

January 26, 2011
File No. 144-01

Morse Construction
Attn: Mr. Glenn Morse
P.O. Box 1466
Scarborough, ME 04070

Re: 218 Washington Avenue Slope Stability
Portland, Maine

Dear Glenn

Soil Metrics LLC is pleased to present the results of a stability analysis for a proposed steep riprap slope at your 218 Washington Avenue residence in Portland, Maine. The project involves adding a parking lot to the left side of an existing residence (looking down slope). The lot will be approximately 70 feet long and approximately 40 feet deep, and constructed out of imported fill with a side slope away from Washington Avenue of 1H:1V. A plan showing the approximate dimensions of the parking lot in relation to the existing house is shown on the attached Figure 1, from Blais Civil Engineers. The plan currently calls for the 1H:1V slope to be covered with riprap. This report presents the results of a stability analysis performed to evaluate the global stability of the proposed new slope, and to assess if reinforcing might be necessary to enhance the stability.

Subsurface Conditions and Assumed Soil Properties: Six borings were drilled at the site at locations shown on Figure 1 in 2006 by Sebago Technics for a previous project at the site. The logs, included in Appendix A, indicate the subsurface conditions consist of the following from the ground surface:

Topsoil: Consisting of very loose to loose brown silty sand (SM) with roots. The thickness was 0.3 foot.

Fill: Consisting of very loose to medium dense, brown well graded sand with silt (SW-SM) to silty sand (SM), to poorly graded sand with silt (SP/SM) with various amounts of gravel, wood, bricks, bituminous and cinders. The thickness varied from 3.7 to 9.7 feet.

Marine Fan (Sand): Consisting of medium dense, brown to light brown well-graded sand with Gravel (SW). Up to 9 feet of this stratum was encountered.

Marine Sand: Consisting of loose to medium dense brown poorly graded sand with silt (SP/SM); to silty sand (SM). The thickness varied from 6 to 11 feet.

Marine Clay: Consisting of medium stiff, gray brown lean clay (CL). One boring near the bottom of the slope may have penetrated the clay deposit, indicating a thickness of 5.8 feet. The other borings were terminated in the stiff clay.

The borings were not extended to refusal and were terminated in a medium stiff clay except at B5 indicated above. Figure 2 is an interpretive subsurface profile through the center line of the proposed embankment fill. Borings B-2 (top of slope) and B4 (bottom of slope), were used to develop a subsurface profile of foundation conditions beneath the proposed embankment fill and forms the basis of the stability analysis.

The stiff clay stratum is interpreted as about 5-feet thick. Below the stiff clay, two additional strata of clay are assumed, with a slightly lower undrained shear strength.

There were no laboratory tests performed on the samples recovered from the borings. Engineering properties for the slope stability analysis were assumed based on the Standard Penetration Test (SPT) N-values and experience with similar materials. The assumed soil parameters used in the analysis are listed below in Table 1.

Table 1
 Summary of Engineering Properties used in Stability Analyses

Soil Type	Unit Weight (pcf)		Strength Parameters	
	Moist	Saturated	Effective Internal Angle of Friction (degrees)	Cohesion (psf)
New Fill for embankment	135	135	35	0
Existing fill	135	120	30	0
Marine sand	115	115	30	0
Stiff Clay	115	115	0	1,500
Lower assumed clay strata	110	110	0	1,000

Stability Analysis Results:

Global stability analyses were conducted to assess the impact of the fill placement on the stability of the foundation soils, and the internal stability of the steep 1H:1V final slope configuration. The analyses were conducted using the computer program Slope/W (2007). A series of analyses were conducted and are summarized below.

Case 1 Figure 3, Existing Conditions: The existing factor of safety was calculated as about 1.5 to 1.6 for surfaces passing through the loose fill and marine sands.

Case 2 Figure 4: New Embankment - No reinforcing: The minimum failure surfaces pass through the new embankment fill and loose marine. The minimum calculated factor was about 0.9 for surfaces passing through the end of the steep slope. Surfaces extending further into the fill and loose sand had factors of safety in the range of 1.1.

