PART III, ATTACHMENT 3

APPENDIX III-3E

GEOTECHNICAL LABORATORY TESTING RESULTS

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GOLDER

SUMMARY OF LABORATORY RESULTS

CLIENT Waste Management of Texas, Inc. **PROJECT NAME** WM / Hawthorn Park Permit Amend /TX

PROJECT NUMBER 1894269 **PROJECT LOCATION** TX

Sample ID	Depth (ft.)	Natural Moisture (%)	Atterberg Limits			%<#200 Sieve	Class-ification	Unit Weight		Permeability (cm/sec)	Additional Lab Testing
			Liquid Limit	Plastic Limit	Plasticity Index			Moisture Content (%)	Dry Density (pcf)		
BME-1; U-10	22.0	13.1	33	13	20	72	CL				
BME-1; U-13	28.0					46					
BME-1; U-35	72.0	15.8	31	13	18	52	CL				
BME-2; S-12	22.0					26					
BME-2; U-31	60.0	24.3	69	23	46	100	CH				
BME-2; U-7	12.0	20.7	55	16	39	79	CH	20.7	101.0	5.54E-08	
BME-3; S-24	46.0					21					
BME-3; U-12	22.0	17.0	33	12	21	64	CL				CONSOLIDATION
BME-3; U-36	70.0	18.8	44	16	28	91	CL				
BME-4; S-16	30.0					12					
BME-4; U-19	36.0	20.7	44	17	27	91	CL				
BME-4; U-34	64.0					100					
BME-4; U-34	66.0	26.7	69	24	45						
BME-4; U-7	12.0	21.8	36	13	23	73	CL				
BME-5; S-27	53.0					7					
BME-5; U-12	22.0	15.3	25	13	12	82	CL				
BME-5; U-4	6.0	12.7	28	13	15	41	SC	12.7	110.1	2.60E-08	
BME-6; U-11	20.0	21.0	54	16	38	79	CH				
BME-6; U-13	24.0	16.4	47	13	34	85	CL				CONSOLIDATION
BME-6; U-32	62.0	29.4	75	23	52	100	CH				CONSOLIDATION
BME-6; U-4	6.0	17.5	42	12	30	57	CL				
BME-6; U-7	12.0	24.8	67	20	47	90	CH	24.8	95.5	3.23E-08	TRIAXIAL
BME-7; U-13	24.0	19.2	55	17	38	92	CH	19.2	110.4	1.33E-08	
BME-7; U-19	36.0	21.7	65	22	43	98	CH				
BME-7; U-25	48.0	31.0	51	21	30	76	CH				
BME-7; U-27	52.0	28.4	NP	NP	NP	73	ML				
BME-7; U-3	4.0	18.3	37	13	24	52	CL				
BME-7; U-7	12.0	21.0	59	17	42	98	CH				
BME-8; U-11	20.0	17.3	47	13	34	82	CL				
BME-8; U-34	66.0	25.8	60	23	37	99	CH				
BME-8; U-4	6.0	17.1	28	11	17	43	SC				
BME-8; U-6	10.0	19.9	30	13	17	38	SC	19.9	105.5	5.98E-08	
BME-9; U-17	32.0	32.9	86	27	59	98	CH				
BME-9; U-19	36.0	31.2	75	22	53	98	CH	31.2	91.2	8.46E-09	
BME-9; U-3	4.0	14.5	31	11	20	53	CL				
BME-9; U-35	68.0	25.6	52	19	33	93	CH				
BME-9; U-5	8.0	18.4	35	17	18	48	SC	18.4	109.7	9.18E-07	
BME-10; U-13	24.0	17.3	34	13	21	54	CL	17.3	111.2	8.16E-08	
BME-10; U-3	4.0	16.3	36	13	23	61	CL				
BME-10; U-37	72.0	16.6	32	13	19	68	CL				
BME-11; U-32	66.0	25.1	60	20	40	90	CH				

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PROJECT NUMBER 1894269 **PROJECT LOCATION** TX

Sample ID	Depth (ft.)	Natural Moisture (%)	Atterberg Limits			%<#200 Sieve	Class-ification	Unit Weight		Permeability (cm/sec)	Additional Lab Testing
			Liquid Limit	Plastic Limit	Plasticity Index			Moisture Content (%)	Dry Density (pcf)		
BME-11; U-4	6.0	23.8	46	16	30	83	CL				TRIAXIAL
BME-11; U-5	8.0	17.1	35	14	21	45	SC	17.1	108.5	5.09E-08	

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ATTERBERG LIMITS RESULTS
ASTM D4318
LL Machine Type:Mechanical
Plastic Limit Type:Hand Rolled
Grooving Tool Type:Plastic

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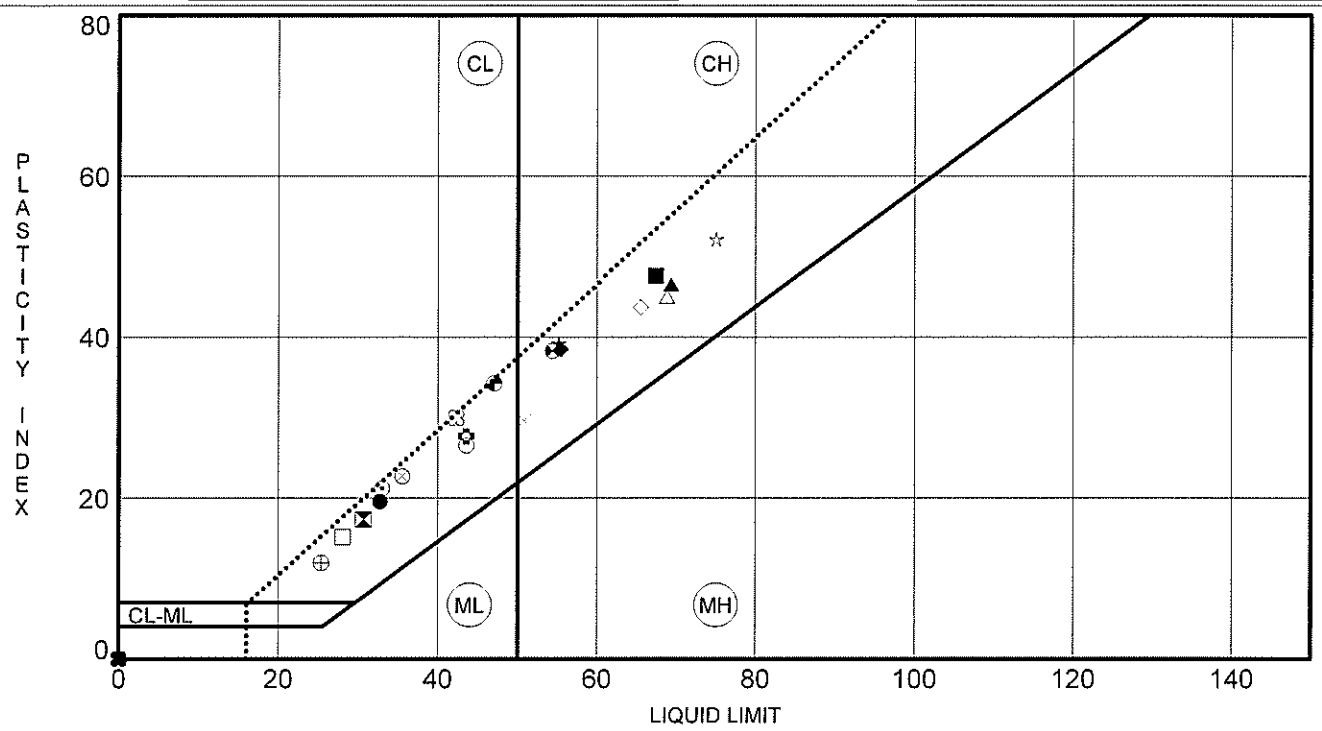
PROJECT LOCATION TX



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification	Max Grain Size	% RET. #40	As Rec. WC %	Method	Date Tested	Prep. Type	Tech.	Review	Description	Notes
●	BME-1; U-10	22 ft	33	13	20	72	LEAN CLAY with SAND (CL)	0.425 mm	0.1%	13.14%	B	4/8/19	Wet	MR	JBF	Lt. Khaki	
⊠	BME-1; U-35	72 ft	31	13	18	52	SANDY LEAN CLAY (CL)	0.425 mm	0.2%	15.75%	B	4/8/19	Wet	MR	JBF	Lt. Brown	
▲	BME-2; U-31	60 ft	69	23	46	100	FAT CLAY (CH)	0.425 mm	0.0%	24.30%	B	4/8/19	Wet	MR	JBF	Redd. Brown	
★	BME-2; U-7	12 ft	55	16	39	79	FAT CLAY with SAND (CH)	4.75 mm	4.1%	20.71%	B	4/3/19	Wet	MR	JBF	Lt. Brown	
⊙	BME-3; U-12	22 ft	33	12	21	64	SANDY LEAN CLAY (CL)			17.0%	B	5/2019	Wet	KWG	MB	Lt. Brown	
✿	BME-3; U-36	70 ft	44	16	28	91	LEAN CLAY (CL)	0.425 mm	0.0%	18.84%	B	4/8/19	Wet	MR	JBF	Lt. Brown	
○	BME-4; U-19	36 ft	44	17	27	91	LEAN CLAY (CL)	4.75 mm	7.8%	20.74%	B	4/8/19	Wet	MR	JBF	Lt. Redd. Brown	
△	BME-4; U-34	64 ft	69	24	45	100	FAT CLAY (CH)	0.425 mm	0.0%	26.71%	B	4/8/19	Wet	MR	JBF	Redd. Brown	
⊗	BME-4; U-7	12 ft	36	13	23	73	LEAN CLAY with SAND (CL)	4.75 mm	9.8%	21.84%	B	4/8/19	Wet	MR	JBF	Lt. Brown	
⊕	BME-5; U-12	22 ft	25	13	12	82	LEAN CLAY with SAND (CL)	0.425 mm	0.0%	15.31%	B	4/8/19	Wet	MR	JBF	Lt. Khaki	
□	BME-5; U-4	6 ft	28	13	15	41	CLAYEY SAND with GRAVEL (SC)	4.75 mm	25.4%	12.72%	B	4/3/19	Wet	MR	JBF	Gray. Brown	
⊛	BME-6; U-11	20 ft	54	16	38	79	FAT CLAY with SAND (CH)	0.425 mm	1.4%	21.01%	B	2/23/19	Wet	MR	JBF	Lt. Brown	
◔	BME-6; U-13	24 ft	47	13	34	85	LEAN CLAY with SAND (CL)			16.4%	B	5/6/2019	Wet	KWG	MB	Brown	
☆	BME-6; U-32	62 ft	75	23	52	100	FAT CLAY (CH)			29.4%	A	5/13/2019	Wet	EH	MB	Redd. Brown	
⊠	BME-6; U-4	6 ft	42	12	30	57	GRAVELLY LEAN CLAY with SAND (CL)	4.75 mm	25.8%	17.52%	B	2/23/19	Wet	MR	JBF	Lt. Gray. Brown	
■	BME-6; U-7	12 ft	67	20	47	90	FAT CLAY (CH)	0.425 mm	0.1%	24.82%	B	4/3/19	Wet	MR	JBF	Redd. Brown	
◆	BME-7; U-13	24 ft	55	17	38	92	FAT CLAY (CH)	4.75 mm	0.9%	19.17%	B	4/3/19	Wet	MR	JBF	Redd. Brown	
◇	BME-7; U-19	36 ft	65	22	43	98	FAT CLAY (CH)	4.75 mm	1.2%	21.73%	B	2/23/19	Wet	MR	JBF	Redd. Brown	
×	BME-7; U-25	48 ft	51	21	30	76	FAT CLAY with GRAVEL (CH)	4.75 mm	21.1%	30.96%	B	4/8/19	Wet	MR	JBF	Redd. Brown	
✖	BME-7; U-27	52 ft	NP	NP	NP	73	SILT with SAND (ML)	4.75 mm	2.5%	28.37%	B	4/8/19	Wet	MR	JBF	Redd. Brown	

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ASTM D4318
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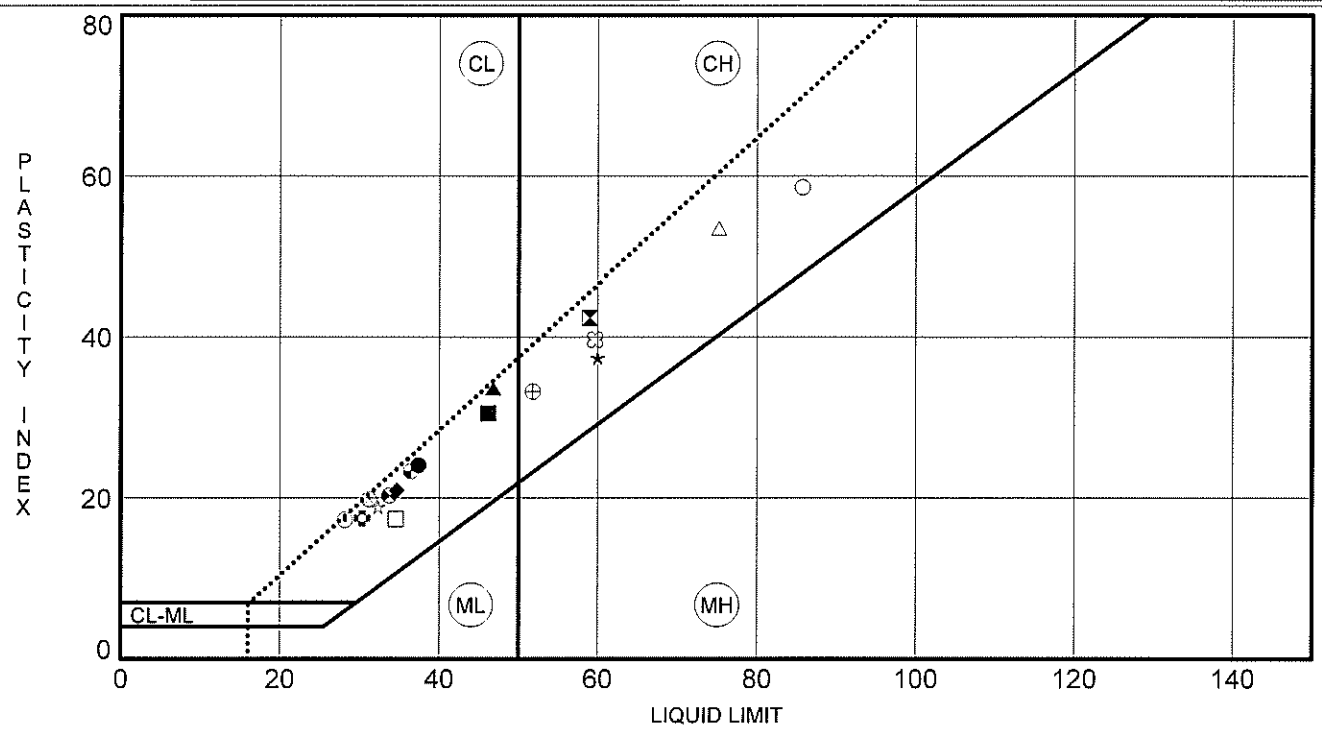

	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification	Max Grain Size	% RET. #40	As Rec. WC %	Method	Date Tested	Prep. Type	Tech.	Review	Description	Notes
●	BME-7; U-3	4 ft	37	13	24	52	SANDY LEAN CLAY (CL)	4.75 mm	32.00%	18.28%	B	2/23/19	Wet	MR	JBF	Gray	
⊠	BME-7; U-7	12 ft	59	17	42	98	FAT CLAY (CH)			21.0%	B	4/25/2019	Wet	BC	MB	Brown	
▲	BME-8; U-11	20 ft	47	13	34	82	LEAN CLAY with SAND (CL)	4.75 mm	1.1%	17.34%	B	2/23/19	Wet	MR	JBF	Khaki	
★	BME-8; U-34	66 ft	60	23	37	99	FAT CLAY (CH)	0.425 mm	0.1%	25.75%	B	4/8/19	Wet	MR	JBF	Redd. Brown	
⊙	BME-8; U-4	6 ft	28	11	17	43	CLAYEY SAND (SC)	0.425 mm	0.5%	17.08%	B	2/23/19	Wet	MR	JBF	Gray	
✿	BME-8; U-6	10 ft	30	13	17	38	CLAYEY SAND (SC)	0.425 mm	0.2%	19.93%	B	4/3/19	Wet	MR	JBF	Lt. Gray. Brown	
○	BME-9; U-17	32 ft	86	27	59	98	FAT CLAY (CH)	0.425 mm	0.5%	32.86%	B	2/23/19	Wet	MR	JBF	Redd. Brown	
△	BME-9; U-19	36 ft	75	22	53	98	FAT CLAY (CH)	0.425 mm	0.1%	31.16%	B	4/3/19	Wet	MR	JBF	Redd. Brown	
⊗	BME-9; U-3	4 ft	31	11	20	53	SANDY LEAN CLAY (CL)	0.425 mm	0.2%	14.49%	B	2/23/19	Wet	MR	JBF	Lt. Brown	
⊕	BME-9; U-35	68 ft	52	19	33	93	FAT CLAY (CH)	4.75 mm	0.8%	25.61%	B	4/8/19	Wet	MR	JBF	Lt. Redd. Brown	
□	BME-9; U-5	8 ft	35	17	18	48	CLAYEY SAND (SC)	0.425 mm	0.2%	18.38%	B	4/3/19	Wet	MR	JBF	Lt. Brown	
⊖	BME-10; U-13	24 ft	34	13	21	54	SANDY LEAN CLAY (CL)	0.425 mm	0.0%	17.26%	B	4/3/19	Wet	MR	JBF	Lt. Brown	
◔	BME-10; U-3	4 ft	36	13	23	61	SANDY LEAN CLAY (CL)	0.425 mm	0.1%	16.33%	B	4/8/19	Wet	MR	JBF	Lt. Gray. Brown	
☆	BME-10; U-37	72 ft	32	13	19	68	SANDY LEAN CLAY (CL)	0.425 mm	0.1%	16.59%	B	4/8/19	Wet	MR	JBF	Lt. Redd. Brown	
⊠	BME-11; U-32	66 ft	60	20	40	90	FAT CLAY (CH)	0.425 mm	1.1%	25.12%	B	4/8/19	Wet	MR	JBF	Redd. Brown	
■	BME-11; U-4	6 ft	46	16	30	83	LEAN CLAY with SAND (CL)			23.8%	B	4/25/2019	Wet	BC	MB	Lt. Brown	
◆	BME-11; U-5	8 ft	35	14	21	45	CLAYEY SAND (SC)	0.425 mm	0.1%	17.13%	B	4/3/19	Wet	MR	JBF	Khaki	

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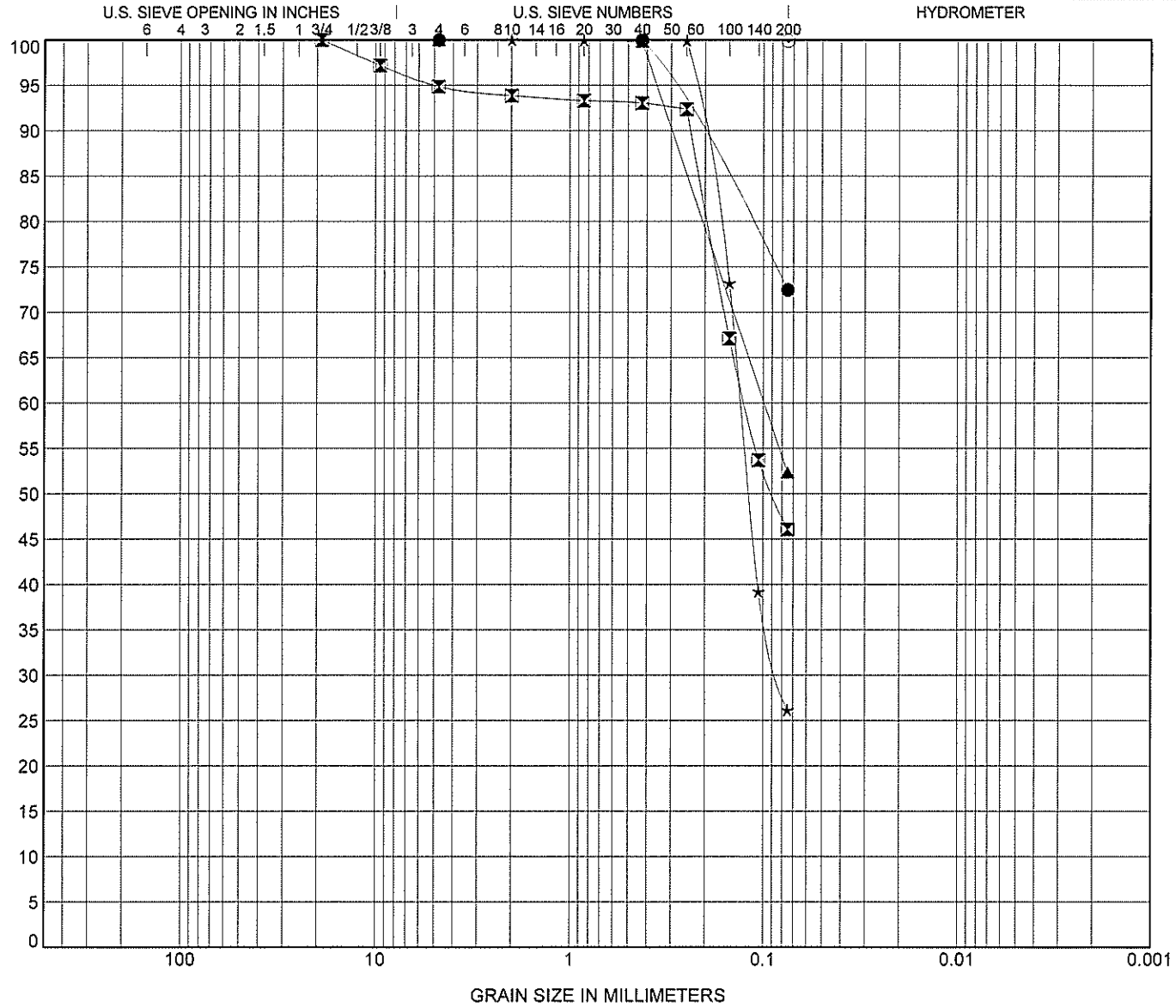
GRAIN SIZE DISTRIBUTION
ASTM D6913

