

**NEW BOSTON LANDFILL**  
**APPENDIX E5**  
**LABORATORY TESTS**

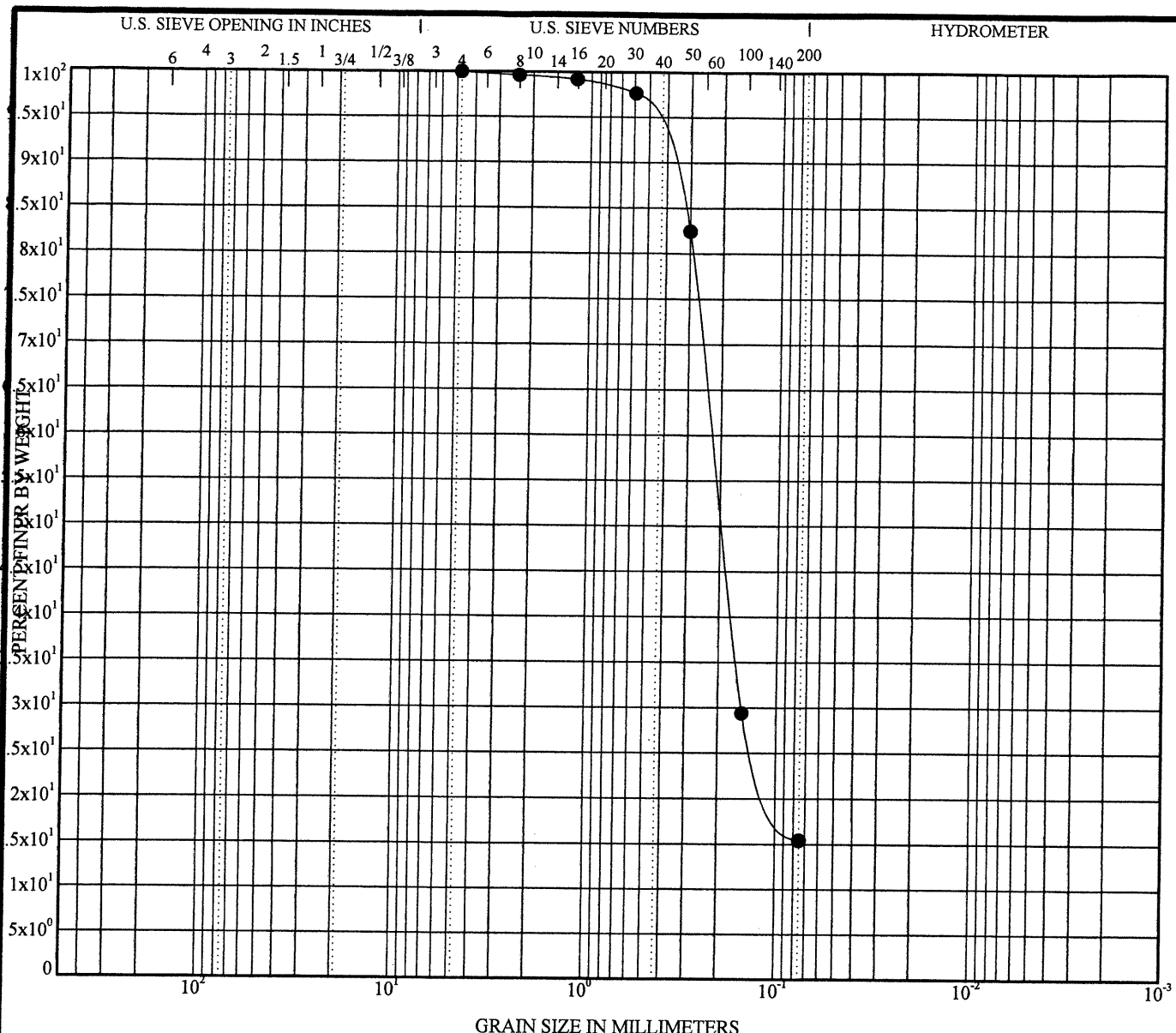
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**New Boston Landfill  
Geotechnical Laboratory Test Summary**

Subsurface Exploration	Boring #	Sample Elevation, ft	Atterberg Limits			Passing 200 Sieve, %	Moisture, %	Unit Dry Weight, pcf	Permeability, cm/sec
			Liquid Limit, %	Plastic Limit, %	Plasticity Index, %				
Environmental Science and Engineering, 1990	B-01	368.2	95	21	74		31		
	B-01	364.2				80	12		
	B-01	362.2	31	19	12	99	9		
	B-01	344.2	80	24	56	99	27		
	B-01	320.2	44	14	30	75	23		
	B-01	308.2				40	17		
	B-04	360.3	81	20	61	91	22		
	B-04	328.3				59	22		
	B-04	326.3				29	20		
	B-04	320.3				41	21		
	B-04	297.3					23	105.2	
	B-07	334.6					10	112.4	
	B-07	326.6	55	18	37	96	18		
	B-08	365.1	82	23	59	92	22	102	1.10E-09
	B-09	356.1	30	18	12	97	25		
	B-09	351.1					28		
	B-09	349.1					32	89.8	
	B-09	347.1	72	23	49	99	29		
	B-09	343.1					25		
	B-09	339.1					24		
	B-09	335.1					30		
	B-09	331.1					23		
	B-09	329.1					22	104.4	
	B-09	327.1					21		
	B-09	324.1	48	15	33	85	21	105.6	2.50E-08
	B-09	323.1					29		
	B-09	319.1					22		
	B-09	315.1					21		
	B-09	307.1	87	28	59	100	22	105.1	1.30E-08
	B-09	303.1	87	28	59	100	23		
	B-10	346.6	25	20	5	99	23		
	B-14	377.9					17	108.3	
	B-14	359.9	26	19	7	92	6		
B-15	373.3				80	13			
B-15	361.3					28	96.1		
B-16	324.4	49	14	35					
B-17	357.6	20	18	2	76	16			
B-17	325.6				76	16			
Biggs and Mathews Environmental, Inc., 2000	B-29	324.0	83	28	55	97	28	85.7	
	B-30	340.2	44	23	21	99	25	98.4	
	B-32	315.7	66	23	43	98	24	102.6	
Biggs and Mathews Environmental, Inc., 2010 to 2011	BME-1	377.6	74	23	51	85	16.0		
	BME-1	370.1	44	25	19	71	23.0		
	BME-1	364.1	68	31	37	63			
	BME-1	343.1	70	26	44	100	24.8		
	BME-1	317.3	30	15	15	50	22.7		
	BME-1	305.1					9.3		
	BME-3	362.4	67	25	42	100	30.3		
	BME-3	332.4	56	31	25	90	25.0		
BME-3	304.4	63	29	34	100	23.0			

**New Boston Landfill  
Geotechnical Laboratory Test Summary**

Subsurface Exploration	Boring #	Sample Elevation, ft	Atterberg Limits			Passing 200 Sieve, %	Moisture, %	Unit Dry Weight, pcf	Permeability, cm/sec
			Liquid Limit, %	Plastic Limit, %	Plasticity Index, %				
Biggs and Mathews Environmental, Inc., 2010 to 2011 (continued)	BME-4	379.8	31	19	12	50	16.7	111	8.70E-08
	BME-4	368.8	37	20	17	87	18.0	99.6	
	BME-4	353.8	59	26	33	99	21.9	103.4	3.70E-07
	BME-4	343.8	54	23	31	99	22.4	105.3	
	BME-4	328.8	62	22	40	96	23.8	103.7	6.40E-08
	BME-8	357.0	64	23	41	99	25.7	98.1	
	BME-8	332.0	46	23	23	100	22.0	102.1	
	BME-8	297.0							1.60E-08
	BME-10	322.4	36	15	21	50	18.9	104.8	
	BME-10	309.4				15			
	BME-10	302.4	70	29	41	94	20.2	106.1	
	BME-12	380.2	45	14	31	84	11.5	121.1	
	BME-12	351.2	62	26	36	99	26.4	98.5	
	BME-12	326.2	59	24	35	98	23.3	103.2	
	BME-12	306.2							2.40E-08
	BME-13	380.4	52	20	32				
	BME-13	372.4	34	23	11	66	10.1		
	BME-13	364.4					25.5		
	BME-13	348.9					31.0		
	BME-13	317.4	50	29	21	78	20.8		
	BME-13	296.4					18.8		
	BME-14	374.7	35	20	15	99	19.6	102	2.90E-07
	BME-14	370.7	25	21	4	67	8.8	100.1	
	BME-14	357.7	33	23	10	98	24.8	98.3	4.60E-07
	BME-14	342.7	61	27	34	99	26.9	95.8	
	BME-14	317.7	32	17	15	43	18.5	107	4.30E-06
	BME-14	297.7							3.50E-08
	BME-15	381.3	51	17	34	84	14.9	106.8	
	BME-15	327.3				59			
	BME-15	319.3				38			
	BME-17	376.1	52	22	30	86	14.2		
	BME-17	347.1					22.6		
BME-20	359.6	42	22	20		8.2			
BME-20	344.1	54	25	29		23.9			
BME-20	334.6					27.1			
BME-20	319.6				14	13.8			
BME-20	305.6	88	31	57	94	24.0			