Case 3 Figures 5 through 7: New Embankment - Geogrid Reinforcement: The calculated minimum factor of safety is about 1.4 for slip surfaces that pass behind the reinforcing. The presence of the grid forces the minimum circles beyond the grid. Hypothetical slip surfaces that pass through the grid are on the order of 1.5 as indicated on Figure 6. The minimum calculated FS of 1.39 as indicated on Figure 5 assumes a water table surface at the base of the fill soils at a depth of 11 feet in Boring B2, and at about 6 feet below ground at Boring B-4. The borings were drilled in July 2006 and indicated dry conditions in both borings which were drilled to depths of 17 feet each. A water table was included in the stability analysis because water surfaces can increase seasonally. The surface depicted on the stability analysis profile is considered to be a reasonably conservative assumption, although the exact water table location is not known. The same analysis was re-run without a water table and the factor of safety was 1.6 as indicated on Figure 7. The actual factor of safety under most conditions is likely somewhere between 1.4 and 1.6. The above analyses were limited to depths explored by the borings, down to the stiff clay stratum with an undrained shear strength of 1,500 psf. As noted on the profile, a lower strength clay stratum was modeled to explore the impact that lower unknown/unexplored softer clay would have on the overall stability. Figure 8 shows the minimum calculated factor of safety of about 1.4 using an undrained shear strength of

1,000 psf. This seems like a reasonable assumption, however the only way to confirm deeper conditions would be to drill deeper borings.

Geogrid reinforcement will be necessary in order to improve the factor of safety in the embankment fill and shallow existing fill and marine sands. Details of the recommended grid elevations and lengths are provided on Figure 9. In order get the grid back far enough in the slope beneath the new fill, the existing slope will have to be cut back at a 1.5H to 1V angle to remove the existing fill. The bottom grid length is 27 feet at elevation 79 feet and extends from the back of the cut face to the end of the granular fill soil. The grid does not extend into the riprap. Ten layers of geogrid are necessary, spaced every 2 feet in elevation. The lengths increase by one foot up the slope to the upper layer (layer 10) at elevation 97 with a length of 36 feet.

The ends of the granular fill adjacent to the riprap will require wrapping in a geotextile to contain the fill and prevent it from unraveling and filtering into the riprap facing on the slope. The slope wrapping is shown on Detail A, Figure 9. Specifications for the geogrid, geotextile and granular backfill are indicated on Figure 9.

After the cut slope has been made, the existing subgrade on which the first layer of grid will be placed should be compacted with intense surface compaction. This can be accomplished using a vibratory roller or at least 30,000 pounds operating at a frequency of 30 cycles per second (Hz) and a minimum of 10 passes. Following the vibratory rolling, the surface should be compacted with at least 2 passes without vibration, to densify the near surface soils. New fill within the embankment should be placed in loose lift thicknesses of no more than 1-foot, and be compacted to 95 percent of ASTM D-1557.

The proposed construction includes a cast-in-place retaining wall to be built on the right side, perpendicular to the slope between the parking lot and the house. You may want to consider a segmental block, mechanically stabilized earth wall for this structure as it might be a cheaper alternative. Some of the geogrid for the slope reinforcement might be able to be utilized for the wall.

Thank you for the opportunity to provide geotechnical engineering services on this project. If you have any questions about this report, please do not hesitate to contact me.

Very truly yours,

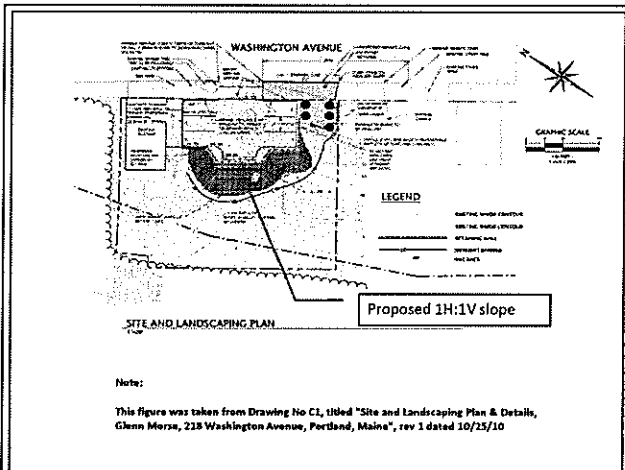
SOIL METRICS LLC

Stephen J. Rabasca, P.E.