CLIENT Waste Management of Texas, Inc. **PROJECT NAME** WM / Hawthorn Park Permit Amend /TX

PROJECT NUMBER 1894269 **PROJECT LOCATION** TX



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test.?	Test Date	Description	Tech.	Review	Notes
●	BME-1; U-10	22 ft	LEAN CLAY with SAND (CL)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
⊠	BME-1; U-13	28 ft		B	Oven	No		2 hrs.	No	4/5/19		MR	JBF	
▲	BME-1; U-35	72 ft	SANDY LEAN CLAY (CL)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
★	BME-2; S-12	22 ft		B	Oven	No		2 hrs.	No	4/5/19		MR	JBF	
⊙	BME-2; U-31	60 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-1; U-10	22 ft	4.75				0.0	27.5	72	
⊠	BME-1; U-13	28 ft	19	0.125			5.2	48.8	46	
▲	BME-1; U-35	72 ft	4.75	0.099			0.0	47.7	52	
★	BME-2; S-12	22 ft	4.75	0.131	0.083		0.0	73.9	26	
⊙	BME-2; U-31	60 ft	4.75				0.0	0.1	100	

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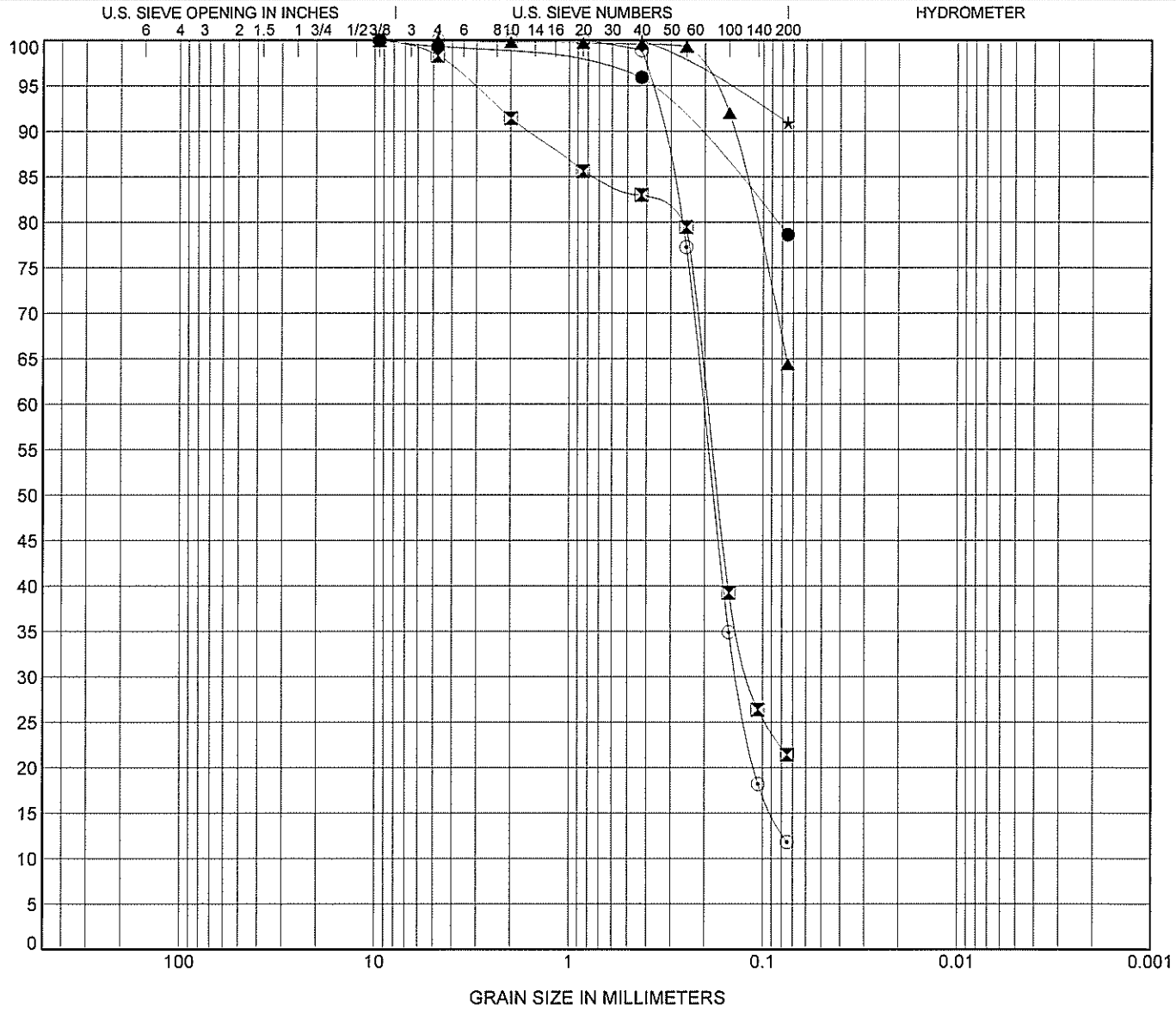

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test.?	Test Date	Description	Tech.	Review	Notes
●	BME-2; U-7	12 ft	FAT CLAY with SAND (CH)	B	Oven	No		2 hrs.	No	3/26/19		TB	MR	
⊠	BME-3; S-24	46 ft		B	Oven	No		2 hrs.	No	4/5/19		MR	JBF	
▲	BME-3; U-12	22 ft	SANDY LEAN CLAY (CL)							5/3/2019		KWG	MB	
★	BME-3; U-36	70 ft	LEAN CLAY (CL)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
⊙	BME-4; S-16	30 ft		B	Oven	No		2 hrs.	No	4/5/19		MR	JBF	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-2; U-7	12 ft	9.5				0.7	20.7	79	
⊠	BME-3; S-24	46 ft	9.5	0.195	0.117		1.7	76.9	21	
▲	BME-3; U-12	22 ft	4.75				0.0	35.6	64	
★	BME-3; U-36	70 ft	4.75				0.0	9.1	91	
⊙	BME-4; S-16	30 ft	4.75	0.203	0.135		0.0	88.2	12	

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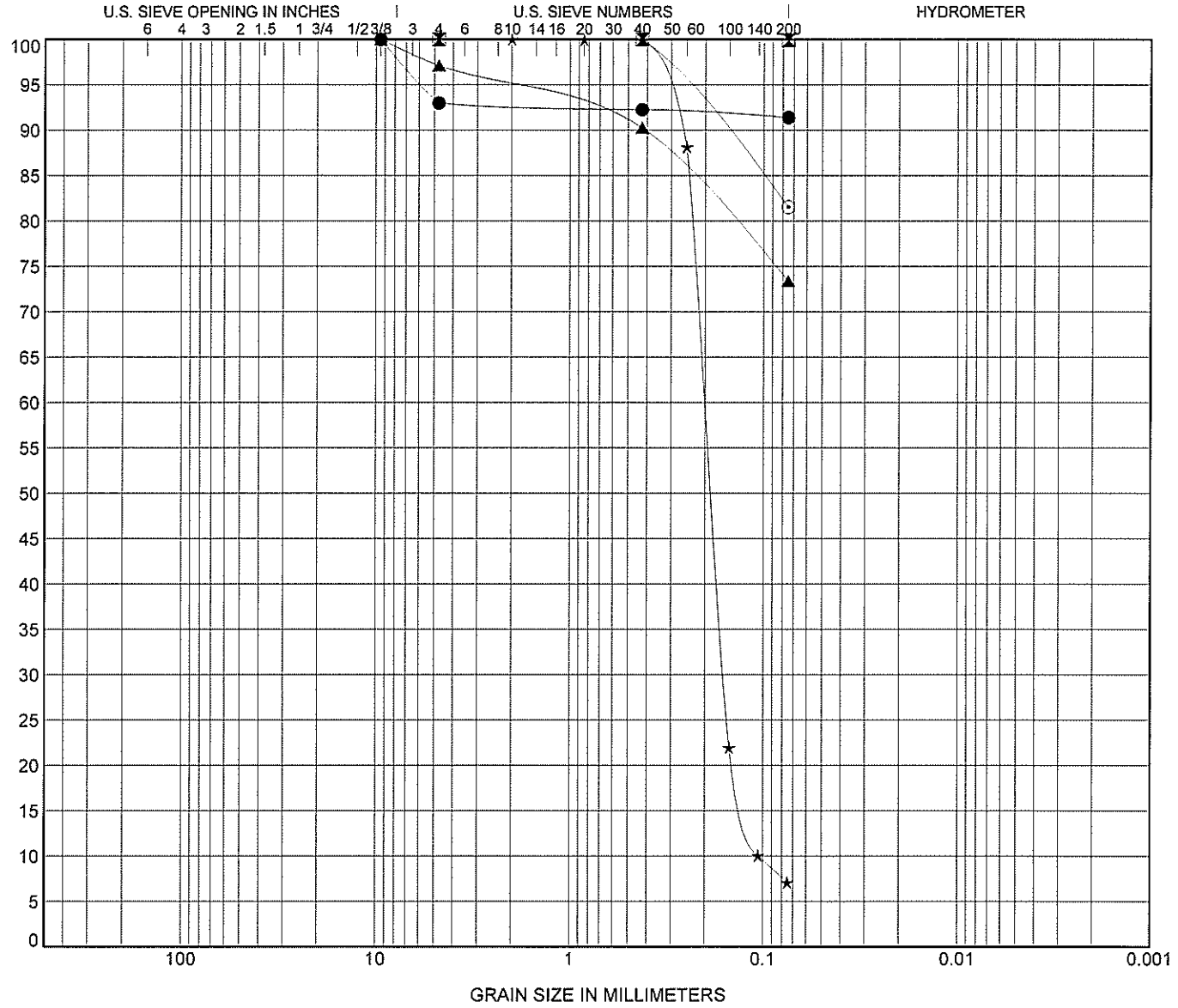

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test.?	Test Date	Description	Tech.	Review	Notes
●	BME-4; U-19	36 ft	LEAN CLAY (CL)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
⊠	BME-4; U-34	64 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
▲	BME-4; U-7	12 ft	LEAN CLAY with SAND (CL)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
★	BME-5; S-27	53 ft		B	Oven	No		2 hrs.	No	4/5/19		MR	JBF	
⊙	BME-5; U-12	22 ft	LEAN CLAY with SAND (CL)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-4; U-19	36 ft	9.5				7.0	1.6	91	
⊠	BME-4; U-34	64 ft	4.75				0.0	0.1	100	
▲	BME-4; U-7	12 ft	9.5				2.9	23.7	73	
★	BME-5; S-27	53 ft	2	0.201	0.16	0.105	0.0	92.9	7	
⊙	BME-5; U-12	22 ft	4.75				0.0	18.5	82	

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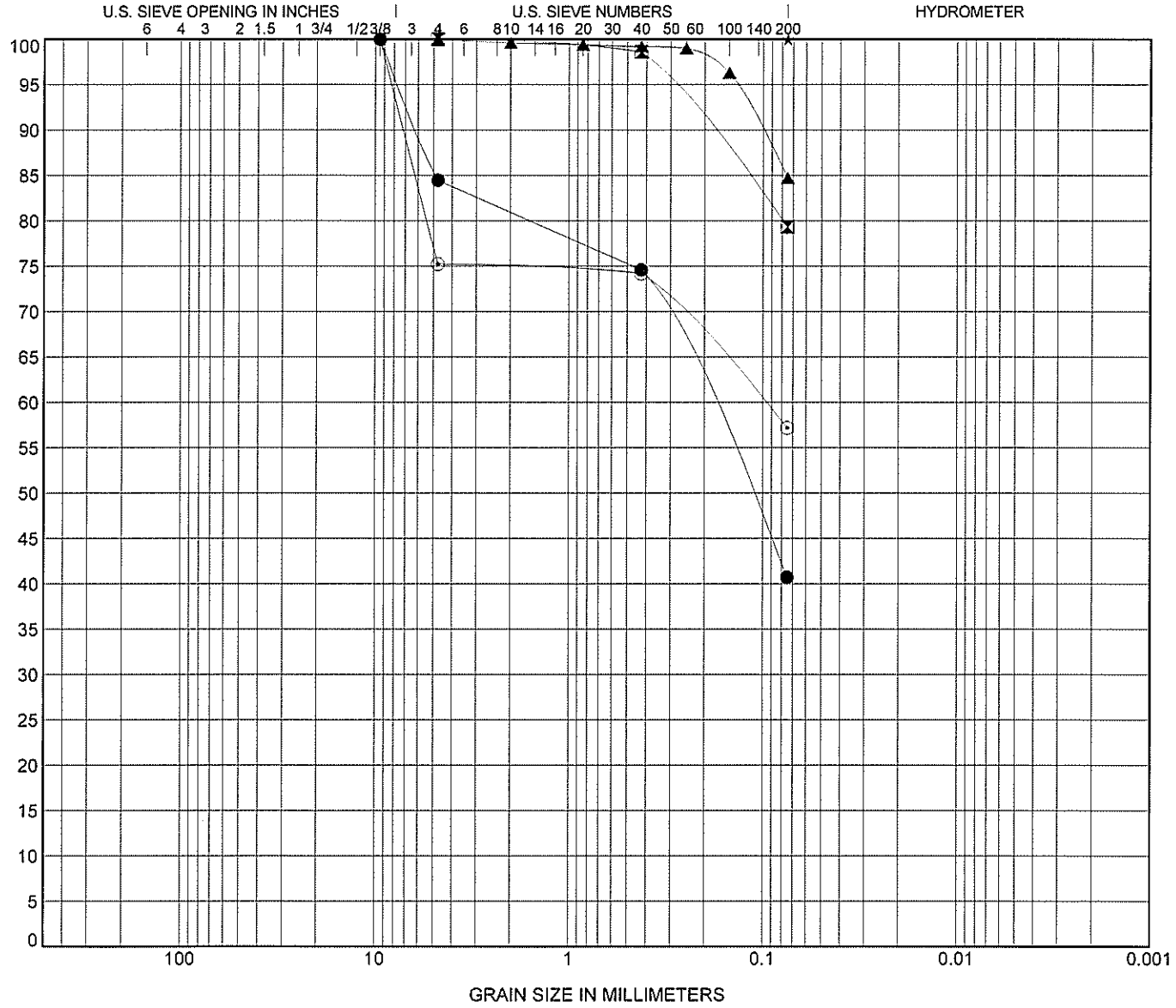

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test ?	Test Date	Description	Tech.	Review	Notes
●	BME-5; U-4	6 ft	CLAYEY SAND with GRAVEL (SC)	B	Oven	No		2 hrs.	No	3/26/19		TB	MR	
⊠	BME-6; U-11	20 ft	FAT CLAY with SAND (CH)	B	Oven	No		2 hrs.	No	3/6/19		MR	JBF	
▲	BME-6; U-13	24 ft	LEAN CLAY with SAND (CL)							5/6/2019		KWG	MB	
★	BME-6; U-32	62 ft	FAT CLAY (CH)							5/13/2019		EH	MB	
⊙	BME-6; U-4	6 ft	GRAVELLY LEAN CLAY with SAND (CL)	B	Oven	No		2 hrs.	No	3/6/19		MR	JBF	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-5; U-4	6 ft	9.5	0.201			15.5	43.8	41	
⊠	BME-6; U-11	20 ft	4.75				0.0	20.7	79	
▲	BME-6; U-13	24 ft	4.75				0.0	15.3	85	
★	BME-6; U-32	62 ft	0.075				0.0	0.0	100	
⊙	BME-6; U-4	6 ft	9.5	0.1			24.8	18.1	57	

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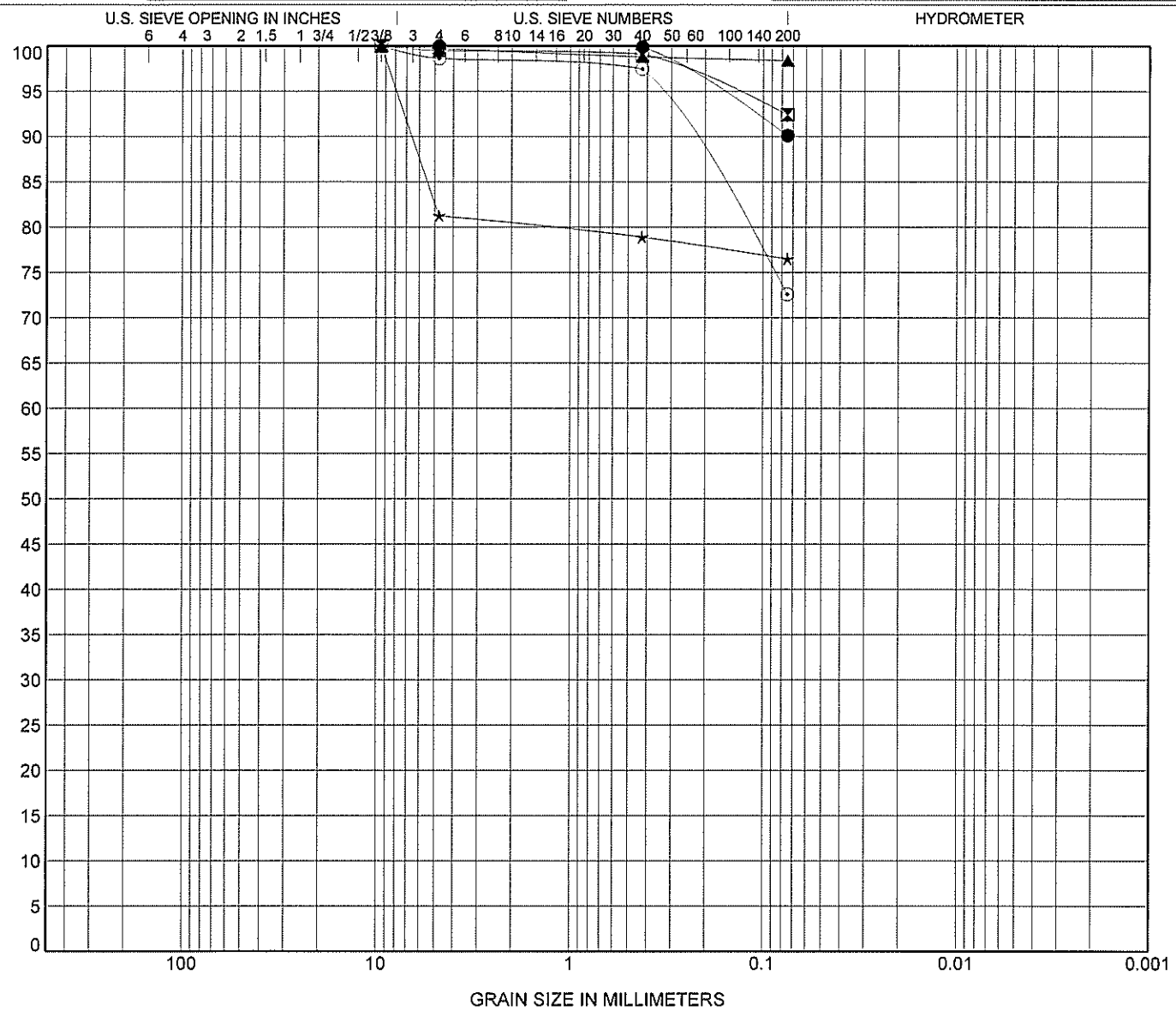
GRAIN SIZE DISTRIBUTION
ASTM D6913

CLIENT Waste Management of Texas, Inc. **PROJECT NAME** WM / Hawthorn Park Permit Amend /TX

PROJECT NUMBER 1894269 **PROJECT LOCATION** TX



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test.?	Test Date	Description	Tech.	Review	Notes
●	BME-6; U-7	12 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	3/26/19		TB	MR	
⊠	BME-7; U-13	24 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	4/11/19		MR	JBF	
▲	BME-7; U-19	36 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	3/6/19		MR	JBF	
★	BME-7; U-25	48 ft	FAT CLAY with GRAVEL (CH)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
⊙	BME-7; U-27	52 ft	SILT with SAND (ML)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-6; U-7	12 ft	4.75				0.0	9.9	90	
⊠	BME-7; U-13	24 ft	9.5				0.5	7.1	92	
▲	BME-7; U-19	36 ft	9.5				0.3	1.3	98	
★	BME-7; U-25	48 ft	9.5				18.7	4.8	76	
⊙	BME-7; U-27	52 ft	9.5				1.4	26.0	73	

