

25. Soil Boring and Profile Plan

Soil Boring and Profile Plan

Please see the attached boring information.

TEST BORING REPORT

Boring No. HA10-1

Project Portland International Marine Terminal Improvements, Portland, Maine
 Client HNTB Corporation
 Contractor Maine Test Borings

File No. 37272-000
 Sheet No. 1 of 2
 Start 15 November 2010
 Finish 15 November 2010
 Driller R. Leonard
 H&A Rep. M. Foley
 Elevation 11.5 (approx.)
 Datum NGVD 29
 Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	4.0	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	16	30	-	Casing: SSA to 5', HSA to 15.0', HW to 25.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel		Sand			Field Test							
							% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0				11.3		-BITUMINOUS CONCRETE-													
7		S1	0.5	0.2	SM	Medium dense, brown, silty SAND (SM), mps 0.75 in., no odor, moist	3	3	5	33	36	20							
9		18	2.5			-BASE/SUBBASE-													
10				10.0	SW	Medium dense, dark brown, well graded SAND with gravel (SW), mps 0.75 in., no odor, moist, contains brick and wood fragments	20	5	15	55	5								
14				1.5															
12		S2	2.5	9.0	SM	Medium dense, brown, silty SAND (SM), mps 1.25 in., no odor, moist	4	6	8	30	34	18							
11		18	4.5	2.5		-FILL-													
7																			
8																			
5		S3	4.5		SW-SM	Medium dense, brown, well graded SAND with silt and gravel (SW-SM), mps 0.3 in., no odor, moist, rust-staining around schist gravel	15	5	10	60	10								
6		11	6.5																
6																			
9																			
7		S4	6.5		SW-SM	Medium dense, brown, well graded SAND with silt and gravel (SW-SM), mps 1.3 in., no odor, moist, rust-staining around schist gravel	25	10	15	40	10								
9		13	8.5																
8																			
10																			
5		S5	8.5		SM	Medium dense, brown, silty SAND with gravel (SM), mps 0.75 in., no odor, wet	30	5	25	25	15								
3		7	10.5																
13						-FILL-													
25																			
6		S6A	10.5		SW	Loose, brown, well graded SAND with gravel (SM), mps 1.5 in., no odor, wet	25	10	20	40	5								
2		4	12.5																
7																			
5																			
14		S6B	13.0		SW	Note: Advance roller bit through boulder from 12.5 to 13.0 ft. Dense, gray, well graded SAND with gravel (SW), mps 1.0 in., no odor, saturated, brick fragments in coarse sand	15	5	15	60	5								
22		11	15.0																
23						-FILL-													
23																			
15		S7	15.0	-3.5	SP	Loose, gray, poorly graded SAND (SP), mps 0.3 in., no odor, wet	10	5	5	75	5								
5		13	17.0	15.0															
5					SP-SW	Loose, brown, well graded SAND (SW), trace gravel, mps 0.2 in., no odor, wet	10	10	30	50									
5																			
8																			
9		S8	17.0	-4.5	SP	Medium dense, brown, poorly graded SAND with silt (SP), mps 2.0 mm, no odor, wet, thin (1 cm) layer of clay in the top of the spoon, thin (1.5 in.) layer of rust-stained sand at approximately 18.0 ft			15	75	10								
8		8	19.0	16.0															
10																			
13																			
20						-MARINE DEPOSIT- (Sand)													

Water Level Data						Sample ID		Well Diagram			Summary	
Date	Time	Elapsed Time (hr.)	Depth (ft) to:			O - Open End Rod	T - Thin Wall Tube	Riser Pipe	Screen	Filter Sand	Overburden (ft)	27.0
			Bottom of Casing	Bottom of Hole	Water							
11/15/10	1445	0	pulled	27.0	4.5	S - Split Spoon Sample	Grout	Concrete	Bentonite Seal	Samples	11S	

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
 Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

15 Mar 11 G:\PROJECTS\37272 - INT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ HA-TB-CORE-WELL-07-1.GDT HA-LIB07-1R-POR-06-08-08.GLB HA-TB-CORE-WELL-07-1.GDT HA-LIB07-1R-POR-06-08-08.GLB

