

Entered

GEOTECHNICAL TESTING REPORT
DUNLOP INACTIVE WASTE SITE CLOSURE
GRAND ISLAND, NEW YORK

Huntingdon
Consulting Engineers Environmental Scientists



Empire Soils Investigations, Inc., Division

August 18, 1993

AUG 19 1993

Mr. John Workasien, PE
URS CONSULTANTS, INC.
282 Delaware Avenue
Buffalo, New York 14202-1805

**SUBJECT: GEOTECHNICAL TESTING, BORROW QUALIFICATION
DUNLOP INACTIVE WASTE SITE CLOSURE
GRAND ISLAND, NEW YORK**

Dear Mr. Workasien:

Transmitted herewith are the results of geotechnical laboratory testing performed for qualification of Borrow Material for the subject project. The work was executed under the terms of Purchase Order No. BU-93-G0877, dated June 14, 1993.

The testing program included the following tests:

40 Water Content	(ASTM D2216)
40 Atterberg Limits	(ASTM D4318)
16 Grain Size Distribution	(ASTM D422)
8 Standard Compaction	(ASTM D698)
8 Flexible Wall Permeability	(ASTM D5084)

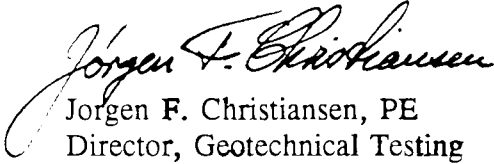
The permeability test specimens were compacted to a dry density corresponding to approximately 95% of maximum dry density (ASTM D698) at moisture contents ranging from about 2% below optimum water content to about 4% above optimum.

Individual Grain Size Distribution Test Reports are presented in Appendix A. The results of Atterberg Limits and natural water content determinations are included in Appendix B. Proctor Compaction Test Reports are contained in Appendix C, and Permeability Test Reports are presented in Appendix D.

Advance test reports have been submitted by Facsimile Transmission as the testing program was being completed.

It has been a pleasure working with your Firm again. Should you have any questions or in case we may be of further service, do not hesitate to contact the undersigned at 716-735-3400.

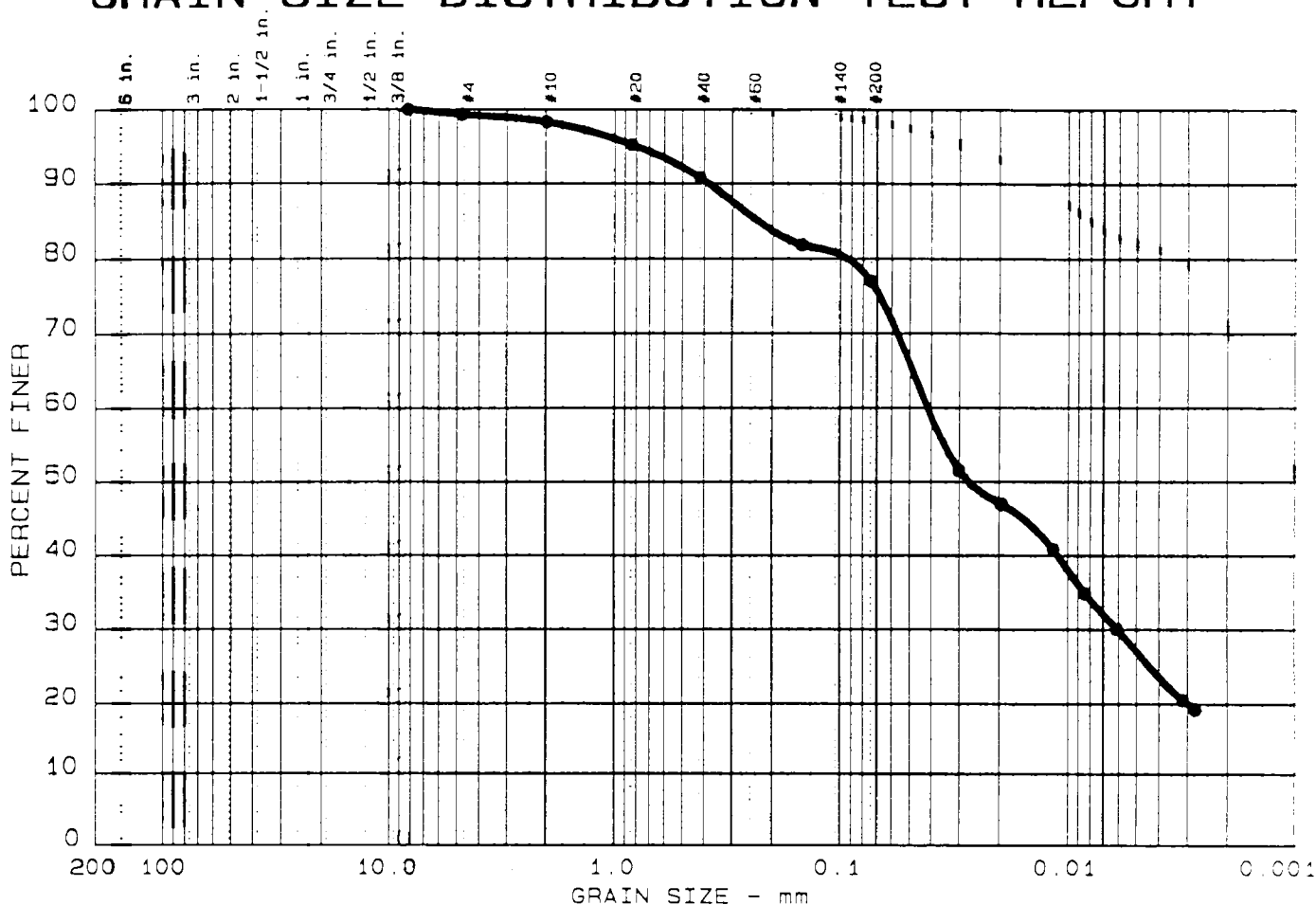
EMPIRE SOILS INVESTIGATIONS, INC.


Jorgen F. Christiansen, PE
Director, Geotechnical Testing

JFC/rfp

APPENDIX A
GRAIN SIZE DISTRIBUTION TESTS

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY
2	0.0	0.7	22.3	49.9	27.1

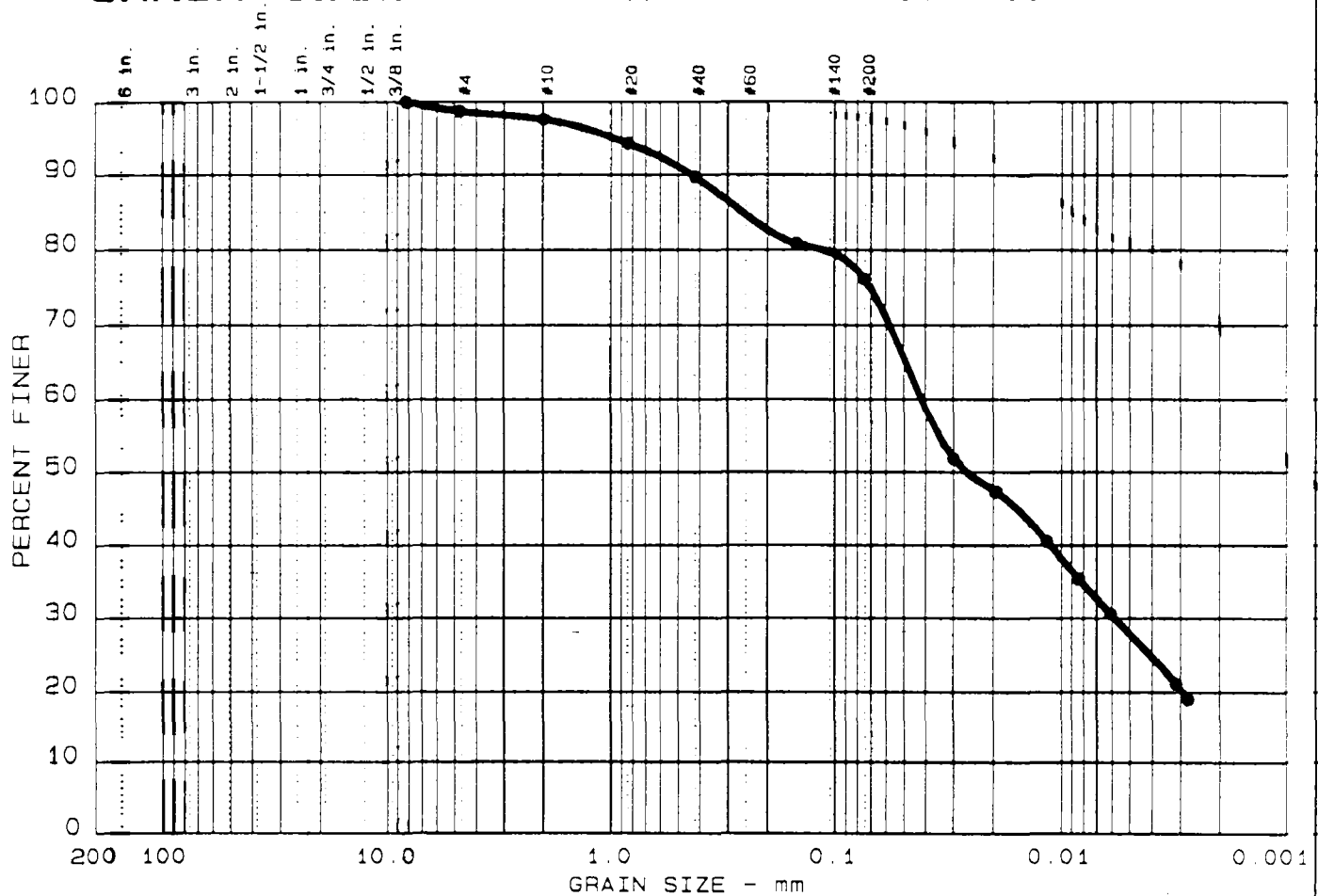
LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.23		0.03	0.006				

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Silt, Some Clay, Some Sand, Trace Gravel		

Project No.: G008.014 Project: Dunlop Landfill ● Location: Zone 1-A Date: 07/12/93	Remarks: Sample collected by Empire Soils on 7/1/93
GRAIN SIZE DISTRIBUTION TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.	

Figure No. 1-A

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
• 2	0.0	1.3	22.5	48.3	27.9

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		0.26		0.03	0.006				

MATERIAL DESCRIPTION	USCS	AASHTO
• Brown Silt, Some Clay, Some Sand, Trace Gravel		

Project No.: G008.014
 Project: Dunlop Landfill
 • Location: Zone 1-B

Date: 07/12/93

GRAIN SIZE DISTRIBUTION TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

Remarks:
 Sample collected by
 Empire Soils on 7/1/93

Figure No. 1-B

Grain size distribution plot for Test No. 100. The y-axis is 'PERCENT FINER' (0-100) and the x-axis is 'GRAIN SIZE - mm' (log scale, 200 to 0.001). The curve shows 100% finer for sizes down to 75 microns, then drops to approximately 22% finer at 7.5 microns.

Grain Size (mm)	Percent Finer (%)
200	100
100	100
75	100
60	100
40	100
20	100
10	100
7.5	98
6	95
4.75	92
3.75	88
3.0	85
2.5	82
2.0	78
1.5	75
1.18	72
0.85	68
0.75	65
0.60	60
0.425	55
0.30	52
0.25	50
0.20	45
0.15	40
0.10	35
0.075	32
0.060	30
0.0425	28
0.030	25
0.025	24
0.020	22

[illegible]

Project No.: G008.014 Project: Dunlop Landfill ● Location: 1-C Date: 07/12/93	Remarks: Sample collected by Empire Soils on 7/1/93
GRAIN SIZE DISTRIBUTION TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.	Figure No. 1-C

Grain size distribution plot showing Percent Finer versus Grain Size (mm). The curve indicates the percentage of material finer than a given grain size.

Grain Size (mm)	Percent Finer (%)
6 in.	100
3 in.	100
2 in.	100
1-1/2 in.	100
1 in.	100
3/4 in.	100
1/2 in.	100
3/8 in.	100
#4	98
#10	97
#20	95
#40	92
#60	88
#140	82
#200	78
0.85 mm	70
0.425 mm	65
0.25 mm	60
0.15 mm	52
0.075 mm	45
0.0475 mm	35
0.025 mm	32

[illegible]

Project No.: G008.014 Project: Dunlop Landfill ● Location: 2-A Date: 07/12/93	Remarks: Sample collected by Empire Soils on 7/1/93
GRAIN SIZE DISTRIBUTION TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.	
	Figure No. 2-A

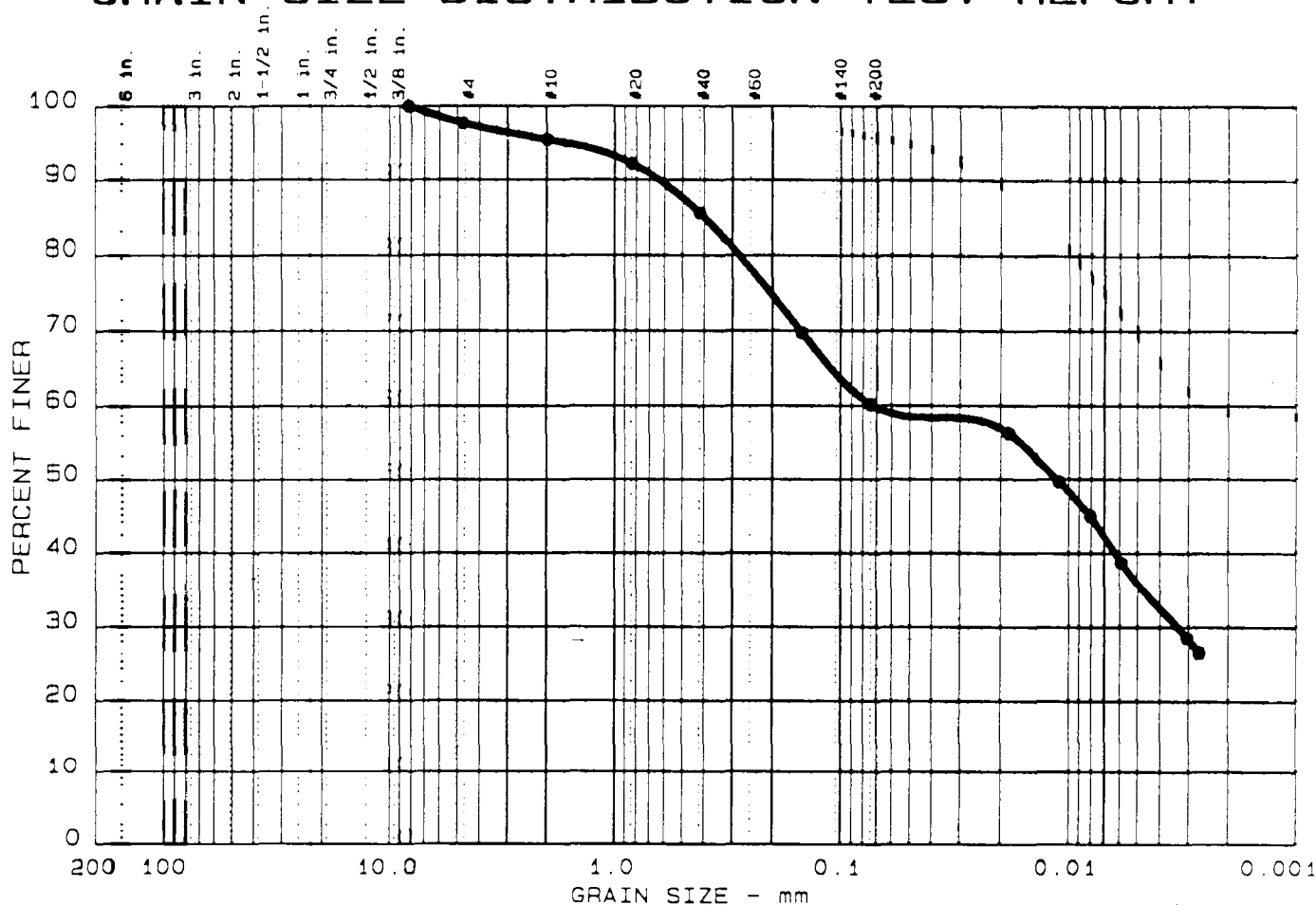
Grain size distribution test report graph showing Percent Finer vs Grain Size (mm). The curve starts at 100% finer for 60 mm and decreases to approximately 33% finer for 0.075 mm.

Grain Size (mm)	Percent Finer (%)
60	100
40	92
20	88
10	85
5	82
2.5	72
1.25	68
0.6	58
0.3	52
0.15	45
0.075	33

[illegible]

Project No.: G008.014 Project: Dunlop Landfill ● Location: 2-B Date: 07/12/93	Remarks: Sample collected by Empire Soils on 7/1/93
GRAIN SIZE DISTRIBUTION TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.	Figure No. 2-B

GRAIN SIZE DISTRIBUTION TEST REPORT



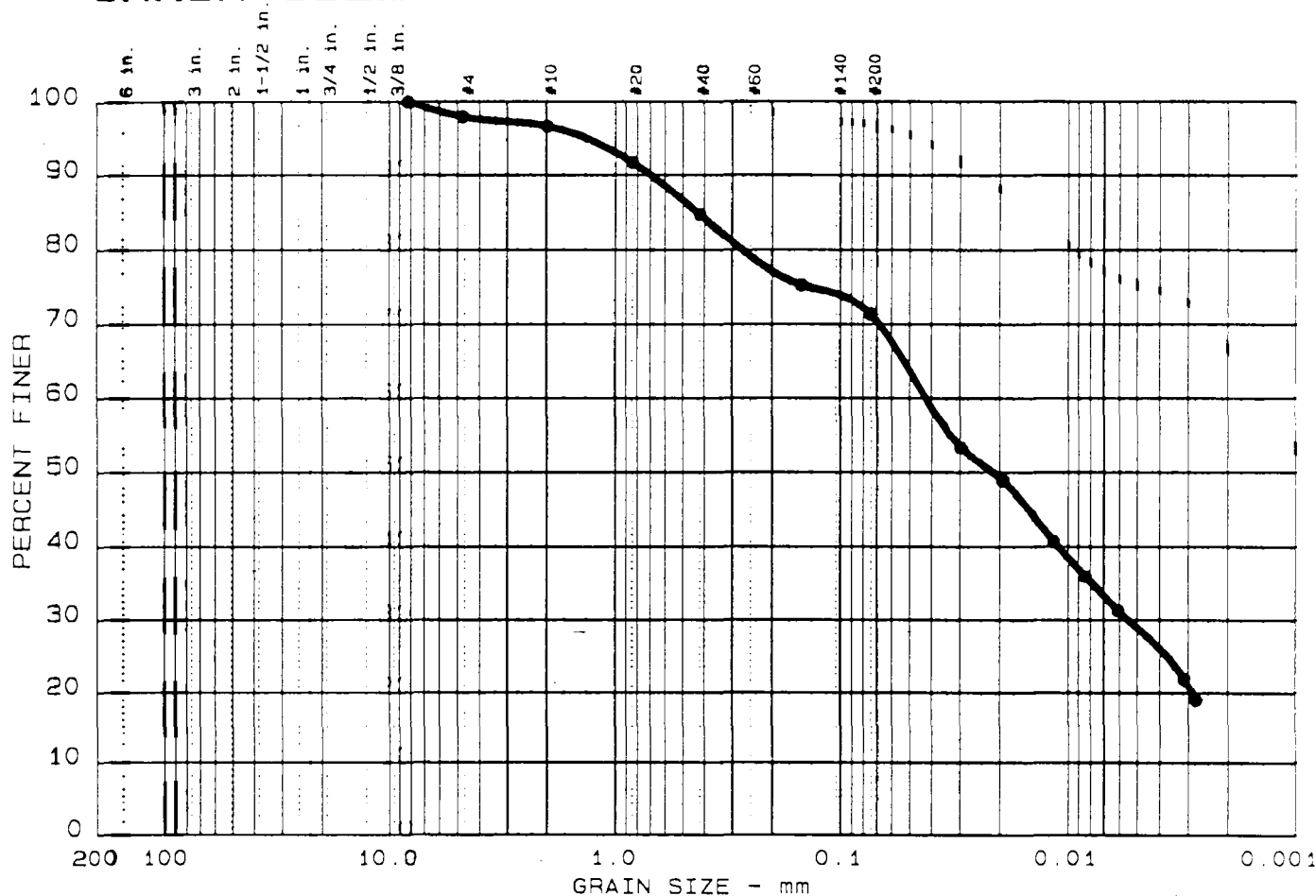
Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
• 2	0.0	2.3	37.5	24.2	36.0

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		0.40		0.01	0.003				

MATERIAL DESCRIPTION	USCS	AASHTO
• Sand & Clay, Some Silt, Trace Gravel		

Project No.: G008.014 Project: Dunlop Landfill • Location: 2-C Date: 07/12/93	Remarks: Sample collected by Empire Soils on 7/1/93
GRAIN SIZE DISTRIBUTION TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.	Figure No. 2-C

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
● 2	0.0	2.1	26.5	42.5	28.9

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
●		0.43		0.02	0.005				

MATERIAL DESCRIPTION	USCS	AASHTO
● Silt, Some Clay, Some Sand, Trace Gravel		*

Project No.: G008.014
 Project: Dunlop Landfill
 ● Location: 2-D

Date: 07/12/93

GRAIN SIZE DISTRIBUTION TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

Remarks:
 Sample collected by
 Empire Soils on 7/1/93

Figure No. 2-D

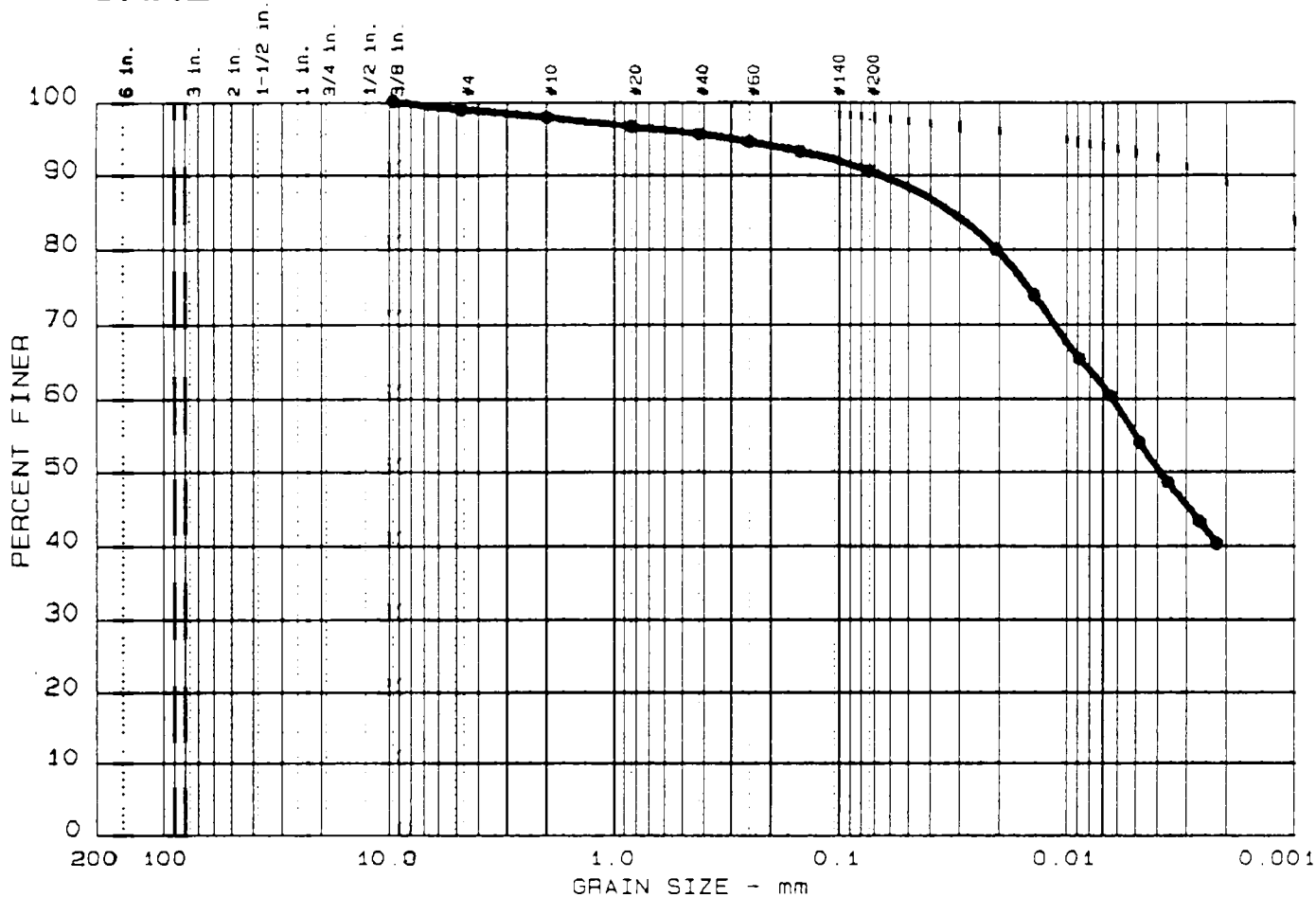
Grain size distribution curve showing Percent Finer versus Grain Size (mm). The curve indicates a well-graded soil with a maximum grain size of approximately 60 mm and a minimum grain size of approximately 0.075 mm.

Grain Size (mm)	Percent Finer (%)
60	100
40	95
20	92
10	90
5	88
2.5	82
1.0	75
0.5	65
0.25	58
0.15	52
0.1	45
0.075	38

[illegible]

Project No.: G008.014	Remarks:
Project: DUNLOP INACTIVE WASTE SITE CLOSURE	CLIENT: URS CONSULTANTS
● Location: 3 / 3-GS-HA	
Date: JULY 15, 1993	LAB NO. 1667.023
GRAIN SIZE DISTRIBUTION TEST REPORT	
EMPIRE SOILS INVESTIGATIONS, INC	Figure No. 1

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
2	0.0	1.1	8.3	35.6	55.0

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
				0.00					

MATERIAL DESCRIPTION	USCS	AASHTO
BROWN CLAY AND SILT, tr sand & gravel. ORGANICS		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Location: 3 / 3-GS-HB

Date: JULY 15, 1993

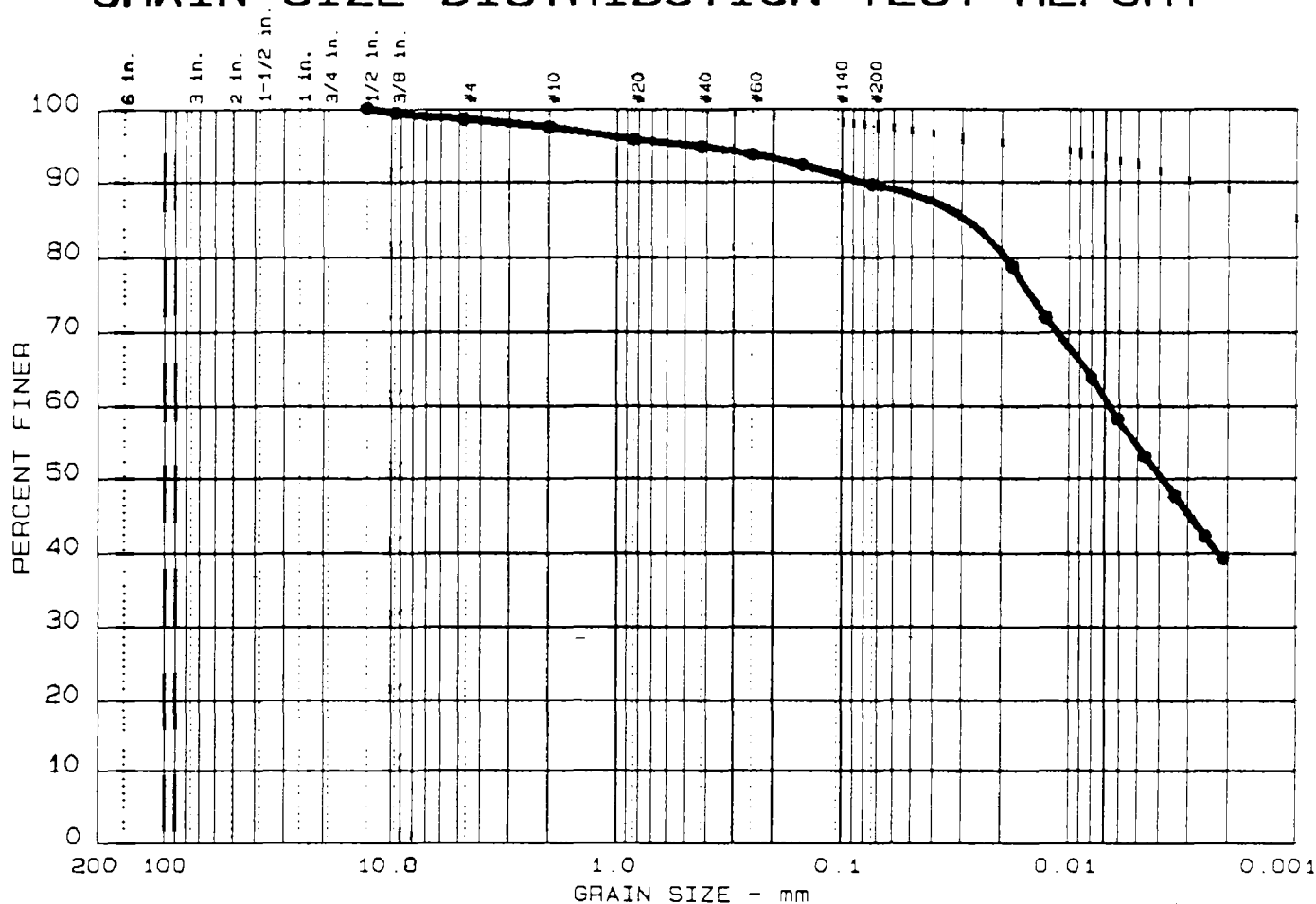
Remarks:
 CLIENT: URS CONSULTANTS

LAB NO. 1667.024

GRAIN SIZE DISTRIBUTION TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Figure No. 1