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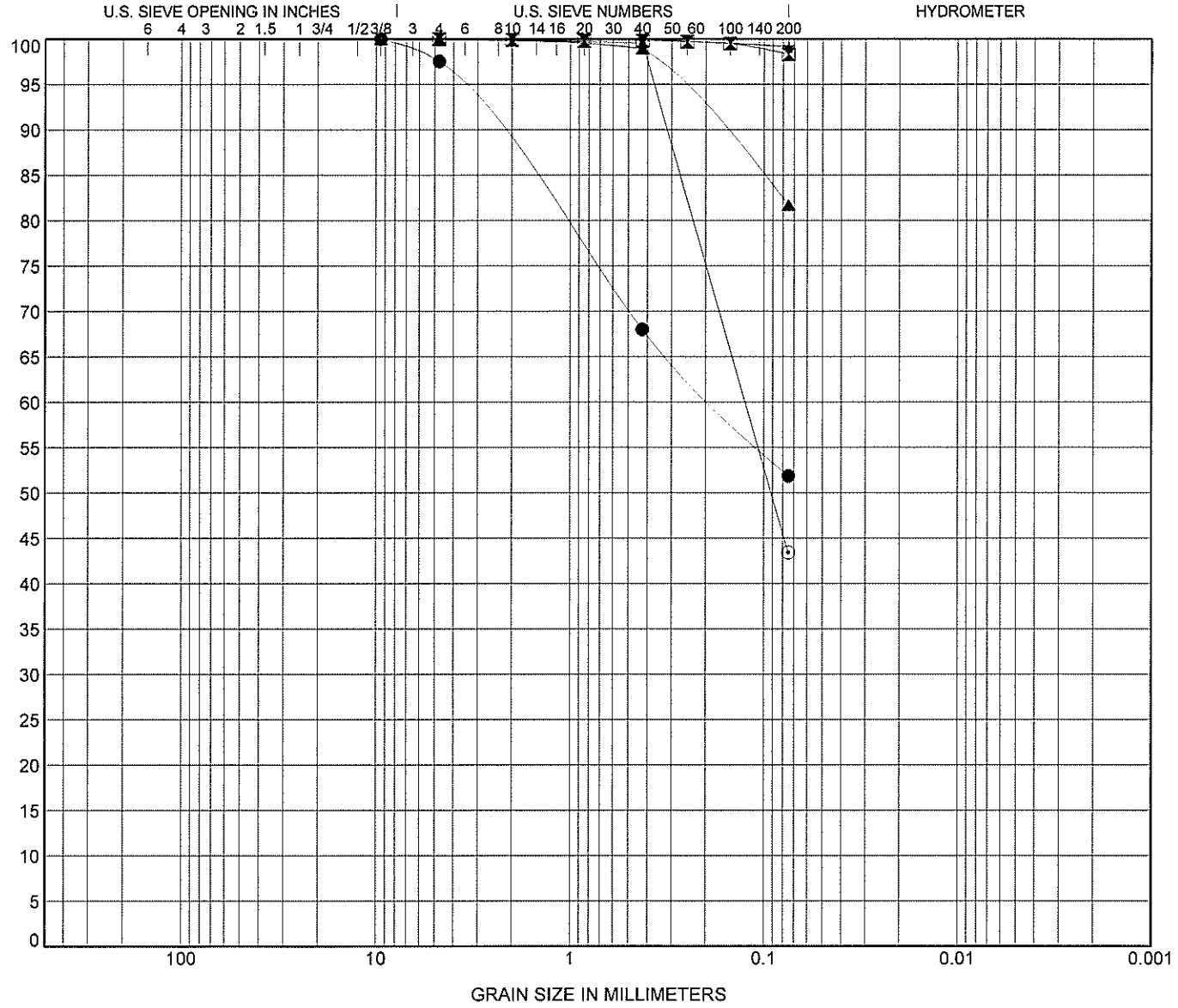
PROJECT NUMBER 1894269 **PROJECT LOCATION** TX



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test.?	Test Date	Description	Tech.	Review	Notes
●	BME-7; U-3	4 ft	SANDY LEAN CLAY (CL)	B	Oven	No		2 hrs.	No	3/6/19		MR	JBF	
⊠	BME-7; U-7	12 ft	FAT CLAY (CH)							4/25/2019		BC	MB	
▲	BME-8; U-11	20 ft	LEAN CLAY with SAND (CL)	B	Oven	No		2 hrs.	No	3/6/19		MR	JBF	
★	BME-8; U-34	66 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
⊙	BME-8; U-4	6 ft	CLAYEY SAND (SC)	B	Oven	No		2 hrs.	No	3/6/19		MR	JBF	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-7; U-3	4 ft	9.5	0.18			2.5	45.7	52	
⊠	BME-7; U-7	12 ft	4.75				0.0	1.7	98	
▲	BME-8; U-11	20 ft	9.5				0.1	18.2	82	
★	BME-8; U-34	66 ft	4.75				0.0	0.8	99	
⊙	BME-8; U-4	6 ft	4.75	0.125			0.0	56.6	43	

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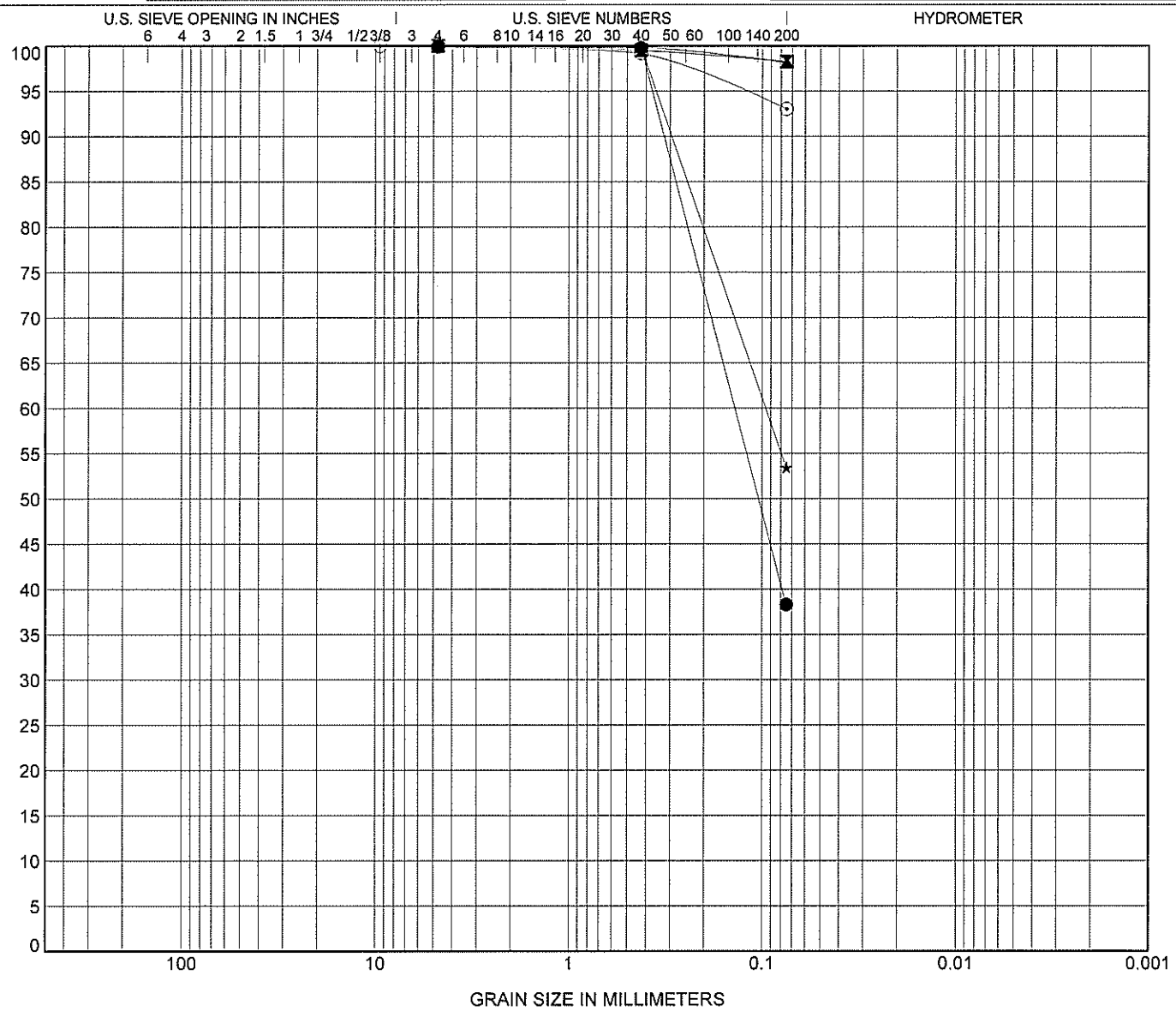

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test ?	Test Date	Description	Tech.	Review	Notes
●	BME-8; U-6	10 ft	CLAYEY SAND (SC)	B	Oven	No		2 hrs.	No	3/26/19		TB	MR	
⊠	BME-9; U-17	32 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	3/6/19		MR	JBF	
▲	BME-9; U-19	36 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	3/26/19		TB	MR	
★	BME-9; U-3	4 ft	SANDY LEAN CLAY (CL)	B	Oven	No		2 hrs.	No	3/6/19		MR	JBF	
⊙	BME-9; U-35	68 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-8; U-6	10 ft	4.75	0.138			0.0	61.7	38	
⊠	BME-9; U-17	32 ft	4.75				0.0	1.8	98	
▲	BME-9; U-19	36 ft	4.75				0.0	1.8	98	
★	BME-9; U-3	4 ft	4.75	0.096			0.0	46.6	53	
⊙	BME-9; U-35	68 ft	9.5				0.1	6.9	93	

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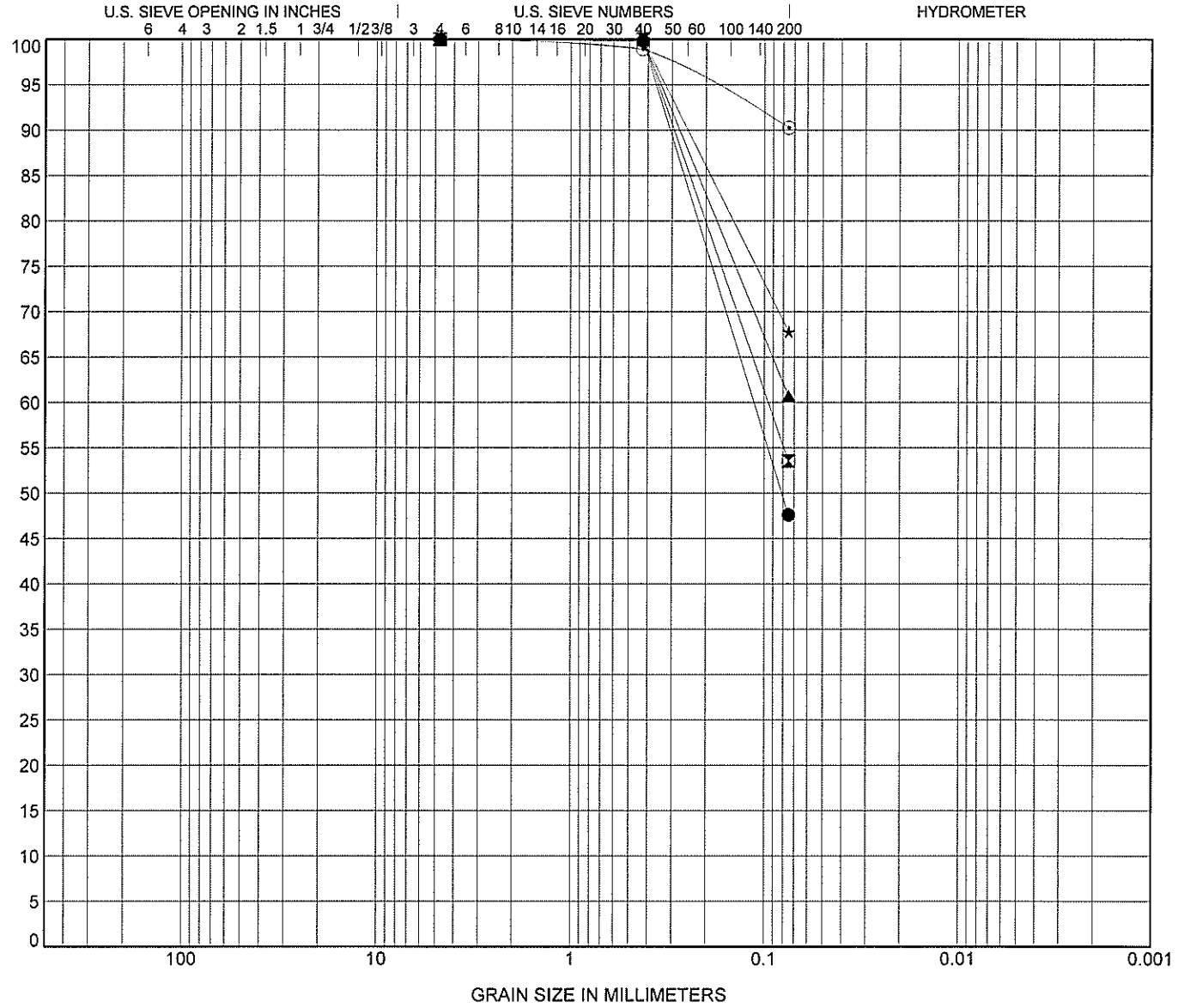
PROJECT NUMBER 1894269 **PROJECT LOCATION** TX



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test.?	Test Date	Description	Tech.	Review	Notes
●	BME-9; U-5	8 ft	CLAYEY SAND (SC)	B	Oven	No		2 hrs.	No	3/26/19		TB	MR	
⊠	BME-10; U-13	24 ft	SANDY LEAN CLAY (CL)	B	Oven	No		2 hrs.	No	3/26/19		TB	MR	
▲	BME-10; U-3	4 ft	SANDY LEAN CLAY (CL)	B	Oven	No		2 hrs.	No	4/3/19		MR	JBF	
★	BME-10; U-37	72 ft	SANDY LEAN CLAY (CL)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	
⊙	BME-11; U-32	66 ft	FAT CLAY (CH)	B	Oven	No		2 hrs.	No	4/3/19		TB	MR	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-9; U-5	8 ft	4.75	0.113			0.0	52.4	48	
⊠	BME-10; U-13	24 ft	4.75	0.095			0.0	46.5	54	
▲	BME-10; U-3	4 ft	4.75				0.0	39.3	61	
★	BME-10; U-37	72 ft	4.75				0.0	32.2	68	
⊙	BME-11; U-32	66 ft	4.75				0.0	9.7	90	

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GRAIN SIZE DISTRIBUTION
ASTM D6913

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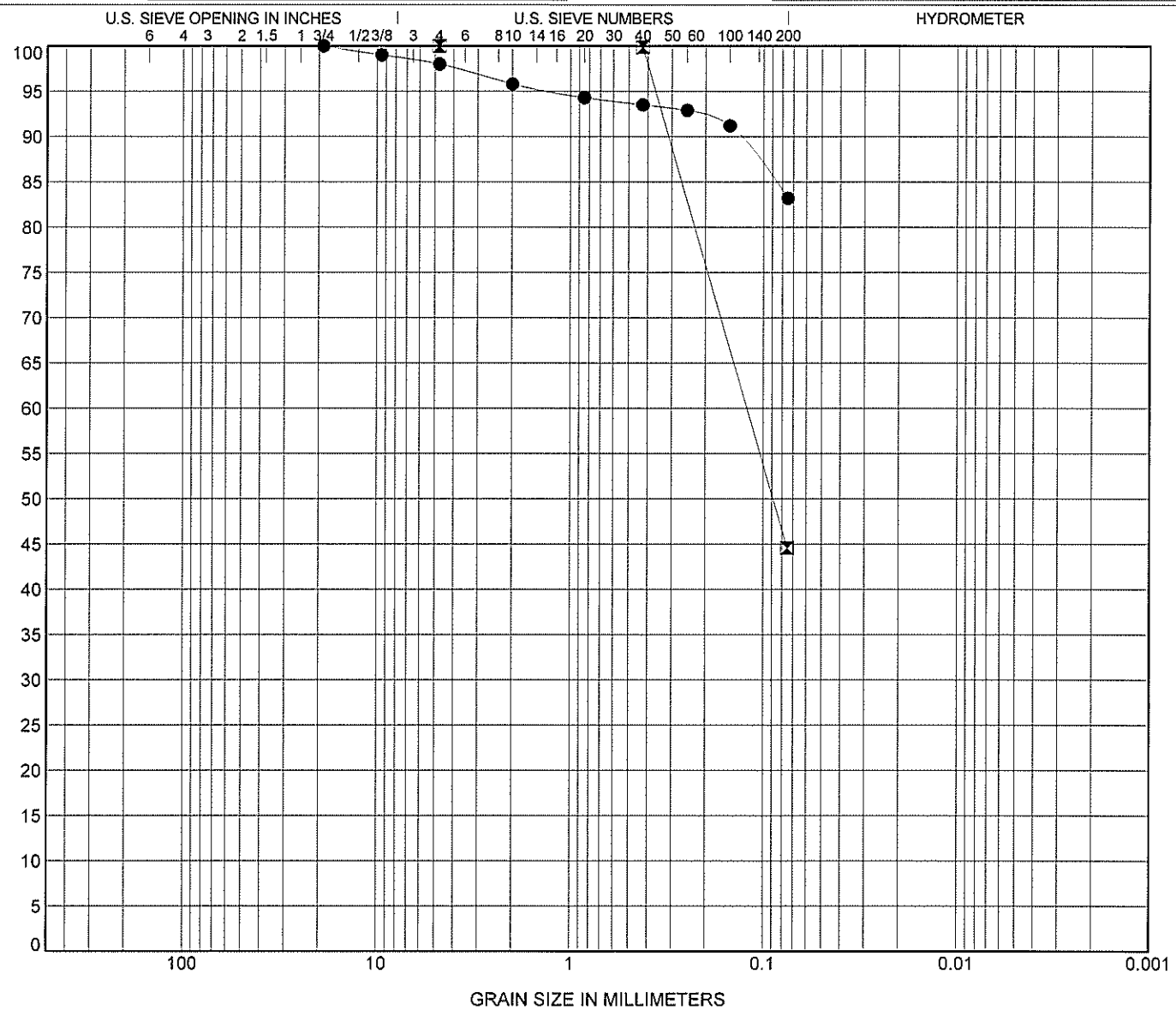
PROJECT NUMBER 1894269 **PROJECT LOCATION** TX



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	Method	Proced.	Comp. Sieve?	Separ. Sieve	Soak Time	Prior Test.?	Test Date	Description	Tech.	Review	Notes
●	BME-11; U-4	6 ft	LEAN CLAY with SAND (CL)							4/25/2019		BC	MB	
⊠	BME-11; U-5	8 ft	CLAYEY SAND (SC)	B	Oven	No		2 hrs.	No	3/26/19		TB	MR	

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BME-11; U-4	6 ft	19				2.0	14.8	83	
⊠	BME-11; U-5	8 ft	4.75	0.122			0.0	55.4	45	

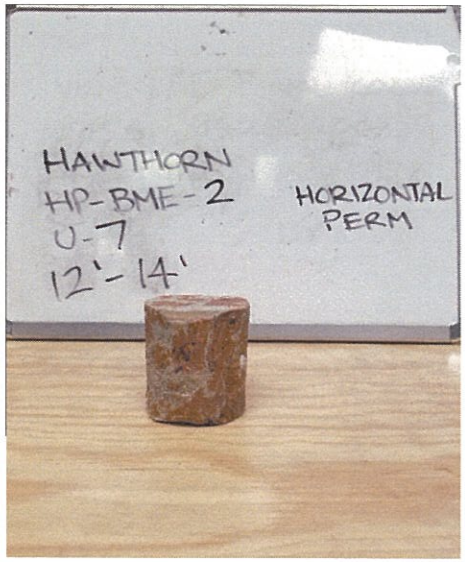
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-2; U-7 HORIZONTAL
DEPTH:	12'-14'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial		centimeters	**Sample Data, Final**		centimeters
Height, in	2.381	6.05	Height, in	2.376	6.04
Top Diameter, mm	48.620		Top Diameter, mm	49.090	
Middle Diameter, mm	48.690		Middle Diameter, mm	49.110	
Bottom Diameter, mm	48.750		Bottom Diameter, mm	49.090	
Average Diameter, cm	4.869		Average Diameter, cm	4.910	
Area, cm^2	18.62		Area, cm^2	18.93	
Volume, cm^3	112.59		Volume, cm^3	114.25	
Wet Mass, g	220.0		Wet Mass, g	224.3	
Wt. tare, gm	32.69		Wt. tare, gm	30.09	
Wt. wet soil + tare, gm	183.06		Wt. wet soil + tare, gm	253.86	
Wt. dry soil + tare, gm	157.26		Wt. dry soil + tare, gm	210.38	
Moisture Content, %	20.7%		Moisture Content, %	24.1%	
Dry Density, pcf	101.0		Dry Density, pcf	98.7	
Specific Gravity	2.65	Assumed	Specific Gravity	2.65	
Void Ratio	0.64		Void Ratio	0.68	
Saturation, %	86%		Saturation, %	95%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 15.0