TEST BORING REPORT

Boring No. HA10-1

File No. 37272-000

Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel		Sand			Field Test				
							% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
20	7 11 15 16	S9 11	20.0 22.0		SP	Medium dense, brown, poorly graded SAND (SP), mps 2.0 mm, no odor, wet, thin (0.75 in.) layer of rust-stained sand at bottom of spoon -MARINE DEPOSIT- (Sand)			25	75						
25	7 8 9 10	S10 11	25.0 27.0	-15.5 27.0	SP	Medium dense, brown, poorly graded SAND (SP), mps 2.0 mm, no odor, wet			25	75						
						Bottom of Exploration 27.0 ft										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA10-1

TEST BORING REPORT

Boring No. HA10-2

Project Portland International Marine Terminal Improvements, Portland, Maine
 Client HNTB Corporation
 Contractor Maine Test Borings

File No. 37272-000
 Sheet No. 1 of 1
 Start 18 November 2010
 Finish 18 November 2010
 Driller R. Leonard
 H&A Rep. M. Foley
 Elevation 11.0 (approx.)
 Datum NGVD 29
 Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 9.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel		Sand			Field Test							
							% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0				10.8		-BITUMINOUS CONCRETE-													
				0.2		Note: Cobble at 0.5 ft.													
	10	S1	1.0		SW	Medium dense, dark brown to brown at 2.0 ft, well graded SAND with gravel (SW), mps 0.75 in., no odor, dry to moist	25	15	15	45									
	10	15	3.0			-BASE/SUBBASE-													
	8																		
	6	S2	3.0	7.9	SP	Loose, brown, poorly graded SAND (SP), mps 0.42 mm, no odor, moist, frequent 0.5 in. thick horizontal layers of black sand			20	80									
	5	18	5.0	3.1															
	4																		
	3																		
5	2	S3	5.0		SP	Loose, brown, poorly graded SAND (SP), mps 0.3 in., no odor, moist, dark brown layers from 5.0 to 5.5 ft	5		20	75									
	1	22	7.0			-FILL-													
	3																		
	2																		
	2	S4	7.0	4.0	SW	Very loose, brown, well graded SAND (SW), mps 4.0 mm, no odor, wet			15	25	60								
	1	22	9.0	7.0		-MARINE DEPOSIT- (Sand)													
	2																		
	2																		
10	1	S5	9.0		SW	Very loose, brown, well graded SAND (SW), mps 1.0 in., no odor, wet	5	15	30	50									
	1	21	11.0																
	1																		
	2																		
				0.0		Bottom of Exploration 11.0 ft													
				11.0															

Water Level Data				Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth (ft) to:			O - Open End Rod	Riser Pipe	T - Thin Wall Tube	Screen
			Bottom of Casing	Bottom of Hole	Water				
						U - Undisturbed Sample <td>Cuttings <td>Grout <td>Overburden (ft) 11.0</td> </td></td>	Cuttings <td>Grout <td>Overburden (ft) 11.0</td> </td>	Grout <td>Overburden (ft) 11.0</td>	Overburden (ft) 11.0
						S - Split Spoon Sample <td>Concrete <td>Bentonite Seal <td>Rock Cored (ft) --</td> </td></td>	Concrete <td>Bentonite Seal <td>Rock Cored (ft) --</td> </td>	Bentonite Seal <td>Rock Cored (ft) --</td>	Rock Cored (ft) --
									Samples 5S
									Boring No. HA10-2

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
 Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-IR-POR-06-09-08.GLB HA-TB-CORE-WELL-07-1.GDT G:\PROJECTS\37272 - INT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

TEST BORING REPORT

Boring No. HA10-3

Project Portland International Marine Terminal Improvements, Portland, Maine
 Client HNTB Corporation
 Contractor Maine Test Borings

