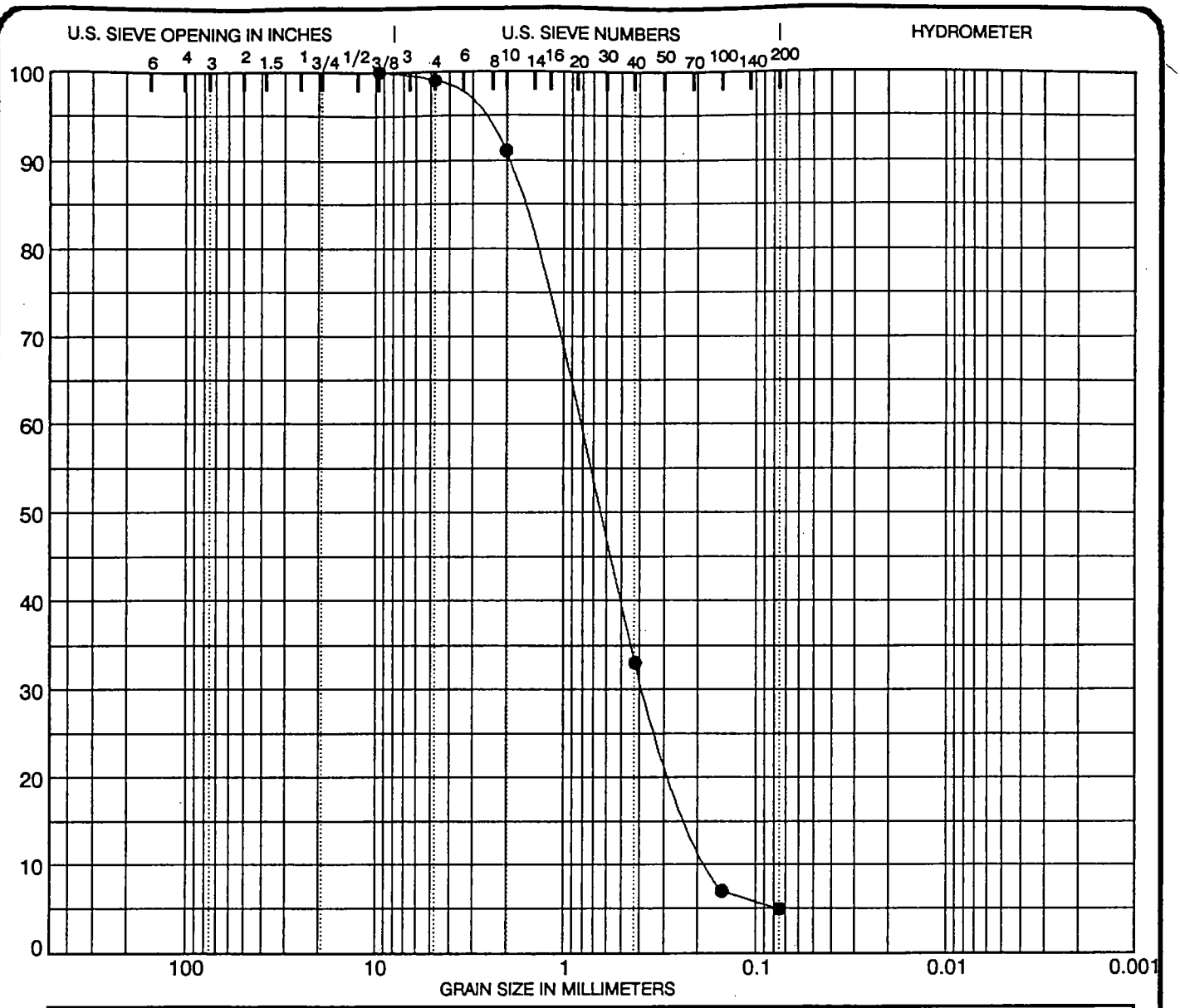
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

14

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 137 D	3"	100	
SS - 2	2"	100	
11'- 13'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	100	
POROSITY (%): 35.4	3/8"	100	
	#4	99	
	#10	91	
	#40	33	
	#100	7	
	#200	5.0	