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	15.0	0.85		29.39		23	0.931	
3	28	208	14.8	0.86	3.021E-05	28.80	5.54E-08	23	0.931	5.16E-08
9	49	381	14.4	0.87	3.298E-05	27.71	6.29E-08	23	0.931	5.85E-08
16	22	393	14.0	0.89	3.198E-05	26.85	6.29E-08	23	0.931	5.86E-08
24	16	474	13.6	0.91	2.651E-05	25.98	5.39E-08	23	0.931	5.02E-08
31	49	453	13.2	0.92	2.774E-05	25.11	5.83E-08	23	0.931	5.43E-08
						HYDRAULIC CONDUCTIVITY REPORTED AS				**5.54E-08 cm/sec**

TECH:	MR	CHECKED:	PKP
DATE:	3/20/2019	DATE:	3/25/2019

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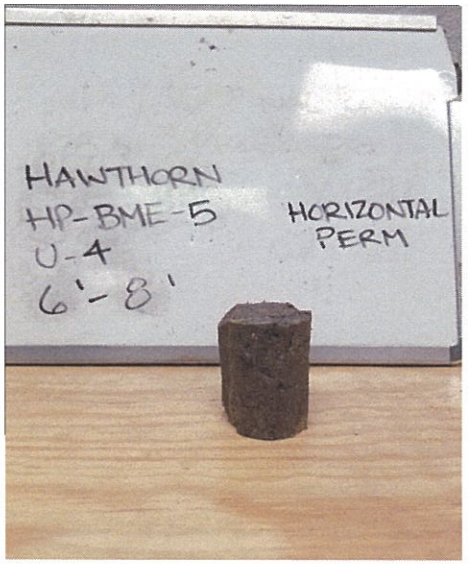
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-5; U-4 HORIZONTAL
DEPTH:	6'-8'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial			**Sample Data, Final**		
		centimeters			centimeters
Height, in	2.475	6.29	Height, in	2.469	6.27
Top Diameter, mm	49.040		Top Diameter, mm	48.930	
Middle Diameter, mm	48.540		Middle Diameter, mm	48.530	
Bottom Diameter, mm	47.770		Bottom Diameter, mm	47.820	
Average Diameter, cm	4.845		Average Diameter, cm	4.843	
Area, cm^2	18.44		Area, cm^2	18.42	
Volume, cm^3	115.90		Volume, cm^3	115.51	
Wet Mass, g	230.5		Wet Mass, g	233.17	
Wt. tare, gm	31.5		Wt. tare, gm	30.28	
Wt. wet soil + tare, gm	166.49		Wt. wet soil + tare, gm	262.94	
Wt. dry soil + tare, gm	151.25		Wt. dry soil + tare, gm	221.71	
Moisture Content, %	12.7%		Moisture Content, %	21.5%	
Dry Density, pcf	110.1		Dry Density, pcf	103.6	
Specific Gravity	2.65	Assumed	Specific Gravity	2.65	
Void Ratio	0.50		Void Ratio	0.60	
Saturation, %	67%		Saturation, %	96%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 15.5

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	15.5	0.85		29.27		23	0.931	
2	58	178	15.4	0.85	1.765E-05	29.03	3.30E-08	23	0.931	3.07E-08
8	52	354	15.2	0.86	1.775E-05	28.51	3.38E-08	23	0.931	3.15E-08
18	52	600	15.0	0.87	1.047E-05	28.09	2.02E-08	23	0.931	1.88E-08
29	59	667	14.7	0.88	1.413E-05	27.36	2.80E-08	23	0.931	2.61E-08
44	30	871	14.3	0.90	1.443E-05	26.42	2.96E-08	23	0.931	2.76E-08
						HYDRAULIC CONDUCTIVITY REPORTED AS				**2.60E-08** cm/sec

TECH:	MR	CHECKED:	PKP
DATE:	3/20/2019	DATE:	3/25/2019

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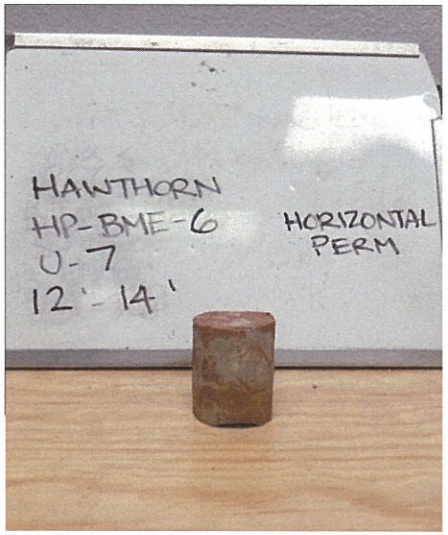
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-6; U-7 HORIZONTAL
DEPTH:	12'-14'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial		centimeters	**Sample Data, Final**		centimeters
Height, in	2.308	5.86	Height, in	2.314	5.88
Top Diameter, mm	45.020		Top Diameter, mm	45.050	
Middle Diameter, mm	45.030		Middle Diameter, mm	45.080	
Bottom Diameter, mm	44.550		Bottom Diameter, mm	45.130	
Average Diameter, cm	4.487		Average Diameter, cm	4.509	
Area, cm^2	15.81		Area, cm^2	15.97	
Volume, cm^3	92.68		Volume, cm^3	93.84	
Wet Mass, g	177.1		Wet Mass, g	179.37	
Wt. tare, gm	31.76		Wt. tare, gm	30.44	
Wt. wet soil + tare, gm	185.95		Wt. wet soil + tare, gm	209.55	
Wt. dry soil + tare, gm	155.28		Wt. dry soil + tare, gm	170.21	
Moisture Content, %	24.8%		Moisture Content, %	28.1%	
Dry Density, pcf	95.5		Dry Density, pcf	93.1	
Specific Gravity	2.65	Assumed	Specific Gravity	2.65	
Void Ratio	0.73		Void Ratio	0.78	
Saturation, %	90%		Saturation, %	96%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 14.5

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	14.5	0.85		29.25		23	0.931	
3	30	210	14.0	0.87	7.480E-05	27.50	1.70E-07	23	0.931	1.59E-07
10	34	424	13.7	0.88	2.223E-05	27.05	5.15E-08	23	0.931	4.79E-08
17	42	428	13.4	0.90	2.202E-05	26.39	5.23E-08	23	0.931	4.87E-08
26	3	501	13.1	0.91	1.881E-05	25.72	4.58E-08	23	0.931	4.27E-08
33	41	458	12.9	0.92	1.372E-05	25.39	3.38E-08	23	0.931	3.15E-08
41	11	450	12.7	0.92	1.396E-05	24.94	3.51E-08	23	0.931	3.26E-08
52	50	699	12.4	0.94	1.348E-05	24.16	3.50E-08	23	0.931	3.25E-08
60	43	473	12.2	0.94	1.328E-05	23.83	3.49E-08	23	0.931	3.25E-08
						HYDRAULIC CONDUCTIVITY REPORTED AS				**3.23E-08** cm/sec

TECH:	MR	CHECKED:	PKP
DATE:	3/20/2019	DATE:	3/25/2019

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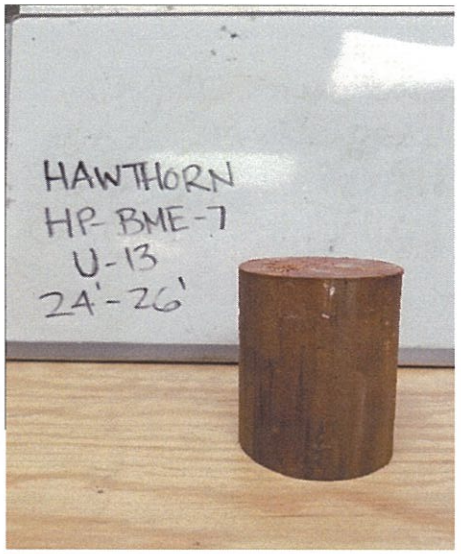
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-7; U-13
DEPTH:	24'-26'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial		centimeters	**Sample Data, Final**		centimeters
Height, in	3.548	9.01	Height, in	3.565	9.06
Top Diameter, mm	71.210		Top Diameter, mm	71.550	
Middle Diameter, mm	71.260		Middle Diameter, mm	71.510	
Bottom Diameter, mm	71.330		Bottom Diameter, mm	71.630	
Average Diameter, cm	7.127		Average Diameter, cm	7.156	
Area, cm^2	39.89		Area, cm^2	40.22	
Volume, cm^3	359.48		Volume, cm^3	364.22	
Wet Mass, g	758.1		Wet Mass, g	765.19	
Wt. tare, gm	31.47		Wt. tare, gm	150.08	
Wt. wet soil + tare, gm	121.67		Wt. wet soil + tare, gm	915.02	
Wt. dry soil + tare, gm	107.16		Wt. dry soil + tare, gm	790.3	
Moisture Content, %	19.2%		Moisture Content, %	19.5%	
Dry Density, pcf	110.4		Dry Density, pcf	109.7	
Specific Gravity	2.65	Assumed	Specific Gravity	2.65	
Void Ratio	0.50		Void Ratio	0.51	
Saturation, %	102%		Saturation, %	102%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 22.0

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	22.0	0.85		29.48		23	0.931	
2	43	163	21.5	0.87	9.637E-05	28.25	8.48E-08	23	0.931	7.90E-08
10	15	452	21.2	0.88	2.085E-05	27.96	1.85E-08	23	0.931	1.73E-08
23	12	777	20.8	0.90	1.617E-05	27.31	1.47E-08	23	0.931	1.37E-08
33	35	623	20.5	0.91	1.513E-05	26.95	1.40E-08	23	0.931	1.30E-08
51	3	1048	20.0	0.93	1.499E-05	26.09	1.43E-08	23	0.931	1.33E-08
61	46	643	19.7	0.94	1.466E-05	25.80	1.41E-08	23	0.931	1.32E-08
						HYDRAULIC CONDUCTIVITY REPORTED AS				**1.33E-08 cm/sec**

TECH:	MR	CHECKED:	PKP
DATE:	3/19/2019	DATE:	3/25/2019

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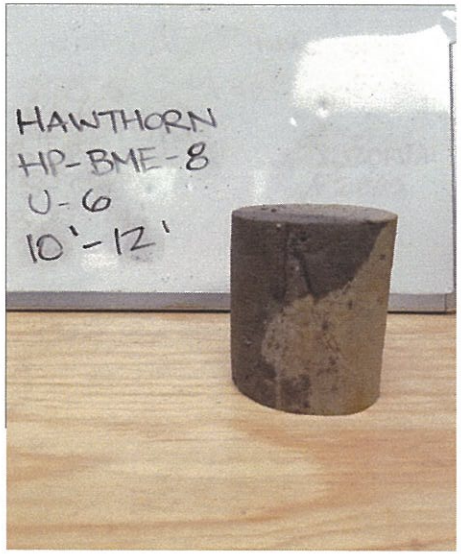
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-8; U-6
DEPTH:	10'-12'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial		centimeters	**Sample Data, Final**		centimeters
Height, in	3.551	9.02	Height, in	3.49	8.86
Top Diameter, mm	71.020		Top Diameter, mm	70.550	
Middle Diameter, mm	71.010		Middle Diameter, mm	70.510	
Bottom Diameter, mm	70.620		Bottom Diameter, mm	70.550	
Average Diameter, cm	7.088		Average Diameter, cm	7.054	
Area, cm^2	39.46		Area, cm^2	39.08	
Volume, cm^3	355.93		Volume, cm^3	346.40	
Wet Mass, g	721.4		Wet Mass, g	712.89	
Wt. tare, gm	31.72		Wt. tare, gm	150.8	
Wt. wet soil + tare, gm	211.68		Wt. wet soil + tare, gm	863.37	
Wt. dry soil + tare, gm	181.77		Wt. dry soil + tare, gm	745.45	
Moisture Content, %	19.9%		Moisture Content, %	19.8%	
Dry Density, pcf	105.5		Dry Density, pcf	107.2	
Specific Gravity	2.65	Assumed	Specific Gravity	2.65	
Void Ratio	0.57		Void Ratio	0.54	
Saturation, %	93%		Saturation, %	97%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 22.0

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	22.0	0.85		29.45		23	0.931	
6	5	365	20.0	0.93	1.721E-04	25.51	1.73E-07	23	0.931	1.61E-07
17	13	668	18.3	1.00	7.995E-05	23.23	8.81E-08	23	0.931	8.20E-08
23	27	374	17.6	1.03	5.880E-05	22.96	6.55E-08	23	0.931	6.10E-08
33	27	600	16.5	1.08	5.760E-05	21.03	7.01E-08	23	0.931	6.53E-08
44	22	655	15.5	1.12	4.796E-05	19.63	6.25E-08	23	0.931	5.82E-08
55	33	671	14.6	1.15	4.214E-05	18.38	5.87E-08	23	0.931	5.46E-08
						HYDRAULIC CONDUCTIVITY REPORTED AS				**5.98E-08 cm/sec**

TECH:	MR	CHECKED:	PKP
DATE:	3/20/2019	DATE:	3/25/2019

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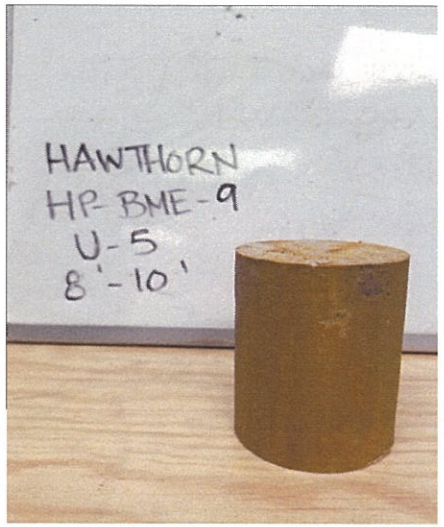
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-9; U-5
DEPTH	8'-10'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial		centimeters	**Sample Data, Final**		centimeters
Height, in	3.563	9.05	Height, in	3.544	9.00
Top Diameter, mm	71.050		Top Diameter, mm	71.030	
Middle Diameter, mm	70.940		Middle Diameter, mm	70.800	
Bottom Diameter, mm	70.930		Bottom Diameter, mm	71.020	
Average Diameter, cm	7.097		Average Diameter, cm	7.095	
Area, cm^2	39.56		Area, cm^2	39.54	
Volume, cm^3	358.04		Volume, cm^3	355.89	
Wet Mass, g	744.9		Wet Mass, g	745.02	
Wt. tare, gm	30.08		Wt. tare, gm	149.95	
Wt. wet soil + tare, gm	171.56		Wt. wet soil + tare, gm	894.77	
Wt. dry soil + tare, gm	149.59		Wt. dry soil + tare, gm	779.8	
Moisture Content, %	18.4%		Moisture Content, %	18.3%	
Dry Density, pcf	109.7		Dry Density, pcf	110.5	
Specific Gravity	2.65	Assumed	Specific Gravity	2.65	
Void Ratio	0.51		Void Ratio	0.50	
Saturation, %	96%		Saturation, %	97%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 22.0

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	22.0	0.85		29.35		23	0.931	
0	18	18	21.0	0.89	1.745E-03	27.33	1.62E-06	23	0.931	1.50E-06
0	44	26	20.0	0.93	1.208E-03	25.87	1.18E-06	23	0.931	1.10E-06
1	15	31	19.0	0.97	1.013E-03	24.42	1.05E-06	23	0.931	9.77E-07
1	47	32	18.0	1.01	9.818E-04	22.97	1.08E-06	23	0.931	1.01E-06
2	24	37	17.0	1.05	8.491E-04	21.51	9.98E-07	23	0.931	9.30E-07
3	5	41	16.0	1.10	7.662E-04	20.06	9.66E-07	23	0.931	9.00E-07
3	47	42	15.0	1.14	7.480E-04	18.61	1.02E-06	23	0.931	9.47E-07
4	33	46	14.0	1.18	6.830E-04	17.15	1.01E-06	23	0.931	9.38E-07
5	26	53	13.0	1.22	5.928E-04	15.70	9.55E-07	23	0.931	8.89E-07
						HYDRAULIC CONDUCTIVITY REPORTED AS				**9.18E-07** **cm/sec**

TECH:	MR	CHECKED:	PKP
DATE:	3/19/2019	DATE:	3/25/2019

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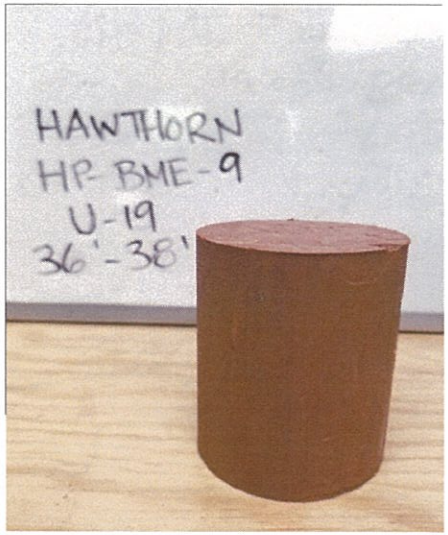
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-9; U-19
DEPTH	36'-38'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial		centimeters	**Sample Data, Final**		centimeters
Height, in	3.581	9.10	Height, in	3.61	9.17
Top Diameter, mm	71.030		Top Diameter, mm	71.530	
Middle Diameter, mm	71.030		Middle Diameter, mm	71.390	
Bottom Diameter, mm	70.920		Bottom Diameter, mm	71.510	
Average Diameter, cm	7.099		Average Diameter, cm	7.148	
Area, cm^2	39.58		Area, cm^2	40.13	
Volume, cm^3	360.05		Volume, cm^3	367.92	
Wet Mass, g	690.1		Wet Mass, g	699.27	
Wt. tare, gm	32.62		Wt. tare, gm	151.26	
Wt. wet soil + tare, gm	149.23		Wt. wet soil + tare, gm	850.28	
Wt. dry soil + tare, gm	121.52		Wt. dry soil + tare, gm	684.34	
Moisture Content, %	31.2%		Moisture Content, %	31.1%	
Dry Density, pcf	91.2		Dry Density, pcf	90.4	
Specific Gravity	2.69	Assumed	Specific Gravity	2.69	
Void Ratio	0.84		Void Ratio	0.86	
Saturation, %	100%		Saturation, %	98%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 22.5

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	22.5	0.85		29.90		23	0.931	
2	8	128	22.2	0.86	7.363E-05	29.01	6.32E-08	23	0.931	5.89E-08
8	50	402	22.0	0.87	1.563E-05	28.80	1.35E-08	23	0.931	1.26E-08
18	30	580	21.7	0.88	1.625E-05	28.30	1.43E-08	23	0.931	1.33E-08
35	4	994	21.3	0.90	1.264E-05	27.66	1.14E-08	23	0.931	1.06E-08
45	46	642	21.1	0.91	9.787E-06	27.52	8.86E-09	23	0.931	8.25E-09
56	29	643	20.9	0.92	9.772E-06	27.23	8.94E-09	23	0.931	8.33E-09
67	2	633	20.7	0.92	9.926E-06	26.95	9.18E-09	23	0.931	8.55E-09
77	31	629	20.5	0.93	9.989E-06	26.66	9.34E-09	23	0.931	8.69E-09
						HYDRAULIC CONDUCTIVITY REPORTED AS				**8.46E-09 cm/sec**

TECH:	MR	CHECKED:	PKP
DATE:	3/19/2019	DATE:	3/25/2019

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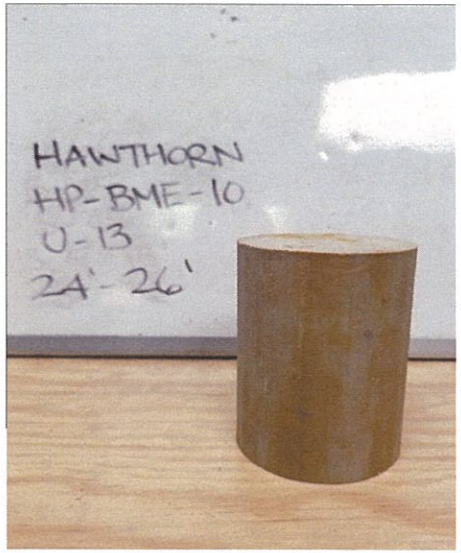
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-10; U-13
DEPTH:	24'-26'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial		centimeters	**Sample Data, Final**		centimeters
Height, in	3.78	9.60	Height, in	3.785	9.61
Top Diameter, mm	70.820		Top Diameter, mm	70.790	
Middle Diameter, mm	70.810		Middle Diameter, mm	70.720	
Bottom Diameter, mm	71.030		Bottom Diameter, mm	71.050	
Average Diameter, cm	7.089		Average Diameter, cm	7.085	
Area, cm^2	39.47		Area, cm^2	39.43	
Volume, cm^3	378.92		Volume, cm^3	379.06	
Wet Mass, g	791.9		Wet Mass, g	795.19	
Wt. tare, gm	31.66		Wt. tare, gm	152.3	
Wt. wet soil + tare, gm	181.32		Wt. wet soil + tare, gm	947.21	
Wt. dry soil + tare, gm	159.29		Wt. dry soil + tare, gm	821.77	
Moisture Content, %	17.3%		Moisture Content, %	18.7%	
Dry Density, pcf	111.2		Dry Density, pcf	110.2	
Specific Gravity	2.65	Assumed	Specific Gravity	2.65	
Void Ratio	0.49		Void Ratio	0.50	
Saturation, %	94%		Saturation, %	99%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 23.5