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
3	0.0	1.4	8.9	35.3	54.4

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
				0.00					

MATERIAL DESCRIPTION	USCS	AASHTO
BROWN CLAY AND SILT, tr sand & gravel, ORGANICS		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Location: 3 / 3-GS-HC

Date: JULY 15, 1993

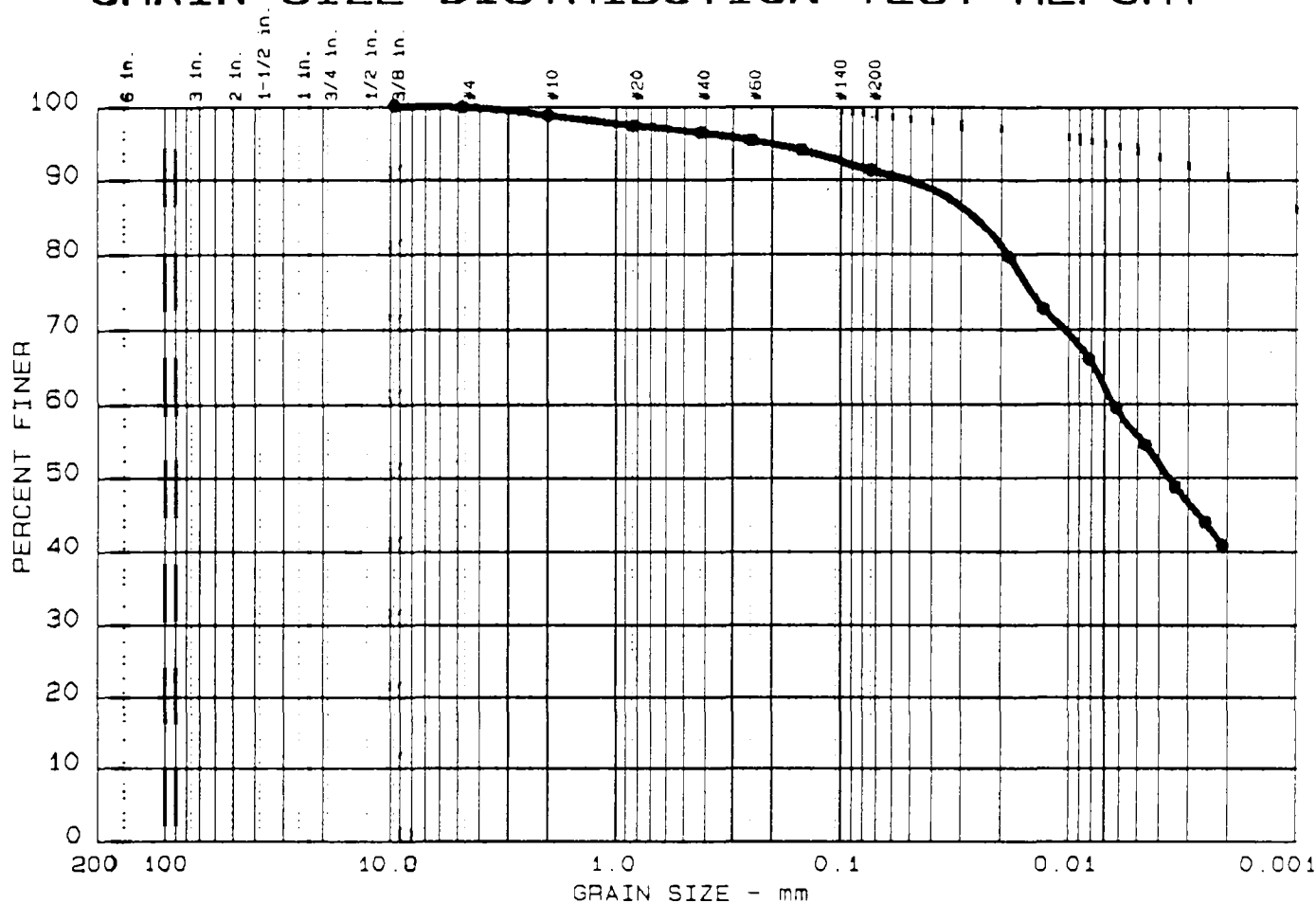
GRAIN SIZE DISTRIBUTION TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Remarks:
 CLIENT: URS CONSULTANTS

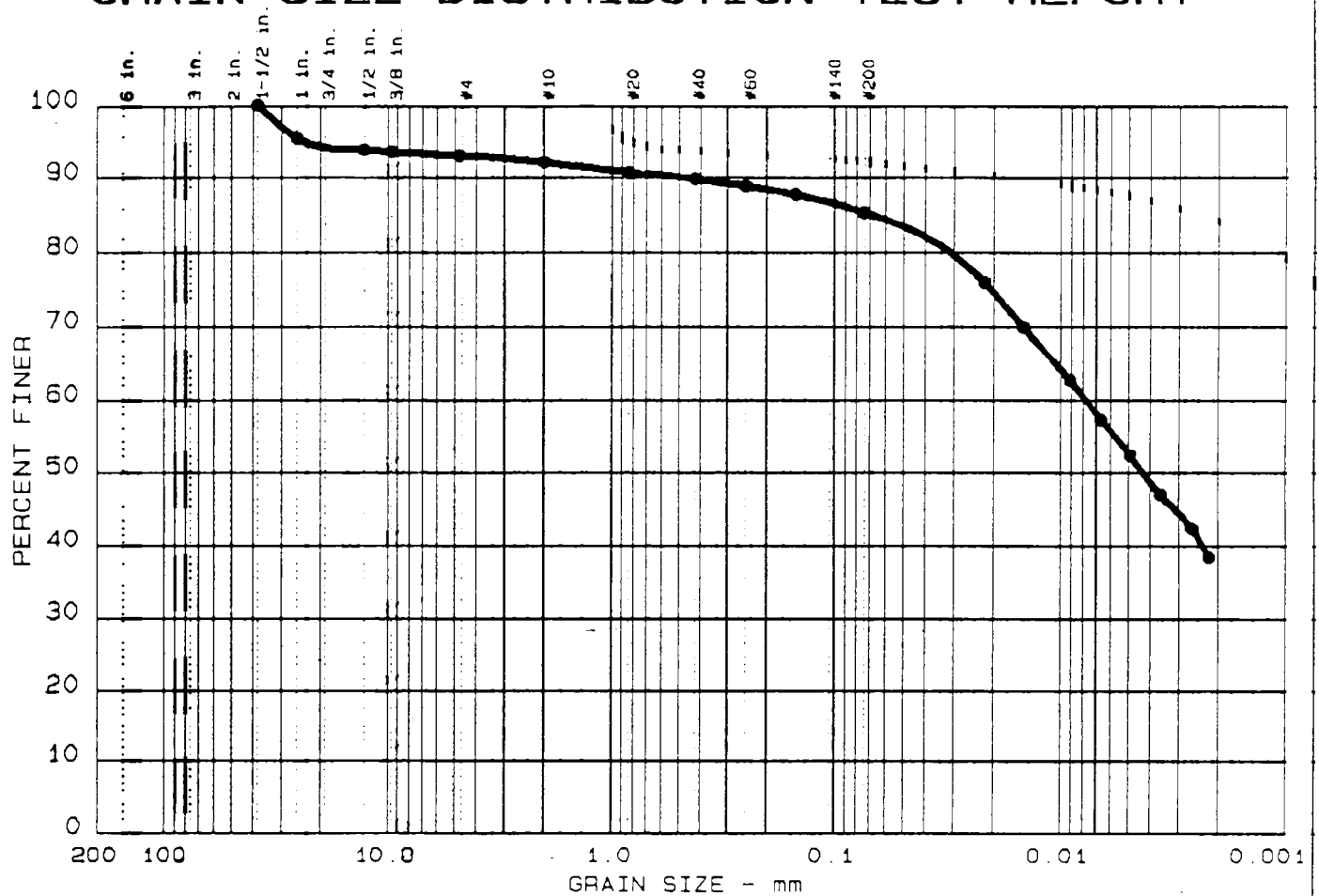
LAB NO. 1667.025

Figure No. 1

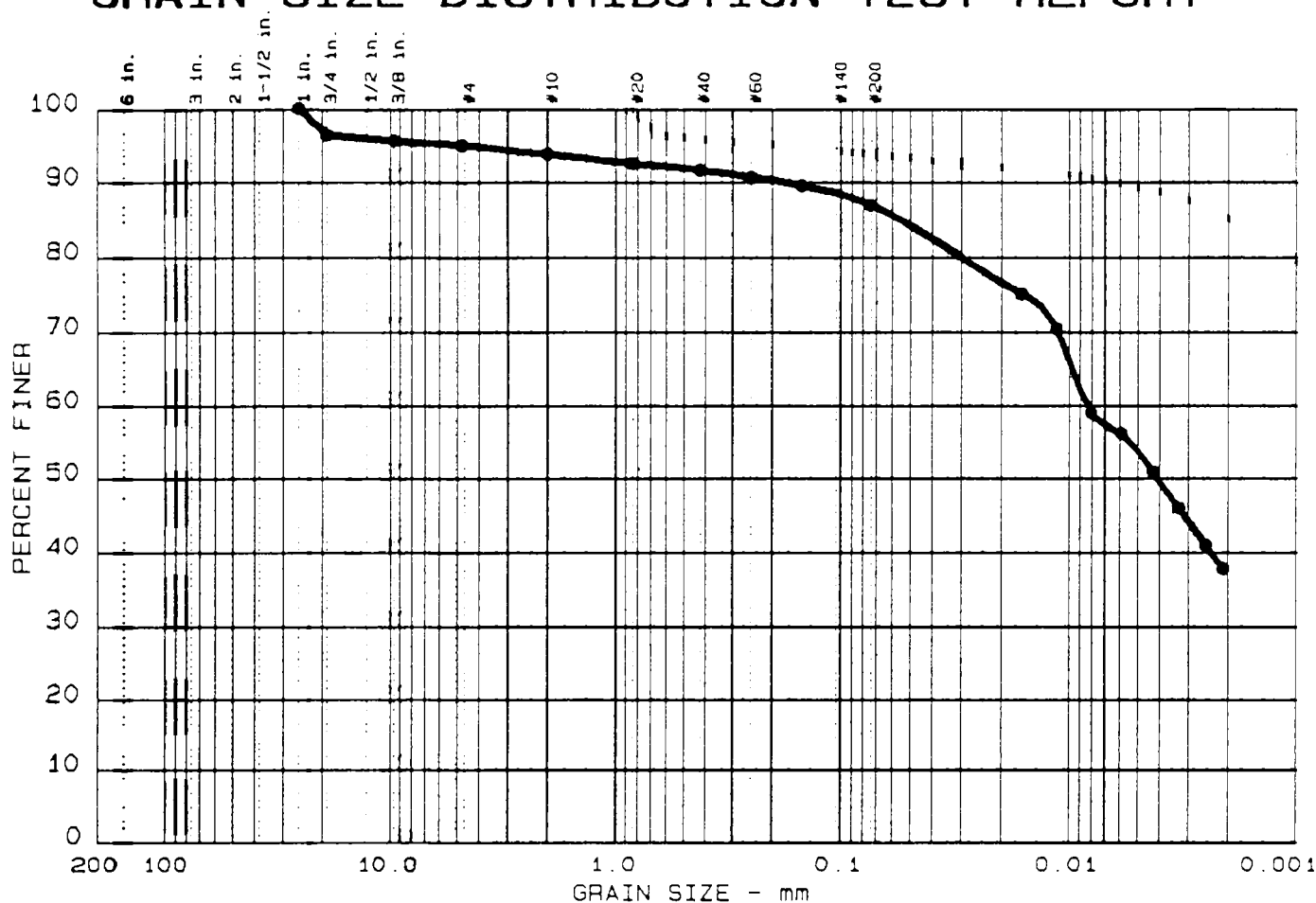
GRAIN SIZE DISTRIBUTION TEST REPORT



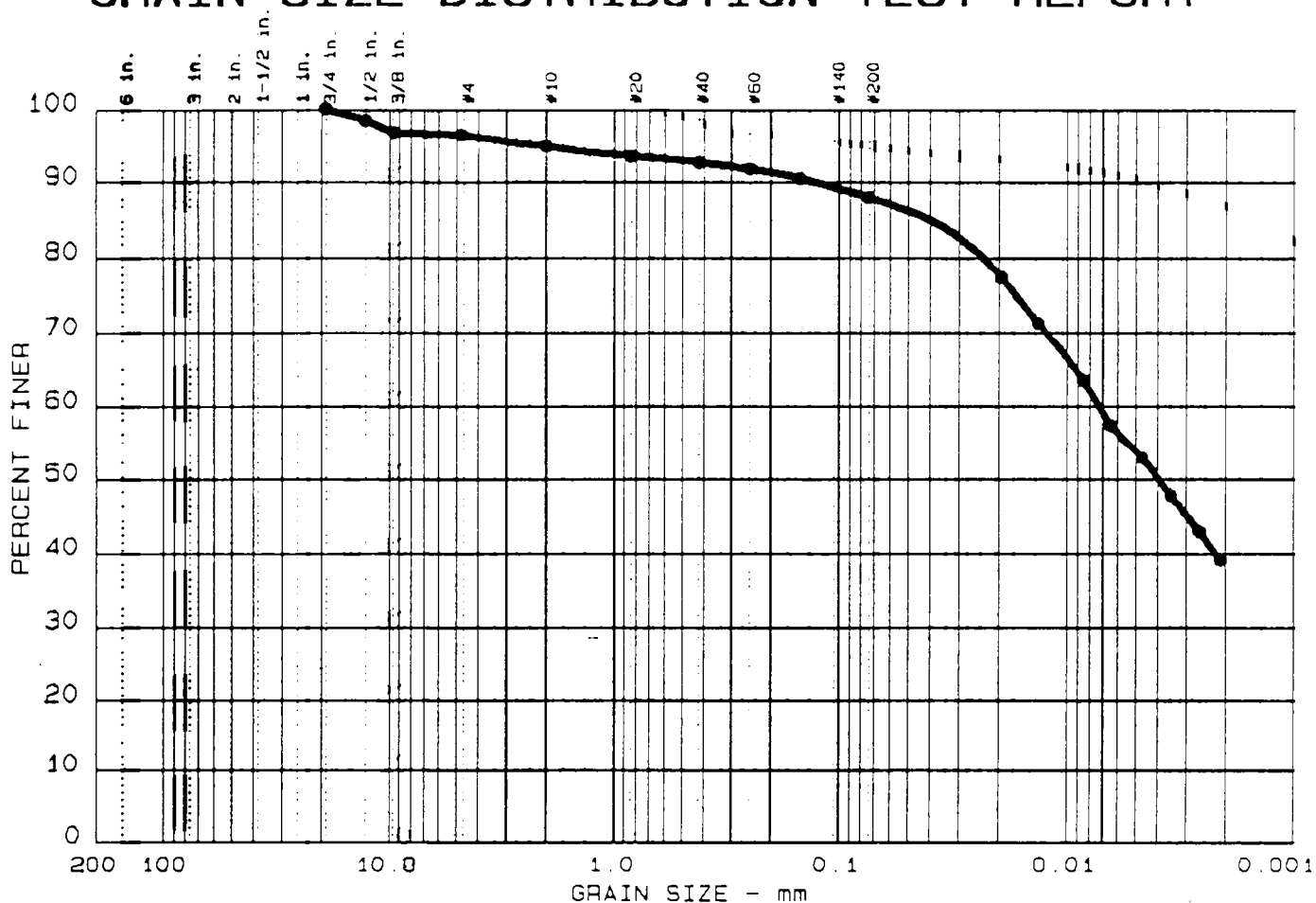
GRAIN SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST REPORT



GRAIN SIZE DISTRIBUTION TEST REPORT



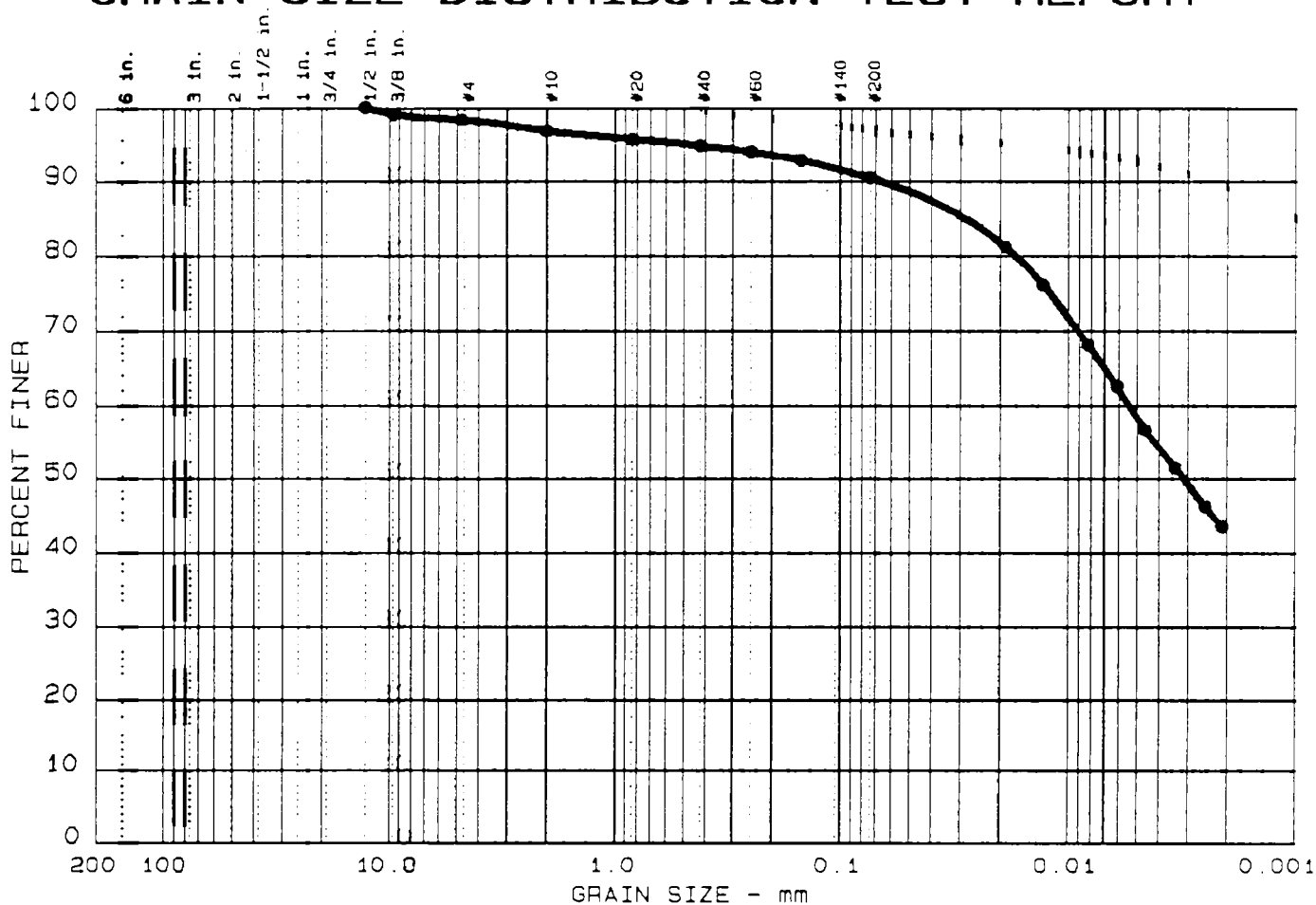
Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
7	0.0	3.6	8.4	34.2	53.8

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
				0.00					

MATERIAL DESCRIPTION	USCS	AASHTO
BROWN CLAY, Some Silt, tr sand & gravel		

Project No.: G008.014 Project: DUNLOP INACTIVE WASTE SITE CLOSURE Location: 4 / 4-GS-HC Date: JULY 15, 1993	Remarks: CLIENT: URS CONSULTANTS LAB NO. 1667.031 Figure No. 1
GRAIN SIZE DISTRIBUTION TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC	

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
• 8	0.0	1.7	7.8	32.2	58.3

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•				0.00					

MATERIAL DESCRIPTION	USCS	AASHTO
• BROWN CLAY. Some Silt. tr sand & gravel		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 • Location: 5 / 5-GS-HA

Date: JULY 15, 1993

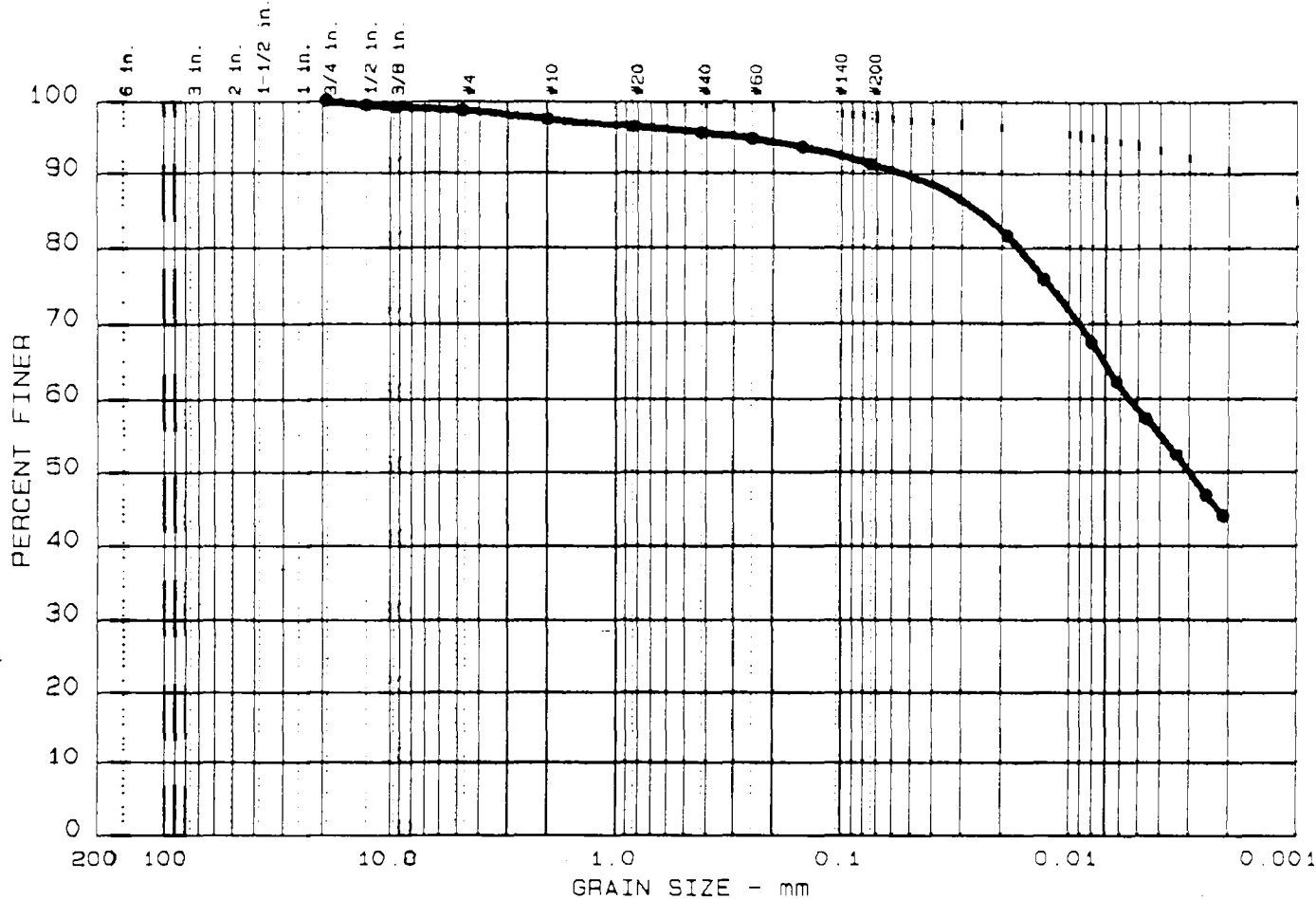
GRAIN SIZE DISTRIBUTION TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Remarks:
 CLIENT: URS CONSULTANTS

LAB NO. 1667.033

Figure No. 1

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
● 9	0.0	1.3	7.5	32.7	58.5

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
●				0.00					

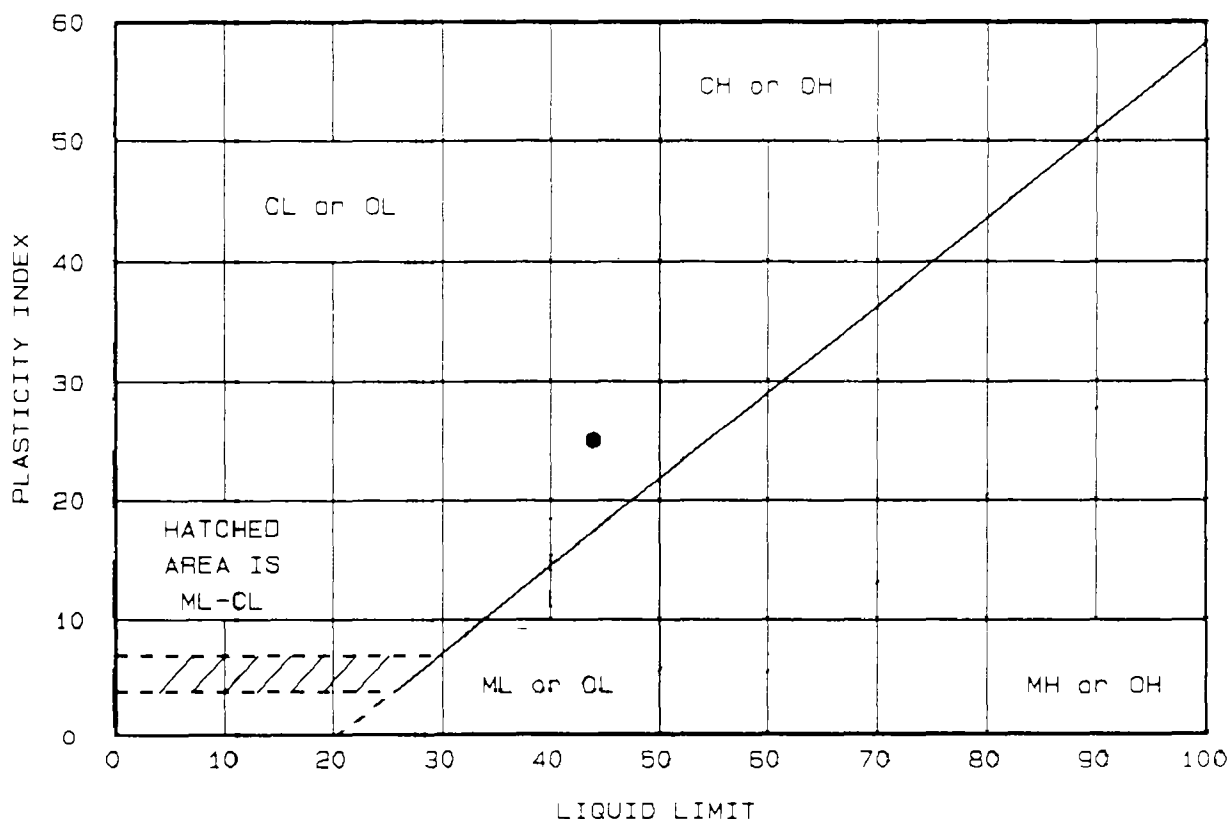
MATERIAL DESCRIPTION	USCS	AASHTO
● BROWN CLAY, Some Silt, tr sand & gravel		

Project No.: G008.014 Project: DUNLOP INACTIVE WASTE SITE CLOSURE ● Location: 5 / 5-GS-HB Date: JULY 15, 1993	Remarks: CLIENT: URS CONSULTANTS LAB NO. 1667.034 Figure No. 1
GRAIN SIZE DISTRIBUTION TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC	

APPENDIX B

ATTERBERG LIMITS
NATURAL WATER CONTENT

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT A ZONE 1 SAMPLE A1	44	19	25		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Client: URS CONSULTANTS, INC.
 Location: GRAND ISLAND, NEW YORK

Date: JULY 9, 1993

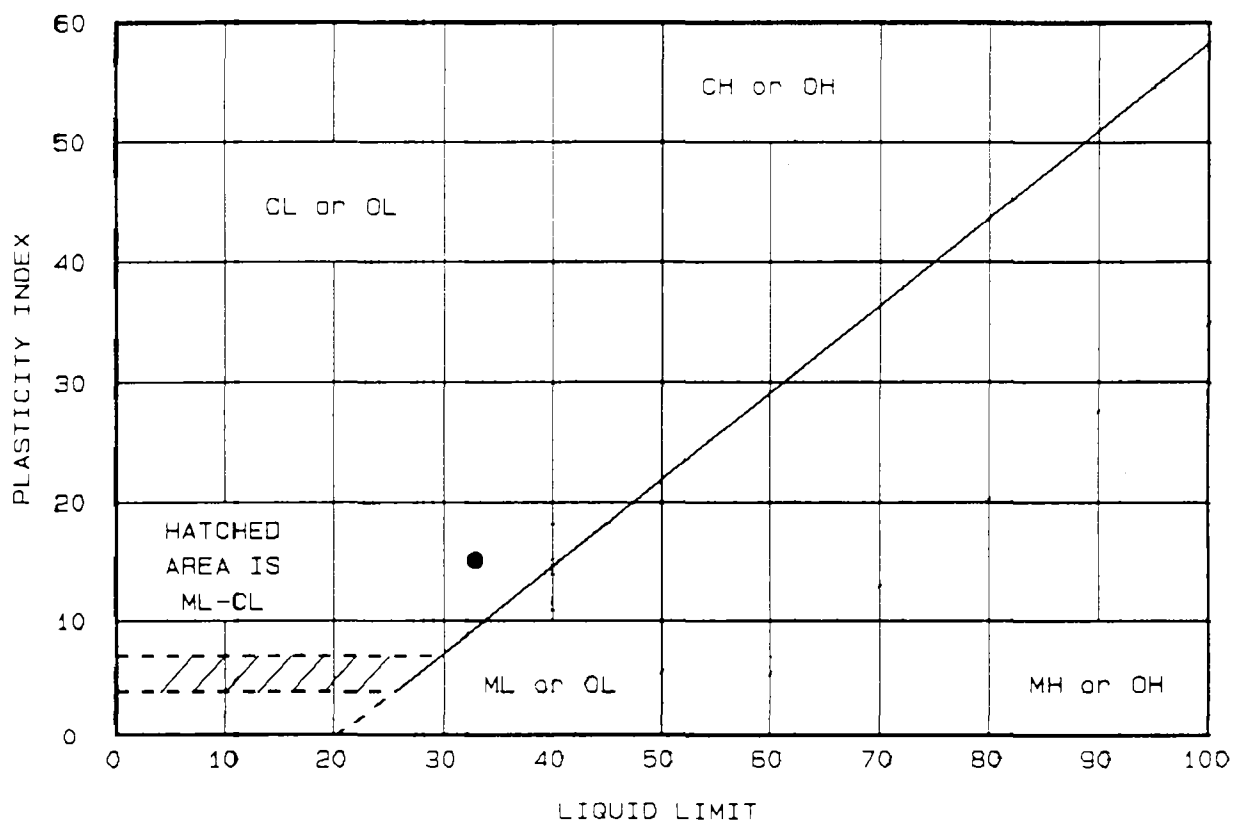
Remarks:
 MATERIAL SIEVED THRU
 #40 SIEVE
 WATER CONTENT: 18.9%

