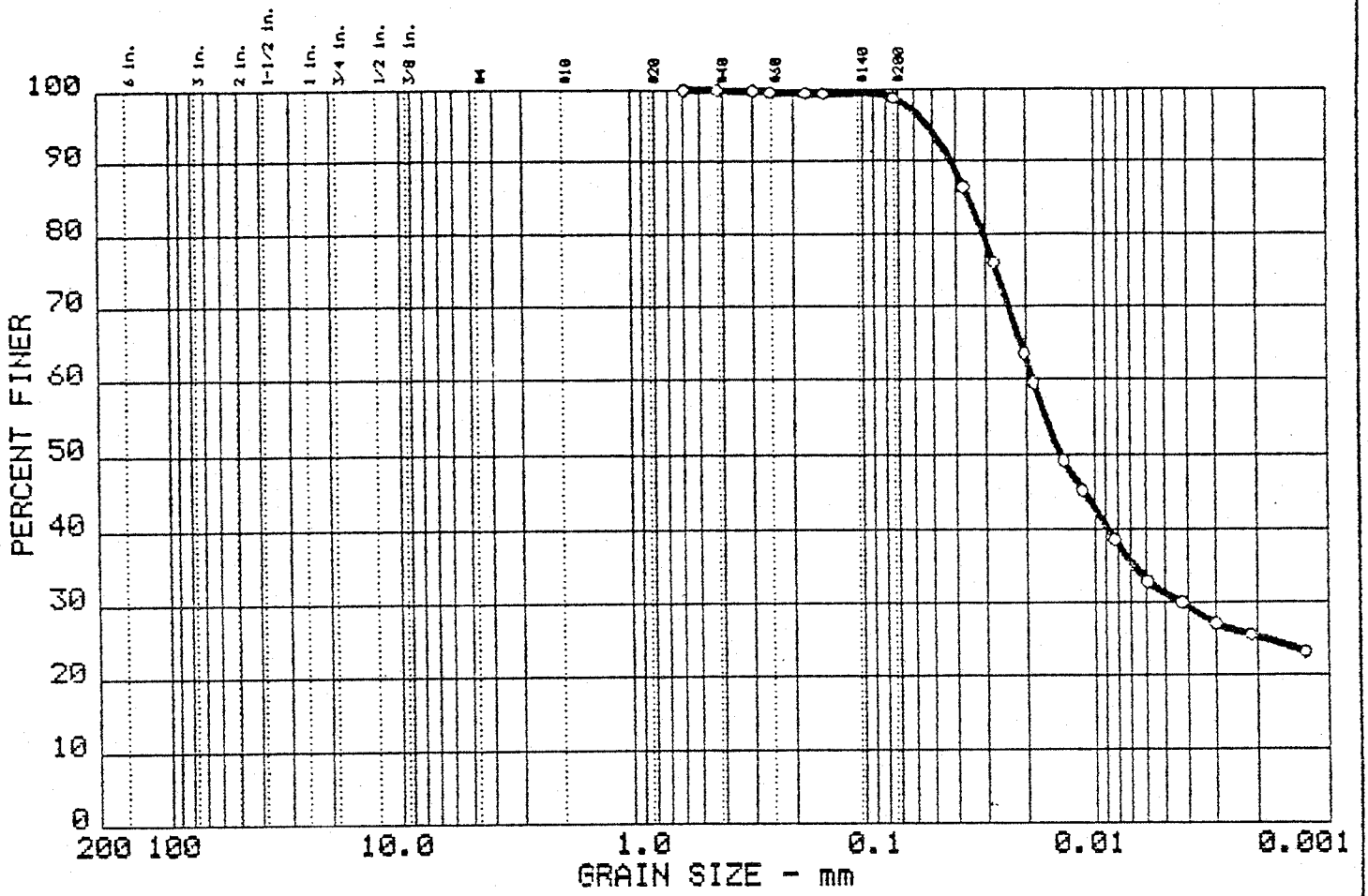
PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	16	0.0	0.0	1.3	67.5	31.2	CL

SIEVE inches size	PERCENT FINER ○		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○		
30	100.0		
40	99.9		
50	99.8		
60	99.7		
80	99.5		
100	99.3		
200	98.7		

Sample information:
○ Lean Clay, trace sand

E7 S3 Sample #2

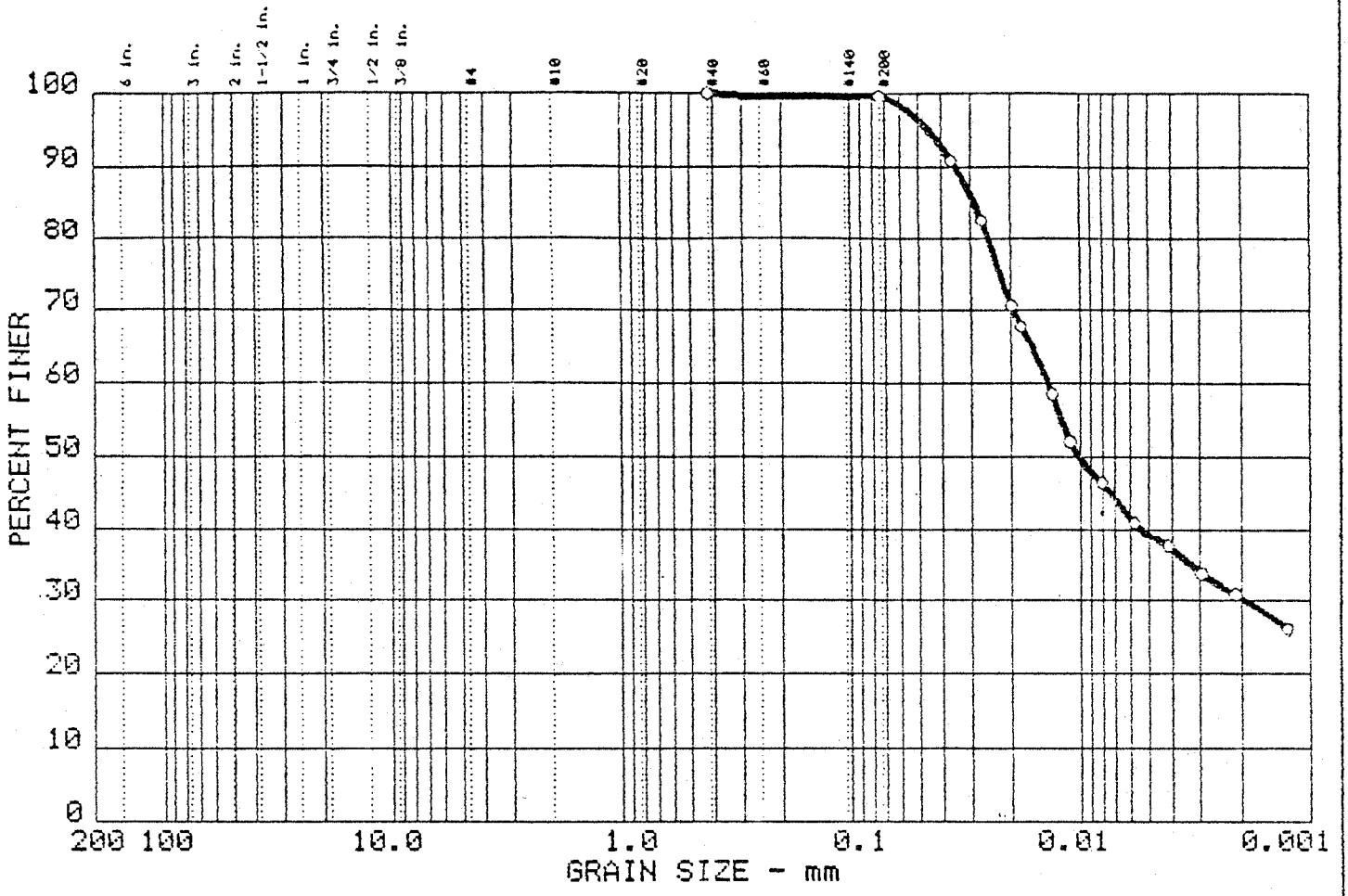
Remarks:
Liquid Limit = 40
Plasticity Index = 16

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 10, 1988 Data Sheet No. K43

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
15	0.0	0.0	0.4	60.4	39.2	CL

SIEVE inches size	PERCENT FINER ○
GRAIN SIZE	
D_{60} D_{30} D_{10}	0.00
COEFFICIENTS	
C_c C_u	

SIEVE number size	PERCENT FINER ○
40	100.0
200	99.6

Sample information:
○ Lean Clay

E9 S3 Sample #1

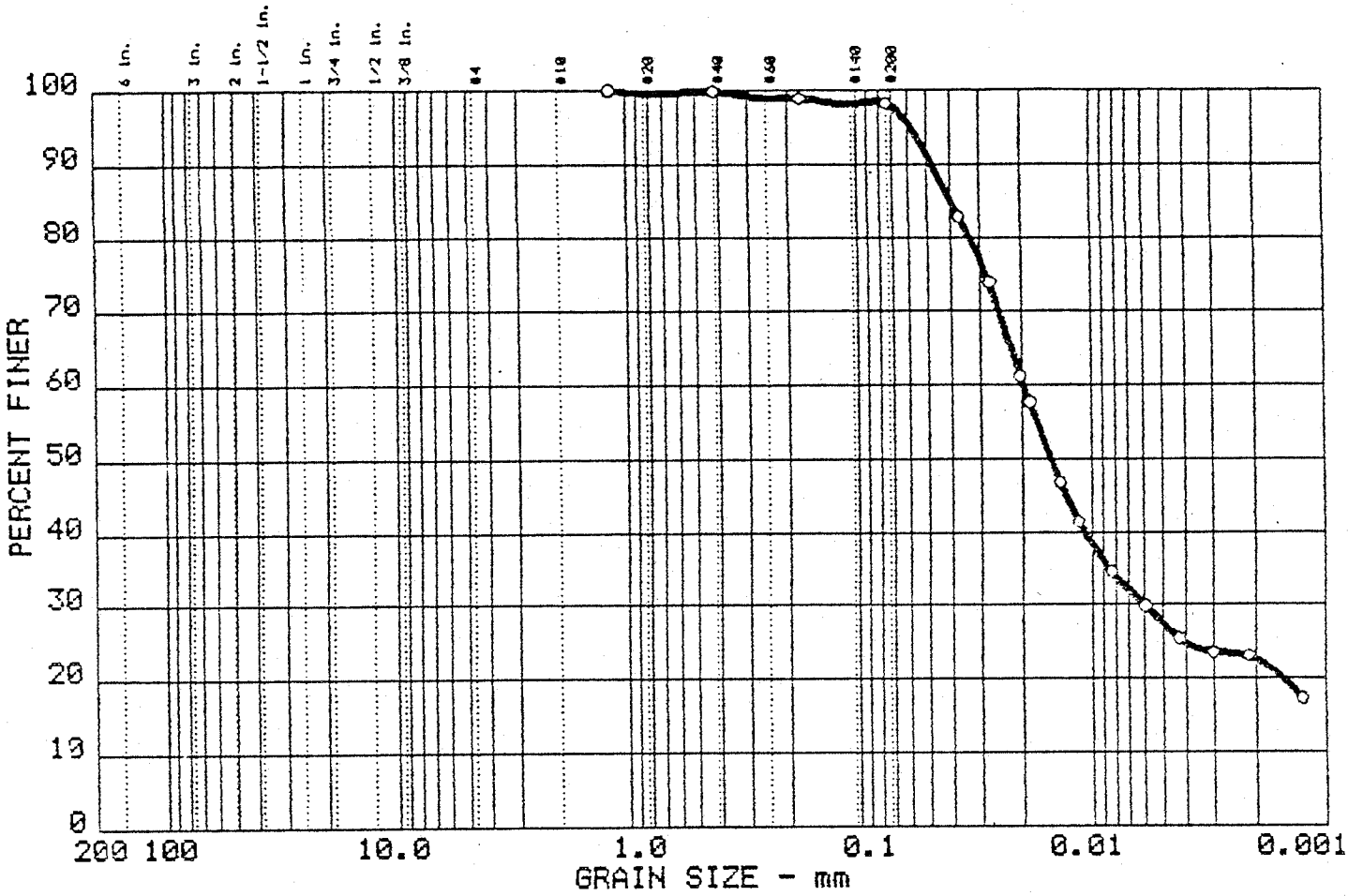
Remarks:
Liquid Limit = 46
Plasticity Index = 23

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K31

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	17	0.0	0.0	1.8	70.8	27.4	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.01		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.8		
80	98.9		
200	98.2		

Sample information:
○ Lean Clay, trace sand

E9 S3 Sample #2

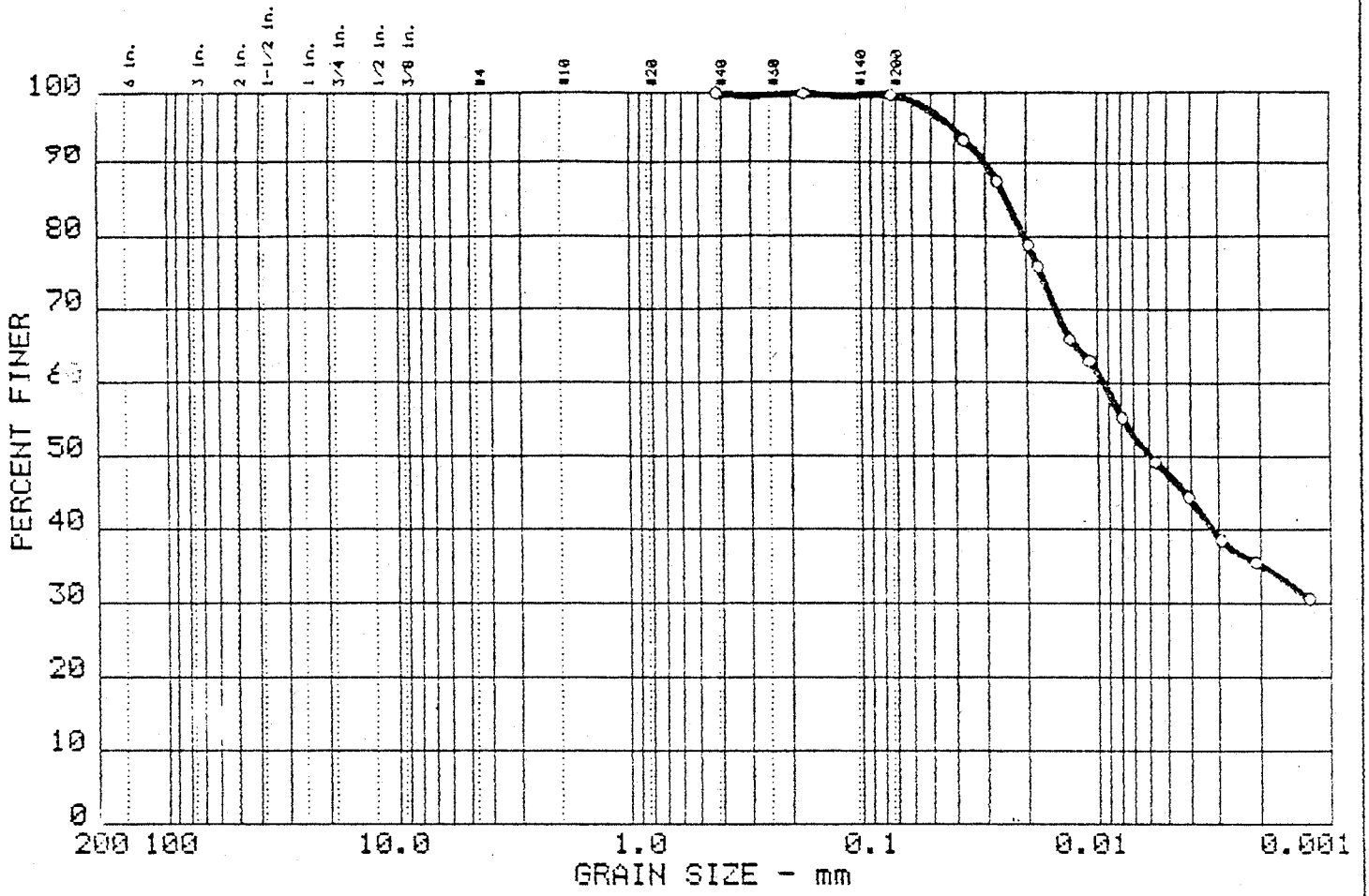
Remarks:
Liquid Limit = 33
Plasticity Index = 14

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 10, 1988 Data Sheet No. K44

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
16	0.0	0.0	0.3	52.2	47.5	MH

SIEVE inches size	PERCENT FINER ○
GRAIN SIZE	
D_{60} D_{30} D_{10}	
COEFFICIENTS	
C_c C_u	

SIEVE number size	PERCENT FINER ○
40	100.0
80	99.9
200	99.7

Sample information:
○ Elastic Silt

E11 S3 Sample #1

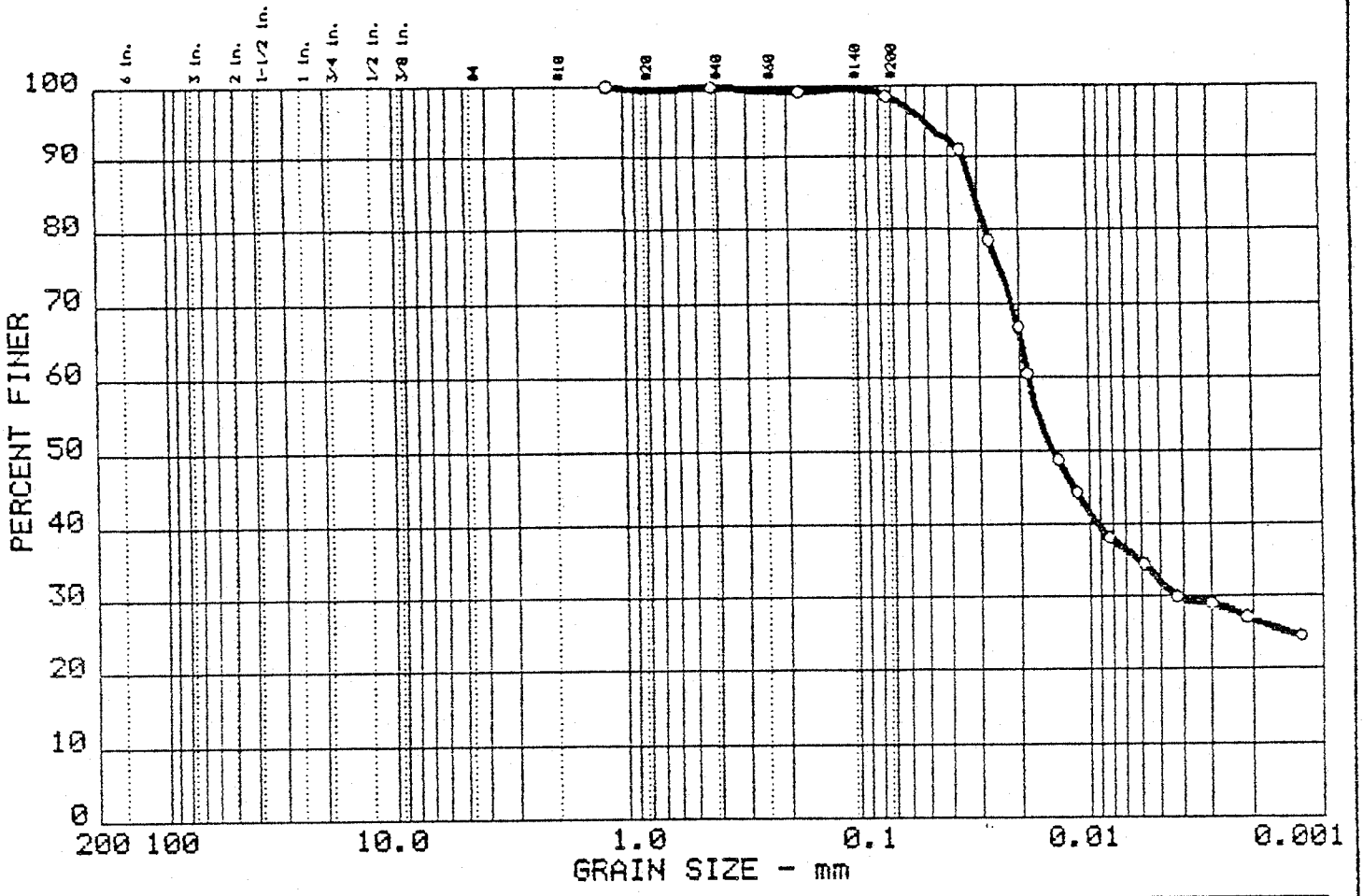
Remarks:
Liquid Limit = 50
Plasticity Index = 28

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K32

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	18	0.0	0.0	1.4	66.6	32.0	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.9		
80	99.2		
200	98.6		

Sample information:
○ Lean Clay, trace sand

E11 S3 Sample #2

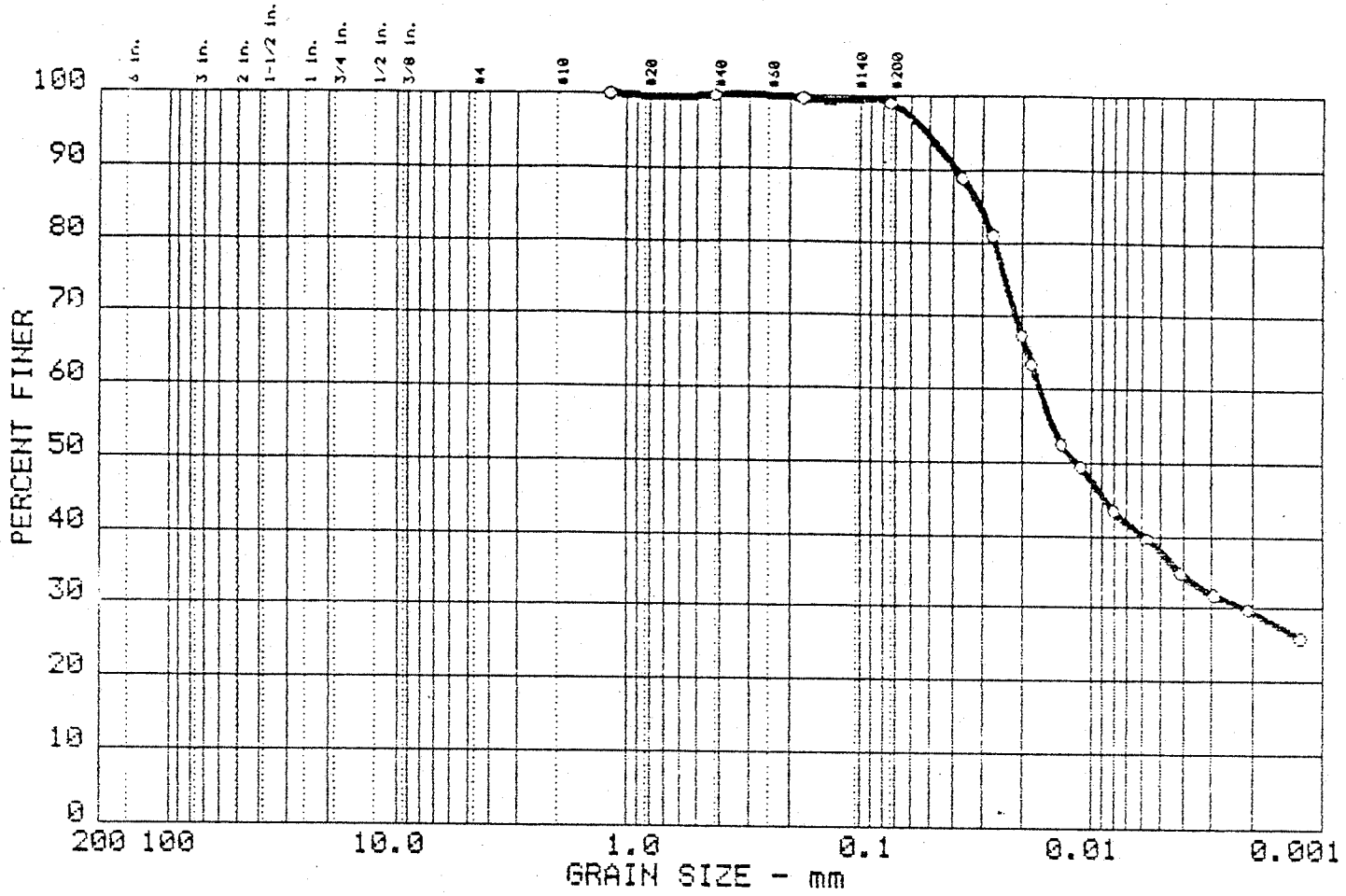
Remarks:
Liquid Limit = 38
Plasticity Index = 14

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 10, 1988 Data Sheet No. K45

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	17	0.0	0.0	0.9	61.5	37.6	CH

SIEVE inches size	PERCENT FINER ○
GRAIN SIZE	
D_{60} D_{30} D_{10}	0.00
COEFFICIENTS	
C_c C_u	

SIEVE number size	PERCENT FINER ○
16	100.0
40	99.9
80	99.6
200	99.1

Sample information:
○ Fat Clay, trace sand

E13 S3 Sample #1

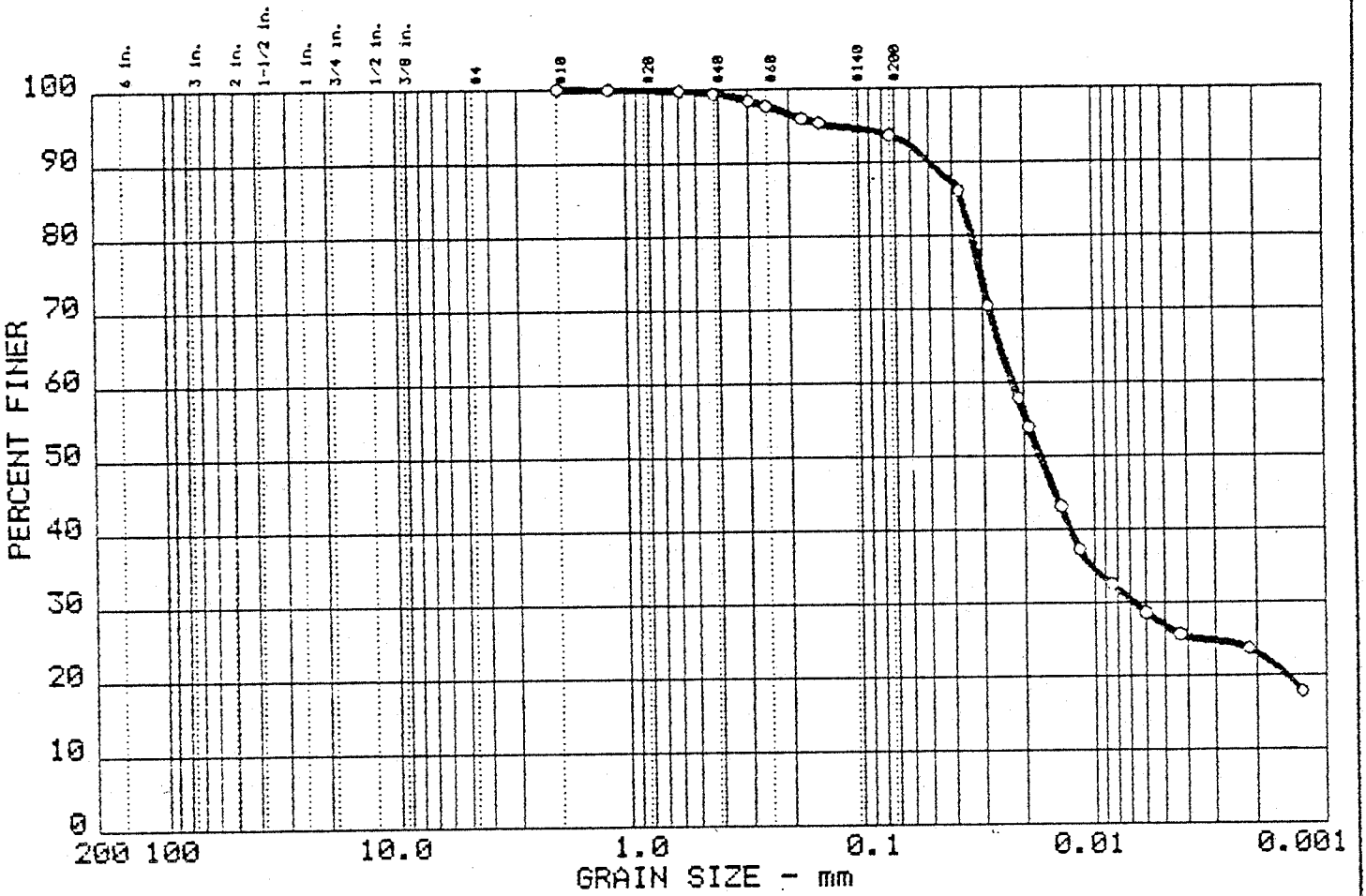
Remarks:
Liquid Limit = 64
Plasticity Index = 43

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K33

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	19	0.0	0.0	6.3	67.0	26.7	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.01		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
10	100.0		
16	99.9		
30	99.8		
40	99.4		
50	98.4		
60	97.7		
80	96.0		
100	95.4		
200	93.7		

Sample information:
○Lean Clay, little sand

E13 S3 Sample #2

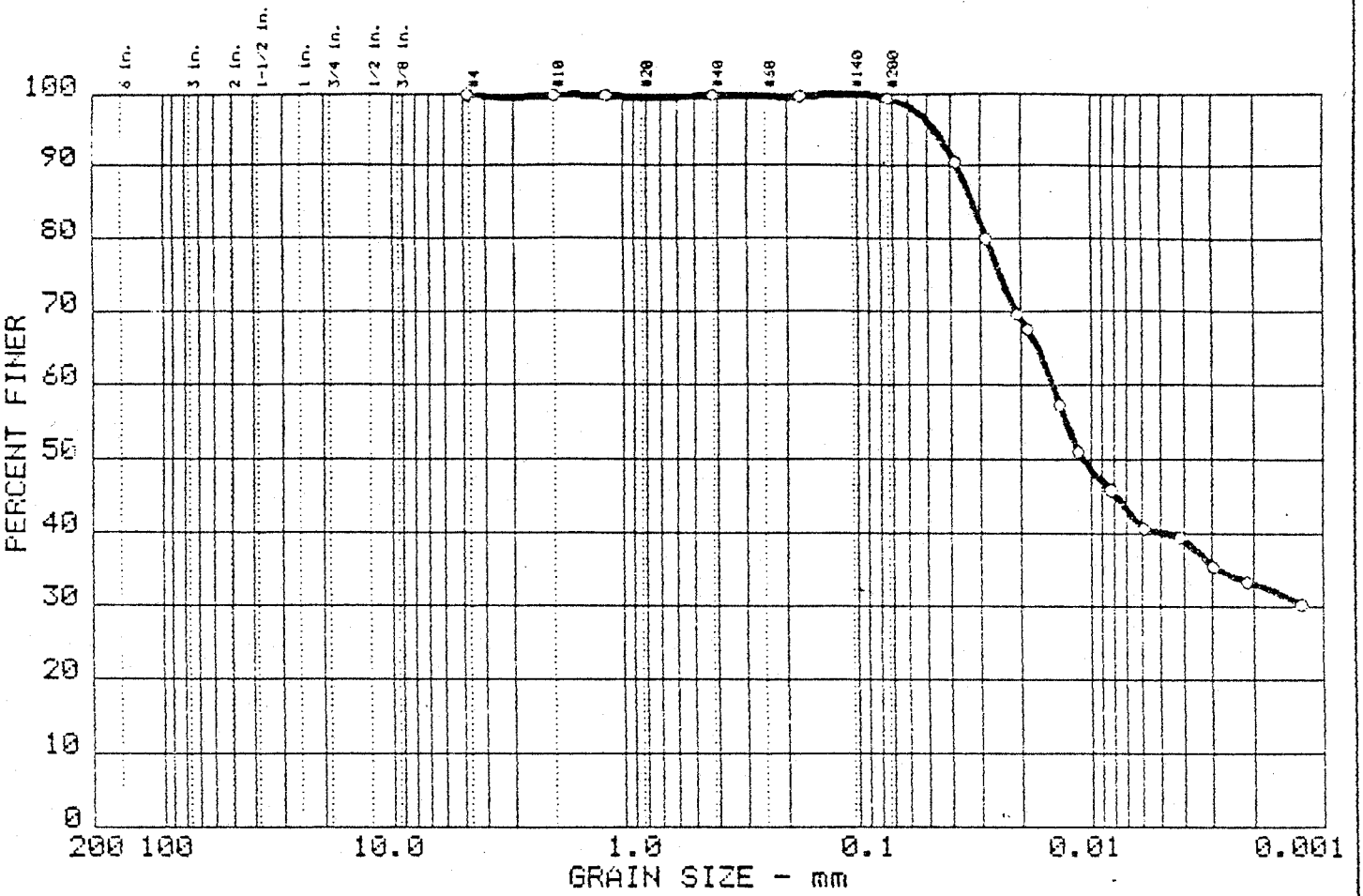
Remarks:
Liquid Limit = 39
Plasticity Index = 15

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 10, 1988 Data Sheet No. K46

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○ 18	0.0	0.0	0.6	59.4	40.0	CL

SIEVE inches size	PERCENT FINER ○
GRAIN SIZE	
D_{60}	
D_{30}	
D_{10}	
COEFFICIENTS	
C_c	
C_u	

SIEVE number size	PERCENT FINER ○
4	100.0
10	99.9
16	99.9
40	99.9
80	99.7
200	99.4

Sample information:
○ Lean Clay

E15 S3 Sample 1

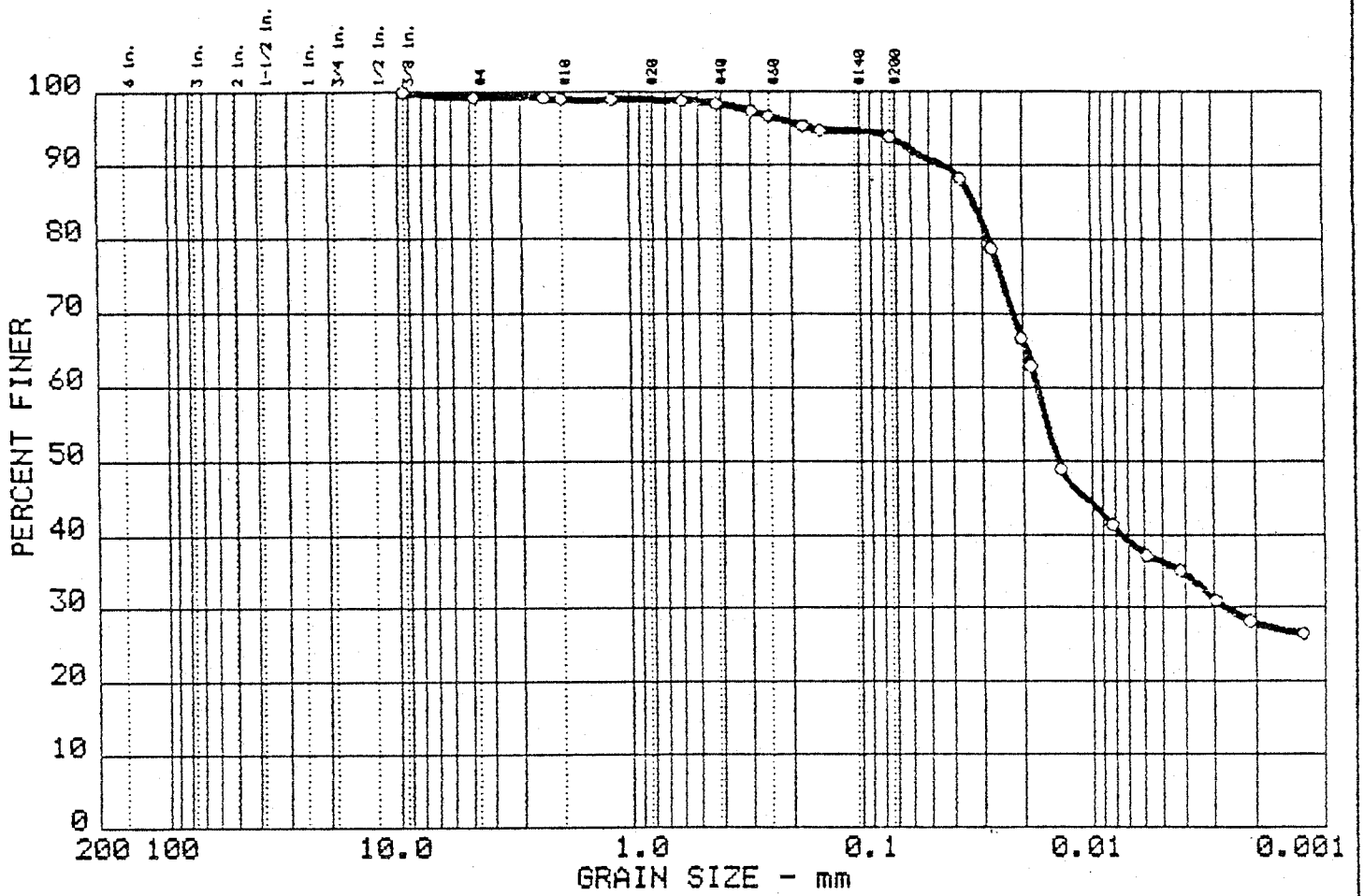
Remarks:
Liquid Limit = 47
Plasticity Index = 23

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K34

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	20	0.0	0.8	5.4	58.0	35.8	CL

SIEVE inches size	PERCENT FINER ○		
0.375	100.0		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○		
4	99.2		
8	99.2		
10	99.0		
16	98.9		
30	98.8		
40	98.5		
50	97.5		
60	96.6		
80	95.2		
100	94.7		
200	93.8		

Sample information:
○Lean Clay, little sand

E15 S3 Sample #2

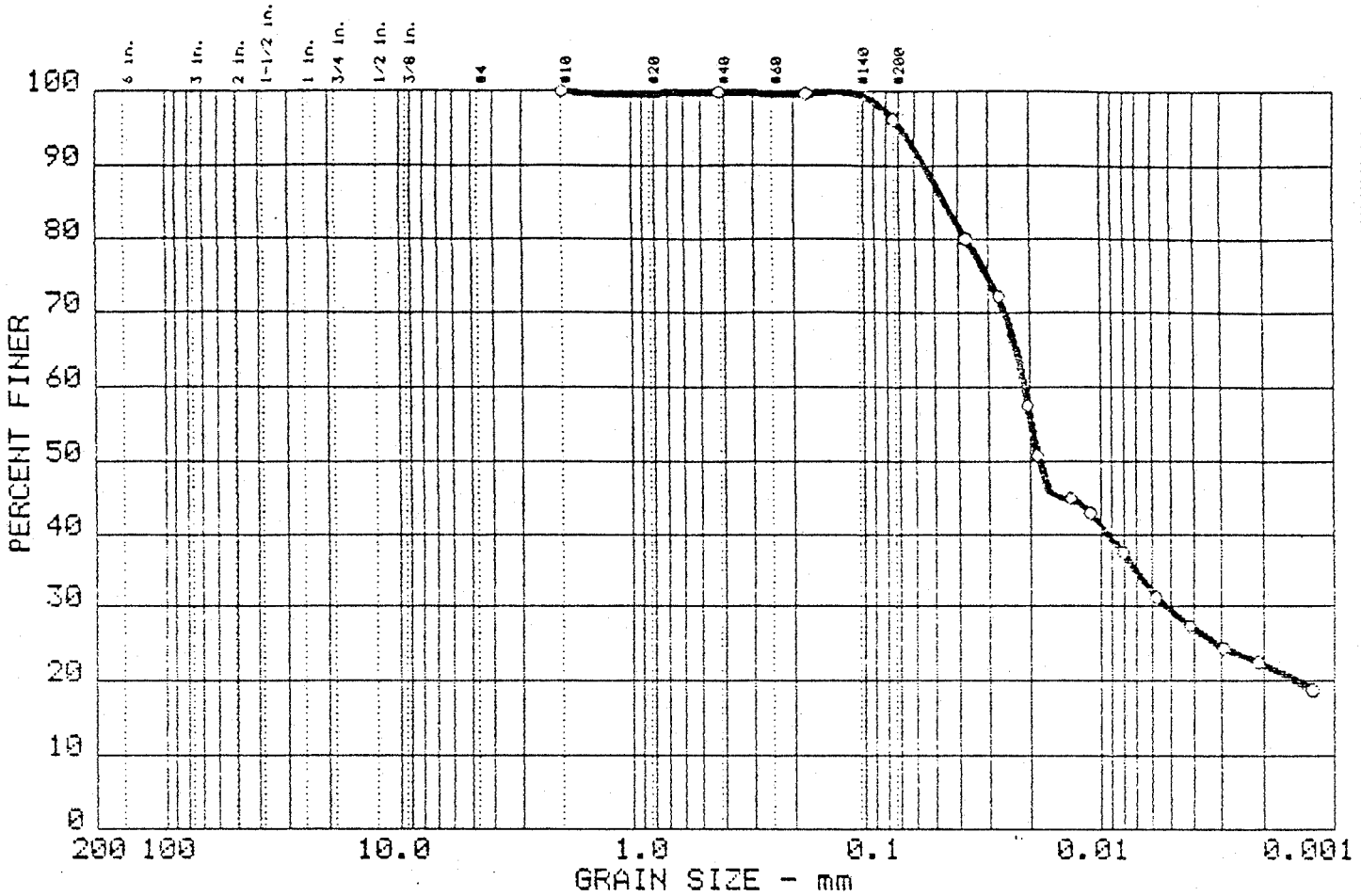
Remarks:
Liquid Limit = 43
Plasticity Index = 23

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 10, 1988 Data Sheet No. K47

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
19	0.0	0.0	3.7	66.9	29.4	CL

SIEVE inches size	PERCENT FINER ○
GRAIN SIZE	
D_{60} D_{30} D_{10}	0.01
COEFFICIENTS	
C_c C_u	

SIEVE number size	PERCENT FINER ○
10	100.0
40	99.9
80	99.7
200	96.3

Sample information:
○ Lean Clay, trace sand

E17 S3 Sample #1

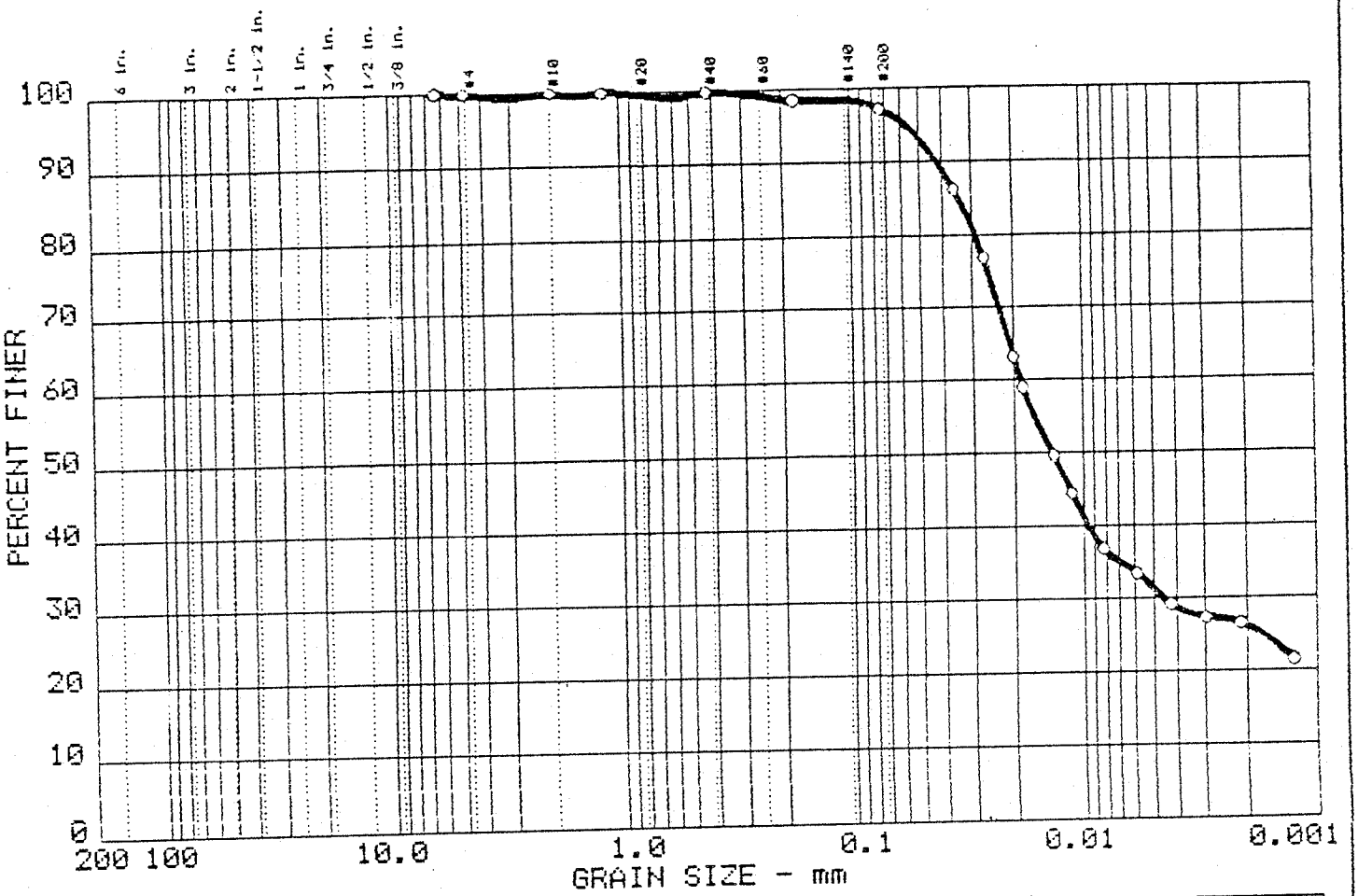
Remarks:
Liquid Limit = 45
Plasticity Index = 23

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K35

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	13	0.0	0.1	2.6	66.0	31.3	CL

SIEVE inches size	PERCENT FINER ○		
0.25	100.0		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○		
4	99.9		
10	99.9		
16	99.9		
40	99.8		
80	98.6		
200	97.3		

Sample information:
○ Lean Clay, trace sand

E17 S3 Sample #2

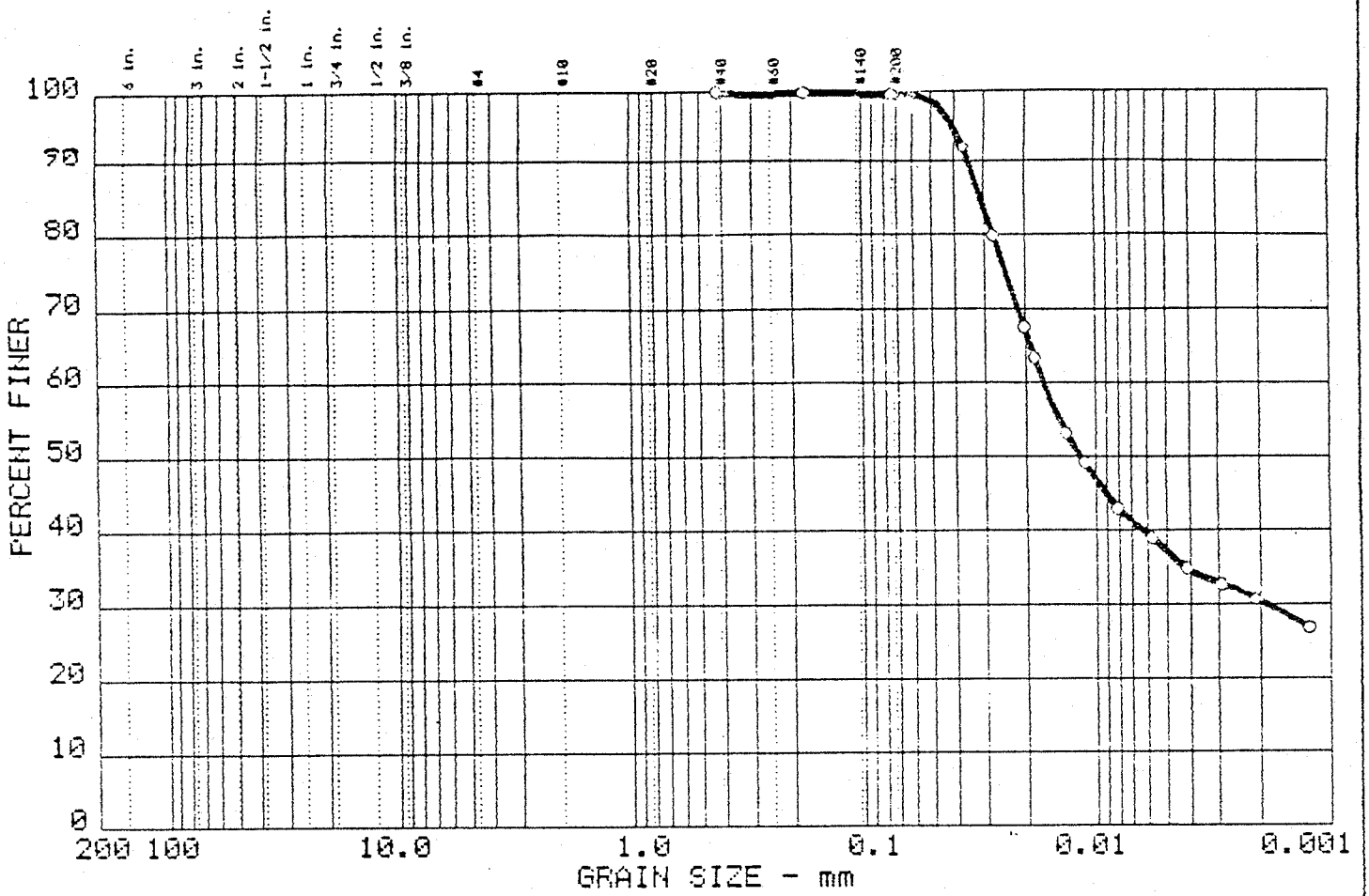
Remarks:
Liquid Limit = 40
Plasticity Index = 17

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K48

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
20	0.0	0.0	0.4	62.6	37.0	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
40	100.0		
80	99.9		
200	99.6		

Sample information:
○ Lean Clay

E:9 S3 Sample #1

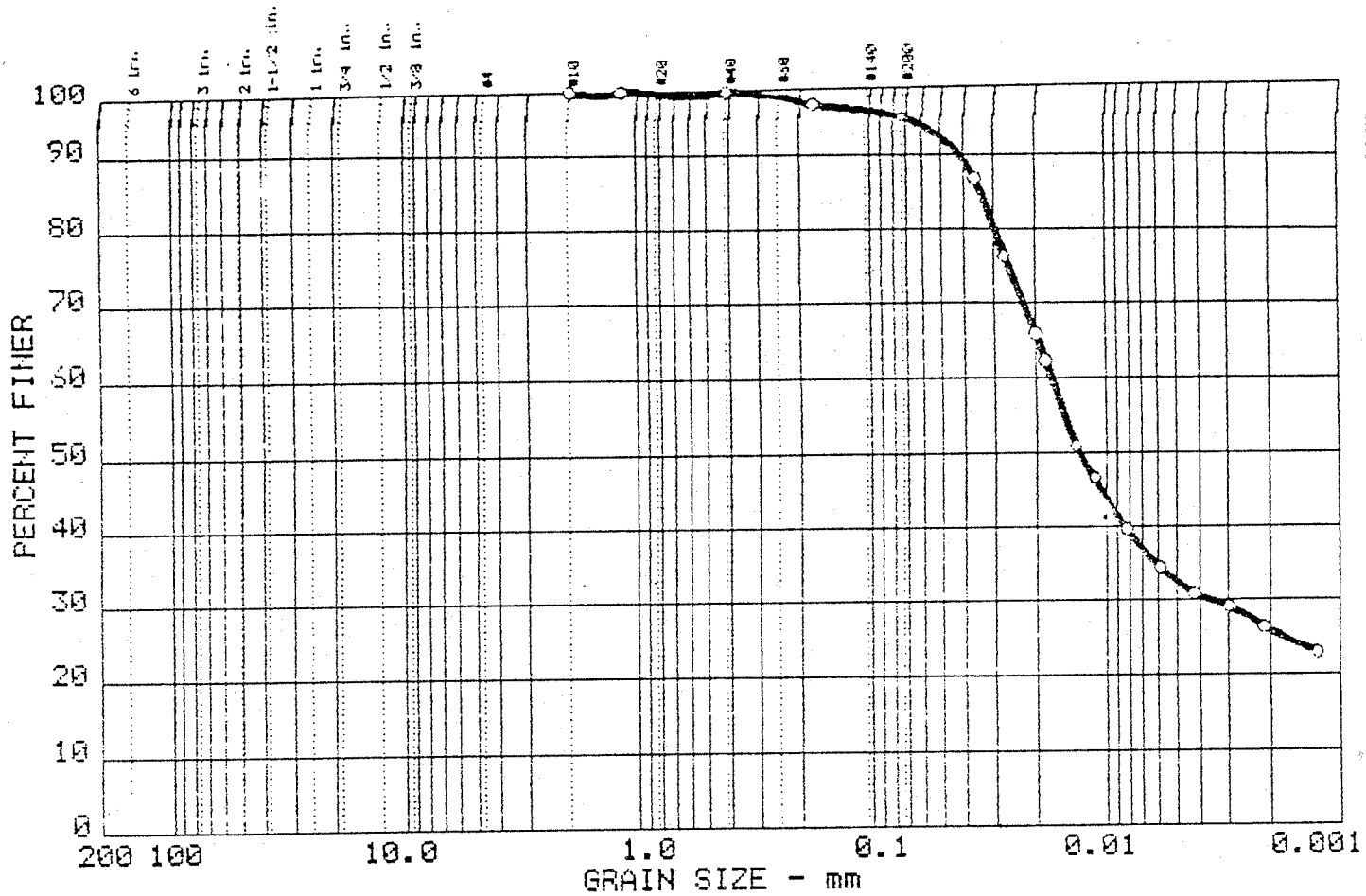
Remarks:
Liquid Limit = 42
Plasticity Index = 21

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K36

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	14	0.0	0.0	4.6	63.0	32.4	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○
10	100.0
16	99.9
40	99.7
80	97.4
200	95.4

Sample information:
○Lean Clay, trace sand

E19 S3 Sample #2

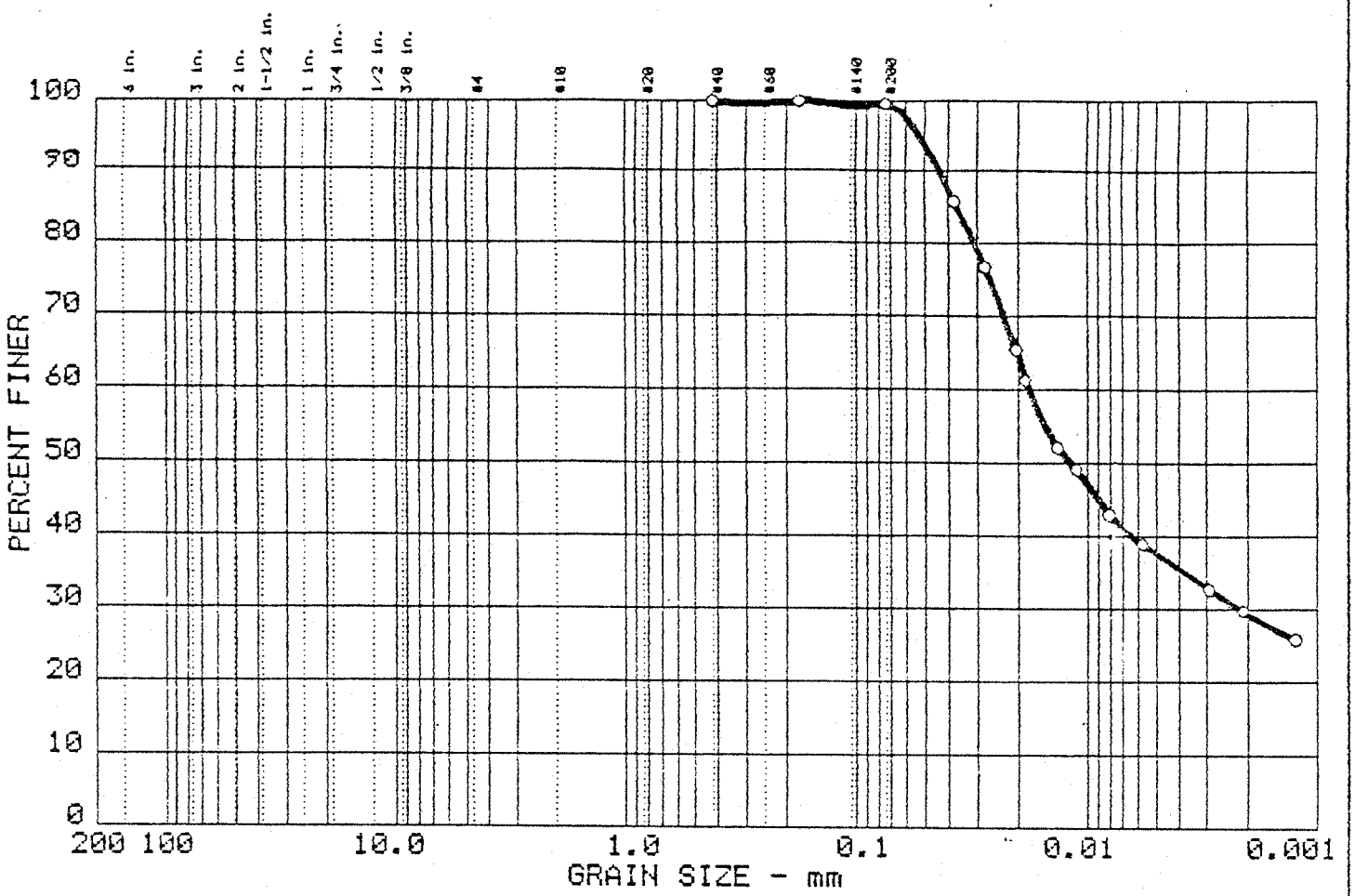
Remarks:
Liquid Limit = 42
Plasticity Index = 20

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K49

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
1	0.0	0.0	0.4	62.1	37.5	ML

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60}	0.00		
D_{30}			
D_{10}			
COEFFICIENTS			
C_C			
C_U			

SIEVE number size	PERCENT FINER ○		
40	100.0		
80	100.0		
200	99.6		

Sample information:
○ Silt

E21 S3 Sample #1

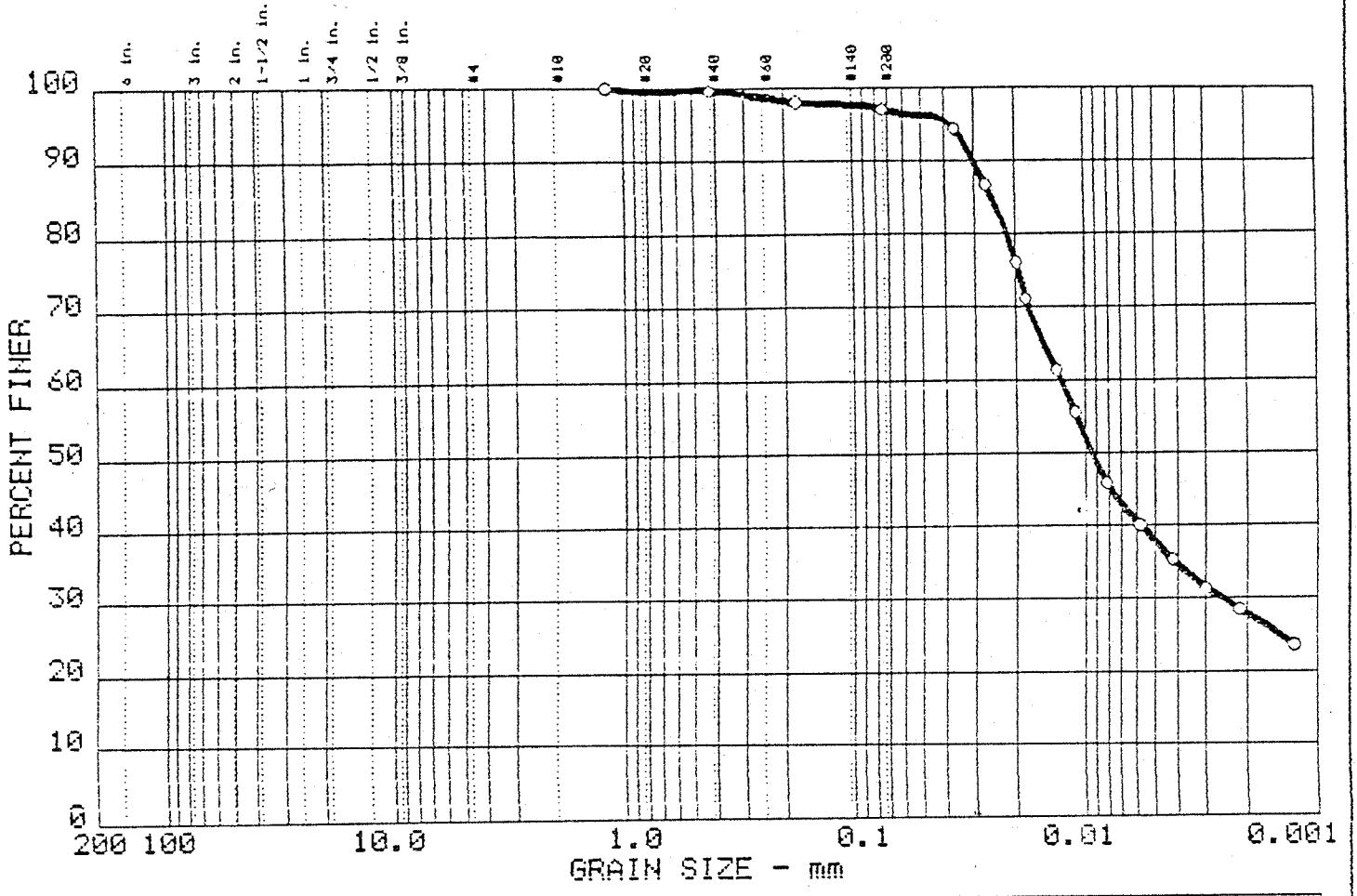
Remarks:
Liquid Limit = 32
Plasticity Index = 4

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K37

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	15	0.0	0.0	2.8	59.5	37.7	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.7		
80	98.2		
200	97.2		

Sample information:
○ Lean Clay, trace sand

E21 S3 Sample #2

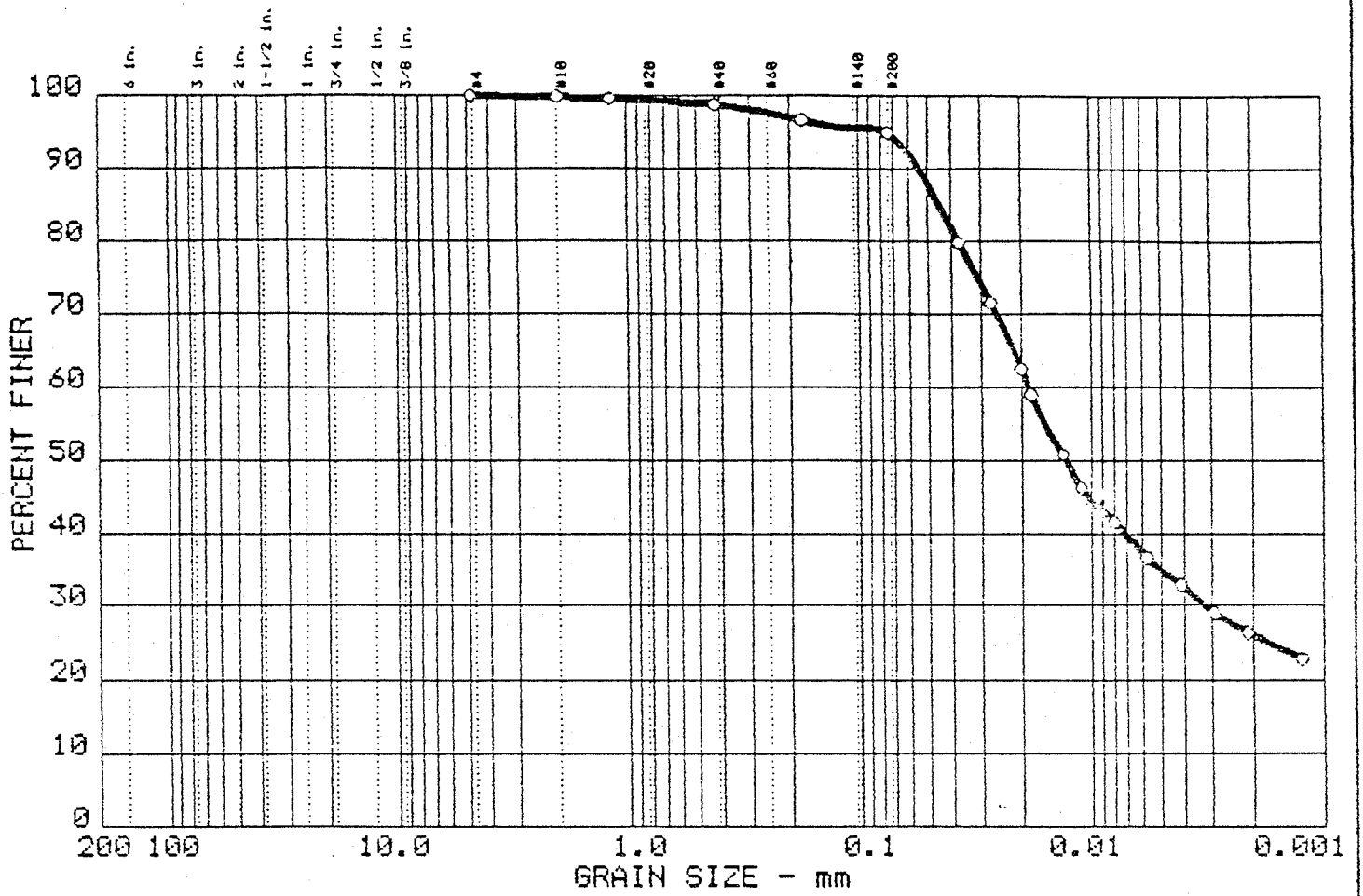
Remarks:
Liquid Limit = 41
Plasticity Index = 17

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K53

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	2	0.0	0.0	5.0	60.4	34.6	CL

SIEVE inches size	PERCENT FINER ○
GRAIN SIZE	
D_{60} D_{30} D_{10}	0.00
COEFFICIENTS	
C_C C_u	

SIEVE number size	PERCENT FINER ○
4	100.0
10	99.6
16	99.5
40	98.7
80	96.6
200	95.0

Sample information:
○ Lean Clay, little sand

E23 S3 Sample #1

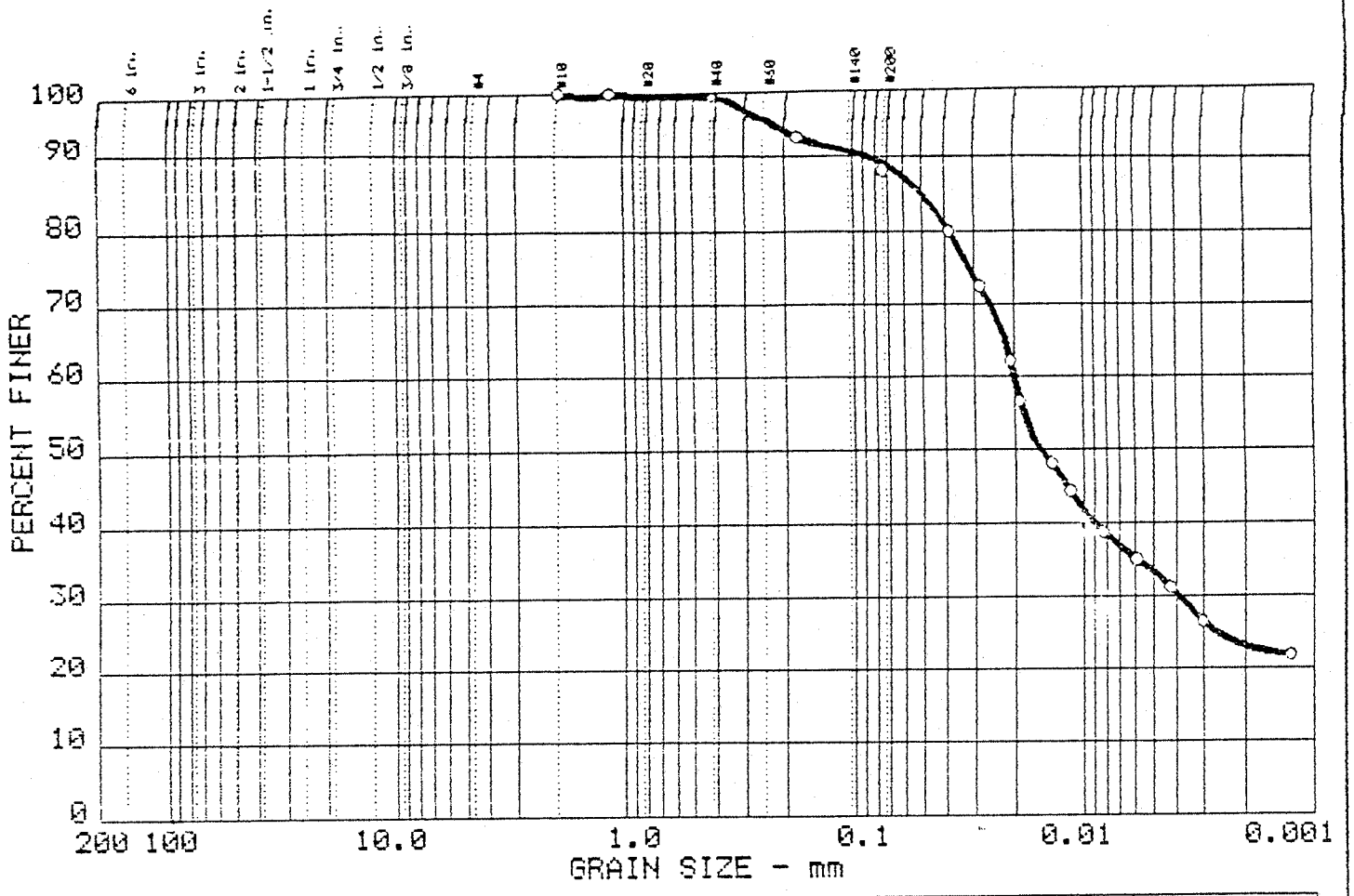
Remarks:
Liquid Limit = 32
Plasticity Index = 11

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K38

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	16	0.0	0.0	10.9	55.9	33.2	CL

SIEVE inches size	PERCENT FINER ○		

GRAIN SIZE	
D_{60}	0.00
D_{30}	
D_{10}	

COEFFICIENTS	
C_c	
C_u	

SIEVE number size	PERCENT FINER ○
10	100.0
16	99.9
40	99.2
80	92.7
200	88.1

Sample information:
○ Lean Clay, little sand

E23 S3 Sample #2

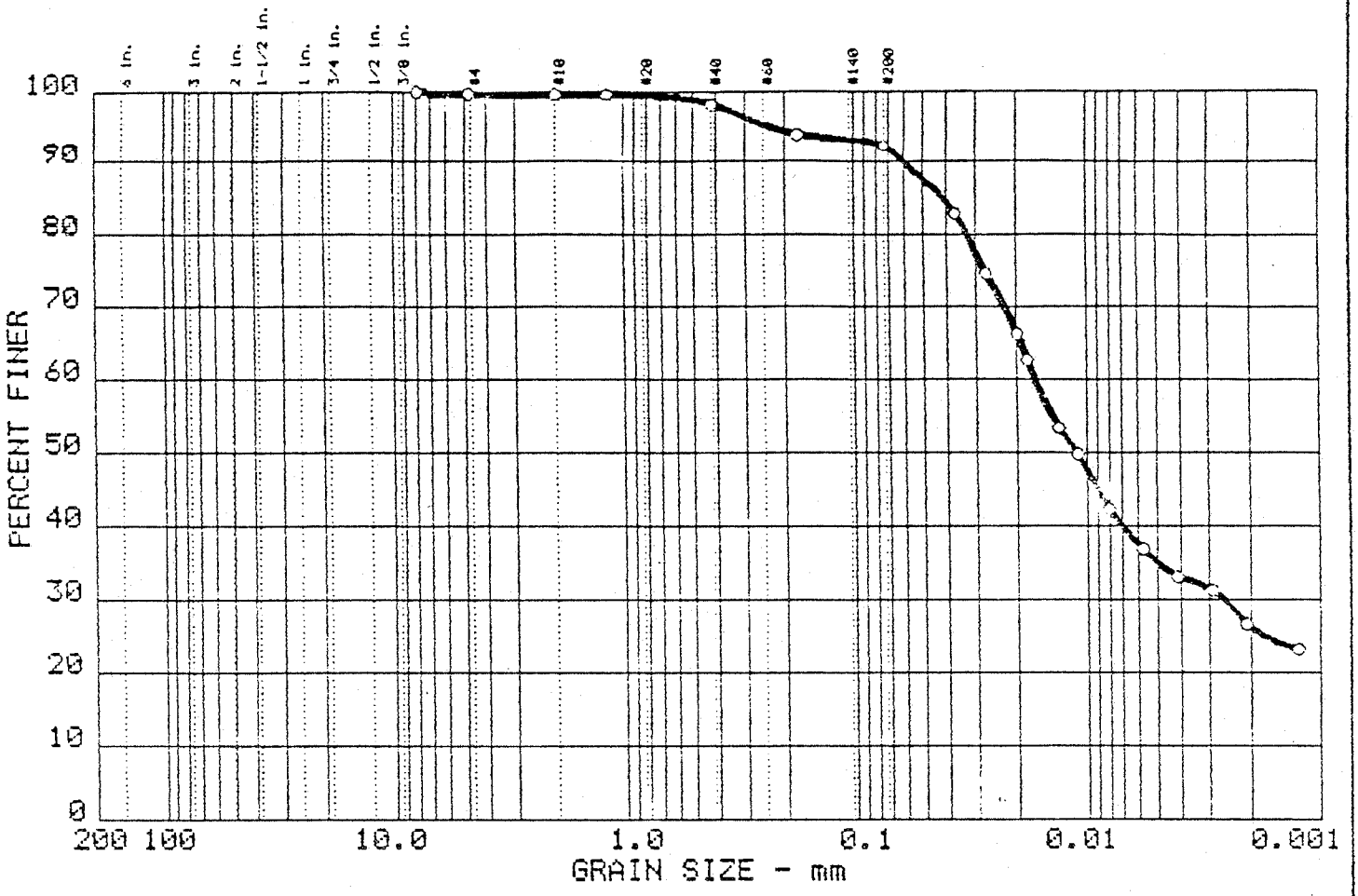
Remarks:
Liquid Limit = 40
Plasticity Index = 18

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K51

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	3	0.0	0.2	7.5	57.2	35.1	CL

SIEVE inches size	PERCENT FINER ○		
0.313	100.0		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○		
4	99.8		
10	99.6		
16	99.5		
40	98.0		
80	93.8		
200	92.2		

Sample information:
○ Lean Clay, little sand

E25 S3 Sample #1

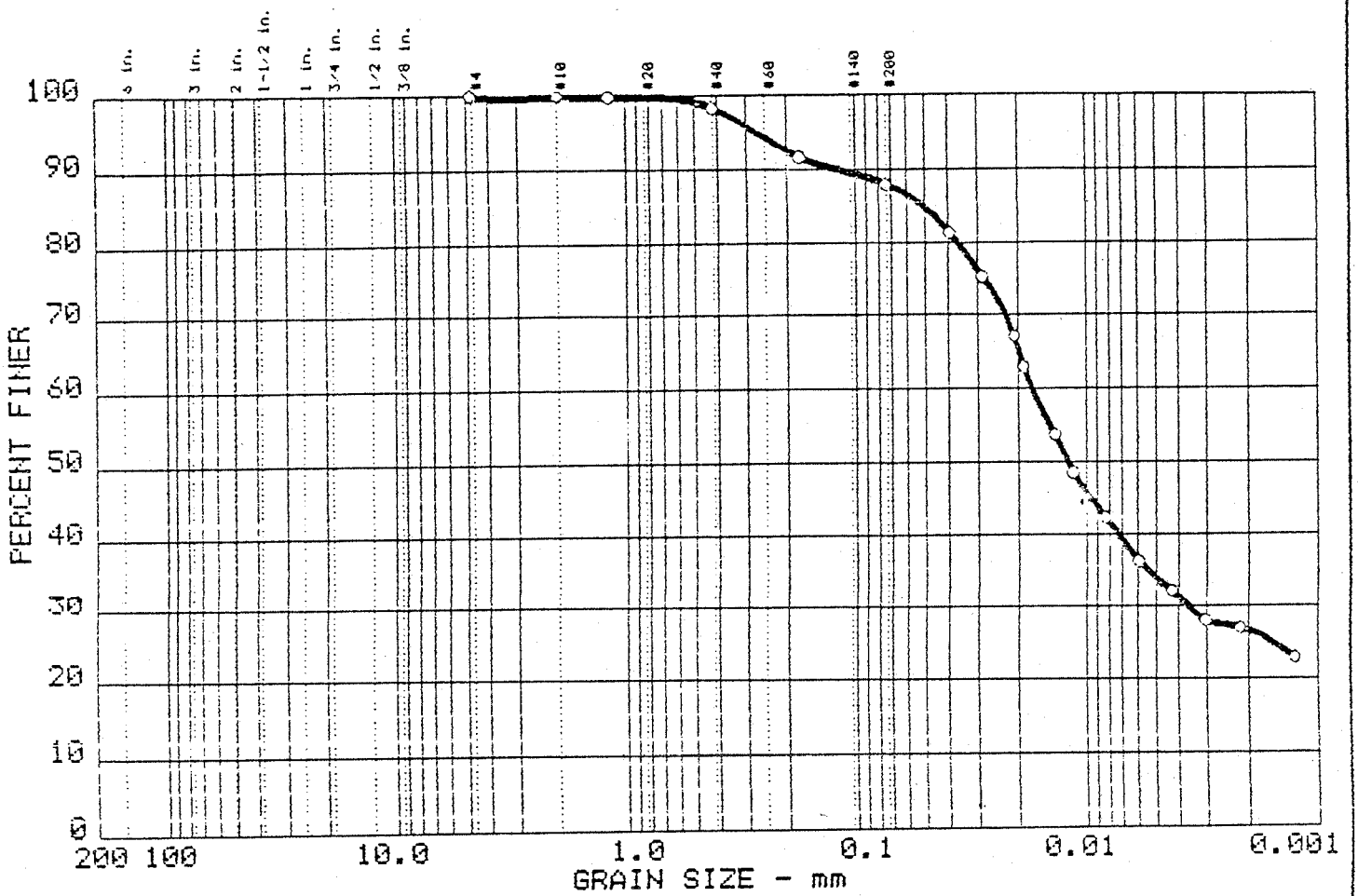
Remarks:
Liquid Limit = 39
Plasticity Index = 25

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K39

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	17	0.0	0.0	12.0	54.0	34.0	CL

SIEVE inches size	PERCENT FINER ○		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○
4	100.0
10	99.9
16	99.8
40	98.4
80	91.8
200	88.0

Sample information:
○Lean Clay, little sand

E25 S3 Sample #2

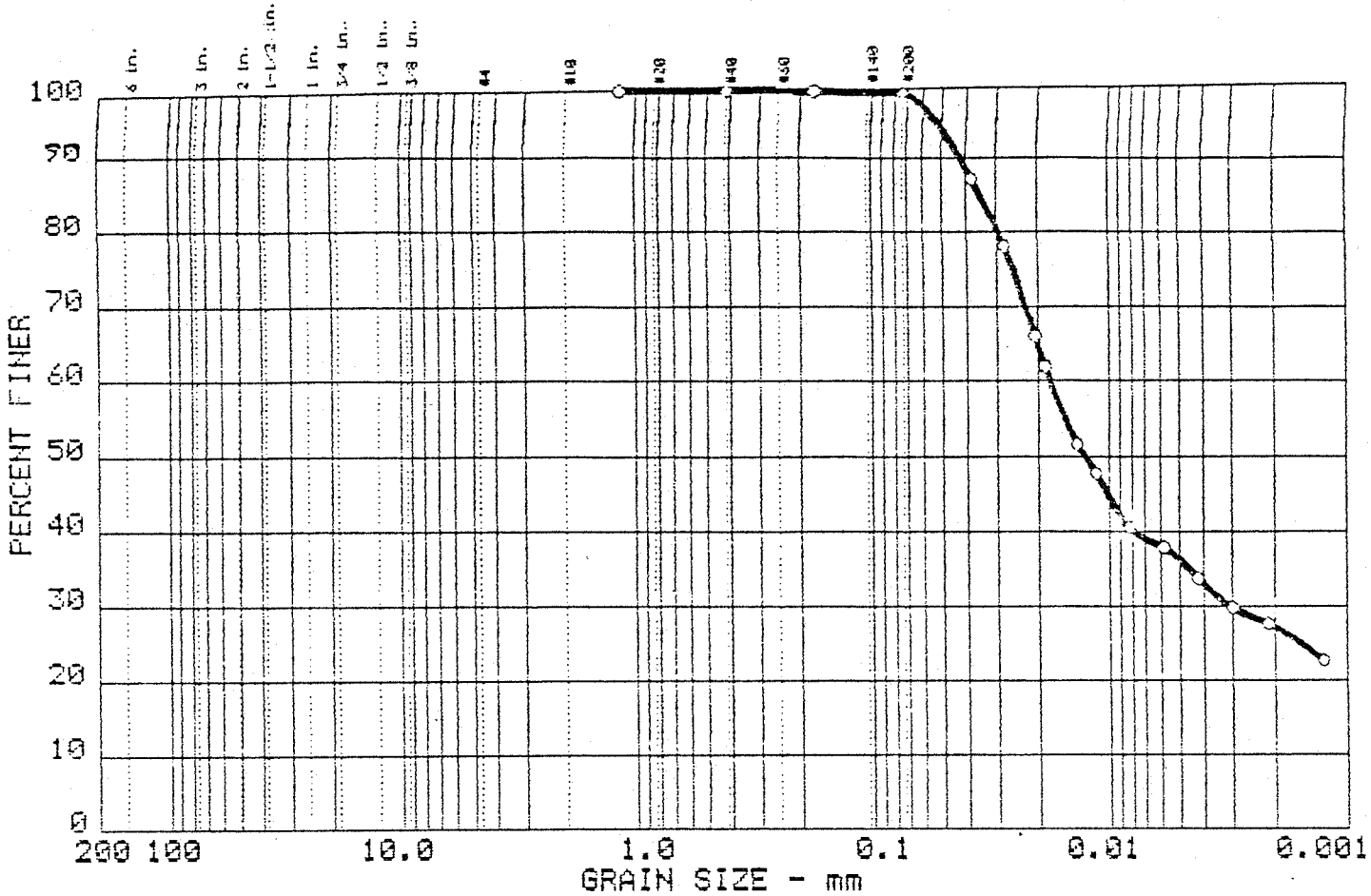
Remarks:
Liquid Limit = 33
Plasticity Index = 12