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	23.5	0.85		29.63		23	0.931	
3	3	183	22.7	0.88	1.373E-04	27.96	1.25E-07	23	0.931	1.16E-07
12	10	547	20.7	0.96	1.149E-04	24.40	1.19E-07	23	0.931	1.11E-07
19	17	427	19.5	1.01	8.829E-05	23.33	9.60E-08	23	0.931	8.94E-08
23	40	263	18.9	1.04	7.167E-05	22.92	7.93E-08	23	0.931	7.38E-08
28	26	286	18.2	1.07	7.689E-05	21.90	8.90E-08	23	0.931	8.29E-08
33	35	309	17.5	1.10	7.117E-05	20.95	8.62E-08	23	0.931	8.02E-08
						HYDRAULIC CONDUCTIVITY REPORTED AS				**8.16E-08 cm/sec**

TECH:	MR	CHECKED:	PKP
DATE:	3/20/2019	DATE:	3/25/2019

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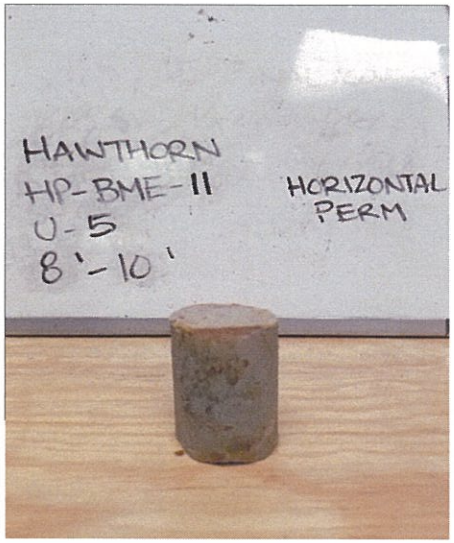
FLEXIBLE WALL TRIAXIAL PERMEABILITY

ASTM D 5084 METHOD F, CONSTANT VOLUME - FALLING HEAD

PROJECT TITLE:	Hawthorn Park
PROJECT NUMBER:	1894269
SAMPLE ID:	HP-BME-11; U-5 HORIZONTAL
DEPTH:	8'-10'

Cell Pressure =	80	psi
Backwater Pressure =	70	psi
Run Number =	1	
Permeant Used=	De-Aired Water	

Sample Data, Initial		centimeters	**Sample Data, Final**		centimeters
Height, in	2.381	6.05	Height, in	2.384	6.06
Top Diameter, mm	43.020		Top Diameter, mm	43.050	
Middle Diameter, mm	42.940		Middle Diameter, mm	42.910	
Bottom Diameter, mm	43.020		Bottom Diameter, mm	42.980	
Average Diameter, cm	4.299		Average Diameter, cm	4.298	
Area, cm^2	14.52		Area, cm^2	14.51	
Volume, cm^3	87.80		Volume, cm^3	87.85	
Wet Mass, g	178.8		Wet Mass, g	181.02	
Wt. tare, gm	31.54		Wt. tare, gm	32.61	
Wt. wet soil + tare, gm	191.03		Wt. wet soil + tare, gm	213.4	
Wt. dry soil + tare, gm	167.70		Wt. dry soil + tare, gm	184.55	
Moisture Content, %	17.1%		Moisture Content, %	19.0%	
Dry Density, pcf	108.5		Dry Density, pcf	108.1	
Specific Gravity	2.65	Assumed	Specific Gravity	2.65	
Void Ratio	0.52		Void Ratio	0.53	
Saturation, %	87%		Saturation, %	95%	
Effective Stress, psi	10				



Manometer Constants:

$a_{annulus}$ = 0.76712 cm^2

$a_{center\ pipette}$ = 0.03142 cm^3

Initial Manometer Readings

Pipette = 15.0

Annulus = 0.85

Minutes	Seconds	Δt (sec)	Pipette (cm)	Annulus (cm)	Flowrate (cm^3/s)	Gradient (i)	Hydraulic Conductivity (cm/sec)	Temp. °C	rt temp. corr.	Hydraulic Conductivity (cm/sec) @20°C
0	0	0	15.0	0.85		29.39		23	0.931	
3	6	186	14.8	0.86	3.378E-05	28.70	8.11E-08	23	0.931	7.55E-08
11	18	492	14.4	0.87	2.554E-05	27.62	6.37E-08	23	0.931	5.93E-08
18	4	406	14.1	0.89	2.321E-05	27.08	5.91E-08	23	0.931	5.50E-08
24	25	381	13.8	0.90	2.474E-05	26.43	6.45E-08	23	0.931	6.01E-08
30	35	370	13.6	0.91	1.698E-05	26.11	4.48E-08	23	0.931	4.17E-08
41	43	668	13.2	0.92	1.881E-05	25.03	5.18E-08	23	0.931	4.82E-08
52	7	624	12.8	0.94	2.014E-05	24.17	5.74E-08	23	0.931	5.35E-08
						HYDRAULIC CONDUCTIVITY REPORTED AS				**5.09E-08** cm/sec

TECH:	MR	CHECKED:	PKP
DATE:	3/20/2019	DATE:	3/25/2019

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	Initial		Final		Notes
Height =	1.002	in	0.978	in	USCS description (ASTM D2487): Sandy lean clay, light yellowish brown, moist
Diameter =	2.500	in	2.500	in	Atterberg Limits (ASTM D4318): LL = 33 PL = 12 PI = 21
Area =	4.909	in^2	4.909	in^2	Percent Finer (ASTM D422): 3/4 in. = 100% No. 4 = 100% No. 200 = 64%
Volume =	4.919	in^3	4.801	in^3	Specimen Type: [X] Intact [ ] Reconstituted
Water Content =	17.4%		16.8%		Remold Targets: Not applicable
Specific Gravity =	2.70	(Assumed)	2.70	(Assumed)	Water Content of Trimmings (ASTM D2216): 16.5%
Height of Solids =	0.672	in	0.672	in	Trimming Procedure: Specimen trimmed using cylindrical cutting tool
Void Ratio =	0.490		0.454		Inundation: [ ] Not inundated [X] Inundated at 0.1 ksf
Degree of Saturation =	96.0%		99.8%		Test Method: [ ] A [X] B
Wet Mass =	0.377	lb	0.375	lb	Apparatus: GeoTac automated consolidometer
Dry Mass =	0.321	lb	0.321	lb	Final Water Content Specimen: [X] Entire [ ] Partial
Wet Unit Weight =	132.6	pcf	135.1	pcf	Final Differential Height: -0.0043 in
Dry Unit Weight =	112.9	pcf	115.7	pcf	Estimated Preconsolidation Stress: 2.8 ksf

			At End of Primary Consolidation				At End of Load Duration							
	Axial Stress (ksf)	Load Duration (min)	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Time Deformation Method	Average Void Ratio	Coefficient of Consolidation (ft^2/day)	Time to 50% Consolidation (min)
Seating	0.10	1084					0.0004	1.0016	0.04	0.490				
1	1.00	1440	0.0023	0.9997	0.23	0.487	0.0021	0.9999	0.21	0.487	1 (Log time)	0.489	0.070	7.0
2	2.00	1376	0.0078	0.9942	0.78	0.479	0.0074	0.9946	0.74	0.479	1 (Log time)	0.483	0.027	18.3
3	4.00	1440	0.0185	0.9835	1.85	0.463	0.0199	0.9821	1.98	0.461	1 (Log time)	0.470	0.078	6.2
4	8.00	1440	0.0353	0.9667	3.52	0.438	0.0359	0.9661	3.58	0.437	1 (Log time)	0.447	0.036	13.0
5	16.00	1440	0.0515	0.9505	5.14	0.413	0.0530	0.9490	5.29	0.411	1 (Log time)	0.425	0.036	12.7
6	4.00	1440					0.0493	0.9527	4.92	0.417				
7	1.00	455					0.0419	0.9601	4.18	0.428				
8	0.25	1995					0.0283	0.9737	2.83	0.448				

ect Name: **WM/Hawthorn Park Permit Amend/TX**

ect Number: **1894269**

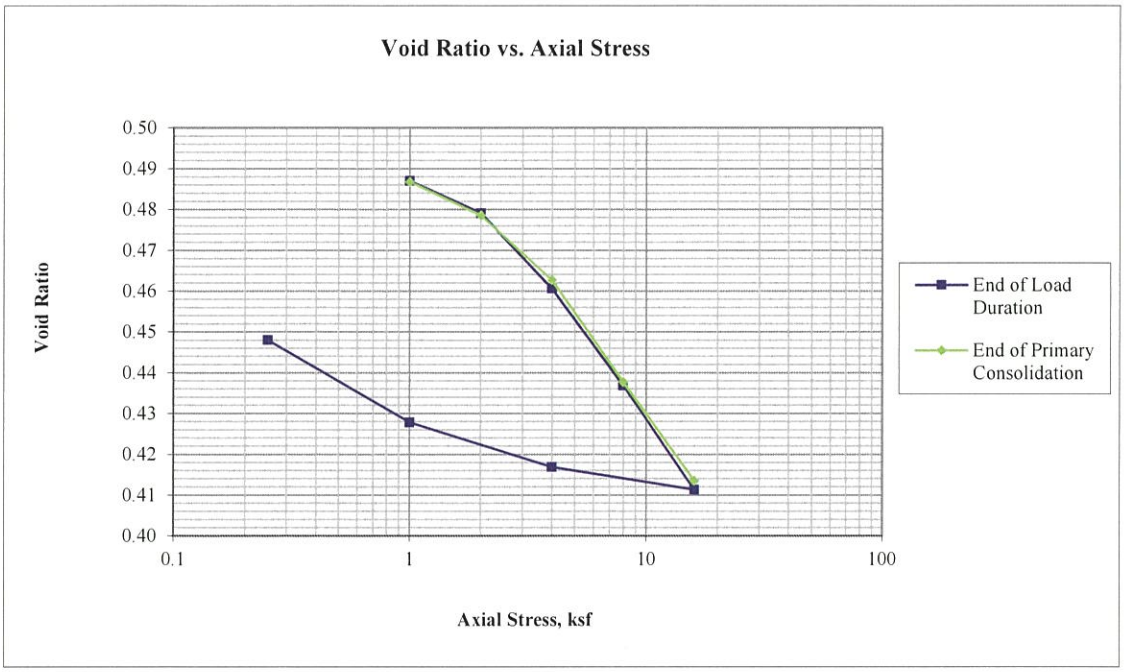
ple ID: **BME-3 / U-12 @ 22 -24 ft.**

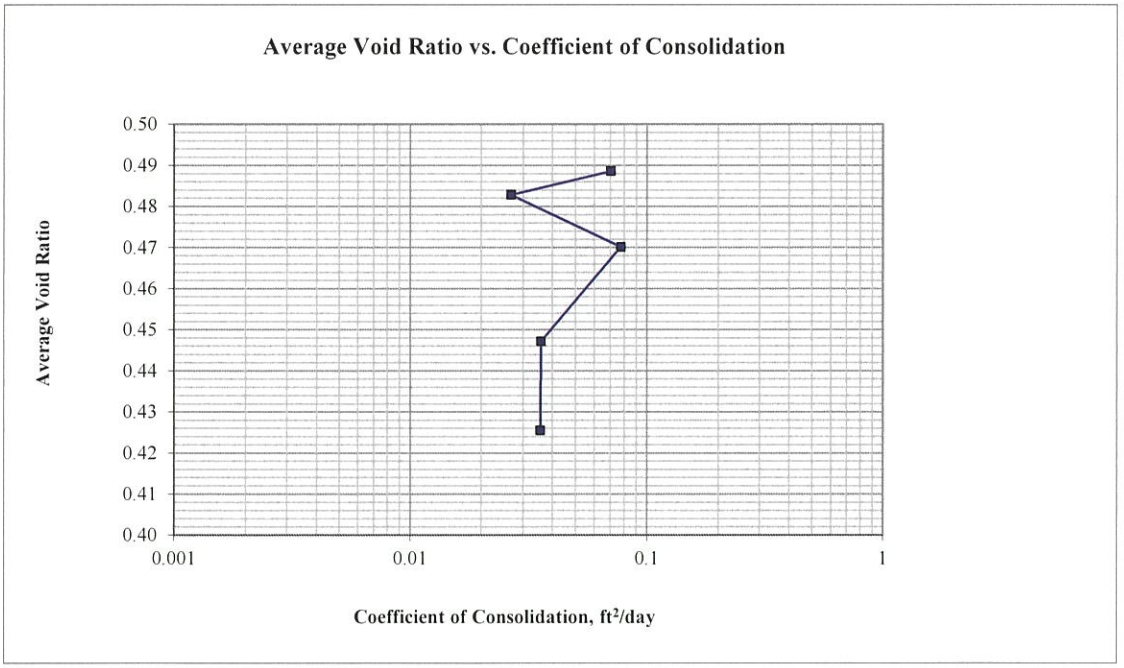
ASTM D2435

ONE-DIMENSIONAL CONSOLIDATION TEST REPORT SPECIMEN AND SUMMARY DATA

Technician:	Checked:	Reviewed:	Date:	Figure:
PRH	PRH	CPA	8-May-2019	1

GOLDER

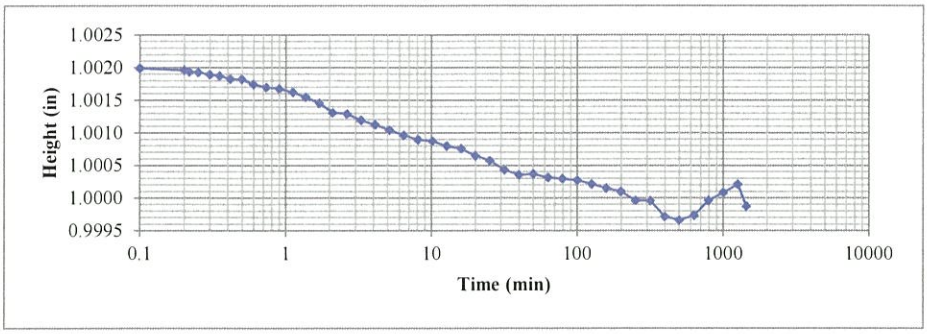




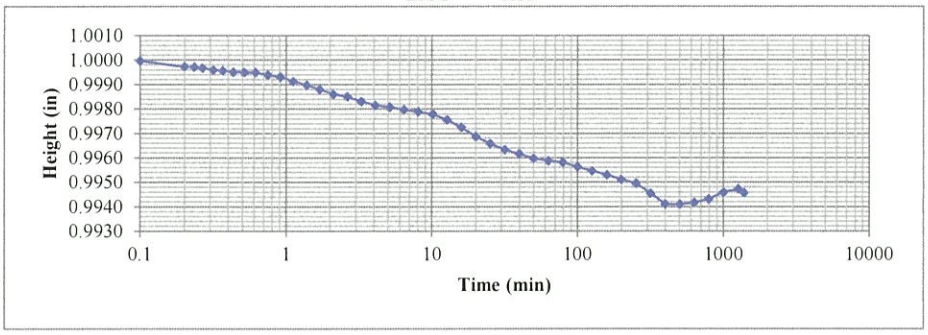
Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION TEST REPORT CONSOLIDATION PLOTS				
Project Number 1894269					
Sample ID: BME-3 / U-12 @ 22 -24 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 8-May-2019	Figure: 2

GOLDER

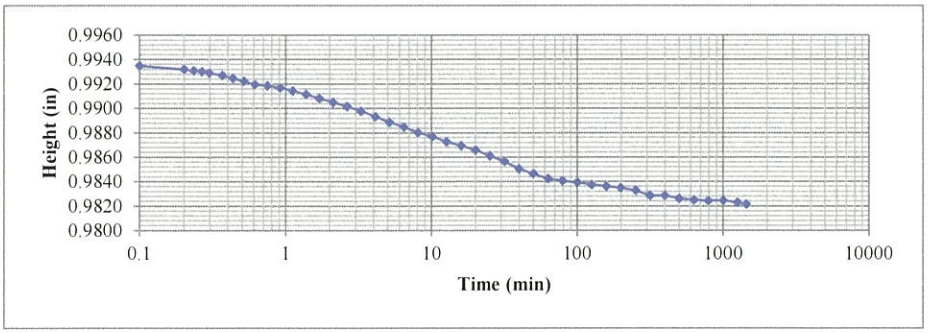
1.00 ksf



2.00 ksf



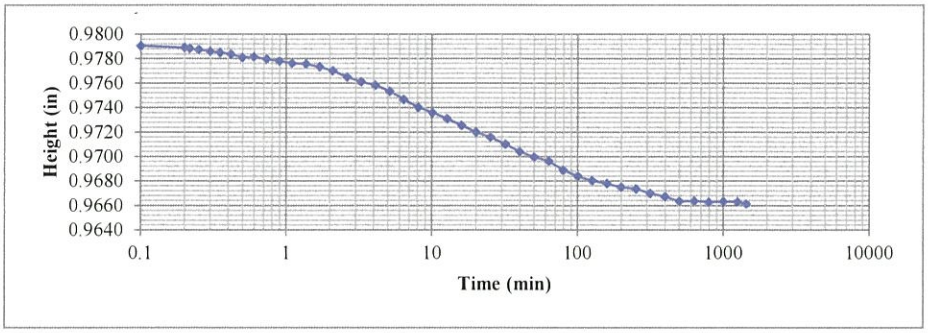
4.00 ksf



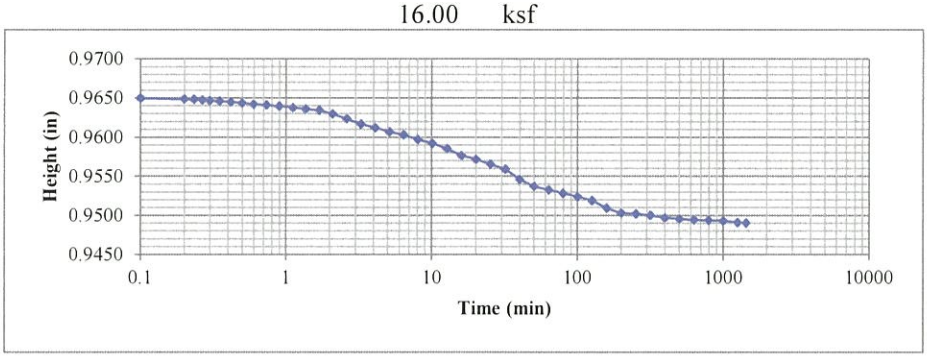
Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION REPORT TIME-DEFORMATION PLOTS (1)				
Project Number: 1894269					
Sample ID: BME-3 / U-12 @ 22 -24 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 8-May-2019	Figure: 3

GOLDER

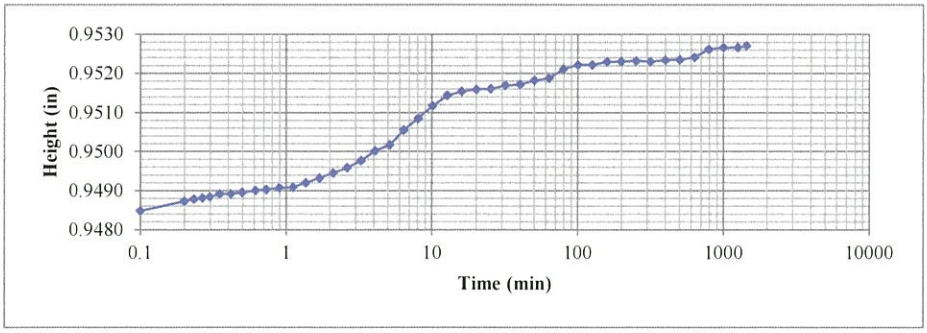
8.00 ksf



16.00 ksf



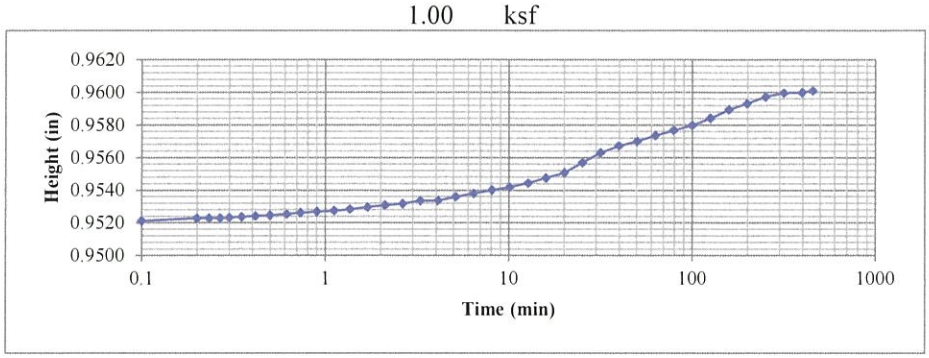
4.00 ksf



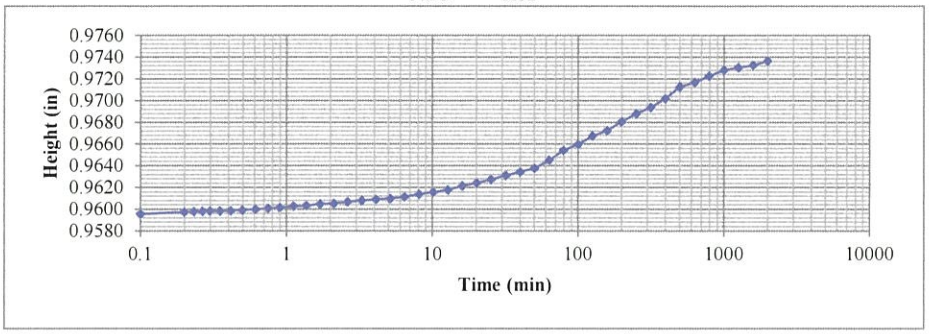
Project Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D2435** ONE-DIMENSIONAL CONSOLIDATION REPORT TIME-DEFORMATION PLOTS (2)					
Project Number: 1894269						
Sample ID: BME-3 / U-12 @ 22 -24 ft.	**Technician:** PRH	**Checked:** PRH	**Reviewed:** CPA	**Date:** 8-May-2019	**Figure:** 4	