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

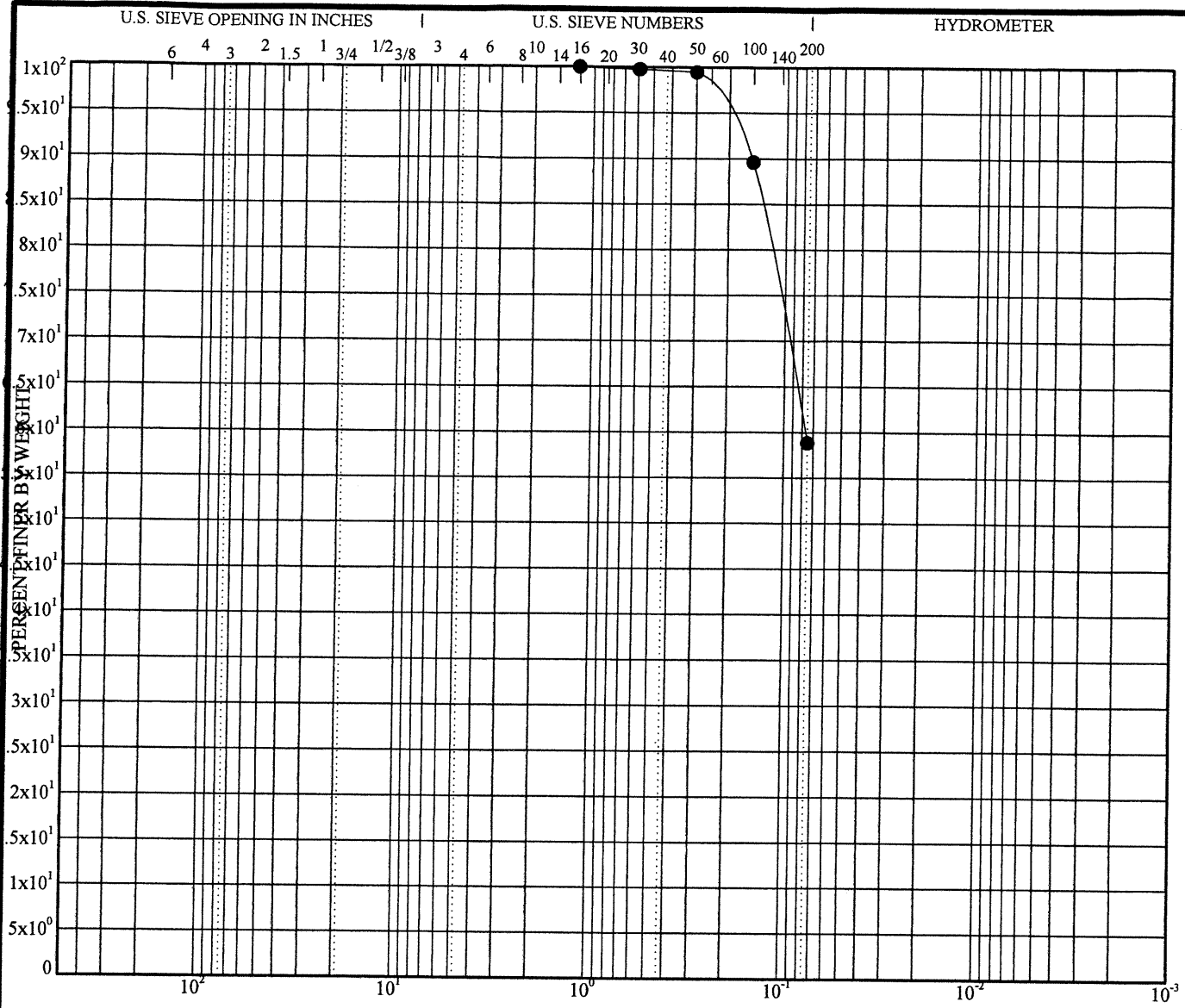
Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● BME-10 62.0										

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● BME-10 62.0	4.76	0.224	0.151		0.0	84.6	15.4	

<b>LANDTEC ENGINEERS</b> 1700 Robert Road, Suite 101 Mansfield, Texas 76063	<b>GRAIN SIZE DISTRIBUTION</b>	
	Project: New Boston Landfill	Number: 1548

US GRAIN SIZE NEW BOSTON LANDFILL.GPJ DATA.GDT 9/16/11





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

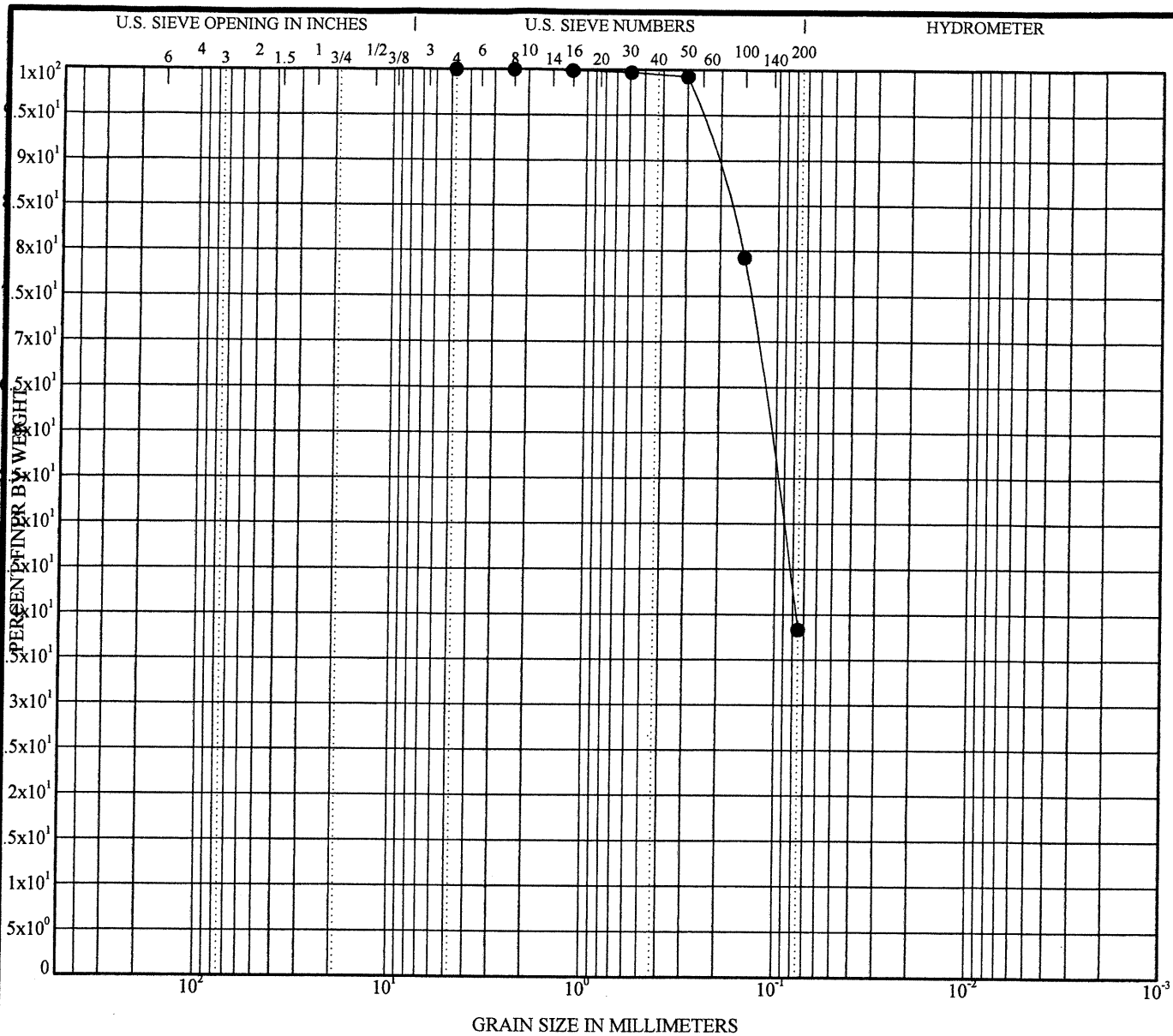
Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● BME-15 59.0						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● BME-15 59.0	1.19	0.077			0.0	41.1	58.9	

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U.S. GRAIN SIZE NEW BOSTON LANDFILL.GPJ DATA.GDT 9/16/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● BME-15 67.0						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● BME-15 67.0	4.76	0.108			0.0	61.7	38.3	

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Number: 1548

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CLIENT: Biggs & Mathews Environmental, Inc.  
 1700 Robert Road, Ste. 100  
 Mansfield, Texas 76063

REPORT DATE: 6/14/2011  
 PROJECT NO.: 0910-1548

ATTN: Gregg Adams, P.E.