File No. 37272-000
 Sheet No. 1 of 1
 Start 18 November 2010
 Finish 18 November 2010
 Driller R. Leonard
 H&A Rep. M. Foley
 Elevation 11.5 (approx.)
 Datum NGVD 29
 Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 8.5'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel		Sand			Field Test						
							% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength		
0				11.3	SW	-BITUMINOUS CONCRETE-	25	10	15	50								
12	24	S1 14	0.5	10.5	SP	Very dense, brown, well graded SAND with gravel (SW), mps 0.75 in., no odor, dry to moist	15	10	10	60	5							
24	50/0"		1.8	1.0		-BASE/SUBBASE-												
8	14	S2 8	2.5		SP	Dense, black, poorly graded SAND with gravel (SP), mps 1.3 in., no odor, dry to moist, brick and coal fragments Note: Augered through boulder from approximately 1.8 to 2.5 ft.	15	10	10	65								
9			4.5			Medium dense, black, poorly graded SAND with gravel (SP), mps 1.0 in., no odor, dry to moist, 0.5 in. ash layer, brick and coal fragments												
11																		
5	5	S3 16	4.5		SW	Loose, dark brown to black, well graded SAND with gravel (SW), mps 1.0 in., no odor, dry, contains ash and coal	20	15	25	40								
5	4		6.5															
6																		
3	2	S4 4	6.5		SP	Loose, dark brown to black, poorly graded SAND with gravel (SP), mps 0.3 in., no odor, dry	15	10	10	65								
3	3		8.5															
3						-FILL-												
1	1	S5 5	8.5		SP	Very loose, black, poorly graded SAND with gravel (SP), mps 0.7 in., no odor, moist to wet	20	10	10	60								
2			10.5															
4				1.0		Bottom of Exploration 10.5 ft												
				10.5														

15 Mar 11 G:\PROJECTS\37272 - INT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ G:\PROJECTS\37272 - INT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ HA-TB-CORE-WELL-07-1.GDT HA-LIB07-1R-POR-06-09-08.GLB HA-TB-CORE-WELL-07-1.GDT H&A-TEST BORING-07-1

Water Level Data				Sample ID		Well Diagram		Summary		
Date	Time	Elapsed Time (hr.)	Depth (ft) to:			O - Open End Rod	T - Thin Wall Tube	U - Undisturbed Sample	S - Split Spoon Sample	Overburden (ft) 10.5
			Bottom of Casing	Bottom of Hole	Water					
										Samples 5S
									Boring No. HA10-3	

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
 Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Boring No. HA10-4

Project Portland International Marine Terminal Improvements, Portland, Maine
 Client HNTB Corporation
 Contractor Maine Test Borings

File No. 37272-000
 Sheet No. 1 of 1
 Start 18 November 2010
 Finish 18 November 2010
 Driller R. Leonard
 H&A Rep. M. Foley
 Elevation 11.0 (approx.)
 Datum NGVD 29
 Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 8.5'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel		Sand			Field Test							
							% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0				10.7		-BITUMINOUS CONCRETE-													
	14	S1	0.5	0.3	SW	Dense, brown, well graded SAND with gravel (SW), mps 2.0 in., no odor, dry to damp	25	15	15	45									
	21	19	2.5	10.0	SP	-BASE/SUBBASE- Dense, black, poorly graded SAND with gravel (SP), mps 2.0 in., no odor, dry to moist, contains coal	30	5	10	55									
	16			1.0															
	12	S2	2.5		SW	Medium dense, brown to dark brown, well graded SAND with silt and gravel (SW), mps 1.0 in., no odor, moist, contains coal and large wood fragments	15	10	15	50	10								
	16	17	4.5																
	12																		
	7	S3	4.5		SW	-FILL- Medium dense, dark brown, well graded SAND with silt and gravel (SW), mps 0.8 in., no odor, moist, contains wood fragments	15	10	10	55	10								
	6	5	6.5																
	5																		
	5	S4	6.5		SW	Medium dense, brown, well graded SAND with gravel (SW), mps 1.0 in., no odor, moist	25	15	10	50									
	7	7	8.5																
	4																		
	4																		
	1	S5	8.5		SM	Very loose, brown, silty SAND (SM), mps 0.5 in., no odor, saturated	5		10	70	15								
	1	24	10.5																
	2			1.0															
	2			10.0	CL	Soft, brown, sandy CLAY (CL), mps 0.47 mm, no odor, saturated				30	70								
	2			0.5															
				10.5		-MARINE DEPOSIT- (Clay)													
						Bottom of Exploration 10.5 ft													

15 Mar 11 G:\PROJECTS\37272 - INT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ G:\PROJECTS\37272 - INT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ HA-TB-CORE-WELL-07-1.GDT HA-LIB07-1R-POR-06-09-08.GLB HA-TB-CORE-WELL-07-1.GDT H&A-TEST BORING-07-1

Water Level Data				Sample ID		Well Diagram		Summary				
Date	Time	Elapsed Time (hr.)	Depth (ft) to:			O - Open End Rod	T - Thin Wall Tube	U - Undisturbed Sample	S - Split Spoon Sample	Overburden (ft) 10.5	Rock Cored (ft) --	Samples 5S
			Bottom of Casing	Bottom of Hole	Water							

Field Tests: Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
 Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.