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Log of Boring **G-51** Sheet 3 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.3 NAVD88

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-35.7		7	45	C-3					
			7	46						
		C-4: Light grey, mica SCHIST, very slightly fractured, very slightly weathered joints, hard rock [NYCBC Class 1a]	10	47	C-4	NX CORE BARREL	REC=60"/60" =100%	RQD=57"/60" =95%		
			10	48						
			10	49						
			7	50						
			8	51						
	-42.2	End of boring at 51.5'	10	52						Borehole backfilled with cuttings & concrete patched upon completion
				53						
				54						
				55						
				56						
				57						
				58						
				59						
				60						
				61						
				62						
				63						
				64						
				65						
				66						
				67						
				68						
				69						
				70						

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Log of Boring **G-52** Sheet 1 of 3

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 9.3 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/22/04 — Date Finished: 10/25/04
Drilling Equipment: Acker 2D Hi-Rail Truck Rig	Completion Depth: 57 ft — Rock Depth: 27 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 4 — Undisturbed 0 — Core 6
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 26	Water Level (ft.): First ▽ 5 — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Reynolds Bridgpal
Sampler: 2" O.D. Split Spoon	Field Engineer: Michael Paquette
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+9.3	14" Reinforced Concrete	0						Boring located on LIRR track 14, about 50' west of 11th Avenue overpass
+8.1		1						
+7.7	5" Asphalt	2						
	Brown, coarse to medium SAND, some medium to fine gravel, dry (Fill) [NYCBC Class 7]	3						
		4						Rollerbit through concrete and asphalt
	▽	5						Hand auger to a depth of 5'
		6						Drill to 10' using rollerbit with water and no down pressure
		7						
		8						Push 4" casing to 4'
		9						
	S-1: Gravel and rock fragments (mica schist) (Fill) [NYCBC Class 7]	10	S-1	SS	1	9 24 9 2	33	1" Rec (gravel) Redrive 2" Spoon: 20-8-5-11 1" Rec (gravel)
		11						
		12						Push 4" casing to 9' Rollerbit to 15'
		13						
		14						
-5.7		15						Hard drilling and loss of wash water at 15' (Boulder?) Drive 4" casing to 15'
	S-2: Brown-grey, CLAY (CH), some fine sand, trace silt, trace mica, trace shells [NYCBC Class 4b]	16	S-2	SS	24	3 6 7 7	13	WC=52.7 , LL=71 , PL=30
		17						Organic Content = 4.9% (burnoff)
		18						Drive 4" casing to 20' Rollerbit to 20' Dark brown-grey wash
		19						
		20						

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Log of Boring **G-52** Sheet 2 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.3 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-10.7			20						
		S-3A: 6" stiff, dark brown, SILT (CL-ML), trace fine sand, trace shells, trace mica [NYCBC Class 5b]			S-3	SS	12	9 11 11 8	22	WC=17.2 , LL=21 , PL=14
	-11.7	S-3B: 6" stiff, light brown, SILT (ML), trace mica [NYCBC Class 5b]		21						
				22						Rollerbit to 25' Light brown wash
				23						
				24						
		S-4: Light brown, SILT (ML), trace shells, trace mica, trace gravel [NYCBC Class 5a]		25	S-4	SS	8	5 10 100/0"	100/0"	
	-16.7			26						Spoon bouncing at 26'
		C-1: Light grey, mica SCHIST, very lightly weathered joints, 30 to 45 degree foliation, joints are fresh (many mechanical), soft rock that breaks apart in fingers at joints [NYCBC Class 1b]	12	27	C-1 NX CORE BARREL		REC=60"/60" =100%	RQD=48"/60" =80%		Spin 3" casing to 26' Can break rock with fingers at sharp joints
			5	28						
			5	29						
		Vertical joint 30.5' to 31' Clay in joint	5	30						Many joints are fresh and mechanical, rock is falling apart as it exits the core barrel
			6	31						
		C-2: Light grey, mica SCHIST, highly fractured, slightly weathered joints, 45 degree foliation with parallel fractures [NYCBC Class 1b]	8	32	C-2 NX CORE BARREL		REC=60"/60" =100%	RQD=32"/60" =53%		Soft rock, can break with fingers at joints
			5	33						
		Very soft from 33' to 39'	7	34						Area of very soft, weathered rock from 33' to 39'
			5	35						
			8	36						
		C-3: Light grey, mica SCHIST, moderately fractured, moderately weathered, hard rock, 60 to 70 degree foliation with parallel fractures [NYCBC Class 1b]	9	37	C-3 NX CORE BARREL		REC=56"/60" =93%	RQD=37"/60" =62%		
			8	38						
			10	39						Majority of breaks are mechanical, rock is soft, breaking as removed from core barrel
			9	40						
			10	41						
		C-4: Light grey, mica SCHIST, moderately weathered fractures, hard rock, 70 to 80 degree dip in fractures [NYCBC Class 1b]	12	42	C-4 NX CORE BARREL		REC=58"/60" =97%	RQD=47"/60" =78%		
			9	43						
			8	44						
				45						

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Log of Boring **G-52** Sheet 3 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.3 NAVD88

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-35.7			45					10 20 30 40	
			9							Rock breaking as removed from core barrel
		Highly fractured zone from 46' to 47'	9	46	C-4					
			10	47						
		C-5: Light grey, mica SCHIST, highly fractured, moderately weathered [NYCBC Class 1b]	10	48	C-5	NX CORE BARREL	REC=58"/60" =97%	RQD=30"/60" =50%		
			12	49						
			9	50						
		Highly fractured zone 51' to 52'	13	51						
			10	52						
		C-6: Light grey, mica SCHIST, few fractures, slightly weathered [NYCBC Class 1a]	7	53	C-6	NX CORE BARREL	REC=60"/60" =100%	RQD=53"/60" =88%		Many mechanical breaks Rock is broken by fingers at joints (soft)
			10	54						
			10	55						
			12	56						
	-47.7			57						
		End of boring at 57'		58						Borehole backfilled with cuttings & concrete patched upon completion
				59						
				60						
				61						
				62						
				63						
				64						
				65						
				66						
				67						
				68						
				69						
				70						

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Log of Boring **G-53** Sheet 1 of 6

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 6.9 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 12/2/04 — Date Finished: 12/9/04
Drilling Equipment: DK-50 Track Rig	Completion Depth: 123 ft — Rock Depth: 96 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 18, Undisturbed 3, Core 4
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 95	Water Level (ft.): First ▽, Completion ▼, 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Dave Puzycki
Sampler: 2" O.D. Split Spoon / 3" Shelby Tube	Field Engineer: Stuart Knoop
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+6.9									Boring located about 116' south of W33rd Street, and about 3' off of 12th Avenue curb
	+6.6	Dark brown, coarse to medium SAND, some gravel, trace brick fragments (Fill) [NYCBC Class 7]		0						
		Brown, medium to fine SAND, some silt, trace fine gravel (Fill) [NYCBC Class 7]		1						qu (tsf) estimated from Pocket Penetrometer
		Brown-grey, GRAVEL, trace brick, trace sand (Fill) [NYCBC Class 7]		2						Hand auger to 6' Obstruction at 2.5' Expand hole southward, cannot remove Offset hole 2' north
		S-1: Grey, silty fine SAND, trace fine gravel, trace brick fragments, dark 2" stain (Fill) [NYCBC Class 7]		3	S-1	SS	12	5 5 6 10	11	Hammer casing to 5' Rollerbit to 7'
				4						Rollerbit to 10'
		S-2: Grey-brown, fine GRAVEL, some fine to medium sand (Fill) [NYCBC Class 7]		5	S-2	SS	14	6 9 9 9	18	
				6						Push 4" casing to 15' Rollerbit to 15' Dark grey cuttings at 14'
		S-3: Grey-black, fine GRAVEL, trace coarse sand, trace brick (Fill) [NYCBC Class 7]		7	S-3	SS	11	5 6 2 2	8	Staining, petroleum odor
	-10.1	S-4: Grey-black, organic CLAY (OH), trace silt, fine sand lenses [NYCBC Class 4b]		8	S-4	SS	24	4 8 11 11	19	Staining, petroleum odor
				9						Rollerbit to 20'
				10						
				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **G-53** Sheet 2 of 6

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.9 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-13.1	S-5: Grey-black, organic CLAY (OH), trace vegetation, trace shell fragments [NYCBC Class 6]		20	S-5	SS	18	WOH 1 2 1 2		Staining, slight odor
				21						
				22						Rollerbit to 25'
				23						
				24						
		S-6: Grey-black, organic CLAY (OH), trace shell fragments [NYCBC Class 6]		25	S-6	SS	15	WOH 1 WOH 1		q_u=0.25 tsf
				26						Staining
				27						Rollerbit to 30'
				28						
				29						
		S-7: Dark grey organic CLAY (OH), trace shell fragments [NYCBC Class 6]		30	S-7	SS	24	WOH WOH 1 2		q_u=0.25 tsf
				31						Spotty staining
				32						Rollerbit to 35'
				33						
				34						
		S-8: Black-grey, organic CLAY (OH) [NYCBC Class 6]		35	S-8	SS	14	1 1 1 2 2		Slight odor, staining
				36						
	-30.1			37						q_u=0.25 tsf
		S-9: Dark grey, varved silty CLAY (CL-ML), trace shell fragments, 0.25" sandy horizons with shells [NYCBC Class 6]		38	S-9	SS	24	3 1 2 3		
				39						Rollerbit to 40'
				40						
				41	U-1	UNDIST	24			
				42						Rollerbit to 45'
				43						
				44						
				45						

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Log of Boring **G-53** Sheet 3 of 6

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.9 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-38.1	S-10: Dark grey, varved clayey SILT (ML-CL), trace shell fragments [NYCBC Class 6]		45	S-10	SS	24	WOH WOH WOH WOH		q_u=0.25 tsf
				46						
				47						Rollerbit to 50'
				48						
				49						
		S-11: Dark grey, varved clayey SILT (ML-CL), trace shell fragments [NYCBC Class 6]		50	S-11	SS	24	WOH WOH WOH WOH		q_u=0.5 tsf
				51						
				52						Rollerbit to 55'
				53						
				54						
		S-12: Dark grey, clayey SILT (ML-CL), trace shell fragments, slight odor [NYCBC Class 6]		55	S-12	SS	24	WOH WOH WOH WOH		q_u=0.5 tsf
				56						
				57						Rollerbit to 60'
				58						
				59						
				60	U-2	UNDIST	24			
				61						
				62						Rollerbit to 65'
				63						
				64						
		S-13: Dark grey, varved clayey SILT (ML-CL), trace shell fragments, slight organic odor [NYCBC Class 6]		65	S-13	SS	24	WOH WOH WOH WOH		q_u=0.5 tsf
				66						
				67						Rollerbit to 70'
				68						
				69						
				70						

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Log of Boring **G-53** Sheet 4 of 6

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.9 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-63.1	S-14: Dark grey, clayey SILT (ML-CL), trace shell fragments, slight organic odor [NYCBC Class 6]		70	S-14	SS	24	WOH WOH WOH WOH		q_u=0.75 tsf
				71						
				72						Rollerbit to 75'
				73						
				74						
		S-15: Dark grey, clayey SILT (ML), trace shell fragments [NYCBC Class 6]		75	S-15	SS	24	WOH WOH WOH WOH		q_u=0.5 tsf
				76						
				77						Rollerbit to 80'
				78						
				79						
				80	U-3	UNDIST	0			
				81						
		S-16: Dark grey, clayey, silty fine SAND (SM), laminated with clayey silt lenses, trace shell fragments [NYCBC Class 3a]		82	S-16	SS	24	WOH 18 19 18	37	
				83						
				84						Rollerbit to 90'
				85						
				86						
				87						
				88						
				89						
		S-17: Stiff, dark grey, clayey, sandy SILT (ML), laminated [NYCBC Class 6]		90	S-17	SS	24	6 3 6 8	9	
				91						
				92						Rollerbit to 95'
				93						
				94						
	-88.1			95						

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Log of Boring **G-53** Sheet 5 of 6

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.9 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-88.1			95	S-18	SS	0	100/0"	100/0"	Biotite schist in spoon shoe
		C-1: Grey-black, biotite SCHIST, 1" quartz vein, medium hard, v slightly weathered, v close fracture spacing, foliation at ~50 degrees, fractures parallel to foliation, slight brown stain on fracture surfaces [NYCBC Class 1d]	11	96	C-1 NX CORE BARREL		REC=102"/120" =85%	RQD=37"/120" =31%		
			11	97						
			11	98						
		Blue-grey, biotite, feldspar, garnet SCHIST, hard, v slightly weathered, close to v close fracture spacing, foliation at ~50 degrees, fractures parallel to foliation, fresh fracture surfaces	11	99						
			6	100						
		Grey-white, GRANITOID, 0.5" spaced, muscovite defined foliation, hard, fresh, close fracture spacing, fractures dip at ~10 degrees, foliation at ~50 degrees, fresh fractures	7	101						
			6	102						
			5	103						
			6	104						
			6	105						
		C-2: Black-grey, biotite, feldspar SCHIST, hard, foliation at ~50 degrees [NYCBC Class 1b]	6	106	C-2 NX CORE BARREL		REC=120"/120" =100%	RQD=95"/120" =79%		
		Grey-white, GRANITOID, hard, close fracture spacing	5	107						
			5	108						
			3	109						
		Black-grey, biotite, feldspar SCHIST, hard, foliation at ~50 degrees	4	110						
			7	111						
			5	112						
			5	113						38" of core unrecovered during C-2, piece was retrieved during core run C-3
			5	114						
			5	115						
			5	116						
			4	117	C-3 NX CORE BARREL		REC=43"/60" =72%	RQD=25"/60" =42%		
			4	118						
		C-3: Grey-pink, GRANITOID, very hard, fresh, faint foliation defined by quartz and mica at 10-40 degrees, course crystalline quartz at 119', mica layers are spaced and folded, fractured along mica layers [NYCBC Class 1c]	4	119						
			5	120						

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Log of Boring **G-53** Sheet 6 of 6

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.9 NAVD88

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-113.1			120					10 20 30 40	
			6	121	C-3	NX CORE BARREL	REC=24"/24" =100%	RQD=24"/24" =100%		
			4	122	C-4					Core barrel jammed at 123'
			9	123						Borehole backfilled with cuttings and surface patched upon completion
	-116.1	C-4: Grey-pink, GRANITOID, very hard, fresh, faint foliation defined by quartz and mica at 10-40 degrees, course crystalline quartz at 119', mica layers are spaced and folded, fractured along mica layers [NYCBC Class 1a]		124						
		End of boring at 123'		125						
				126						
				127						
				128						
				129						
				130						
				131						
				132						
				133						
				134						
				135						
				136						
				137						
				138						
				139						
				140						
				141						
				142						
				143						
				144						
				145						

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Log of Boring **G-6** Sheet 1 of 4

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 8.5 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/21/04 — Date Finished: 10/27/04
Drilling Equipment: Acker-11 Truck	Completion Depth: 90 ft — Rock Depth: 65 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 12, Undisturbed 0, Core 5
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 65	Water Level (ft.): First ▽, Completion ▼, 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Cory Tirro
Sampler: 2" O.D. Split Spoon	Field Engineer: Nipam Shah
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.5			0						Boring located in NYDS parking, about 420' east of 12th Avenue and 26' north of 30th Street
	+8.0	6" Asphalt		1						
				2						qu (tsf) estimated from Pocket Penetrometer
				3						
				4						Hand auger to 6'
				5						
		S-1: Brown, coarse to fine SAND, some fine gravel, trace silt (Fill) [NYCBC Class 7]		6	S-1	SS	18	3, 2, 1, 5	3	
				7						
				8						Drive 4" casing to 10' Rollerbit to 10'
				9						
		S-2: Dark brown, f SAND, some silt, trace fine gravel (Fill) [NYCBC Class 7]		10	S-2	SS	18	4, 3, 2, 3	5	Add revert to wash
				11						
				12						Drive 4" casing to 15' Rollerbit to 15'
				13						
				14						
		S-3: Brown, coarse to fine SAND, some coarse to fine gravel, trace silt, trace concrete and asphalt fragments (Fill) [NYCBC Class 7]		15	S-3	SS	6	4, 11, 47, 27	58	
				16						Concrete fragments in tip of spoon
				17						Drive 4" casing to 20' Rollerbit to 20' (Hard drilling)
				18						
				19						
				20						

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Log of Boring **G-6** Sheet 2 of 4

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.5 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-11.5	S-4: ROCK FRAGMENTS, with brown medium to fine sand, trace fine gravel (Fill) [NYCBC Class 7]		20	S-4	SS	10	44 15 22 10	37	
				21						
				22						Rollerbit to 25'
				23						
				24						
		S-5: ROCK FRAGMENTS, with some coarse to fine gravel, some medium to fine sand (Fill) [NYCBC Class 7]		25	S-5	SS	8	13 8 5 23	13	
				26						
				27						Rollerbit to 30' Gravel and rock fragments in wash Hard drilling and rig chatter 28.5'-30' (Possible boulder)
				28						
				29						
		S-6: Brown, coarse to fine SAND, some coarse to fine gravel, trace silt (Fill) [NYCBC Class 7]		30	S-6	SS	10	20 8 5 6	13	
				31						
				32						Rollerbit to 35' Loss of wash water
				33						Drive 4" casing to 35' Rollerbit to 35'
				34						
		S-7: Dark brown, coarse to fine SAND, some silt, trace coarse to fine gravel, trace asphalt fragments (Fill) [NYCBC Class 7]		35	S-7	SS	14	11 5 3 5	8	
				36						
				37						Mix revert into wash Rollerbit to 40'
				38						
	-30.5			39						
		S-8: Grey, silty CLAY (CH), trace shell fragments [NYCBC Class 4c]		40	S-8	SS	13	3 2 3 4	5	
				41						
				42						Rollerbit to 45'
				43						
				44						
				45						

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Log of Boring **G-6** Sheet 3 of 4

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.5 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-36.5	S-9: Grey, silty CLAY (CH), trace shell fragments [NYCBC Class 4c]		45	S-9	SS	22	3 2 2 3	4	q_u=0.75 tsf Took Shelby tube at 45', recovery = 3", take spoonWC=49.3 , LL=56 , PL=24 Organic Content = 3.8% (burnoff) Rollerbit to 50'
				46						
				47						
				48						
				49						
		S-10: Grey, silty CLAY (CH), trace shell fragments [NYCBC Class 4c]		50	S-10	SS	2	4 3 3 5	6	
				51						
				52						Rollerbit to 52'
				53						
				54						
		S-11: Grey, silty CLAY (CL), trace shell fragments, trace wood and grass [NYCBC Class 4c]		55	S-11	SS	4	4 3 4 5	7	Organic Content = 3.3% (burnoff)WC=65.5 , LL=45 , PL=20
				56						
				57						Rollerbit to 60 '
				58						
				59						
		S-12: Grey, clayey SILT (ML-CL), trace wood chips, rock fragments [NYCBC Class 5b]		60	S-12	SS	12	4 4 6 10	10	WC=30.1 , LL=25 , PL=20
				61						
				62						Rollerbit to 65'
				63						
				64						
	-56.5			65						Rock at ~65' Spin 3" casing to 65'
		C-1: Grey-black, mica SCHIST, highly weathered, moderately fractured except highly fractured between 67.7' - 67.9'. close to wide fracture spacing, strong rock, fine to medium grained, iron-oxide staining at 67', 67.3' and 67.7' [NYCBC Class 1b]	12	66	C-1	NX CORE BARREL	REC=49"/60" =82%	RQD=33"/60" =55%		
			10	67						
			10	68						
			8	69						
				70						

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Log of Boring **G-6** Sheet 4 of 4

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.5 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-61.5			70						
		C-2: Grey-black, mica SCHIST, moderately weathered except highly weathered at 74.4', slightly fractured except moderately fractured [NYCBC Class 1b]	6	71	C-2	NX CORE BARREL	REC=56"/60" =93%	RQD=43"/60" =72%		
			6	72						
			6	73						
			6	74						
			5	75						
		C-3: Grey-black, mica SCHIST, moderately weathered except highly weathered at 75.5'-75.7' and 78.5'-80', slightly fractured except highly fractured at 78.5'-80', close to wide fracture spacing, strong rock, medium to fine grained, Serpentine at 76', clay coated fractures [NYCBC Class 1b]	5	76	C-3	NX CORE BARREL	REC=60"/60" =100%	RQD=38"/60" =63%		
			5	77						
			4	78						
			4	79						
			4	80						
		C-4: Grey-black, mica SCHIST, highly weathered, moderately to highly fractured, close to wide fracture spacing, soft rock, fine to medium grained, serpentine at 83' [NYCBC Class 1b]	6	81	C-4	NX CORE BARREL	REC=38"/60" =63%	RQD=32"/60" =53%		
			6	82						
			5	83						
			4	84						
			6	85						
		C-5: Grey-black, mica SHIST, moderately weathered, slightly fractured, wide fracture spacing, strong rock, medium to fine grained, trace pegmatite, clay coated fractures 85-87' [NYCBC Class 1a]	5	86	C-5	NX CORE BARREL	REC=57"/60" =95%	RQD=54"/60" =90%		
			5	87						
			6	88						
			6	89						
			6	90						
	-81.5	End of boring at 90'		91						Borehole backfilled with cuttings and surface patched upon completion
				92						
				93						
				94						
				95						

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Log of Boring **G-62** Sheet 1 of 5

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 6.6 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/15/04 — Date Finished: 10/21/04
Drilling Equipment: DK-50 Track Rig	Completion Depth: 115 ft — Rock Depth: 90 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 15, Undisturbed 2, Core 5
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 89	Water Level (ft.): First ▽ 7, Completion ▼, 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Robert Ware
Sampler: 2" O.D. Split Spoon / 3" Shelby Tube	Field Engineer: Juan Pinzon
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40
	+6.6			0					
	+6.4	2" Asphalt Pavement							
	+5.9	6" Concrete Slab		1					
		Light brown, fine sandy GRAVEL with cobbles (Fill) [NYCBC Class 7]		2					
				3					
				4					
				5					
				6					
		▽		7					
				8					
				9					
		S-1: Black, fine GRAVEL, some sand, some brick fragments (Fill) [NYCBC Class 7]		10	S-1	SS	11	12 9 6 8	15
				11					
				12					
				13					
				14					
		S-2: Dark brown, silty GRAVEL, some sand, trace brick fragments (Fill) [NYCBC Class 7]		15	S-2	SS	2	4 4 4 5	8
				16					
				17					
				18					
				19					
				20					

Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

Boring located on LIRR west access road, about 40' south of 33rd street gate and 17' east of fence

qu (tsf) estimated from Pocket Penetrometer

Drill through asphalt and concrete slab

Rollerbit with water and no pressure to 6'
Push casing to 4ft

Rollerbit with water and no pressure to 10'
Spin casing to 9'
Rollerbit to 10'

Hammer casing to 14'
Mix revert
Rollerbit to 15'

Rollerbit to 15'

Rollerbit to 20'

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Log of Boring **G-62** Sheet 2 of 5

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.6 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-13.4	S-3: Dark brown-black, fine GRAVEL, some medium sand (Fill) [NYCBC Class 7]		20	S-3	SS	3	6 6 4 6	10	
				21						
				22						Rollerbit to 25'
				23						
				24						
		S-4: Black, fine GRAVEL, some sand, trace rock fragments (Fill) [NYCBC Class 7]		25	S-4	SS	5	7 7 4 5	11	
				26						
				27						
				28						
				29						
		S-5: Black, fine GRAVEL, some sand, trace clay (Fill) [NYCBC Class 7]		30	S-5	SS	6	2 2 3 5	5	
				31						
				32						Rollerbit to 35'
	-26.9			33						
				34						
		S-6: Black, organic silty CLAY (OH) [NYCBC Class 4c]		35	S-6	SS	24	1 1 3 2	4	q_u=0.25 tsf
				36						
				37						Rollerbit to 40'
				38						
				39						
		S-7: Grey, organic silty CLAY (OH), shell fragments [NYCBC Class 6]		40	S-7	SS	22	2 1 1 2	2	q_u=0.5 tsf WC=51.8 , LL=52 , PL=21 Organic Content = 3.6% (burnoff)
				41						
				42						Rollerbit to 45' Hole is caving in Push casing to 29' Rollerbit to 45'
				43						
				44						
				45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **G-62** Sheet 3 of 5

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.6 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-38.4	Grey, organic silty CLAY (OH)		45	U-1	UNDIST	24			WC=49.5 , LL=60 , PL=22
				46						
				47						Rollerbit to 50'
				48						
				49						
		S-8: Grey, organic silty CLAY (OH), shell fragments [NYCBC Class 6]		50	S-8	SS	24	1 WOH WOH 2		q_u=0.5 tsf
				51						
				52						Rollerbit to 55'
				53						
				54						
		S-9: Grey, organic silty CLAY (OH), trace fine sand, trace organics, shell fragments [NYCBC Class 4c]		55	S-9	SS	24	WOH 3 2 2	5	q_u=0.5 tsf WC=54.3 , LL=58 , PL=24 Organic Content = 4.2% (burnoff)
				56						
				57						
				58						
				59						
	-53.4	Grey, silty CLAY (CL)		60	U-2	UNDIST	24			WC=34.1 , LL=30 , PL=16
				61						
				62						Rollerbit to 65' Lost water Fill up mud tub Mix revert
				63						
				64						
		S-10: Grey, silty CLAY (CL), shell fragments [NYCBC Class 6]		65	S-10	SS	24	WOH WOH 2 4		q_u=0.5 tsf
				66						
				67						Rollerbit to 70'
				68						
				69						
				70						

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Log of Boring **G-62** Sheet 4 of 5

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.6 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-63.4	S-11: Grey, silty CLAY (CL), some fine sand, shell fragments [NYCBC Class 6]		70	S-11	SS	24	1 1 2 3	3	q_u=0.5 tsf WC=28.5 , LL=28 , PL=15
				71						
				72						Rollerbit to 75'
				73						
				74						
		S-12: Grey, silty CLAY (CL), some fine sand, shell fragments [NYCBC Class 4c]		75	S-12	SS	24	WOH WOH 4 5		q_u=0.50-0.75 tsf
				76						
				77						Rollerbit to 80'
				78						
				79						
		S-13: Grey, silty CLAY (CL), some fine sand [NYCBC Class 6]		80	S-13	SS	24	WOH WOH WOH 1		q_u=0.25-0.50 tsf
				81						
				82						Rollerbit to 85'
				83						
				84						
		S-14: Grey, silty CLAY (CL), trace fine sand [NYCBC Class 6]		85	S-14	SS	24	3 WOH WOH 2		q_u=0.5 tsf WC=32.4 , LL=34 , PL=16
				86						
				87						Rollerbit to 90' Rig chatters from 89.5' to 90'
				88						
				89						
	-83.4			90	S-15	SS	0	100/0"	100/0"	Spoon refusal @ 90'
		C-1: Grey-brown, slightly fractured QUARTZITE, very hard, slightly weathered joints, trace mica schist in joints [NYCBC Class 1b]	6	91	C-1	NX CORE BARREL	REC=58"/60" =97%	RQD=46"/60" =77%		Push/Spin casing to 89'
			4.5	92						
			4.5	93						
			4.5	94						
			5.5	95						

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Log of Boring **G-62** Sheet 5 of 5

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 6.6 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-88.4	C-2: Grey-brown, slightly fractured QUARTZITE, very hard, slightly weathered joints, mica schist veins Some serpentine (green) from 99' to 100 [NYCBC Class 1b]	5 5.5 5 3.5 3.5	95 96 97 98 99 100	C-2	NX CORE BARREL	REC=58"/60" =97%	RQD=48"/60" =80%		
		C-3: Grey-brown, highly fractured QUARTZITE, hard, weathered joints, mica schist veins Serpentine (green) from 100' to 100.5 [NYCBC Class 1b]	2 2 3 3 4.5	101 102 103 104 105	C-3	NX CORE BARREL	REC=30"/60" =50%	RQD=4"/60" =7%		
		C-4: Grey-brown, fractured QUARTZITE, very hard, slightly weathered joints, mica schist veins Trace serpentine (green) [NYCBC Class 1b]	3 3 4 4 4.5	106 107 108 109 110	C-4	NX CORE BARREL	REC=58"/60" =97%	RQD=35"/60" =58%		
		C-5: Grey-brown, fractured QUARTZITE, very hard, slightly weathered joints, mica schist veins [NYCBC Class 1b]	4 5 4.5 7.5 5	111 112 113 114 115	C-5	NX CORE BARREL	REC=57"/60" =95%	RQD=30"/60" =50%		Borehole backfilled with cuttings and surface patched upon completion
	-108.4	End of boring at 115'		116 117 118 119 120						

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Log of Boring **G-63** Sheet 1 of 5

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 8.3 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/11/04 — Date Finished: 10/13/04
Drilling Equipment: Acker 2D Hi-Rail Truck Rig	Completion Depth: 105 ft — Rock Depth: 85 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 15 — Undisturbed 0 — Core 4
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 85	Water Level (ft.): First ▽ 6 — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Bob Verbent
Sampler: 2" O.D. Split Spoon	Field Engineer: Nipam Shah
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.3	14" Concrete		0						Boring located on LIRR track 29, about 73' east of bumper block
	+7.1	Asphalt		1						
	+6.6	GRAVEL with some coarse to fine sand, trace silt (Fill) [NYCBC Class 7]		2						qu (tsf) estimated from Pocket Penetrometer Su (tsf) estimated from Pocket Torvane
		Brown, coarse to fine SAND, some silt, trace coarse to fine gravel, moist (Fill) [NYCBC Class 7]		3 4 5						Use thin wall bit to core concrete Hand auger to a depth of 6'
		Dark brown, coarse to fine SAND, some silt, trace fine gravel, wet (Fill) [NYCBC Class 7]	▽	6 7 8 9						Used Rollerbit without pressure between 6'-10'
		S-1: No recovery		10 11	S-1	SS	0	2 2 3 3	5	Sample lost Drive 4" casing to 10'
				12 13 14						Rollerbit to 15'
		S-2: No recovery		15 16	S-2	SS	0	6 8 4 5	12	Sample lost
	-11.7			17 18 19 20						Rollerbit to 20'

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Log of Boring **G-63** Sheet 2 of 5

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.3 NAVD88

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-11.7	S-3: Dark brown-black, organic CLAY (OH), trace silt, trace sand [NYCBC Class 6]		20	S-3	SS	14	WOH WOH WOH WOH		WC=86 , LL=91 , PL=33 Sheen in sample, Strong petroleum odor Organic Content = 7.0% (burnoff) Rollerbit to 25'
				21						
				22						
				23						
				24						
		S-4: Black, organic CLAY (OH), trace silt [NYCBC Class 6]		25	S-4	SS	24	WOH WOH WOH WOH		Strong petroleum odor Rollerbit to 30'
				26						
				27						
				28						
				29						
		S-5: Black, organic CLAY (OH), trace silt, occasional fine gravel, trace wood fragments [NYCBC Class 6]		30	S-5	SS	24	1 1 2 1 1		WC=83.7 , LL=98 , PL=32 Organic Content = 8.1% (burnoff) Rollerbit to 35'
				31						
				32						
				33						
				34						
		S-6: Black, organic CLAY (OH), trace silt, trace shell fragments [NYCBC Class 6]		35	S-6	SS	24	2 1 3 2 3		Rollerbit to 40'
				36						
				37						
				38						
				39						
		S-7: Black, organic CLAY (OH), trace fine sand, trace silt, trace shell fragments [NYCBC Class 6]		40	S-7	SS	24	2 1 2 1 1		Rollerbit to 45'
				41						
				42						
				43						
				44						
				45						

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Log of Boring **G-63** Sheet 3 of 5

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.3 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-36.7	S-8: Black, organic CLAY (OH), trace fine sand, trace silt, trace shell fragments [NYCBC Class 6]		45	S-8	SS	12	2 2 2 2	4	q_u=0.06 tsf
				46						
				47						Rollerbit to 50'
				48						
				49						
		S-9: Black, organic CLAY (OH), trace fine sand, trace silt, trace shell fragments [NYCBC Class 6]		50	S-9	SS	18	2 1 1 2	2	q_u=0.09 tsf
				51						
				52						Rollerbit to 55'
				53						
				54						
		S-10: Black, organic silty CLAY (OH), some fine sand, trace shell fragments [NYCBC Class 4c]		55	S-10	SS	18	3 3 2 2	5	q_u=0.07 tsf WC=42.7 , LL=32 , PL=17
				56						
				57						Rollerbit to 60'
				58						
				59						
	-51.7	S-11: Dark grey-black, silty CLAY (CL), little fine sand, shell fragments [NYCBC Class 6]		60	S-11	SS	24	WOH WOH 1 1		q_u=0.19 tsf
				61						
				62						Rollerbit to 65'
				63						
				64						
		S-12: Dark grey, silty CLAY (CL), some shell fragments, trace fine sand [NYCBC Class 6]		65	S-12	SS	24	WOH WOH WOH WOH		q_u=0.17 tsf
				66						Organic Content = 2.6% (burnoff)
				67						Rollerbit to 70'
				68						
				69						
				70						

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Log of Boring **G-63** Sheet 4 of 5

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.3 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-61.7	S-13: Dark grey, silty CLAY (CL), trace f sand, trace shell fragments [NYCBC Class 6]		70	S-13	SS	24	1 1 1 2 2	2	q_u=0.22 tsf WC=34.6 , LL=33 , PL=17 Organic Content = 2.4% (burnoff) Rollerbit to 75'
	-66.7	S-14: Dark grey, CLAY (CL), some medium to coarse gravel, some silt, little sand (Glacial Till) [NYCBC Class 4a]		75	S-14	SS	2	14 45 35 39	80	Lost sample, possibly because of gravel Very soft cohesive sample Revert the bore hole Mixed drilling fluid additive with water Rollerbit to 80'
	-71.7	S-15: Dark brown, medium to fine SAND (SM), some silt, trace coarse to fine gravel, trace rock fragments, trace shell fragments (Glacial Till) [NYCBC Class 4a]		80	S-15	SS	10	25 100/5"	100/5"	Rollerbit to 85' Rollerbit refusal
	-76.7	C-1: Grey, mica SCHIST, slightly weathered, sound, closely to widely fracture spacing, very strong rock, f grained. slightly to moderately foliated, Iron staining @ 87.3'-87.5' [NYCBC Class 1a]	5 5 5 5 5	85 86 87 88 89	C-1	NX CORE BARREL	REC=54"/60" =90%	RQD=54"/60" =90%		Top of rock at 85' Drive 3" casing to 85'
		C-2: Grey, mica SCHIST, slightly weathered, sound, very closely to widely fractured spacing, very strong rock fine grained, slightly to moderately weathered foliations [NYCBC Class 1a] Clay coated staining @ 90.0'-90.2' and 94.5'-95.0	5 5 5 5 4 4	90 91 92 93 94 95	C-2	NX CORE BARREL	REC=60"/60" =100%	RQD=54"/60" =90%		

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Log of Boring **G-63** Sheet 5 of 5

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.3 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-86.7	C-3: Grey-black, mica SCHIST, moderately weathered, slightly to moderately fractured, closely to widely fracture spacing, very strong rock, fine to medium grained, moderately weathered foliations [NYCBC Class 1b]	5	95						
			5	96						
		Iron oxide staining @ 95.9'-96.6' and 99.2'-99.6' Weak	5	97	C-3	NX CORE BARREL	REC=60"/60" =100%	RQD=31"/60" =52%		
			4	98						
			4	99						
		C-4: Grey-black, mica SCHIST, Moderately weathered, slightly to moderately fractured, Closely to widely fracture spacing, Very strong rock, fine to medium grained, Moderately weathered foliations [NYCBC Class 1b]		100						
				101						
				102	C-4	NX CORE BARREL	REC=60"/60" =100%	RQD=47"/60" =78%		
				103						
				104						Borehole backfilled with cuttings & concrete patched upon completion
	-96.7	End of boring at 105'		105						
				106						
				107						
				108						
				109						
				110						
				111						
				112						
				113						
				114						
				115						
				116						
				117						
				118						
				119						
				120						

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Log of Boring **G-64** Sheet 1 of 4

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 8.7 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/13/04 — Date Finished: 10/18/04
Drilling Equipment: Acker 2D Hi-Rail Truck Rig	Completion Depth: 79 ft — Rock Depth: 59 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 10 — Undisturbed 2 — Core 4
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 59	Water Level (ft.): First ▽ 6 — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Bob Verbent
Sampler: 2" O.D. Split Spoon / 3" Shelby Tube	Field Engineer: Nipam Shah / Cynthia Burzynski
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+8.7	15" Concrete		0						Boring located on LIRR track 29, about 225' east of bumper block
	+7.5	6" Asphalt		1						
	+7.0	GRAVEL, trace coarse to fine sand, trace silt		2						qu (tsf) estimated from Pocket Penetrometer
		Brown coarse to fine SAND Some silt, trace coarse to fine gravel (moist)		3						
				4						Use thin wall core for initial concrete and asphalt coring Hand auger to 6'
		Dark brown coarse to fine SAND, trace silt, trace coarse to fine gravel (wet) ▽		5						
				6						Used Rollerbit without pressure between 6' and 10'
				7						
				8						
				9						
		S-1: No recovery		10	S-1	SS	0	6 2 3 3	5	Push/spin 4" casing Sample lost, reattempted Sample lost again
				11						
				12						Rollerbit to 15'
				13						
				14						
		S-2: Black, coarse to fine SAND (SW), some fine gravel, trace silt [NYCBC Class 6]		15	S-2	SS	8	5 5 5 6	10	Sample lost, reattempted
				16						
				17						Rollerbit to 20'
				18						
				19						
	-11.3			20						

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Log of Boring **G-64** Sheet 2 of 4

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.7 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-11.3	S-3: Black, organic CLAY (OH), trace silt, trace fine sand, trace rock fragments [NYCBC Class 4c]		20	S-3	SS	15	6 2 2 3	4	
				21						
				22						Rollerbit to 25'
				23						
				24						
				25	S-4	UNDIST	10			Pushed Shelby Tube
				26						
		S-5: Black, organic CLAY (OH), some silt, trace fine sand trace shell fragments [NYCBC Class 4c]		27	S-5	SS	24	2 2 3 2	5	q_u=0.11 tsf
				28						
				29						Rollerbit to 30'
		S-6: Black, organic CLAY (OH), some silt, trace shell fragments [NYCBC Class 4c]		30	S-6	SS	24	2 2 3 3	5	q_u=0.2 tsf
				31						
				32						Rollerbit to 35'
				33						
				34						
		S-7: Black, organic CLAY (OH), trace fine sand, trace silt trace shell fragments [NYCBC Class 6]		35	S-7	SS	24	1 1 2 1	3	q_u=0.11 tsf
				36						
				37						Rollerbit to 40'
				38						
				39						
				40						
				41	S-8	UNDIST	24			Organic Content = 3.6% (burnoff)
		S-9: Black, organic CLAY (OH), trace fine sand, trace silt, trace shell fragments [NYCBC Class 6]		42	S-9	SS	24	1 WOH WOH WOH		Rollerbit to 45'WC=42.6 , LL=51 , PL=20
				43						Organic Content = 2.9% (burnoff)
				44						
				45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **G-64** Sheet 3 of 4

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.7 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-36.3	S-10A: Top 12": Soft, black, organic CLAY (OH), trace silt, trace shell fragments [NYCBC Class 6]		45	S-10	SS	24	1 2 1 1	3	q_u=0.23 tsf
	-37.3	S-10B: Bottom 12": medium to fine SAND (SM), some silt, trace fine gravel, trace shell fragments [NYCBC Class 6]		46						
				47						Rollerbit to 50'
				48						
				49						
		S-11: Dark grey, medium to fine SAND (SM), some silt, some fine gravel, trace shell fragments [NYCBC Class 3b]		50	S-11	SS	24	5 4 7 11	11	
				51						
				52						Drilling fluid additive mixed with water Rollerbit to 55'
				53						
	-45.3			54						
		S-12: Dark brown, coarse to fine SAND (SM), some silt, some coarse to fine gravel, trace rock fragments (Glacial Till) [NYCBC Class 3a]		55	S12	SS	5	60 50 100/5"	100/5"	Gravel in tip of spoon
				56						
				57						Rollerbit to 59'
	-49.3	Weathered Rock		58						Harder drilling from 58' Core rock at 59'
	-50.3		6	59	C-1	NX CORE BARREL	REC=29"/60" =48%	RQD=18"/60" =30%		1/4" gray clay in filling at 60.1' - 60.9' along high angle joint 75 to 85 degrees
		C-1: Grey, mica SCHIST, medium to fine grained, slightly weathered Medium strong to weak rock, with 50-75 degree foliation [NYCBC Class 1d]	5	60						Steady and faster drilling at 62 to 64' (possibly weathered rock)
		60.4' to 60.9' - QUARTZ vein Slightly weathered, strong rock	5	61						
		60.9' to 61.4' - SCHIST Highly fractured, strong	3	62						
			3	63						
		C-2: Grey, mica SCHIST, m grained, slightly weathered, medium strong, with 55-60 degree foliation [NYCBC Class 1c]	5	64	C-2	NX CORE BARREL	REC=52"/60" =87%	RQD=27"/60" =45%		Moderately fractured 64' to 66' 1/8" thick white clay coating along 60-75 degree rough surfaces
			6	65						
			6	66						High angle 75-85 degree fracture 66' to 67.2'
			6	67						Slightly fractured from 66' to 68'. Weak to medium strong rock
			6	68						
			6	69	C-3					Weak rock, moderately weathered 72.5'-72.8'
				70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **G-64** Sheet 4 of 4

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 8.7 NAVD88

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-61.3	C-3: Grey, mica SCHIST, medium grained, slightly weathered, medium strong to strong, with 45-55 degree foliation [NYCBC Class 1a]	6	70	C-3	NX CORE BARREL	REC=60"/60" =100%	RQD=57"/60" =95%		SCHIST with few garnets, strong rock from 72.8', with 50 degree foliation, from 72.8' to 74.0'
			6	71						
			6	72						
			6	73						
		C-4: Grey, mica SCHIST, m grained, slightly weathered, medium strong, with few pink garnets, 55-70 degree foliation [NYCBC Class 1b]	6	74	C-4	NX CORE BARREL	REC=51"/60" =85%	RQD=36"/60" =60%		Weak rock along portion of core 76.9'-77.2' @ 70 degrees Smooth planar joint 45 degree at end of run
			6	75						
			6	76						
			6	77						
			6	78						
	-70.3		6	79						
		End of borinig at 79'		80						Borehole backfilled with cuttings & concrete patched upon completion
				81						
				82						
				83						
				84						
				85						
				86						
				87						
				88						
				89						
				90						
				91						
				92						
				93						
				94						
				95						

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Log of Boring **G-66** Sheet 1 of 3

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 9.3 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/12/04 — Date Finished: 10/13/04
Drilling Equipment: Acker 2D Hi-Rail Truck Rig	Completion Depth: 50 ft — Rock Depth: 30 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 5 — Undisturbed 0 — Core 4
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 29	Water Level (ft.): First ▽ 5 — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Reynolds Bridgpal
Sampler: 2" O.D. Split Spoon	Field Engineer: Michael Paquette
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	+9.3	14" Reinforced Concrete		0						Boring located on LIRR track 29, about 170' west of 11th Avenue overpass
	+8.1			1						
	+7.7	5" Asphalt Light brown, medium to coarse SAND, some gravel (Fill) [NYCBC Class 7]		2						qu (tsf) estimated from Pocket Penetrometer Su (tsf) estimated from Pocket Torvane
				3						
				4						
				5						Core concrete / asphalt Hand auger to 6' Water @ ~5'
				6						Use rollerbit, no pressure, and water to clean to 10'
				7						
				8						Sand/ Gravel cuttings
				9						
		S-1: Brown, SILT, some fine sand, trace gravel, trace wood (Fill) [NYCBC Class 7]		10	S-1	SS	14	4 2 1 2	3	Push 4" casing to 10' Rollerbit to 15'
				11						
				12						Rollerbit to 15'
				13						
				14						
		S-2A: 12" Brown, SILT, trace fine sand, trace gravel (Fill) [NYCBC Class 7]		15	S-2	SS	20	WOH WOH 7 1		q_u=0.09 tsf
	-6.7	S-2B: 8" Grey, CLAY (CH-OH), trace fine sand, organic [NYCBC Class 4c]		16						
				17						Rollerbit to 20'
				18						
				19						
				20						

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Log of Boring **G-66** Sheet 2 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.3 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-10.7	S-3: Grey, CLAY (CH-OH), trace silt, trace fine sand, shell fragments [NYCBC Class 4b]		20–22	S-3	SS	24	3, 3, 6, 11	9	q_u=0.25 tsf WC=49.6 , LL=66 , PL=28 Organic Content = 4.3% (burnoff) Rollerbit to 25'
	-14.7	S-4: Brown, silty SAND (SM), some gravel, trace fine sand, trace mica, trace shells (Glacial Till) [NYCBC Class 3b]		23–26	S-4	SS	10	10, 10, 12, 12	22	Gravel in cuttings, wash turns brown @ ~24' Rollerbit to 30'
	-20.7			27–29						
				30	S-5	SS	0	100/1"	100/1"	Spoon bouncing @ 30' Spin 3" casing to 30'
		C-1A: Grey, mica SCHIST, highly fractured, weathered [NYCBC Class 1b]	10	31						
		C-1B: Light grey and pink, granitic PEGMATITE, sound [NYCBC Class 1b]	10, 13, 8, 5	32–34	C-1	NX CORE BARREL	REC=60"/60" =100%	RQD=41"/60" =68%		
		C-2: Light grey and pink, granitic PEGMATITE, sound [NYCBC Class 1a]	6, 5, 4, 8	35–38	C-2	NX CORE BARREL	REC=60"/60" =100%	RQD=60"/60" =100%		
		C-3: Light grey and pink, granitic PEGMATITE, sound Highly weathered fracture at 41 [NYCBC Class 1a]	8, 6, 10, 8, 10, 15, 14	39–45	C-3	NX CORE BARREL	REC=60"/60" =100%	RQD=60"/60" =100%		

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **G-66** Sheet 3 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.3 NAVD88

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-35.7	C-4: Light grey and pink, granitic PEGMATITE, slightly weathered joints from 45' to 46' [NYCBC Class 1a]	13	45	C-4	NX CORE BARREL	REC=60"/60" =100%	RQD=60"/60" =100%		Silt in core barrel, unclog and run again
			7	46						
			5	47						
			6	48						
				49						
	-40.7	End of boring at 50'		50						Borehole backfilled with cuttings & concrete patched upon completion
				51						
				52						
				53						
				54						
				55						
				56						
				57						
				58						
				59						
				60						
				61						
				62						
				63						
				64						
				65						
				66						
				67						
				68						
				69						
				70						

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Log of Boring **G-67** Sheet 1 of 3

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 9.4 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/13/04 — Date Finished: 10/19/04
Drilling Equipment: Acker 2D Hi-Rail Truck Rig	Completion Depth: 50 ft — Rock Depth: 30 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 5 — Undisturbed 0 — Core 4
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 30	Water Level (ft.): First ▽ 5 — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Reynolds Bridgpal
Sampler: 2" O.D. Split Spoon	Field Engineer: Michael Paquette / Stephen Morse
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.4	14" Reinforced Concrete		0						Boring located on LIRR track 29, about 50' west of 11th Avenue overpass
	+8.2			1						
	+7.8	5" Asphalt Brown, medium to coarse SAND (SW), some gravel		2						
				3						Core concrete slab Rollerbit through asphalt (~5') Hand auger to 5' Encounter water @ 5'
		▽		4						
				5						Rollerbit with water and no pressure to 10'
				6						
				7						
				8						
				9						Hard drilling @ 9'
		S-1: Brown, SILT, and black MICA SCHIST (fragments) (boulder) [NYCBC Class 5a]		10	S-1	SS	3			Spoon bouncing @ 10' Install casing to 8' Rig chatter @ 10' (boulder?) Drill to 15' No wash return Rig drop @ ~ 13.5' Drop @ ~ 14.5'
				11						
				12						
				13						
				14						
		S-2A: 6" black-brown, coarse SAND (SW), some fine to coarse gravel, some mica [NYCBC Class 6]		15						Hammer casing to 15' Rollerbit to 20' No wash return Drilling indicative of boulders (hard drilling followed by sudden drops and no wash return)
	-6.6	S-2B: 6" brown, SILT (ML), trace mica [NYCBC Class 5a]		16	S-2	SS	12	3 4 17 100/2"	21	
				17						
				18						
				19						
				20						

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Log of Boring **G-67** Sheet 2 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.4 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-10.6	S-3: SILT (ML) and MICA, some coarse sand, trace gravel, rock fragments (Glacial Till) [NYCBC Class 5a]		20	S-3	SS	10	40 100/5"	100/5"	
				21						
				22						Rollerbit to 25'
				23						
	-14.6			24						Rig chatter @ 24'
		S-4: Decomposed rock (mica, quartz pegmatite) [NYCBC Class 5a]		25	S-4	SS	4	100/4"	100/4"	Spin 3" casing to 25' No wash return Roller bit to 30' No wash return
				26						
				27						
				28	S-5	SS	0	100/1"	100/1"	
				29						
	-20.6			30						Spoon bouncing at 30' Spin 3" casing to 30'
		C-1: Grey, mica SCHIST, moderate to highly weathered Moderate to highly fractured [NYCBC Class 1b]	4	31	C-1 NX CORE BARREL		REC=60"/60" =100%	RQD=31"/60" =52%		
			3	32						
			3	33						
			4	34						
			5	35						
		C-2: Grey, mica SCHIST, Moderate weathering, some highly weathered zones, Vertical joint between 39' - 40' Vertical foliation in mica between 38' - 40' [NYCBC Class 1d]	3	36	C-2 NX CORE BARREL		REC=45"/60" =75%	RQD=20"/60" =33%		
			2	37						
			2	38						
			2	39						
			5	40						
		C-3: Grey, mica SCHIST, banded between 41' - 43' Vertically foliated 40' - 41' and 43' - 45' Moderately weathered [NYCBC Class 1b]	6	41	C-3 NX CORE BARREL		REC=60"/60" =100%	RQD=30"/60" =50%		
			6	42						
			7	43						
			8	44						Core barrel clogged @ 44' No vertical movement Remove core sample
				45						

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Log of Boring **G-67** Sheet 3 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.4 NAVD88