GOLDER

1.00 ksf



0.25 ksf



Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION REPORT TIME-DEFORMATION PLOTS (3)				
Project Number: 1894269					
Sample ID: BME-3 / U-12 @ 22 -24 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 8-May-2019	Figure: 5

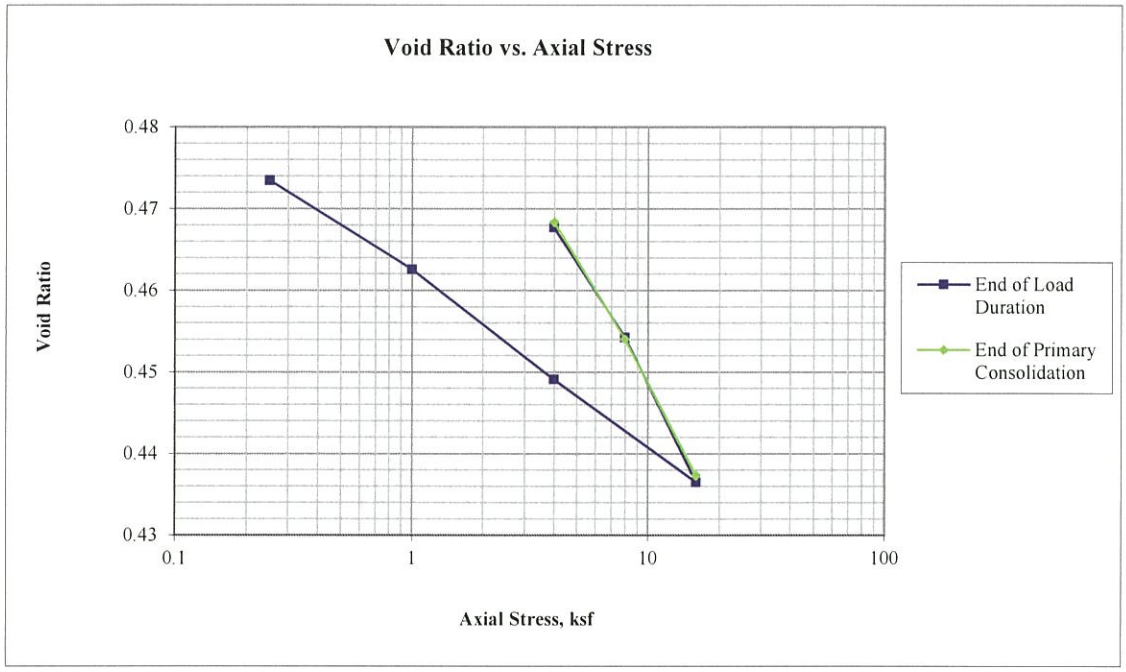
	Initial		Final		Notes					
Height =	1.001	in	0.999	in	USCS description (ASTM D2487):	Lean clay with sand, strong brown, moist				
Diameter =	2.50	in	2.50	in	Atterberg Limits (ASTM D4318):	LL = 47		PL = 13		PI = 34
Area =	4.909	in^2	4.909	in^2	Percent Finer (ASTM D422):	3/4 in. = 100%		No. 4 = 100%		No. 200 = 85%
Volume =	4.914	in^3	4.904	in^3	Specimen Type:	X	Intact		Reconstituted	
Water Content =	15.7%		17.0%		Remold Targets:	Not applicable				
Specific Gravity =	2.70	(Assumed)	2.70	(Assumed)	Water Content of Trimmings (ASTM D2216):	16.7%				
Height of Solids =	0.680	in	0.680	in	Trimming Procedure:	Specimen trimmed using cylindrical cutting tool				
Void Ratio =	0.473		0.470		Inundation:		Not inundated	X	Inundated at	0.1 ksf
Degree of Saturation =	89.5%		97.7%		Test Method:		A	X	B	
Wet Mass =	0.376	lb	0.380	lb	Apparatus:	GeoTac automated consolidometer				
Dry Mass =	0.325	lb	0.325	lb	Final Water Content Specimen:	X	Entire		Partial	
Wet Unit Weight =	132.1	pcf	133.9	pcf	Final Differential Height:	0.0024 in				
Dry Unit Weight =	114.2	pcf	114.5	pcf	Estimated Preconsolidation Stress:	-- ksf				

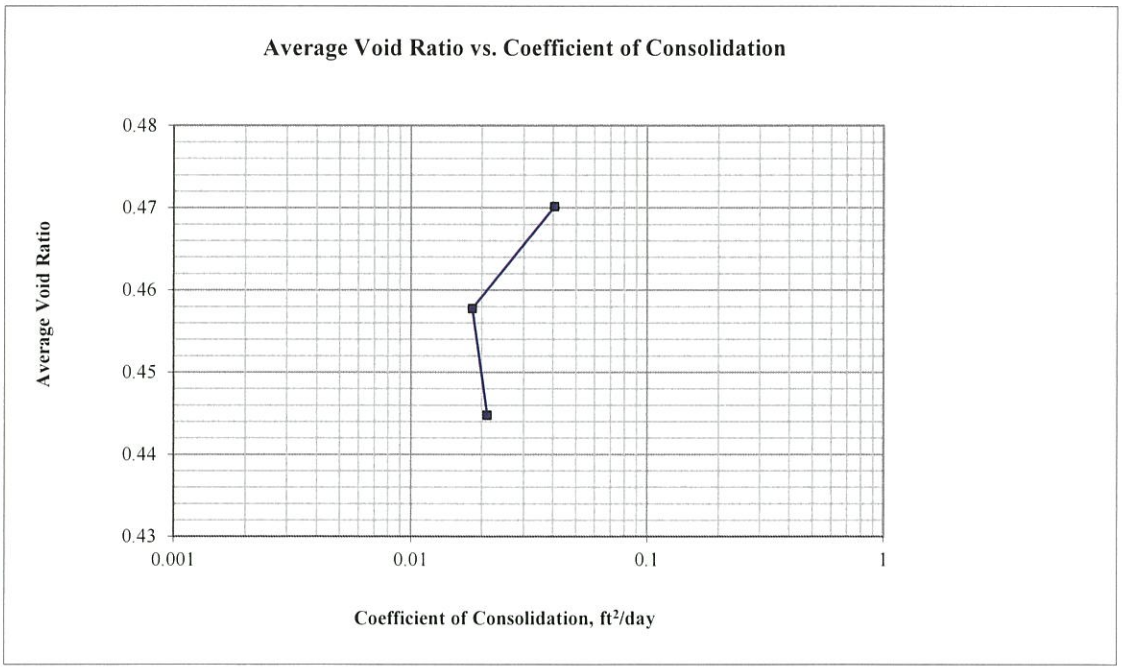
			At End of Primary Consolidation				At End of Load Duration							
	Axial Stress (ksf)	Load Duration (min)	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Time Deformation Method	Average Void Ratio	Coefficient of Consolidation (ft^2/day)	Time to 50% Consolidation (min)
Seating*	2.13	1381					0.0007	1.0003	0.07	0.472				
1	4.0	1440	0.0031	0.9979	0.31	0.468	0.0036	0.9974	0.36	0.468	I (Log time)	0.470	0.041	12.1
2	8.0	1440	0.0129	0.9881	1.29	0.454	0.0127	0.9883	1.27	0.454	I (Log time)	0.458	0.018	26.5
3	16.0	1440	0.0242	0.9768	2.42	0.437	0.0248	0.9762	2.47	0.437	I (Log time)	0.445	0.021	22.5
4	4.0	1440					0.0162	0.9848	1.62	0.449				
5	1.0	1440					0.0071	0.9939	0.71	0.463				
6	0.25	1440					-0.0004	1.0014	-0.04	0.473				

*Axial stress of 2.13 ksf was required to prevent swelling.

ect Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D2435**				
ect Number: 1894269	**ONE-DIMENSIONAL CONSOLIDATION TEST REPORT**				
	SPECIMEN AND SUMMARY DATA				
ple ID: BME-6 / U-13 @ 24-27 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 1

GOLDER

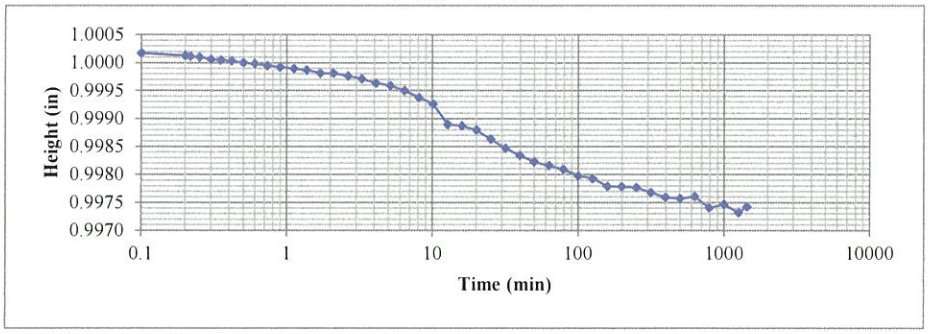




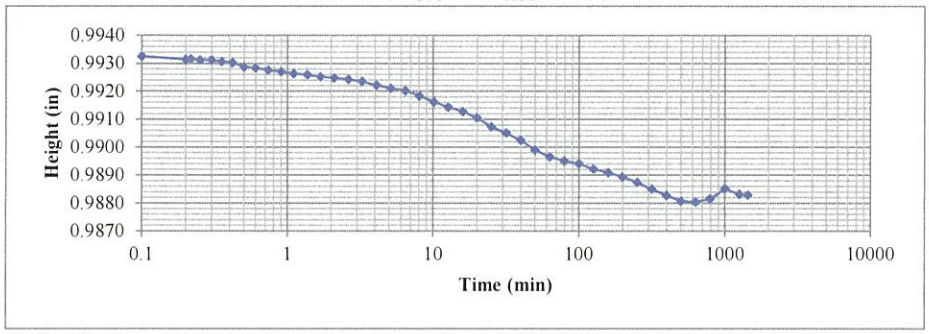
Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION TEST REPORT CONSOLIDATION PLOTS				
Project Number 1894269					
Sample ID: BME-6 / U-13 @ 24-27 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 2

GOLDER

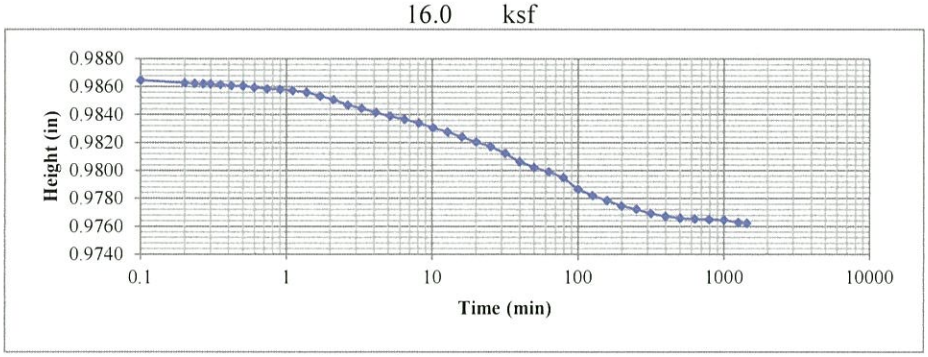
4.0 ksf



8.0 ksf



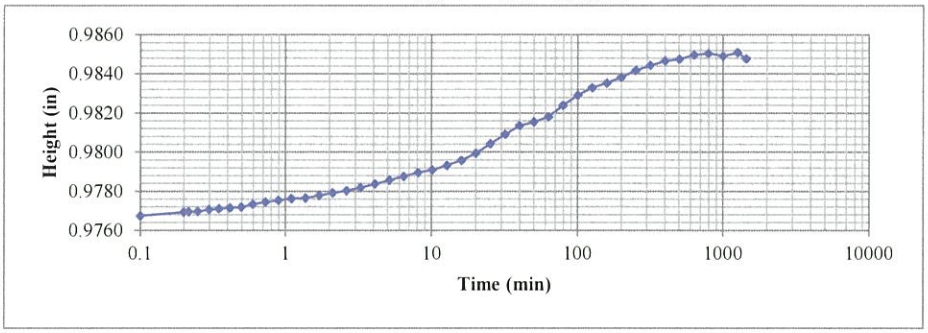
16.0 ksf



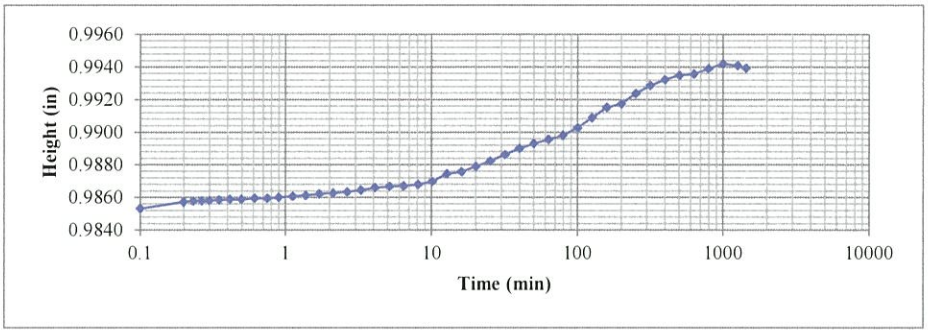
Project Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D2435** ONE-DIMENSIONAL CONSOLIDATION REPORT TIME-DEFORMATION PLOTS (1)				
Project Number: 1894269					
Sample ID: BME-6 / U-13 @ 24-27 ft.	**Technician:** PRH	**Checked:** PRH	**Reviewed:** CPA	**Date:** 13-May-2019	**Figure:** 3

GOLDER

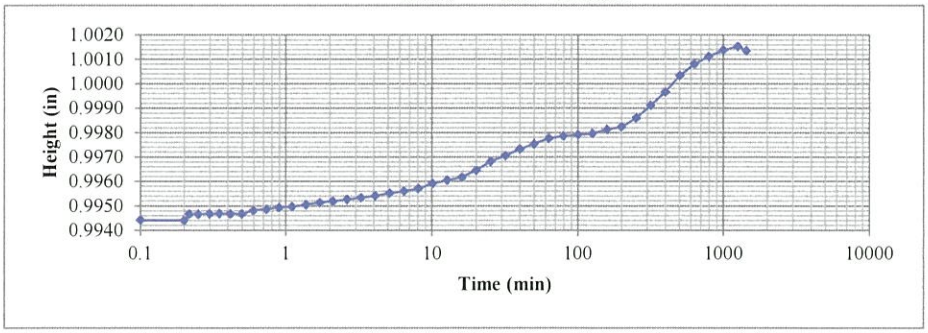
4.0 ksf - unload



1.0 ksf - unload



0.25 ksf - unload



Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION REPORT TIME-DEFORMATION PLOTS (2)				
Project Number: 1894269					
Sample ID: BME-6 / U-13 @ 24-27 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 4

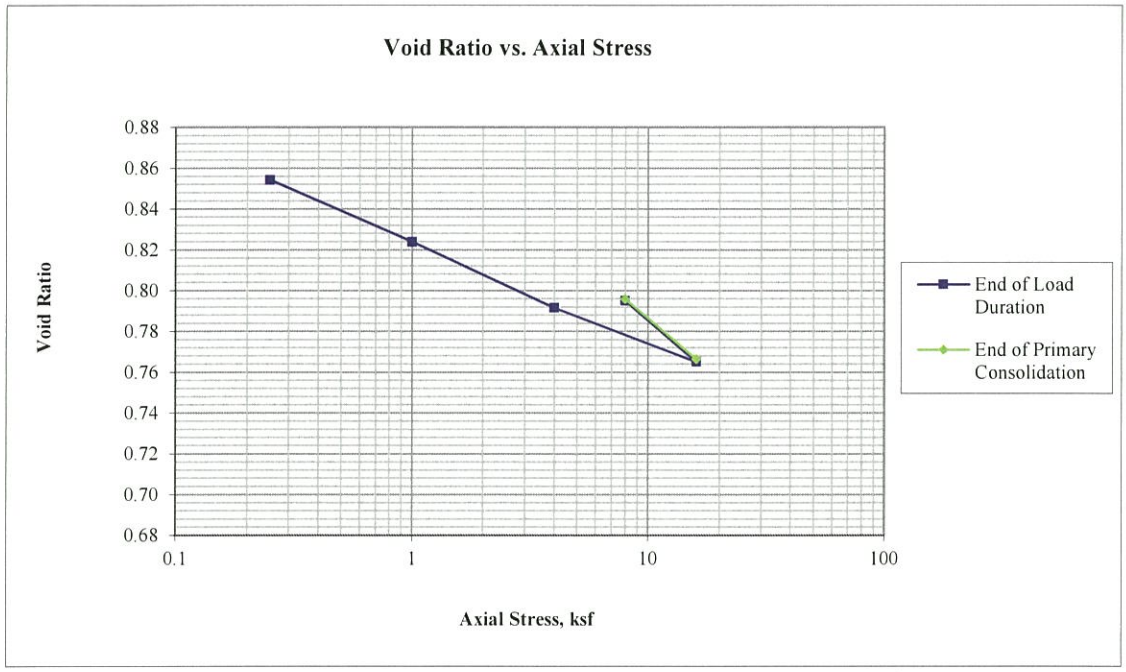
	Initial		Final		Notes					
Height =	1.078	in	1.099	in	USCS description (ASTM D2487):	Fat clay, reddish brown, moist				
Diameter =	1.935	in	1.935	in	Atterberg Limits (ASTM D4318):	LL = 75		PL = 23		PI = 52
Area =	2.941	in^2	2.941	in^2	Percent Finer (ASTM D422):	3/4 in. = 100%		No. 4 = 100%		No. 200 = 100%
Volume =	3.170	in^3	3.232	in^3	Specimen Type:	X	Intact		Reconstituted	
Water Content =	28.2%		30.3%		Remold Targets:	Not applicable				
Specific Gravity =	2.80	(Assumed)	2.80	(Assumed)	Water Content of Trimmings (ASTM D2216):	28.9%				
Height of Solids =	0.5949	in	0.5949	in	Trimming Procedure:	Specimen trimmed using cylindrical cutting tool				
Void Ratio =	0.812		0.847		Inundation:		Not inundated	X	Inundated at	0.1 ksf
Degree of Saturation =	97.3%		100.1%		Test Method:		A	X	B	
Wet Mass =	0.226	lb	0.230	lb	Apparatus:	GeoTac automated consolidometer				
Dry Mass =	0.177	lb	0.177	lb	Final Water Content Specimen:	X	Entire		Partial	
Wet Unit Weight =	123.5	pcf	123.1	pcf	Final Differential Height:	0.0041 in				
Dry Unit Weight =	96.3	pcf	94.4	pcf	Estimated Preconsolidation Stress:	-- ksf				