LAB NO. 1667.001

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT A ZONE 2 SAMPLE A2	33	18	15		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Client: URS CONSULTANTS, INC.
 Location: GRAND ISLAND, NEW YORK

Date: JULY 13, 1993

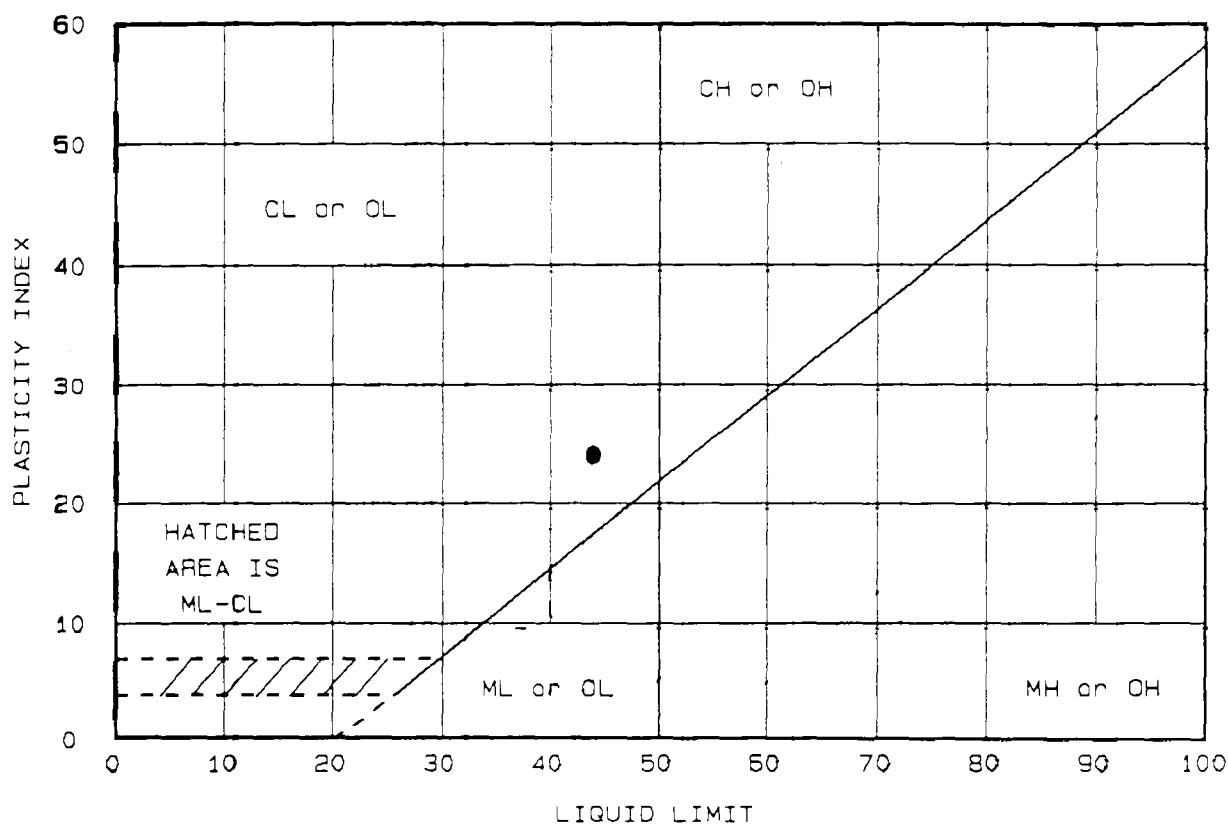
Remarks:
 MATERIAL SIEVED THRU
 #40 SIEVE
 WATER CONTENT: 15.0%

LAB NO. 1667.002

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT B ZONE 1 SAMPLE B1	44	20	24		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Client: URS CONSULTANTS, INC.
 Location: GRAND ISLAND, NEW YORK

Date: JULY 9, 1993

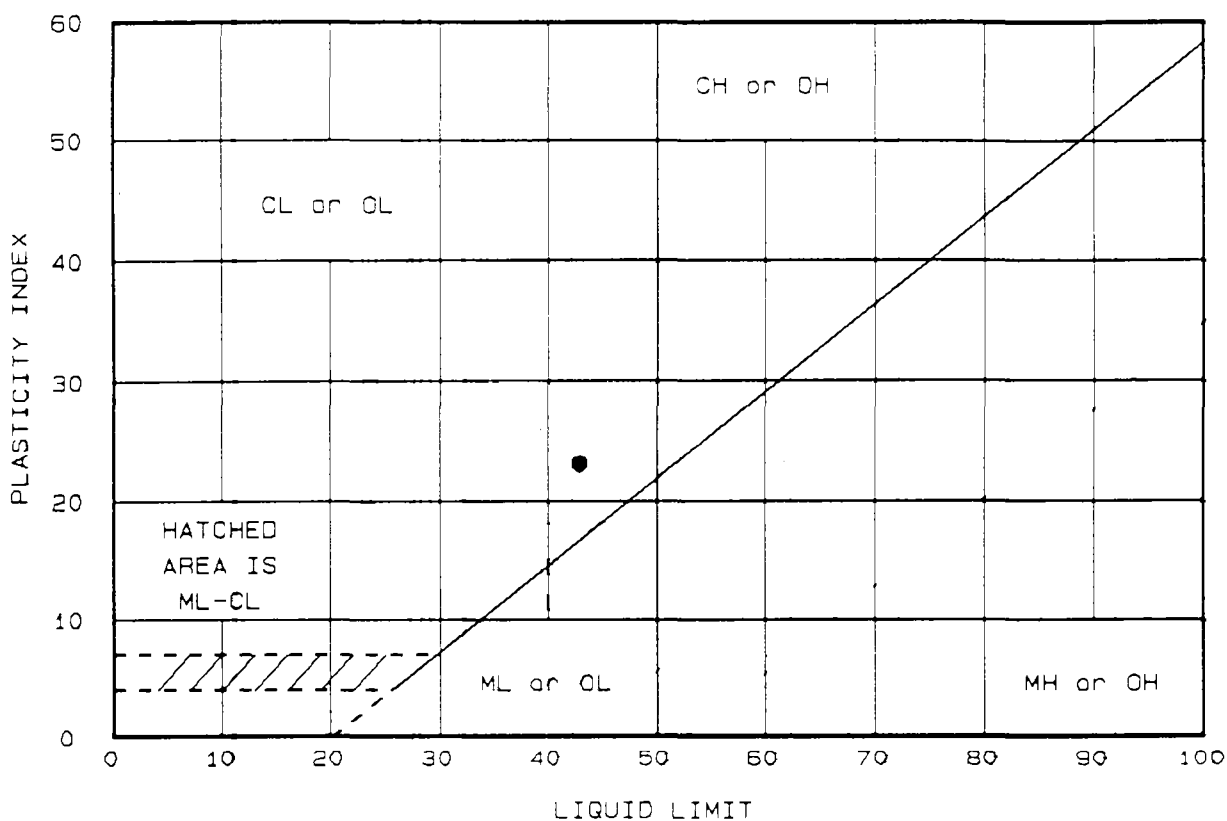
Remarks:
 MATERIAL SIEVED THRU
 #40 SIEVE
 WATER CONTENT: 22.1%

LAB NO. 1667.003

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT B ZONE 2 SAMPLE B2	43	20	23		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Client: URS CONSULTANTS, INC.
 Location: GRAND ISLAND, NEW YORK

Date: JULY 12, 1993

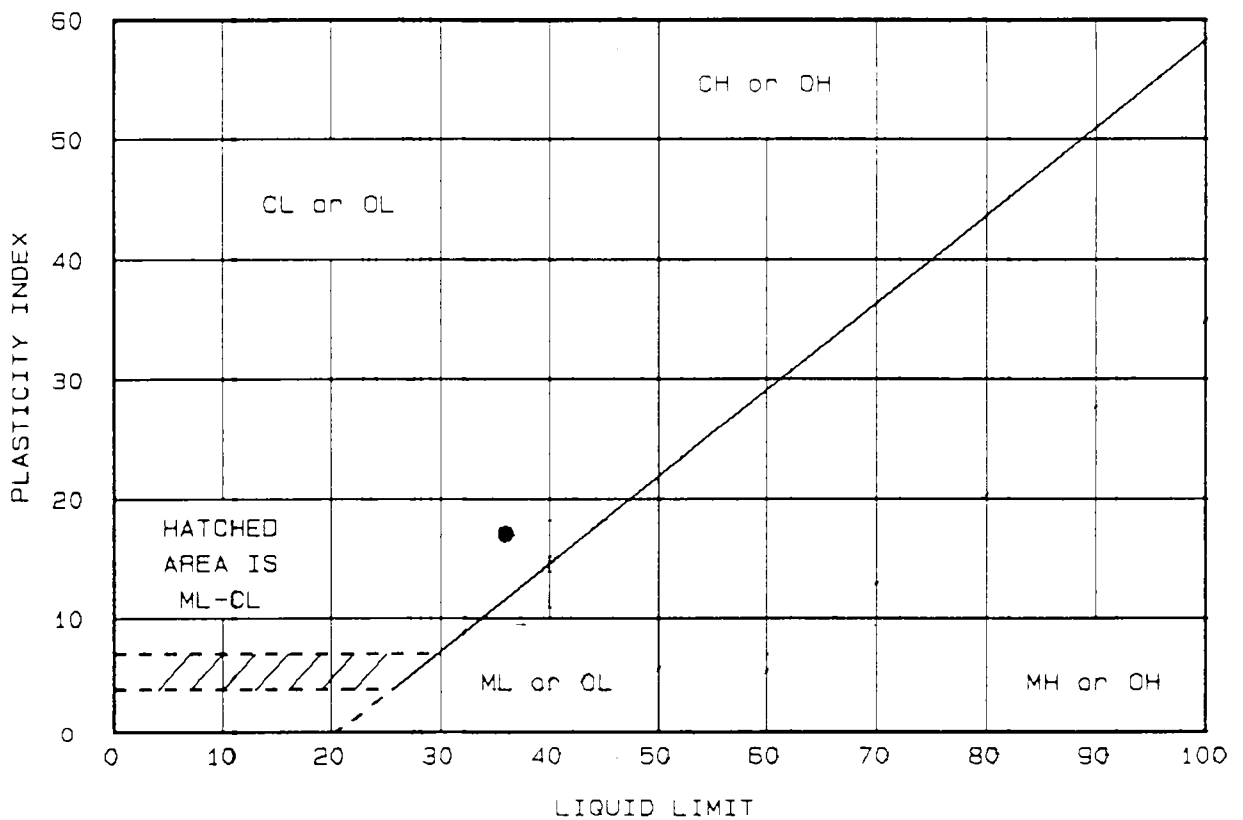
Remarks:
 MATERIAL SIEVED THRU
 #40 SIEVE
 WATER CONTENT: 21.1%

LAB NO. 1667.004

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT C ZONE 1 SAMPLE C1	36	19	17		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 9, 1993

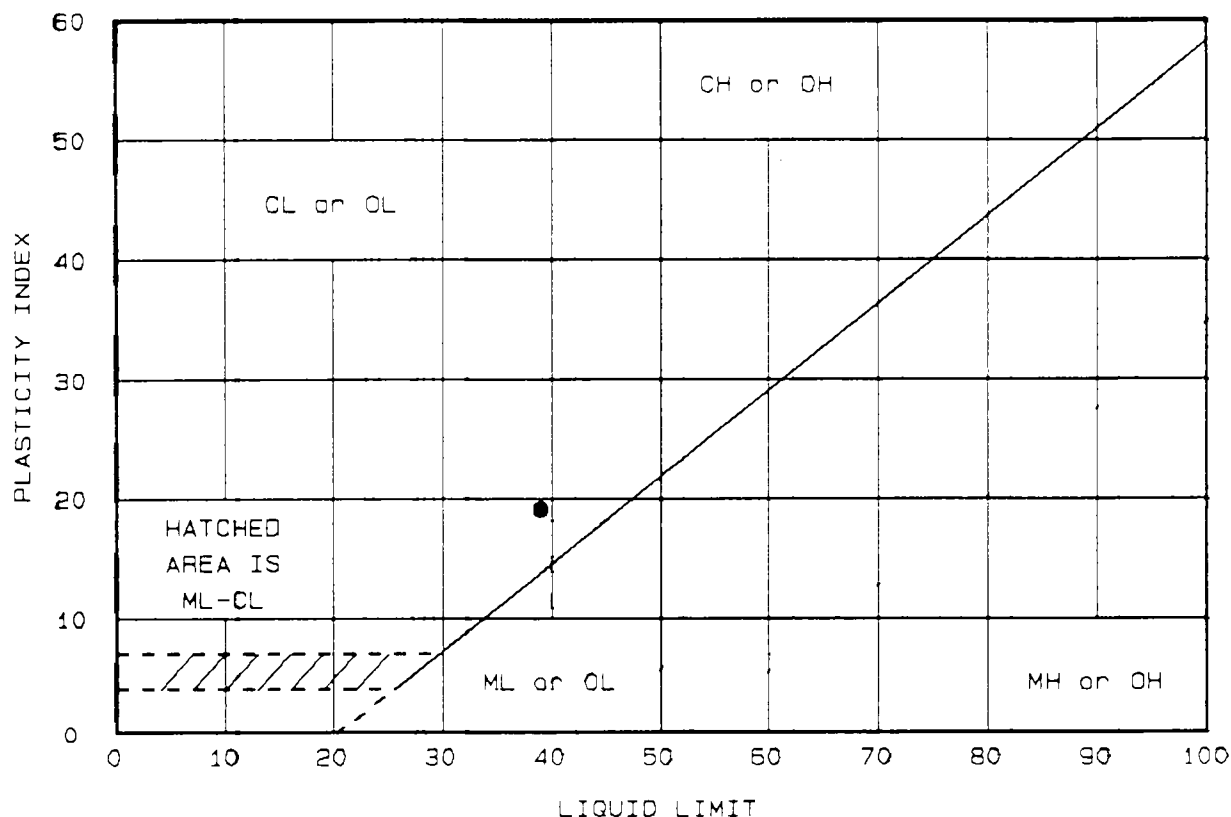
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 16.9%

LAB NO. 1667.005

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT: C ZONE 2 SAMPLE C2	39	20	19		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 12, 1993

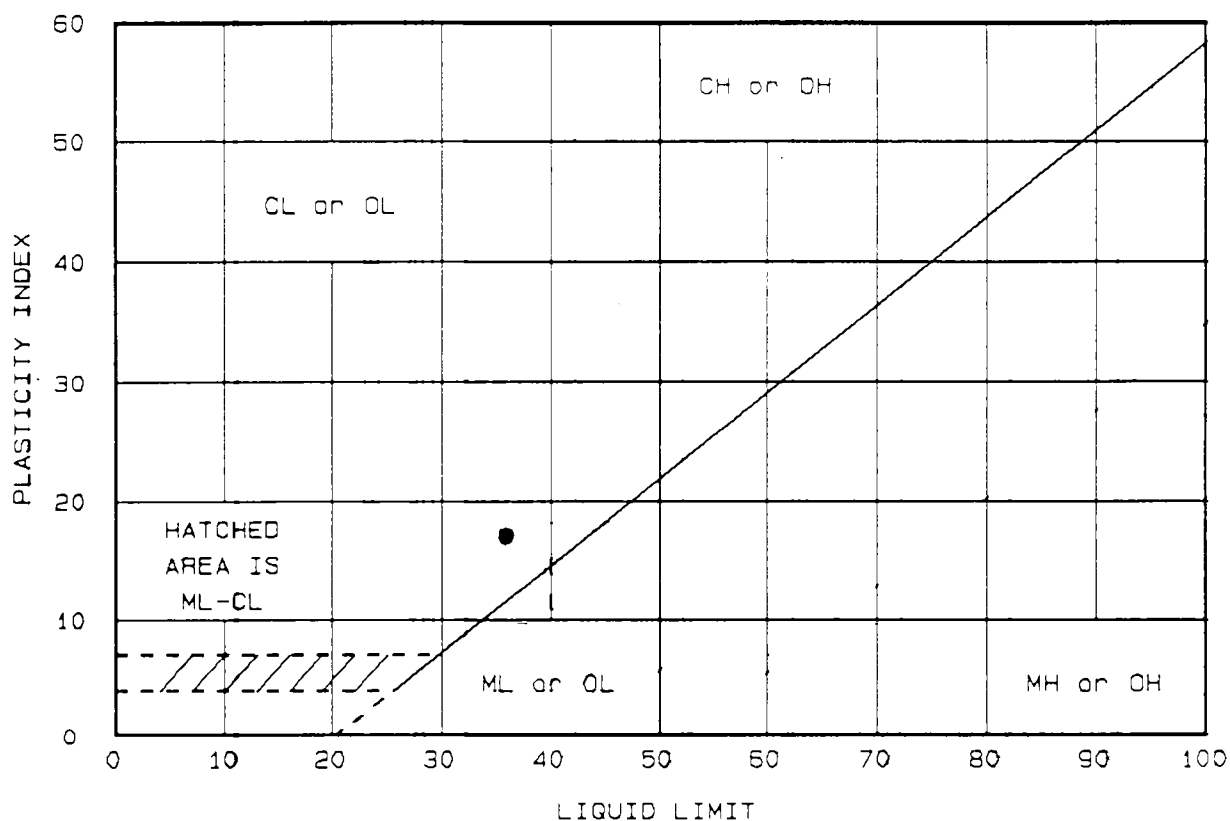
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 19.5%

LAB NO. 1667.006

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT D ZONE 1 SAMPLE D1	35	19	17		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 9, 1993

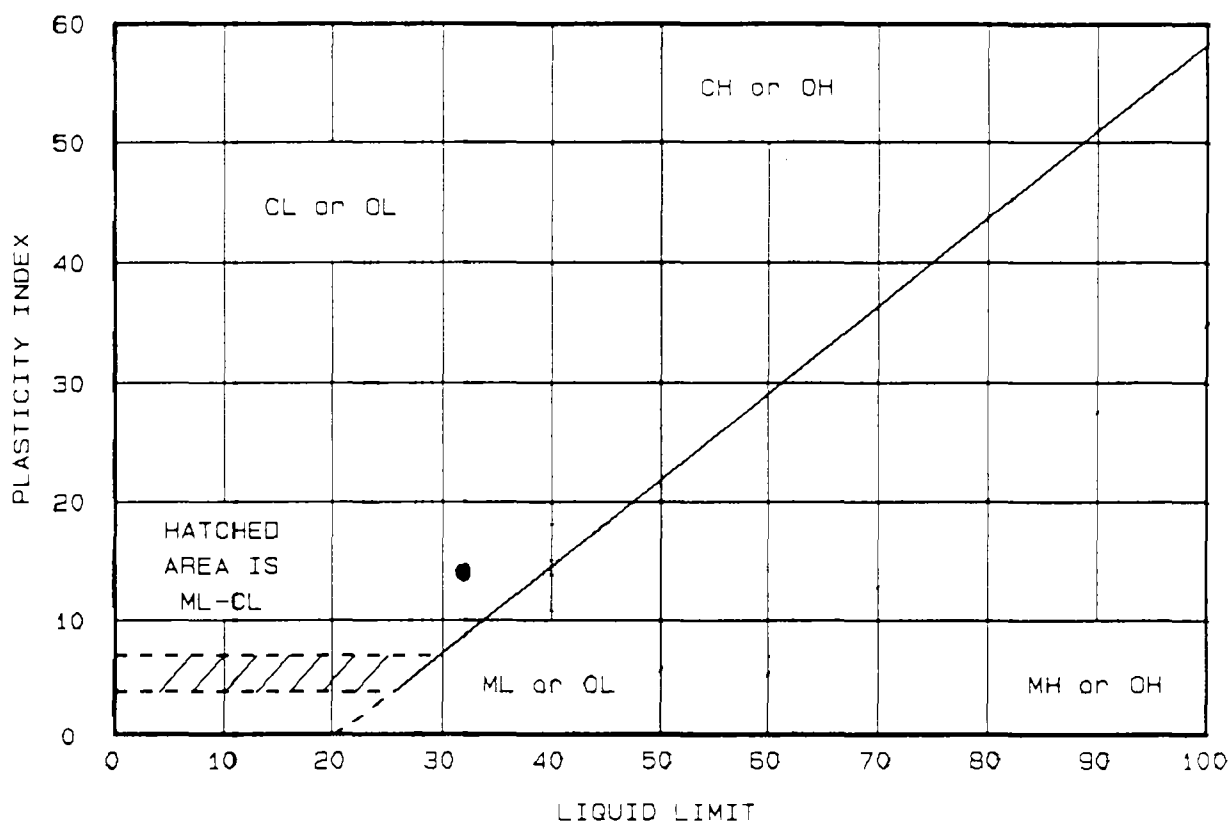
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 16.2%

LAB NO. 1667.007

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT D ZONE 2 SAMPLE D2	32	18	14		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 13, 1993

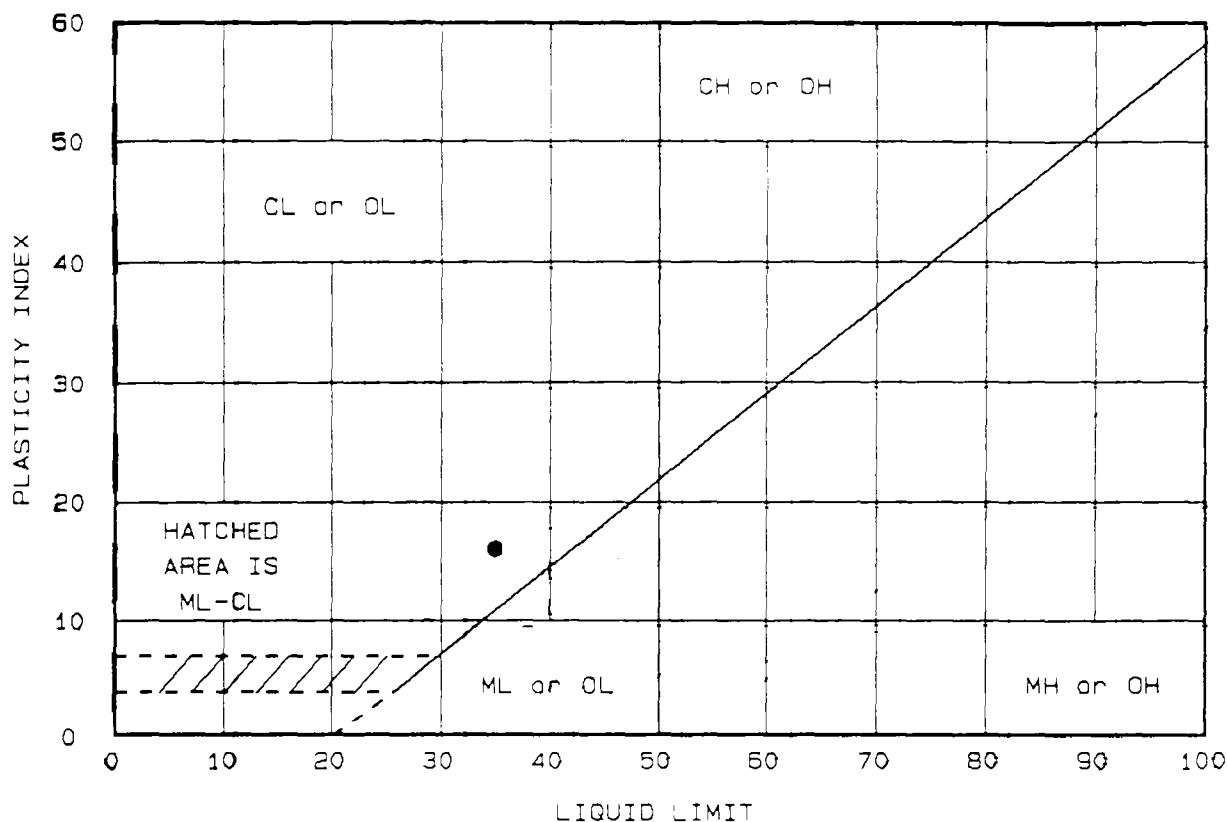
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 15.1%

LAB NO. 1667.008

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT E ZONE 1 SAMPLE E1	35	19	16		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 9, 1993

Remarks:

MATERIAL SIEVED THRU

#40 SIEVE

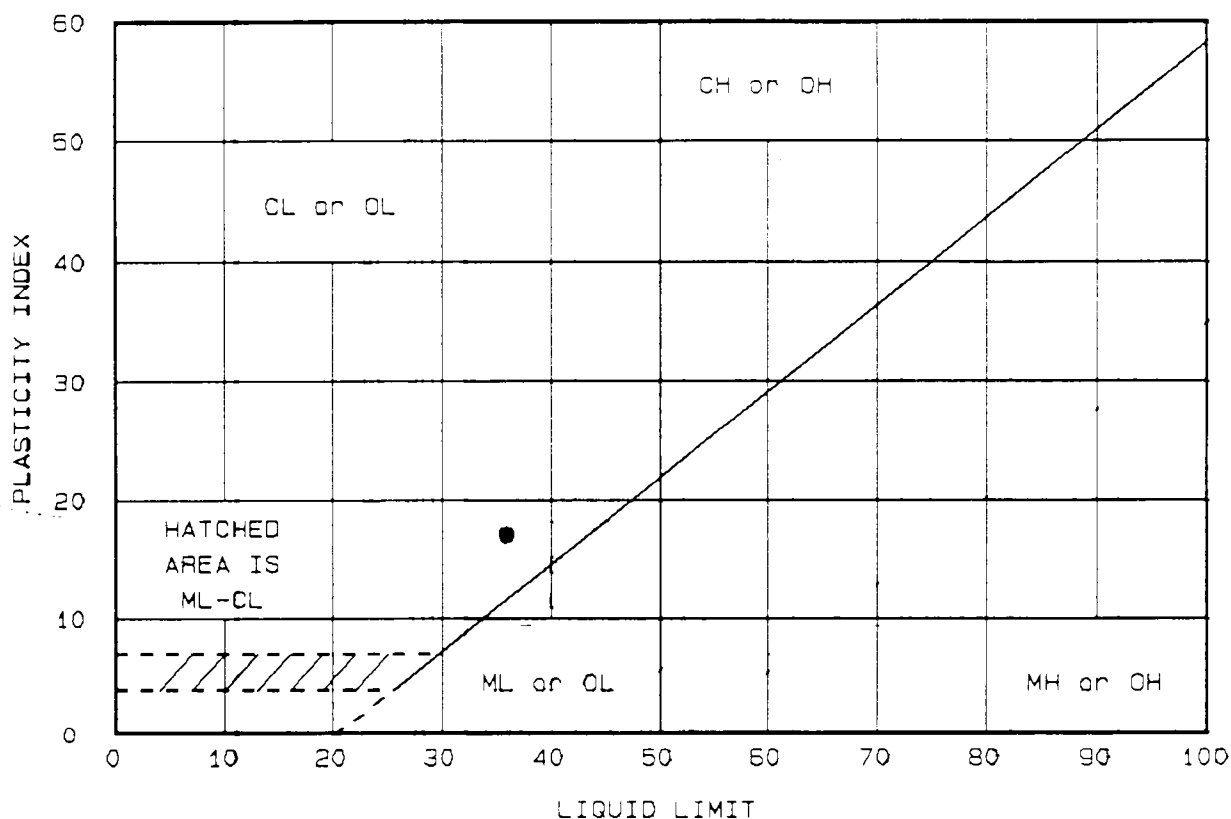
WATER CONTENT: 15.1%

LAB NO. 1667.009

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT E ZONE 2 SAMPLE E2	36	19	17		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 12, 1993