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-35.6	C-4: Grey, mica SCHIST, vertically foliated, highly weathered and fractured areas [NYCBC Class 1b]	6	45	C-4	NX CORE BARREL	REC=60"/60" =100%	RQD=31"/60" =52%		
			6	46						
			5	47						
			6	48						
			5	49						
	-40.6	End of boring at 50'		50						Borehole backfilled with cuttings & concrete patched upon completion
				51						
				52						
				53						
				54						
				55						
				56						
				57						
				58						
				59						
				60						
				61						
				62						
				63						
				64						
				65						
				66						
				67						
				68						
				69						
				70						

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Log of Boring **G-7** Sheet 1 of 3

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 9.4 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/12/04 — Date Finished: 10/13/04
Drilling Equipment: Acker-11 Truck Rig	Completion Depth: 70 ft — Rock Depth: 50 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 9 — Undisturbed 1 — Core 4
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 50	Water Level (ft.): First ▽ — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Corey Tirro
Sampler: 2" O.D. Split Spoon / 3" Shelby Tube	Field Engineer: Juan Pinzon / Clay Patterson
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+9.4	8" Asphalt		0						Boring located in NYDS parking area, about 280' west of 11th Avenue and 25' north of 30th Street
	+8.7			1						
				2						qu (tsf) estimated from Pocket Penetrometer
				3						
				4						Rollerbit with no pressure to 6'
				5						Push casing to 4' Clean to 6'
		S-1: Fine GRAVEL, brick fragments, some medium sand (Fill) [NYCBC Class 7]		6	S-1	SS	7	6 10 7 5	17	
				7						
				8						Hammer 4" casing to 9' Rollerbit to 10' Add Revert
				9						
		S-2: Brown, medium silty SAND, trace gravel (Fill) [NYCBC Class 7]		10	S-2	SS	8	2 1 2 1	3	
				11						
				12						Rollerbit to 15' Rig chatter
				13						
				14						Hole caves in when trying to take sample, hammer 4" casing to 14' Redrill to 15'
		S-3: Brown, medium silty SAND, trace fine gravel, rock fragments (Fill) [NYCBC Class 7]		15	S-3	SS	4	6 3 1 2	4	
				16						
				17						Rollerbit to 20'
				18						
				19						
				20						

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Log of Boring **G-7** Sheet 2 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.4 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-10.6	S-4: Brown, medium SAND, some fine gravel, some silt (Fill) [NYCBC Class 7]		20	S-4	SS	9	9, 6, 4, 9	10	
				21						
				22						Rollerbit to 25'
				23						Rig chatter
				24						
		S-5: Brown-tan, coarse to medium SAND, rock fragments, some fine gravel (Fill) [NYCBC Class 7]		25	S-5	SS	3	6, 22, 16, 25	38	
				26						
				27						Install casing to 24'
				28						Rollerbit to 30'
				29						
	-20.6	S-6: Grey, organic silty CLAY (OH), trace shell fragments [NYCBC Class 4c]		30	S-6	SS	5	5, 3, 3, 4	6	q_u=0.25 tsf
				31						
				32						Install casing to 29'
				33						Rollerbit to 35'
				34						Casing drops 6"
				35						Install casing to 34'
		S-7: Grey, organic silty CLAY (OH), trace shell fragments [NYCBC Class 4c]		36	S-7	SS	19	5, 1, 3, 3	4	Redrill to 35' q_u=0.5 tsf
		No recovery		37	U-1	UNDIST	0			Rollerbit to 37
				38						
				39						Rollerbit to 40'
		S-8: No recovery		40	S-9	SS	0	11, 12, 11, 13	23	
				41						
				42						Rollerbit to 45'
				43						
				44						
				45						

N-Value (Blows/ft) scale: 10 20 30 40

\\LANGAN.COM\DATA\NY\DATA1\170444101\ENGINEERING DATA\GEOTECHNICAL\GINT\JETS STADIUM LOGS\LANGAN BORINGS.GPJ ... 3/28/2017 1:21:30 PM ... Report: Log - LANGAN

LANGAN

Log of Boring **G-7** Sheet 3 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 9.4 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-35.6	S-9: Grey, organic silty CLAY (OH), some fine sand [NYCBC Class 6]		45	S-10	SS	20	WOH WOH 2 2		q_u=0.5 tsf WC=36.1 , LL=33 , PL=16 Organic Content = 3.4% (burnoff) Rollerbit to 50' Hard drilling 48' - 50'
	-40.6			50	S-11	SS	0	100/0"	100/0"	Spoon bouncing at 50' Spin 3" casing to 50'
		C-1: Black-white banded mica SCHIST, slightly fractured, partially weathered [NYCBC Class 1b]	5 5 4 5 4	51 52 53 54	C-1 NX CORE BARREL		REC=51"/60" =85%	RQD=42"/60" =70%		
		C-2: Black-white banded mica SCHIST, slightly fractured, partially weathered [NYCBC Class 1b]	5 4 3 6 7	55 56 57 58 59	C-2 NX CORE BARREL		REC=51"/60" =85%	RQD=46"/60" =77%		
		C-3: Black-white banded mica SCHIST, one break, no weathering [NYCBC Class 1a]	6 6 4 5 6	60 61 62 63 64	C-3 NX CORE BARREL		REC=53"/60" =88%	RQD=53"/60" =88%		
		C-4: Black-white banded mica SCHIST, no fractures [NYCBC Class 1a]	5 6 6 6 6	65 66 67 68 69	C-4 NX CORE BARREL		REC=56"/60" =93%	RQD=56"/60" =93%		Borehole backfilled with cuttings and surface patched upon completion
	-60.6	End of boring at 70'	10	70						

LANGAN

Log of Boring **G-9** Sheet 1 of 3

Project: Hudson Yards - WRY	Project No.: 170444101
Location: LIRR West Side Yard, Manhattan, NY	Elevation and Datum: Approx. 15.1 NAVD88
Drilling Company: Warren George, Inc.	Date Started: 10/13/04 — Date Finished: 10/13/04
Drilling Equipment: DK-50 Track Rig	Completion Depth: 59 ft — Rock Depth: 39 ft
Size and Type of Bit: 3 7/8" Tri-Cone Rollerbit	Number of Samples: Disturbed 8 — Undisturbed 0 — Core 4
Casing Diameter (in): 3"/4" Flush Joint Steel — Casing Depth (ft): 39	Water Level (ft.): First ▽ — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut — Weight (lbs): 300 — Drop (in): 30	Drilling Foreman: Robert Ware
Sampler: 2" O.D. Split Spoon	Field Engineer: Clay Patterson
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+15.1			0						
	+14.6	6" Concrete Slab		1						Rollerbit through concrete Drill to 6' with water and no pressure on drill head
		Brown-black, medium to fine SAND, trace silt, trace brick, trace mica (Fill) [NYCBC Class 7]		2						Cuttings indicate Fill (sand and gravel)
				3						
				4						qu (tsf) obtained from Pocket Penetrometer
				5						
				6	S-1	SS	0	27 100/0"	100/0"	Install 4" casing to 5'
				7						
				8	S-2	SS	0	100/3"	100/3"	Rollerbit to 8' Lose of water at 8' Refusal at 8' - take sample
				9						
		S-3: Black-white-brown, coarse to medium SAND, trace brick (Fill) [NYCBC Class 7]		10	S-3	SS	4	100/5"	100/5"	Rollerbit to 10', hard drilling, cuttings indicate cobble Install 4" casing to 10' Rollerbit to 10'
				11						
				12						Rollerbit to 15' Hard drilling from 12' to 15'
				13						
				14						
		S-4: Black-white-brown, coarse to medium SAND, trace brick (Fill) [NYCBC Class 7]		15	S-4	SS	4	100/4"	100/4"	
				16						
				17						Rollerbit to 20' Hard drilling from 15' to 18'
				18						
				19						
				20						

LANGAN

Log of Boring **G-9** Sheet 2 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 15.1 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-4.9	S-5: Brown, coarse to fine SAND, some fine gravel, trace silt (Fill) [NYCBC Class 7]		20–21	S-5	SS	14	17, 21, 29, 31	50	
				21–22						Rollerbit to 25'
				22–23						Cannot advance 4" casing past 10', spin 3" casing to 25'
				23–24						
				24–25						
		S-6: Brown, coarse to medium SAND, some fine gravel, trace silt (Fill) [NYCBC Class 7]		25–26	S-6	SS	8	14, 19, 27, 26	46	
				26–27						Spin 3" casing to 30' Rollerbit to 30'
				27–28						
	-13.4			28–29						
		S-7: Grey, organic CLAY (OH), trace medium to fine sand [NYCBC Class 4b]		29–30						
				30–31	S-7	SS	15	14, 7, 3, 3	10	
				31–32						Spin 3" casing to 35' Rollerbit to 35'
				32–33						
				33–34						
		S-8: No recovery		34–35						
				35–36	S-8	SS	0	6, 4, 3, 5	7	
				36–37						Rollerbit to 39' Refusal at 39' Spin 3" casing to 39'
				37–38						
				38–39						
	-23.9		4	39–40	C-1	NX CORE BARREL	REC=55"/60" =92%	RQD=48"/60" =80%		
		C-1: Black and white banded mica SCHIST, partially weathered, slightly fractured [NYCBC Class 1b]	5	40–41						
			5	41–42						
			6	42–43						
			5	43–44						
			6	44–45	C-2					

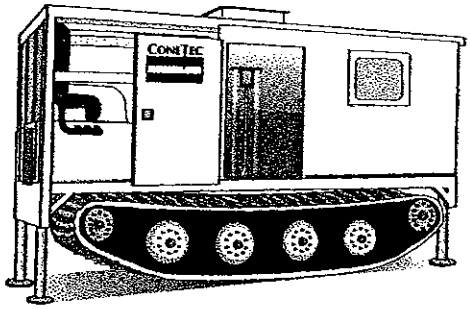
LANGAN

Log of Boring **G-9** Sheet 3 of 3

Project	Project No.
Hudson Yards - WRY	170444101
Location	**Elevation and Datum**
LIRR West Side Yard, Manhattan, NY	Approx. 15.1 NAVD88

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-29.9	C-2: Black and white banded mica SCHIST, slightly weathered, slightly fractured [NYCBC Class 1a]	7	45	C-2	NX CORE BARREL	REC=57"/60" =95%	RQD=54"/60" =90%		
			7	46						
			6	47						
			6	48						
			6	49	C-3	NX CORE BARREL	REC=57"/60" =95%	RQD=53"/60" =88%		
		C-3: Black and white banded mica SCHIST, slightly weathered, slightly fractured [NYCBC Class 1a]	5	50						
			5	51						
			6	52						
			7	53						
			6	54	C-4	NX CORE BARREL	REC=60"/60" =100%	RQD=54"/60" =90%		
		C-4: Black and white banded mica SCHIST, slightly weathered, slightly fractured [NYCBC Class 1a]	7	55						
			6	56						
			5	57						
			5	58						
	-43.9	End of boring at 59'		59						Borehole backfilled with cuttings and surface patched upon completion
				60						
				61						
				62						
				63						
				64						
				65						
				66						
				67						
				68						
				69						
				70						

APPENDIX B
2004 CPT Report (NYSCC)



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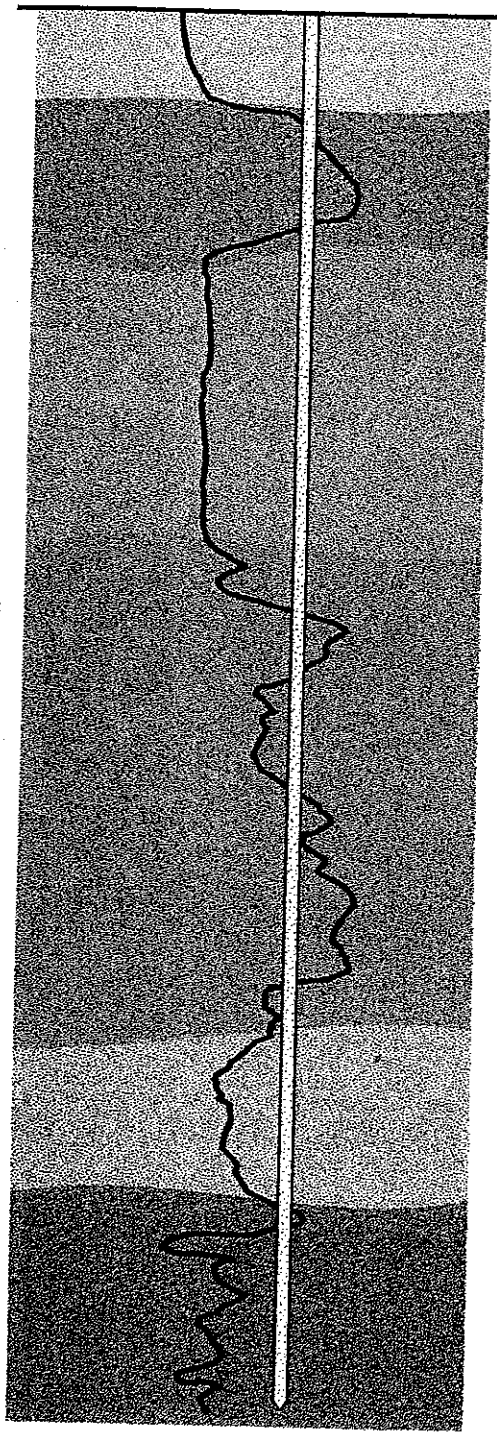
Geotechnical and Environmental In Situ Testing Contractors



ConeTec Field Report

Presentation of CPTU Test Results for:

Proposed Jets Stadium Manhattan, New York

Presented to:	Langan Engineering
Date:	December 7, 2004
Presented by:	ConeTec, Inc. 436 Commerce Lane, Unit C West Berlin, NJ (856) 767-8600

TABLE OF CONTENTS

2.0 FIELD EQUIPMENT AND PROCEDURES

2.1 CONE PENETRATION TESTING

The cone penetrometer tests were carried out using an integrated electronic piezo cone manufactured by ConeTec in Vancouver, Canada. The piezo cone used was a compression model cone penetrometer with a 15 cm^2 tip and a 225 cm^2 friction sleeve. The cone is designed with an equal end area friction sleeve and a tip end area ratio of 0.85. The piezo cone dimensions and the operating procedure were in accordance with ASTM Standard D-3441. A diagram of the cone penetrometer used for this project is shown as Figure 1.

Pore pressure filter elements, made of porous plastic, were saturated under a vacuum using glycerin as the saturating fluid. The pore pressure element was six millimeters thick and was located immediately behind the tip (the U_2 location) for all soundings.

The cone was advanced using a 25-ton, unitized, truck-mounted cone penetration rig with high rail capabilities. The following data were recorded onto magnetic media every five centimeters (approximately every two inches) as the cone was advanced into the ground:

- Tip Resistance (Qc)
- Sleeve Friction (Fs)
- Dynamic Pore Pressure (Ut)

The field data recorded is included on the attached diskette (appendix E).

The principal objective of this project was to profile the soils and obtain shear wave velocity measurements.

Before each sounding a complete set of analog baseline readings are taken with a multi-meter and compared with the digitized value on the computer screen. This provides a check on the analog to digital conversion board.

Evaluation of the analog baselines is key to consistent readings. The baseline data should be stable and should not wander excessively during the course of a sounding. Baseline data can be used to apply corrections to the cone data where necessary. For this project, the baseline shift from sounding to sounding was small, typically less than 0.1% of full scale, and no data corrections were applied.

During seismic testing, the seismic signals were recorded using a geophone mounted in the cone as shown in Figure 1 and an up-hole digital oscilloscope. A sledge hammer hit against a beam was used for the seismic source. Normal reaction for the beam was provided by the dead weight of the rig placed upon the beam. A schematic of the shear wave testing configuration is shown in Figure 2.

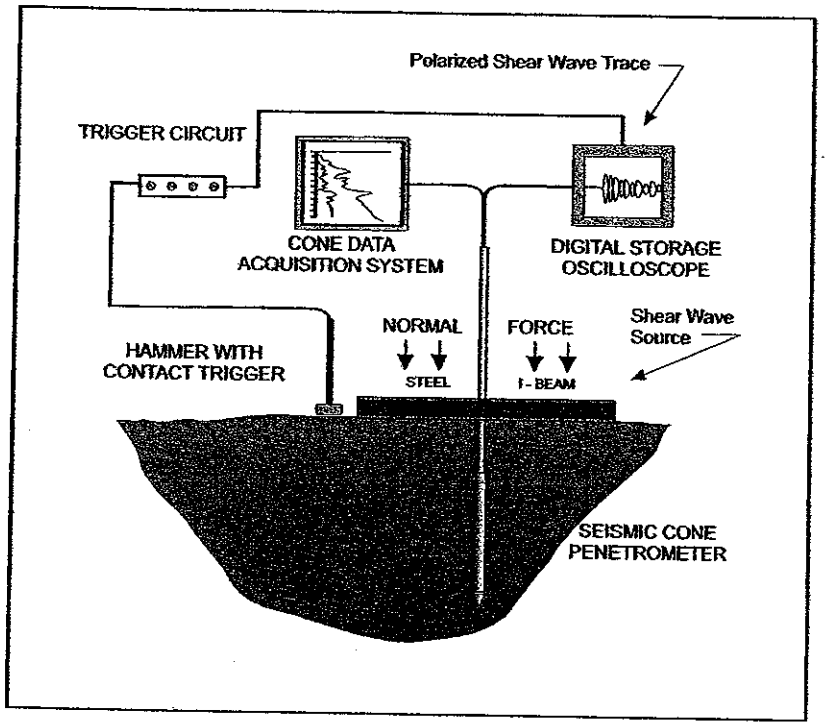


FIGURE 2 - SCHEMATIC OF SHEAR WAVE TESTING CONFIGURATION

2.2 PORE PRESSURE DISSIPATION TESTS

When cone penetration is stopped, the piezo cone essentially becomes a piezometer. While stopped, pore water pressures are automatically recorded at five-second intervals and the readings are stored in a dissipation file (.ppd). Dissipation data can then be plotted onto a dissipation curve consisting of pore water pressure (U) verses time (t). The shapes of dissipation curves are very useful in evaluating soil type, drainage and in situ static water level.

A flat curve that stabilizes quickly (i.e. less than 30 seconds) is typical of a free draining sand. In this case, the final measured pore water pressure is the static in situ water pressure.

Soils that generate excess dynamic pore water pressure during penetration will dissipate this excess pressure when penetration stops. The shape of the dissipation curve and the time of dissipation can be used to estimate C_h, the coefficient of consolidation that can in turn be used to calculate K_h, the horizontal permeability.

Figure 3 shows some idealized shapes of various pore water pressure dissipation curves. The reader is referred Robertson et. al., 1990 to reference dissipation test data analytical techniques.

3.0 CONE PENETRATION TEST DATA AND INTERPRETATION

3.1 ANALYSIS OF PIEZOCONE DATA - GENERAL

A total of 24 CPT soundings involving 1,378.10 feet of testing, were completed.

The interpretation of cone data is based on the relationship between cone bearing, Qc, sleeve friction, Fs, and penetration pore water pressure, U. The friction ratio, Rf , (sleeve friction divided by cone bearing) is a calculated parameter which is used to infer soil behavior type. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

The interpretation of soils encountered on this project was carried out using correlations developed by Robertson et al., 1986. It should be noted that it is not always possible to clearly identify a soil type based on Qc, Fs and Ut. Occasionally soils will fall within different soil categories on the classification charts. In these situations, experience and judgment and an assessment of the pore pressure dissipation data should be used to infer the soil behavior type. Computer tabulations of the interpreted soil types along with certain other geotechnical parameters for each cone hole is presented in Appendix B.

Each of the parameters measured in the sounding is discussed briefly below. A detailed explanation of CPTU testing and interpretation of the results can be found in "Guidelines for Geotechnical Design Using CPT and CPTU" by P. K. Robertson and R. G. Campanella, listed in the references.

TIP RESISTANCE (Q_c): The resistance to penetration, measured at the cone tip, provides an accurate profile of subsurface strata. The recorded tip resistance is a composite of the penetration resistance of the soils located five to ten cone diameters (7 to 14 inches) in front of and behind the tip. The actual resistance "sensed" by the tip depends on the soil properties and on the relative stiffness of the layers encountered. Tip resistance is often corrected for pore pressure effects when testing in soft saturated cohesive soils.

For this project the correction was made and the tip resistance shown, Q_t is the corrected tip resistance.

The correction used is: $Q_t = Q_c + (1-a)U$

Where:
- Q_t = corrected tip resistance
- Q_c = measured tip resistance
- a = net area ratio for cone (0.85 for this project)
- U = dynamic pore water pressure measured behind tip

3.4 SHEAR WAVE VELOCITY MEASUREMENTS

Shear wave velocity measurements were conducted in sixteen of the CPT soundings at one-meter intervals. A tabular summary of the results and shear wave velocity plots are presented in Appendix C.

3.5 CPTSUMM DATA PROCESSING

The electronic data files were processed using the program CPTSUMM. CPTSUMM is a program developed by ConeTec to calculate common engineering parameters from CPT data. The processed data files are attached in Appendix B. The files are also included on the data disk. The calculations used are summarized in the table at the front of the Appendix. Each calculation is derived according to the referenced article. The water table used was an estimate derived from the dissipation data.

3.6 DATA DISK

One data disk is included in Appendix E. The disk includes all of the CPT, dynamic and static pore water pressure, and CPTSUMM data.

CONETEC

TABLE 1 - SUMMARY OF CPTU SOUNDINGS

Job No.: 04-797
Location: Jets Stadium - Manhattan, New York
Client: Langan Engineering
Date: October 11, 18, 19, November 11, 12, 13, 15, 16, 17, 18, 19, 2004

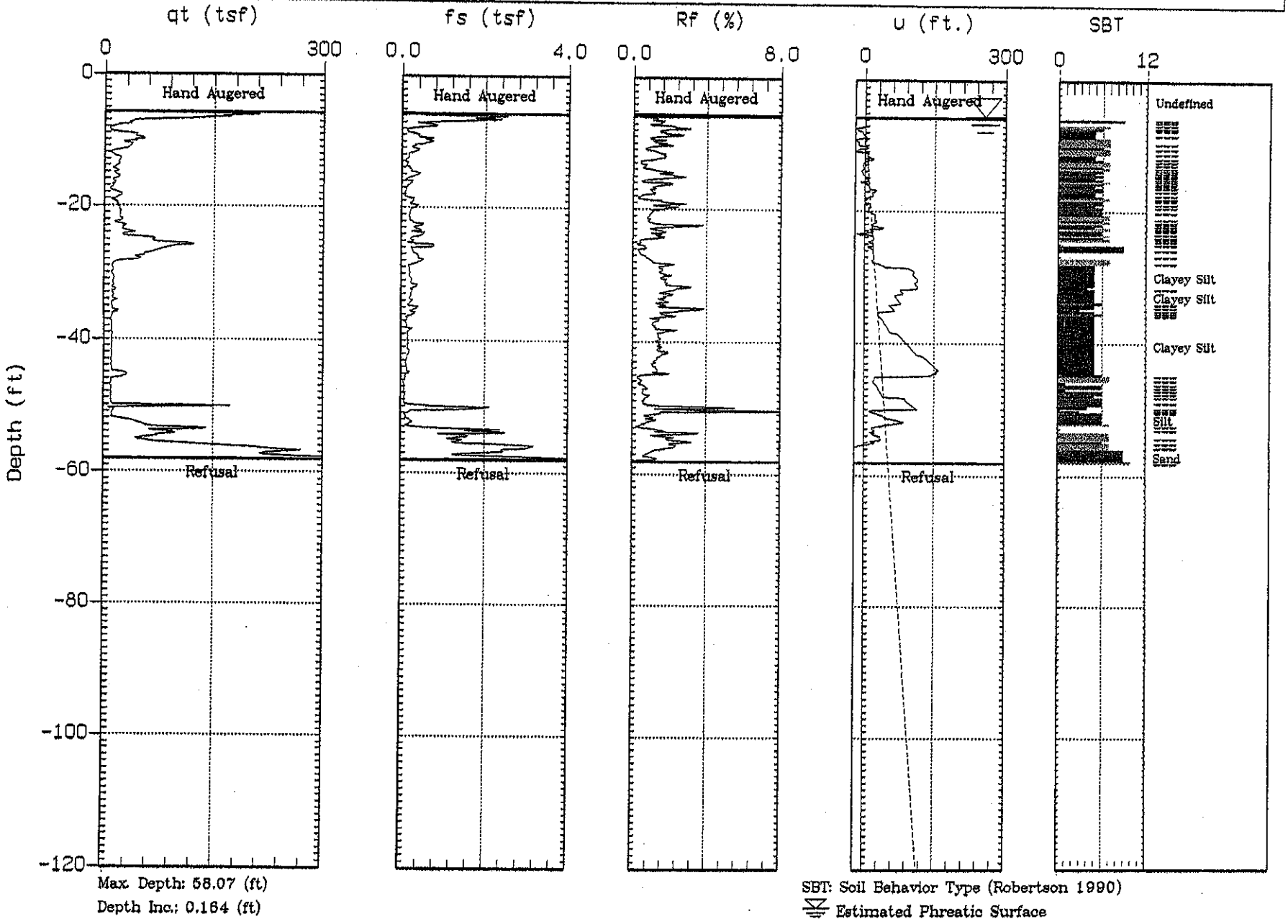
Date	CPTU Sounding	File Name	Total Depth (ft)	Seismic Tests	Comments
October 11, 2004	SCPT-11	797cp11.cor	83.99	24	
October 18, 2004	SCPT-12	797cp012.cor	58.07	16	
October 18, 2004	SCPT-24	797cp024.cor	76.28	22	
October 19, 2004	SCPT-25	797cp025.cor	39.53	11	
November 17, 2004	CPT-36	797cp36.cor	60.69	0	
November 18, 2004	CPT-38	797cp38.cor	36.09	0	
November 16, 2004	SCPT-41	797cp41.cor	102.85	29	
November 16, 2004	SCPT-42	797cp42.cor	74.97	21	combined 42 & 42A
November 17, 2004	SCPT-43	797cp43.cor	58.89	17	combined 43 & 43A
November 17, 2004	SCPT-44	797cp44.cor	42.98	10	combined 44 & 44A
November 17, 2004	SCPT-45	797cp45.cor	30.68	7	
November 17, 2004	SCPT-46	797cp46.cor	22.31	5	
November 13, 2004	CPT-54	797cp54.cor	77.75	0	
November 13, 2004	CPT-55	797cp55.cor	58.89	0	
November 15, 2004	CPT-56	797cp56.cor	46.42	0	
November 15, 2004	CPT-57	797cp57.cor	46.10	0	
November 15, 2004	CPT-58	797cp58.cor	36.42	0	
November 16, 2004	CPT-59	797cp59.cor	23.46	0	
November 19, 2004	SCPT-62	797cp62.cor	95.47	29	
November 11, 2004	SCPT-63	797cp63.cor	76.44	21	
November 12, 2004	SCPT-65	797cp65.cor	42.81	11	
November 12, 2004	SCPT-67	797cp67.cor	12.96	2	
October 19, 2004	SCPT-68	797cp068.cor	62.99	18	
November 18, 2004	SCPT-70	797cp70.cor	111.06	34	
Totals:	**24 holes**	**24 files**	**1378.10**	**277**	

CONETEC

Langan Engineering

Site:SCPT-12
Location:Jets Stadium

Cone:20 Ton AD139
Date:10:18:04 08:20



Max. Depth: 58.07 (ft)
Depth Inc.: 0.164 (ft)

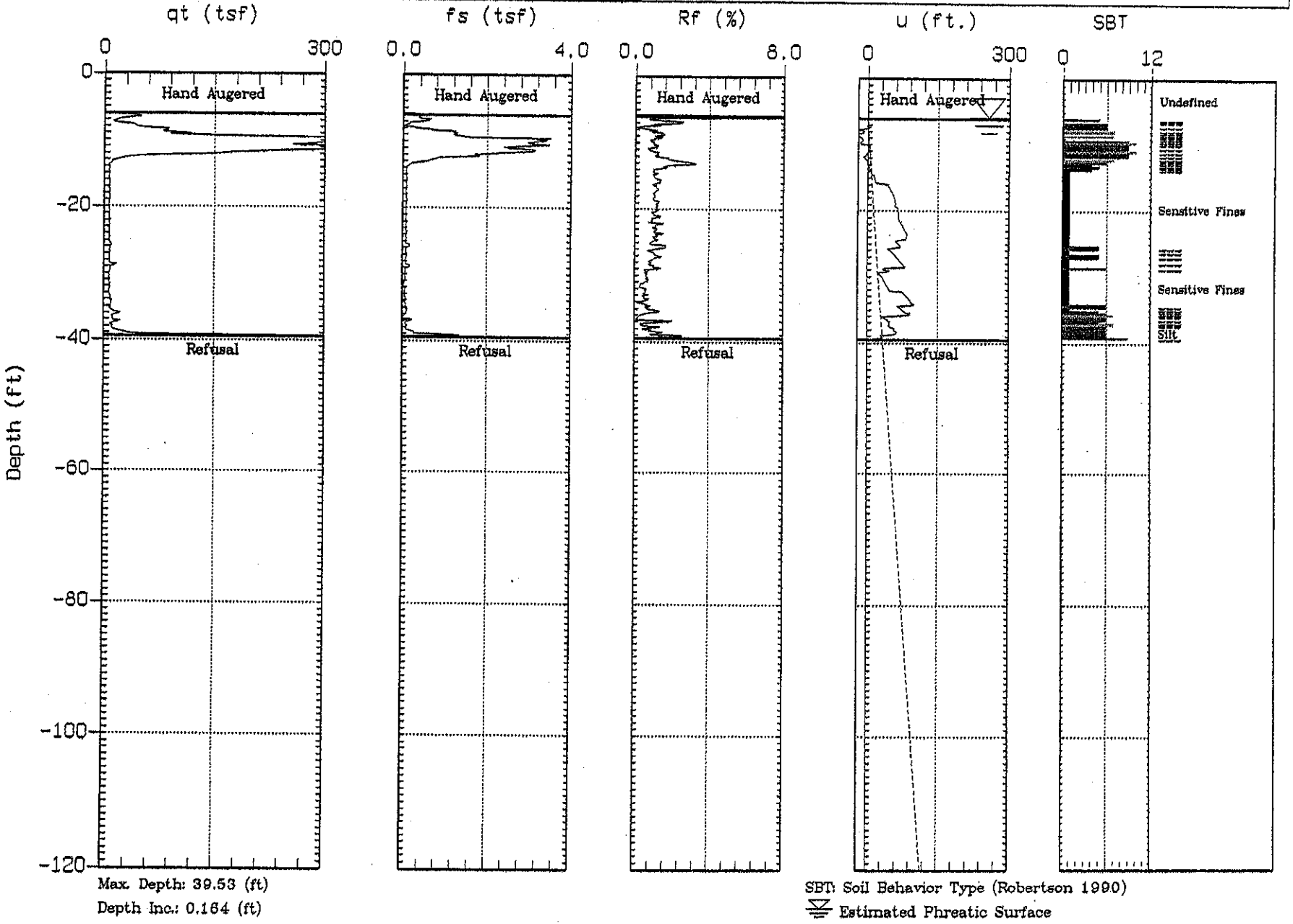
SBT: Soil Behavior Type (Robertson 1990)
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:SCPT-25
Location:Jets Stadium

Cone:20 Ton AD139
Date:10:19:04 08:09



Max. Depth: 39.53 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

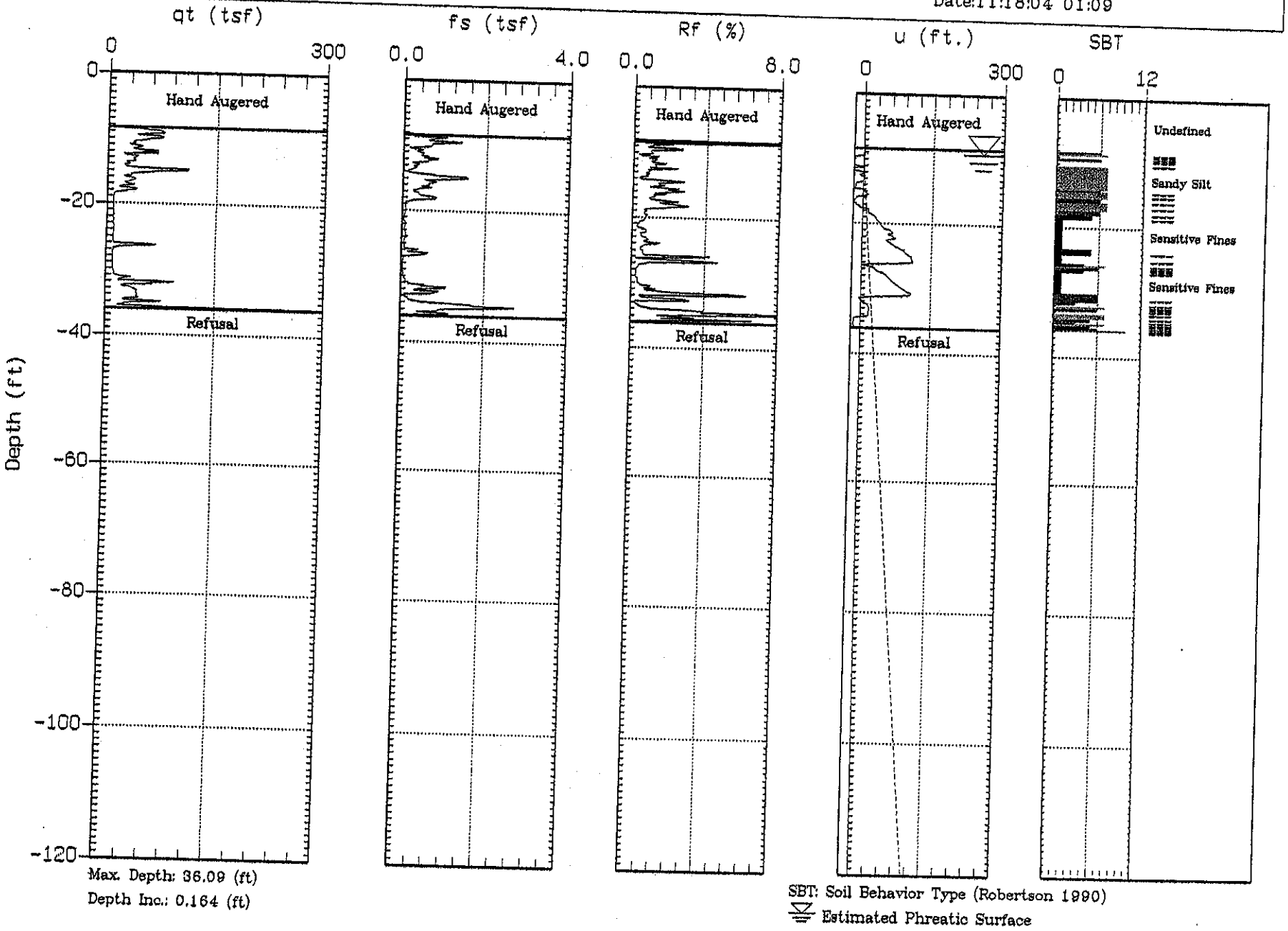
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:CPT-38
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:18:04 01:09



Max. Depth: 36.09 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

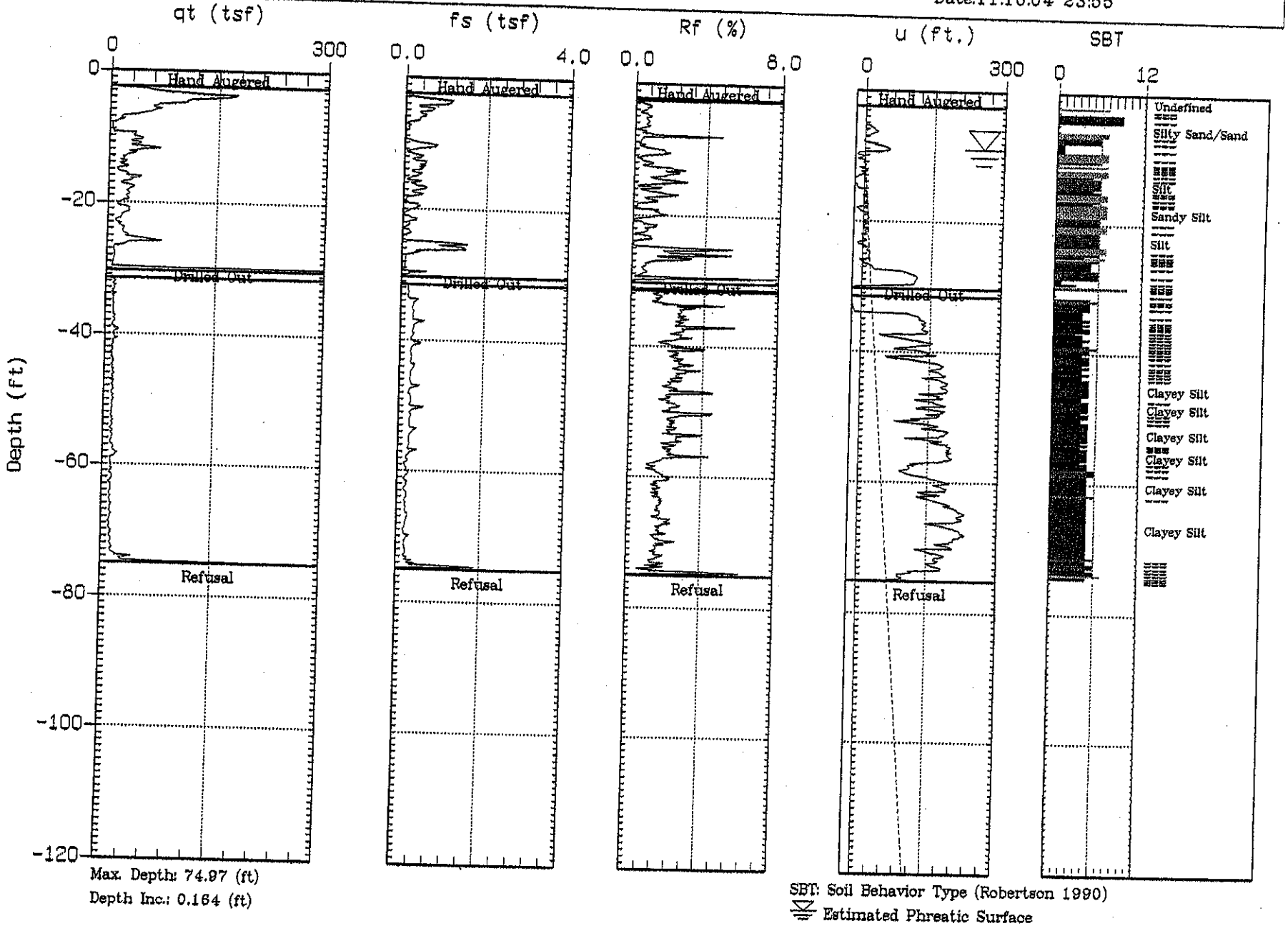
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:SCPT-42
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:16:04 23:55



Max. Depth: 74.97 (ft)
Depth Inc.: 0.164 (ft)

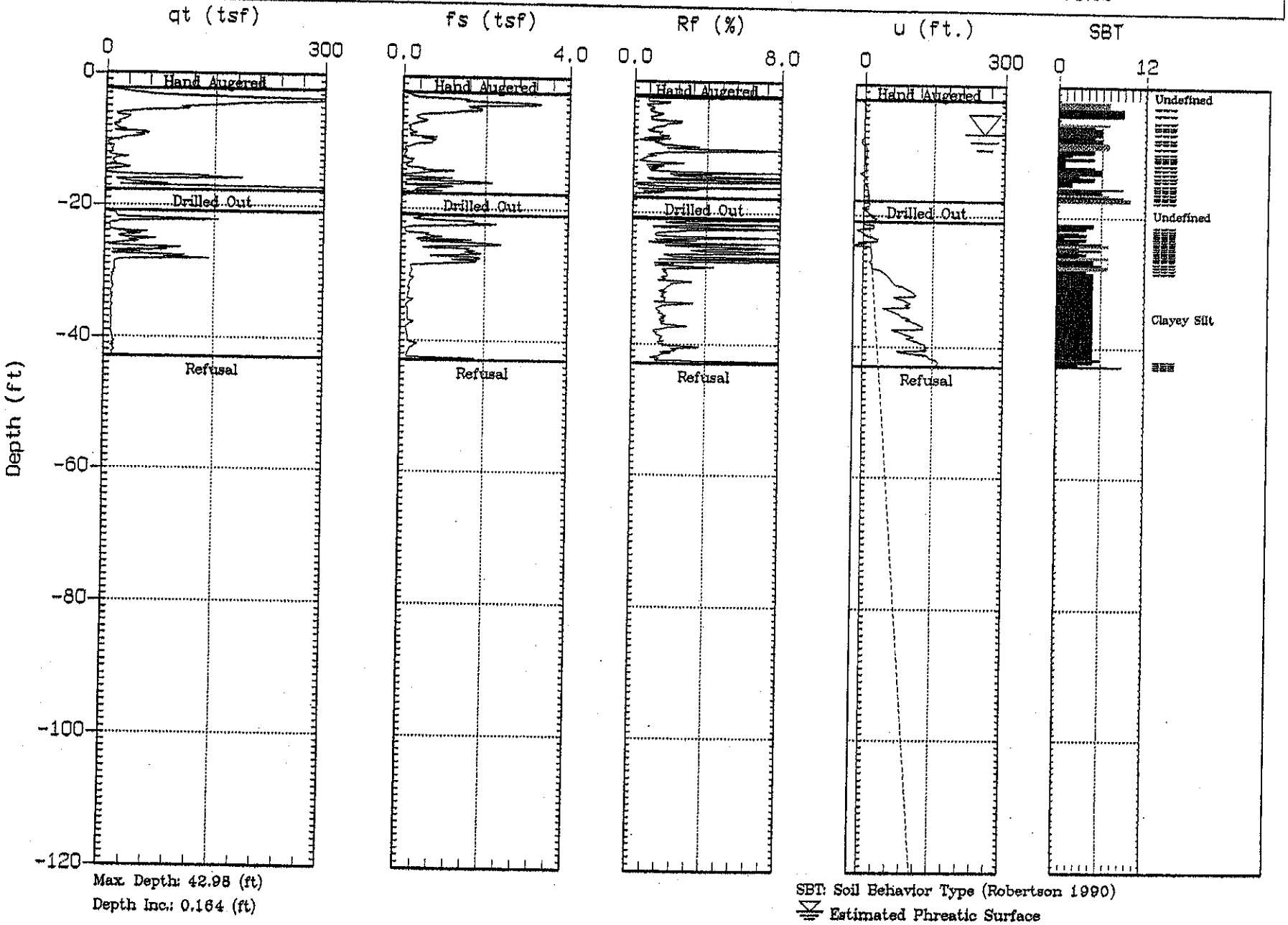
SBT: Soil Behavior Type (Robertson 1990)
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:SCPT-44
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:17:04 01:42



Max. Depth: 42.98 (ft)
Depth Inc.: 0.164 (ft)

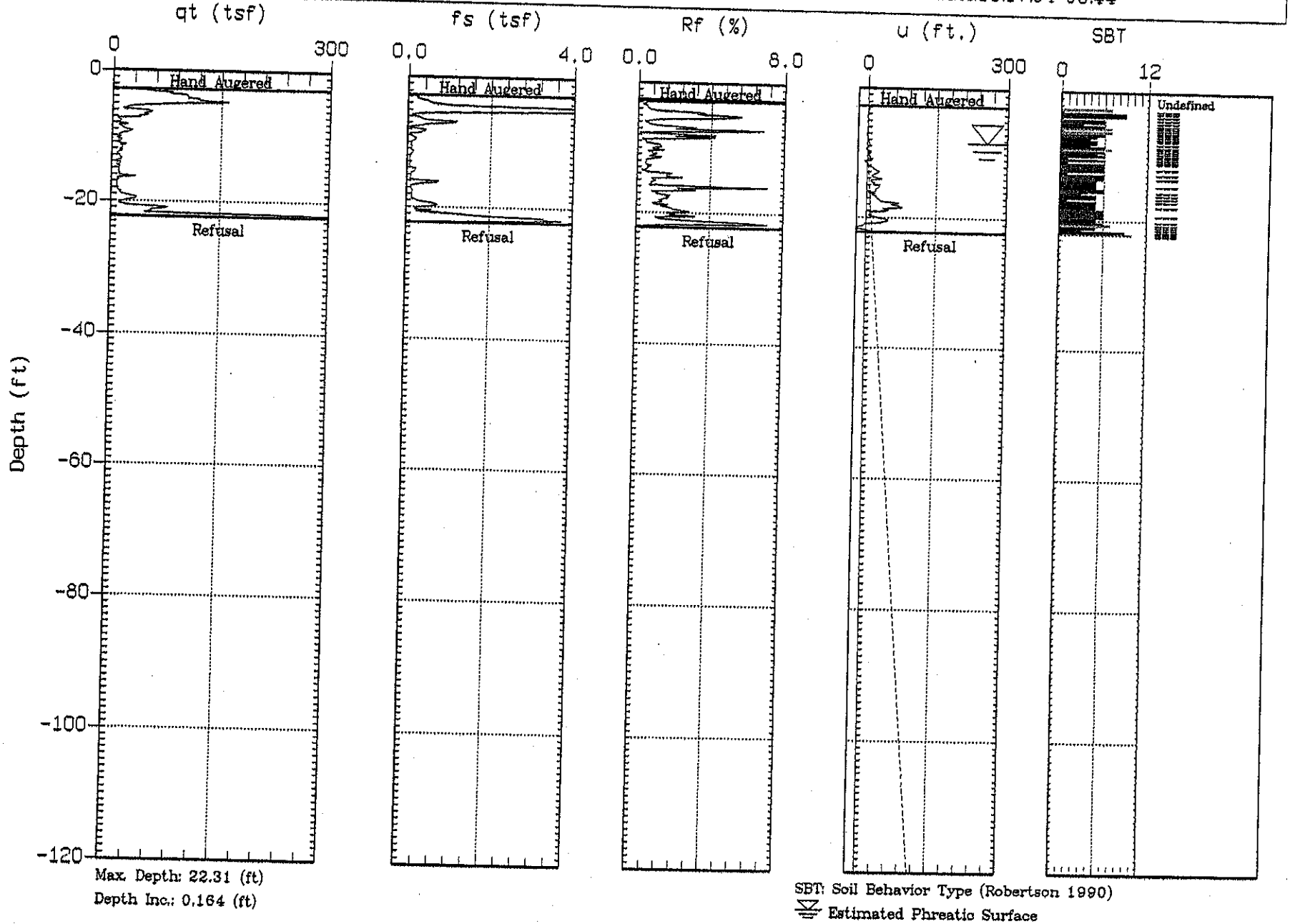
SBT: Soil Behavior Type (Robertson 1990)
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:SCPT-46
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:17:04 03:44



Max. Depth: 22.31 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

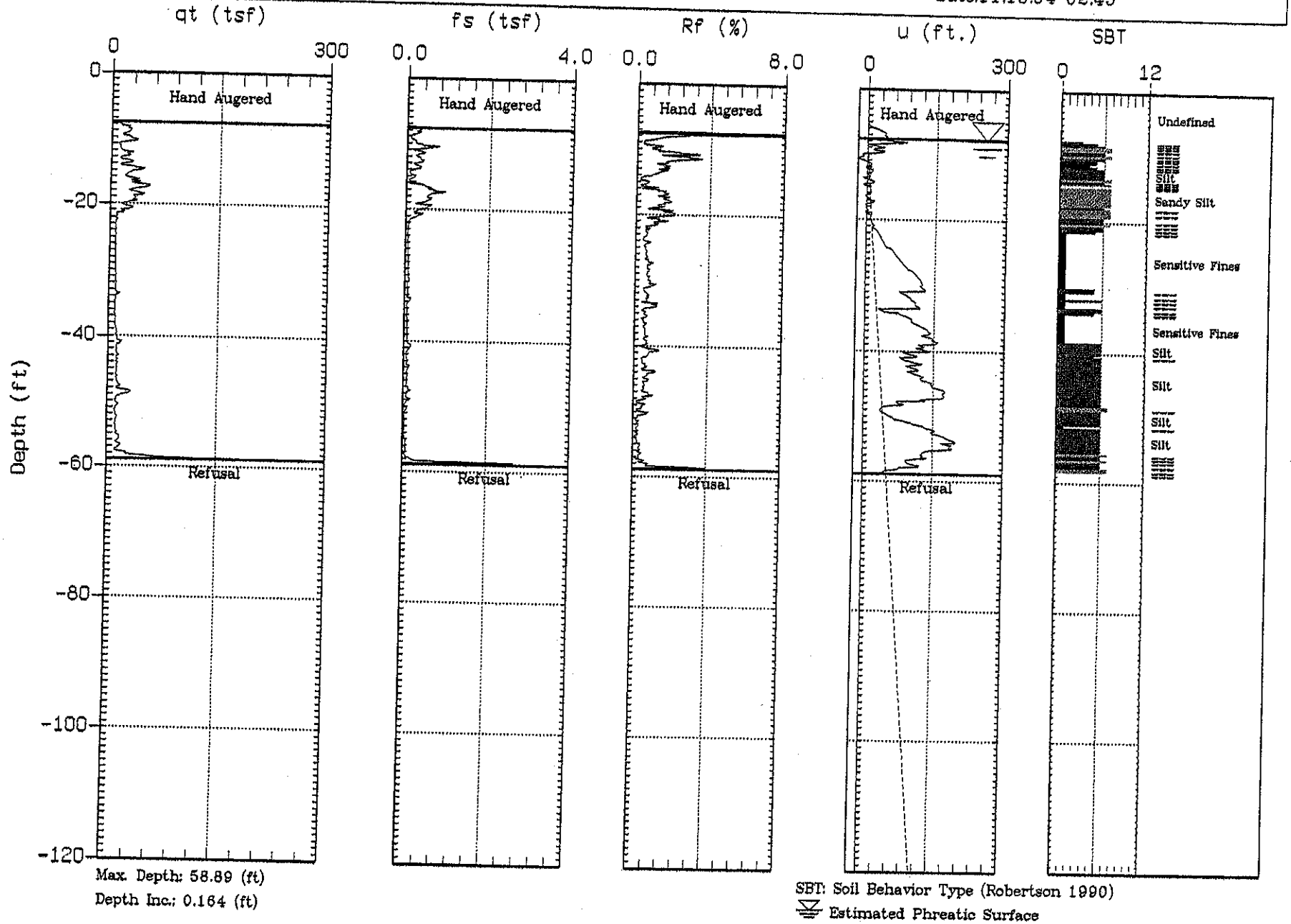
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:CPT-55
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:13:04 02:45