PROJECT: New Boston Landfill Expansion

### HYDRAULIC CONDUCTIVITY WORKSHEET FALLING HEAD - FIXED WALL PERMEAMETER

LOCATION: New Boston Landfill  
 MATERIAL: Clay, dark red  
 BORING/SAMPLE: BME-4  
 PROCTOR #: \_\_\_\_\_  
 SAMPLE ORIENTATION: H X V \_\_\_\_\_  
 Remold \_\_\_\_\_

LAB START DATE: 6/12/2011  
 LAB RPT. DATE: 6/14/2011  
 TECHNICIAN: SG/TB  
 DEPTH/LIFT: 9 - 10 ft  
 PERM FLUID USED: De-aired Tap Water

a. Length of Specimen, L: 1.0 in  
 c. Sample Volume  
 ( $\pi b^2 / 4 * a$ ): 4.897 cu in

b. Avg. Diameter of Specimen: 2.5 in  
 d. Wet Unit Weight:  
 $[(g-i)*3.8095]/c$ : 116.7 pcf

#### INITIAL CONDITIONS

#### FINAL CONDITIONS

e. Ring Weight: 523.4 gms  
 f. Ring + Wet Weight Soil: 686.1 gms  
 g. Wet Weight Soil + Tare: 157.5 gms  
 h. Dry Weight Soil + Tare: 137.9 gms  
 i. Tare Weight: 7.5 gms  
 j. Moisture Content  
 $[(g-h)/(h-i)]*100$ : 15.0 %  
 k. Unit Dry Weight  
 $[d/(1+(j/100))]$ : 101.4 pcf

l. Wet Weight Soil + Tare: 168.7 gms  
 m. Dry Weight Soil + Tare: 137.9 gms  
 n. Tare Weight: 7.5 gms  
 o. Moisture Content  
 $[(l-m)/(m-n)]*100$ : 23.6 %  
 p. Unit Dry Weight  
 $[d/(1+(o/100))]$ : 94.4 pcf

Date	Time	t sec	Initial Height, ho	Corrected ho - C	Final Height, hf	Corrected hf - C	Temp C	Rt	k @ 20C cm/sec
12-Jun	16:15		47.0	39.9					
13-Jun	08:34	58740			43.3	36.2	22	0.953	1.1E-07
13-Jun	08:34		43.3	36.2					
13-Jun	14:25	21060			42.3	35.2	22	0.953	8.8E-08
13-Jun	14:25		42.3	35.2					
13-Jun	20:58	23580			41.2	34.1	22	0.953	8.9E-08
13-Jun	20:58		41.2	34.1					
14-Jun	09:20	44520			39.7	32.6	22	0.953	6.7E-08
14-Jun	09:20		39.7	32.6					
14-Jun	12:20	10800			39.5	32.4	22	0.953	3.8E-08
<u>Cumulative</u>									
12-Jun	16:15		47.0	39.9			22		
14-Jun	12:20	158700			39.5	32.4	22	0.953	8.7E-08

Height of Top of Specimen		Standpipe Diameter	Standpipe Area
From Top of Table:	7.13 cm	1.05 cm	0.866 sq cm

Test Method: Corps of Engineers EM 1110-2-1906, Appendix VII

Hx-C = Hx-Ht









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PROJECT: New Boston Landfill Expansion

### HYDRAULIC CONDUCTIVITY WORKSHEET FALLING HEAD - FIXED WALL PERMEAMETER

LOCATION:	New Boston Landfill	LAB START DATE:	6/12/2011
MATERIAL:	Clay, dark gray	LAB RPT. DATE:	6/14/2011
BORING/SAMPLE:	BME-8	TECHNICIAN:	SG/TB
PROCTOR #:		DEPTH/LIFT:	80-81
SAMPLE ORIENTATION:	H <u>      </u> V <u>X</u> Remold <u>      </u>	PERM FLUID USED:	De-aired Tap Water
a. Length of Specimen, L:	1.0 in	b. Avg. Diameter of Specimen:	2.5 in
c. Sample Volume ( $\pi b^2 / 4 * a$ ):	4.897 cu in	d. Wet Unit Weight: [[ $(g-i) * 3.8095$ ]/c]:	117.8 pcf

**INITIAL CONDITIONS**

**FINAL CONDITIONS**

e. Ring Weight:	452.5 gms	i. Wet Weight Soil + Tare:	164.9 gms
f. Ring + Wet Weight Soil:	691.5 gms	m. Dry Weight Soil + Tare:	133.6 gms
g. Wet Weight Soil + Tare:	160.3 gms	n. Tare Weight:	8.9 gms
h. Dry Weight Soil + Tare:	133.6 gms	o. Moisture Content [[ $(l-m)/(m-n)$ ]*100]:	25.1 %
i. Tare Weight:	8.9 gms	p. Unit Dry Weight [ $d/(1+(j/100))$ ]:	94.1 pcf
j. Moisture Content [[ $(g-h)/(h-i)$ ]*100]:	21.4 %		
k. Unit Dry Weight [ $d/(1+(j/100))$ ]:	97.0 pcf		

Date	Time	t sec	Initial		Final		Temp C	Rt	k @ 20C cm/sec
			Height, ho	Corrected ho - C	Height, hf	Corrected hf - C			
12-Jun	14:05		63.1	56.0					
12-Jun	15:30	5100			62.9	55.8	22	0.953	4.9E-08
12-Jun	15:30		62.9	55.8					
12-Jun	17:15	6300			62.7	55.6	22	0.953	4.0E-08
12-Jun	17:15		62.7	55.6					
12-Jun	20:58	13380			62.5	55.4	22	0.953	1.9E-08
12-Jun	20:58		62.5	55.4					
12-Jun	22:15	4620			62.3	55.2	22	0.953	5.5E-08
12-Jun	22:15		62.3	55.2					
13-Jun	08:10	35700			62.0	54.9	22	0.953	1.1E-08
<b>Cumulative</b>									
12-Jun	14:05		63.1	56.0			22		
13-Jun	14:25	87600			62.0	54.9	22	0.953	1.6E-08

Height of Top of Specimen		Standpipe Diameter		Standpipe Area
From Top of Table:	7.07 cm	1.08 cm		0.916 sq cm

Test Method: Corps of Engineers EM 1110-2-1906, Appendix VII

Hx-C = Hx-Ht





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 Mansfield, Texas 76063

REPORT DATE: 6/23/2011

PROJECT NO.: 0910-1548

ATTN: Gregg Adams, P.E.

PROJECT: New Boston Landfill Expansion

**HYDRAULIC CONDUCTIVITY WORKSHEET**  
**FALLING HEAD - FIXED WALL PERMEAMETER**

LOCATION: New Boston Landfill  
 MATERIAL: Clay, sandy, reddish orange  
 BORING/SAMPLE: BME-14  
 PROCTOR #: \_\_\_\_\_  
 SAMPLE ORIENTATION: H X V \_\_\_\_\_  
 Remold \_\_\_\_\_

LAB START DATE: 6/20/2011  
 LAB RPT. DATE: 6/23/2011  
 TECHNICIAN: SG/TB  
 DEPTH/LIFT: 3-4  
 PERM FLUID USED: De-aired Tap Water

a. Length of Specimen, L: 1.0 in  
 c. Sample Volume  
 ( $\pi b^2 / 4 * a$ ): 4.897 cu in

b. Avg. Diameter of Specimen: 2.5 in  
 d. Wet Unit Weight:  
 $[(g-i)*3.8095]/c$ : 118.8 pcf

**INITIAL CONDITIONS**

**FINAL CONDITIONS**

e. Ring Weight: 512.8 gms  
 f. Ring + Wet Weight Soil: 666.1 gms  
 g. Wet Weight Soil + Tare: 160.1 gms  
 h. Dry Weight Soil + Tare: 133.4 gms  
 i. Tare Weight: 7.4 gms  
 j. Moisture Content  
 $[(g-h)/(h-i)]*100$ : 21.2 %  
 k. Unit Dry Weight  
 $[d/(1+(j/100))]$ : 98.0 pcf

l. Wet Weight Soil + Tare: 167.8 gms  
 m. Dry Weight Soil + Tare: 133.4 gms  
 n. Tare Weight: 7.4 gms  
 o. Moisture Content  
 $[(l-m)/(m-n)]*100$ : 27.3 %  
 p. Unit Dry Weight  
 $[d/(1+(o/100))]$ : 93.3 pcf

Date	Time	t sec	Initial		Final		Temp C	Rt	k @ 20C cm/sec
			Height, ho	Corrected ho - C	Height, hf	Corrected hf - C			
20-Jun	22:18		76.2	69.2					
21-Jun	09:30	40320			66.4	59.4	22	0.953	4.6E-07
21-Jun	09:30		66.4	59.4					
21-Jun	10:45	4500			65.4	58.4	22	0.953	4.6E-07
21-Jun	10:45		65.4	58.4					
21-Jun	14:45	14400			62.7	55.7	22	0.953	4.0E-07
21-Jun	14:45		62.7	55.7					
21-Jun	18:32	13620			61.4	54.4	22	0.953	2.1E-07
21-Jun	18:32		61.4	54.4					
23-Jun	06:15	128580			49.5	42.5	22	0.953	2.3E-07

Cumulative

20-Jun	22:18		76.2	69.2					
23-Jun	06:15	201420			49.5	42.5	22	0.953	2.9E-07

Height of Top of Specimen		Standpipe Diameter		Standpipe Area
From Top of Table:	7.01 cm		1.42 cm	1.584 sq cm

Test Method: Corps of Engineers EM 1110-2-1906, Appendix VII

Hx-C = Hx-Ht

BME-14 3-4 ft



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REPORT DATE: 6/23/2011  
 PROJECT NO.: 0910-1548

ATTN: Gregg Adams, P.E.