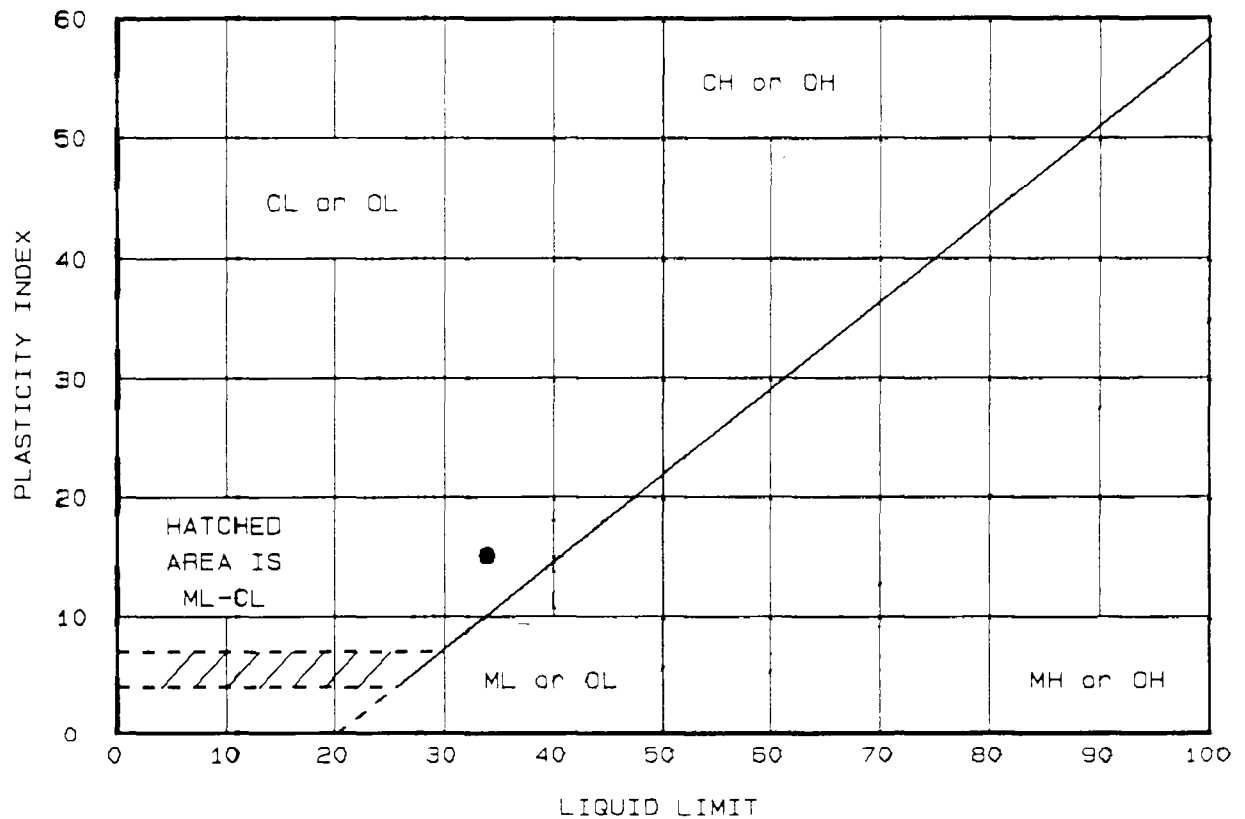
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 15.9%

LAB NO. 1667.010

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT F ZONE 2 SAMPLE F2	34	19	15		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Client: URS CONSULTANTS, INC.
 Location: GRAND ISLAND, NEW YORK
 Date: JULY 12, 1993

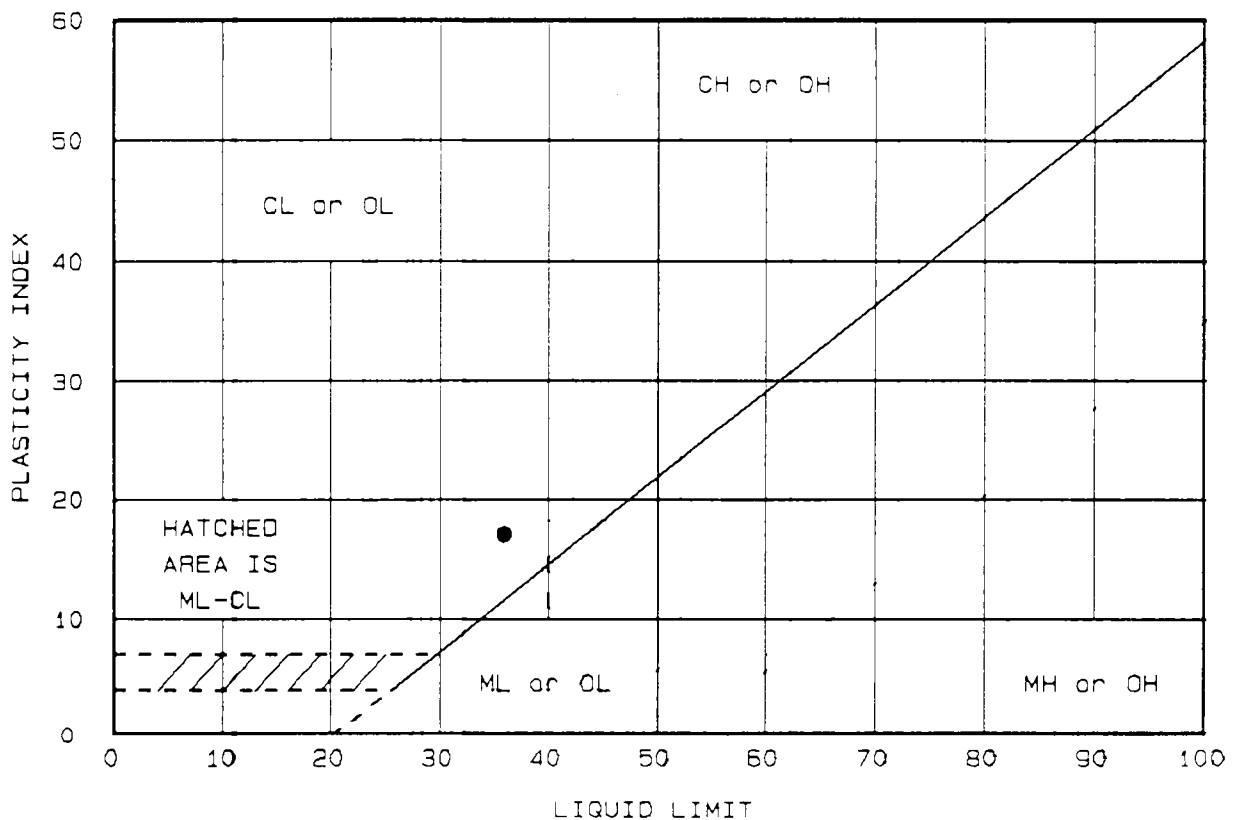
Remarks:
 MATERIAL SIEVED THRU
 #40 SIEVE
 WATER CONTENT: 15.6%

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

LAB NO. 1667.011

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT G ZONE 1 SAMPLE G1	36	19	17		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 9, 1993

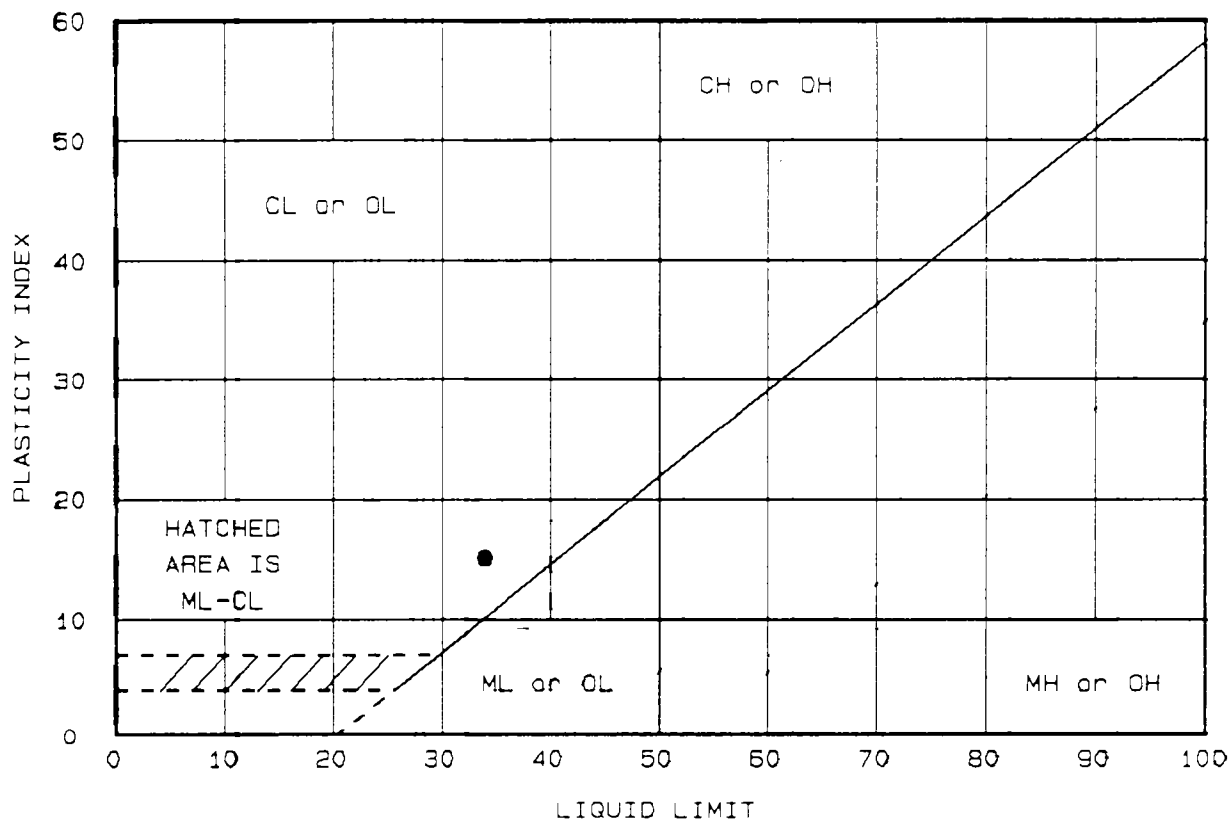
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 16.0%

LAB NO. 1667.012

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT G ZONE 2 SAMPLE G2	34	19	15		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 12, 1993

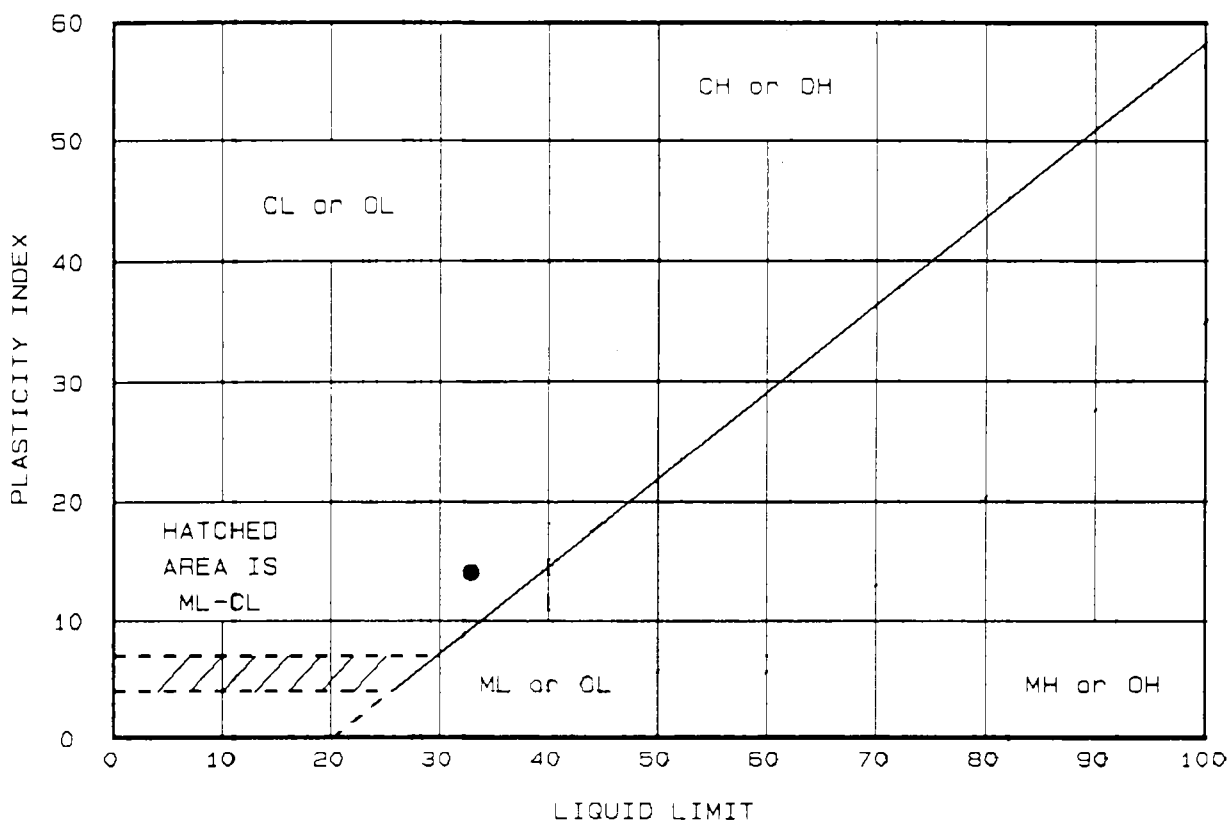
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 15.3%

LAB NO. 1667.013

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT H ZONE 1 SAMPLE H1	33	19	14		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Client: URS CONSULTANTS, INC.
 Location: GRAND ISLAND, NEW YORK
 Date: JULY 9, 1993

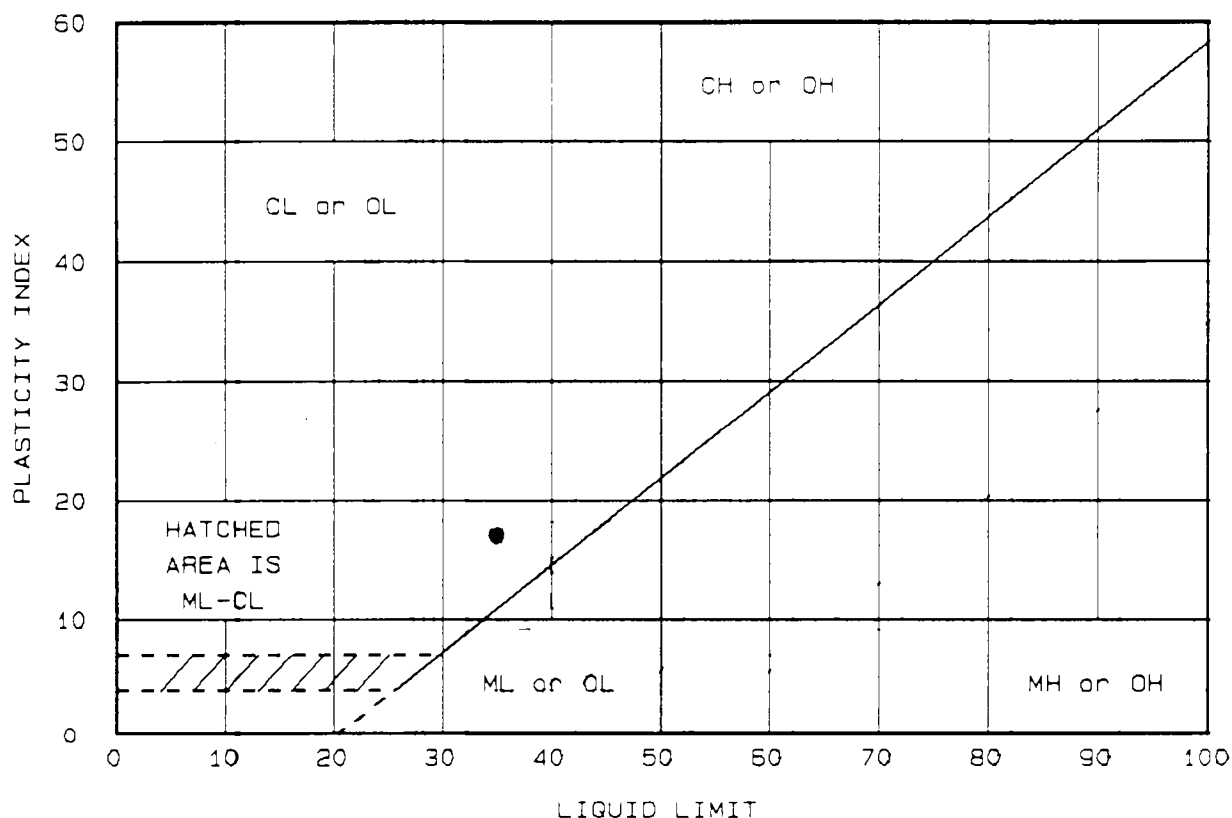
Remarks:
 MATERIAL SIEVED THRU
 #40 SIEVE
 WATER CONTENT: 17.7%

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

LAB NO. 1667.014

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT H ZONE 2 SAMPLE H2	35	18	17		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 12, 1993

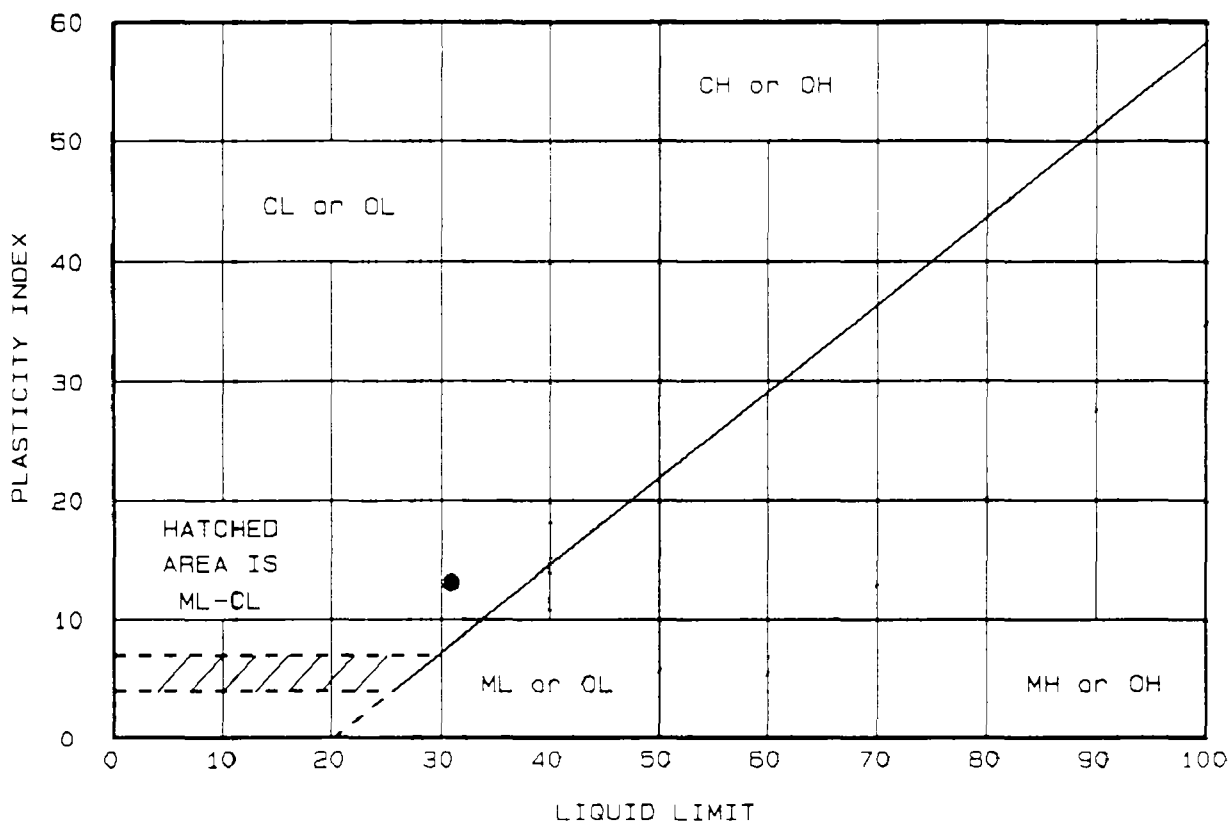
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 15.6%

LAB NO. 1667.015

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT J ZONE 2 SAMPLE J2	31	18	13		

Project No.: G008.014
Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Client: URS CONSULTANTS, INC.
Location: GRAND ISLAND, NEW YORK

Date: JULY 13, 1993

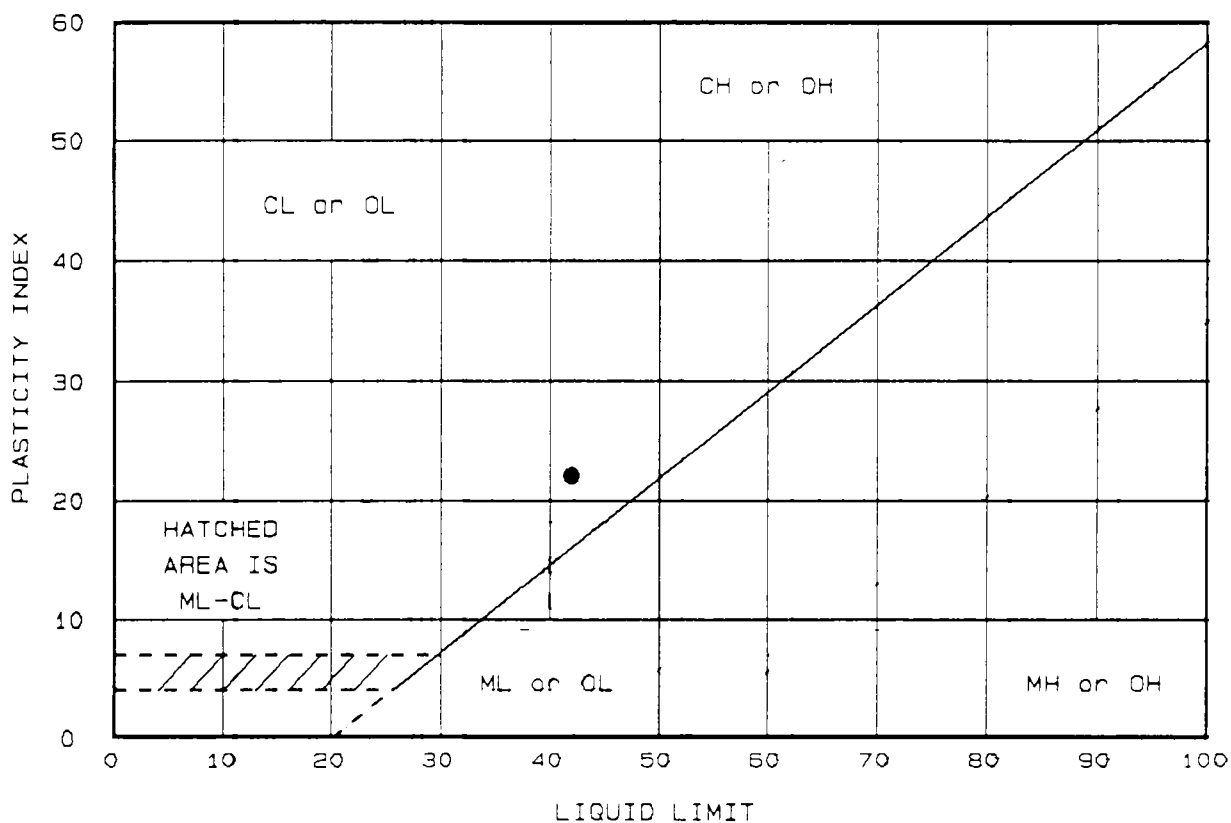
Remarks:
MATERIAL SIEVED THRU
#40 SIEVE
WATER CONTENT: 14.8%

LAB NO. 1667.016

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● SAMPLE POINT K ZONE 1 SAMPLE K1	42	20	22		

Project No.: G008.014
 Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Client: URS CONSULTANTS, INC.
 Location: GRAND ISLAND, NEW YORK
 Date: JULY 9, 1993

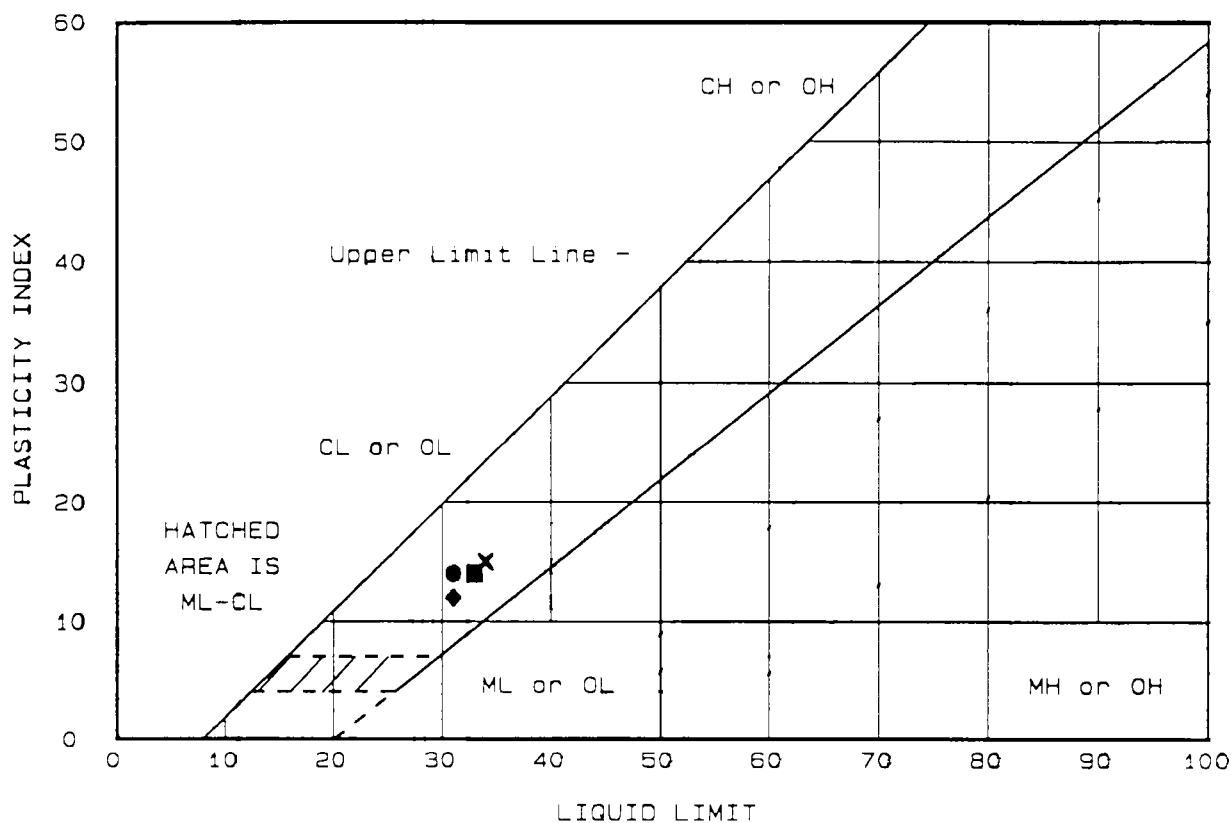
Remarks:
 MATERIAL SIEVED THRU
 #40 SIEVE
 WATER CONTENT: 20.3%

LAB NO. 1667.017

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-95
● Sample No. A-3 Brown Clay & Silt Natural M.C. = 26.6 %	31	17	14		
▲ Sample No. B-3 Brown Clay & Silt Natural M.C. = 14.8 %	33	19	14		
■ Sample No. C-3 Brown Clay & Silt Natural M.C. = 13.9 %	33	19	14		
◆ Sample No. D-3 Brown Clay & Silt Natural M.C. = 13.0 %	31	19	12		
✕ Sample No. E-3 Brown Clay & Silt Natural M.C. = 36.1 %	34	19	15		

Project No.: G008.014
 Project: Dunlop Landfill
 Client: URS Consultants
 Location: Grand Island, New York

Date: 7-8-93

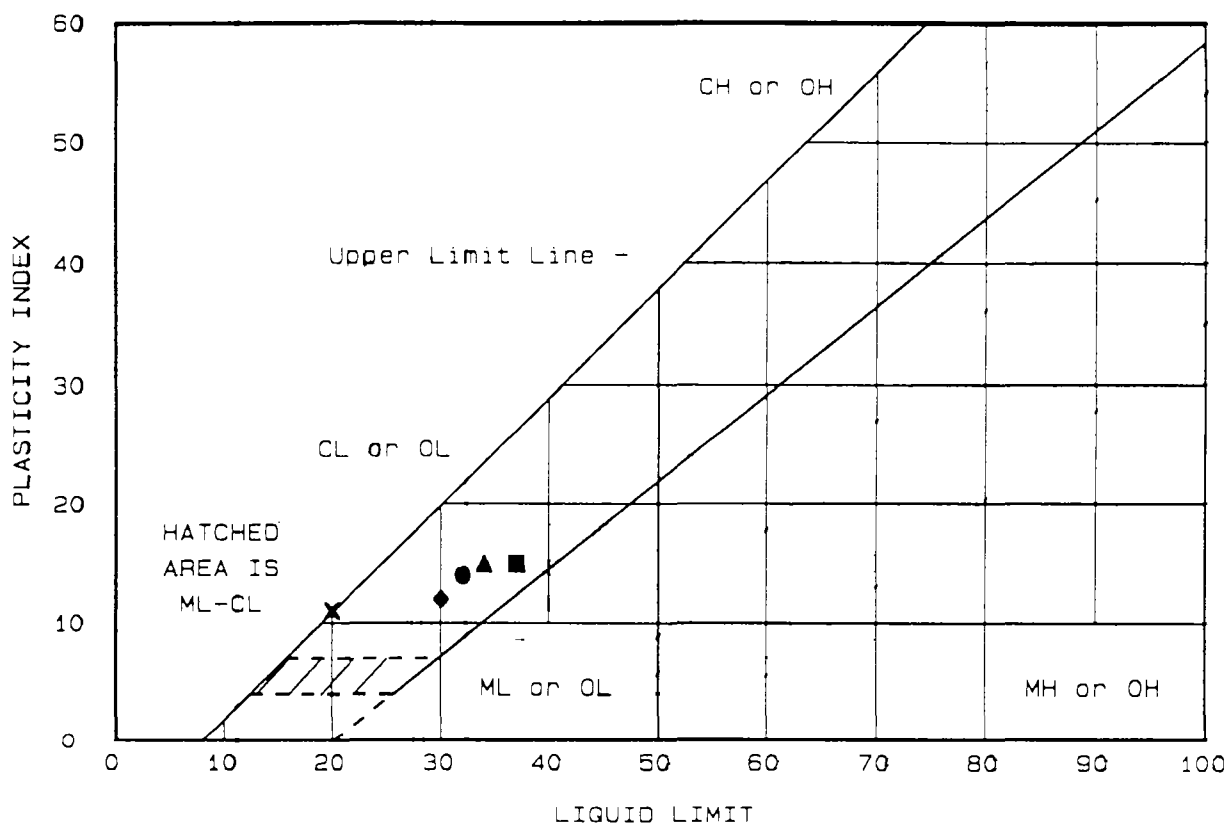
Remarks:
 Sample collected by
 Empire Soils on 7-1-93