Max. Depth: 58.89 (ft)
Depth Inc.: 0.164 (ft)

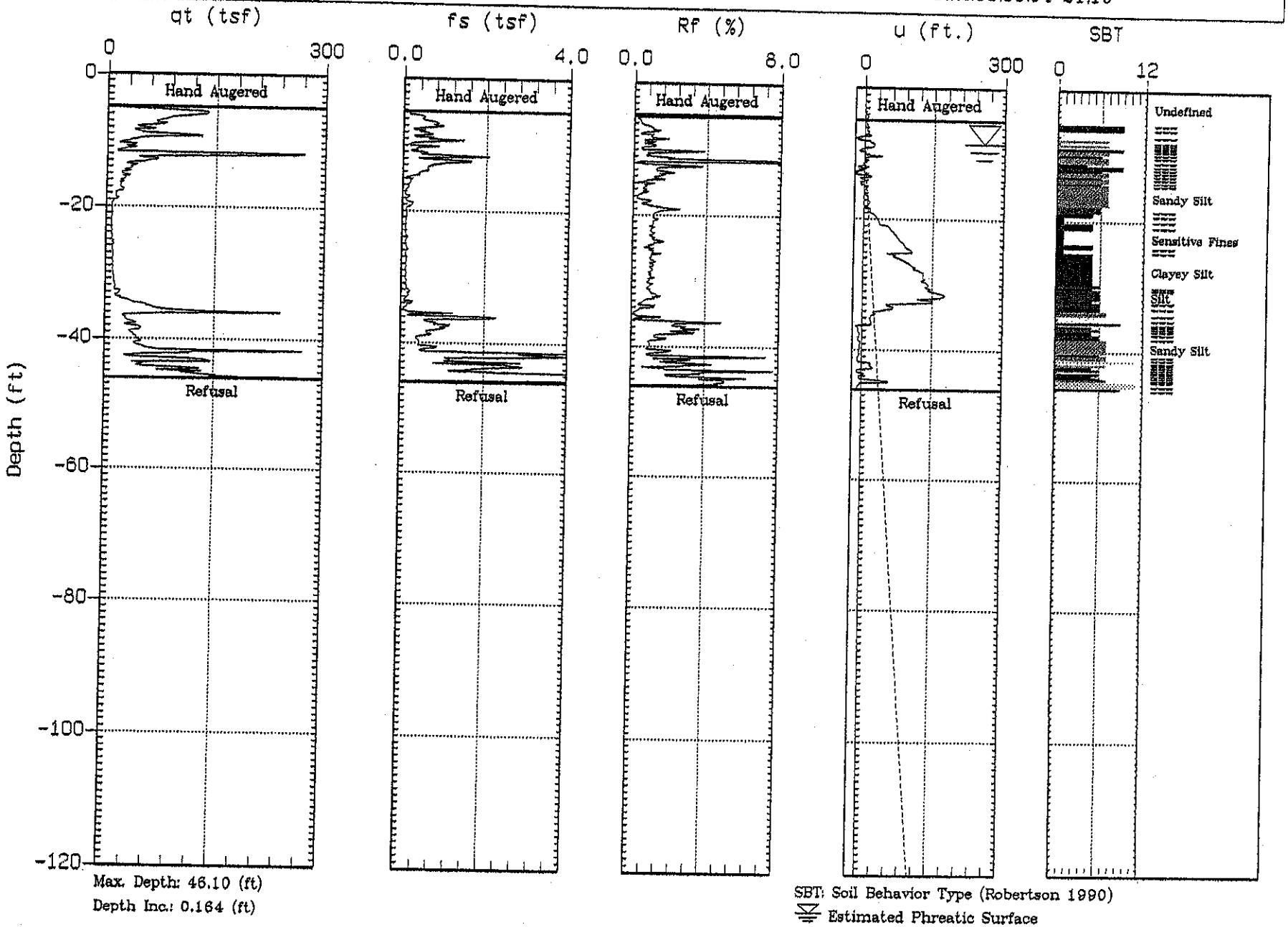
SBT: Soil Behavior Type (Robertson 1990)
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:CPT-57
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:15:04 21:19



Max. Depth: 46.10 (ft)
Depth Inc.: 0.164 (ft)

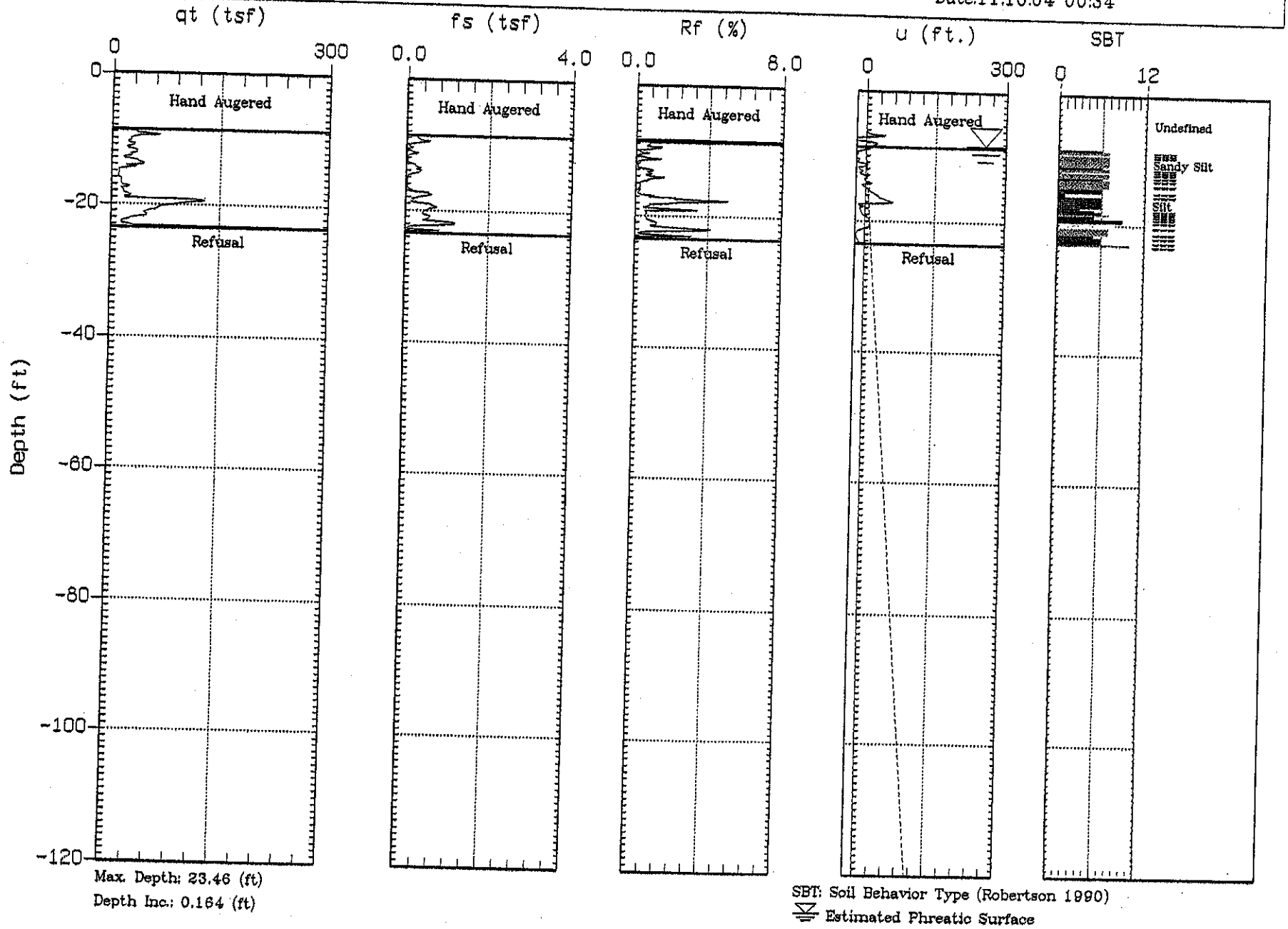
SBT: Soil Behavior Type (Robertson 1990)
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:CPT-59
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:16:04 00:34



Max. Depth: 23.46 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

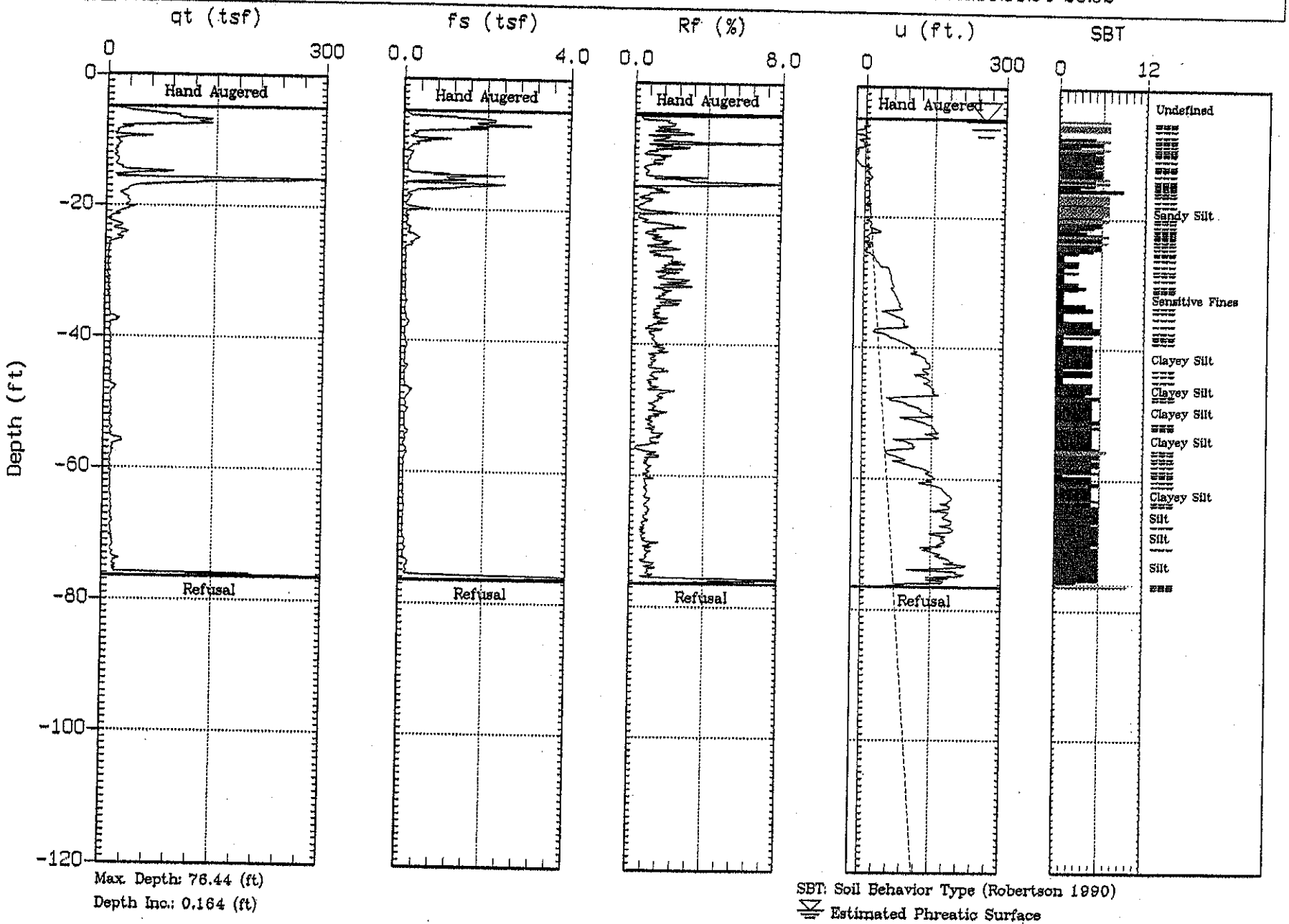
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:SCPT-63
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:11:04 23:52



Max. Depth: 76.44 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

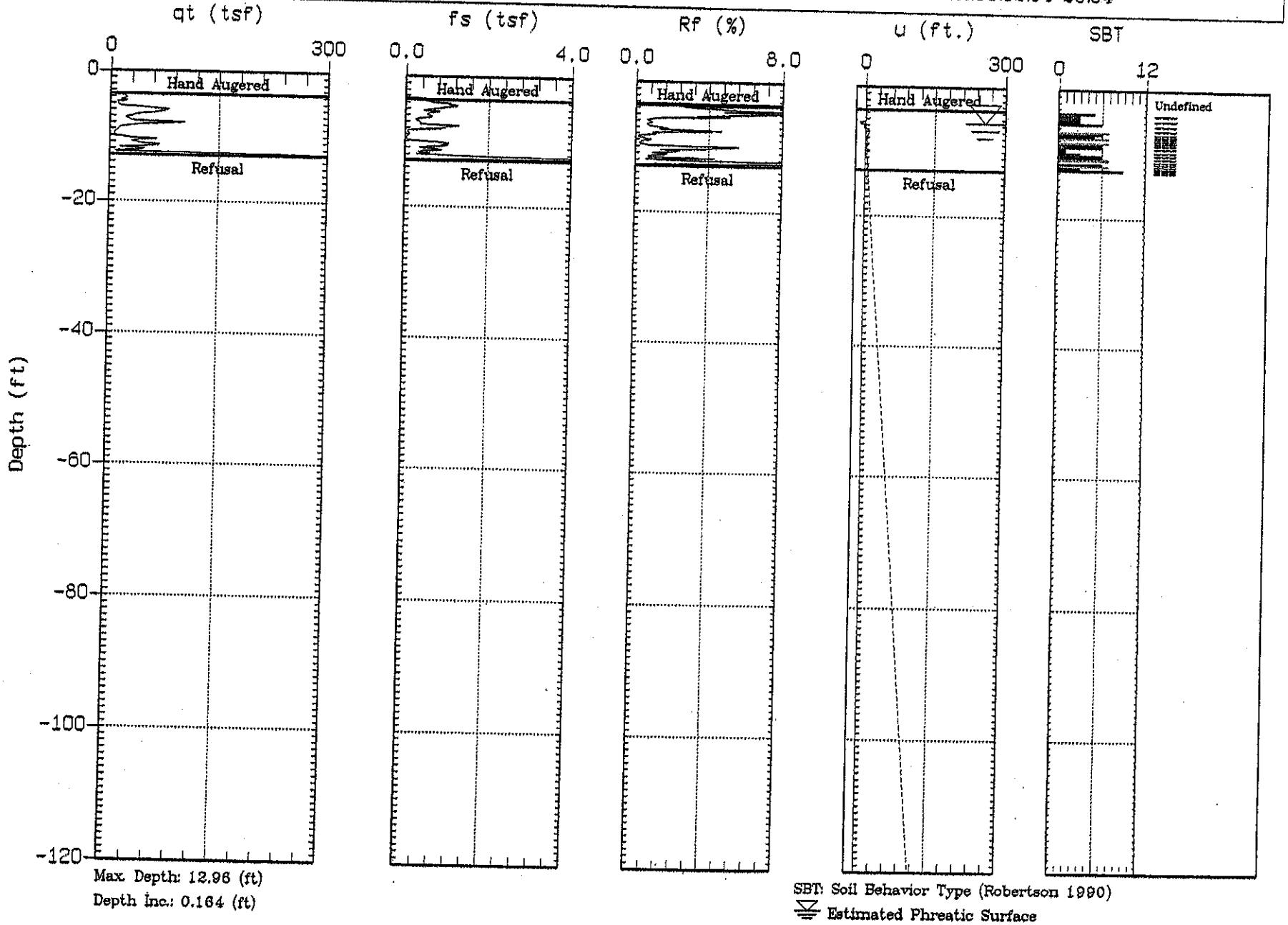
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:SCPT-67
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:12:04 23:34



Max. Depth: 12.96 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

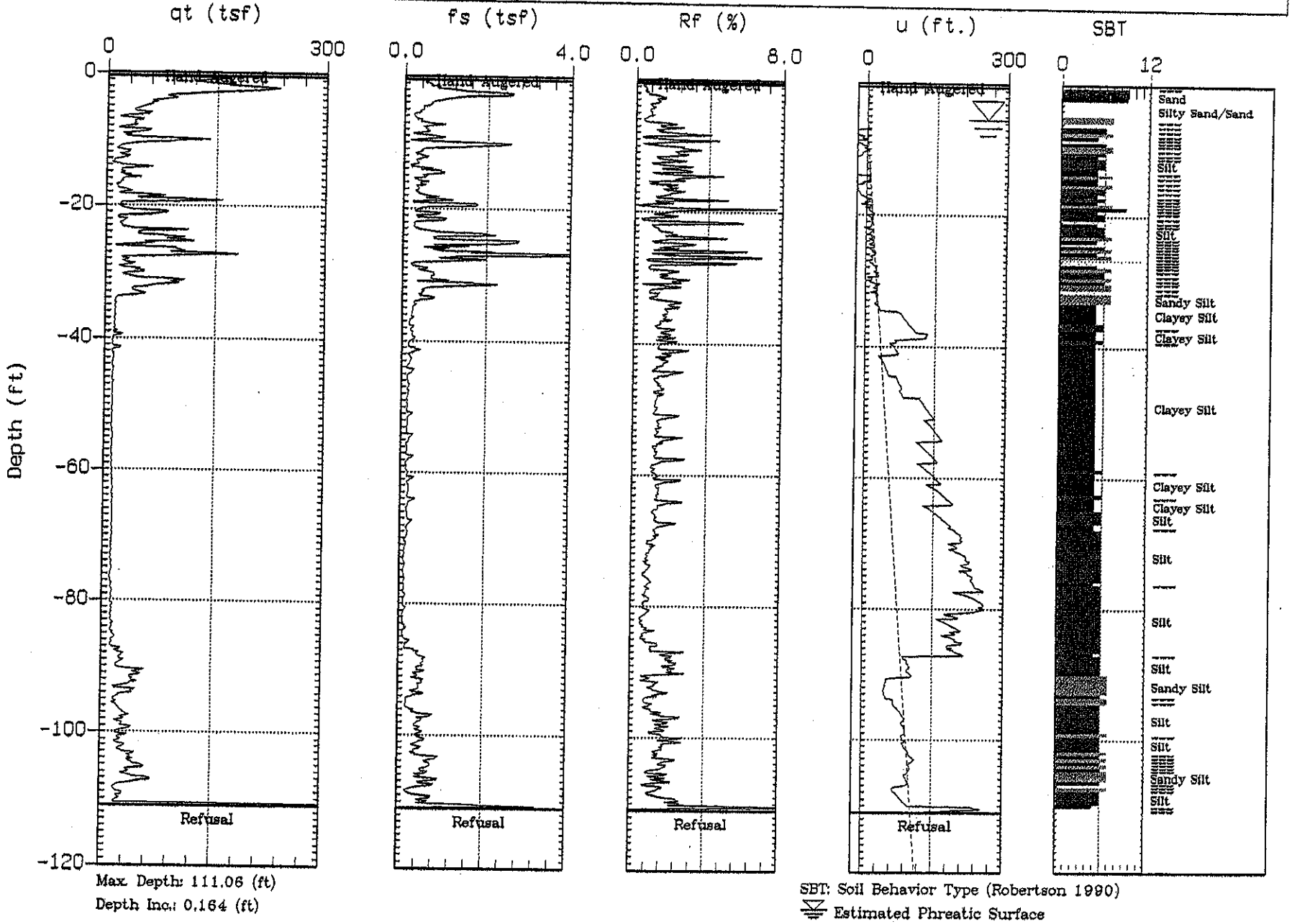
Estimated Phreatic Surface

CONETEC

Langan Engineering

Site:SCPT-70
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:18:04 21:06



Max. Depth: 111.06 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)
Estimated Phreatic Surface

FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-11

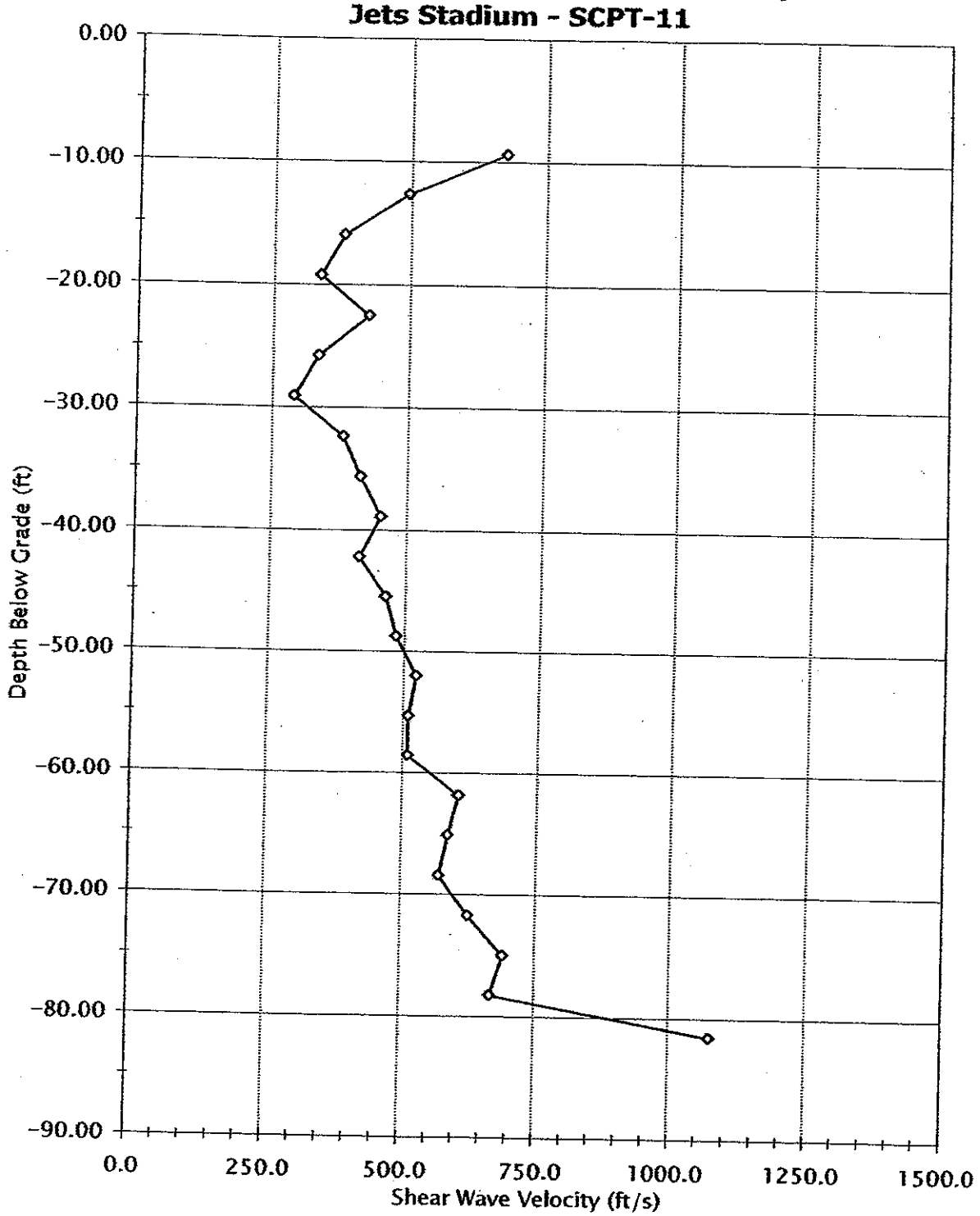


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-12

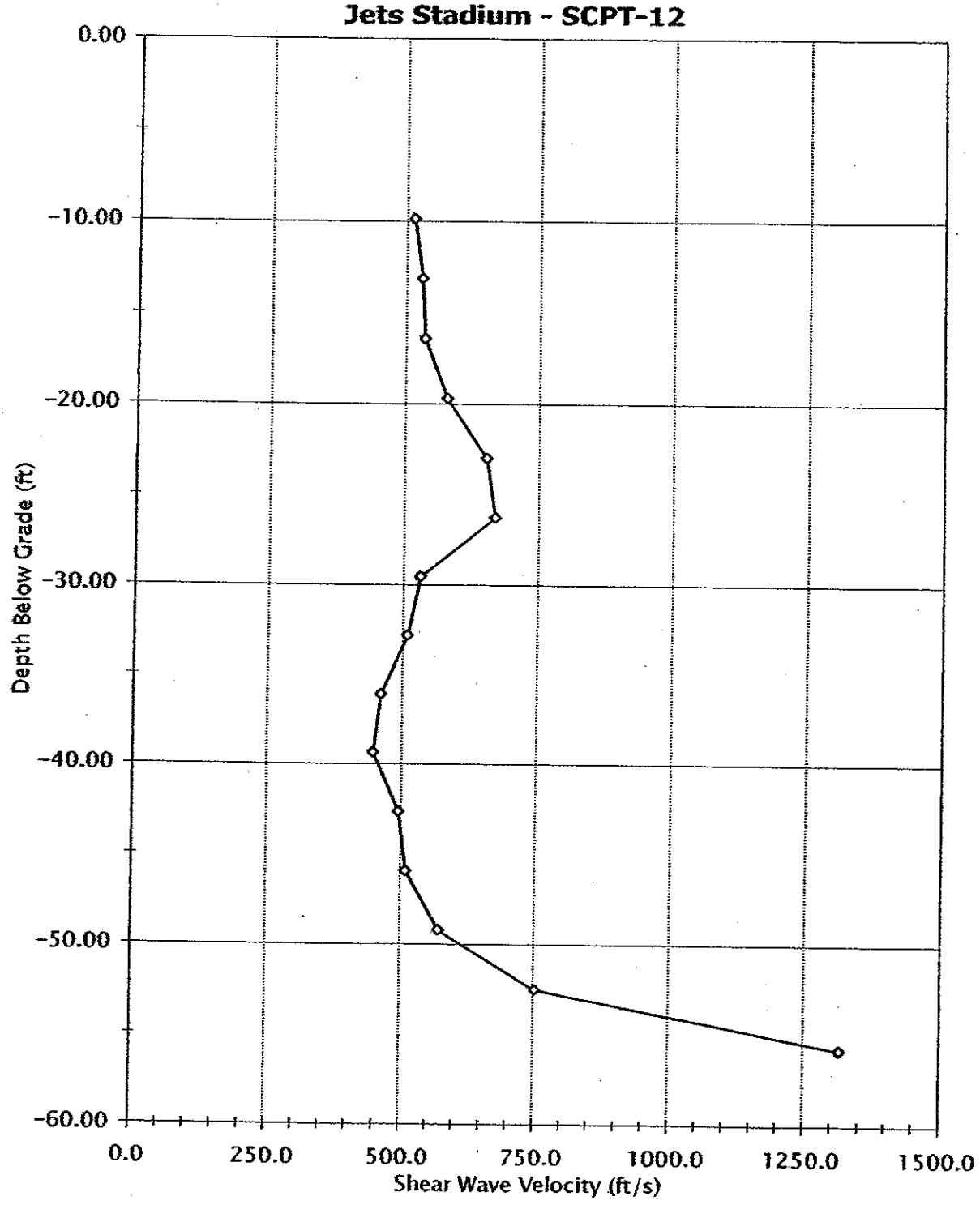


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-24

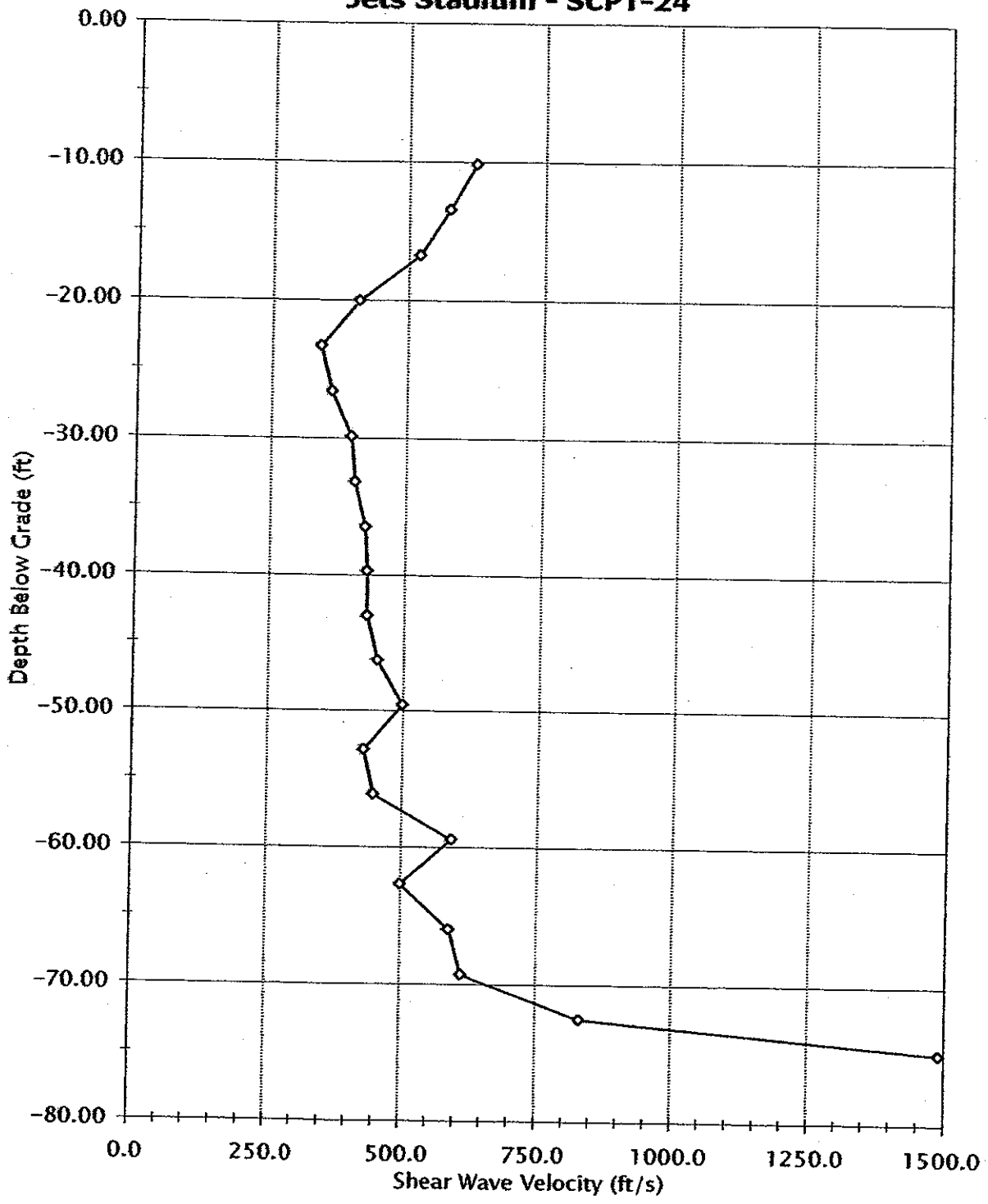


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-25

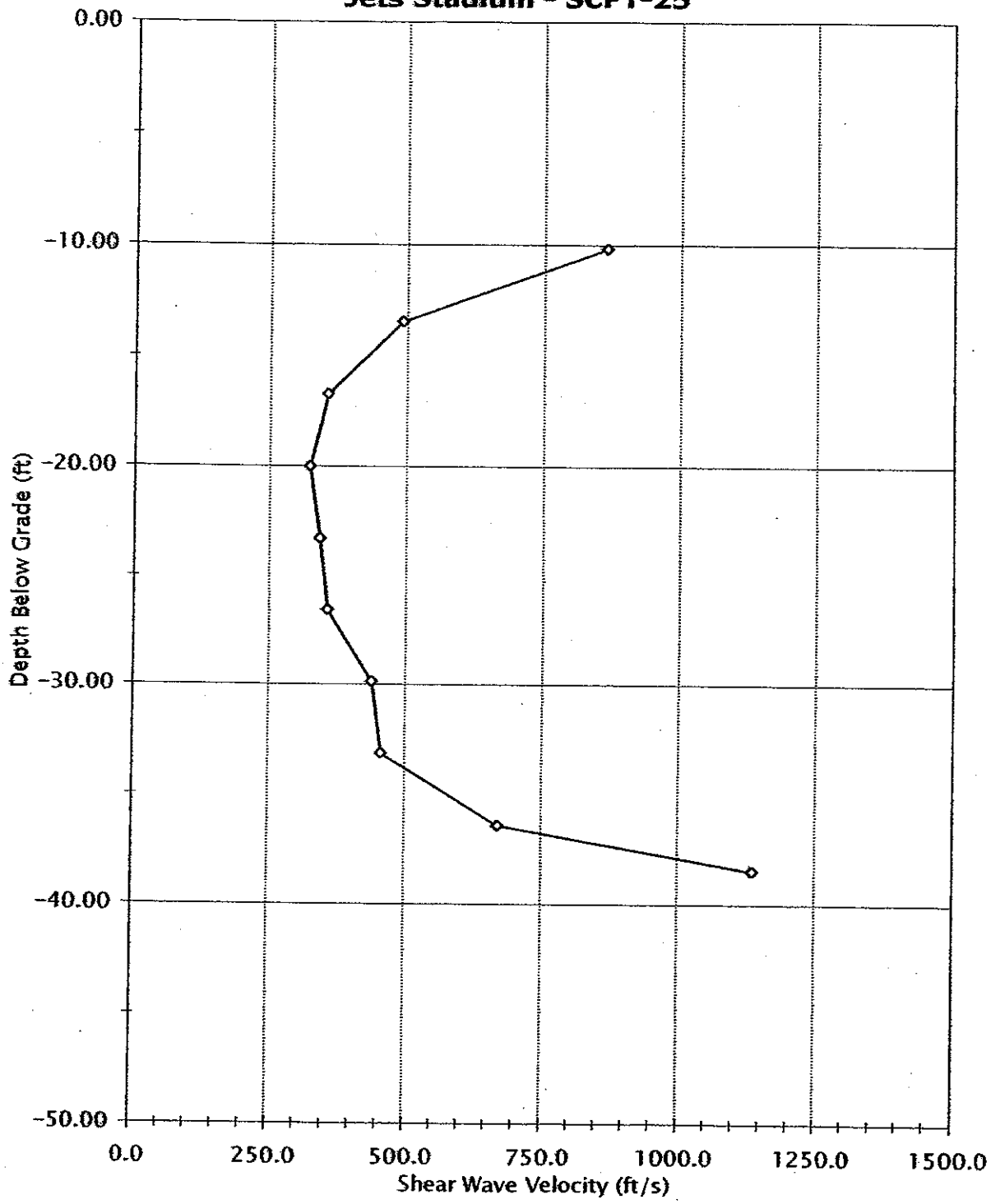


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-41

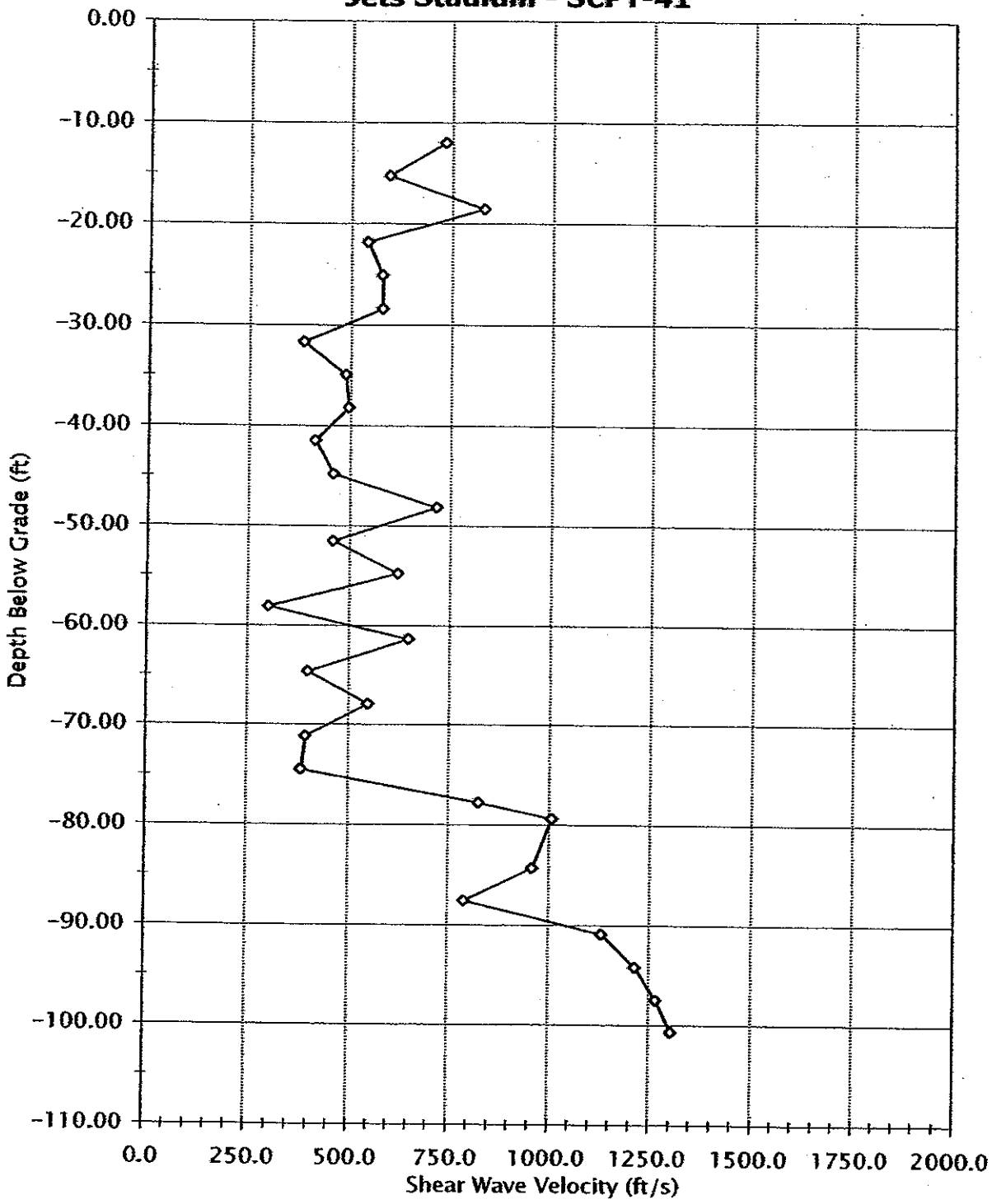


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-42

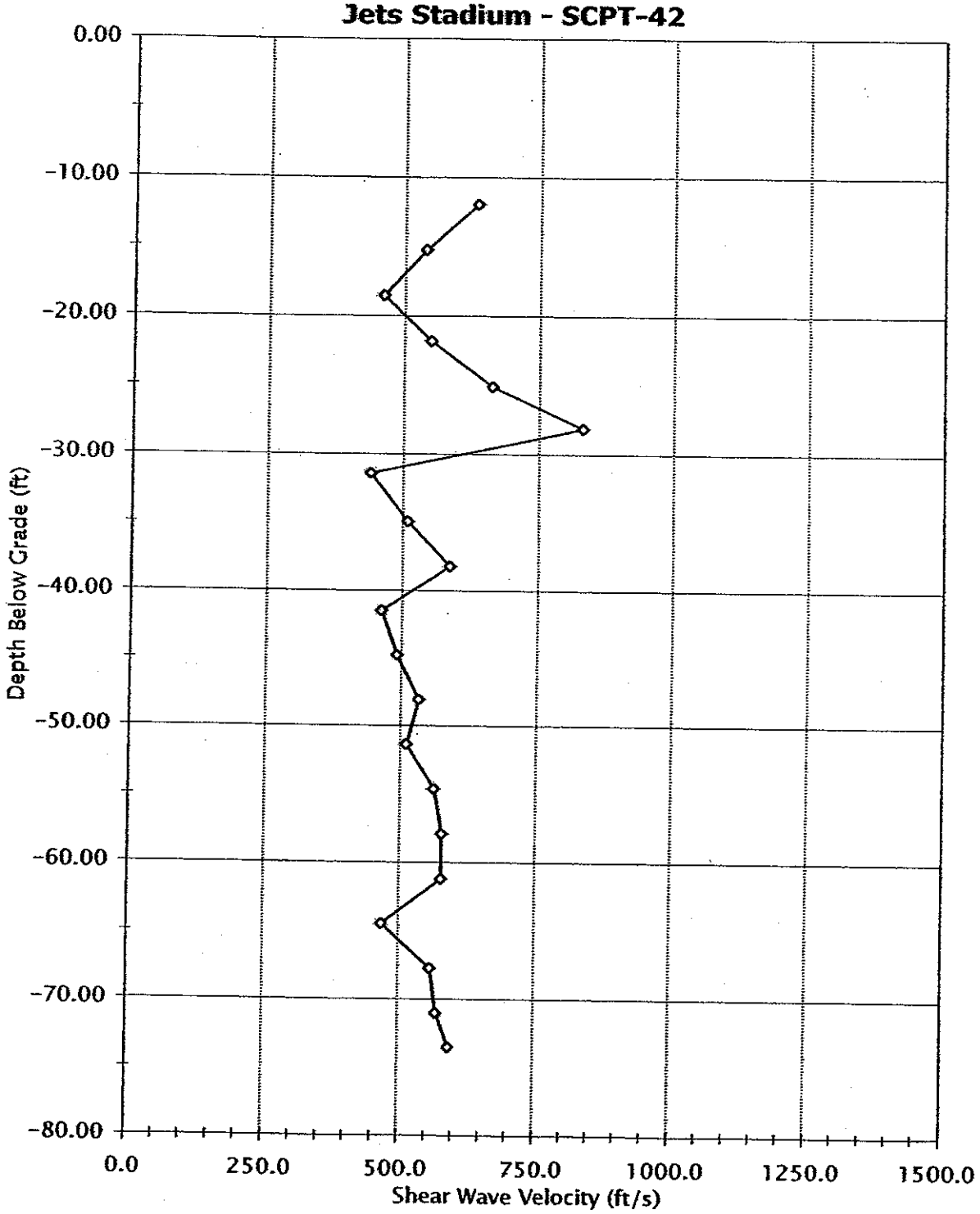


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-43

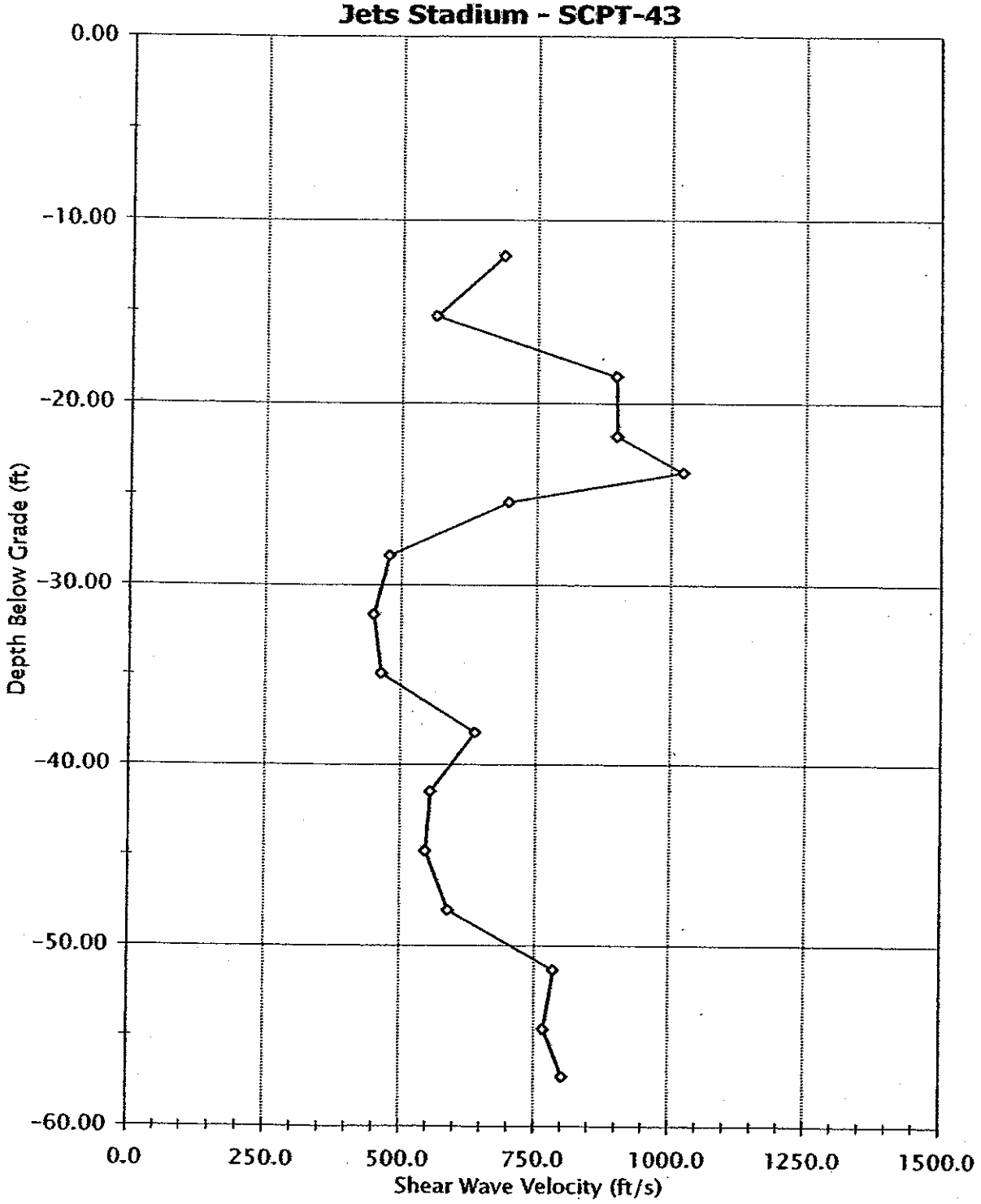


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-44

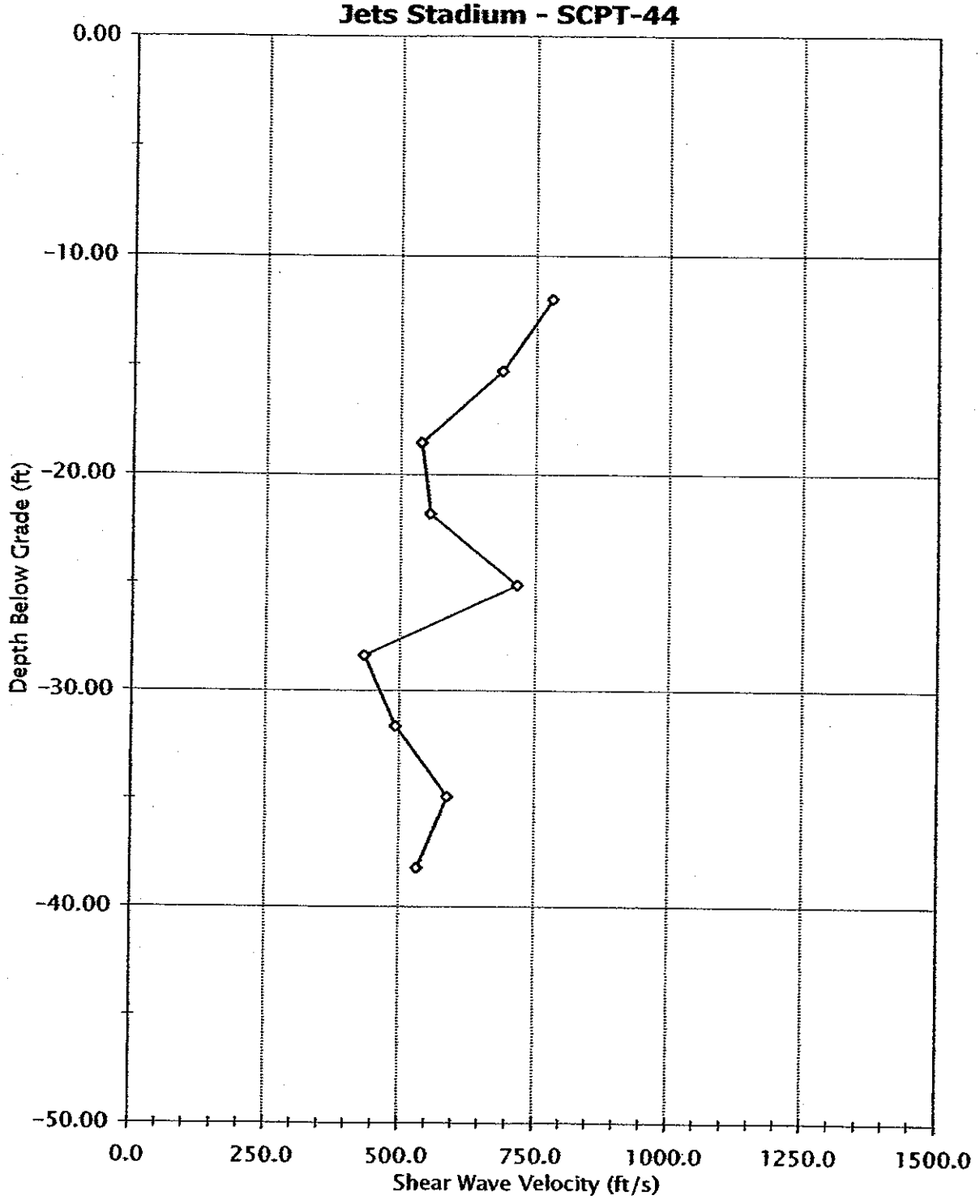


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-45

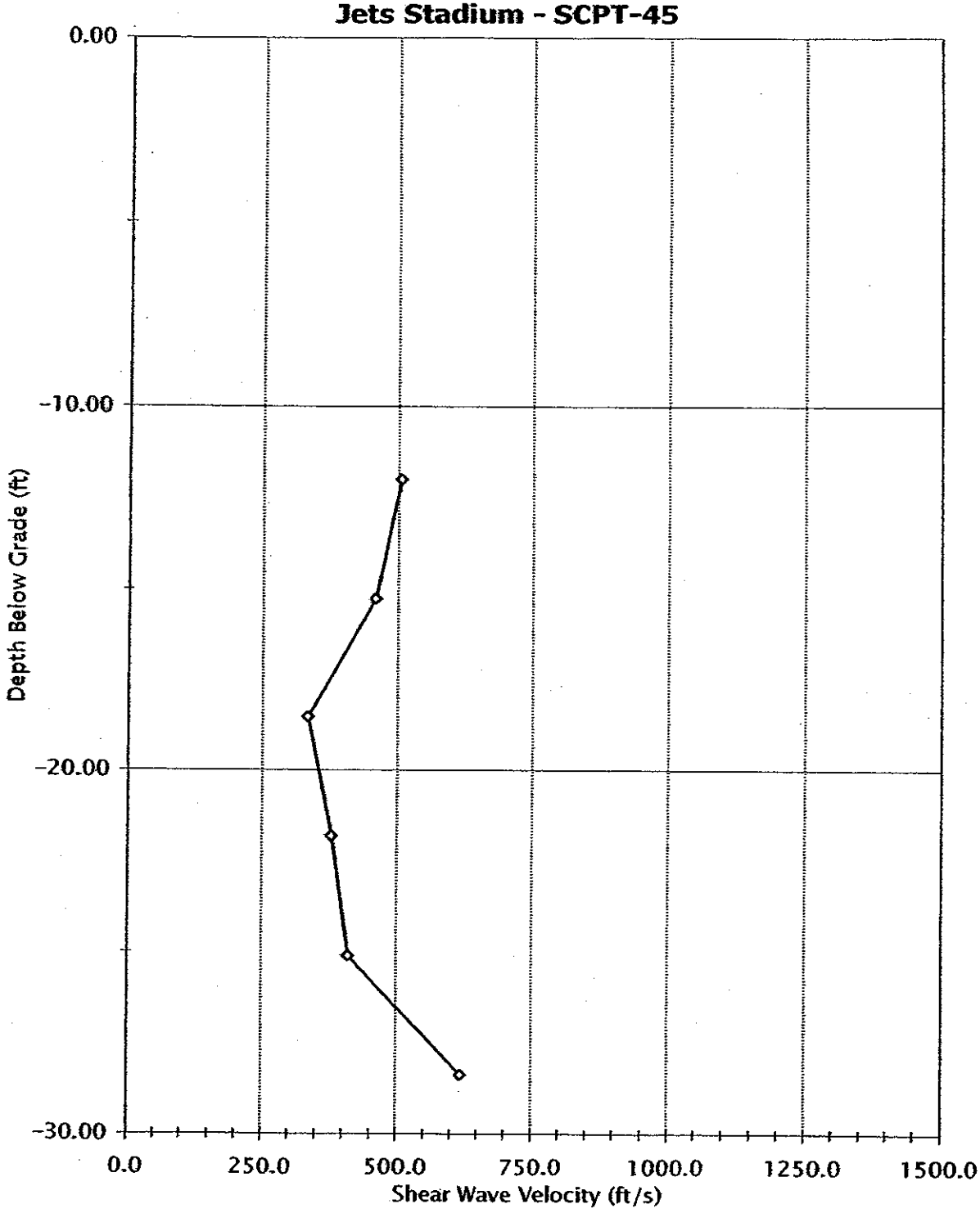


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-46

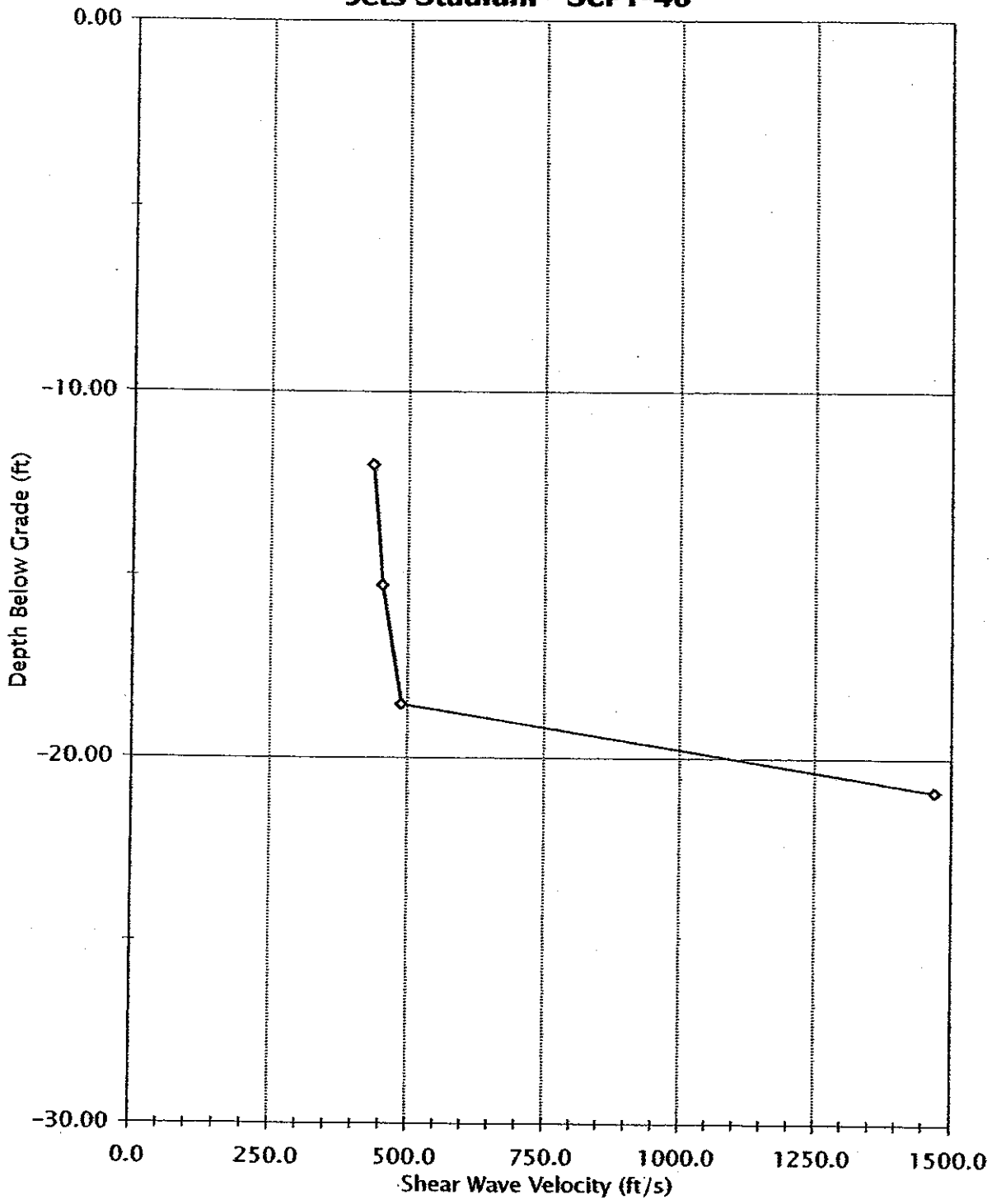


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-62

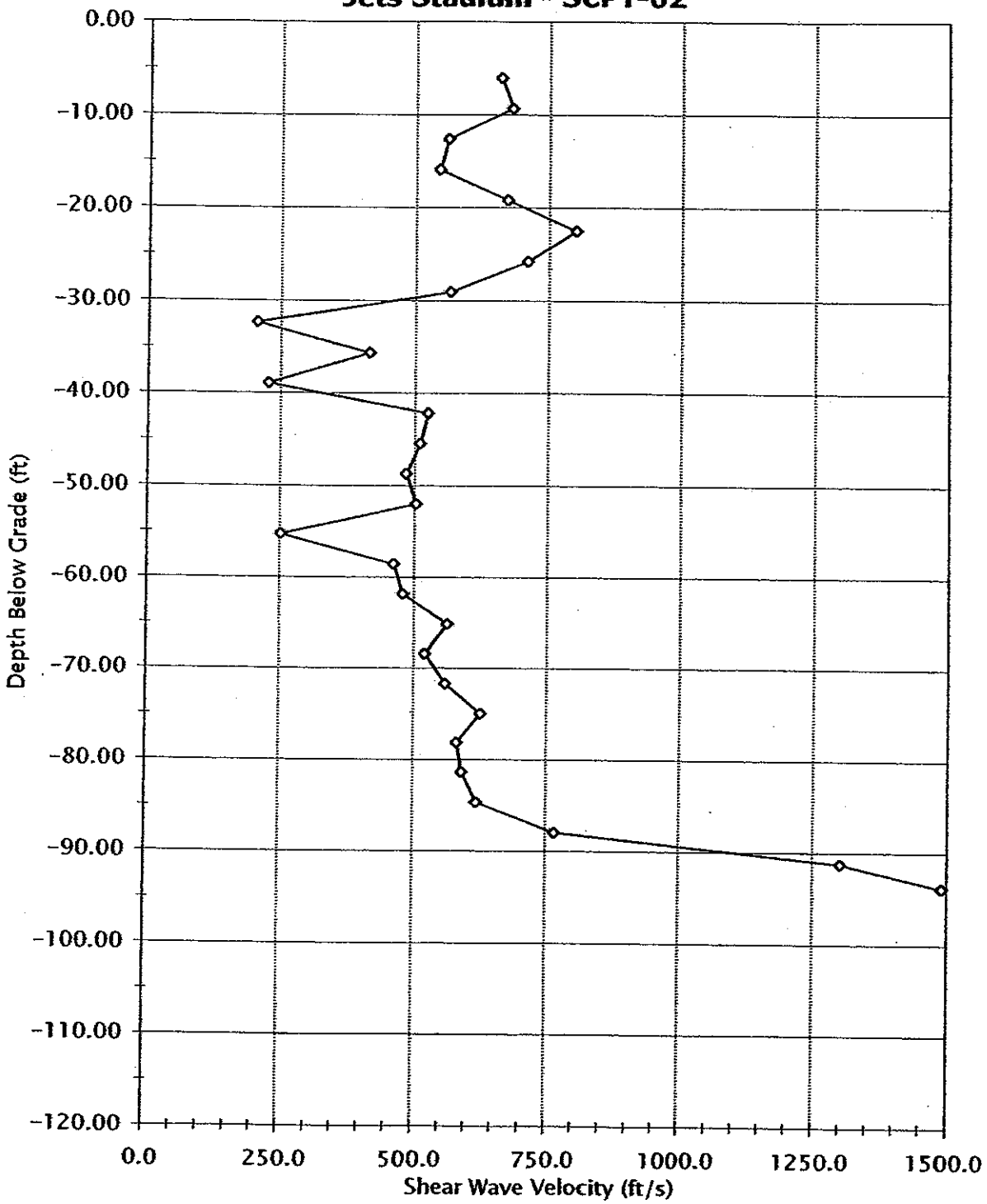


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-63

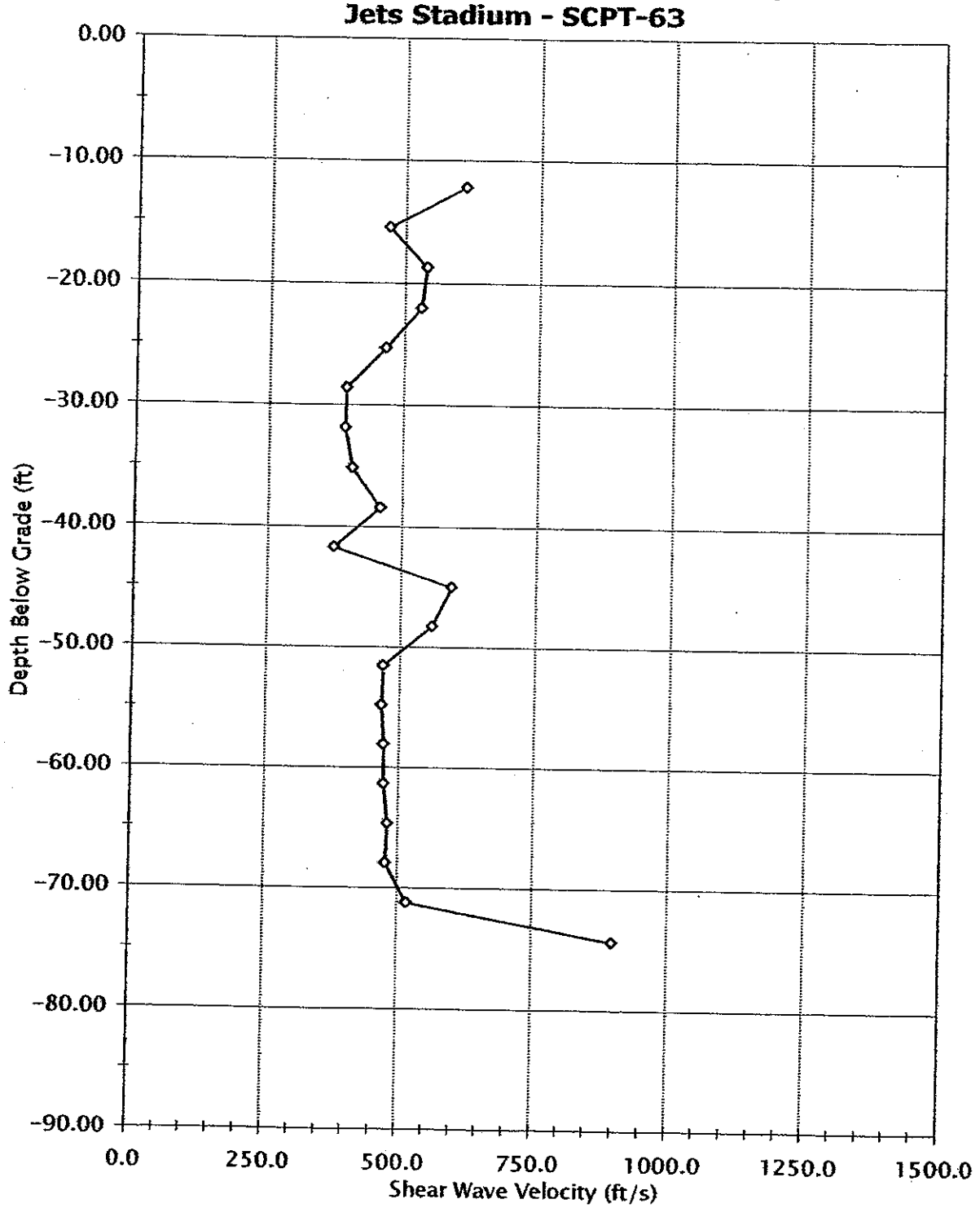


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-65

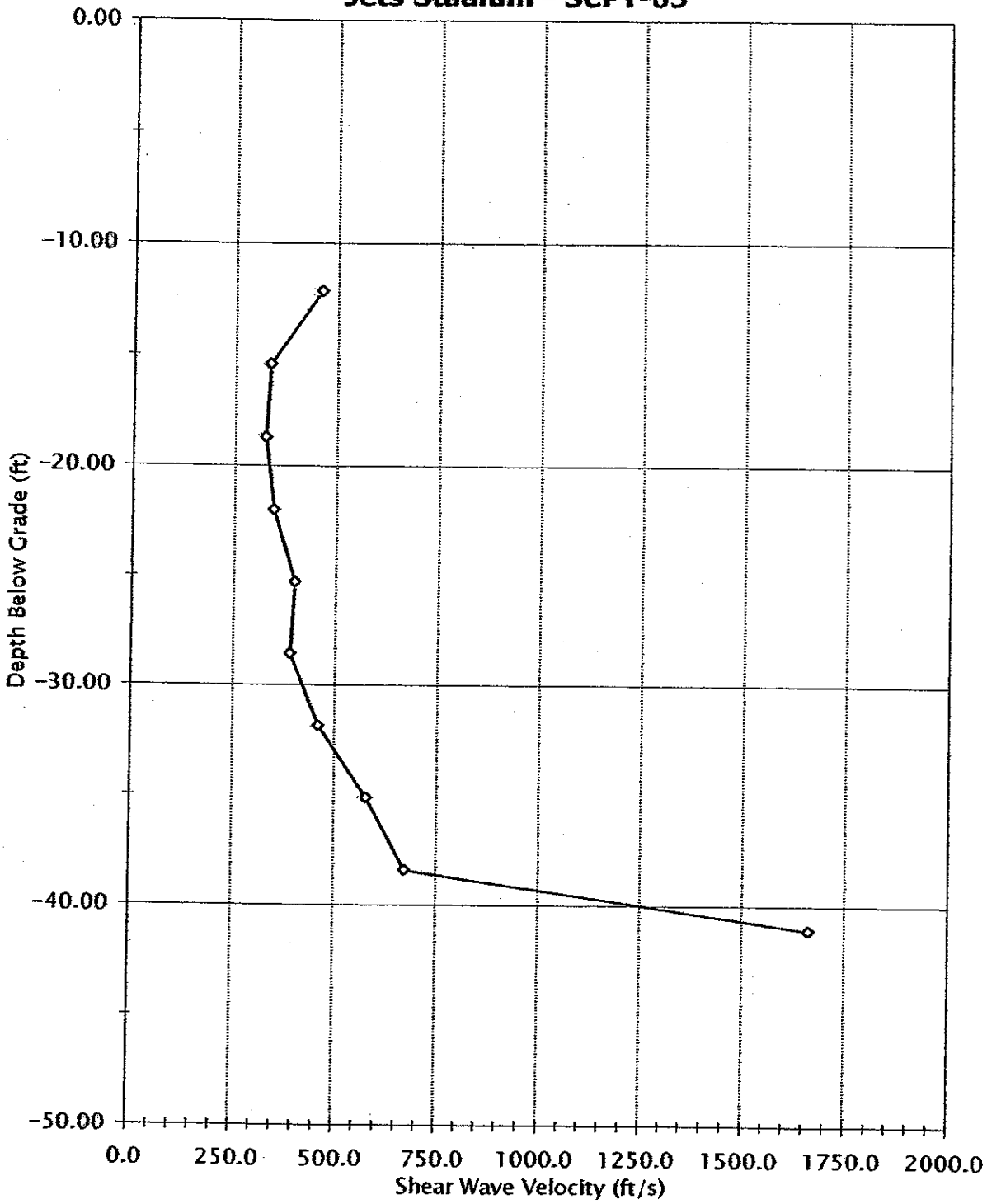


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-67

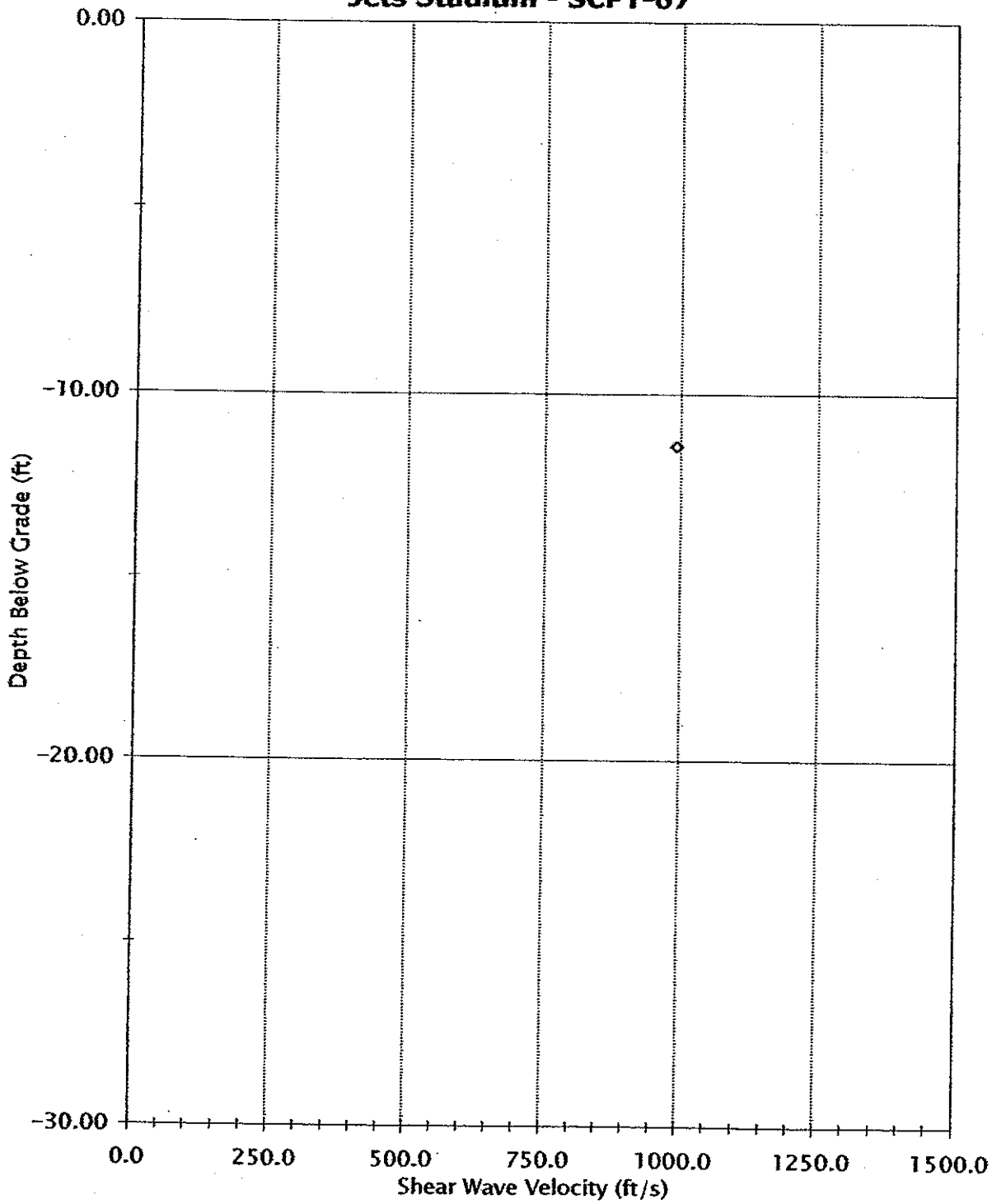


FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-68

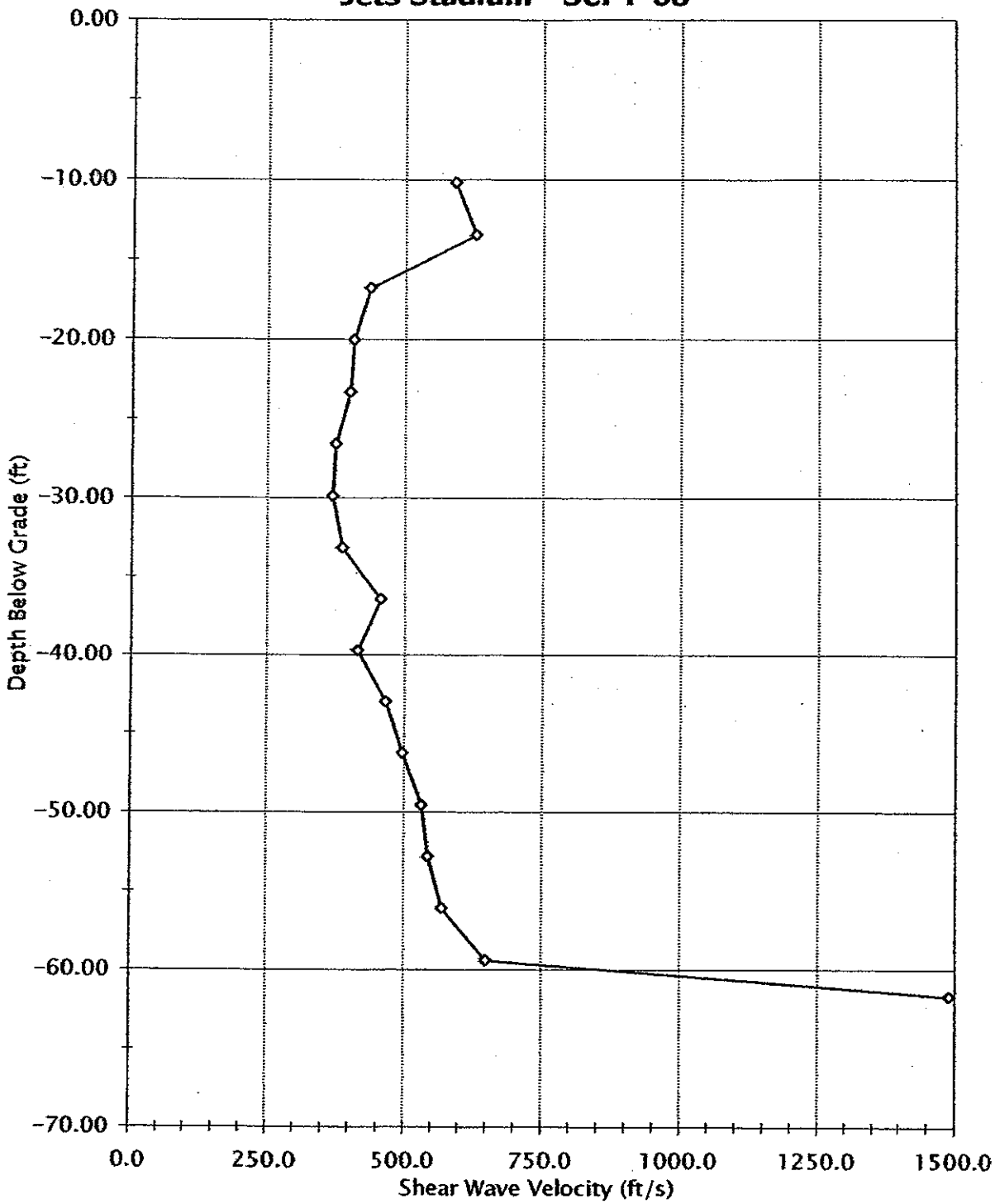
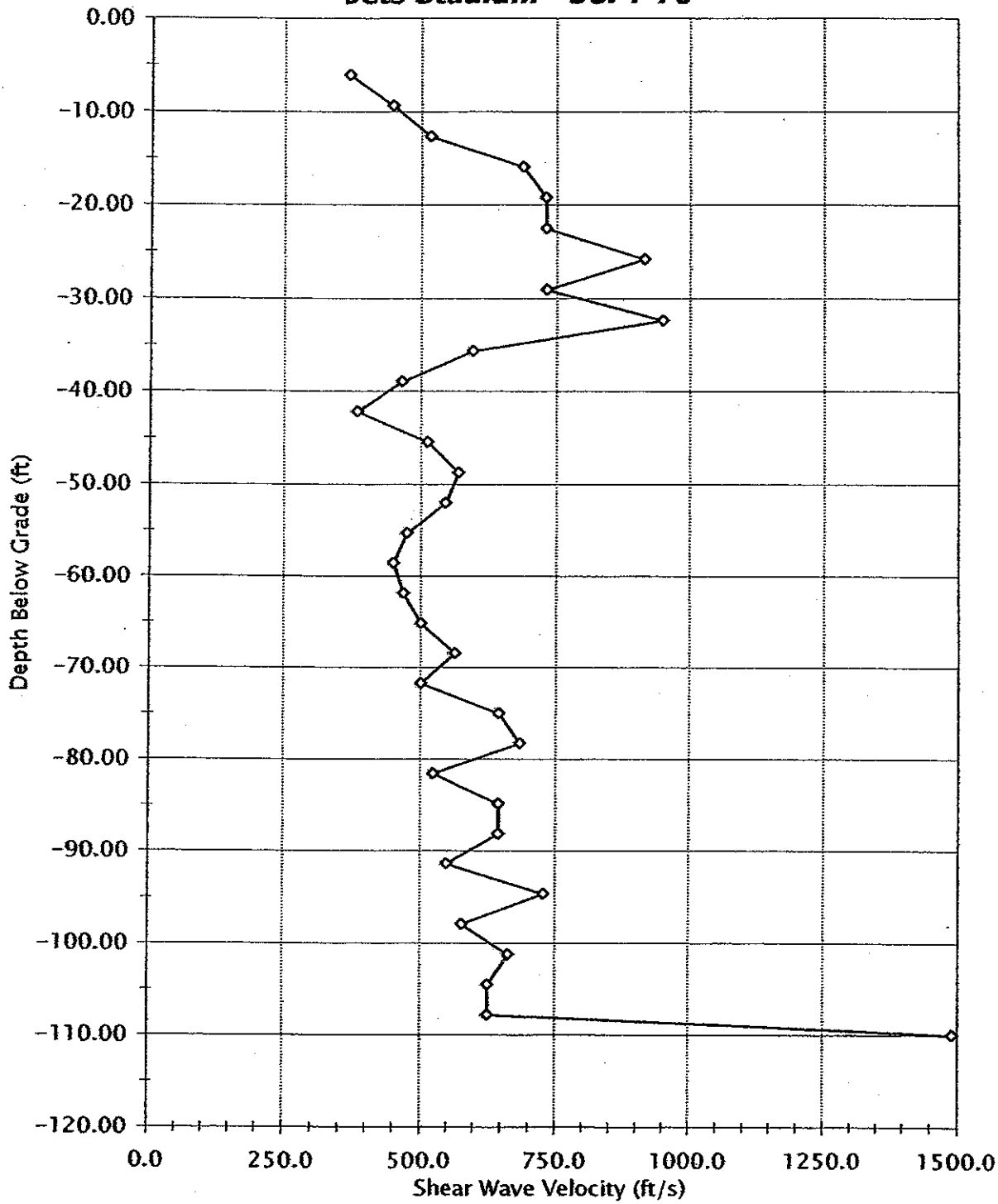


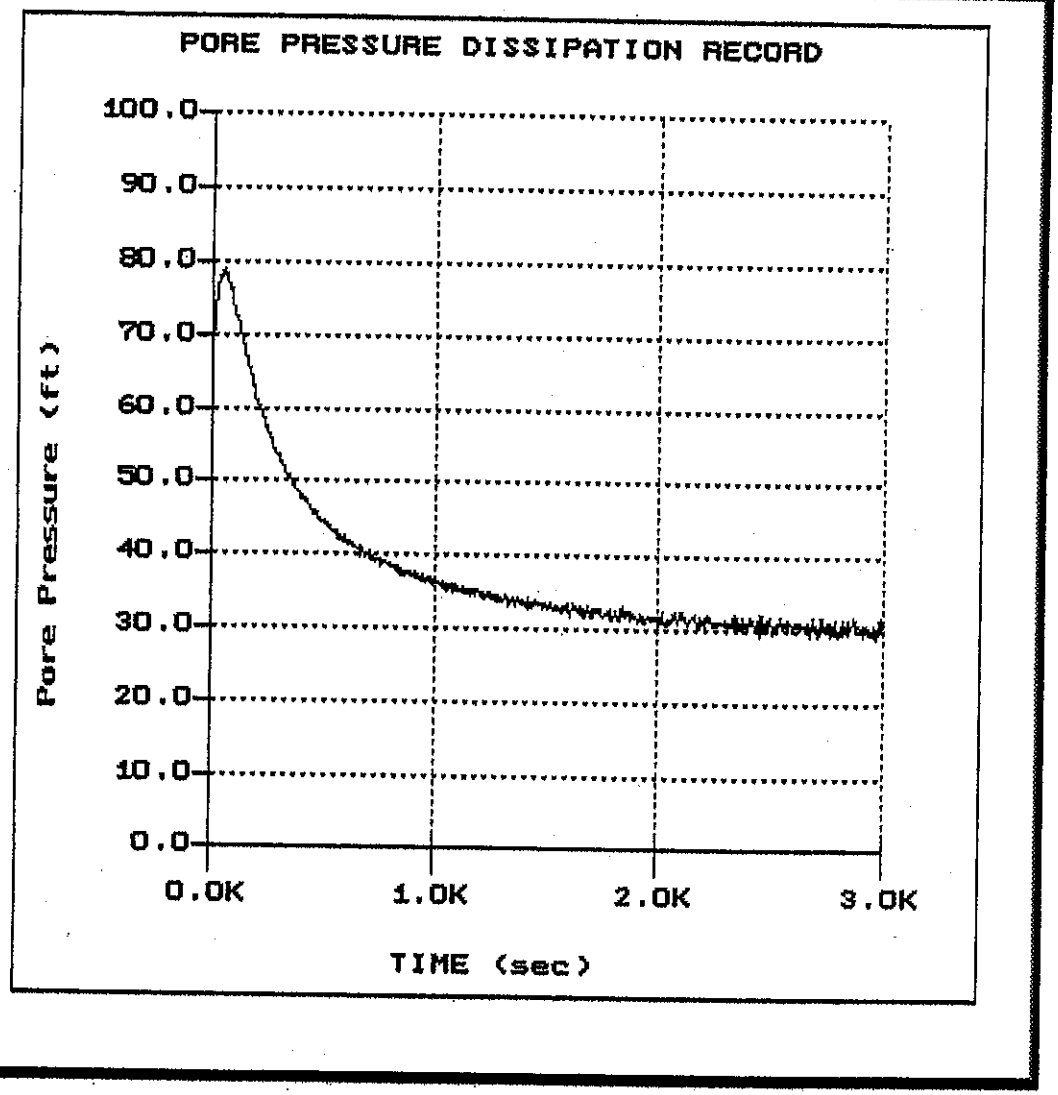
FIGURE 1 - Shear Wave Velocity vs. Depth
Jets Stadium - SCPT-70



Langan

Hole:SCPT-12
Location:Jets Stadium

Cone:20 Ton AD139
Date:10:18:04 08:20

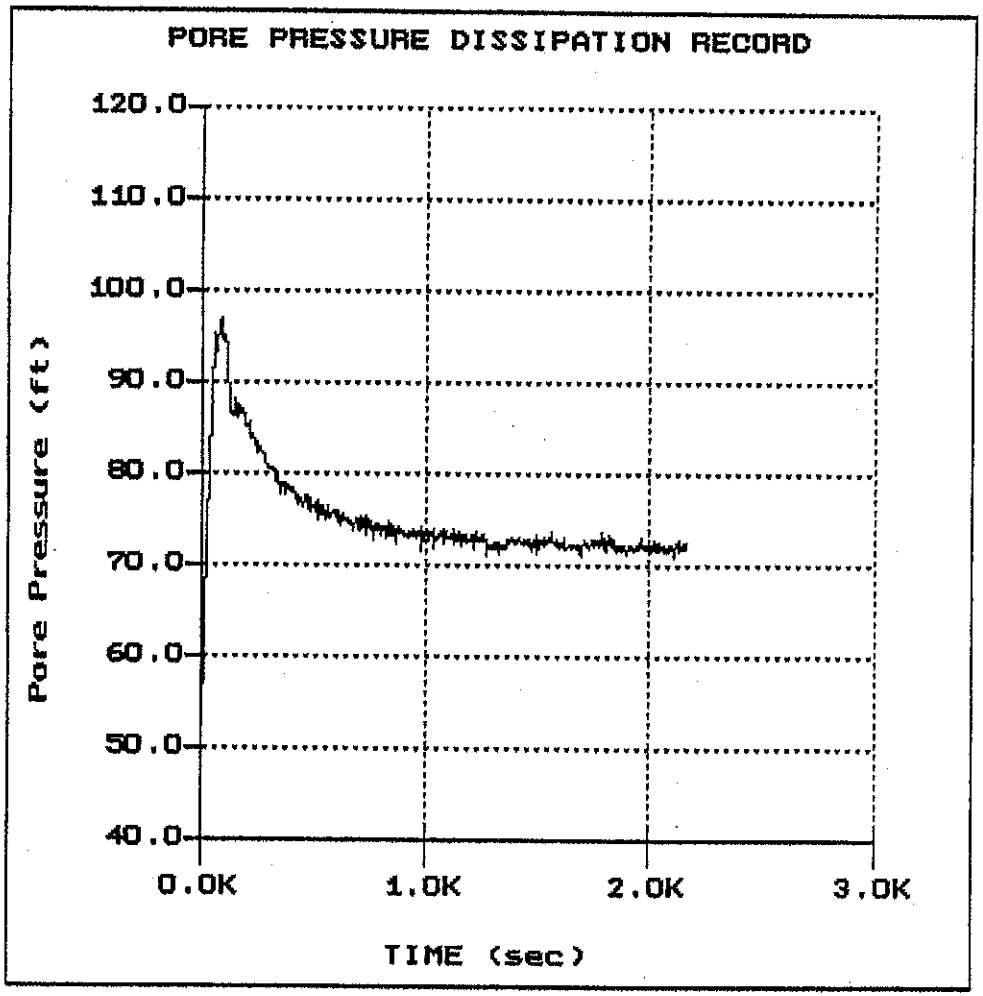


File: 797CP012.PPD
Depth (m): 10.70
(ft): 35.10
Duration : 3000.0s
U-min: 28.67 2970.0s
U-max: 78.75 55.0s

Langan

Hole:SCPT-24
Location:Jets Stadium

Cone:20 Ton AD139
Date:10:18:04 10:53

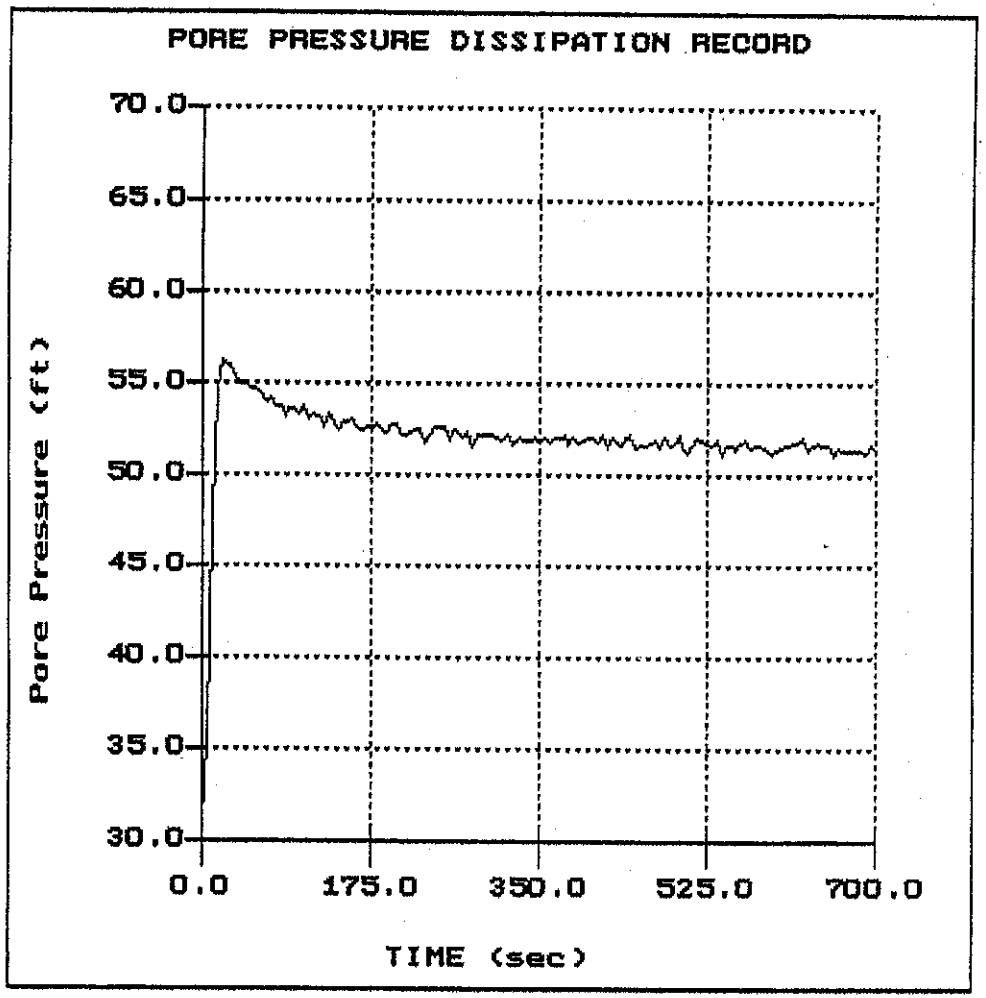


File: 797CP024.PPD
Depth (m): 23.25
(ft): 76.28
Duration : 2160.0s
U-min: 47.63 0.0s
U-max: 96.81 85.0s

Langan

Hole:CPT-36
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:17:04 23:20

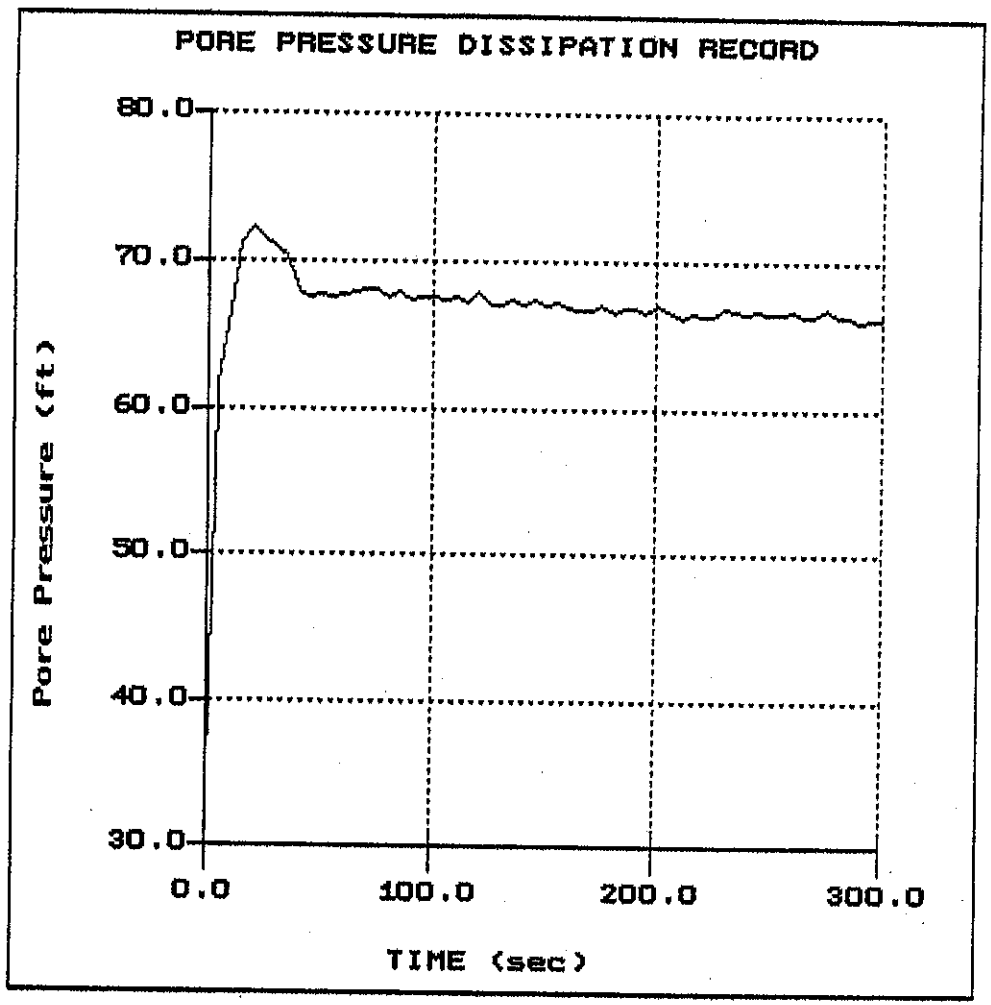


File: 797CP36.PPD
Depth (m): 18.50
(ft): 60.70
Duration : 700.0s
U-min: 30.88 0.0s
U-max: 56.31 20.0s

Langan

Hole:SCPT-42
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:16:04 23:55

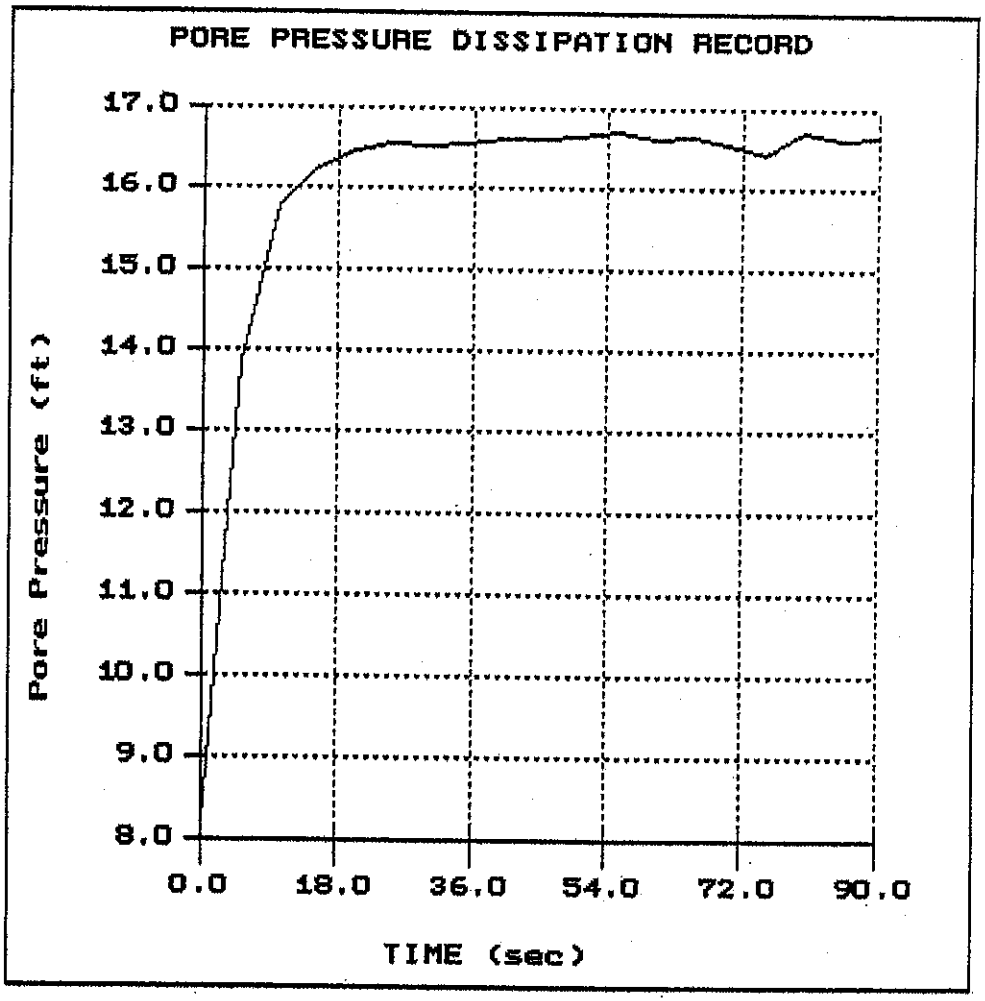


File: 797CP42.PPD
Depth (m): 22.85
(ft): 74.97
Duration : 300.0s
U-min: 33.98 0.0s
U-max: 72.22 20.0s

Langan

Hole:SCPT-44
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:17:04 01:42

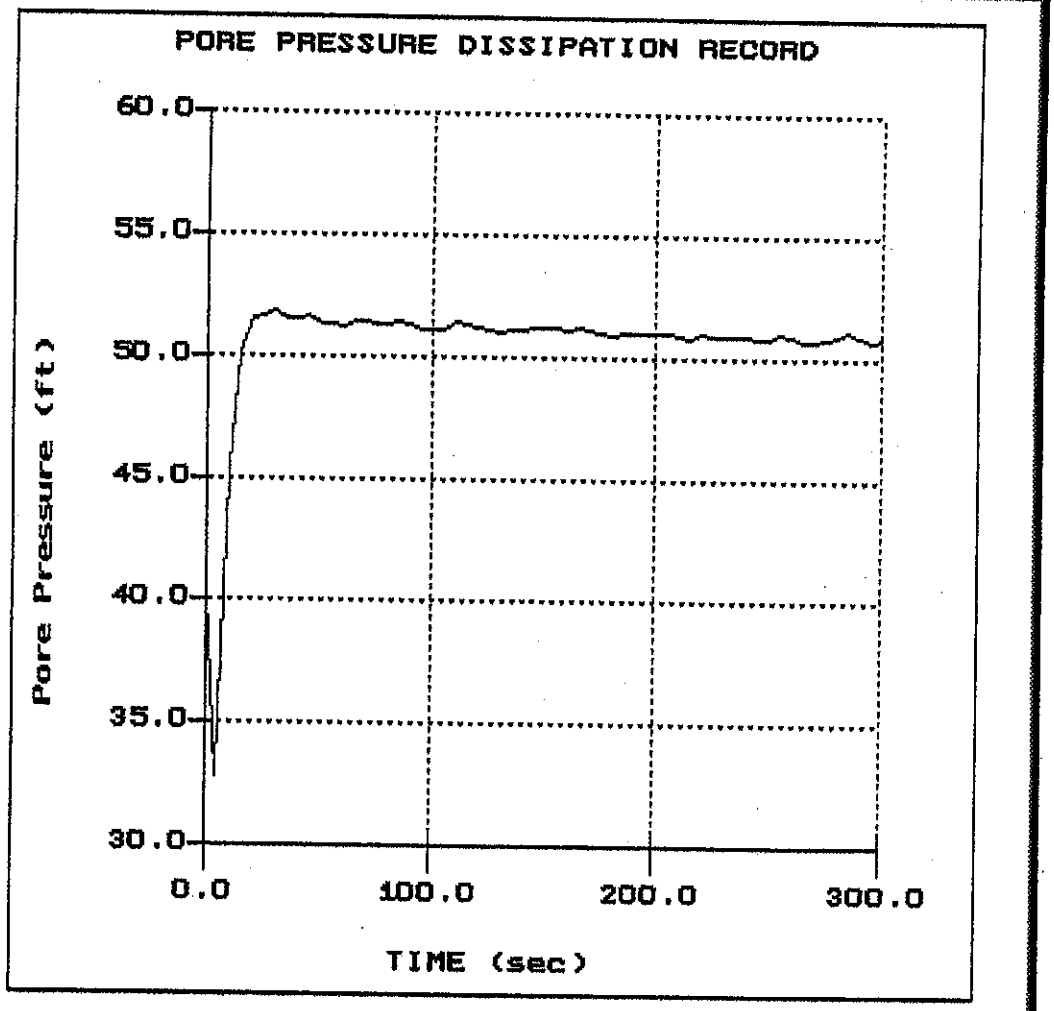


File: 797CP44.PPD
Depth (m): 7.35
(ft): 24.11
Duration : 90.0s
U-min: 8.17 0.0s
U-max: 16.71 80.0s