PROJECT: New Boston Landfill Expansion

**HYDRAULIC CONDUCTIVITY WORKSHEET**  
**FALLING HEAD - FIXED WALL PERMEAMETER**

LOCATION: New Boston Landfill  
 MATERIAL: Clay, dark red  
 BORING/SAMPLE: BME-14  
 PROCTOR #: \_\_\_\_\_  
 SAMPLE ORIENTATION: H X V \_\_\_\_\_  
 Remold \_\_\_\_\_

LAB START DATE: 6/20/2011  
 LAB RPT. DATE: 6/23/2011  
 TECHNICIAN: SG/TB  
 DEPTH/LIFT: 20-22  
 PERM FLUID USED: De-aired Tap Water

a. Length of Specimen, L: 1.0 in  
 c. Sample Volume  
 ( $\pi b^2 / 4 * a$ ): 4.897 cu in

b. Avg. Diameter of Specimen: 2.5 in  
 d. Wet Unit Weight:  
 $[(g-i)*3.8095/c]$ : 125.1 pcf

**INITIAL CONDITIONS**

**FINAL CONDITIONS**

e. Ring Weight: 523.4 gms  
 f. Ring + Wet Weight Soil: 686.5 gms  
 g. Wet Weight Soil + Tare: 168.4 gms  
 h. Dry Weight Soil + Tare: 138.9 gms  
 i. Tare Weight: 7.6 gms  
 j. Moisture Content  
 $[(g-h)/(h-i)]*100$ : 22.5 %  
 k. Unit Dry Weight  
 $[d/(1+(j/100))]$ : 102.1 pcf

l. Wet Weight Soil + Tare: 175.4 gms  
 m. Dry Weight Soil + Tare: 138.9 gms  
 n. Tare Weight: 7.6 gms  
 o. Moisture Content  
 $[(l-m)/(m-n)]*100$ : 27.8 %  
 p. Unit Dry Weight  
 $[d/(1+(o/100))]$ : 97.9 pcf

Date	Time	t sec	Initial		Final		Temp C	Rt	k @ 20C cm/sec
			Height, ho	Corrected ho - C	Height, hf	Corrected hf - C			
20-Jun	22:18		72.2	65.0					
21-Jun	09:30	40320			61.6	54.4	22	0.953	4.2E-07
21-Jun	09:30		61.6	54.4					
21-Jun	10:45	4500			60.6	53.4	22	0.953	3.9E-07
21-Jun	10:45		60.6	53.4					
21-Jun	14:45	14400			57.4	50.2	22	0.953	4.0E-07
21-Jun	14:45		57.4	50.2					
21-Jun	18:30	13500			55.0	47.8	22	0.953	3.4E-07
21-Jun	18:30		55.0	47.8					
23-Jun	06:15	128700			31.6	24.4	22	0.953	4.9E-07
<b>Cumulative</b>									
20-Jun	22:18		72.2	65.0					
23-Jun	06:15	201420			31.6	24.4	22	0.953	4.6E-07

Height of Top of Specimen		Standpipe Diameter		Standpipe Area
From Top of Table:	7.23 cm		1.25 cm	1.227 sq cm

Test Method: Corps of Engineers EM 1110-2-1906, Appendix VII

Hx-C = Hx-Ht



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PROJECT: New Boston Landfill Expansion

**HYDRAULIC CONDUCTIVITY WORKSHEET**  
**FALLING HEAD - FIXED WALL PERMEAMETER**

LOCATION: New Boston Landfill  
 MATERIAL: Sand, Clayey, gray & yellowish tan  
 BORING/SAMPLE: BME-14  
 PROCTOR #: \_\_\_\_\_  
 SAMPLE ORIENTATION: H \_\_\_\_\_ V X  
 Remold \_\_\_\_\_

LAB START DATE: 6/12/2011  
 LAB RPT. DATE: 6/14/2011  
 TECHNICIAN: SG/TB  
 DEPTH/LIFT: 60-62  
 PERM FLUID USED: De-aired Tap Water

a. Length of Specimen, L: 1.0 in  
 c. Sample Volume  
 ( $\pi b^2 / 4 * a$ ): 4.897 cu in

b. Avg. Diameter of Specimen: 2.5 in  
 d. Wet Unit Weight:  
 $[(g-i)*3.8095/c]$ : 118.6 pcf

**INITIAL CONDITIONS**

**FINAL CONDITIONS**

e. Ring Weight: 512.3 gms  
 f. Ring + Wet Weight Soil: 664.8 gms  
 g. Wet Weight Soil + Tare: 160.0 gms  
 h. Dry Weight Soil + Tare: 134.8 gms  
 i. Tare Weight: 7.5 gms  
 j. Moisture Content  
 $[(g-h)/(h-i)]*100$ : 19.8 %  
 k. Unit Dry Weight  
 $[d/(1+(j/100))]$ : 99.0 pcf

l. Wet Weight Soil + Tare: 167.1 gms  
 m. Dry Weight Soil + Tare: 134.8 gms  
 n. Tare Weight: 7.5 gms  
 o. Moisture Content  
 $[(l-m)/(m-n)]*100$ : 25.4 %  
 p. Unit Dry Weight  
 $[d/(1+(o/100))]$ : 94.6 pcf

Date	Time	t sec	Initial		Final		Temp C	Rt	k @ 20C cm/sec
			Height, ho	Corrected ho - C	Height, hf	Corrected hf - C			
12-Jun	16:14		51.8	44.8					
13-Jun	08:36	58920			15.2	8.2	22	0.953	3.5E-06
13-Jun	08:36		15.2	8.2					
13-Jun	14:25	20940			10.5	3.5	22	0.953	4.9E-06
13-Jun	14:25		10.5	3.5					
13-Jun	20:58	23580			7.9	0.9	22	0.953	7.0E-06
13-Jun	20:58		7.9	0.9					
14-Jun	09:20	44520			7.3	0.3	22	0.953	3.1E-06
14-Jun	09:20		7.3	0.3					
14-Jun	11:30	7800			7.2	0.2	22	0.953	6.6E-06
<b>Cumulative</b>									
12-Jun	16:14		51.8	44.8			22		
14-Jun	11:30	155760			7.2	0.2	22	0.953	4.3E-06

Height of Top of Specimen \_\_\_\_\_ Standpipe Diameter 1.42 cm Standpipe Area 1.584 sq cm  
 From Top of Table: 7.01 cm

Test Method: Corps of Engineers EM 1110-2-1906, Appendix VII

Hx-C = Hx-Ht



1700 Robert Road, Suite 101  
 Mansfield, Texas 76063  
 Metro 817.572.2818  
 Fax 817.453.9984

CLIENT: Biggs & Mathews Environmental, Inc.  
 1700 Robert Road, Ste. 100  
 Mansfield, Texas 76063

REPORT DATE: 6/14/2011

PROJECT NO.: 0910-1548

ATTN: Gregg Adams, P.E.

PROJECT: New Boston Landfill Expansion

**HYDRAULIC CONDUCTIVITY WORKSHEET**  
**FALLING HEAD - FIXED WALL PERMEAMETER**

LOCATION: New Boston Landfill  
 MATERIAL: Clay, dark gray  
 BORING/SAMPLE: BME-14  
 PROCTOR #: \_\_\_\_\_  
 SAMPLE ORIENTATION: H \_\_\_\_\_ V X  
 Remold \_\_\_\_\_

LAB START DATE: 6/12/2011  
 LAB RPT. DATE: 6/14/2011  
 TECHNICIAN: SG/TB  
 DEPTH/LIFT: 80-81  
 PERM FLUID USED: De-aired Tap Water

a. Length of Specimen, L: 1.0 in  
 c. Sample Volume  
 ( $\pi b^2 / 4 * a$ ): 4.897 cu in

b. Avg. Diameter of Specimen: 2.5 in  
 d. Wet Unit Weight:  
 $[(g-i)*3.8095/c]$ : 118.6 pcf

**INITIAL CONDITIONS**

**FINAL CONDITIONS**

e. Ring Weight: 452.5 gms  
 f. Ring + Wet Weight Soil: 685.9 gms  
 g. Wet Weight Soil + Tare: 161.2 gms  
 h. Dry Weight Soil + Tare: 130.8 gms  
 i. Tare Weight: 8.8 gms  
 j. Moisture Content  
 $[(g-h)/(h-i)]*100$ : 24.9 %  
 k. Unit Dry Weight  
 $[d/(1+(j/100))]$ : 94.9 pcf

l. Wet Weight Soil + Tare: 160.5 gms  
 m. Dry Weight Soil + Tare: 130.8 gms  
 n. Tare Weight: 8.8 gms  
 o. Moisture Content  
 $[(l-m)/(m-n)]*100$ : 24.3 %  
 p. Unit Dry Weight  
 $[d/(1+(o/100))]$ : 95.3 pcf