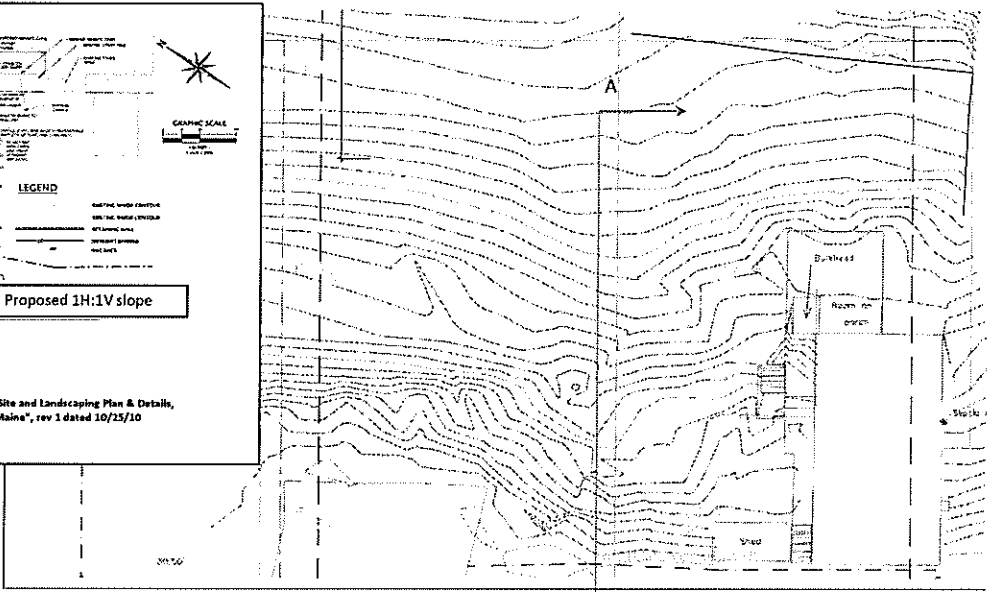
Enclosures:

- Figure 1: Site and Boring Location Plan
- Figure 2: Interpretive Subsurface Profile
- Figure 3: Stability Analysis Results - Existing Conditions
- Figure 4: Stability Analysis Results - Embankment - No Reinforcement
- Figure 5: Stability Analysis Results - Embankment Reinforcement - Surfaces beyond Grid
- Figure 6: Stability Analysis Results - Embankment Reinforcement - Surfaces through Grid
- Figure 7: Stability Analysis Results - No Groundwater Table
- Figure 8: Stability Analysis Results - Deep softer Clay
- Figure 9: Slope Reinforcement Details
- Appendix A - Sebago Technics Boring Logs



Note:

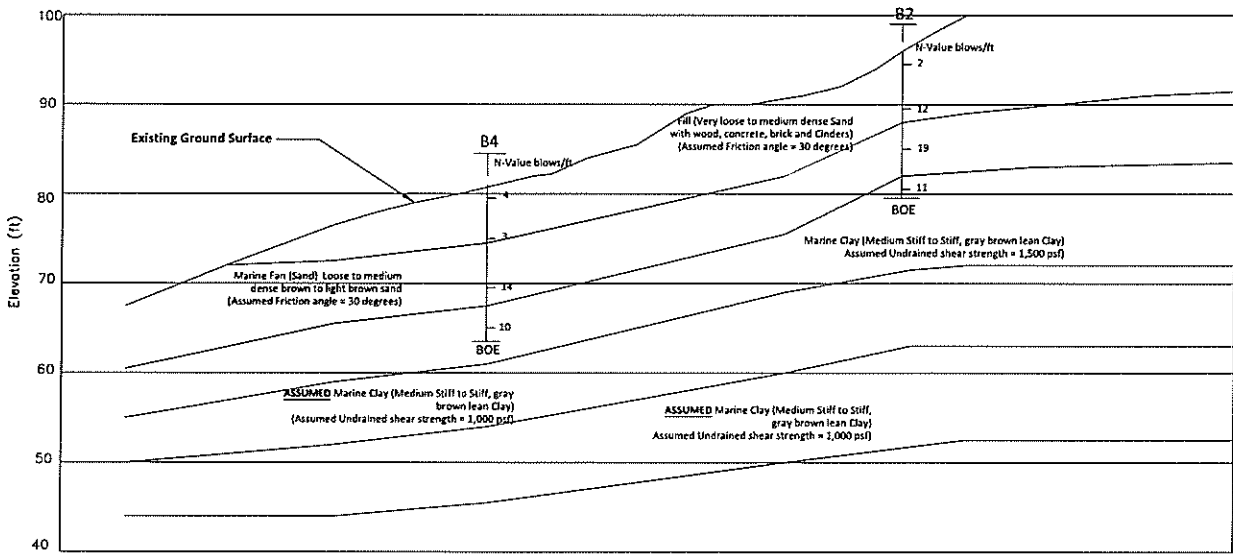
This figure was taken from Drawing No. CI, titled "Site and Landscaping Plan & Details, Glenn Morse, 218 Washington Avenue, Portland, Maine", rev 1 dated 10/25/10



Note:

This figure was taken from Sebago Technics Drawing titled "Boring Plan, 218 Washington Avenue", dated August 15, 2006, by Sebago Technics.