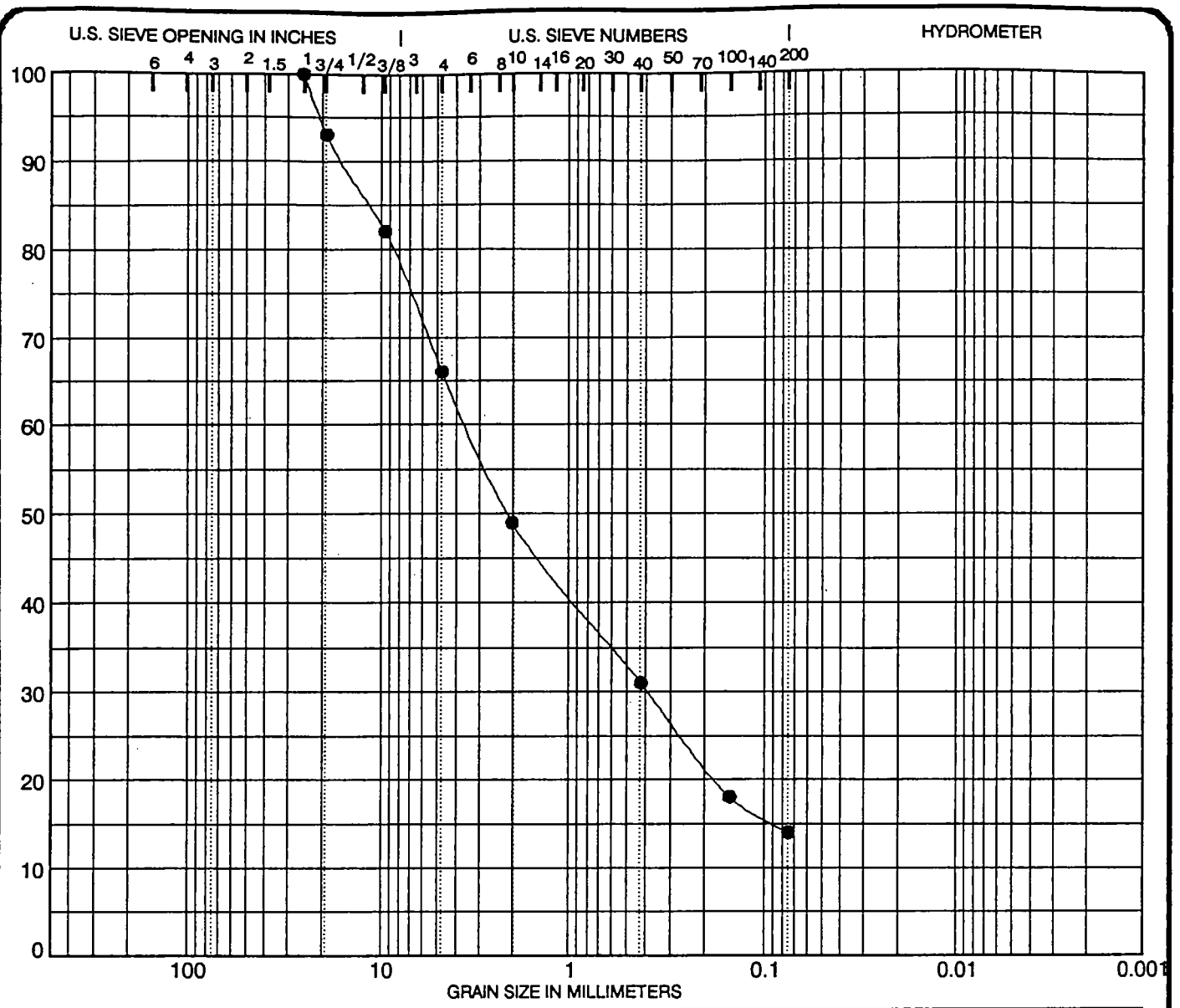
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

15

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 137 D	3"	100	
SS - 38	2"	100	
74'- 76'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	93	
POROSITY (%): 28.9	3/8"	82	
	#4	66	
	#10	49	
	#40	31	
	#100	18	
	#200	14.0	