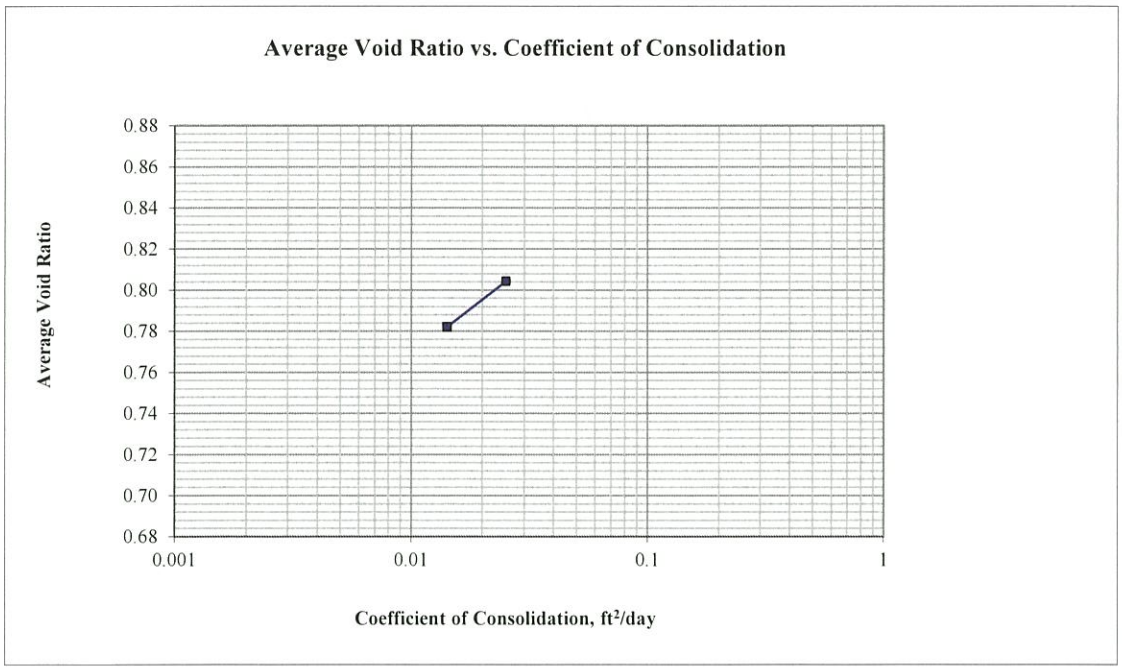
			At End of Primary Consolidation				At End of Load Duration							
	Axial Stress (ksf)	Load Duration (min)	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Time Deformation Method	Average Void Ratio	Coefficient of Consolidation (ft^2/day)	Time to 50% Consolidation (min)
Seating*	3.3	1054					0.0003	1.0778	0.03	0.812				
1	8.0	1440	0.0098	1.0683	0.91	0.796	0.0104	1.0678	0.96	0.795	1 (Log time)	0.804	0.025	22.5
2	16.0	1440	0.0273	1.0508	2.54	0.766	0.0282	1.0499	2.62	0.765	1 (Log time)	0.782	0.014	39.0
3	4.0	1232					0.0124	1.0658	1.15	0.792				
4	1.0	1440					-0.0068	1.0850	-0.63	0.824				
5	0.25	1440					-0.0249	1.1031	-2.31	0.854				

*Axial stress of 3.29 ksf was required to prevent swelling.

ect Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D2435**				
ect Number: 1894269	**ONE-DIMENSIONAL CONSOLIDATION TEST REPORT**				
	SPECIMEN AND SUMMARY DATA				
ple ID: BME-6 / U-32 @ 60 - 64 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 1

GOLDER

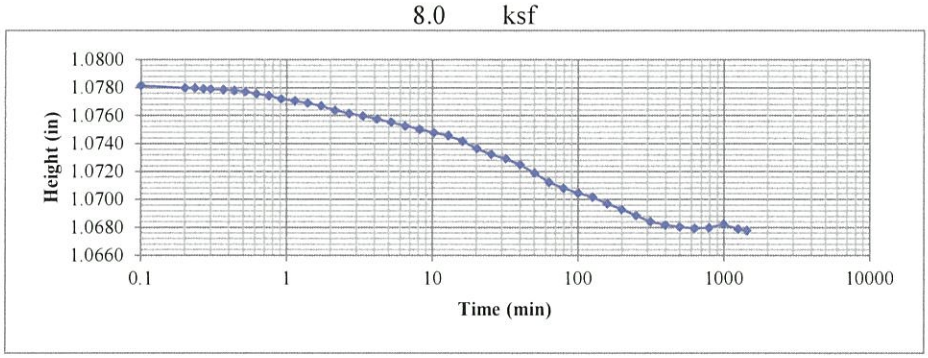




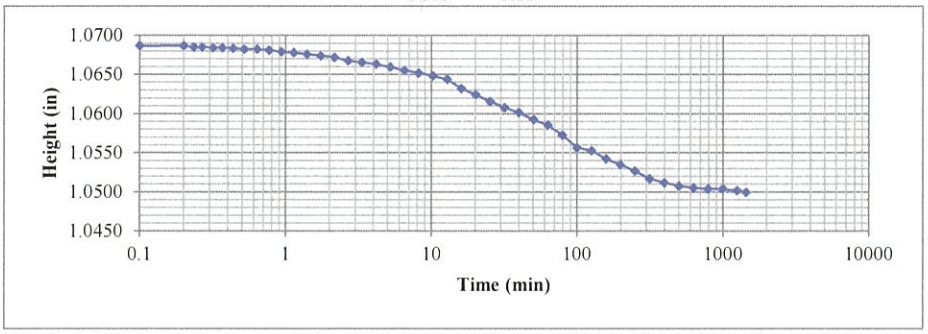
Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION TEST REPORT CONSOLIDATION PLOTS				
Project Number: 1894269					
Sample ID: BME-6 / U-32 @ 60 - 64 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 2

GOLDER

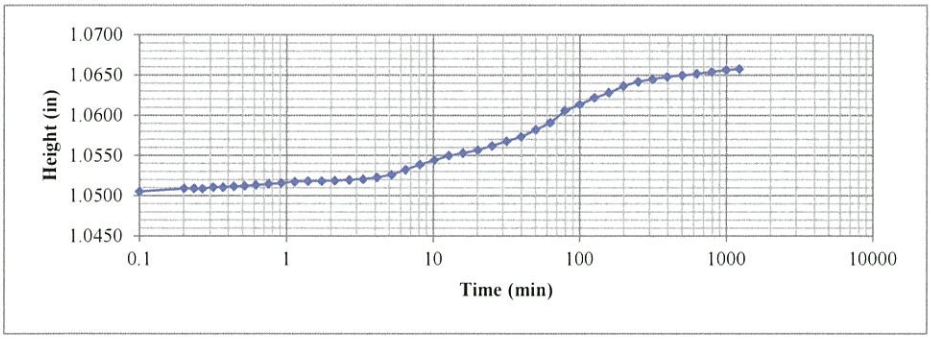
8.0 ksf



16.0 ksf



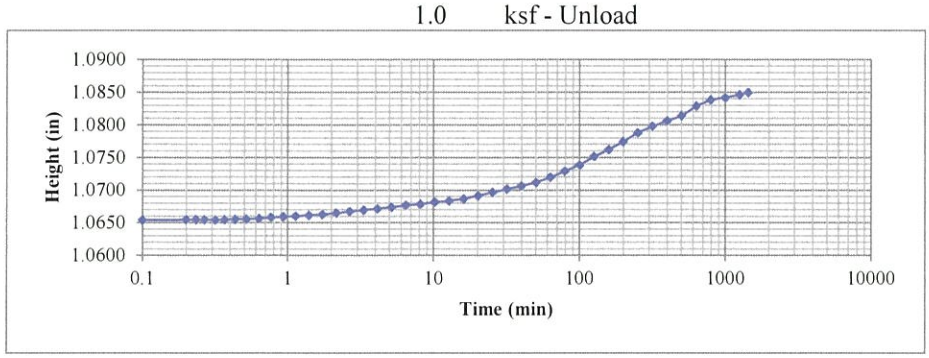
4.0 ksf - Unload



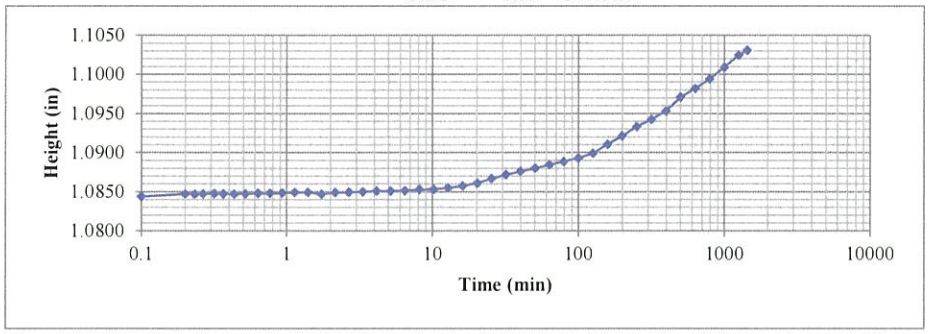
Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION REPORT TIME-DEFORMATION PLOTS (1)				
Project Number: 1894269					
Sample ID: BME-6 / U-32 @ 60 - 64 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 3

GOLDER

1.0 ksf - Unload



0.25 ksf - Unload



Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION REPORT TIME-DEFORMATION PLOTS (2)				
Project Number: 1894269					
Sample ID: BME-6 / U-32 @ 60 - 64 ft.	Technician: PRH	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 4

Depth:	12-14	ft	Depth:	12-14	ft	Depth:	12-14	ft
Point No.:	1		Point No.:	2		Point No.:	3	
	Initial			**Initial**			**Initial**	
Length =	6.026	in	Length =	--	in	Length =	--	in
Diameter =	2.788	in	Diameter =	--	in	Diameter =	--	in
Wet Mass =	2.755	lb	Wet Mass =	--	lb	Wet Mass =	--	lb
Area =	6.105	in^2	Area =	--	in^2	Area =	--	in^2
Volume =	36.79	in^3	Volume =	--	in^3	Volume =	--	in^3
Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)
Dry Mass of Solids =	2.277	lb	Dry Mass of Solids =	2.277	lb	Dry Mass of Solids =	2.277	lb
Water Content =	21.0%		Water Content =	--		Water Content =	--	
Wet Unit Weight =	129.4	pcf	Wet Unit Weight =	--	pcf	Wet Unit Weight =	--	pcf
Dry Unit Weight =	107.0	pcf	Dry Unit Weight =	--	pcf	Dry Unit Weight =	--	pcf
Void Ratio =	0.57		Void Ratio =	--		Void Ratio =	--	
Percent Saturation =	99%		Percent Saturation =	100%		Percent Saturation =	100%	
	After Consolidation			**After Consolidation**			**After Consolidation**	
Length =	6.030	in	Length =	5.878	in	Length =	5.622	in
Diameter =	--	in	Diameter =	--	in	Diameter =	2.891	in
Area =	--	in^2 (Method B)	Area =	--	in^2 (Method B)	Area =	6.563	in^2 (Metho
Volume =	--	in^3	Volume =	--	in^3	Volume =	36.90	in^3
Water Content =	--		Water Content =	--		Water Content =	21.4%	
Wet Unit Weight =	--	pcf	Wet Unit Weight =	--	pcf	Wet Unit Weight =	129.5	pcf
Dry Unit Weight =	--	pcf	Dry Unit Weight =	--	pcf	Dry Unit Weight =	106.6	pcf
Void Ratio =	--		Void Ratio =	--		Void Ratio =	0.58	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	0.97		B Parameter =	--		B Parameter =	--	
Shear Rate =	0.0017%	/min.	Shear Rate =	0.0017%	/min.	Shear Rate =	0.0017%	/min.
t_{50} =	960.0	min.	t_{50} =	--	(not computed)	t_{50} =	--	(not compu
Strain at Failure =	2.4%		Strain at Failure =	4.2%		Strain at Failure =	5.3%	
Cell Pressure =	60.0	psi	Cell Pressure =	73.2	psi	Cell Pressure =	91.5	psi
Back Pressure =	50.0	psi	Back Pressure =	53.2	psi	Back Pressure =	61.5	psi
Confining Pressure =	10.0	psi	Confining Pressure =	20.0	psi	Confining Pressure =	30.0	psi

Notes: USCS description (ASTM D2487): Fat clay, strong brown, moist

Atterberg limits: LL = 59 PL = 17 PI = 42 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 98% (ASTM D422, refer to separate report for gradation

Initial water content specimen obtained from cuttings.

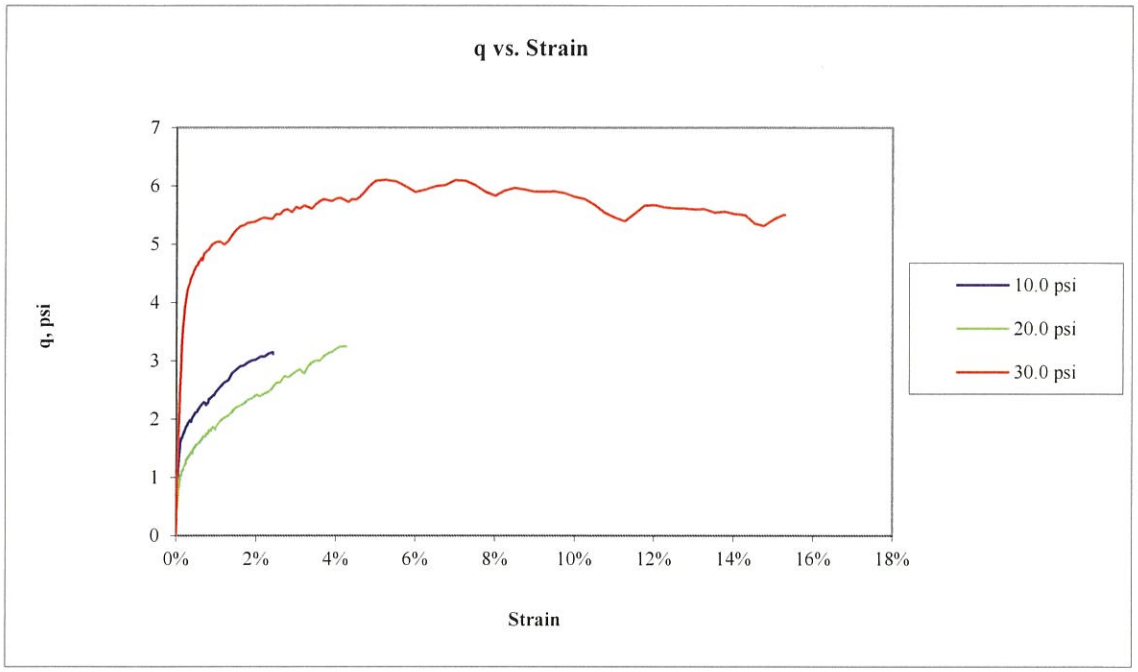
Specimen type:	X	Intact		Reconstituted	
Saturation method:	X	Wet		Dry	
Failure criterion:		$(\sigma'_1/\sigma'_3)_{max}$	X	$(\sigma'_1-\sigma'_3)_{max}$	% strain
Membrane effect:	X	Corrected		Not Corrected	

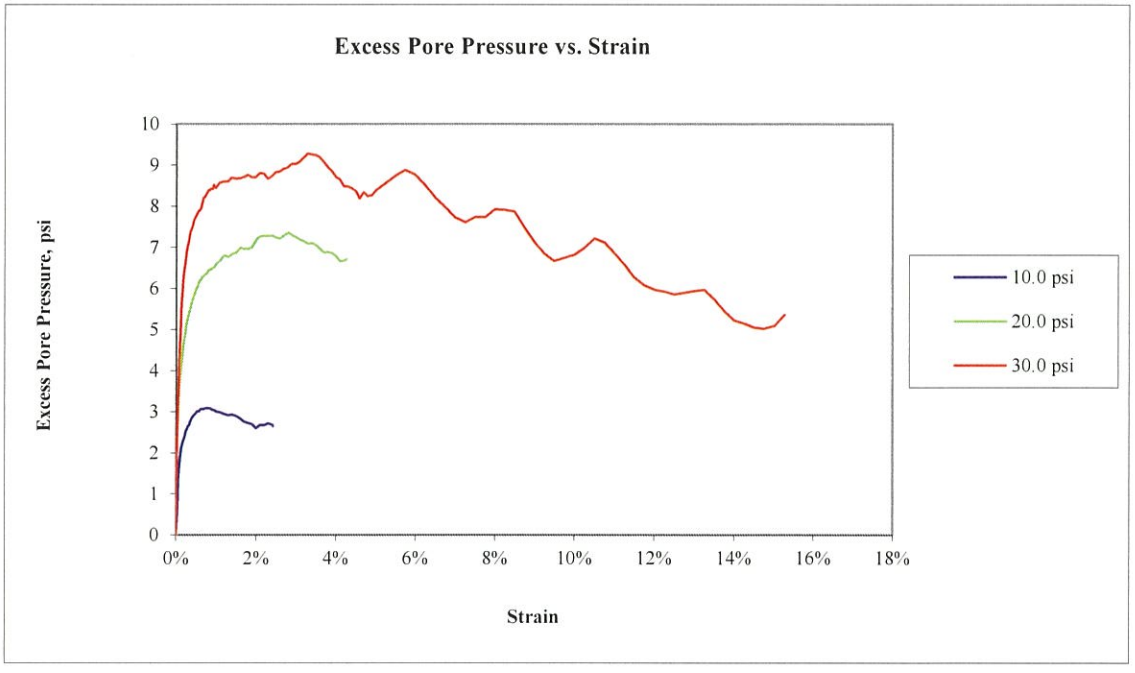
Test was staged using a single specimen. Intermediate specimen dimensions were not determined. Calculations are based on initial specimen dimensions and from corrected area calculations based on axial strain (deviation from ASTM D4767).

Shear rate provided by client.

Stage one terminated at approximately 2.4% strain due to a visible shear plane developing in the specimen.

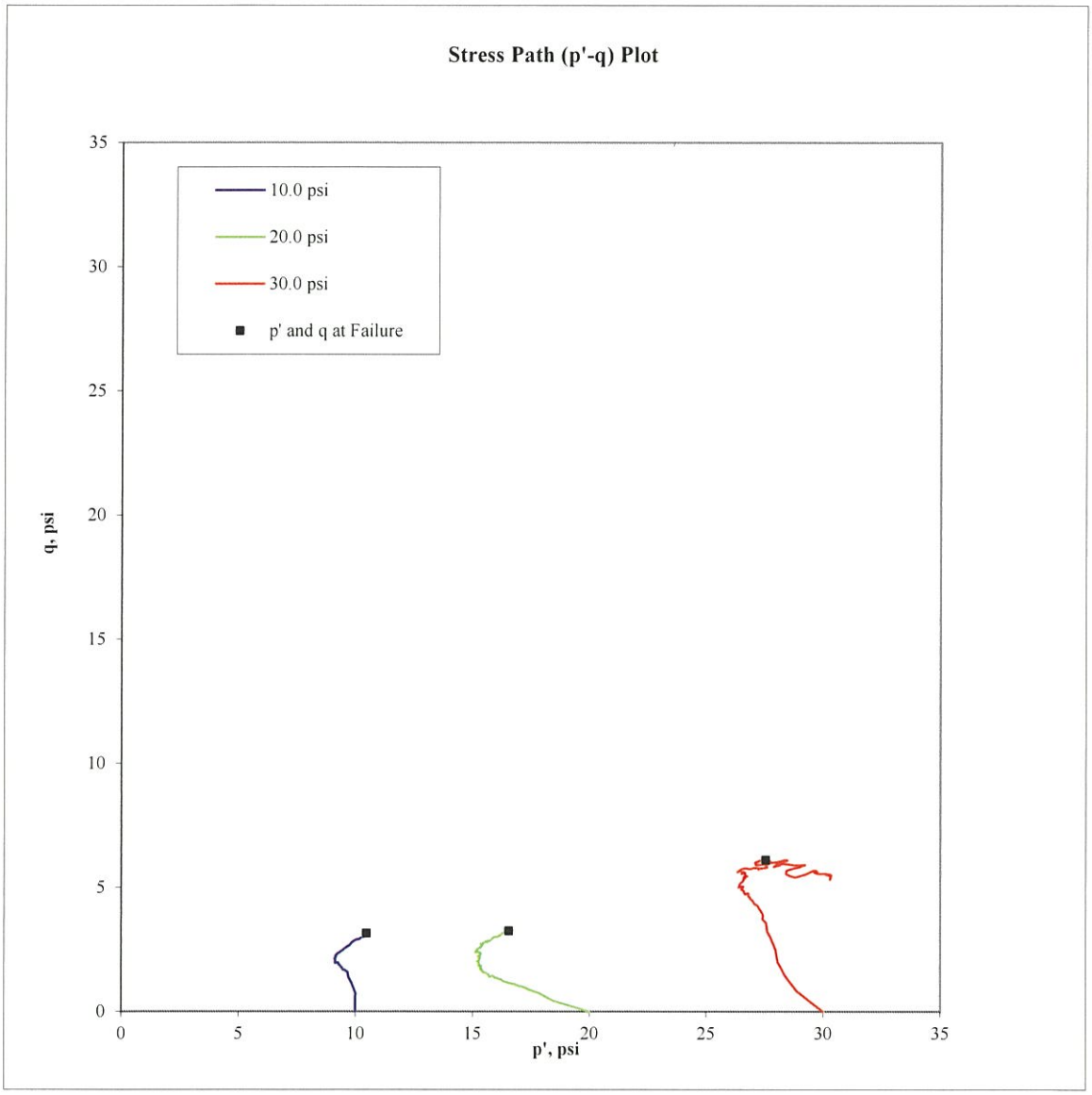
GOLDER





Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Project Number: 1894269					
Sample ID: BME-7 / U7 @ 12 - 14 ft.	Technician: BC	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 2