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K52

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	15	0.0	0.0	0.5	63.2	36.3	CH

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.9		
80	99.8		
200	99.5		

Sample information:
○ Fat Clay, trace sand

E1 S5 Sample #1

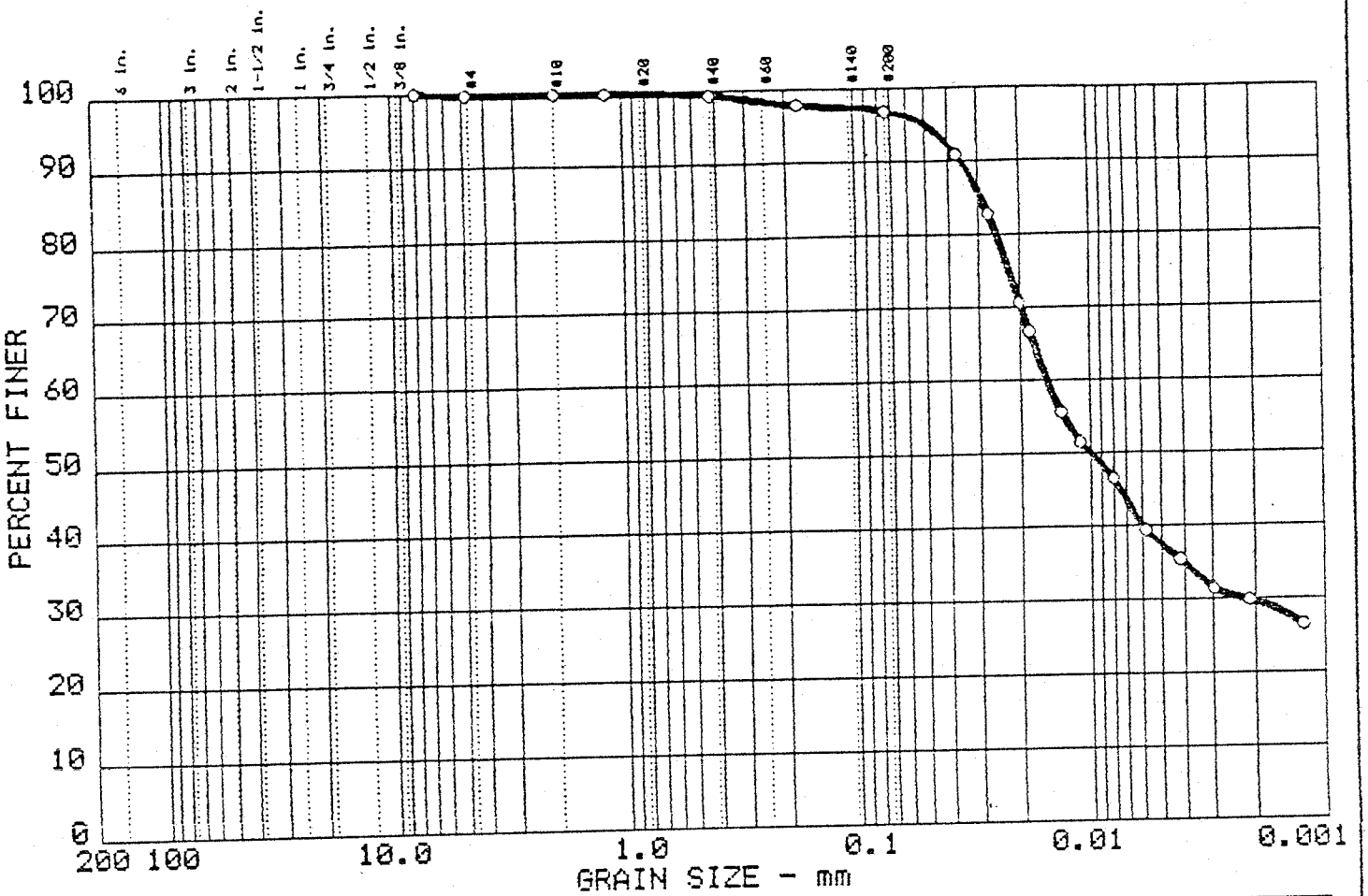
Remarks:
Liquid Limit = 50
Plasticity Index = 27

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: July 15, 1988 Data Sheet No. K53

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	1	0.0	0.1	2.9	59.6	37.4	CL

SIEVE inches size	PERCENT FINER ○		
0.313	100.0		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○		
4	99.9		
10	99.8		
16	99.7		
40	99.4		
80	97.9		
200	96.9		

Sample information:
○ Lean Clay, trace sand

E1 S5 Sample #2

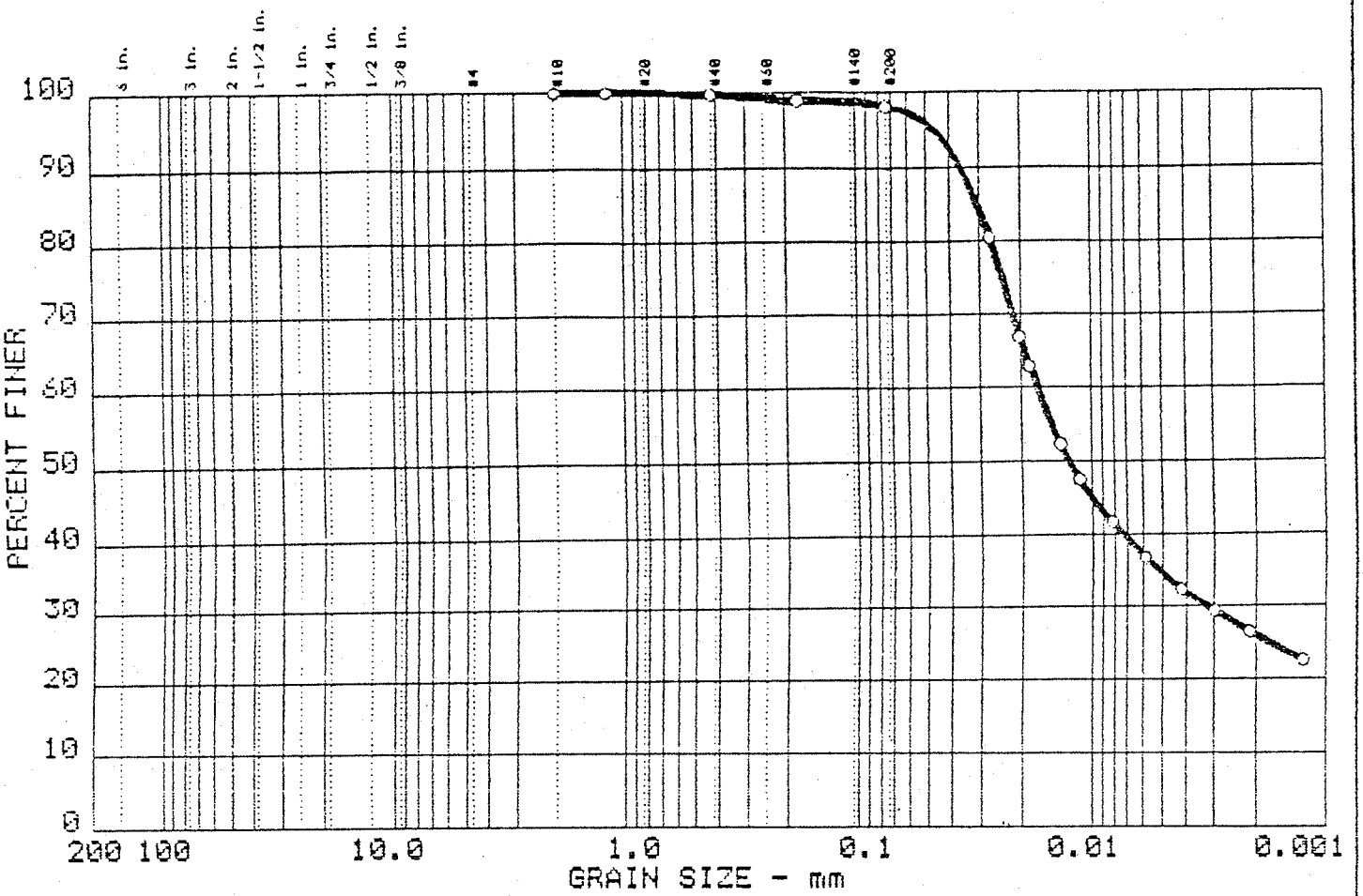
Remarks:
Liquid Limit = 38
Plasticity Index = 17

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K65

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○ 1§	0.0	0.0	1.8	63.7	34.5	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○
10	100.0
16	99.9
40	99.8
80	99.0
200	98.2

Sample information:
○ Lean Clay, trace sand

E3 S5 Sample #1

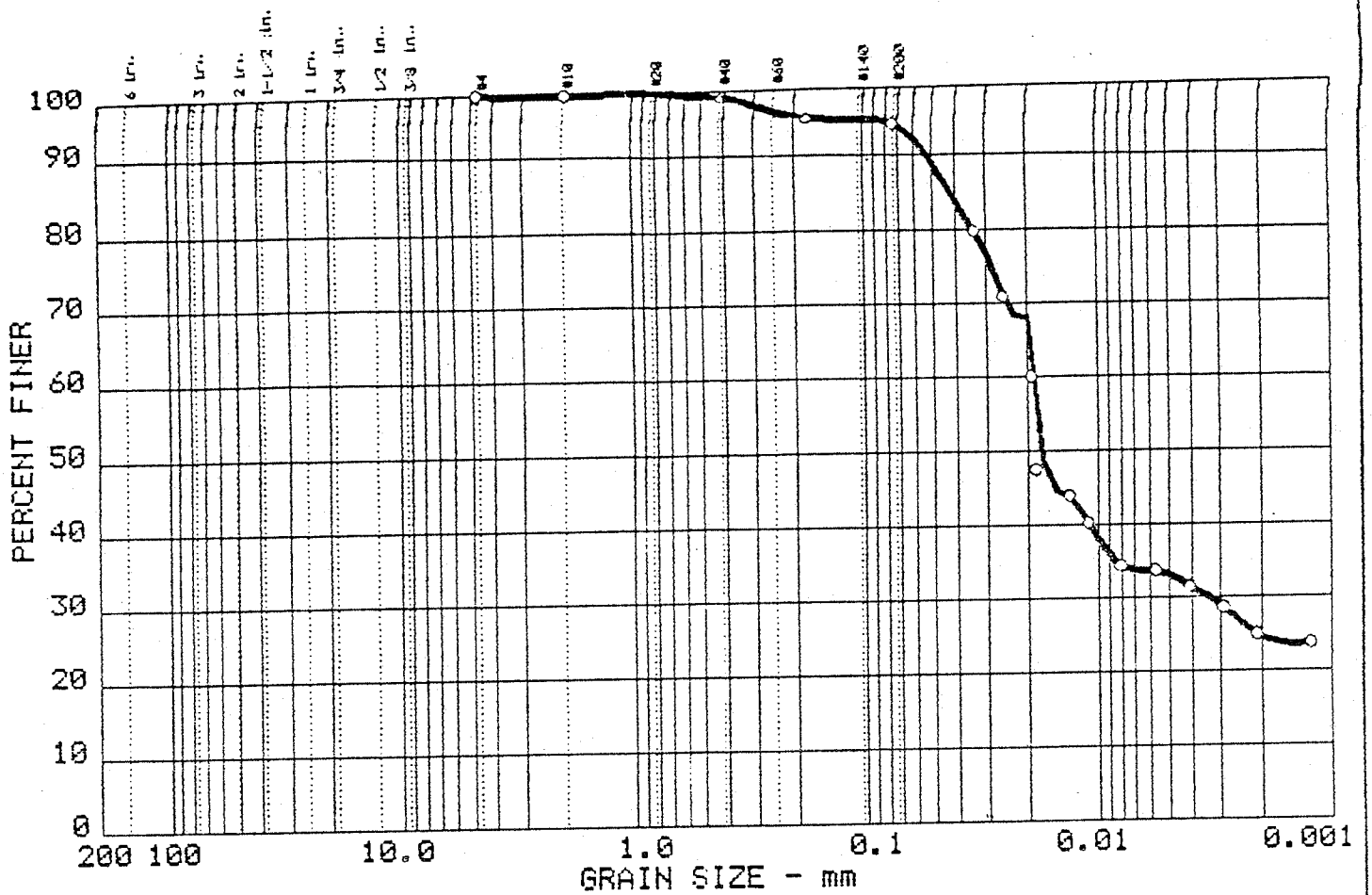
Remarks:
Liquid Limit = 44
Plasticity Index = 25

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: July 15, 1988 Data Sheet No. K54

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	2	0.0	0.0	5.7	61.1	33.2	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
4	100.0		
10	99.8		
40	98.7		
80	95.3		
200	94.3		

Sample information:
○ Lean Clay, little sand

E3 S5 Sample #2

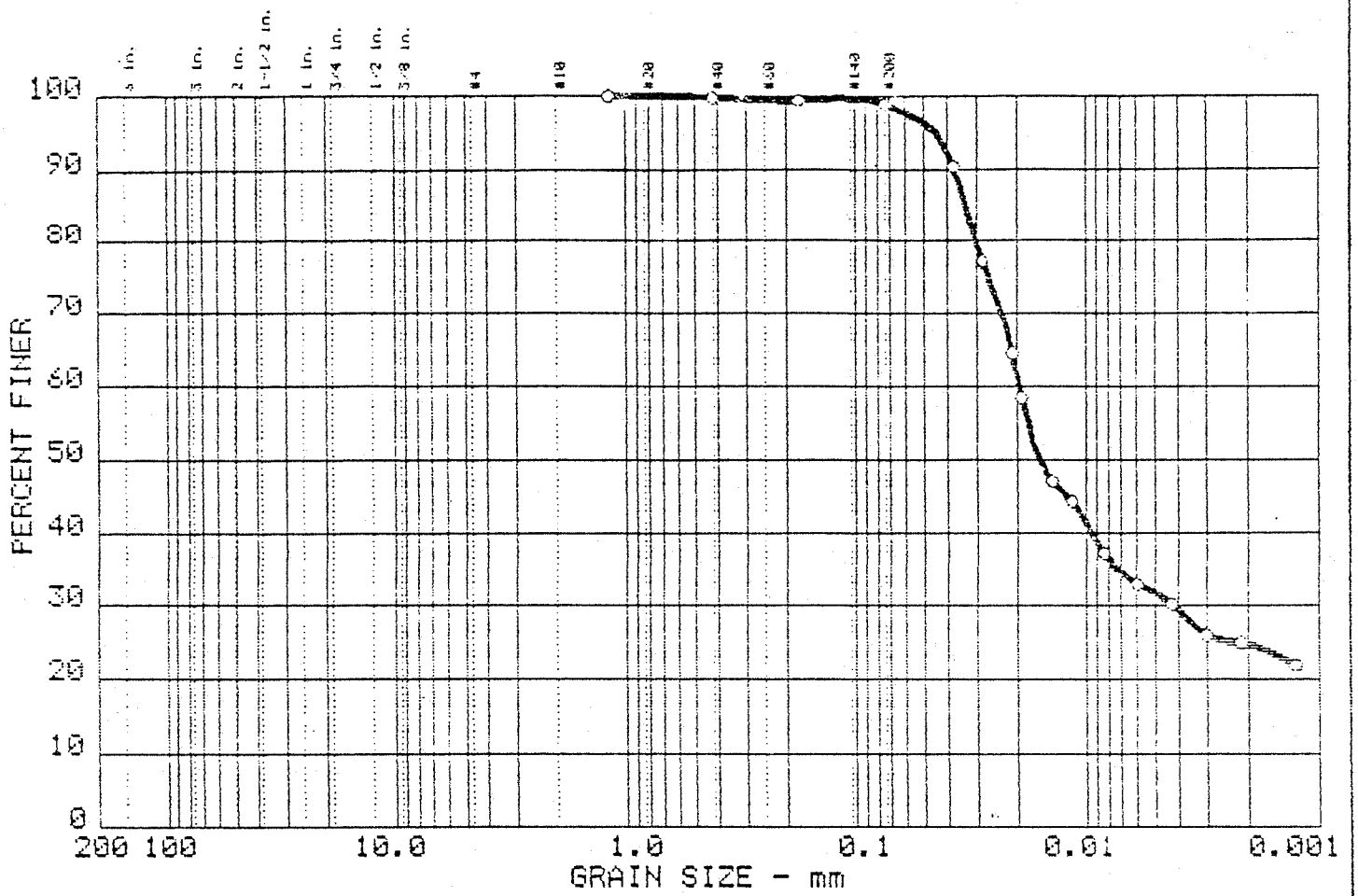
Remarks:
Liquid Limit = 36
Plasticity Index = 14

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K66

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	17	0.0	0.0	1.1	67.1	31.8	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.9		
80	99.5		
200	98.9		

Sample information:
○Lean Clay, trace sand

E5 S5 Sample #1

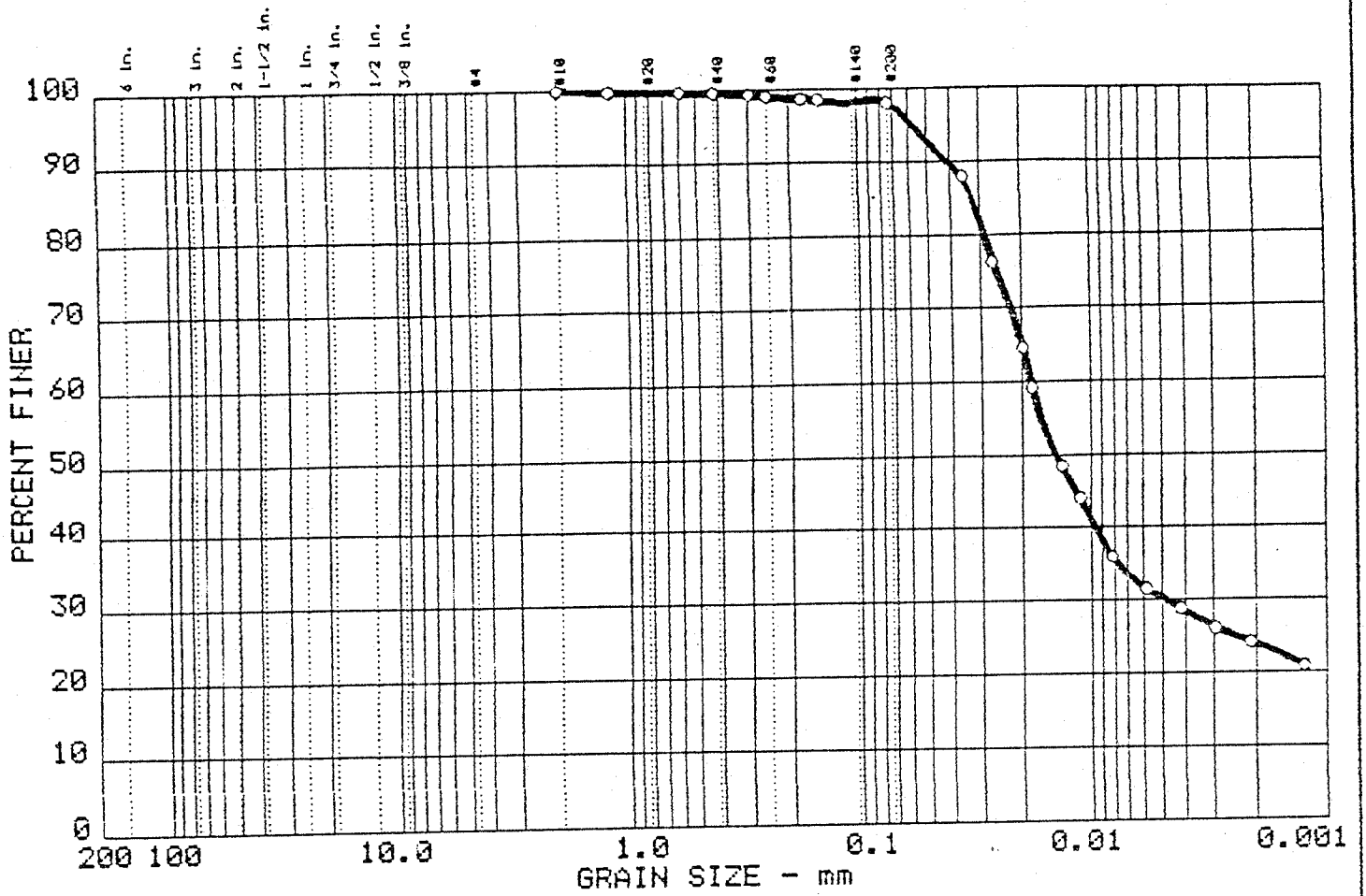
Remarks:
Liquid Limit = 44
Plasticity Index = 18

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: July 15, 1988 Data Sheet No. K55

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	3	0.0	0.0	1.8	68.0	30.2	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○
10	100.0
16	99.9
30	99.7
40	99.6
50	99.3
60	99.1
80	98.7
100	98.5
200	98.2

Sample information:
○ Lean Clay, trace sand

E5 S5 Sample #2

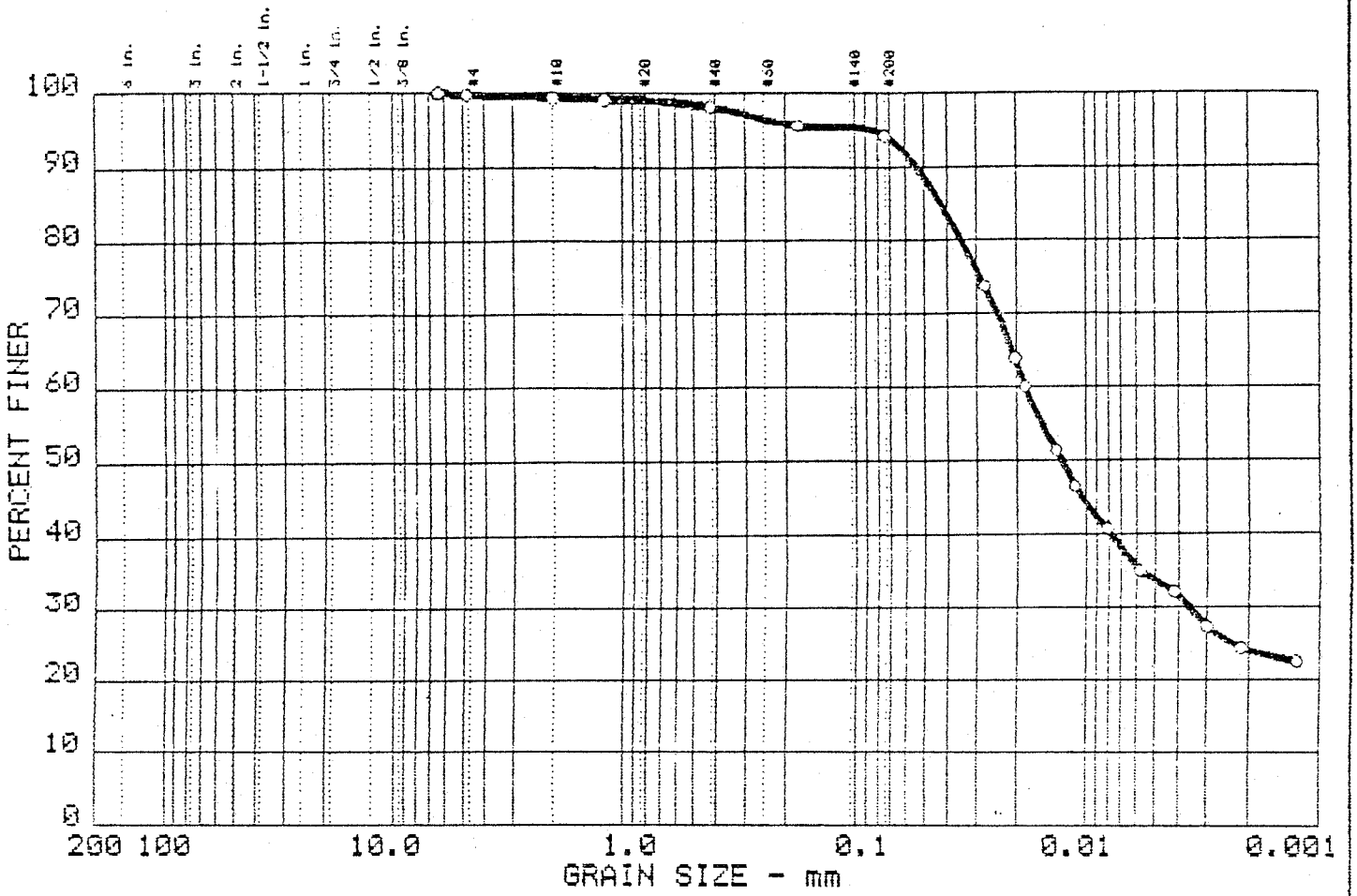
Remarks:
Liquid Limit = 33
Plasticity Index = 11

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K67

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	18	0.0	0.2	5.4	60.9	33.6	CL

SIEVE inches size	PERCENT FINER ○		
0.25	100.0		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○
4	99.8
10	99.5
16	99.4
40	98.0
80	95.6
200	94.4

Sample information:
○ Lean Clay

E7 S5 Sample #1

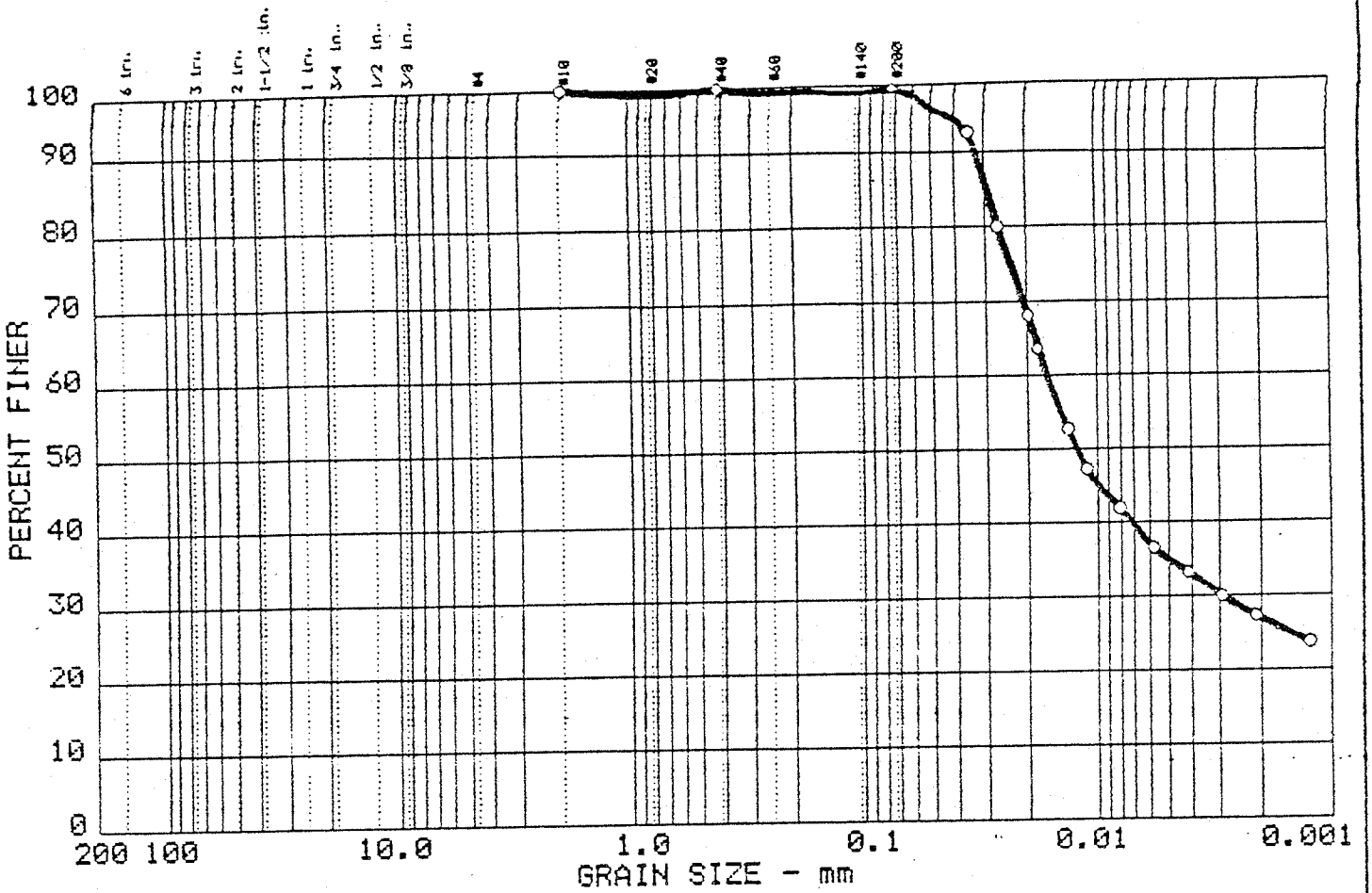
Remarks:
Liquid Limit = 42
Plasticity Index = 17

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: July 15, 1988 Data Sheet No. K56

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	4	0.0	0.0	0.6	64.5	34.9	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
10	100.0		
40	99.9		
200	99.4		

Sample information:
○ Lean Clay, trace sand

E7 S5 Sample #2

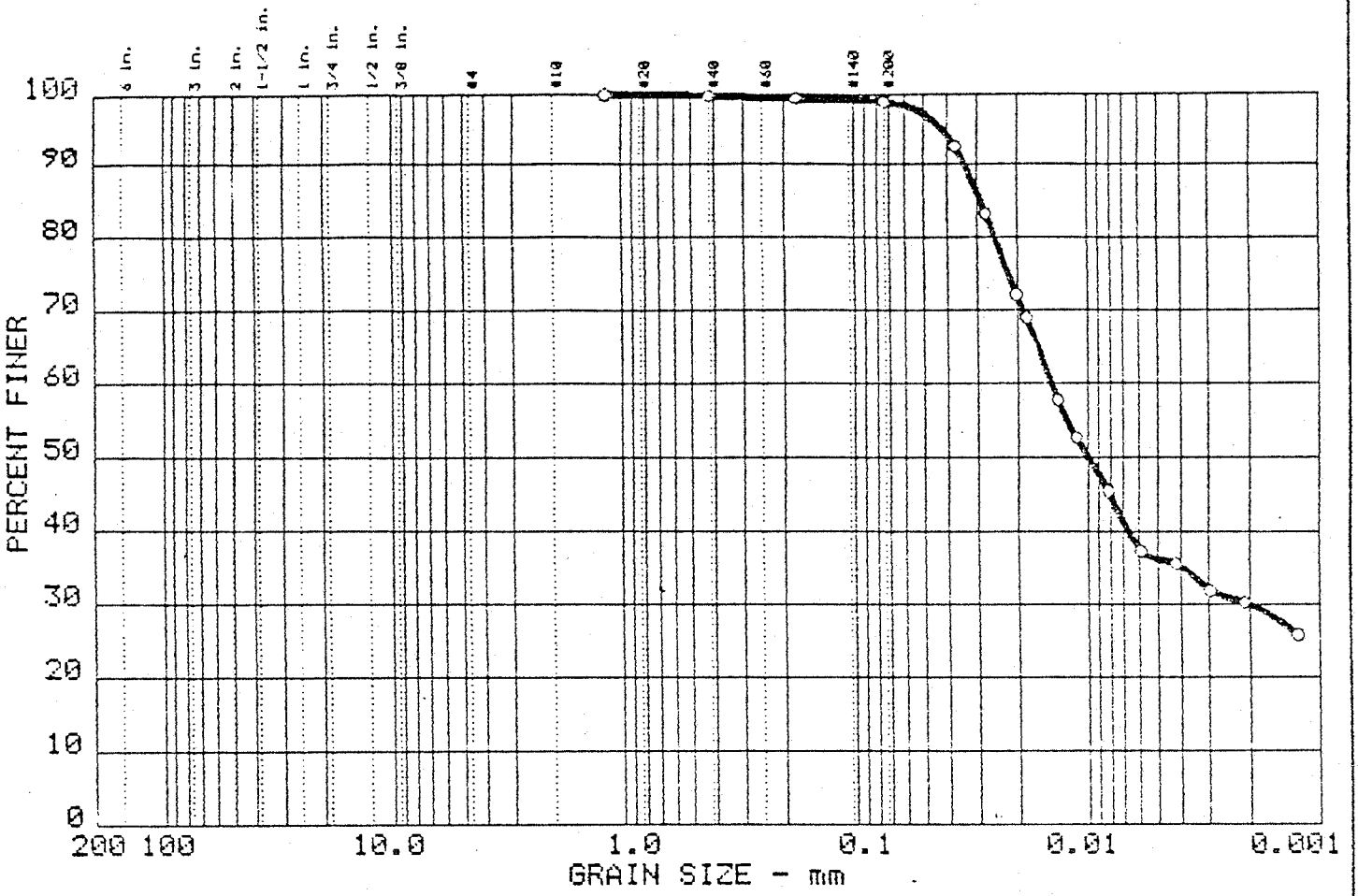
Remarks:
Liquid Limit = 33
Plasticity Index = 11

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K68

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	19	0.0	0.0	1.0	62.9	36.1	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.9		
80	99.5		
200	99.0		

Sample information:
○Lean Clay, trace sand

E9 S5 Sample #1

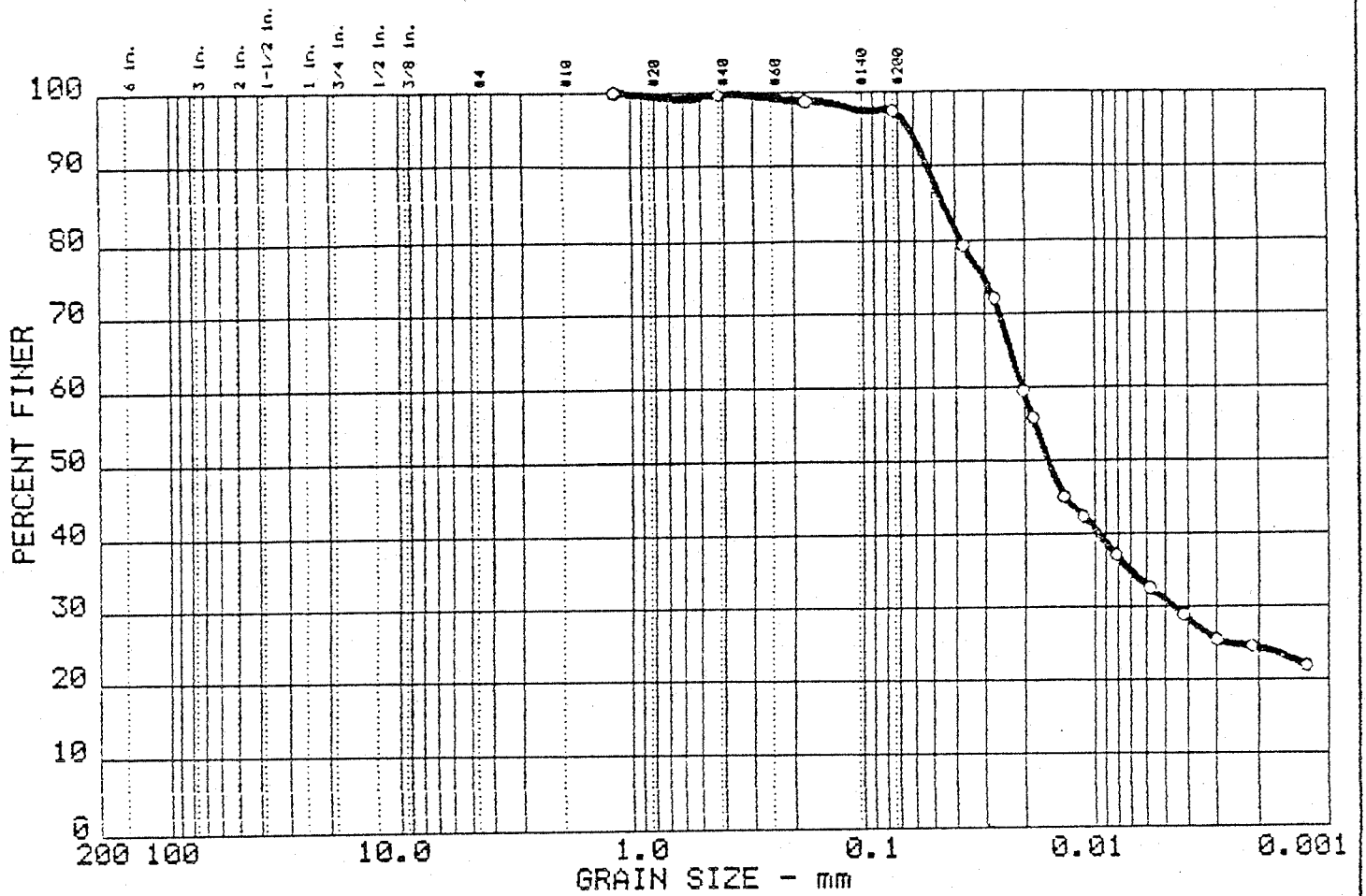
Remarks:
Liquid Limit = 46
Plasticity Index = 20

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: July 15, 1988 Data Sheet No. K57

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	5	0.0	0.0	2.5	66.6	30.9	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.7		
80	98.9		
200	97.5		

Sample information:
○ Lean Clay, trace sand

E9 S5 Sample #2

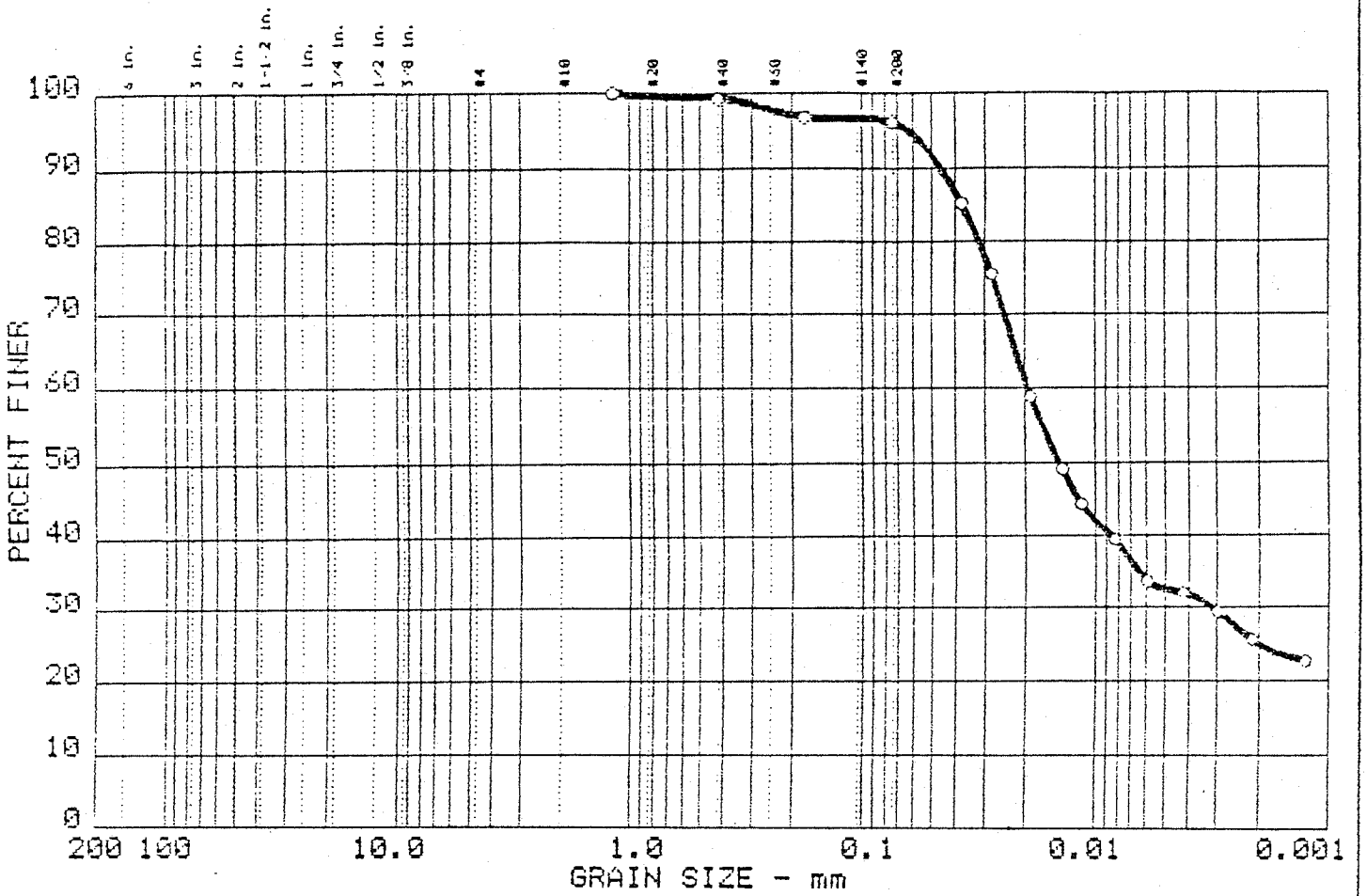
Remarks:
Liquid Limit = 39
Plasticity Index = 15

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K69

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
20	0.0	0.0	3.7	63.9	32.4	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○
16	100.0
40	99.5
80	97.0
200	96.3

Sample information:
○ Lean Clay, little sand

E11 S5 Sample #1

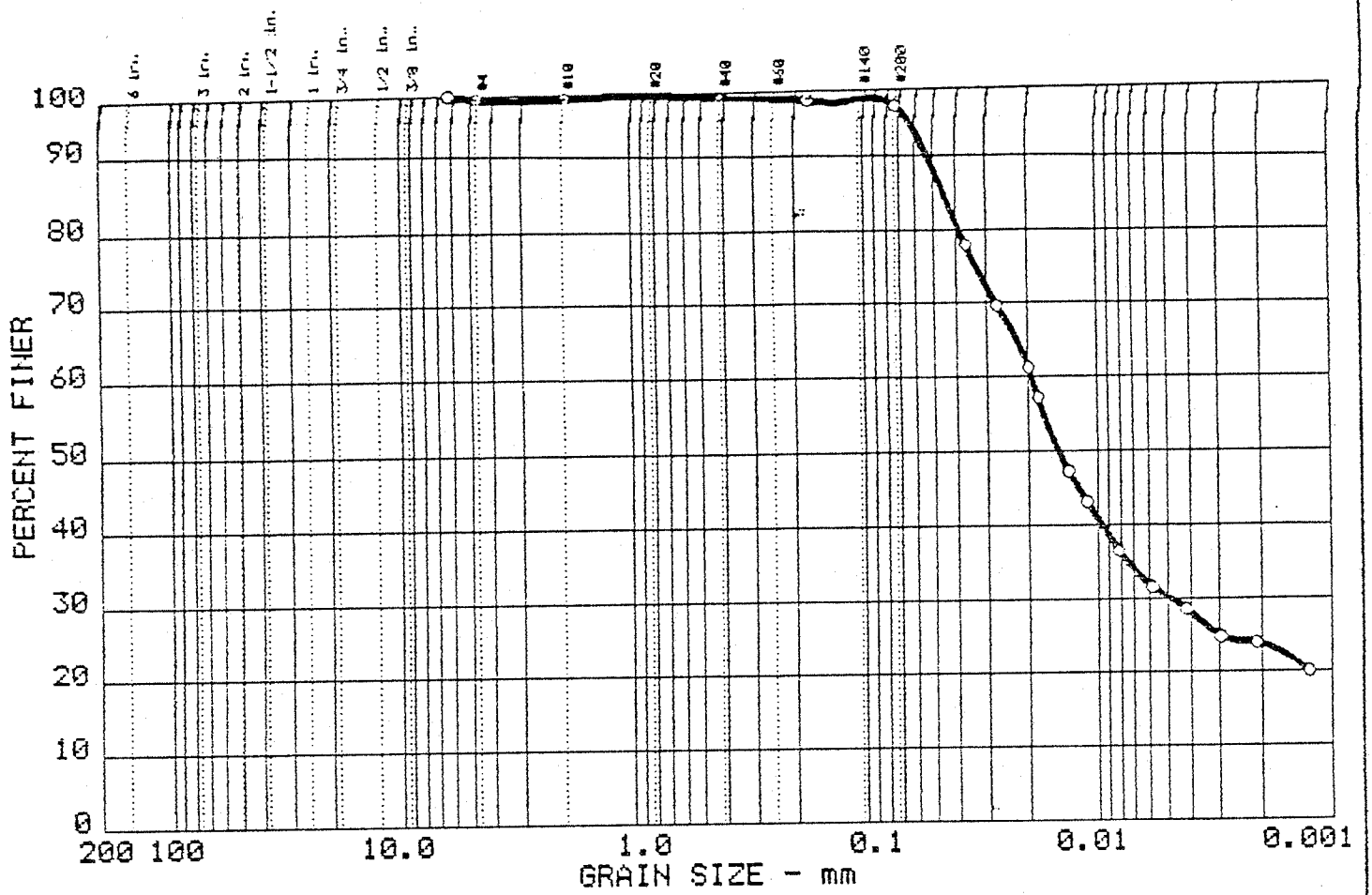
Remarks:
Liquid Limit = 45
Plasticity Index = 20

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: July 15, 1988 Data Sheet No. K58

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	6	0.0	0.5	2.3	67.0	30.2	CL

SIEVE inches size	PERCENT FINER ○		
0.25	100.0		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○		
4	99.5		
10	99.5		
40	99.2		
80	98.2		
200	97.2		

Sample information:
○ Lean Clay, trace sand

E11 S5 Sample #2

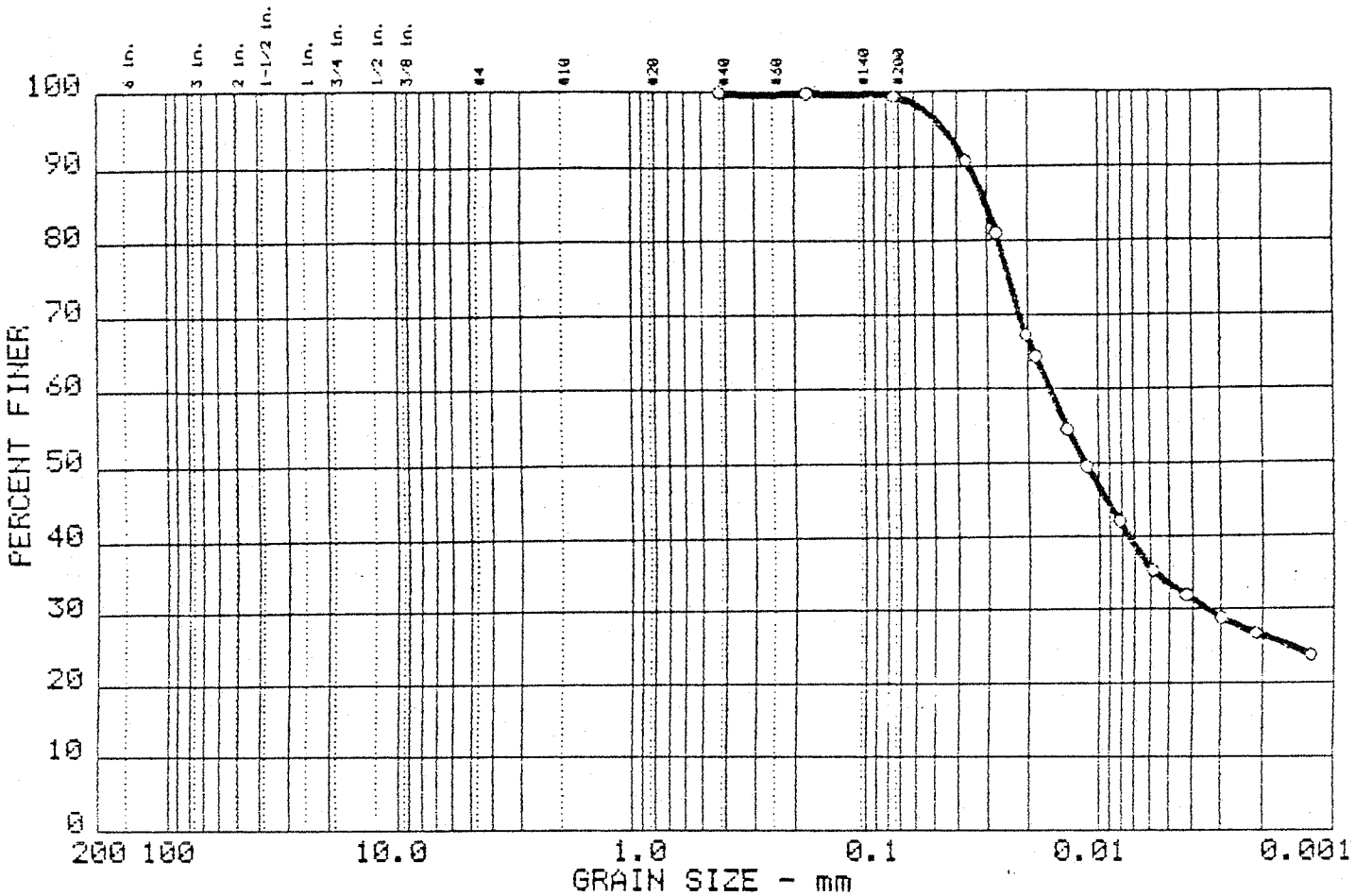
Remarks:
Liquid Limit = 36
Plasticity Index = 12

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K70

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	14	0.0	0.0	0.5	66.1	33.3	CL

SIEVE inches size	PERCENT FINER ○		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.00		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○		
40	100.0		
80	99.9		
200	99.5		

Sample information:
○ Lean Clay, trace sand

E13 S5 Sample #1

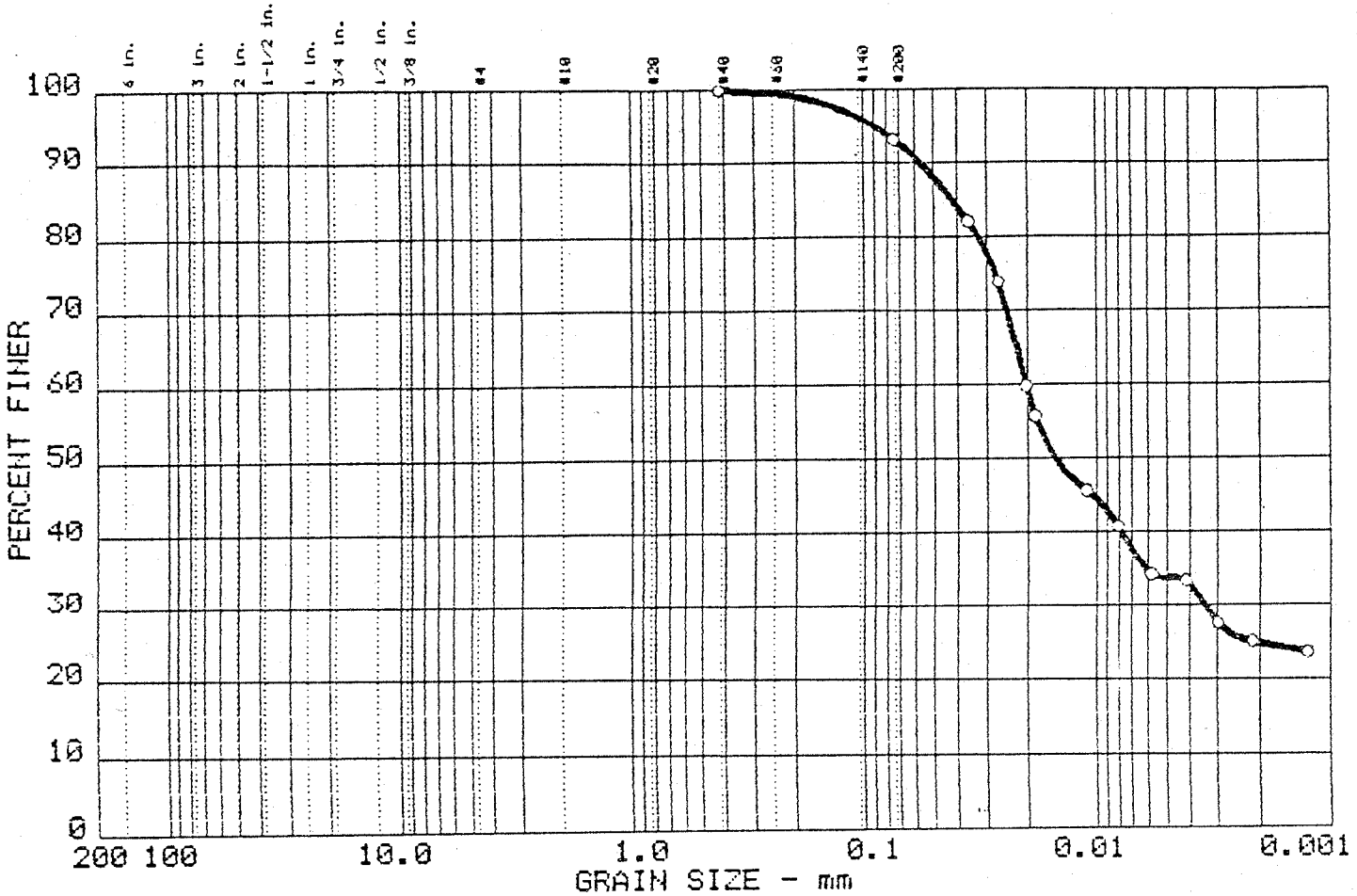
Remarks:
Liquid Limit = 48
Plasticity Index = 21

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: July 15, 1988 Data Sheet No. K59

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	7	0.0	0.0	6.9	59.4	33.7	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
40	100.0		
200	93.1		

Sample information:
○ Lean Clay, little sand

E13 S5 Sample #2

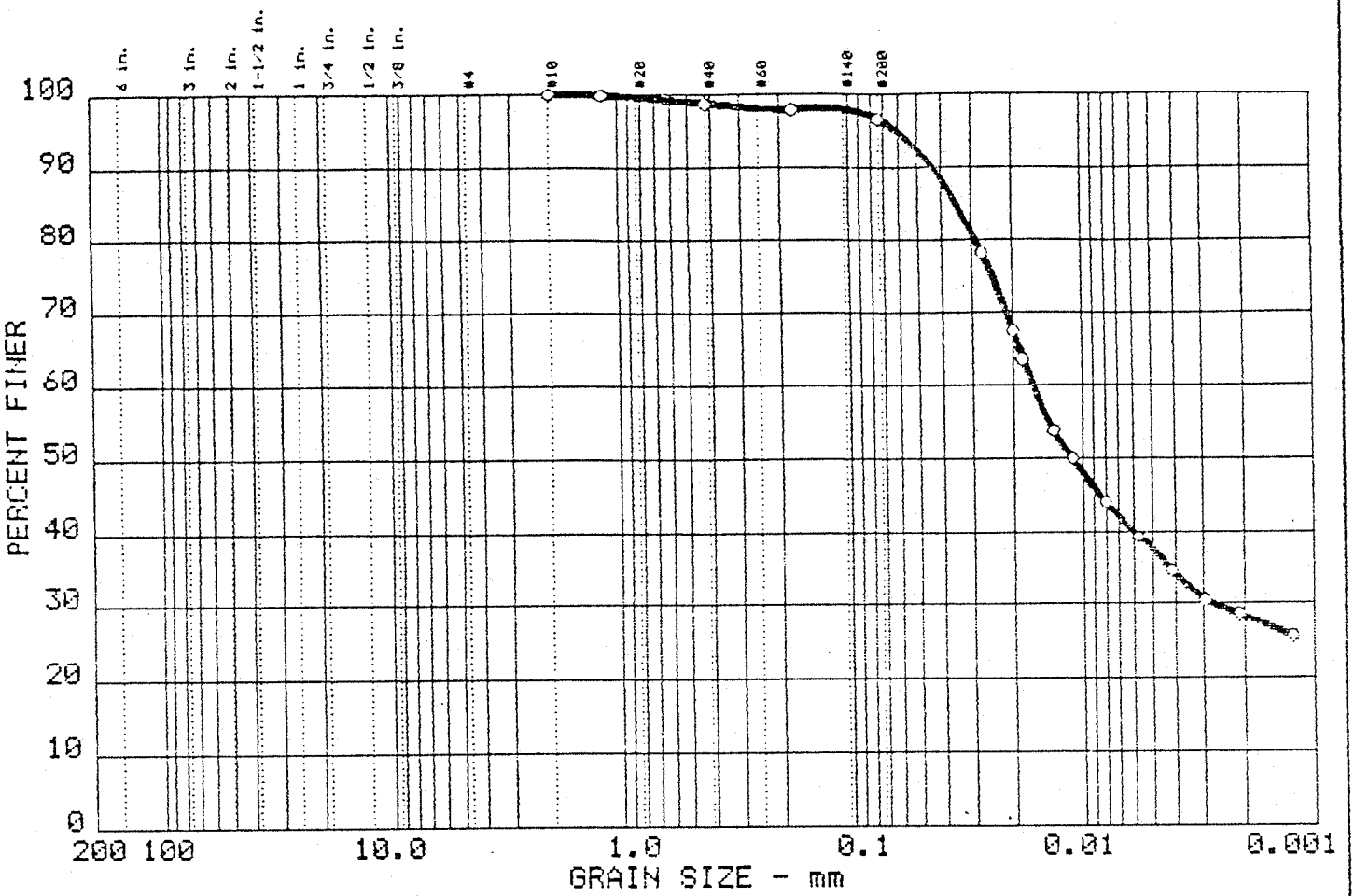
Remarks:
Liquid Limit = 37
Plasticity Index = 13

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K71

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	4	0.0	0.0	3.3	59.5	37.2	ML

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
10	100.0		
16	99.9		
40	98.8		
80	98.0		
200	96.7		

Sample information:
○ Silt, little sand

E15 S5 Sample #1

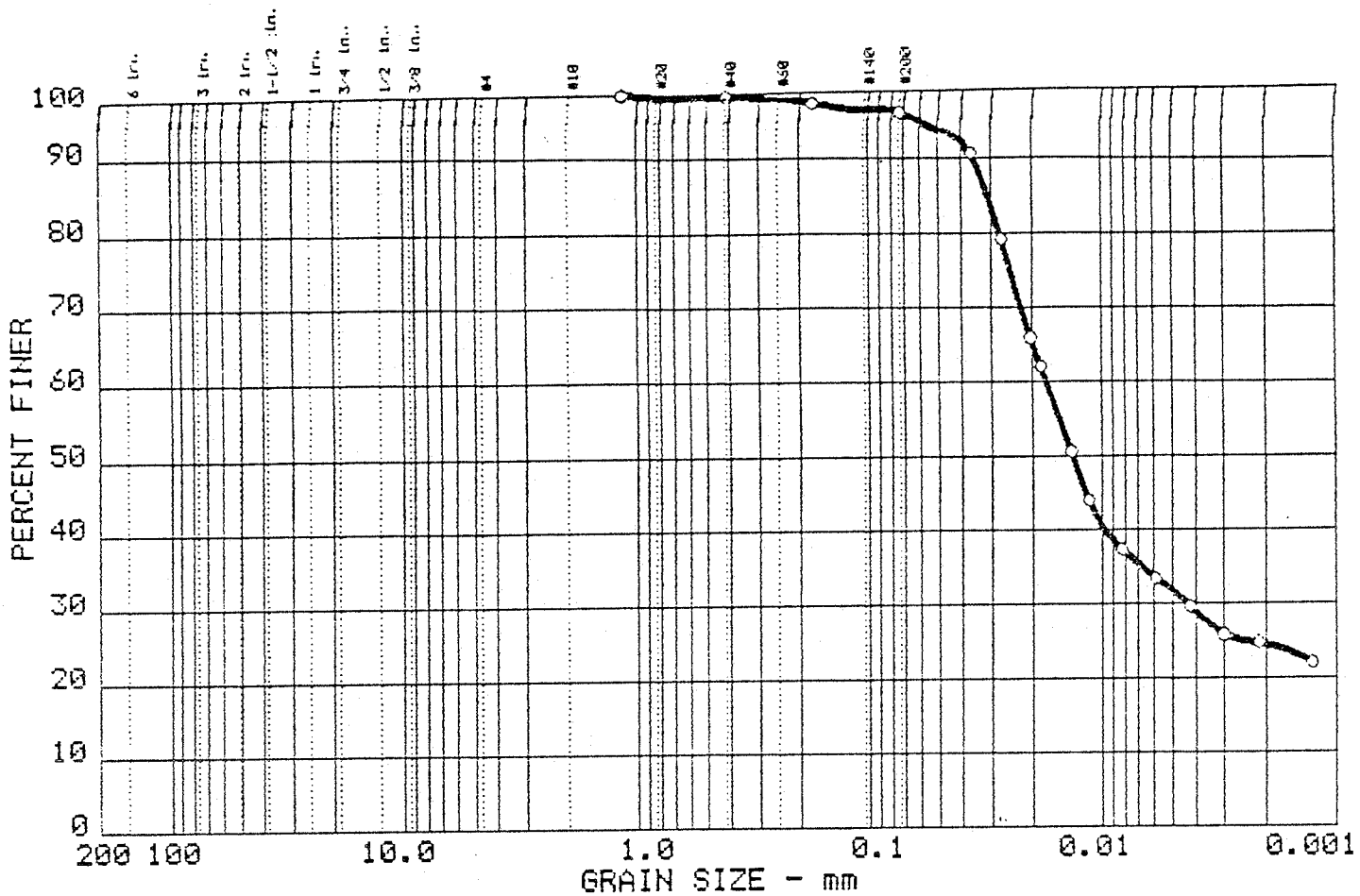
Remarks:
Liquid Limit = 46
Plasticity Index = 18

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K60

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	8	0.0	0.0	3.3	65.1	31.6	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.7		
80	98.0		
200	96.7		

Sample information:
○ Lean Clay, trace sand

E15 S5 Sample #2

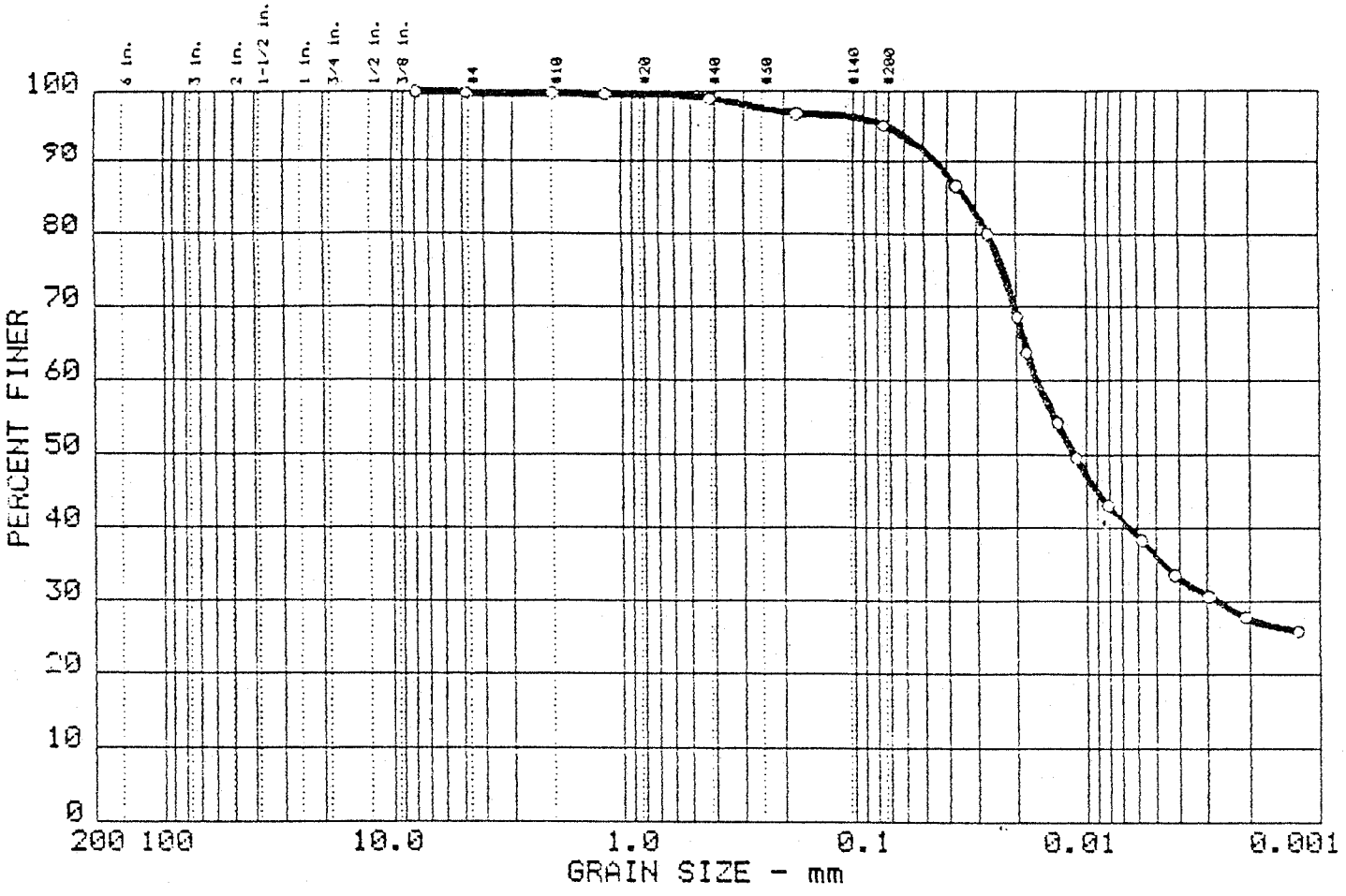
Remarks:
Liquid Limit = 30
Plasticity Index = 11

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K72

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	5	0.0	0.1	4.7	59.2	36.0	CL

SIEVE inches size	PERCENT FINER ○		
0.313	100.0		

GRAIN SIZE			
D_{60} / D_{30} / D_{10}	0.00		

COEFFICIENTS			
C_c / C_u			

SIEVE number size	PERCENT FINER ○		
4	99.9		
10	99.8		
16	99.7		
40	99.0		
80	97.0		
200	95.3		

Sample information:
○ Lean Clay, trace sand

E17 S5 Sample #1

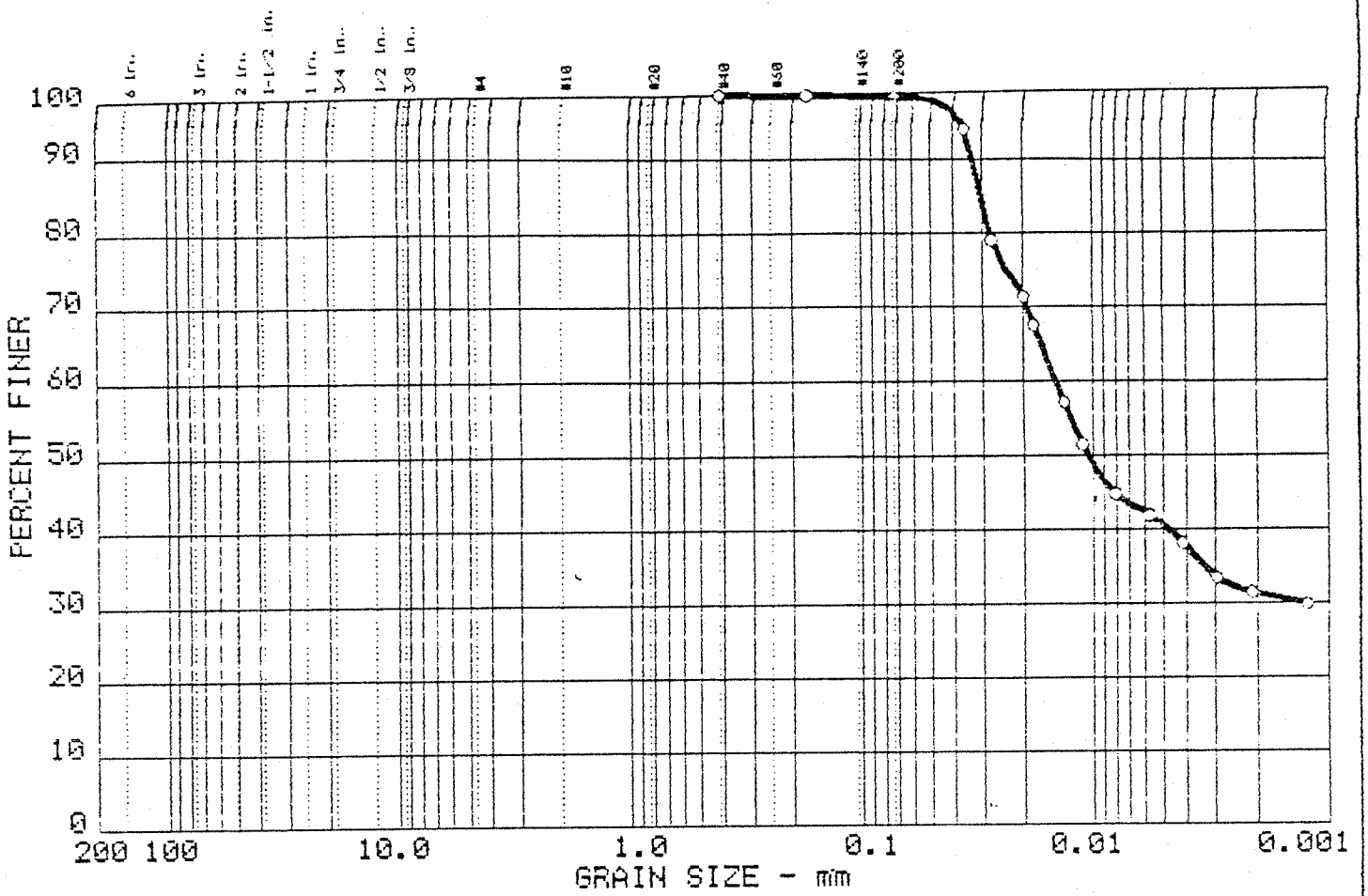
Remarks:
Liquid Limit = 42
Plasticity Index = 19

SOILS & ENGINEERING SERVICES, INC.