LIQUID AND PLASTIC LIMITS TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

Fig. No. 1-AL

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● Sample No. F-3 Brown Clay & Silt Natural M.C. = 15.0 %	32	18	14		
▲ Sample No. G-3 Brown Clay & Silt Natural M.C. = 14.9 %	34	19	15		
■ Sample No. H-3 Brown Clay & Silt Natural M.C. = 15.7 %	37	22	15		
◆ Sample No. J-3 Brown Clay & Silt Natural M.C. = 15.2 %	30	18	12		
✕ Sample No. A-4 Brown Clay & Silt Natural M.C. = 18.2 %	20	9	11		

Project No.: G008.014
 Project: Dunlop Landfill
 Client: URS Consultants
 Location: Grand Island, New York

Date: 7-8-93

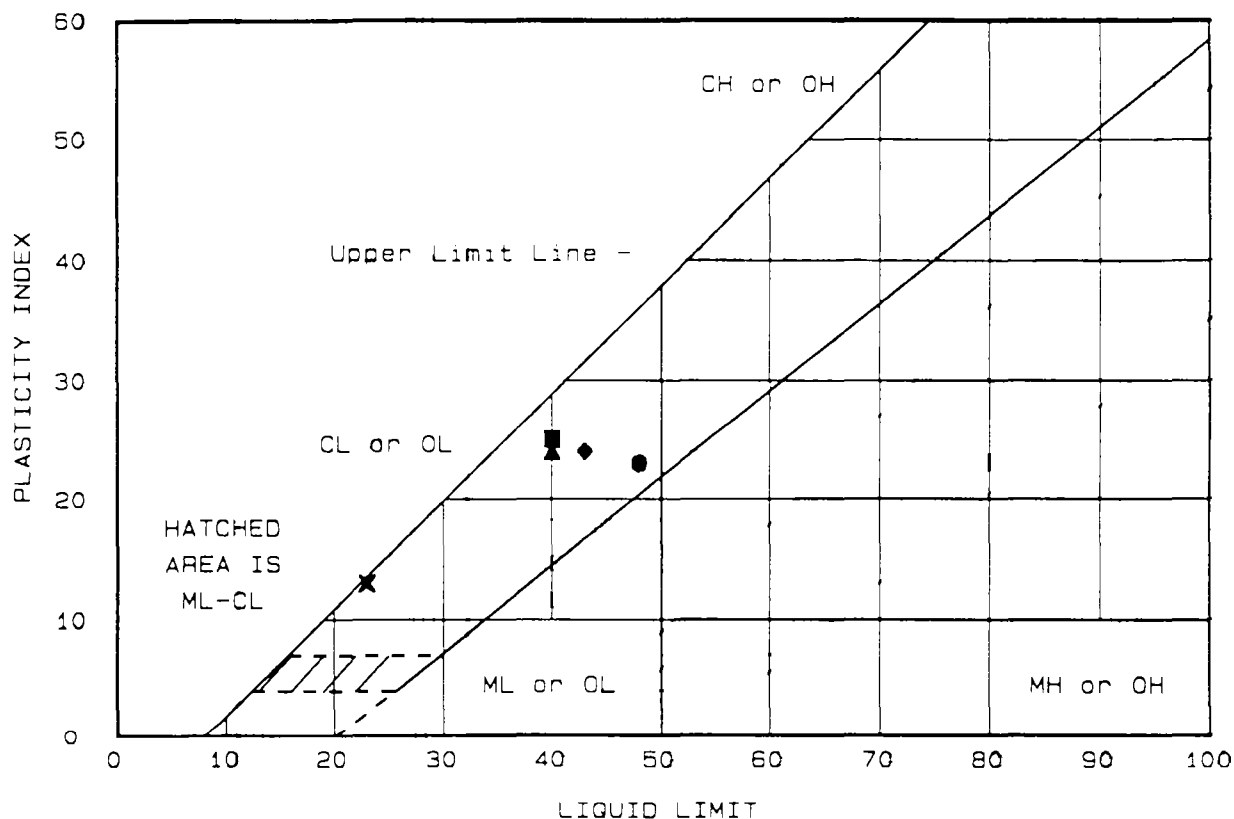
Remarks:
 Sample collected by
 Empire Soils on 7-1-93

LIQUID AND PLASTIC LIMITS TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

Fig. No. 1-AL

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● Sample No. B-4 Brown Clay & Silt Natural M.C. = 17.0 %	48	25	23		
▲ Sample No. C-4 Brown Clay & Silt Natural M.C. = 16.0 %	40	16	24		
■ Sample No. D-4 Brown Clay & Silt Natural M.C. = 15.4 %	40	15	25		
◆ Sample No. E-4 Brown Clay & Silt Natural M.C. = 14.8 %	43	19	24		
✕ Sample No. F-4 Brown Clay & Silt Natural M.C. = 16.6 %	23	10	13		

Project No.: G008.014
 Project: Dunlop Landfill
 Client: URS Consultants
 Location: Grand Island, New York

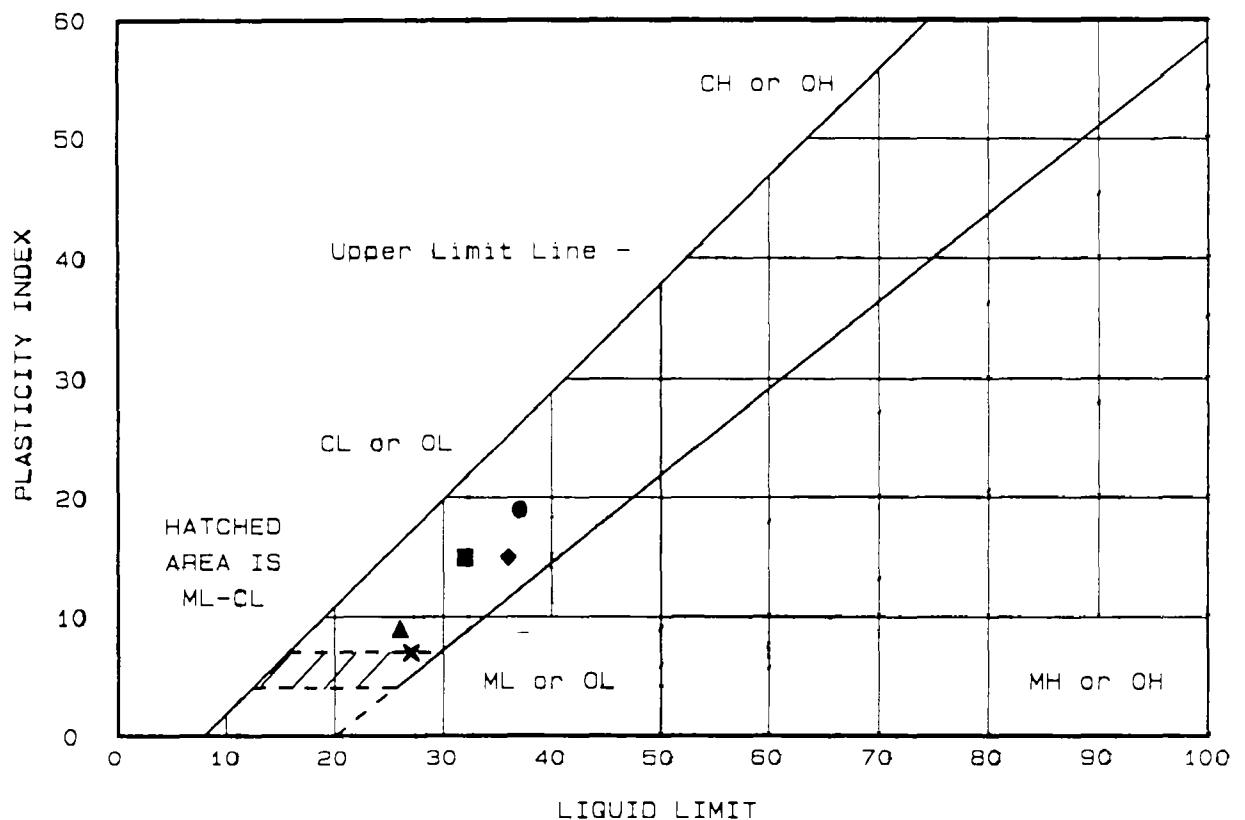
Date: 7-8-93

Remarks:
 Sample collected by
 Empire Soils on 7-1-93

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

Fig. No. 1-AL

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● Sample No. G-4 Brown Clay & Silt Natural M.C. = 16.5 %	37	18	19		
▲ Sample No. H-4 Brown Clay & Silt Natural M.C. = 15.6 %	26	17	9		
■ Sample No. J-4 Brown Clay & Silt Natural M.C. = 14.9 %	32	17	15		
◆ Sample No. A-5 Brown Clay & Silt Natural M.C. = 19.4 %	36	21	15		
✕ Sample No. B-5 Brown Clay & Silt Natural M.C. = 16.6 %	27	20	7		

Project No.: G008.014
 Project: Dunlop Landfill
 Client: URS Consultants
 Location: Grand Island, New York

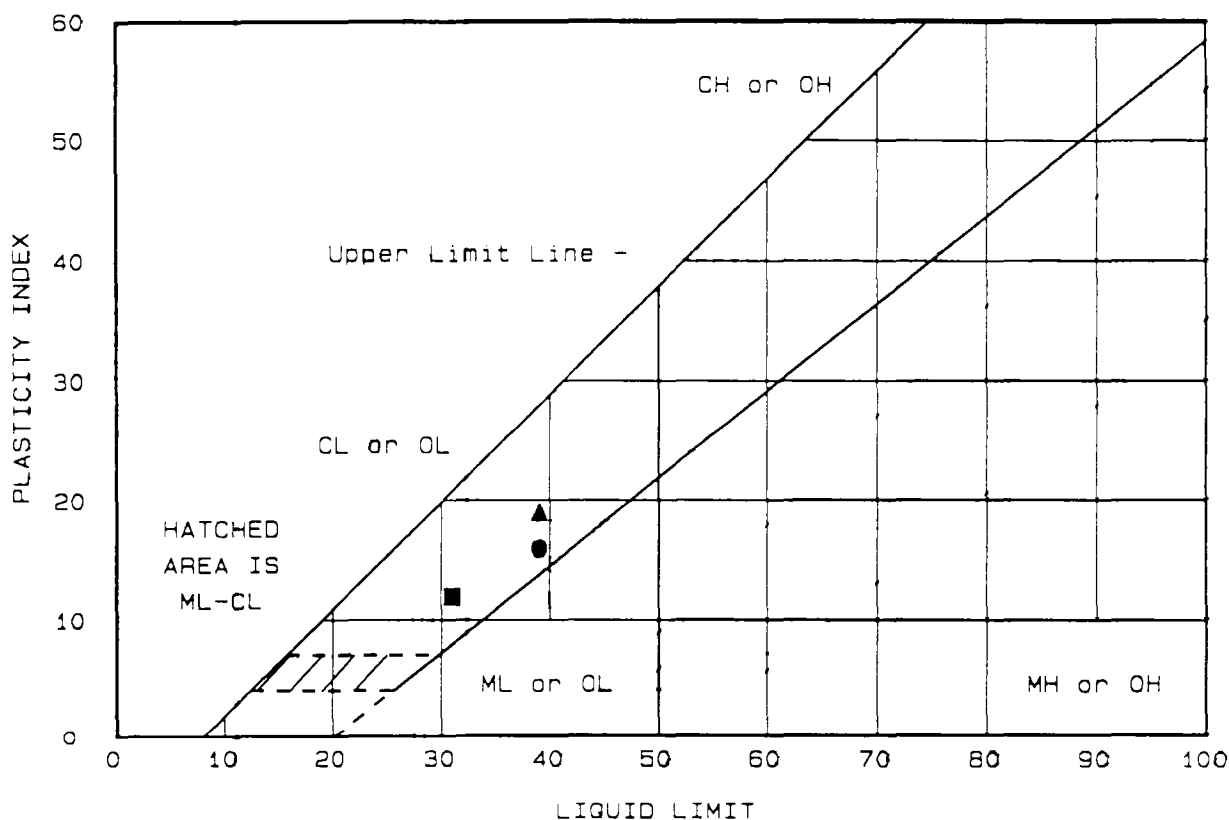
Date: 7-8-93

Remarks:
 Sample collected by
 Empire Soils on 7-1-93

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

Fig. No. 1-AL

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● Sample No. E-5 Brown Silt & Clay Natural M.C. = 19.8 %	39	23	16		
▲ Sample No. G-5 Brown Silt & Clay Natural M.C. = 19.3 %	39	20	19		
■ Sample No. J-5 Brown Silt & Clay Natural M.C. = 14.8 %	31	19	12		

Project No.: G008.014
 Project: Dunlop Landfill

 Client: URS Consultants
 Location: Grand Island, New York

Date: 7-8-93

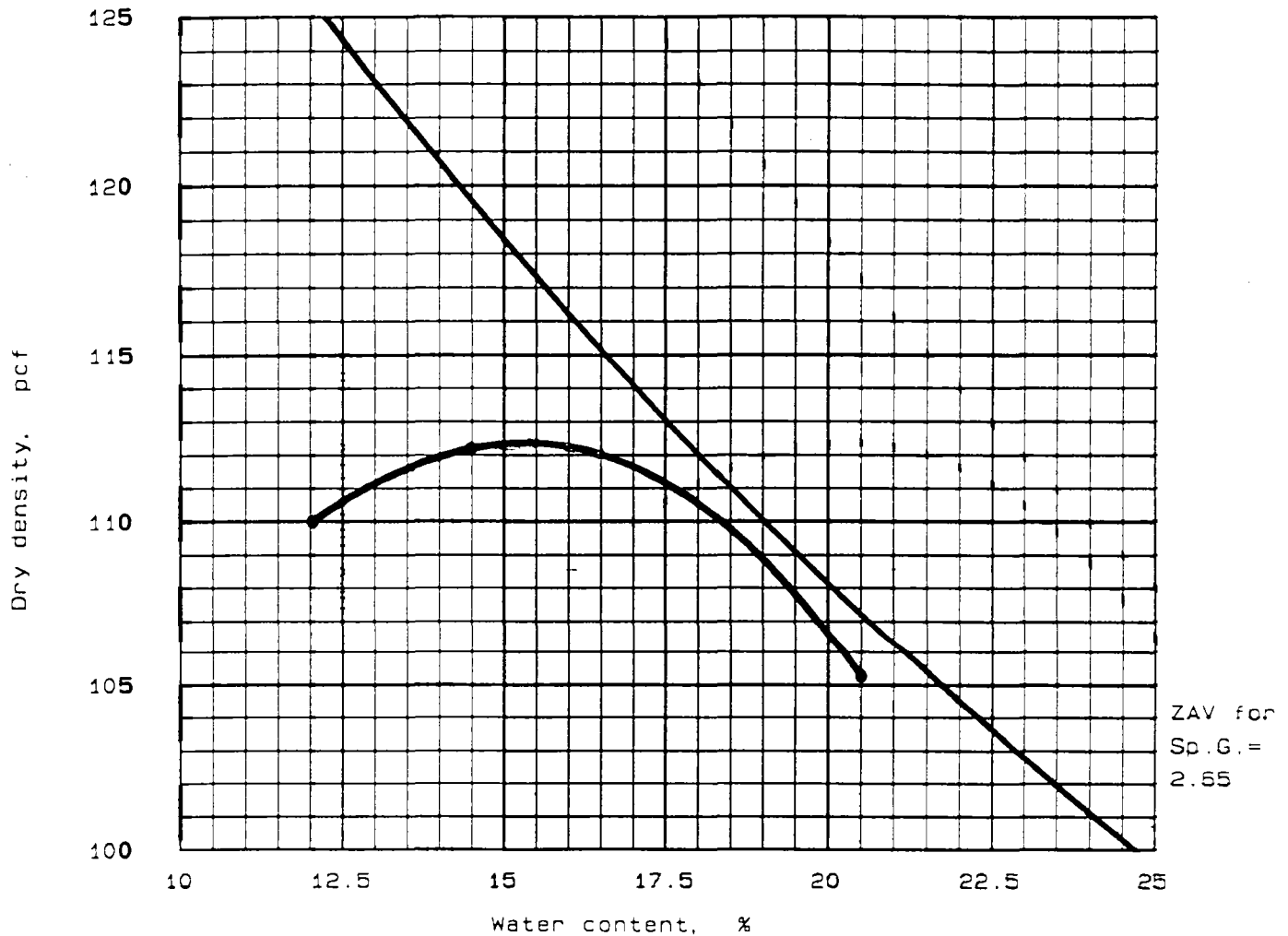
Remarks:
 Sample collected by
 Empire Soils on 7-1-93

LIQUID AND PLASTIC LIMITS TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

Fig. No. 1-AL

APPENDIX C
PROCTOR COMPACTION TEST

PROCTOR TEST REPORT

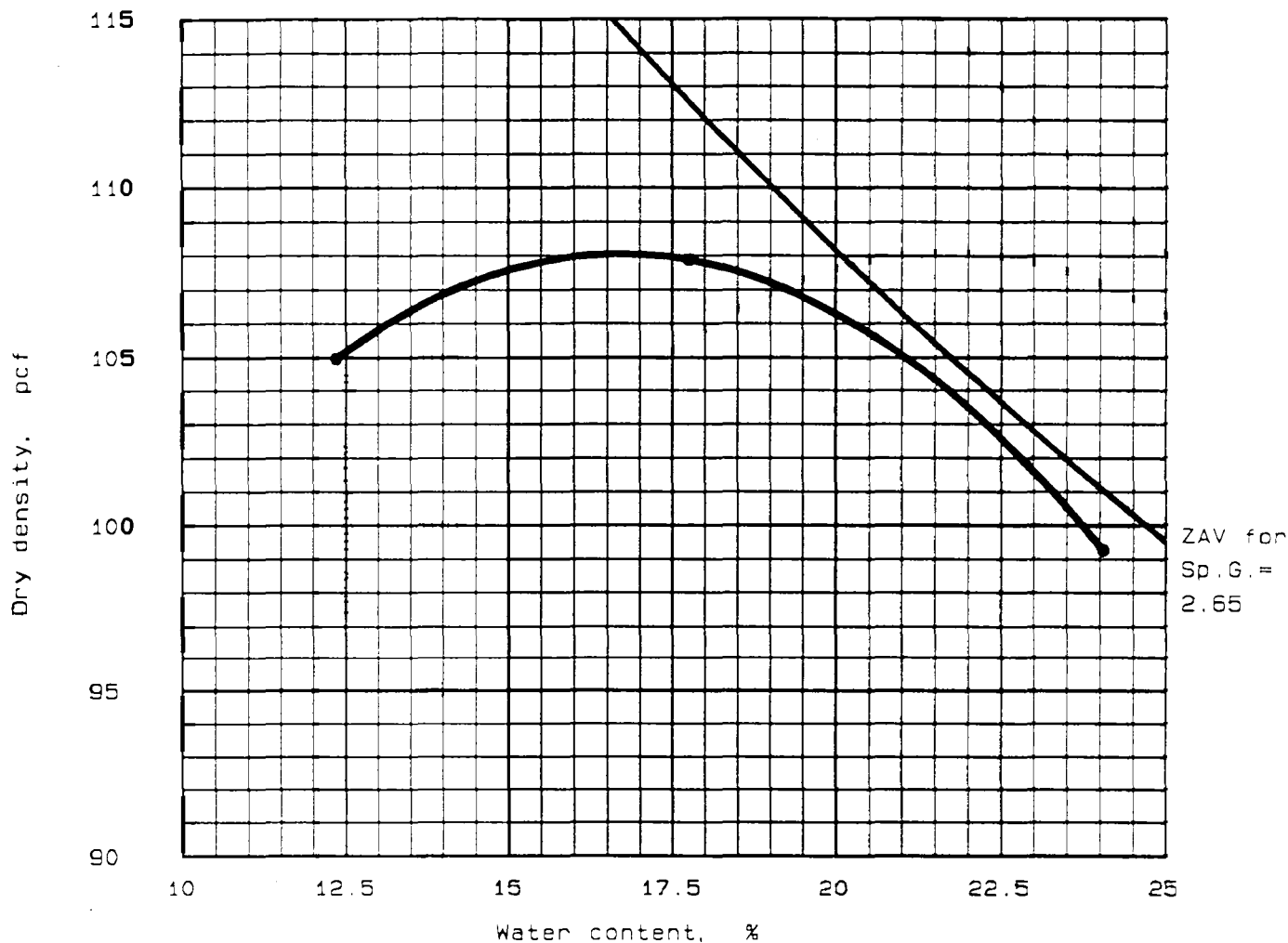


"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
				2.65				

TEST RESULTS				MATERIAL DESCRIPTION			
Optimum moisture = 15.3 % Maximum dry density = 112.4 pcf				Clay & Silt Zone 1-A			
Project No.: G008.014 Project: Dunlop Landfill Location: Grand Island, New York Date: 7-07-1993				Remarks: Sampled By Empire Soils on 7/1/93. ESI Sample No. 1-A			
PROCTOR TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.				Figure No. 1-A			

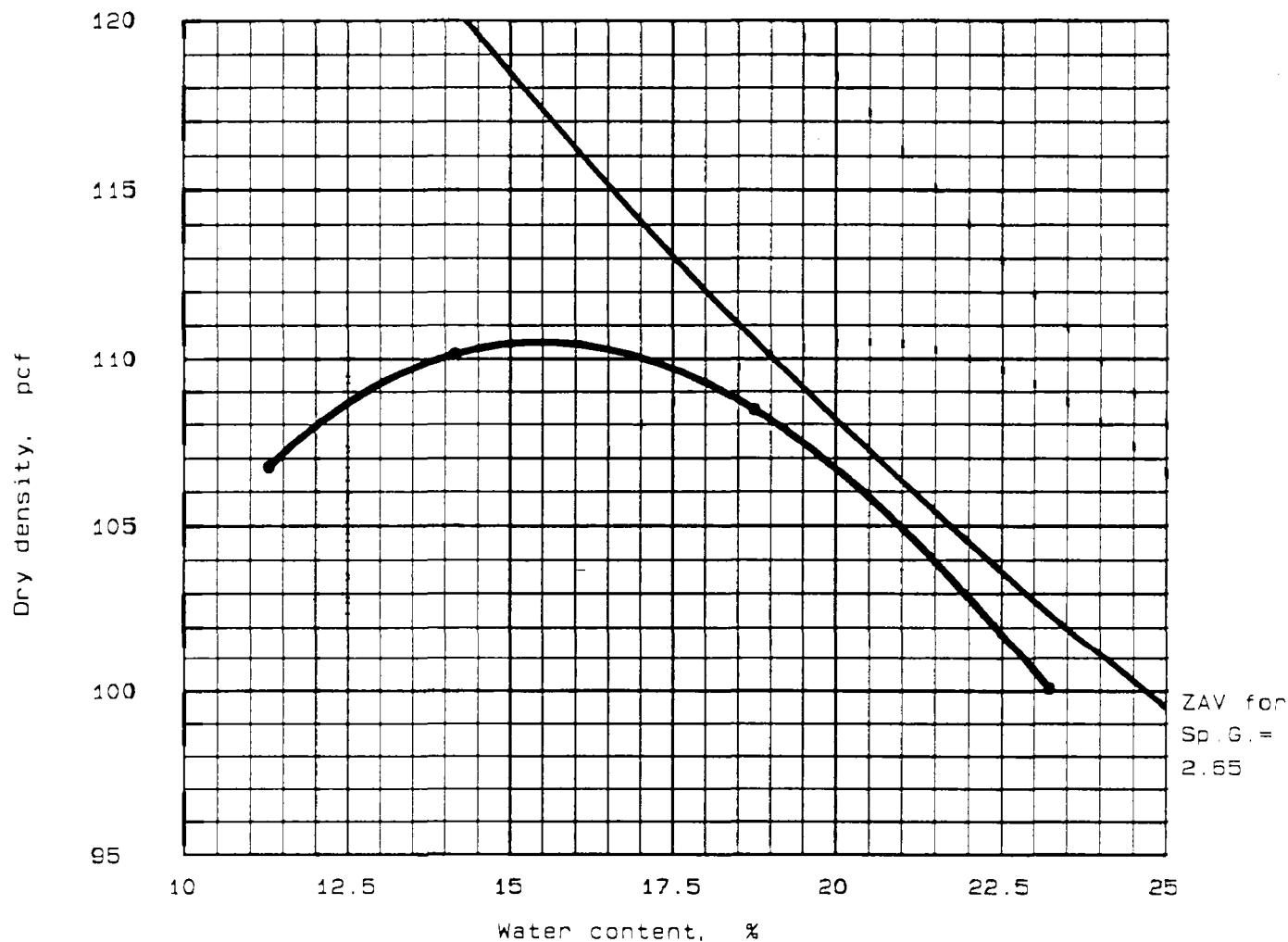
PROCTOR TEST REPORT



"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat.	Sp.G.	LL	PI	% >	% <
	USCS	AASHTO	Moist.				No. 4	No. 200
				2.65				
TEST RESULTS					MATERIAL DESCRIPTION			
Optimum moisture = 16.7 % Maximum dry density = 108.1 pcf					Clay & Silt Zone 2-A			
Project No.: G008.014 Project: Dunlop Landfill Location: Grand Island, New York Date: 7-07-1993					Remarks: Sampled By Empire Soils on 7/1/93. ESI Sample No. 2-A			
PROCTOR TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.					Figure No. 2-A			

PROCTOR TEST REPORT

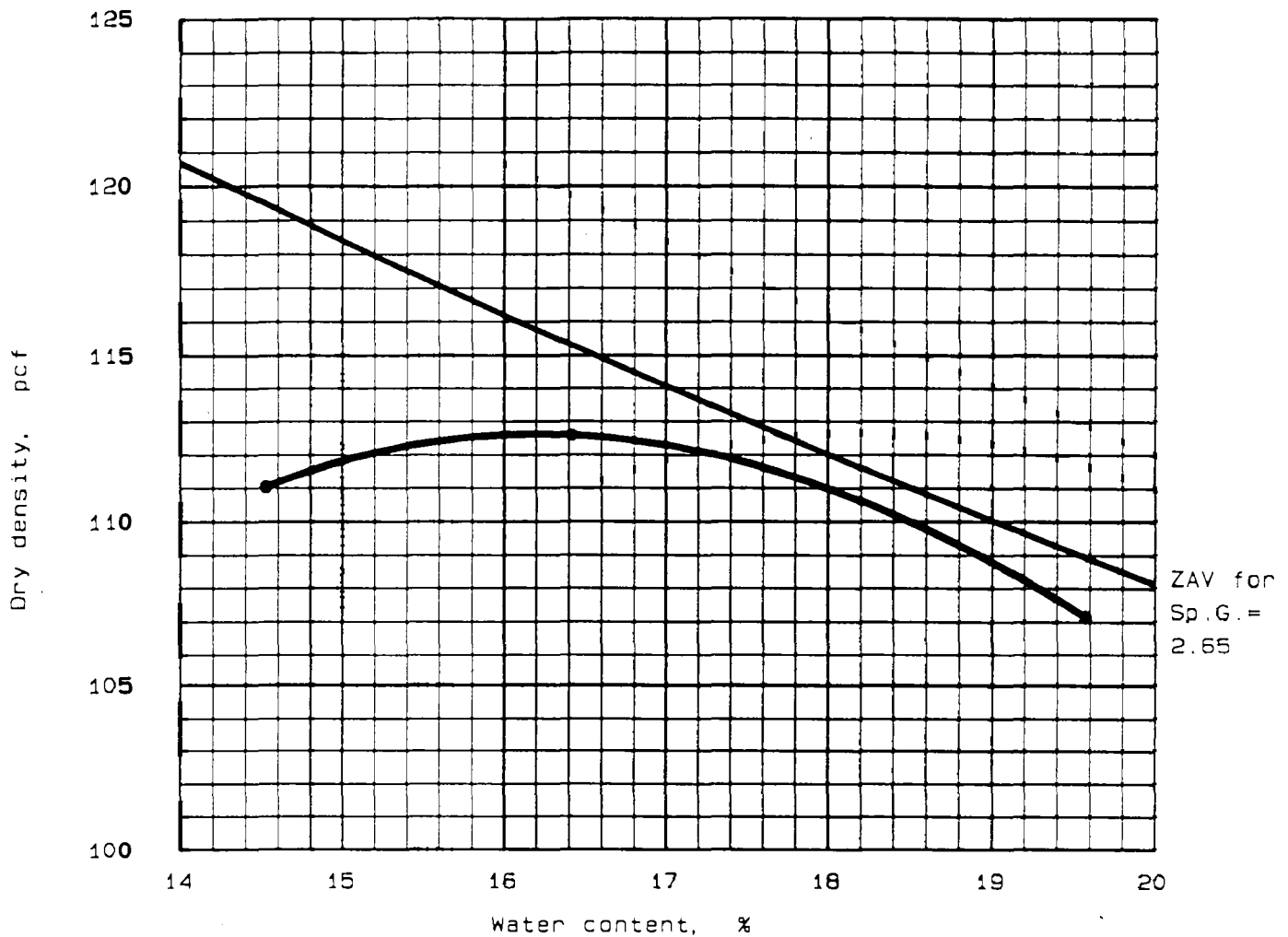


"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
				2.65				

TEST RESULTS				MATERIAL DESCRIPTION			
Optimum moisture = 15.4 % Maximum dry density = 110.5 pcf				Clay & Silt Zone 2-B			
Project No.: G008.014 Project: Dunlop Landfill Location: Grand Island, New York Date: 7-07-1993				Remarks: Sampled By Empire Soils on 7/1/93. ESI Sample No. 2-B			
PROCTOR TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.				Figure No. 2-B			