GOLDER

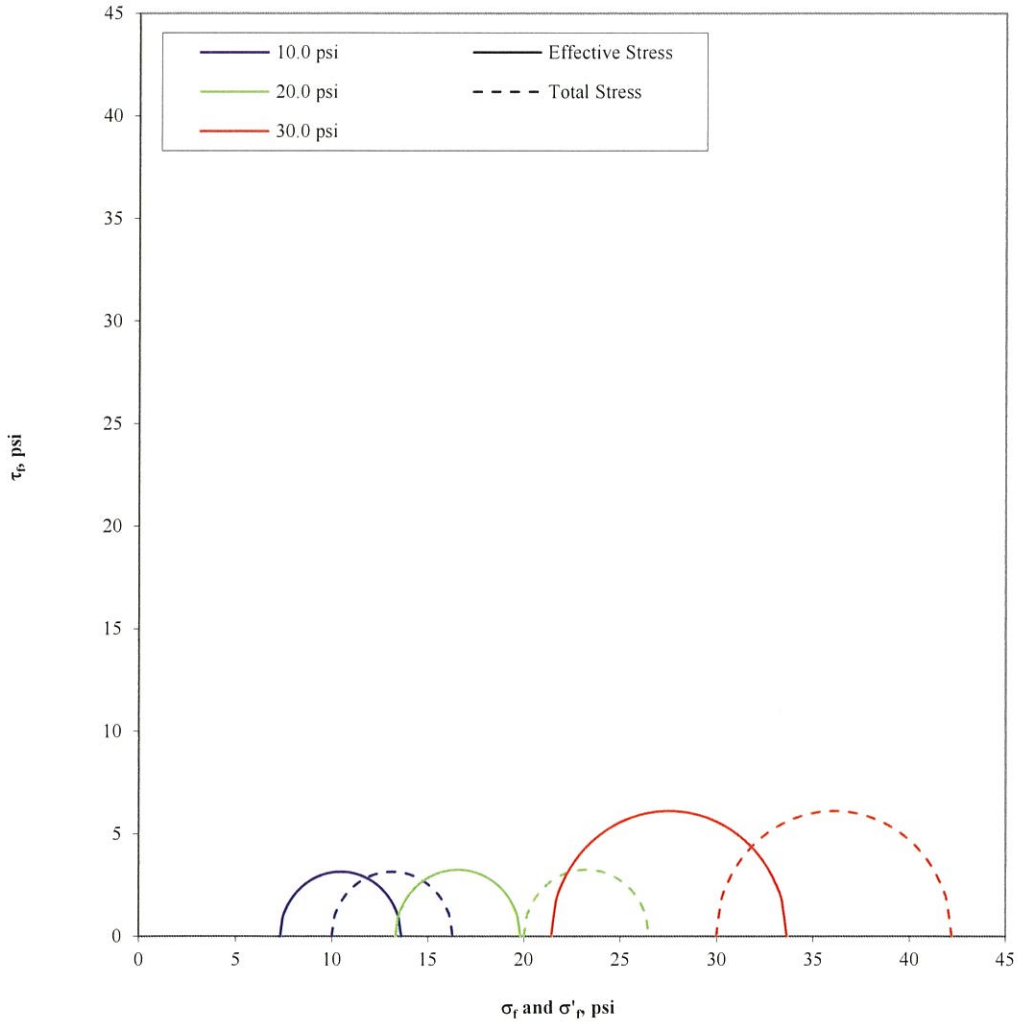


Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
10.0	13.1	10.5	3.1
20.0	23.2	16.6	3.2
30.0	36.1	27.5	6.1

Project Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D4767** CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT STRESS PATH PLOT				
Project Number: 1894269					
Sample ID: BME-7 / U7 @ 12 - 14 ft.	**Technician:** BC	**Checked:** PRH	**Reviewed:** CPA	**Date:** 13-May-2019	**Figure:** 3

GOLDER

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
10.0	13.6	7.3	16.3	10.0
20.0	19.8	13.3	26.5	20.0
30.0	33.6	21.4	42.2	30.0

Project Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D4767** CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT MOHR'S CIRCLE DIAGRAM				
Project Number: 1894269					
Sample ID: BME-7 / U7 @ 12 - 14 ft.	**Technician:** BC	**Checked:** PRH	**Reviewed:** CPA	**Date:** 13-May-2019	**Figure:** 4

GOLDER

Project Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D4767**				
Project Number: 1894269	**CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **POST-TEST SPECIMEN PHOTOGRAPH**				
Sample ID: BME-7 / U7 @ 12 - 14 ft.	**Technician:** BC	**Checked:** PRH	**Reviewed:** CPA	**Date:** 13-May-2019	**Figure:** 5

	Depth:	6-8	ft	Depth:	6-8	ft	Depth:	6-8	ft
	Point No.:	1		Point No.:	2		Point No.:	3	
	Initial			**Initial**			**Initial**		
	Length =	6.032	in	Length =	--	in	Length =	--	in
	Diameter =	2.784	in	Diameter =	--	in	Diameter =	--	in
	Wet Mass =	2.664	lb	Wet Mass =	--	lb	Wet Mass =	--	lb
	Area =	6.087	in^2	Area =	--	in^2	Area =	--	in^2
	Volume =	36.72	in^3	Volume =	--	in^3	Volume =	--	in^3
	Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)	Specific Gravity =	2.70	(Assumed)
	Dry Mass of Solids =	2.152	lb	Dry Mass of Solids =	2.152	lb	Dry Mass of Solids =	2.152	lb
	Water Content =	23.8%		Water Content =	--		Water Content =	--	
	Wet Unit Weight =	125.3	pcf	Wet Unit Weight =	--	pcf	Wet Unit Weight =	--	pcf
	Dry Unit Weight =	101.3	pcf	Dry Unit Weight =	--	pcf	Dry Unit Weight =	--	pcf
	Void Ratio =	0.66		Void Ratio =	--		Void Ratio =	--	
	Percent Saturation =	97%		Percent Saturation =	100%		Percent Saturation =	100%	
	After Consolidation			**After Consolidation**			**After Consolidation**		
	Length =	5.997	in	Length =	5.694	in	Length =	5.584	in
	Diameter =	--	in	Diameter =	--	in	Diameter =	2.798	in
	Area =	--	in^2 (Method B)	Area =	--	in^2 (Method B)	Area =	6.147	in^2 (Metho
	Volume =	--	in^3	Volume =	--	in^3	Volume =	34.33	in^3
	Water Content =	--		Water Content =	--		Water Content =	20.5%	
	Wet Unit Weight =	--	pcf	Wet Unit Weight =	--	pcf	Wet Unit Weight =	130.5	pcf
	Dry Unit Weight =	--	pcf	Dry Unit Weight =	--	pcf	Dry Unit Weight =	108.3	pcf
	Void Ratio =	--		Void Ratio =	--		Void Ratio =	0.55	
	Pe Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
	B Parameter =	0.98		B Parameter =	--		B Parameter =	--	
	Shear Rate =	0.001%	/min.	Shear Rate =	0.001%	/min.	Shear Rate =	0.001%	/min.
	t_{50} =	400.0	min.	t_{50} =	--	(not computed)	t_{50} =	--	(not compu
	Strain at Failure =	4.9%		Strain at Failure =	2.3%		Strain at Failure =	5.7%	
	Cell Pressure =	65.0	psi	Cell Pressure =	70.4	psi	Cell Pressure =	120.1	psi
	Back Pressure =	60.0	psi	Back Pressure =	60.4	psi	Back Pressure =	90.1	psi
	Confining Pressure =	5.0	psi	Confining Pressure =	10.0	psi	Confining Pressure =	30.0	psi

Notes: USCS description (ASTM D2487): Lean clay with sand, light brown, dry

Atterberg limits: LL = 46 PL = 16 PI = 30 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 98% No. 200 = 83% (ASTM D422, refer to separate report for gradation

Initial water content specimen obtained from cuttings.

Specimen type:	X	Intact		Reconstituted
Saturation method:	X	Wet		Dry
Failure criterion:		$(\sigma'_1/\sigma'_3)_{max}$	X	$(\sigma'_1-\sigma'_3)_{max}$ % strain
Membrane effect:	X	Corrected		Not Corrected

Test was staged using a single specimen. Intermediate specimen dimensions were not determined. Calculations are based on initial specimen dimensions and from corrected area calculations based on axial strain (deviation from ASTM D4767).

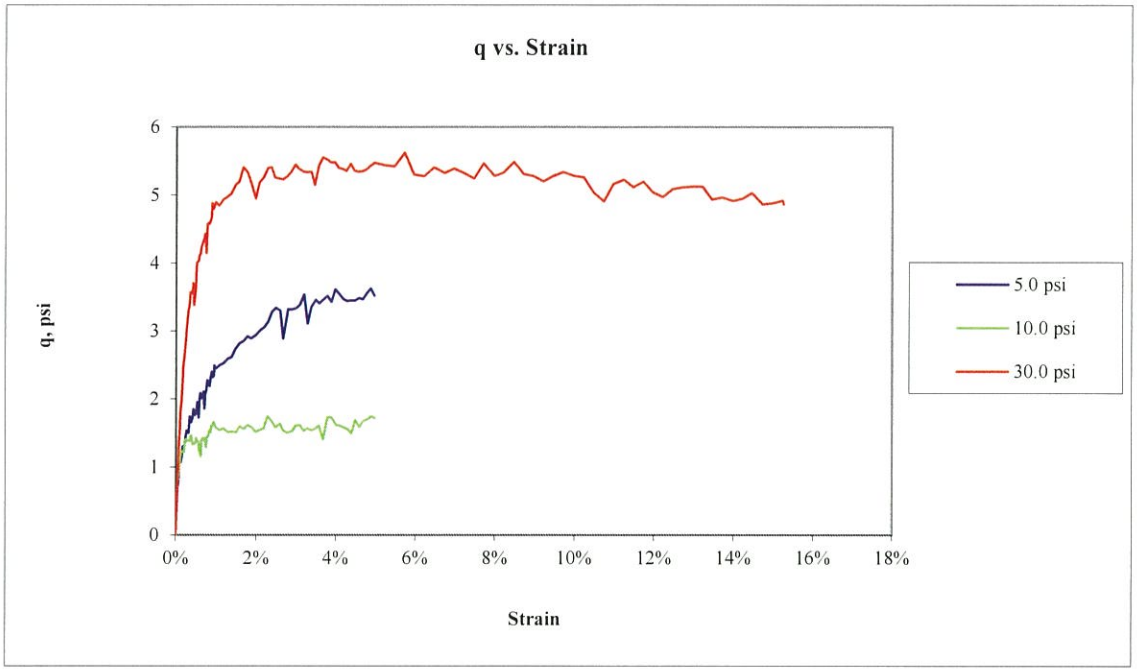
Name: **WM/Hawthorn Park Permit Amend/TX**

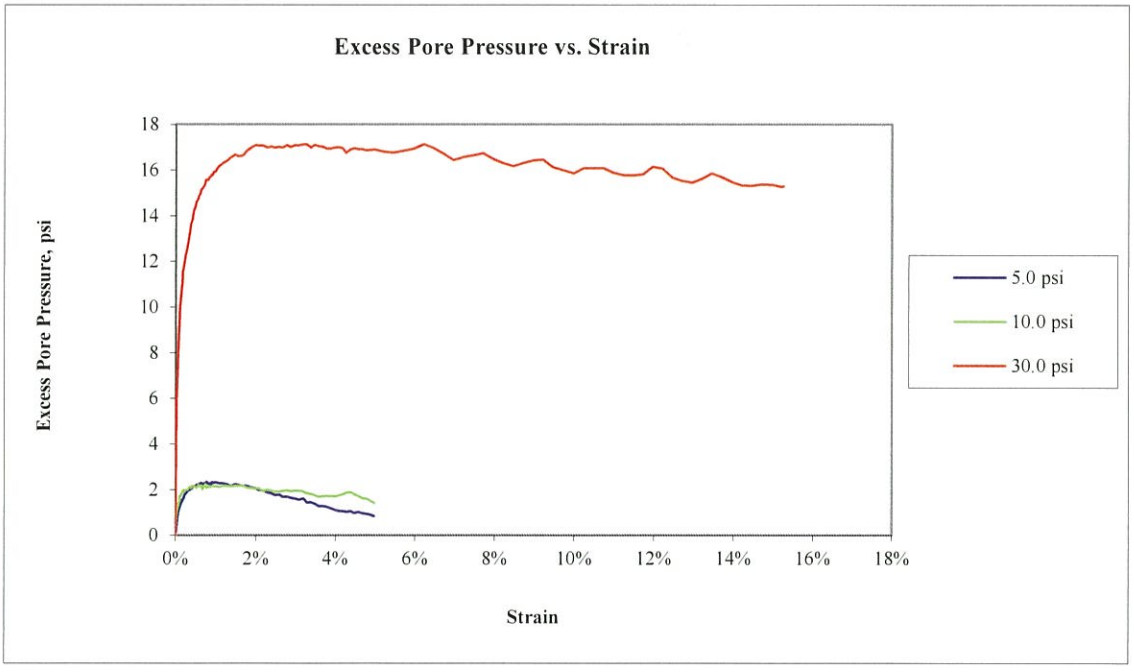
Number:

ASTM D4767

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REI

GOLDER

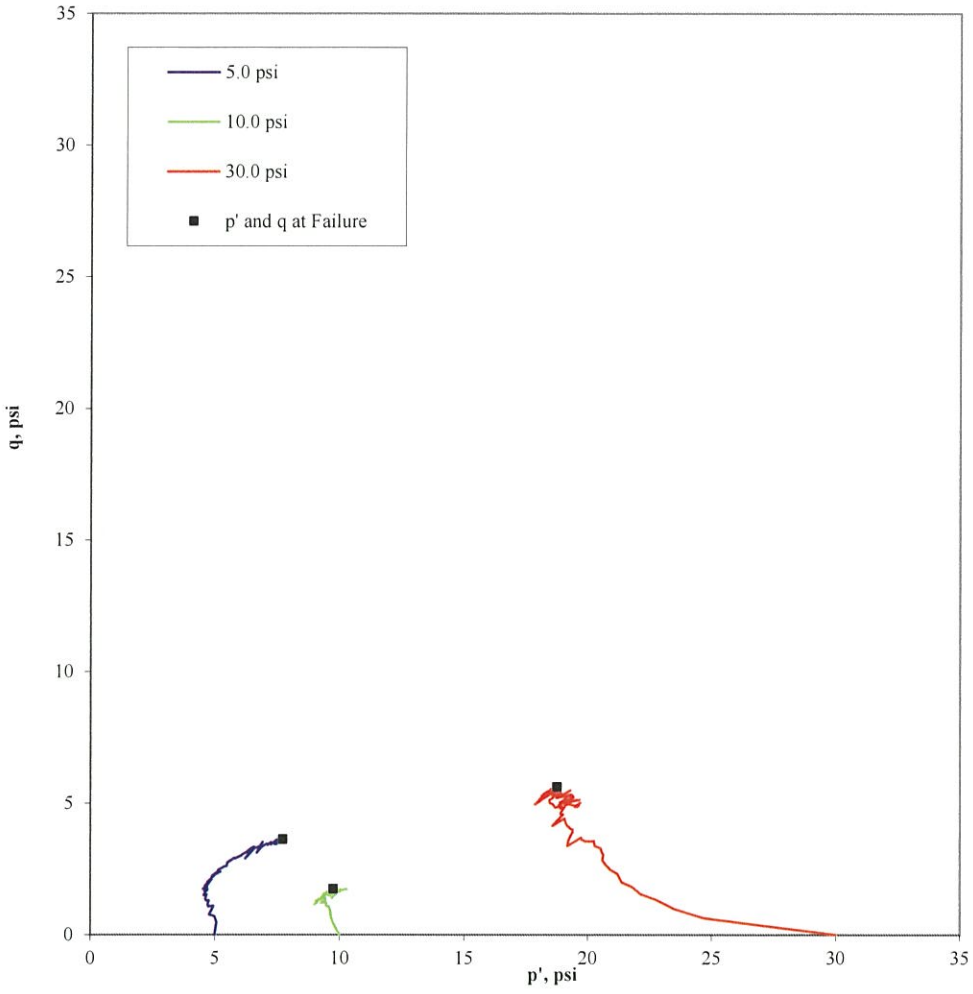




Project Name: WM/Hawthorn Park Permit Amend/TX	ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Project Number: 1894269					
Sample ID: BME-11 / U-4 @ 6 - 8 ft.	Technician: BC	Checked: PRH	Reviewed: CPA	Date: 13-May-2019	Figure: 2

GOLDER

Stress Path (p'-q) Plot

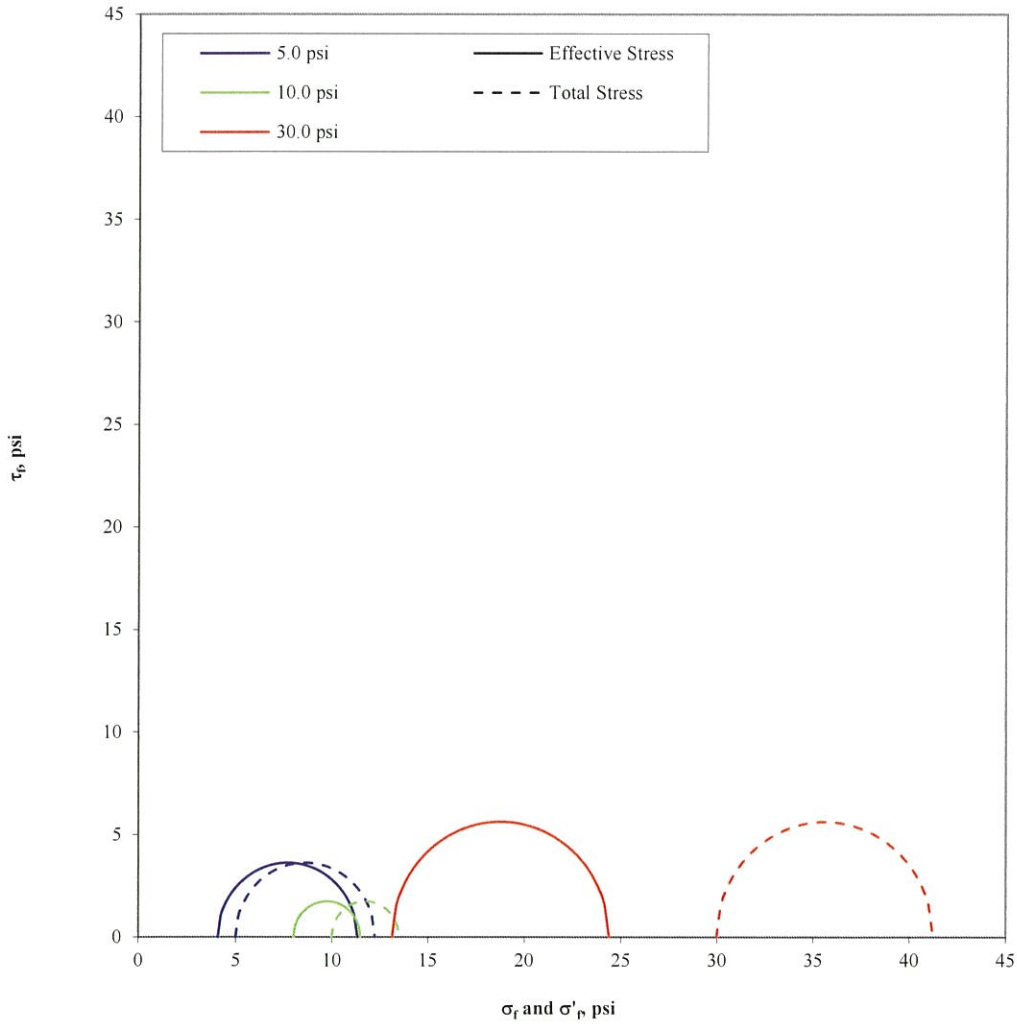


Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
5.0	8.6	7.7	3.6
10.0	11.7	9.7	1.7
30.0	35.6	18.8	5.6

Project Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D4767** CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT STRESS PATH PLOT				
Project Number: 1894269					
Sample ID: BME-11 / U-4 @ 6 - 8 ft.	**Technician:** BC	**Checked:** PRH	**Reviewed:** CPA	**Date:** 13-May-2019	**Figure:** 3

GOLDER

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
5.0	11.3	4.1	12.2	5.0
10.0	11.5	8.0	13.5	10.0
30.0	24.4	13.1	41.2	30.0

Project Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D4767** CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT MOHR'S CIRCLE DIAGRAM				
Project Number: 1894269					
Sample ID: BME-11 / U-4 @ 6 - 8 ft.	**Technician:** BC	**Checked:** PRH	**Reviewed:** CPA	**Date:** 13-May-2019	**Figure:** 4

GOLDER

Project Name: WM/Hawthorn Park Permit Amend/TX	**ASTM D4767**				
Project Number: 1894269	**CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **POST-TEST SPECIMEN PHOTOGRAPH**				
Sample ID: BME-11 / U-4 @ 6 - 8 ft.	**Technician:** BC	**Checked:** PRH	**Reviewed:** CPA	**Date:** 13-May-2019	**Figure:** 5