Project No.: S721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K61

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	18	0.0	0.0	0.5	58.8	40.7	CL

SIEVE inches size	PERCENT FINER ○
GRAIN SIZE	
D_{60} D_{30} D_{10}	0.00
COEFFICIENTS	
C_c C_u	

SIEVE number size	PERCENT FINER ○
40	100.0
80	99.8
200	99.5

Sample information:
○ Lean Clay

E17 S5 Sample #2

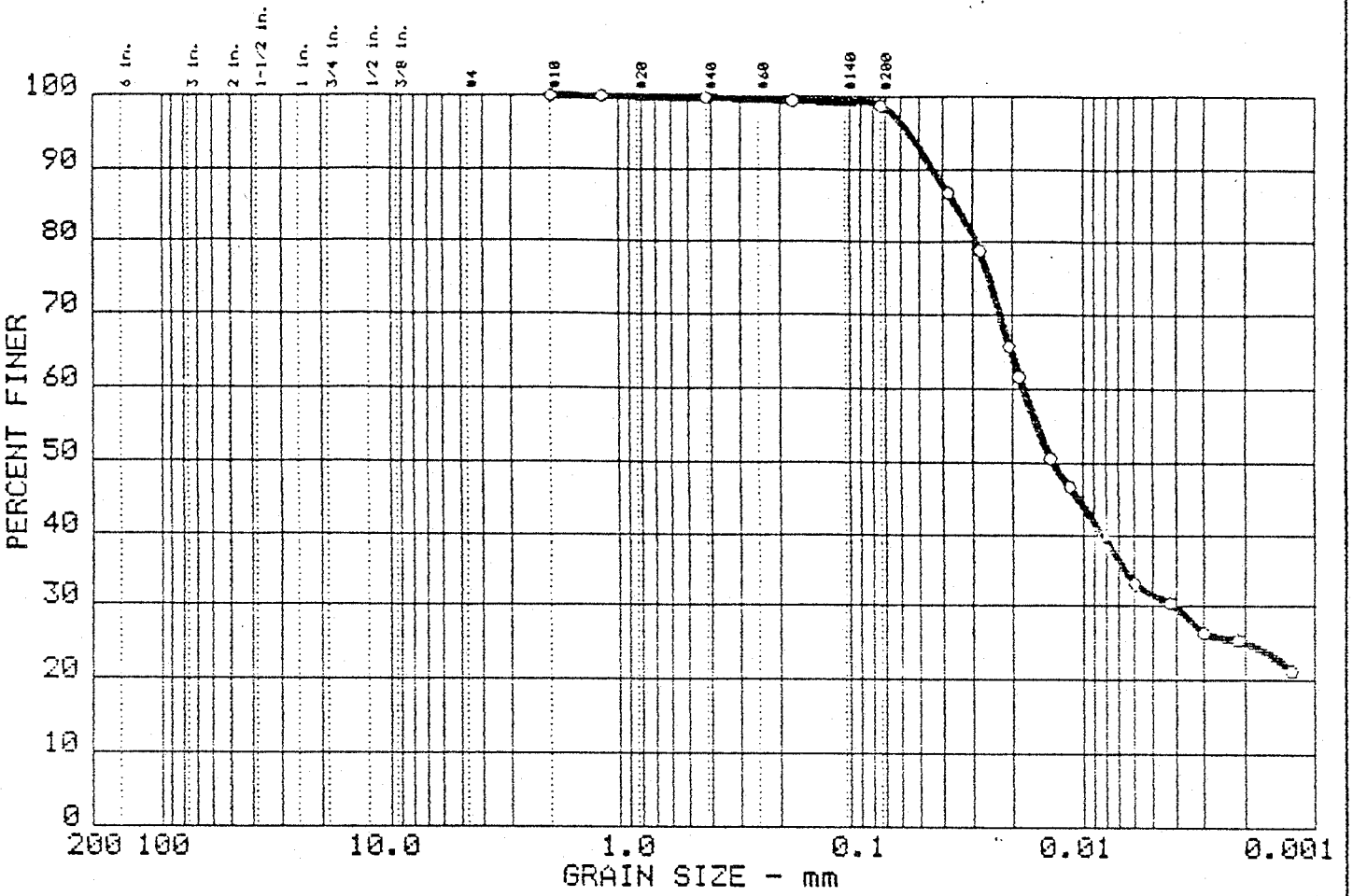
Remarks:
Liquid Limit = 37
Plasticity Index = 16

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K73

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	6	0.0	0.0	1.2	67.3	31.5	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
10	100.0		
16	99.9		
40	99.8		
80	99.4		
200	98.8		

Sample information:
○Lean Clay, trace sand

E19 S5 Sample #1

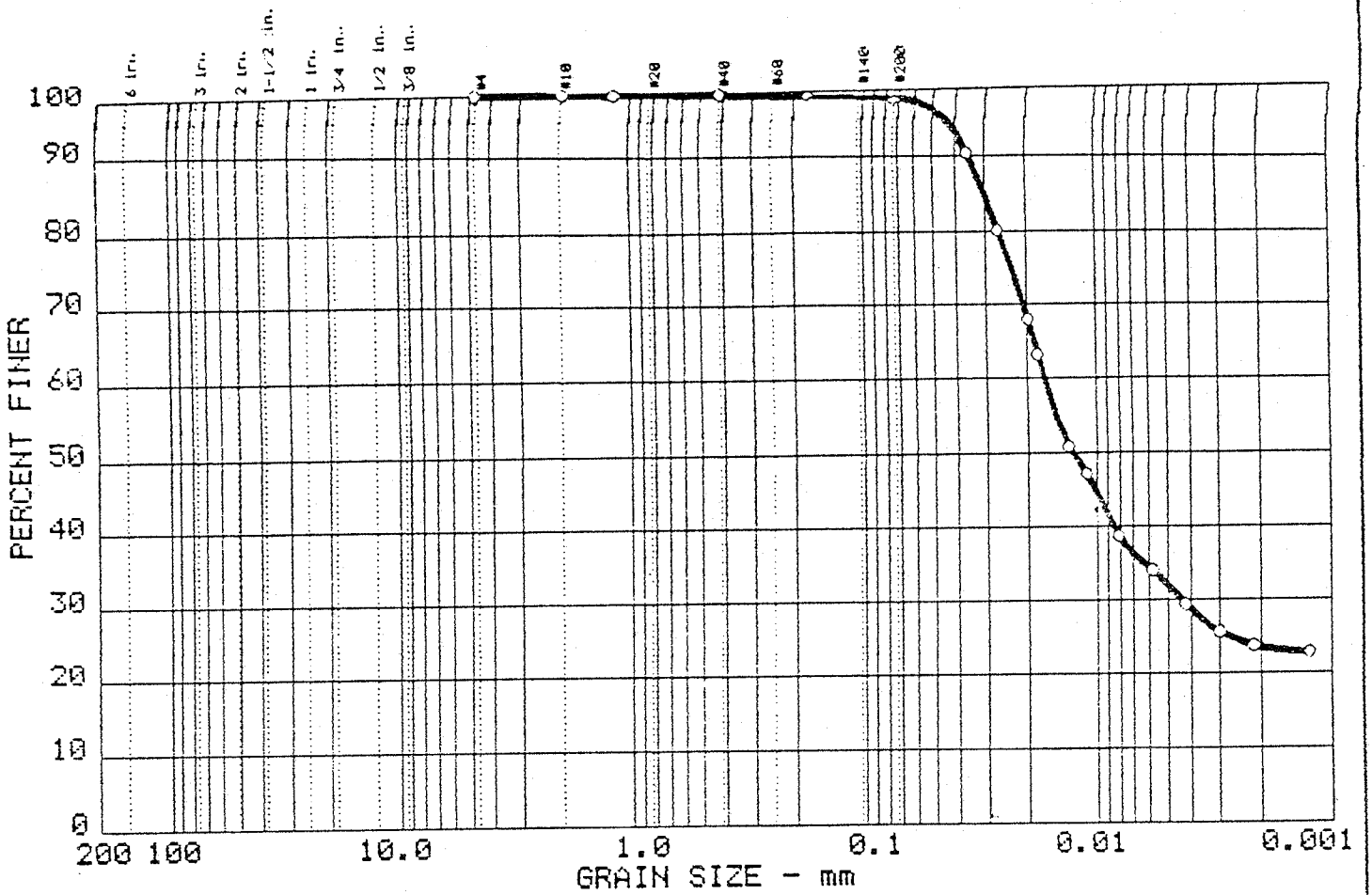
Remarks:
Liquid Limit = 31
Plasticity Index = 10

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K62

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	10	0.0	0.0	1.5	66.5	32.0	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
4	100.0		
10	99.9		
16	99.9		
40	99.8		
80	99.2		
200	98.5		

Sample information:
○ Lean Clay, trace sand

E19 S5 Sample #2

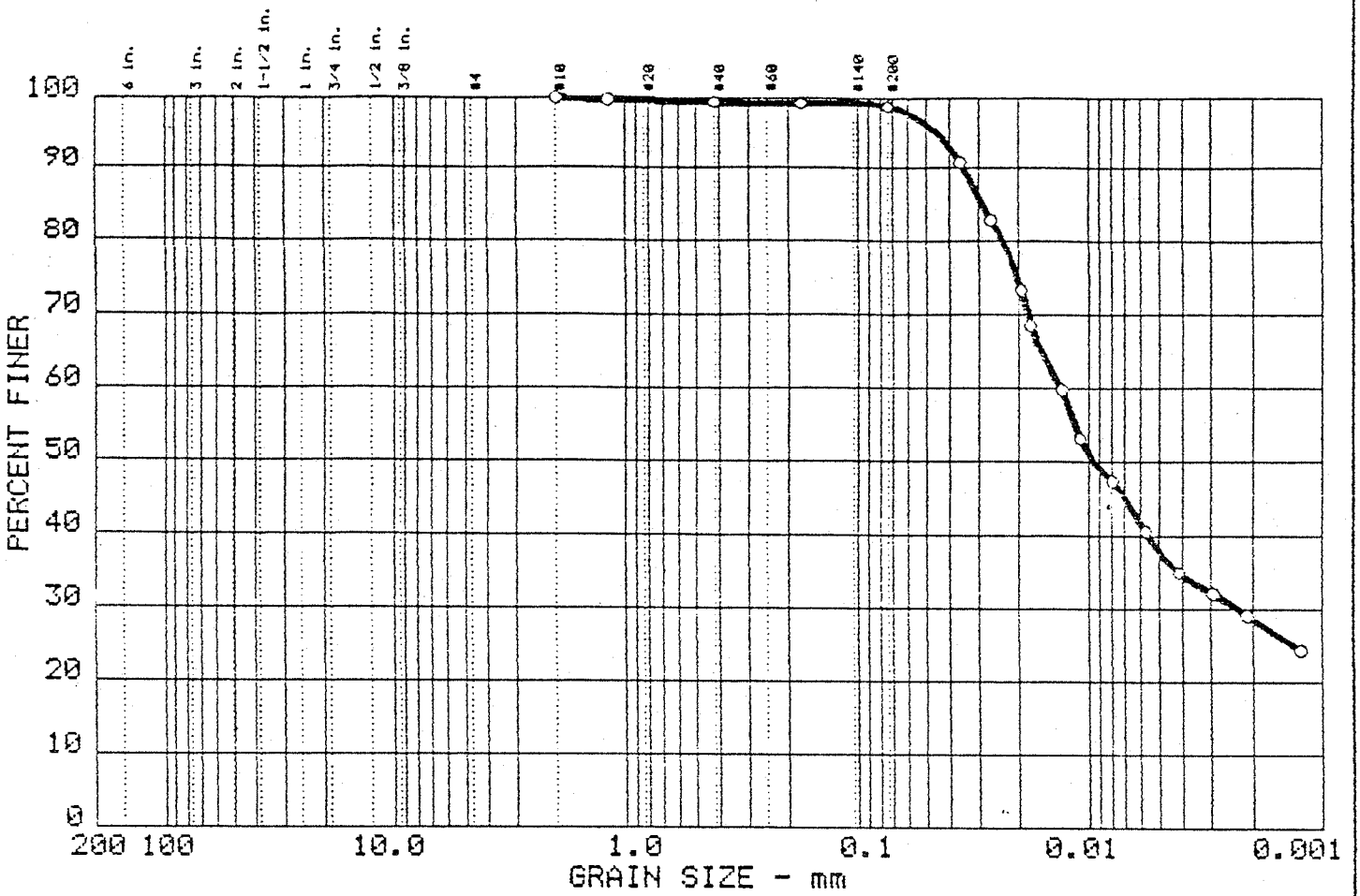
Remarks:
Liquid Limit = 36
Plasticity Index = 15

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K74

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	7	0.0	0.0	1.3	60.8	37.9	CH

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
10	100.0		
16	99.9		
40	99.5		
80	99.2		
200	98.7		

Sample information:
○ Fat Clay, trace sand

E21 S5 Sample #1

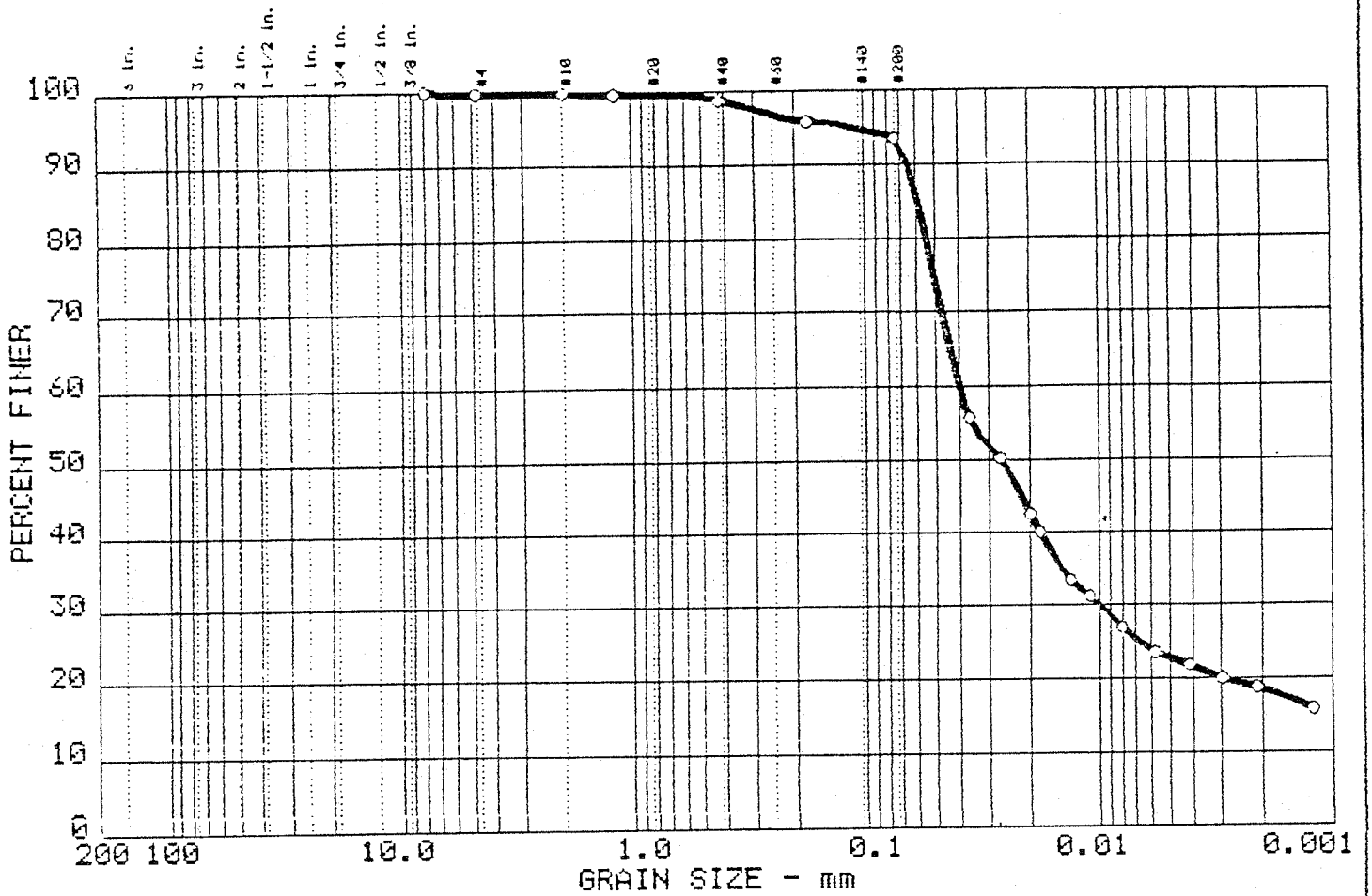
Remarks:
Liquid Limit = 50
Plasticity Index = 23

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K63

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	11	0.0	0.2	6.3	70.7	22.8	CL

SIEVE inches size	PERCENT FINER ○		
0.313	100.0		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.01		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ○		
4	99.8		
10	99.7		
16	99.6		
40	98.9		
80	95.9		
200	93.5		

Sample information:
○ Lean Clay, some sand

E21 S5 Sample #2

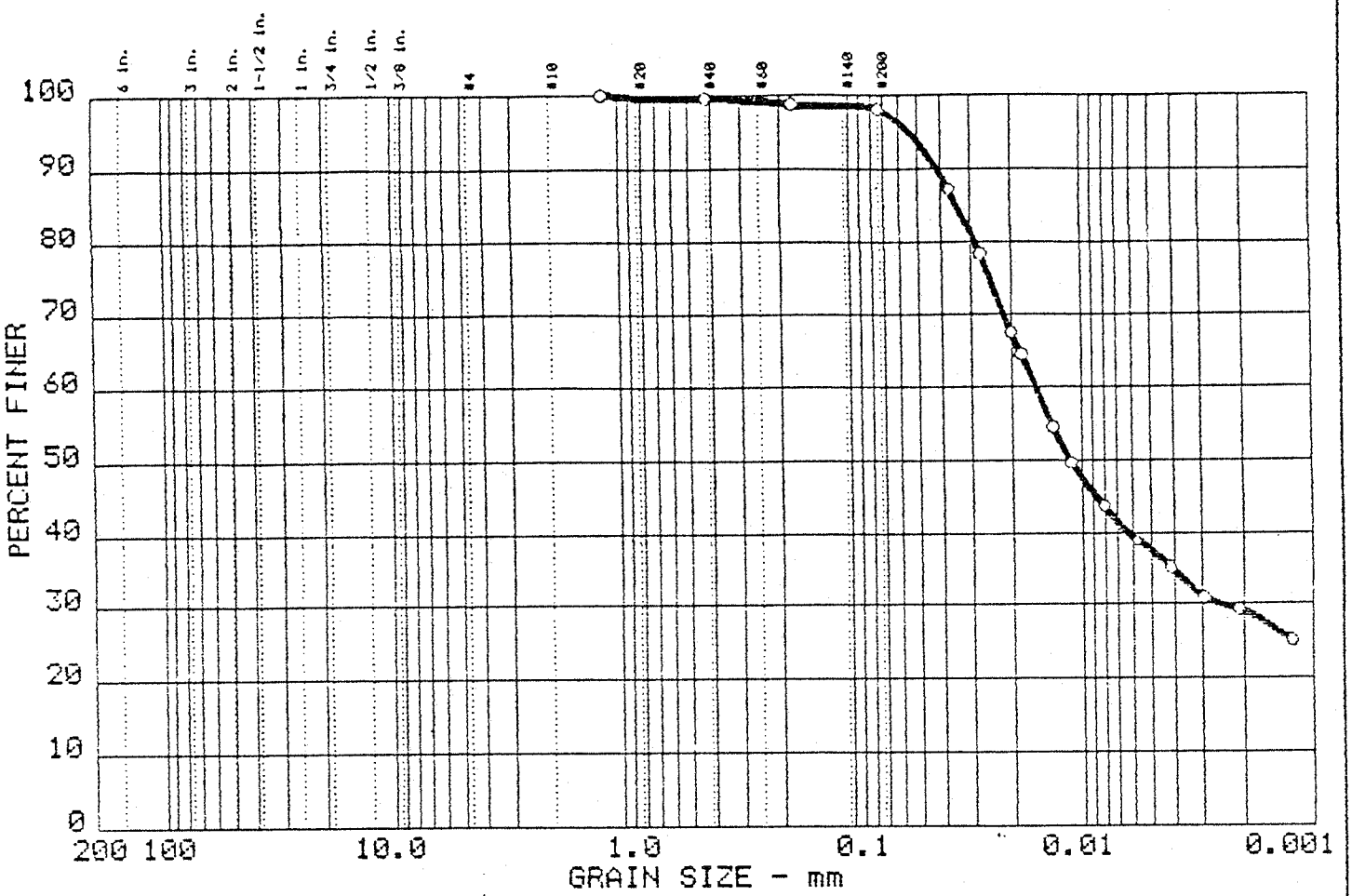
Remarks:
Liquid Limit = 34
Plasticity Index = 14

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K75

PARTICLE SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○ 8	0.0	0.0	1.9	61.0	37.1	CL

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60} D_{30} D_{10}	0.00		
COEFFICIENTS			
C_c C_u			

SIEVE number size	PERCENT FINER ○		
16	100.0		
40	99.6		
80	98.8		
200	98.1		

Sample information:
○ Lean Clay, trace sand

E23 S5 Sample #1

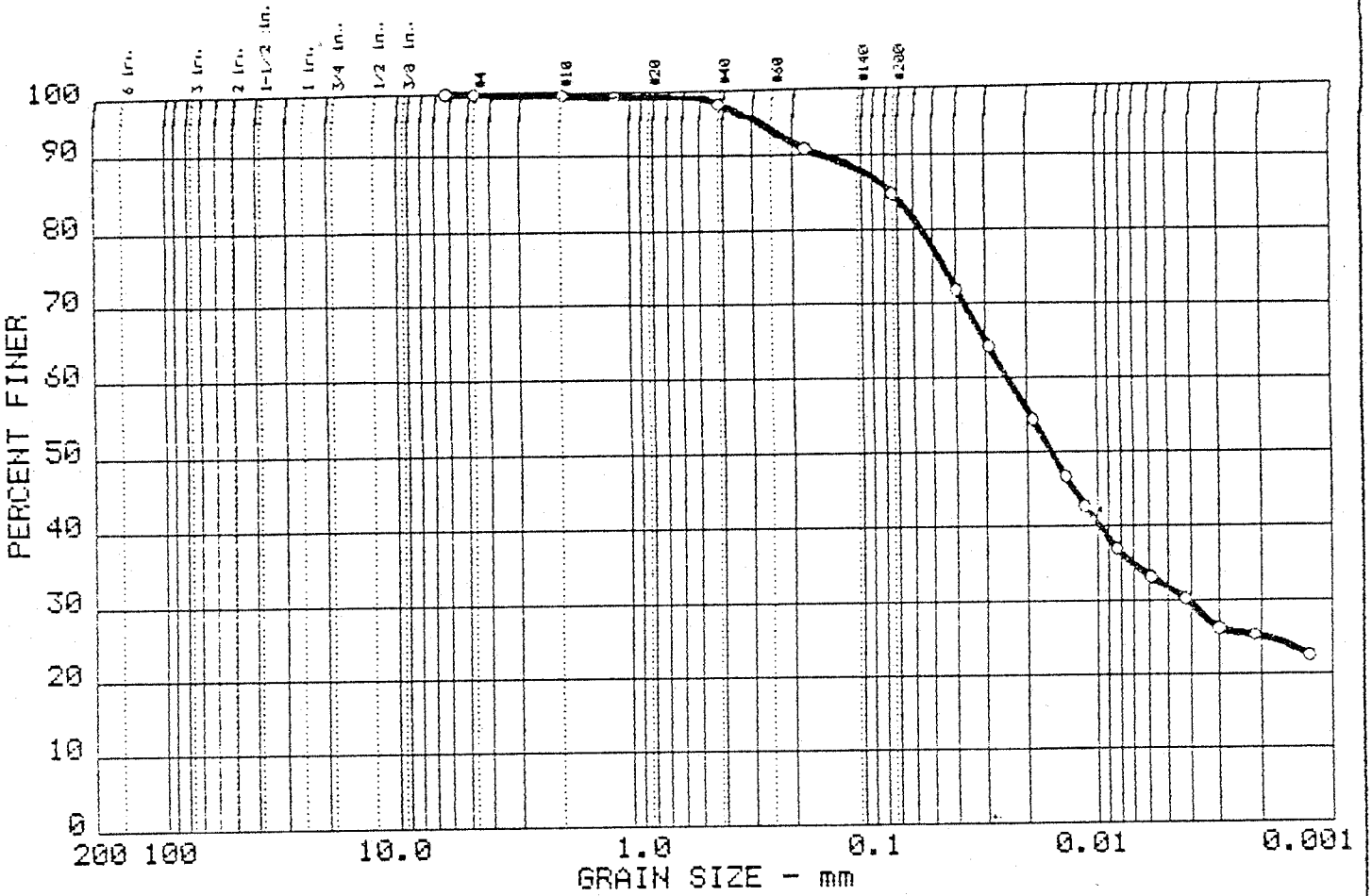
Remarks:
Liquid Limit = 39
Plasticity Index = 12

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 3, 1988 Data Sheet No. K64

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	12	0.0	0.1	15.1	53.1	31.7	CL

SIEVE inches size	PERCENT FINER ○		
0.25	100.0		

GRAIN SIZE	
D_{60}	0.00
D_{30}	
D_{10}	

COEFFICIENTS	
C_c	
C_u	

SIEVE number size	PERCENT FINER ○
4	99.9
10	99.7
16	99.3
40	97.6
80	90.8
200	84.8

Sample information:
○ Lean Clay, some sand

E23 S5 Sample #2

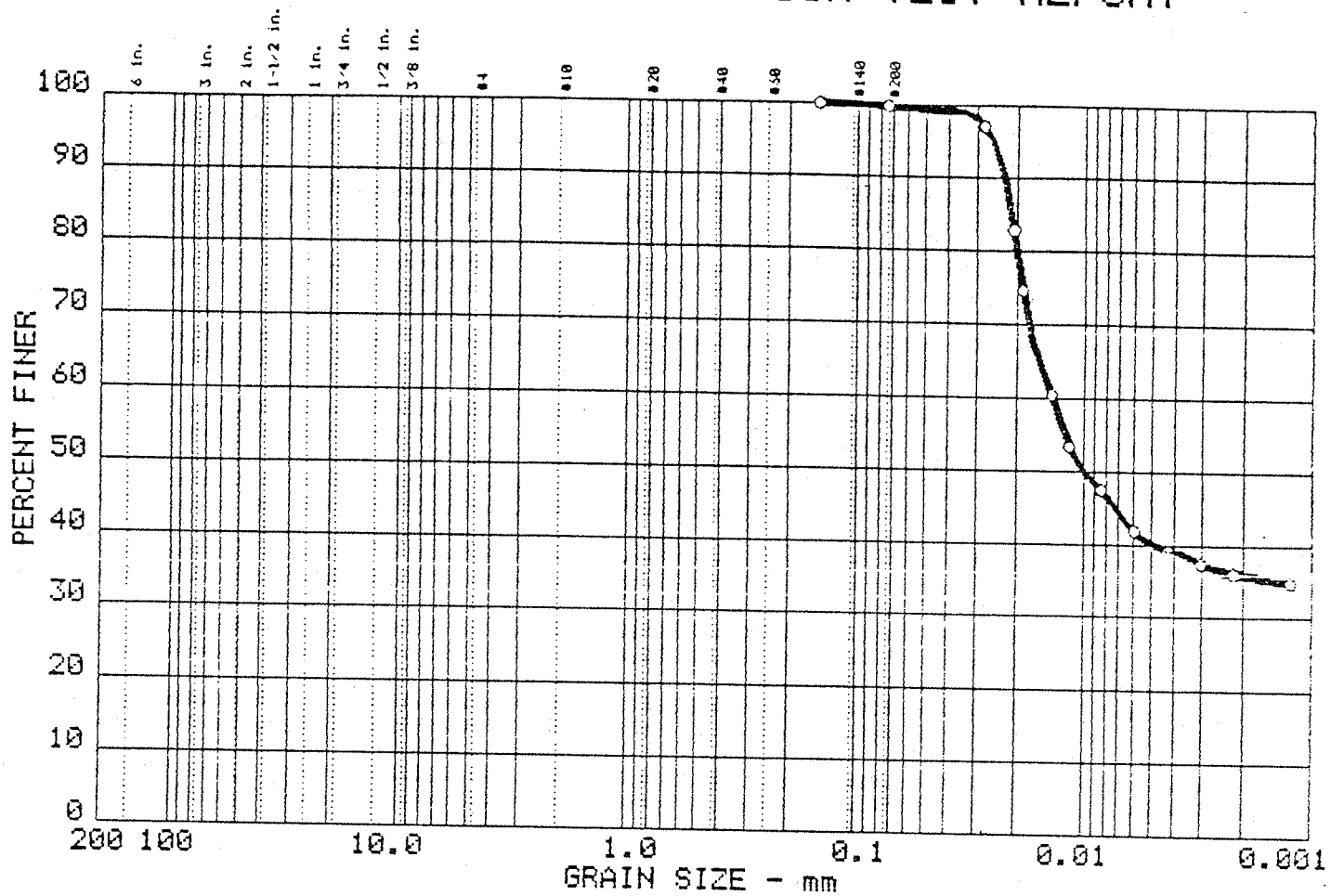
Remarks:
Liquid Limit = 37
Plasticity Index = 16

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 16, 1988 Data Sheet No. K76

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS
○	8	0.0	0.0	0.2	59.6	40.2	CL

SIEVE inches size	PERCENT FINER ○
GRAIN SIZE	
D_{60}	
D_{30}	
D_{10}	
COEFFICIENTS	
C_c	
C_u	

SIEVE number size	PERCENT FINER ○
100	100.0
200	99.8

Sample information:
○ Lean Clay

E5 S7 Sample #1

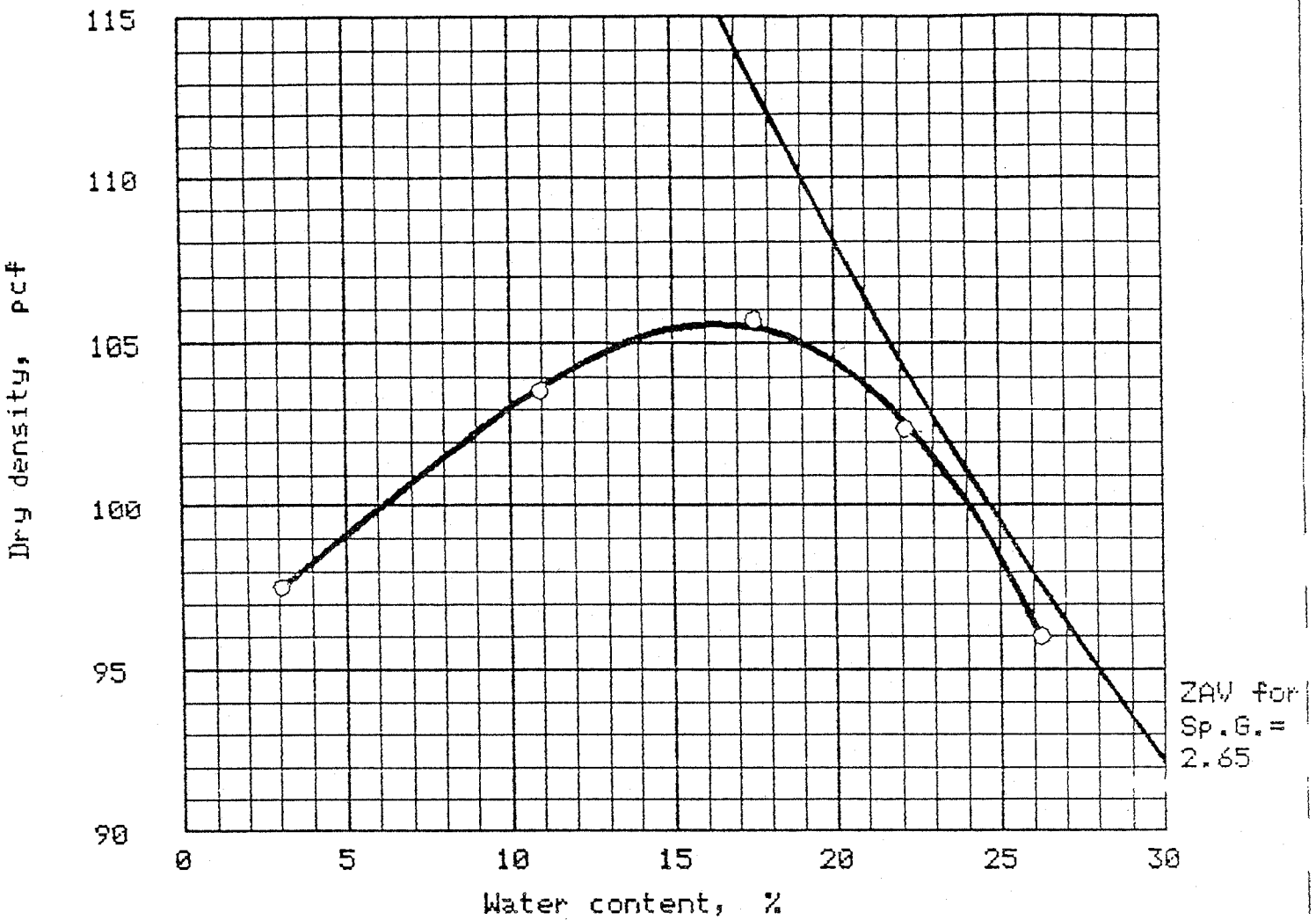
Remarks:
Liquid Limit = 39
Plasticty Index = 16

SOILS & ENGINEERING SERVICES, INC.

Project No.: 8721
Project: Dane County Landfill

Date: August 29, 1988 Data Sheet No. K 103

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CH			51	27	0.0 %	0.1 %	99.6 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 16.4 % Maximum dry density = 105.6 pcf	Fat Clay

Project No.: 8721
Project: Dane County Landfill
Location: E7 S3 Sample #1

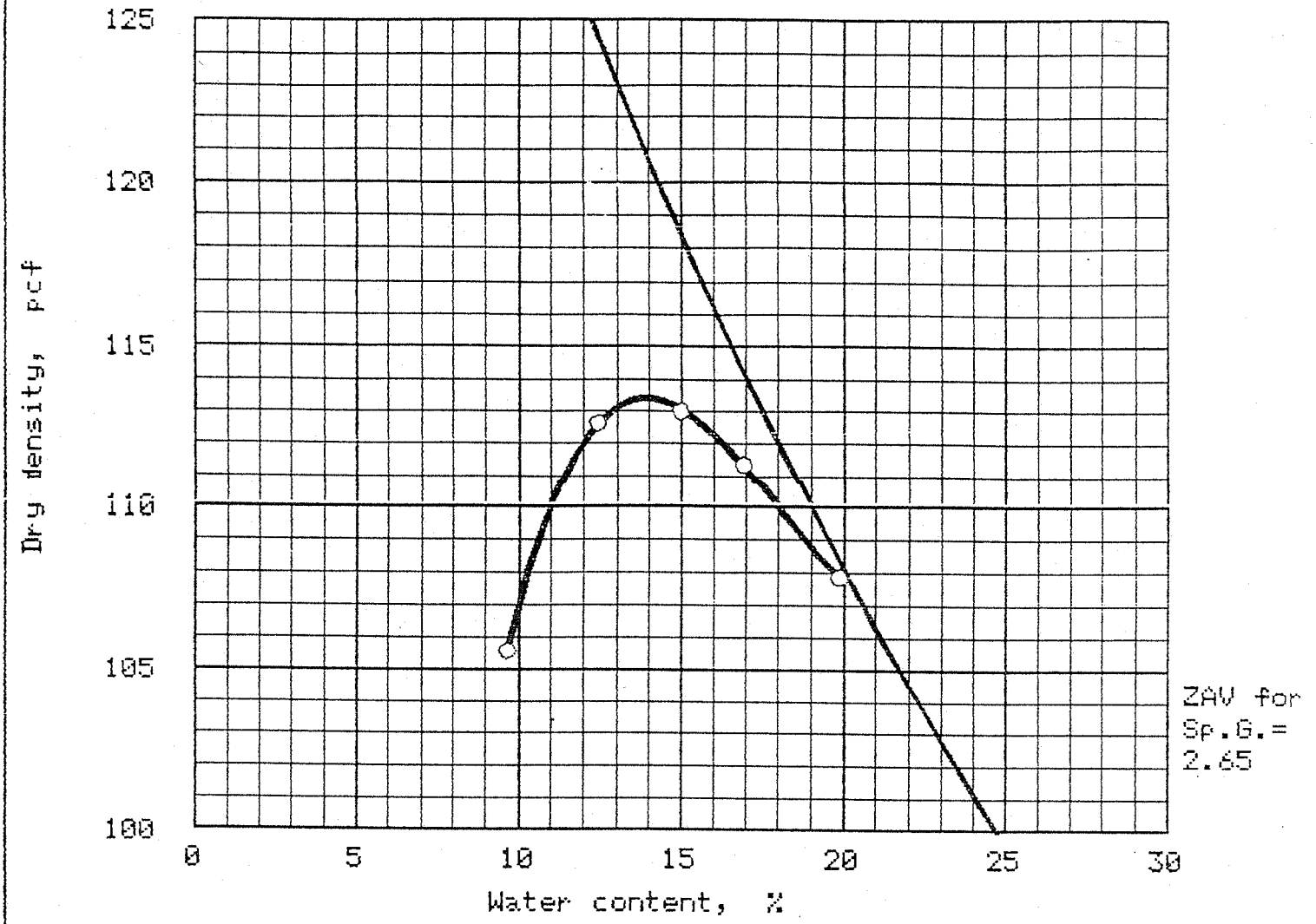
Date: November 1, 1988 ,

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K90

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			46	23	0.0 %	0.0 %	99.6 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 13.9 % Maximum dry density = 113.4 pcf	Lean Clay

Project No.: 8721
Project: Dane County Landfill
Location: E9 S3 Sample #1

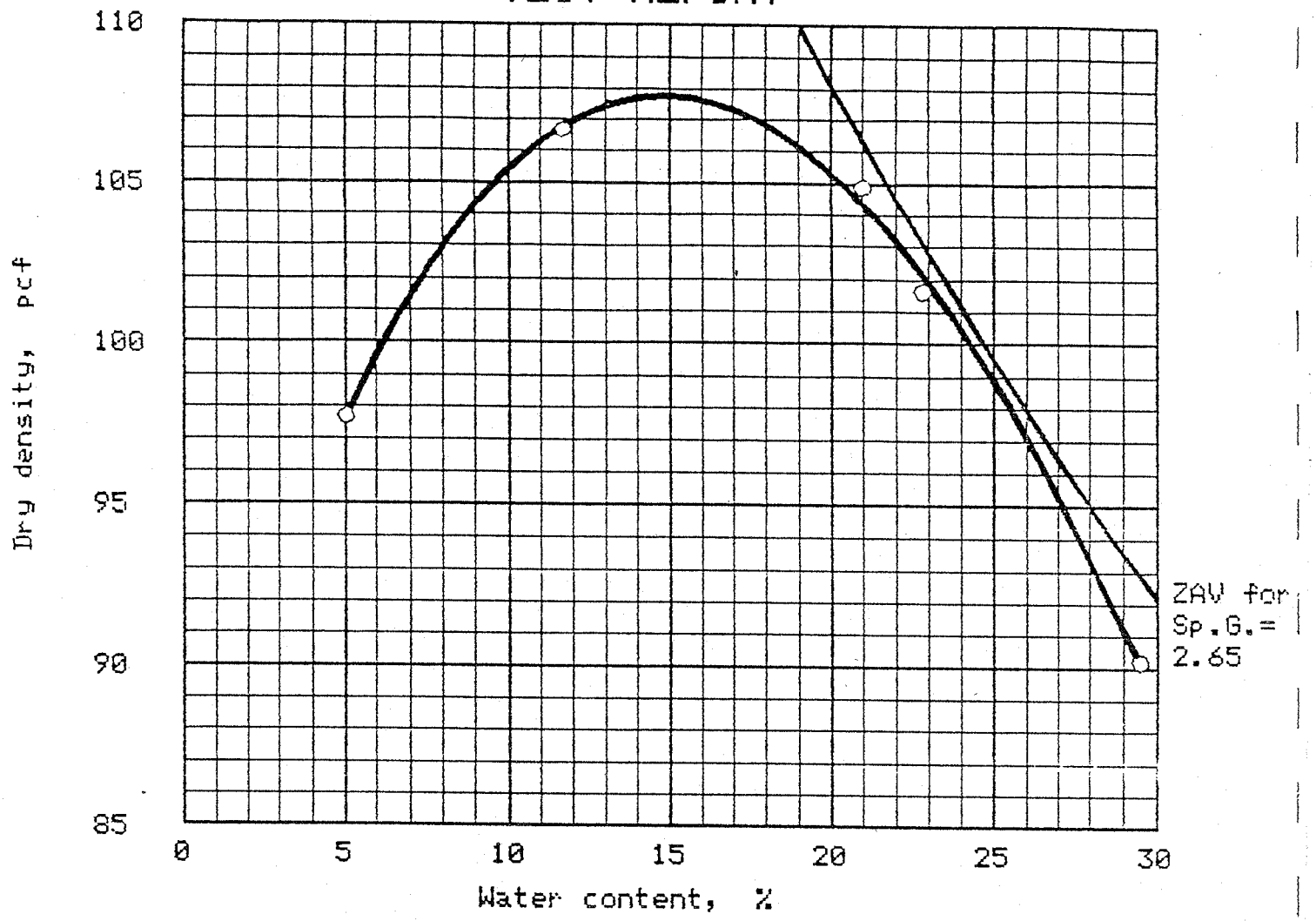
Date: December 5, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K91

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	MH			50	28	0.0 %	0.0 %	99.7 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 14.8 % Maximum dry density = 107.7 pcf	Elastic Silt

Project No.: 8721
Project: Dane County Landfill
Location: E11 S3 Sample #1

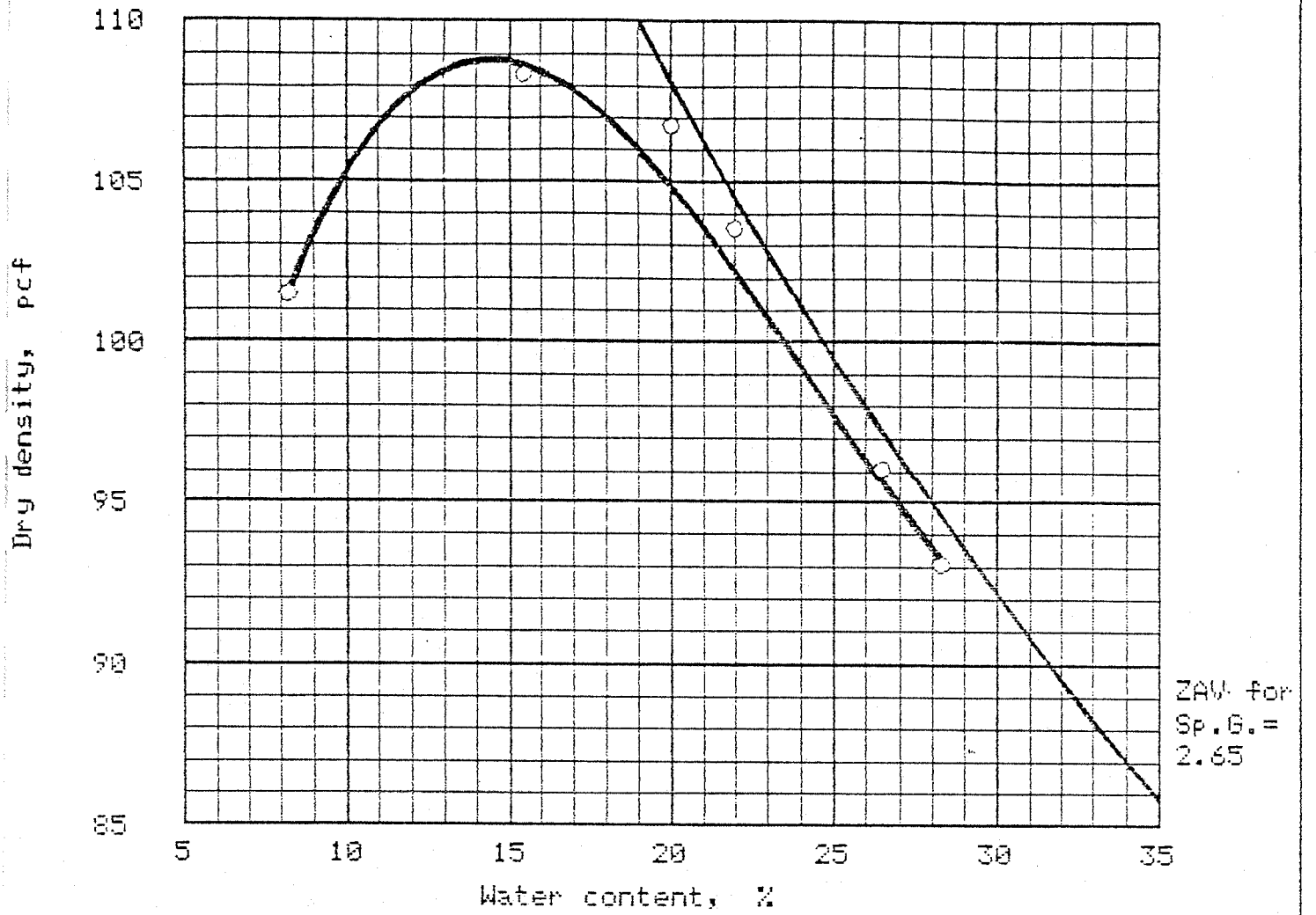
Date: November 1, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K92

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CH			64	43	0.0 %	0.1 %	99.1 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 14.4 % Maximum dry density = 108.8 pcf	Fat Clay, trace sand

Project No.: 8721
Project: Dane County Landfill
Location: E13 S3 Sample #1

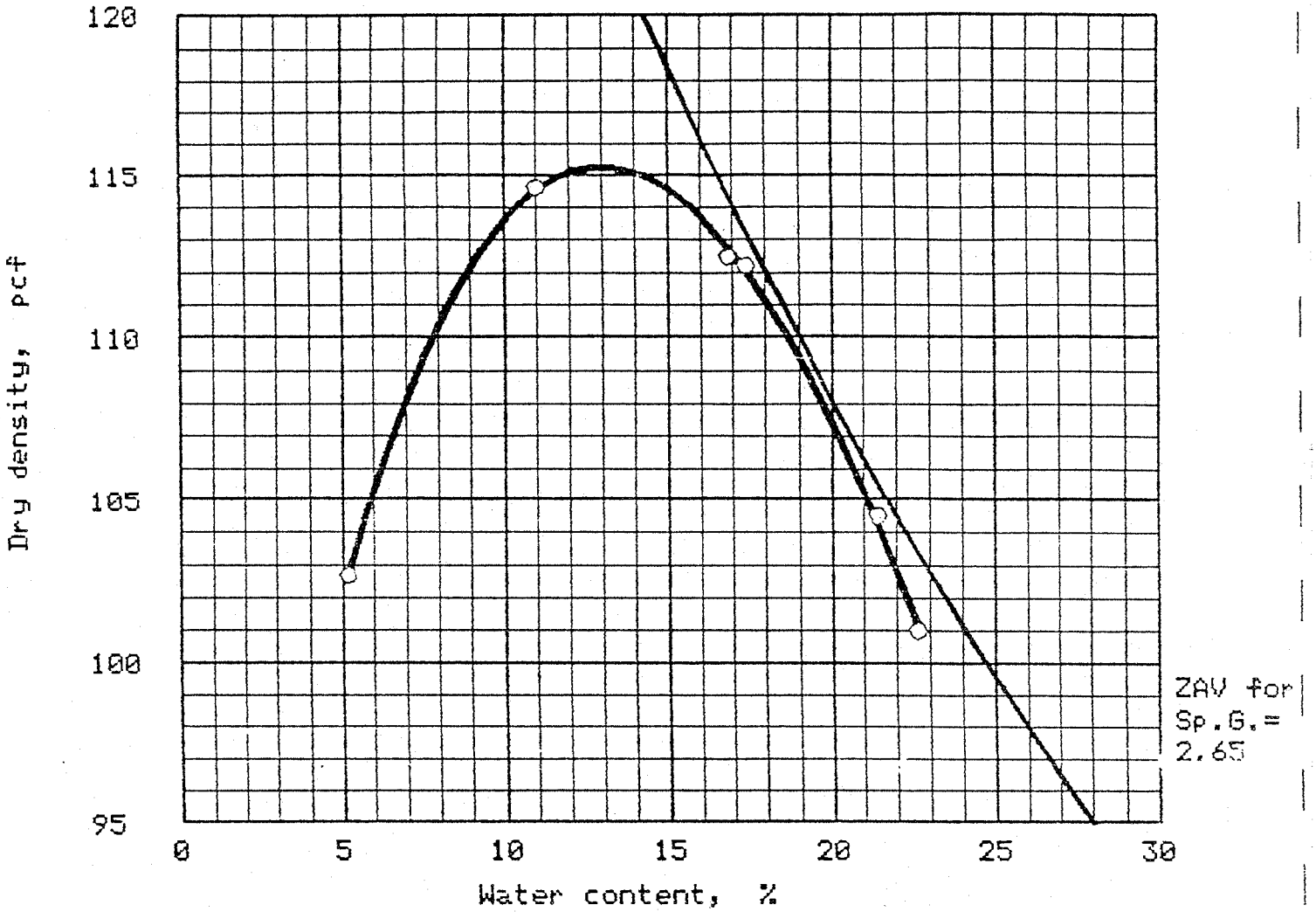
Date: August 4, 1988

Remarks:

SOILS & ENGINEERING SERVICES, INC.

Figure No. K93

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			38	17	0.0 %	.1 %	96.9 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 13.0 % Maximum dry density = 115.3 pcf	Lean Clay, trace sand

Project No.: 8721
Project: Dane County Landfill
Location: E1 S5 Sample #2

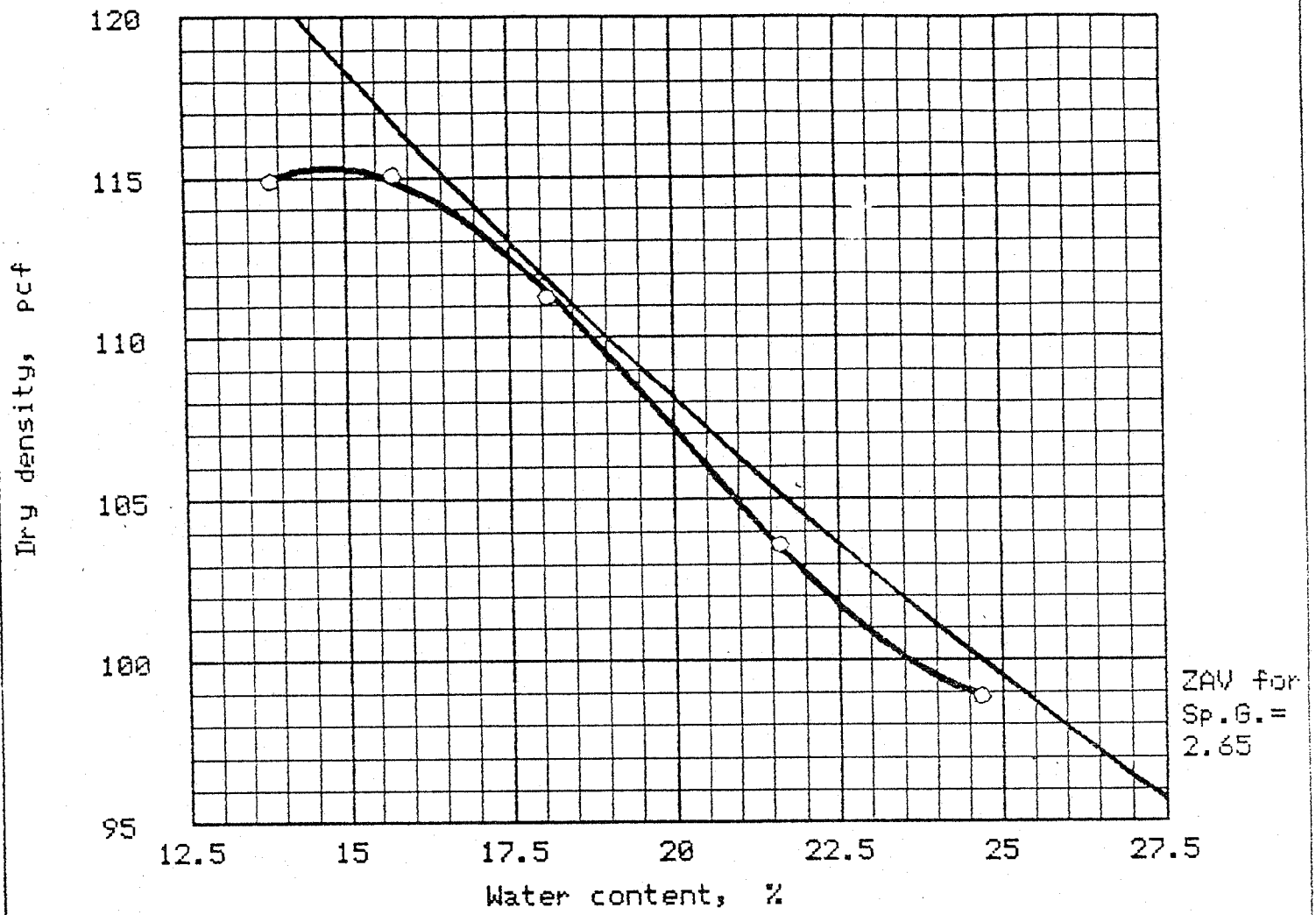
Date: November 1, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K96

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			33	11	0.0 %	.0 %	98.2 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 14.7 % Maximum dry density = 115.3 pcf	Lean Clay, trace sand

Project No.: 8721
Project: Dane County Landfill
Location: E5 S5 Sample #2

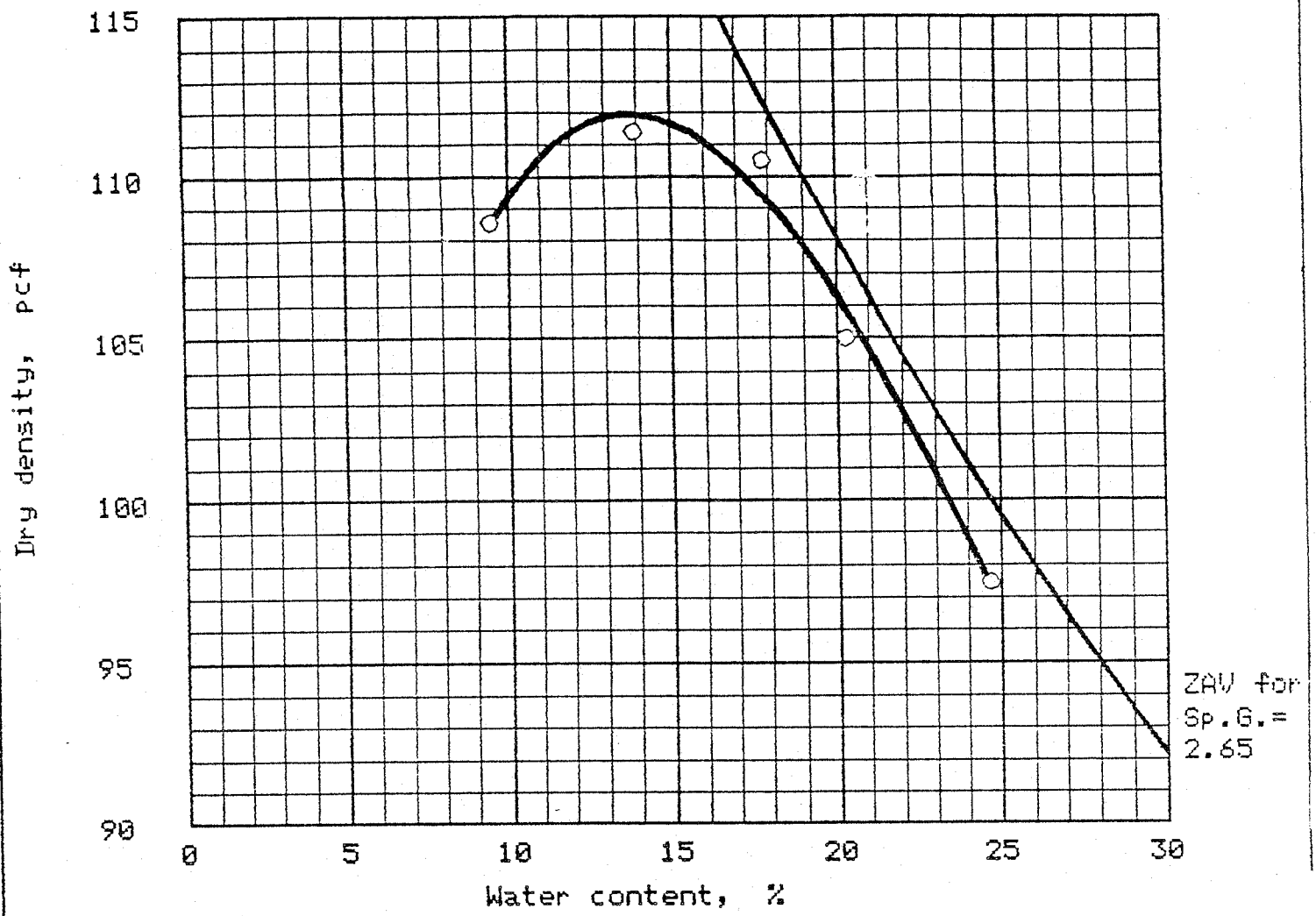
Date: November 1, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K97

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			39	15	.0 %	.0 %	97.5 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 13.7 % Maximum dry density = 111.9 pcf	Lean Clay, trace sand

Project No.: 8721
Project: Dane County Landfill
Location: E9 S5 Sample #2

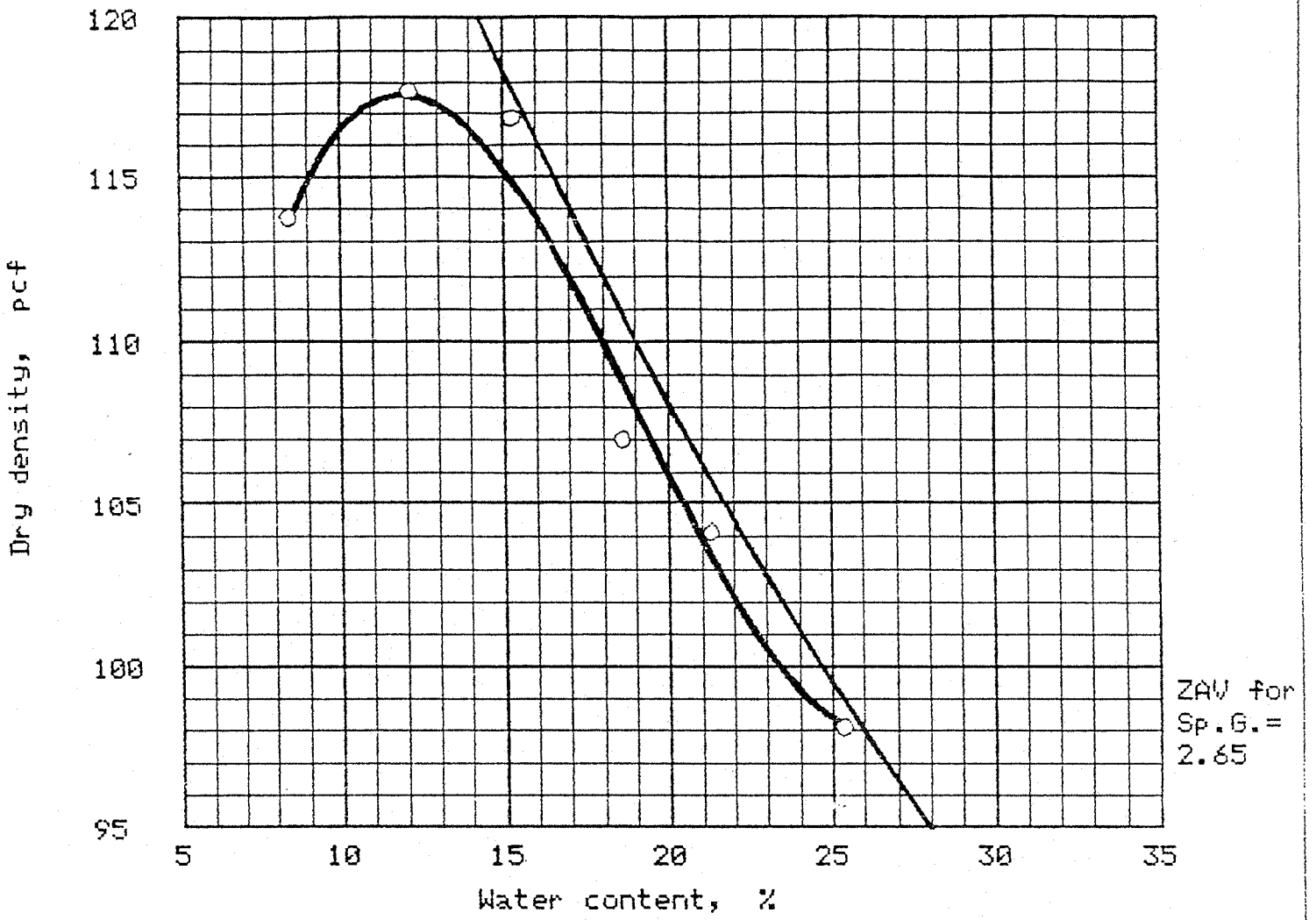
Date: November 1, 1988

Remarks:

SOILS & ENGINEERING SERVICES, INC.

Figure No. K98

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			30	11	.0 %	.0 %	96.7 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 11.9 % Maximum dry density = 117.6 pcf	Lean Clay, trace sand

Project No.: 8721
Project: Dane County Landfill
Location: E15 S5 Sample #2

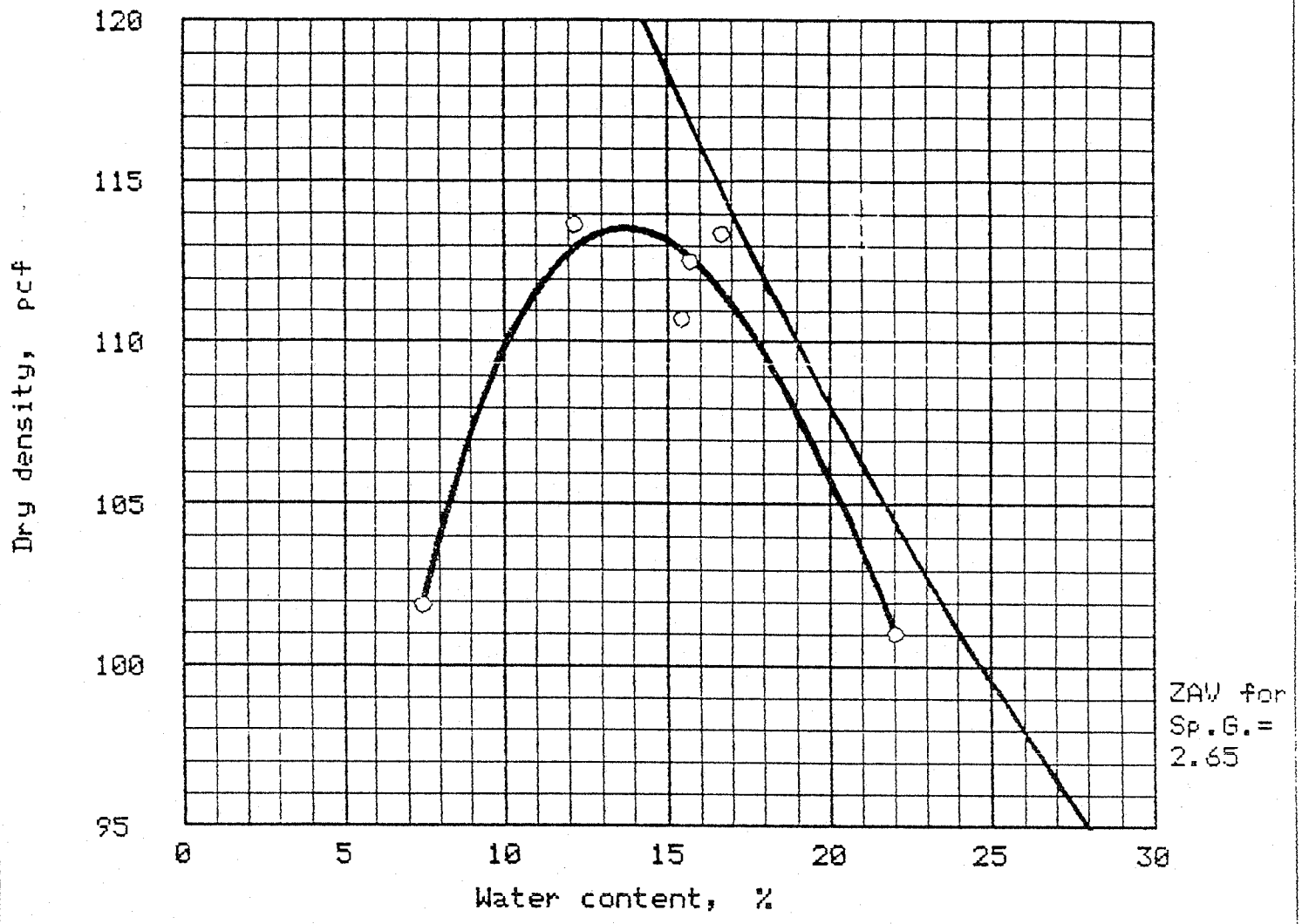
Date: November 1, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K99

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			42	19	0.0 %	0.1 %	95.3 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 13.7 % Maximum dry density = 113.6 pcf	Lean Clay, trace sand

Project No.: 8721
Project: Dane County Landfill
Location: E17 S5 Sample #1

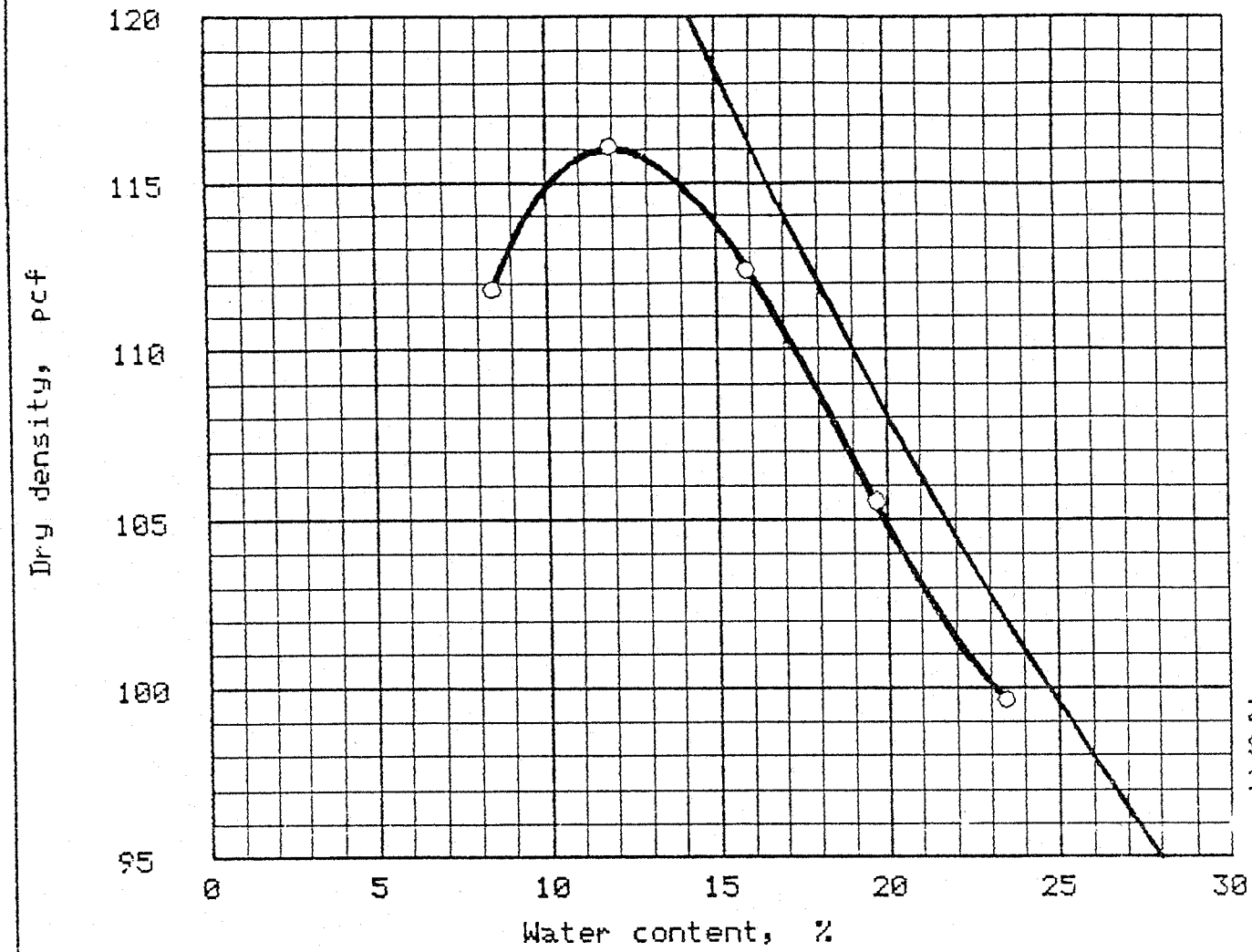
Date: November 1, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K95

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			36	15	.0 %	.0 %	98.5 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 11.9 % Maximum dry density = 116.0 pcf	Lean Clay, trace sand

Project No.: 8721
Project: Dane County Landfill
Location: E19 S5 Sample #2

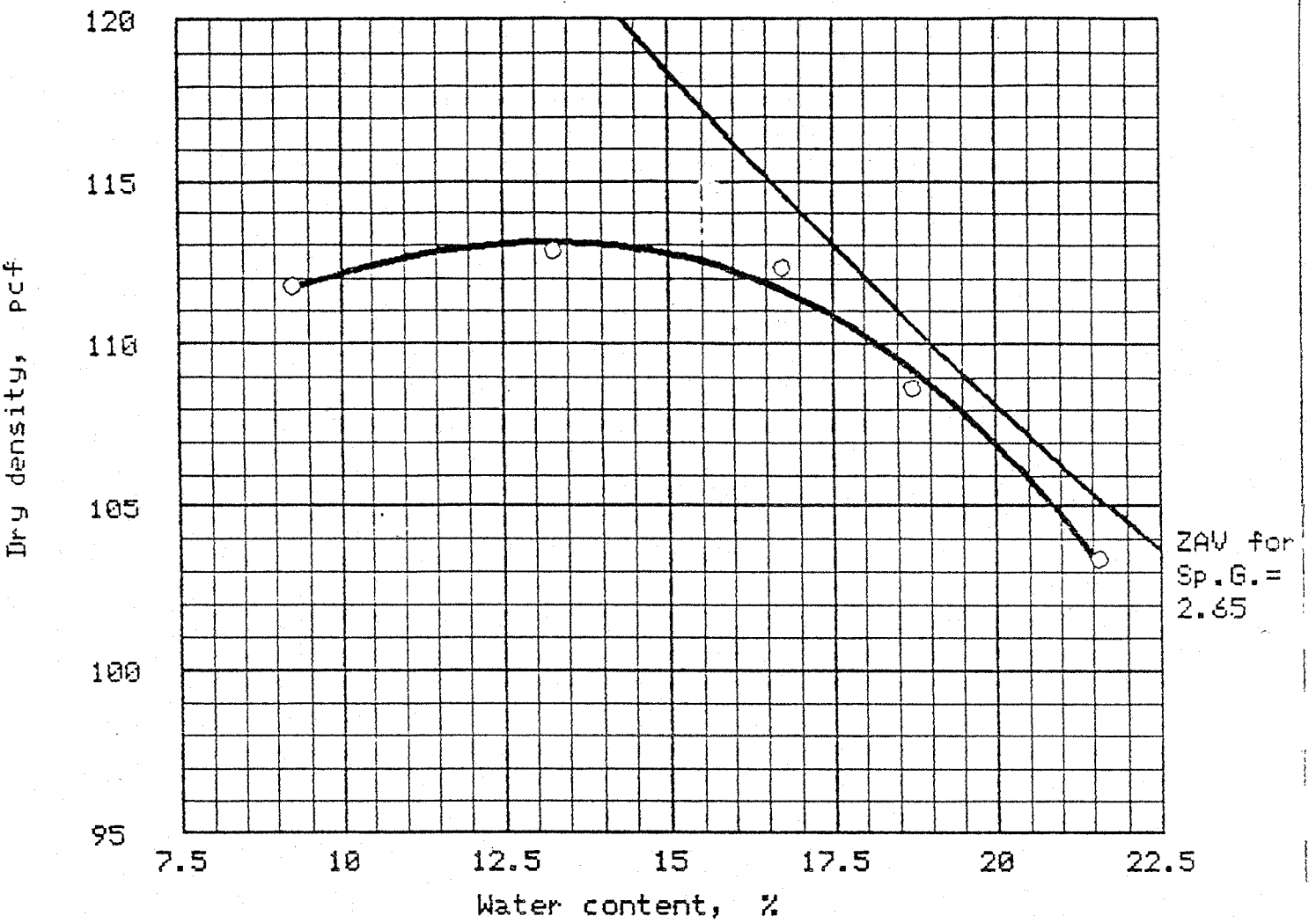
Date: November 1, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K100

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			37	16	.0 %	.1 %	81.7 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 13.3 % Maximum dry density = 113.1 pcf	Lean Clay, some sand

Project No.: 8721
Project: Dane County Landfill
Location: E23 S5 Sample #2

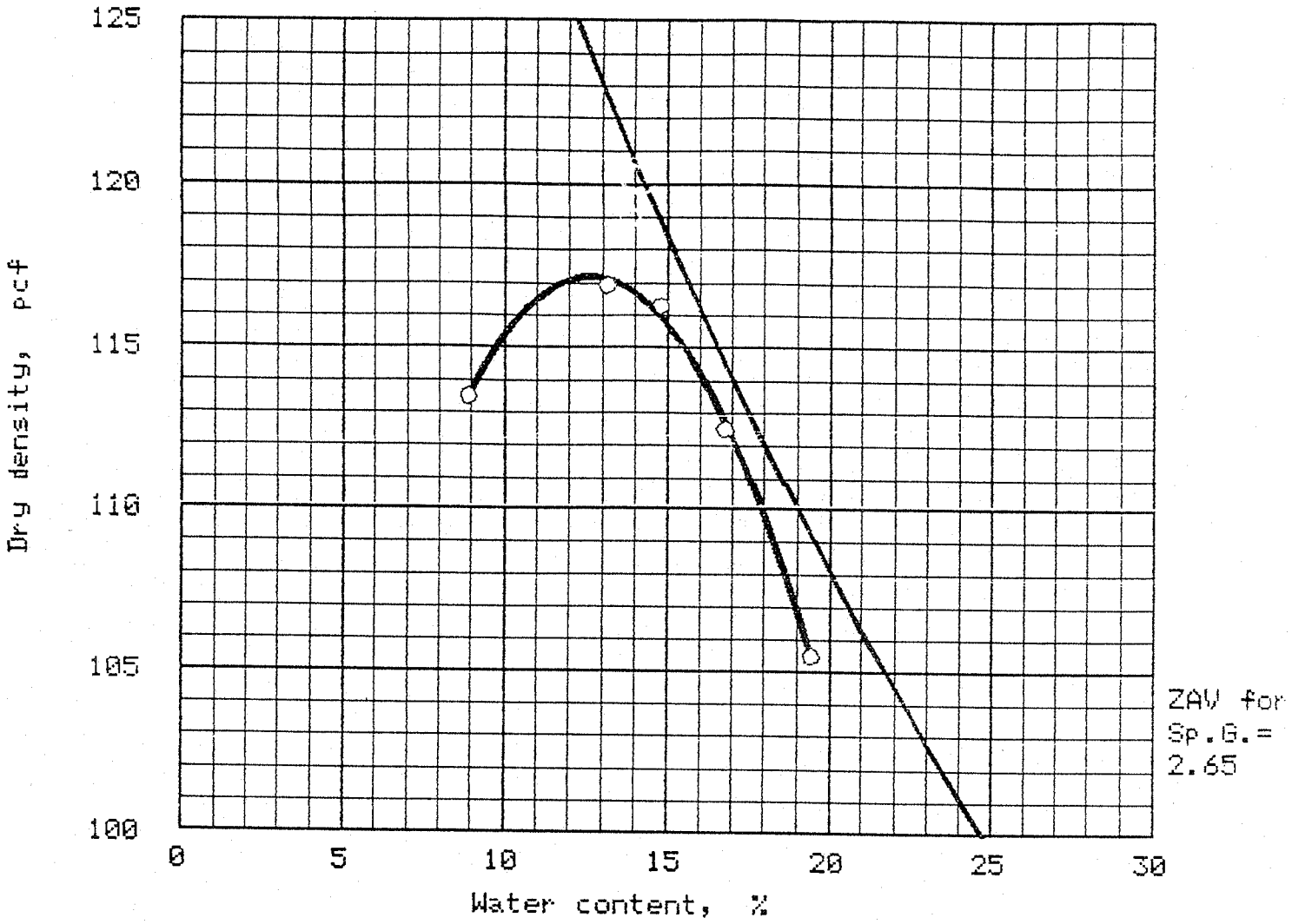
Date: November 1, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K102

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			45	21	0.0 %	0.0 %	99.8 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 12.6 % Maximum dry density = 117.2 pcf	Lean Clay

Project No.: 8721
Project: Dane County Landfill
Location: E7 S7 Sample #1

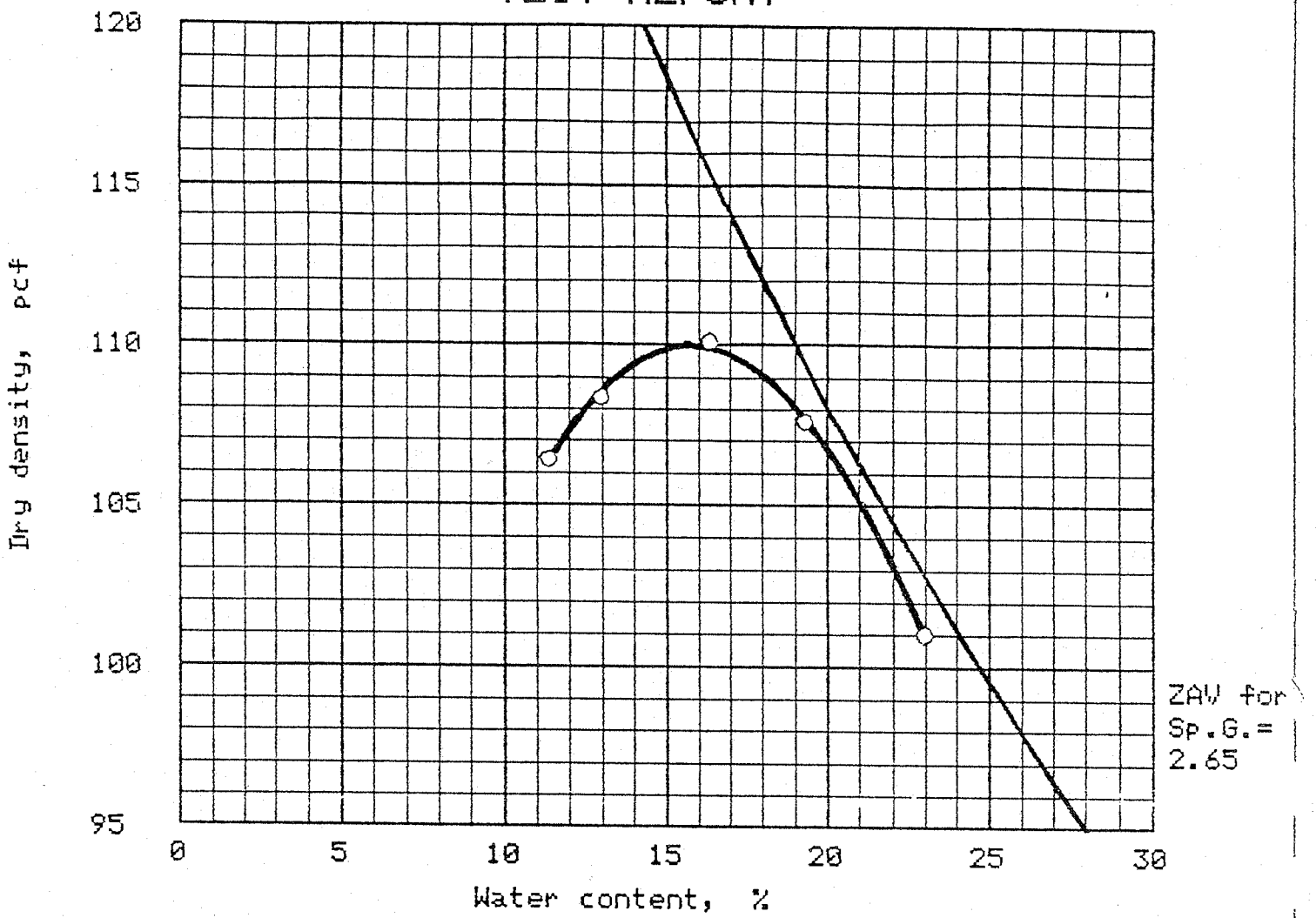
Date: December 5, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K187

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			33	13	.0 %	2.7 %	89.1 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 15.7 % Maximum dry density = 110.0 pcf	Lean Clay, little sand

Project No.: 8721
Project: Dane County Landfill
Location: E21 S11 Sample #2

Date: November 1, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K188

SOILS & ENGINEERING SERVICES, INC.

CONSULTING CIVIL ENGINEERS 8721

1102 STEWART STREET • MADISON, WISCONSIN 53713 • TELEPHONE: 608 • 274-7600

Earl H. Reichel, P.E.
Octavio Tejeda, P.E.

December 6, 1988

Dane County Department of Public Works
210 Martin Luther King, Jr., Boulevard
Madison, Wisconsin 53709

Attention: Mr. Dennis Sopcich

Subject: Laboratory Testing
Permeability Versus Compaction
Optimum Moisture/Maximum Density Determinations
Clay Samples
Kippley Site

Gentlemen:

We have completed the subject testing on three clay samples acquired from the Kippley Site. The samples were acquired by your personnel and delivered to our office on June 22 and 24, 1988. The sample locations are as follows:

Grid E9 S3 Sample 1
Grid E7 S7 Sample 1
Grid E5 S21 Sample 2

Prior to this report, we determined the soil characteristics and USCS classification for the subject samples. This information was presented in our reports dated August 10, August 31, and September 6, 1988.

The Optimum Moisture/Maximum Density of each sample was determined in accordance with A.S.T.M. D1557. These test results are presented on the enclosed copies of Figures K91, K101, and K187.

The Permeability versus Compaction Curves were developed using the same points from moisture/density curves. The permeability of each point was determined using the falling head method. These test results are presented on the enclosed copies of Figures K91A, K101A, and K187A.

This completed the laboratory testing on the Kippley Site test pit samples.

If you have any questions concerning this work, please contact us.

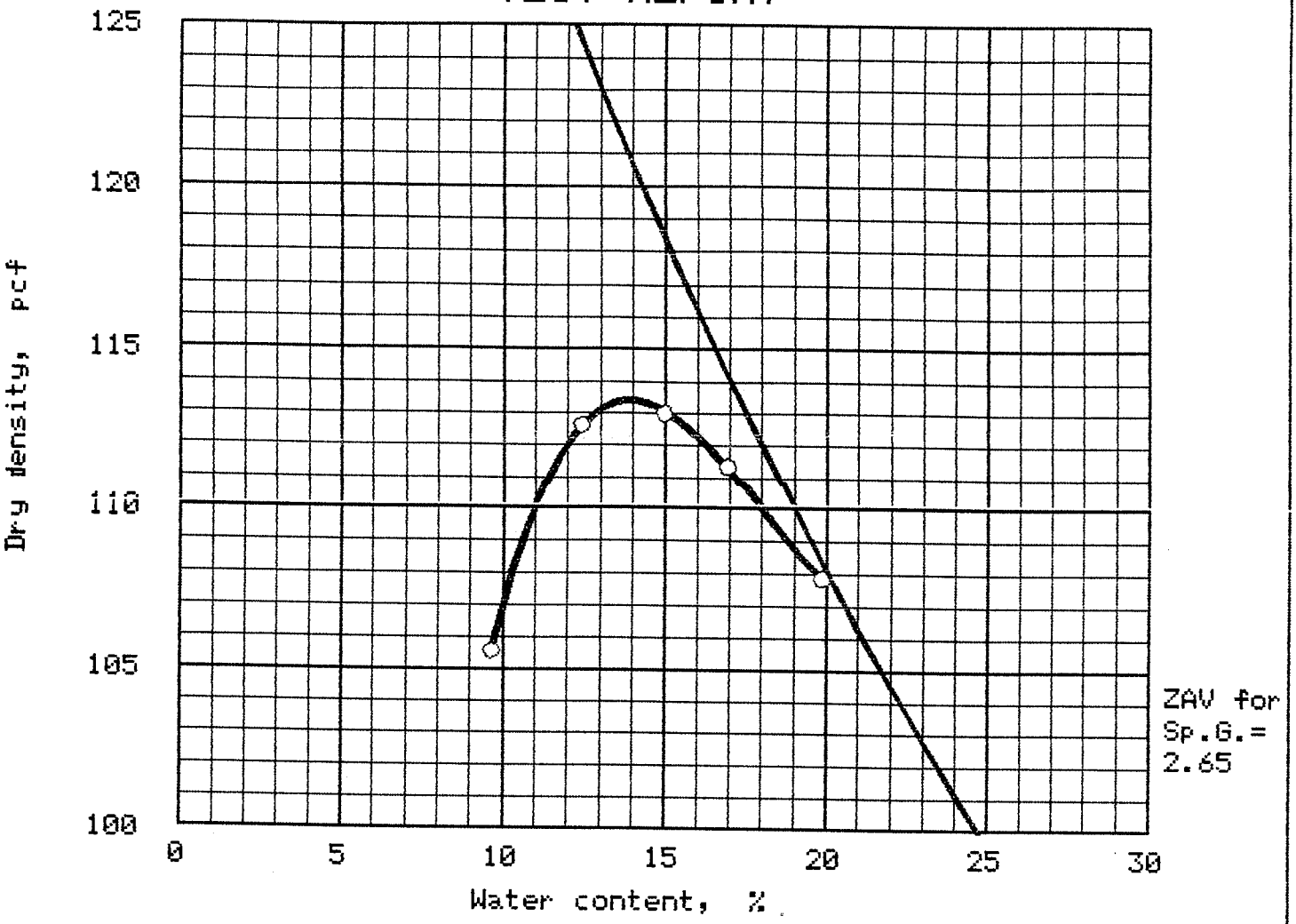
Respectfully submitted,

SOILS & ENGINEERING SERVICES, INC.