Langan

Hole:CPT-55
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:13:04 02:45

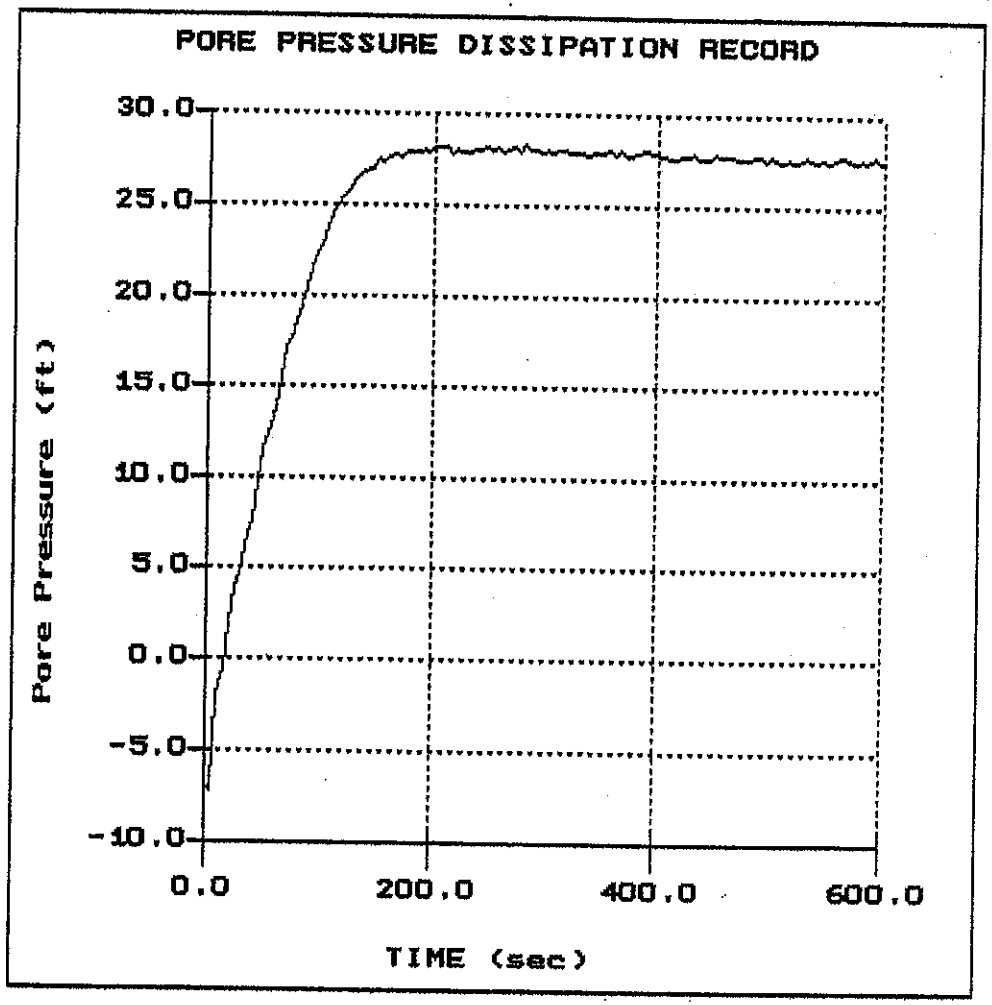


File: 797CP55.PPD
Depth (m): 17.95
(ft): 58.89
Duration : 300.0s
U-min: 32.80 5.0s
U-max: 51.86 30.0s

Langan

Hole:CPT-58
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:15:04 22:14

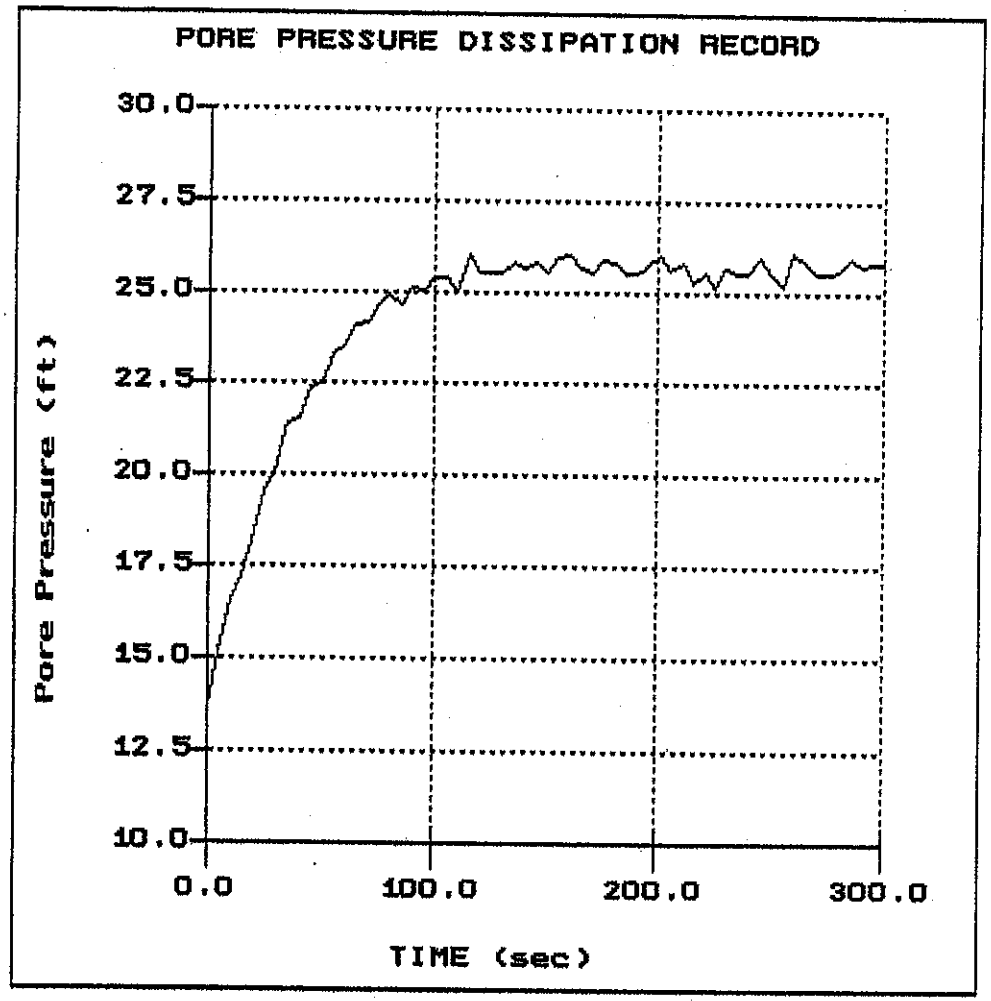


File: 797CP58.PPD
Depth (m): 11.10
(ft): 36.42
Duration : 600.0s
U-min: -7.27 5.0s
U-max: 28.30 280.0s

Langan

Hole:SCPT-65
Location:Jets Stadium

Cone:20 Ton AD165
Date:11:12:04 01:59

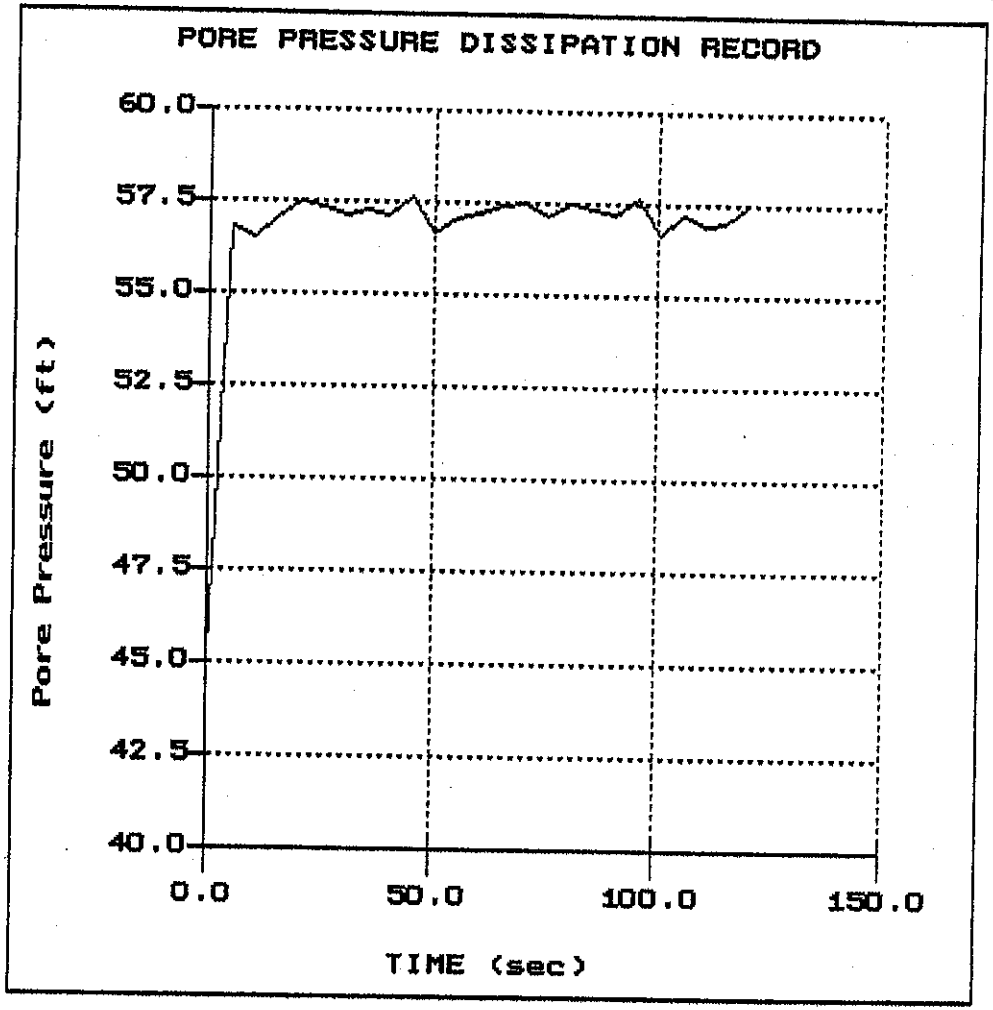


File: 797CP65.PPD
Depth (m): 10.70
(ft): 35.10
Duration : 300.0s
U-min: 13.66 0.0s
U-max: 26.14 260.0s

Langan

Hole:SCPT-68
Location:Jets Stadium

Cone:20 Ton AD139
Date:10:19:04 11:39



File: 797CP068.PPD
Depth (m): 19.20
(ft): 62.99
Duration : 120.0s
U-min: 45.10 0.0s
U-max: 57.63 95.0s

APPENDIX C
2004 Laboratory Data (NYSCC)

Project No.: 31737700-458 File: Indx1.xls

Langan #35578403
New York Sports and Convention Center
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS									STRENGTH			CONSOL.		REMARKS
			WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLAS. IND.	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2 µm (%)	ORGANIC CONTENT (burnoff) (%)	TOTAL UNIT WEIGHT (pcf)	Type Test @ STRESS (tsf)	PEAK DEVIATOR STRESS (tsf)	AXIAL STRAIN @ PEAK STRESS (%)	INITIAL CONDITIONS VOID RATIO	INITIAL CONDITIONS SATUR-ATION	
G-6	S-9	45-47	49.3	56	24	32	CH			3.8							
G-6	S-11	55-57	65.5	45	20	25	CL			3.3							
G-6	S-12	60-62	30.1	25	20	5	CL-ML										
G-7	S-10	45-47	36.1	33	16	17	CL			3.4							
G-9	S-7	30-32	43.3	63	25	38	CH-OH			5.2							
G-9	S-7	30-32		43	25	18	CH-OH										
																	oven dried
G-15	S-7	35-37	59.1	64	26	38	CH			4.4							
G-17	U-2	82-84									120.3						
G-17	U-2	82.15	48.7														
G-17	U-2	82.65	34.9														
G-17	U-2	83.15	27.5														
G-17	U-2C	83.4	27.1	27	14	13	SC				122.6	UU@1.15	0.9	15.2			UU005c
G-19	S-7	35-37	57.7	77	28	49	CH-OH			5.9							
G-19	U-2	60-62									107.3						
G-19	U-2	60.35	61.4														
G-19	U-2	60.9	43.6														
G-19	U-2	61.45	48.2														
G-19	U-2C	61.7	43.3	43	19	24	CL				110.7	UU@0.94	1.0	11.5			UU342e
G-19	S-16	90-95	42.1	52	20	32	CH			4.2							
G-20	U-1	25-27															
G-20	S-7	45-47	25.1	np	np	np	ML			1.6		UU					missing
G-21	S-6	30-32	53.0	57	22	35	CH-OH			4.6							
G-21	S-6	30-32		41	21	20	CH-OH										
																	oven dried

Prepared by: RV Reviewed by: MG Date: 01/10/2005

Langan #35578403
New York Sports and Convention Center
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS									STRENGTH			CONSOL.		REMARKS
			WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLAS. IND.	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2 µm (%)	ORGANIC CONTENT (burnoff) (%)	TOTAL UNIT WEIGHT (pcf)	Type Test @ STRESS (tsf)	PEAK DEVIATOR STRESS (tsf)	AXIAL STRAIN @ PEAK STRESS (%)	INITIAL CONDITIONS VOID RATIO	INITIAL CONDITIONS SATUR-ATION	
G-27	S-6	30-32	9.3	np	np	np	ML			1.2							
G-27	U-1	45-47									104.9						
G-27	U-1	45.6	52.3														
G-27	U-1	46.15	50.4														
G-27	U-1C	46.4	42.3	49	22	27	CL			4.2	111.1				1.159	98	C04255
G-27	U-2	55-57									102.3						
G-27	U-2	55.55	53.7														
G-27	U-2B	55.8	50.1	50	21	29	CH			4.1	106.5	UU@0.94	1.0	6.7			UU342f
G-27	S-10	60-62	41.9	49	23	26	CL										
G-27	S-12	70-72	46.9	57	24	33	CH										
G-27	S-15	85-87	36.3	37	18	19	CL			2.9							
G-27	S-23	125-127	43.6	64	27	37	CH-OH			9.1							
G-30	U-1	40-42									104.7						
G-30	U-1	40.6	42.4														
G-30	U-1B	40.85	51.5	52	19	33	CH				106.9	CIU@0.79	0.6	7.3			T2438
G-30	U-2	50-52									124.4						
G-30	U-2	50.3	26.3														
G-30	U-2B	50.55	23.7	22	16	6	CL-ML				129.1	UU@0.94	0.8	15.1			UU342d
G-31	U-1	20-22									97.1						
G-31	U-1	20.35	64.9														
G-31	U-1	20.9	65.2														
G-31	U-1B	21.15	63.8				CH-OH	99.0	35		100.3	UU@0.58	0.7	8.2			UU343e
G-31	U-1	21.45	57.0														
G-31	U-1C	21.7	66.2	83	30	53	CH-OH			5.7	99.6				1.728	100	C04252

Prepared by: RV Reviewed by: CNG Date: 01/10/2005

Project No.: 31737700-458 File: Indx1.xls

Langan #35578403
New York Sports and Convention Center
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS									STRENGTH			CONSOL.		REMARKS
			WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLAS. IND.	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2 µm (%)	ORGANIC CONTENT (burnoff) (%)	TOTAL UNIT WEIGHT (pcf)	Type Test @ STRESS (tsf)	PEAK DEVIATOR STRESS (tsf)	AXIAL STRAIN @ PEAK STRESS (%)	INITIAL CONDITIONS VOID RATIO	INITIAL CONDITIONS SATUR-ATION	
G-37	S-1	10-12	22.8				SM	29.3									
G-37	S-2	15-17	25.5				SM	19.7									
G-37	S-3	20-22	15.7				SM	43.2									
G-37	S-5	30-32	58.6	69	27	42	CH-OH			4.4							
G-37	S-6	35-37	50.6	62	23	39	CH-OH			4.6							
G-37	S-6	35-37		43	21	22	CH-OH										
G-37	S-8	45-47	26.8	34	17	17	CL			2.0							oven dried
G-39	S-4	25-27	44.9	64	24	40	CH-OH			3.9							
G-39	S-5	30-32	10.5				SM	20.8									
G-48	U-2	25-27									94.0						
G-48	U-2	25.3	72.4														
G-48	U-2	25.85	79.8														
G-48	U-2B	26.1	69.4	80	29	51	CH-OH			6.5	100.3	CIU@0.50	0.3	9.3			T2439
G-48	U-2	26.4	66.8														
G-48	U-3	60-62									114.6						
G-48	U-3	60.25	52.0														
G-48	U-3	60.8	33.7														
G-48	U-3B	61.05	30.8				CL				120.7	UU@0.86	0.9	15.1			UU342c
G-48	U-3	61.35	30.7														
G-48	U-3C	61.6	37.8	33	17	16	CL				116.1				1.022	101	C04250
G-49	S-4	25-27	72.5	80	29	51	CH-OH			6.2							
G-49	U-1	30-32									102.1						
G-49	U-1	30.5	42.5														
G-49	U-1	31.05	57.5														
G-49	U-1C	31.3	56.6				CH-OH				103.7	UU@0.58	0.7	8.1			UU343b
G-49	U-1	31.6	54.7														
G-49	U-1D	31.85	60.4	67	25	42	CH-OH				102.7				1.584	101	C04251
G-49	S-6	35-37	50.4	63	24	39	CH-OH			3.8							
G-49	S-8	45-47	22.6	23	13	10	CL										

Prepared by: RV Reviewed by: Date: 01/10/2005

Project No.: 31737700-458 File: Indx1.xls

Langan #35578403
New York Sports and Convention Center
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS									STRENGTH			CONSOL.		REMARKS
			WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLAS. IND.	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2 µm (%)	ORGANIC CONTENT (burnoff) (%)	TOTAL UNIT WEIGHT (pcf)	Type Test @ STRESS (tsf)	PEAK DEVIATOR STRESS (tsf)	AXIAL STRAIN @ PEAK STRESS (%)	INITIAL CONDITIONS VOID RATIO	INITIAL CONDITIONS SATUR-ATION	
G-50	S-4	25-27	55.0	66	26	40	CH-OH			4.5							
G-50	S-6	35-37	18.6	np	np	np	SM			1.0							
G-50	S-6	35-37															
																	np - oven dried not performed
G-52	S-2	16-18	52.7	71	30	41	CH	83.3	24	4.9							
G-52	S-3	20-22	17.2	21	14	7	CL-ML										
G-62	S-7	40-42	51.8	52	21	31	CH			3.6							
G-62	U-1	45-47									102.1						
G-62	U-1	45.35	57.9														
G-62	U-1	45.85	56.3														
G-62	U-1	46.25	50.5														
G-62	U-1C	46.5	49.5	60	22	38	CH-OH				105.1	UU@0.86	0.8	8.5			UU005a
G-62	S-9	55-57	54.3	58	24	34	CH-OH			4.2							
G-62	U-2	60-62									107.9						
G-62	U-2	60.55	53.5														
G-62	U-2	61.05	32.3														
G-62	U-2	61.4	37.3														
G-62	U-2C	61.7	34.1	30	16	14	CL				118.5	UU@1.01	0.6	15.1			UU005b
G-62	S-11	70-72	28.5	28	15	13	CL										
G-62	S-14	85-87	32.4	34	16	18	CL										
G-63	S-3	20-22	86.0	91	33	58	CH-OH			7.0							
G-63	S-5	30-32	83.7	98	32	66	CH-OH			8.1							
G-63	S-7	40-42	65.1														
G-63	S-10	55-57	42.7	32	17	15	CL										
G-63	S-12	65-67	33.7							2.6							
G-63	S-13	70-72	34.6	33	17	16	CL			2.4							
G-63	S-15	80-82					SM	39.8	8								

Prepared by: RV Reviewed by: Date: 01/10/2005

Project No.: 31737700-458 File: Indx1.xls

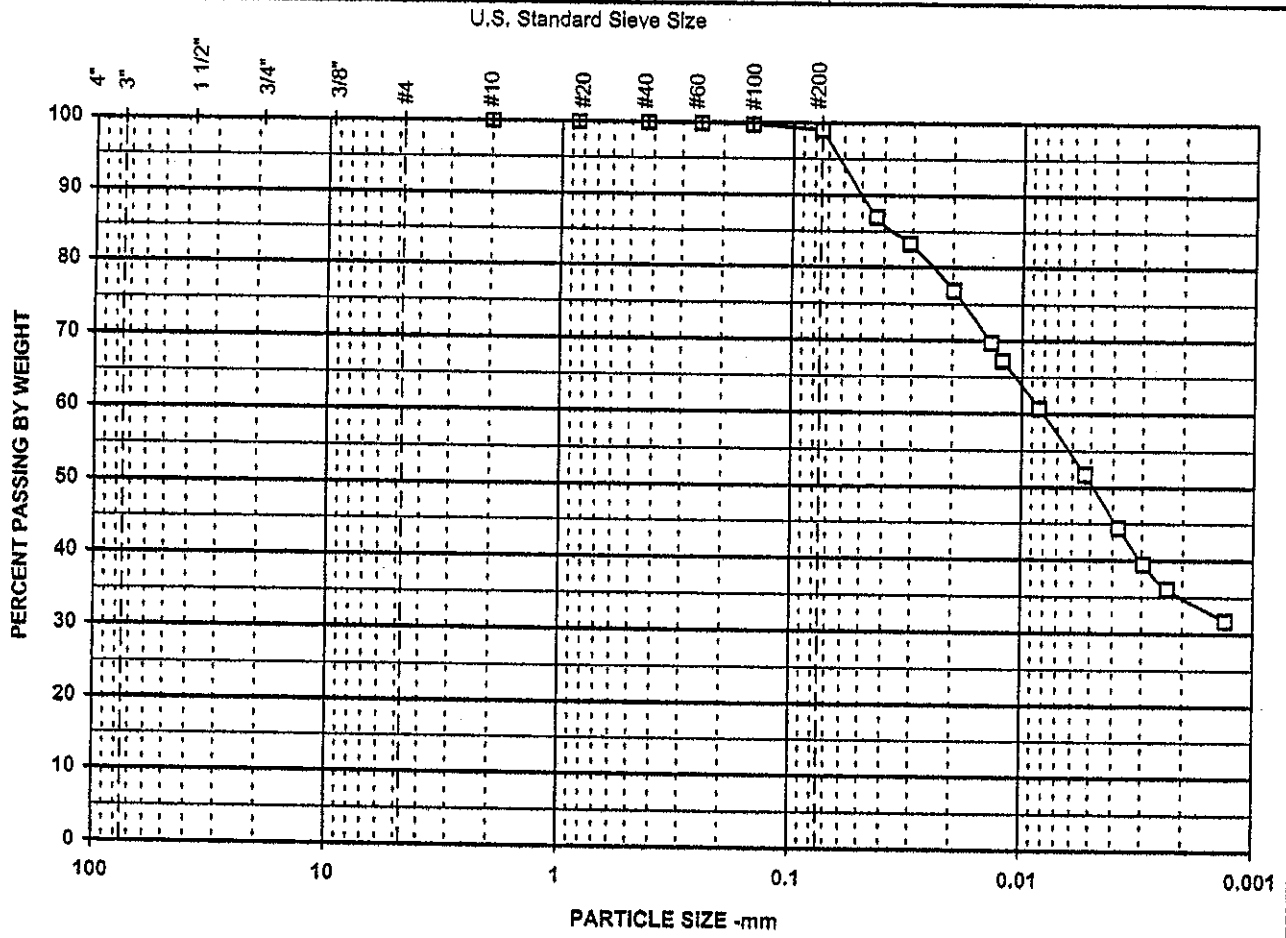
Langan #35578403
New York Sports and Convention Center
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS									STRENGTH			CONSOL.		REMARKS
			WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLAS. IND.	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDRO. % MINUS 2 µm (%)	ORGANIC CONTENT (burnoff) (%)	TOTAL UNIT WEIGHT (pcf)	Type Test @ STRESS (tsf)	PEAK DEVIATOR STRESS (tsf)	AXIAL STRAIN @ PEAK STRESS (%)	INITIAL CONDITIONS VOID RATIO	INITIAL CONDITIONS SATUR-ATION	
G-64	S-3	20-22	26.3							1.9							
G-64	U-1	25-27															*no test
G-64	S-6	30-32	58.9														
G-64	U-2	40-42									104.8						
G-64	U-2	40.55	53.6														
G-64	U-2	41.1	53.6														
G-64	U-2C	41.35	46.4				CL	83.5	19	3.6	108.1	UU@0.65	0.9	6.9			UU343a
G-64	U-2	41.65	34.2														
G-64	S-9	42-44	42.6	51	20	31	CH			2.9							
G-66	S-3	20-22	49.6	66	28	38	CH-OH			4.3							
G-66	S-4	25-27					SM	16.5	5								

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.

Prepared by: RV Reviewed by: CMG Date: 01/10/2005

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



SYMBOL	DESCRIPTION AND REMARKS
□	gray ORGANIC CLAY, trace f. sand.
■	
○	

Symbol	□	■	○
Boring	G-31		
Sample	U-1		
Spec	B		
Depth	21.15		
% +3"			
% Gravel			
% SAND	1.0		
% FINES	99.0		
% -2μ	35		
Cc			
Cu			
LL			
PL			
PI			
USCS	CH-OH		
w (%)			

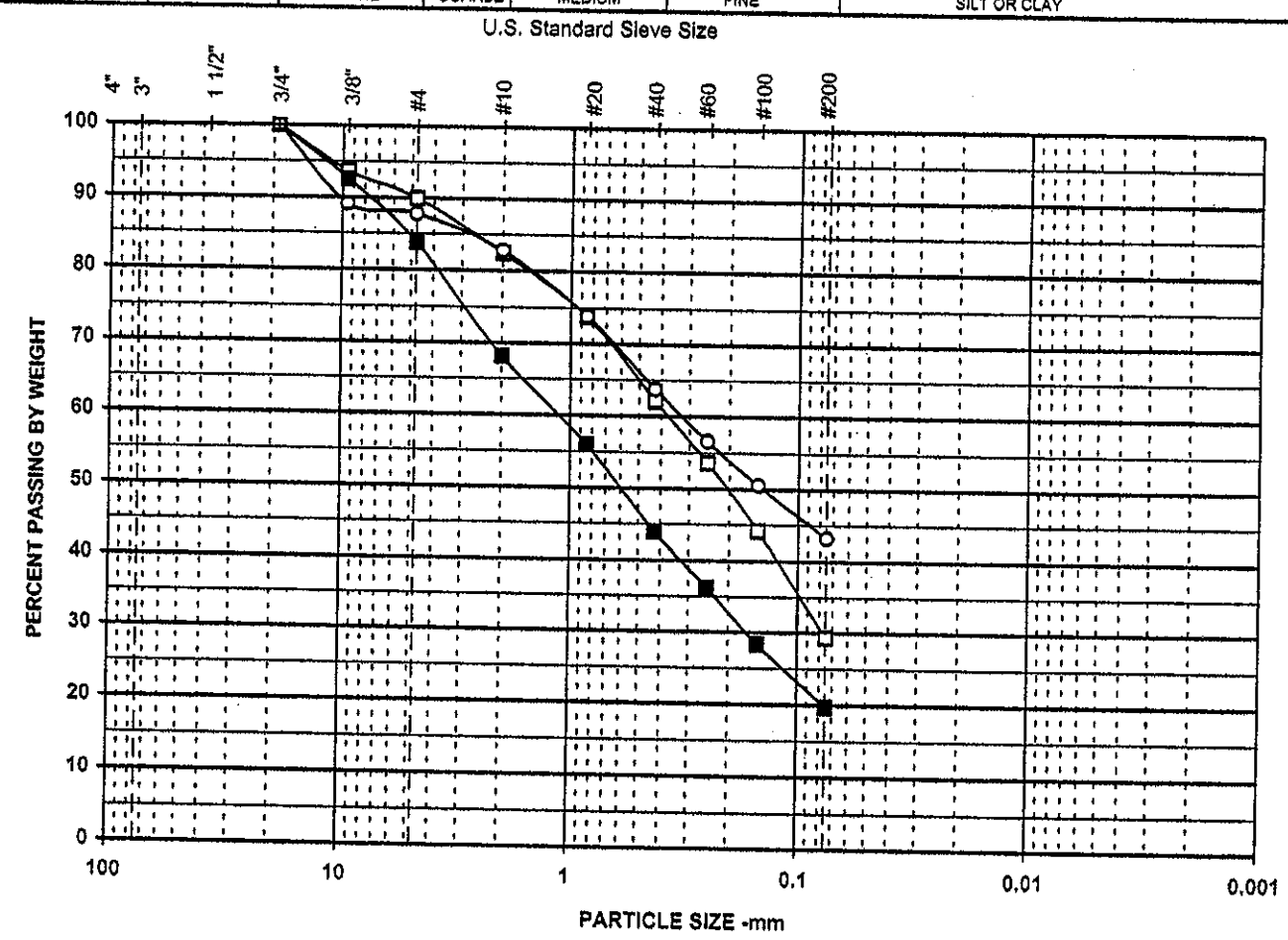
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			
3/8"			
4			
10			
20	100.0		
40	99.9		
60	99.8		
100	99.7		
200	99.0		

PARTICLE SIZE DISTRIBUTION
Langan #5578403

Project No.		
31737700-458	January 2005	Figure

Geotesting Services, Inc.

sievld.xls 01/05/2005



SYMBOL	DESCRIPTION AND REMARKS
□	brown c-f SAND, some silt, trace f. gravel.
■	brown-black c-f SAND, some f. gravel, silt.
○	brown silty c-f SAND, some f. gravel.

Symbol	□	■	○
Boring	G-37	G-37	G-37
Sample	S-1	S-2	S-3
Spec			
Depth	10-12	15-17	20-22
% +3"			
% Gravel	10.1	16.2	12.2
% SAND	60.6	64.1	44.6
% FINES	29.3	19.7	43.2
% -2μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	SM	SM	SM
w (%)	22.8	25.5	15.7

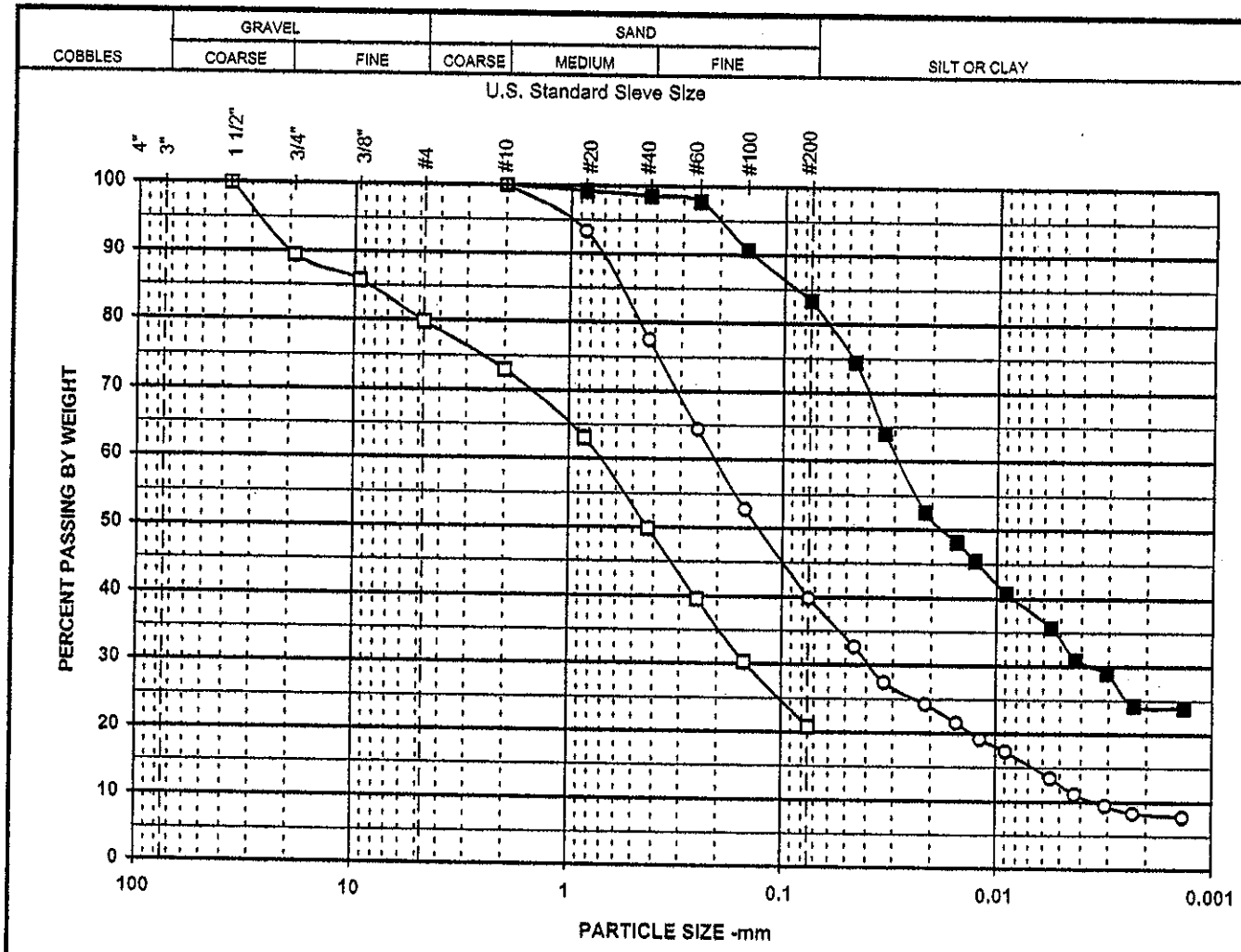
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"	100.0	100.0	100.0
3/8"	93.6	92.5	89.1
4	89.9	83.8	87.8
10	82.4	68.1	82.7
20	73.8	56.0	73.8
40	62.1	44.0	63.7
60	53.6	36.2	56.5
100	44.2	28.3	50.5
200	29.3	19.7	43.2

PARTICLE SIZE DISTRIBUTION

Langan #5578403

Project No.		
31737700-458	December 2004	Figure

Geotesting Services, Inc.



SYMBOL	DESCRIPTION AND REMARKS
□	reddish brown c-f SAND, some gravel, silt.
■	reddish brown CLAY, some f. sand, trace m. sand.
○	brown silty m-f SAND.

Symbol	□	■	○
Boring	G-39	G-52	G-63
Sample	S-5	S-2	S-15
Spec			
Depth	30-32	16-18	80-82
% +3"			
% Gravel	20.2		
% SAND	59.0	16.7	60.2
% FINES	20.8	83.3	39.8
% -2μ		24	8
Cc			
Cu			
LL		71	
PL		30	
PI		41	
USCS	SM	CH	SM
w (%)	10.5		

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"	100.0		
3/4"	89.4		
3/8"	85.7		
4	79.8		
10	73.0	100.0	100.0
20	63.0	99.2	93.3
40	49.8	98.6	77.5
60	39.5	97.8	64.3
100	30.3	90.7	52.7
200	20.8	83.3	39.8

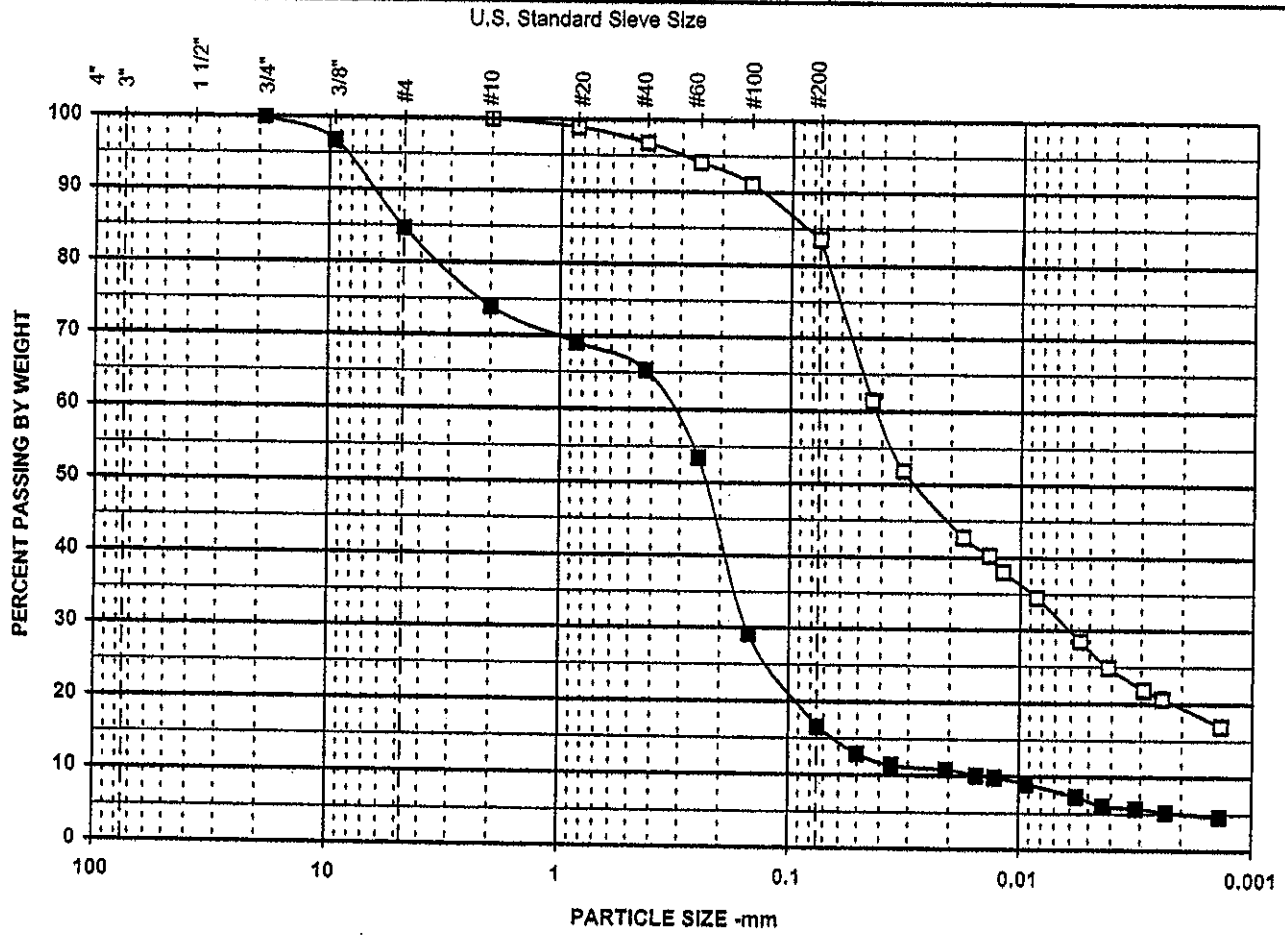
PARTICLE SIZE DISTRIBUTION

Langan #5578403

Project No.		
31737700-458	December 2004	Figure

Geotesting Services, Inc.

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



SYMBOL	DESCRIPTION AND REMARKS
□	gray ORGANIC silty CLAY, some m-f sand.
■	brown c-f SAND, some f. gravel, silt.
○	

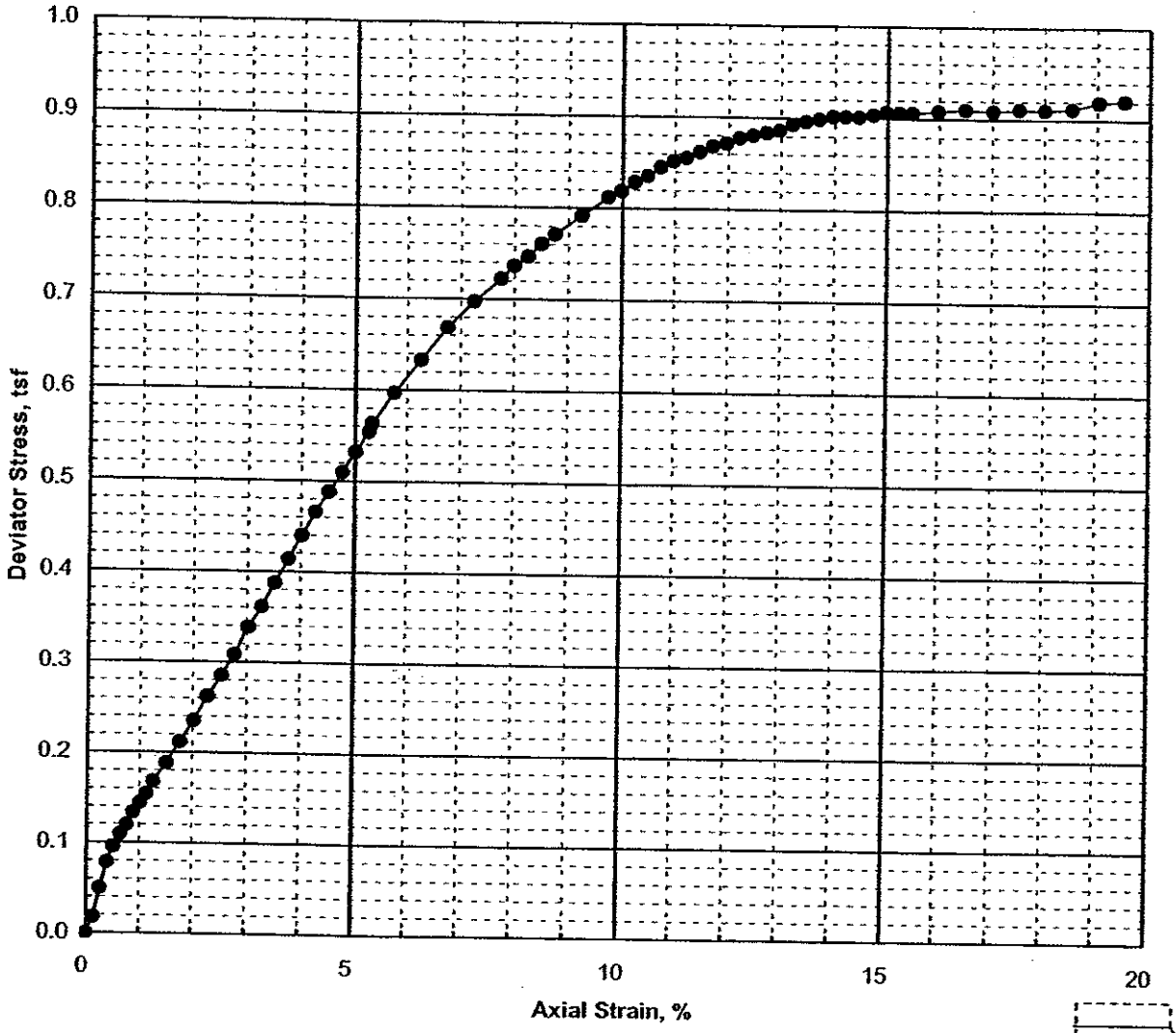
Symbol	□	■	○
Boring	G-64	G-66	
Sample	U-2	S-4	
Spec	C		
Depth	41.35	25-27	
% +3"			
% Gravel		15.4	
% SAND	16.5	68.1	
% FINES	83.5	16.5	
% -2μ	19	5	
Cc			
Cu			
LL			
PL			
PI			
USCS	CL-OL	SM	
w (%)			

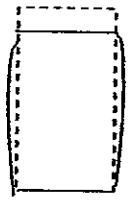
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"		100.0	
3/8"		96.7	
4		84.6	
10	100.0	73.9	
20	98.9	69.0	
40	96.8	65.3	
60	94.1	53.4	
100	91.1	29.2	
200	83.5	16.5	

PARTICLE SIZE DISTRIBUTION
Langan #5578403

Project No.		Figure
31737700-458	January 2005	

Geotesting Services, Inc.





FAILURE SKETCH

Specimen Information

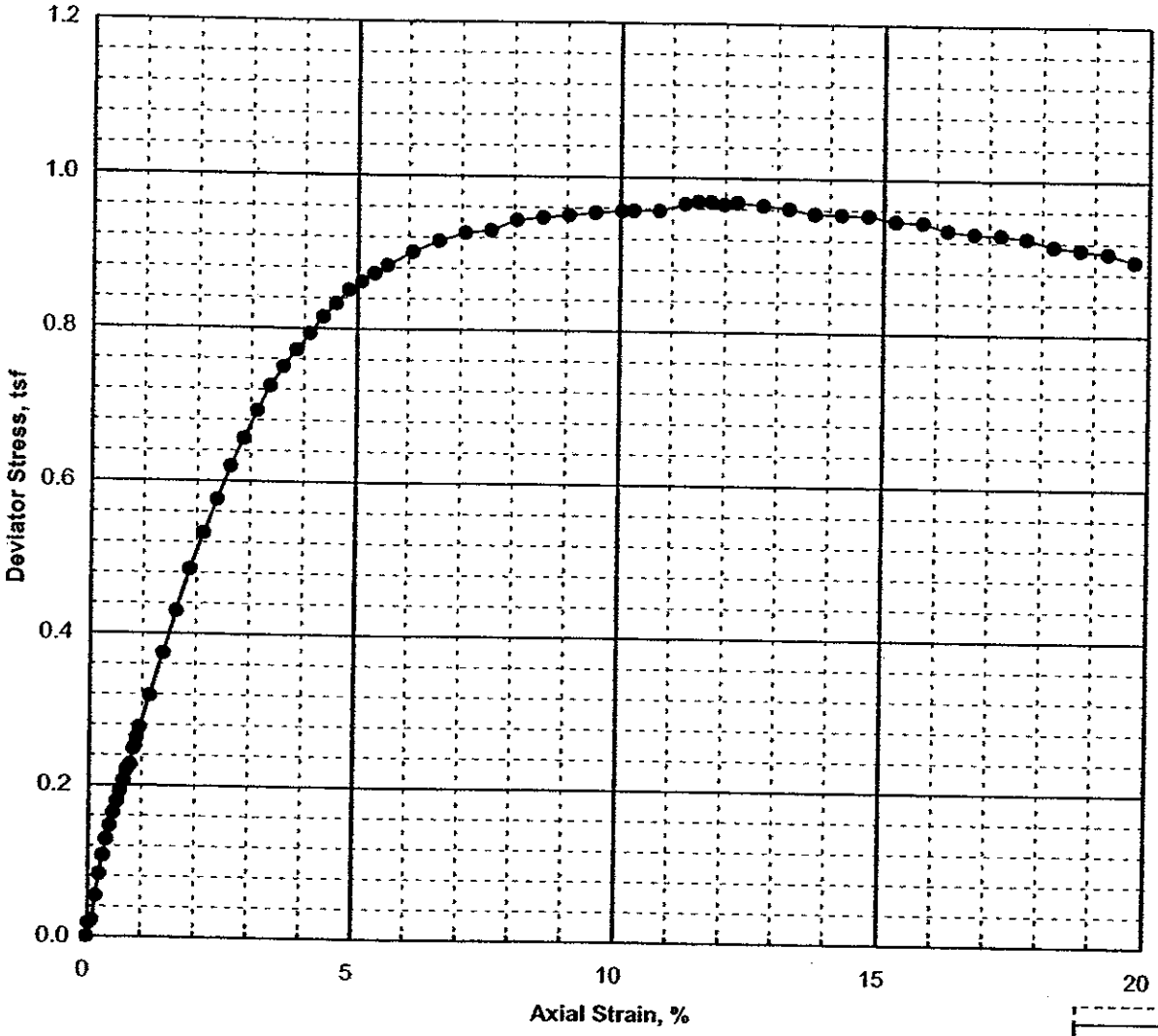
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
27.1	27	13	5.977	2.871	122.6	96.5

SC, gray silty clayey, f. SAND, trace m-f sand; shell fragments and organic mat'l noted.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
1.15	0.25	0.91	15.2	0.75

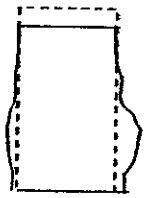
Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-17 Sample No.: U-2C Depth (ft): 83.4	January 2005



Specimen Information

Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
43.3	43	24	6.007	2.865	110.7	77.3

CL, gray CLAY, trace f. sand; silt lenses and organic mat'l noted.