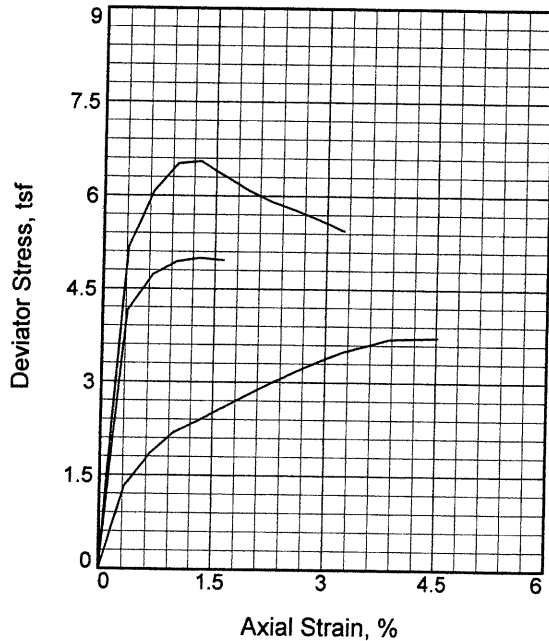
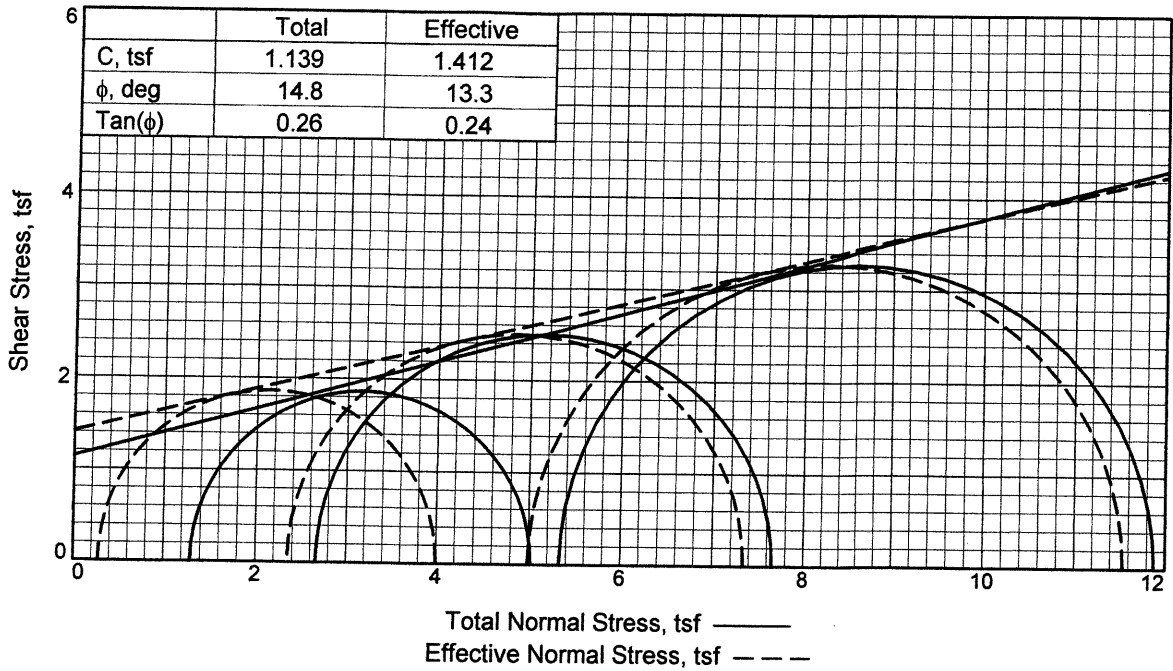
Date	Time	t sec	Initial		Final		Temp C	Rt	k @ 20C cm/sec
			Height, ho	Corrected ho - C	Height, hf	Corrected hf - C			
12-Jun	16:10		52.1	44.4					
13-Jun	08:33	58980			50.6	42.9	22	0.953	3.9E-08
13-Jun	08:33		50.6	42.9					
13-Jun	14:25	21120			50.1	42.4	22	0.953	3.7E-08
13-Jun	14:25		50.1	42.4					
13-Jun	20:58	23580			49.7	42.0	22	0.953	2.7E-08
13-Jun	20:58		49.7	42.0					
14-Jun	09:20	44520			49.1	41.4	22	0.953	2.1E-08
14-Jun	09:20		49.1	41.4					
14-Jun	11:45	8700			48.8	41.1	22	0.953	5.5E-08
<b>Cumulative</b>									
12-Jun	16:10		52.1	44.4			22		
14-Jun	09:20	148200			48.8	41.1	22	0.953	3.5E-08

Height of Top of Specimen From Top of Table: 7.70 cm  
 Standpipe Diameter: 1.05 cm  
 Standpipe Area: 0.866 sq cm

Test Method: Corps of Engineers EM 1110-2-1906, Appendix VII

Hx-C = Hx-Ht





Sample No.		1	2	3
Initial	Water Content, %	22.7	22.7	22.7
	Dry Density, pcf	102.7	102.7	102.7
	Saturation, %	98.6	98.6	98.6
	Void Ratio	0.6110	0.6110	0.6110
	Diameter, in.	1.46	1.46	1.46
	Height, in.	3.10	3.10	3.10
At Test	Water Content, %	23.1	23.1	23.1
	Dry Density, pcf	102.7	102.7	102.7
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6110	0.6110	0.6110
	Diameter, in.	1.46	1.46	1.46
	Height, in.	3.10	3.10	3.10
Strain rate, in./min.		0.03	0.03	0.03
Back Pressure, psi		10.00	10.00	10.00
Cell Pressure, psi		28.00	47.00	84.00
Fail. Stress, tsf		3.7	5.0	6.6
Total Pore Pr., tsf		1.7	1.0	1.1
Ult. Stress, tsf				
Total Pore Pr., tsf				
$\bar{\sigma}_1$ Failure, tsf		4.0	7.3	11.5
$\bar{\sigma}_3$ Failure, tsf		0.3	2.3	5.0

**Type of Test:**

CU with Pore Pressures

**Sample Type:** Undisturbed

**Description:** Clay, brown w/sand sms

LL= 46      PL= 23      PI= 23

**Assumed Specific Gravity=** 2.65

**Remarks:**

**Figure** \_\_\_\_\_

**Client:**

**Project:** New Boston Landfill

**Sample Number:** BME-8      **Depth:** 45.0'-46.0'

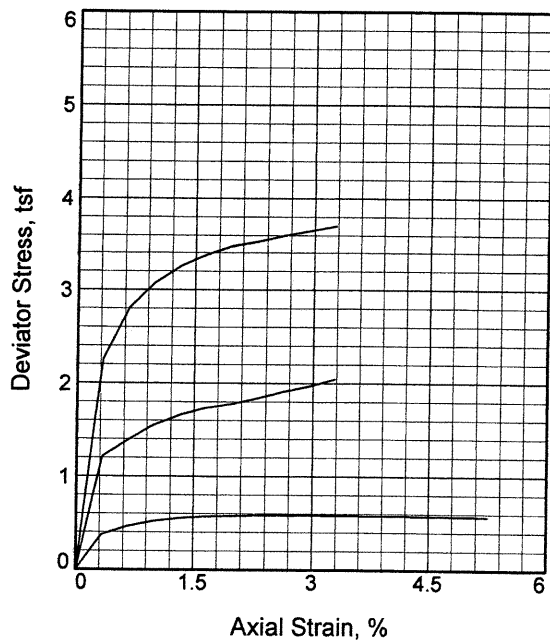
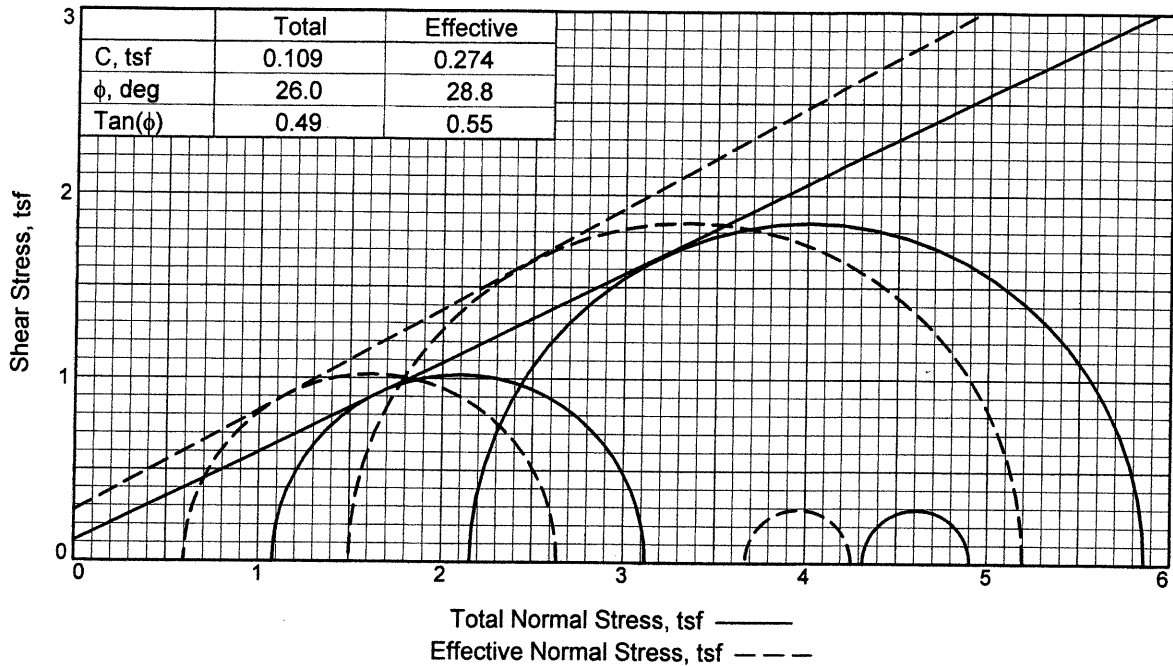
**Proj. No.:** 1548