Octavio Tejeda, P.E.
OTG:CMB:lt

Enclosures

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			46	23	0.0 %	0.0 %	99.6 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 13.9 % Maximum dry density = 113.4 pcf	Lean Clay

Project No.: 8721
Project: Dane County Landfill
Location: E9 S3 Sample #1

Date: December 5, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K91

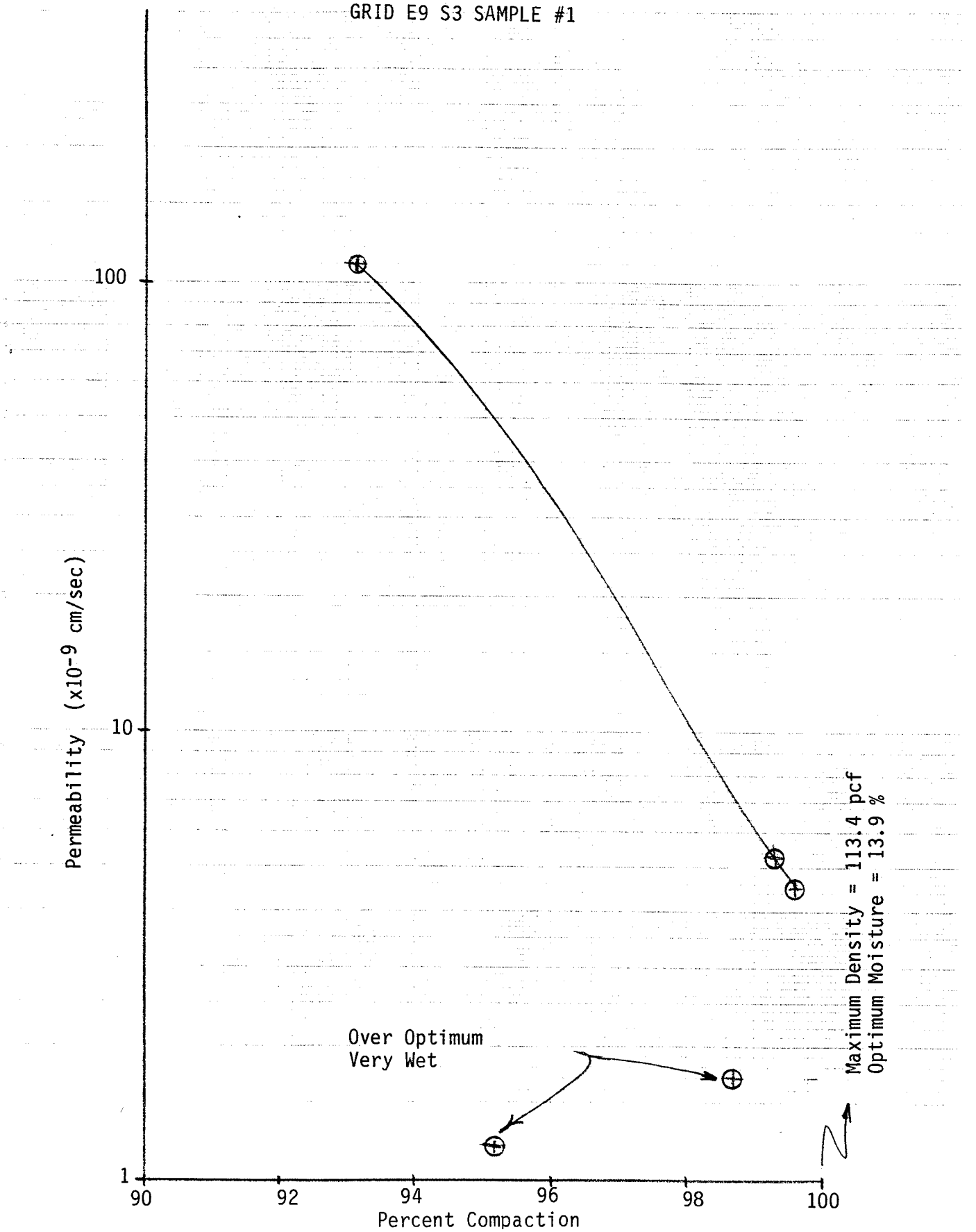
Figure K91A

PLANO PnB

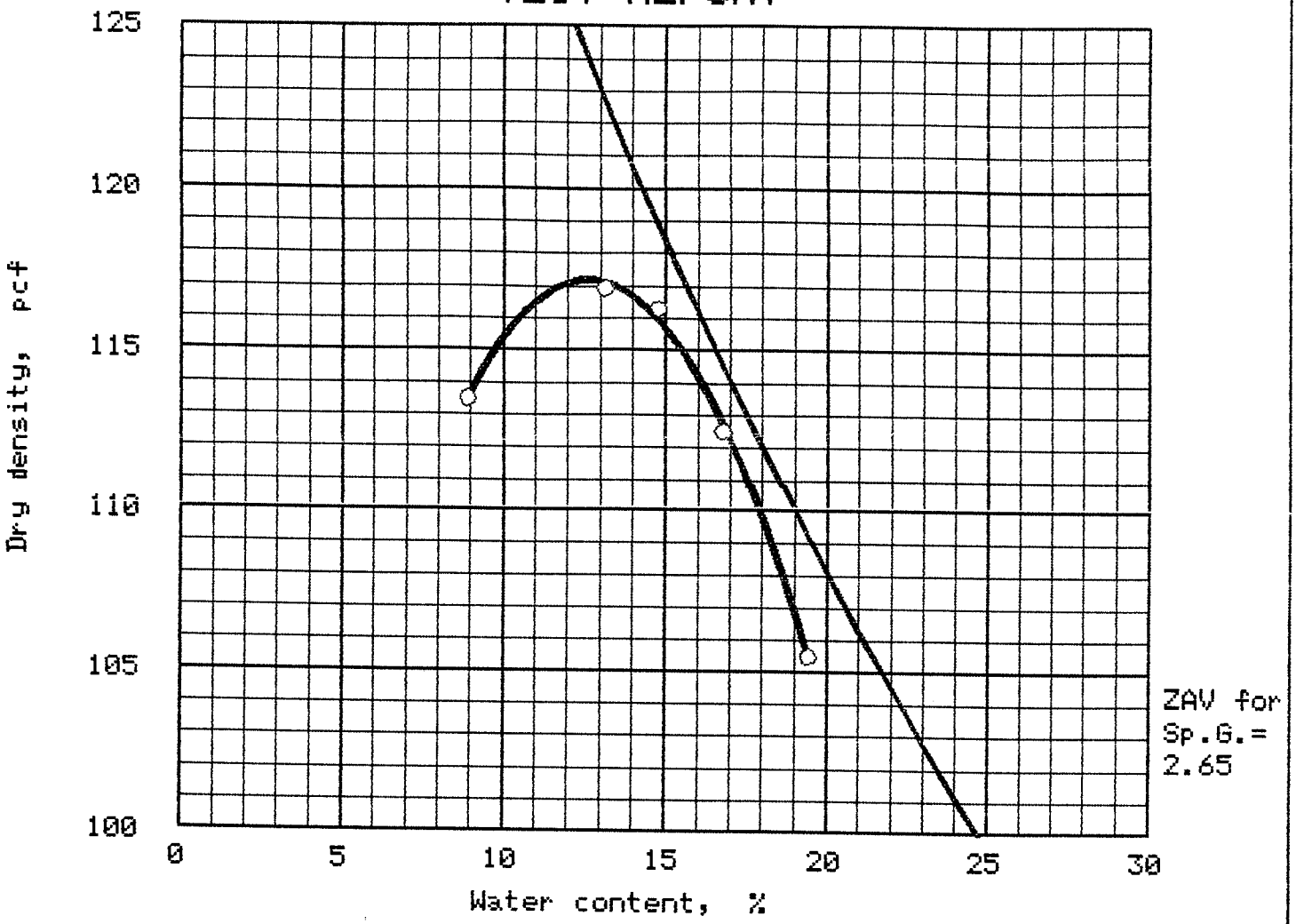
PERMEABILITY VS. COMPACTION

KIPPLEY SITE

GRID E9 S3 SAMPLE #1



OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			45	21	0.0 %	0.0 %	99.8 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 12.6 % Maximum dry density = 117.2 pcf	Lean Clay

Project No.: 8721
Project: Dane County Landfill
Location: E7 S7 Sample #1

Date: December 5, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K187

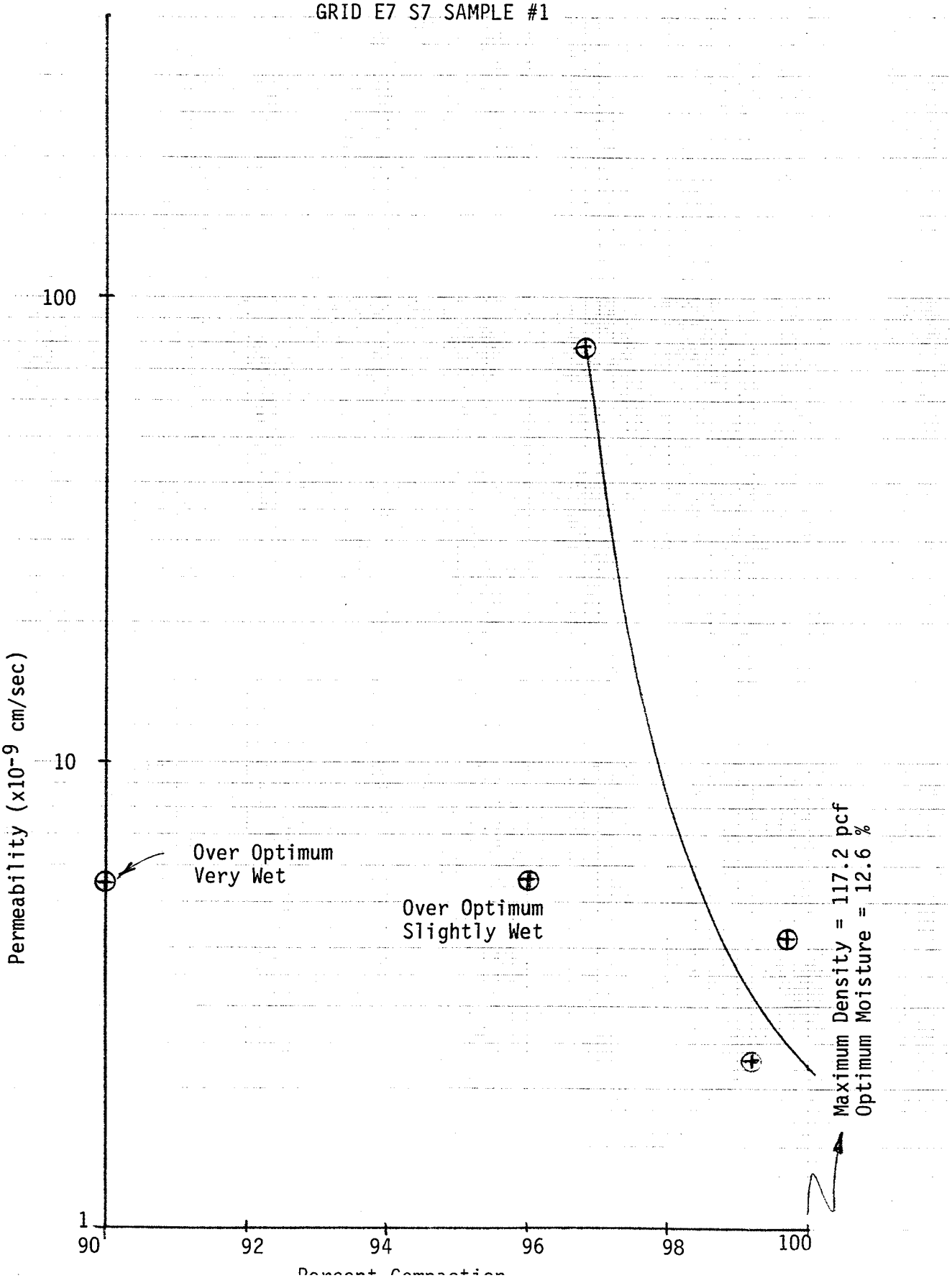
Figure K187A

PLANO PnB

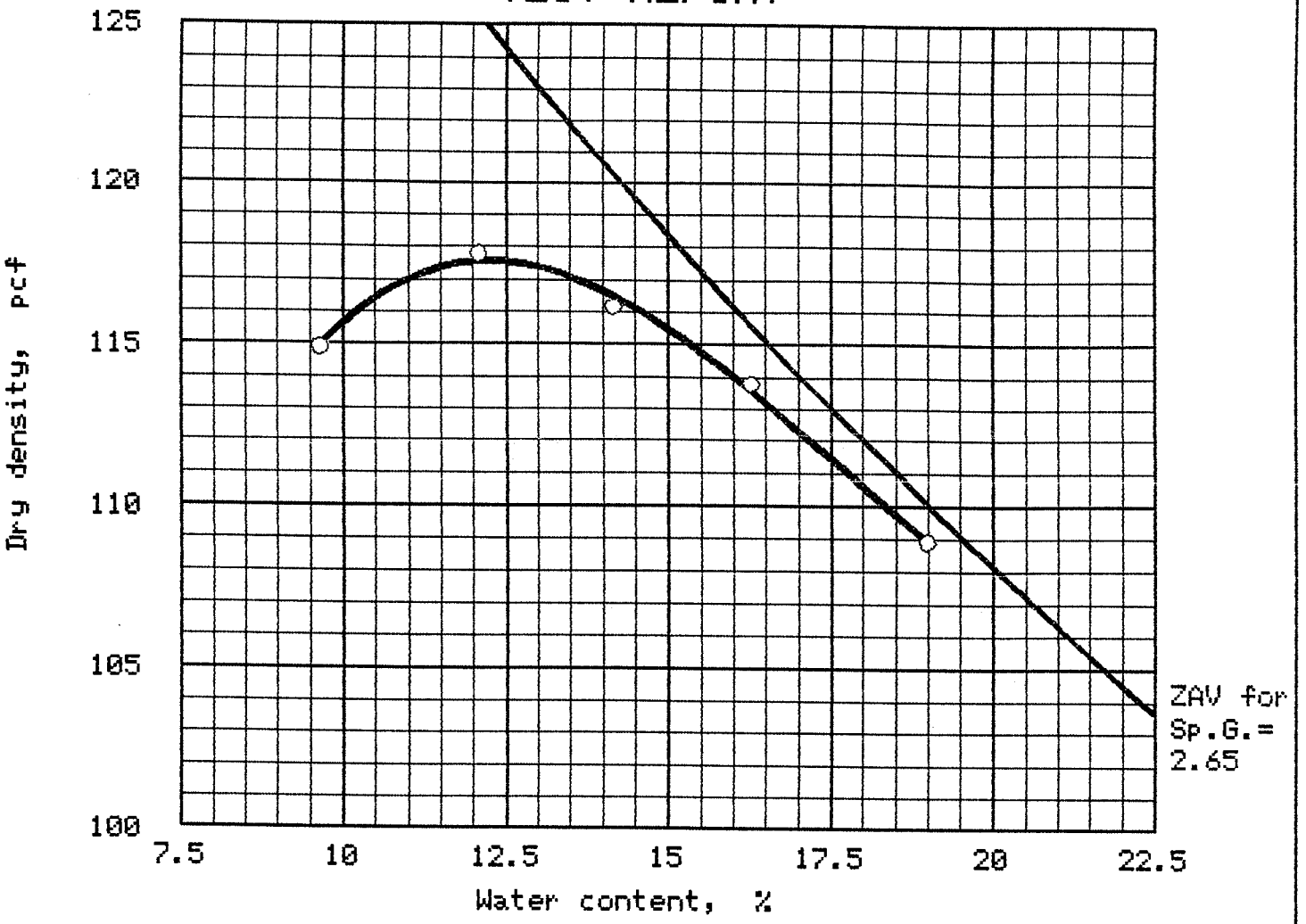
PERMEABILITY VS. COMPACTION

KIPPLEY SITE

GRID E7 S7 SAMPLE #1



OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			41	17	0.0 %	0.0 %	94.6 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 12.2 % Maximum dry density = 117.6 pcf	Lean Clay, little sand

Project No.: 8721
Project: Dane County Landfill
Location: E5 S21 Sample #2

Date: December 5, 1988

SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K101

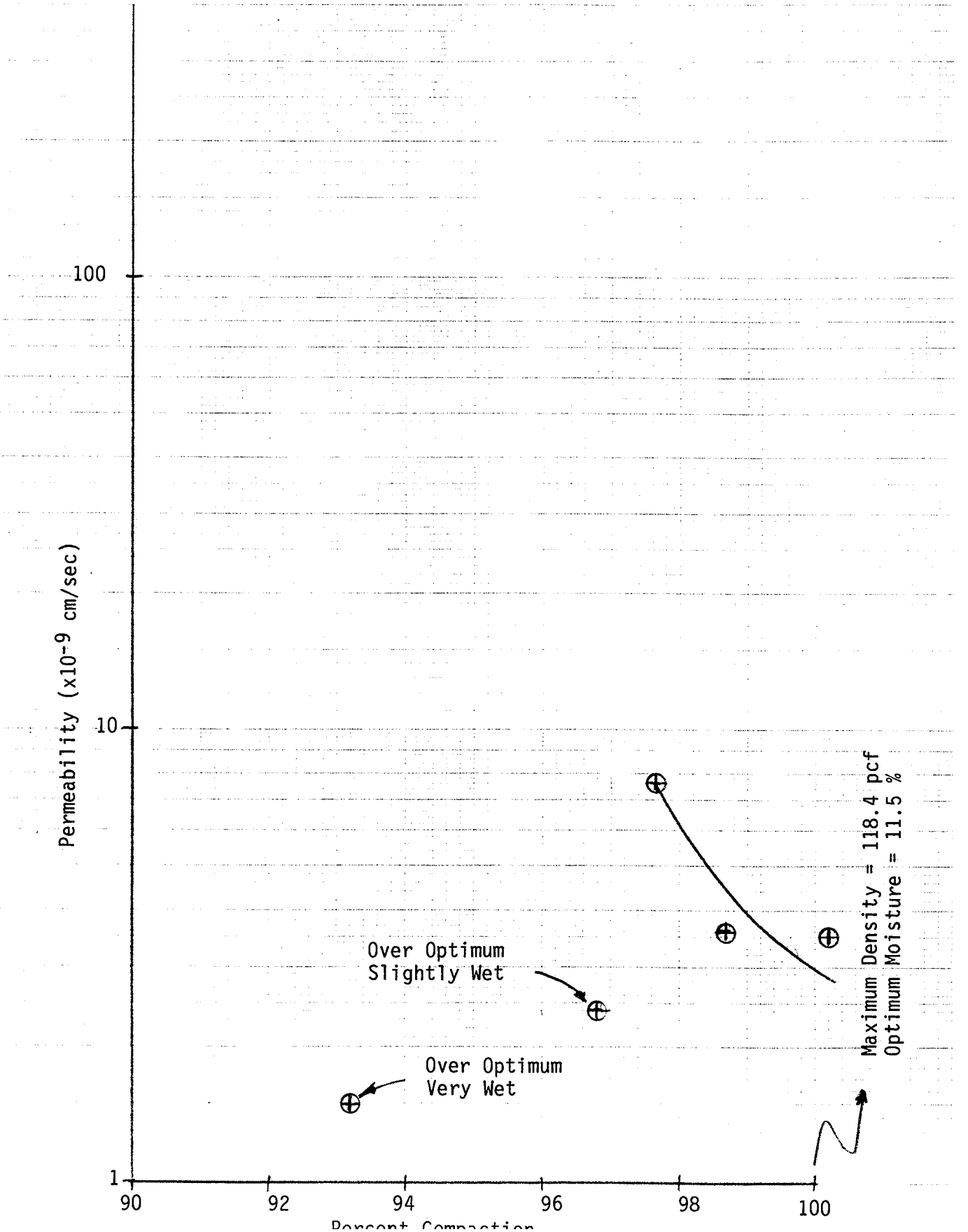
Figure K101A

PERMEABILITY VS. COMPACTION

KIPPLEY SITE

GRID E5 S21 SAMPLE #2

RINGWOOD RnB



SOILS & ENGINEERING SERVICES, INC.
CONSULTING CIVIL ENGINEERS 8721
1102 STEWART STREET • MADISON, WISCONSIN 53713 • TELEPHONE: 608 • 274-7600

Earl H. Reichel, P.E.
Octavio Tejeda, P.E.

November 1, 1988

Dane County Department of Public Works
210 Martin Luther King, Jr., Boulevard
Madison, Wisconsin 53709

Attention: Mr. Dennis Sopcich

Subject: Laboratory Testing
Permeability versus. Compaction
Optimum Moisture/Maximum Density Determinations
Clay Samples
Kippley Site

Gentlemen:

We have completed the subject testing on three clay samples acquired from the Kippley Site. The samples were acquired by your personnel and delivered to our office on June 22 and 24, 1988. The sample locations are as follows:

Grid E3 S21	Sample 2
Grid E19 S23	Sample 1
Grid E23 S19	Sample 1

Prior to this report, we determined the soil characteristics and USCS classification for the subject samples. This information was represented in our reports dated August 31 and September 6, 1988.

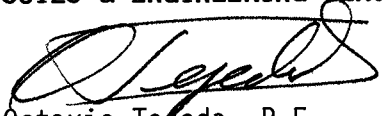
The Optimum Moisture/Maximum Density of each sample was determined in accordance with A.S.T.M. D1557. These test results are presented on the enclosed copies of K191, K193, and K196.

The Permeability versus Compaction Curves were developed using the same points from the moisture/density curves. The permeability of each point was determined using the ~~following~~ falling head method. These test results are presented on the enclosed copies of Figures K191A, K193A, and K196A.

If you have any questions concerning this work, please contact us.

Respectfully submitted,

SOILS & ENGINEERING SERVICES, INC.

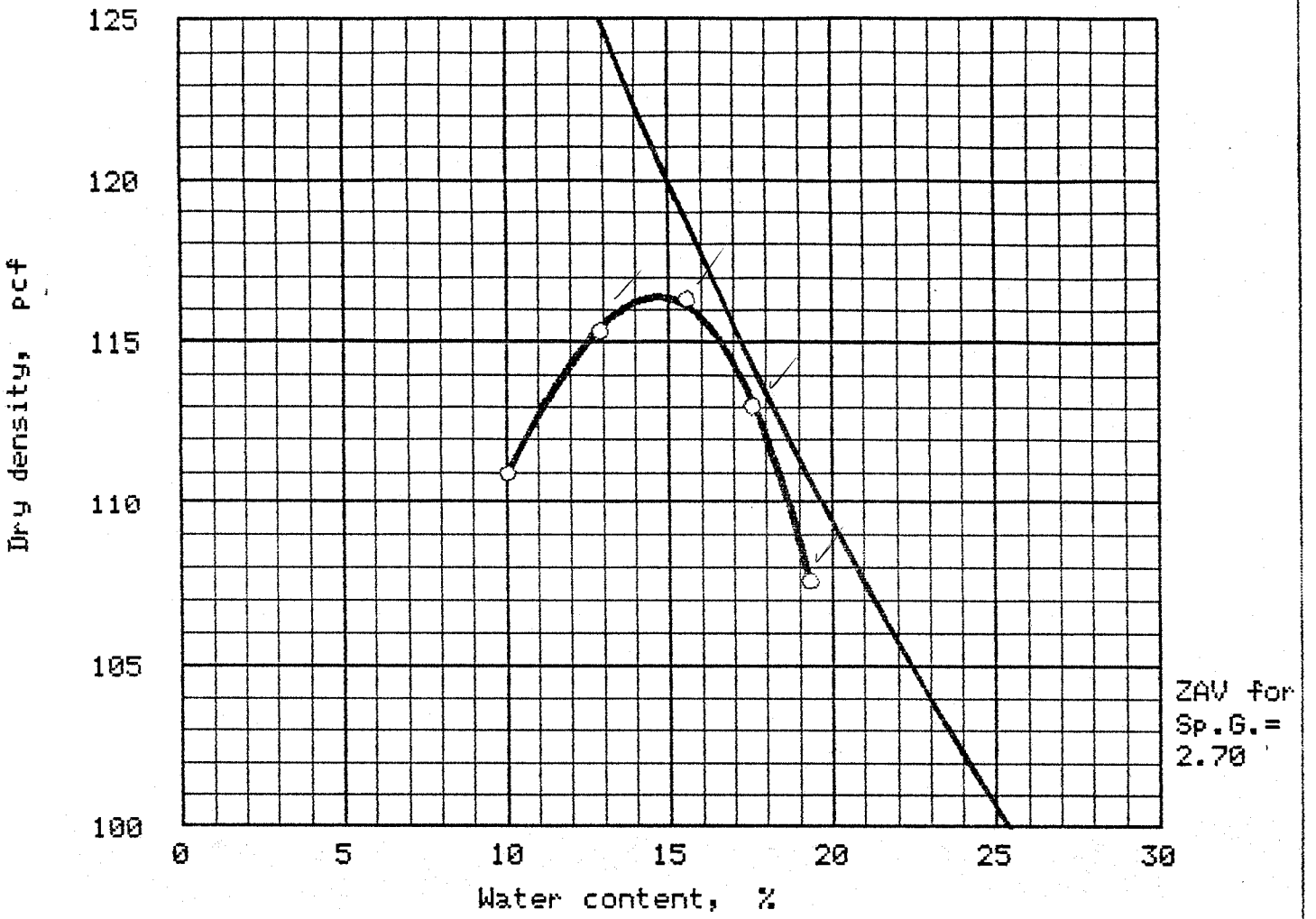


Octavio Tejeda, P.E.

OTG:CMB:lt

Enclosures

OPTIMUM MOISTURE / MAXIMUM DENSITY TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	LL	PI	% R 3/4"	% R No.4	% P No.200
	USCS	AASHTO						
	CL			37	18	0.0 %	0.0 %	93.8 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 14.7 % Maximum dry density = 116.4 pcf	Lean Clay, little sand

Project No.: 8721
Project: Dane County Landfill
Location: E3 S21 Sample #2

Date: September 23, 1988

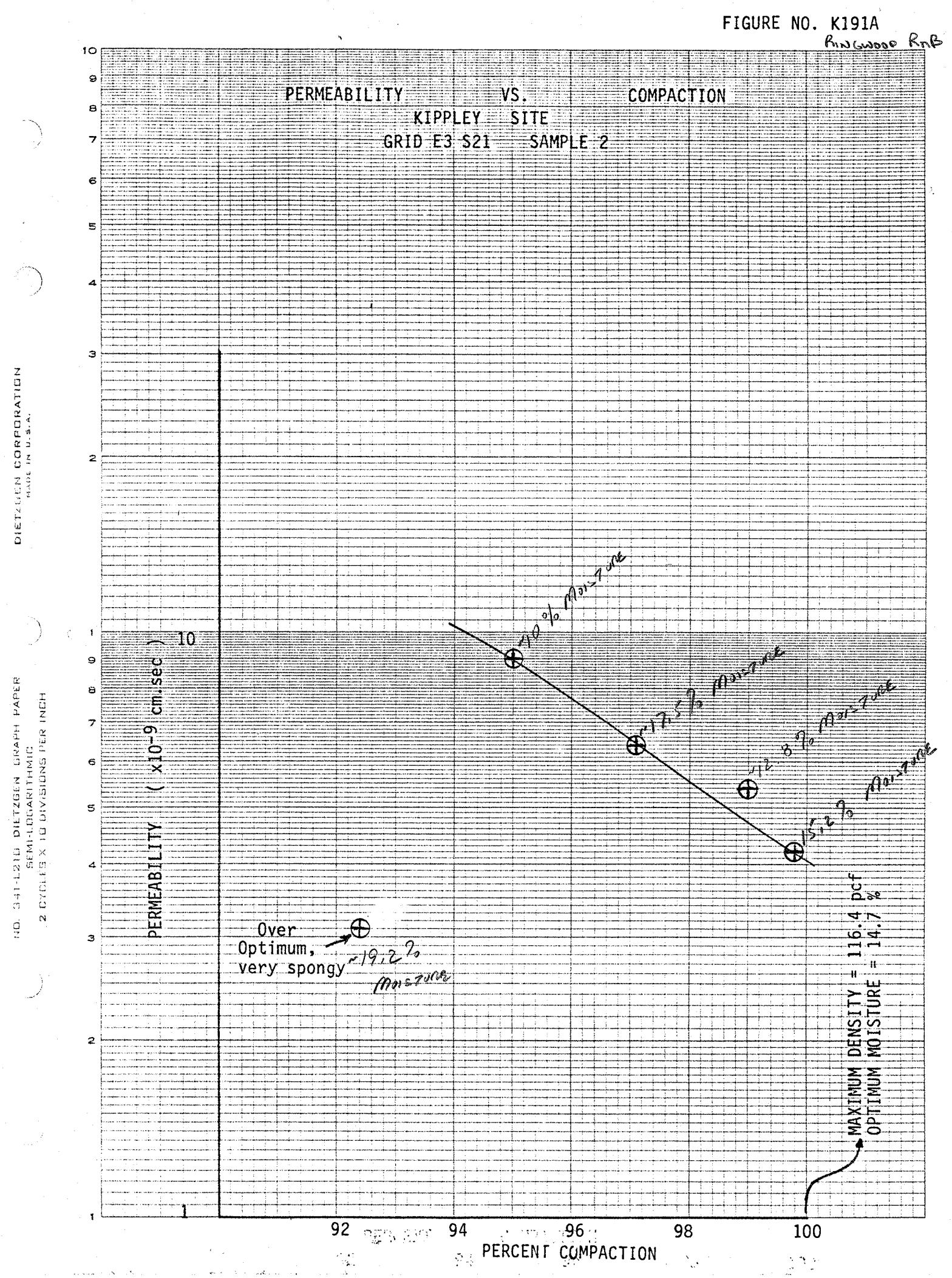
SOILS & ENGINEERING SERVICES, INC.

Remarks:

Figure No. K191

FIGURE NO. K191A

Ringwood R-1B



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APPENDIX B
CONSTRUCTION DOCUMENTATION COORDINATE AND ELEVATION TABLES

Table 1
Gradient Control System
Phase 10 - Cell 2 Construction
Dane County No. 2 (Rodefeld) Landfill

POINT NO.	PIPE LOCATION		GRADIENT CONTROL COLLECTION LINE TRENCH ELEVATION			PIPE INVERT ELEVATION			TOP OF STONE BEDDING ELEVATION			STONE THICKNESS			COMMENTS
	NORTHING	EASTING	DESIGN (ft)	ACTUAL (ft)	DELTA (ft)	DESIGN (ft)	ACTUAL (ft)	DELTA (ft)	DESIGN (ft)	ACTUAL (ft)	DELTA (ft)	DESIGN (ft)	ACTUAL (ft)	DELTA (ft)	
875	381,967.4	2,200,755.0	N.A	N.A.	N.A.	N.A.	866.05	N.A.	N.A	N.A.	N.A.	N.A	N.A.	N.A.	Blind Flange End of Existing Pipe
1212	381,920.0	2,200,755.0	865.85		-865.85	866.23		-866.23	867.85		-867.85	2.00	0.00	-2.00	Spot elevation along pipe
1211	381,870.0	2,200,755.0	866.05		-866.05	866.43		-866.43	868.05		-868.05	2.00	0.00	-2.00	Spot elevation along pipe
1210	381,820.0	2,200,755.0	866.24		-866.24	866.62		-866.62	868.24		-868.24	2.00	0.00	-2.00	Spot elevation along pipe
1209	381,770.0	2,200,755.0	866.44		-866.44	866.82		-866.82	868.44		-868.44	2.00	0.00	-2.00	Spot elevation along pipe
1208	381,720.0	2,200,755.0	866.63		-866.63	867.01		-867.01	868.63		-868.63	2.00	0.00	-2.00	Spot elevation along pipe
1207	381,670.0	2,200,755.0	866.83		-866.83	867.21		-867.21	868.83		-868.83	2.00	0.00	-2.00	Spot elevation along pipe
1206	381,620.0	2,200,755.0	867.02		-867.02	867.40		-867.40	869.02		-869.02	2.00	0.00	-2.00	Spot elevation along pipe
1205	381,570.0	2,200,755.0	867.22		-867.22	867.60		-867.60	869.22		-869.22	2.00	0.00	-2.00	Spot elevation along pipe
1204	381,520.0	2,200,755.0	867.41		-867.41	867.79		-867.79	869.41		-869.41	2.00	0.00	-2.00	Spot elevation along pipe
1203	381,470.0	2,200,755.0	867.61		-867.61	867.99		-867.99	869.61		-869.61	2.00	0.00	-2.00	Spot elevation along pipe
1202	381,420.0	2,200,755.0	867.80		-867.80	868.18		-868.18	869.80		-869.80	2.00	0.00	-2.00	Spot elevation along pipe
1201	381,370.0	2,200,755.0	868.00		-868.00	868.38		-868.38	870.00		-870.00	2.00	0.00	-2.00	Spot elevation along pipe
1200	381,331.2	2,200,755.0	868.15		-868.15	868.53		-868.53	870.15		-870.15	2.00	0.00	-2.00	Spot elevation along pipe
1199	381,318.8	2,200,755.0	868.20		-868.20	868.58		-868.58	870.20		-870.20	2.00	0.00	-2.00	Blind Flange End of Pipe

Notes:

1. Refer to Plan Sheet 4 of the construction drawings for Phase 10 - Cell 2 locations of coordinate points.

By: R. Nolden 2016-03-15
Checked: D. Marshall 2/25/16

7.4 Thickness Documentation

The finished elevation of the select granular or aggregate fill drainage layer portion of the leachate and gradient control systems will be surveyed on a 50 foot grid, which coincides with the grid used for the final clay liner and cover surface, respectively, to verify

Section 8
Soil Barrier Layer

8.1 General

This section includes the quality assurance requirements for placing, backfilling, and compacting the barrier layer soil in the final cover system. The 24-inch–thick soil barrier layer will consist of fine-grained soil.

8.2 Subgrade Preparation

The Contractor will be responsible for the preparation of the subgrade of the barrier layer. Subgrade preparation may include top-of-waste regrading, grading layer placement, or top of grading layer regrading, at the discretion of the Owner.

The subgrade will consist of a minimum 6-inch–thick soil grading layer placed on top of the waste. The soil grading layer will consist of general fill material obtained from on-site or off-site and will typically be installed as a normal part of landfill operations (see Section 6). If topsoil material was used as part of the grading layer placed during normal landfill operations, the Contractor will remove and salvage the temporary topsoil layer. The CQA Officer or RPR will inspect the subgrade, upon completion of the grading layer work and will verify, at a minimum, the following:

- A qualified land surveyor has verified lines and grades as described in Subsection 6.4.
- The grading layer soil meets the depth criteria in the project specifications.

The RPR will indicate to the Contractor any observed locations that are not adequate for the placement of the barrier layer during final cover construction. The Contractor will repair defects in the subgrade soil such that the properties of the repaired areas meet the minimum subgrade requirements.

8.3 Procedures and Observations

The RPR will observe and document barrier layer construction activities to support certification of the following requirements:

- The RPR will confirm the uniformity of the barrier layer soil and will monitor for segregation and removal of unsuitable material and for changes in soil type, color, texture, and moisture content. The Contractor will segregate and/or remove unsuitable materials, such as soil not meeting acceptance criteria, boulders, cobbles, and organic material.

- The RPR will observe the barrier layer placement and will measure field densities and moisture contents (see Subsection 8.4), to document that the barrier layer is in substantial conformance with the specifications and that soil placement has been conducted in a manner to achieve a uniform, homogeneous mass.
- The RPR will backfill with granular bentonite, or a bentonite-soil mixture, voids created by nuclear density gauge probes.
- The RPR will document areas of unacceptable density or moisture content, as defined by Subsection 8.4. The Contractor will perform corrective action that will consist of the moisture-conditioning of the soil and/or additional compactive effort, as necessary. The RPR will retest the area, following corrective actions.
- The Contractor will place each lift of barrier layer material in approximate 1-foot lifts.
- The RPR will verify that compaction equipment has a minimum static weight of 30,000 pounds or has a minimum static weight 15,000 pounds that is capable of vibrating to produce a minimum dynamic compaction force of 30,000 pounds.
- The RPR will verify that compaction equipment used to compact the barrier layer has compaction feet a minimum of 6 inches long.
- The Contractor will not use frozen soil in the barrier layer and will remove frozen soil from the compaction work area.
- The Contractor will remove stones and other penetrating objects 1 inch or larger protruding from the surface of the final lift of the barrier layer to avoid puncturing the overlying geosynthetics. The RPR will document the removal of the stones and other objects. The Contractor will fill with barrier layer soil or bentonite any voids made by the removal of stones, and the entire cover surface will be rolled with a smooth-drum compactor.
- Preconstruction planning will be undertaken to sequence construction activities to minimize the length of time a completed barrier layer surface will be exposed prior to receiving protective cover. Protective cover will be provided by the installation of the GCL and subsequently the geomembrane.

8.4 Sampling Requirements and Acceptance Criteria

This section describes the required analyses, methods, sample frequencies, and acceptance limits of the barrier layer. The RPR will collect soil samples for laboratory analysis. The RPR will record the field sample locations in the daily construction reports or field data sheets as record construction data, including locations and lift locations of the laboratory sample points.

8.4.1 Field Testing

The RPR will use the following field-testing methods during construction of the barrier layer:

PARAMETER	TEST METHOD
Moisture content	ASTM D3017
Field density	ASTM D2922 Method B

Moisture content and field density tests will be performed in accordance with NR 516.07(2m)(b)(1) using a nuclear density gauge on a 100-foot grid pattern for each 1-foot thickness of barrier layer soil placed. The testing grid pattern will be offset on each subsequent layer of tests. In confined areas where compaction equipment is hindered or hand compaction is necessary, a minimum of two field density and moisture content tests will be performed for each 1-foot thickness of barrier layer soil placed.

8.4.2 Field Testing Acceptance Criteria

Acceptance criteria for field density will require soil compaction to a minimum of 90 percent of the Modified Proctor (ASTM D1557) maximum dry density or to a minimum of 95 percent of the Standard Proctor (ASTM D698) maximum dry density and at a moisture content wet of optimum moisture content.

8.4.3 Laboratory Testing

Routine laboratory testing of the barrier layer soil will be performed on samples from the borrow area or on-site stockpile (representative). Soil characteristics will be determined from the representative samples.

Representative Sample Analysis

Representative (grab) samples will be obtained on the basis of three criteria. First, an initial sample will be obtained from the borrow source (if not used in construction of a prior phase) and analyzed prior to construction. This will confirm soil characteristics and provide an initial maximum dry density and optimum moisture content for field moisture/density testing. Second, routine samples will be obtained for every 5,000 cubic yards placed. Third, in the event that changes in physical appearance or soil characteristics are observed, a sample will be obtained and analyzed. The maximum dry density and optimum moisture content values used for compaction testing may be adjusted

during the course of cover construction based on the results of the above sampling.

The following laboratory analyses will be performed on the representative samples obtained:

PARAMETER	TEST METHOD
Moisture-density relationship using Modified or Standard Proctor compaction	ASTM D1557 (1, 2)/ ASTM D698 (1, 2)
Atterberg limits	ASTM D4318
Grain-size analysis	ASTM D422(3)

Notes:
(1) Five-point Proctor analysis required, except as described in Note 2, below.
(2) One-point Proctor analysis may be utilized for representative samples collected for apparent changes in soil quality to verify applicability of previously analyzed moisture-density relationships. If the result does not verify applicability, then a five-point analysis will be performed in accordance with the first sampling criteria.
(3) Distribution is to be reported through the 0.002-mm particle size.

8.4.4 Laboratory Testing Acceptance Criteria

The following acceptance criteria will apply to the barrier layer.

- The upper 1 foot of the barrier layer will have a maximum particle diameter of 2 inches and the lower 1 foot of the barrier layer will have a maximum particle diameter of 4 inches.
- Fine grained-soil or well graded sandy soil with fines meeting the USCS soil types ML, CL, CH, SM, or SC, or dual-symbol classifications composed of those soil types, with at least 25 percent by weight passing the #200 sieve.

8.5 Thickness Documentation

The bottom of the final cover barrier layer (top of grading layer) will be surveyed on a maximum 100-foot grid pattern (maximum 50-foot grid pattern if the final cover construction is less than 4 acres) and at key locations on the final cover. Key locations include breaks in grade, top of slopes, and limits of final cover construction. The barrier layer thickness will be determined at top of grading layer surveyed locations and reported in a tabular fashion in the Construction Documentation Report. The minimum acceptable barrier layer thickness will be 2 feet.

Section 9
Topsoil

9.1 General

This section includes the quality assurance requirements for the excavation and placement of the topsoil and for the fertilization, seeding, mulching, and watering of the topsoil layer for vegetation. Topsoil is the final layer of soil material installed on the final cover, along the outside slopes of the perimeter berms, along the ditches, and on other perimeter areas. Topsoil will be obtained from existing on-site stockpile and from soil excavated by the clearing of the landfill footprint and associated disturbed perimeter areas or will be hauled in from an off-site borrow source.

9.2 Procedures and Observation

Work covered by this section will be performed in accordance with the construction plans and specifications. The RPR will observe topsoil placement activities and will document relevant observations to support certification of the following requirements:

- The RPR will confirm the source and uniformity of topsoil used. Soil excavation and placement will be monitored for minimization of inorganic soil not compatible for establishment of vegetation.
- Prior to seeding, the topsoil will be worked to prepare a suitable seedbed.
- Fertilizing, seeding, and mulching will be performed in a timely manner.

9.3 Sampling Requirements and Acceptance Criteria

The topsoil will be suitable for the establishment and long-term maintenance of the selected vegetation seed mix with appropriate fertilization. At the CQA Officer's discretion, samples may be collected for laboratory testing.

9.4 Thickness Documentation

The thickness of topsoil placement on the final cover will be documented on a 100-foot grid by surveying or by hand shoveling or auguring and measuring the observed thickness of topsoil.

Section 10
Geomembrane

10.1 General

This section of the CQA Plan applies to the high-density polyethylene (HDPE) geomembrane used in the landfill composite liner and the linear low density polyethylene (LLDPE) geomembrane used in the composite final cover. The geomembrane used in the liner system of the landfill will be 60-mil HDPE (textured and smooth) on the horizontal expansion areas and 40-mil HDPE textured on the vertical expansion areas. The geomembrane in the final cover will be 40- mil LLDPE (textured).

The geomembrane will be supplied to the site in factory rolls. No factory seams will be used to prepare larger panels of geomembrane for delivery to the site.

This section is divided into five major subheadings, which cover general information, and the CQA requirements for pre-installation, installation, field seaming, and post-installation. These terms pre-installation, installation, field seaming, and post–installation are applicable only to the geomembrane installation and to not apply to the overall construction of the landfill facility.

10.2 Pre-Installation

This section describes the quality control measures that are applicable to the polyethylene (PE) resin manufacturers, geomembrane manufactures, and finished geomembrane roll delivery to the site prior to installation.

The geomembrane must be fabricated from polyethylene resin and be virgin material with no more than 10 percent rework by weight. Rework material must be of the same formulation as the parent material. No post-consumer resin allowed.

10.2.1 Manufacturing

Material Specifications

The following list specifies the required geomembrane materials for liner and final cover construction:

- Horizontal expansion base liner sideslopes (3H:1V): 60-mil HDPE-textured
- Horizontal expansion base liner: 60-mil HDPE-smooth (textured optional)

- Vertical expansion base liner: 40-mil HDPE-textured
- Final cover: 40-mil LLDPE-textured

Quality Control Requirements

Prior to the delivery of any geomembrane rolls to the site, the Geomembrane Manufacturer will provide the Owner and the CQA Officer with the following information:

- The resin supplier, location of supplier's production plant(s), and resin brand name and product number
- Any results of tests conducted by the Geomembrane Manufacturer and/or the Resin Manufacturer's testing laboratories to document the quality of the resin used in fabricating the geomembrane
- The Quality Control Plan that the Geomembrane Manufacturer will be using for the geomembrane being supplied

Every roll of geomembrane for delivery to the site must be manufactured and inspected in accordance with the Geomembrane Manufacturer according to the following requirements:

- First quality polyethylene resin must be used.
- The geomembrane must contain no more than a maximum of 1 percent by weight of additives, fillers, or extenders, excluding carbon black.
- Carbon black for ultraviolet protection shall be added during manufacturing of the geomembrane.
- The geomembrane must be free of holes, blisters, undispersed raw materials, or any other sign of contamination by foreign matter.

The Geomembrane Manufacturer will routinely perform specific gravity (ASTM 0792, method B or ASTM D1505) and melt index (ASTM D1238) tests on the raw resin to document the quality of the HDPE and LLDPE resin used to manufacture the geomembrane rolls assigned to this project. The maximum specific gravity allowed for the HDPE and LLDPE raw resin is 0.932 and 0.926, respectively. The maximum melt index for both the HDPE and LLDPE raw resins is 1.0 grams/10 minutes.

Manufacturer's Certification

The Geomembrane Manufacturer will test the geomembrane produced for the site according to the test method and frequencies listed in Tables 10-1, 10-2, and 10-3 or in accordance with the most current version of GM13 and GM17. The Geomembrane Manufacturer will provided certification, based on tests performed by either the Geomembrane Manufacturer's laboratory or another outside laboratory contracted by the Geomembrane Manufacturer, that the geomembrane supplied under this Plan will meet the specifications presented in Tables 10-1, 10-2, and 10-3. Additionally, the Manufacturer will provide certification that the Manufacturer's Quality Control Plan was fully implemented for the geomembrane material supplied under this Plan. The Manufacturer will provide documentation to verify results of the Manufacturer's Quality Control Plan implementation if requested by the CQA Officer.

10.2.2 Delivery, Handling, and Storage of Geomembrane Rolls

The geomembrane will be protected during shipment from excessive heat or cold, puncture, cutting, or other damaging or deleterious conditions. The geomembrane rolls will be stored on-site in a designated area and will be protected from long-term ultraviolet exposure prior to actual installation.

– Each geomembrane roll will be marked by the Geomembrane Manufacturer with the following information (on a durable gummed label, or equivalent, on inside of core):
    - Name of Manufacturer
    - Product type and identification number (if any)
    - Roll length and width
    - Nominal product thickness
    - Roll number
    - Batch or lot number
    - Date of manufacture

Table 10-1
High Density Polyethylene (HDPE) Geomembrane – Smooth Test Frequency and Acceptance Criteria

PROPERTIES	TEST METHOD	TEST VALUE (60 mils)	TESTING FREQUENCY
Thickness (min. average) ▪ Lowest individual of 10 values	D5199	Nom. -10%	Per roll
Density mg/L (minimum)	D1505/D792	0.940 g/cc	200,000 lb
Tensile Properties (min. average)(1) ▪ Yield strength ▪ Break strength ▪ Yield elongation ▪ Break elongation	D6693 Type IV	 126 lb/in. 228 lb/in. 12% 700%	20,000 lb
Tear Resistance (min. average)	D1004	42 lb	45,000 lb
Puncture Resistance (min. average)	D4833	108 lb	45,000 lb
Stress Crack Resistance(2)	D5397 (App.)	300 hr.	per GRI-GM10
Carbon Black Content (range)	D4218(3)	2.0–3.0%	20,000 lb
Carbon Black Dispersion	D5596	Note (4)	45,000 lb
Oxidative Induction Time (OIT) (min. average)(5) ▪ Standard OIT —or— ▪ High Pressure OIT	 D3895 D5885	 100 min. 400 min.	200,000 lb
Oven Aging at 85°C(5)(6) ▪ Standard OIT (min. average) - % retained after 90 days —or— ▪ High Pressure OIT (min. average) - % retained after 90 days	D5721 D3895 D5885	 55% 80%	Per each formulation
UV Resistance(7) ▪ Standard OIT (min. average) —or— ▪ High Pressure OIT (min. average) - % retained after 1,600 hours(9)	D7238 D3895 D5885	 N.R.(8) 50%	Per each formulation

Notes:
(1) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
  – Yield elongation is calculated using a gauge length of 1.3 inches.
  – Break elongation is calculated using a gauge length of 2.0 inches.
(2) The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.
(3) Other methods such as D1603 (tube furnace) or D63 TGA) are acceptable if an appropriate correlation to D4218 (muffle furnace) can be established.
(4) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
  – Nine in Categories 1 or 2, and 1 in Category 3.
(5) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.
(6) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90-day response.
(7) The condition of the test should be 20-hour UV cycle at 75°C, followed by 4-hour condensation at 60°C.
(8) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.
(9) UV resistance is based on percent retained value of the original HP-OIT value.

Table 10-2
High Density Polyethylene (HDPE) Geomembrane – Textured Test Frequency and Acceptance Criteria

PROPERTIES	TEST METHOD	TEST VALUE (40 mils	TEST VALUE (60 mils)	TESTING FREQUENCY
Thickness (min. average) ▪ Lowest individual for 8 out of 10 values ▪ Lowest individual for any of the 10 values	D5994	Nom. (-5%) 10% 15%	Nom. (-5%) 10% 15%	Per roll
Asperity Height (min. average)(1)	D7466	10 mil.	10 mil.	Every second roll(2)
Density (min. average)	D1505/D 792	0.940 g/cc	0.940 g/cc	200,000 lb
Tensile Properties (min. average)(3) ▪ Yield strength ▪ Break strength ▪ Yield elongation ▪ Break elongation	D6693 Type IV	 84 lb/in. 60 lb/in. 12% 100%	 126 lb/in. 90 lb/in. 12% 100%	20,000 lb
Tear Resistance (min. average)	D1004	28 lb	42 lb	45,000 lb
Puncture Resistance (min. average)	D4833	60 lb	90 lb	45,000 lb
Stress Crack Resistance(4)	D5397 (App.)	300 hr.	300 hr.	per GRI-GM10
Carbon Black Content (range)	D4218(5)	2.0–3.0%	2.0–3.0%	20,000 lb
Carbon Black Dispersion	D5596	Note (6)	Note (6)	45,000 lb
Oxidative Induction Time (OIT) (min. average)(7) ▪ Standard OIT —or— ▪ High Pressure OIT	 D3895 D5885	 100 min. 400 min.	 100 min. 400 min.	200,000 lb
Oven Aging at 85°C(7)(8) ▪ Standard OIT (min. average) - % retained after 90 days —or— ▪ High Pressure OIT (min. average) - % retained after 90 days	D5721 D3895 D5885	 55% 80%	 55% 80%	Per each formulation
UV Resistance(9) ▪ Standard OIT (min. average) —or— ▪ High Pressure OIT (min. average) - % retained after 1,600 hours(11)	D7238 D3895 D5885	 N.R.(10) 50%	 N.R.(10) 50%	Per each formulation

Notes:
(1) Of 10 readings, 8 out of 10 must be ≥ 7 mils, and lowest individual reading must be ≥ 5 mils. Also see Note 6.
(2) Alternate the measurement side for double-sided textured sheet.
(3) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
– Yield elongation is calculated using a gauge length of 1.3 inches.
– Break elongation is calculated using a gauge length of 2.0 inches.
(4) P-NCTL test is not appropriate for testing geomembranes with textured or irregular rough surfaces. Test should be conducted on smooth edges of textured rolls or on smooth sheets made from the same formulation as being used for the textured sheet materials. The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.
(5) Other methods such as D1603 (tube furnace) or D63 TGA) are acceptable if an appropriate correlation to D4218 (muffle furnace) can be established.
(6) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
– Nine in Categories 1 or 2, and 1 in Category 3.
(7) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.
(8) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90-day response.
(9) The condition of the test should be 20-hour UV cycle at 75°C, followed by 4-hour condensation at 60°C.
(10) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.
(11) UV resistance is based on percent retained value of the original HP-OIT value.

Table 10-3
Linear Low Density Polyethylene (LLDPE) Geomembrane – Textured
Test Frequency and Acceptance Criteria

PROPERTIES	TEST METHOD	TEST VALUE (40 mils)	TESTING FREQUENCY (minimum)
Thickness mils (min. average) ▪ Lowest individual for 8 out of 10 values ▪ Lowest individual for any of the 10 values	D5994	nom. (-5%) -10% -15%	Per roll
Asperity Height mils (min. average)(1)	D7466	10	Every 2nd roll(2)
Density g/ml (max.)	D1505/D792	0.939	200,000 lb
Tensile Properties (min. average)(3) ▪ Break strength - lb/in ▪ Break elongation - %	D6693 Type IV	 60 250	20,000 lb
2% Modulus - lb/in (max.)	D5323	2,400	Per formulation
Tear Resistance - lb (min. average)	D1004	22	45,000 lb
Puncture Resistance - lb (min. average)	D4833	44	45,000 lb
Axi-Symmetric Break Resistance Strain - % (min.)	D5617	30	Per formulation
Carbon Black Content - %	D4218(4)	2.0-3.0	45,000 lb
Carbon Black Dispersion	D5596	Note (5)	45,000 lb
Oxidative Induction Time (OIT) (min. average)(6) ▪ Standard OIT —or— ▪ High Pressure OIT	 D3895 D5885	 100 400	200,000 lb
Oven Aging at 85°C(7) ▪ Standard OIT (min. average) - % retained after 90 days —or— ▪ High Pressure OIT (min. average) - % retained after 90 days	D5721 D3895 D5885	 35 60	Per formulation
UV Resistance(8) ▪ Standard OIT (min. average) —or— ▪ High Pressure OIT (min. average) - % retained after 1,600 hours(10)	 D3895 D5885	 N.R. (9) 35	Per formulation

Notes:
(1) Of 10 readings, 8 out of 10 must be ≥ 7 mils, and lowest individual reading must be ≥ 5 mils; also see Note 9.
(2) Alternate the measurement side for double-sided textured sheet.
(3) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
– Break elongation is calculated using a gauge length of 2.0 inches at 2.0 in/min.
(4) Other methods such as D1603 (tube furnace) or D63 TGA) are acceptable if an appropriate correlation to D4218 (muffle furnace) can be established.
(5) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
– Nine in Categories 1 or 2, and 1 in Category 3.
(6) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.
(7) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90-day response.
(8) The condition of the test should be 20-hour UV cycle at 75°C, followed by 4-hour condensation at 60°C.
(9) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.
(10) UV resistance is based on percent retained value regardless of the original HP-OIT value.

When cores are required for preparing geomembrane for shipment, the manufacturer will use cores with sufficient crushing strength to prevent collapse or other damage while in use.

The following practices will be used as a minimum in receiving and storing geomembrane rolls in the designated storage area at the job site:

- While unloading or transferring the geomembrane rolls from one location to another, care will be taken to prevent damage to the geomembrane itself. The preferred method involves using a spreader-bar, straps, and a loader. Rolls will not be dragged.
- Geomembrane rolls will be stored in a manner so as to ensure that they are adequately protected from the following:
    - Equipment damage
    - Strong oxidizing chemicals, acids, or bases
    - Flames, including welding sparks
    - Temperature in excess of 160° Fahrenheit
    - Dust and dirt

The RPR will observe and document, throughout the pre-installation, installation, and post-installation periods that the Installer provided adequate handling equipment for moving geomembrane rolls and that the equipment and the handling methods used do not pose unnecessary risk of damage. The Installer is responsible for the means and methods to implement the work.

The Installer will be responsible for ensuring that all material installed meets specifications (i.e., that the roll marking label information indicates required specifications and properly represents materials). The RPR will maintain a log of geomembrane roll deliveries. The log will contain the roll numbers, the date of delivery, and the batch (lot) numbers.

10.3 Installation

This section includes discussion of geomembrane roll testing requirements, earthwork required for geomembrane placement, placement of the geomembrane, defects and repairs of geomembrane, and requirements applicable to other materials in contact with the geomembrane. Subsection 10.4 describes the installation and testing requirements for geomembrane seams.

All parties involved in the installation of the geomembranes will be familiar with geomembrane and will focus on protecting the geomembrane from damage during construction activities.

10.3.1 Testing Requirements

This subsection describes the test methods, including sampling procedures and frequencies, and the role of the geosynthetics testing laboratory in testing the geomembrane roll samples. Subsection 10.2.1, under Quality Control Requirements, describes the test methods that are performed on an infrequent basis to demonstrate the uniformity of resin used to fabricate geomembrane shipped to the job site. Seam testing is described in Subsection 10.4.4 and 10.4.5.

Test Methods

A representative of the geosynthetics testing laboratory at the Geomembrane Manufacturer's plant may collect geomembrane roll samples. Conformance samples will be collected at a rate one sample per 100,000 square feet (or per requirements of NR516.07(2)(a) of geomembrane produced for delivery to the site. At least one sample will also be obtained for each geomembrane production batch. Samples for thickness testing or measurements will be collected on every roll for delivery to the site. The Installer should not ship to, or receive at, the site geomembrane from more than two production batches in any single shipment without the prior written approval of the CQA Officer and the Owner.

Samples collected will be of a size determined by the geosynthetics testing laboratory. The laboratory technician will indicate the machine direction on the sample.

Tables 10-1, 10-2, and 10-3 list some of the tests and the test methods that may be performed on HDPE and LLDPE geomembrane roll samples. At a minimum, the minimum number of tests required by NR516.07(2)(a) or approved by the WDNR will be conducted on the samples. The specifications and methods used in evaluating the results are discussed below under Procedures for Determining Geomembrane Roll Test Failures. Unless specified otherwise, sample specimens will be prepared in accordance with the referenced test method. The results for tear resistance and each of the tensile property tests will be reported for both the machine and cross direction if these tests are conducted.

Role of Testing Laboratory

The geosynthetics testing laboratory will be responsible for performing the tests on samples submitted to them as described above under Test Methods or as determined by the CQA Officer. The results of the tests performed will be reported to the CQA Officer, the RPR, and the Owner.

Retesting of geomembrane rolls for quality assurance purposes because of failure to meet any or all of the acceptance specifications listed in Tables 10-1, 10-2, and 10-3 can only be authorized by the CQA Officer.

The Geomembrane Manufacturer and/or Installer may perform their own tests according to the methods and procedures defined in Tables 10-1, 10-2, and 10-3; however, the results will only be applicable to their own quality control needs. The results will not be substituted for the quality assurance testing describe herein.

Procedures for Determining Geomembrane Roll Test Failures

Tables 10-1, 10-2, and 10-3 list the acceptance specifications for HDPE and LLDPE geomembranes of various thicknesses. The HDPE geomembrane values listed in the acceptance specifications of Tables 10-1 and 10-2 is from GRI Test Method GM 13. Table 10-3 was developed from GRI Test Method GM 17 for LLDPE geomembranes. The most current version of GM 13 and GM 17 will supersede the acceptance specifications in the tables. Acceptance specifications apply to both textured and smooth geomembranes. For those tests where results are reported for both machine and cross direction, each result will be compared to the listed specification to determine acceptance.

The following procedure will be used for interpreting results:

- If the test values meet the stated specification in Tables 10-1, 10-2, and 10-3, then the roll and the lot will be accepted for use at the job site. If the sample represents all rolls from an entire shipment, then the entire shipment will also be considered accepted.
- If the result does not meet the specifications, then the roll and the batch may be retested using specimens either from the original roll sample or from another sample collected by the geosynthetics laboratory technician or the RPR. For retesting, two additional tests will be performed for the failed test procedure. (Each additional test will consist of multiple-specimen tests if multiple specimens are called for in the test procedure). If both of the retests are acceptable, then the roll and batch will be considered

to have passed this particular acceptance test; if either of the two additional tests fail, then the roll and batch will be considered unsuitable without further recourse. The CQA Officer and the Owner may obtain samples from other rolls in the batch. On the basis of testing these samples, the CQA Officer and the Owner may choose to accept a portion of the batch while rejecting the remainder.

If retesting does not result in passing test results as defined in the preceding paragraph, or if there is any other nonconformity with the material specifications, then the Installer will withdraw the rolls from use in the project at the Installer's sole risk, and expense. The Installer will be responsible at his/her sole risk, cost, and expense for removing this geomembrane from the site and replacing it with acceptable geomembrane.

10.3.2 Earthwork

The Construction Contractor will be responsible for preparing the supporting soil according to the plans and specifications. For each day of installation of the geomembrane, the Installer, the Contractor, and the RPR will observe the surface and certify that the surface is acceptable for installations. The installer will prepare and sign a subgrade acceptance form for each day of geomembrane deployment.

The soil surface will also be evaluated during geomembrane installation for any areas softened by precipitation or cracked due to desiccation. The Construction Contractor will rework areas determined to be unacceptable until acceptable.

10.3.3 Placement

Location and Panel Layout Drawing

A panel layout drawing for the geomembrane installation covered by this Plan will be prepared by the Installer prior to the installation and submitted to the CQA Officer and the Owner, showing the proposed location and orientation of geomembrane panels to be installed in relation to slope, collection trenches, anchor trench, and phase boundaries. The panel layout drawing will be submitted to the State Regulatory Agency prior to the preconstruction meeting required by NR516.04(4). The Owner and the CQA Officer will review the proposed panel layout drawing and document that it is consistent with accepted practice and the construction plans and specifications.

Installation Techniques

Geomembrane panels will be installed by placing one at a time, and each panel will be seamed by the end of the day on which it was placed.

The RPR will document that the condition of the supporting soil has not changed detrimentally during installation. The RPR will notify the Installer and the Construction Contractor of any damage done (i.e., rutting by equipment used to deploy geomembrane) to the supporting soil prior to panel seaming.

It is the responsibility of the Installer to remove the deployed panel to allow the Construction Contractor to repair the supporting soil. The RPR will observe and document the repair of the supporting soil. The RPR will inform the Installer that the method of deployment will be observed during further deployment, and if damage to supporting soil continues, deployment will be stopped and an alternative means of deployment is to be developed. The RPR will document these events and conversations in the daily report.

The Installer will take the following precautions while installing the geomembrane:

- Ensure that the equipment used does not damage the geomembrane by the way it is handled, by excessive heat, by leakage of hydrocarbons, or by other means.
- Ensure that personnel working on the geomembrane do not smoke, wear damaging clothing, or engage in other activities that could damage the geomembrane.
- Ensure that the method used to deploy the geomembrane does not cause scratches or crimps in the geomembrane.
- Ensure that the method used to deploy the rolls minimizes wrinkles.
- Ensure that the geomembrane is adequately loaded to prevent wind uplift.
- Minimize the amount of direct contact with the geomembrane, by limiting the number of personnel that are allowed on the geomembrane once QC and CQA are completed.
- Ensure that only approved equipment is allowed on the surface of the geomembrane (i.e., generators, test equipment). The use of motorized ATV vehicles is not permitted without approval from the CQA Officer.

Weather Conditions

Geomembrane will not be placed in areas of ponded water, during precipitation events, or in the presence of excess winds. The Installer must receive written approval to deploy geomembrane in temperature below 32°F.

Damages

The RPR will examine each panel for damage after placement and will determine which panels, or panel portions, should be rejected, or accepted. Damaged panels or portions that have been rejected will be marked, removed, and recorded by the RPR.

10.3.4 Defects and Repairs

This section applies to all defects and repairs resulting from examinations, tests, or visual observations performed on the geomembrane material itself and on the seams.

Identification

All seamed and nonseamed areas of the geomembrane will be examined and documented by the RPR for identification of defects, holes, blisters, undispersed raw material, and any signs of contamination by any foreign matter. Because light reflected by the geomembrane helps to detect defects, the surface of the geomembrane will be clean at the time of examination. The RPR will complete a final examination of the geomembrane in areas in which both the Installer and the RPR have completed their QC and CQA, respectively. The RPR and the Installer will perform a final examination over the entire geomembrane at the completion of the project. The Installer and/or the Construction Contractor will clean any area that is insufficiently clean to complete the final examination.

Evaluation

Each suspect area identified will be nondestructively tested using the vacuum box test method, an air test, or the spark test method. The RPR will approve the proper test method for each suspect location.

Repair Procedures

Any portion of the geomembrane exhibiting a flaw or failing a destructive or nondestructive test will be repaired. Several procedures exist for the repair of these areas. The procedures available include the following:

- Patching is used to repair large holes, tears, undispersed raw materials, and contamination by foreign matter.
- Grinding and rewelding are used to repair small sections of extruded seams.
- Spot welding or seaming is used to repair small tears; pinholes; or other minor, localized flaws.
- Capping is used to repair large lengths of failed seams.
- Topping is used to repair areas of inadequate seams that have an exposed edge.
- Other procedures may be used at the recommendation of the Installer if agreed upon by the CQA Officer and the RPR.

The repair procedures, materials, and techniques will be approved in advance of the specific repair by the CQA Officer, the RPR, and the Installer. At a minimum, the following provisions will be satisfied:

- Patches or caps will extend at least 6 inches beyond the edge of the defect, and all corners of patches will be rounded with a radius of at least 3 inches.
- The type of geomembrane (i.e., smooth or textured) used for repairs will be approved by the RPR prior to completing repairs.

Examination of Repairs

Each repair will be numbered and logged by the RPR. Each repair will be nondestructively tested according to Subsection 10.4.4. Repairs that pass the above testing will be considered to be adequate, except that large caps may be of sufficient extent to require destructive seam sampling and testing, at the discretion of the RPR, according to the provisions of Subsection 10.4.5.

Failed tests indicate that the repair was inadequate, and the repair will be redone and retested until a passing result is obtained. The RPR will document that all repairs have been subjected to nondestructive testing and will record the number of each repair, the date, and the test outcome.

Large Wrinkles

When seaming of the geomembrane is completed, the RPR will examine the geomembrane for wrinkles and determine which wrinkles should be cut out and reseamed by the Installer. The wrinkle repair will be done in accordance with the equipment and procedures described in Subsection 10.4.2 and 10.4.3, respectively, and it will be nondestructively tested using the vacuum box test method described in Subsection 10.4.4.

10.3.5 Material in Contact With Geomembranes – Anchor Trench System and Backfilling

The Construction Contractor will excavate the anchor trench for the geomembrane, unless otherwise specified, to the lines and grades shown on the plans and specifications. The trench will use a "U" configuration. No more than the amount of trench required for the geomembrane to be anchored in 1 day will be excavated to minimize the desiccation potential of the anchor trench soil unless moisture content is maintained. The anchor trench will be adequately drained to prevent ponding or softening of the adjacent soil while the trench is open.

The anchor trench will be backfilled and compacted by the Contractor. Care will be taken when backfilling the trenches to prevent any damage to the geomembrane or other geosynthetics that may also be placed in the trench prior to backfilling.

The RPR will observe the backfilling and compacting operations and will advise the Contractor of the adequacy of the soil installation. The RPR will also advise the CQA Officer and the Owner of any problems.

10.4 Field Seaming

This section covers the quality assurance procedures on seams used to join the rolls of geomembrane into a continuous layer. The installation of each of the geomembranes at the landfill facility will include 100 percent nondestructive testing of all field seams for joining adjacent rolls of geomembranes to document that no openings or gaps exist between geomembrane sheets. In addition, destructive testing will be performed at a routine interval for determining the strength and mode of failure of field seams in both the shear and peel modes.

The allowable field seam methods, equipment, personnel qualifications, and destructive and nondestructive testing methods are described in this section.

10.4.1 Panel/Seam Layout

No horizontal seams will be allowed on slopes greater than 5 horizontal to 1 vertical except at the location that the 40-mil and 60-mil geomembranes are seamed together in the vertical expansion areas. In corners and at other odd-shaped geometric intersections, the number of horizontal seams will be minimized. A seam numbering system comparable and compatible with panel numbering system will be agreed upon at the preconstruction meeting (Subsection 3.3).

10.4.2 Seaming Equipment

The approved methods for field seaming panels and repairs are the dual hot wedge (fusion-type) seam method and the extrusion fillet weld process. Dual hot wedge seaming method will be used on linear seams (production seams). Corners, butt seams, tie-ins, and long repairs will be dual hot wedge seamed. The extrusion fillet or dual hot wedge welding will be used for other repairs and patches (nonproduction). No other processes can be used without prior written authorization from the CQA Officer and the Owner. Only equipment that has been specifically approved by make and model will be used.

Dual Hot Wedge Process

The Installer will meet the following requirements regarding the use, availability, and cleaning of the equipment to be used at the job site:

- An automated self-propelled type of apparatus will be used.
- The welding apparatus will be equipped to continuously monitor applicable temperatures.
- One spare operable seaming device will be maintained on-site at all times.
- Equipment used for seaming will not damage the geomembrane.
- The geomembrane will be protected in areas of heavy traffic to prevent damage discussed in Subsection 10.3.3.
- For cross seams, the intersecting dual hot wedge seam will be patched using the extrusion fillet process described below.
- The electric generator for the equipment will be placed on a smooth base in such a way that no damage occurs to the geomembrane. Similarly, a smooth insulating plate or fabric will be placed beneath the hot equipment after use.

The Installer will keep records for each seamer performing dual hot wedge seaming, including welding machine I.D. number, ambient temperature, and machine operating temperatures. These data will be recorded at intervals as agreed upon at the preconstruction meeting.

Extrusion Fillet Process

The Installer will meet the following requirements regarding the use, availability, and cleaning of the extrusion welding equipment to be used at the job site:

- The welding equipment will be equipped to continuously monitor temperature at the nozzle.
- One spare seaming device will be maintained on-site at all times.
- Equipment used for seaming will not damage the geomembrane.
- The geomembrane will be protected in areas of heavy traffic to prevent damage.
- The extruder will be cleaned and purged prior to beginning seaming, and at any time seaming operations are stopped, until all heat-degraded extrudate has been removed from the barrel.
- The electric generator for the equipment will be placed on a smooth base in such a way that no damage occurs to the geomembrane. Similarly, a smooth insulating plate or fabric will be placed beneath the hot equipment after use.
- Grinding geomembrane surfaces for welding preparation will not be performed more than 1 hour prior to seaming.
- Welding rod shall be kept clean and be of the correct type for the specific material being welded.

The Installer and, if applicable the Geomembrane Manufacturer will provide documentation to the CQA Officer regarding the quality of the extrudate used in the welding apparatus. At a minimum, the extrudate will be compatible with the base liner material and will contain the same grade and quality of polyethylene resins as used in the base material.

The Installer will keep records for each seamer performing extrusion weld seaming, including welding machine I.D. number, and ambient temperature. These data will be recorded at intervals as agreed upon at the preconstruction meeting.

10.4.3 Initial Requirements

Personnel Qualifications

All personnel performing seaming operations will be qualified by experience and by successfully passing seaming tests for the type of seaming equipment to be used. At least one seamer will have experience in seaming a minimum of 1,000,000 square feet of polyethylene geomembrane using the same type of seaming apparatus to be used at the landfill facility. The most experienced seamer, the "master seamer," will have direct supervisory responsibility at the job site.

The Installer will provide a list of proposed seaming personnel and their experience records to the CQA Officer and the RPR for their review and approval.

Weather Conditions

The weather conditions under which geomembrane seaming can be performed are as follows:

- Unless otherwise authorized in writing by the CQA Officer, no seaming will be attempted or performed at an ambient temperature below 32°F (0°C) or above 104°F (40°C).
- Between ambient temperatures of 32°F (0°C) and 50°F (10°C), seaming will be performed only if the geomembrane is preheated by either sun or a hot air device, provided there is no excessive ambient cooling resulting from high winds.
- Above 50°F (10°C), no preheating of the geomembrane will be required.
- Geomembrane will be dry and protected from wind.
- Seaming will not be performed during any precipitation event unless the Installer erects satisfactory shelter to protect the geomembrane areas for seaming from water and/or moisture.
- Seaming will not be performed in areas where ponded water has collected below the surface of the geomembrane.

If the Installer wishes to use methods that may allow seaming at ambient temperatures below 32°F or above 104°F, the Installer will demonstrate and certify that the methods and techniques used to perform the seaming produce seams that are entirely equivalent to seams produced at temperatures above

50°F and below 104°F, and that the overall quality of the geomembrane is not adversely affected.

The RPR will document the following:

- Ambient temperature at which seaming is performed.
- Any precipitation events that occurred at the site, including the time of such occurrences, the intensity, and the amount of the event.

The RPR will inform the CQA Officer and the Owner if any of the weather conditions are not being fulfilled. The CQA Officer will stop or postpone the geomembrane seaming when weather conditions are unacceptable.

Overlapping and Temporary Bond

The Installer will be responsible for ensuring that the following requirements are met:

- Panels of geomembrane will have a finished overlap of a minimum of 3 inches for extrusion welding and 4 inches for fusion welding; but, in any event, sufficient overlap will be provided to allow peel tests to be performed on the seam.
- No solvents or adhesives will be used on the geomembrane unless the CQA Officer and the Owner have approved the product in writing. Approval can only be obtained by submitting samples and data sheets to the CQA Officer and the Owner for evaluation.
- Procedures used to temporally bond adjacent geomembrane panels must not damage the geomembrane; in particular, the temperature of the hot air at the nozzle of any spot welding apparatus will be controlled such that the geomembrane is protected at all times against potential damage.

Trial Seams

Trial seams will be made on fragments of geomembrane to document that seaming conditions are adequate. Trial seams will be performed on the surface the geomembrane will be deployed on (i.e., top of compacted clay liner, top of GCL). Such trial seams will be made at the beginning of each seaming period, following work interruptions, at changes in weather, and at least once every 5 hours of seaming activities, for each seaming apparatus used that day with additional test run following work interruptions, weather changes, changes in machine settings for temperature or speed or as directed by the CQA officer or RPR. Each seamer is required to complete a trial seam prior to seaming. Trial

seams are to be run using the materials for which the seaming will be used (i.e., smooth to smooth, smooth to textured, textured to textured). At a minimum, one trial seam per welding machine will be made at the start of each day by each seaming technician performing welding that day.

The trial seams will be examined by the Installer and the RPR for squeeze-out, foot pressure applied by the seaming equipment, and general appearance, and will be tested using a field tensiometer. If the seam fails any of these examinations, it will be repeated. If the second trial seam fails these examinations, the welding apparatus and seamer are not allowed to seam until the Installer can demonstrate the cause of the failure. Once the Installer has made the necessary corrections to the welding equipment, the seamer and the apparatus are required to pass two trial seams prior to beginning seaming. The RPR will document the reason for the failure and all subsequent trial seams.

The trial seam samples will be at least 3 feet long by 1 foot wide after seaming, with the seam centered lengthwise. Seam overlap will be as indicated above under Overlapping and Temporary Bond. Trial seams shall be welded under the same conditions as production seaming is to take place.

Five adjoining specimens, each 1 inch wide, will be cut from each end of the trial seam sample by the Installer. The specimens will be tested by the Installer in shear (5 field shear) and peel (5 field peel [inner and outer seams for dual hot wedge]), respectively, using a field tensiometer.

The remainder of the trial seam sample will be identified and marked by the RPR as follows:

- The sample will be assigned a number and marked as to the welding apparatus used and the seamer's name.
- The date, time, applicable welding equipment operating temperatures, and ambient temperature at the time of seaming will be noted.
- Whether the sample passes or fails will be recorded.

The RPR will observe trial seam procedures, and record them on the field log forms. The sample itself will be cut into three pieces, one for the Owner's record, one to be retained by the RPR, and one to be made available to the Installer.

The RPR may randomly select trial seam samples for destructive testing by the geosynthetics testing laboratory according to the test procedures described in Subsection 10.4.5. The frequency for trial seam laboratory testing will be at the discretion of the RPR and the CQA Officer.

If a trial seam sample fails a destructive test performed by the geosynthetics testing laboratory, according to the acceptance criteria stated in Subsection 10.4.5, then a destructive test seam sample(s) will be taken from each of the seams completed by the seamer during the shift related to the failed trial seam test. These samples will be forwarded by the RPR to the geosynthetics testing laboratory and, if any of them fails the tests, then the procedures described in Subsection 10.4.5 will apply. The conditions of this paragraph will be considered met if a destructive seam test sample, collected and tested according to the provisions under Location and Sampling Frequency and Sampling Procedure of Subsection 10.4.5, has already been taken and has passed.

Seam Preparation

The Installer will ensure that the following conditions for each of the geomembrane installations covered by this Plan are met:

- Prior to seaming, the seam area is clean and free of moisture, dust, dirt, debris of any kind, and foreign material.
- If seam overlap grinding is required, then the grinding process will be completed according to the Geomembrane Manufacturer's instructions within 1 hour of the seaming operation, and in a way that will not damage the geomembrane or cause excessive striation of the geomembrane surface.
- Seams will be aligned so as to minimize the number of wrinkles and "fishmouths."

General Seaming Procedures

Unless otherwise specified, the general seaming procedures to be used by the Installer for each of the geomembrane installations covered by this Plan, and observed by the RPR, will be as follows:

- A firm subbase will be provided to achieve proper support for seaming.
- Fishmouths or wrinkles at the seam overlaps will be cut along the ridge of the wrinkle in order to achieve a flat overlap. The cut fishmouths or wrinkles will be seamed, and any portion where the overlap is inadequate

will then be patched with the same geomembrane (including thickness) extending a minimum of 6 inches beyond the cut in all directions.

- If seaming operations are to be conducted at night, adequate illumination will be provided.

10.4.4 Nondestructive Testing

Each field seam will be nondestructively tested over its full length using one of the methods described in this section. The purpose of nondestructive testing is to determine the continuity of the seams. Nondestructive testing, at this stage of development, does not provide any information on the strength of seams. Seam strengths will be determined by destructive testing methods that are described in Subsection 10.4.5. Failure of any of the nondestructive or destructive tests will require the repair of the failed section according to the procedures contained in Subsection 10.3.4.

Nondestructive testing as described in this section will be performed on seams for every geomembrane installation covered by this Plan. The recommended test methods for conducting the nondestructive seam testing are the air pressure test for dual hot wedge seams and the vacuum box test for extrusion fillet welds. These two nondestructive testing methods are described below.

The RPR will perform the following documentation tasks:

- Observe nondestructive seam testing, and examine seams for squeeze-out, foot pressure, and general appearance. Failure of these criteria will be considered as failure of the seam, and repair or reconstruction will be required.
- Document location, date, test unit number, name of tester, and outcome of all testing.
- Inform the Installer and CQA Officer of any required repairs.
- Document that appropriate repairs are made and that the repairs are retested nondestructively with passing results.

Air Pressure Testing

The following test procedures are applicable only to dual hot wedge seams. The equipment for performing the test should meet the following minimum requirements:

- An air compressor or hand pump equipped with a pressure gauge and regulator capable of producing and sustaining a pressure between 25 and 30 psig and mounted on a cushion to protect the geomembrane surface

- Fittings, rubber hose, valves, etc., to operate the equipment, and a sharp hollow needle or other approved pressure feed device

Air pressure testing will be performed according to the following procedure:

1. Seal both ends of the seam to be tested.
2. Insert a needle or other approved pressure feed device into the airspace at one end of the dual hot wedge seam.
3. Energize the air compressor or hand pump to a pressure of 25-30 psig. Close the valve, and monitor the pressure in the seam airspace for approximately 7 minutes.
4. Record the pressure in the seam at the end of 2 minutes and again at the end of 7 minutes.
5. If the pressure difference between the 2-minute and 7-minute readings exceeds 2 psi for 60 mil or 3 psi for 40 mil HDPE and LLDPE, or if the pressure does not stabilize within the 7-minute period, one more 5-minute pressure-monitoring interval is allowed.
6. If the pressure loss over both 5-minute intervals exceeds 2 psi for 60 mil HDPE or 3 psi for 40 mil HDPE and LLDPE, or if the pressure does not stabilize, then the seam fails the test.
7. If the pressure loss over either 5-minute interval does not exceed 2 psi for 60 mil HDPE or 3 psi for 40 mil HDPE and LLDPE, then the seam may be deemed by the Installer to have passed the test.
8. The Installer must verify that the air channel tested was not obstructed by noting a release of air pressure at the end of the tested seam interval opposite the pressure gauge.

For any seam interval that fails the air pressure nondestructive test, additional nondestructive testing or visual inspection will be used to identify, if possible, the faulty area of the seam. The faulty area will be repaired and retested. If the faulty area cannot be identified, then the entire seam will be repaired and retested.

Vacuum Box Test

Vacuum box testing is to be used on those seams made by the extrusion fillet process, to locate the defects identified from air pressure testing, or to evaluate suspect seam and nonseam areas as discussed in Subsection 10.3.4.

Vacuum box testing equipment must meet the following minimum standards:

- A five-sided vacuum box with an open bottom, a clear viewing panel on top and a pliable gasket attached to the bottom
- A pump assembly equipped with pressure controller and pipe connections capable of achieving a vacuum of 10 inches of water.
- A vacuum gauge on the tank with an operating range from 0 to 26 inches of vacuum, and a vacuum gauge on the vacuum box with an operating range from 0 to 10 inches of water vacuum

The following procedure will be used in performing the vacuum box test:

1. Clean the seams to be tested so that they are relatively free from soil or foreign objects that might prohibit a good seal from being formed between the vacuum chamber and the geomembrane.
2. Energize the vacuum pump, and reduce the tank pressure to approximately 5 to 10 inches of water vacuum.
3. Wet a strip of geomembrane approximately twice the size of the vacuum box with the soapy solution.
4. Place and center the vacuum box with the gasket in contact with the geomembrane surface over the wetted area of the seam.
5. Applying a normal force to the top of the vacuum box, close the bleed valve, and open the vacuum valve. Check to make certain that a tight seal is created between the geomembrane and the vacuum box. A minimum vacuum of 5 inches will be used for testing with the maximum allowable testing pressure never exceeding 10 inches of vacuum.
6. With the vacuum drawn, use the viewing panel to examine the geomembrane seam for bubbles resulting from the flow of air through the seam. Continue this examination for not less than 5 seconds.
7. Remove the vacuum box by first closing the vacuum valve and then opening the bleed valve. Proceed to Step 8 if bubbles appear in Step 6. If no bubbles appear in Step 6, then proceed directly to Step 9.
8. If bubbles appear through the geomembrane, mark the defective area for repair according to the provisions of Subsection 10.3.4. All repairs will be tested until nondestructive results are passing.
9. Move the vacuum box along the seam to be tested, overlapping the previously tested area by no less than 3 inches.

10.4.5 Destructive Seam Testing

Destructive seam testing will be performed on the geomembrane seams covered by this Plan. Destructive seam testing is performed to determine the strength of the seam in both shear and peel failure modes. Destructive seam testing will be performed within 48 hours of sampling either in an on-site laboratory by personnel under the direction of the CQA Officer or at the geosynthetics testing laboratory.

Location and Sampling Frequency

The RPR will select locations where seam samples will be cut out for the destructive testing. The RPR will mark the locations and record on the seam sample the assigned sample number, seam number, welder ID, machine number, and date welded. Test locations will be determined during seaming at the RPR's discretion. Suspicion of excess crystallinity, contamination, offset welds, or any other potential causes of an imperfect seam may prompt selection of such locations. The Installer will not be informed in advance of any location where seam samples will be taken.

The minimum frequency of sample collection on the liner system geomembrane will be one test location for every 1,000 linear feet of fusion seam length. Note: leak testing is required on the liner system. The minimum frequency of sample collection on the final cover geomembrane, where leak location testing will not be performed, will be one test location every 500 linear feet of fusion seam length.

Sample Procedure

Samples will be cut under the direction of the RPR as the seaming progresses. For each sample location, the following information will be documented:

- Assigned sample number and reason for collecting the sample (e.g., as part of statistical testing program, suspicious seam, etc.)
- Seam number
- Welder ID
- Machine #
- Date Welded
- Sample location on layout drawing

- For the peel test, which geomembrane is the top and which is the bottom with respect to seams performed using dual hot wedge (fusion) weld techniques

Specimens for qualitative field testing will be taken prior to the removal of the laboratory sample. Samples for field tensiometer testing will be 1 inch wide by 8 inches long, with the seam centered parallel to the width. A total of 10 samples will be collected for field testing. Five samples will be tested in peel (inner and outer seams for dual hot wedge samples) and five samples will be tested in shear. If all 10 samples pass the field tensiometer test described below under Field Test Methods, then the sample for laboratory testing will be taken according to the procedure described below.

The sample for laboratory testing will be located between samples used for field-testing. The destructive sample will be 12 inches wide by a minimum 42 inches long with the seam centered lengthwise. The sample will be cut by the Installer into three parts and distributed as follows:

- A sample 12 inches by 14 inches will be kept by the Installer for testing.
- A sample 12 inches by 12 inches will be given to the Owner for record storage.
- A sample 12 inches by 16 inches will be transmitted to the geosynthetics testing laboratory or on-site testing laboratory by the RPR.

The Installer in accordance with the repair procedures described in Subsection 10.3.4 will immediately repair all holes cut into the geomembrane resulting from destructive seam sampling. The repaired area will be nondestructively tested in accordance with the requirements of Subsection 10.4.4.

End-of-Seam Sampling

In addition to the 42-inch sample cut for laboratory testing, an additional sample will be cut from at least one end of each fusion seam weld greater than 100 feet in length for field-testing as described below. The end-of seam sample will consist of a minimum of two 1 inch wide samples, often referred to as bones. A minimum of one bone will be field tested in shear mode and a minimum of one bone will be field tested in peel mode (inner and outer seam).

Field Test Methods

The 1-inch–wide samples described above under Sampling Procedure, as well as the end-of-seam samples described above under End-of-Seam Sampling, will be field-tested in both peel mode and shear mode. Testing will be performed using a field tensiometer or equivalent device. Seam testing acceptance criteria for the field testing of the destructive samples and end of seam samples is contained in Tables 10-4 or 10-5. If the samples fail the field tensiometer test, then the repair procedures of Subsection 10.3.4 for the holes left by the cutout samples, and the seam reconstruction procedures for the repair of the defective seam, discussed later in this subsection, will be implemented.

Laboratory Test Methods

Laboratory testing of the destructive seam samples will be performed by the geosynthetics testing laboratory or on-site testing laboratory under the direction of the CQA Officer. All destructive seam tests, whether performed on trial seam samples (as described above) or on samples cut out from production seams, will be performed in general accordance with the methodology of ASTM D6392, which stipulates that at least five specimens will be tested in shear and five in peel. All specimens will be cut as 1-inch–wide strips.

The following tests will be performed on each seam sample submitted for laboratory testing:

- Shear and peel maximum tension is the maximum load per unit width of a 1-inch–wide specimen expressed in pounds per inch of width in both the shear and peel mode, according to ASTM D6392.
- Shear elongation at break is the extension at break expressed as a percentage of the initial distance between the edge of the fused track and the nearer grip. This distance should be the same on both sides of the seam and is usually 2 inches.
- Peel seam separation estimates the length of seam bond separation expressed as a percentage of the original bond length.

Also, for both the seam shear and peel tension tests, an indication will be given for each specimen tested that defines the locus of the failure.

For shear tests, the following values will be reported for each specimen tested:

- Maximum tension in pounds per inch

- Elongation at break indicating at what percentage the specimen failed (up to a tested maximum of 50%)
- The locus of failure

Table 10-4
40-mil and 60-mil HDPE Geomembrane Seam Acceptance Criteria

PROPERTY	TEST METHOD	UNITS	TYPE OF CRITERION	ACCEPTANCE VALUES	
				40-mil [1]	60-mil [1]
Shear strength [2]	ASTM D6392	ppi	Minimum	80	120
Shear elongation [2]	--	%	Minimum	50	50
Peel strength [3],[4] Fusion	ASTM D6392	ppi	Minimum	60	91
Peel strength [3],[4] Extrusion	ASTM D6392	ppi	Minimum	52	78
Peel separation [5],[6]	--	%	Maximum	25	25

Notes:
[1] Values apply for both textured and smooth HDPE geomembranes.
[2] Five out of the five test specimens must meet these requirements. In addition, failure type must be film-tear (FTB) for all five specimens.
[3] Four of the five specimens must meet these requirements. The fifth specimen shall achieve 90 percent of the listed peel strength.
[4] Failure type must be film-tear bond (FTB) for five out of the five specimens.
[5] Maximum Acceptance Value for five out of the five test specimens.
[6] The following are unacceptable break codes:
- Hot wedge: AD and AD-Brk >25%
- Extrusion fillet: AD1, AD2 and AD-WLD (unless strength is achieved)

Table 10-5
40-mil LLDPE Geomembrane Seam Acceptance Criteria

PROPERTY	TEST METHOD	UNITS	TYPE OF CRITERION	ACCEPTANCE VALUES	
				NON-TEXTURED	TEXTURED (1)
Shear strength (2)	ASTM D6392	ppi	Minimum	60	60
Shear elongation (2)	--	%	Minimum	50	50
Peel strength (3),(4) Fusion	ASTM D6392	ppi	Minimum	50	50
Peel strength (3),(4) Extrusion	ASTM D6392	ppi	Minimum	44	44
Peel separation (5),(6)	--	%	Maximum	25	25

Notes:
(1) If the lengthwise edges of the textured geomembrane panels are nontextured, then the nontextured specifications shall apply for testing of seams made along these edges.
(2) Five out of the five test specimens must meet these requirements. In addition, failure type must be film-tear (FTB) for all five specimens.
(3) Four of the five specimens must meet these requirements. The fifth specimen shall achieve 90 percent of the listed peel strength.
(4) Failure type must be film-tear bond (FTB) for five out of the five specimens.
(5) Maximum Acceptance Value for five out of the five test specimens.
(6) The following are unacceptable break codes:
- Hot wedge: AD and AD-Brk >25%
- Extrusion fillet: AD1, AD2 and AD-WLD (unless strength is achieved)

For peel tests, the following values will be reported for each specimen tested:

- Maximum tension in pounds per inch
- Seam separation expressed as percent of original seam bond length
- Locus of failure

For each set of five specimens, the mean will be calculated and reported for the shear maximum tension and the peel maximum tension.