PROCTOR TEST REPORT

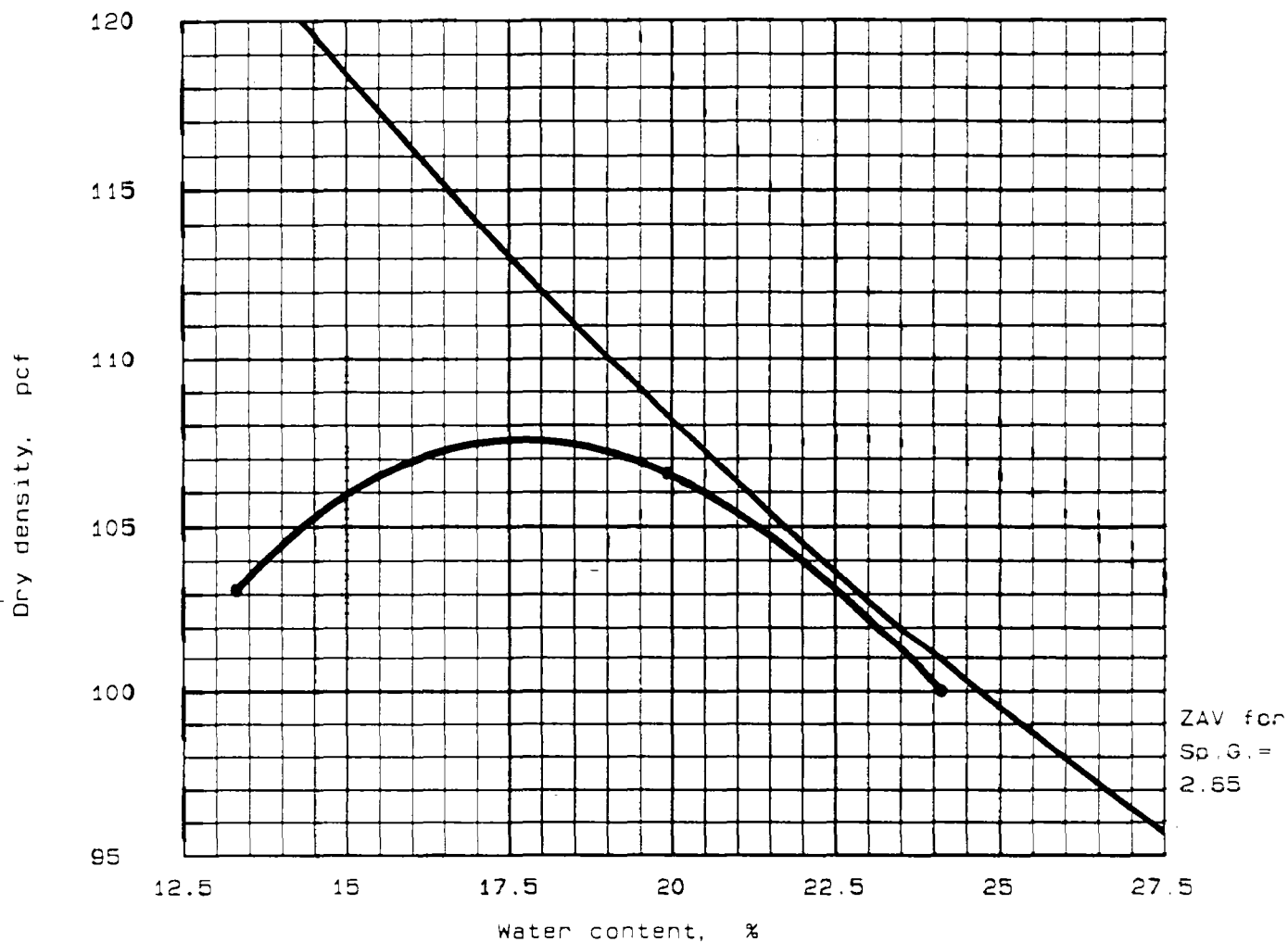


"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
				2.65				

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 16.2 % Maximum dry density = 112.6 pcf	Clay & Silt Zone 3A
Project No.: G008.014 Project: Dunlop Landfill Location: Grand Island, New York Date: 7-07-1993	Remarks: Sampled By Empire Soils on 7/1/93. ESI Sample No. 3-A
PROCTOR TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.	
Figure No. 3-A	

PROCTOR TEST REPORT

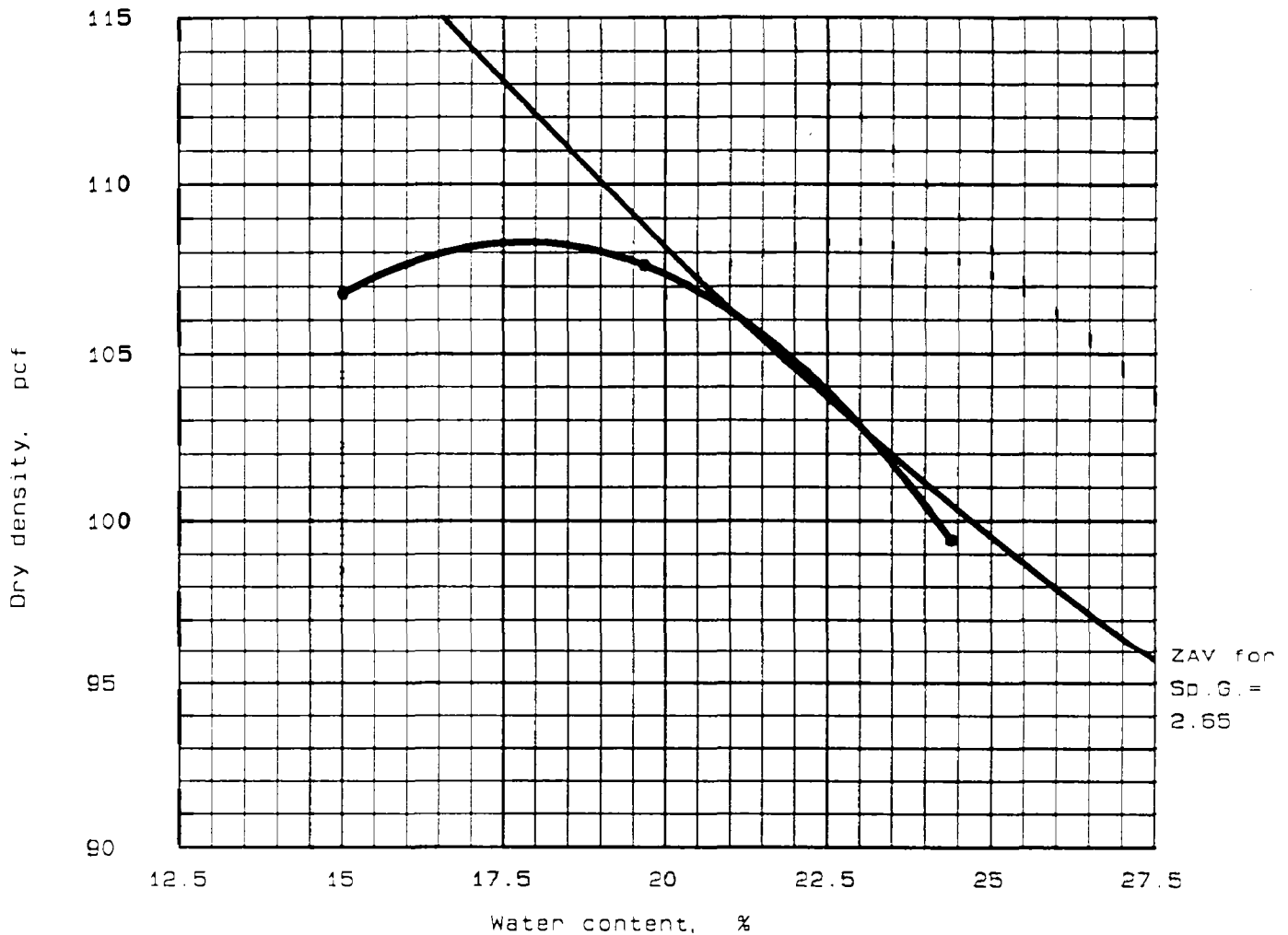


"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
				2.65				

TEST RESULTS		MATERIAL DESCRIPTION
Optimum moisture = 17.7 % Maximum dry density = 107.6 pcf		Clay & Silt Zone 3B
Project No.: G008.014 Project: Dunlop Landfill Location: Grand Island, New York Date: 7-07-1993		Remarks: Sampled By Empire Soils on 7/1/93. ESI Sample No. 3-B
PROCTOR TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.		Figure No. 3-B

PROCTOR TEST REPORT

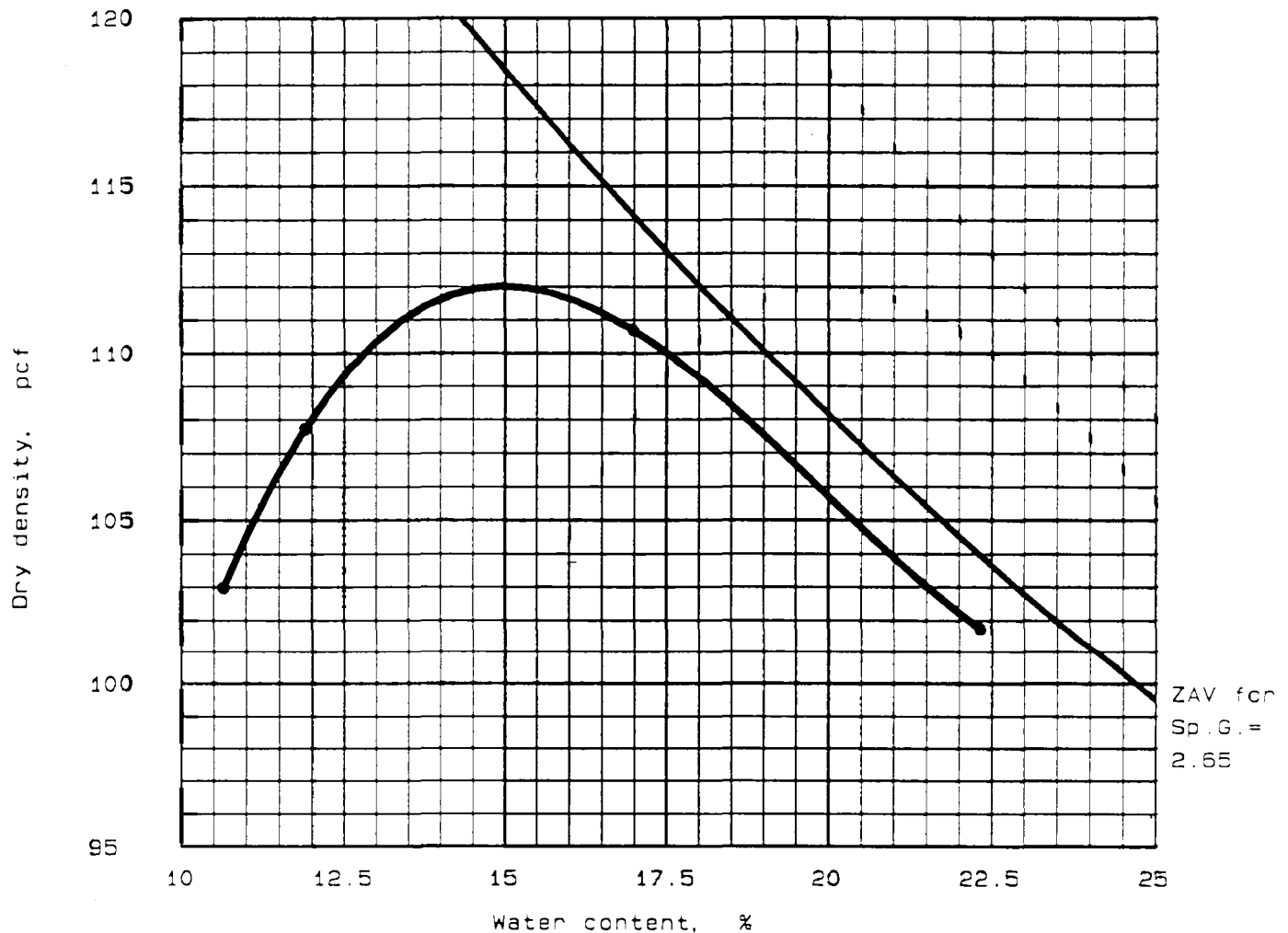


"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
				2.65				

TEST RESULTS				MATERIAL DESCRIPTION			
Optimum moisture = 17.8 % Maximum dry density = 108.3 pcf				Clay & Silt Zone 4A			
Project No.: G008.014 Project: Dunlop Landfill Location: Grand Island, New York Date: 7-07-1993				Remarks: Sampled By Empire Soils on 7/1/93. ESI Sample No. 4-A			
PROCTOR TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.				Figure No. 4-A			

PROCTOR TEST REPORT

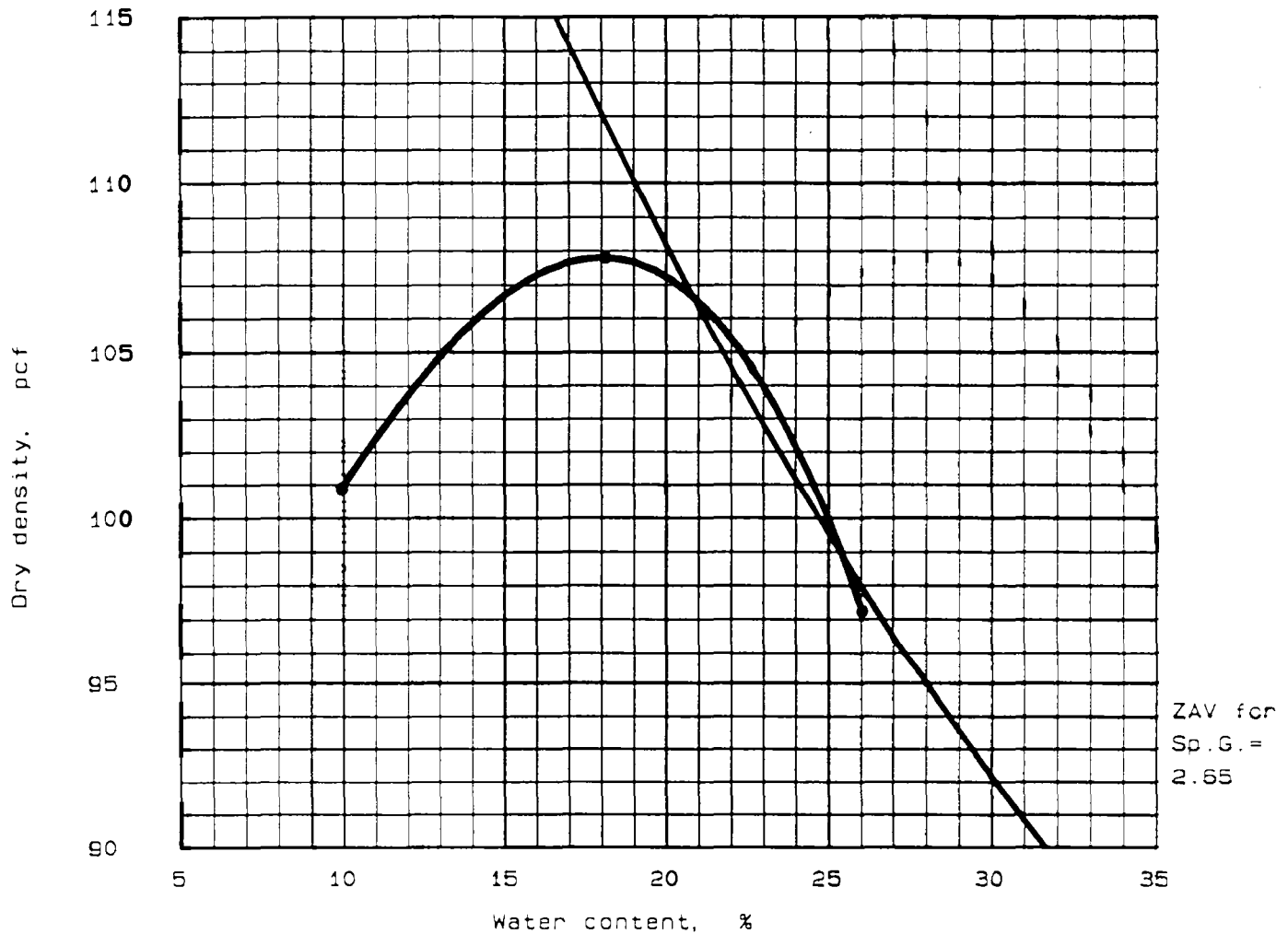


"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
				2.65				

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 15.0 % Maximum dry density = 112.0 pcf	Clay & Silt Zone 4B
Project No.: G008.014 Project: Dunlop Landfill Location: Grand Island, New York Date: 7-07-1993	Remarks: Sampled By Empire Soils on 7/1/93. ESI Sample No. 4-B
PROCTOR TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.	Figure No. 4-B

PROCTOR TEST REPORT



"Standard" Proctor. ASTM D 698, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
				2.65				

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 18.0 % Maximum dry density = 107.8 pcf	Clay & Silt Zone 5A
Project No.: G008.014 Project: Dunlop Landfill Location: Grand Island, New York Date: 7-07-1993	Remarks: Sampled By Empire Soils on 7/1/93. ESI Sample No. 5-A
PROCTOR TEST REPORT EMPIRE SOILS INVESTIGATIONS, INC.	Figure No. 5-A

APPENDIX D
PERMEABILITY TESTS

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 11.74
 Specimen Diameter (cm): 10.16
 Dry Unit Weight (pcf): 105.3
 Moisture Before Test (%): 14.4
 Moisture After Test (%): 20.5

Run Number: 1 ● 2 ▲
 Cell Pressure (psi): 95.0 95.0
 Test Pressure (psi): 85.1 90.1
 Back Pressure (psi): 79.8 79.8
 Diff. Head (psi): 5.3 10.3
 Flow Rate (cc/sec): 1.85×10^{-4} 3.95×10^{-4}
 Perm. (cm/sec): 7.25×10^{-8} 7.88×10^{-8}

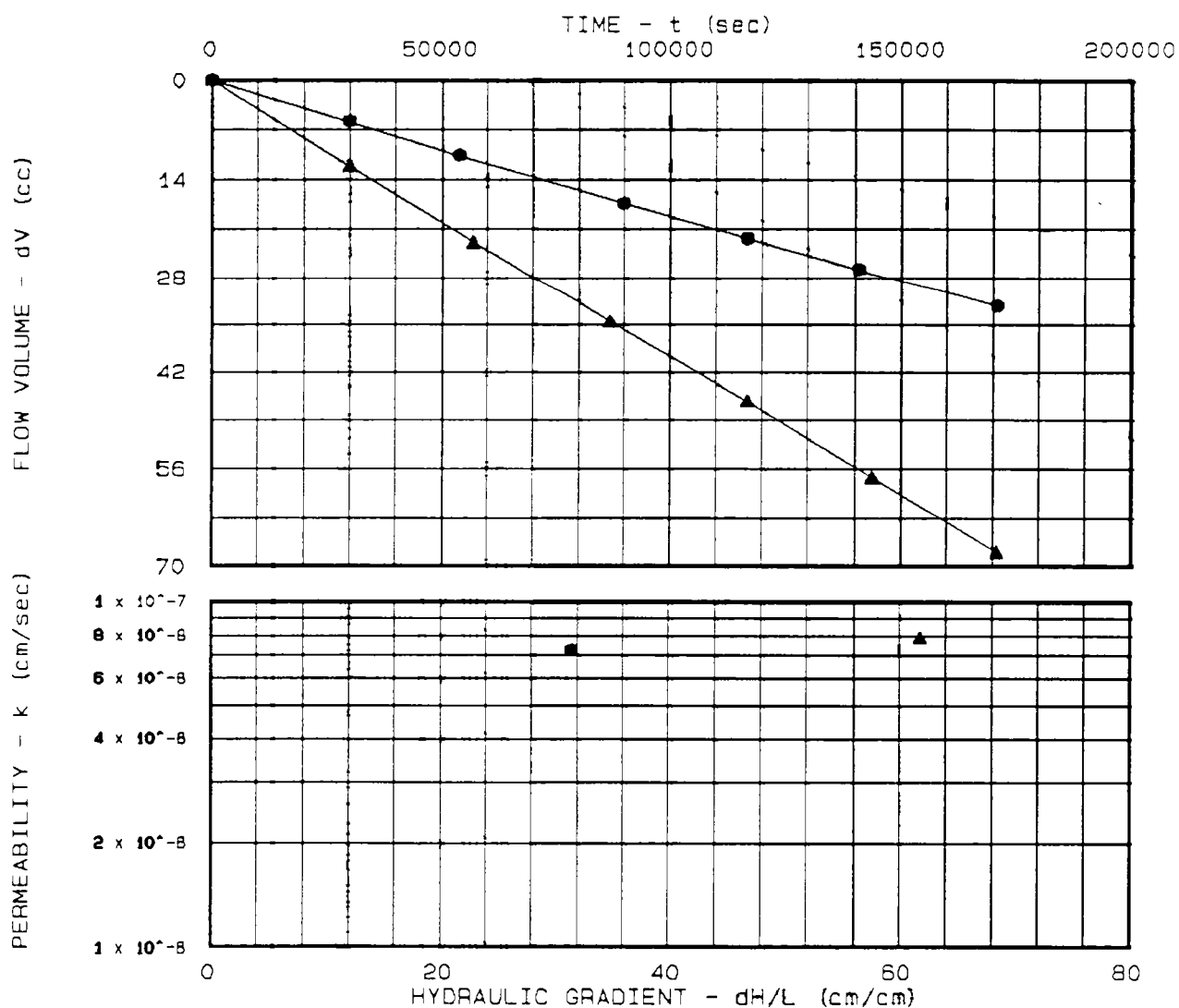
SAMPLE DATA:

Sample Identification: ZONE 1 / SAMPLE 1-PA

Visual Description: BROWN CLAY

Remarks:

Maximum Dry Density (pcf): 112.4
 Optimum Moisture Content (%): 15.3
 ASTM (D698)
 Percent Compaction: 93.6%
 Permeameter type: FLEXIBLE WALL
 Sample type: REMOLDED



Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Location: GRAND ISLAND, NEW YORK
 Date: JULY 1993

Project No.:
 File No.: G008.014
 Lab No.: 1657.018
 Tested by: KJC
 Checked by: JFC ✓

PERMEABILITY TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

=====

PERMEABILITY TEST DATA

=====

PROJECT DATA

Project Name: DUNLOP INACTIVE WASTE SITE CLOSURE
File No.: G008.014
Project Location: GRAND ISLAND, NEW YORK
Project No.:
Sample Identification: ZONE 1 / SAMPLE 1-PA

Lab No.: 1667.018
Description: BROWN CLAY

Sample Type: REMOLDED
Max. Dry Dens.: 112.4
Method (D1557/D698): D698
Opt. Water Content: 15.3
Date: JULY 1993
Remarks:

Permeameter Type: FLEXIBLE WALL
Tested by: KJC

PERMEABILITY TEST SPECIMEN DATA

Before test:

After test:

Diameter:	1	2		1	2	
Top:	4.002 in	0.000 in		4.042 in	0.000 in	
Middle:	3.998 in	0.000 in		4.007 in	0.000 in	
Bottom:	3.997 in	0.000 in		3.956 in	0.000 in	
Average:	4.00 in	10.16 cm		4.00 in	10.17 cm	
Length:	1	2	3	1	2	3
	4.626 in	4.625 in	4.614 in	4.673 in	4.574 in	4.602 in
Average:	4.62 in	11.74 cm		4.62 in	11.73 cm	

Moisture, Density and Sample Parameters:

Specific Gravity:	2.75	
Wet Wt. & Tare:	2605.10	2702.80
Dry Wt. & Tare:	2374.00	2374.00
Tare Wt.:	770.40	770.40
Moisture Content:	14.4 %	20.5 %
Dry Unit Weight:	105.3 pcf	93.6 % of max
Porosity:	0.3869	0.3875
Saturation:	62.8 %	89.1 %

PERMEABILITY TEST CONDITIONS DATA

Cell No.: FP-10

Panel No.: 10

Positions: 6&5

Run Number:

1

2

Cell Pressure: 95.0 psi

95.0 psi

Saturation Pressure: 0.0 psi

0.0 psi

Inflow Buret Factor: 5.60

5.60

Outflow Buret Factor: 5.50

5.50

Test Temperature: 20.0 °C

20.0 °C

PERMEABILITY TEST READINGS DATA

ASE X or R -	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi) IN OUT	BURET READING (cc) IN OUT	FLOW VOLUME (cc) AVERAGE
X	7/10/93	8: 9	0	85.2 80.1	0.05 24.80	0.00
X	7/10/93	16:29	30,000	85.1 80.1	1.15 23.80	5.83
X	7/10/93	23: 9	54,000	85.1 80.1	2.00 22.95	10.55
	7/11/93	9: 9	90,000	85.1 80.1	3.30 21.80	17.35
	7/11/93	16:39	117,000	85.1 80.0	4.15 20.85	22.34
	7/11/93	23:19	141,000	85.0 80.1	4.95 20.05	26.78
	7/12/93	7:39	171,000	85.1 80.1	6.00 19.10	32.34

Test Pressure = 85.1 psi Differential Head = 5.3 psi, 369.6 cm H2O
 Gradient = 3.148E 01 Flow rate = 1.850E-04 cc/sec R squared = 1.00000
 Permeability, K20.0° = 7.253E-08 cm/sec², K20° = 7.253E-08 cm/sec²

SECOND RUN PERMEABILITY TEST READINGS DATA

ASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi) IN OUT	BURET READING (cc) IN OUT	FLOW VOLUME (cc) AVERAGE
X	7/13/93	7:49	0	90.2 80.2	0.10 24.65	0.00
	7/13/93	16: 9	30,000	89.9 80.0	2.30 22.50	12.07
	7/13/93	23:39	57,000	90.1 80.0	4.20 20.50	22.89
	7/14/93	7:59	87,000	90.1 80.1	6.30 18.40	34.55
	7/14/93	16:19	117,000	89.9 79.9	8.40 16.30	46.20
R	0/ 0/ 0	0:00	0	0.0 0.0	8.40 16.30	0.00
R	0/ 0/ 0	0:00	0	0.0 0.0	0.00 24.75	0.00
	7/14/93	23:49	144,000	90.3 80.1	1.95 22.75	57.16
	7/15/93	7:19	171,000	90.4 80.2	3.90 20.85	67.85

Test Pressure = 90.1 psi Differential Head = 10.3 psi, 725.6 cm H2O
 Gradient = 6.181E 01 Flow rate = 3.949E-04 cc/sec R squared = 0.99996
 Permeability, K20.0° = 7.884E-08 cm/sec², K20° = 7.884E-08 cm/sec²

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 11.63
 Specimen Diameter (cm): 10.16
 Dry Unit Weight (pcf): 103.1
 Moisture Before Test (%): 19.0
 Moisture After Test (%): 20.2

Run Number: 1 • 2 ▲

Cell Pressure (psi): 95.0 95.0

Test Pressure (psi): 85.1 82.5

Back Pressure (psi): 80.0 79.8

Diff. Head (psi): 5.1 2.7

Flow Rate (cc/sec): 5.93×10^{-5} 3.02×10^{-5}

Perm. (cm/sec): 2.35×10^{-8} 2.28×10^{-8}

SAMPLE DATA:

Sample Identification: ZONE 2 / SAMPLE 2-PA

Visual Description: BROWN CLAY

Remarks:

Maximum Dry Density (pcf): 108.1

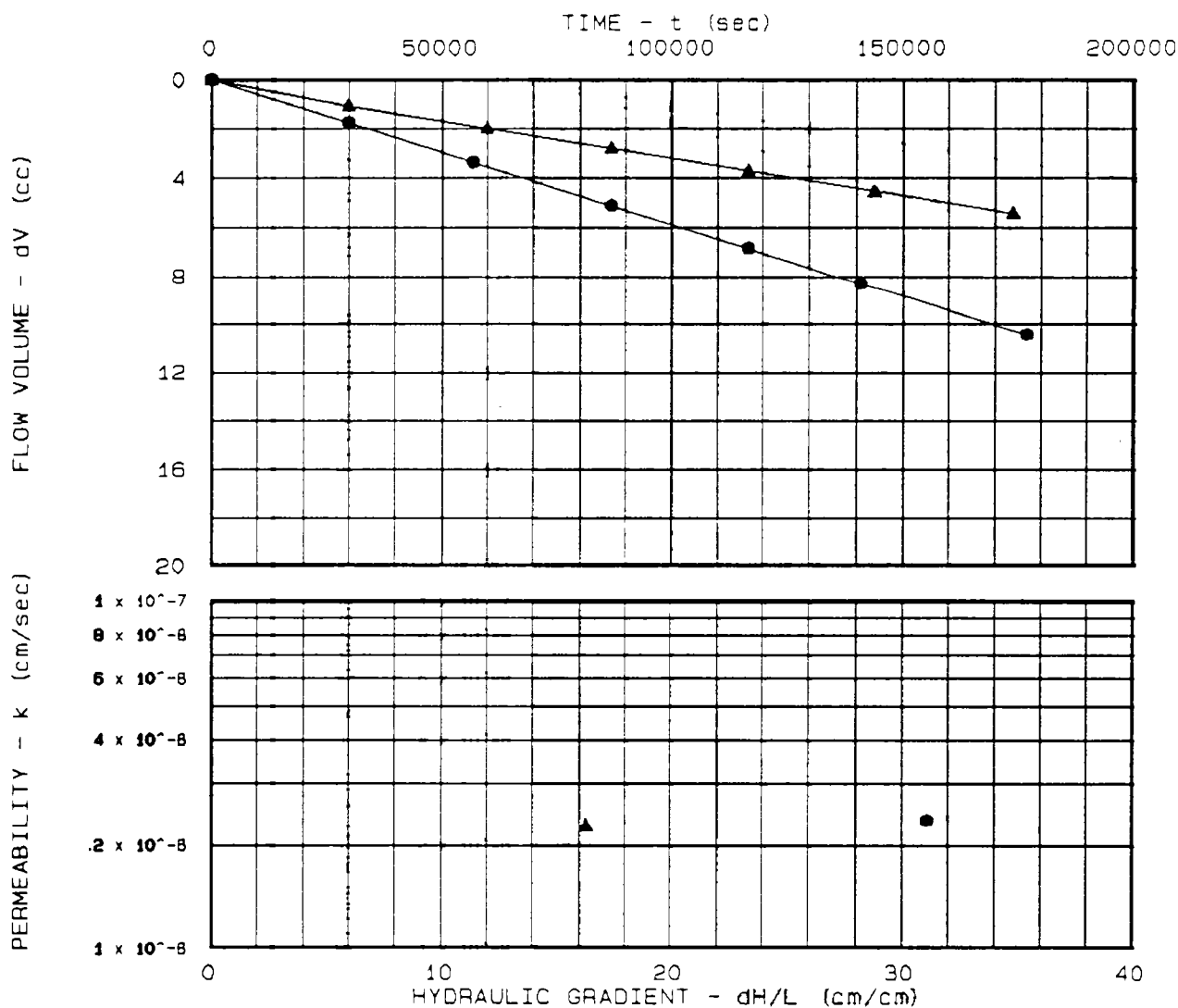
Optimum Moisture Content (%): 16.7

ASTM (D698)