**Date Sampled:** 9/14/2011

TRIAXIAL SHEAR TEST REPORT

**LANDTEC ENGINEERS**

Mansfield, Texas 76063



Sample No.	1	2	3	
Initial	Water Content, %	25.0	25.0	25.0
	Dry Density, pcf	98.5	98.5	98.5
	Saturation, %	97.3	97.3	97.3
	Void Ratio	0.6804	0.6804	0.6804
	Diameter, in.	1.36	1.36	1.36
	Height, in.	3.05	3.05	3.05
At Test	Water Content, %	25.7	25.7	25.7
	Dry Density, pcf	98.5	98.5	98.5
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6804	0.6804	0.6804
	Diameter, in.	1.36	1.36	1.36
	Height, in.	3.05	3.05	3.05
Strain rate, in./min.	0.03	0.03	0.03	
Back Pressure, psi	10.00	10.00	10.00	
Cell Pressure, psi	25.00	40.00	70.00	
Fail. Stress, tsf	2.04	3.70	0.58	
	Total Pore Pr., tsf	1.20	1.38	1.37
Ult. Stress, tsf				
	Total Pore Pr., tsf			
$\bar{\sigma}_1$ Failure, tsf	2.64	5.20	4.26	
$\bar{\sigma}_3$ Failure, tsf	0.60	1.50	3.67	

**Type of Test:**

CU with Pore Pressures

**Sample Type:** Undisturbed

**Description:** Clay, red-brown w/sand sms

LL= 61      PL= 27      PI= 34

**Assumed Specific Gravity=** 2.65

**Remarks:**

**Client:**

**Project:** New Boston Landfill

**Sample Number:** BME-14

**Depth:** 35.0'-37.0'

**Proj. No.:** 1548

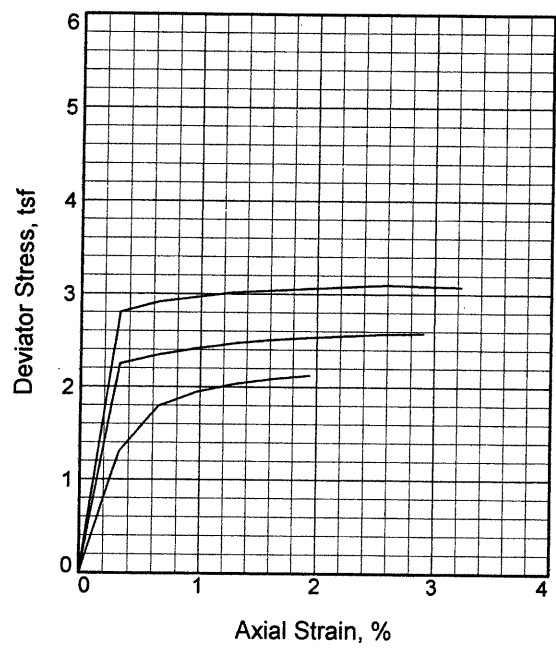
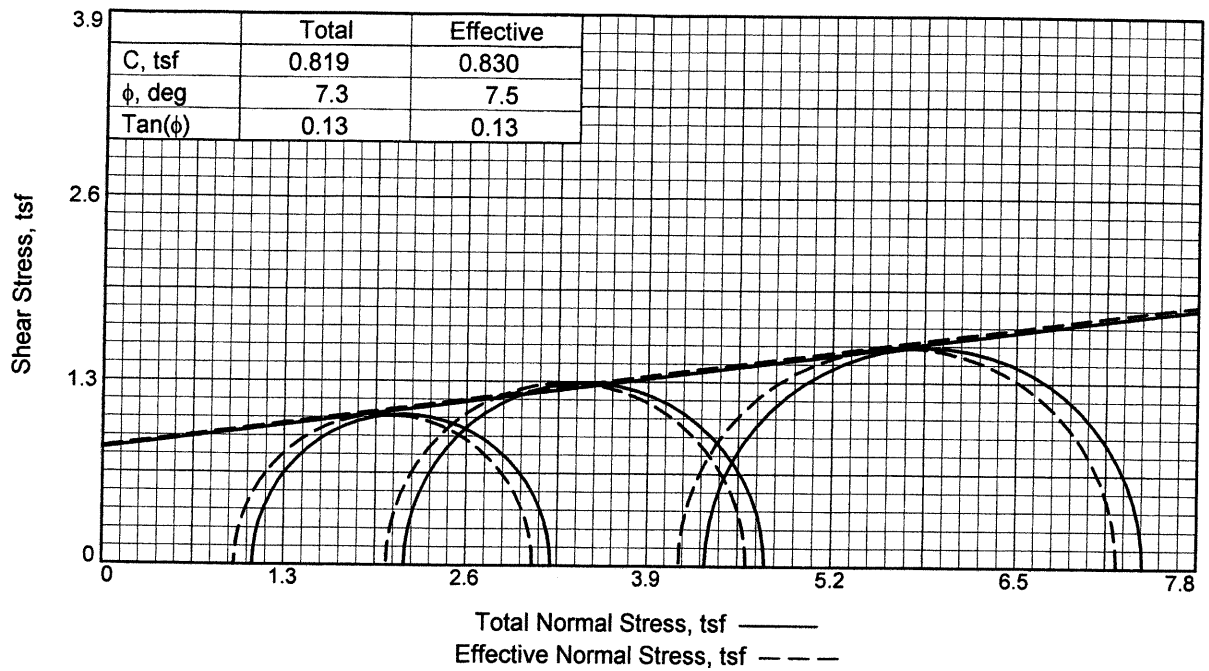
**Date Sampled:** 9/14/2011

**TRIAXIAL SHEAR TEST REPORT**

**LANDTEC ENGINEERS**

Mansfield, Texas 76063

**Figure** \_\_\_\_\_



Sample No.	1	2	3	
Initial	Water Content, %	22.5	22.5	22.5
	Dry Density, pcf	102.3	102.3	102.3
	Saturation, %	96.9	96.9	96.9
	Void Ratio	0.6165	0.6165	0.6165
	Diameter, in.	1.40	1.40	1.40
	Height, in.	3.10	3.10	3.10
At Test	Water Content, %	23.3	23.3	23.3
	Dry Density, pcf	102.3	102.3	102.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6165	0.6165	0.6165
	Diameter, in.	1.40	1.40	1.40
	Height, in.	3.10	3.10	3.10
Strain rate, in./min.	0.03	0.03	0.03	
Back Pressure, psi	10.00	10.00	10.00	
Cell Pressure, psi	25.00	40.00	70.00	
Fail. Stress, tsf	2.12	2.58	3.10	
Total Pore Pr., tsf	0.85	0.85	0.91	
Ult. Stress, tsf				
Total Pore Pr., tsf				
$\bar{\sigma}_1$ Failure, tsf	3.07	4.61	7.23	
$\bar{\sigma}_3$ Failure, tsf	0.95	2.03	4.13	

**Type of Test:**  
CU with Pore Pressures

**Sample Type:** Undisturbed

**Description:** Shaley clay, red-brown w/sand sms

LL= 59      PL= 26      PI= 33

**Assumed Specific Gravity=** 2.65

**Remarks:**

**Client:**

**Project:** New Boston Landfill

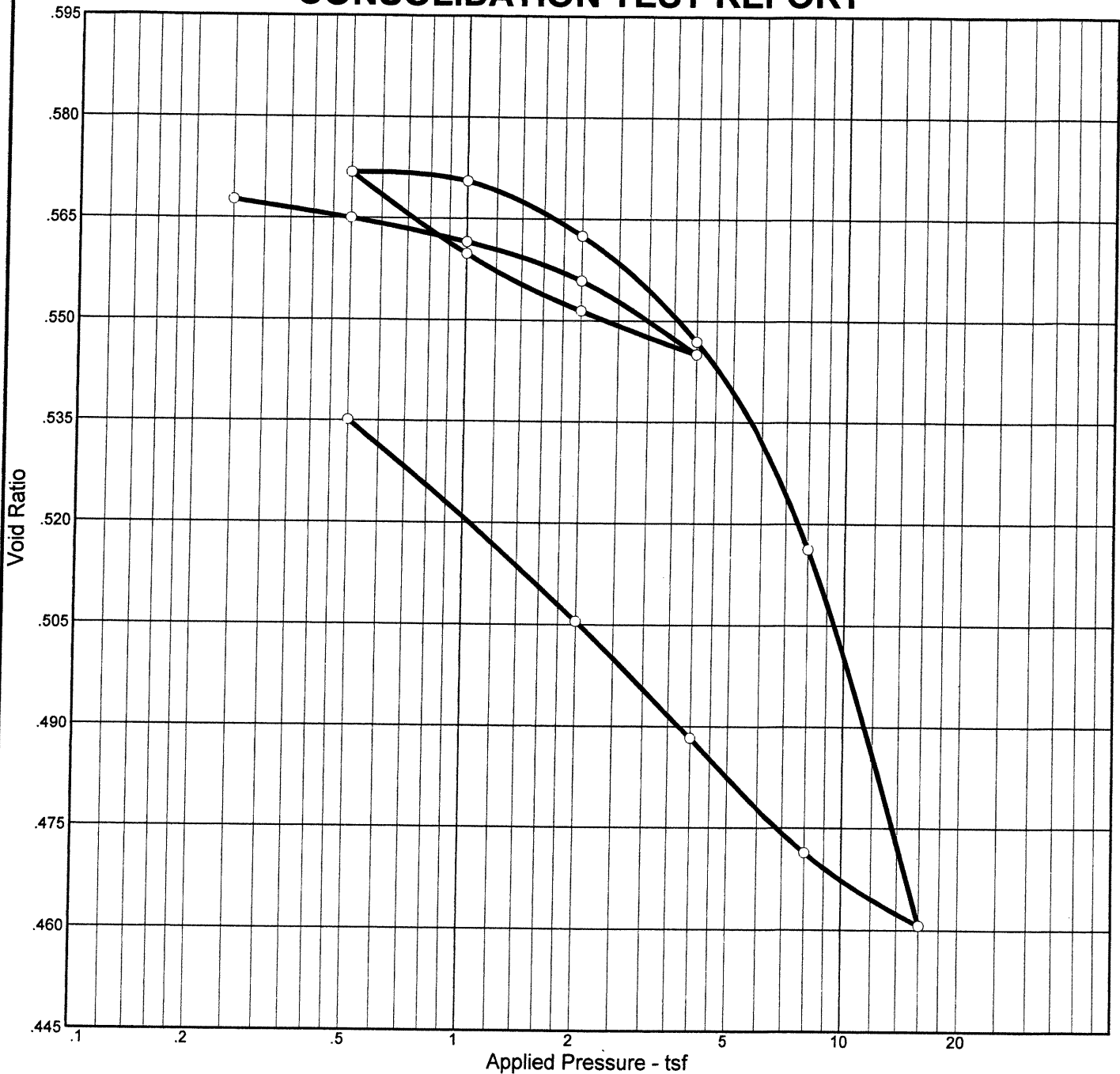
**Sample Number:** BME-4      **Depth:** 35.0'-37.0'