Role of Testing Laboratory

The geosynthetics testing laboratory or on-site testing laboratory will be responsible for performing the tests on samples submitted to them as described above. The results of tests performed will be reported to the Owner, the CQA Officer, and the RPR. Retesting of seams because of failure to meet any or all of the specifications listed below can only be authorized by the CQA Officer and the Owner.

The Geomembrane Manufacturer and/or the Installer may perform their own quality control testing in accordance with the methods and procedures defined above under Laboratory Test Methods; however, the results, if substantially different from those obtained by the geosynthetics testing laboratory or on-site laboratory, may only be used to request a retesting by the geosynthetics testing laboratory or on-site testing laboratory. All quality assurance test results from the geosynthetics testing laboratory or on-site laboratory govern over any test results from the Geomembrane Manufacturer or the Installer. Only the CQA Officer and the Owner are authorized to approve a retesting request.

Procedures for Determining Destructive Seam Test Failures

The procedures described in this section apply to the destructive testing procedures defined above under Field Test Methods and Laboratory Test Methods. Procedures for repairing failed seams are given in Subsection 10.3.4 of this Plan.

The results from the shear and peel tests for the HDPE geomembranes will be evaluated against the criteria tabulated in Table 10-4; and the LLDPE geomembrane will be evaluated against the criteria presented in Table 10-5.

All of the tabular criteria for each respective geomembrane type must be met for a given seam to be considered acceptable.

The Installer has the following two options in determining the repair boundary whenever a seam has failed either the field tensiometer testing or the laboratory destructive testing:

1. The seam can be reconstructed between any two previously tested and passed destructive seam test locations.
2. The Installer can trace the welding path to an intermediate location (at a 10-foot minimum from the point of the failed test in each direction) and request that the field tensiometer tests be performed at these intermediate locations. If the field tensiometer sample results are acceptable, then the seam sample will be sent to the geosynthetics testing laboratory. If either sample fails, then the process will be repeated until acceptable destructive seam tests have been performed in both directions away from the original failed sample location. All retesting of seams according to this procedure will use the sampling methodology described earlier in this Plan under Sampling Procedure.

   The tracing of a failed seam test will continue until the seaming path boundaries are located, tracking will continue into the previous day's work if needed and into the next day's welding as well.

Seams reconstructed due to a failing destructive seam sample that are in excess of 150 feet long will be destructed tested, and any additional samples taken from the reconstructed zone must pass destructive seam testing.

The RPR will be responsible for documenting all actions, including test results submitted by the geosynthetics testing laboratory, taken in conjunction with seam testing. The RPR will also be responsible for keeping the CQA Officer informed on seam testing results and seaming progress.

The RPR will be responsible for documenting all actions, including test results submitted by the geosynthetics test laboratory, taken in conjunction with seam testing. The RPR will also be responsible for keeping the CQA Officer informed of the seam testing results and the seaming process.

10.5 Post-Installation

Each component covered by this Plan will be examined by the RPR. Any defects, whether due to failed seams, pinholes, or other penetrations, will be repaired.

Placement of the geotextile cushion and select aggregate fill drainage layer will proceed as soon as practicable following the RPR's testing and acceptance of completed geomembrane areas.

The geotextile cushion and drainage layer will provide ultraviolet protection, thermal insulation, and protection form physical damage.

Low-ground pressure tracked equipment (<5 psi) will be used to place the drainage layer material over the geomembrane. A minimum of 1 foot of cover material is required between the geomembrane and the low-ground pressure equipment. A minimum of 2 feet of cover soil is required between the geomembrane and all other tracked or floatation wheeled equipment. A minimum of 3 feet of cover soil is required between the geomembrane and all rubber-tired vehicles.

10.6 Leak Location Testing

Leak location testing (electrical resistivity testing or other approved method) of the installed geomembrane in the liner system will be completed by or observed by the CQA Officer, RPR, or a qualified technician. Leak location testing will be conducted after the leachate collection layer has been placed on the base grades and lower half of the sideslopes. Documentation of the testing method, including a description of the procedures and photographic documentation will be included in the construction documentation report. The documentation report will also include documentation of all defects and repairs including testing data for geomembrane sheet and welding and photographic documentation of the defects prior to and after repairs.

Section 11
Geotextile

11.1 General

This section of the CQA Plan applies to nonwoven geotextile used throughout the landfill facility. Geotextile will be installed in the following systems of the landfill facility:

- Leachate collection system
- Leachate collection sumps
- Liner system

Geotextile may also be used within roadways and spillways for reinforcement. Specifications for the reinforced geotextile will be included with the project plans and specifications for each construction project.

This section is further divided into three major subheadings, which cover the quality assurance requirements for pre-installation (which includes Geotextile Manufacturers), installation, and post-installation (which includes the final examination of the geotextiles prior to placing the appropriate material above the geotextile). The terms pre-installation, installation, and post-installation are applicable only to the geotextile and do not apply to the overall construction of the landfill facility.

11.2 Pre-Installation

11.2.1 Manufacturing

The geotextile will be supplied to the site in factory rolls. Prior to the delivery of any geotextile rolls, the Geotextile Manufacturer will provide the CQA Officer and the Owner with the manufacturer's Quality Control Plan used for the production of the geotextile.

Every roll of geotextile for delivery to the site will be manufactured and inspected by the Geotextile Manufacturer, according to the following requirements:

- The geotextile must contain no needles used for punching.
- The geotextile must be free of holes and any other sign of contamination by foreign matter.

The Geotextile Manufacturer will provide certification, based on tests performed in accordance with the methods listed in Table 11-1 that the geotextile supplied under this Plan will meet the material specifications listed in Table 11-2. These tests may be performed by the Geotextile Manufacturer's laboratory or a laboratory contracted by the Manufacturer. Additionally, the Geotextile Manufacturer will provide certification that the Manufacturer's Quality Control Plan was fully implemented for the geotextile materials supplied under this plan and that the geotextile delivered to the site does not contain needles. The Geotextile Manufacturer will provide documentation to verify the results of the Manufacturer's CQA Plan implementation required by the CQA Officer and the Owner.

The geotextile rolls will be tested and evaluated prior to acceptance. The CQA Officer may perform/require additional testing (i.e., conformance testing) as required by detailed specifications or as required in the judgment of the CQA Officer to verify that the geotextile meets the specifications.

11.2.2 Delivery, Handling, and Storage of Geotextile Rolls

Each geotextile roll to be used at the landfill facility will be marked by the Geotextile Manufacturer with the following information and in the following manner:

When fabric is rolled on a core, each roll will be identified with a durable gummed label, or an equivalent, on the inside of the core and on the outside of the protective wrapping for the roll.

- Each roll label will contain the following information at a minimum:
    - Name of manufacturer
    - Style and type number
    - Roll length and width
    - Batch (or lot) number
    - Nominal product thickness
    - Date of manufacture
    - Roll number

Table 11-1
Geotextile Tests and Test Methods

PROPERTY	TEST METHOD
Grab tensile strength[1] [2]	ASTM D4632
Grab elongation[1] [2]	ASTM D4632
Puncture strength[1] [2]	ASTM D4833
Trapezoidal tear[1] [2]	ASTM D4533
Apparent opening size[1]	ASTM D4751
Permittivity[1]	ASTM D4491
Water flow rate[1]	ASTM D4491
UV resistance[3]	ASTM D4355

Notes:
[1] Testing is required for geotextile filter.
[2] Testing is required for geotextile cushion.
[3] Testing is required only if the geotextile is to be uncovered for more than 30 days.

Table 11-2
Geotextile Tests, Test Methods, and Acceptance Criteria

PROPERTY[1][2]	TEST METHOD	UNITS	VALUE	6 OZ. [3]	8 OZ. [3]	10 OZ. [3]	12 OZ. [3]	16 OZ. [3]
Grab tensile strength	ASTM D4632	lb	MARV	160	205	250	300	380
Grab elongation	ASTM D4632	%	MARV	50	50	50	50	50
Puncture strength	ASTM D4833	lb	MARV	85	110	150	175	240
Trapezoidal tear	ASTM D4533	lb	MARV	60	85	100	115	150
Apparent opening size	ASTM D4751	Sieve	MARV	70	80	100	100	100
Permittivity	ASTM D4491	Sec^{-1}	MARV	1.4	1.2	1.0	0.7	0.5
Water flow rate	ASTM D4491	gpm/ft^2	MARV	110	95	75	50	45
UV resistance	ASTM D4355	% Retained @ 500 hrs	Typical[2]	70	70	70	70	70

Notes:
1. Values are based on discussions with acceptable manufacturers and represent production values at the time this document was prepared.
2. Values reported in weaker principal direction. All values listed are Minimum Average Roll Values (MARV) except UV resistance. UV resistance is a typical value.
3. Ounce values indicate MARV's in ounce per square yard as determined in accordance with test method ASTM D5261.

The Geotextile Manufacturer will use the following guidelines in packaging, wrapping, and preparing all geotextile rolls for shipment:

- When cores are required, those that have a crushing strength sufficient to avoid collapse or other damage while in use will be used.
- Each roll will be covered with a wrapping material that will protect the geotextile from damage due to shipment, water, sunlight, or contaminants.

The following practices will be used as minimum in receiving and storing geotextile rolls in the designated storage area at the job site:

- While unloading or transferring the geotextile rolls from one location to another, care will be taken to prevent damage to the wrapping or the geotextile itself. If practicable, the Installer/Contractor may use forklift trucks fitted with poles that can be inserted into the cores of rolls. The poles will be at least two-thirds the length of the rolls, to prevent breaking the cores and possibly damaging the geotextile. Rolls will not be dragged.
- The geotextile rolls will be stored in such a manner so as to ensure that they are adequately protected from the following:
    - Precipitation
    - Ultraviolet radiation, including sunlight
    - Strong oxidizing chemicals, acids or bases
    - Flames, including welding sparks
    - Temperatures in excess of 160° Fahrenheit
    - Soiling

The RPR will observe and document, throughout the pre-installation, installation, and post-installation periods, that the Installer provides adequate handling equipment used for moving geotextile rolls and that the equipment and handling methods used do not pose unnecessary risk of damage. The Installer/Contractor is responsible for the means and methods to implement the work.

- The Installer will responsible for ensuring that all materials installed meet specifications. The RPR will maintain a log of the geotextile rolls delivered. The following information, at a minimum, will be recorded on the log for each shipment received at the job site:
    - Date of delivery at the job site
    - For each roll of geotextile, the roll number and the batch (lot) number

11.3 Installation

This section describes the quality assurance requirements applicable to the installation, observation, and documentation of geotextile.

11.3.1 Placement

The Installer will install all geotextile in such a manner so as to ensure that it is not damaged and that it complies with the following requirements:

- On sideslopes, the geotextile will be securely anchored and then rolled down the slope in such a manner so as to continually keep the geotextile in tension.
- In the presence of wind, all geotextile will be secured by suitable methods. The temporary securing material will be left in place until replaced with cover material, if applicable.
- In-place geotextile will be cut with special care to protect other materials from damage that could be caused by the cutting of the geotextile.
- The Installer will take the necessary precautions to prevent damage to any underlying layers during placement of the geotextile.
- During placement of the geotextile, care will be taken not to entrap in the geotextile any stones, excessive dust, or moisture that could damage the geotextile or the underlying geosynthetics, or that could clog drains or filters.
- A visual examination of the geotextile will be carried out over the entire surface after the installation by the Installer to ensure that no potentially harmful objects, such as needles, are present.
- The edges of the geomembrane between phases will be protected with a geotextile wrap and/or an overlying protective material until the edges are spliced together with the liner system of the adjacent phase.

11.3.2 Seams and overlaps

- Geotextile placed as geotextile cushion (to protect the geomembrane liner from the drainage layer material and drainage layer material placement) will be continuously sewn, heat-bonded or seamed using another method approved by the CQA Officer. Geotextile will be overlapped 6 inches prior to seaming. The sewing method and stitch type will be per the Manufacturer's recommendation, but must be approved by the CQA Officer and the Owner. Overlapping of geotextile without sewing may be acceptable for certain applications (*i.e.*, seams under riprap, access roads) with approval from the CQA Officer.

- No horizontal seams will be allowed on slopes steeper than 5 horizontal to 1 vertical (i.e., seams will be along, not across, the slopes), except as part of a geotextile repair.
- Sewing will be performed with thread made from the same base material as the geotextile, or suitable equivalent.
- The Installer will pay particular attention to seams to ensure that materials are not inadvertently trapped beneath the geotextile.

The RPR will be responsible for observing and documenting that the above provisions are performed by the Installer in an acceptable manner.

11.4 Post-Installation

11.4.1 Final Examination

The RPR will perform a final geotextile examination after the installation of each geotextile layer has been completed. The objectives of the final examination are as follows:

- To examine for the presence of holes, tears, or other deterioration
- To examine for excessive tension due to stretching of the fabric during installation
- To examine for the presence of foreign objects (i.e., stones, soil clods) beneath the geotextile

If there will be an extended time delay between completion of the geotextile and the start of the installation of any other cover, then the Installer will make provisions by temporarily securing the geotextile using suitable methods to protect it from wind uplift. The RPR will document in the daily report the placement of the temporary securing methods used.

11.4.2 Placement of Soil Materials

The Construction Contractor will place all soil materials located on top of a geotextile in such a manner so as to minimize the following:

- Damage to the geosynthetics
- Slippage of the geotextile on underlying layers
- Excessive tensile stresses imposed on the geotextile

Section 12
Geosynthetic Clay Liner

12.1 Introduction

This section is divided into three major subheadings, which cover the quality assurance requirements for preinstallation (includes the GCL manufacturer), installation, and post-installation (includes the final examination of GCL prior to the placement of the geomembrane). The terms preinstallation, installation, and post-installation are applicable only to the GCL installation and do not apply to the overall construction of the landfill facility.

12.2 Preinstallation

Preinstallation activities are designed to help ensure that a high-quality product is being manufactured and that it is properly delivered, handled, and stored to maintain its quality.

12.2.1 Manufacturer's Quality Control Plan (MQCP)

The manufacturer of each component of the GCL and the GCL itself will have a Manufacturer's Quality Control Plan (MQCP) to ensure that their product meets all of the stated minimum properties. These manufacturers include the Bentonite Supplier, the Geotextile Manufacturer, and the GCL Manufacturer.

Bentonite Supplier

The Bentonite Supplier will have a MQCP that will be adhered to in the manufacturing process. This plan will include the following information:

- Documentation that the bentonite is sodium bentonite
- Testing that demonstrates that the bentonite meets specified gradation requirements
- Testing that demonstrates that the bentonite meets specified index test requirements
- Testing that demonstrates that the bentonite has not been treated with synthetic chemicals or polymers

Geotextile Manufacturer

The Geotextile Manufacturer will have a MQCP that will be adhered to in their manufacturing process. This plan will include the following provisions:

- Testing that demonstrates that the product is made of specified polymers
- Testing that demonstrates that the product meets certain minimum average roll values (for geotextiles)

GCL Manufacturer

The GCL manufacturer will have a MQCP that describes the procedures for accomplishing quality in the final product. At a minimum, the tests shown in Table 12-1 shall be performed by the Manufacturer.

This MQCP will also dictate the following requirements:

- Overlap alignment lines are to be marked on the edges.
- Completed rolls are to be securely wrapped in plastic.
- Completed rolls are to be stored indoors, and provisions are to be in place to prevent rolls from being stacked too high, to ensure that they are kept dry, and to prevent damage during handling.
- Quality control certificates are to be provided.

12.2.2 Materials

The GCL will be needle-punched reinforced composite GCL consisting of a layer of pure sodium bentonite clay encapsulated between two geotextiles, and will comply with all of the manufacturing processes and physical/chemical criteria listed in this Section.

The bentonite clay utilized in the manufacture of the GCL, as well as any accessory bentonite clay (*i.e.*, Volclay® granular sodium bentonite or approved equivalent) provided for seaming and detail work, will meet the manufacturer's minimum requirements, as specified in the MQCP.

The geotextile components of the GCL, and the geosynthetic clay liner itself, will meet the minimum requirements of the respective MQCPs.

12.2.3 GCL Delivery, Handling, and Storage

The GCL panels will be supplied to the site in factory-produced rolls, which are of standard factory roll dimensions.

Table 12-1
GCL Material Tests, Test Methods, and Acceptance Criteria

	PROPERTY	TEST METHOD(1)	UNITS	VALUE
Bentonite properties	Swell Index Moisture Content Fluid loss	ASTM D5890 ASTM D4643 ASTM D5891	ml/2 g min % ml	24 (min) 12 (max) 18 (max)(3)
Geotextile (as received)	Non-woven (mass per unit area)	ASTM D5261	oz/yd^2	5.9 (MARV)
	Woven (mass per unit area)	ASTM D5261	oz/yd^2	3.0 (MARV)
Physical GCL properties	Bentonite mass per unit area(1) @ 0% moisture	ASTM D5993	lb/ft^2	0.75 (MARV)
	Tensile Strength(2)	ASTM D6768	lb/in	30 (MARV)
	Peel Strength	ASTM D6496	lb/in	3.5 (MARV)
	Hydraulic Conductivity(3)	ASTM D5887	cm/sec	5×10^{-9} (max)
	Index Flux(4)	ASTM D5887	$m^3/m^2/sec$	1×10^{-8} (max)
	Internal Shear Strength(4)	ASTM D6243	psf	500 (typical)

Notes:
(1) At 0% moisture content
(2) Tested in machine and cross direction
(3) Deaired, deionized water @ 5 psi maximum effective confining stress and 2 psi head pressure
(4) Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf normal stress

Each roll of GCL supplied to the site will be labeled with the following information:

- Name and date of manufacturer
- Product type and identification number (if any)
- Roll number
- Lot (batch) number

The GCL Manufacturer will ensure that the crushing strength of all GCL roll cores will be sufficient to avoid collapse or other damage while in use.

The rolls of GCL will be carefully unloaded by the Contractor upon arrival at the site. At a minimum, the following practices will be followed in receiving and storing GCL rolls in the covered storage area at the job site:

- While unloading or transferring the GCL rolls from one location to another, prevent damage to the GCL.
- For standard rolls, a steel support pipe will be inserted through the cardboard roll core. The slings or lifting chains will be attached at one end to the support pipe and at the other end to the bucket of a front-end loader or lifting device. A spreader bar will be used to support and spread the slings. The bar and support pipe must be long enough to prevent damage to the edges of the GCL during hoisting.
- Alternatively, fork lift trucks can be modified to lift the rolls with a steel bar, securely attached to the fork lift and inserted into the roll core. At no time will the rolls be lifted by sliding the forks under the roll.
- The rolls of GCL will be stored in their original, unopened, wrapped cover in a clean, dry area. The material will be stored off the ground on pallets or by other suitable techniques that provide continuous support over the entire length of the roll. It will be covered with a heavy, protective tarpaulin or stored beneath a roof. Care will be used to protect the GCL from the following:
    - Precipitation
    - Ultraviolet radiation, including sunlight
    - Strong oxidizing chemicals, acids or bases
    - Flames, including welding sparks
    - Temperatures in excess of 160°F

The RPR will be responsible throughout the preinstallation, installation, and post-installation periods, for observing and documenting that the Installer provides adequate

handling equipment used for moving GCL rolls and that the equipment and handling methods used do not pose any risk of damage.

The RPR will be responsible for making certain that the name of the manufacturer, the type, and the thickness of each roll (as noted on the roll marking label described above) are correct. The RPR will also maintain a log of GCL roll deliveries. The following information, at a minimum, will be recorded on the log for each shipment received at the job site:

- Date of receipt of delivery at job site
- For each GCL roll, the following information will be noted:
    - Roll number
    - Batch (lot) number

12.2.4 Submittals

Submittals will be made prior to installation of the GCL concerning the GCL manufacturer/production information and the GCL installer information.

The GCL Manufacturer/Production Information will include the following:

- Corporate background and information
- Manufacturer's Quality Control Plan (MQCP) for bentonite, geotextile, and GCL manufacturers
- Project reference list consisting of the principal details of at least 10 projects totaling at least 8 million square feet of GCL installation, if required by the RPR or CQA Officer
- Results of tests conducted by the Bentonite Supplier and Geotextile Supplier to document the quality of the materials used to manufacture the GCL rolls assigned to the project
- Copy of quality control certificates, signed by a responsible entity of the Manufacturer. Each quality control certificate will include roll identification numbers, and the results of quality control tests (refer to Subsection 12.2.1 above for minimum testing requirements)
- Manufacturer's written certification that the GCL meets the project specifications, that the GCL has been continuously inspected and found to be needle-free, that the bentonite will not shift during transportation or installation, and that the bentonite and geotextile materials meet the Manufacturer's specifications

GCL Installer information will include the following:

- Corporate background information
- Project reference list consisting of the principal details of at least five projects totaling at least 1 million square feet, if required by the RPR or CQA Officer
- List of personnel performing field operations, along with pertinent experience information, if required by the RPR or CQA Officer

The proposed panel layout diagram identifying placement of the GCL panels and seams, as well as any variances or additional details that deviate from the engineering drawings will also be submitted prior to installation. The layout will be drawn to scale, will include information such as dimensions and details, and will be adequate for use as a construction plan.

12.3 Installation

The following installation procedures are designed to ensure the effectiveness of the GCL in meeting its design requirements and to simplify the deployment procedures. These procedures are to be followed by the Installer, unless the Installer proposes alternative procedures in writing and the CQA Officer approves them in writing prior to installation.

12.3.1 Testing Requirements

This subsection describes the test methods, including sampling procedures and frequencies, and the role of the Geosynthetic Testing Laboratory in testing the GCL roll samples. Unless specified otherwise, all sampling procedures will be performed in accordance with the referenced test method defined in this section.

GCL roll samples will be collected by the Contractor at the discretion of, and under the direction of, the RPR, at a rate specified by the RPR.

Samples will be 3 feet long by the full width of the roll and will not include the first 3 feet of any roll.

Table 12-1 lists the tests and the test methods that may be performed on GCL roll samples. The specifications and methods used in evaluating the results are discussed later in this subsection. At a minimum, the testing required by NR516.07(2m)(a) will be conducted on the GCL.

Role of Testing Laboratory

The Geosynthetic Testing Laboratory will be responsible for performing the tests on samples submitted to them. The results of tests performed will be reported to the RPR and CQA Officer.

Retesting of GCL rolls for quality assurance purposes, because of failure to meet any or all of the acceptance specifications in this section, can only be authorized by the CQA Officer.

The GCL Manufacturer and/or Installer may perform their own tests according to the methods and procedures defined in Table 12-1; however, the results will only be applicable to their own quality control needs. These results will not be substituted for the quality assurance testing described herein.

Procedure For Determining GCL Roll Test Failures

Table 12-1 lists the specifications that are applicable to the GCL. For any referenced test method that requires the testing of multiple specimens, the criteria in Table 12-1 will be met based on the average results of the multiple specimen tests.

The following procedure will be used for interpreting the results relative to acceptance or rejection of rolls, lots, and shipments of GCL to the site:

1. If the test values meet the stated specifications, then the roll and batch will be accepted for use at the job site. If the sample represents all rolls from an entire shipment, then the entire shipment will also be considered accepted.
2. If the results do not meet the specification, then the roll and the batch will be retested at the Contractor's expense using specimens either from the original roll sample or from another sample collected by the RPR. For retesting, two additional tests will be performed for the failed test procedure. (Each additional test will consist of multiple specimen tests if multiple specimens are called for in the failed test procedure.) If both of the retests are acceptable, then the roll and batch will be considered as having passed this particular acceptance test; if either of the two additional tests fail, then the roll and batch will be considered as being unsuitable without further recourse. The RPR may obtain samples from other rolls in the batch. On the basis of testing these samples, the CQA Officer may choose to accept a portion of the batch while rejecting the remainder.

3. If retesting does not result in passing test results as defined in the preceding paragraph, or if there is any other nonconformity with the material specifications, then the Contractor will withdraw the rolls from use in the project at Contractor's sole risk, cost, and expense. Once withdrawn, the same rolls will not be resubmitted for use. Expenses for removing this GCL from the site and replacing it with acceptable GCL will be the sole risk and responsibility of Contractor.

12.3.2 Required Equipment

The following installation equipment is required on-site:

- Front end loader, crane, or other similar equipment. The selected piece of equipment will not cause damage to the subgrade, such as rutting. The Installer will verify in the presence of the RPR that the selected piece of equipment does not damage the subgrade
- A spreader bar to prevent slings from damaging the ends of the rolls.
- Several steel pipes to be inserted into the roll's core for lifting.
- Wooden pallets for aboveground storage of the GCL rolls.
- Heavy waterproof tarps for protecting all GCL rolls.
- Sandbags for securing the GCL during installation and for securing the tarps.
- Adhesive or tape for securing patches.
- Granular bentonite for seams and patches, and for securing around penetrations and structures as shown on the drawings.

12.3.3 Surface/Subgrade Preparation

GCL liner installation will not begin until a proper subbase has been prepared to accept the bentonite liner. Base material will be fine-grained soil free from angular rocks, roots, grass, and vegetation. Foreign materials and protrusions will be removed, and all cracks and voids will be filled; the surface will be made smooth and uniformly sloping. Unless otherwise required by the contract specifications and drawings, the prepared surface will be free from excessive moisture, loose earth, rocks or clay clods larger than 2 inches in diameter, rubble, and other foreign matter. The subgrade will be uniformly compacted to a minimum of 90 percent Modified Proctor density (ASTM D1557), to ensure against localized settlement and rutting under wheel loads and will be smoothed with a smooth drum or vibratory roller.

The surface on which the liner is to be placed will be maintained in a firm, clean, and smooth condition, free of standing water, during liner installation.

12.3.4 Deployment

As each roll is moved from the storage area, the labels will be removed by the Installer or RPR for storage in the project file.

The rolls of GCL will be brought to the area to be lined with a front-end loader, and support pipe will be set up such that the roll of liner is fully supported across its length. A spreader bar or similar device will be used to prevent the lifting chains or slings from damaging the edges. Dragging of the GCL liner will be minimized.

The Contractor will ensure, and the RPR will verify, that the following criteria are being met:

- The equipment used does not damage the GCL by handling, excessive heat, leakage of hydrocarbons, or by other means.
- The prepared surface underlying the GCL has not deteriorated since previous acceptance, and it is still acceptable at the time of GCL placement.
- Personnel working on the GCL do not smoke, wear damaging clothing, or engage in other activities that could damage the GCL.
- The method used to unroll the GCL does not cause damage to the GCL, and/or the subgrade.
- The method used to place the rolls minimizes wrinkles (especially wrinkles between adjacent panels).

GCL must not be placed during precipitation events, in the presence of excessive moisture, in any area of ponded water, or during excessive winds. The GCL must be dry when installed and must be dry when covered.

The proper side of the GCL, as per the manufacturer's recommendation, will face upward (unless otherwise dictated by project requirements). The liner will be placed over the prepared surface such that material handling will be minimized.

The GCL panels will be placed in a manner that ensures sufficient overlap as described in Subsection 12.3.5. Horizontal seams will not occur on slopes steeper than 7H:1V.

The cover material (i.e., geomembrane) will be placed over the bentonite liner during the same day as the placement of the GCL. Only those GCL rolls that can be covered that same day will be unpacked and placed in position.

When wind conditions could affect installation, the GCL liner installation will be started at the upwind side of the project and will proceed downwind. The leading edge of the liner will be secured at all times with sandbags or other means sufficient to hold it down during high winds.

The GCL will be installed in a relaxed condition and will be free of tension or stress upon completion of the installation. Stretching of the liner to fit will not be allowed. Deployed rolls (panels) will be straightened by the installation personnel to smooth out creases or irregularities.

The RPR will visually inspect the geotextile's quality, the bentonite uniformity, and the degree of hydration, if any, of the GCL. Any areas in need of repair will be marked.

12.3.5 Seaming

Once the first panel has been deployed, adjoining panels will be laid with a 6-inch minimum overlap on longitudinal seams, and 20 inches on the panel end seams, depending on project specifications. Six-inch overlap lines will be marked on the liner to assist in obtaining the proper overlap. All dirt, gravel, or other debris will be removed from the overlap area of the GCL.

Seam overlaps, whenever possible, will be placed such that the direction of flow is from the top panel to the underlying panel to form a shingle effect.

If the GCL requires a granular bentonite seam, then the overlapping panel edge will be pulled back and granular Volclay® (or approved equivalent) sodium bentonite will be poured continuously along all seams and lap areas from the panel edge to the 6-inch lapline, at a minimum application rate of ¼ pound per linear foot or as recommended by the manufacturer.

12.3.6 Patches/Repairs

Irregular shapes, cuts, or tears in the installed GCL will be covered with sufficient liner to provide a 12-inch overlap in all directions beyond the damaged area. A layer of granular bentonite will be placed in the overlap zone in accordance with the Manufacturer's recommendations. An epoxy-based adhesive, or other approved

method, will be used to secure the patch during backfill operations. Alternatively, the patch can be placed underneath the defective liner.

12.3.7 Penetration Seals

The GCL will be sealed around penetrations, pipes, and structures in accordance with the recommendations of the GCL Manufacturer.

Pipe penetrations will incorporate a collar of GCL wrapped around the pipe and securely fastened. A bentonite or mastic grout will be placed around the corners for additional protection.

An additional GCL skirt placed over the bentonite grout is also recommended to provide a third level of protection and to prevent the bentonite grout from being displaced.

If the seal requires granular bentonite, then a 1- to 2-inch cut will be excavated around the circumference of the pipe, into the subgrade at least 12 inches out from the pipe. Volclay® sodium bentonite (or approved equivalent) will then be packed around the pipe in the subgrade excavation and on adjacent areas so that the pipe is surrounded with granular bentonite.

The GCL panel will then be placed over the pipe by penetrating the GCL with slits in a "pie" configuration where the pipe is to protrude in a manner that will create a snug fit between the GCL and the pipe.

More sodium bentonite will then be spread around the cut edges of the GCL against the pipe and over adjacent areas.

To complete the pipe penetration seal, a collar of GCL will be cut in a manner similar to that made on the main panel and will be fit around the pipe, with additional Volclay® sodium bentonite (or approved equivalent) being applied into any gaps that may remain.

12.3.8 Covering GCL

Only the amount of GCL that can be inspected, repaired, and covered with geomembrane in the same day will be installed. The GCL must be covered with geomembrane or alternative temporary cover the same day on which it is installed.

Geosynthetics

When covering the GCL, precautions will be taken to prevent damage to the GCL by restricting heavy equipment traffic. If a textured geomembrane is to be placed over the GCL, the RPR may require a slip sheet (such as 20-mil smooth HDPE) will be placed over the GCL to allow the textured geomembrane to slide into its proper position. The slip sheet will be removed after the geomembrane is in place.

The following requirements apply to soil placement over the GCLs:

- Equipment used for placing the soil must not be driven directly on the GCL.
- A minimum thickness of 1 foot of soil is specified between a light dozer (*i.e.*, maximum contact pressure of 5 lb/sq. inch) and the GCL.
- A minimum thickness of 3 feet of soil is specified between rubber-tired vehicles and the GCL.

Any leading edge or panels of GCL left unprotected must be covered with a heavy, waterproofing tarp that is secured and protected with sandbags or other ballast.

12.3.9 Submittals

The following will be submitted during installation:

- Daily records/logs prepared by the Installer documenting work performed, personnel involved, general working conditions, and any problems encountered or expected on the project. These records will be submitted on a weekly basis.
- Copy of daily subgrade acceptance forms by the Installer.
- Quality control documentation.

12.4 Post-installation

12.4.1 Final Examination

The RPR will perform a final GCL examination after portions of installation have been completed. The RPR will examine the GCL for the following:

- Tears or defects
- Proper overlaps

If any portion of the GCL requires repairs based on the above examination, it will be repaired in accordance with the procedures in Subsection 12.3.6.

12.4.2 Submittals

The following will be submitted after installation is complete:

- Installation certification prepared by the Installer certifying that the GCL was installed in substantial accordance with the specifications and the CQA Plan.
- An as-build panel layout diagram prepared by the Installer identifying the placement of panels and seams. The numbering sequence will be as agreed upon between the RPR and the Installer prior to commencing installation.
- A copy of the Warranty obtained from the Manufacturer/Installer.

Section 13
Piping

13.1 General

This section includes quality assurance requirements for piping used throughout the facility. Piping will be used in the construction of the following items:

- Leachate collection system
- Leachate conveyance system
- Gradient control system
- Gas extraction system
- Final cover toe drain collection and discharge piping

This section is further divided into three major subheadings, which cover the quality assurance requirements for the pre-installation (includes Piping Manufacturers and Fabricators), installation, and post-installation (includes the final observation and documentation of piping installations). The terms pre-installation, installation, and post-installation are applicable only to the piping installation and do not apply to the overall construction.

Individual pipe sizes and standard dimension ratios (SDRs) to be used for each individual pipe installation are not detailed in this section; the construction plans and specifications will be used for the determination of correct size and wall thickness.

13.2 Pre-Installation

13.2.1 Manufacturing

High-Density Polyethylene Material Specifications

High-density polyethylene (HDPE) pipe must be made from extra high molecular weight (EHMW) polyethylene (PE) resin, and the manufactured piping must be classified as Type III, Class C, Category 5, Grade P34 material according to ASTM D1248 and have a cell classification of 345464C as defined by ASTM D3350.

Polyvinyl Chloride Material Specifications

All polyvinyl chloride (PVC) pipe fittings must be PVC molded fittings. Extruded fittings may not be used unless specifically approved in writing by the CQA Officer.

Fabricator

The Piping Fabricator will be responsible for perforating the pipe delivered by the Piping Manufacturer according to the plans and specifications.

13.2.2 Delivery, Handling, and Storage of Piping

Pipe will be protected during shipment from excessive heat or cold, puncture, or other damaging or deleterious conditions. The pipe will be stored on-site in a manner suitable to protect it from long-term ultraviolet exposure prior to actual installation.

The RPR will be responsible throughout the pre-construction, construction, and post-construction periods for observing and documenting that the Contractor provides adequate handling equipment for moving pipe and that the equipment and handling methods used do not pose any risk of damage.

The RPR will maintain a log of pipe deliveries throughout the installation. The pipe size and type at a minimum will be recorded on the log for each shipment received at the job site.

13.3 Installation

13.3.1 Connections

HDPE Pipe

Unless approved otherwise by the CQA Officer, HDPE pipe connections will be made by the butt fusion procedure. The following procedure will be used regarding butt fusion seams:

- Seams will be made at the Manufacturer's recommended temperature for fusing pipe and fittings.
- For pipe diameter sizes 4 inches (nominal) and larger, seams will be made using the hydraulic fusion machines. For pipe diameters of less than 4 inches, manual fusion equipment can be used.

- Care will be taken to make certain that adequate pressures are used for fusing pipes and that sufficient cooling periods are allowed prior to testing, bending, or backfilling of pipe sections.

PVC Pipe

Unless approved otherwise by the CQA Officer, all PVC pipe connections will be made according to the Standard Practice for Making Solvent-Cemented Joints with Polyvinyl chloride (PVC) Pipe and Fittings, ASTM D2855. Particular care will be taken regarding required set and cure times for solvent-cemented joints, which vary for ambient temperature conditions. Joints will not be subjected to stresses by moving or backfilling prior to the specified set times, ASTM D2855. Only original quality solvent cement may be used since expired shelf life and deteriorated cements may cause inadequate connections.

13.3.2 Placement

Pipe placement will be done in accordance with the following procedure and requirements:

- Piping will be bedded and backfilled according to the plans and specifications.
- Piping placement will not be performed in the presence of excessive moisture.
- The prepared surface underlying the piping will not show evidence of deterioration since previous acceptance and must be acceptable prior to piping placement.
- The method used to place the piping will not cause damage to the piping and will not disturb the supporting backfill.
- The pipe bedding material will be shovel-sliced, or compacted to the spring line of the pipe to ensure proper bedding.
- Observations and measurements will be made to ensure that the pipes are of the specified size and dimension ratio, manufactured of the specified material, and that pipe perforations are sized and spaced as specified.
- All piping will be located as noted in the plans and specifications. Locations, grades, and size requirements are specified on the details of the plan set. Observations and surveying measurements will be made to ensure that the pipes are placed at the specified locations and grades and in the specified configuration. Deviations from the plans and specifications will be brought to the attention of the CQA Officer for evaluation of the necessity of corrective action.

13.3.3 Damage

The RPR will examine each pipe after placement for damage. The RPR will advise the CQA Officer as to which pipes will be rejected, repaired, or accepted. Damaged pipes or portions of pipes that have been rejected will be marked and removed from the installation area and documented by the RPR.

13.4 Post-Installation

Leachate collection pipes will be cleaned with a water jet cleanout device with a maximum pressure of 10,000 pounds per square inch after collection pipe and leachate drainage layer installation is complete. The pipes will be cleaned by jetting from each cleanout access point to the toe of the opposite sideslope. Any pipes that do not appear to be free flowing will be immediately reported to the CQA Officer, and corrective action will be taken.

A video camera inspection will be conducted on all leachate collection pipes after initial pipe cleaning activities described above. The video camera inspection will extend a minimum of 300 feet onto the base grades of each leachate collection pipe.

A summary report will be submitted after the pipe cleaning and video camera inspection. The report will summarize any specialty equipment used in collection pipe cleaning, blockages or difficulties in cleaning pipes, and how blockages were removed or pipe damage repaired. Recording tape or disk of the video camera inspection will be included with the summary report.

Solid-wall leachate transfer pipe (single- and double-walled) outside the limits of waste and all gas transfer pipe will be water pressure–tested to document that the piping system is water-tight. The line will be filled with clean water to remove all air and pressurized to a target value of 30 pounds/square inch (gauge pressure). The valve on the pressurizing unit will be closed, and the system will be pressure monitored for a minimum of 3 hours. The water pressure test is acceptable if the pressure remains within 5 percent of the target value for 1 hour once the target pressure is reached. The RPR will observe and document that this operation is carried out and that the pipes are water-tight. If pipes are found to not be water-tight, the pipes will be repaired and repressurized until passing values are achieved.

Pipe invert elevations will be documented every 25 linear feet by survey or every 50 feet if a total station, GPS, or laser equipment is used, as well as at key points, including changes in grade, intersections, and end points.

Section 14
Geocomposite

14.1 General

This section covers the quality assurance requirements for pre-installation, installation, and post-installation. The terms pre-installation, installation, and post-installation are applicable only to the geocomposite and to not apply to the overall construction of the landfill facility.

14.2 Pre-Installation

14.2.1 Manufacturing

The geotextile portion of the geocomposite will be composed of a nonwoven, needle-punched, polyester or polypropylene geotextile. The Installer will ensure that the geotextile portion of the geocomposite has a minimum average roll value as listed in Table 14-1.

The geonet portion of the geocomposite must be fabricated for HDPE resin, and fabricated geonet must be classified as Type III, Class C, and Category 4 or 5, as defined by ASTM D1248. The geonet will be manufactured by extruding two sets of strands to form a three-dimensional structure to provide planar flow. The Installer will ensure that the geonet portion of the geocomposite has minimum average roll values listed in Table 14-2.

The geocomposite will be manufactured by heat-bonding the geotextile to the geonet on both sides. The bond between the geotextile and the geonet must have minimum peel strength of 1 lb/inch (ASTM D413).

The geocomposite will be supplied to the site in factory rolls. Prior to the delivery of any geocomposite rolls, the Geocomposite Manufacturer will provide the CQA Officer and the Owner with the manufacturer's Quality Control Plan used for the production of the geocomposite.

Table 14-1
Geotextile Specifications

PROPERTY	TEST	UNITS	CRITERION	4 OZ VALUE	6 OZ VALUE	8 OZ VALUE	10 OZ VALUE	12 OZ VALUE	16 OZ VALUE
Apparent opening size	ASTM D4751	Sieve	Maximum	70	70	80	100	100	100
Grab strength	ASTM D4632	lb	Minimum	120	170	220	260	320	390
Grab strength elongation	ASTM D4632	Percent	Minimum	50	50	50	50	50	50
Trapezoidal tear	ASTM D4533	lb	Minimum	50	70	95	100	125	150
Puncture strength	ASTM D4833	lb	Minimum	60	90	120	165	190	240
Permittivity	ASTM D4491	Sec^{-1}	Minimum	1.50	1.50	1.50	1.20	0.80	0.70
Permittivity	ASTM D4491	cm/s	Minimum	0.22	0.30	0.30	0.30	0.29	0.27

Table 14-2
Geonet Specifications

PROPERTY	TEST	UNITS	CRITERION	VALUE	VALUE	VALUE	VALUE
Thickness	ASTM D5199	Mils	Range	200	250	275	300
Density	ASTM D1505	g/cm^3	Minimum	0.94	0.94	0.94	0.94
Carbon black content	ASTM D1603 modified	Percent	Range	2.0	2.0	2.0	2.0

The Geocomposite Manufacturer will provide certification, based on tests performed in accordance with the methods listed in Table 14-1 that the geotextile supplied under this Plan will meet the material specifications listed in Table 14-1 and that the geonet supplied under this Plan will meet the material specifications in Table 14-2. These tests may be performed by the Geotextile or Geonet Manufacturer's laboratory or a laboratory contracted by the Manufacturer. Additionally, the Geocomposite Manufacturer will provide certification that the Manufacturer's Quality Control Plan was fully implemented for the geotextile materials supplied under this plan and that the geocomposite delivered to the site does not contain needles. The Geocomposite Manufacturer will provide documentation to verify the results of the Manufacturer's CQA Plan implementation required by the CQA Officer and the Owner.

The geocomposite rolls may be tested and evaluated prior to acceptance. The CQA Officer may perform/require additional testing (i.e., conformance testing) as required by detailed specifications or as required in the judgment of the CQA Officer to verify that the geocomposite meets the specifications.

14.2.2 Delivery, Handling, and Storage of Geocomposite Rolls

Each geocomposite roll, for use at the landfill facility, will be marked by the Geocomposite Manufacturer with the following information and in the following manner:

- When fabric is rolled on a core, each roll will be identified with a durable gummed label, or an equivalent, on the inside of the core and on the outside of the protective wrapping for the roll.
- Each roll label will contain the following information, at a minimum:
    - Name of manufacturer
    - Style and type number
    - Roll length and width
    - Batch (or lot) number, if applicable
    - Date of manufacture
    - Roll number

The geocomposite Manufacturer will use the following guidelines in packing, wrapping, and preparing all geocomposite rolls for shipment:

- When cores are required, those that have a crushing strength sufficient to avoid collapse or other damage while in use will be used.
- Each roll will be covered with a wrapping material that will protect the geotextile from damage due to shipment, water, sunlight, or contaminants.

At a minimum, the following practices will be followed in receiving and storing geocomposite rolls in the covered storage area at the job site:

- While unloading or transferring the geocomposite rolls from one location to another, care will be taken to prevent damage to the geocomposite. If practicable, forklift trucks fitted with poles that can be inserted into the cores of the rolls will be used. The poles will be at least two-thirds the length of the rolls to avoid breaking the cores and possibly damaging the geocomposite. Rolls will not be dragged. For geocomposite rolls shipped with manufacturer's straps, these straps can be used to unload or transport geocomposite rolls.
- The geocomposite rolls will be stored in a manner so as to ensure that they are adequately covered to protect the geocomposite from the following:
    - Precipitation
    - Ultraviolet radiation
    - Strong oxidizing chemicals, acids or bases
    - Flames, including welding sparks
    - Temperature in excess of 160°F

The RPR will be responsible throughout the pre-installation, installation, and the post-installation periods for observing and documenting that the Installer provides adequate handling equipment used for moving geocomposite rolls and that the equipment used does not damage the geocomposite rolls.

The RPR will maintain a log of geocomposite roll deliveries. The following information, at a minimum, will be recorded on the log for each shipment received at the job site.

- Date of delivery at the job site.
- For each geocomposite roll, the following information:
    - Roll number
    - Batch (lot) number, if applicable

14.3 Installation

14.3.1 Placement

The Installer will install all geocomposite in such a manner so as to ensure that it is not damaged in any way, and in a manner that complies with the following:

- The geocomposite will be securely anchored, as shown on the design drawings and specifications, and then rolled downslope in such a manner so as to continually keep the geocomposite in tension. If needed, the geocomposite will be positioned by hand after being unrolled to minimize wrinkles. Horizontal placement of the geocomposite on sideslopes will not be allowed.
- In the presence of wind, all geocomposite will be secured by suitable means. The temporary weighted material will be left in place until replaced with cover material as shown on the design drawings and specifications.
- Cutting will be done according to manufacturer's recommendations.
- The Installer will take the necessary precautions to prevent damage to any underlying layers during placement of the geocomposite.
- During placement of geocomposite, care will be taken not to entrap any stones, excessive dust, or moisture that could clog the drainage system, and/or stones that could damage the adjacent geomembrane.
- The geocomposite will not be welded or tack-welded to the geomembrane.

The RPR will observe and document that the Installer performs each of the above steps. Any noncompliance with the above requirements will be recorded and reported by the RPR.

14.3.2 Overlaps and Joining

The following requirements will be used with regard to the overlapping and joining of geocomposite rolls:

- The geotextile portion of the geocomposite will be overlapped 4 to 6 inches, and the upper geotextile will be sewn or fusion welded. The geonet portion will be overlapped a minimum of 2 inches, and will be secured with plastic ties.
- Tying will be performed with pull ties. Ties will be white or brightly colored plastic for easy identification. Ties will be placed 3 feet to 5 feet on center along the edges, and 12 inches on center on the ends of the rolls. Metallic devices will not be used under any circumstances.

- No horizontal joints or overlaps will be allowed on slopes greater than 3 horizontal to 1 vertical, except as part of a patch.
- The Installer will pay particular attention to the overlapped areas to ensure that no earthen or foreign materials could be inadvertently trapped beneath the geocomposite.

The RPR will observe and document that the Installer performs each of the above steps. Any noncompliance with the above requirements will be reported by the RPR to the CQA Officer and the Owner.

14.3.3 Repairs

Any tears or other defects in the geocomposite will be repaired by placing a patch with minimum overlaps described in Subsection 14.3.2. The patch will be secured to the original geocomposite by tying every 6 inches. If the tear or other defect width is more than 50 percent of the roll width, the damaged area will be cut out and replaced with new geocomposite. Tying will be as indicated in Subsection 14.3.2.

The RPR will examine and document that the repair of any geocomposite is performed according to the above procedure.

14.4 Post-Installation

14.4.1 Final Acceptance

The RPR will perform a final geocomposite examination after installation has been completed. The objectives of this step are as follows:

- To examine for presence of tears or defects
- To examine overlaps to make certain that they are in conformance with the requirements of Subsection 14.3.2

If any portion of the geocomposite requires repairs due the above examination, they will then be performed according to the procedures in Subsection 14.3.3.

If there will be an extended delay between completion of the geocomposite and the start of the installation of any overlaying cover, the Installer will make provisions, by placing temporary securing means, to protect the geocomposite from wind uplift.

14.4.2 Placement of Soil Materials

The Contractor will place all soil materials located on top of the geocomposite in such a manner so as to minimize the following:

- Damage to the geocomposite
- Slippage of the geocomposite on underlying layers
- Excessive tensile stresses imposed on the geocomposite

APPENDIX D
EASY STREET CLAY BORROW INFORMATION

Dane County Conditional Use Permit Application

Application Date	C.U.P Number
01/24/2014	DCPCUP-2014-02266
Public Hearing Date	
03/25/2014	

OWNER INFORMATION		AGENT INFORMATION	
OWNER NAME DANE COUNTY	Phone with Area Code	AGENT NAME DANE COUNTY PUBLIC WORKS	Phone with Area Code (608) 266-4990
BILLING ADDRESS (Number, Street) 210 MARTIN LUTHER KING BLVD RM 114		ADDRESS (Number, Street) 1919 ALLIANT ENERGY CENTER WAY	
(City, State, Zip) MADISON, WI 53703-3342		(City, State, Zip) MADISON, WI 53713	
E-MAIL ADDRESS		E-MAIL ADDRESS RUPIPER.MICHAEL@COUNTYOFDANE.COM	

ADDRESS/LOCATION 1		ADDRESS/LOCATION 2		ADDRESS/LOCATION 3	
ADDRESS OR LOCATION OF CUP		**ADDRESS OR LOCATION OF CUP**		**ADDRESS OR LOCATION OF CUP**	
SOUTH OF 5202 EASY ST				SOUTH OF 5202 EASY ST	
TOWNSHIP WESTPORT	SECTION 2	TOWNSHIP	SECTION	TOWNSHIP WESTPORT	SECTION 02
PARCEL NUMBERS INVOLVED		**PARCEL NUMBERS INVOLVED**		**PARCEL NUMBERS INVOLVED**	
0809-022-8000-4		---		0809-021-8500-0	

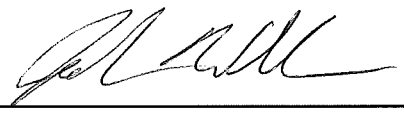
CUP DESCRIPTION

MINERAL EXTRACTION

DANE COUNTY CODE OF ORDINANCE SECTION	ACRES
10.123(3)(d)	82.5

DEED RESTRICTION REQUIRED?	Inspectors Initials
☐ Yes ☐ No Applicant Initials_____	HJH3

SIGNATURE:(Owner or Agent)



PRINT NAME:

John Welch

DATE:

1/24/14

Form Version 01.00.03

DANE COUNTY PLANNING & DEVELOPMENT

Conditional Use Application

Application Fee: $486 Mineral Extraction: $1136

Zoning Division
Room 116, City-County Building
210 Martin Luther King Jr. Blvd.
Madison, Wisconsin 53703-3342
Phone: (608) 266-4266
Fax: (608) 267-1540

Items required to be submitted with application:

- **Written Legal Description of Conditional Use Permit boundaries**
- **Scaled drawing of the property showing existing/proposed buildings, setback requirements, driveway, parking area, outside storage areas, location/type of exterior lighting, any natural features, and proposed signs.**
- **Scaled map showing neighboring area land uses and zoning districts**
- **Written operations plan describing the items listed below (additional items needed for mineral extraction sites)**
- **Written statement on how the proposal meets the 6 standards of a Conditional Use**

Owner	County of Dane	Agent	Mike Rupiper / Public Works
Address	210 Martin Luther King Jr. Blvd.	Address	1919 Alliant Energy Center Way
	Madison, WI 53703		Madison, WI 53713
Phone		Phone	608-266-4990
Email		Email	rupiper.michael@countyofdane.com

Parcel numbers affected: 080902280004 and 080902185000

Town: Westport Section: 2

Property Address: Easy Street

Existing/ Proposed Zoning District : A-1 EX

- Type of Activity proposed: Clay borrow site (short term non-metallic mineral extraction)
- Hours of Operation Monday - Friday: 8:00 AM - 4:00 PM
- Number of employees 3-4 Equipment operators
- Anticipated customers None
- Outside storage Construction equipment (backhoe, scrapers, dozer)
- Outdoor activities Earthwork (excavation and grading)
- Outdoor lighting None
- Outside loudspeakers None
- Proposed signs Traffic control signs as shown on the traffic control plan
- Trash removal Any trash will be removed from the site daily
- Six Standards of CUP (see back)

The statements provided are true and provide an accurate depiction of the proposed land use. I authorize that I am the owner or have permission to act on behalf of the owner of the property.

Submitted By: John Welch, Solid Waste Manager

Date: _____

Six Standards of a Conditional Use Permit

Provide an explanation on how the proposed land use will meet all six standards.

1. The establishment, maintenance or operation of the conditional use will not be detrimental to or endanger the public health, safety, comfort or general welfare.

   The clay borrow site will be designed and operated in accordance with all applicable regulations for mineral extraction and stormwater management and erosion control.

2. The uses, values and enjoyment of other property in the neighborhood for purposes already permitted shall be in no foreseeable manner substantially impaired or diminished by establishment, maintenance or operation of the conditional use.

   The site will be operated in a nuisance free manner. The hours of operation will be limited to Monday - Friday: 8:00 AM - 4:00 PM. The clay extraction is a short term use.

3. That the establishment of the conditional use will not impede the normal and orderly development and improvement of the surrounding property for uses permitted in the district.

   The surrounding properties are zoned A-1 Exclusive Agriculture, except for 2 rural homes (RH-2 and R-3A) on the north side of Easy Street. The site will be returned to agricultural use after the clay extraction.

4. That adequate utilities, access roads, drainage and other necessary site improvements have been or are being made.

   A stormwater management and erosion control plan has been prepared for the site and submitted to the Dane County Land & Water Resources Department and WDNR for review and approval.

5. Adequate measures have been or will be taken to provide ingress and egress so designed as to minimize traffic congestion in the public streets.

   A traffic control plan has been prepared for the site.

6. That the conditional use shall conform to all applicable regulations of the district in which it is located.

   Non-metallic mineral extraction operations that comply with s. 91.46(6), Wis. Stats., and Dane County Ordinances section 10.191 and Chapter 74 are allowed as a Conditional Use in the A-1 Exclusive Agriculture District.

Dane County

Non-Metallic Mining Reclamation Permit Application

Zoning office use only

Permit #: _____

Date: _____

Landowner: County of Dane

Address: 210 Martin Luther King Jr. Blvd.
Madison, WI 53703

Phone: _____

E-mail: _____

Agent: Mike Rupiper / Public Works

Address: 1919 Alliant Energy Center Way
Madison, WI 53713

Phone: 608-266-4990

E-mail: rupiper.michael@countyofdane.com

Address of site: Easy Street

(may need to be assigned)

Township: Westport

Parcel #: 080902280004

Parcel #: 080902185000

Parcel #: _____

Parcel #: _____

Parcel #: _____

Parcel #: _____

Parcel #: _____

Parcel #: _____

Parcel #: _____

Type of aggregate: Clay

Total site acreage: 82.5

Plan review fees: _____

(Less than one acre: NO FEE, 1 to 25 acres: $875.00, 25 to 50 acres: $1,100.00, More than 50 acres: $1,300.00)

Non-conforming: Yes or No

Conditional use permit #: _____

Effective Date: _____

Expiration Date: _____

Erosion control/Stormwater permit #: _____ Expiration Date: _____

I hereby request on behalf of the applicant a non-metallic mining permit. I certify, as aduly authorized representative or agent that the operator listed above will comply with the statewide non-metallic mining reclamation standards established in ss. NR 135.05 through NR 135.15, Wis. Adm. Code. The applicant agrees to provide to Dane County an annual fee as established by county ordinance and site access for county officials necessary to evaluate this application and ensure compliance with a permit. Also, financial assurance standards as established in Ch. 74141 od Dane County Code of Ordinances.

Applicant signature: _____ Date: _____

If the person applying (submitting the application in-person, at the counter) is not the landowner, a notarized statement authorizing the applicant to act as the landowner's agent must be attached.

Permit received by: _____ Date: _____

Permit reviewed by: _____ Date: _____

This application must be submitted in person M - F, 8 A.M. - 4 P.M., with two copies of all permit materials to:

Dane County Zoning, 210 Martin Luther King Jr. Blvd. Room 116, Madison, WI

Non-metallic Mining Reclamation Application Checklist

Applicant			Zoning	LCD
Plan Requirement	**I**	**Location in Plan - page number**	**I**	**I**
1. Site information - maps of the site including the general location, property boundaries, aerial extent, geologic composition and depth of the deposit, the distribution, thickness and type of soil, the approximate elevation of ground water, the location of surface waters and the existing drainage patterns.		Plan sheets 1 - 5		
2. Biological resources - plant communities and wildlife use at and adjacent to the site.		Page 1		
3. Existing topography - contour maps of the site at ten foot contour intervals.		Plan sheet 5		
4. Location of manmade features - on or near the site.		Plan sheets 1, 3, 4, 5		
5. Plan view - (existing mines) showing the location and extent of land previously affected by non-metallic mining.		Not Applicable		
6. Post-mining land use - consistent with local land use plans/local zoning.		Page 3		
7. Under exclusive agricultural zoning?		Page 1		
8. Reclamation measures - description of the proposed reclamation, including methods and procedures to be used and a proposed schedule for the completion of reclamation.		Plan sheets 2, 12, 13 Page 3		
9. Proposed earthwork and reclamation - final slope angles, high wall reduction, benching and terracing.		Plan sheets 12, 13		
10. Methods of topsoil - topsoil substitute material removal and storage.		Plan sheet 7, 8 Page 3		
11. Anticipated topography of the reclaimed site.		Plan sheets 12 & 13		
12. Plan map that shows surface structures - after the cessation of mining.		Not Applicable		
13. Estimated cost of reclamation.		Not Applicable		
14. Revegetation plan - shall include timing and methods of seed bed preparation, rates and kinds of soil amendments, seed application timing, methods and rates, mulching and any other techniques needed to accomplish soil and slope stabilization.		Plan sheet 2, 11		
15. Standards for revegetation - may be based on the percent of vegetative cover, productivity, plant density, diversity or other applicable measures.		Plan sheet 2		
16. Erosion control and stormwater - chapter 14 requirements.		Permit Applied For		
17. Description of interim reclamation.		Not Applicable		
18. Financial assurance - $1500/acre.		Not Applicable		

Conditional Use / Mineral Extraction / Reclamation
Permit Application
Proposed Clay Borrow Site
Dane County - Department of Public Works - Solid Waste Division

Legal Description

The proposed clay borrow site includes two parcels (080902280004 and 080902185000), which are owned by Dane County. The legal descriptions of the parcels are SEC 2-8-9 FR NE1/4 NW1/4 and SEC 2-8-9 FR NW1/4 NE1/4. Together the parcels include an area of 82.5 acres.

General Description of the Operation

The proposed operation is a temporary, non-metallic mineral (clay) extraction site. The clay will be used in the construction of the eastern expansion of the Dane County No. 2 (Rodefeld) Landfill located at 7102 USH 12.

Existing Land Use

The property is currently zoned agricultural land (A-1 EX) and is leased by the County to an area farmer for agricultural purposes.

Existing Natural Features

Surface water drainage from the site is to the north toward Easy Street. Runoff then travels east in the roadside ditch on the south side of Easy Street. At the northeast corner of the site the runoff enters a constructed drainageway. The drainageway flows generally east to an unnamed tributary to the Yahara River. There are no mapped wetlands on the site. A mapped wetland area exists to the northeast of the proposed borrow site, on the north side of Easy Street.

Types and Quantities of Materials to be Extracted

Calculations based on test pits and laboratory analysis of the soil at the site indicate that the site contains an estimated 279,000 cubic yards of clay soil that meets WDNR specifications for landfill liner and final cover construction. This estimate is based on the removal of suitable clay within an area of about 45 acres, where it is at least 2 feet thick, down to within 3" of the subsoil.

Proposed Phasing Plan / Schedule

Clay removal is proposed to be conducted in two phases. The first phase will occur in 2014 and includes the eastern parcel. Approximately 35.0 acres of this parcel will be disturbed. An estimated 120,000 cubic yards of clay will be removed from 22.4 acres. This will require an estimated 8,000 truckloads.

Phase 1 (Eastern Parcel)

April 1, 2014 - Strip topsoil / construct erosion control practices
April 21, 2014 – Begin clay extraction
September 15, 2014 – End clay extraction / begin restoration
October 15, 2014 – Complete restoration / reclamation

Alternatively, part of the clay may be removed from Phase 1 during 2014, 2015, 2016, and 2017. In that case the restoration will be phased so that disturbed areas are seeded with temporary cover by October 15th of each year and final reclamation will be completed in 2017.

The second phase will occur in 2020 and includes the western parcel. Approximately 34.7 acres of this parcel will be disturbed. An estimated 160,000 cubic yards of clay will be removed from 22.5 acres. This will require an estimated 10,700 truckloads.

Phase 2 (Western Parcel)
March 30, 2020 - Strip topsoil / construct erosion control practices
April 20, 2020 – Begin clay extraction
September 25, 2020 – End clay extraction / begin restoration
October 15, 2020 – Complete restoration / reclamation

Alternatively, part of the clay may be removed from Phase 2 during 2020, 2024, and 2026. In that case the restoration will be phased so that disturbed areas are seeded with temporary cover by October 15th of each year and final reclamation will be completed in 2026. The years of removal are subject to change based on future waste acceptance rates at the landfill, but it is anticipated that clay excavation will take place no more than 3 years between 2020 and 2026.

Proposed Operating Hours
The proposed hours of operation are 8:00 AM to 4:00 PM, Monday through Friday.

Geologic Composition and Depth to the Mineral Deposit
Based on the test pit field logs, lab test results and the Soil Survey for Dane County, the subsurface profile at the site consists of, in descending order, a variable thickness (9" to 40") of silt loam topsoil (ML-CL) over mottled brown lean day (CL). The clay soils present at the site overlay either varying thicknesses of brown sandy clay loam (SC) with increased sand content with depth, brown silt soils (ML), or silty sand and sand soils (SM, SP) with trace amounts of cobbles and boulders. The clay stratum is not continuous over the entire area of the site. It ranges in thickness from 1 to 8 feet. The geologic origin of the clay stratum is interpreted as aeolian, or wind deposited materials. The sediments were deposited in this part of Dane County as the glacial ice fronts retreated and exposed newly deposited materials to erosion. The fine-grained material in these glacially derived deposits, primarily silt and clay sized particles, were then picked up by the wind and redeposited as a surficial layer over previous in-place deposits, primarily consisting of poorly graded sand with a variable silt content.

Proposed Transportation Route
The following transportation route will be used to transport clay excavated from the borrow site to the landfill:

Exit the borrow site toward the north and travel west on Easy Street for approximately ½ miles to the junction with County Trunk Highway I. Turn right and travel north on CTH I for approximately 3 miles to the junction with CTH V. Turn right and travel east on CTH V for approximately 1.2 miles to the junction with I-39/90/94. The interstate will then be followed south and east to the junction with USH 12-18 which will be taken east to the landfill. This

results in a total haul distance of approximately 24 miles. No route access restrictions are anticipated other than possible weight restrictions in early Spring on Easy Street.

The Dane County Highway and Transportation Division does not recommend the use of CTH I south of Easy Street as a haul route due to the bad intersection with STH 19. A route travelling east on Easy Street to River Road to STH 19 is not recommended to reduce traffic impacts on the residents of the Hickory Meadows and Nature Valley subdivisions in the Town of Vienna.

Equipment to be Used

Scrapers will be used to remove and stockpile the topsoil. The clay soil will be excavated using a tracked backhoe and/or scrapers, and loaded into trucks for transportation to the landfill site. Approximately 80 to 100 truckloads per day will be used to haul the clay from the site.

Site Activities

No blasting, drilling, mining, crushing, screening, washing, asphalt batching, or concrete mixing will be performed on the site. Most likely the equipment will be refueled on site, as needed, by a fuel truck and no fuel will be stored on the site. However, it is possible that a small, probably 500-gallon, fuel tank may be kept on site.

Groundwater Protection

The approximate depth to groundwater is 33 to 38 feet, based on the nearest well construction reports to the property. No excavation will occur below the water table.

Proposed Structures

There are no temporary or permanent structures (e.g., scales, offices) proposed as part of this project.

Special Measures

A water truck will be kept on site and the soil surface will be watered as necessary to control dust. Easy Street will be swept as needed. A stormwater and erosion control plan, traffic control plan, and restoration plan have been prepared for the site. The erosion control plan includes stone tracking pads and sediment basins.

Proposed Use After Reclamation

Once the clay removal operations are completed, grades will be established for maintaining permanent surface water drainage. Overall the drainage patterns for the site will remain essentially the same after the site as they are now. Upon completion of the site grading, topsoil will be restored by uniformly spreading a minimum of 6 inches of topsoil over all excavated areas. After the topsoil is spread, the area will be seeded with a cover crop of winter rye and mulched. Post clay removal, the site will be returned to agricultural land use.

Zoning Map

Proposed Clay Borrow Site
November 2013

R-1
DCPREZ-0000-04456

A-1(EX)
DCPREZ-0000-00000

A-1(EX)
DCPREZ-0000-04778

A-1(EX)
DCPREZ-0000-00000

RH-2
DCPREZ-0000-10231

RH-2
DCPREZ-0000-08972

LC-1
DCPREZ-0000-03981

LC-1
DCPREZ-0000-02675

R-3A
DCPREZ-0000-10229

Easy St

Easy Street

RH-1
DCPREZ-0000-09957

Proposed Clay Borrow Site

A-1(EX)
DCPREZ-0000-00000

ETZ
DCPREZ-0000-00000

R-1
DCPREZ-0000-079139239

A-1(EX)
DCPREZ-0000-00000

R-1
DCPREZ-0000-01321

CO-1
DCPREZ-0000-086

R-3A
DCPREZ-0000-01321

R-1
DCPREZ-0000-08676

Beech Ct

Aspen Ct

Harvest Moon Ct

Vienna Dr

Locust Ln

Hickory Ln

Nature Valley Dr

R-1
DCPREZ-0000-08676

R-1
DCPREZ-0000-01321

R-1
DCPREZ-0000-08676

R-1
DCPREZ-0000-01321

CO-1
DCPREZ-0000-08676

R-3A
DCPREZ-0000-01321

R-1
DCPREZ-0000-08676

R-1
DCPREZ-0000-08676

R-1
DCPREZ-0000-08676

R-3
DCPREZ-0000-06541

Meadow Side Ln

R-1
DCPREZ-0000-08676

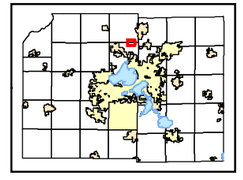
CO-1
DCPREZ-0000-08676

A-2
DCPREZ-0000-03125

N

0 135 270 540 810
Feet

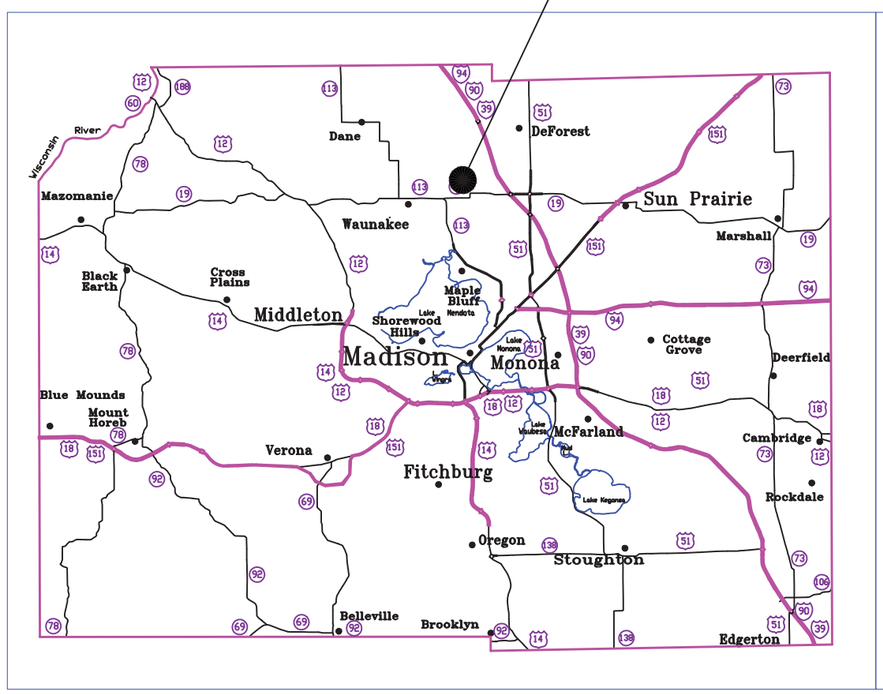
Locator Map



This map was prepared by the Dane County Land Information Office from records and data located in various public offices. Map information is believed to be accurate but is not guaranteed to be without error. Source data used to compile this map is dynamic and in a constant state of maintenance, correction and update. This map does not represent a field survey and is not intended to be used as one. For general cartographic and reference purposes only.

EASY STREET CLAY BORROW SITE
CONDITIONAL USE, NON–METALLIC MINING RECLAMATION
and EROSION CONTROL PERMIT APPLICATION

PREPARED BY:
DANE COUNTY PUBLIC WORKS
SOLID WASTE DIVISION
JANUARY 2014



DANE COUNTY MAP

LOCATOR MAP

SHEET NUMBER	SHEET TITLE
1	TITLE SHEET
2	GENERAL NOTES
3	TRAFFIC CONTROL
4	HAUL ROUTE
5	EXISTING CONDITIONS
6	CLAY ISOPACH
7	EROSION CONTROL – PHASE 1
8	EROSION CONTROL – PHASE 2
9	EROSION CONTROL DETAILS
10	EROSION CONTROL DETAILS
11	EROSION CONTROL DETAILS
12	RECLAMATION PLAN – PHASE 1
13	RECLAMATION PLAN – PHASE 2

File Name:

EROSION CONTROL NOTES:

1. All erosion and sediment control practices will be installed and maintained in accordance with the following WDNR Technical Standards:

   CHANNEL EROSION MAT (1053)
   CONSTRUCTION SITE DIVERSION (1066)
   DUST CONTROL (1068)
   MULCHING FOR CONSTRUCTION SITES (1058)
   SEEDING (1059)
   STONE TRACKING PAD & TIRE WASHING (1057)
   VEGETATIVE BUFFER FOR CONSTRUCTION SITES (1054)
   SEDIMENT BASIN (1064)
   SILT FENCE (1056)

2. All topsoil stockpiles, diversion berms and vegetated buffer area will be seeded with oats immediately after they are constructed.

3. All erosion and sediment control practices will be inspected at least weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24 hour period.

RESTORATION NOTES:

1. Final reclaimed slopes covered by topsoil will not be steeper than a 3:1 horizontal to vertical incline.

2. Topsoil will be replaced to a minimum depth of 6 inches. Topsoil redistribution will not be performed during or immediately after a precipitation event until the soils have sufficiently dried.

3. Restored areas will be seeded with cereal (winter) rye at a rate of 131 lbs. Pure Live Seed/acre and milched at a rate of 1.5 tons per acre. Mulch shall cover min. 70% of soil surface. Seeding and m,ulching will take place no later than October 15th.

4. The grassed waterway will be seeded according to NRCS FOTG Standard 342, Critical Area Planting and Erosion Matted.

CONSTRUCTION SCHEDULE:

Phase 1 (Eastern Parcel)
April 1, 2014 – Strip topsoil / construct erosion control practices
April 21, 2014 – Begin clay extraction
September 15, 2014 – End clay extraction / begin restoration
October 15, 2014 – Complete restoration

Alternatively, part of the clay may be removed from Phase 1 during 2014, 2015, 2016, and 2017. In that case the restoration will be phased so that disturbed areas are seeded with temporary cover by October 15th of each year and final reclamation will be completed in 2017.

Phase 2 (Western Parcel)
March 30, 2020 – Strip topsoil / construct erosion control practices
April 20, 2020 – Begin clay extraction
September 25, 2020 – End clay extraction / begin restoration
October 15, 2020 – Complete restoration

Alternatively, part of the clay may be removed from Phase 2 during 2020, 2024, and 2026. In that case the restoration will be phased so that disturbed areas are seeded with temporary cover by October 15th of each year and final reclamation will be completed in 2026. The years of removal are subject to change based on future waste acceptance rates at the landfill, but it is anticipated that clay excavation will take place no more than 3 years between 2020 and 2026.

Revisions

Approved By: JW
Scale: As shown
Drawn By: MR
Date: Jan. 2014
Design By: MR
Bid No.:

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
NOTES

Sheet 2 of 13

File Name:

File Name:

Revisions

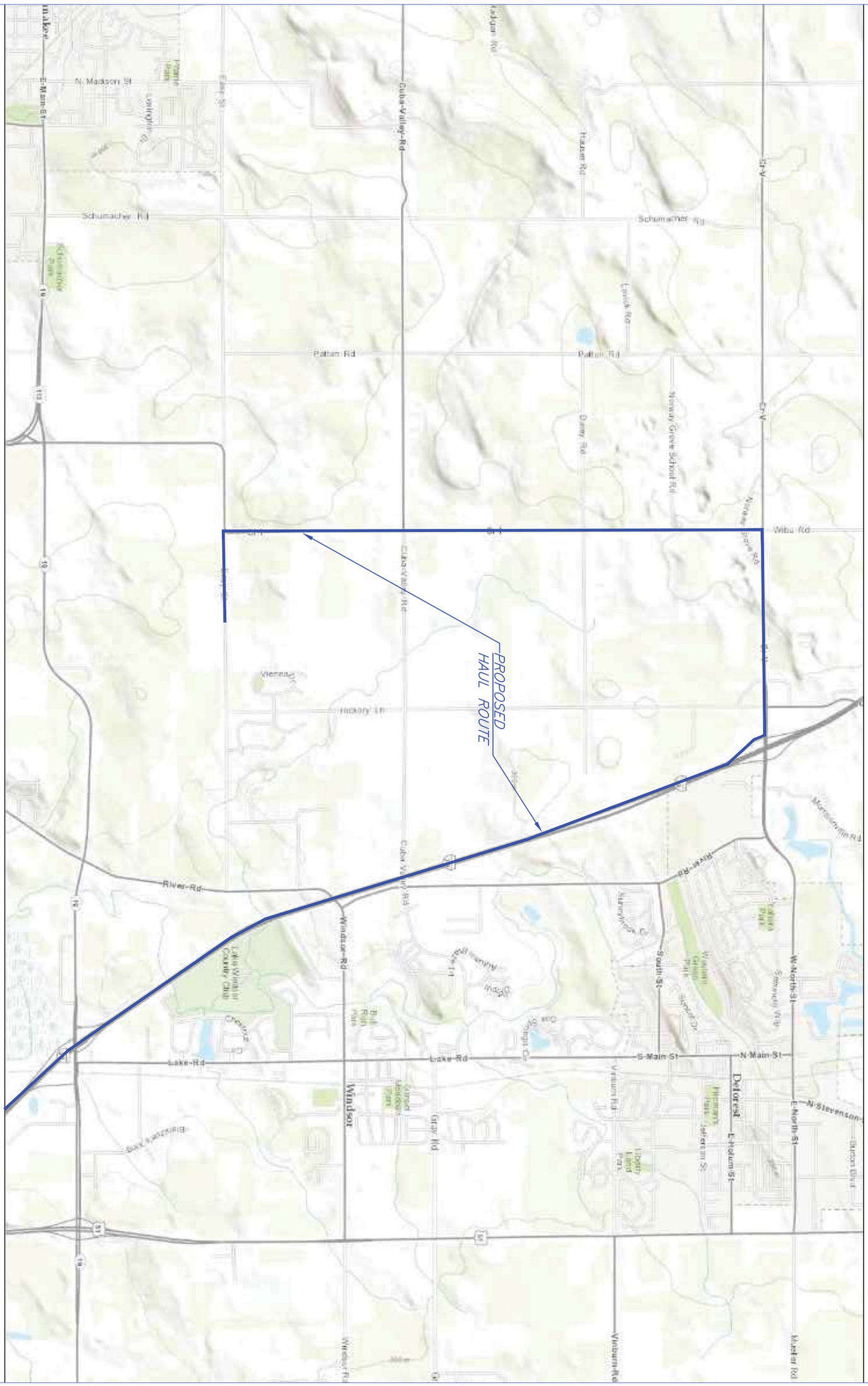
Design By: MR
Drawn By: MR
Approved By: JV
Date: Jan. 2014
Scale: As shown
Bid No.:

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
TRAFFIC CONTROL PLAN

Sheet 3 of 13

File Name:



Sheet 4 of 13

EASY STREET
CLAY BORROW SITE
HAUL ROUTE

DEPARTMENT OF PUBLIC WORKS

DANE COUNTY WISCONSIN

Design By: MR	Drawn By: MR	Approved By: JW
Bid No.:	Date: Jan. 2014	Scale: As shown

Revisions

LEGEND

Existing Contours ---920---

Flow Direction →

Scale 1" = 200'

0 100 200 400

N

5202

EXISTING 18" DIA. RCP

EASY STREET

5118

EXISTING 14" x 23" ELIP. RCP

916 918 920 930 940 950 960 970 980 990 914 912

Approved By: JW

Drawn By: MR

Design By: MR

Scale: As shown

Date: Jan. 2014

Bid No.:

DEPARTMENT OF PUBLIC WORKS

DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
EXISTING CONDITIONS

Sheet 5 of 13

File Name:

CLAY EXCAVATION FOR PHASE 10- CELL 2 LINER PROJECT WILL BEGIN IN THE NORTHEAST CORNER OF THE WEST QUADRANT. CONTRACTOR SHALL REMOVE AND TRUCK 30,000 CUBIC YARDS OF CLAY REGARDLESS OF ACTUAL CLAY THICKNESS AND CONDITIONS ON THE BORROW SITE. THE AREAS SHOWN AND THE THICKNESSES OF CLAY ARE BASED ON INFORMATION PROVIDED TO DANE COUNTY. AT COMPLETION OF CLAY EXCAVATION, GRADE AROUND PERIMETER OF EXCAVATION BY SLOPING BACK TO EXISTING GROUND SURFACE.

LEGEND

Existing Contours 920

Clay Thickness 5

Scale 1" = 200'

0 100 200 400

N

5202

5118

EASY STREET

2 3 4 916 5 918 920 6 5 5 6 930 7 8 940 8 7 6 5 4 3 2 950 960 970 980 990 914 912 916 918 920 930 940 950 960 970 980 2 3 4 5 4 3 2

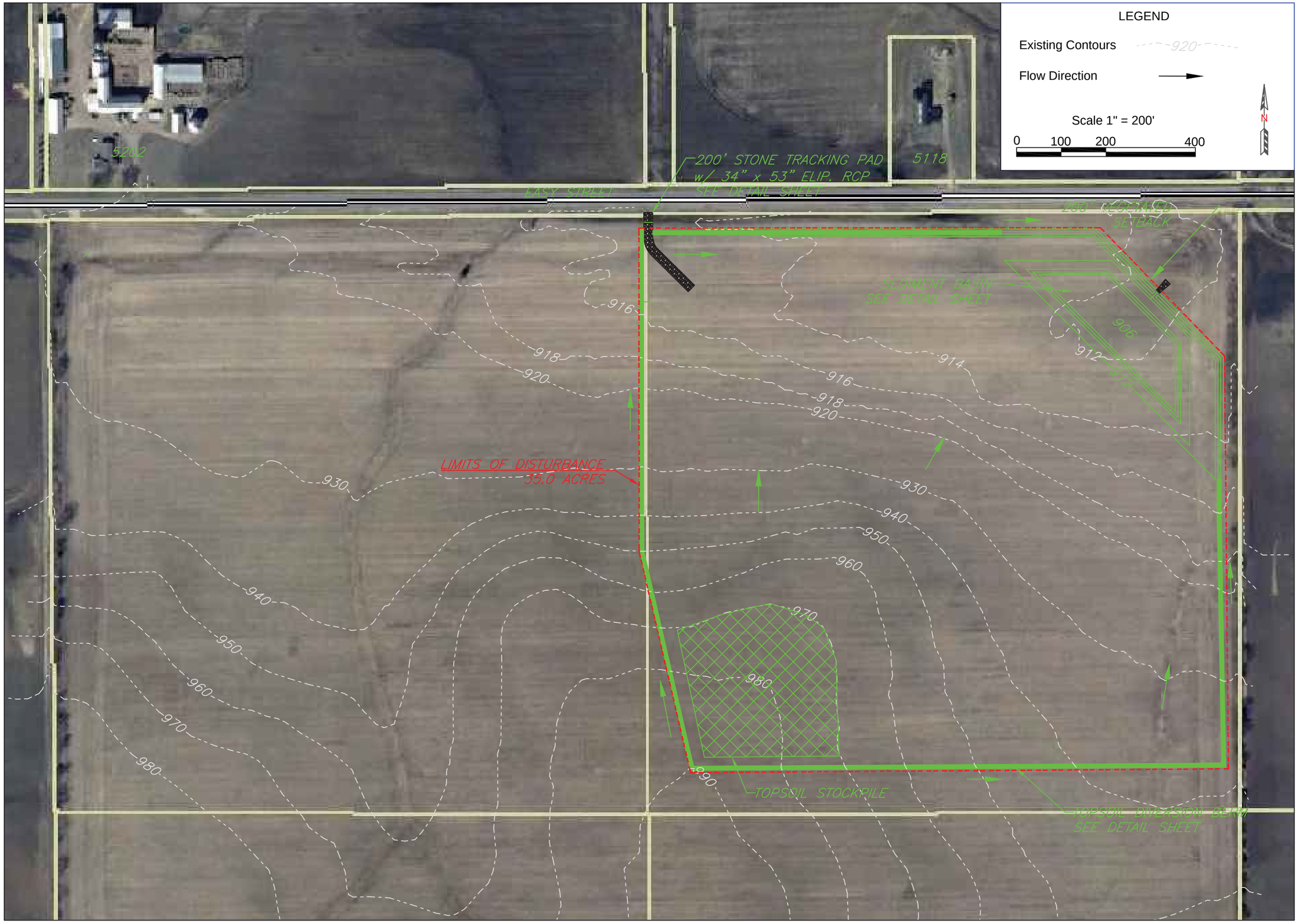
Approved By: JW
Drawn By: MR
Design By: MR
Scale: As shown
Date: Jun. 2014
Bid No.:

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
CLAY ISOPACH

Sheet 6 of 13

File Name:



Approved By: JW
Drawn By: MR
Design By: MR
Scale: As shown
Date: Jan. 2014
Bid No.:

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
PH. 1 EROSION CONTROL

Sheet 7 of 13

File Name:

CLAY EXCAVATION FOR PHASE 10- CELL 2 LINER PROJECT WILL BEGIN IN THE NORTHEAST CORNER OF THE WEST QUADRANT. CONTRACTOR SHALL REMOVE AND TRUCK 30,000 CUBIC YARDS OF CLAY REGARDLESS OF ACTUAL CLAY THICKNESS AND CONDITIONS ON THE BORROW SITE. THE AREAS SHOWN AND THE THICKNESSES OF CLAY ARE BASED ON INFORMATION PROVIDED TO DANE COUNTY. AT COMPLETION OF CLAY EXCAVATION, GRADE AROUND PERIMETER OF EXCAVATION BY SLOPING BACK TO EXISTING GROUND SURFACE.