Percent Compaction: 95.4%

Permeameter type: FLEXIBLE WALL

Sample type: REMOLDED



Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Location: GRAND ISLAND, NEW YORK
 Date: JULY 1993

Project No.:
 File No.: G008.014
 Lab No.: 1657.019
 Tested by: KJC
 Checked by: JFC ✓

PERMEABILITY TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

=====

PERMEABILITY TEST DATA

=====

PROJECT DATA

Project Name: DUNLOP INACTIVE WASTE SITE CLOSURE
File No.: G008.014
Project Location: GRAND ISLAND, NEW YORK
Project No.:
Sample Identification: ZONE 2 / SAMPLE 2-PA
Lab No.: 1667.019
Description: BROWN CLAY
Sample Type: REMOLDED
Max. Dry Dens.: 108.1
Method (D1557/D698): D698
Mnt. Water Content: 16.7
Date: JULY 1993
Remarks:
Permeameter Type: FLEXIBLE WALL
Tested by: KJC

PERMEABILITY TEST SPECIMEN DATA

Before test:

After test:

Diameter:	1	2		1	2	
Top:	3.998 in	0.000 in		3.968 in	0.000 in	
Middle:	4.000 in	0.000 in		3.962 in	0.000 in	
Bottom:	4.001 in	0.000 in		3.984 in	0.000 in	
Average:	4.00 in	10.16 cm		3.97 in	10.08 cm	
Length:	1	2	3	1	2	3
	4.588 in	4.587 in	4.563 in	4.533 in	4.565 in	4.542 in
Average:	4.58 in	11.63 cm		4.55 in	11.55 cm	

Moisture, Density and Sample Parameters:

Specific Gravity:	2.75	
Wet Wt. & Tare:	2628.20	2646.40
Dry Wt. & Tare:	2332.50	2332.50
Tare Wt.:	775.10	775.10
Moisture Content:	19.0 %	20.2 %
Dry Unit Weight:	103.1 pcf	95.4 % of max
Porosity:	0.3994	0.3856
Saturation:	78.5 %	88.3 %

PERMEABILITY TEST CONDITIONS DATA

Cell No.: FP-28

Panel No.: 4

Positions: 4&3

Run Number:

1

2

Cell Pressure: 95.0 psi

95.0 psi

Saturation Pressure: 0.0 psi

0.0 psi

Inflow Buret Factor: 1.00

1.00

Outflow Buret Factor: 1.00

1.00

Test Temperature: 20.0 °C

20.0 °C

PERMEABILITY TEST READINGS DATA

ASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/ 9/93	7:55	0	85.1	80.5	0.15	24.90	0.00
	7/ 9/93	16:15	30,000	85.0	80.3	2.15	23.40	1.75
	7/ 9/93	23:45	57,000	85.1	80.4	4.00	22.00	3.38
	7/10/93	8: 5	87,000	85.1	80.3	5.95	20.45	5.13
	7/10/93	16:25	117,000	85.0	80.1	7.85	18.90	6.85
R	0/ 0/ 0	0:00	0	0.0	0.0	7.85	18.90	0.00
R	0/ 0/ 0	0:00	0	0.0	0.0	0.05	24.80	0.00
	7/10/93	23: 5	141,000	85.1	80.0	1.65	23.40	8.35
	7/11/93	9: 5	177,000	85.0	80.0	3.90	21.40	10.48

1 st Pressure = 85.1 psi Differential Head = 5.1 psi, 361.9 cm H2O
 Gradient = 3.111E 01 Flow rate = 5.926E-05 cc/sec R squared = 0.99992
 Permeability, K20.0° = 2.350E-08 cm/sec², K20° = 2.350E-08 cm/sec²

SECOND RUN PERMEABILITY TEST READINGS DATA

CASE or	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/12/93	7:35	0	82.7	81.2	0.00	24.90	0.00
X	7/12/93	15:55	30,000	82.5	80.2	1.10	23.90	1.05
	7/13/93	0:15	60,000	82.5	80.0	2.10	23.05	1.98
	7/13/93	7:45	87,000	82.5	80.2	3.00	22.35	2.78
	7/13/93	16: 5	117,000	82.5	80.1	3.90	21.40	3.70
	7/13/93	23:35	144,000	82.5	80.0	4.80	20.65	4.53
	7/14/93	7:55	174,000	82.5	80.1	5.75	19.85	5.40

1 st Pressure = 82.5 psi Differential Head = 2.7 psi, 190.1 cm H2O
 Gradient = 1.634E 01 Flow rate = 3.017E-05 cc/sec R squared = 0.99991
 Permeability, K20.0° = 2.278E-08 cm/sec², K20° = 2.278E-08 cm/sec²

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 11.67
 Specimen Diameter (cm): 10.15
 Dry Unit Weight (pcf): 105.0
 Moisture Before Test (%): 15.1
 Moisture After Test (%): 19.7

Run Number: 1 ● 2 ▲
 Cell Pressure (psi): 95.0 95.0
 Test Pressure (psi): 85.0 82.5
 Back Pressure (psi): 80.0 79.8
 Diff. Head (psi): 5.0 2.7
 Flow Rate (cc/sec): 2.57×10^{-4} 1.25×10^{-4}
 Perm. (cm/sec): 1.06×10^{-7} 9.68×10^{-8}

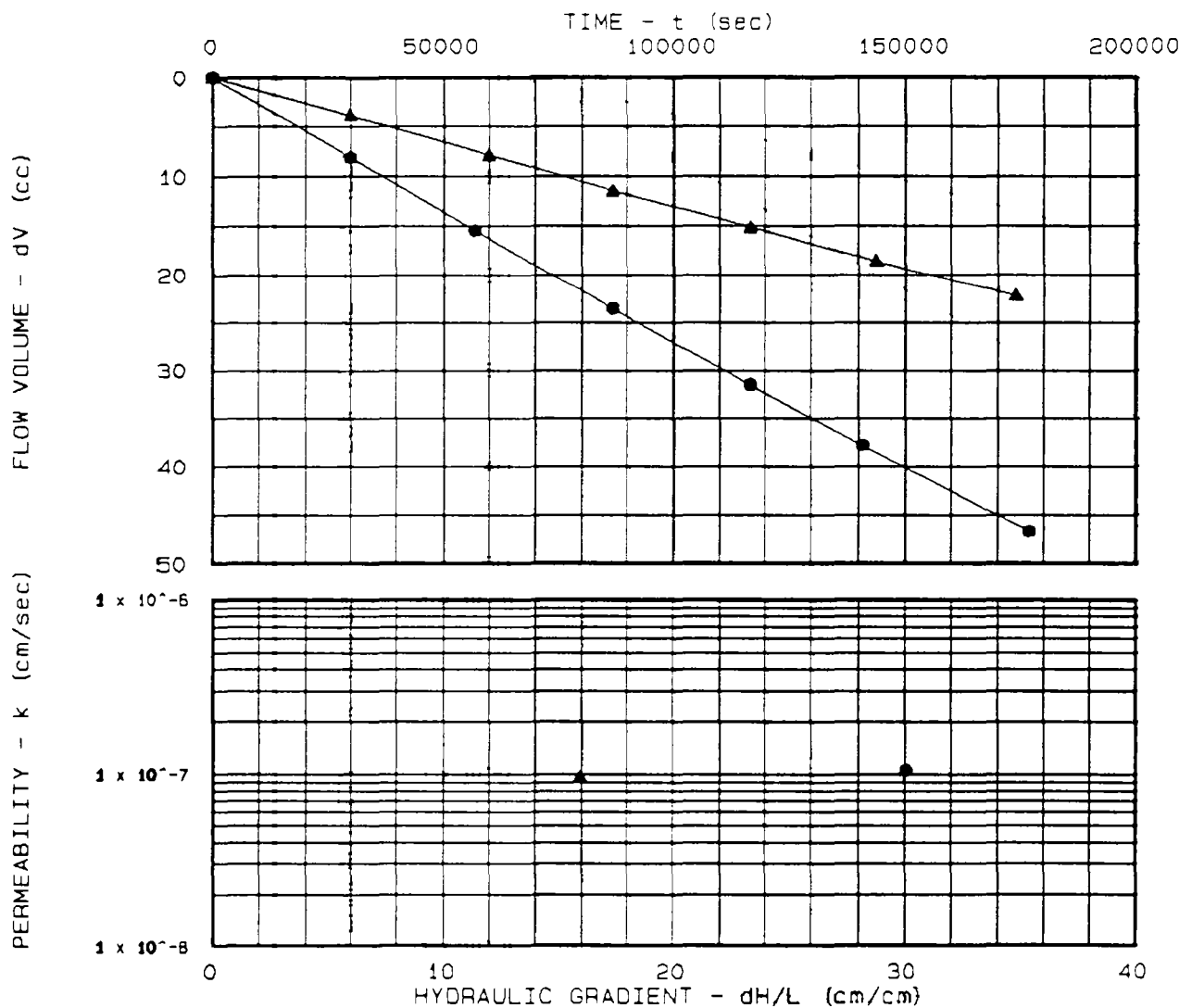
SAMPLE DATA:

Sample Identification: ZONE 2 / SAMPLE 2-PB

Visual Description: BROWN CLAY

Remarks:

Maximum Dry Density (pcf): 110.5
 Optimum Moisture Content (%): 15.4
 ASTM (D698)
 Percent Compaction: 95.1%
 Permeameter type: FLEXIBLE WALL
 Sample type: REMOLDED



Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Location: GRAND ISLAND, NEW YORK
 Date: JULY 1993

Project No.:
 File No.: G008.014
 Lab No.: 1667.020
 Tested by: KJC
 Checked by: JFC ✓

PERMEABILITY TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

=====

PERMEABILITY TEST DATA

=====

PROJECT DATA

Project Name: DUNLOP INACTIVE WASTE SITE CLOSURE
File No.: G008.014
Project Location: GRAND ISLAND, NEW YORK
Project No.:
Sample Identification: ZONE 2 / SAMPLE 2-PB

Lab No.: 1667.020
Description: BROWN CLAY

Sample Type: REMOLDED
Max. Dry Dens.: 110.5
Method (D1557/D698): D698
Ont. Water Content: 15.4
Date: JULY 1993
Remarks:

Permeameter Type: FLEXIBLE WALL
Tested by: KJC

PERMEABILITY TEST SPECIMEN DATA

Before test:

After test:

Diameter:	1	2		1	2	
Top:	3.994 in	0.000 in		4.005 in	0.000 in	
Middle:	3.993 in	0.000 in		4.014 in	0.000 in	
Bottom:	3.999 in	0.000 in		3.974 in	0.000 in	
Average:	3.99 in	10.15 cm		4.00 in	10.16 cm	
Length:	1	2	3	1	2	3
	4.593 in	4.602 in	4.588 in	4.583 in	4.575 in	4.588 in
Average:	4.59 in	11.67 cm		4.58 in	11.64 cm	

Moisture, Density and Sample Parameters:

Specific Gravity:	2.75	
Wet Wt. & Tare:	2600.50	2672.90
Dry Wt. & Tare:	2360.10	2360.10
Tare Wt.:	772.50	772.50
Moisture Content:	15.1 %	19.7 %
Dry Unit Weight:	105.0 pcf	95.1 % of max
Porosity:	0.3882	0.3887
Saturation:	65.6 %	85.2 %

PERMEABILITY TEST CONDITIONS DATA

Cell No.: FP-26

Panel No.: 4

Positions: 6&5

Run Number:

1

2

Cell Pressure: 95.0 psi

95.0 psi

Saturation Pressure: 0.0 psi

0.0 psi

Inflow Buret Factor: 5.40

5.40

Outflow Buret Factor: 5.60

5.60

Test Temperature: 20.0 °C

20.0 °C

PERMEABILITY TEST READINGS DATA

CASE or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/ 9/93	7:56	0	85.0	80.1	0.10	24.70	0.00
X	7/ 9/93	16:16	30,000	84.9	80.0	1.60	23.25	8.11
X	7/ 9/93	23:46	57,000	85.0	80.1	3.05	22.00	15.53
	7/10/93	8: 6	87,000	84.9	80.1	4.60	20.60	23.63
	7/10/93	16:26	117,000	84.9	80.1	6.05	19.20	31.47
	7/10/93	23: 6	141,000	85.0	80.2	7.20	18.05	37.79
	7/11/93	9: 6	177,000	85.0	80.2	8.85	16.45	46.73

Test Pressure = 85.0 psi Differential Head = 5.0 psi, 351.0 cm H2O
 Gradient = 3.008E 01 Flow rate = 2.569E-04 cc/sec R squared = 0.99978
 Permeability, K20.0° = 1.056E-07 cm/sec², K20° = 1.056E-07 cm/sec²

SECOND RUN PERMEABILITY TEST READINGS DATA

CASE or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/12/93	7:36	0	82.5	80.2	0.00	24.70	0.00
X	7/12/93	15:56	30,000	82.4	80.0	0.70	24.00	3.85
X	7/13/93	0:16	60,000	82.5	80.1	1.45	23.30	7.84
	7/13/93	7:46	87,000	82.5	80.1	2.10	22.65	11.41
	7/13/93	16: 6	117,000	82.4	80.1	2.80	22.00	15.12
	7/13/93	23:36	144,000	82.5	80.1	3.45	21.40	18.56
	7/14/93	7:56	174,000	82.5	80.2	4.10	20.70	22.27

Test Pressure = 82.5 psi Differential Head = 2.7 psi, 186.3 cm H2O
 Gradient = 1.597E 01 Flow rate = 1.250E-04 cc/sec R squared = 0.99997
 Permeability, K20.0° = 9.684E-08 cm/sec², K20° = 9.684E-08 cm/sec²

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 11.73
 Specimen Diameter (cm): 10.16
 Dry Unit Weight (pcf): 105.3
 Moisture Before Test (%): 16.0
 Moisture After Test (%): 19.0

Run Number:

Cell Pressure (psi): 95.0

Test Pressure (psi): 84.7

Back Pressure (psi): 79.7

Diff. Head (psi): 5.0

Flow Rate (cc/sec): 1.47×10^{-4}

Perm. (cm/sec): 5.03×10^{-8}

SAMPLE DATA:

Sample Identification: ZONE 3 / SAMPLE 3-PA

Visual Description: BROWN CLAY

Remarks:

Maximum Dry Density (pcf): 112.6

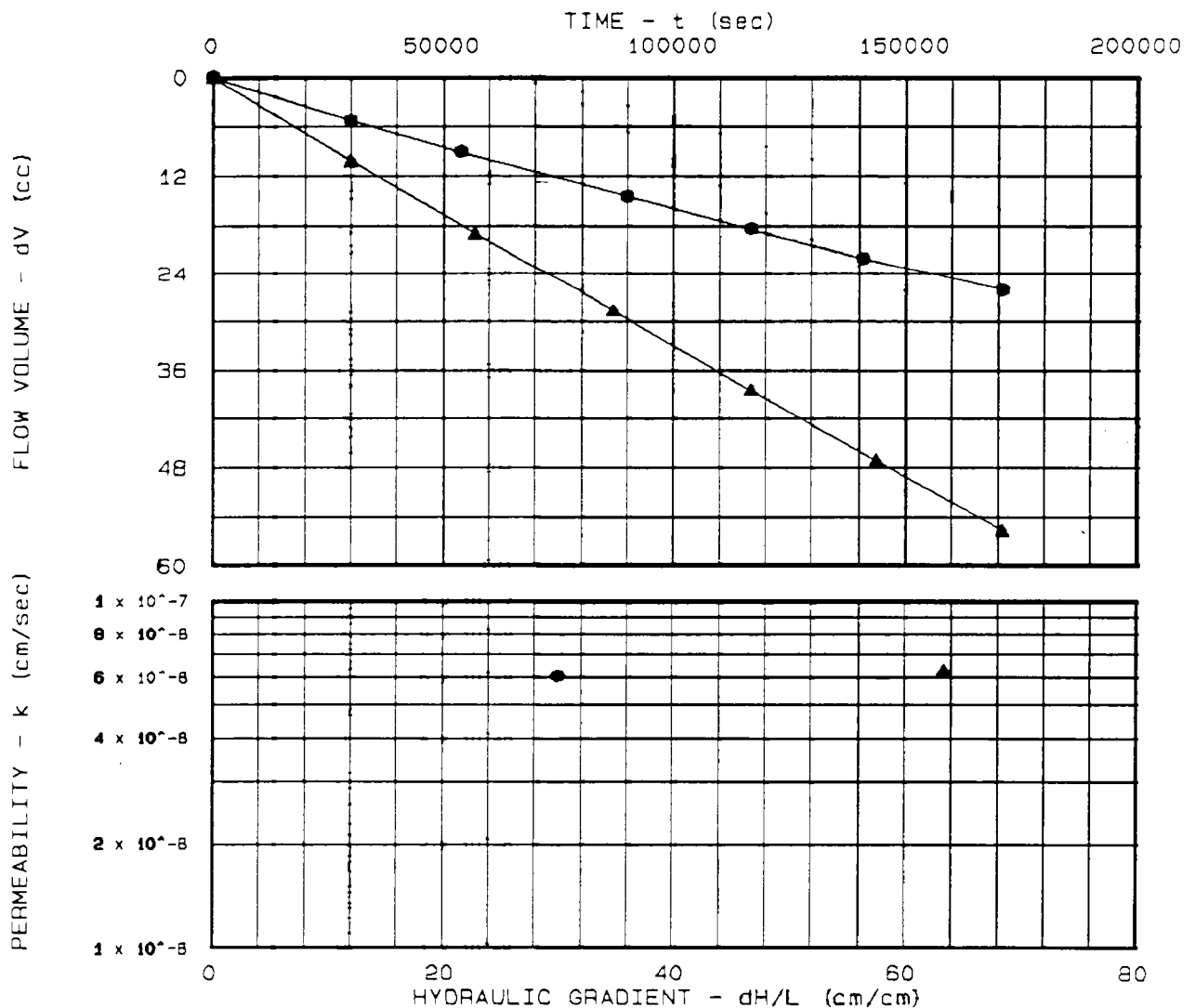
Optimum Moisture Content (%): 16.2

ASTM (D698)

Percent Compaction: 94.4%

Permeameter type: FLEXIBLE WALL

Sample type: REMOLDED



Project: DUNLOP INACTIVE WASTE SITE CLOSURE
 Location: GRAND ISLAND, NEW YORK
 Date: JULY 1993

Project No.:
 File No.: G008.014
 Lab No.: 1667.021
 Tested by: KJC
 Checked by: JFC ✓

PERMEABILITY TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

=====

PERMEABILITY TEST DATA

=====

PROJECT DATA

Project Name: DUNLOP INACTIVE WASTE SITE CLOSURE
File No.: G008.014
Project Location: GRAND ISLAND, NEW YORK
Project No.:
Sample Identification: ZONE 3 / SAMPLE 3-PA
Lab No.: 1667.021
Description: BROWN CLAY
Sample Type: REMOLDED
Max. Dry Dens.: 112.6
Method (D1557/D698): D698
Ont. Water Content: 16.2
Date: JULY 1993
Remarks:
Permeameter Type: FLEXIBLE WALL
Tested by: KJC

PERMEABILITY TEST SPECIMEN DATA

	Before test:			After test:		
Diameter:	1	2		1	2	
Top:	3.997 in	0.000 in		3.989 in	0.000 in	
Middle:	4.002 in	0.000 in		3.964 in	0.000 in	
Bottom:	3.998 in	0.000 in		3.946 in	0.000 in	
Average:	4.00 in	10.16 cm		3.97 in	10.07 cm	
Length:	1	2	3	1	2	3
	4.622 in	4.601 in	4.632 in	4.602 in	4.556 in	4.569 in
Average:	4.62 in	11.73 cm		4.58 in	11.62 cm	

Moisture, Density and Sample Parameters:

Specific Gravity:	2.75	
Wet Wt. & Tare:	2659.20	2707.30
Dry Wt. & Tare:	2400.00	2400.00
Tare Wt.:	781.10	781.10
Moisture Content:	16.0 %	19.0 %
Dry Unit Weight:	106.3 pcf	94.4 % of max 109.1 pcf
Porosity:	0.3809	0.3644
Saturation:	71.6 %	91.1 %

PERMEABILITY TEST CONDITIONS DATA

Cell No.: FP-15

Panel No.: 10

Positions: 4&3

Run Number:

1

2

Cell Pressure: 95.0 psi

95.0 psi

Saturation Pressure: 0.0 psi

0.0 psi

Inflow Buret Factor: 5.50

5.50

Outflow Buret Factor: 5.30

5.30

Test Temperature: 20.0 °C

20.0 °C

PERMEABILITY TEST READINGS DATA

ASE X or P	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi) IN OUT	BURET READING (cc) IN OUT	FLOW VOLUME (cc) AVERAGE
X	7/10/93	8:10	0	84.9 80.0	0.00 24.80	0.00
X	7/10/93	16:30	30,000	84.8 80.0	1.00 23.85	5.27
	7/10/93	23:10	54,000	84.7 80.0	1.70 23.15	9.05
	7/11/93	9:10	90,000	84.9 80.0	2.75 22.20	14.45
	7/11/93	16:40	117,000	84.6 80.0	3.45 21.45	18.37
	7/11/93	23:20	141,000	84.8 80.0	4.10 20.75	22.01
	7/12/93	7:40	171,000	84.7 80.1	4.90 20.00	26.20

Test Pressure = 84.7 psi Differential Head = 5.0 psi, 352.3 cm H2O
 Gradient = 3.003E 01 Flow rate = 1.469E-04 cc/sec R squared = 0.99982
 Permeability, K20.0° = 6.033E-08 cm/sec², K20° = 6.033E-08 cm/sec²

SECOND RUN PERMEABILITY TEST READINGS DATA

ASE A or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi) IN OUT	BURET READING (cc) IN OUT	FLOW VOLUME (cc) AVERAGE
X	7/13/93	7:50	0	90.3 80.1	0.15 24.70	0.00
	7/13/93	16:10	30,000	90.3 79.9	2.00 22.80	10.12
	7/13/93	23:40	57,000	90.4 80.0	3.60 21.15	18.90
	7/14/93	8:00	87,000	90.3 80.0	5.40 19.30	28.75
	7/14/93	16:20	117,000	90.2 79.9	7.20 17.50	38.47
	7/14/93	23:50	144,000	90.4 80.1	8.75 15.85	47.10
R	0/ 0/ 0	0:00	0	0.0 0.0	8.75 15.85	0.00
R	0/ 0/ 0	0:00	0	0.0 0.0	0.00 24.90	0.00
	7/15/93	7:20	171,000	90.5 80.2	1.65 23.40	55.62

Test Pressure = 90.4 psi Differential Head = 10.6 psi, 743.8 cm H2O
 Gradient = 6.341E 01 Flow rate = 3.231E-04 cc/sec R squared = 0.99995
 Permeability, K20.0° = 6.286E-08 cm/sec², K20° = 6.286E-08 cm/sec²

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 11.69
 Specimen Diameter (cm): 10.19
 Dry Unit weight (pcf): 100.4
 Moisture Before Test (%): 23.2
 Moisture After Test (%): 20.5

Run Number:

1 ●

2 ▲

Cell Pressure (psi): 95.0

95.0

Test Pressure (psi): 85.1

82.4

Back Pressure (psi): 79.7

79.7

Diff. Head (psi): 5.4

2.7

Flow Rate (cc/sec): 4.58×10^{-5}

2.27×10^{-5}

Perm. (cm/sec): 1.74×10^{-8}

1.70×10^{-8}

SAMPLE DATA:

Sample Identification: ZONE 3 / SAMPLE 3-PB

Visual Description: BROWN CLAY

Remarks:

Maximum Dry Density (pcf): 107.6

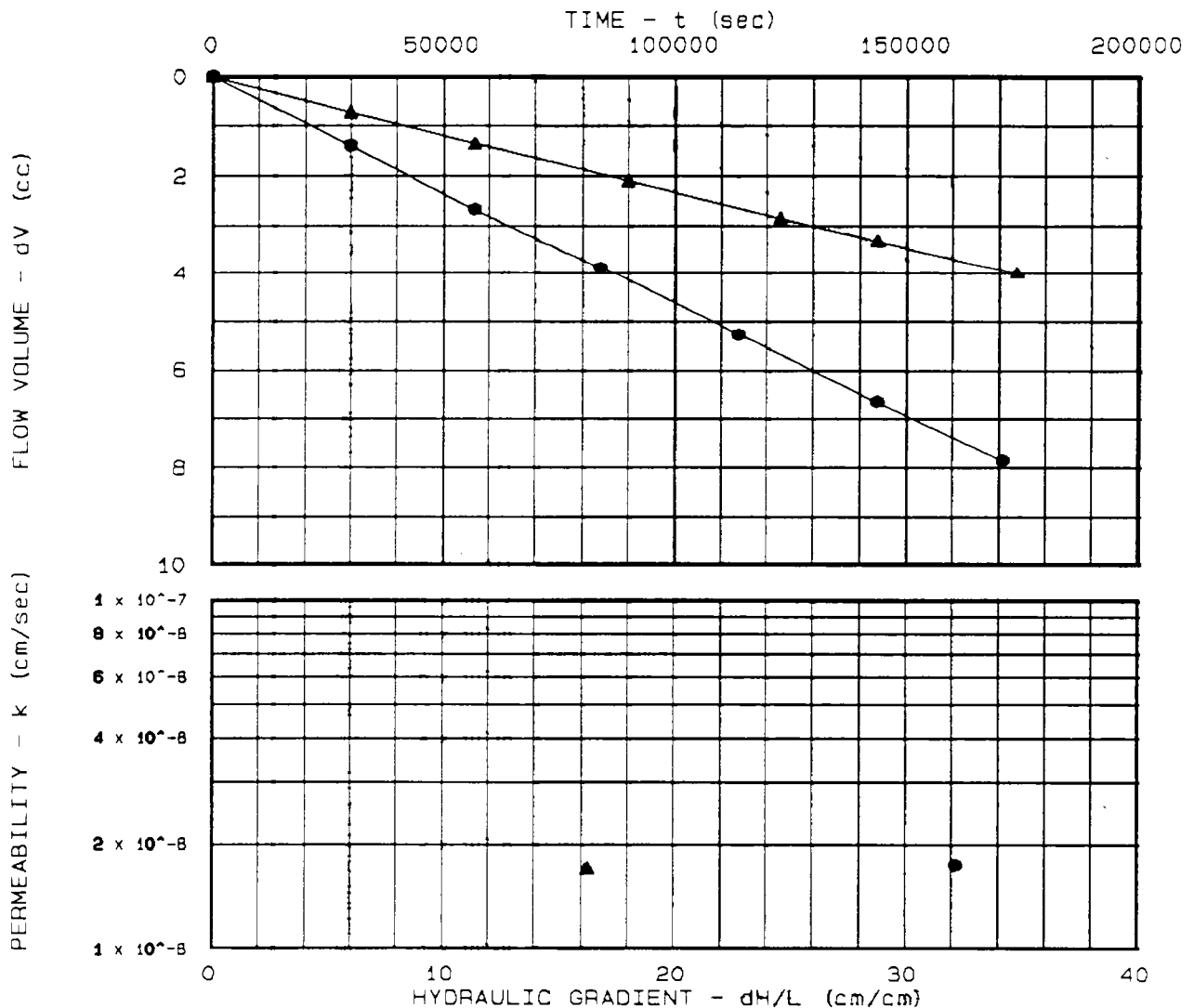
Optimum Moisture Content (%): 17.7

ASTM (D698)

Percent Compaction: 93.3%

Permeameter type: FLEXIBLE WALL

Sample type: REMOLDED



Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Location: GRAND ISLAND, NEW YORK

Date: JULY 1993

Project No.:

File No.: G008.014

Lab No.: 1667.022

Tested by: KJC

Checked by: JFC ✓

PERMEABILITY TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

=====

PERMEABILITY TEST DATA

=====

PROJECT DATA

Project Name: DUNLOP INACTIVE WASTE SITE CLOSURE
File No.: G008.014
Project Location: GRAND ISLAND, NEW YORK
Project No.:
Sample Identification: ZONE 3 / SAMPLE 3-PB
Lab No.: 1667.022
Description: BROWN CLAY
Sample Type: REMOLDED
Max. Dry Dens.: 107.6
Method (D1557/D698): D698
Opt. Water Content: 17.7
Date: JULY 1993
Remarks:
Permeameter Type: FLEXIBLE WALL
Tested by: KJC

PERMEABILITY TEST SPECIMEN DATA

	Before test:			After test:		
Diameter:	1	2		1	2	
Top:	4.002 in	0.000 in		3.990 in	0.000 in	
Middle:	4.013 in	0.000 in		3.957 in	0.000 in	
Bottom:	4.022 in	0.000 in		4.004 in	0.000 in	
Average:	4.01 in	10.19 cm		3.98 in	10.10 cm	
Length:	1	2	3	1	2	3
	4.604 in	4.602 in	4.600 in	4.377 in	4.440 in	4.334 in
Average:	4.60 in	11.69 cm		4.38 in	11.13 cm	
Moisture, Density and Sample Parameters:						
Specific Gravity:	2.75					
Wet Wt. & Tare:	2664.90			2623.50		
Dry Wt. & Tare:	2309.20			2309.20		
Tare Wt.:	776.10			776.10		
Moisture Content:	23.2 %			20.5 %		
Dry Unit Weight:	100.4 pcf	93.3 % of max		107.3 pcf		
Porosity:	0.4154			0.3753		
Saturation:	89.8 %			93.9 %		