**Proj. No.:** 1548      **Date Sampled:** 9/14/2011

**TRIAXIAL SHEAR TEST REPORT**  
**LANDTEC ENGINEERS**  
Mansfield, Texas 76063

**Figure** \_\_\_\_\_

# CONSOLIDATION TEST REPORT



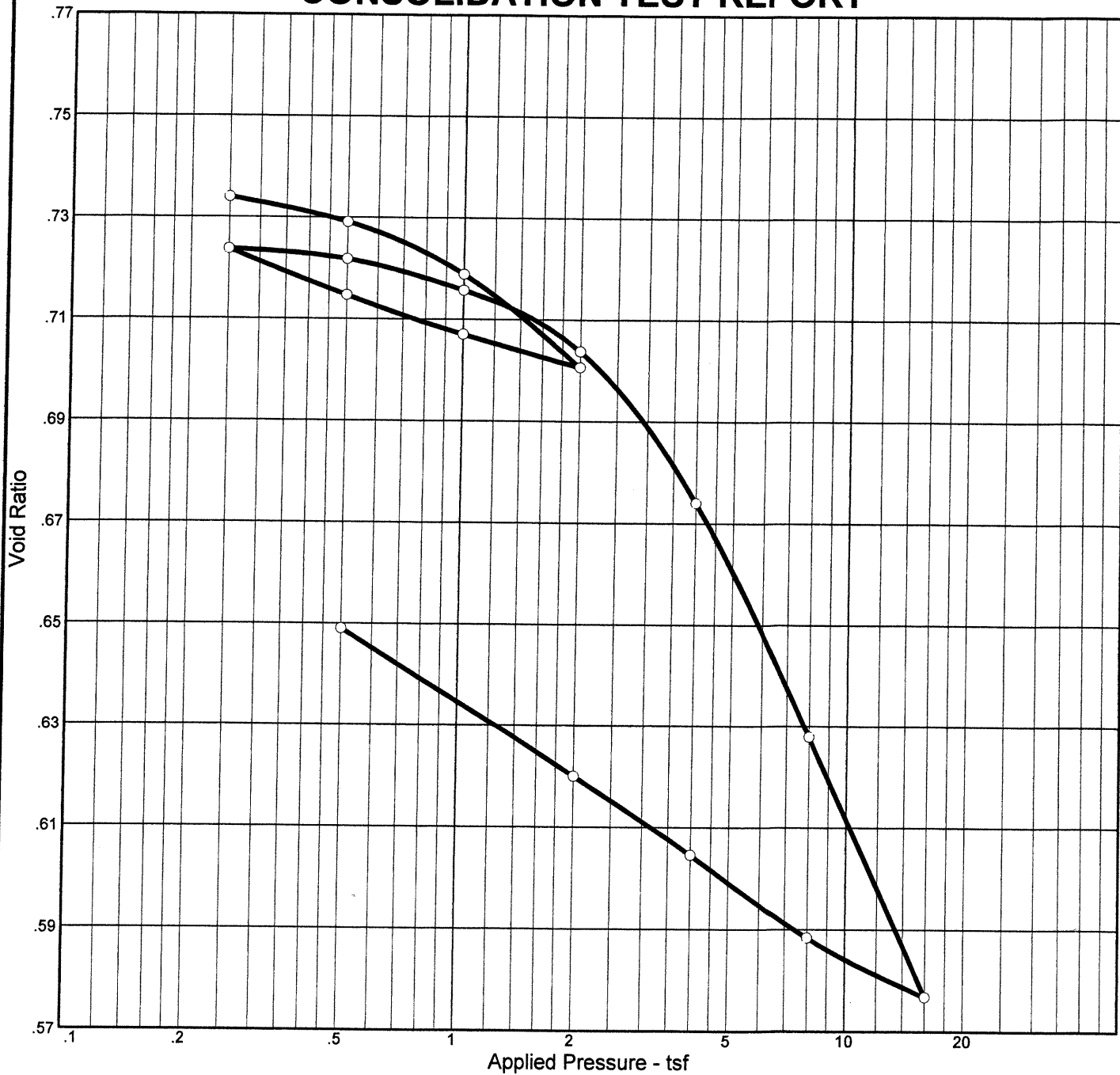
Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P <sub>c</sub> (tsf)	Initial Void Ratio
Saturation	Moisture							
98.9 %	21.4 %	105.2	59	35	2.65		6.56	0.573

<b>MATERIAL DESCRIPTION</b>		<b>USCS</b>	<b>AASHTO</b>
Clay, red			

<b>Project No.</b> 1548 <b>Project:</b> New Boston Landfill <b>Source:</b>	<b>Client:</b>  <b>Sample No.:</b> BME-12 <b>Elev./Depth:</b> 60.0'-62.0'	<b>Remarks:</b>   <div style="text-align: center;"> <b>LANDTEC ENGINEERS</b>                  Mansfield, Texas 76063             </div>
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**Figure**

# CONSOLIDATION TEST REPORT

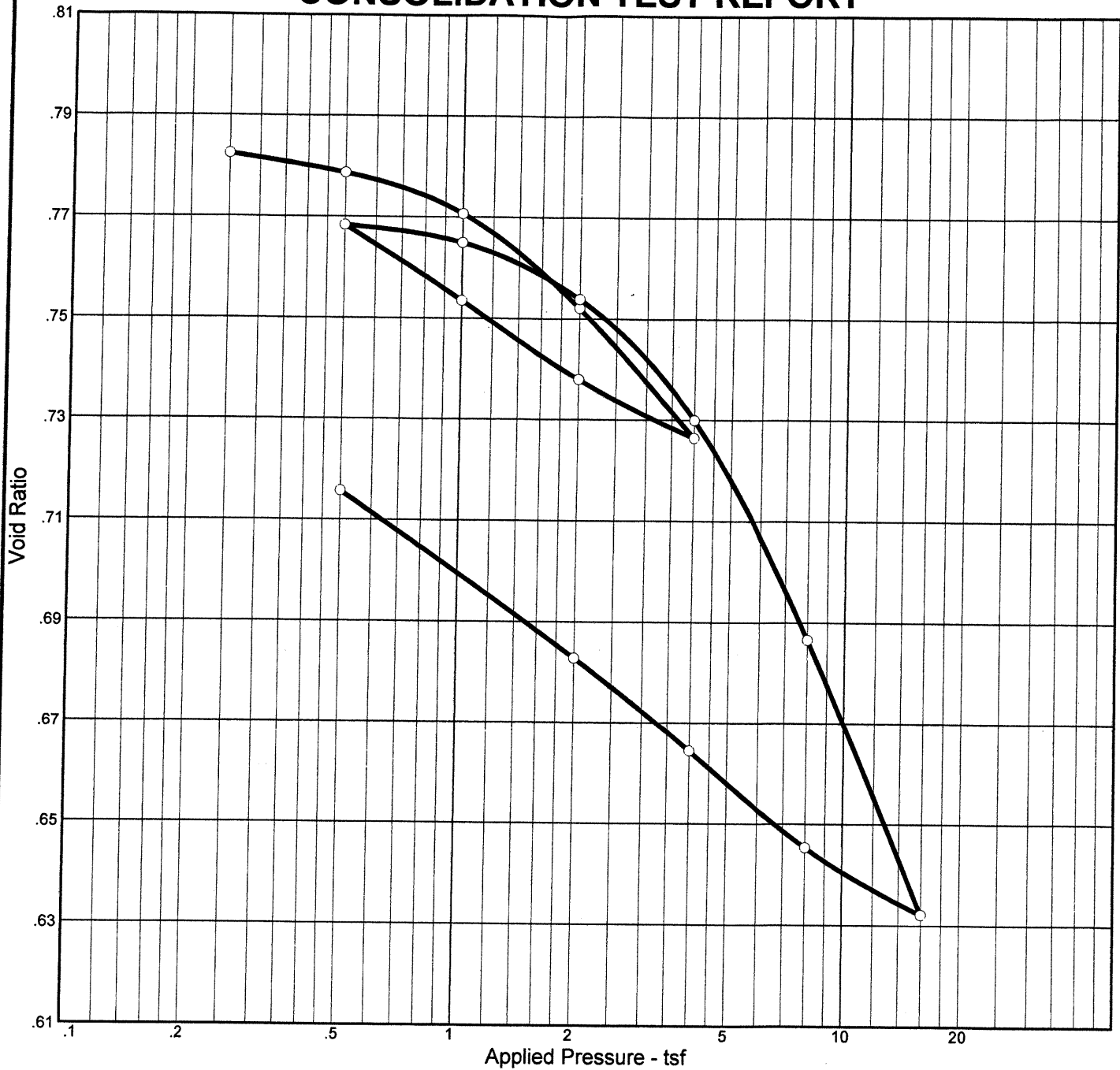


Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P <sub>c</sub> (tsf)	Initial Void Ratio
Saturation	Moisture							
74.7 %	20.8 %	95.2	51	21	2.65		4.46	0.737