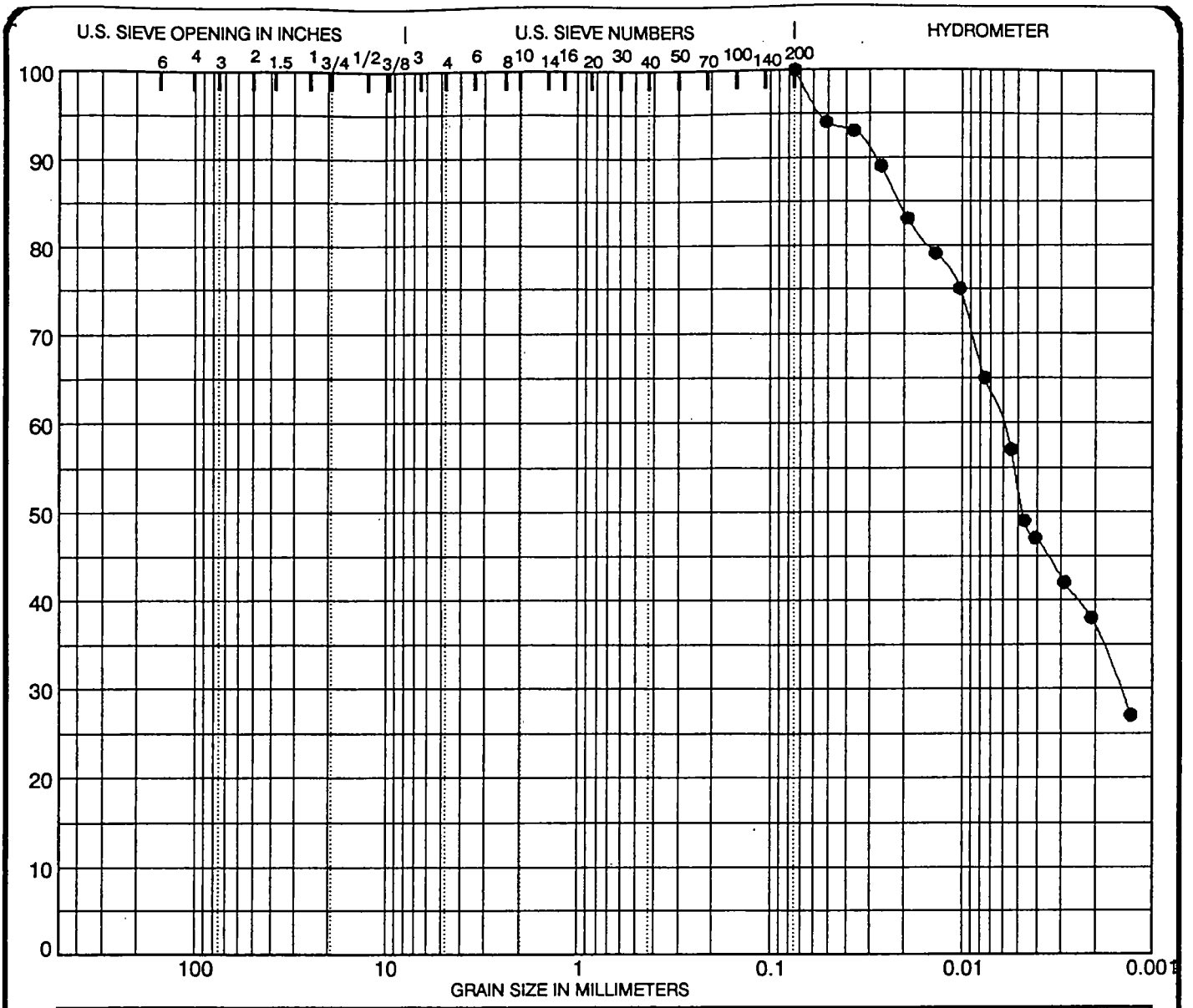
PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

16

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois



COBBLES	GRAVEL		SAND			ASTM D 422
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SPECIFIED PERCENT PASSING
G 137 D	3"	100	
ST - 21	2"	100	
40'- 42'	1-1/2"	100	
	1"	100	
NOTES:	3/4"	100	
POROSITY (%): 36.5	3/8"	100	
HORIZONTAL Kt (cm/sec): 2.0X10-7	#4	100	
VERTICAL Kt (cm/sec): 9.8X10-8	#10	100	
CEC (meg/100gm): 12.2	#40	100	
FOC (ppm): 515.6	#100	100	
	#200	100.0	

PROJECT **Pagel Landfill -**
LOCATION **Rockford, Illinois**

JOB NO. **L - 37,151**
DATE **April 27, 1995**

3

GRADATION SHEET

Testing Service Corporation
Carol Stream Illinois

NATIONAL ENVIRONMENTAL TESTING, INC.

Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622
(800) 807-2877

ANALYTICAL REPORT

Mr. Tom Hilbert
WINNEBAGO RECLAMTAION SERV
8403 Lindenwood Road
Rockford, IL 61109

03/29/1995

NET Job Number: 95.00917

IEPA Cert. No. 100220
WDNR Cert. No. 999447240

Enclosed is the Analytical and Quality Control reports for the following samples submitted to the Rockford Division of NET, Inc. for analysis:

Sample Number	Sample Description	Date Taken	Date Received
151218	G133D-21, Soil		03/22/1995
151219	G133S-2, Soil		03/22/1995
151220	G134D-29, Soil		03/22/1995
151221	G134S-4, Soil		03/22/1995
151222	G135D-23, Soil		03/22/1995
151223	G135S-4, Soil		03/22/1995
151224	G136D-17, Soil		03/22/1995
151225	G137D-39, Soil		03/22/1995
151226	G137S-3, Soil		03/22/1995

The Quality Control report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

National Environmental Testing, Inc. certifies that the analytical results contained herein apply only to the specific samples analyzed.

Reproduction of this analytical report is permitted only in its entirety.

Roline Milne, Project Coordinator
Rockford Division

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622
(800) 807-2877

METHOD REFERENCES

The abbreviations and references listed below have been adopted by NET as standard conventions and are used throughout this report:

(1) Method reference from EPA SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods."

(2) Method reference from ASTM, "American Society for Testing Materials."

(3) Method reference from EPA "Methods for Chemical Analysis of Waters and Wastes."

(4) Method reference from "Standard Methods for the Examination of Water and Wastewater."

(5) Method reference from EPA "Methods for the Determination of Organic Compounds in Drinking Water."

(6) EPA 40 CFR, Part 763 Appendix A to Subpart F - PLM

(7) "Orion Guide to Water and Wastewater Analysis." Form WeWWG/5880

(8) Internal Method

(9) SIM = Selective Ion Monitoring

OCEAN GROUP