PERMEABILITY TEST CONDITIONS DATA

Cell No.: FP-8

Panel No.: 1

Positions: 4&3

Run Number:

1

2

Cell Pressure: 95.0 psi

95.0 psi

Saturation Pressure: 0.0 psi

0.0 psi

Inflow Buret Factor: 1.00

1.00

Outflow Buret Factor: 1.00

1.00

Test Temperature: 20.0 °C

20.0 °C

PERMEABILITY TEST READINGS DATA

CASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/14/93	7:46	0	85.1	80.1	0.05	25.00	0.00
	7/14/93	16: 6	30,000	85.0	79.9	0.60	22.75	1.40
	7/14/93	23:36	57,000	85.1	80.0	1.50	21.10	2.68
	7/15/93	7: 6	84,000	85.2	80.1	2.70	19.90	3.88
	7/15/93	15:26	114,000	85.0	79.9	4.00	18.40	5.28
	7/15/93	23:46	144,000	85.0	79.9	5.45	17.10	6.65
	7/16/93	7:16	171,000	85.0	79.9	6.75	16.00	7.85

Test Pressure = 85.1 psi Differential Head = 5.4 psi, 376.4 cm H2O
 Gradient = 3.220E 01 Flow rate = 4.576E-05 cc/sec R squared = 0.99994
 Permeability, K20.0° = 1.742E-08 cm/sec², K20° = 1.742E-08 cm/sec²

SECOND RUN PERMEABILITY TEST READINGS DATA

CASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/17/93	7:26	0	82.5	80.1	0.05	25.00	0.00
	7/17/93	15:46	30,000	82.4	80.0	0.75	24.25	0.73
	7/17/93	23:16	57,000	82.4	80.1	1.30	23.55	1.35
	7/18/93	8:26	90,000	82.5	80.1	2.05	22.80	2.10
	7/18/93	17:36	123,000	82.4	80.0	2.75	22.00	2.85
	7/18/93	23:26	144,000	82.4	80.0	3.20	21.55	3.30
	7/19/93	7:46	174,000	82.5	80.1	3.90	20.85	4.00

Test Pressure = 82.4 psi Differential Head = 2.7 psi, 190.5 cm H2O
 Gradient = 1.630E 01 Flow rate = 2.266E-05 cc/sec R squared = 0.99993
 Permeability, K20.0° = 1.705E-08 cm/sec², K20° = 1.705E-08 cm/sec²

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 11.76
Specimen Diameter (cm): 10.16
Dry Unit Weight (pcf): 102.6
Moisture Before Test (%): 20.7
Moisture After Test (%): 19.9

Run Number: 1 ● 2 ▲
Cell Pressure (psi): 95.0 95.0
Test Pressure (psi): 85.1 89.9
Back Pressure (psi): 79.9 79.7
Diff. Head (psi): 5.2 10.2
Flow Rate (cc/sec): 3.35×10^{-5} 6.55×10^{-5}
Perm. (cm/sec): 1.32×10^{-8} 1.33×10^{-8}

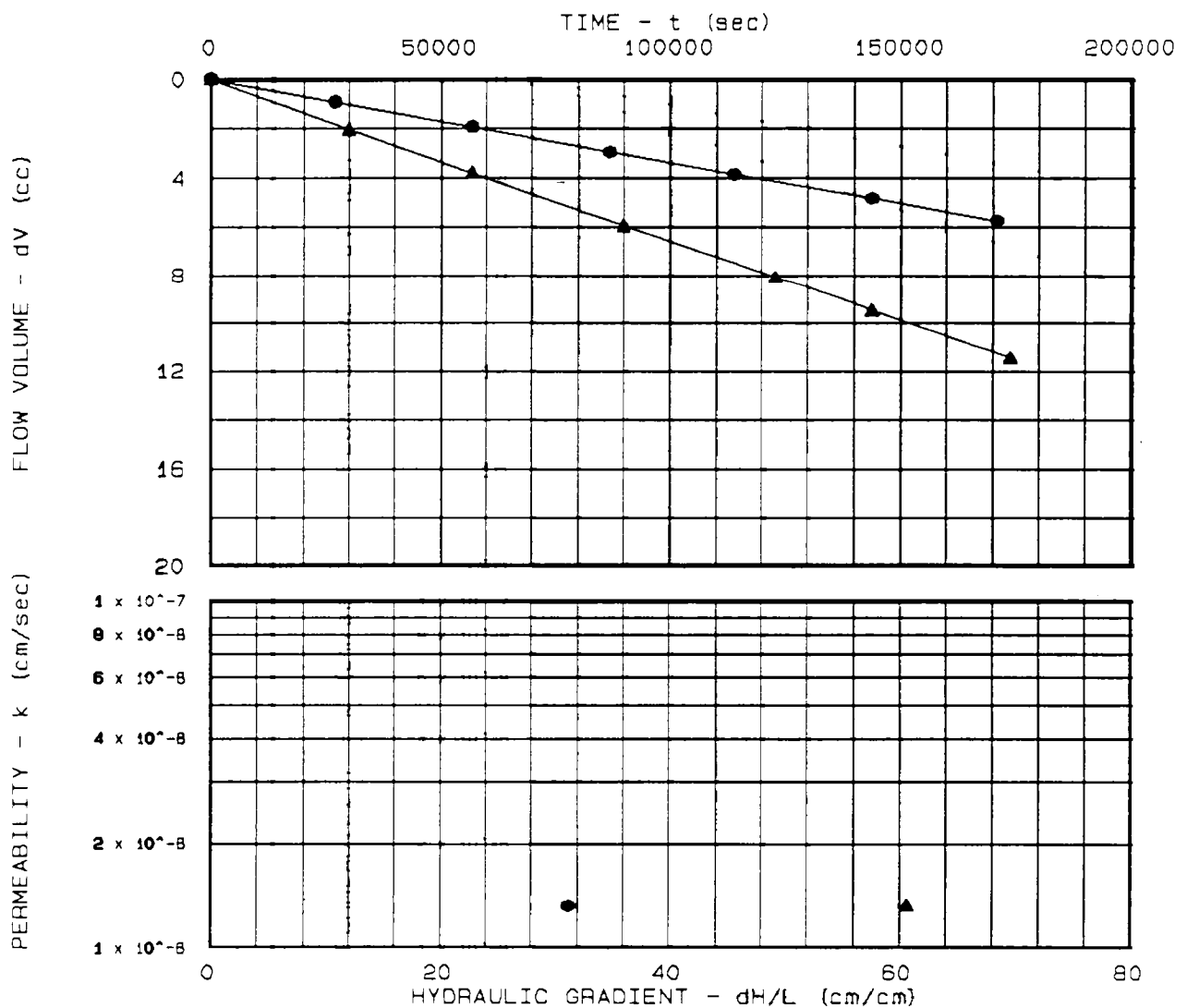
SAMPLE DATA:

Sample Identification: ZONE 4 / SAMPLE 4-PA

Visual Description: BROWN CLAY

Remarks:

Maximum Dry Density (pcf): 108.3
Optimum Moisture Content (%): 17.8
ASTM (D698)
Percent Compaction: 94.8%
Permeameter type: FLEXIBLE WALL
Sample type: REMOLDED



Project: DUNLOP INACTIVE WASTE SITE CLOSURE
Location: GRAND ISLAND, NEW YORK
Date: JULY 1993

Project No.:
File No.: G008.014
Lab No.: 1557.027
Tested by: KJC
Checked by: JFC ✓

PERMEABILITY TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

=====

PERMEABILITY TEST DATA

=====

PROJECT DATA

Project Name: DUNLOP INACTIVE WASTE SITE CLOSURE
File No.: G008.014
Project Location: GRAND ISLAND, NEW YORK
Project No.:
Sample Identification: ZONE 4 / SAMPLE 4-PA
Lab No.: 1667.027
Description: BROWN CLAY
Sample Type: REMOLDED
Max. Dry Dens.: 108.3
Method (D1557/D698): D698
Opt. Water Content: 17.8
Date: JULY 1993
Remarks:
Permeameter Type: FLEXIBLE WALL
Tested by: KJC

PERMEABILITY TEST SPECIMEN DATA

	Before test:			After test:		
Diameter:	1	2		1	2	
Top:	3.998 in	0.000 in		3.957 in	0.000 in	
Middle:	4.003 in	0.000 in		3.947 in	0.000 in	
Bottom:	4.001 in	0.000 in		3.933 in	0.000 in	
Average:	4.00 in	10.16 cm		3.95 in	10.02 cm	
Length:	1	2	3	1	2	3
	4.631 in	4.633 in	4.630 in	4.552 in	4.528 in	4.548 in
Average:	4.63 in	11.76 cm		4.54 in	11.54 cm	
Moisture, Density and Sample Parameters:						
Specific Gravity:	2.75					
Wet Wt. & Tare:	2669.60			2657.50		
Dry Wt. & Tare:	2345.30			2345.33		
Tare Wt.:	776.20			776.20		
Moisture Content:	20.7 %			19.9 %		
Dry Unit Weight:	102.6 pcf	94.8 % of max		107.6 pcf		
Porosity:	0.4021			0.3732		
Saturation:	84.5 %			91.9 %		

PERMEABILITY TEST CONDITIONS DATA

Cell No.: FP-14	Panel No.: 4	Positions: 2&1
Run Number:	1	2
Cell Pressure:	95.0 psi	95.0 psi
Saturation Pressure:	0.0 psi	0.0 psi
Inflow Buret Factor:	1.00	1.00
Outflow Buret Factor:	1.00	1.00
Test Temperature:	20.0 °C	20.0 °C

PERMEABILITY TEST READINGS DATA

CASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/14/93	23:44	0	85.0	80.1	1.75	22.75	0.00
	7/15/93	7:14	27,000	85.1	80.1	2.70	21.85	0.93
	7/15/93	15:34	57,000	85.1	80.1	3.65	20.80	1.93
	7/15/93	23:54	87,000	85.1	80.1	4.75	19.85	2.95
	7/16/93	7:24	114,000	85.3	80.2	5.65	18.95	3.85
	7/16/93	15:44	144,000	85.0	80.1	6.65	18.00	4.83
	7/16/93	23:14	171,000	85.2	80.2	7.60	17.10	5.75

Test Pressure = 85.1 psi Differential Head = 5.2 psi, 367.8 cm H2O
 Gradient = 3.126E 01 Flow rate = 3.346E-05 cc/sec R squared = 0.99996
 permeability, K20.0° = 1.319E-08 cm/sec², K20° = 1.319E-08 cm/sec²

SECOND RUN PERMEABILITY TEST READINGS DATA

CASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/17/93	7:34	0	90.1	80.2	0.00	24.90	0.00
	7/17/93	15:54	30,000	89.9	80.0	2.10	22.95	2.03
	7/17/93	23:24	57,000	89.9	80.0	3.90	21.25	3.78
	7/18/93	8:34	90,000	90.0	80.1	6.10	19.10	5.95
	7/18/93	17:44	123,000	89.8	80.0	8.25	17.00	8.08
R	0/ 0/ 0	0:00	0	0.0	0.0	8.25	17.00	0.00
R	0/ 0/ 0	0:00	0	0.0	0.0	0.05	25.00	0.00
	7/18/93	23:34	144,000	89.8	79.9	1.50	23.60	9.50
	7/19/93	7:54	174,000	89.9	80.0	3.45	21.65	11.45

Test Pressure = 89.9 psi Differential Head = 10.2 psi, 713.9 cm H2O
 Gradient = 6.069E 01 Flow rate = 6.549E-05 cc/sec R squared = 0.99998
 Permeability, K20.0° = 1.330E-08 cm/sec², K20° = 1.330E-08 cm/sec²

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 11.69
Specimen Diameter (cm): 10.17
Dry Unit Weight (pcf): 105.9
Moisture Before Test (%): 14.3
Moisture After Test (%): 18.4

Run Number: 1 ● 2 ▲

Cell Pressure (psi): 95.0

Test Pressure (psi): 85.0

Back Pressure (psi): 79.6

Diff. Head (psi): 5.4

Flow Rate (cc/sec): 5.72×10^{-5}

Perm. (cm/sec): 2.19×10^{-8}

SAMPLE DATA:

Sample Identification: ZONE 4 / SAMPLE 4-PB

Visual Description: BROWN CLAY

Remarks:

Maximum Dry Density (pcf): 112

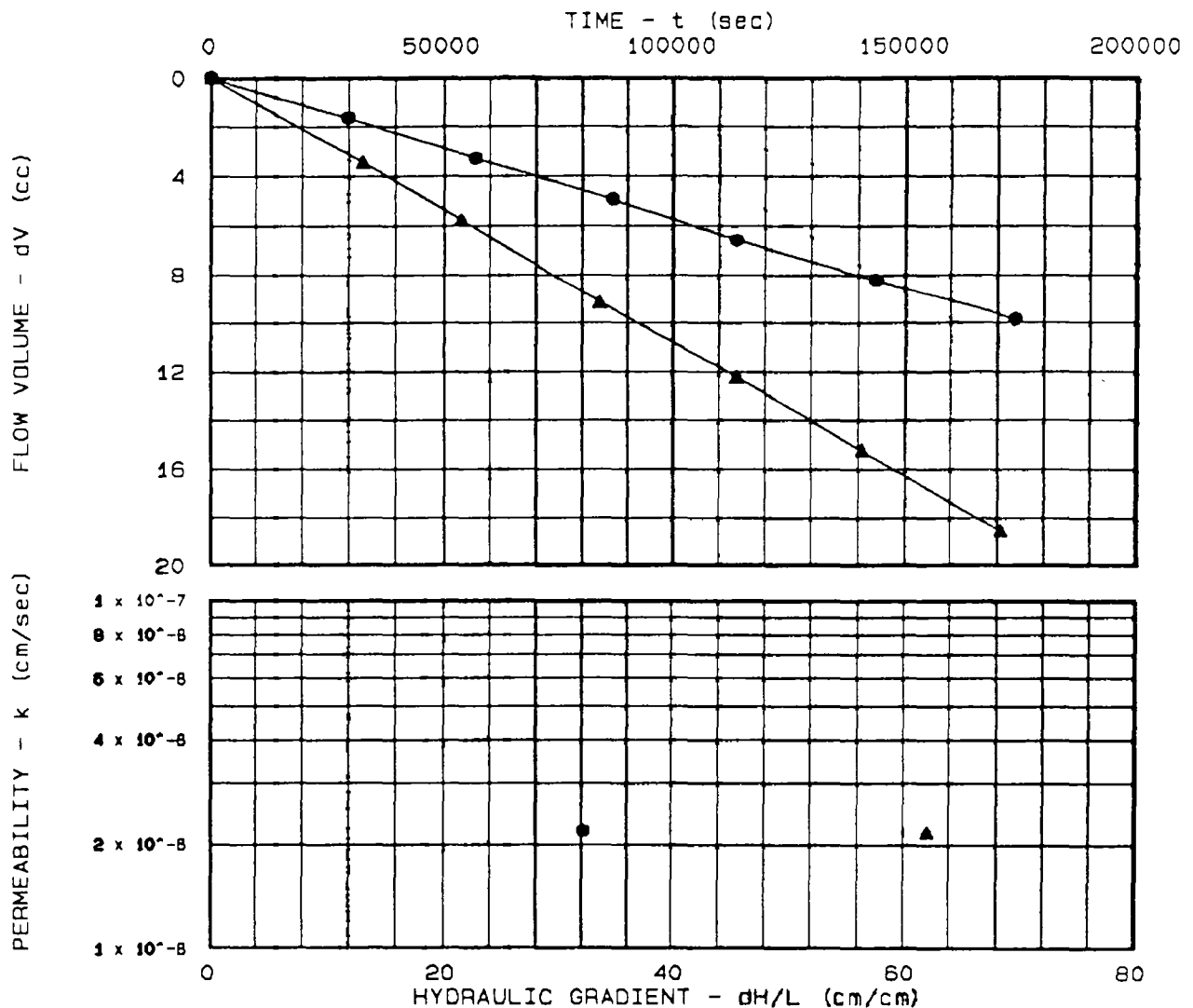
Optimum Moisture Content (%): 15.0

ASTM (D698)

Percent Compaction: 94.5%

Permeameter type: FLEXIBLE WALL

Sample type: REMOLDED



Project: DUNLOP INACTIVE WASTE SITE CLOSURE
Location: GRAND ISLAND, NEW YORK
Date: JULY 1993

Project No.:
File No.: G008.014
Lab No.: 1667.028
Tested by: KJC
Checked by: JFC ✓

PERMEABILITY TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

=====

PERMEABILITY TEST DATA

=====

PROJECT DATA

Project Name: DUNLOP INACTIVE WASTE SITE CLOSURE
File No.: G008.014
Project Location: GRAND ISLAND, NEW YORK
Project No.:
Sample Identification: ZONE 4 / SAMPLE 4-PB
Lab No.: 1667.028
Description: BROWN CLAY
Sample Type: REMOLDED
Max. Dry Dens.: 112
Method (D1557/D698): D698
Opt. Water Content: 15.0
Date: JULY 1993
Remarks:
Permeameter Type: FLEXIBLE WALL
Tested by: KJC

PERMEABILITY TEST SPECIMEN DATA

	Before test:			After test:		
Diameter:	1	2		1	2	
Top:	4.002 in	0.000 in		3.942 in	0.000 in	
Middle:	4.003 in	0.000 in		3.990 in	0.000 in	
Bottom:	4.001 in	0.000 in		3.925 in	0.000 in	
Average:	4.00 in	10.17 cm		3.96 in	10.06 cm	
Length:	1	2	3	1	2	3
	4.611 in	4.593 in	4.602 in	4.548 in	4.477 in	4.516 in
Average:	4.60 in	11.69 cm		4.51 in	11.46 cm	

Moisture, Density and Sample Parameters:

Specific Gravity:	2.75	
Wet Wt. & Tare:	2609.00	2676.00
Dry Wt. & Tare:	2379.20	2379.20
Tare Wt.:	770.00	770.00
Moisture Content:	14.3 %	18.4 %
Dry Unit Weight:	105.9 pcf	94.5 % of max
Porosity:	0.3832	110.2 pcf
Saturation:	63.2 %	0.3582
		90.9 %

PERMEABILITY TEST CONDITIONS DATA

Cell No.: FP-26

Panel No.: 4

Positions: 6&5

Run Number:

1

2

Cell Pressure: 95.0 psi

95.0 psi

Saturation Pressure: 0.0 psi

0.0 psi

Inflow Buret Factor: 5.40

5.40

Outflow Buret Factor: 5.60

5.60

Test Temperature: 20.0 °C

20.0 °C

PERMEABILITY TEST READINGS DATA

CASE { or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/15/93	15:36	0	85.0	80.0	0.00	24.50	0.00
	7/15/93	23:56	30,000	85.0	80.0	0.35	24.25	1.65
	7/16/93	7:26	57,000	85.0	80.0	0.70	24.00	3.29
	7/16/93	15:46	87,000	85.0	80.0	1.00	23.70	4.94
	7/16/93	23:16	114,000	85.1	80.1	1.35	23.45	6.59
	7/17/93	7:36	144,000	85.1	80.1	1.65	23.15	8.24
	7/17/93	15:56	174,000	85.0	80.0	1.95	22.85	9.89

Test Pressure = 85.0 psi Differential Head = 5.4 psi, 377.0 cm H2O
 Gradient = 3.225E 01 Flow rate = 5.720E-05 cc/sec R squared = 0.99969
 permeability, K20.0° = 2.185E-08 cm/sec², K20° = 2.185E-08 cm/sec²

SECOND RUN PERMEABILITY TEST READINGS DATA

CASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/18/93	8:36	0	90.0	80.1	0.00	24.45	0.00
	7/18/93	17:46	33,000	89.9	79.9	0.65	23.85	3.44
	7/18/93	23:36	54,000	89.9	79.9	1.10	23.45	5.77
	7/19/93	7:56	84,000	89.9	79.9	1.75	22.85	9.21
	7/19/93	16:16	114,000	90.0	80.0	2.30	22.30	12.23
	7/19/93	23:46	141,000	90.1	80.1	2.85	21.75	15.26
	7/20/93	8: 6	171,000	90.0	80.0	3.45	21.15	18.56

Test Pressure = 90.0 psi Differential Head = 10.3 psi, 726.4 cm H2O
 Gradient = 6.215E 01 Flow rate = 1.091E-04 cc/sec R squared = 0.99978
 permeability, K20.0° = 2.163E-08 cm/sec², K20° = 2.163E-08 cm/sec²

PERMEABILITY TEST REPORT

TEST DATA:

Specimen Height (cm): 11.72
 Specimen Diameter (cm): 10.17
 Dry Unit Weight (pcf): 101.2
 Moisture Before Test (%): 16.3
 Moisture After Test (%): 20.3

Run Number: 1 ● 2 ▲
 Cell Pressure (psi): 95.0 95.0
 Test Pressure (psi): 84.9 90.0
 Back Pressure (psi): 78.9 79.7
 Diff. Head (psi): 6.0 10.3
 Flow Rate (cc/sec): 1.07×10^{-4} 2.29×10^{-4}
 Perm. (cm/sec): 3.67×10^{-8} 4.57×10^{-8}

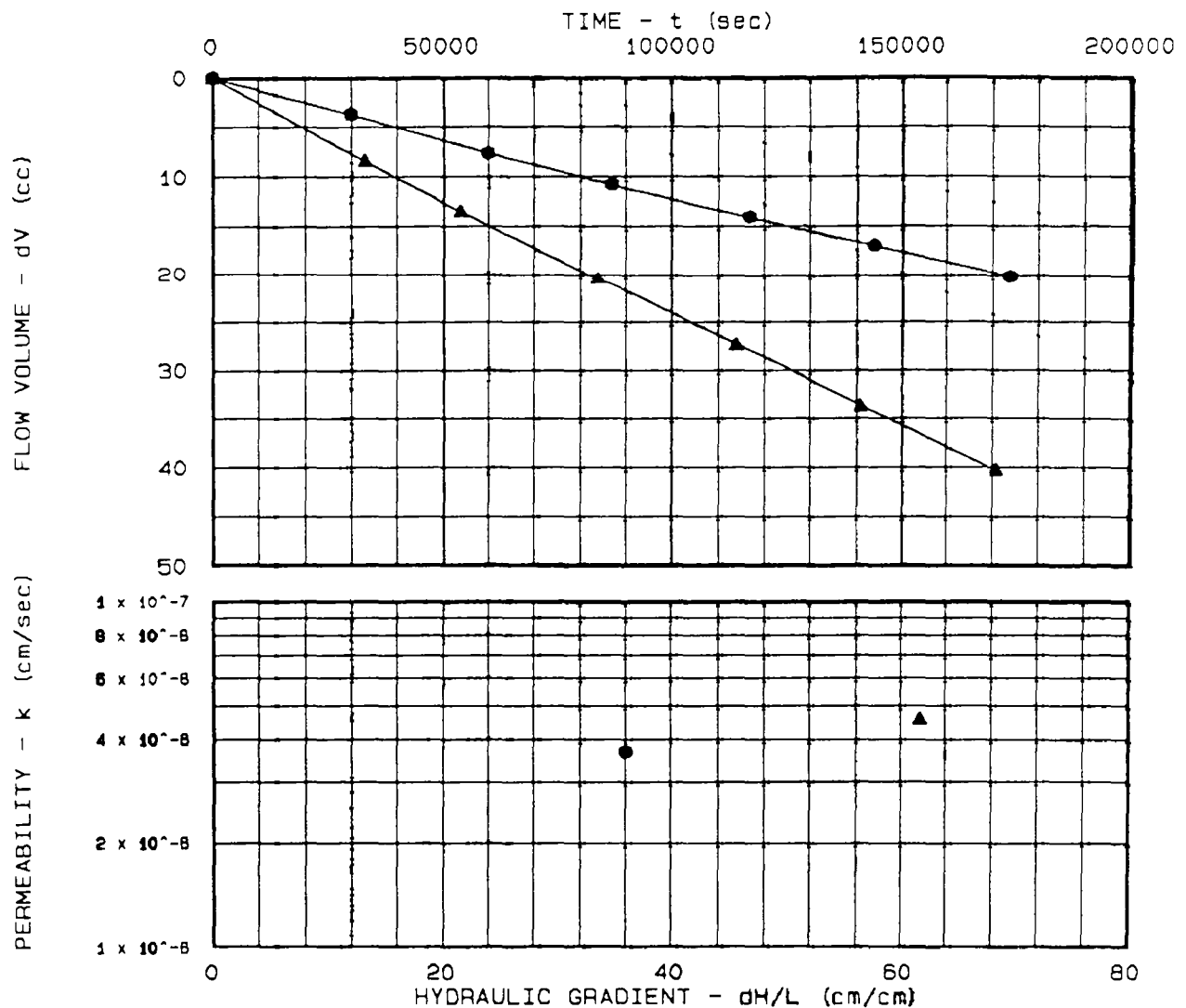
SAMPLE DATA:

Sample Identification: ZONE 5 / SAMPLE 5-PA

Visual Description: BROWN CLAY

Remarks:

Maximum Dry Density (pcf): 107.8
 Optimum Moisture Content (%): 18.0
 ASTM (D698)
 Percent Compaction: 93.8%
 Permeameter type: FLEXIBLE WALL
 Sample type: REMOLDED



Project: DUNLOP INACTIVE WASTE SITE CLOSURE

Location: GRAND ISLAND, NEW YORK

Date: JULY 1993

Project No.:

File No.: G008.014

Lab No.: 1667.032

Tested by: KJC

Checked by: JFC ✓

PERMEABILITY TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

=====

PERMEABILITY TEST DATA

=====

PROJECT DATA

Project Name: DUNLOP INACTIVE WASTE SITE CLOSURE
 File No.: G008.014
 Project Location: GRAND ISLAND, NEW YORK
 Project No.:
 Sample Identification: ZONE 5 / SAMPLE 5-PA

 Lab No.: 1667.032
 Description: BROWN CLAY

 Sample Type: REMOLDED
 Max. Dry Dens.: 107.8
 Method (D1557/D698): D698
 Opt. Water Content: 18.0
 Date: JULY 1993
 Remarks:

 Permeameter Type: FLEXIBLE WALL
 Tested by: KJC

PERMEABILITY TEST SPECIMEN DATA

	Before test:			After test:		
Diameter:	1	2		1	2	
Top:	4.007 in	0.000 in		3.926 in	0.000 in	
Middle:	4.004 in	0.000 in		3.950 in	0.000 in	
Bottom:	4.003 in	0.000 in		3.924 in	0.000 in	
Average:	4.00 in	10.17 cm		3.94 in	10.00 cm	
Length:	1	2	3	1	2	3
	4.627 in	4.615 in	4.604 in	4.572 in	4.547 in	4.528 in
Average:	4.62 in	11.72 cm		4.55 in	11.55 cm	
Moisture, Density and Sample Parameters:						
Specific Gravity:	2.75					
Wet Wt. & Tare:	2566.20				2628.40	
Dry Wt. & Tare:	2315.10				2315.10	
Tare Wt.:	771.60				771.60	
Moisture Content:	16.3 %				20.3 %	
Dry Unit Weight:	101.2 pcf	93.8 % of max			106.2 pcf	
Porosity:	0.4108				0.3817	
Saturation:	64.2 %				90.4 %	

PERMEABILITY TEST CONDITIONS DATA

Cell No.: FP-28

Panel No.: 4

Positions: 4&3

Run Number:

1

2

Cell Pressure: 95.0 psi

95.0 psi

Saturation Pressure: 0.0 psi

0.0 psi

Inflow Buret Factor: 5.90

5.90

Outflow Buret Factor: 5.60

5.60

Test Temperature: 20.0 °C

20.0 °C

PERMEABILITY TEST READINGS DATA

CASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/15/93	7:15	0	85.1	80.2	0.00	24.70	0.00
X	7/15/93	15:35	30,000	85.0	80.0	0.70	24.10	3.75
X	7/15/93	23:55	60,000	84.9	79.2	1.40	23.45	7.63
	7/16/93	7:25	87,000	84.9	79.2	2.00	22.95	10.80
	7/16/93	15:45	117,000	84.9	79.2	2.60	22.40	14.11
	7/16/93	23:15	144,000	85.0	79.2	3.15	21.95	16.99
	7/17/93	7:35	174,000	84.9	79.3	3.70	21.40	20.16

Test Pressure = 84.9 psi Differential Head = 6.0 psi, 422.7 cm H2O
 Gradient = 3.606E 01 Flow rate = 1.075E-04 cc/sec R squared = 0.99988
 permeability, K20.0° = 3.668E-08 cm/sec², K20° = 3.668E-08 cm/sec²

SECOND RUN PERMEABILITY TEST READINGS DATA

CASE X or R	DATE	TIME (24 hr)	ELAPSED TIME (sec)	GAUGE PRESSURE (psi)		BURET READING (cc)		FLOW VOLUME (cc) AVERAGE
				IN	OUT	IN	OUT	
X	7/18/93	8:35	0	90.1	80.0	0.05	24.35	0.00
X	7/18/93	17:45	33,000	89.9	79.8	1.55	22.95	8.35
	7/18/93	23:35	54,000	89.9	79.8	2.45	22.05	13.52
	7/19/93	7:55	84,000	89.9	79.8	3.70	20.90	20.43
	7/19/93	16:15	114,000	90.1	80.0	4.95	19.75	27.34
	7/19/93	23:45	141,000	90.0	80.1	6.05	18.65	33.66
	7/20/93	8: 5	171,000	90.1	80.0	7.25	17.55	40.28

Test Pressure = 90.0 psi Differential Head = 10.3 psi, 724.2 cm H2O
 Gradient = 6.178E 01 Flow rate = 2.294E-04 cc/sec R squared = 0.99992
 permeability, K20.0° = 4.569E-08 cm/sec², K20° = 4.569E-08 cm/sec²