<b>MATERIAL DESCRIPTION</b>		<b>USCS</b>	<b>AASHTO</b>
Shaley clay, dark gray w/sand sms			

Project No. 1548	Client:	Remarks:
Project: New Boston Landfill		
Source:	Sample No.: BME-8      Elev./Depth: 80.0'-81.0'	
<b>LANDTEC ENGINEERS</b> Mansfield, Texas 76063		<b>Figure</b>

# CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P <sub>c</sub> (tsf)	Initial Void Ratio
Saturation	Moisture							
77.7 %	23.0 %	92.7	61	29	2.65		3.22	0.785

<b>MATERIAL DESCRIPTION</b>		<b>USCS</b>	<b>AASHTO</b>
Shale, clayey gray			

<b>Project No.</b> 1548 <b>Project:</b> New Boston Landfill <b>Source:</b>	<b>Client:</b>  <b>Sample No.:</b> BME-12 <b>Elev./Depth:</b> 80.0'-81.0'	<b>Remarks:</b>   <div style="text-align: center; border: 1px solid black; padding: 5px;"> <b>LANDTEC ENGINEERS</b>                  Mansfield, Texas 76063             </div>
		<b>Figure</b>

**MOISTURE/DENSITY RELATIONSHIP**  
ASTM D 698 A

**New Boston Landfill**

**PROJECT NO. 1548**

Rammer Type: Manual  
Sampled By: Landtec  
Sample Location: Onsite

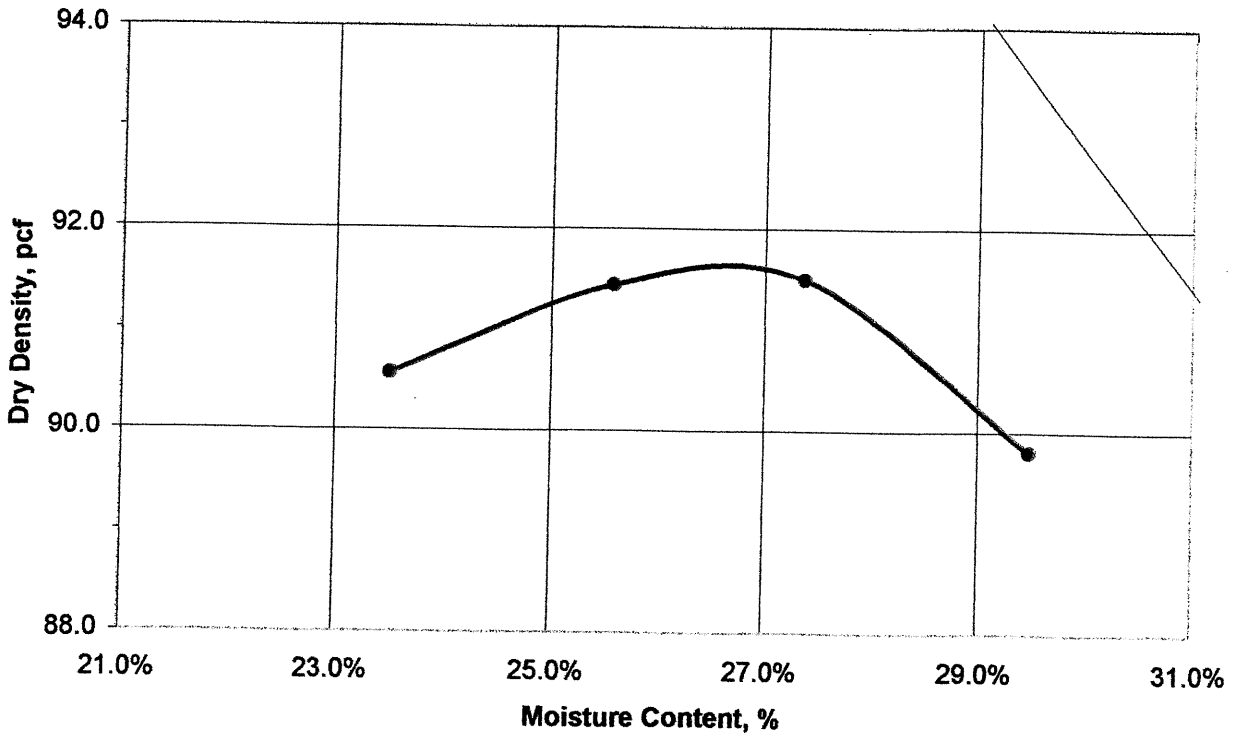
Sample Prep: Dry  
Sample Date: 05/31/11

Description: Clay, red & dark red  
Liquid Limit: 62  
Plastic Limit: 24  
Plastic Index: 38

(-) # 200 Mesh Sieve: 99%  
Classification (USCS): CH

**PROCTOR NO. NB-1**

Maximum Dry Density, pcf: 91.6  
Optimum Moisture Content, %: 26.6





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 Fax 817.453.9984

CLIENT: Biggs & Mathews Environmental, Inc.  
 1700 Robert Road, Ste. 100  
 Mansfield, Texas 76063

REPORT DATE: 9/17/2011  
 PROJECT NO.: 1548

ATTN: Gregg Adams, P.E.

PROJECT: New Boston Landfill Expansion

### HYDRAULIC CONDUCTIVITY WORKSHEET FALLING HEAD - FIXED WALL PERMEAMETER

LOCATION:  
 MATERIAL: Clay, red & dark red  
 BORING/SAMPLE:  
 PROCTOR #: NB-1  
 SAMPLE ORIENTATION: H \_\_\_\_\_ V X  
 Remold X

LAB START DATE: 9/15/2011  
 LAB RPT. DATE: 9/17/2011  
 TECHNICIAN: MLT  
 DEPTH/LIFT:  
 PERM FLUID USED: De-aired Tap Water

a. Length of Specimen, L: 1.0 in  
 c. Sample Volume  
 ( $\pi b^2 / 4 * a$ ): 4.909 cu in

b. Avg. Diameter of Specimen: 2.5 in  
 d. Wet Unit Weight:  
 $[(f-h)*3.8095/c]$ : 110.1 pcf

#### INITIAL CONDITIONS

#### FINAL CONDITIONS

e. Ring + Wet Weight Soil: 657.5 gms  
 f. Wet Weight Soil + Tare: 240.1 gms  
 g. Dry Weight Soil + Tare: 210.3 gms  
 h. Tare Weight: 98.2 gms  
 i. Moisture Content  
 $[(f-g)/(g-h)]*100$ : 26.6 %  
 j. Unit Dry Weight  
 $[d/(1+(i/100))]$ : 87.0 pcf

k. Wet Weight Soil + Tare: 244.7 gms  
 l. Dry Weight Soil + Tare: 210.3 gms  
 m. Tare Weight: 98.2 gms  
 n. Moisture Content  
 $[(k-l)/(l-m)]*100$ : 30.7 %  
 o. Unit Dry Weight  
 $[d/(1+(n/100))]$ : 84.3 pcf  
 p. Ring Weight: 515.6 gms

Date	Time	t sec	Initial Height, ho	Corrected ho - C	Final		Temp C	Rt	k @ 20C cm/sec
					Height, hf	Corrected hf - C			
15-Sep	06:34		42.8	35.3					
15-Sep	13:40	25560			40.0	32.5	22	0.953	2.1E-07
15-Sep	13:40		40.0	32.5					
15-Sep	21:00	26400			38.8	31.3	22	0.953	9.4E-08
15-Sep	21:00		38.8	31.3					
16-Sep	07:00	36000			37.9	30.4	22	0.953	5.4E-08
16-Sep	07:00		37.9	30.4					
16-Sep	12:00	18000			37.6	30.1	22	0.953	3.6E-08
16-Sep	12:00		37.6	30.1					
16-Sep	17:15	18900			37.4	29.9	22	0.953	2.3E-08
<b>Cumulative</b>									
15-Sep	13:40		40.0	32.5					
16-Sep	17:15	99300			37.4	29.9	22	0.953	5.6E-08

Height of Top of Specimen	Standpipe Diameter	Standpipe Area
From Top of Table: 7.50 cm	1.05 cm	0.866 sq cm

Test Method: Corps of Engineers EM 1110-2-1906, Appendix VII

Hx-C = Hx-Ht