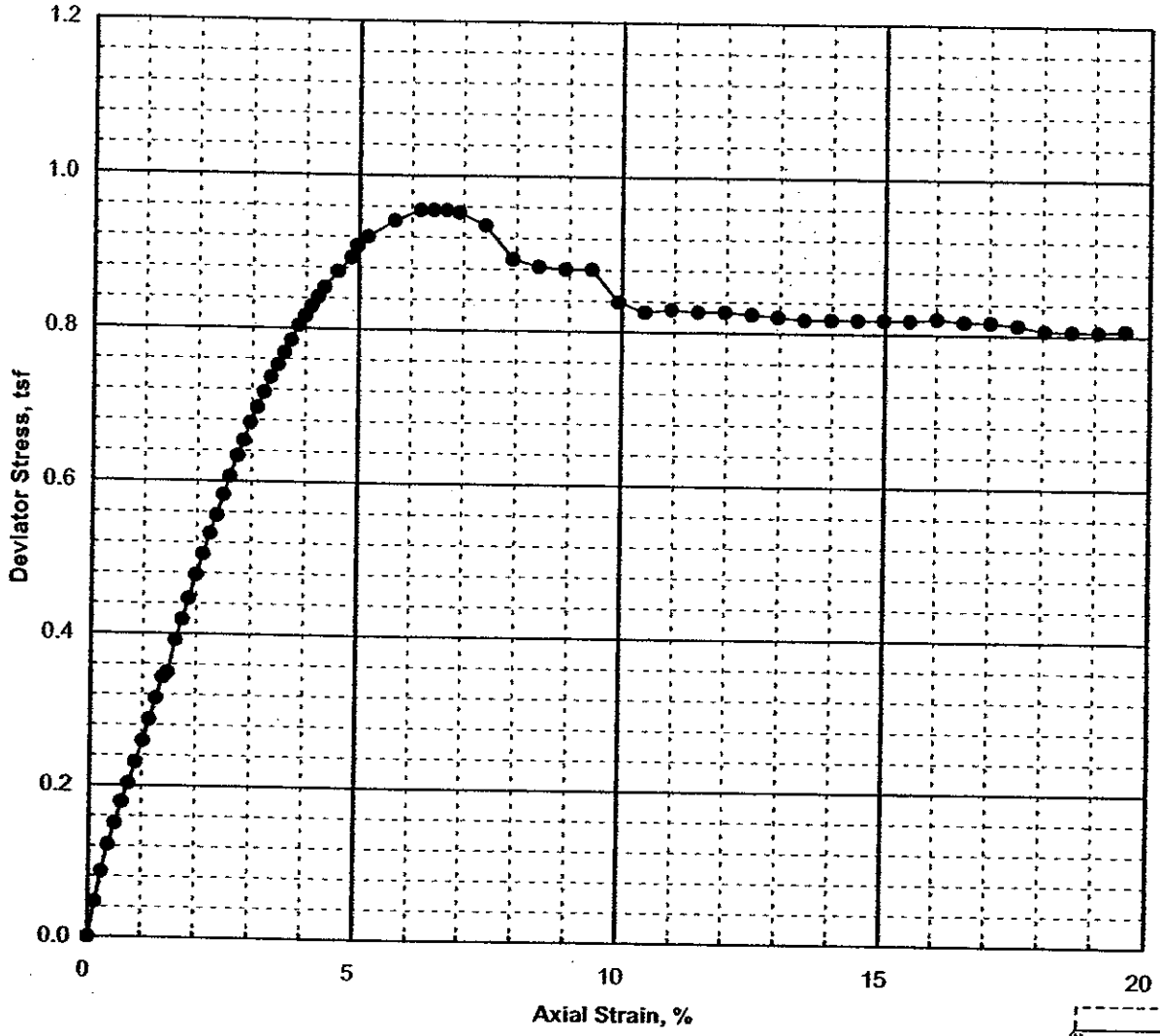


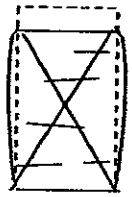
FAILURE SKETCH

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
0.94	0.17	0.97	11.5	0.74

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-19 Sample No.: U-2C Depth (ft): 61.7	January 2005





FAILURE SKETCH

Specimen Information

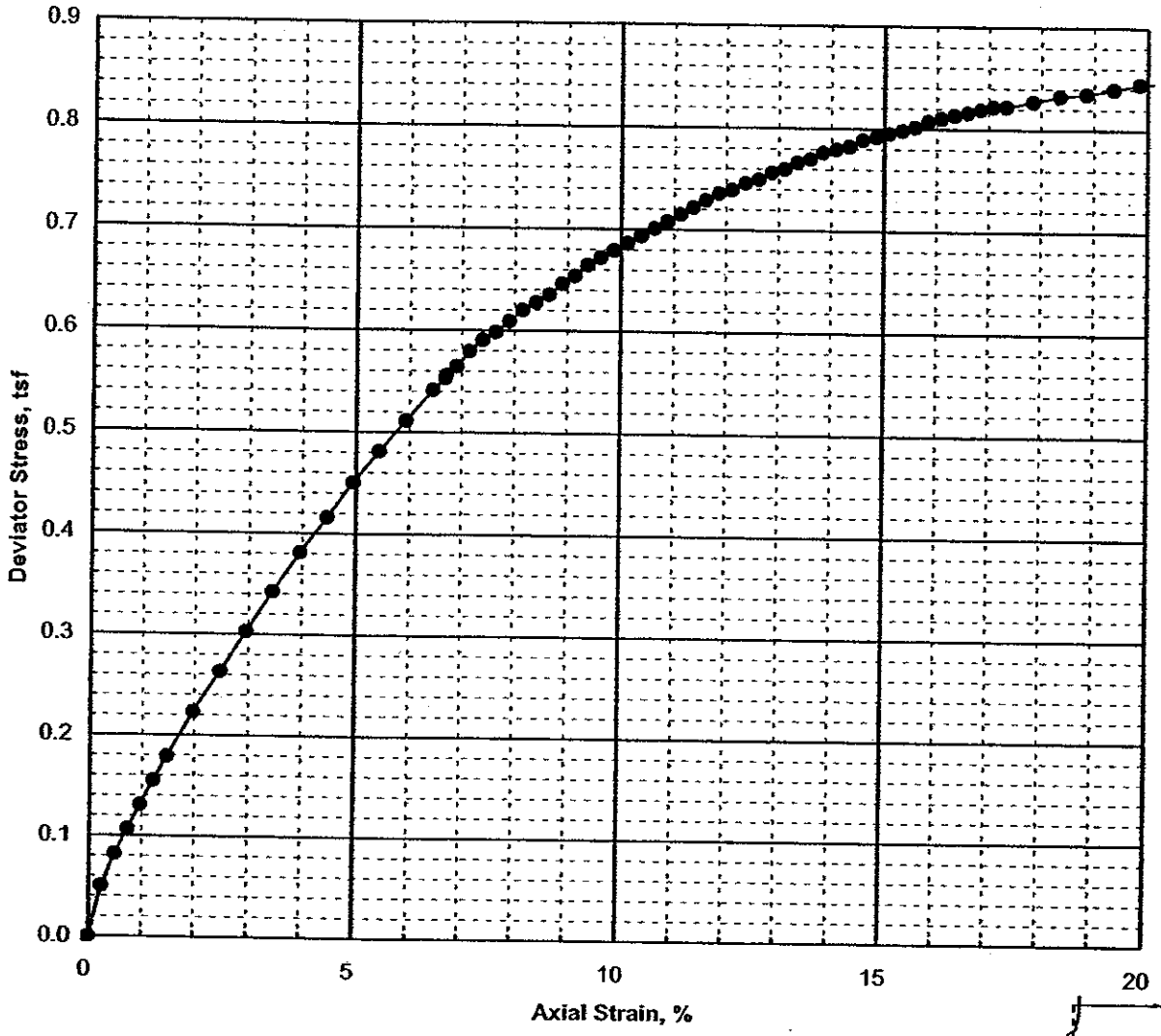
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
50.1	50	29	5.963	2.864	106.5	71.0

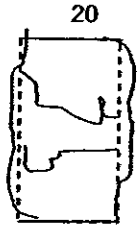
CH, gray VARVED CLAY, trace f. sand.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
0.94	0.17	0.96	6.7	0.75

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-27 Sample No.: U-2B Depth (ft): 55.8	January 2005





FAILURE SKETCH

Specimen Information

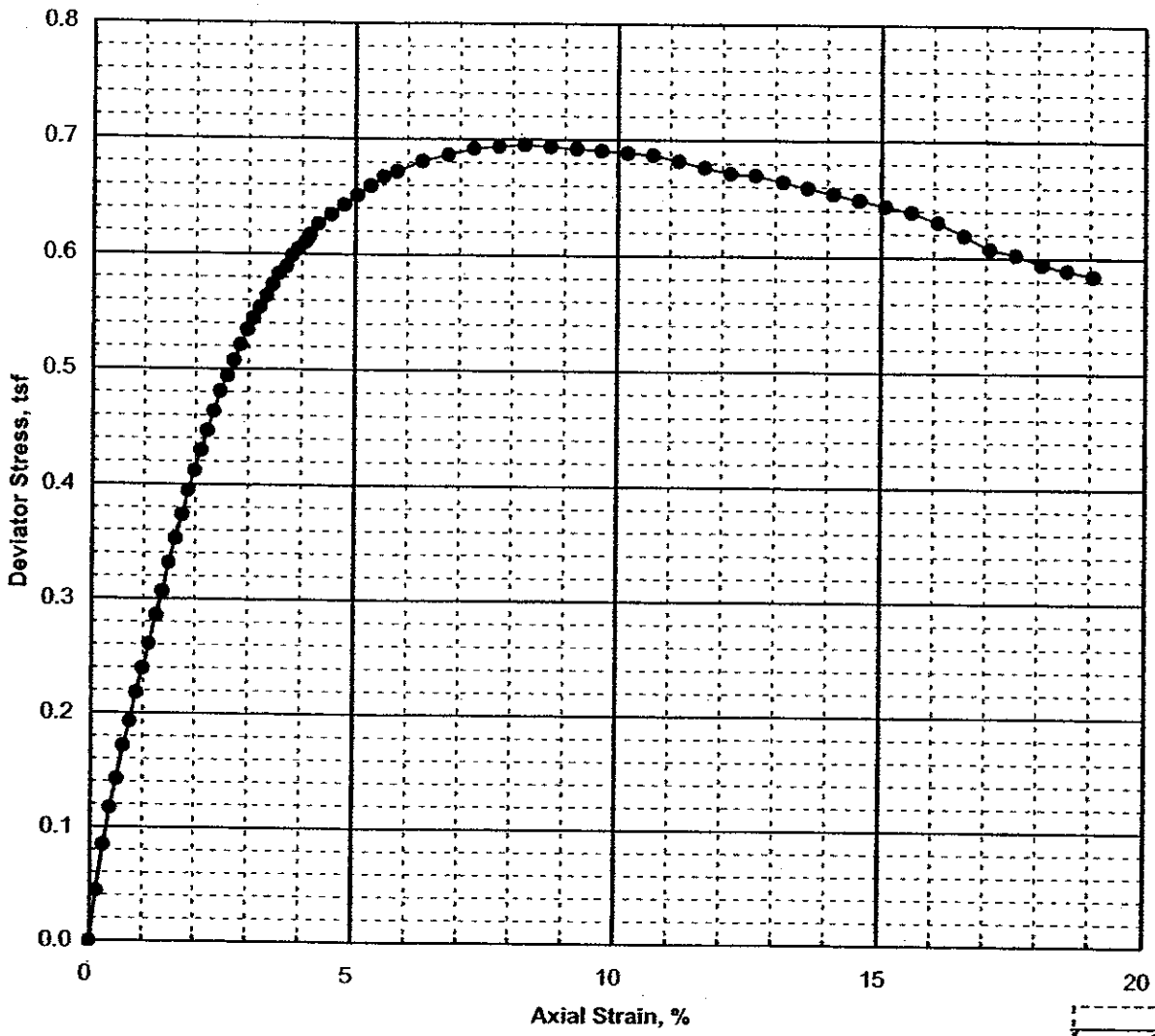
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
23.7	22	6	5.983	2.855	129.1	104.3

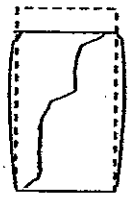
CL-ML, gray sandy silty CLAY, trace f. gravel.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
0.94	0.07	0.80	15.1	0.73

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-30 Sample No.: U-2B Depth (ft): 50.55	January 2005





FAILURE SKETCH

Specimen Information

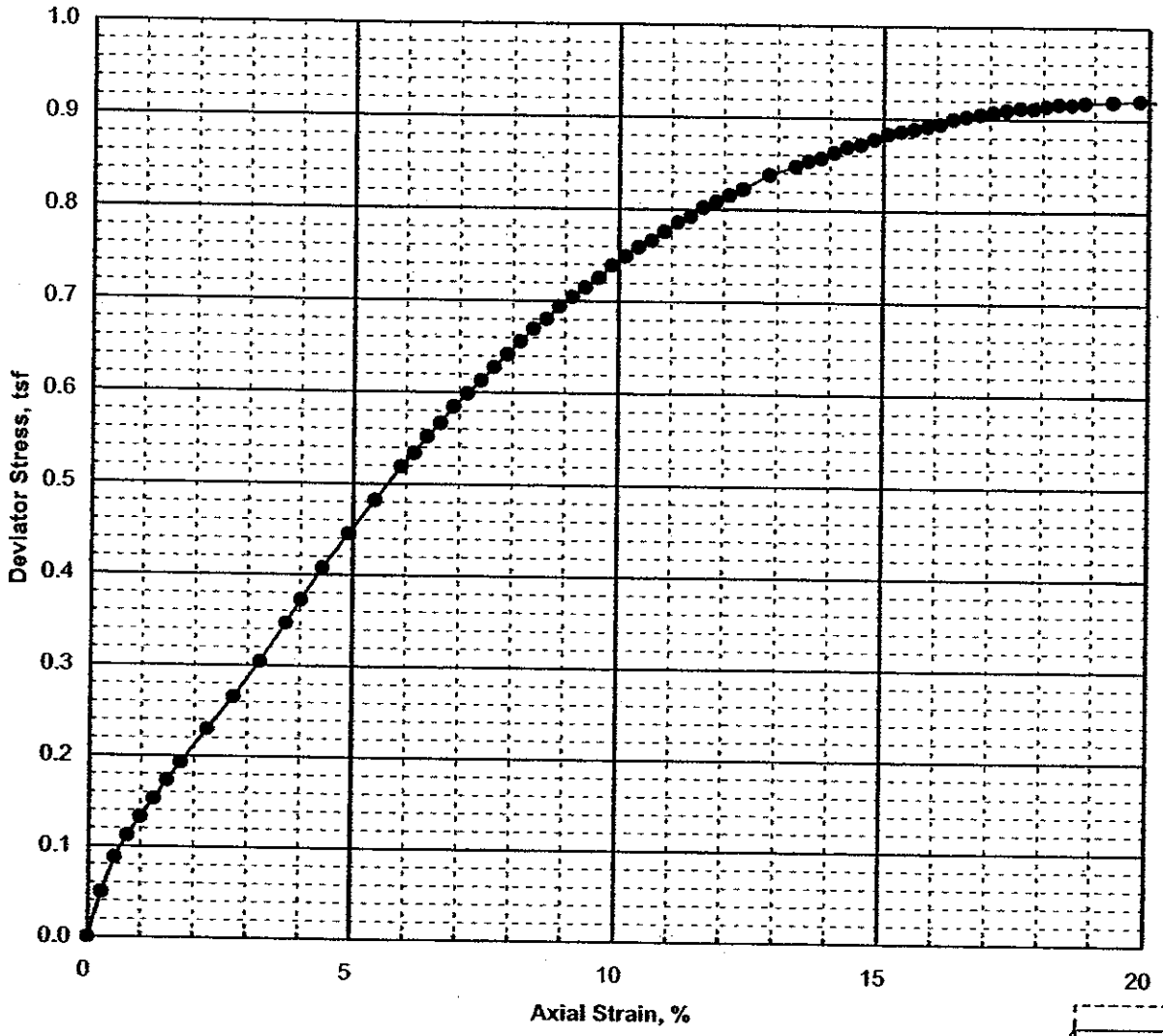
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
63.8			6.034	2.831	100.3	61.3

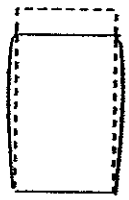
CH-OH, gray ORGANIC CLAY, trace f. sand.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
0.58	0.12	0.70	8.2	0.74

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-31 Sample No.: U-1B Depth (ft): 21.15	January 2005





FAILURE SKETCH

Specimen Information

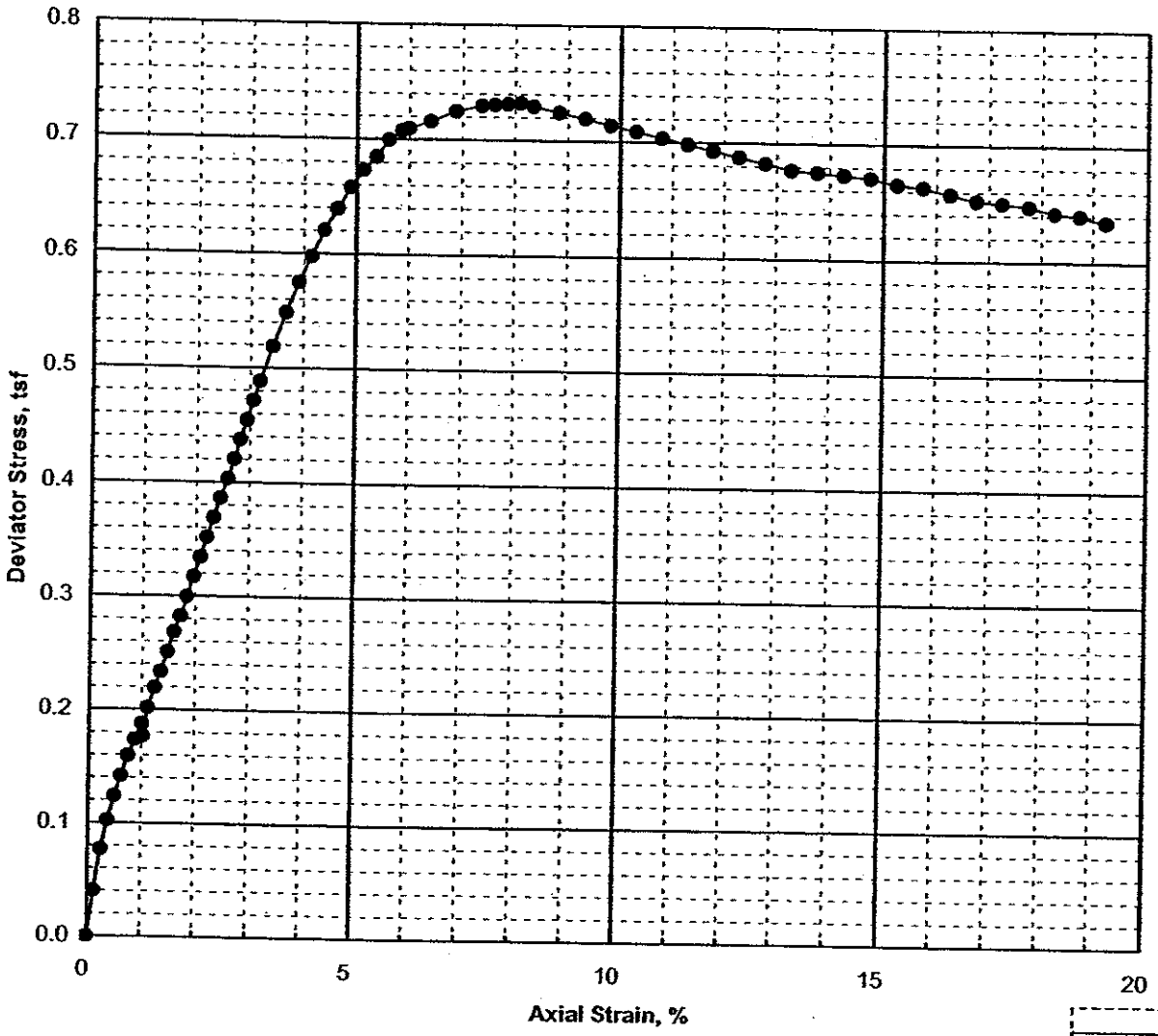
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
30.8			6.009	2.875	120.7	92.3

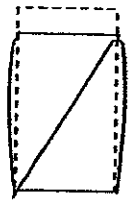
CL, gray silty CLAY, trace f. sand; shell fragments and organic mat'l noted.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
0.86	0.18	0.88	15.1	0.74

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-48 Sample No.: U-3B Depth (ft): 61.05	January 2005





FAILURE SKETCH

Specimen Information

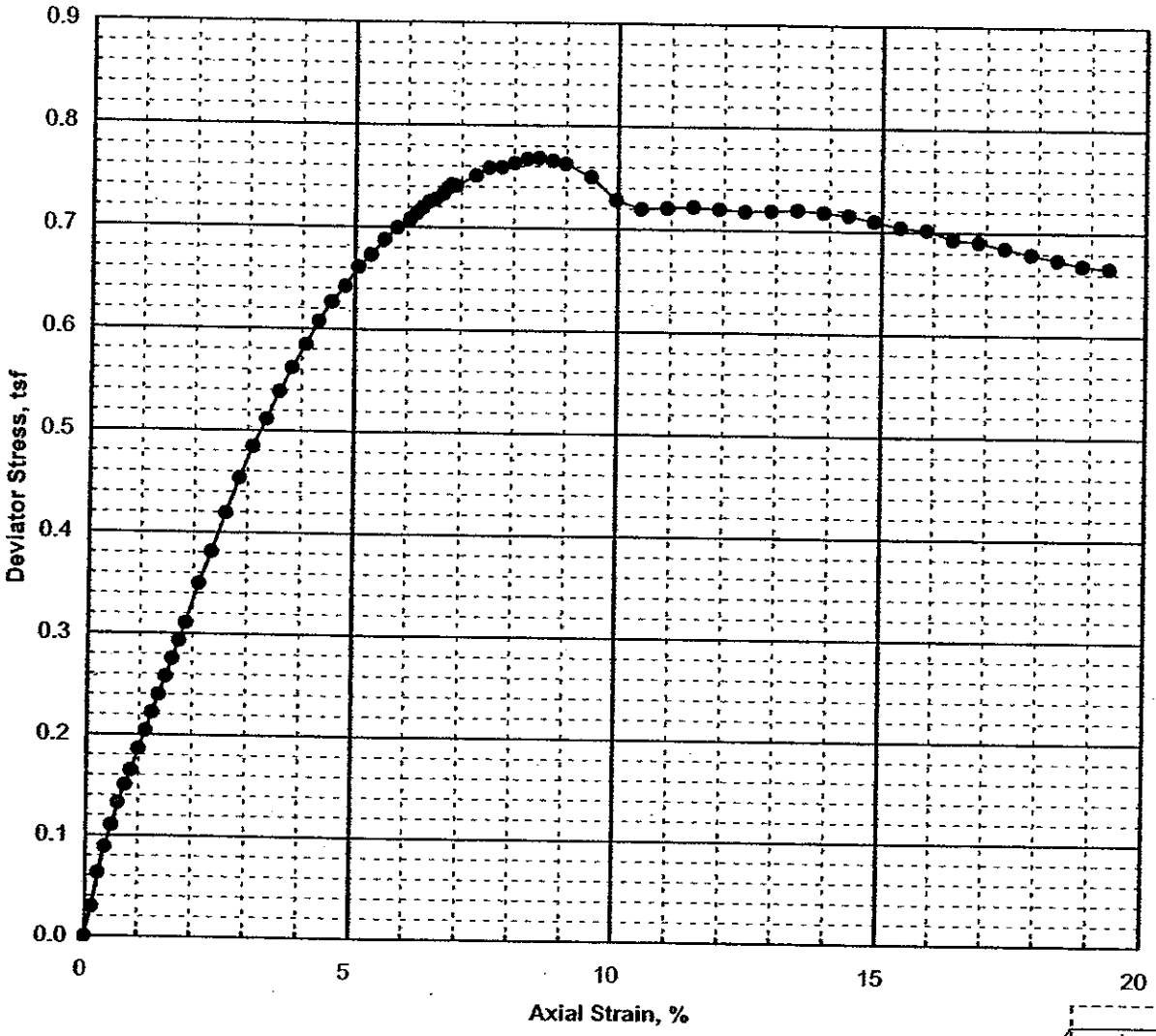
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
56.6			6.022	2.833	103.7	66.3

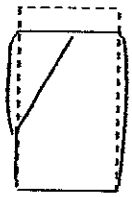
CH-OH, gray ORGANIC CLAY, trace f. sand; shell fragments noted.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
0.58	0.08	0.73	8.1	0.73

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-49 Sample No.: U-1C Depth (ft): 31.3	January 2005





FAILURE SKETCH

Specimen Information

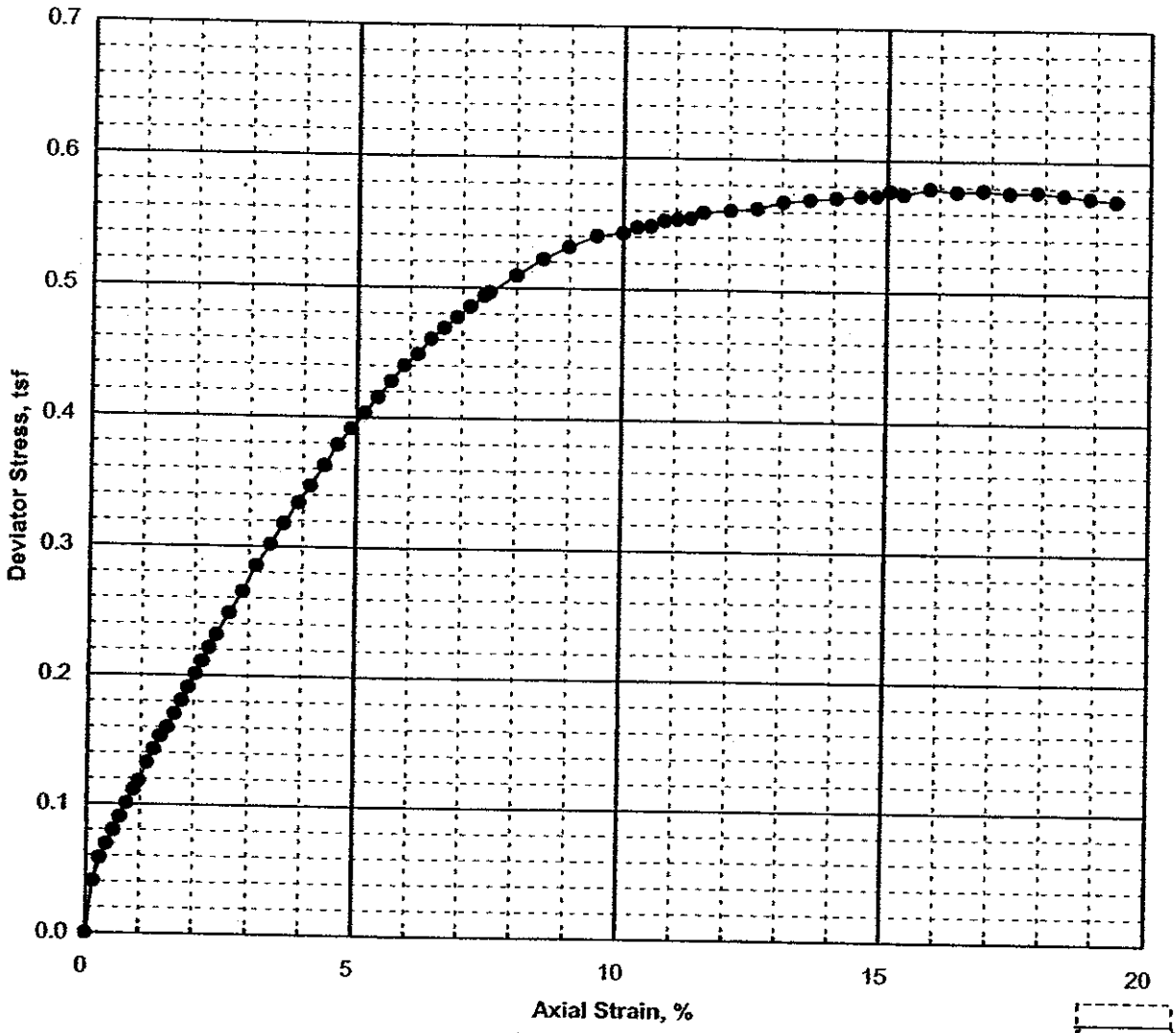
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
49.5	60	38	6.007	2.816	105.1	70.3

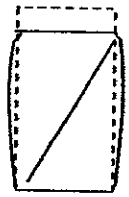
CH-OH, gray ORGANIC VARVED CLAY, trace f. sand.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
0.86	0.12	0.77	8.5	0.74

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-62 Sample No.: U-1C Depth (ft): 46.5	January 2005





FAILURE SKETCH

Specimen Information

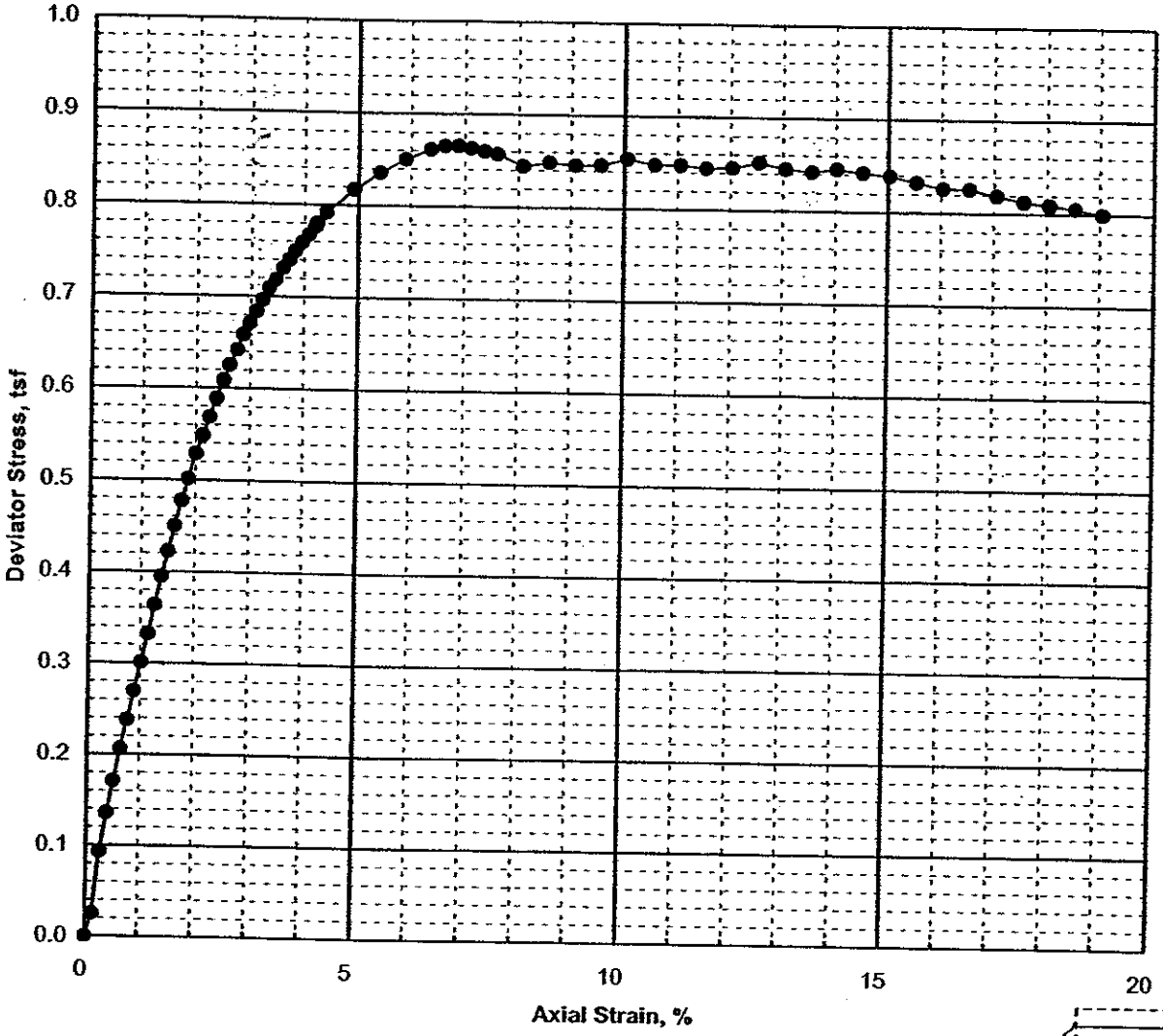
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
34.1	30	14	5.843	2.835	118.5	88.4

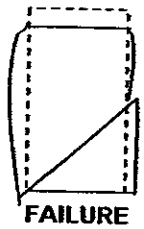
CL, gray silty CLAY, trace f. sand; numerous shell fragments noted.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
1.01	0.14	0.58	15.1	0.76

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-62 Sample No.: U-2C Depth (ft): 61.7	January 2005





FAILURE SKETCH

Specimen Information

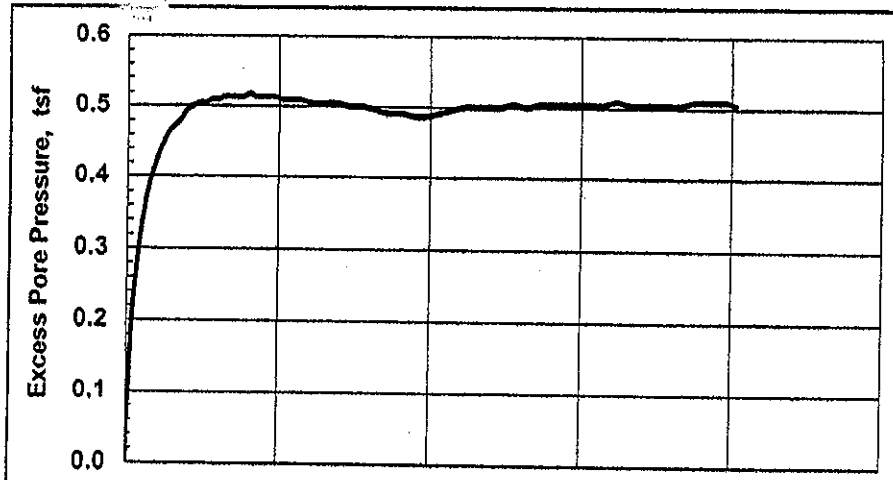
Water Content (%)	LL	PI	Length (inch)	Diameter (inch)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)
46.4			6.011	2.870	108.1	73.8

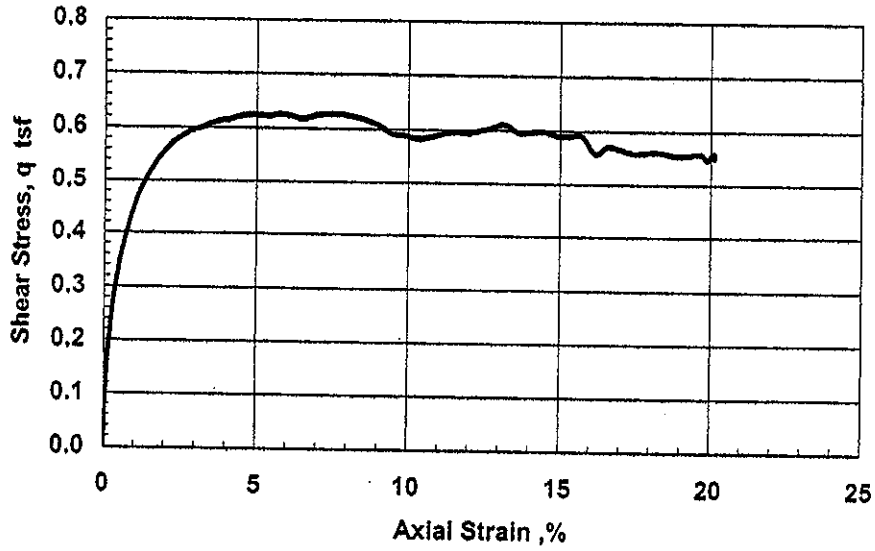
CL, gray silty CLAY, some m-f sand; shell fragments noted.

Test Summary

Cell Pressure (tsf)	Axial Strain during confinement (%)	Compressive Strength (tsf)	Strain to Peak (%)	Strain Rate (%/min)
0.65	0.22	0.87	6.9	0.74

Project No. 31737700-458	New York Sports and Convention Center	UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Geotesting Services, Inc.		Boring No.: G-64 Sample No.: U-2C Depth (ft): 41.35	January 2005





SAMPLE INFORMATION

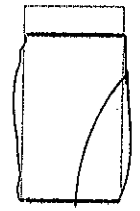
Boring: G-30 Sample: U-1B Depth: 40.85ft
Type: Undisturbed
Description: CH-OH, gray ORGANIC VARVED CLAY, trace f. sand.
LL = 52 PL = 19 PI = 33

SPECIMEN INFORMATION (initial)

Height: 6.02 inch Diameter: 2.86 inch Area: 6.41 in²
Water Content: 51.5 % Total Unit Weight: 106.9 pcf

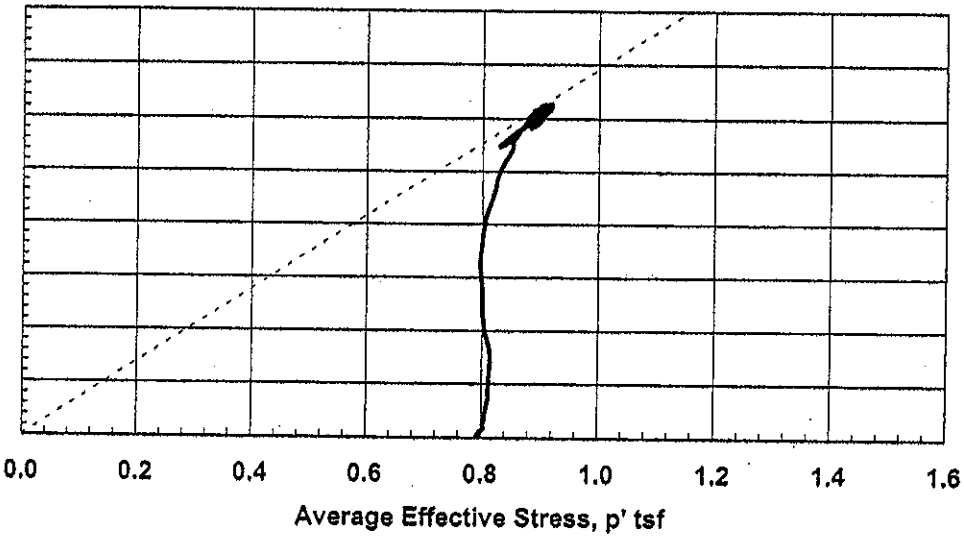
TEST SUMMARY

Consolidation Stresses: 0.79 tsf vertical, 0.79 tsf lateral
Water Content: 48.6 % Total Unit Weight: 108.0 pcf
B Coefficient: 98 Strain Rate: 0.017 %/min
Peak Shear Strength: 0.63 tsf @ 7.3 % Strain
Peak Effective Friction Angle: 43.8°



Failure Sketch

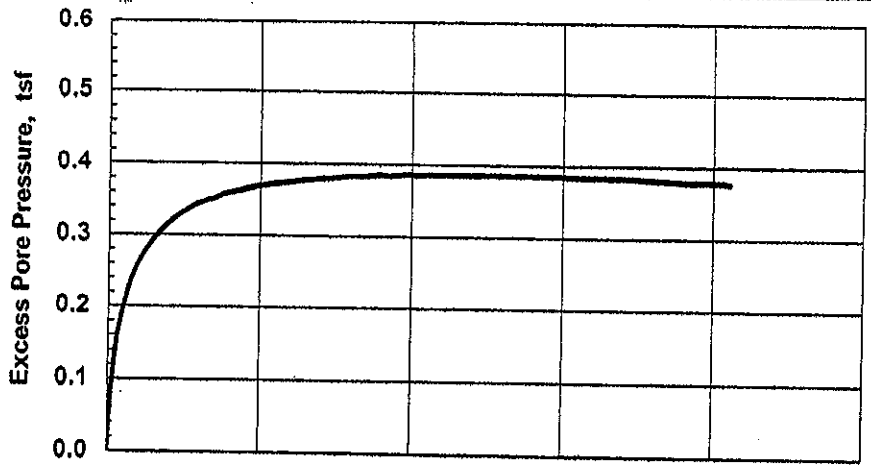
REMARKS:

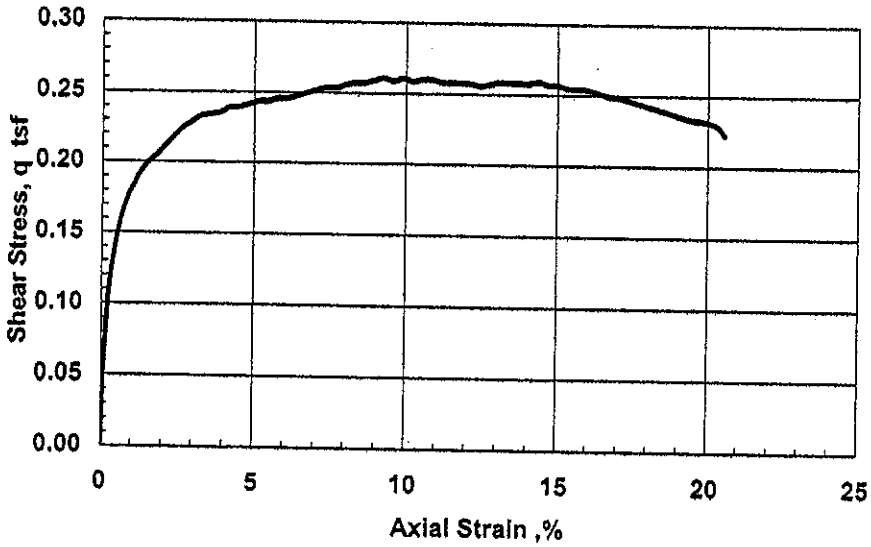


Test by: DT

Checked by: MO

Project No. 31737700-458	New York Sports and Convention Center	CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION with Pore Pressure Measurements	
Geotesting Services, Inc.		Boring G-30 Sample U-1B	January-05





SAMPLE INFORMATION

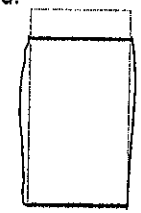
Boring: G-48 Sample: U-2B Depth: 26.1ft
Type: Undisturbed
Description: CH-OH, gray ORGANIC CLAY, trace f. sand; silt layers noted.
LL = 80 PL = 29 PI = 51

SPECIMEN INFORMATION (Initial)

Height: 6.01 inch Diameter: 2.78 inch Area: 6.07 in²
Water Content: 69.4 % Total Unit Weight: 100.3 pcf

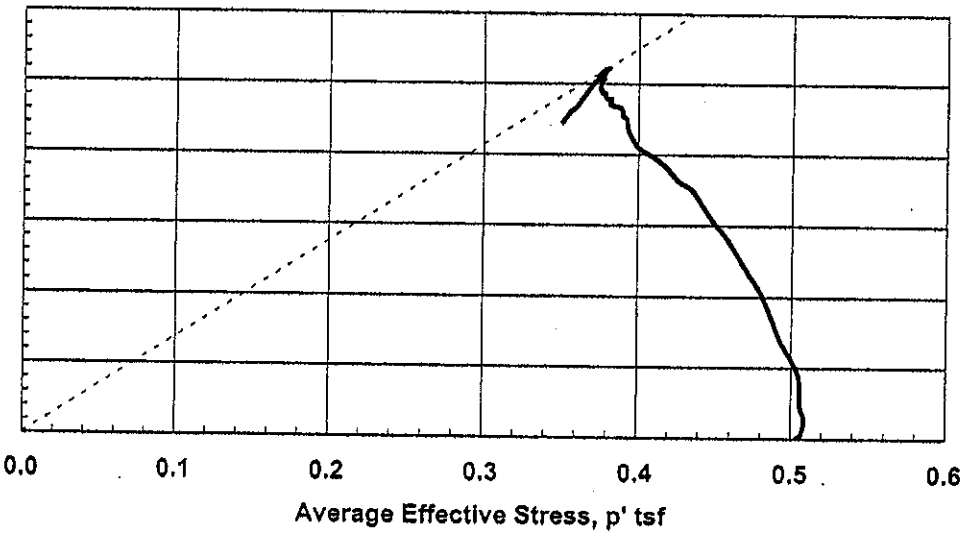
TEST SUMMARY

Consolidation Stresses: 0.50 tsf vertical, 0.50 tsf lateral
Water Content: 60.5 % Total Unit Weight: 102.9 pcf
B Coefficient: 99.5 Strain Rate: 0.018 %/min
Peak Shear Strength: 0.26 tsf @ 9.3 % Strain
Peak Effective Friction Angle: 43.5°



Failure Sketch

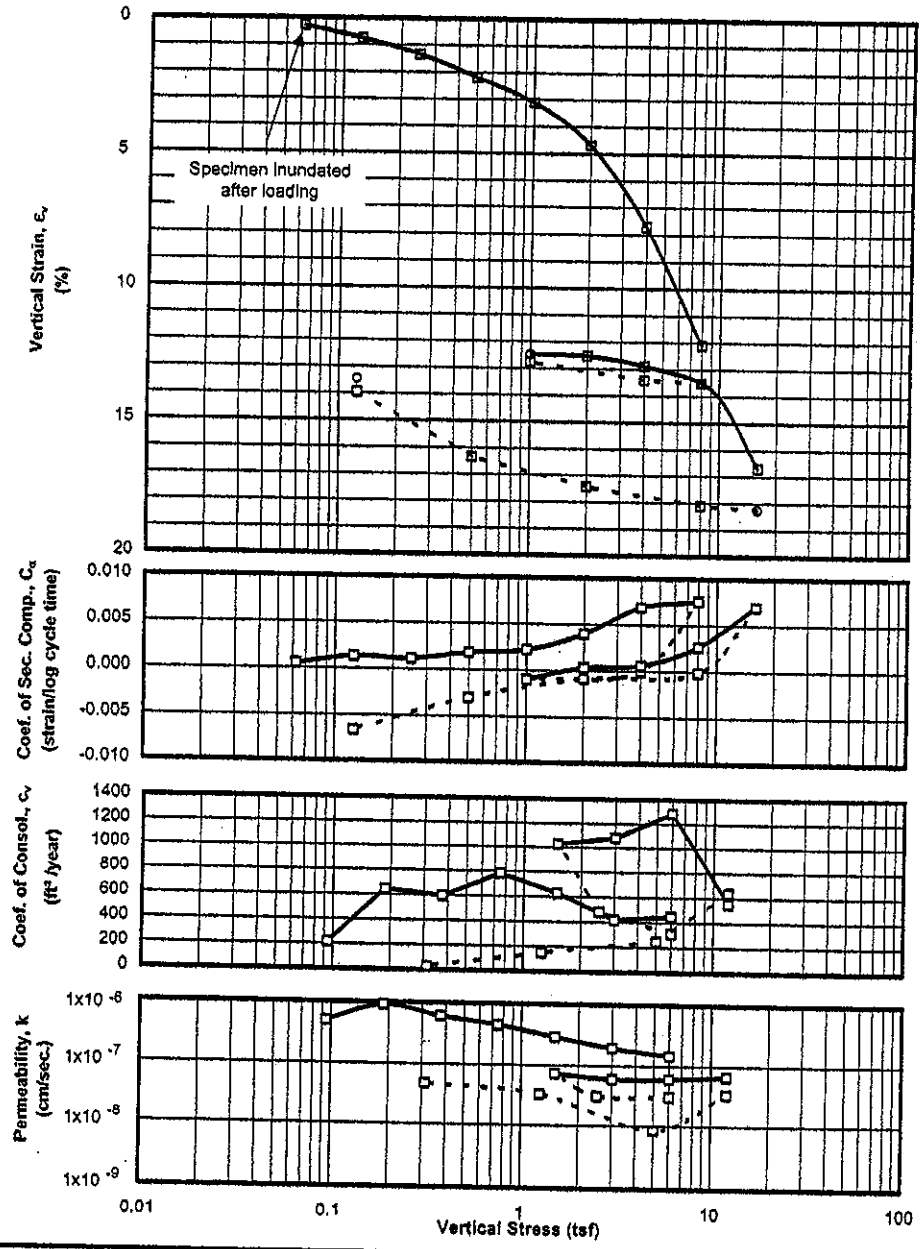
REMARKS:



Test by: DT

Checked by: MS

Project No. 31737700-458	New York Sports and Convention Center	CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION with Pore Pressure Measurements	
Geotesting Services, Inc.		Boring G-48 Sample U-2B	January-05



SAMPLE INFORMATION

Boring:	G-27
Sample:	U-1C
Depth:	46.40 feet
Elevation:	
Type:	3-inch thin wall tube
Description:	CL, gray CLAY, trace f. sand; numerous shell fragments noted, LL = 49, PL = 22, PI = 27

SPECIMEN INFORMATION

(NOTE: Initial and final states refer to beginning and end of test)

Initial height:	0.63	inch
Diameter:	2.50	inch

Initial water content:	42.3	%
Initial total unit weight:	111.1	pcf
Initial dry unit weight:	78.1	pcf
Initial void ratio:	1.159	
Initial degree of saturation:	98	%
Final water content:	37.7	%
Final total unit weight:	115.1	pcf
Final dry unit weight:	83.6	pcf
Final void ratio:	1.016	
Final degree of saturation:	100	%

(assumed specific gravity = 2.70)

TEST SUMMARY

Construction Method:	Casagrande (Log)
Estimated preconsolidation stress (tsf):	2.9 (Range: 2.5 to 3.2)
Estimated in situ effective overburden stress (tsf):	
Compression Ratio (strain per log cycle stress):	0.149
Compression Index (void ratio per log cycle stress):	0.322
Swell Ratio (strain per log cycle stress):	0.011
Swell Index (void ratio per log cycle stress):	0.024
Recompression Ratio (strain per log cycle stress):	0.012
Recompression Index (void ratio per log cycle stress):	0.026
Remarks:	

LEGEND: □ End of primary ○ End of Stage ——— Loading - - - - - - - Unloading

Test Date: 12/9/04 Tested By: RV Checked By:

Langan #35578403	New York Sports and Convention Center	ONE DIMENSIONAL CONSOLIDATION TEST Boring: G-27 Depth: 46.40 feet
Geotesting Services, Inc.	Project No. 31737700-458	January 2005 Fig.