LEGEND

Existing Contours 920

Proposed Contours 920

Flow Direction

Scale 1" = 200'

0 100 200 400

N

5202

5118

200' STONE TRACKING PAD
W/ TARPED EXIT
SEE DETAIL SHEET

EASY STREET

SEDIMENT BASIN
SEE DETAIL SHEET

TOPSOIL DIVERSION BERM
SEE DETAIL SHEET

LIMITS OF DISTURBANCE
35.3 ACRES

TOPSOIL STOCKPILE

910 912 914 916 918 920 930 940 950 960 970 980 990

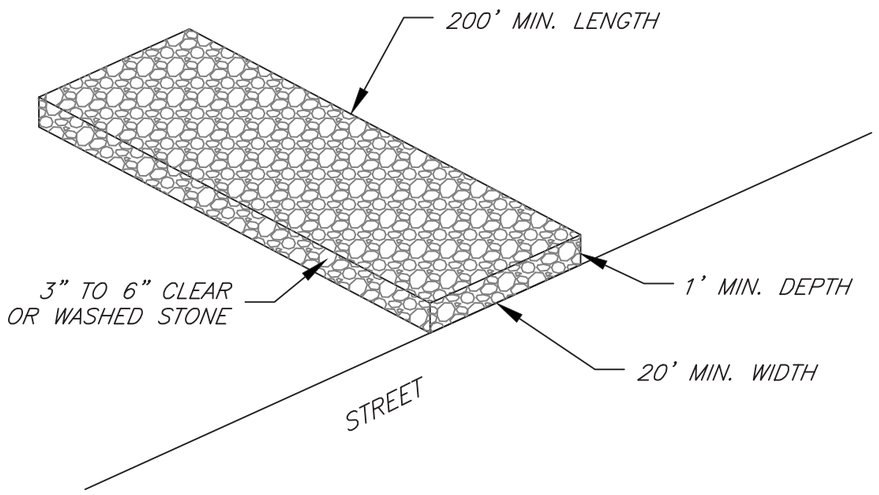
Approved By: JW
Drawn By: MR
Design By: MR
Scale: As shown
Date: Jan. 2014
Bid No.:

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

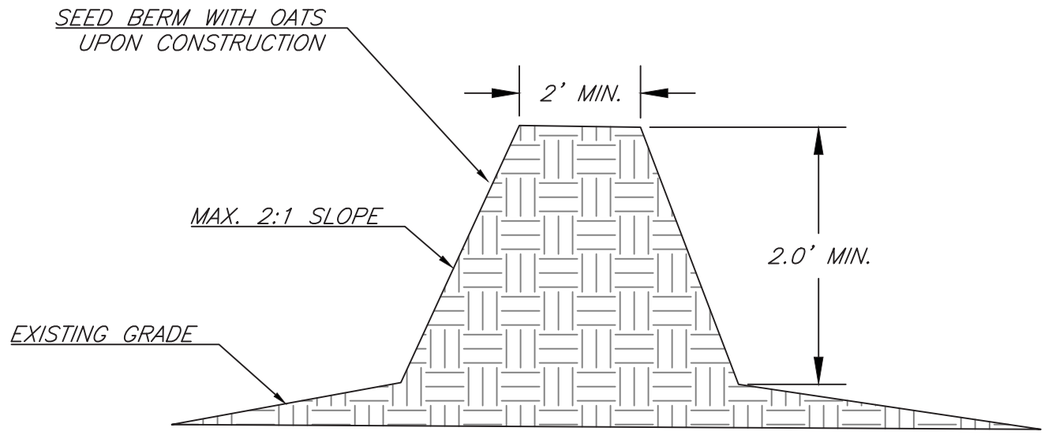
EASY STREET
CLAY BORROW SITE
PH. 2 EROSION CONTROL

Sheet 8 of 13

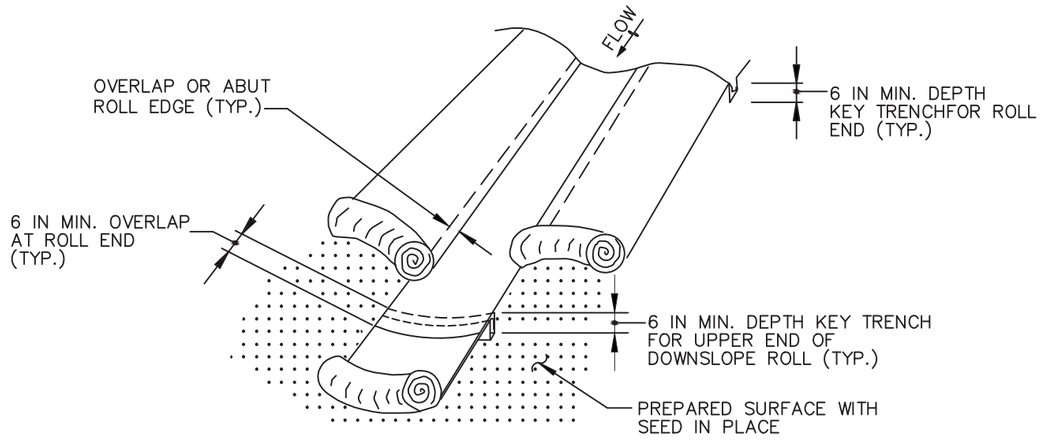
File Name:



STONE TRACKING PAD



DIVERSION BERM CROSS SECTION



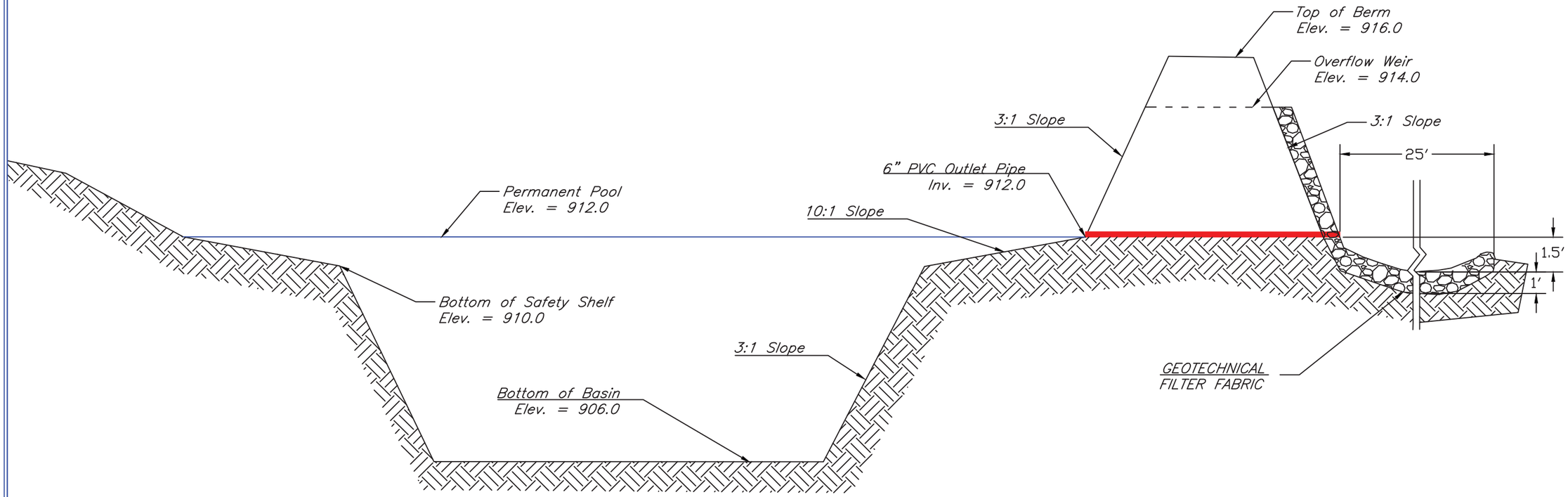
CHANNEL EROSION MAT

Approved By: JW
Drawn By: MR
Design By: MR
Scale: As shown
Date: Jan. 2014
Bid No.:

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
EROSION CONTROL PLAN

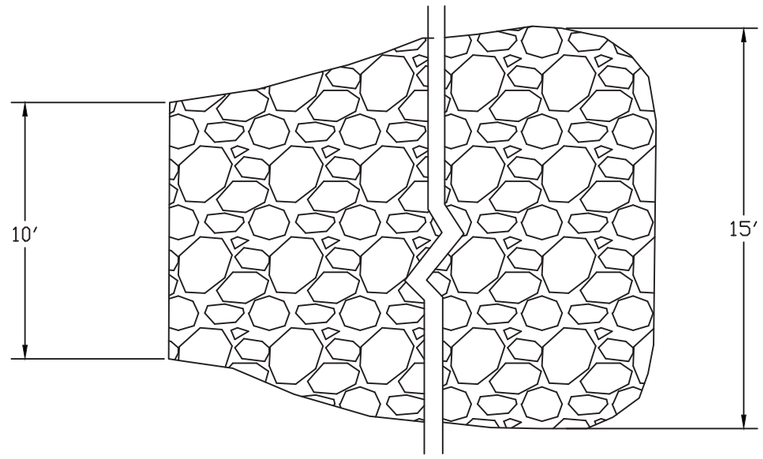
File Name:



PHASE 1 SEDIMENT BASIN CROSS SECTION

Stone Gradation

Percent passing by weight	Size (inches)
100	12 in.
60–85	9 in.
25–50	6 in.
5–20	3 in.
0–5	1.2 in.



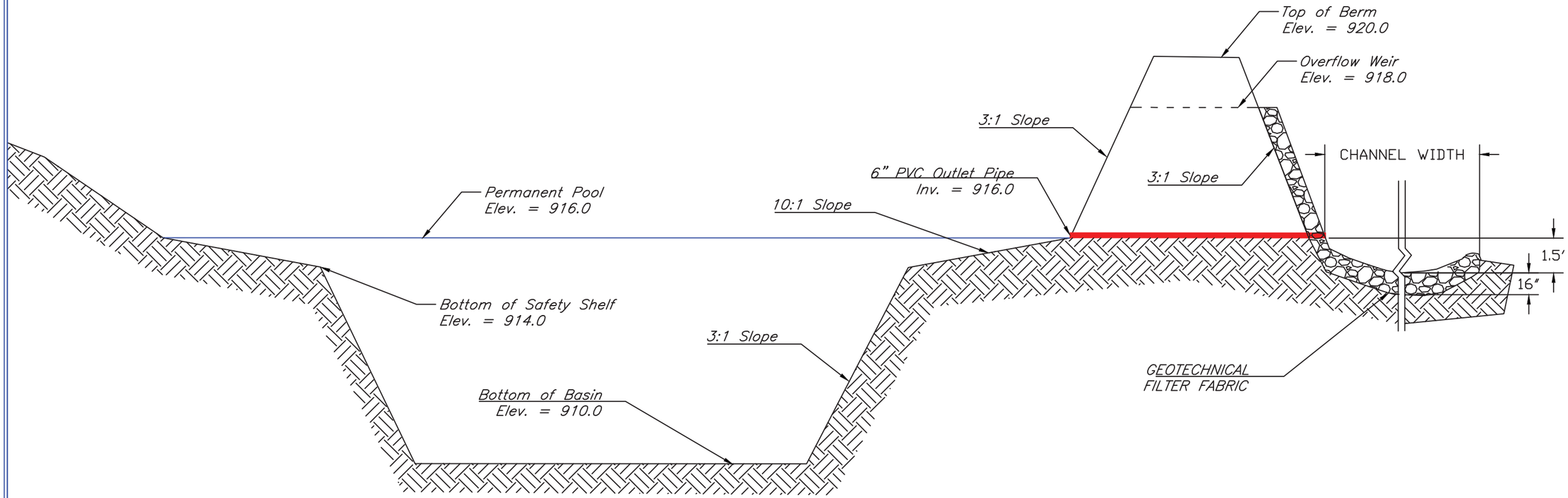
Design By: MR
Drawn By: MR
Approved By: JW
Bid No.:
Date: Jan. 2014
Scale: As shown

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
EROSION CONTROL PLAN

Sheet 10 of 13

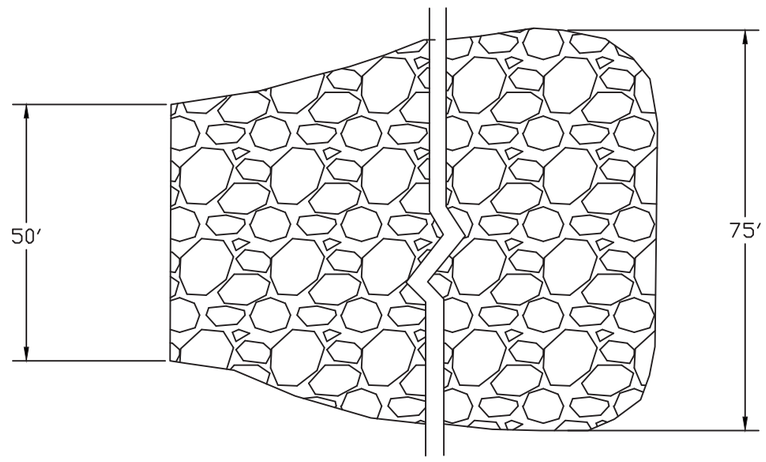
File Name:



PHASE 2 SEDIMENT BASIN CROSS SECTION

Stone Gradation

Percent passing by weight	Size (inches)
100	16 in.
60–85	12 in.
25–50	8 in.
5–20	4 in.
0–5	1.6 in.



Design By: MR
Drawn By: MR
Approved By: JW
Bid No.:
Date: Jan. 2014
Scale: As shown

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
EROSION CONTROL PLAN

Sheet 11 of 13

File Name:

LEGEND

Existing Contours 920

Proposed Contours 920

Flow Direction

Scale 1" = 200'

0 100 200 400

N

5202

5118

EASY STREET

916 918 920 930 940 950 960 970 980 990

914 912 916 918 920 930 940 950 960 970 980

912

Approved By: JW

Drawn By: MR

Design By: MR

Scale: As shown

Date: Jan. 2014

Bid No.:

DEPARTMENT OF PUBLIC WORKS

DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
PHASE 1 RECLAMATION

Sheet 12 of 13

File Name:

DEPARTMENT OF PUBLIC WORKS
DANE COUNTY WISCONSIN

EASY STREET
CLAY BORROW SITE
PHASE 2 RECLAMATION

Approved By: JV
Drawn By: MR
Design By: MR
Scale: As shown
Date: Jan. 2014
Bid No.:

Sheet 13 of 13

File Name:

SECTION 00900
SAMPLE FORMS

1. Notice of Award (EJCDC C-510, 2013 edition)
2. Notice to Proceed (Dane County standard form)
3. Change Order (Dane County standard form)
4. Application for Payment (EJCDC C-620, 2013 edition) or AIA
5. Performance Bond
6. Payment Bond
7. Certificate of Substantial Completion (EJCDC C-625, 2013 Edition)
8. Equal Benefits Compliance Payment Certification

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE OF AWARD

Date of Issuance:

Owner:

Owner's Contract No.:

Engineer:

Engineer's Project No.:

Project:

Contract Name:

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

_____

[describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is: $_____ *[note if subject to unit prices, or cost-plus]*

- [ ] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically. *[revise if multiple copies accompany the Notice of Award]*
- [ ] a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [____] counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner:

Authorized Signature

By:

Title:

Copy: Engineer

DANE COUNTY DEPT. OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION

1919 Alliant Energy Center Way
Madison, Wisconsin 53713
Office: 608/266-4018 ◊ Fax: 608/267-1533
Public Works Engineering Division
Public Works Solid Waste Division

NOTICE TO PROCEED

TO: **DATE:**

ADDRESS:

TELEPHONE: **MOBILE:** **FAX:**

PURCHASE ORDER NO.:

OWNER'S BID NO.: [Bid or Proposal No.]

OWNER'S CONTRACT NO.:

PROJECT: Phase 10 – Cell 2 Liner Construction
Dane County No 2 (Rodefeld) Landfill Site

You are notified that, under terms of Contract, you are to start performing your obligations on July 25, 2016 with desired completion by December 31, 2016.

These obligations include all items as detailed in:

1. Dane County [Request for Bid (RFB No. 316024)] for above Project, bid due date June 28, 2016;
2. Dane County Ordinance Chapter 25.016, which pertains to domestic partnership benefits;
3. Project RFB [Addendum, Addenda 1-X]
4. Public Works Contract.

Agreed upon Lump Sum Contract price is $[XX,XXX].00
Agreed upon contract price for Alternate Bid No. 1 is $[XX,XXX].00

Before you may start any Work at site:

1. Sign this "Notice To Proceed" and return it to Public Works Project Manager;
2. Submit Certificate of Insurance with "Dane County" listed as additional insured;
3. Submit completed 100% Performance / Payment Bond;
4. Have submittals on all equipment / materials approved by Public Works Project Manager;
5. Coordinate starting date and work schedule with John Welch, 608/516-4154;
6. Provide 7 days notice before starting work; and
7. Understand that Public Works Project Manager must agree upon any project Change Orders before proceeding.

Public Works Project Manager is John Welch, 608/516-4154.

In addition, you must comply with these requirements:

1. Maintain Dane County insurance requirements;
2. Attend pre-construction meeting on [Day] [Meeting Date], 201[X] at [Time] [on site, other site];
3. Submit construction schedule;
4. Submit list of subcontractors;
5. Submit breakdown of costs according to division on pay request form;
6. Submit all billing to Public Works Project Manager at address on top of this form; and
7. Submit Equal Benefits Compliance Payment Certification Form with final payment application.

OWNER - DANE COUNTY

By: _____
[Project Manager's Name]

Project Manager [Signing Date], 201[X]
Title Date

CONTRACTOR

By: _____
(Authorized Signature)

_____
Title Date

DANE COUNTY DEPT. OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION

1919 Alliant Energy Center Way
Madison, Wisconsin 53713
Office: 608/266-4018 ◊ Fax: 608/267-1533
Public Works Engineering Division
Public Works Solid Waste Division

CONTRACT CHANGE ORDER

TO: Public Works & Transportation Committee

C.O. NO: [XXX]
DATE: [Issue Date], 20[X]

REFERENCE: Bid No.: [30XXXX]
P.O. No.: [20XXXXXX]
PROJECT: Phase 10 – Cell 2 Liner Construction
CONTRACTOR: _____
DESCRIPTION

1. RFI No.: [N/A, ##]
2. Requested By: [Owner, Contractor, A/E, Other]
3. Proposed Change: _____
4. Reason for Change: _____

5. **TOTAL [ADD / DEDUCT] TO CONTRACT:** **$[0.00]**

Document not valid unless signed by the Owner, Architect (if applicable) and Contractor

The original Contract amount was ..... $[0.00]
Net change by previously authorized Change Orders ..... $[0.00]
The Contract amount prior to this Change Order was ..... $[0.00]
The Contract amount will be [increased, decreased, unchanged] by this Change Order in the amount of .. $[0.00]
The new Contract amount including this Change Order will be ..... $[0.00]

The Completion Date will be [increased, decreased, unchanged] by ..... [0] days
The date of Substantial Completion as of the date of this Change Order therefore is ..... [Date]

Approvals:

_____ Public Works & Transportation Committee	_____ Controller's Division
_____ Contractor	_____ Architect / Engineer (A/E)
_____ Purchasing Division	_____ Public Works, Highway & Transportation (PWHT)

Final Copy Distribution: Contractor ____ Purchasing ____ Department ____ A/E ____ PWHT ____

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Contractor's Application for Payment No.

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	**$**
2. Net change by Change Orders	**$**
3. Current Contract Price (Line 1 ± 2)	**$**
4. TOTAL COMPLETED AND STORED TO DATE (Column F total on Progress Estimates)	**$**
5. RETAINAGE:	
a. X _____ Work Completed	**$**
b. X _____ Stored Material	**$**
c. Total Retainage (Line 5.a + Line 5.b)	**$**
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)	**$**
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	**$**
8. AMOUNT DUE THIS APPLICATION	**$**
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G total on Progress Estimates + Line 5.c above)	**$**

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;
(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all Liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interest, or encumbrances); and
(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding or Financing Entity (if applicable) (Date)

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Progress Estimate - Lump Sum Work

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D				
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
	Totals							

EJCDC® C-620 Contractor's Application for Payment
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Stored Material Summary

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E		F		G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously		Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
					Date Placed into Storage (Month/Year)	Amount ($)			Date (Month/ Year)	Amount ($)	
				Totals							

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PERFORMANCE BOND

CONTRACTOR (*name and address*):

SURETY (*name and address of principal place of business*):

OWNER (*name and address*):

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description (*name and location*):

BOND

Bond Number:

Date (*not earlier than the Effective Date of the Agreement of the Construction Contract*):

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature (*attach power of attorney*)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than

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the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirements shall be deemed deleted therefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

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12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.]*

Amendments to Owner's responsibilities: ☐ None ☐ As follows

Amendments to Contractor's responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

EQUAL BENEFITS COMPLIANCE PAYMENT CERTIFICATION

PURPOSE

25.016(8) of the Dane County Ordinance requires that each contractor receiving payment for contracted services must certify that he or she has complied fully with the requirements of Chapter 25.016 "Equal Benefits Requirement" of the Dane County Ordinances. Such certification must be submitted prior to the final payment on the contract.

This form should be included with a copy of the final contract invoice forwarded to your contract representative at Dane County.

CERTIFICATION

I, _____ certify that
Printed or Typed Name and Title

_____
Printed or Typed Name of Contractor

has complied fully with the requirements of Chapter 25.016 of the Dane County Ordinances "Equal Benefits Requirements".

Signed _____

Date _____

For questions on this form, please contact Chuck Hicklin at 608-266-4109 or your contract representative at Dane County.

DIVISION 1

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SECTION 01016
HEALTH AND SAFETY CONSIDERATIONS

PART 1. GENERAL

1.1 RESPONSIBILITY FOR HEALTH AND SAFETY

A. CONTRACTOR shall be solely and completely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent injury or loss to, all CONTRACTOR's and SUBCONTRACTOR's employees on the Site.

B. CONTRACTOR is expected to comply with all applicable OSHA regulations. The CONTRACTOR's Health and Safety Plan does not supersede or in any way relieve the CONTRACTOR of obligations under any applicable OSHA regulations including 29 CFR 1926: Occupational Health and Safety Standards for Construction.

C. CONTRACTOR shall be solely responsible for developing, providing, and implementing an appropriate health and safety program, including monitoring, equipment, plans in event of problems, incidents, and/or emergencies, and other related items as needed.

D. CONTRACTOR shall submit, for informational purposes only, one copy of site Health and Safety Plans to the OWNER within 14 calendar days after Notice to Proceed.

1.2 EXCAVATION SAFETY

A. CONTRACTOR shall maintain a temporary barrier around open excavations at all times to restrict personnel access.

1.3 HEALTH AND SAFETY PROGRAM

A. CONTRACTOR shall develop, provide, and implement a Health and Safety Program in accordance with all applicable OSHA regulations, 29 CFR 1926 and any other applicable federal, state, or local agency regulations or requirements. Landfill gas and municipal solid waste leachate are present at the site. Landfill gas contains flammable gases and volatile organic compounds (VOCs) as well as other compounds. Address landfill gas and municipal solid waste leachate in CONTRACTOR's Health and Safety Program.

B. If OWNER/ENGINEER observes any of CONTRACTOR's employees or Subcontractors engaging in an unsafe act or procedure that may result in serious injury or death to the person performing the act/procedure, or to any other person, OWNER/ENGINEER shall have the right, but not the duty, to stop the Work until the condition is corrected.

C. CONTRACTOR shall be held responsible for any increased costs that result from this Work stoppage.

D. The cost of complying with this Section shall be included in the prices bid in the Bid Schedule for other items of work.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01270
SCHEDULE OF VALUES AND PAYMENT

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Procedures for schedule of value payment.

B. Schedule of value prices.

1.2 PROCEDURES

A. Lump Sum Bid is full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete all Work of the contract documents.

B. OWNER will pay CONTRACTOR for the percentage of Work completed on the basis of each schedule of value item.

1.3 SCHEDULE OF VALUE ITEMS FOR LUMP SUM BID

A. Description of work Items described below will form the basis for determining a schedule of values for determining progress payments for the lump sum price for Phase 10 Cell 2 Construction.

ITEM 1 MOBILIZATION

Mobilization schedule of value item includes, but is not limited to, the work and operations necessary for the transportation of equipment, training and movement of personnel to the project site, and for all other work and operations which must be performed before beginning work at the project site. Work also includes providing field office trailers (if felt necessary by the CONTRACTOR), equipment trailers, location of underground utilities, development of appropriate Health and Safety plans, site security procedures, obtaining required construction related permits with the exception of the erosion control permit which Dane County will provide, bonds and insurance, and administrative costs. Fifty percent of this item will be paid as demobilization at the end of the project.

ITEM 2 SURVEYING

Surveying schedule of value item includes, but is not limited to, performing all survey layout and survey documentation work required to complete the Work required under this contract. This item of Work includes global positioning system (GPS) setup of base stations and equipment, construction layout staking, and documenting as-constructed coordinates and elevations required to complete shaded areas of the Construction Documentation Coordinate and Elevations Tables 1 through 3 provided in Appendix B of the supplementary conditions section of this Project Manual. CONTRACTOR survey requirements are further outlined in Section 01720 (Field Engineering) of these Specifications. The Construction Documentation Coordinate and Elevations Tables contained in Appendix B provide the Groundwater Gradient Control System and liner design coordinates and elevations on a maximum 50-foot grid and at slope break lines, Groundwater Gradient Control System Perforated and Non-perforated piping at 50-feet intervals, and Leachate Collection pipe design elevations at maximum 25-feet intervals. This item of work also includes surveying the location of every as-constructed Geomembrane panel corner and the middle of every repair. Stakes, lath, paint or other materials used for locating and maintaining the locations will be furnished by the

CONTRACTOR. Note that GPS-enabled/guided equipment is required to be used for finish grading the subbase of the Select Clay Fill liner, (except for over the Vertical Expansion Area where existing Select Clay Fill will not be excavated) for maintaining maximum clay lift thickness during Select Clay Fill placement, finish grading the base grades (top of Select Clay Fill liner), for finish grading outside the Limits of Composite Liner Construction, and for placing Select Aggregate Fill over the Geomembrane liner to monitor that minimum specified cover soil thickness are maintained for the various equipment traversing over the Geomembrane liner.

ITEM 3 SEDIMENT CONTROL

SILT CONTROL FENCE

Silt Fence schedule of value item includes furnishing and installing Silt Fence in accordance with Specification Section 02374 in this Project Manual, local codes, and ordinances. This item of Work includes maintaining Silt Fence during construction. Silt Fence locations are shown on Plan Sheet 10 in the engineering plans.

SEDIMENT CONTROL EROSION LOGS

Sediment Control Erosion Logs schedule of value item includes furnishing and installing Erosion Control Logs in accordance with Specification Section 02375 in this Project Manual, local codes, and ordinances. This item of Work includes maintaining Erosion Control Logs during construction. Erosion Control Logs location are shown on Plan Sheet 10 in the engineering drawings.

ITEM 4 CLEAR AND GRUB

OWNER will provide clearing and grubbing within the limits of construction prior to start of Phase 10 – Cell 2 construction. CONTRACTOR shall protect trees, brush, and shrubs outside and directly adjacent to the Limit of Construction boundary so they provide visual screening to the construction activities and landfill operations.

ITEM 5 GEOMEMBRANE BOOTS AROUND TWO EXISTING GAS WELLS

Installing Geomembrane Pipe Boots Around Two Existing Gas Wells schedule of value item includes, but is not limited to, furnishing, and installing 60 mil HDPE Geomembrane pipe boots around two existing gas wells as indicated on the Drawings and Specifications. For this Item, performing specified testing, documentation, and repairs of the Geomembrane panels and seams, is covered under schedule of value Item 12 (Geomembrane).

ITEM 6 SUBBASE GRADE CONSTRUCTION – HORIZONTAL EXPANSION AREA

Note:

1. The Horizontal Expansion Area includes Area “C” shown on Plan Sheets 4 and 5. The northern boundary includes the liner tie-in between Phase 10 – Cell 2 and Phase 10 – Cell 1, the western boundary includes the Limits of Waste line for the Old Western Expansion, and the southern and eastern boundaries include the Limits of Composite Liner Construction for Phase 10 – Cell 2.

Subbase Grade Construction for Horizontal Expansion Area schedule of value item includes, but is not limited to, excavating, and placing fill to establish subbase grades, fine-grading the subbase grades prior to placement of Select Clay Fill as shown on the Drawings. This item also includes controlling and removing surface water and groundwater, and stabilizing areas to allow construction of the subbase in accordance

with the Drawings and specifications. Subbase grades within the Limits of Composite Liner will be documented on a maximum 50-foot grid, and at changes of slopes. Coordinate locations of the subbase to be documented are contained on the Construction Documentation Coordinate and Elevations Tables provided in Appendix B of the Supplementary Conditions of this Project Manual. The documentation point locations numbers indicated on the tables are shown on Plan Sheet 4. The as-constructed subbase elevations at the documentation locations within the limits of the Select Clay Fill placement are required to be at or below (-0.1-feet below) design subbase grades. Base coarse gravel for the existing access road is not included in the estimated volume for this bid item. Asphalt and coarse gravel removal shall be included with Bid Item 28, Removal of Existing Haul Road. Stockpile excess Topsoil and General Fill in the excess soil stockpile areas shown on Plan Sheet 6.

The Designer has estimated the quantity of cut to be approximately 99,400 cubic yards, and quantity of fill to be approximately 400 cubic yards resulting in excess Topsoil and General Fill to be stockpiled. Note that these estimated quantities are based on in place cut and fill quantities comparing the existing topographic map shown on Plan Sheet 3 and the subbase grades shown on Plan Sheet 4 and do not account for stripped Topsoil, shrink, swell, or material loss and these estimated quantities are not guaranteed. A descriptions on the sources used to develop the existing topography map is provided in Note 1 of Plan Sheet 2. Bidder is responsible for determining actual quantities and determining how the quantities affect the lump sum price. Also not included in the estimated quantities are the cuts and fills required for constructing the Groundwater Gradient Control System trenches and drainage layer.

ITEM 7 SUBBASE GRADE CONSTRUCTION – VERTICAL EXPANSION AREA WITH NO EXISTING GEOMEMBRANE LAYER

Notes:

1. The Vertical Expansion Area includes Area “B” shown on Plan Sheets 4 and 5. The northern boundary includes the liner tie-in between Phase 10 – Cell 2 and Phase 10 – Cell 1, the western boundary includes the line that identifies the Limits of Existing Composite Final Cover for the Old Western Expansion, and the southern boundary includes the Limits of Composite Liner Construction Line for Phase 10 – Cell 2, the eastern boundary includes the Limits of Waste line for the Old Western Expansion

2. For this item it is assumed that the existing 2 foot thick clay layer in the existing final cover meets compaction specifications required by NR 504.06(2)(a). After the Topsoil and General Fill are removed and the Select Clay Fill liner is exposed, the OWNER/ENGINEER will perform in-field moisture and density tests to verify the clay meets compaction requirements and no further recompaction of the existing Select Clay Fill will be needed.

3. Bidder must also provide an Alternate Bid for item in Section ALTERNATE BID ITEMS of the Bid Form Tab. A description of Measurement and Payment for the Alternate Bid is provided in PART B of this Specification section.

4. Conditions found in the field may indicate that the top of existing Select Clay Fill grades will not conform to the design top of liner grades shown on Plan Sheet 5. If these conditions are found, the existing top of Select Clay Fill grades will be maintained for the new composite liner system, but shall not be less than two percent. If areas are found with slopes less than two percent grades additional Select Clay Fill shall be placed to achieve the minimum grades.

Subbase Grade Construction for Vertical Expansion Area having no Existing Geomembrane schedule of value item includes, but is not limited to, excavating and stockpiling existing Topsoil and General Fill rooting zone layers to expose the existing 2 foot thick compacted Select Clay Fill layer; placing fill, if necessary, to establish a minimum two percent slope for the subbase grades; and fine-grading the subbase grades prior to placement of geomembrane layer as shown on the Drawings. This item also includes controlling and removing surface water, and stabilizing areas to allow construction of the subbase in accordance with the Drawings and Specifications. Subbase grades within the limits of liner area will be documented on a maximum 50-foot grid, and at changes of slopes. Coordinate locations of the subbase to be documented are contained on the Construction Documentation Coordinate and Elevations Tables provided in Appendix B of the Supplementary Conditions of this Project Manual. The documentation point locations numbers indicated on the tables are shown on Plan Sheet 4. General fill material for exterior berms and road construction will be obtained from cut areas within the Limits of Construction. Stockpile excess Topsoil and General Fill in the soil stockpile areas shown on Plan Sheet 6.

The Designer has estimated the quantity of cut to be approximately 10,170 cubic yards of Topsoil and General Fill to be stockpiled. Note that these estimated quantities are based on in place cut and fill quantities comparing the existing topographic map shown on Plan Sheet 3 to the designed top of liner grades for the Vertical Expansion Area shown on Plan Sheet 5 and do not account for stripped Topsoil, shrink, swell, or material loss and these estimated quantities are not guaranteed. A descriptions on the sources used to develop the existing topography map is provided in Note 1 of Plan Sheet 2. Bidder is responsible for determining actual quantities and determining how the quantities affect the lump sum price.

ITEM 8 GRADING FOR VERTICAL EXPANSION AREA WITH AN EXISTING GEOMEMBRANE LAYER

Notes:

1. The Vertical Expansion Area includes Area “A” shown on Plan Sheets 4 and 5. The northern boundary includes the liner tie-in between Phase 10 – Cell 2 and Phase 10 – Cell 1, the western and southern boundaries include the Limits of Composite Liner Construction Line for Phase 10 – Cell 2, the eastern boundary includes the line that identifies the Limits of Existing Composite Final Cover for the Old Western Expansion.

2. For this item, existing Topsoil and General Fill rooting zone materials will be removed down to approximately 6 inches above the existing geocomposite drainage and 40 mil geomembrane layers.

3. Conditions found in the field may indicate that grades at the top of existing geocomposite and geomembrane layers will not conform to the design top of liner grades shown on Plan Sheet 5, if these conditions are found, the existing grades will be maintained for the new composite liner system, but shall not be less than two percent. If there are areas found to be less than two percent grades additional General Fill will be placed to achieve the minimum grades.

Grading for Vertical Expansion Area with an Existing Geomembrane schedule of value item includes, but is not limited to, excavating and stockpiling existing Topsoil and General Fill rooting zone layers down to approximately 6 inches above the existing geocomposite drainage and 40 mil geomembrane layers and maintaining at a minimum two percent grade slopes as shown on Plan Sheets 4 and 5 in the drawings. This item also includes controlling and removing surface water, and stabilizing areas to allow tie-in

of the existing and new liner systems in accordance with the Drawings and Specifications. Top of the 6 inch existing General Fill protective layer within the limits of liner area will be documented on a maximum 50-foot grid, and at changes of slopes. Coordinate locations that need to be documented are contained on the Construction Documentation Coordinate and Elevations Tables provided in Appendix B of the Supplementary Conditions of this Project Manual. The documentation point locations numbers indicated on the tables are shown on Plan Sheet 4. Stockpile excess Topsoil and General Fill in the soil stockpile areas shown on Plan Sheet 6.

The Designer has estimated the quantity of cut to be approximately 1,940 cubic yards of General Fill and topsoil to be stockpiled (does not take into account fill needed to construct the small perimeter berm shown on Detail 1 on Plan Sheet 9. Note that these estimated quantities are based on in place cut and fill quantities comparing the existing topographic map shown on Plan Sheet 3 to the designed top of liner grades for the Vertical Expansion Area shown on Plan Sheets 4 and 5 and do not account for stripped Topsoil, shrink, swell, or material loss and these estimated quantities are not guaranteed. A descriptions on the sources used to develop the existing topography map is provided in Note 1 of Plan Sheet 2. Bidder is responsible for determining actual quantities and determining how the quantities affect the lump sum price.

ITEM 9 GROUNDWATER GRADIENT CONTROL SYSTEM

Groundwater Gradient Control System schedule of value item includes, but is not limited to, miscellaneous excavation, grading, trenching and backfilling; furnishing and installing Select Aggregate Fill, Perforated HDPE Pipe, connecting to the existing transfer pipe, geotextile wrap, Select Granular Fill drainage layer and pipe bedding. This item also includes controlling and removing surface water and groundwater, and stabilizing areas to allow construction of the Groundwater Gradient Control System in accordance with the Drawings and specification.

ITEM 10 SELECT CLAY FILL

Select Clay Fill Schedule of Value item includes loading and hauling from the OWNER provided on-site Select Clay Fill stockpile, placing, scarifying, moisture conditioning, compacting and constructing to the grades and minimum thickness shown on the Drawings. Work also includes proof-rolling the subbase surface prior to placing the first lift of Select Clay Fill, and coordinating with and assisting the OWNER/ENGINEER as necessary to allow the OWNER/ENGINEER to conduct required in-field density testing and collecting undisturbed Shelby tube samples for laboratory testing. Select Clay Fill field and laboratory testing will be provided by OWNER, but CONTRACTOR will remove and replace Select Clay Fill with failing test results at no additional cost to OWNER. Top of Select Clay Fill grades will be documented on a maximum 50-foot grid, and at changes of slopes (at the same location as the subbase grades). Coordinate locations of the Select Clay Fill to be documented are contained in the Construction Documentation Coordinate and Elevations Tables provided in Appendix B of the Supplementary Conditions of this Project Manual. The documentation point locations numbers indicated on the tables are shown on Plan Sheet 4. The as-constructed elevations at the documentation locations are required to be at or above the design base grades and at or above the minimum design Select Clay Fill liner thicknesses shown on Table 2. CONTRACTOR will be responsible for maintaining uniform slopes to comply with the Drawings and Specifications and to control/pump surface water from the Select Clay Fill clay liner area.

This bid item applies to Horizontal and Vertical Expansion Area, with the exception that for the Vertical Expansion Area the Select Clay Fill will not be hauled in from the stockpile because the Select Clay Fill in the existing final cover will be used.

ITEM 11 GEOMEMBRANE SURFACE PREPARATION

Geomembrane Surface Preparation schedule of value item includes fine-grading and smooth drum-rolling the top of Select Clay Fill surface, so that it is free of irregularities, protrusions, loose soil, and abrupt changes in grade. This item includes removing stones, waste materials, grade stakes, and other debris that may be damaging to the Geomembrane, and filling all depressions and large cracks with tamped Select Clay Fill or bentonite. This item of Work also includes maintaining the surface and moisture content of the Select Clay Fill layer until Geomembrane installation is complete including fixing ruts in the Select Clay Fill during Geomembrane installation.

ITEM 12 GEOMEMBRANE

Geomembrane schedule of value item includes furnishing, unloading shipments, storing, deploying, and installing 60 mil HDPE Geomembrane liner material above the Select Clay Fill. This item also includes performing specified testing, documentation, and repairs of the Geomembrane panels and seams. This item includes excavating and backfilling anchor trenches, repairs required to remove rolled up stones/debris from under the Geomembrane. This item includes patching holes found in the liner during the Electrical Resistivity Testing survey after the leachate drainage layer and leachate piping is installed over the Geomembrane. The rain flap in the Delineation Berms shall be included in the schedule of value for Item 15 (Delineation Berm).

ITEM 13 GEOTEXTILE CUSHION

Geotextile Cushion schedule of value item includes, but is not limited to, furnishing and installing the Geotextile Cushion above the Geomembrane of the composite liner and over the General Fill protection layer left in place to protect the existing geomembrane layer over the Vertical Expansion Area as shown on the Drawings (12 oz. over areas “B” and “C” and 6 oz. filter over Area “A” on Drawings 4 and 5).

ITEM 14 SELECT AGGREGATE FILL DRAINAGE LAYER

Select Aggregate Fill Drainage Layer schedule of values item includes, but is not limited to, furnishing and installing Select Aggregate Fill on the composite liner system to a minimum thickness of 1.0-feet, including the entire Vertical Expansion Area, to comply with the Drawings and Specifications. This item includes using GPS-enabled equipment or other method to control stone thickness ensuring that a minimum thickness of Select Aggregate Fill is maintained between tracked and wheeled equipment as specified in the specifications. This item should not include the additional Select Aggregate Fill placed as bedding material for the Perforated HDPE Leachate Pipe or Select Aggregate Fill placed in the Delineations Berms. Additional Select Aggregate Fill described above should be accounted in the appropriate other schedule of value items.

ITEM 15 DELINEATION BERMS

Delineation Berms schedule of value item includes, but is not limited to, furnishing and installing Geomembrane rain flap, protection for the primary Geomembrane liner future tie-in area, and appurtenances to construct the Delineation Berms in accordance with the Drawings and Specifications. For this Item, performing specified testing, documentation, and repairs of the Geomembrane panels and seams, is covered under schedule of valve Item 12 (Geomembrane). This item also includes furnishing, installing, and grading the additional Select Aggregate Fill above the 1-foot thick drainage layer included in schedule of value Item 14.

ITEM 16 PERFORATED HDPE LEACHATE PIPE

Perforated HDPE Leachate Pipe schedule of value item includes, but is not limited to furnishing, fusing, and installing, Perforated HDPE Leachate Pipes, pipe fittings, and appurtenances in accordance with the Drawings and Specifications. This item also includes furnishing and installing the additional Select Aggregate Fill over the pipe above and beyond the 1-foot thick drainage layer included in schedule of value Item 14. This item also includes video taping and cleaning of pipe per Section 2618.

ITEM 17 ELECTRICAL RESISTIVITY TESTING ASSISTANCE

Electrical Resistivity Testing Assistance schedule of value item includes, but not limited to, providing assistance to OWNER/ENGINEER while OWNER/ENGINEER performs the Geomembrane Leak Location Survey as discussed in Section 02320, Subsection 3.5. This item includes providing a source of AC power (110 VAC, 5 A), two supervised laborers with equipment, a water truck, water, and truck driver. Work also includes remove standing water and uncovering, exposing, and repairing any leaks found in the Geomembrane. The Leak Location Survey will be completed in less than three consecutive 10 hour days. Contractor must coordinate sequence of other Work with schedule for electric resistivity test.

ITEM 18 STRIP AND STOCKPILE TOPSOIL

Strip and Stockpile Topsoil schedule of value item includes, but is not limited to, stripping Topsoil to the extent available from outside of the liner area of the Horizontal Expansion Area described for Item 6, the Vertical Expansion area covered under Items 7 and 8, and the Temporary Berms covered under Items 23 and 27. Areas included for Topsoil removal under this item are the General Fill and Select Clay Fill stockpile areas and the landfill perimeter berm located along Dane County's eastern property boundary (soil stockpile areas shown on the drawing 6). Bidder is responsible for determining the thickness of Topsoil on-site to determine pricing for the lump sum cost.

ITEM 19 TOPSOIL PLACEMENT

Topsoil Placement schedule of value item includes providing all labor, equipment, finish grading and maintenance, and other incidentals as required to comply with the Drawings and Specifications. Topsoil will be placed to a minimum 6-inch thickness over disturbed areas outside the limits of the composite liner and the Access Roads that will receive vegetation which includes, but is not limited to, landfill Flat Bottom and V-Notch Ditches. This item includes placing Topsoil over the on-site Select Clay Fill stockpile area after removing the Select Clay Fill for construction. This item also includes grading and placing Topsoil on the excess General Fill stockpiles (Topsoil placed on the General Fill stockpiles will have a minimum thickness of 4-inches and all other Topsoil areas will have a minimum Topsoil thickness of 6-inches). Topsoil will be obtained from Topsoil that was stripped and stockpiled under Schedule of Value Items 6, 7, 8 and 18.

ITEM 20 SEED, FERTILIZE, AND MULCH

Seed, Fertilizer, and Mulch schedule of value item includes, but is not limited to, seedbed preparation, seeding, fertilizing, mulching, maintenance and repair (reseeding if necessary) in accordance with the Drawings and Specifications. This item includes seeding, fertilizing and mulching all Topsoil areas and other areas where vegetation was disturbed during construction (includes stockpiles of remaining soil and stockpile areas where soil is removed).

ITEM 21 EROSION CONTROL AND REVEGETATION MAT

Erosion Control and Revegetation Mat (ECRM) schedule of value item includes, but is not limited to, furnish and installing ECRM and appurtenances in the Flat Bottom Ditches, V-Notch Ditches, temporary diversion berms, and all disturbed areas with 3H:1V or greater slopes in accordance with the Drawings and Specifications. This item includes trenching, anchoring, and staking or pinning the ECRM in accordance with manufacturer's instructions.

ITEM 22 ACCESS ROADS

Access Roads schedule of value item includes furnishing and installing Mirafi 500x (or equal) woven geotextile, Base Coarse and Gravel Surface Coarse in accordance with the Drawings and Specifications. This item includes grading the Base Course and Gravel Surface Course, watering and smooth drum-compacting to a firm and stable road. This item also includes furnishing and installing materials for constructing Stone Tracking Pads in accordance with WDNR Conservative Practice Standard No. 1057 and the Drawings and Specifications.

ITEM 23 TEMPORARY SURFACE WATER DIVERSION BERM ON FINAL COVER

Temporary Surface Water Diversion Berm on Final Cover schedule of value item includes, but not limited to, excavating existing topsoil and stockpiling, hauling and placing general fill from stockpile, placing topsoil over berm in accordance with Detail 2 on Plan Sheet 9 and in location shown on Plan Sheet 5.

ITEM 24 FLAT BOTTOM AND V-NOTCH DITCHES

Flat Bottom and V-Notch Ditches schedule of value item includes, but is not limited to, fine grading to the minimum widths, minimum depths, grades and slopes indicated on the Drawings.

ITEM 25 REMOVE AND RELOCATE EXISTING FLUME PIPE AND ENERGY DISSIPATER

Remove and Relocate Existing Flume Pipe and Energy Dissipater schedule of value item includes, but is not limited to, excavation and removal of an approximately 180 feet long section of 18 inch diameter HDPE corrugated with smooth wall interior pipe and an approximately 64 inch by 68 inch concrete energy dissipater located in the area shown on Plan Sheet 4. Work also includes relocating the existing flume pipe and energy dissipater to a new location shown on Plan Sheet 4 and furnishing additional 18 inch diameter HDPE (corrugated with smooth wall interior) pipe for extending the inlet of the pipe up to the temporary diversion berm as shown on Plan Sheet 4. Work includes providing a new inlet apron, geotextile and riprap around the inlet of the apron and around the energy dissipater as shown on Detail 5 of Plan Sheet 9 and Detail 4 of Plan Sheet 11.

ITEM 26 REMOVE EXISTING CMP CULVERTS

Remove Existing CMP Culverts schedule of value item includes, but is not limited to, removal and salvaging of an approximate 65 foot long, 24 inch diameter culvert and an approximate 40 foot long culvert, and placing the culverts in an on-site location designated by OWNER for storage or disposal by OWNER.

ITEM 27 TEMPORARY PERIMETER BERM AT WESTERN LIMITS OF PHASE 10 – CELL 2 LINER

Temporary Perimeter Berm at Western Limits of Phase 10 – Cell 2 Liner schedule of value item includes, but is not limited to, excavate existing topsoil and stockpiling, hauling and placing general fill from stockpile, hauling and placing topsoil over berm in accordance with Detail 1 on Plan Sheet 9 and in location shown on Plan Sheet 5.

ITEM 28 REMOVAL OF EXISTING HAUL ROAD

Removal of Existing Haul Road schedule of value item includes, but is not limited to, excavate, load, and haul 12-inch thick course road bed gravel from area shown on the Plan Sheet 4 and place in stockpile in area shown on Plan Sheet 6.

B. Description of work for Alternate Bid Items described below will form the basis for determining a schedule of values for determining progress payments for the lump sum price for Phase 10 Cell 2 Construction.

ITEM 1A REWORK EXISTING CLAY OVER VERTICAL EXPANSION AREA

Rework Existing Clay over Vertical Expansion Area schedule of value item includes, but is not limited to, excavate the top one foot thick layer of the existing two foot thick Select Clay Fill liner in the area that has no existing geomembrane layer and placing the clay in a stockpile adjacent to cell; recompact the bottom one foot thick layer of Select Clay Fill to meet NR 500 requirements; remove Select Clay Fill previously placed in a stockpile, placing, scarifying, moisture conditioning, compacting in 6 inch lifts to one foot thickness. Conditions found in the field may indicate that the top of existing Select Clay Fill grades will not conform to the design top of liner grades shown on Plan Sheet 5, if these conditions are found, the existing top of Select Clay Fill grades will be maintained for the new composite liner system, but shall not be less than a two percent. If there are areas found to be less than two percent grades additional Select Clay Fill will be placed to achieve the minimum grades. Work also includes coordinating with and assisting the OWNER/ENGINEER as necessary to conduct required in-field density testing. Top of Select Clay Fill grades will be documented on a maximum 50-foot grid, and at changes of slopes. Coordinate locations of the Select Clay Fill to be documented are contained in the Construction Documentation Coordinate and Elevations Tables provided in Appendix B of the Supplementary Conditions of this Project Manual. The documentation point locations numbers indicated on the tables are shown on Plan Sheet 4. The as-constructed elevations at the documentation locations are required to be added to Table 2. CONTRACTOR will be responsible for maintaining uniform slopes to comply with the Drawings and Specifications and to control/pump surface water from the Select Clay Fill liner area.

ITEM 2A BID FOR EXCAVATION AND TRANSPORTATION OF CLAY FROM DANE COUNTY'S OFF-SITE BORROW SOURCE TO THE LANDFILL (ALSO BIDDING ON CONSTRUCTION OF THE GEOCOMPOSITE LINER SYSTEM)

Bid for Transporting Clay From Dane County's Off-site Borrow Source to the Landfill (also bidding on construction of the geocomposite liner system) schedule of value item includes, but is not limited to the following (refer to Easy Street borrow site information provided in Appendix D):

- Follow requirements and procedures identified in Dane County's approved Conditional Use Permit.

- Furnishing materials and installing erosion control features per Dane County's erosion control plan.

- Stripping of Topsoil and General Fill from borrow area and stockpiling on site.

- Excavating, loading, hauling clay to the landfill and unloading in the Phase 10 – Cell 2 liner construction area or placing in an adjacent stockpile area shown on Plan Sheets 3 and 4. Contractor is responsible for excavating 30,000 CY of in-situ clay and hauling it to the landfill site for liner construction. Volumes shall be verified by Owner's survey before topsoil stripping, before clay excavation, and after clay excavation.

  Any hauled clay that is in excess of clay needed for Phase 10 Cell 2 construction shall be stockpiled at the landfill site in the clay stockpile location shown on the Plan Set.

- Restore the borrow area by placing general fill from the stockpile in areas where clay was excavated and grading to provide proper drainage per Dane County's site restoration plan.

- Using topsoil from the on-site stockpile and placing a six inch thick layer over the area disturbed by clay excavation.

- Seed fertilize and mulch disturbed areas.

Dane County has an approved Conditional Use Permit and will obtain the necessary Erosion Control Permits for the Easy Street Borrow Site. Contractor is responsible for any other permits necessary for excavating and hauling clay from the borrow site to the landfill.

ITEM 3A BID FOR TRANSPORTING CLAY FROM DANE COUNTY'S OFF-SITE BORROW SOURCE TO THE LANDFILL (NOT BIDDING ON CONSTRUCTION OF THE GEOCOMPOSITE LINER)

Bid for Transportation of Clay from Dane County's Off-site Borrow Source to the Landfill (not bidding on construction of the geocomposite liner system) schedule of value item includes, but is not limited to the following (refer to Easy Street borrow site information provided in Appendix D):

- Follow requirements and procedures identified in Dane County's approved Conditional Use Permit.

- Furnishing materials and installing erosion control features per Dane County's erosion control plan.

- Stripping of Topsoil and General Fill from borrow area and stockpiling on site.

- Excavating, loading, hauling clay to the landfill and unloading in the Phase 10 – Cell 2 liner construction area, if contractor constructing the liner is ready for clay to be placed in the liner area, or placing clay in an adjacent stockpile area shown on Plan Sheets 3 and 4. Contractor is responsible for excavating 30,000 CY of in-situ clay and hauling it to the landfill site for liner construction. Volumes shall be verified by Owner's survey before topsoil stripping, before clay excavation, and after clay excavation.

  Any hauled clay that is in excess of clay needed for Phase 10 Cell 2 construction shall be stockpiled at the landfill site in the clay stockpile location shown on the Plan Set.

- Restore the borrow area by placing general fill from the stockpile in areas where clay was excavated and grading to provide proper drainage per Dane County's site restoration plan.

- Using topsoil from the on-site stockpile and placing a six inch thick layer over the area disturbed by clay excavation.

- Seed fertilize and mulch disturbed areas.

Dane County has an approved Conditional Use Permit and will obtain the necessary Erosion Control Permits for the Easy Street Borrow Site. Contractor is responsible for any other permits necessary for excavating and hauling clay from the borrow site to the landfill.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01310
ADMINISTRATIVE PROVISIONS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Work Covered by Contract Documents.

B. Contract Method.

C. Work Sequence.

D. CONTRACTOR Use of Premises and OWNER Occupancy.

E. OWNER-furnished Products.

F. Alternates.

G. Applications for Payment.

H. Coordination.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. CONTRACTOR shall complete all work as specified or indicated in the Contract Documents. The Work is generally described as follows:

- Furnishing, installing and maintaining temporary and permanent erosion controls throughout Phase 10, Cell 2 liner construction.
- Stripping available Topsoil.
- Excavating, filling, and grading to achieve design grades shown on the Drawings.
- Stockpiling excess fill at the stockpile locations shown on the Drawings.
- Remove and reinstalling a downslope flume and energy dissipater and add an extension to the pipe
- Remove two Culverts
- Remove existing haul/access road
- Placing Topsoil on drainage ditches, diversion berms and disturbed areas.
- Constructing a Groundwater Gradient Control System including trenching, collection piping, pipe bedding, and 50-feet wide drainage layer.
- Constructing a minimum 4-foot thick Select Clay Fill clay liner using Select Clay Fill clay from an on-site stockpile.
- Preparing existing final cover over Vertical Expansion Area for use as the Phase 10 – Cell 2 liner – prepare existing 2-foot thick Select Clay Fill liner.
- Furnishing and installing a 60-mil HDPE Geomembrane liner component of the composite liner for the Phase 10 – Cell 2 Horizontal Expansion Area.
- Furnishing and installing a 60-mil HDPE Geomembrane liner component of the composite liner for the Phase 10 – Cell 2 Vertical Expansion Area.

- Furnishing and installing a 12-ounce nonwoven geotextile cushion and 6-ounce nonwoven geotextile filter.
- Furnishing and installing a minimum 1-foot thick aggregate leachate collection drainage blanket.
- Furnishing and installing Perforated HDPE Leachate Collection Pipes.
- Constructing cell Delineation Berms and temporary Geomembrane flaps.
- Assisting the OWNER/ENGINEER in conducting a leak location survey on the Geomembrane
- Seeding, fertilizing and mulching the disturbed areas and excess soil stockpiles.
- Installing Erosion Control and Revegetation Mat (ECRM).
- Constructing Access Roads and Stone Tracking Pads.

B. The Limits of Construction line shown on the Drawings designates the limit of the construction area. Storage of materials and equipment and staging of Work is to be within this area unless other areas are approved by the OWNER/ENGINEER.

1.3 CONTRACT METHOD

A. Construct the Work under a Lump Sum Contract.

B. Compensation is full payment for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the Work.

1.4 WORK SEQUENCE

A. Construct the Work in stages to accommodate OWNER's landfill operations and to accommodate the resistivity testing requirements during the construction period; coordinate construction schedule and operations with OWNER. Erosion controls must be installed prior to performing any work task that will require erosion controls.

1.5 CONTRACTOR USE OF PREMISES AND OWNER OCCUPANCY

A. Limit use of premises to Work and construction operations; allow for OWNER's operations.

B. Coordinate use of premises under direction of OWNER. Cooperate with OWNER to minimize conflict and to facilitate OWNER's operations.

C. Limit access to site from the entrance located off of State Highway 12 and 18 or the site entrance located off of County Rd AB.

D. Keep landfill gate closed and locked during times the landfill operations are closed.

1.6 OWNER-FURNISHED PRODUCTS

A. Products furnished by OWNER:

- Select Clay Fill
- General Fill
- Topsoil

- Portion of Downslope Flume Pipe and Energy Dissipater

1.7 ALTERNATES

A. Alternates quoted on Bid Form will be exercised based on the condition of the Select Clay Fill layer in the existing final cover and if in-field test results show that the Select Clay Fill does not meet WDNR requirements for a liner

B. Dane County will consider bids the following items:

1. Construction of the liner system using clay furnished by Dane County and located in a stockpile at the landfill

2. Construction of the liner system requiring loading and hauling of clay from Dane County's off-site borrow source to the landfill

3. Loading clay from Dane County's borrow source and hauling and stockpiling at the landfill (no landfill liner construction bid needed)

C. Coordinate and modify Work affected by accepted alternates as required to complete the Work.

D. Schedule of Alternates:

1. Alternate 1A: Square Yard add for excavating the top one foot thick layer of the existing two foot thick Select Clay Fill liner in the area that has no existing geomembrane layer and placing in stockpile adjacent to cell. Recompact the bottom one foot thick layer of Select Clay Fill in areas that do not (if any) meet NR 500 requirements. Remove Select Clay Fill from stockpile, place, scarify, moisture condition, and compact per specifications. Maintain minimum two percent grades. Coordinate with and assist the OWNER/ENGINEER as necessary to conduct required in-field moisture and density testing. Document top of Select Clay Fill grades on a maximum 50-foot grid, and at changes of slopes.

2. Alternate 2A: Cubic Yard for loading and hauling of clay from Dane County's off-site borrow source to the landfill and also bidding on installation of the composite liner work. Requires following the requirements in Dane County's approve Conditional Use Permit for the borrow site, stripping topsoil and general fill, excavating and hauling liner quality clay to the landfill. WORK also includes restoring the borrow area after completion of clay excavation by placing back general fill and topsoil into the excavation area, grading slope back to existing ground surface and providing proper drainage per the site restoration plan, seeding, fertilizing and mulching disturbed areas.

3. Alternate 3A: Cubic Yard for loading and hauling of clay from Dane County's off-site borrow source to the landfill and not bidding on installation of the composite liner work. Requires following the requirements in Dane County's approve Conditional Use Permit for the borrow site, stripping topsoil and general fill, excavating and hauling liner quality clay to the landfill. WORK also includes restoring the borrow area after completion of clay excavation by placing back general fill and topsoil into the excavation area, grading slope back to existing ground surface and providing proper drainage per the site restoration plan, seeding, fertilizing and mulching disturbed areas.

4. Other Alternatives Proposed by the Bidder: Alternative(s) proposed should include any earthwork or any other Work that Dane County may be able to do to obtain a deduct from the lump sum price such as purchase materials, haul and direct place Select Clay Fill in the liner rather than place in the Select Clay Fill stockpile, etc. Alternates proposed by the BIDDER should be submitted with the bids and be detailed and easily measured for deducting from the lump sum price.

1.8 APPLICATIONS FOR PAYMENT

A. Submit three copies of each application under procedures of Section 01330.

B. Content and Format: Sample form for Application for Payment contained in this Project Manual or other spreadsheet approved by OWNER.

1.9 COORDINATION

A. Coordinate and integrate elements of Work of the various Sections of Specifications to ensure efficient and orderly sequence of installation with provisions for accommodating items installed later.

B. Verify that characteristics of elements of interrelated operating equipment are compatible; coordinate Work of various Specification sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical Work which are indicated diagrammatically on Drawings. Follow routing shown for pipes as closely as practicable. Use spaces efficiently for maximum accessibility to other installations, for maintenance, and for repairs.

1.10 WAGE RATES

A. A wage rate determination is included at the end of this Specification Section that will require not less than the prevailing wage rates for this area to be paid to the workers employed to perform the work under this Contract.

B. CONTRACTOR shall comply with all provisions of Section 66.0903 and Section 103.49 of the Wisconsin Statues, and Wisconsin Administrative Code Chapter DWD 290, unless exempted by Statute.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

State of Wisconsin
Department of Workforce Development
Equal Rights Division

SPECIAL DEPARTMENTAL ORDER

ISSUE DATE: 5/27/2016

PROJECT:

DANE COUNTY LANDFILL SITE #2: PHASE 10 CELL #2 CONSTRUCTION
MADISON CITY, DANE COUNTY, WI
Determination No. 201601667

PROJECT OWNER:	REQUESTER:
JOHN WELCH, RECYCLING MANAGER / PROJECT MANAGER DANE COUNTY 1919 ALLIANT ENERGY CTR WAY MADISON, WI 53713	JOHN WELCH, RECYCLING MANAGER / PROJECT MANAGER DANE COUNTY 1919 ALLIANT ENERGY CTR WAY MADISON, WI 53713

ADDITIONAL CONTACT:

ROBERT REGAN, SOLID WASTE ENGINEER
DANE COUNTY PUBLIC WORKS
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

NOTE: The Requester must provide a copy of this Project Determination and enclosures to the Project Owner and Additional Contact.

The department received an application for prevailing wage rate determination for the above-captioned project. The department conducted a survey to determine the prevailing wage rate for the trade(s) or occupation(s) needed to complete the project. The survey's findings appear in the attached project determination.

If you believe that the wage rate for any trade or occupation does not accurately reflect the prevailing wage rate in the city, village or town where the project is located, you may ask the department to conduct an administrative review of such wage rate. You must submit this request in writing within 30 days from the date indicated above. Additionally, your request must include wage rate information from at least three similar projects in the city, village or town where the proposed project is located and on which some work has been performed by the contested trade(s) during the current survey period and was previously considered by the department in issuing the attached determination. See DWD 290.10 of the Wisconsin Administrative Code and either s. 66.0903(3)(br), Stats., or s. 103.49(3)(c), Stats., for a complete explanation of the administrative review process.

This determination was not issued before the date on which construction contracts were awarded or negotiated. Therefore, you must either terminate the contract(s) and resolicit bids using the determination, or incorporate the determination retroactive to the beginning of construction through supplemental agreement or change order, provided that all employers are compensated for any increases in wages resulting from such change. The method used to incorporate the determination and any adjustment in contract or bid price, where appropriate, shall be in accordance with applicable procurement law.

Enclosures

It is hereby ordered that the prevailing wage rates set forth in the attached project determination shall only be applicable to the above referenced project. This order is a **FINAL ORDER** of the department unless a timely request for an administrative review is filed with the department.

ISSUED BY:

Equal Rights Division
Labor Standards Bureau
Construction Wage Standards Section
P.O. Box 8928, Madison, WI 53708-8928
(608)266-6861

Web Site: http://dwd.wisconsin.gov/er/

PREVAILING WAGE RATE DETERMINATION
Issued by the State of Wisconsin
Department of Workforce Development
Pursuant to s. 66.0903, Wis. Stats.
Issued On: 5/27/2016

DETERMINATION NUMBER: 201601667

EXPIRATION DATE: Prime Contracts MUST Be Awarded or Negotiated On Or Before 12/31/2016. If NOT, You MUST Reapply.

PROJECT NAME: DANE COUNTY LANDFILL SITE #2: PHASE 10 CELL #2 CONSTRUCTION

PROJECT LOCATION: MADISON CITY, DANE COUNTY, WI

CONTRACTING AGENCY: DANE COUNTY PUBLIC WORKS
LOCAL GOVTL UNIT: DANE COUNTY

CLASSIFICATION:	Contractors are responsible for correctly classifying their workers. Either call the Department of Workforce Development (DWD) with trade or classification questions or consult DWD's Dictionary of Occupational Classifications & Work Descriptions on the DWD website at: dwd.wisconsin.gov/er/prevailing_wage_rate/Dictionary/dictionary_main.htm.
OVERTIME:	Time and one-half must be paid for all hours worked: - over 10 hours per day on prevailing wage projects - over 40 hours per calendar week - Saturday and Sunday - on all of the following holidays: January 1; the last Monday in May; July 4; the 1st Monday in September; the 4th Thursday in November; December 25; - The day before if January 1, July 4 or December 25 falls on a Saturday; - The day following if January 1, July 4 or December 25 falls on a Sunday. Apply the time and one-half overtime calculation to whichever is higher between the Hourly Basic Rate listed on this project determination or the employee's regular hourly rate of pay. Add any applicable Premium or DOT Premium to the Hourly Basic Rate before calculating overtime. A DOT Premium (discussed below) may supersede this time and one-half requirement.
FUTURE INCREASE:	When a specific trade or occupation requires a future increase, you MUST add the full hourly increase to the "TOTAL" on the effective date(s) indicated for the specific trade or occupation.
PREMIUM PAY:	If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the "HOURLY BASIC RATE OF PAY" indicated for such trade or occupation, whevenever such pay is applicable.
DOT PREMIUM:	This premium only applies to highway and bridge projects owned by the Wisconsin Department of Transportation and to the project type heading "Airport Pavement or State Highway Construction." DO NOT apply the premium calculation under any other project type on this determination.
APPRENTICES:	Pay apprentices a percentage of the applicable journeyperson's hourly basic rate of pay and hourly fringe benefit contributions specified in this determination. Obtain the appropriate percentage from each apprentice's contract or indenture.
SUBJOURNEY:	Subjourney wage rates may be available for some of the trades or occupations indicated below with the exception of laborers, truck drivers and heavy equipment operators. Any employer interested in using a subjourney classification on this project MUST complete Form ERD-10880 and request the applicable wage rate from the Department of Workforce Development PRIOR to using the subjourney worker on this project.

This document **MUST BE POSTED** by the **CONTRACTING AGENCY** in at least one conspicuous and easily accessible place **on the site of the project** . A local governmental unit may post this document at the place normally used to post public notices if there is no common site on the project. This document **MUST** remain posted during the entire time any worker is employed on the project and **MUST** be physically incorporated into the specifications and all contracts and subcontracts. If you have any questions, please write to the Equal Rights Division, Labor Standards Bureau, P.O. Box 8928, Madison, Wisconsin 53708 or call (608) 266-6861.

The following statutory provisions apply to local governmental unit projects of public works and are set forth below pursuant to the requirements of s. 66.0903(8), Stats.

s. 66.0903 (1) (f) & s. 103.49 (1) (c) "PREVAILING HOURS OF LABOR" for any trade or occupation in any area means 10 hours per day and 40 hours per week and may not include any hours worked on a Saturday or Sunday or on any of the following holidays:

1. January 1.
2. The last Monday in May.
3. July 4.
4. The first Monday in September.
5. The 4th Thursday in November.
6. December 25.
7. The day before if January 1, July 4 or December 25 falls on a Saturday.
8. The day following if January 1, July 4 or December 25 falls on a Sunday.

s. 66.0903 (10) RECORDS; INSPECTION; ENFORCEMENT.
(a) Each contractor, subcontractor, or contractor's or subcontractor's agent performing work on a project of public works that is subject to this section shall keep full and accurate records clearly indicating the name and trade or occupation of every person performing the work described in sub. (4) and an accurate record of the number of hours worked by each of those persons and the actual wages paid for the hours worked.

s. 66.0903 (11) LIABILITY AND PENALTIES.
(a) 1. Any contractor, subcontractor, or contractor's or subcontractor's agent who fails to pay the prevailing wage rate determined by the department under sub. (3) or who pays less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor is liable to any affected employee in the amount of his or her unpaid wages or his or her unpaid overtime compensation and in an additional amount as liquidated damages as provided under subd. 2., 3., whichever is applicable.
2. If the department determines upon inspection under sub. (10) (b) or (c) that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the department shall order the contractor to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages within a period specified by the department in the order.
3. In addition to or in lieu of recovering the liability specified in subd. 1. as provided in subd. 2., any employee for and in behalf of that employee and other employees similarly situated may commence an action to recover that liability in any court of competent jurisdiction. If the court finds that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the court shall order the contractor, subcontractor, or agent to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages.
5. No employee may be a party plaintiff to an action under subd. 3. unless the employee consents in writing to become a party and the consent is filed in the court in which the action is brought. Notwithstanding s. 814.04 (1), the court shall, in addition to any judgment awarded to the plaintiff, allow reasonable attorney fees and costs to be paid by the defendant.

BUILDING OR HEAVY CONSTRUCTION

Includes sheltered enclosures with walk-in access for the purpose of housing persons, employees, machinery, equipment or supplies and non-sheltered work such as canals, dams, dikes, reservoirs, storage tanks, etc. A sheltered enclosure need not be "habitable" in order to be considered a building. The installation of machinery and/or equipment, both above and below grade level, does not change a project's character as a building. On-site grading, utility work and landscaping are included within this definition. Residential buildings of four (4) stories or less, agricultural buildings, parking lots and driveways are NOT included within this definition.

SKILLED TRADES

Fringe Benefits Must Be Paid On All Hours Worked

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
101	Acoustic Ceiling Tile Installer Future Increase(s): Add $1.42/hr on 6/1/2016.	33.02	17.12	50.14
102	Boilermaker	33.35	28.29	61.64
103	Bricklayer, Blocklayer or Stonemason Future Increase(s): Add $1.45 on 06/06/2016 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.86	20.03	52.89
104	Cabinet Installer Future Increase(s): Add $1.42/hr on 6/1/2016.	33.02	17.12	50.14
105	Carpenter Future Increase(s): Add $1.42/hr on 6/1/2016. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	33.02	17.12	50.14
106	Carpet Layer or Soft Floor Coverer Future Increase(s): Add $1.42/hr on 6/1/2016.	33.02	17.12	50.14
107	Cement Finisher	33.15	16.40	49.55
108	Drywall Taper or Finisher	29.97	20.08	50.05
109	Electrician Future Increase(s): Add $1.25/hr on 6/1/16. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	35.75	19.97	55.72
110	Elevator Constructor	46.05	27.09	73.14
111	Fence Erector	18.72	5.78	24.50

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
112	Fire Sprinkler Fitter	36.78	19.97	56.75
113	Glazier	38.27	14.42	52.69
114	Heat or Frost Insulator	33.53	27.31	60.84
115	Insulator (Batt or Blown) Future Increase(s): Add $1.42/hr on 6/1/2016.	33.02	17.12	50.14
116	Ironworker	32.50	20.58	53.08
117	Lather	32.72	16.00	48.72
118	Line Constructor (Electrical)	40.81	18.06	58.87
119	Marble Finisher	25.72	18.54	44.26
120	Marble Mason	32.82	18.67	51.49
121	Metal Building Erector	22.40	6.27	28.67
122	Millwright Future Increase(s): Add $1.47/hr on 6/1/2016.	34.79	17.17	51.96
123	Overhead Door Installer	31.93	13.39	45.32
124	Painter	26.70	16.65	43.35
125	Pavement Marking Operator	30.00	18.81	48.81
126	Piledriver Future Increase(s): Add $1.44/hr on 6/1/2016. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	33.56	17.12	50.68
127	Pipeline Fuser or Welder (Gas or Utility)	44.20	18.26	62.46
129	Plasterer	32.82	18.81	51.63
130	Plumber	38.82	18.02	56.84
132	Refrigeration Mechanic	45.55	18.71	64.26
133	Roofer or Waterproofer	29.65	1.71	31.36
134	Sheet Metal Worker	35.55	24.67	60.22
135	Steamfitter	45.55	18.71	64.26
137	Teledata Technician or Installer	22.50	12.74	35.24
138	Temperature Control Installer	34.97	19.67	54.64
139	Terrazzo Finisher	25.72	18.54	44.26

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
140	Terrazzo Mechanic Future Increase(s): Add $1.60 on 06/06/2016	33.98	18.96	52.94
141	Tile Finisher	30.00	0.00	30.00
142	Tile Setter Future Increase(s): Add $1.45/hr on 6/06/2016.	31.59	19.61	51.20
143	Tuckpointer, Caulker or Cleaner Future Increase(s): Add $1.45 on 06/06/2016 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.86	20.03	52.89
144	Underwater Diver (Except on Great Lakes)	36.74	16.00	52.74
146	Well Driller or Pump Installer Future Increase(s): Add $1/hr on 6/1/2016; Add $1/hr on 6/1/2017.	25.32	16.40	41.72
147	Siding Installer	17.00	6.71	23.71
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	36.73	20.41	57.14
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	32.65	15.52	48.17
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	28.57	13.71	42.28
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	26.53	13.55	40.08
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	25.00	12.55	37.55

TRUCK DRIVERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
201	Single Axle or Two Axle	33.69	19.78	53.47
203	Three or More Axle	18.25	21.61	39.86
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1.60/hr on 6/3/2016.	34.69	20.38	55.07
205	Pavement Marking Vehicle	18.25	21.61	39.86
207	Truck Mechanic	18.25	21.61	39.86

LABORERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
301	General Laborer Future Increase(s): Add $1.25/hr eff. 06/06/2016 Premium Increase(s): Add $1.00/hr for certified welder and pipelayer; Add $.25/hr for mason tender.	25.81	15.63	41.44
302	Asbestos Abatement Worker	17.00	4.22	21.22
303	Landscaper	21.90	9.83	31.73
310	Gas or Utility Pipeline Laborer (Other Than Sewer and Water)	20.83	18.39	39.22
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	19.35	0.00	19.35
314	Railroad Track Laborer	17.00	3.96	20.96
315	Final Construction Clean-Up Worker	29.01	7.20	36.21

HEAVY EQUIPMENT OPERATORS
SITE PREPARATION, UTILITY OR LANDSCAPING WORK ONLY

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
501	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Milling Machine; Boring Machine (Directional, Horizontal or Vertical); Backhoe (Track Type) Having a Mfgr's Rated Capacity of 130,000 Lbs. or Over; Backhoe (Track Type) Having a Mfgr's Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Crane, Shovel, Dragline, Clamshells; Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Grader or Motor Patrol; Master Mechanic; Mechanic or Welder; Robotic Tool Carrier (With or Without Attachments); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Tractor (Scraper, Dozer, Pusher, Loader); Trencher (Wheel Type or Chain Type Having Over 8 Inch Bucket). Future Increase(s): Add $1.60/hr on 6/3/2016.	35.22	20.38	55.60
502	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Environmental Burner; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Jeep Digger; Screed (Milling Machine); Skid Rig; Straddle Carrier or Travel Lift; Stump Chipper; Trencher (Wheel Type or Chain Type Having 8 Inch Bucket & Under). Future Increase(s): Add $1.60/hr on 6/3/2016.	34.69	20.38	55.07

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
503	Air Compressor (&/or 400 CFM or Over); Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Forklift; Generator (&/or 150 KW or Over); Greaser; High Pressure Utility Locating Machine (Daylighting Machine); Mulcher; Oiler; Post Hole Digger or Driver; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add $1.60/hr on 6/3/2016.	32.62	20.38	53.00
504	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	41.65	21.71	63.36
505	Work Performed on the Great Lakes Including Crane or Backhoe Operator; Assistant Hydraulic Dredge Engineer; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder; 70 Ton & Over Tug Operator. Future Increase(s): Add $1.25/hr on 1/1/2017. Premium Increase(s): Add $.50/hr for Friction Crane, Lattice Boom or Crane Certification (CCO).	44.05	23.24	67.29
506	Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery. Future Increase(s): Add $1.25/hr on 1/1/2017.	39.20	23.09	62.29
507	Work Performed on the Great Lakes Including Deck Equipment Operator, Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY.	36.72	21.15	57.87

HEAVY EQUIPMENT OPERATORS
EXCLUDING SITE PREPARATION, UTILITY, PAVING LANDSCAPING WORK

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
508	Boring Machine (Directional); Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic. Future Increase(s): Add $1.60/hr on 6/3/2016. Premium Increase(s):	37.67	20.38	58.05

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
	Add $.50/hr for >200 Ton; Add $1/hr at 300 Ton; Add $1.50/hr at 400 Ton; Add $2/hr at 500 Ton & Over.			
509	Backhoe (Track Type) Having a Mfgr's Rated Capacity of 130,000 Lbs. or Over; Boring Machine (Horizontal or Vertical); Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With A Lifting Capacity Of 4,000 Lbs. & Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Pile Driver; Versi Lifts, Tri-Lifts & Gantrys (20,000 Lbs. & Over). Future Increase(s): Add $1.60/hr on 6/3/2016. Premium Increase(s): Add $.25/hr for all >45 Ton lifting capacity cranes.	36.42	20.38	56.80
510	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Concrete Spreader & Distributor; Dredge (NOT Performing Work on the Great Lakes); Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Hydro-Blaster (10,000 PSI or Over); Milling Machine; Skid Rig; Traveling Crane (Bridge Type). Future Increase(s): Add $1.60/hr on 6/3/2016.	35.22	20.38	55.60
511	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Pump (46 Meter & Under), Concrete Conveyor (Rotec or Bidwell Type); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Environmental Burner; Gantrys (Under 20,000 Lbs.); Grader or Motor Patrol; High Pressure Utility Locating Machine (Daylighting Machine); Manhoist; Material or Stack Hoist; Mechanic or Welder; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tining or Curing Machine; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket). Future Increase(s): Add $1.60/hr on 6/3/2016.	34.69	20.38	55.07

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
512	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Grout Pump; Hoist (Tugger, Automatic); Industrial Locomotives; Jeep Digger; Lift Slab Machine; Mulcher; Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket & Under); Winches & A-Frames. Future Increase(s): Add $1.60/hr on 6/3/2016.	32.62	20.38	53.00
513	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Boatmen (NOT Performing Work on the Great Lakes); Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Elevator; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Forklift; Generator (&/or 150 KW or Over); Greaser; Heaters (Mechanical); Loading Machine (Conveyor); Oiler; Post Hole Digger or Driver; Prestress Machine; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Robotic Tool Carrier (With or Without Attachments); Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add $1.60/hr on 6/3/2016.	31.99	20.38	52.37
514	Gas or Utility Pipeline, Except Sewer & Water (Primary Equipment). Future Increase(s): Add $1/hr on 5/30/2016.	37.04	22.44	59.48
515	Gas or Utility Pipeline, Except Sewer & Water (Secondary Equipment).	33.82	20.30	54.12
516	Fiber Optic Cable Equipment	29.50	0.68	30.18

SEWER, WATER OR TUNNEL CONSTRUCTION

Includes those projects that primarily involve public sewer or water distribution, transmission or collection systems and related tunnel work (excluding buildings).

SKILLED TRADES

CODE	TRADE OR OCCUPATION **Fringe Benefits Must Be Paid On All Hours Worked**	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
103	Bricklayer, Blocklayer or Stonemason	32.82	18.67	51.49
105	Carpenter	32.72	16.00	48.72
107	Cement Finisher Future Increase(s): Add $1.75 on 6/1/16. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.40/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.	35.97	17.85	53.82
109	Electrician	52.00	1.50	53.50
111	Fence Erector	18.72	5.78	24.50
116	Ironworker	32.50	20.58	53.08
118	Line Constructor (Electrical)	40.81	18.06	58.87
125	Pavement Marking Operator	30.00	18.81	48.81
126	Piledriver	33.24	16.00	49.24
130	Plumber Future Increase(s): Add $1.50 on 6/1/16	39.95	19.45	59.40
135	Steamfitter	44.20	18.26	62.46
137	Teledata Technician or Installer	22.50	12.74	35.24
143	Tuckpointer, Caulker or Cleaner	32.82	18.67	51.49
144	Underwater Diver (Except on Great Lakes)	31.00	20.43	51.43
146	Well Driller or Pump Installer Future Increase(s): Add $1/hr on 6/1/2016; Add $1/hr on 6/1/2017.	25.32	16.40	41.72
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	36.73	15.92	52.65
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	32.65	15.52	48.17

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	28.57	13.71	42.28
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	26.53	13.55	40.08
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	12.97	34.72

TRUCK DRIVERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
201	Single Axle or Two Axle	19.00	0.00	19.00
203	Three or More Axle	19.00	0.00	19.00
204	Articulated, Euclid, Dumptor, Off Road Material Hauler	33.69	19.78	53.47
205	Pavement Marking Vehicle	19.00	0.00	19.00
207	Truck Mechanic	19.00	0.00	19.00

LABORERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
301	General Laborer Future Increase(s): Add $1.25/hr eff. 06/06/2016 Premium Increase(s): Add $.20 for blaster, bracer, manhole builder, caulker, bottomman and power tool; Add $.55 for pipelayer; Add $1.00 for tunnel work 0-15 lbs. compressed air; Add $2.00 for over 15-30 lbs. compressed air; Add $3.00 for over 30 lbs. compressed air.	27.18	15.64	42.82
303	Landscaper	41.00	0.00	41.00
304	Flagperson or Traffic Control Person	20.92	14.80	35.72
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	19.35	0.00	19.35
314	Railroad Track Laborer	17.00	3.96	20.96

HEAVY EQUIPMENT OPERATORS
SEWER, WATER OR TUNNEL WORK

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
521	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Master Mechanic; Pile Driver. Premium Increase(s): Add $.25/hr for operating tower crane.	38.09	20.80	58.89
522	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Boring Machine (Directional); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Spreader & Distributor; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With a Lifting Capacity of 4,000 Lbs. & Under; Dredge (NOT Performing Work on the Great Lakes); Milling Machine; Skid Rig; Telehandler; Traveling Crane (Bridge Type). Future Increase(s): Add $1.60/hr on 6/3/2016.	35.22	20.38	55.60
523	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Boring Machine (Horizontal or Vertical); Bulldozer or Endloader (Over 40 hp); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Concrete Pump (46 Meter & Under), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Hydro-Blaster (10,000 PSI or Over); Manhoist; Material or Stack Hoist; Mechanic or Welder; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket). Future Increase(s): Add $1.60/hr on 6/3/2016.	34.69	20.38	55.07

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
524	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Environmental Burner; Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Hoist (Tugger, Automatic); Grout Pump; Jeep Digger; Lift Slab Machine; Mulcher; Power Subgrader; Pump (3 Inch or Over) or Well Points; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Tining or Curing Machine; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket & Under); Winches & A-Frames.	33.69	21.75	55.44
525	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Loading Machine (Conveyor); Post Hole Digger or Driver; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add $1.60/hr on 6/3/2016.	31.99	20.38	52.37
526	Boiler (Temporary Heat); Forklift; Greaser; Oiler.	30.99	19.78	50.77
527	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	41.65	21.71	63.36
528	Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	41.65	21.71	63.36
529	Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.	36.72	21.15	57.87
530	Work Performed on the Great Lakes Including Deck Equipment Operator; Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under), Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY.	36.72	21.15	57.87

LOCAL STREET OR MISCELLANEOUS PAVING CONSTRUCTION

Includes roads, streets, alleys, trails, bridges, paths, racetracks, parking lots and driveways (except residential or agricultural), public sidewalks or other similar projects (excluding projects awarded by the Wisconsin Department of Transportation).