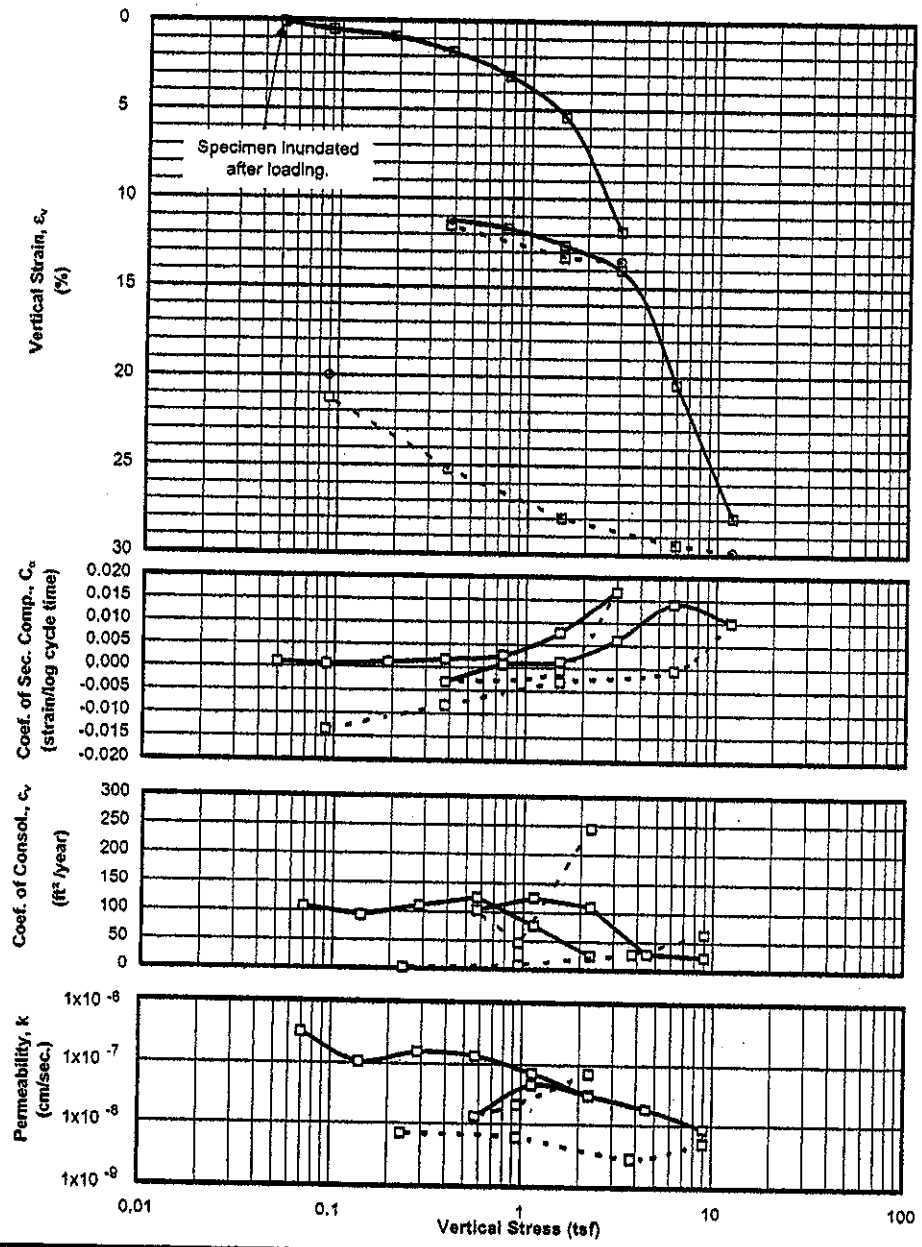
PROJECT:	New York Sports and Convention Center					
PROJECT NO.:	31737700-458	Initial height:	0.635 inch	Final height:	0.593 inch	
BORING:	G-27	Initial water content:	42.3 %	Final water content:	37.7 %	
SAMPLE:	U-1C	Initial dry density:	78.1 pcf	Final dry density:	83.6 pcf	
TEST:	C04255	Initial total density:	111.1 pcf	Final total density:	115.1 pcf	
DEPTH, feet:	46.4	Initial saturation:	98 %	Final saturation:	100 %	
BY:	RV	Initial void ratio:	1.159	Final void ratio:	1.016	
TEST DATE:	12/09/2004			Final strain:	6.6 %	

EQUIPMENT:
Load Frame No.: 4
Ring Diameter: 2.5 inch

SPECIMEN DESCRIPTION: CL, gray CLAY, trace f. sand; numerous shell fragments noted.

G	LL	PL	PI
2.7	49	22	27

Load No.	Load (tsf)	d_{100} (inch)	t_{100} Strain (%)	t_{100} Void Ratio (-)	Final Strain (%)	Final Void Ratio (-)	c_v (ft²/year)	C_α (strain/logt)	Constrained Modulus (tsf)	Permeability (cm/sec)
1	0.063	0.0018	0.290	1.153	0.299	1.152	186.14	0.0005	21.56	2.60E-07
2	0.125	0.0049	0.770	1.142	1.075	1.136	211.17	0.0013	13.01	4.90E-07
3	0.250	0.0086	1.357	1.130	1.581	1.125	643.01	0.0011	21.32	9.10E-07
4	0.500	0.0140	2.204	1.111	2.576	1.103	593.76	0.0018	29.52	6.07E-07
5	1.00	0.0199	3.141	1.091	3.636	1.080	780.56	0.0022	53.35	4.41E-07
6	2.00	0.0297	4.675	1.058	5.516	1.040	626.94	0.0039	65.18	2.90E-07
7	4.00	0.0491	7.734	0.992	9.058	0.963	415.93	0.0069	65.39	1.92E-07
8	8.00	0.0768	12.103	0.898	13.522	0.867	445.28	0.0076	91.55	1.47E-07
9	4.00	0.0851	13.409	0.869	13.402	0.870	310.77	-0.0001	306.24	3.06E-08
10	1.00	0.0810	12.762	0.883	12.484	0.889	479.60	-0.0010	463.63	3.12E-08
11	2.00	0.0795	12.526	0.888	12.617	0.887	1027.25	0.0003	424.48	7.30E-08
12	4.00	0.0818	12.892	0.881	13.129	0.875	1079.08	0.0006	546.40	5.96E-08
13	8.00	0.0858	13.513	0.867	14.562	0.845	1283.66	0.0026	644.31	6.01E-08
14	16.0	0.1060	16.703	0.798	18.246	0.765	551.18	0.0070	250.79	6.63E-08
15	8.00	0.1149	18.108	0.768	18.069	0.769	636.91	-0.0002	569.51	3.37E-08
16	2.00	0.1106	17.432	0.783	17.297	0.785	246.02	-0.0009	887.59	8.36E-09
17	0.500	0.1038	16.349	0.806	15.925	0.815	150.82	-0.0030	138.52	3.28E-08
18	0.125	0.0886	13.965	0.857	13.469	0.868	24.61	-0.0067	15.73	4.72E-08



SAMPLE INFORMATION

Boring:	G-31
Sample:	U-1C
Depth:	21.70 feet
Elevation:	
Type:	3-inch thin wall tube
Description:	CH-OH, gray ORGANIC CLAY, trace f. sand.

LL = 83, PL = 30, PI = 53

SPECIMEN INFORMATION

(NOTE: Initial and final states refer to beginning and end of test)

Initial height:	0.62	Inch
Diameter:	2.50	Inch

Initial water content:	66.2	%
Initial total unit weight:	99.6	pcf
Initial dry unit weight:	60.0	pcf
Initial void ratio:	1.728	
Initial degree of saturation:	100	%
Final water content:	51.2	%
Final total unit weight:	105.5	pcf
Final dry unit weight:	69.8	pcf
Final void ratio:	1.344	
Final degree of saturation:	100	%

(assumed specific gravity = 2.62)

TEST SUMMARY

Construction Method:	Casagrande (Log)
Estimated preconsolidation stress (tsf):	1.8 (Range: 1.6 to 1.9)
Estimated in situ effective overburden stress (tsf):	
Compression Ratio (strain per log cycle stress):	0.286
Compression Index (void ratio per log cycle stress):	0.780
Swell Ratio (strain per log cycle stress):	0.029
Swell Index (void ratio per log cycle stress):	0.079
Recompression Ratio (strain per log cycle stress):	0.031
Recompression Index (void ratio per log cycle stress):	0.085
Remarks:	

LEGEND: □ End of primary ○ End of Stage ——— Loading - - - - - - - Unloading

Test Date: 12/8/04 Tested By: RV Checked By:

Langan #35578403	New York Sports and Convention Center	ONE DIMENSIONAL CONSOLIDATION TEST Boring: G-31 Depth: 21.70 feet
Geotesting Services, Inc.	Project No. 31737700-458	January 2005 Fig.

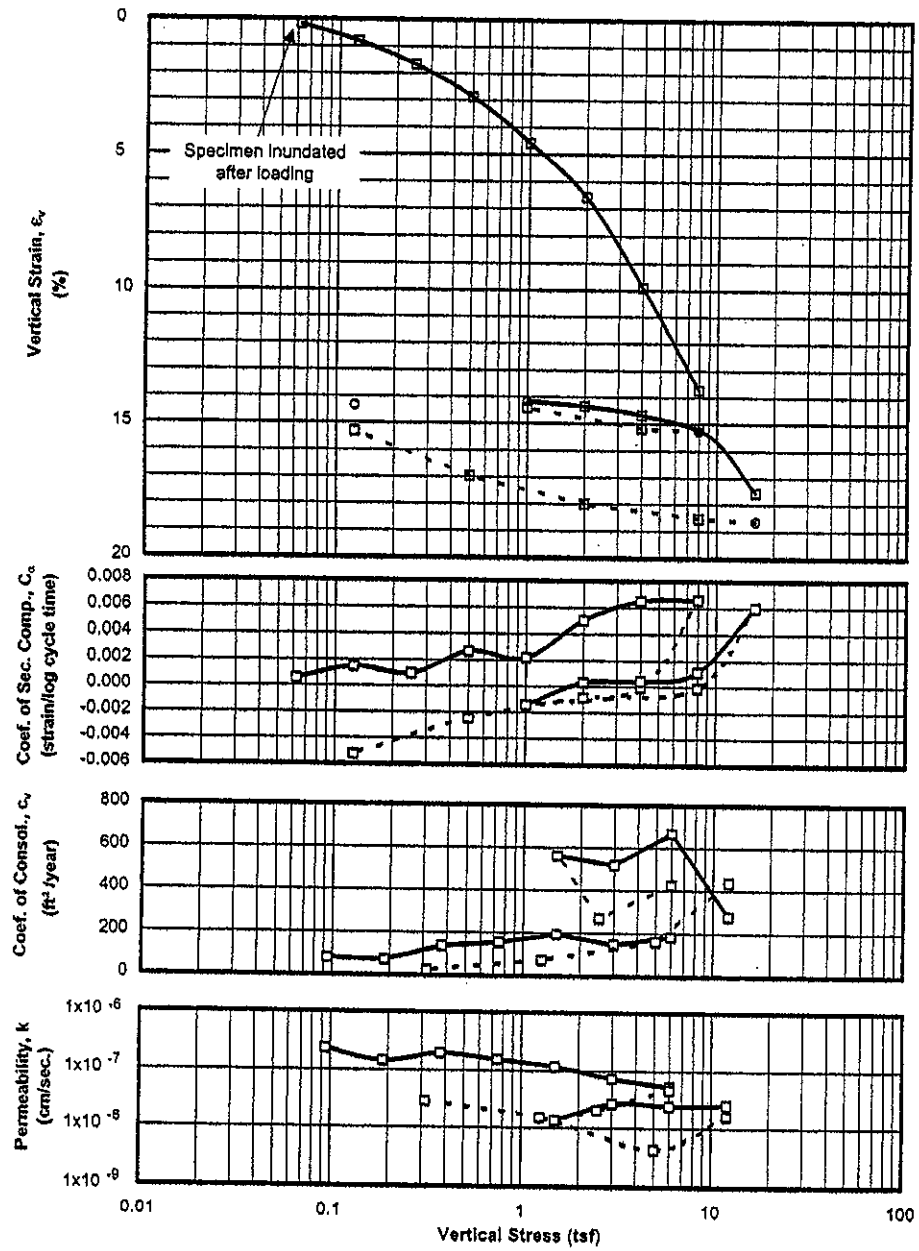
PROJECT:	New York Sports and Convention Center				
PROJECT NO.:	31737700-458	Initial height:	0.623 inch	Final height:	0.534 inch
BORING:	G-31	Initial water content:	66.2 %	Final water content:	51.2 %
SAMPLE:	U-1C	Initial dry density:	60.0 pcf	Final dry density:	69.8 pcf
TEST:	C04252	Initial total density:	99.6 pcf	Final total density:	105.5 pcf
DEPTH, feet:	21.7	Initial saturation:	100 %	Final saturation:	100 %
BY:	RV	Initial void ratio:	1.728	Final void ratio:	1.344
TEST DATE:	12/08/2004			Final strain:	14.3 %

EQUIPMENT:
Load Frame No.: 2
Ring Diameter: 2.5 inch

SPECIMEN DESCRIPTION: CH-OH, gray ORGANIC CLAY, trace f. sand.

G	LL	PL	PI
2.62	83	30	53

Load No.	Load (tsf)	d_{100} (inch)	t_{100} Strain (%)	t_{100} Void Ratio (-)	Final Strain (%)	Final Void Ratio (-)	c_v (ft²/year)	C_α (strain/logt)	Constrained Modulus (tsf)	Permeability (cm/sec)
1	0.050	0.0007	0.114	1.725	0.131	1.724	589.25	0.0009	43.87	4.05E-07
2	0.090	0.0032	0.510	1.714	0.569	1.712	107.32	0.0006	10.10	3.21E-07
3	0.190	0.0055	0.887	1.704	1.068	1.699	93.44	0.0010	26.55	1.06E-07
4	0.380	0.0111	1.776	1.680	1.984	1.674	110.39	0.0017	21.38	1.56E-07
5	0.760	0.0195	3.136	1.642	3.511	1.632	125.18	0.0026	27.93	1.35E-07
6	1.51	0.0337	5.417	1.580	6.276	1.557	77.39	0.0077	32.89	7.10E-08
7	3.00	0.0737	11.841	1.405	13.527	1.359	24.27	0.0167	23.19	3.16E-08
8	1.51	0.0828	13.287	1.366	13.185	1.368	244.34	-0.0006	103.01	7.16E-08
9	0.380	0.0719	11.546	1.413	11.225	1.422	46.12	-0.0033	64.88	2.14E-08
10	0.760	0.0729	11.708	1.409	11.803	1.406	103.33	0.0006	234.24	1.33E-08
11	1.51	0.0787	12.633	1.383	12.793	1.379	124.82	0.0012	81.09	4.64E-08
12	3.00	0.0873	14.016	1.346	14.737	1.326	109.64	0.0061	107.71	3.07E-08
13	6.00	0.1273	20.444	1.170	22.880	1.104	28.51	0.0141	46.67	1.84E-08
14	12.0	0.1740	27.932	0.966	29.895	0.912	22.78	0.0100	80.12	8.58E-09
15	6.00	0.1836	29.474	0.924	29.349	0.927	63.54	-0.0005	389.14	4.93E-09
16	1.51	0.1742	27.977	0.965	27.681	0.973	28.08	-0.0031	299.86	2.83E-09
17	0.380	0.1569	25.196	1.041	24.451	1.061	7.83	-0.0083	40.64	5.81E-09
18	0.090	0.1324	21.260	1.148	19.985	1.183	1.64	-0.0136	7.37	6.71E-09



SAMPLE INFORMATION

Boring:	G-48
Sample:	U-3C
Depth:	61.60 feet
Elevation:	
Type:	3-inch thin wall tube
Description:	CL, gray silty CLAY, trace f. sand; shell fragments and organic mat'l noted. LL = 33, PL = 17, PI = 16

SPECIMEN INFORMATION

(NOTE: Initial and final states refer to beginning and end of test)

Initial height:	0.63	inch
Diameter:	2.50	inch

Initial water content:	37.8	%
Initial total unit weight:	116.1	pcf
Initial dry unit weight:	84.3	pcf
Initial void ratio:	1.022	
Initial degree of saturation:	101	%
Final water content:	30.6	%
Final total unit weight:	121.3	pcf
Final dry unit weight:	92.9	pcf
Final void ratio:	0.834	
Final degree of saturation:	100	%

(assumed specific gravity = 2.73)

TEST SUMMARY

Construction Method:	Casagrande (Log)
Estimated preconsolidation stress (tsf):	2.2 (Range: 2.0 to 2.4)
Estimated in situ effective overburden stress (tsf):	
Compression Ratio (strain per log cycle stress):	0.127
Compression Index (void ratio per log cycle stress):	0.257
Swell Ratio (strain per log cycle stress):	0.013
Swell Index (void ratio per log cycle stress):	0.026
Recompression Ratio (strain per log cycle stress):	0.014
Recompression Index (void ratio per log cycle stress):	0.028
Remarks:	

LEGEND: □ End of primary ○ End of Stage ——— Loading - - - - - - - Unloading

Test Date: 12/8/04 Tested By: RV Checked By: MNS

Langan #35578403	New York Sports and Convention Center	ONE DIMENSIONAL CONSOLIDATION TEST Boring: G-48 Depth: 61.60 feet
Geotesting Services, Inc.	Project No. 31737700-458	January 2005 Fig.

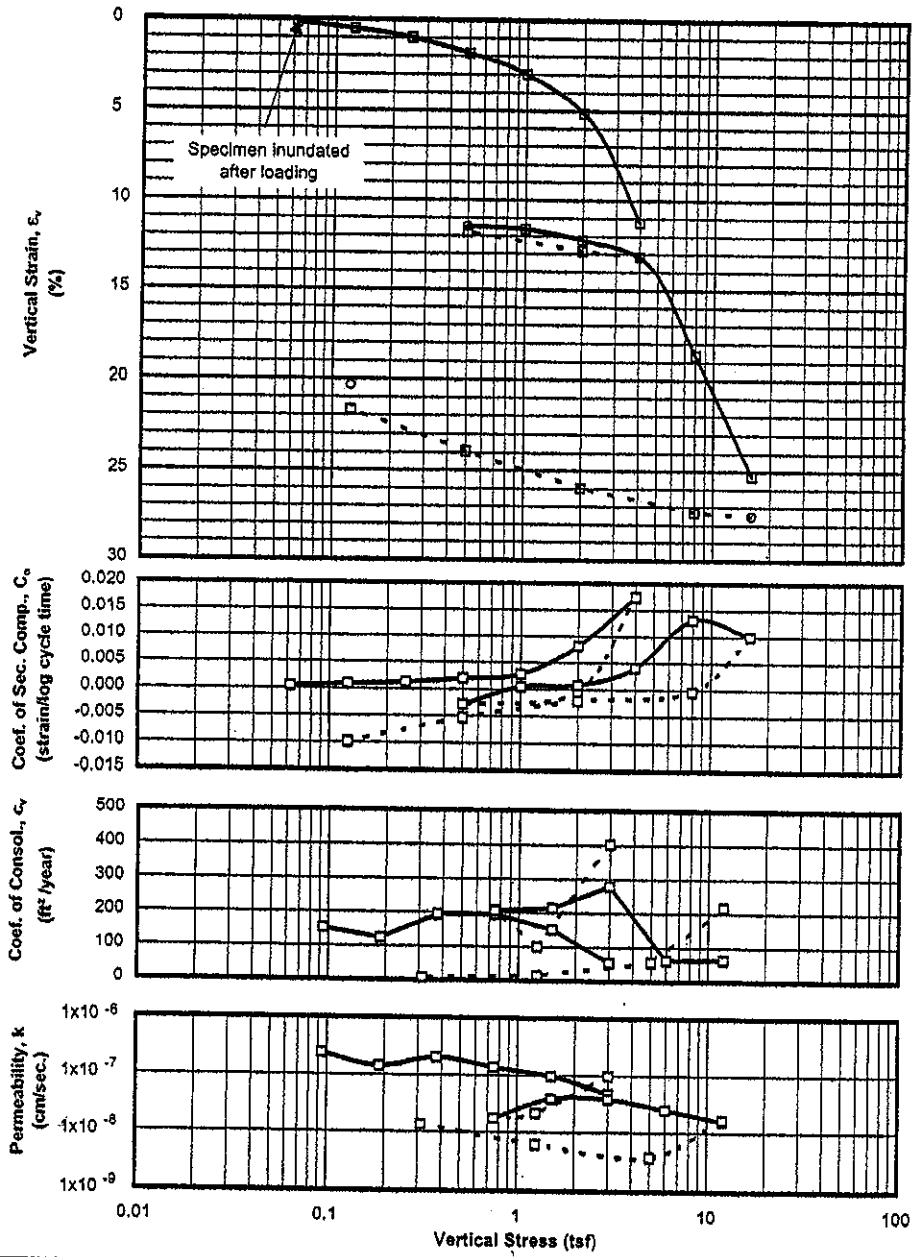
PROJECT:	New York Sports and Convention Center					
PROJECT NO.:	31737700-458	Initial height:	0.625 inch	Final height:	0.567 inch	
BORING:	G-48	Initial water content:	37.8 %	Final water content:	30.6 %	
SAMPLE:	U-3C	Initial dry density:	84.3 pcf	Final dry density:	92.9 pcf	
TEST:	C04250	Initial total density:	116.1 pcf	Final total density:	121.3 pcf	
DEPTH, feet:	61.6	Initial saturation:	101 %	Final saturation:	100 %	
BY:	RV	Initial void ratio:	1.022	Final void ratio:	0.834	
TEST DATE:	12/08/2004			Final strain:	9.3 %	

EQUIPMENT:
Load Frame No.: 5
Ring Diameter: 2.5 inch

SPECIMEN DESCRIPTION: CL, gray silty CLAY, trace f. sand; shell fragments and organic mat'l noted.

G	LL	PL	PI
2.73	33	17	16

Load No.	Load (tsf)	d_{100} (inch)	t_{100} Strain (%)	t_{100} Void Ratio (-)	Final Strain (%)	Final Void Ratio (-)	c_v (ft²/year)	C_α (strain/logt)	Constrained Modulus (tsf)	Permeability (cm/sec)
1	0.063	0.0011	0.176	1.019	0.297	1.016	77.29	0.0005	35.47	6.57E-08
2	0.125	0.0051	0.811	1.006	1.086	1.000	77.21	0.0014	9.84	2.37E-07
3	0.250	0.0106	1.690	0.988	1.774	0.986	69.00	0.0009	14.23	1.46E-07
4	0.500	0.0181	2.895	0.964	3.186	0.958	135.66	0.0026	20.73	1.97E-07
5	1.00	0.0286	4.582	0.930	4.867	0.924	151.83	0.0022	29.65	1.54E-07
6	2.00	0.0412	6.586	0.889	7.260	0.876	192.66	0.0050	49.90	1.16E-07
7	4.00	0.0619	9.911	0.822	10.817	0.804	145.79	0.0065	60.15	7.31E-08
8	8.00	0.0858	13.725	0.745	15.284	0.713	183.17	0.0066	104.87	5.27E-08
9	4.00	0.0949	15.186	0.715	15.177	0.715	423.40	-0.0001	273.78	4.67E-08
10	1.00	0.0902	14.427	0.731	14.180	0.736	265.71	-0.0015	395.40	2.03E-08
11	2.00	0.0897	14.349	0.732	14.425	0.731	558.65	0.0003	1273.05	1.32E-08
12	4.00	0.0918	14.687	0.725	14.773	0.724	516.16	0.0004	591.47	2.63E-08
13	8.00	0.0948	15.168	0.716	15.424	0.710	667.66	0.0011	831.17	2.42E-08
14	16.0	0.1099	17.577	0.667	18.655	0.645	277.02	0.0060	332.11	2.52E-08
15	8.00	0.1159	18.540	0.647	18.496	0.648	434.71	-0.0001	831.16	1.58E-08
16	2.00	0.1125	18.002	0.658	17.809	0.662	159.57	-0.0009	1116.97	4.31E-09
17	0.500	0.1060	16.961	0.679	16.390	0.691	71.14	-0.0025	143.97	1.49E-08
18	0.125	0.0958	15.325	0.712	14.350	0.732	21.69	-0.0053	22.93	2.85E-08



SAMPLE INFORMATION

Boring:	G-49
Sample:	U-1D
Depth:	31.85 feet
Elevation:	
Type:	3-inch thin wall tube
Description:	CH-OH gray ORGANIC silty CLAY, trace f. sand; silt lenses and shell fragments. LL = 67, PL = 25, PI = 42

SPECIMEN INFORMATION

(NOTE: Initial and final states refer to beginning and end of test)

Initial height:	0.62	inch
Diameter:	2.50	inch

Initial water content:	60.4	%
Initial total unit weight:	102.7	pcf
Initial dry unit weight:	64.0	pcf
Initial void ratio:	1.584	
Initial degree of saturation:	101	%
Final water content:	47.0	%
Final total unit weight:	108.3	pcf
Final dry unit weight:	73.7	pcf
Final void ratio:	1.244	
Final degree of saturation:	100	%

(assumed specific gravity = 2.65)

TEST SUMMARY

Construction Method:	Casagrande (Log)
Estimated preconsolidation stress (tsf):	2.1 (Range: 2.0 to 2.3)
Estimated in situ effective overburden stress (tsf):	
Compression Ratio (strain per log cycle stress):	0.233
Compression Index (void ratio per log cycle stress):	0.602
Swell Ratio (strain per log cycle stress):	0.018
Swell Index (void ratio per log cycle stress):	0.047
Recompression Ratio (strain per log cycle stress):	0.020
Recompression Index (void ratio per log cycle stress):	0.052
Remarks:	

LEGEND: □ End of primary ○ End of Stage ——— Loading - - - - - - - Unloading

Test Date: 12/8/04 Tested By: RV Checked By:

Langan #35578403	New York Sports and Convention Center	ONE DIMENSIONAL CONSOLIDATION TEST Boring: G-49 Depth: 31.85 feet
Geotesting Services, Inc.	Project No. 31737700-458	January 2005 Fig.

PROJECT:	New York Sports and Convention Center					
PROJECT NO.:	31737700-458	Initial height:	0.624 inch	Final height:	0.542 inch	
BORING:	G-49	Initial water content:	60.4 %	Final water content:	47.0 %	
SAMPLE:	U-1D	Initial dry density:	64.0 pcf	Final dry density:	73.7 pcf	
TEST:	C04251	Initial total density:	102.7 pcf	Final total density:	108.3 pcf	
DEPTH, feet:	31.85	Initial saturation:	101 %	Final saturation:	100 %	
BY:	RV	Initial void ratio:	1.584	Final void ratio:	1.244	
TEST DATE:	12/08/2004			Final strain:	13.1 %	

EQUIPMENT:
Load Frame No.: 6
Ring Diameter: 2.5 inch

SPECIMEN DESCRIPTION: CH-OH gray ORGANIC silty CLAY, trace f. sand; silt lenses and shell fragments.

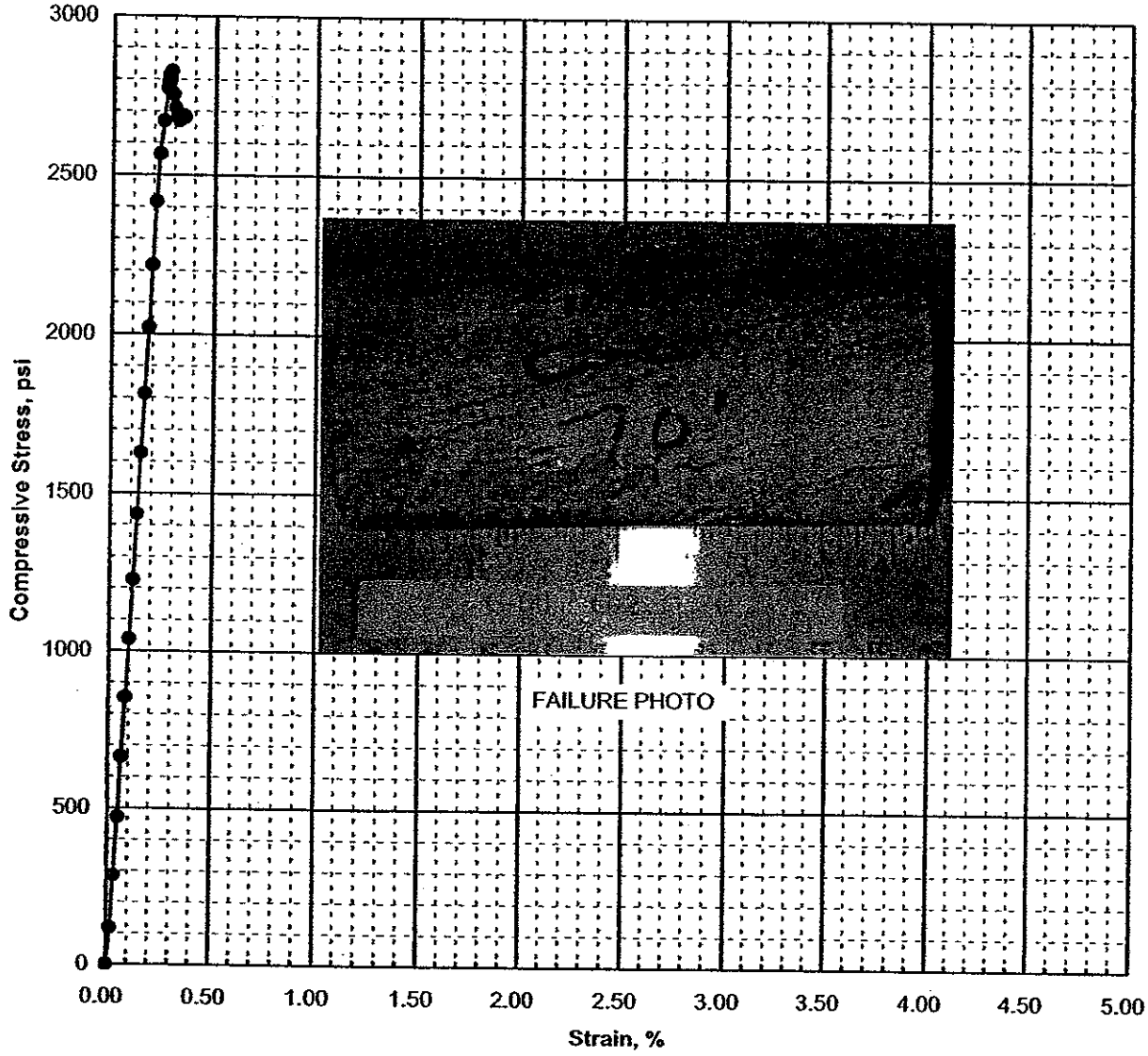
G	LL	PL	PI
2.65	67	25	42

Load No.	Load (tsf)	d_{100} (inch)	t_{100} Strain (%)	t_{100} Void Ratio (-)	Final Strain (%)	Final Void Ratio (-)	c_v (ft²/year)	C_α (strain/logt)	Constrained Modulus (tsf)	Permeability (cm/sec)
1	0.063	0.0011	0.181	1.579	0.253	1.577	260.21	0.0004	34.46	2.28E-07
2	0.125	0.0032	0.510	1.571	0.715	1.565	151.88	0.0008	19.02	2.41E-07
3	0.250	0.0062	0.987	1.558	1.163	1.554	122.97	0.0012	26.21	1.42E-07
4	0.500	0.0116	1.852	1.536	2.191	1.527	194.29	0.0019	28.89	2.03E-07
5	1.00	0.0189	3.023	1.506	3.411	1.496	195.32	0.0028	42.71	1.38E-07
6	2.00	0.0321	5.139	1.451	6.213	1.423	151.42	0.0082	47.26	9.67E-08
7	4.00	0.0703	11.255	1.293	13.149	1.244	52.85	0.0175	32.70	4.88E-08
8	2.00	0.0803	12.865	1.251	12.770	1.254	401.95	-0.0004	124.27	9.76E-08
9	0.500	0.0736	11.790	1.279	11.487	1.287	100.43	-0.0028	139.55	2.17E-08
10	1.00	0.0727	11.649	1.283	11.716	1.281	205.75	0.0004	354.62	1.75E-08
11	2.00	0.0765	12.251	1.267	12.410	1.263	213.47	0.0008	166.11	3.88E-08
12	4.00	0.0822	13.173	1.243	14.023	1.221	278.08	0.0041	216.77	3.87E-08
13	8.00	0.1165	18.660	1.102	20.336	1.058	61.30	0.0132	72.91	2.54E-08
14	16.0	0.1576	25.256	0.931	27.526	0.873	63.38	0.0101	121.28	1.58E-08
15	8.00	0.1705	27.317	0.878	27.215	0.881	217.24	-0.0004	388.21	1.69E-08
16	2.00	0.1621	25.975	0.913	25.547	0.924	55.34	-0.0021	447.01	3.73E-09
17	0.500	0.1494	23.936	0.965	23.111	0.987	14.76	-0.0053	73.59	6.05E-09
18	0.125	0.1355	21.703	1.023	20.341	1.058	7.46	-0.0099	16.79	1.34E-08

Langan #35578403
New York Sports and Convention Center
SUMMARY OF ROCK TESTING

BORING NO.	RUN NO.	DEPTH (ft)	WATER CONTENT (%)	TOTAL UNIT WGT. (pcf)	DRY UNIT WGT. (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psi)	AXIAL STRAIN @ FAILURE (%)
G-6	C-2	70	0.2	171	171	2830	0.28
G-7	C-3	61	0.1	174	174	5580	0.21
G-7	C-3 (2)	61	0.0	173	173	3050	0.19
G-15	C-3	52	0.1	173	173	3690	0.19
G-27	C-4A	156	0.2	165	165	17960	0.40
G-27	C-4B	156	0.1	169	169	3830	0.19
G-30	C-2	60	0.1	172	172	4190	0.21
G-35	C-3	98	0.3	176	176	7040	0.30
G-35	C-9	128	0.1	172	172	7190	0.21
G-48	C-2	86	0.1	172	172	2810	0.14
G-62	C-2A	97	0.1	162	162	18300	0.50
G-62	C-2B	97	0.2	164	164	13130	0.39
G-63	C-4	100	0.2	169	169	3390	0.16

Prepared by: RV Reviewed by: MO Date: 01/06/2005



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.17	171	171	4.291	1.981

gray mica schist

Specimen meets ASTM D4543 shape tolerances

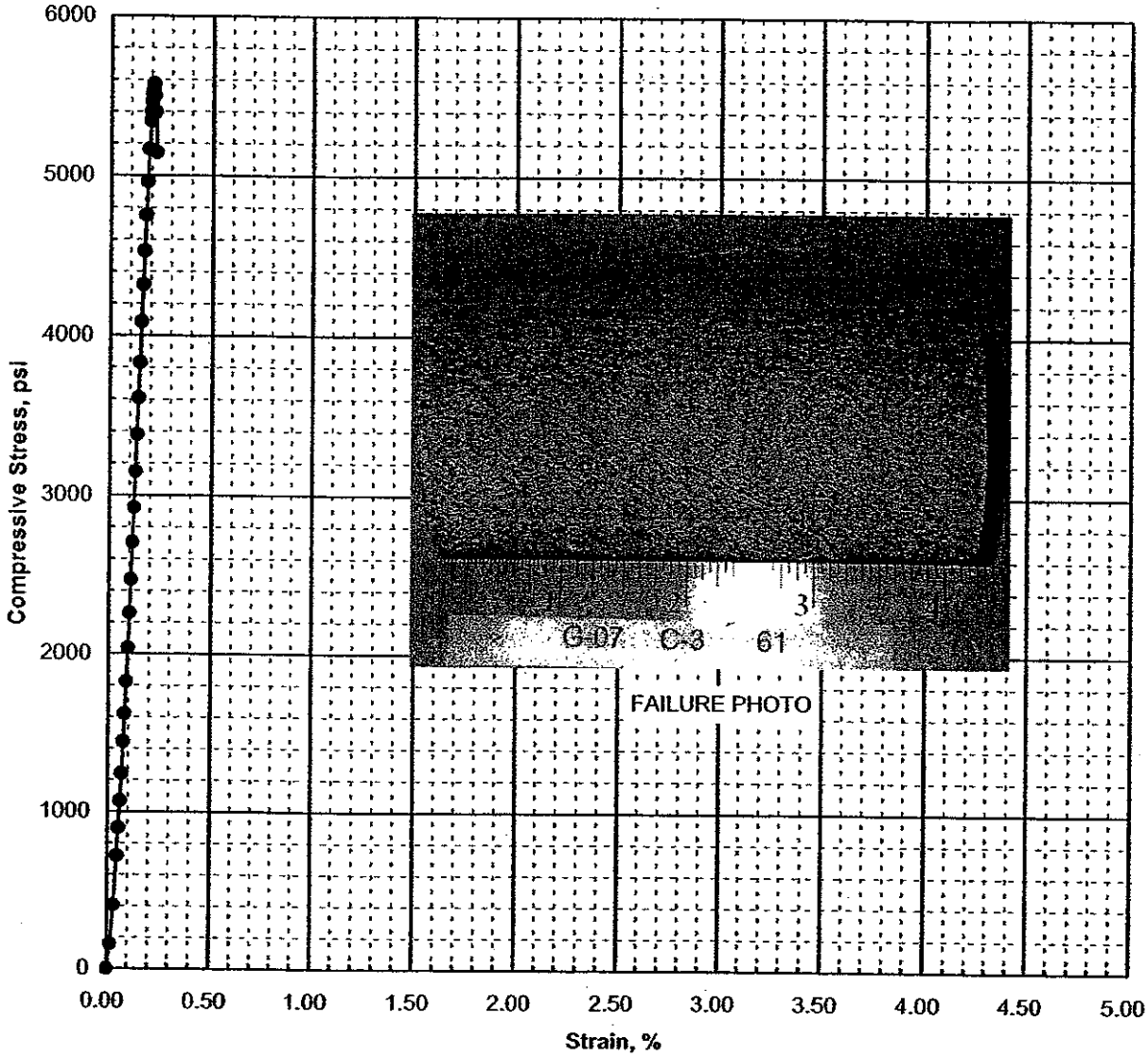
Test Summary

Tested by: DT

Test Date: Dec-21-04

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.17	0.28	2830

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST Boring: G-6 Sample: C-2 Depth 70 ft.	
Geotesting Services, Inc.			



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.05	174	174	4.269	2.000

gray micaceous schist

Specimen meets ASTM D4543 shape tolerances

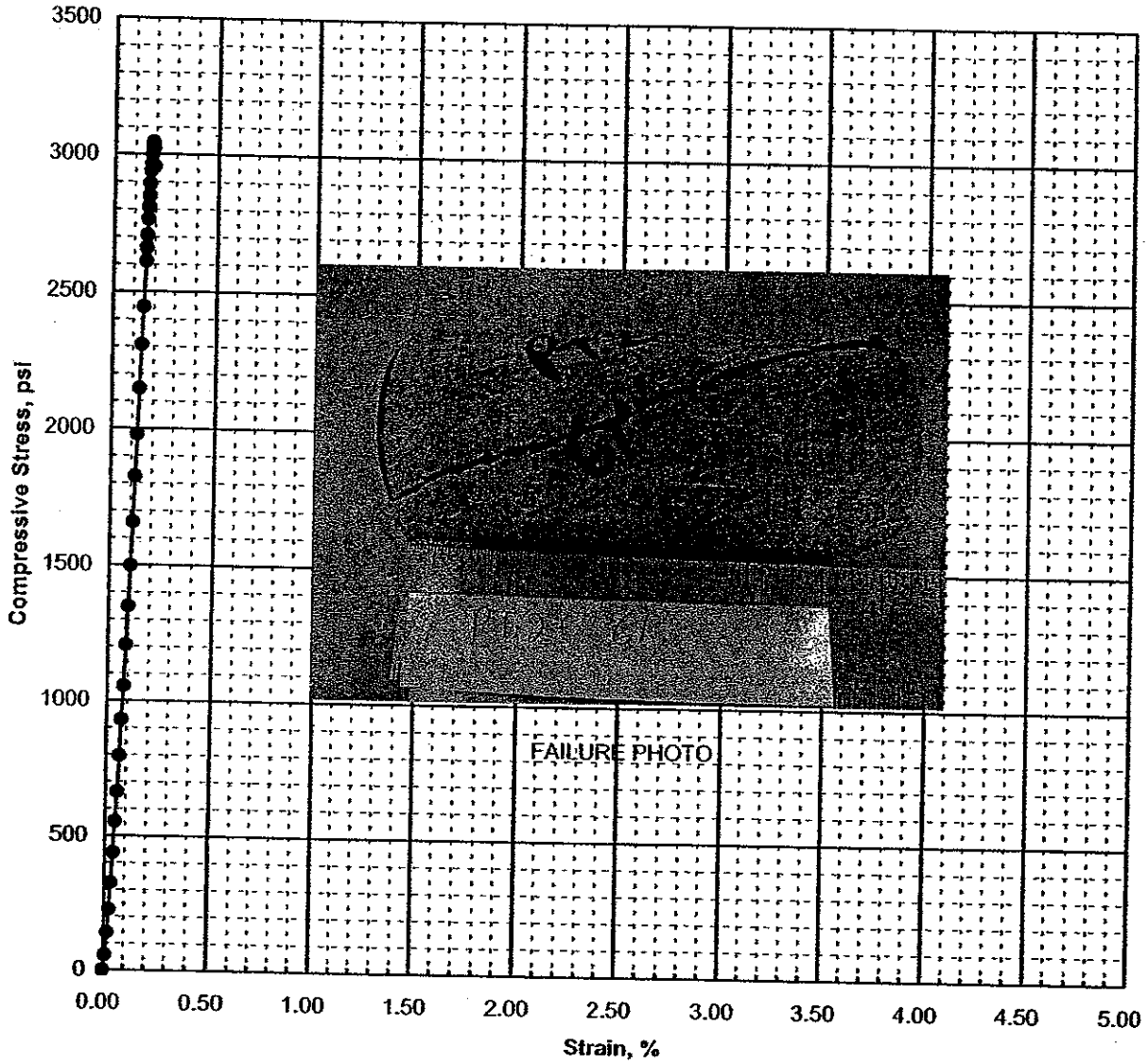
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.15	0.21	5580

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-7 Sample: C-3 Depth 61 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.02	173	173	4.214	2.000

gray fine grained gneiss

Specimen meets ASTM D4543 shape tolerances

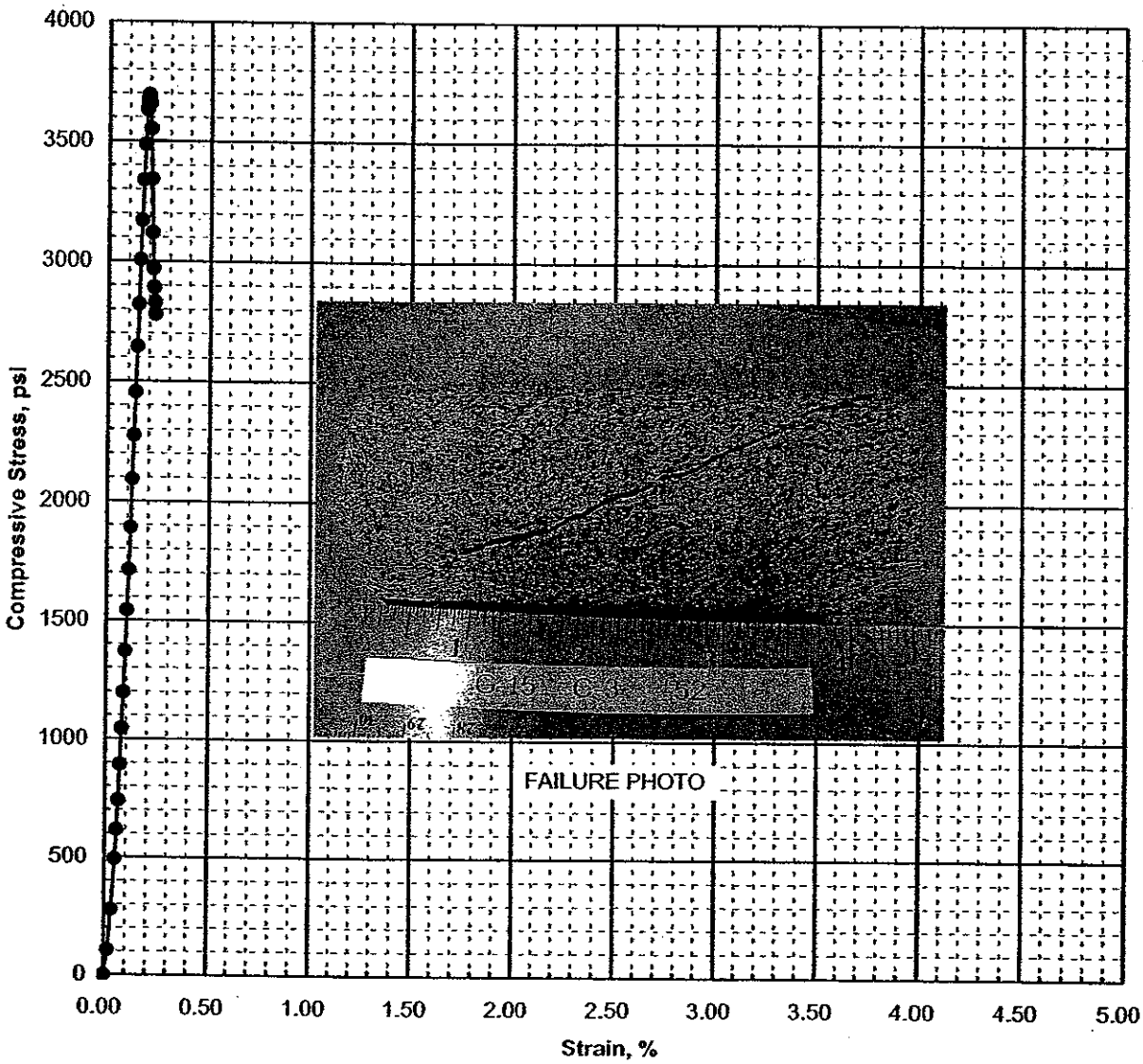
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.16	0.19	3050

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-7 Sample: C-3 (2) Depth 61 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.10	173	173	4.355	1.975

gray granitiferous gneiss

Specimen does not meet ASTM D4543 shape tolerances

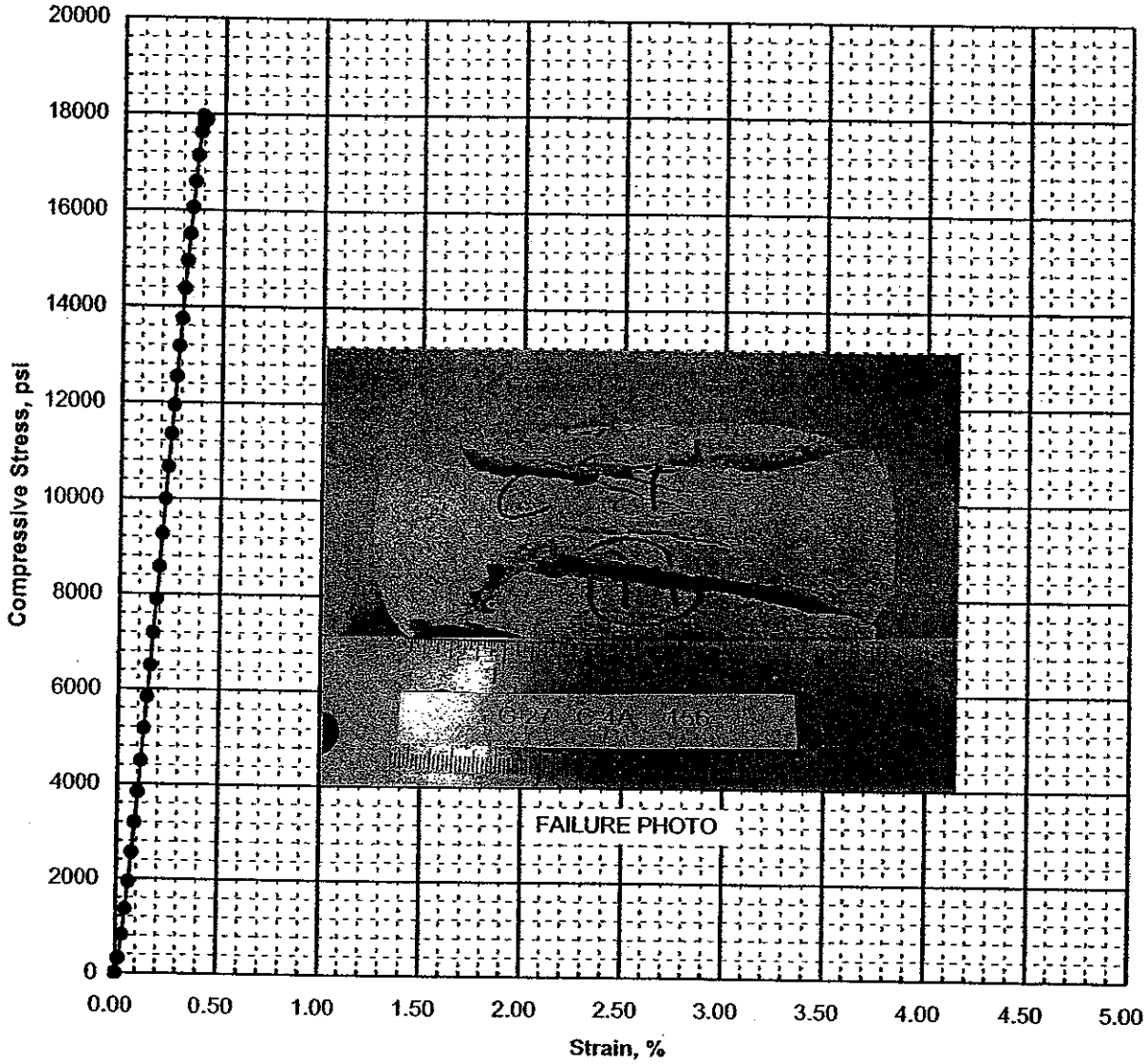
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.16	0.19	3690

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-15 Sample: C-3 Depth 52 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.21	165	165	4.261	1.982

white fine grained schist

Specimen meets ASTM D4543 shape tolerances

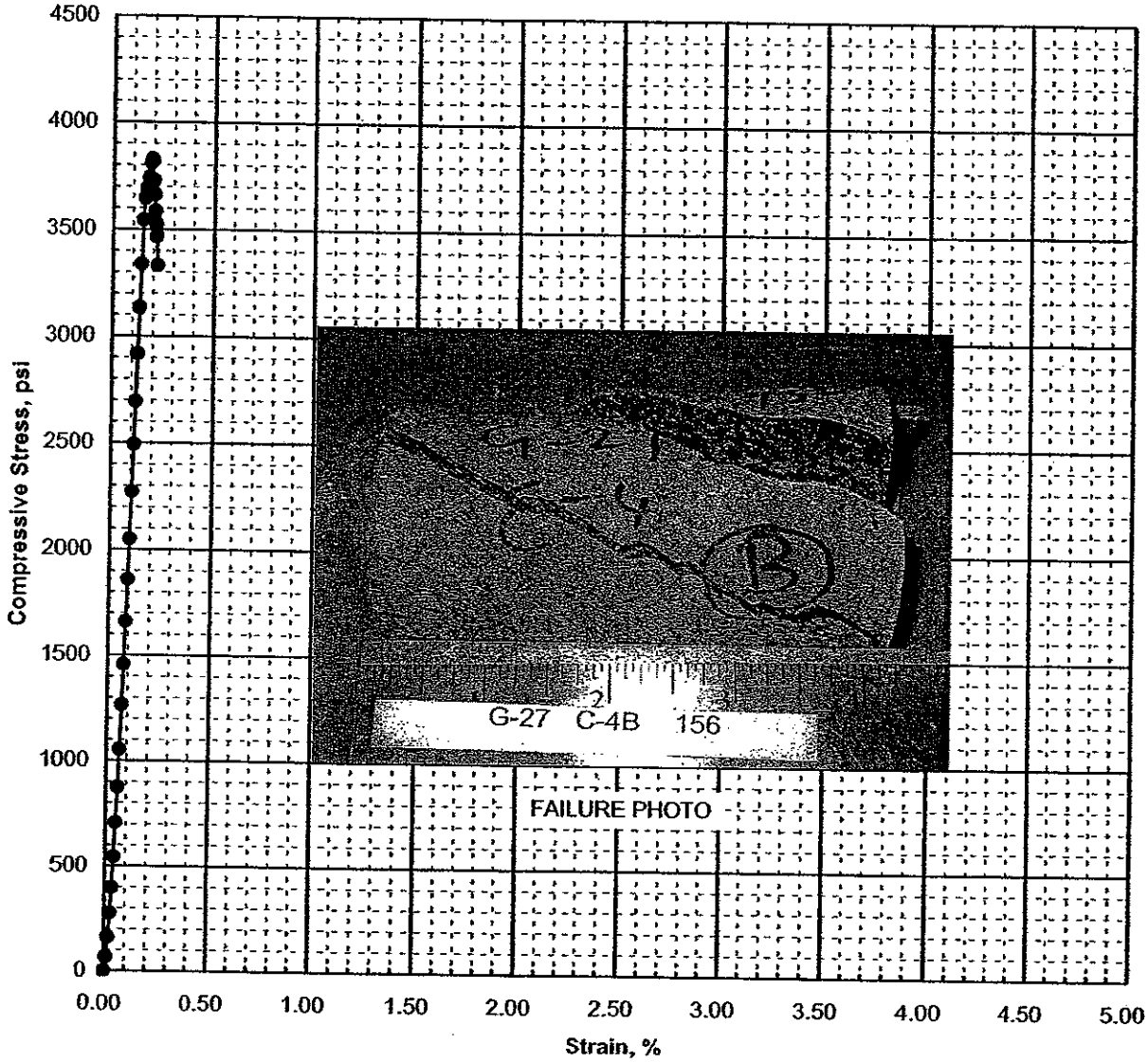
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.12	0.40	17960

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-27 Sample: C-4A Depth 156 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.12	169	169	4.142	1.984

gray micaceous schist

Specimen meets ASTM D4543 shape tolerances

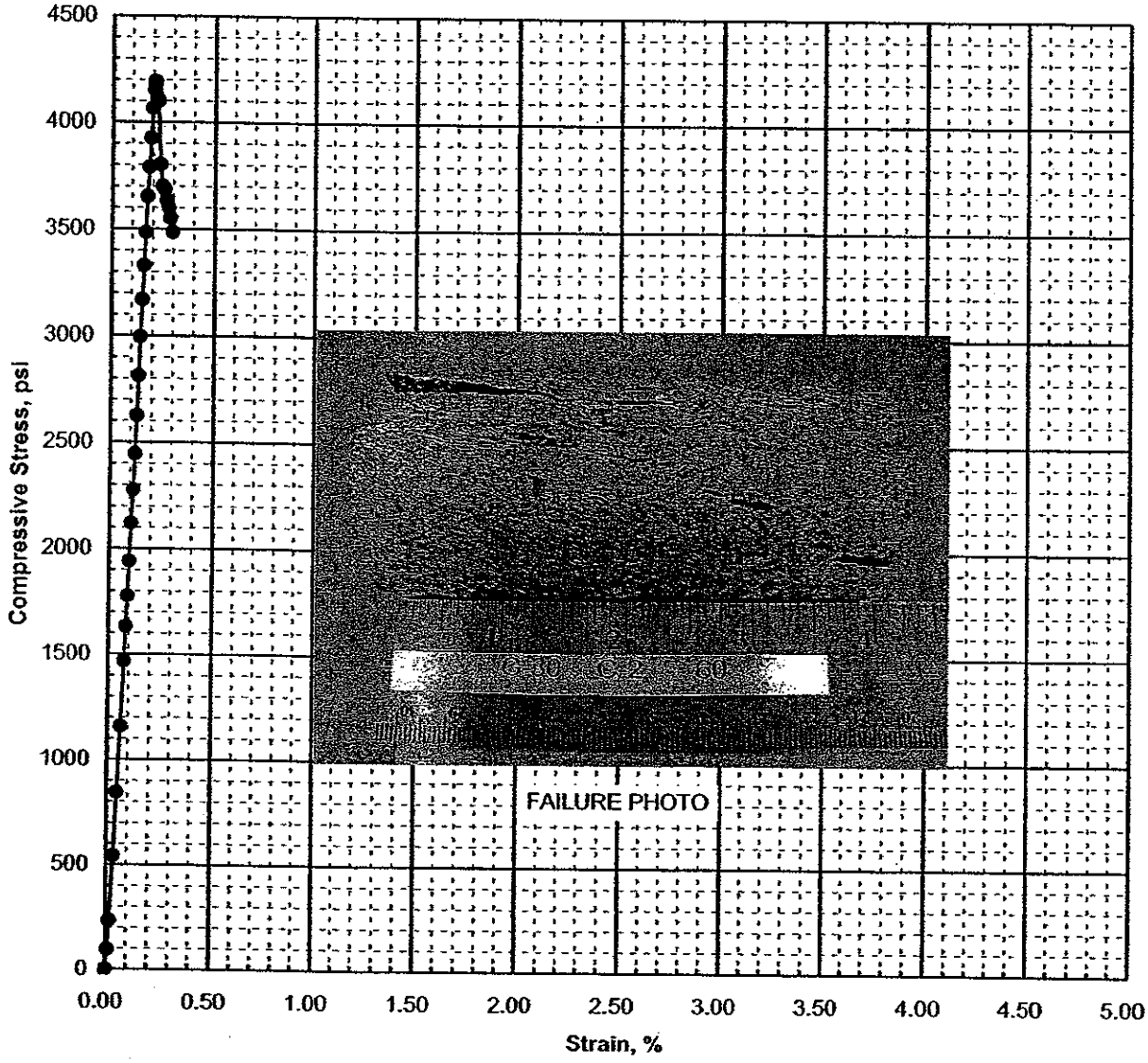
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.16	0.19	3830

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-27 Sample: C-4B Depth 156 ft.	
Geotesting Services, Inc.			