SKILLED TRADES

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
103	Bricklayer, Blocklayer or Stonemason	32.82	18.67	51.49
105	Carpenter Future Increase(s): Add $1.42/hr on 6/1/2016. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	33.02	17.12	50.14
107	Cement Finisher Future Increase(s): Add $1.75 on 6/1/16. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.40/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.	35.97	17.85	53.82
109	Electrician Future Increase(s): Add $1.25/hr on 6/1/16. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	35.75	19.97	55.72
111	Fence Erector	18.72	5.78	24.50
116	Ironworker	32.50	20.58	53.08
118	Line Constructor (Electrical)	40.81	18.06	58.87
124	Painter	26.70	16.65	43.35
125	Pavement Marking Operator	30.00	18.81	48.81
126	Piledriver Future Increase(s): Add $1.44/hr on 6/1/2016. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	33.56	17.12	50.68

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
133	Roofer or Waterproofer	29.65	1.71	31.36
137	Teledata Technician or Installer	22.50	12.74	35.24
143	Tuckpointer, Caulker or Cleaner	32.82	18.67	51.49
144	Underwater Diver (Except on Great Lakes)	36.74	16.00	52.74
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	36.73	15.92	52.65
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	32.65	15.52	48.17
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	28.57	13.71	42.28
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	26.53	13.55	40.08
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	12.97	34.72

TRUCK DRIVERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
201	Single Axle or Two Axle	18.00	0.00	18.00
203	Three or More Axle	18.00	0.00	18.00
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1.60/hr on 6/3/2016.	34.69	20.38	55.07
205	Pavement Marking Vehicle	18.00	0.00	18.00
206	Shadow or Pilot Vehicle	18.00	0.00	18.00
207	Truck Mechanic	18.00	0.00	18.00

LABORERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
301	General Laborer	26.34	15.17	41.51

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
303	Landscaper Future Increase(s): Add $1.00/hr eff. 06/01/2016; Add $1.00/hr eff. 06/01/2017 Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).	30.67	15.65	46.32
304	Flagperson or Traffic Control Person	20.92	14.80	35.72
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	19.35	0.00	19.35
314	Railroad Track Laborer	17.00	3.96	20.96

HEAVY EQUIPMENT OPERATORS
CONCRETE PAVEMENT OR BRIDGE WORK

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
541	Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic. Future Increase(s): Add $1.60/hr on 6/3/2016. Premium Increase(s): Add $.50/hr for >200 Ton; Add $1/hr at 300 Ton; Add $1.50/hr at 400 Ton; Add $2/hr at 500 Ton & Over.	37.67	20.38	58.05

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
542	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With a Lifting Capacity of 4,000 Lbs. & Under; Crane, Tower Crane Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Dredge (NOT Performing Work on the Great Lakes); Licensed Boat Pilot (NOT Performing Work on the Great Lakes); Pile Driver. Future Increase(s): Add $1.30/hr on 6/1/2016; Add $1.25/hr on 6/1/2017. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.50/hr night work premium. See DOT'S website for details about the applicability of this night work premium at: http://wisconsindot.gov/Pages/doing-bus/civil-rights/labornwage/prevailing-wage-compliance.aspx.	37.77	21.85	59.62
543	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Automatic Subgrader (Concrete); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Boring Machine (Directional, Horizontal or Vertical); Bridge (Bidwell) Paver; Bulldozer or Endloader; Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Conveyor System; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump, Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Concrete Spreader & Distributor; Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane With a Lifting Capacity of 25 Tons or Under; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Grout Pump; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Sideboom; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Straddle Carrier or Travel Lift; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Trencher (Wheel Type or Chain Type); Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches & A-Frames. Future Increase(s): Add $1.30/hr on 6/1/2016; Add $1.25/hr on 6/1/2017. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.50/hr night work premium. See DOT'S website for details about the applicability of this night work premium at: http://wisconsindot.gov/Pages/doing-bus/civil-rights/labornwage/prevailing-wage-compliance.aspx.	37.27	21.85	59.12

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
544	Backfiller; Belting, Burlap, Texturing Machine; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Jeep Digger; Joint Sawer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (WIth or Without Attachments); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler; Tining or Curing Machine. Future Increase(s): Add $1.30/hr on 6/1/2016; Add $1.25/hr on 6/1/2017. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.50/hr night work premium. See DOT'S website for details about the applicability of this night work premium at: http://wisconsindot.gov/Pages/doing-bus/civil-rights/labornwage/prevailing-wage-compliance.aspx.	37.27	21.85	59.12
545	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Concrete Proportioning Plant; Crusher, Screening or Wash Plant; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Mudjack; Oiler; Prestress Machine; Pug Mill; Pump (3 Inch or Over) or Well Points; Rock, Stone Breaker; Screed (Milling Machine); Stump Chipper; Tank Car Heaters; Vibratory Hammer or Extractor, Power Pack.	31.62	19.78	51.40
546	Fiber Optic Cable Equipment.	29.50	0.68	30.18
547	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	41.65	21.71	63.36
548	Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder. Future Increase(s): Add $1.25/hr on 1/1/2017. Premium Increase(s): Add $.50/hr for Friction Crane, Lattice Boom or Crane Certification (CCO).	44.05	23.24	67.29
549	Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or more); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.	36.72	21.15	57.87

550	Work Performed on the Great Lakes Including Deck Equipment Operator; Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY.	36.72	21.15	57.87

HEAVY EQUIPMENT OPERATORS
ASPHALT PAVEMENT OR OTHER WORK

Fringe Benefits Must Be Paid On All Hours Worked

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
551	Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self Erecting Tower Crane With a Lifting Capacity of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic.	36.67	19.78	56.45
552	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With a Lifting Capacity Of 4,000 Lbs. & Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Dredge (NOT Performing Work on the Great Lakes); Licensed Boat Pilot (NOT Performing Work on the Great Lakes); Pile Driver. Future Increase(s): Add $1.30/hr on 6/1/2016; Add $1.25/hr on 6/1/2017. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.50/hr night work premium. See DOT'S website for details about the applicability of this night work premium at: http://wisconsindot.gov/Pages/doing-bus/civil-rights/labornwage/prevailing-wage-compliance.aspx.	37.77	21.85	59.62

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
553	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & Paver, Screed; Boring Machine (Directional, Horizontal or Vertical); Bulldozer or Endloader; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Laser/Screed; Concrete Slipform Placer Curb & Gutter Machine; Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane With a Lifting Capacity of 25 Tons or Under; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Sideboom; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Trencher (Wheel Type or Chain Type); Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches & A-Frames. Future Increase(s): Add $1.60/hr on 6/3/2016.	34.69	20.38	55.07
554	Backfiller; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Asphalt Plant, Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Hoist (Tugger, Automatic); Jeep Digger; Joint Sawer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Self-Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler.	36.17	19.19	55.36
555	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Mudjack; Oiler; Prestress Machine; Pug Mill; Pump (3 Inch or Over) or Well Points; Rock, Stone Breaker; Screed (Milling Machine); Stump Chipper; Tank Car Heaters; Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add $1.60/hr on 6/3/2016.	32.62	20.38	53.00
556	Fiber Optic Cable Equipment.	29.50	0.68	30.18

********** END OF RATES **********

Department of Workforce Development
Equal Rights Division
P.O. Box 8928
Madison, WI 53708-8928
Telephone: (608) 266-6860
Fax: (608) 267-4592
TTY: (608) 264-8752

STATE OF WISCONSIN
DWD
Department of Workforce Development

Scott Walker, Governor
Raymond Allen, Secretary

The documents following the Prevailing Wage Rate Determination consist of twenty pages (including this one) of various forms/documents that will be used throughout the completion of the project. This prevailing wage rate determination and its underlying legal requirements outlined in the attached documents apply for the life of this project even though work on the project continues into 2017 or beyond. The chart below lists the form number, form/document name, the party who uses the document, and the document's number of pages. If you have any questions regarding these forms please call the Prevailing Wage Office at (608)266-6861.

ERD Form Number	Form Name	Party Who Uses the Form	Pages
	July 2015 description of recent changes to Wisconsin's prevailing wage laws resulting from enactment of the 2015-17 State Budget Bill.		1
	Prevailing Wage - Public Entity Project Owners	Explanation of project owner responsibilities	2
16056	Post the White Sheet	Contracting agency	1
10908	Consolidated List of Debarred Contractors	Any party contracting someone to complete work on a prevailing wage project	4
	Prevailing Wage – Contractors	Explanation of contractor responsibilities	2
7777	Disclosure of Ownership	Contractors that meet the criteria set out in (3)(A)&(B) of the form	1
5724	Prime Contractor Affidavit of Compliance	Prime contractor files with contracting agency upon completion of the work before receiving final payment	2
10584	Agent or Subcontractor Affidavit of Compliance	Subcontractors file with their awarding contractor upon completion of their work on the project before receiving final payment	2
10880	Request to Employ Subjourneyperson	Contractors wishing to employ a subjourneyperson(s)	1
	Additional General Prevailing Wage Law Information	General information for public entity or any other interested party	3

02/16/2016

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STATE OF WISCONSIN
DWD
Department of Workforce Development

Scott Walker, Governor
Reginald J. Newson, Secretary

THE 2015-17 BUDGET BILL MADE SIGNIFICANT CHANGES TO WISCONSIN'S PREVAILING WAGE LAWS. HOWEVER, THOSE CHANGES DO NOT GO INTO EFFECT UNTIL JANUARY 1, 2017.

During calendar year 2016, DWD will continue to enforce prevailing wage laws for local governmental unit and state agency public works projects under current prevailing wage laws.

2015 Wisconsin Act 55 (the budget bill) repealed the state prevailing wage law for **local governmental units** such as villages, towns, cities, school districts, or sewerage districts effective January 1, 2017. However, if a local governmental unit:

- issues a Request for Bids before January 1, 2017, for a project of public works that is subject to bidding or,
- enters into a contract before January 1, 2017, for a project of public works that is not subject to bidding,

then those public works projects are subject to the current prevailing wage law (§66.0903, Wis. Stats.) through the life of the project. Projects of public works with prevailing wage project determinations issued prior to 2017 continue to be subject to the current prevailing wage law through the life of the project even though the project may have work going on in 2017 or subsequent years.

Contractors working on local governmental unit projects with prevailing wage rate determinations must continue to pay employees the appropriate prevailing wage and maintain required prevailing wage payroll records. For instance, if a contractor is working in 2018 on a public works project with a project determination issued prior to 2017, then the contractor is required to comply with the "old" prevailing wage rate law (§66.0903, Wis. Stats.). After January 1, 2017, DWD will continue to enforce prevailing wage requirements for projects with DWD prevailing wage determinations issued under the "old" prevailing wage laws (§§ 66.0903 & 103.49, Wis. Stats.).

For new public works projects starting on January 1, 2017, state prevailing wage law will only apply to **state agency** and **state highway** projects. Prevailing wage rates applicable to state agencies will be those issued by the U.S. Department of Labor under the Davis-Bacon Act, 40 U.S.C. 3142. The Wisconsin Department of Administration will enforce the new state agency prevailing wage law (§16.856, Wis. Stats.) and the Wisconsin Department of Transportation will continue to enforce prevailing wage on state highway projects (under a law renumbered as §84.062, Wis. Stats.).

(Updated-122215)

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STATE OF WISCONSIN
DWD
Department of Workforce Development

Scott Walker, Governor
Raymond Allen, Secretary

PREVAILING WAGE – Public Entity Project Owners

Any public works project that has a total estimated project cost that equals or exceeds single-trade or multiple-trade project thresholds requires a prevailing wage rate determination issued by the Department of Workforce Development (DWD). Public works include erecting, constructing, remodeling, repairing, demolishing, alterations, painting and decorating projects for a local governmental unit or state agency. State law excludes minor service or maintenance work, warranty work, or work under a supply-and-installation contract. There is a statutory definition for most of these exclusions. The prevailing wage law that applies to local governmental units is §66.0903, Wis. Stats. The prevailing wage law that applies to state agencies is §103.49, Wis. Stats. The applicable administrative rules for all public entities are DWD 290 and DWD 294, Wis. Adm. Code.

Thresholds

A "single-trade project of public works" means a project in which a single trade accounts for 85% or more of the total labor cost of the project. The single trade threshold is $48,000.

A "multiple-trade project of public works" means a project in which no single trade accounts for 85% or more of the total labor cost of the project.

(a) The multiple-trade threshold is $100,000, unless a municipality falls under the description in (b).

(b) The multiple-trade threshold of $234,000 applies to public works projects erected, constructed, repaired, remodeled, or demolished by a private contractor for •a city or village with a population less than 2500 or •a town.

A local governmental unit or state agency that has a public works project that equals or exceeds the prevailing wage thresholds must do all of the following:

- Request a prevailing wage rate determination for the project from DWD at least 30 days before soliciting bids or negotiating contracts. An Application for Prevailing Wage Rate Determination is available on the DWD website: http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm
  To avoid waiting for a project determination use the on-line application system that permits the user to generate a determination immediately and save all documents in PDF form to the user's computer. Use this project determination on line application at the following address:

http://dwd.wisconson.gov/er/prevailing_wage_rate/pw_online_determinations.htm

- Tell potential contractors the project is subject to state prevailing wage law when soliciting bids.

- Include the prevailing wage rate determination in the construction contract, or if there is no written contract, provide a copy of the project determination to each prime contractor.

- Award contracts to contractors who do *not* appear on the "Consolidated List of Debarred Contractors."

- Notify contractors that they are required to have a written substance abuse testing program in place that fulfills the requirements of §103.503, Wis. Stats., before commencing work on the prevailing wage project.

- Post the prevailing wage rate determination on the project site. (This document is often referred to as "the white sheet.")

- Notify project contractors that if DWD finds that a contractor violated the prevailing wage law, DWD will assess liquidated damages of 100% of the wages owed to employees.

- Obtain an Affidavit of Compliance from each prime contractor before making final payment for the project.

If the total estimated cost of the project exceeds the prevailing wage thresholds, a local governmental unit or state agency also must obtain a prevailing wage rate determination under the following circumstances:

- when a completed facility is leased, purchased, lease-purchased or otherwise acquired by or dedicated to a public entity in lieu of the public entity contracting for the project,

- when one public entity does work for another public entity,

- when a *private* entity will construct a road, street, bridge, sanitary sewer or water main project and dedicate it to a local governmental unit or the state for its ownership or maintenance (except for some residential subdivisions).

For more information, visit the prevailing wage website: http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm. For further assistance, call the Equal Rights Division at 608-266-6861 and ask for prevailing wage.

State of Wisconsin
Department of Workforce Development
Equal Rights Division
Labor Standards Bureau

POST THE WHITE SHEET

As the public entity receiving this prevailing wage rate determination, YOU ARE REQUIRED by law to post the prevailing wage rate determination (i.e., white sheet) in at least one conspicuous and easily accessible place on the project site that is available to all construction workers. The white sheet must remain posted from the onset of the project until all construction labor on the project has been completed.
[*See,* Wis. Admin. Code §DWD 290.12(1)]

Posting the white sheet inside the general contractor's trailer does not meet this requirement. That placement is not available/accessible to all workers and is not a location over which you have control.

If you have questions about posting, please call (608)266-6861 and ask for prevailing wage intake.

Consolidated List of Debarred Contractors
Prepared and Issued By
State of Wisconsin - Department of Workforce Development

This list has been prepared in accordance with the provisions of §§66.0903(12) and 103.49(7), Wis. Stats., and Chapter DWD 294 of the Wisconsin Administrative Code. All contractors on this list were found to have committed a "debarable offense" related to certain labor standard provisions determined or established for a state or local public works project. No state agency, local governmental unit or owner or developer may knowingly solicit bids from, negotiate with or award any contracts to or approve or allow any subcontracts with a debarred contractor, including all divisions, affiliates or other organizational elements of such contractor that are engaged in construction business activities, until the debarment is terminated. The name of each debarred contractor must remain on this list for a period of three (3) years from the termination date indicated below. The contractor is, however, only "debarred" from the "effective date" through the "termination date" indicated for that contractor. Questions regarding this list should be addressed to Jim Chiolino, Equal Rights Division, P. O. Box 8928, Madison, WI 53708 or call (608) 266-3345. Deaf, hearing or speech-impaired callers may contact the department by calling its TDD number (608) 264-8752.

Name of Contractor	Address	Effective Date	Termination Date	Cause Code	Date of Violation(s)	Limitations/ Deviations
A-1 Duran Roofing & Insulation Services, Inc.	3700 N Fratney St Milwaukee, WI 53212 or 8095 NW 64th St Miami, FL 33166	11/1/14	10/31/17	1, 2 and 4	2011-2012	None
Abel, Mike	*See,* Abel Electric, Inc					
Abel Electric, Inc	3385 Belmar Rd Green Bay, WI 54313	9/1/12	8/31/15	1	2011	None
Alpha Electric, LLC	350 Business Park Dr Sun Prairie, WI 53590	8/1/15	7/31/18	4	2014	None
Arnie Christiansen Mason Contractors, LLC	2304 65th Dr Franksville, WI 53126	9/1/14	8/31/16	1, 2 and 4	2011	None
Atkins, Scott	*See,* Freedom Insulation, Inc					
Bickel, Matthew	*See,* Peshtigo Asphalt, Inc					
Boecker, Roger	*See,* R-Way Pumping, Inc					
Brechtl, Mark G	*See,* Ecodec, Inc					

Name of Contractor	Address	Effective Date	Termination Date	Cause Code	Date of Violation(s)	Limitations/ Deviations
Cargill Heating and Air Conditioning Company, Inc	3049 Edgewater La La Crosse, WI 54603	3/1/14	2/28/17	1 and 2	2011	None
Castlerock Commercial Construction, Inc	PO Box 11699 Milwaukee, WI 53211-0699	2/1/12	1/31/15	1, 2 and 4	2009 & 2010	None
Christiansen, Andy	*See,* Arnie Christiansen Mason Contractors, LLC					
Christiansen, Arnold	*See,* Arnie Christiansen Mason Contractors, LLC					
Darnick, Gregory L	*See,* Darnick Trucking, LLC					
Darnick Trucking, LLC	W914 County Rd V Berlin, WI 54923	11/1/14	10/31/15	1, 2 and 4	2012 & 2013	None
Dem/Ex Group, Inc	805 S Adams St Manito, IL 61546	12/1/11	11/30/14	1 and 2	2010	None
Duran, Bernardo	*See,* A-1 Duran Roofing & Insulation Services and RRS2 Inc					
Ecodec, Inc	5106 Wintergreen Dr Madison, WI 53704	10/1/14	9/30/17	1	2011 & 2012	None
Fisher, Ed &/or Fisher, Rhonda	*See,* Dem/Ex Group, Inc					
Freedom Insulation, Inc	117925 219th Ave Chippewa Falls, WI 54729	9/1/11	8/31/14	1	2008-2010	None
Froode, Kathleen M	*See,* Masonry Specialists II, LLC					
Galstad, Michael E (aka Michael Earl Galstad)	*See,* Cargill Heating and Air Conditioning Company, Inc					

Name of Contractor	Address	Effective Date	Termination Date	Cause Code	Date of Violation(s)	Limitations/ Deviations
Gjolaj, Ded	*See,* Horizon Bros Painting Corp					
Grade A Construction, Inc	157 Enterprise Rd Delafield, WI 53018	1/1/16	12/31/19	1, 2 and 4	2014	None
Horizon Bros Painting Corp	1053 Kendra La Howell, MI 48843	10/1/14	9/30/16	4	2012	None
JT Roofing, Inc	350 Tower Dr Saukville, WI 53080	6/1/12	5/31/15	1, 2 and 4	2007 & 2008	None
Jinkins, Richard	*See,* Castlerock Commercial Construction, Inc					
John's Concrete	*See,* Wagner Companies, Inc, dba John's Concrete					
Kott, Joseph J	*See,* Alpha Electric, LLC					
Masonry Specialists II, LLC	5109 Briarwood Ct Racine, WI 53402	8/1/15	7/31/18	4	2014	None
Mid-W Enterprises, Inc	1730 22nd Avenue Kenosha, WI 53140	6/1/15	5/31/17	1, 2 and 4	2013	None
Midwest Construction Co, Inc	*See,* Mid-W Enterprises, Inc					
Oden, Cassie	*See,* A-1 Duran Roofing & Insulation Services and RRS2 Inc					
Ofstie, Darin	*See,* Precision Excavating and Grading, LLC					
Peret, Robert	*See,* A-1 Duran Roofing & Insulation Services and RRS2 Inc					

Name of Contractor	Address	Effective Date	Termination Date	Cause Code	Date of Violation(s)	Limitations/ Deviations
Peshtigo Asphalt, Inc	W3895 Track La Peshtigo, WI 54157	3/1/16	2/28/17	1	2013-2014	None
Precision Excavating and Grading, LLC or Precision Excavating Enterprises, LLC	2104 Pierce Saint Croix Rd Baldwin, WI 54002	5/1/11	4/30/14	1, 2 and 4	2006-2008	None
R-Way Pumping, Inc	3023 Lake Maria Rd Freeport, MN 56331	3/1/12	2/28/15	1, 2 and 4	2008	None
RRS2 Inc.	133 N Jackson St, #427 Milwaukee, WI 53202 or 1313 N Franklin Pl, #805 Milwaukee, WI 53202	11/1/14	10/31/17	1, 2 and 4	2011-2012	None
Thull, Gerald T	*See,* JT Roofing, Inc					
Ventura, Robert	*See,* Mid-W Enterprises, Inc					
Wagner, Cory L	*See,* Wagner Companies, Inc					
Wagner Companies, Inc, dba John's Concrete	2063 Georgia Ave Racine, WI 53404	8/1/15	7/31/18	1	2013	None
Yaresh, Kathleen R	*See,* Grade A Construction, Inc					

Cause Code: 1 = Failure to Pay Straight Time 2 = Failure to Pay Overtime 3 = Kickback 4 = Payroll Records.

Department of Workforce Development
Equal Rights Division
P.O. Box 8928
Madison, WI 53708-8928
Telephone: (608) 266-6860
Fax: (608) 267-4592
TTY: (608) 264-8752

STATE OF WISCONSIN
DWD
Department of Workforce Development

Scott Walker, Governor
Raymond Allen, Secretary

PREVAILING WAGE – Contractors

Any public works project that has a total estimated project cost that equals or exceeds prevailing wage project thresholds requires a prevailing wage rate determination issued by the Department of Workforce Development (DWD). Public works include erecting, constructing, remodeling, repairing, demolishing, alterations, painting and decorating projects for a local governmental unit or state agency. State law excludes minor service or maintenance work, warranty work, or work under a supply-and-installation contract. There is a statutory definition for most of these exclusions. The prevailing wage laws that apply to local governmental units and their contractors are §§66.0903 and 103.503, Wis. Stats. The prevailing wage laws that apply to state agencies and their contractors are §§103.49 and 103.503, Wis. Stats. The applicable administrative rules for all prevailing wage projects are DWD 290 and DWD 294, Wis. Adm. Code. These laws include provisions that apply to all contractors and subcontractors working on prevailing wage projects.

Any contractor or subcontractor working on a local governmental unit or state agency's public works project that equals or exceeds current prevailing wage project thresholds must do all of the following:

- Receive and review the project's prevailing wage rate determination (i.e., white sheet).
- Tell subcontractors the project is subject to state prevailing wage law and include the prevailing wage rate determination in the construction contract, or if there is no written contract, provide a copy of the project determination to each subcontractor.
- Hire subcontractors who do *not* appear on the "Consolidated List of Debarred Contractors."
- Have a written substance abuse testing program in place that fulfills the requirements of §103.503, Wis. Stats., before commencing work on the project.

- Notify subcontractors that if DWD finds that a contractor or subcontractor violated the prevailing wage law, DWD will assess liquidated damages of 100% of the wages owed to employees.

- Apply to DWD for subjourney wage rates prior to employing these individuals on the project.

- Receive and retain a completed Affidavit of Compliance from each subcontractor brought on to the project before providing final payment to those subcontractors.

- Submit a completed Affidavit of Compliance to the contractor who brought the subcontractor on to the project before receiving final payment for the project.

- Maintain payroll records for 3 years that comply with §§66.0903(10)(a) or 103.49(5)(a), Stats. and DWD 274.06.

- Respond to requests from DWD or the project owner to provide payroll records and/or respond to prevailing wage complaints filed by employees or third parties.

For more information, visit the prevailing wage website: http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm. For further assistance, call the Equal Rights Division at 608-266-6861 and ask for prevailing wage.

State of Wisconsin
Department of Workforce Development
Equal Rights Division

Disclosure of Ownership

The statutory authority for the use of this form is prescribed in Sections 66.0903(12)(d), 66.0904(10)(d) and 103.49(7)(d), Wisconsin Statutes.
The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes.
Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04(1) (m), Wisconsin Statutes].

(1) On the date a contractor submits a bid to or completes negotiations with a state agency, local governmental unit, or developer, investor or owner on a project subject to Section 66.0903, 66.0904 or 103.49, Wisconsin Statutes, the contractor shall disclose to such state agency, local governmental unit, or developer, investor or owner, the name of any "other construction business," which the contractor, or a shareholder, officer or partner of the contractor, owns or has owned within the preceding three (3) years.

(2) The term "other construction business" means any business engaged in the erection, construction, remodeling, repairing, demolition, altering or painting and decorating of buildings, structures or facilities. It also means any business engaged in supplying mineral aggregate, or hauling excavated material or spoil as provided by Sections 66.0903(3), 66.0904(2), 103.49(2) and 103.50(2), Wisconsin Statutes.

(3) This form must ONLY be filed, with the state agency project owner, local governmental unit project owner, or developer, investor or owner of a publicly funded private construction project that will be awarding the contract, if **both (A) and (B) are met**.

(A) The contractor, or a shareholder, officer or partner of the contractor:
(1) Owns at least a 25% interest in the "other construction business," indicated below, on the date the contractor submits a bid or completes negotiations; or
(2) Has owned at least a 25% interest in the "other construction business" at any time within the preceding three (3) years.

(B) The Wisconsin Department of Workforce Development (DWD) has determined that the "other construction business" has failed to pay the prevailing wage rate or time and one-half the required hourly basic rate of pay, for hours worked in excess of the prevailing hours of labor, to any employee at any time within the preceding three (3) years.

Other Construction Business

Business Name			
Street Address or P O Box	City	State	Zip Code
Business Name			
Street Address or P O Box	City	State	Zip Code
Business Name			
Street Address or P O Box	City	State	Zip Code
Business Name			
Street Address or P O Box	City	State	Zip Code

I hereby state under penalty of perjury that the information, contained in this document, is true and accurate according to my knowledge and belief.

Print the Name of Authorized Officer			
Authorized Officer Signature	Date Signed		
Corporation, Partnership or Sole Proprietorship Name			
Street Address or P O Box	City	State	Zip Code

If you have any questions call (608) 266-6861

State of Wisconsin
Department of Workforce Development
Equal Rights Division

Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination

Authorization for this form is provided under Sections 66.0903(9)(c), 66.0904(7)(c) and 103.49(4r)(c) Wisconsin Statutes.
The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes.
Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04(1)(m), Wisconsin Statutes].

This form must **ONLY** be filed with the **Awarding Agency** indicated below.

State Of)	Project Name	
	DWD Determination Number	Project Number (if applicable)
)SS	Date Determination Issued	Date of Contract
	Awarding Agency	
County Of)	Date Work Completed	

After being duly sworn, the person whose name and signature appears below hereby states under penalty of perjury that

- **I am** the duly authorized officer of the corporation, partnership, sole proprietorship or business indicated below and have recently completed all of the work required under the terms and conditions of a contract with the above-named awarding agency and make this affidavit in accordance with the requirements set forth in Section 66.0903(9)(c), 66.0904(7)(c) or 103.49(4r)(c), Wisconsin Statutes and Chapter DWD 290 of the Wisconsin Administrative Code in order to obtain FINAL PAYMENT from such awarding agency.
- **I have** fully complied with all the wage and hour requirements applicable to this project, including all of the requirements set forth in the prevailing wage rate determination indicated above which was issued for such project by the Department of Workforce Development on the date indicated above.
- **I have** received the required affidavit of compliance from each of my agents and subcontractors that performed work on this project and have listed each of their names and addresses on page 2 of this affidavit.
- **I have** full and accurate records that clearly indicate the name and trade or occupation of every worker(s) that I employed on this project, including an accurate record of the hours worked and actual wages paid to such worker(s).
- **I will** retain the records and affidavit(s) described above and make them available for inspection for a period of at least three (3) years from the completion date indicated above at the address indicated below and shall not remove such records or affidavit(s) without prior notification to the awarding agency indicated above.

Name of Corporation, Partnership, Sole Proprietorship, Business, State Agency or Local Governmental Unit				
Street Address	City	State	Zip Code	Telephone Number
Print Name of Authorized Officer			Date Signed	
Signature of Authorized Officer				

List of Agents and Subcontractors

Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
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Telephone Number			Telephone Number		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		

State of Wisconsin
Department of Workforce Development
Equal Rights Division

Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination

Authorization for this form is provided under Sections 66.0903(9)(b), 66.0904(7)(b) and 103.49(4r)(9b), Wisconsin Statutes. The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes.
Personal information you provide may be used for secondary purposes [Privacy Law, Section 15.04(1)(m), Wisconsin Statutes].

This form must **ONLY** be filed with the **Awarding Contractor** indicated below.

State Of _____)	Project Name	
	DWD Determination Number	Project Number (if applicable)
)SS	Date Determination Issued	Date of Subcontract
County Of _____)	Awarding Contractor	
	Date Work Completed	

After being duly sworn, the person whose name and signature appears below hereby states under penalty of perjury that

- **I am** the duly authorized officer of the corporation, partnership, sole proprietorship or business indicated below. We have recently completed all of the work required under the terms and conditions of a subcontract with the above-named awarding contractor. We make this affidavit in accordance with the requirements set forth in Section 66.0903(9)(b), 66.0904(7)(b) or 103.49(4r)(b), Wisconsin Statutes and Chapter DWD 290 of the Wisconsin Administrative Code in order to obtain FINAL PAYMENT from such awarding contractor.
- **I have** fully complied with the entire wage and hour requirements applicable to this project, including all of the requirements set forth in the prevailing wage rate determination indicated above which was issued for such project by the Department of Workforce Development on the date indicated above.
- **I have** received the required affidavit of compliance from each of my agents and subcontractors that performed work on this project and have listed each of their names and addresses on page 2 of this affidavit.
- **I have** full and accurate records that clearly indicate the name and trade or occupation of every worker(s) that I employed on this project, including an accurate record of the hours worked and actual wages paid to such worker(s).
- **I will** retain the records and affidavit(s) described above and make them available for inspection for a period of at least three (3) years from the completion date indicated above at the address indicated below and shall not remove such records or affidavit(s) without prior notification to the awarding contractor.

Name of Corporation, Partnership, Sole Proprietorship, Business, State Agency or Local Governmental Unit				
Street Address or PO Box	City	State	Zip Code	Telephone Number ( )
Print Name of Authorized Officer			Date Signed	
Authorized Officer Signature				

List of Agents and Subcontractors

Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ( )			Telephone Number ( )		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ( )			Telephone Number ( )		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ( )			Telephone Number ( )		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ( )			Telephone Number ( )		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ( )			Telephone Number ( )		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ( )			Telephone Number ( )		

If you have any questions call (608) 266-6861

State of Wisconsin
Department of Workforce Development
Equal Rights Division
Labor Standards Bureau

Request to Employ Subjourneyperson

The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes.
Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04(1)(m), Wisconsin Statutes].
The employer indicated below requests that the Department of Workforce Development (DWD) determine the prevailing wage rate(s) and related qualifications to enable such employer to use a subjourneyperson(s) on the following prevailing wage project, in accordance with the provisions of Section DWD 290.025, Wisconsin Administrative Code.

1. Name of Project Appearing on the Project Determination			
County	City, Village or Town		
DWD Project Determination Number	Project Number (if applicable)		
2. Job Classification(s) for which you request a subjourney rate (i.e., carpenter, electrician, plumber, etc.)			
a.	b.		
c.	d.		
3. Employer Name (Print)	Requester Name (Print)		
Address	City	State	Zip Code
Telephone Number ( )	Requester Title		
Email address (if you prefer to receive your response via email)	Fax Number (if you prefer to receive your response via fax) ( )		

READ CAREFULLY: I understand that this request is ONLY applicable to the project and job classification(s) listed above and that subjourney employees primarily work under the direction of and assist a skilled trade employee by frequently using the tools of a skilled trade and will NOT regularly perform the duties of a general laborer, heavy equipment operator or truck driver. If the subjourney employee regularly performs the work of a different trade or occupation, he/she will be compensated for such work at the applicable journeyperson prevailing wage rate. I agree to compensate subjourney employees in strict accordance with the directions received from the DWD.

Requester Signature	Date Signed

MAIL the completed request to:
EQUAL RIGHTS DIVISION, LABOR STANDARDS BUREAU
PO BOX 8928, MADISON WI 53708
OR
FAX the completed request to: (608) 267-4592 / **DO NOT e-mail your request.**
Call (608) 266-6861 for assistance in completing this form.

ADDITIONAL GENERAL PREVAILING WAGE LAW INFORMATION

(This document updated July 2015)

NOTE: Recent prevailing wage law changes enacted by the 2015-17 Budget Bill (2015 Wisconsin Act 55) do not go into effect until calendar year 2017.

For prevailing wage laws and frequently asked questions, refer to the prevailing wage website at: http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm

Topic	Who's affected?	Brief description of requirement under §66.0903 or §103.49
Non-applicability	All public entities	Prevailing wage rates do not apply to minor service or maintenance work, warranty work, or work under a supply and installation contract.
Non-applicability: Minor service or maintenance work	Local governmental units & Contractors	Minor service or maintenance work means a project of public works that is limited to • minor crack filling, chip or slurry sealing, or other minor pavement patching, not including overlays, that has a projected life span of no longer than 5 years or that is performed for a TOWN and is not funded under §86.31, regardless of projected life span; • the depositing of gravel on an existing gravel road applied solely to maintain the road; • road shoulder maintenance; • cleaning of drainage or sewer ditches or structures; or • any other limited, minor work on public facilities or equipment that is routinely performed to prevent breakdown or deterioration.
Non-applicability: Minor service or maintenance work	State agencies	Minor service or maintenance work means a project of public works that is limited to • minor crack filling, chip or slurry sealing, or other minor pavement patching, not including overlays, that has a projected life span of no longer than 5 years; • cleaning of drainage or sewer ditches or structures; or • any other limited, minor work on public facilities or equipment that is routinely performed to prevent breakdown or deterioration.
Non-applicability: Supply & installation contract	All public entities	Supply and installation contract means a contract under which the material is installed by means of simple fasteners or connectors such as screws or nuts and bolts and no other work is performed on the site of the project of public works, and the total labor cost to install the material does not exceed 20 percent of the total cost of the contract.
Non-applicability: Work which a contractor or individual donates to a public entity	All public entities	Prevailing wage laws §§66.0903 & 103.49, Stats., do not apply to work performed on a project of public works for which the local governmental unit or the state or the state agency contracting for the project is not required to compensate any contractor, subcontractor, contractor's or subcontractor's agent, or individual for performing the work.

Topic	Who's affected?	Brief description of requirement under §66.0903 or §103.49
Non-applicability: Residential	All public entities	A prevailing wage rate determination is not required for the erection, construction, repair, remodeling, or demolition of a residential property containing 2 dwelling units or less.
Non-applicability: Residential subdivision infrastructure	All public entities	A prevailing wage rate determination is not required for a road, street, bridge, sanitary sewer, or water main project that is a part of a development in which at least 90 percent of the lots contain or will contain 2 dwelling units or less, as determined by the local governmental unit at the time of approval of the development, and that, on completion, is acquired by, or dedicated to, a local governmental unit (including under §236.13(2), Stats.), or the state, for ownership or maintenance by the local governmental unit or the state.
Electronic certified payroll record	Contractors	The requirement that every contractor on a prevailing wage project submit to DWD monthly a certified record of employees who worked on the project and that DWD post these certified records on its Internet website was discontinued effective July 1, 2011. Contractors are still required to maintain payroll records and provide them upon request from DWD &/or the project owner.
Payroll record inspection request by any person	Contractors & Complainants	Any person may request DWD to inspect the payroll records of any contractor working on a prevailing wage project. On receipt of such a request, the contractor must submit to DWD a certified record of its payroll records, other than personally identifiable information relating to an employee of the contractor, for no longer than a 4-week period. DWD may request records from a contractor under this provision no more than once per calendar quarter for each project of public works on which the contractor is performing work. The department may not charge a requester a fee for obtaining that information. DWD must make these certified records available for public inspection.
Statewide uniformity	Local govern-mental units	A local governmental unit may not enact & administer a prevailing wage ordinance/provision for public works or publicly funded private construction projects. Any extant laws to that effect are void.
Substance Abuse Testing	Contractors & Workers	Before commencing work on a prevailing wage project, a contractor must have a written substance abuse testing program in place that complies with §103.503, Wis. Stats. No employee may use, possess, attempt to possess, distribute, deliver, or be under the influence of a drug or under the influence of alcohol while performing work on a prevailing wage project.

Topic	Who's affected	Brief description of requirement under §66.0903 or §103.49
Covered employees	Truck drivers & Other workers & Contractors	A laborer, worker, mechanic, or truck driver who is employed to process, manufacture, pick up, or deliver materials or products from a commercial establishment that has a fixed place of business from which the establishment supplies processed or manufactured materials or products or from a facility that is not dedicated exclusively, or nearly so, to a project of public works is NOT entitled to receive the prevailing wage rate UNLESS any of the following applies: 1) the laborer, worker, mechanic, or truck driver is employed to go to the source of mineral aggregate such as sand, gravel, or stone and deliver that mineral aggregate to the site of a project of public works by depositing the material directly in final place, from the transporting vehicle or through spreaders from the transporting vehicle. 2) the laborer, worker, mechanic, or truck driver is employed to go to the site of a project of public works, pick up excavated material or spoil from the site of the project, and transport that excavated material or spoil away from the site of the project.

SECTION 01314
PROJECT MEETINGS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Preconstruction conferences.

B. Progress meetings.

1.2 PRECONSTRUCTION AND PREINSTALLATION CONFERENCES

A. OWNER/ENGINEER will administer Preconstruction Conference prior to the start of construction to discuss schedules, procedures, submittals, payments, staging areas, and establish a working understanding among parties.

B. OWNER/ENGINEER will administer Pre-installation Conference prior to start of Select Clay Fill liner to discuss Select Clay Fill installation requirements, schedules, procedures, submittals, staging areas, and establish a working understanding among parties.

C. OWNER/ENGINEER will administer Pre-installation Conference prior to the start of Geomembrane installation to discuss geosynthetic installation requirements, schedules, procedures, submittals, staging areas, and establish a working understanding among parties and meet the requirements of NR 516.04(4). At a minimum the OWNER, CONTRACTOR, appropriate DNR staff, geosynthetics INSTALLER, Construction Quality Assurance (CQA) personnel, and the OWNER/ENGINEER will attend the Preinstallation Conference.

1.3 PROGRESS MEETINGS

A. OWNER/ENGINEER will schedule and administer Project meetings throughout progress of the Work at maximum weekly intervals.

B. OWNER/ENGINEER will arrange meetings, prepare agenda, and preside at meetings.

C. Attendance: Job Superintendent, major subcontractors and suppliers, OWNER/ENGINEER as appropriate to topics on the agenda for each meeting.

D. Suggested Agenda: Review Work progress, status of construction schedule and adjustments thereto, equipment and material, delivery schedules, submittals, adherence to quality standards, pending changes and substitutions, coordination, and other items affecting the progress of Work.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01330
SUBMITTALS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Procedures.

B. Construction Progress Schedules.

C. Schedule of Values.

D. Shop Drawings.

E. Product Data.

F. Manufacturer's Instructions.

G. Samples.

H. CONTRACTOR Review.

1.2 PROCEDURES

A. Deliver submittals to OWNER/ENGINEER.

B. Identify Project, CONTRACTOR, Subcontractor, major Supplier; identify pertinent Drawing sheet and detail number, and Specification Section number, as appropriate. Identify deviations from Contract Documents.

C. Comply with construction schedule for submittals related to Work progress. Coordinate submittal of related items.

D. After OWNER/ENGINEER reviews submittal, revise and resubmit as required; identify changes made since previous submittal.

E. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

1.3 CONSTRUCTION PROGRESS SCHEDULE

A. Refer to Section 23 in the General Conditions (Construction Schedule and Periodic Estimates) for submitting and revising the construction schedule.

B. Show detailed sequence for Select Clay Fill placement upon request of the OWNER/ENGINEER. Sequence Select Clay Fill placement to maximize time between lifts to allow for soils testing and documentation, minimize splices, and to meet regulatory requirements.

1.4 SHOP DRAWINGS

A. Submit the number of opaque reproductions which CONTRACTOR requires, plus two copies which will be retained by OWNER/ENGINEER or submit a printable electronic copy.

B. Present in a clear and thorough manner. Title each drawing with Project name; identify each element of Drawings by reference to sheet number and detail of Contract Documents.

C. Identify field dimensions; show relationship to adjacent or critical features of Work or products.

1.5 PRODUCT DATA

A. Mark each copy to identify applicable product, models, options, and other data; supplement manufacturer's standard data to provide information unique to the Work.

B. Submit the number of copies which CONTRACTOR requires plus two copies which will be retained by OWNER/ ENGINEER or submit a printable electronic copy.

1.6 MANUFACTURER'S INSTRUCTIONS

A. When required by an individual Specification Section, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for product data.

1.7 SAMPLES

A. Provide field samples as required by individual Specifications Sections. Install sample complete and finished. Acceptable samples in place may be retained in the completed Work.

B. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing Work.

C. Include identification on each sample, giving full information.

D. Submit number specified in respective Specification Section; one will be retained by OWNER/ENGINEER. Reviewed samples which may be used in the Work are indicated in the Specification Section.

1.8 CONTRACTOR REVIEW

A. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements.

B. Coordinate submittals with requirements of Work and of Contract Documents.

C. Sign or initial each sheet of shop drawings and product data, and each sample label to certify compliance with requirements of Contract Documents. Notify OWNER/ENGINEER in writing at time of submittal of any deviations from requirements of Contract Documents.

D. Do not fabricate products or begin Work which requires submittals until return of submittal with OWNER/ENGINEER's acceptance.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01410
REGULATORY REQUIREMENTS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Description.

B. Permits.

C. Taxes.

1.2 DESCRIPTION

A. Give all notices; observe and comply with all laws, rules, regulations and ordinances applicable to the Work.

B. Notify area utility companies before beginning Work, in accordance with state and local regulations.

1.3 PERMITS

A. OWNER will obtain all required erosion control permits. OWNER shall maintain all conditions of the erosion control permits such as conducting required inspections and record keeping. CONTRACTOR will be responsible for maintenance and any corrective actions necessary (as directed by OWNER) of all erosion control Best Management Practices (BMP's)

B. Obtain all other construction permits (if any) and licenses necessary for the prosecution of the Work, which are applicable at the time of CONTRACTOR's Bid.

C. OWNER will assist CONTRACTOR, when necessary, in obtaining such permits and licenses.

1.4 TAXES

A. Pay all sales, consumer, use and other similar taxes required to be paid in accordance with the law of the place where the Work is to be performed. Refer to Tax paragraph in the Instructions to Bidders section of this Project Manual.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01420
REFERENCE STANDARDS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Applicability of Reference Standards.

B. Provision of Reference Standards at site.

1.2 QUALITY ASSURANCE

A. Comply with requirements of the standard for products or workmanship specified by association, trade, or federal standards, except when more rigid requirements are specified or are required by applicable codes.

B. Except when a specific date is specified, the date of the standard is that in effect as of the Bid date, or date of the OWNER-CONTRACTOR Agreement when there are no bids.

C. When required by individual Specifications Section, obtain copy of standard. Maintain copy at job site during submittals, planning, and progress of the specific Work, until Substantial Completion.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01450
QUALITY CONTROL

PART 1. GENERAL

1.1 SECTION INCLUDES

A. General Quality Control.

B. Workmanship.

C. Manufacturer's Instructions.

D. Manufacturer's Certificates.

E. Mockups.

F. Manufacturer's Field Services.

1.2 GENERAL QUALITY CONTROL

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality.

1.3 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. Perform Work by persons qualified to produce workmanship of specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and cracking.

1.4 MANUFACTURER'S INSTRUCTIONS

A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from OWNER/ENGINEER before proceeding.

1.5 MANUFACTURER'S CERTIFICATES

A. When required by individual Specifications Section, submit manufacturer's certificate, in duplicate, that products meet or exceed specified requirements.

1.6 MANUFACTURER'S FIELD SERVICES

A. When specified in respective Specification Sections, require Supplier or Manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance equipment, as applicable, and to make appropriate recommendations.

B. Manufacturer's Representative shall submit written report to OWNER/ENGINEER listing observations and recommendations.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01452
TESTING LABORATORY SERVICES

PART 1. GENERAL

1.1 SECTION INCLUDES

A. References.

B. Selection and Payment.

C. Quality Assurance.

D. CONTRACTOR Submittals.

E. Laboratory Responsibilities.

F. Laboratory Reports.

G. Limits on Testing Laboratory Authority.

H. CONTRACTOR Responsibilities.

I. Soils Testing.

1.2 REFERENCES

A. ANSI/ASTM D3740 - Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

B. ANSI/ASTM E329 - Specification for Agencies Engaged in Testing and/or Inspection of Materials Used in Construction.

C. ASTM D422 - Test Method for Particle-Size Analysis of Soils: Sieve Analysis and Hydrometer.

D. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort: Standard Proctor.

E. ASTM D1140 - Test Method for Amount of Material in Soils Finer than the No. 200 Sieve: P200 Content.

F. ASTM D1556 - Test Method for Density and Unit Weight of Soil In Place by the Sand-Cone Method: Sand Cone Density Test.

G. ASTM D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort: Modified Proctor.

H. ASTM D2216 - Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock: Natural Moisture Content.

I. ASTM D2434 - Test Method for Permeability of Granular Soils (Constant Head).

J. ASTM D2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System).

K. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth): Nuclear Density Test.

L. ASTM D2937 - Test Method for Density of Soil In Place by the Drive-Cylinder Method.

M. ASTM D3017 - Test Method for Water Content of Soil and Rock In Place by Nuclear Methods (Shallow Depth): Nuclear Moisture Content.

N. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils: Atterberg limits.

O. ASTM C136 - Test Method for Sieve Analysis of Fine and Coarse Aggregates.

P. ASTM D4643 - Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method.

Q. ASTM D5084 - Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

1.3 SELECTION AND PAYMENT

A. OWNER will employ and pay for services of an independent testing laboratory to perform specified inspection and testing.

B. Employment of testing laboratory shall in no way relieve CONTRACTOR of obligation to perform Work in accordance with requirements of Contract Documents.

1.4 LABORATORY RESPONSIBILITIES

A. Test samples of materials submitted by OWNER/ENGINEER or CONTRACTOR.

B. Provide qualified personnel at site after due notice; cooperate with OWNER/ENGINEER and CONTRACTOR in performance of services.

C. Perform specified inspection, sampling and testing of products in accordance with specified standards.

D. Promptly notify OWNER/ENGINEER and CONTRACTOR of observed irregularities or non-conformance of Work or products.

1.5 LABORATORY REPORTS

A. After each inspection and test, promptly submit two copies of laboratory report to OWNER/ENGINEER and to CONTRACTOR.

1.6 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge on the requirements of Contract Documents.

B. Laboratory may not approve or accept any portion of the Work.

C. Laboratory may not assume any duties of CONTRACTOR.

D. Laboratory has no authority to stop Work.

1.7 CONTRACTOR RESPONSIBILITIES

A. Deliver submittal samples required by individual specification sections to OWNER/ENGINEER. OWNER/ENGINEER will deliver samples to the laboratory.

B. Cooperate with laboratory personnel, and provide access to Work.

C. Provide incidental labor and facilities to provide access to Work to be tested, assist OWNER/ENGINEER to obtain and handle samples at the site or at the source of products to be tested, to facilitate tests and inspections, and for storage and curing of test samples.

D. Notify OWNER/ENGINEER of operations requiring inspection and testing services 24 hours before services are needed.

E. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest until compliance is achieved at no cost to OWNER.

1.8 SOILS TESTING

A. OWNER/ENGINEER will determine the moisture-density relation and maximum dry density by the Modified Proctor test.

B. OWNER/ENGINEER may perform additional Proctor tests whenever material changes are detected.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01520
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Electricity, Lighting.

B. Water.

C. Sanitary Facilities.

D. Barriers.

E. Protection of Work.

F. Security.

G. Cleaning During Construction.

H. Field Offices and Sheds.

I. Removal.

1.2 ELECTRICITY, LIGHTING

A. Provide generators for heating requirements. Connect to existing service; provide branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords. Take measures to conserve energy. OWNER will pay for normal electrical use related to the expansion, but will not pay for utility/fuel costs associated with temporary heat.

1.3 WATER

A. Provide water for construction operations.

B. A water line and hydrants are available at the west end of the site for water trucks. Water is not available on the east end of the site except for a small well located in the park.

1.4 SANITARY FACILITIES

A. Provide and maintain enclosed, portable, self-contained sanitary facilities.

1.5 BARRIERS

A. Provide as required for OWNER's use of site, to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage.

1.6 PROTECTION OF WORK

A. Provide temporary protection for Work in progress and items installed.

B. Control traffic in construction area to minimize damage to completed Work.

1.7 SECURITY

A. Provide security program and facilities to protect Work, existing facilities, and OWNER's operations from unauthorized entry, vandalism and theft. Coordinate with OWNER's security program.

1.8 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish; periodically dispose of off-site.

B. Maintain site in a clean and orderly condition.

C. Clean interior plant areas at the end of each day's Work; control dust and other contaminants during operations.

1.9 REMOVAL

A. Remove temporary materials, equipment, services, and construction prior to final inspection.

B. Restore existing facilities used during construction to specified, or to original, condition.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01570
TEMPORARY CONTROLS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Dust Control.

B. Erosion and Sediment Control.

C. Noise Control.

D. Pollution Control.

1.2 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. Do not use oils, bitumens, or chlorides for dust control.

D. Conduct dust control in accordance with WDNR Conservation Practice Standard No. 1068 – Dust Control on Construction Sites.

1.3 EROSION AND SEDIMENT CONTROL

A. Use Best Management Practices (BMP) to minimize erosion and sediment transport.

B. Minimize amount of bare soil exposed at one time.

C. Plan and execute construction to control surface drainage from cuts and fills, and from borrow and waste disposal areas. Prevent erosion and sedimentation.

D. Keep duration of exposure of construction materials before final finishing or cover as short as practical.

E. Conduct operations to avoid washing or deposition of materials into waterways or off-site.

F. Do not track or spill mud, clay, gravel, or other materials onto adjacent streets or off-site. Clean off inadvertent tracking and spills immediately. If dirt tracked onto adjacent streets is not cleaned within 24 hours, OWNER will have clean-up done and bill CONTRACTOR.

G. Periodically inspect earthwork for evidence of erosion and sedimentation; promptly apply corrective measures. OWNER will conduct weekly inspections during construction and within 24 hours of rain events of 0.5-inches or greater and notify the CONTRACTOR when corrective measures are required.

1.4 NOISE CONTROL

A. Limit the operation of heavy equipment and machinery to the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday and 8:00 a.m. to 11:00 a.m. on Saturday.

B. Comply with City of Madison Ordinance 24.08. If CONTRACTOR plans to work additional hours from 7:00 a.m. through 7:00 p.m. on Saturday and 10:00 a.m. – 7:00 p.m. on Sunday, it must be stated on the submitted Bid Form. Coordinate additional hours with OWNER/ENGINEER during construction.

1.5 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01574
TEMPORARY WATER CONTROL

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Control of surface water and ground water during construction.

1.2 WATER CONTROL

A. Rough grade site to prevent standing water and to direct surface water drainage away from Work area.

B. Pump/dewater groundwater as necessary to allow for construction of the Groundwater Gradient Control System and subbase. Conduct dewatering in accordance with WDNR Conservation Practice Standard No. 1061 Dewatering.

C. Maintain or relocate existing ditches and spillways.

D. Do not stockpile material such that it restricts surface drainage.

E. If it is necessary to interrupt existing surface water drainage, provide and maintain temporary piping or ditching until permanent drainage is provided.

F. Maintain excavations and trenches free of water. Provide and operate pumping equipment of a capacity to control water flow out of excavations and trenches.

G. Provide piping to handle discharge to prevent erosion or deposit of silt. Remove equipment when no longer needed for temporary water control.

H. Provide and operate pumping equipment of a capacity to control water flow out of temporary pumping basin.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01600
MATERIAL AND EQUIPMENT

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and Handling.

C. Storage and Protection.

D. Disposal.

E. Product Options.

F. Products List.

G. Substitutions.

H. Systems Demonstration.

1.2 PRODUCTS

A. Products include material, equipment, and systems. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing structure or system, except as specifically required, or allowed by Contract Documents.

C. Comply with Specifications and referenced standards as minimum requirements.

D. Provide components of the same manufacturer, for interchangeable components.

1.3 TRANSPORTATION AND HANDLING

A. Transport products by methods which prevent product damage; deliver in undamaged, dry condition in manufacturer's unopened containers or packing.

B. Provide equipment and personnel to handle products by methods which prevent soiling or damage.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

1.4 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to prevent condensation.

C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to ensure products are undamaged, and are maintained under required conditions.

1.5 DISPOSAL

A. Submit to OWNER/ENGINEER the disposal site location for excess materials which may not be disposed on-site before beginning Work.

B. Dispose of excess materials off-site in an appropriate manner.

1.6 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description only: Any product meeting those standards may be used.

B. Products Specified by naming one or more Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named.

C. Products Specified by Naming Several Manufacturers: Products of named manufacturers meeting specifications: No options, no substitutions allowed.

D. Products Specified by Naming Only One Manufacturer: No options, no substitutions allowed.

1.7 PRODUCTS LIST

A. Within 15 days after Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

1.8 SUBSTITUTIONS

A. OWNER/ENGINEER will consider CONTRACTOR's request for substitutions only within 15 days after Notice to Proceed. Subsequently, substitutions will be considered only when a product becomes unavailable through no fault of CONTRACTOR.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. Request constitutes a representation that CONTRACTOR:

1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.

2. Will provide the same warranty for substitution as for the specified product.

3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.

4. Waives claims for additional costs which may subsequently become apparent.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request, or when acceptance will require substantial revision of Contract Documents.

E. OWNER/ENGINEER will determine acceptability of proposed substitution, and will notify CONTRACTOR of acceptance or rejection in writing within a reasonable time.

F. Only one request for substitution will be considered for each product. When substitution is not accepted, provide specified product.

1.9 SYSTEMS DEMONSTRATION

A. Prior to final walk-through demonstrate operation of each system to OWNER/ENGINEER.

B. Instruct OWNER's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01720
FIELD ENGINEERING

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Submittals.

B. Quality Assurance.

C. Surveying and Field Engineering Services.

D. CONTRACTOR Survey Requirements.

1.2 SUBMITTALS

A. On request, submit data demonstrating qualifications of persons providing services.

B. On request, submit documentation verifying accuracy of survey Work.

C. Maintain complete, accurate log of control and survey Work as it progresses. Submit Record Documents under provisions of Section 01770.

1.3 QUALITY ASSURANCE

A. Use skilled persons, trained and experienced in the necessary tasks and techniques, for the proper performance of this Work.

B. Verify locations of survey control points prior to starting Work. Promptly notify OWNER/ENGINEER of any discrepancies discovered.

1.4 PROTECTION

A. Locate and protect control points before starting Work.

B. Preserve permanent reference points during progress of Work.

C. Do not change or relocate reference points or lines without specific approval from OWNER/ENGINEER.

D. Promptly inform OWNER/ENGINEER when a reference point is lost or destroyed, or requires relocation.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

3.1 SURVEYING AND FIELD ENGINEERING SERVICES

A. OWNER/ENGINEER has identified permanent benchmarks and control points on Plan Sheets 2 and 3. Permanent benchmarks that fall within the Limits of Construction will be relocated by OWNER.

B. CONTRACTOR's surveyor will provide all necessary as-constructed survey information required to complete the Construction Documentation Coordinate and Elevation Tables (provided in Appendix B of the Supplementary Conditions) to the OWNER/ENGINEER. Verify that all as-constructed survey data submitted to the OWNER/ENGINEER indicates that the minimum design thickness were achieved at every survey point location shown on the Construction Documentation Coordinate and Elevation Tables. Locations identified by OWNER/ENGINEER as not meeting minimum design thickness requirements will be repaired and resurveyed by the CONTRACTOR. As-constructed survey data that the CONTRACTOR's surveyor will provide to the OWNER/ENGINEER is identified below.

3.2 CONTRACTOR SURVEY REQUIREMENTS

A. Establish and maintain lines and levels.

B. Locate, layout Work, and document as constructed Work by total Station or GPS instrumentation and similar appropriate means.

C. Periodically verify layouts.

D. Provide all necessary survey data required by the OWNER/ENGINEER to complete an as-constructed Geomembrane panel layout diagram for showing all seam and repair locations. At a minimum, every panel corner and every repair will be surveyed.

E. Provide as-constructed coordinate locations and invert elevations for the leachate pipe at maximum 25-foot intervals to OWNER/ENGINEER. Refer to Table 3 in Appendix B of the Supplementary Conditions.

F. Provide a registered land surveyor or qualified surveyor to provide as-constructed survey data to OWNER/ENGINEER for completion of the Construction Documentation Coordinate and Elevation Tables provided in Appendix B of the Supplementary Conditions as follows:

1. Groundwater Gradient Control Collection/transfer Pipe invert elevations and bottom of trench elevations at maximum 50-foot intervals and at critical locations (tolerances within $\pm$ 0.05-feet unless approved otherwise by the OWNER/ENGINEER). Refer to Table 1 in Appendix B of the Supplementary Conditions.

2. Bottom and top elevations of the Groundwater Gradient Control Select Granular fill drainage layer on a maximum 50-foot grid and at critical locations (minimum drainage layer design thickness of 1.0 feet is required).

3. Subbase (bottom of Select Clay Fill liner) and base (top of Select Clay Fill liner) elevations on a maximum 50-foot grid and at critical locations (minimum Select Clay Fill liner design thicknesses are required). Refer to Table 2 in Appendix B of the Supplementary Conditions.

4. Top of existing Select Clay Fill liner over the Vertical Expansion Area on a maximum 50-foot grid pattern and at critical locations. Refer to Table 2 in Appendix B of the Supplementary Conditions.

5. Perforated HDPE Leachate Pipe invert elevations at maximum 25-foot intervals and at critical locations (tolerances within ± 0.05-feet unless approved otherwise by the OWNER/ENGINEER). Refer to Table 3 in Appendix B of the Supplementary Conditions.

6. Top of Select Aggregate Fill leachate drainage layer on a maximum 50-foot grid and at critical locations (minimum drainage layer design thicknesses are required). Refer to Table 2 in Appendix B of the Supplementary Conditions.

END OF SECTION

SECTION 01760
MONITORING WELL PROTECTION

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Protection

B. Adjustment

C. Repair

1.2 PROTECTION

A. Preserve and protect existing monitoring wells from damage.

B. Protect well casing and boring from infiltration of surface water, other water, soil, and any foreign materials.

C. Use hand equipment when excavating, filling, or conducting other operations around monitoring wells.

D. Notify OWNER/ENGINEER of necessary alterations or damage to monitoring wells.

1.3 ADJUSTMENT

A. All well adjustments or installations will be performed by an environmental well drilling firm who is approved by OWNER.

1.4 REPAIR

A. Wells damaged by the CONTRACTOR'S operations will be repaired by a licensed well driller, as approved by OWNER and at no additional cost to OWNER.

B. OWNER/ENGINEER will observe the repaired well to determine if further repair or replacement is needed. Repair and replacement shall be done at no expense to OWNER.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01770
CONTRACT CLOSEOUT

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Closeout Procedures.

B. Final Cleaning.

C. Project Record Documents.

D. Operation and Maintenance Data.

E. Warranties and Bonds.

F. Spare Parts and Maintenance Materials.

1.2 CLOSEOUT PROCEDURES

A. Comply with procedures stated in General Conditions of the Contract for issuance of Certificate of Substantial Completion.

B. In addition to submittals required by Conditions of the Contract, provide submittals required by governing authorities, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute prior to final walk-through.

B. Clean installed equipment and fixtures.

C. Clean drainage and collection systems.

1.4 PROJECT RECORD DOCUMENTS

A. Maintain on-site, one set of the following project record documents; record actual revisions of the Work:

1. Contract Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other Modifications to the contract.

5. Reviewed shop drawings, product data, and samples.

B. Store project record documents separately from construction documents.

C. Keep documents current; do not permanently conceal any Work until required information has been recorded.

D. At contract closeout, submit documents with transmittal letter containing date, Project title, CONTRACTOR's name and address, list of documents, and signature of CONTRACTOR.

1.5 WARRANTIES AND BONDS

A. Provide duplicate, notarized copies when specified in specific Section. Execute CONTRACTOR's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.

B. Submit material before final application for payment. For equipment put into use with OWNER's permission during construction, submit within ten days after first operation.

1.6 SPARE PARTS AND MAINTENANCE MANUALS

A. Provide products, spare parts, and maintenance materials in quantities specified in each section, in addition to that used for construction of Work.

B. Coordinate with OWNER/ENGINEER; deliver to site before final payment.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

DIVISION 2

SECTION 02070
HIGH-DENSITY POLYETHYLENE (HDPE) GEOMEMBRANE

PART 1. GENERAL

1.1 WORK INCLUDES

A. Providing high-density polyethylene (HDPE) Geomembrane textured and nontextured in accordance with the Drawings and these Specifications, including, but not limited to, excavation and backfilling of anchor trench, deployment of Geomembrane, seaming, repairs, testing, and necessary and incidental items required to complete the Work.

1.2 REFERENCE STANDARDS

A. ASTM D792 - Specific Gravity (Relative Density) and Density of Plastics by Displacement.

B. ASTM D1004 - Test Method for Initial Tear Resistance of Plastic Film and Sheeting.

C. ASTM D1238 - Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.

D. ASTM D1248 - Specification for Polyethylene Plastics Molding and Extrusion Materials.

E. ASTM D1505 - Test Method for Density of Plastics by the Density-Gradient Technique.

F. ASTM D1603 – Test Method for Carbon Black in Olefin Plastics.

G. ASTM D3895 – Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis.

H. ASTM D4218 - Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.

I. ASTM D4437 - Standard Test Methods for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes.

J. ASTM D4833 – Tech Method for Index Puncture Resistance Geotextiles, Geomembrane, and Related Products.

K. ASTM D5199 - Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.

L. ASTM D5321 - Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear.

M. ASTM D5397 – Procedure to Perform a Single-Point Notched Constant Load Test - (SP-NCTL) Test.

N. ASTM D5596 –Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.

O. ASTM D5721 – Practice for Air-Oven Aging of Polyolefin Geomembranes.

P. ASTM D5885 – Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry.

Q. ASTM D5994 – Test Method for Measuring the Core Thickness of Textured Geomembranes.

R. ASTM D6392 –Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.

S. ASTM D6693 – Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polyethylene Geomembranes.

T. GRI GM6 - Standard Practice for Pressurized Air Channel Test for Dual Seamed Geomembranes.

U. GRI GM12 – Measurement of Asperity Height of Textured Geomembrane Using a Depth Gauge.

V. GRI GM13 – Test Properties, Testing Frequency, and Recommended Warrant for High-Density Polyethylene (HDPE) Smooth and Textured Geomembrane.

W. Construction Quality Assurance (CQA) Plan

1.3 DEFINITIONS

A. Installer - CONTRACTOR or organization hired by CONTRACTOR responsible for field handling, transporting, storing, deploying, seaming, and testing of the Geomembrane seams (and if applicable, other geosynthetic components).

B. Manufacturer - Company hired by CONTRACTOR to furnish Geomembrane.

C. Resin Supplier - Company selected by the manufacturer to furnish polyethylene resin used to manufacture the Geomembrane.

D. Geomembrane - A relatively impermeable thin sheet of polyethylene used as a barrier liner or cover to prevent liquid or vapor migration into or from liquid or solid storage facilities.

E. Textured Geomembrane - Geomembrane with roughened, high-friction surfaces created by co-extrusion, extrusion coating, or spray coating.

F. Installation Field Crew - Individuals employed by installer to deploy Geomembrane panels and perform field-screening, nondestructive testing, and other critical operations.

G. Fusion Weld - A bond between two polyethylene Geomembrane surfaces achieved by fusing both polyethylene surfaces into a homogeneous bond using a power-driven apparatus capable of heating and compressing the overlapped portions of the Geomembrane sheets at a specified rate of speed.

H. Extrusion Weld - A bond between two polyethylene materials achieved by extruding a bead of molten polyethylene over leading edge of the seam between upper and lower sheet, or rigid polyethylene piping or plating, using a hand-held apparatus.

I. ENGINEER - Official representative of OWNER. ENGINEER or designated Construction Quality Control Officer (CQA Officer) is responsible for observing and documenting that activities related to quality assurance of the construction conform to the plans and specifications.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: At least 5 years of continuous experience in manufacturing HDPE Geomembrane and have produced 10,000,000 square feet (minimum) of HDPE Geomembrane and installed at least 8,000,000 square feet.

2. Installer:

a. At least 5 years of continuous experience in installing polyethylene Geomembranes and have installed a total of 10,000,000 square feet (minimum) of polyethylene Geomembrane for at least 10 completed facilities.

b. Personnel performing seaming operations: Qualified by experience or by successfully passing seaming tests. At least one seamer to have experience in seaming 5,000,000 square feet (minimum) of polyethylene Geomembrane using the same type of seaming apparatus to be used on this project. The most experienced seamer, called the "master seamer," to provide direct supervision, as required, over less experienced seamers.

B. Quality Assurance Program: Manufacturer/Installer agree to participate in and conform to Quality Assurance Program as outlined in this Specification and Construction Quality Assurance Plan.

1.5 SUBMITTALS

Items A through E shall be submitted no later than 30 days prior to start of Geomembrane installation or 15 days prior to delivery of first Geomembrane shipment, whichever is sooner.

A. Raw Materials:

1. Resin supplier name, production plant(s) location(s), and the resin brand name and product number.

2. Copy of quality control certificates issued by HDPE resin suppliers.

3. HDPE resin production date(s).

4. Results of tests conducted by manufacturer and resin supplier. Results shall conform to requirements in Part 2.2(A).

5. Statement by manufacturer certifying that no recycled polymer and no more than 10% rework of the same type of material is added to resin during Geomembrane manufacturing.

B. Manufacturer's Certification: Manufacturer shall certify that supplied Geomembrane meets Specifications of GRI GM13.

C. Geomembrane Manufacturer/Production Information:

1. Corporate background information.

2. Manufacturing Quality Control (MQC) Plan.

3. List of Geomembrane roll numbers proposed for the project and associated batch each roll was produced.

4. Quality control certificates for Geomembrane rolls and welding rod indicating compliance with requirements of Part 2.

D. Geomembrane Installer's Information:

Dane County has pre-approved the following geomembrane installers, which bidding contractors shall obtain bids for the Phase 10 – Cell 1 liner system construction. Bidders can submit request for an alternate installer with approval from Dane County prior to submitting their bid to Dane County.

GEO-SYNTHETICS, INC.
2401 Pewaukee Rd., Waukesha, WI 53188
Contact: Mark H. Downs – VP of Construction Services Sales
Telephone: (605)428-4353
Fax: (605)428-4393
Cell phone: (262)366-5570
e-mail: markd@geo-synthetics.com
Website: www.geo-synthetics.com

TEXAS ENVIRONMENTAL PLASTICS, LTD
29089 Robinson Rd., Conroe, TX 77385
Contacts: Bob Natz – Sales
E-mail: nantz@tepinc.net
Russell Wells – Fabrication/Distribution Manager
E-mail: rwells@tepinc.net
Candice Caldwall
E-mail: ccaldwell@brawler.com
Telephone: (281)821-7320
Fax: (281)821-7138
Website: www.tepinc.net

COMANCO ENVIRONMENTAL CORPORATION
4301 Sterling Commerce Drive, Plant City, FL 33566
Contact: Christine Thomas – Sr. Estimating/Operations Administrator
Telephone: (813)988-8829
Cell phone: (813)498-8526
Fax: (813)988-8953
E-mail: cthomas@comanco.com
Website: www.comanco.com

CLEAN AIR AND WATER SYSTEM, LLC
P.O. Box 337, 123 Elm St., Dousman, WI 53118
Contact: Brian McKeown – Project Manager
E-mail: bmckeown@caawsystems.com
Matt Albert – Estimating
E-mail: malbert@caawsystems.com
Telephone: (262)9675-4366
Fax: (262)965-4369
Website: www.caawsystems.com

1. Corporate background information.

2. Construction Quality Control (CQC) Plan.

3. A list of at least 10 completed facilities, totaling 10,000,000 square feet minimum for which the Installer has completed installing polyethylene Geomembrane. Include facility name, location, installation date, Geomembrane type, and quantity installed.

4. List of field crew personnel, along with pertinent project experience information.

E. Installation panel layout diagram identifying placement of Geomembrane panels and seams and variances or additional details that deviate from engineering drawings. Following approval, to change the layout without permission from OWNER/ENGINEER.

F. Submittals during installation:

1. Daily records/logs prepared by installer documenting the work performed (i.e., productivity), personnel involved, general working conditions, and any problems encountered or anticipated on the project.

2. Subgrade acceptance forms prepared by installer for each day Geomembrane was deployed.

3. Quality control documentation (i.e., trial seam tests, destructive tests, nondestructive tests).

4. Field tensiometer calibration certificate. Latest calibration within 3 months the start of Geomembrane installation.

5. Geomembrane installer to provide Dane County with estimated number of days to complete the work.

G. Submittals after completion of installation:

1. Geomembrane installation certification stating the Geomembrane was installed in accordance with the contract documents.

2. As-built panel layout diagram.

3. Warranty from manufacturer/installer

1.6 DELIVERY, STORAGE, AND HANDLING

A. Shipping: Ship Geomembrane liner rolled onto cores that allow for easy handling and deployment.

B. Transportation: Unload and handle Geomembrane rolls by appropriate means to prevent damage.

C. On-Site Storage: Provide on-site storage location for Geomembrane material with level base that protects the Geomembrane from punctures, abrasions, and excessive dirt and moisture.

D. On-Site Handling: Use appropriate handling equipment when moving Geomembrane rolls. Instructions for moving shall be given by manufacturer.

1.7 WARRANTIES

A. Manufacturer/Installer shall provide written 2-year warranties from date of substantial completion. Warranties shall address quality of material and workmanship.

PART 2. PRODUCTS

2.1 MANUFACTURERS

A. HDPE Geomembranes

Agru America, Inc.
500 Garrison Road
Georgetown, SC 29440
1-800-321-1379

Poly-Flex, Inc.
2000 West Marshall Drive
Grand Prairie, TX 75051
1-888-765-9359

GSE, Environmental, Inc.
19103 Gundle Road
Houston, TX 77073
1-800-435-2008

B. Substitutions: Submit request to OWNER/ENGINEER with complete supporting technical information under provisions of Section 01600.

2.2 MATERIALS

A. Polyethylene Geomembrane Resin

1.	Specific Gravity/Density	ASTM D792, Method B or ASTM D1505	0.932 minimum
2.	Melt Index	ASTM D1238 (190°C & 2.16 kg)	1.0 g/10 minute maximum

3. Resin: Virgin material with no more than 10 percent rework (by weight). Rework material to be of the same formulation as parent material. No post-consumer resin allowed.

B. HDPE Geomembrane

1. Manufactured from top quality resin.

2. No more than 1 percent (by weight) of additives, fillers, or extenders, excluding carbon black.

3. Free of holes and shall have no undispersed raw materials, striations, scratches, or blemishes on Geomembrane surface.

4. Carbon black for ultraviolet protection, added during the manufacture of the Geomembrane.

5. Uniform textured appearance.

C. Fabrication

1. Supply Geomembrane in factory-produced rolls. No factory seams may be used to prepare larger Geomembrane panels for delivery to the site.

2. Label each Geomembrane roll with the following information:

- Name of manufacturer.
- Product type and identification number (if any).
- Nominal product thickness.
- Roll number.
- Roll dimensions.

2.3 ACCEPTANCE TESTING REQUIREMENTS

Evaluate and test Geomembrane rolls prior to acceptance. OWNER/ENGINEER or a designated, independent geosynthetics laboratory may perform additional testing (i.e., conformance testing and direct shear testing) to verify that HDPE Geomembrane meets the specifications and project requirements. Testing requirements are detailed in following subsections:

A. Manufacturer's Quality Control Testing

Perform tests on HDPE Geomembrane at frequencies given in Tables 02070-1 and Table 02070-2 prior to shipping.

Submit test results to OWNER/ENGINEER prior to shipping Geomembrane rolls. Submit single-point constant tensile load test results to OWNER/ENGINEER within 14 days of shipping. OWNER/ENGINEER will evaluate test results as discussed in Subsection 2.3(C).

Table 02070-1
High Density Polyethylene (HDPE) Geomembrane – Smooth (On Base in Horizontal Expansion Area of the Cell Per the Drawings)

PROPERTIES	TEST METHOD	TEST VALUE (60 mils)	TESTING FREQUENCY
Thickness (min. average) ▪ Lowest individual of 10 values	D5199	Nom. -10%	Per roll
Density mg/L (minimum)	D1505/D792	0.940 g/cc	200,000 lb
Tensile Properties (min. average)(1) ▪ Yield strength ▪ Break strength ▪ Yield elongation ▪ Break elongation	D6693 Type IV	 126 lb/in. 228 lb/in. 12% 700%	20,000 lb
Tear Resistance (min. average)	D1004	42 lb	45,000 lb
Puncture Resistance (min. average)	D4833	108 lb	45,000 lb
Stress Crack Resistance(2)	D5397 (App.)	500 hr.	per GRI-GM10
Carbon Black Content (range)	D4218(3)	2.0–3.0%	20,000 lb
Carbon Black Dispersion	D5596	Note (4)	45,000 lb
Oxidative Induction Time (OIT) (min. average)(5) ▪ Standard OIT —or— ▪ High Pressure OIT	 D3895 D5885	 100 min. 400 min.	200,000 lb
Oven Aging at 85°C(5)(6) ▪ Standard OIT (min. average) - % retained after 90 days —or— ▪ High Pressure OIT (min. average) - % retained after 90 days	D5721 D3895 D5885	 55% 80%	Per each formulation
UV Resistance(7) ▪ Standard OIT (min. average) —or— ▪ High Pressure OIT (min. average) - % retained after 1,600 hours(9)	D7238 D3895 D5885	 N.R.(8) 50%	Per each formulation

Notes:

(1) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.

— Yield elongation is calculated using a gauge length of 1.3-inches.

— Break elongation is calculated using a gauge length of 2.0-inches.

(2) The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.

(3) Other methods such as D1603 (tube furnace) or D6370 (TGA) are acceptable if an appropriate correlation to D4218 (muffle furnace) can be established.

(4) Carbon black dispersion (only near spherical agglomerates) for 10 different views:

— 9 in Categories 1 or 2, and 1 in Category 3.

(5) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the Geomembrane.

(6) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90-day response.

(7) The condition of the test should be 20-hour UV cycle at 75°C, followed by 4-hour condensation at 60°C.

(8) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.

(9) UV resistance is based on percent retained value of the original HP-OIT value.

Table 02070-2
High Density Polyethylene (HDPE) Geomembrane – Textured
(On Base and Berm Sideslopes in Horizontal Expansion Area of Cell and over the Vertical Expansion Area of Cell per the Drawings)

PROPERTIES	TEST METHOD	TEST VALUE (60 mils)	TESTING FREQUENCY
Thickness (min. average) ▪ Lowest individual for 8 out of 10 values ▪ Lowest individual for any of the 10 values	D5994	Nom. (-5%) 10% 15%	Per roll
Asperity Height (min. average)(1)	D7466	16 mil.	Every second roll(2)
Density (min. average)	D1505/D 792	0.940 g/cc	200,000 lb
Tensile Properties (min. average)(3) ▪ Yield strength ▪ Break strength ▪ Yield elongation ▪ Break elongation	D6693 Type IV	 126 lb/in. 90 lb/in. 12% 100%	20,000 lb
Tear Resistance (min. average)	D1004	42 lb	45,000 lb
Puncture Resistance (min. average)	D4833	90 lb	45,000 lb
Stress Crack Resistance(4)	D5397 (App.)	500 hr.	per GRI-GM10
Carbon Black Content (range)	D4218(5)	2.0–3.0%	20,000 lb
Carbon Black Dispersion	D5596	Note (6)	45,000 lb
Oxidative Induction Time (OIT) (min. average)(7) ▪ Standard OIT —or— ▪ High Pressure OIT	 D3895 D5885	 100 min. 400 min.	200,000 lb
Oven Aging at 85°C(7)(8) ▪ Standard OIT (min. average) - % retained after 90 days —or— ▪ High Pressure OIT (min. average) - % retained after 90 days	D5721 D3895 D5885	 55% 80%	Per each formulation
UV Resistance(9) ▪ Standard OIT (min. average) —or— ▪ High Pressure OIT (min. average) - % retained after 1,600 hours(11)	D7238 D3895 D5885	 N.R.(10) 50%	Per each formulation

Notes:
(1) Of 10 readings, 8 out of 10 must be ≥ 7 mils, and lowest individual reading must be ≥ 5 mils. Also see Note 6.
(2) Alternate the measurement side for double-sided textured sheet.
(3) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
— Yield elongation is calculated using a gauge length of 1.3-inches.
— Break elongation is calculated using a gauge length of 2.0-inches.
(4) P-NCTL test is not appropriate for testing Geomembranes with textured or irregular rough surfaces. Test should be conducted on smooth edges of textured rolls or on smooth sheets made from the same formulation as being used for the textured sheet materials. The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.
(5) Other methods such as D1603 (tube furnace) or D6370 (TGA) are acceptable if an appropriate correlation to D4218 (muffle furnace) can be established.
(6) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
— Nine in Categories 1 or 2, and 1 in Category 3.
(7) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the Geomembrane.
(8) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90-day response.
(9) The condition of the test should be 20-hour UV cycle at 75°C, followed by 4-hour condensation at 60°C.
(10) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.
(11) UV resistance is based on percent retained value of the original HP-OIT value.

B. Conformance Test Samples

Conformance samples will be obtained by OWNER/ENGINEER at a minimum rate of one sample per 100,000 square feet of Geomembrane delivered or to be delivered to the site. At least one conformance sample will be obtained from Geomembrane rolls representing each resin production batch. Samples may also be collected from each roll and tested for thickness. Samples will genrerally be collected at the manufacturing plant prior to shipment to the site by a laboratory technician affileated the geosynthetic testing laboratory.

Samples collected on-site: Conformance samples will be 3-feet long by the full width of the roll and not the first 3-feet of any roll or of the size required by the geosynthetic testing Laboratory. Geomembrane thickness samples will be of the size required by the geosynthetic testing laboratory. Table 02070-1 and Table 02070-2 list conformance tests and test methods that may be performed on Geomembrane roll samples. At a minimum, the conformance testing required by Wisconsin Administrative Code NR 516.07(2)(a) will be conducted by OWNER/ENGINEER. OWNER/ENGINEER will perform testing through use of a recognized testing laboratory. OWNER/ENGINEER will evaluate test results as discussed in Subsection 2.3(C).

MANUFACTURER shall not ship Geomembrane rolls to the site until Manufacture test results have been evaluated by OWNER/ENGINEER and accepted for shipment.

OWNER will bear the cost for conformance testing. The cost for retesting samples required due to failing test results shall be paid by CONTRACTOR.

C. Procedures for Determining Geomembrane Roll Test Failures

Table 02070-1 and 02070-2 lists the acceptance Specifications. For tests results reported in both machine and cross direction, compare results from each direction to listed Specifications to determine acceptance. For test methods requiring multiple specimens, criteria in Table 02070-1 and 02070-2 must be met based on average results of multiple specimen tests. Use the following procedures for interpreting results:

1. If the test result values meet stated Specifications, then roll and batch, and entire shipment, if applicable, will be accepted based on conformance testing; and

2. If test results do not meet Specifications, then roll and batch must be retested at CONTRACTOR's expense using specimens from the original roll sample or from another sample collected by OWNER/ENGINEER or third-party geosynthetic laboratory. For retesting, perform two additional tests for a failed test procedure.

   If both retest values meet Specifications, then roll and batch will be accepted based on conformance testing; if one additional test fails, then roll and batch must be rejected without further recourse. OWNER/ENGINEER may obtain samples from other rolls in batch. On the basis of testing these samples, OWNER/ENGINEER may choose to accept a portion of batch while rejecting the remainder.

   If retesting does not result in passing these results as defined above, or if there is any other nonconformity with the material Specifications, then Geomembrane rolls must be withdrawn from the site. Do not resubmit these same rolls for use. Remove rejected Geomembrane from the site and replace with acceptable Geomembrane.

D. Direct Shear Testing and Stability Analysis

Identify the proposed Geomembrane manufacturer (and 12 oz. geotextile cushion manufacturer) a minimum of 4 weeks prior to the start of Geomembrane installation to allow OWNER/ENGINEER to conduct direct shear testing on the selected Geomembrane material.

OWNER/ENGINEER will collect Geomembrane samples (and 12 oz. geotextile cushion) for direct shear testing at Manufacturer's plant as directed by OWNER/ENGINEER. OWNER/ENGINEER will collect samples of on-site soil/material for direct shear testing. OWNER/ENGINEER will perform the required testing through the use of a recognized geosynthetic testing laboratory. OWNER will bear the cost for direct shear testing.

OWNER/ENGINEER will perform slope stability calculations using the direct shear test results on materials proposed for construction. OWNER/ENGINEER will determine if the proposed Geomembrane will be acceptable or unacceptable based on the evaluation of the stability analysis.

PART 3. EXECUTION

3.1 EARTHWORK PREPARATION

A. Prepare foundation and complete subgrade surface that will support Geomembrane. Excavate, backfill, and compact the anchor trenches to dimensions and at locations shown on Drawings.

B. Prior to Geomembrane deployment, visually examine subgrade surface to confirm suitability for deployment of Geomembrane thereon. Verify that subgrade is firm, smooth, and uniform; and free of excessive moisture, abrupt changes in grade, cracking, protruding stones, that could damage the Geomembrane and clay clods (greater than ½-inch), vegetation, and other deleterious debris. Refinish subgrade surface found to be unsuitable for deployment of the Geomembrane. Provide OWNER/ENGINEER with written acceptance of the subgrade surface over which panels are to be deployed for each day of panel deployment.

C. Deploy Geomembrane over prepared and acceptable subgrade surface as soon as practicable after the subgrade has been completed and is suitable for deployment of Geomembrane.

3.2 INSTALLATION - PANEL DEPLOYMENT

A. Install Geomembrane according to approved layout drawing. Notify OWNER/ENGINEER of revisions or modifications to approved plan prior to installing the Geomembrane. Upon placement, identify each panel by roll number, and panel number, and date deployed.

B. Do not place Geomembrane during precipitation, in areas of ponded water, or during excessive winds. OWNER/ENGINEER may order the suspension of work during such conditions.

C. Maintain documentation of above conditions in the daily installation records, and provide such documentation to OWNER/ENGINEER. Inform OWNER/ENGINEER if above conditions are not met.

D. Verify the following:

1. Equipment does not damage Geomembrane.

2. Prepared surface underlying Geomembrane has not deteriorated since previous acceptance, and is still acceptable at time of Geomembrane placement.

3. Personnel working on Geomembrane do not smoke, wear damaging footwear or clothing, or engage in activities that could damage the Geomembrane.

4. Methods and equipment used to unroll and seam the Geomembrane do not cause scratches, crimps, or gouges in the Geomembrane.

5. Method used to place the rolls minimizes wrinkles (especially wrinkles between adjacent panels).

6. Adequate temporary loading or anchoring (continuously placed, if necessary) does not damage Geomembrane.

7. No vehicular traffic operates directly over Geomembrane, except for balloon-tire all-terrain vehicles (ATVs) when approved by OWNER/ENGINEER.

Immediately notify OWNER/ENGINEER if these conditions are, or have been, violated, and take immediate steps to mitigate any damage.

E. Examine each roll for damage after placement and prior to seaming. Inform OWNER/ENGINEER as to which rolls, or portions of rolls, should be rejected or repaired. Mark and remove from site damaged rolls or portions of rolls that have been rejected, at no risk, or expense to OWNER. Notify OWNER/ENGINEER when such removal occurs.

3.3 INSTALLATION - FIELD SEAMS

A. Seam Layout:

1. Orient seams parallel to the line of maximum slope. Do not orient seams across slopes steeper than 5:1 (horizontal to vertical). Minimize the number of seams in corners, at other odd-shaped geometric intersections, in leachate collection trenches, and in Leachate Collection Sump.

2. Do not locate any horizontal seams on slopes steeper than 5:1 (horizontal to vertical).

3. Slope panels must extend a minimum of 5-feet beyond the grade break onto the flat base area.

4. Use a seam numbering system comparable to, and compatible with, the Geomembrane panel numbering system.

5. No longitudinal seams will be allowed in any leachate collection pipe trenches unless prior authorization is obtained by OWNER/ENGINEER.

B. Seaming Processes/Equipment

1. Use the approved processes for field seaming (welding), which are extrusion welds and dual hot wedge fusion welds. Other processes require written authorization from OWNER/ENGINEER. Dual hot fusion weld all linear seam. Dual fusion weld corners, butt seams, and long repairs where possible.

2. Comply with the following requirements regarding use, availability, and cleaning of extrusion welding equipment:

   a. Equip welding apparatus with operational thermocouples to continuously monitor temperature in barrel and at nozzle.

   b. Clean and purge extruder prior to beginning seaming until heat-degraded extrudate has been removed from the barrel.

   c. Check vital mechanical components, i.e., Teflon shoes, brushes, and thermostats, daily.

   d. Place electric generator for equipment on a smooth base such that no damage occurs to the Geomembrane.

   e. Place a smooth insulating plate or fabric beneath hot equipment after usage to protect Geomembrane.

3. Comply with the following requirements regarding use, availability, and cleaning of dual hot wedge fusion welding equipment:

   a. Equip welding apparatus to continuously monitor applicable temperatures. Verify and document temperatures daily.

   b. Ground edge of cross seams to a smooth incline (top and bottom) prior to welding. Patch cross seams after welding.

   c. Place electric generator for equipment on a smooth base such that no damage occurs to the Geomembrane.

   d. Place a smooth insulating plate or fabric beneath hot equipment after usage to protect Geomembrane.

C. Seaming Requirements/Procedures

1. Perform Geomembrane seaming under the following weather conditions only:

   a. Ambient temperature at least 32°F (0°C) but no higher than 104°F (40°C), unless authorized in writing by OWNER/ENGINEER. Measure temperatures 1- to 2-feet above the Geomembrane surface using a conventional mercury thermometer.

   b. Dry Geomembrane.

   c. No ponded water has collected above or below the surface of the Geomembrane.

2. For seaming at ambient temperatures below 32°F or above 104°F, demonstrate to OWNER/ENGINEER that the methods and techniques used to perform the seaming produce seams that are entirely equivalent to seams produced at temperatures above 32°F and below 104°F, and that the overall quality of the Geomembrane is not adversely affected. OWNER/ENGINEER may, at his/her sole discretion, deny approval for use of proposed technique regardless of demonstration results.

3. For overlapping and temporary bonding, use the following procedures:

    a. Provide sufficient overlap between Geomembrane panels to perform extrusion or fusion welding, in accordance with manufacturer's recommendation, and allow peel tests to be performed on the seam. Cap seam if there is insufficient overlap.

    b. Do not use solvents or adhesives on Geomembranes unless the product has been approved in writing by OWNER/ENGINEER based upon samples and data sheets submitted to OWNER/ENGINEER for testing and evaluation.

    c. Do not use procedures to temporarily bond adjacent Geomembrane rolls that will damage the Geomembrane; in particular, control the nozzle temperature of the spot welding apparatus to protect the Geomembrane from potential damage. Keep spot welding to a minimum. Spot welding is subject to weather restrictions listed above. Perform spot welding only by approved seaming personnel pursuant to Subsection 1.4 of this specification.

4. Make trial seams on nondeployed Geomembrane seams at the beginning of each seaming period and at least once every 5 hours during continuous operation with each welding machine by each seaming technical performing Geomembrane welding with that machine. Make trial seams under the same conditions as actual seams. Trial seams are also required for welding equipment for which the power supply has been interrupted. Seaming personnel must make at least one satisfactory trial seam each day to demonstrate satisfactory abilities. Satisfactory trial seams must pass the inspection and testing described below.

    a. Ensure that trial seam samples are at least 3-feet long by 1-foot wide after seaming, with the seam centered along its length.

    b. Inspect trial seams for proper squeeze-out, footprint pressure, and general appearance. If general appearance is acceptable, then cut five specimens, 1-inch in width, from each end of the trial seam sample. Give remainder of trial seam to OWNER/ENGINEER.

    c. Subject five specimens to a shear test and five specimens to a peel test (dual fusion welds shall be tested for peel on both sides of the air channel). If test specimens exhibit a film-tear bond and meet acceptance specifications listed in Subsection 3.5 Table 02070-3, then the trial seam is satisfactory.

d. If the trial seam fails the field test or inspection, make a second trial seam (either with or without adjustments in the seaming techniques), and inspect and test it. If no inspection or test on the second trial seam fails, then the trial seam is satisfactory. If the second trial seam fails, then adjust the seaming apparatus or seaming technique as necessary until two consecutive, satisfactory trial seams are obtained.

5. Seam Preparation:

a. Ensure that the seam area is clean and free of moisture, dust, dirt, debris, and foreign material prior to seaming.

b. Align seams so as to minimize the number of wrinkles and "fishmouths."

6. General Seaming Procedures:

a. Use dual hot wedge fusion welding for all linear seams.

b. Use dual fusion welding for corner seams, butt seams, and long repairs where possible.

c. Extend welded seam to the end of Geomembrane panels placed in anchor trenches to minimize the potential for tear propagation along the seam.

d. Whenever possible, start field seaming from top of slope down, to minimize the development of wrinkles. Use hot air only when making tack welds; no double-sided tape, glue, or other method is permitted.

e. Ensure that the completed liner does not exhibit "bridging" or "trampolining" when protective cover or other materials are placed over Geomembrane.

f. “Walk out” fishmouths or wrinkles at seam overlaps if possible, or cut along ridge of wrinkle in order to achieve a flat overlap, and then weld along overlap and patch each end.

g. Provide adequate illumination when seaming operations are to be conducted at night.

h. When restarting an extrusion seam, grind end of existing extrusion bead, and start new seam with less than a 2-inch overlap of existing bead.

3.4 NONDESTRUCTIVE TESTING

A. Nondestructively test each field seam over its full length using one of the methods described in this section. Perform nondestructive testing concurrently with seaming and do not await completion of the project's seaming. Air pressure testing is only applicable to dual hot wedge fusion seams.

B. Vacuum Box Testing

1. Vacuum box testing equipment:

a. Vacuum box with open bottom, clear viewing panel on top, and pliable gasket attached to the bottom.

b. Vacuum pump assembly equipped with pressure controller and pipe connections capable of achieving a vacuum of 2 psig.

c. Vacuum gauge on vacuum box with an operating range of vacuum pressures from 0 to 5 psig.

d. Soapy solution compatible with the Geomembrane and conductive to the formation of bubbles with a means to apply.

2. Vacuum box test procedures:

a. Ensure that seams are clean and relatively free from soil or foreign objects.

b. Wet seam approximately twice the length of the vacuum box with a soapy solution.

c. Center vacuum box with gasket in contact with the Geomembrane surface over the wetted area of the seam.

d. Apply normal force to the top of the vacuum box, Energize vacuum pump, and create a vacuum in vacuum box of 2 to 10 psig. (Ensure that a tight seal is created between the Geomembrane and vacuum box.)

e. Examine the Geomembrane seam through the viewing panel for bubbles for a period of not less than 10 seconds.

f. Remove the vacuum box after removing or bleeding vacuum from the vacuum box. Proceed to step g if bubbles appeared in step e. If no bubbles appeared in step e, move vacuum box over the next adjoining area with a minimum 3-inch overlap, and repeat the process.

g. If bubbles appeared through the Geomembrane, then mark the defective area with an appropriate device for repair according to the provisions of Subsection 3.6(C).

C. Air Pressure Testing

1. Air pressure testing equipment:

a. Air compressor with pressure gauge and regulator capable of producing and sustaining a pressure between 25 and 30 psig.

b. Fittings, rubber hose, valves, etc., to operate the equipment and a sharp hollow needle, or other pressure feed device, if approved by OWNER/ENGINEER.

2. Air pressure testing procedures:

   a. Seal both ends of the seam to be tested.

   b. Insert needle into air channel of dual hot wedge seam.

   c. Inflate airspace with compressor to a pressure of approximately 30 psig, close valve, and monitor pressure in the air channel for approximately 7 minutes.

   d. Record pressure at the end of 2 minutes and again at the end of 7 minutes.

   e. If the pressure difference between the 2-minute and the 7-minute readings exceeds 2 psi, or if the pressure does not stabilize within the 2-minute period, one more 5-minute pressure monitoring interval will be allowed.

   f. If the pressure loss over both 5-minute intervals exceeds 2 psig or if the pressure does not stabilize, then the seam fails the test.

   g. If the pressure loss over either 5-minute interval does not exceed 2 psig, then the seam may be deemed by the installer to have passed the test.

   h. Cut the end of the tested seam interval opposite the pressure gauge to verify that air channel tested was not obstructed by noting a release of air pressure.

3. For seam intervals failing the air pressure nondestructive test, perform additional nondestructive testing or visual inspection to identify, if possible, the faulty area of the seam. Repair and retest the faulty area. If the faulty area cannot be identified, then repair and retest the entire seam.

D. Nondestructive Seam Test Failures

Repair seams failing nondestructive testing according to Subsection 3.6(C) and subsequently nondestructively retest according to Subsection 3.4.

3.5 DESTRUCTIVE TESTING

OWNER/ENGINEER will have the seam samples laboratory-tested at OWNER's expense. Installer to perform field destructive seam testing.

A. Location and Sampling Frequency

1. OWNER/ENGINEER will select locations where laboratory seam samples shall be cut by installer for destructive testing.

2. Collect laboratory destructive samples at a frequency of not less than one per every 1000 linear feet of seam length. OWNER/ENGINEER may direct that additional samples be cut.

3. Collect and test field end-of-seam destructive samples from at least one end of each fusion welded seam 100 feet or greater in length using a calibrated field tensiometer according to ASTM D4437. Field test a minimum of one sample

specimen each in peel and shear. Results will be evaluated against the criteria presented in Subsection 3.5(E).

B. Sampling Procedure

1. For each sample location, OWNER/ENGINEER will:

   a. Assign a sample number and mark accordingly.

   b. Record sample location on layout drawing.

   c. Record pertinent information, including date, time, number of seaming unit, and name of seamer.

2. Ensure that destructive samples are at least 12-inches wide (at least 5-inches on each side of the seam) by 42-inches long. Cut samples into three parts, and distribute as follows:

   a. Cut and retain a 12-inch by 14-inch portion. Perform field testing on this sample as described in Subsection 3.5(C).

   b. Cut a 12-inch by 12-inch portion and give it to OWNER/ENGINEER for record storage.

   c. Give the remaining 16-inch by 12-inch portion, to OWNER/ENGINEER for testing as described in Subsection 3.5(D).

3. Repair holes cut into the Geomembrane resulting from destructive seam sampling in accordance with Subsection 3.6(C). Nondestructively test repair area in accordance with Subsection 3.4(B).

C. Field Testing

1. Field-test a minimum of five 1-inch wide samples for peel, and field-test a minimum of five 1-inch wide samples for shear. Use a field tensionmeter run at a cross-head speed of 2-inches per minute that has been calibrated within 3 months of the start of Geomembrane installation.

2. Record quantitative and qualitative test results, and evaluate against acceptance specifications listed in Table 02070-3.

3. Implement the procedures of Subsection 3.5(E) if any sample fails the field tensiometer test.

D. Laboratory Testing

1. Test destructive seam samples in general accordance with the methodology of ASTM D4437. Perform peel testing for dual hot wedge fusion welds on both inside and outside tracks.

Table 02070-3
60-mil HDPE Geomembrane Acceptance Specifications

PROPERTY	ASTM TEST METHOD	UNITS	MINIMUM AVERAGE VALUE	
			60 mil NON-TEXTURED	60 mil TEXTURED(1)
Shear Strength(2)	D4437	ppi	120	120
Shear Elongation(2)(6)	--	percent	50	50
Peel Strength(3),(4) - Fusion	D4437	ppi	91	91
Peel Strength(3),(4) - Extrusion	D4437	ppi	78	78
Peel Separation(5)	--	percent	25	25

Notes:

(1) If the lengthwise edges of the textured Geomembrane panels are nontextured, then the nontextured specifications shall apply for the testing of seams made along these edges. For textured to nontextured seams, use the textured specifications.

(2) Five out of the five test specimens shall meet these requirements. In addition, failure type must be film-tear bond (FTB) for all five specimens.

(3) Four out of the five specimens shall meet the three requirements. The fifth specimen shall achieve 80 percent of the listed peel strength.

(4) Failure type shall be film-tear bond (FTB) for five out of five test specimens.

(5) Maximum Acceptance Value for five out of five test specimens. The locus-of-break patterns of the different seaming methods in shear and peel, the following are unacceptable break codes per their description in ASTM D6392 (in this regard, SIP is an acceptable break code):

- Hot Wedge: AD and AD-BrK >25%.
- Extrusion Fillet: AD1, AD2, and AD-WLD (unless strength is achieved).

(6) Elongation measurements shall be omitted for field testing.

2. Perform the following tests on each destructive seam sample:

   a. Shear strength, expressed in pounds per inch width (ppi), when tested in general accordance with ASTM D4437.

   b. Peel strength, expressed in pounds per inch width (ppi), recorded during the peel test in general accordance with ASTM D4437.

3. Ensure that the shear test gauge length is 2-inches between each edge of the seam and the adjacent grip. Maintain crosshead speed of 2-inches per minute. Monitor load and cross-head displacement during the test.

4. Ensure that peel test grips are no closer than 1-inch to the edge of the seam unless material is insufficient to allow insertion at this setting. Maintain cross head speed of 2-inches per minute.

5. Report the following values, along with mean and standard deviation where appropriate for each specimen tested in shear:

   a. Maximum tension in pounds per square inch.

   b. Elongation at break (up to a tested maximum of 100 percent).

   c. The locus of failure.

6. Report the following values, along with mean and standard deviation where appropriate for each specimen tested in peel:

   a. Maximum tension in pounds per square inch.

   b. Seam separation (expressed as percent of original seam area).

   c. Locus of failure.

7. Retesting of seams, because of failure to meet any or all of the specifications, may be performed at the sole discretion of OWNER/ENGINEER.

E. Destructive Seam Test Failure

1. Evaluate results from the shear and peel tests against the criteria tabulated in Table 02070-3. Meet Table 02070-3 criteria for the seam to be considered acceptable.

2. Determine the repair boundary whenever a seam has failed the destructive testing following one of two options:

   a. Reconstruct the seam path between any two previously tested and passed field and laboratory destructive sample locations; or

   b. Trace the welding path to an intermediate location at least 10-feet from the point of the failed test in each direction, and obtain destructive test samples at these intermediate locations. If the destructive tests on these samples are acceptable, then reconstruct the seam between these intermediate locations. If either sample fails, then repeat the process until an acceptable seam test has been performed on both sides of the

original failed sample. If a passing sample is not found on one (or both) sides of the original failed sample, then extend the seam repair to the end(s) of the seam. Continue to track the failing seam path, as necessary, and as appropriate, past the end(s) and onto the prior seams and following the seams made with the same welding equipment. For the retesting of seams, according to this procedure, use the sampling methodology described in Subsection 3.5(B). Continue tracking the seam path until passing field and laboratory destruction sample locations are found at both ends of the seam path, even if seaming occurred by the machine days prior or days after welding the failing destruct seam. An additional sample taken from the reconstructed zone must pass destructive seam testing, if destructive sample failure(s) causes the reconstruction and the length of the reconstructed seam is greater than 150 feet.

3.6 DEFECTS AND REPAIRS

A. Examine seam and nonseam areas of the Geomembrane to identify defects, holes, blisters, undispersed raw materials, and signs of contamination by foreign matter. Clean the surface of the Geomembrane at the time of examination. Groom and wash Geomembrane surface if the amount of dust or mud inhibits examination. Provide a water truck, an operator, and water and hoses as reasonably necessary to assist in such washing.

B. Evaluation

1. Mark each location requiring repair due to failure of the nondestructive test, observations, examinations, or destructive tests.

2. Do not cover locations that have been repaired or replaced until these locations are examined by OWNER/ENGINEER and testing results indicate passing values.

C. Repair or replace portions of the Geomembrane exhibiting a flaw, or failing a destructive or nondestructive test. Several procedures exist for the repair of these areas, as follows:

1. Patching—for repair of large holes, tears, undispersed raw materials, contamination by foreign matter, holes resulting from destructive sampling, and locations where the seam overlap is insufficient.

2. Spot welding or seaming—for repair of small tears, pinholes, or other minor, localized flaws.

3. Capping—for repair of large lengths of failed seams.

4. Removal and replacement—used to replace nonconforming or damaged panels or portions thereof.

5. Additional procedures if agreed upon by OWNER/ENGINEER.

D. Extend patches and caps at least 6-inches beyond the edge of the defect. Round the corners of patches and caps. In addition, satisfy the following provisions:

1. Abrade surfaces of the Geomembrane to be repaired no more than 1 hour prior to the repair if extrusion welding techniques are used.

2. Ensure that Geomembrane surfaces are clean and dry at the time of repair.

3. OWNER/ENGINEER must approve repair procedures, equipment, materials, and techniques prior to the repair.

E. Log the repair date, time, welder number, and the name of welder operator for each repair. Nondestructively test each repair. Passing tests indicate adequate repair. Large caps may be of sufficient extent to require destructive test sampling at the discretion of OWNER/ENGINEER.

F. If failing nondestructive tests indicate inadequate repair, reconstruct repair and retest until a passing result is obtained.

G. Cut and seam wrinkles that are higher than they are wide or may adversely affect the long-term integrity of the Geomembrane, hinder subsequent construction of the overlying layers, or impede drainage off the Geomembrane after it is covered by soil. Perform seaming in accordance with the equipment and procedures described in Subsections 3.3(B) and 3.3(C), respectively, and subject to the test provisions of Subsections 3.4 (nondestructive testing) and 3.5 (destructive testing).

3.7 MATERIAL IN CONTACT WITH GEOMEMBRANES

A. Pipe Penetrations and Appurtenances - Verify that the following requirements are met:

1. Non-destructively test seaming performed on and pipe penetrations, and other appurtenances according to one of the following methods: (1) vacuum box method as discussed in Section 3.4; (2) spark testing according to manufacturer's recommended procedures; or (3) factory testing, along with certification, of prefabricated seams (i.e., pipe boots).

2. The Geomembrane has not been visibly damaged while making connection to Leachate Collection Sump and appurtenances.

3. Installation of the Geomembrane in the area of the pipe penetrations and connections of the Geomembrane to these structures and appurtenances have been made according to the approved engineering plans and shop drawings.

B. Soil/Select Aggregate Fill - Requirements for the placement of soil are described in Section 02320. Apply the following general criteria for Work on Geomembranes:

1. Do not place soil on the Geomembrane at an ambient temperature below 32°F, (0°C) nor above 104°F (40°C), unless otherwise specified.

2. Do not drive equipment used for placing the soil directly on the Geomembrane.

3. A minimum thickness of 1-foot of soil is specified between a low ground pressure dozer (maximum contact pressure of 5 psi) and the Geomembrane.

4. A minimum thickness of 2.0-feet of soil is specified between for other tracked vehicles and flotation-tire–equipped vehicles.

5. A minimum thickness of 3.0-feet of soil is specified between rubber-tired vehicles and the Geomembrane, including areas of heavy traffic.

6. On slopes steeper than 6:1, place overlying soil from bottom to top.

3.8 LEAK LOCATION TESTING

A. OWNER/ENGINEER will conduct a Leak Location Survey on the Geomembrane liner after the placement of the leachate drainage layer and leachate piping on the composite liner per NR 516.07(2)(d).

B. Refer to Specification Section 02320 Subpart 3.4 for CONTRACTOR requirements for assisting OWNER/ENGINEER in conducting a Leak Location Survey on the Geomembrane liner.

END OF SECTION

SECTION 02076
GEOTEXTILES

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary for the installation of geotextiles, as specified herein, and as shown on the Drawings, and in accordance with the Construction Quality Assurance (CQA) Plan.

1.2 REFERENCES

A. ASTM D3786 - Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabric - Diaphragm Bursting Strength Tester Method.

B. ASTM D4491 - Standard Test Method for Water Permeability of Geotextiles by Permittivity.

C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

D. ASTM D4595 - Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

E. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

F. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.

G. ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

H. ASTM D5261 - Standard Test Method for Measuring Mass Per Unit Area of Geotextiles.

1.3 QUALITY ASSURANCE

A. Responsibilities and Qualifications:

1. Provide and accept and retain full responsibility for all services of a Geotextile Manufacturer and Installer who meet the following qualifications.

- Manufacturer: Shall be responsible for the production and delivery of geotextile rolls and shall be a well-established firm with more than 2 years' experience in the manufacture of geotextiles. Shall submit a statement listing certified minimum average roll values of the proposed geotextile and the tests used to determine those properties.
- Installer: Shall be responsible for field handling, storing, deploying, seaming or connecting, anchoring, and other site aspects of the geotextiles. Shall be trained and qualified to install geotextiles.

B. Quality Assurance Program: Agree to participate in, and conform to, all items and requirements of the quality assurance program as outlined in this Specification and in the Construction Quality Assurance (CQA) Plan.

1.4 SUBMITTALS

A. Submit the following information no later than 5 days prior to delivery of first shipment.

1. A copy of the quality control certificate for each roll of nonwoven geotextile proposed for delivery to the site. The quality control certificate shall include lot, batch, or roll numbers and identification.

2. The results of the quality control tests. The results shall include sampling frequencies and test methods used.

B. Manufacturer's Certification

On the basis of the results of the tests performed by either the Manufacturer's laboratory or another outside laboratory with which Manufacturer has contracted at its sole cost and expense, Manufacturer shall provide a written certification that the supplied geotextile meets the requirements outlined in this Specification and that the nonwoven geotextile supplied to the site is needle free.

1.5 DELIVERY, STORAGE AND HANDLING

A. Unload and handle geotextiles so as to cause no damage.

B. Protect geotextiles from sunlight, moisture, mud, dirt, and dust, excessive heat or cold, puncture, or other damaging conditions.

C. Handle with care so as not to rupture or puncture geotextiles.

PART 2. PRODUCTS

2.1 MATERIALS

A. 12 oz. Geotextile Cushion (Geotextile Cushion), and geotextile filter used to envelope the Select Aggregate Fill in the Groundwater Gradient Control System trench shall consist of nonwoven polyester or polypropylene. Nonwoven fabric may be needle punched, heat bonded, resin bonded, or combinations thereof.

B. Unless otherwise noted on the Drawings, furnish materials with Minimum Average Roll Values (MARV) that meet or exceed the criteria specified in Tables 02076-1 and 02076-2. Provide test results for these procedures, as well as certification that the materials' properties meet or exceed the specified values.

C. Minimum Average Role Value (MARV) shall be based on Manufacturer's data and shall be calculated as the mean value of the property of interest plus or minus two standard deviations, as appropriate. Where material proprieties vary among the machine and cross-machine directions, the MARV shall apply to the direction providing the lowest value when a minimum value is specified or the highest value when a maximum value is specified.

D. Woven Geotextile used in the construction of the all-weather Access Road will be Mirafi 500x (or equal) woven geotextile

Table 02076-1
Geotextile (Filter)

PROPERTIES AND REQUIREMENTS	QUALIFIER	UNITS	SPECIFIED VALUES[1]	TEST METHOD
Polymer composition	Minimum	Percent	95 percent polypropylene or polyester by weight	
Mass per unit area	Minimum	Ounce/sq. yd.	6	ASTM D5261
Permittivity	Minimum	1/s	1.4	ASTM D4491
Apparent opening size (AOS)	Maximum	Sieve	70	ASTM D4751
Grab strength[2]	Minimum	lb	160	ASTM D4632
Grab elongation[2]	Minimum	Percent	50	ASTM D4632
Tear strength[2]	Minimum	lb	60	ASTM D4533
Puncture strength	Minimum	lb	85	ASTM D4833
Water flow rate	Minimum	gpm/ft^2	110	ASTM D4491

Notes:

1 All values represent minimum average roll values (i.e., all rolls in a lot shall meet or exceed the values in this table).

2 Minimum value measured in machine and cross machine direction.

Table 02076-2
12 oz. Geotextile Cushion (Geotextile Cushion)

PROPERTIES AND REQUIREMENTS	QUALIFIER	UNITS	SPECIFIED VALUES[1]	TEST METHOD
Type	--	--	Nonwoven	--
Polymer composition	Minimum	Percent	95 percent polypropylene or polyester by weight	
Mass per unit area	Minimum	oz/yd^2	12	ASTM D5261
Grab strength[2]	Minimum	lb	300	ASTM D4632
Tear strength[2]	Minimum	lb	115	ASTM D4533
Puncture strength	Minimum	lb	175	ASTM D4833
Grab elongation	Minimum	Percent	50	ASTM D4632

Notes:

1 All values represent minimum average roll values (i.e., all rolls in a lot shall meet or exceed the values in this table).

2 Minimum value measured in machine and cross machine direction.

2.2 ACCEPTANCE TESTING REQUIREMENTS

A. General Requirements: Geotextile rolls will be tested and evaluated prior to acceptance. In general, testing of the geotextile will be conducted by Manufacturer. OWNER/ENGINEER or a designated, independent geosynthetics laboratory may perform additional testing (i.e., conformance testing) as determined necessary by OWNER/ENGINEER to verify that the geotextile meets the specifications.

B. Manufacturing Quality Control

1. Sampling and testing of the geotextile material will be conducted by Manufacturer to demonstrate that the material conforms to the requirements in Part 2.1 of this Section. Submit test results in accordance with the submittal requirement of Part 1.4 of this Section and the CQA Plan.

2. Sampling shall, in general, be performed on sacrificial portions of the material, such that repair of the material is not required.

3. Samples that do not meet the specified properties shall result in rejection of the applicable rolls.

4. At Manufacturer's discretion and expense, additional testing of individual rolls may be performed to more closely identify the noncomplying rolls and/or to qualify individual rolls.

PART 3. EXECUTION

3.1 PREPARATION

A. Grade the area smooth; and remove all stones, roots, sticks, or other foreign material that would interfere with the geotextile being completely in contact with the soil prior to placing the geotextile.

3.2 HANDLING AND PLACEMENT

A. Handle all geotextiles in such a manner as to ensure they are not damaged in any way.

B. Take any necessary precautions to prevent damage to underlying layers during placement of the geotextile. After deployment of the geotextile, the geotextile shall not be left exposed for a period in excess of 30 days unless a longer exposure period is approved by OWNER/ENGINEER, based on a formal demonstration by Manufacturer that the geotextile is stabilized against U.V. degradation for the proposed period of exposure.

C. Take care not to entrap stones, bones, trash or debris between the Geotextile Cushion and the Geomembrane during Geotextile Cushion placement. Remove all debris from the Geomembrane surface prior to placing the Geotextile Cushion over the Geomembrane.

D. Secure all geotextiles with sandbags, or equivalent. Such sandbags shall be installed during placement and shall remain until overlying protective soil cover or other components of the liner system are in place. Sandbag shall not be left in place without prior approval from the OWNER/ENGINEER except for those placed over sheets of plywood along the Delineation Berms to protect the geosynthetics as shown on the drawings.

E. Examine the entire geotextile surface after installation to ensure that no potentially harmful foreign objects are present. Remove any such foreign objects, and replace any damaged geotextile in accordance with Subsection 3.4.

F. Place all soil and geosynthetic materials on top of a geotextile as shown on the Drawings, in such a manner as to ensure that

1. the geotextile and underlying materials are not damaged;

2. minimum slippage occurs between the geotextile and underlying layers; and

3. excess stresses are not produced in the geotextile.

3.3 SEAMS AND OVERLAPS

A. Continuously sew or fusion weld 12 oz. Geotextile Cushion (i.e., spot sewing or fusion welding is not allowed) install above the Geomembrane liner. Seaming method must be approved by the OWNER/ENGINEER. Overlap geotextiles a minimum of 6-inches prior to seaming or 4-inches prior to fusion welding. No horizontal seams shall be allowed on slopes steeper than 5 horizontal to 1 vertical (i.e., seams shall be along, not across, the slopes) unless preapproved by the OWNER/ENGINEER.

B. For all sewing, use polymeric thread, with chemical resistance properties equal to or exceeding those of the geotextile.

C. Geotextile and Geotextile Cushion used in the Groundwater Gradient Control System and under riprap can be seamed by sewing, fusion welding, or overlapping a minimum of 1-foot.

3.4 REPAIR

A. Repair any holes or tears in the geotextile as follows:

1. On slopes steeper than 5 horizontal to 1 vertical, double-seam a patch made from the same geotextile into place (with each seam 0.5-inch apart and no closer than 2-inches from any edge). Should any tear exceed 10 percent of the width of the roll, remove that roll from the slope and replace it with new material.

2. On slopes flatter than or equal to 5 horizontal to one vertical, spot-seam a patch made from the same geotextile in place with a minimum of a 1-foot overlap in all directions.

B. Take care to remove any soil or other material that may have penetrated the torn geotextiles.

END OF SECTION

SECTION 02222
REMOVAL OF MISCELLANEOUS STRUCTURES

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Removal and salvaging of two existing corrugated metal culvert pipes.

B. Removal and relocate one existing 18 inch diameter HDPE downslope flume pipe.

C. Removal and relocate of one concrete energy dissipater.

D. Existing Monitoring wells or Gas probes in area of construction activities for Phase 10 – Cell 2 will be abandoned and replaced or extended by OWNER prior to beginning of the Phase 10 – Cell 2 liner construction.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

3.1 PREPARATION

A. Protect existing structures such as manholes, vaults, pavement, culvert pipe, gas probes, monitoring wells, and piping which are not to be removed or disturbed.

B. Mark location of disconnected utilities (if any). Identify utilities and indicate capping locations on Project Record Drawings.

3.2 EXECUTION

A. Remove structures and appurtenances in an orderly and careful manner. Leave site in clean condition.

B. Except where noted otherwise, immediately remove demolished material from site.

C. Remove materials to be reinstalled or retained in manner to prevent damage.

D. Remove for storage/disposal by OWNER the following materials and equipment:

1. Existing corrugated metal culverts. Location of culverts are shown on the drawings.

E. Remove and relocate the following materials

1. One existing 18 inch diameter HDPE corrugated with smooth wall interior downslope flume pipe located within the footprint of the Phase 10 – Cell 2 liner construction area. Area where flume will be relocated is shown on the drawings.

2. One existing 64 inch by 68 inch concrete energy dissipater located at the end of the existing 18 diameter flume pipe and within the footprint of the Phase 10 – Cell 2 liner construction area. Area where dissipater will be relocated is shown on the drawings.

F. Dispose of culvert to be removed to an area at the landfill as identified by the OWNER/ENGINEER

G. Do not burn or bury material on-site without approval of the OWNER/ENGINEER.

H. Backfill excavated areas and open holes caused as a result of removal. Use soil specified in Section 02320 - Fill.

I. Rough grade and compact areas affected by removal to maintain site grades and contours.

END OF SECTION

SECTION 02232
CLEARING AND GRUBBING

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Clearing, stripping, grubbing, removing, and disposing of plant life, including dead and decayed matter, that exists within the Limits of Construction areas and which are not specifically designated to remain.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

3.1 CLEARING AND GRUBBING

A. CONTRACTOR will provide all Clearing and Grubbing prior to the start of Phase 10 – Cell 2 construction.

B. CONTRACTOR will remove stumps, roots, shrubs, brush and logs to a minimum depth of 2-feet below ground surface.

3.2 DISPOSAL

A. CONTRACTOR will dispose, chip, or salvage Cleared and Grubbed materials prior to the start of Phase 10 – Cell 2 construction.

3.3 PROTECTION OF EXISTING TREES AND VEGETATION

A. Preserve and protect trees not cleared and grubbed by the OWNER and intended to remain for landfill screening. Do not remove any trees, shrubs, or brush without prior approval from the OWNER.

END OF SECTION

SECTION 02315
EXCAVATION

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Stripping Topsoil to the extent possible and stockpiling on-site. Finish grading of stockpiles that will remain after Phase 10 – Cell 2 construction.

B. Digging, moving, and stockpiling of materials including finish grading to the extent and elevations shown on the Drawings.

C. Constructing perimeter diversion berms and drainage ditches.

D. Measurement based on the length of berms and ditches.

PART 2. PRODUCTS

NOT USED.

PART 3. EXECUTION

3.1 PREPARATION

A. Remove ice and snow before excavation.

B. Identify required construction survey control lines and datum.

3.2 EXCAVATION

A. Grade perimeter of excavation to prevent surface water drainage into excavation.

B. Notify OWNER/ENGINEER of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

C. Stockpile excess excavated General Fill (refer to Section 02320) and Topsoil (refer to Section 02911) in excess soil stockpile areas designated on the Drawings. Grade to provide positive drainage. CONTRACTOR will install Sediment Control Fence around the stockpiles prior to beginning of construction for Phase 10 – Cell 2 as indicated on the Drawings. Place a minimum 4-inches of Topsoil over the General Fill stockpile and seed with WisDOT #20 seed mixture and 131 pounds per acre of oats after stockpiling of General Fill is complete.

D. Use suitable excavated material as General Fill in accordance with Section 02320

3.3 FINISHING

A. Blend slopes with existing landscape features, at the intersection of cuts and fills; provide gradual slope between new and existing construction.

B. Finish to elevations shown within 0.10-foot tolerance. Use GPS-enabled equipment to finish grade areas outside the Limits of Composite Liner Construction.

3.4 FIELD QUALITY CONTROL

A. Identify materials within the excavation areas which will meet the required specifications for Topsoil (Section 02911) and General Fill Section 02320). Excavate and place unsuitable soils encountered during excavation in a stockpile within the Limits of Construction in an area identified by the OWNER/ENGINEER.

3.5 PROTECTION

A. Notify all area utility companies prior to commencing work in accordance with state and local regulations.

B. Locate, identify, and protect existing utilities from damage.

C. Protect bench marks, survey monuments, monitoring wells, existing structures, fences and gates, sidewalks, paving, and curbs from damage by excavation equipment and vehicular traffic.

D. Protect excavations by shoring, bracing, sheet piling, or other methods required to prevent cave-in or loose soil from falling into excavation.

E. Underpin adjacent structures which may be damaged by excavation Work, including service utilities and piping.

F. Do not remove or disturb any materials outside the Limits of Construction.

G. Keep excavations free from water by pumping or constructing diversion berms and/or ditches to divert water.

H. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

END OF SECTION

SECTION 02316
EXCAVATION UNDERCUT

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Removing and disposing of unsuitable subgrade soils encountered in the Groundwater Gradient Control subgrade and in the Select Clay Fill subgrade.

B. Backfilling and compacting undercut area.

PART 2. PRODUCTS

2.1 MATERIALS

A. Backfill: General Fill in accordance with Section 02320.

PART 3. EXECUTION

3.1 INSPECTION

A. OWNER/ENGINEER will monitor and measure the Excavation Undercut.

B. No compensation will be made for Excavation Undercut not monitored by the OWNER/ENGINEER.

3.2 PERFORMANCE

A. Excavate and backfill the Undercut in compliance with Section 02317 (Trenching, Backfilling and Compacting).

B. Compact the backfill material to at least 90 percent of the maximum dry density as determined by the Modified Proctor (ASTM D1557) or 95 percent of the maximum dry density as determined by the Standard Proctor (ASTM D698).

3.3 DISPOSAL

A. Excavate and stockpile unsuitable soils in an area within the Limits of Construction as directed by OWNER/ENGINEER.

3.4 FIELD QUALITY CONTROL

A. Proof-roll the subbase grades using a partially loaded haul truck or equipment approved by the OWNER/ENGINEER prior to placing Select Clay Fill in the clay liner. Conduct subbase proof rolling in the presence and observation of the OWNER/ENGINEER. OWNER/ENGINEER will determine locations and extents of the subbase, if any, requiring undercutting and backfilling.

B. OWNER/ENGINEER will perform the same number of tests specified for General Fill material under Section 02320.

END OF SECTION

SECTION 02317
TRENCHING, BACKFILLING, AND COMPACTING

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Excavating trenches, backfilling, and compacting for installation of piped utilities.

B. Dewatering, protection and maintenance of trench, support of existing structures, sheeting and shoring, hauling and disposal of excess excavated materials and fill.

1.2 REFERENCES

A. OSHA 29 CFR Part 1926, Occupational Safety and Health Standards - Excavations.

PART 2. PRODUCTS

2.1 BACKFILL MATERIALS

A. Backfill: Select Fill complying with Section 02320 to the minimum thicknesses and extents indicated the drawings.

2.2 BEDDING MATERIALS

A. For pipes greater than 10-inches in diameter:

Bedding material to the thickness and extent as indicated on the drawings. Use Select Granular Fill in accordance with Section 02320 if not identified on the drawings.

B. For all pipes less than 10-inches in diameter:

Bedding material to the thickness and extent as indicated on the drawings. Use Select Granular Fill in accordance with Section 02320 if not identified on the drawings.

PART 3. EXECUTION

3.1 PREPARATION AND RESTORATION

A. Remove sod, Topsoil, and other surface treatment and restore to original condition or better upon completion of the Work.

3.2 PROTECTION

A. Comply with OSHA 29 CFR Part 1926, Occupational Safety and Health Standards - Excavations

B. Protect excavations by shoring, bracing, sheet piling, or other methods required to prevent cave-in or loose soil from falling into excavation.

C. Place excavated and other material 2-feet minimum back from edge of trench excavation.

D. Minimum trench excavation slope to be in compliance with OSHA 29 CFR Part 1926. Terrace trench where necessary to provide a stable trench.

E. Underpin adjacent structures which may be damaged by excavation Work, including utilities and piping.

F. Notify OWNER/ENGINEER immediately of unexpected subsurface conditions.

G. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

3.3 TRENCHING

A. Excavate to the design alignment and grade. Elevations of pipes subject to revisions as necessary to fit field conditions. Revise alignment and grades only with the approval of OWNER/ENGINEER.

B. Dewater groundwater as necessary to allow installation and construction of the Groundwater Gradient Control System.

C. No adjustment in compensation will be made for grade adjustments unless preapproved by the OWNER/ENGINEER.

D. Maximum trench width at pipe level to be outside pipe diameter plus 24-inches unless indicated on the drawings.

E. Remove water which may accumulate in trench, and construct ditches, flumes, and dams to direct water away from excavation.

F. OWNER/ENGINEER may limit the amount of open trench where field conditions or plant operations require.

G. OWNER/ENGINEER may order additional excavation in areas where unsuitable soil conditions are encountered.

H. Promptly stockpile excess excavation on-site at the stockpile locations shown on the Drawings.

3.4 UTILITY TEST HOLES

A. Where potential utility conflicts are anticipated, uncover utility lines well in advance of trench excavation.

B. Determine grade of the utility line. OWNER/ENGINEER will advise the Utility Company of the adjustment required.

C. Backfill and restore disturbed area to original condition or better.

3.5 BEDDING

A. Minimum bedding requirements: Install pipe bedding to the minimum thicknesses below and above the pipe in accordance with the drawings. Install bedding material from 6-inches below pipe to 12-inches above pipe if not indicated on the Drawings.

B. Minimum depth of pipe embedment in bedding: One third outside pipe diameter.

C. Mechanically compact bedding under pipe hunches.

3.6 BACKFILLING

A. Backfill immediately following completion of pipe installation.

B. Take necessary precautions with backfill and construction operations to protect completed utility system from damage.

C. Backfill with care around structures and cleanouts.

D. Backfill to the original ground elevation unless shown otherwise on Drawings.

3.7 COMPACTING

A. Compact backfills outside the compacted Select Clay Fill liner area to at least 90 percent or 95 percent of the maximum dry density as determined by the Modified Proctor or Standard Proctor, respectively.

3.8 FIELD QUALITY CONTROL

A. Allow access for OWNER/ENGINEER to perform backfill compaction testing and collection of pipe bedding samples. Coordinate compaction testing and the collection of pipe bedding material sampling with OWNER/ENGINEER.

B. OWNER/ENGINEER will collect and test pipe bedding samples from the Perforated and Non-perforated HDPE Leachate Pipe, Groundwater Gradient Control System collection pipe, and solid wall Groundwater Gradient Control System transfer pipe at the minimum frequencies required by NR 516.07(4).

C. OWNER/ENGINEER will perform backfill compaction at the minimum frequencies required by NR 516.07(1m).

D. Backfill to within 0.10-feet of grades shown.

END OF SECTION

SECTION 02320
FILL

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Moving, placing, and compacting General Fill materials in accordance with the lines, grades, thicknesses, and typical sections shown on the Drawings.

B. For the Horizontal Expansion Area: loading, hauling, placing, moisture conditioning, and compacting Select Clay Fill from the on-site stockpile in accordance with the lines, grades, thicknesses, and typical sections shown on the Drawings.

C. For the Vertical Expansion Area (Select Clay Fill in the existing final cover will be used for developing the Composite Liner for Phase 10 – Cell 2):

1. Expose Select Clay Fill liner in the existing final cover by removing Topsoil General Fill and placing in on-site stockpile.

2. OWNER/ENGINEER will perform of in-field moisture and density tests on the existing Select Clay Fill to determine if material meets NR 500 requirements. If tests results indicate the Select Clay Fill meets requirements, no recompaction of the Select Clay Fill will be needed and the surface can be prepared for placement of the geomembrane layer as indicated in Subsection 3.6 Part D.

   If the Select Clay Fill does not meet in-field moisture and density test requirements, the CONTRACTOR will remove the top one foot thick layer of Select Clay Fill and place in nearby stockpile. OWNER/ENGINEER will perform in-field moisture and density tests on the bottom one foot thick layer of Select Clay Fill. In areas where the tests do not meet in-field moisture and density test, the CONTRACTOR will recompact the Select Clay Fill until passing tests are achieved. After completion of the rework for the bottom one foot thick Select Clay Fill layer, the CONTRACTOR will place back and recompact in 6 inch lifts the top one foot thick layer of Select Clay Fill. The top Select Clay Fill layer will be placed in 6 inch lifts to a total thickness of a one foot after compaction. Following documentation of passing in-field and laboratory test results, the top of Select Clay Fill surface will be prepared for placement of the geomembrane layer as indicated in Subsection 3.6 Part D.

D. Providing fill materials for pipe bedding, Groundwater Gradient Control System collection layer and the Leachate Collection Layer in accordance with the lines, grades, thicknesses, and typical sections shown on the Drawings.

1.2 REFERENCES

A. AASHTO Designation T96 - Percentage of Wear, Los Angeles abrasion test.

B. AASHTO Designation T104 - Sodium Sulfate soundness test, 5 cycles.

C. ASTM C136 - Test Method for Sieve Analysis of Fine and Coarse Aggregates.

D. ASTM D422 - Test Method for Particle-Size Analysis of Soils.

E. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort: Standard Proctor.

F. ASTM D1140 - Standard Test Method for Amount of Material in Soils Finer than the No. 200 Sieve.

G. ASTM D1556 - Test Method for Density and Unit Weight of Soil In Place by the Sand-Cone Method.

H. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristic of Soil Using Modified Effort: Modified Proctor.

I. ASTM D2216 - Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock.

J. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).

K. ASTM D2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System).

L. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth).

M. ASTM D2937 - Standard Test Method for Density of Soil In Place by the Drive-Cylinder Method.

N. ASTM D3017 - Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

O. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

P. ASTM D4643 - Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method.

Q. ASTM D5084 - Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Material Using a Flexible Wall Permeameter.

1.3 SUBMITTALS

A. Submit sequence of Select Clay Fill placement with project schedule under provisions of Section 01330.

B. Submit material testing documentation and samples of Select Granular Fill and Select Aggregate Fill with the project schedule as described in Part 3 of this specification.

PART 2. PRODUCTS

2.1 GENERAL FILL

A. On-site materials free from organic matter and refuse, masonry, metal, sharp objects, boulders, snow, and ice.

B. No solid material larger than 6-inches in its largest dimension.

2.2 SELECT GRANULAR FILL

A. Provide Select Granular Fill meeting all the requirements in this subpart.

B. Durable sand or gravelly material rounded, subrounded, or subangular with a USCS Classification of SP for sand material (ASTM D2487).

C. A minimum hydraulic conductivity of 1×10^{-3} cm/sec at the dry density and moisture content achieved during placement (ASTM D2434).

D. A maximum of 5 percent by weight passing the #200 sieve (ASTM D422)

2.3 SELECT AGGREGATE FILL (USED IN THE GROUNDWATER GRADIENT CONTROL SYSTEM)

A. Provide Select Aggregate Fill meeting all the requirements in this subpart.

B. Durable gravel material rounded or subangular with a USCS Classification of GP (ASTM D2487).

C. Grain Size: 100 percent by weight passing the 1.5-inch sieve, a maximum of 80 percent by weight passing the 3/4-inch sieve, a maximum of 50 percent by weight passing the 3/8-inch sieve, and a maximum of 5 percent by weight passing the #4 sieve (ASTM D422)

D. A minimum hydraulic conductivity of 1×10^{-2} cm/sec at the dry density and moisture content achieved during placement (ASTM D2434).

E. A Uniformity Coefficient of less than 4 (ASTM D422).

2.4 SELECT AGGREGATE FILL (USED IN THE LEACHATE COLLECTION SYSTEM)

A. Provide Select Aggregate Fill meeting all the requirements in this subpart.

B. Durable gravel material rounded or subangular with a USCS Classification of GP (ASTM D2487).

C. Non-calcareous origin without OWNER/ENGINEER approval.

D. Grain Size: 100 percent by weight passing the 1.5-inch sieve, a maximum of 80 percent by weight passing the 3/4-inch sieve, a maximum of 50 percent by weight passing the 3/8-inch sieve, and a maximum of 5 percent by weight passing the #8 sieve (ASTM D422).

E. A minimum hydraulic conductivity of 1 cm/sec at the dry density and moisture content achieved during placement (ASTM D2434).

F. A Uniformity Coefficient of less than 4 (ASTM D422).

2.5 SELECT CLAY FILL

A. For the Vertical Expansion Area, the Select Clay Fill liner in the existing final cover system will be used for the developing a Composite Liner system.

B. Select Clay Fill will be furnished by OWNER and either stockpiled on-site in area designated on the Drawings or hauled in by contractor constructing the liner depending agreement between the contractor and Dane County.

C. Materials classified as CL, ML, CH, or MH or as a combination according to the Unified Soil Classification System.

D. Maximum clump size of 8-inches and capable of being broken down with normal construction equipment to a size of 2- to 3-inches prior to compaction.

E. Fifty percent or more of the soil particles by weight pass the Number 200 sieve.

F. Average Liquid Limit (LL) greater than or equal to 25 with no values less than 20.

G. Average Plasticity Index (PI) greater than or equal to 12 with no values less than 10.

H. Maximum hydraulic conductivity of 1×10^{-7} cm/sec at a dry density of 90 percent Modified Proctor maximum dry density or at a dry density of 95 percent Standard Proctor maximum dry density.

PART 3. EXECUTION

3.1 STOCKPILE

A. Stockpile excess General Fill on-site at locations indicated on Drawings.

B. Stockpile Fill in sufficient quantities to meet project schedule and requirements.

C. Maintain stockpiles during construction. Grade stockpiles to provide positive drainage to prevent erosion or deterioration of materials. Provide erosion control around stockpile.

D. Regrade and restore stockpile areas, after borrow excavation is complete from the stockpile.

3.2 PREPARATION AND RESTORATION

A. Remove ice and snow before placing Fill. Do not place Fill on frozen subgrade.

B. Cut out soft areas of unsuitable subgrade.

C. Proof-roll subgrade before placing Select Granular Fill and Select Clay fill per Section 02316 using partially loaded haul truck.

D. Cut out soft areas of unsuitable subgrade (refer to Section 02316)

E. OWNER/ENGINEER will observe and accept surface conditions prior to placement of Select Granular fill and Select Clay Fill.

3.3 PLACEMENT AND COMPACTION OF GENERAL FILL

A. Maintain proper moisture content to achieve standard compaction as specified in Subpart 3.7 of this Section.

B. Place and spread General Fill in lift thicknesses as required to obtain the specified levels of compaction. Maximum lift thicknesses of 1-foot after compaction will not be exceeded.

3.4 PLACEMENT OF SELECT GRANULAR FILL

A. Do not compact Select Granular Fill. Place loosely and avoid excessive traffic compaction.

B. Remove and replace Select Granular Fill which does not meet specified material testing requirements at no additional cost to OWNER.

3.5 PLACEMENT AND COMPACTION OF SELECT AGGREGATE FILL

A. Do not compact Select Aggregate Fill. Place loosely and avoid excessive traffic compaction. Refer to Specification Section 02070 Subpart 3.7 for specifications for placement of soil/drainage material over Geomembrane.

B. Remove and replace Select Aggregate Fill which does not meet specified material testing requirements at no additional cost to OWNER.

C. CONTRACTOR to provide assistance during the Geomembrane Leak Location Survey that includes the following:

- Provide a source of AC power (110 VAC, 5 A);
- Provide two supervised laborers with equipment to help lay out the survey string lines and to wet the survey area if the drainage material is dry. If the cover material located on top of the primary liner is dry, water must be sprayed onto the cover material to provide additional surface moisture;
- Provide a water truck, water, and driver if required. For best results, the survey should be conducted with the Geotextile Cushion wet, either through rainfall or by manually wetting the geotextile;
- Provide electrical isolation at the edges of the survey area. Electrical isolation is achieved by leaving a strip of 2- to 5-feet of bare liner exposed around the perimeter of the landfill cell;
- Remove standing water, if any, in the drainage layer on top of the Geomembrane; and
- Uncovering, exposing, and repairing any leaks found in the Geomembrane
- INSTALLER will be on-site during the Geomembrane Leak Location Survey to repair holes found in the Geomembrane to allow the repaired Geomembrane area to be retested for holes after the repair is complete.

3.6 PLACEMENT AND COMPACTION OF SELECT CLAY FILL

A. Maintain proper moisture content to achieve specified compaction and hydraulic conductivity.

B. Provide Select Clay Fill in lift thicknesses as required to obtain the specified levels of compaction. Do not exceed maximum lift thicknesses of 6-inches after compaction.

C. Compact Select Clay Fill in accordance with the following Special Compaction:

- Maintain moisture content of at least 2 percent above the optimum value as determined by the Modified Proctor test. Maintain a moisture content higher than 2 percent above optimum moisture content as determined by the Modified Proctor test or higher moisture content if needed to achieve the maximum specified hydraulic conductivity of 1 x 10^{-7} cm/sec.

- Compact material to a dry density of at least 90 percent of the maximum dry density, as determined by the Modified Proctor test.
- Compact Select Clay Fill using penetrating foot–type compaction equipment having feet protrusion greater in length than the loose lift thickness of clay being placed prior to compaction. Compaction equipment utilized to compact Select Clay Fill shall have a minimum static weight of 30,000 pounds.
- Scarify Select Clay Fill to a minimum depth of 2-inches between lifts when previous lift has dried out or been smooth drum-rolled. Add water as required to maintain specified moisture content
- Remove and replace Select Clay Fill that does not meet specified material compaction or hydraulic conductivity testing requirements at no additional cost to OWNER.
- Place additional lifts of Select Clay Fill as soon as practical after compaction and completion of clay testing by OWNER/ENGINEER avoid drying and desiccation of Select Clay Fill proceeding lift.
- Scarify Select Clay Fill to a minimum depth of 2-inches between lifts when previous lift has dried out or been smooth drum-rolled to protect from desiccation rain events. Add water as required to maintain specified moisture content.

D. Top surface of the layer of Select Clay Fill will be rolled smooth to facilitate placement of the Geomembrane. Protruding rocks (larger than ½-inch diameter), sticks, and other foreign objects that could damage the Geomembrane will be removed and replaced with Select Clay Fill.

3.7 STANDARD COMPACTION

A. Provide each layer of fill to the degree that no further appreciable consolidation is evidence under the action of the compaction equipment. OWNER/ENGINEER will require the compaction of the material to a dry density of 90 percent or 95 percent of the maximum dry density as determined by the Modified Proctor or the Standard Proctor test, respectively.

B. Provide each layer of General Fill to the degree that no further appreciable consolidation is evidence under the action of the compaction equipment.

C. Required compaction will be attained for each layer before any material for the succeeding layer is placed.

3.8 TRENCH BACKFILLING

A. Backfill immediately following completion of pipe installation and documentation required by the OWNER/ENGINEER.

B. Take necessary precautions with backfill and construction operations to protect completed utility system from damage.

C. Backfill with care around structures and cleanouts.

D. Backfill to the original ground elevation unless shown otherwise on Drawings.

3.9 FIELD QUALITY CONTROL OF SELECT GRANULAR FILL

A. Top and bottom of Select Granular Fill in the Groundwater Gradient Control System drainage layer will be surveyed by CONTRACTOR as specified in Specification Section 01720 (Field Engineering).

B. OWNER/ENGINEER will collect samples and perform the following tests under provisions of Section 01452:

Select Granular Fill

1. One sieve analysis (ASTM D422) (minimum of four samples will be tested) to the #200 sieve for every 1,000 cubic yards of Select Granular Fill placed as Groundwater Gradient Control System drainage layer material.

2. One constant head hydraulic conductivity (ASTM D2434) (minimum of two samples will be tested) for every 2,500 cubic yards of Select Granular Fill placed as Groundwater Gradient Control System drainage layer material.

3. One sieve analysis (ASTM D422) (minimum of three samples will be tested) to the #4 sieve for every 1,000 linear feet of Select Granular Fill solid wall leachate transfer pipe bedding material placed.

3.10 FIELD QUALITY CONTROL SELECT AGGREGATE FILL

A. Top and bottom of Select Aggregate Fill leachate collection drainage layer will be surveyed by CONTRACTOR as specified in Specification Section 01720 (Field Engineering) on a 50-foot grid pattern to verify minimum thicknesses are achieved.

B. OWNER/ENGINEER will collect samples and perform the following tests under provisions of Section 01452.

Select Aggregate Fill

1. One sieve analysis (ASTM D422) (minimum of three samples) to the #200 sieve for every 1,000 linear feet of Groundwater Gradient Control System collection pipe bedding material placed.

2. One sieve analysis (ASTM D422) (minimum of two samples) to the #200 sieve for every 5,000 cubic yards of Select Aggregate Fill placed as leachate drainage layer material.

3. One constant head hydraulic conductivity (ASTM D2434) of Select Aggregate Fill placed as leachate drainage layer material.

4. One sieve analysis (ASTM D422) (minimum of three samples) to the #200 sieve for every 1,000 linear feet of Select Aggregate Fill leachate collection pipe bedding material placed.

5. One constant head hydraulic conductivity (ASTM D2434) of Select Aggregate Fill placed as leachate collection pipe bedding material.

3.11 FIELD QUALITY CONTROL OF GENERAL FILL PLACED FOR SUBGRADE

A. OWNER/ENGINEER will collect samples and perform the following tests under provisions of Section 01452:

General Fill for Subgrade

1. Continuous in-field moisture (ASTM D3017) and density (ASTM D2922) tests on maximum 100-foot grid on each 12-inch compacted thickness.

2. A Modified Proctor (ASTM D1557) or Standard Proctor (ASTM D698), sieve analysis and hydrometer (ASTM D422), and Atterberg limits (ASTM D4318) for every 5,000 cubic yards placed, or when visual observations indicate that change has occurred in the material.

3.12 FIELD QUALITY CONTROL OF SELECT CLAY FILL

A. Top and bottom of the Select Clay Fill liner in the Horizontal Expansion Area and top of existing Select Clay Fill liner over the Vertical Expansion Area will be surveyed by CONTRACTOR as specified in Specification Section 01720 (Field Engineering) on a 50-foot grid pattern and critical locations to verify minimum thicknesses are achieved.

B. OWNER/ENGINEER will collect samples and perform the following tests under provisions of Section 01452:

Select Clay Fill for 4 foot thick liner in Horizontal Expansion Area:

1. Representative samples will be collected from the Select Clay Fill stockpiled at a minimum frequency of one sample for every 5,000 cubic yards placed, or when visual observations indicate that change has occurred in the material. Each representative sample collected will be tested for Modified Proctor (ASTM D1557) or Standard Proctor (ASTM D698), USCS classification (ASTM D2487), sieve analysis and hydrometer (ASTM D422), and Atterberg limits (ASTM D4318).

2. Continuous in-field moisture (ASTM D3017) and density (ASTM D2922) tests on approximate 100-foot grid on each 12-inch compacted thickness.

3. Undisturbed Shelby tube samples will be collected from the in place compacted Select Clay Fill liner at a minimum frequency of one sample for each acre-foot thickness of Select Clay Fill placed. Each undisturbed sample from the liner will analyzed for USCS Classification (ASTM D2487), sieve analysis and hydrometer (ASTM D422), Atterberg limits (ASTM D4318), and moisture/density content (ASTM D4643). Every third undisturbed Shelby tube samples sample collected from the Select Clay Fill liner will analyzed for hydraulic conductivity (ASTM D5084).

Select Clay Fill over Vertical Expansion Areas:

1. After CONTRACTOR removes the Topsoil and General Fill layer and exposes the Select Clay Fill for the existing final cover, OWNER/ENGINEER will perform continuous in-field moisture (ASTM D3017) and density (ASTM D2922) tests on approximate 100 foot grid. In area with passing test results no additional compaction will be required. In areas with failing test results (if any), the CONTRACTOR will remove the top one foot thick layer of Select Clay Fill and place in a nearby stockpile so the OWNER/ENGINEER can perform in-field moisture and density tests on the bottom one foot thick layer of Select Clay Fill.

In areas with failing test results, the CONTRACTOR will recompaction the Select Clay Fill. After achieving passing in-field moisture and density test results on the bottom one foot layer of Select Clay Fill, the CONTRACTOR will place back and recompact in 6 inch lifts the top one foot thick layer of Select Clay Fill. The OWNER/ENGINEER will perform in-field moisture and density tests on a 100 foot grid to document passing test results.

2. Undisturbed Shelby tube samples will be collected from the in place compacted Select Clay Fill liner at a minimum frequency of one sample for every three acres or less per one foot thickness of Select Clay Fill placed to analyzed for hydraulic conductivity (ASTM D5084).

END OF SECTION

SECTION 02372
RIPRAP

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Furnishing and placing riprap in accordance with the locations and thicknesses shown on the Drawings.

PART 2. PRODUCTS

2.1 MATERIALS

A. Durable field or quarry stone that is sound, hard, dense, resistant to action of air and water, and free from seams, cracks, or other structural defects.

B. D_{50} = 8” Stone pieces meeting the following size requirements:

Size	% Passing by Weight
16”	100
12”	60-85
8”	25-50
4”	5-20
2”	0-5

C. D_{50} = 4” Stone pieces meeting the following size requirements:

Size	% Passing by Weight
8”	100
6”	60-85
4”	25-50
2”	5-20
1”	0-5

PART 3. EXECUTION

3.1 PREPARATION

A. Excavate to the lines and grades required for placement of the riprap to the thickness indicated on the Drawings.

B. Place 12 oz. Geotextile Cushion over areas to receive riprap in accordance with Section 02076 and the Drawings.

3.2 PLACEMENT

A. Minimum thickness of riprap layer is as shown on the Drawings measured perpendicular to the slope.

B. Place riprap to the limits shown on the Drawings and to within a 3-inch tolerance for thickness.

C. Place riprap with care so no damage is done to 12 oz. Geotextile Cushion. Do not drop riprap from a height greater than 12-inches.

D. Place riprap from the base of the slope upward. Place smaller sized stones to fill voids between the larger sized stones.

END OF SECTION

SECTION 02374
SEDIMENT CONTROL FENCE

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Installing, maintaining, and replacing damaged CONTRACTOR installed Sediment Control Fence. Maintaining and replacing damaged installed Sediment Control Fence.

1.2 REFERENCES

A. WDNR Conservation Practice Standard No. 1056 – Silt Fence.

PART 2. PRODUCTS

2.1 MATERIALS

A. Wood Supports as indicated on the drawings

1. Fill length of the silt fence shall be supported by air or kiln dried posts of hickory or oak.

2. Silt fence fabric shall be stapled to the upslope side of the post.

B. Maximum post spacing for non-woven silt fabric as indicated on the drawings.

C. Silt fence shall have a support cord in location as indicated on the drawings.

D. Geotextile Fabric: woven or non-woven polyester, polypropylene, stabilized nylon, polyethylene or Polyvinylidene chloride.

E. Geotextile fabric shall have the following MARV values:

1. Minimum grab tensile strength (ASTM D 4632) in machine and cross machine direction – 120 lbs. and 100 lbs, respectively.

2. Maximum apparent opening size (ASTM D4751) – No. 30 sieve size

3. Maximum permittivity (ASTM D4491) – 0.05 sec^{-1}

4. Minimum ultraviolet stability percent of strength retained after 500 hours of exposure (ASTM D4355) – 70%

PART 3. EXECUTION

3.1 INSTALLATION OF DAMAGED SILT FENCE

A. Install hardwood posts 2-feet below grade, at maximum spacing as indicated on the drawings.

B. Anchor bottom 6-inches of fence netting below grade to create a continuous toe-in structure along fence installation.

END OF SECTION

SECTION 02375
SEDIMENT CONTROL EROSION LOGS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Installing, maintaining, and replacing damaged CONTRACTOR installed Sediment Control Erosion Logs. Maintaining and replacing damaged installed Sediment Control Erosion Logs.

1.2 REFERENCES

A. WDNR Conservation Practice Standard No. 1071 – Interim Manufactured Perimeter Control and Slope Interruption Products

PART 2. PRODUCTS

2.1 MATERIALS

A. Curlex 20-inch Sediment Logs.

Type I (20-inch nominal diameter) logs filled with Great Lakes Aspen Excelsior fibers encased in an outside open weave containment fabric. Fibers shall be curled with soft, interlocking barbs to form a strong, organic filtration matrix. A minimum of 80 percent of the fibers shall be 16 cm (6-inch) or greater in length. Fibers shall be evenly disturbed throughout the diameter and length of the Sediment Log. Fibers shall be naturally seed free. Excelsior color shall be standard Aspen (natural). Netting at each end of the log shall be secured to assure fiber containment.

PART 3. EXECUTION

3.1 INSTALLATION OF DAMAGED EROSION LOGS

A. Logs placed on disturbed ground shall be entrenched a minimum of 2-inches to ensure continuous ground contact.

B. Logs placed on vegetated ground may be installed without entrenchment. All gaps and ruts creating and undercutting situation shall be filled with soil or log-type product filter media.

C. Logs placed on frozen ground does not require entrenchment. Product installed on frozen ground shall be assessed for effectiveness upon ground thaw and staked or replaced as needed.

D. Overlap – minimum of 24-inches or as required by the manufacturer if more restrictive. Overlap should be shingled in the direction of flow as shown on the drawings.

E. Support – stake or anchor as needed to maintain constant ground contact along the entire length of product at all times and to prevent lateral movement and/or flotation. Staking or anchoring shall be performed per manufacturer's recommendations.

F. Stacking – logs shall not be stacked individually on top of one another. Logs may be staked in a "pyramid" manner (i.e., one on top of two).

G. Maximum Spacing – space logs in direction of slope shall not exceed the maximum slope lengths for the appropriate slope as specified in Table 2 of the WDNR Conservation Practice Standard No. 1071.

H. Install Logs prior to disturbing the upslope area and/or when changes in disturbed slope or slope length require the installation of additional product.

END OF SECTION

SECTION 02376
EROSION CONTROL MATERIAL

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Providing and installing Erosion Control and Revegetation Mat (ECRM) in all flat-bottom, in all V-notch ditches and seeded 3:1 or greater slopes.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. D 570 - Standard Test Methods for Water Absorption of Plastics.

2. D 5199 - Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.

3. D 1907 -Test Method for Yarn Number by Skein Method.

4. D 2256 - Test Method for Breaking Strength and Elongation of Yarn by Single Strand Method.

5. D 3786 - Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics.

6. D 4354 - Practice for Sampling of Geosynthetics for Testing.

7. D 4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).

8. D 4439 - Terminology for Geotextiles.

9. D 4595 - Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

10. D 4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles.

11. D 4759 - Practice for Determining the Specification Conformance of Geosynthetics.

12. D 4873 - Guide for Identification, Storage, and Handling of Geotextiles.

13. D 5035 - Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Force).

14. D 5261 - Test Method for Measuring Mass Per Unit Area of Geotextiles.

B. Federal Test Method of America (FTMA) CCC-5-191B - Smolder Resistance of Textile Materials.

C. Geosynthetic Accreditation Institute (GAI) - Laboratory Accreditation Program (LAP).

D. International Standards Organization (ISO) 9002 - Quality System Certification.

E. Light Projection Analysis - Lumite Test Method for Measuring Light Projection Through Fabric.

F. WDNR Conservation Practice Standards

1. No. 1053 – Channel Erosion Mat

2. No. 1052 – Non-channel Erosion Mat

1.3 DELIVERY, STORAGE, AND HANDLING

A. Attach durable label to product, indicating manufacturer, product name or style number, roll and lot number, and roll dimensions.

B. Deliver, store, and handle rolls in manner to prevent damage.

C. After unloading, inspect rolls for defects and damage.

D. Store rolls off ground, protected from precipitation, ultraviolet radiation, strong chemicals, sparks and flames, temperatures in excess of 71 degrees C (160 degrees F) and other environmental conditions that could cause damage to geosynthetic.

E. Prevent damage to wrappings and geosynthetic.

PART 2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. ECRM – Various. Approved Class I, Type A and Type B erosion mats in WDOT Product Acceptability List (PAL).

2.2 MATERIALS

A. Erosion Control and Revegetation Mat (ECRM) for ditches < 4% grade.

1. Class I, Type B ECRM as approved in WDOT Product Acceptability List (PAL), current edition.

B. Erosion Control Revegetative Mat for seeded 3:1 slopes or greater.

1. Class I, Type A ECRM as approved in WisDOT Product Acceptability List (PAL), current edition

2.3 ACCESSORIES

A. Ground Anchoring Devices:

1. U-shaped wire staples, metal pins, or triangular wooden stakes.

2. Wire staples: Minimum 8 gauge.

3. Metal pins: Steel, minimum 0.20-inch in diameter with 1.5-inch steel washer.

4. Wooden stakes: triangular wooden survey stakes with minimum 1.6-inch head.

5. Length: 8- to 18-inches; sufficient ground penetration to resist pullout. Use longer anchors for loose soils.

2.4 QUALITY CONTROL

A. Manufacturing Quality Control: Manufacturer shall certify that supplied erosion control materials meets manufacturer's minimum specifications.

B. Conformance Testing: OWNER/ENGINEER, or a designated, independent laboratory, may perform additional testing (i.e., conformance testing) to verify the erosion control material meets the specifications.

PART 3. EXECUTION

3.1 PREPARATION

A. Grade areas to be treated with erosion control material, or as directed by OWNER/ENGINEER.

B. Remove large rocks, soil clods, vegetation, and other sharp objects that could keep erosion control material from intimate contact with subgrade.

C. Prepare seedbed by loosening 2- to 3-inches of soil above final grade.

D. Construct anchor trenches per manufacturer written procedures.

E. Install ground anchoring devices and at the locations and frequency per manufacturer recommendations.

3.2 INSTALLATION

A. Install erosion control material at elevation and alignment indicated, and in accordance with manufacturer written procedures.

END OF SECTION

SECTION 02618
HDPE PIPING, BELOW-GRADE

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Providing High Density Polyethylene (HDPE) pipe, fittings and appurtenances for gradient control and leachate collection as indicated on the Drawings.

1.2 REFERENCES

A. ASTM D1248 – HDPE weight resin for pipe and fittings.

B. ASTM D2513 – Industrial molded fittings for high-density polyethylene (HDPE) pipes.

C. ASTM D3261 – Butt fittings for high-density polyethylene (HDPE) pipes.

D. ASTM D2683 – Socket fittings for high-density polyethylene (HDPE) pipes.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Protect pipe from the sun, and provide ventilation.

B. Deliver and store valves in shipping containers with labeling in place.

C. Comply with requirements of Section 01600 - Material and Equipment

1.4 SUBMITTALS

A. Submit product data under provisions of Section 01330.

B. Provide data on pipe materials, pipe fittings, valves, and accessories.

PART 2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Pipe:

1. Spirolite Corporation
4094 Blue Ridge Industrial Parkway
Norcross, GA 30071

2. Plexco
3240 N. Mannheim Road
Franklin Park, IL 60131

3. Poly Pipe Industries, Inc.
Drawer HH
Gainesville, TX 76240

4. Phillips Driscopipe, Inc.
2929 North Central Expressway
Richardson, TX 75083

B. Substitutions: Under provisions of Section 01600.

2.2 MATERIALS

A. HDPE Piping: As shown on the Drawings. Only new and undamaged materials shall be used.

B. HDPE piping and fittings shall be made from high-density, extra-high molecular weight material with a broad range of molecular weight distribution designed as PE 3408 with an ASTM D3350 cell classification number of 345464C or 355464C.

C. Joints: Heat fusion process according to MANUFACTURER's specifications.

D. Perforations: As shown on the Drawings.

E. Valves: As shown on the Drawings.

PART 3. EXECUTION

3.1 INSPECTION

A. Inspect pipe, fittings, and other appurtenances before installation to verify quality of material.

B. Bends to be prefabricated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove dirt and foreign material, inside and outside, from pipe and fitting materials before assembly.

C. Make straight field cuts without chipping or cracking pipe.

3.3 BEDDING

A. Excavate pipe trench to lines and grades indicated. Hand trim excavation for placement of pipe to elevations and depths indicated.

B. Place bedding material at trench bottom under provisions of Section 02317.

3.4 INSTALLATION - PIPE

A. Make heat fusion joints in accordance with MANUFACTURER's specifications.

B. Install pipe and fittings to the line and grade specified on the Drawings.

C. Provide continuous, smooth invert.

D. The maximum allowable tolerance for leachate collection pipe grade is 0.08-feet.

E. Install bedding, backfill, and cover material over pipe as designated in Drawings.

3.5 FIELD QUALITY CONTROL

A. OWNER/ENGINEER to observe prior to backfilling.

B. When fusing joints and fittings, follow MANUFACTURER's recommendations and procedures for heat joining pipes and fittings.

C. Clean all Phase 10 – Cell 2 leachate collection pipe after completing installation of the Select Aggregate Fill drainage layer. Clean collection pipe with a water jet device with a maximum pressure of 10,000 pounds per square inch. Clean the leachate collection pipe the full length with water jet cleaning device cleaning from each cleanout access point. Provide OWNER/ENGINEER with a written statement or letter from the company cleaning the leachate collection pipe indicating the total length of the pipe segment, direction and cleanout access point from which the pipe was cleaned, the length that the pipe was cleaned, any difficulties encountered during the cleaning of the pipe segment, and any relevant observations.

D. Conduct a video camera inspection on entire length of Phase 10 – Cell 2 leachate collection pipe after initial pipe cleaning activities required by paragraph (C.) above. Provide OWNER/ENGINEER with 2 copies of the video. The videos will identify the cleanout access location, direction of videoing, and location of the camera in feet from the access point.

END OF SECTION

SECTION 02720
AGGREGATE BASE AND SURFACE COURSE

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Constructing dense compacted Access Roads.

1.2 REFERENCES

A. State of Wisconsin Department of Transportation, Standard Specifications for Highway and Bridge Construction (2014 Edition).

1.3 SUBMITTALS

A. Submit test results under provisions of Section 01330, indicating that the Aggregate Surface Course meets the required specifications.

B. Crushed or recycled concrete or bituminous pavement may be an acceptable ingredient in the production of Aggregate Course materials. Submit source of supply and test results from an accredited testing laboratory under provisions of Section 01452. Submit request for substitution under provisions of Section 01600.

PART 2. PRODUCTS

2.1 MATERIALS

A. Aggregate Surface Course:

Wisconsin DOT Gradation No. 2 Crushed Stone:

Sieve Size	**Gradation No. 2**
1 1/2"	--
1"	100
3/4"	--
3/8"	40-75
No. 4	25-60
No. 10	15-45
No. 40	--
No. 200	12

Percentage of wear: Not more than 50 percent as determined by AASHTO Designation T96.

Soundness: Fraction of the aggregates retained on No. 4 sieve subjected to 5 cycles of the sodium sulfate soundness test, AASHTO Designation T104, weighted loss not more than 18 percent by weight.

At least 50 percent by count of the number of particles of aggregate retained on No. 4 sieve to have at least one fractured surface or face resulting from the mechanical crushing operations of the aggregate.

Sample and test in accordance with AASHTO Standard Method.

B. Aggregate Base Course: Breaker run crushed stone, with 4-inch maximum diameter.

PART 3. EXECUTION

3.1 INSPECTION

A. OWNER/ENGINEER to observe and approve subgrade prior to Base Course placement.

B. Apply water to dry subgrade before placement, and rework or recompact as necessary.

3.2 INSTALLATION

A. Aggregate Base Course: Deposit Base Course material on the subgrade in a manner to minimize segregation and facilitate spreading to uniform uncompacted layers not less than 5-inches in depth. Construct the Access Road Aggregate Base Course in two or more layers.

B. Compact each layer of Aggregate Base Course material to the degree that no further appreciable consolidation or movement of the base is evidenced under action of the compaction equipment.

C. Aggregate Surface Course: Deposit Surface Course material on the Base Course in a manner to minimize segregation and facilitate spreading to uniform uncompacted layers not less than 5-inches in depth.

D. Add water as necessary to assist compaction. If excess water is apparent, aerate Aggregate Surface Course material to reduce the moisture content.

E. Compact each layer of Aggregate Surface Course material to the degree that no further appreciable consolidation or movement of the base is evidenced under action of the compaction equipment.

F. Rework or remove and replace soft or yielding areas as required until proper compaction is obtained. The cost of such reworking or removal and replacement shall be at CONTRACTOR's expense.

END OF SECTION

SECTION 02911
TOPSOIL

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Strip available Topsoil from excavation area and soil stockpile areas and stockpile at a locations shown on the drawings. Move Topsoil from on-site stockpiles and place over finished graded areas to be seeded. Do not place Topsoil to be stockpiled on Select Clay Fill or General Fill stockpiles.

PART 2. PRODUCTS

2.1 MATERIALS

A. Friable, fertile, loamy soil containing an amount of organic matter normal to the region, capable of sustaining healthy plant life.

B. Free from refuse, subsoils, materials toxic to plant growth, and foreign objects.

PART 3. EXECUTION

3.1 PREPARATION

A. Remove vegetation, foreign materials, unsatisfactory or contaminated soils, obstructions, and matter harmful to plant growth from ground surface before placement.

B. Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

C. Scarify subsoil to a depth of 3-inches where Topsoil is to be placed. Repeat cultivation in areas where equipment used for hauling and spreading Topsoil has compacted subsoil.

3.2 PLACEMENT

A. Place Topsoil to a uniform depth of 4-inches or as indicated on the drawings.

B. Finish grade to within 0.10-foot of elevations shown on Drawings.

C. Break down clods and lumps.

END OF SECTION

SECTION 02921
SEEDING

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Preparing the Topsoil.

B. Seeding.

C. Hydroseeding.

D. Mulching.

1.2 REFERENCES

A. State of Wisconsin Department of Transportation, 2014 Standard Specifications for Road and Bridge Construction (Section 630).

B. WDNR Conservation Practice Standards

1. No. 1059 – Seeding for Construction Site Erosion Control.

2. No. 1058 – Mulching for Construction Sites.

1.3 DEFINITIONS

A. Weeds: Includes, but is not limited to, Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.4 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

B. Seed which is wet, moldy, or otherwise damaged is not acceptable.

PART 2. PRODUCTS

2.1 SEED MIXTURE

A. Seed Mixture (Wisconsin DOT Highway seed mix No. 20):

1. Kentucky Bluegrass: 6 percent

2. Hard Fescue: 24 percent

3. Tall Fescue: 40 percent

4. Perennial Rye Grass: 30 percent.

5. Add oats at 131 lbs/acre to the seeding mixture for seeding the soil stockpiles only.

2.2 ACCESSORIES

A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

B. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of grass.

PART 3. EXECUTION

3.1 INSPECTION

A. Verify that prepared soil base is ready to be seeded.

3.2 PREPARATION OF TOPSOIL

A. Grade Topsoil to finish grades to ensure positive drainage.

B. Remove stones or objects over 2-inches in diameter, foreign materials, weeds, and undesirable plants and their roots. Remove contaminated Topsoil.

C. Apply fertilizer immediately before seeding in accordance with Section 02923.

3.3 SEEDING

A. Apply seed at a rate of 3 pounds per 1,000 square feet evenly in two intersecting directions. Rake in lightly.

B. Do not sow immediately following rain, or when ground is too dry, or during windy periods.

3.4 HYDROSEEDING

A. A hydroseeder may be used if deemed more appropriate for seeding, particularly for slopes. If used, the hydroseeder shall have continuous agitating action that keeps the seed uniformly mixed in the slurry until pumped from the tank.

B. Apply seeded slurry at a rate of 3 pounds of seed and 7 pounds of fertilizer per 1,000 square feet evenly in two intersecting directions, with a hydraulic seeder. Do not hydroseed area in excess of that which can be mulched on the same day.

3.5 MULCHING

A. All seeded 3:1 slopes or greater will be matted with WisDOT Class I Type A erosion mat (or hydroseeded with a mulch approved by the OWNER/ENGINEER).

B. Apply mulch to the seeded area at a rate of 1.5 tons per acre. Mulch shall cover min. 70% of soil surface.

C. Immediately following mulching, the mulch shall be anchored by a mulch crimper or equivalent device. On large areas, a cultipacker may be used to roll and cover the seed.

3.6 WATERING

A. Apply water with a fine spray immediately after each area has been mulched. Saturate soil to a depth of 4-inches.

B. Keep the surface layer of soil damp by frequent light watering with a fine spray during the germination period when rainfall is insufficient.

3.7 REPAIR AND RESEEDING

A. Repair Topsoil and reseed areas of erosion or poor grass catch per the direction of OWNER/ENGINEER. Acceptable grass catch is considered a uniform stand of grass 2-inches tall. CONTRACTOR will be responsible for repairing Topsoil and reseeding of areas of erosion or poor grass catch to June 1, 2017.

END OF SECTION

SECTION 02923
FERTILIZING

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Providing fertilizer.

B. Applying fertilizer.

1.2 REFERENCES

A. State of Wisconsin Department of Transportation, 2014 Standard Specifications for Road and Bridge Construction (section 630).

1.3 REGULATORY REQUIREMENTS

A. Comply with regulatory agency's requirements for fertilizer composition.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2. PRODUCTS

2.1 FERTILIZER MIXTURE

A. Fertilizer: Nitrogen 16 percent, phosphoric acid 0 percent, soluble potash 12 percent or as approved by the OWNER/ENGINEER.

PART 3. EXECUTION

3.1 INSPECTION

A. Verify that area is ready to receive the work of this Section.

B. OWNER/ENGINEER must accept existing site conditions before beginning installation.

3.2 FERTILIZING

A. Apply fertilizer at a rate of 7 lbs. Per 1,000 square feet.

B. Apply after Topsoil is raked smooth.

C. Mix thoroughly into upper 2-inches of Topsoil.

D. Lightly water to aid the dispersion of fertilizer.

END OF SECTION