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.09	172	172	4.204	1.974

gray granitiferous gneiss

Specimen meets ASTM D4543 shape tolerances

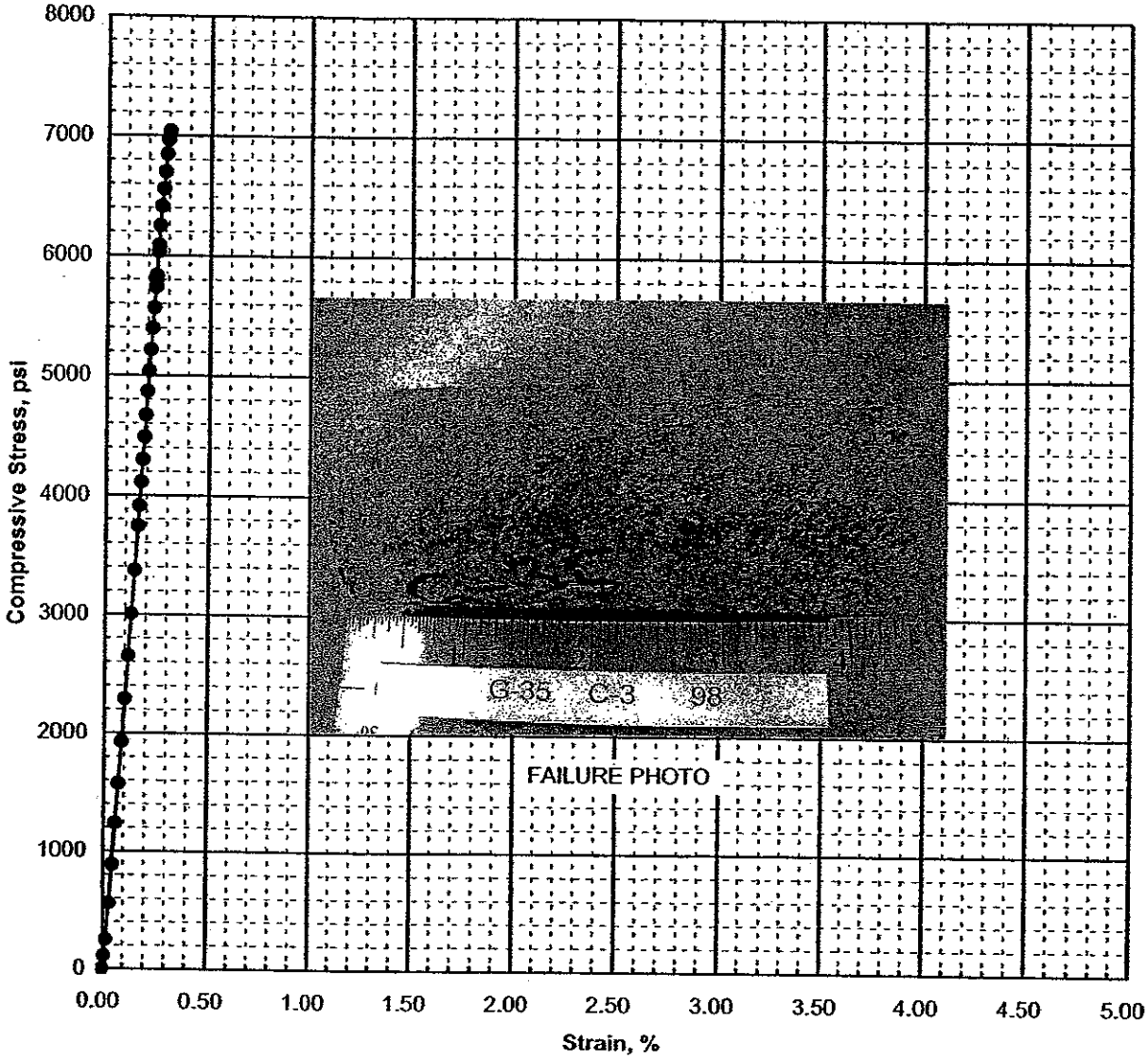
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.17	0.21	4190

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-30 Sample: C-2 Depth 60 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.31	176	176	4.329	1.981

blue-gray gneiss

Specimen meets ASTM D4543 shape tolerances

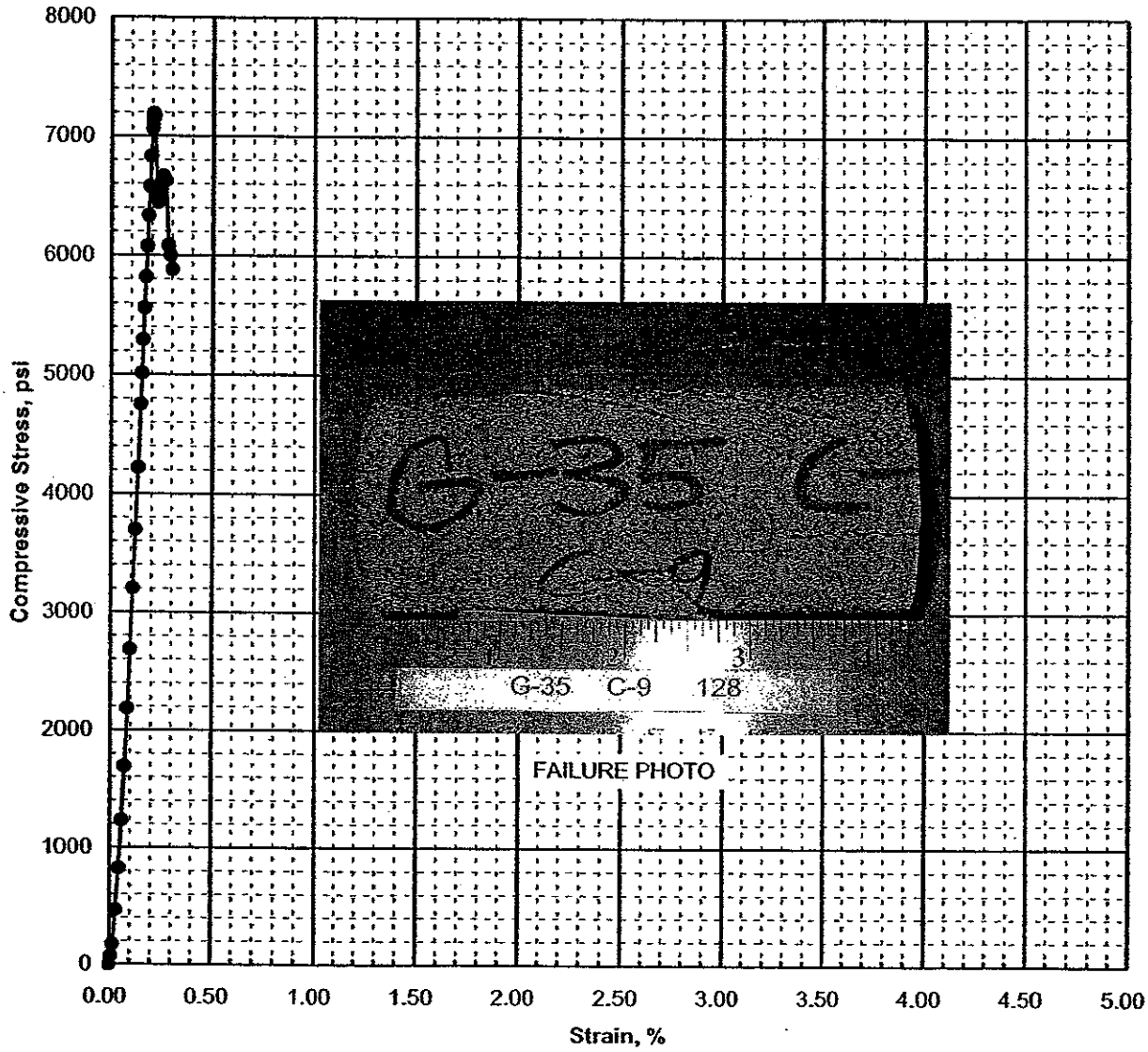
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.14	0.30	7040

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-35 Sample: C-3 Depth 98 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.08	172	172	4.320	1.986

gray granitiferous gneiss

Specimen meets ASTM D4543 shape tolerances

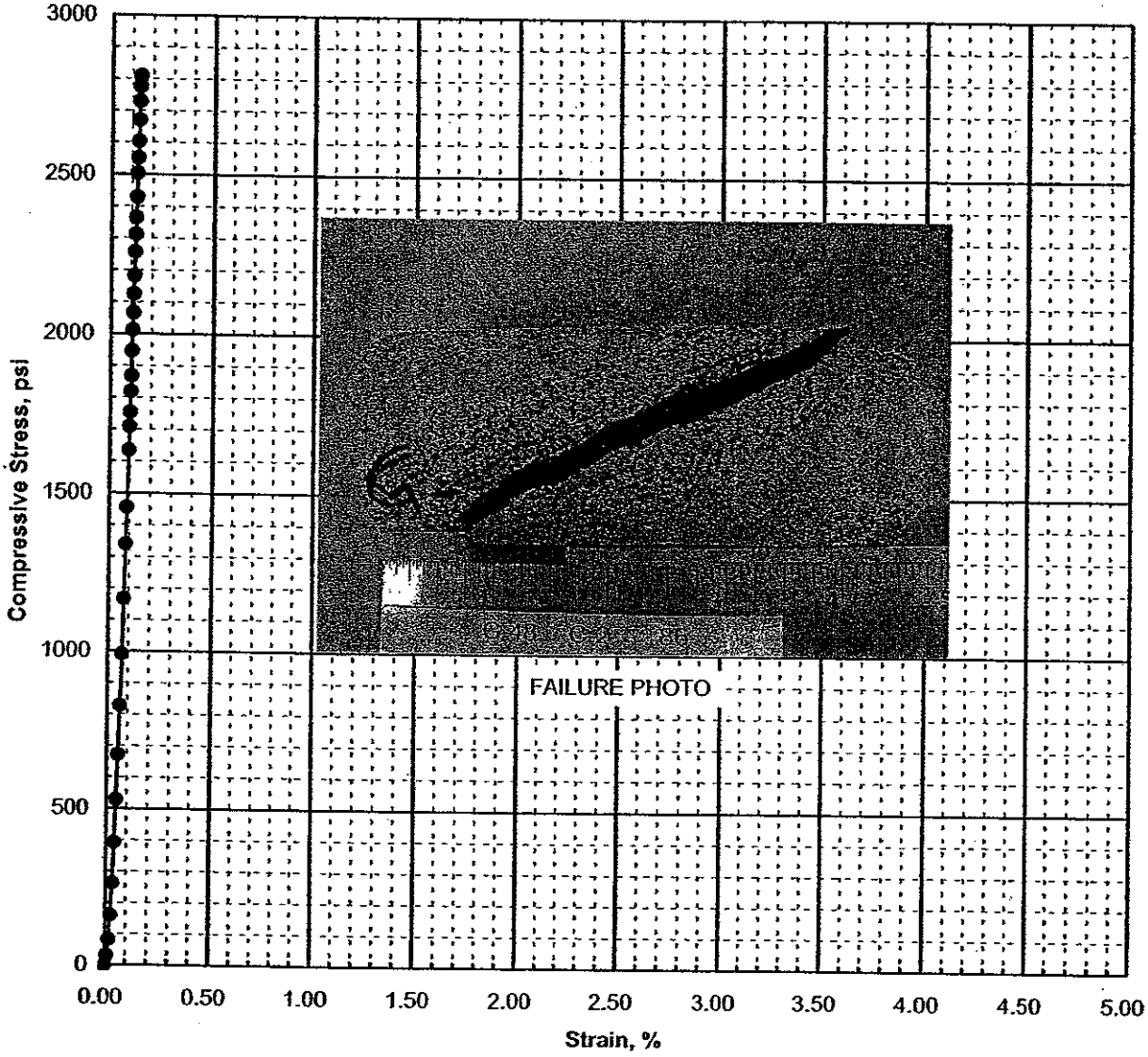
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.15	0.21	7190

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-35 Sample: C-9 Depth 128 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.10	172	172	4.451	1.988

gray granitiferous gneiss

Specimen meets ASTM D4543 shape tolerances

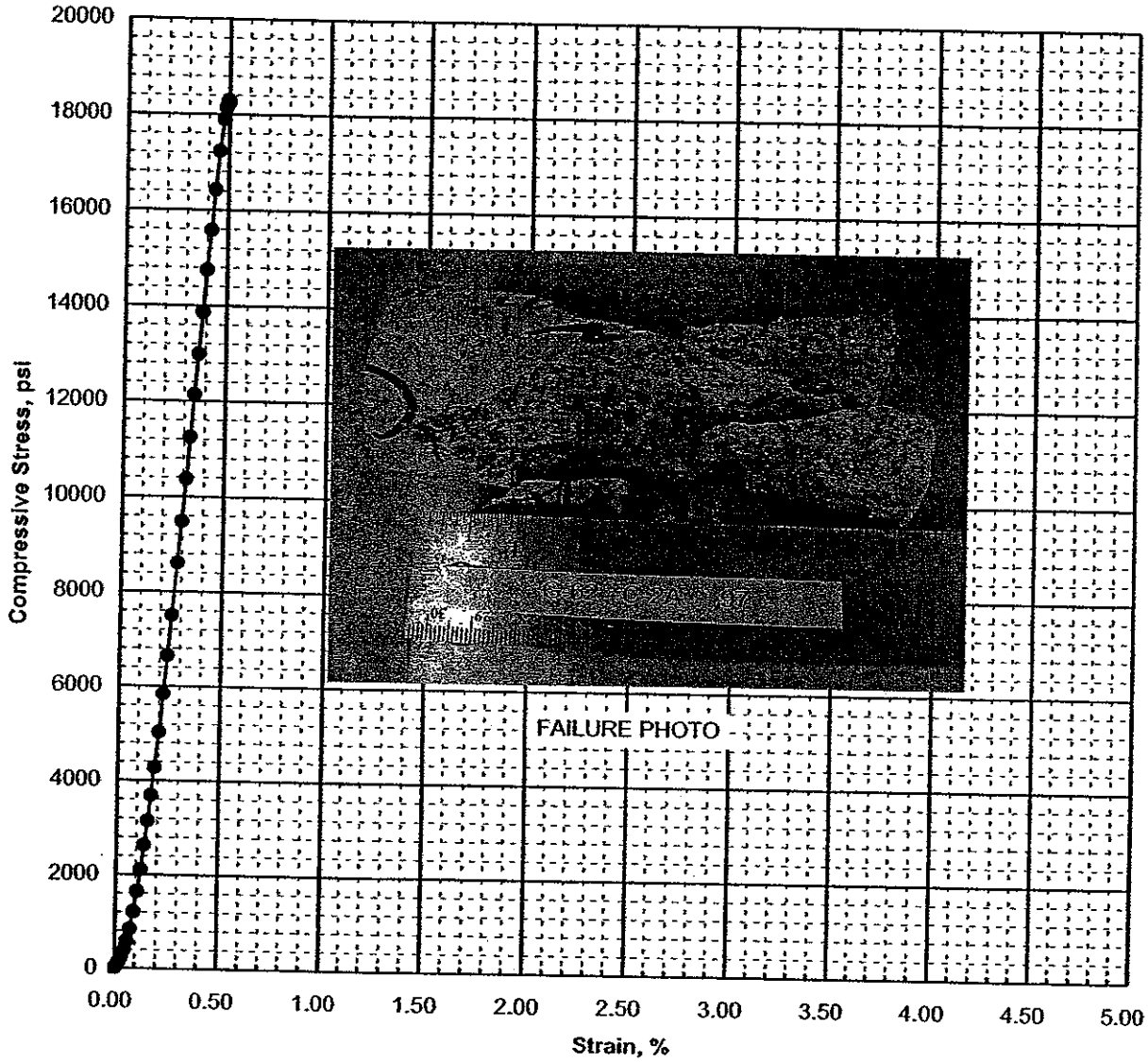
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.15	0.14	2810

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST Boring: G-48 Sample: C-2 Depth 86 ft.	
Geotesting Services, Inc.			



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.12	162	162	4.276	1.989

pink pegmatite

Specimen meets ASTM D4543 shape tolerances

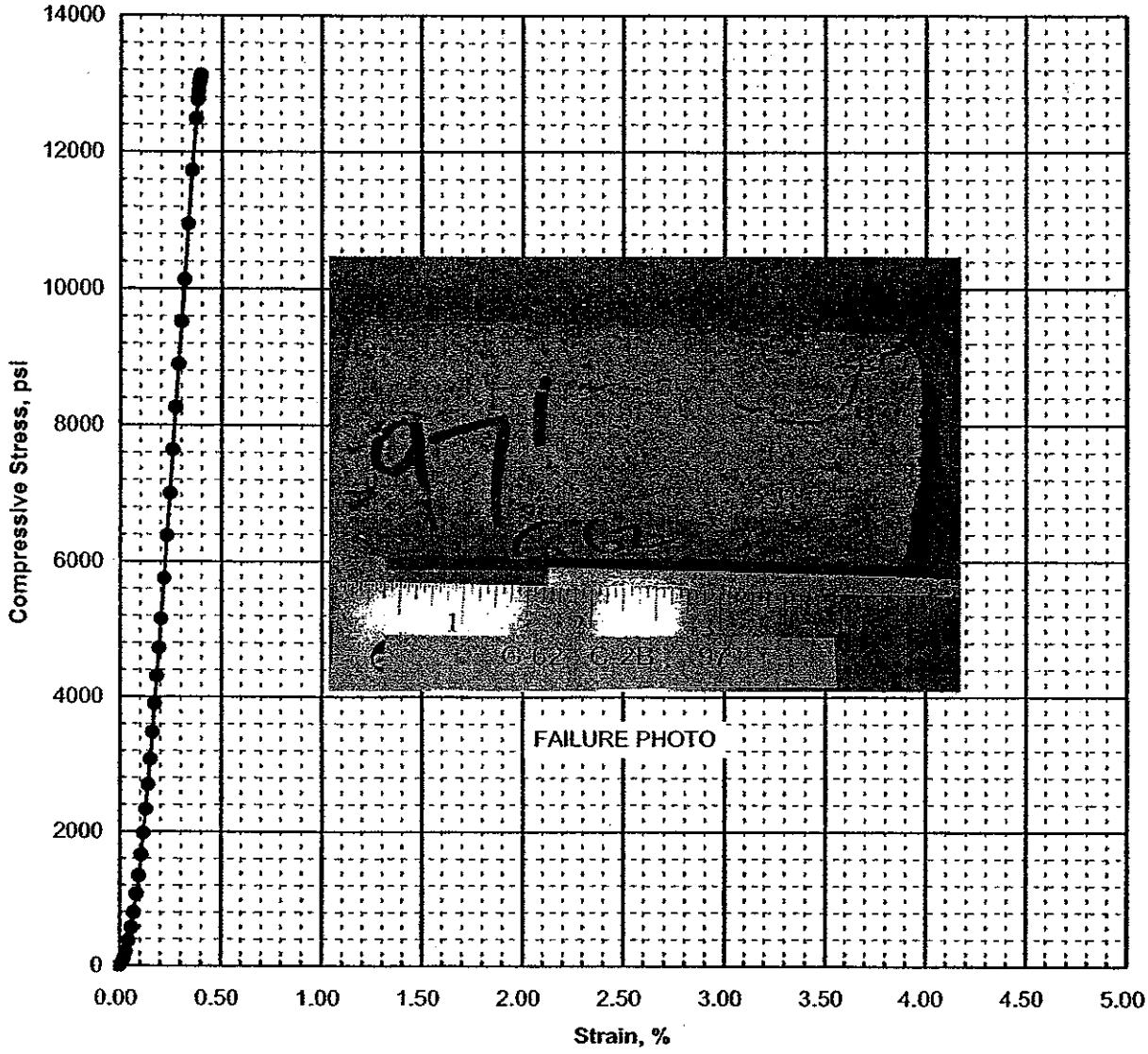
Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.13	0.50	18300

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-62 Sample: C-2A Depth 97 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.16	164	164	4.329	1.989

white-gray pegmatite

Specimen meets ASTM D4543 shape tolerances

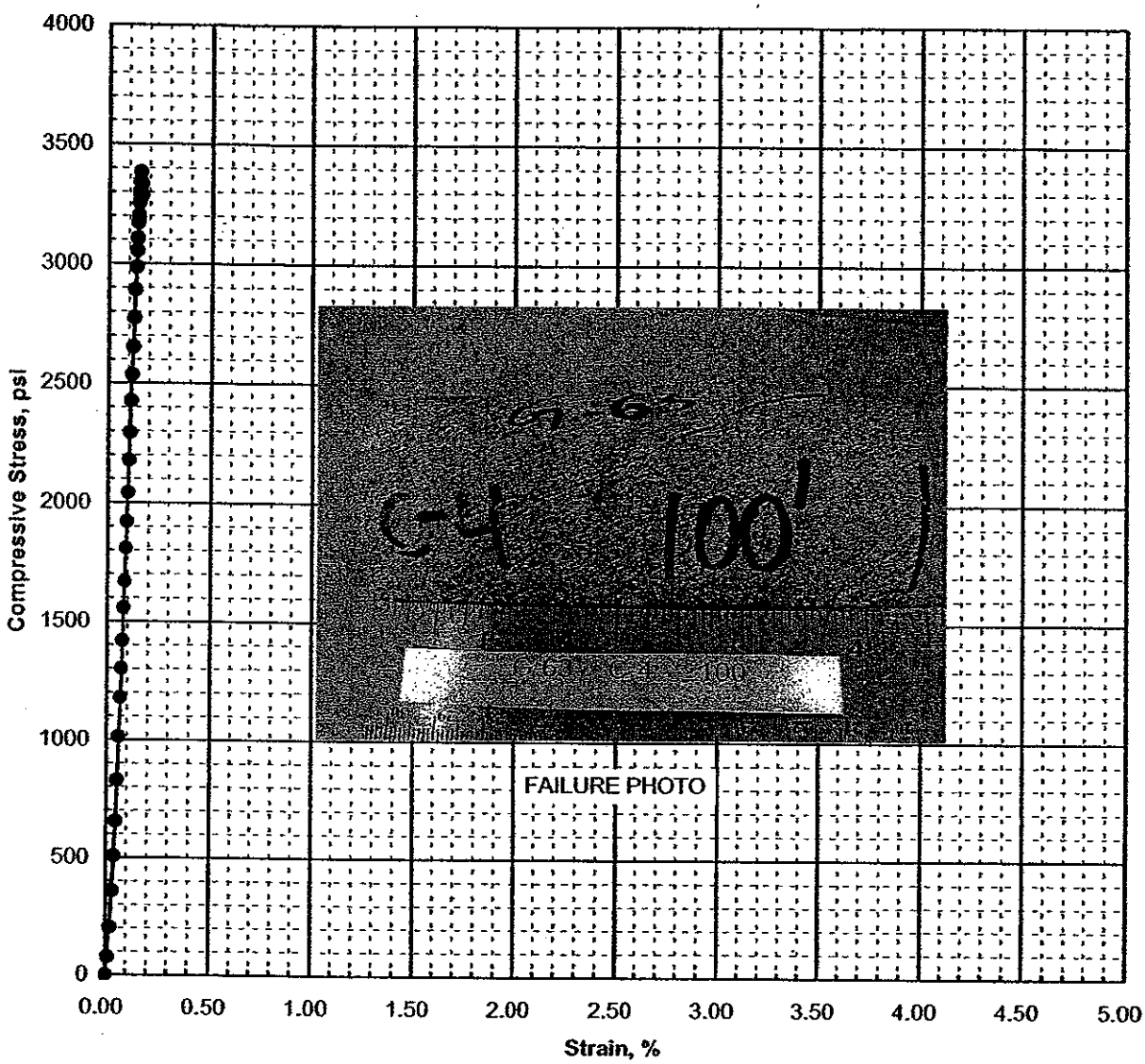
Test Summary

Tested by: DT

Test Date: Dec-21-04

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.13	0.39	13130

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** Boring: G-62 Sample: C-2B Depth 97 ft.
Geotesting Services, Inc.		



Specimen Information

Water Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Length (inch)	Diameter (inch)
0.18	169	169	4.364	1.985

gray gneiss

Specimen meets ASTM D4543 shape tolerances

Test Summary

Strain Rate (%/min)	Strain to Peak (%)	q_u (psi)
0.15	0.16	3390

Tested by: DT

Test Date: Dec-21-04

Project No. 31737700-458	Langan #35578403 New York Sports and Convention Center	**COMPRESSIVE STRESS VS STRAIN UNCONFINED COMPRESSIVE STRENGTH TEST** **Boring: G-63 Sample: C-4 Depth 100 ft.**	
Geotesting Services, Inc.			

APPENDIX D

Borings by Others (Various)

Parsons Brinckerhoff Quade & Douglas, Inc.

BORING LOG

BORING NUMBER: **CD-11w**
SHEET NUMBER: **1** of **1**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **R. Jeremic**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **CME 75 Truck Mounted**

LOCATION: **33rd St. & 11th Ave**
COORD. **N: 214,489.9** **E: 983,503.1**
STN. NO.: OFFSET:
SURFACE ELEV.: **107.5 feet**
DATUM:
START DATE: **3/24/03** TIME: **8:00 am**
FINISH DATE: **3/28/03** TIME: **5:00 pm**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ▤
I.D.	4"	1.375"	2.938"	2.938"		2"
O.D.	4.5"	2"	3"	3"		3"
Length		24"	24"	24"		
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		NWJ	
Hammer Fall	24"	30"	I.D. (O.D.)		2.937" (2.938")	

GROUNDWATER DATA*

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
3/26/03	7:30 am	11.0	22.0	30.0
3/27/03	7:30 am	12.0	22.0	69.2
3/28/03	7:45 am	13.5	22.0	120.0
3/28/03	10:30 am	14.0	22.0	130.0

*For additional readings, see CD-11w Well Installation Log.

DEPTH (feet)	GRAPHIC LOG	CASING (Blows/ft) CORING (Min./ft)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE DEPTH (feet)	SOIL (Blows/6 in.) 0/6	6/12	12/18	18/24	REC. (in.)	CORING RUN (in.)	CORING REC. (in.)	CORING REC. %	CORING L>4" (in.)	CORING RQD %	Depth Elev.	FIELD CLASSIFICATION AND REMARKS
						0.0 - 3.5		Hand		Auger							107.5	Hand Augered Material: 0' to 1' - Asphalt 1' to 3.5' - Dark gray c-f SAND, and c-f GRAVEL, little Silt (GM), frequent concrete and bricks (construction debris) (FILL)
5			S	1	■	3.5 - 5.5	58	28	21	40	14							Grayish-brown c-f SAND, some c-f Gravel (rock fragments), little Silt, very dense (SM) (occasional bricks and concrete fragments - (FILL) 3.5' to 4.5' - Large cobbles Rollerbit (5 7/8") to 10 ft Hard drilling - possible rip-rap material (FILL)
10			S	2	■	10.0 - 12.0	8	12	17	20	4							Gray & silver c-f SAND, little m-f Gravel, little Silt, medium dense (Decomposed Mica Schist) (FILL) Rig chatter to 15 ft Wash is reddish-brown from 13' to 15'
15			S	3	■	15.0 - 17.0	8	14	17	20	15							Reddish-brown c-f SAND, little m-f Gravel, little Clayey Silt, dense (SM) (Glacial Till) Smooth drilling Wash is reddish-brown
20			S	4	■	20.0 - 20.3	100/4"	-	-	-	2							Dark red and green c-f GRAVEL (angular), some c-f Sand, trace Silt, very dense (GP) (TILL) Hard drilling to 22' Mica Schist in cuttings 22' to 25'
																	25.0	Roller bit refusal and begin coring at 25'.

BORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/18/06

Parsons Brinckerhoff Quade & Douglas, Inc.

CORING LOG

BORING NUMBER: **CD-11w**
SHEET NUMBER: **1** of **4**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **R. Jeremic**
DRILLING METHOD: **Diamond drilling with double core barrel**
RIG TYPE: **CME 75 Truck Mounted**

LOCATION: **33rd St. & 11th Ave**
COORD. **N: 214,489.9** **E: 983,503.1**
STN. NO.: OFFSET:
SURFACE ELEV.: **107.5 feet**
DATUM:
START DATE: **3/24/03** TIME: **8:00 am**
FINISH DATE: **3/28/03** TIME: **5:00 pm**

CORE BARREL DATA:
TYPE: NX
CORE SIZE: 2"
O.D.: 3"
I.D.: 2"
CASING SIZE: 4" (4.5")

NOTES:

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
3/26/03	7:30 am	11.0	22.0	30.0
3/27/03	7:30 am	12.0	22.0	69.2
3/28/03	7:45 am	13.5	22.0	120.0
3/28/03	10:30 am	14.0	22.0	130.0

DEPTH (feet)	CORING RATE (ft/min)	CORE RUN NO. AND DEPTH (ft)	RECOVERY (in)	RECOVERY (%)	RQD (%)	DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break	WEATHERING	STRENGTH	DISCONTINUITY DATA ANGLE (deg)	Jr	Ja	DEPTH (feet)
		C-1 25.0 - 30.0	56	93	92	Gray SCHIST, thinly foliated, slightly weathered, medium strong to strong, slightly fractured to sound, close fracture spacing from 25.3' to 27', fine to coarse grained Loss of recovery from 25' to 25.3'	II	R3/R4	10 35 50 80 70 90	1.5 1.5 1.5 1.5 1.5 1.5	1 1 1 2 2 2	25.3 25.35 25.8 26.7 26.9 27.2
30		C-2 30.0 - 35.0	57	95	93	Dark gray SCHIST, wavy foliated, slightly weathered, moderate fracture spacing, slightly fractured, strong, fine to coarse grained, garnets present throughout the run Possible recovery loss (no rock wall contact 34.4' to 34.6')	II	R4	$0\text{-}5_{MB}$ 20_{MB} $5\text{-}10_{MB}$ 10 20 30 30_{MB} 30	- - - 1.5 1.5 1.5 - 1.5	- - - 2 2 1 - 2	30 30.4 31 31.7 31.75 32.8 33.2 33.5
35		C-3 35.0 - 45.0	120	100	100	Dark gray SCHIST, foliated, unweathered, sound, wide fracture spacing, strong, fine to coarse grained Wavy foliation 70 to 90 degrees except in contact with Granitic Material where 35 to 40 degrees Quartz and Feldspar veins 38' to 38.7' and 40.3' to 40.7'	I	R4	$5\text{-}10_{MB}$ 30 40_{MB} $*40_{MB}$ 10 $*75_{MB}$ 40_{MB} $*45_{MB}$ $-_{MB}$	- 1.5 - - 1.5 - - - -	- 1 - - 1 - - - -	34.4 34.8 35 38 39.6 39.8 40.3 40.8 43
40												
45						Gray SCHIST, thinly foliated approx.. 80 to 90 degrees, unweathered, sound, wide fracture spacing, strong, fine to coarse grained from 45' to 48.5'	I	R4	$10\text{-}30_{MB}$	-	-	45
		C-4 45.0 - 53.0	96	100	94	48.5' to 52' - Granitic Material mixed with SCHIST, slightly weathered, slightly fractured, close to	II	R4	$15\text{-}30_{MB}$ 55	- 1.5	- 1	48.5 49.3

NO. 7 CORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/21/06

Parsons Brinckerhoff Quade & Douglas, Inc.

CORING LOG
(continued)

BORING NUMBER: **CD-11w**
SHEET NUMBER: **2** of **4**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **R. Jeremic**

DEPTH (feet)	CORING RATE (ft/min)	CORE RUN NO. AND DEPTH (ft)	RECOVERY (in)	RECOVERY (%)	RQD (%)	DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break	WEATHERING	STRENGTH	DISCONTINUITY DATA ANGLE (deg)	Jr	Ja	DEPTH (feet)
						moderate fracture spacing, fine to coarse grained			20_{MB}	-	-	49.7
						Low friction (polished Mica) at 50.3', 51.6', and 51.7'			5_{MB}	-	-	50.2
									*70	1.5	4	50.3
						52' to 53' - Granitic PEGMATITE, sound, very strong, coarse grained	I	R5	*65	1.5	1	50.5
									*75	1.5	4	51.6
						53' to 54.5' - Granitic PEGMATITE, sound, very strong, coarse grained	I	R4	90	1.5	4	51.7
									5_{MB}	-	-	53
						54.5' - PEGMATITE contact with SCHIST at high angle - 70 degrees			0_{MB}	-	-	53.1
55									*70_{MB}	-	-	54.5
		C-5 53.0 - 59.2	74	100	100	54.5' to 59.2' - Gray SCHIST, wavy, thinly foliated approx. 70 to 90 degrees, unweathered, sound, wide fracture spacing, strong, fine to coarse grained Garnets (1/8") present			30_{MB}	-	-	55.6
									20_{MB}	-	-	58
						Gray SCHIST, foliated (wavy approx. 70 to 90 degrees), unweathered, sound, wide fracture spacing, strong, fine to coarse grained	I	R4	5_{MB}	-	-	59.2
60									30_{MB}	-	-	61.2
						Except: 63' to 65.2' - QUARTZ vein, with thin lenses containing Feldspar minerals, interlayered at high to vertical angles with SCHIST			0_{MB}	-	-	61.8
							I	R5	*60_{MB}	-	-	61.85
						Foliation reverses dip direction at 62' and 67.3'			*70_{MB}	-	-	62.3
		C-6 59.2 - 69.2	120	100	100				*75_{MB}	-	-	62.8
							I	R4/R5	0_{MB}	-	-	63.6
65									0_{MB}	-	-	64
									5_{MB}	-	-	64.4
									*65_{MB}	-	-	65
									20_{MB}	-	-	65.1
									20_{MB}	-	-	65.3
									40_{MB}	-	-	67.2
									35_{MB}	-	-	67.5
						Gray SCHIST, foliated, wavy 60 to 90 degrees, unweathered, sound, wide to very wide fracture spacing, strong to very strong, fine to coarse grained	I	R4/R5	40_{MB}	-	-	68.6
70									*70_{MB}	-	-	68.8
									20_{MB}	-	-	69.2
									10_{MB}	-	-	70.2
						Interlayered with QUARTZ vein with thin lenses containing Feldspar minerals at 70.2' to 74.6'						
									*60_{MB}	-	-	73.1
									30_{MB}	-	-	73.6
									45_{MB}	-	-	74
75									*$80\text{-}90_{MB}$	-	-	74.2
		C-7 69.2 - 79.2	120	100	100				45_{MB}	-	-	74.5
									30_{MB}	-	-	77
						79.2' to 80.2' - Gray Granitic Material mixed with SCHIST, sound, unweathered, strong, fine to coarse grained	I	R4	5_{MB}	-	-	79.2
80									0_{MB}	-	-	80
						80.2' to approx. 81' - Gray SCHIST, foliated, dip: 60 to 80 degrees			25_{MB}	-	-	80.7
						81' to approx. 87' - Gray GRANOFELS, unweathered, sound, wide fracture spacing, strong to very strong, fine to medium grained			15_{MB}	-	-	82.2
									15	1.5	1	82.3
		C-8 79.2 - 88.7	114	100	100	87' to 88.7' - SCHIST, foliated, dip: 60 to 90 degrees			5_{MB}	-	-	84

NO. 7 CORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/21/06

Parsons Brinckerhoff Quade & Douglas, Inc.

CORING LOG
(continued)

BORING NUMBER: **CD-11w**
SHEET NUMBER: **3** of **4**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **R. Jeremic**

DEPTH (feet)	CORING RATE (ft/min)	CORE RUN NO. AND DEPTH (ft)	RECOVERY (in)	RECOVERY (%)	RQD (%)	DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break	WEATHERING	STRENGTH	DISCONTINUITY DATA ANGLE (deg)	Jr	Ja	DEPTH (feet)
									20_{MB}	-	-	85.3
									25_{MB}	-	-	86.3
									$*60_{MB}$	-	-	87.9
90		C-9 88.7 - 91.3	31	100	100	Gray SCHIST, faintly foliated dip 80 to 90 degrees, unweathered, sound, wide fracture spacing, very strong, fine to medium grained -Block up at 91.5'	I	R5				
						-Problems with core catcher -Rock jammed inside core casing -Mechanical breaks 90.9' to 91.5'	I	R5	45_{MB} 70_{MB} 5_{MB}	- - -	- - -	90.7 91 91.3
						91.3' to 95.8' - Gray GRANOFELS, unweathered, sound, wide fracture spacing, strong to very strong, fine to medium grained			30_{MB} 20_{MB} 20	- - 1.5	- - 1	93 93.4 94.4
95		C-10 91.3 - 100.3	108	100	96	95.8' to 97.4' - Gray to dark gray Hornblende SCHIST interlayered with gray SCHIST, same as above, strong	I	R4	45 *65 20_{MB}	1.5 1.5 -	2 2 -	95.7 95.8 96.1
						Wavy foliation 70 to 90 degrees 97.4' to 100.3' - Greenish-gray, speckled pink GRANITE, unweathered, sound, strong to very strong, coarse grained	I	R4/R5	60_{MB} 25_{MB} 5_{MB} 5_{MB}	- - - -	- - - -	97.4 98.4 98.6 99.1
100						100.3' to 100.9' - PEGMATITE	I/II	R4/R5	10_{MB}	-	-	99.4
						100.9' to 101.6' - Greenish-gray GRANITE, slightly fractured, unweathered to slightly weathered, coarse grained, close fracture spacing -Healed fracture (vertical from 99.8' to 101.6') -No rock wall contact at 100.4' and 100.9'	I	R4	70 20_{MB} 30 15 20_{MB}	1.5 - 1.5 3 -	2 - 2 2 -	100.1 100.3 100.4 100.9 101.6
						101.6' to 102.9' - Light gray GRANITE in high angle contact with gray SCHIST			30_{MB} 50_{MB}	- -	- -	103.2 103.9
105		C-11 100.3 - 110.6	124	100	95	102.9' to 107.5' - Gray SCHIST, faintly foliated, dip: 60 to 70 degrees, unweathered, sound, wide fracture spacing, strong, fine to coarse grained			45_{MB} 10-30_{MB}	- -	- -	104.4 105.4
						107.5' to 110.1' - Greenish-gray Hornblende SCHIST or AMPHIBOLITE, foliated, slightly weathered to unweathered, slightly fractured, strong, fine to coarse grained Foliation dip: wavy, 75 to 90 degrees	I/II	R4	5-10_{MB} 30 80-90 0_{MB}	- 1.5 1.5 -	- 2 2 -	107.9 108.7 109 109.3
110						110.1' to 110.6' - Gray SCHIST, foliated 65 to 35 degrees	I	R4	*75 20_{MB}	1.5 -	2 -	109.5 109.7
						110.6' to 113.6' - Gray SCHIST, thinly foliated (wavy 70 to 90 degrees), unweathered, sound, wide fracture spacing, strong, fine to coarse grained			5_{MB} 30	- 1.5	- 1	110.6 113.1
						113.6' to 116.4' - Gray SCHIST mixed with pink & gray Granitic PEGMATITE, sound, unweathered, wide fracture spacing, fine to coarse grained	I	R4/R5	*45 5-20_{MB}	1.5 -	2 -	114.4 115.3
115		C-12 110.6 - 119.8	110	100	100	116.4' to 117.7' - Gray SCHIST, thinly foliated approx. 80 to 90 degrees, same as above			5-40_{MB} 0-5_{MB}	- -	- -	115.8 116.1
						117.7' to 119.8' - Light gray QUARTZITE, unweathered, sound, strong to very strong, fine to coarse grained, wide fracture spacing	I	R4/R5	5-10_{MB}	-	-	118.7

NO. 7 CORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/21/06

Parsons Brinckerhoff Quade & Douglas, Inc.

CORING LOG
(continued)

BORING NUMBER: **CD-11w**
SHEET NUMBER: **4** of **4**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**

CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **R. Jeremic**

DEPTH (feet)	CORING RATE (ft/min)	CORE RUN NO. AND DEPTH (ft)	RECOVERY (in)	RECOVERY (%)	RQD (%)	DESCRIPTION AND REMARKS (Lithology, Structure, Weathering, Continuity, Strength, Color, Grain Size) * - Denotes discontinuity along foliation MB - Denotes mechanical break	WEATHERING	STRENGTH	DISCONTINUITY DATA ANGLE (deg)	Jr	Ja	DEPTH (feet)
						119.8' to 120.3' - Light gray QUARTZITE in vertical to high angle contact with SCHIST, unweathered, coarse grained, strong to very strong	I I	R4/R5 R4	15_{MB}	-	-	119.8
						120.3' to 129.7' - Gray SCHIST, unweathered, thinly foliated, wavy 70 to 90 degrees, sound, wide fracture spacing, strong, fine to coarse grained			$-_{MB}$	-	-	122.5
125		C-13 119.8 - 129.7	119	100	100				55_{MB} $*80_{MB}$ $10\text{-}30_{MB}$ 50_{MB} 15_{MB} 30 5 65 20_{MB} 15 $10\text{-}30_{MB}$	- - - - - 1.5 1.5 1.5 - 1.5 -	- - - - - 2 2 2 - 2 -	124 124.5 124.7 125 125.5 126.3 127.4 127.5 128.3 129 129.7
130						E.O.B. at 129.7'. -Packer testing performed -Monitoring well installed						
135												
140												
145												
150												

NO. 7 CORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/21/06

Parsons Brinckerhoff Quade & Douglas, Inc.

BORING LOG

BORING NUMBER: **CD-12**
SHEET NUMBER: **1** of **1**
PROJECT NUMBER: **26553A**

PROJECT: **No 7 Subway line Extension**
LOCATION: **Manhattan**
CLIENT: **MTA**
CONTRACTOR: **Jersey Boring & Drilling**
DRILLER: **M. Blejuwas**
INSPECTOR: **A. Zabala**
DRILLING METHOD: **Rotary Wash**
RIG TYPE: **CME 75**

LOCATION: **LIRR (West Side Yard)**
COORD. **N: 213,877.0** **E: 983,374.0**
STN. NO.: OFFSET:
SURFACE ELEV.: **108.0 feet**
DATUM:
START DATE: **5/27/03** TIME: **8:00 am**
FINISH DATE: **6/1/03** TIME: **4:00 pm**

	Casing	Split Spoon	Shelby Tube	Piston	Grab	Core Barrel
Type/Symbol	HW	S ■	U ▯	P ▨	G ☒	C ▤
I.D.	4"	1.375"	2.938"	2.938"		2"
O.D.	4.5"	2"	3"	3"		3"
Length		24"	24"	24"		
Hammer Wt.	300 lbs	140 lbs	Drill Rod Size		NWJ	
Hammer Fall	24"	30"	I.D. (O.D.)		2.937" (2.938")	

GROUNDWATER DATA

Date	Time	Water Depth (ft)	Casing Depth (ft)	Hole Depth (ft)
6/2/03	11:30 am	5.4	25.0	120.0

DEPTH (feet)	GRAPHIC LOG	CASING (Blows/ft) CORING (Min./ft)	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE SYMBOL	SAMPLE DEPTH (feet)	SOIL (Blows/6 in.) 0/6	6/12	12/18	18/24	REC. (in.)	CORING RUN (in.)	CORING REC. (in.)	CORING REC. %	CORING L>4" (in.)	CORING RQD %	Depth Elev.	FIELD CLASSIFICATION AND REMARKS
						0.0 - 6.0		Hand		Auger								Hand Augered Material: 0-0.5' - Concrete from street 0.5' to 2' - Dark brown, coarse to fine SAND, c-f Gravel, some organics, occasional cobbles 2' to 4.5' - Same as above 4.5' to 6' - Light brown, yellowish SAND (possibly from LIRR drain pipe trench)
5			S	1		6.0 - 8.0	2	5	3	2	14							Light Brown, c-f SAND, some m-f Gravel, moist, loose.
10			S	2		10.0 - 12.0	2	1	1	2	10							(a) 3" light brown c-f SAND, some m-f Gravel, moist loose. (b) 7" Black, Clayey SILT, some m-f Sand, trace f gravel, soft organics.
15			S	3		15.0 - 17.0	8	11	6	7	13							Light Brown, Clayey SILT, little m-f Sand, medium dense, moist.
20			S	4		20.0 - 22.0	9	11	16	14	14							Brown, c-f SAND, little c-f gravel, trace clayey silt, medium dense, moist.
																	25.0	Roller bit refusal and begin coring at 25'.

BORING LOG NO_7NE.GPJ MAINLI~1.GLB 8/18/06