Soil Metrics Geotechnical Engineering LLC	
By: SUR	Checked: ajr
Date: 1/28/11	Scale: NTS
Site and Boring Location Plan	
218 Washington Avenue Morse Construction	
Project No. 144-01	
Figure No. I	



Notes:

1. The existing slope topography based on Plan titled "Boring Plan, 218 Washington Avenue", dated August 15, 2006, by Sabago Technics.
2. Refer to Figure 1 for profile location.
3. The borings were terminated before a refusal surface was encountered. The assumed conditions below the bottom of the boring are indicated on the profile as stiff clay with an undrained shear strength of 1,000 psf.

Interpretive Subsurface Profile A-A'
218 Washington Avenue Slope
Portland, Maine

SCALE: 1"=10'

Project: 218 Washington Avenue Slope
 Morse Construction
 Subject: Interpretive Subsurface Profile

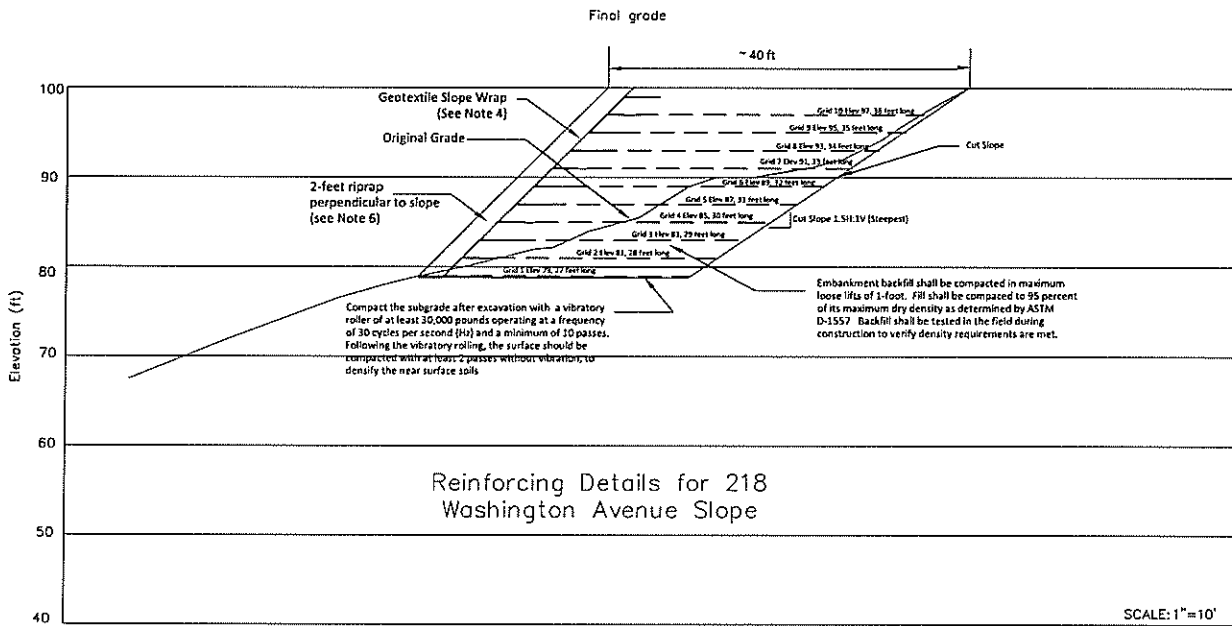
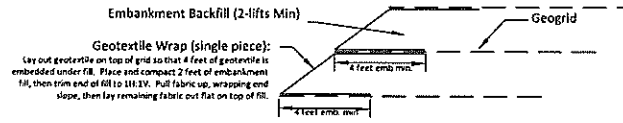
Project No: 144-01
 Date: January 26, 2011
 By: SIR

Figure No:
2

Notes:

1. The existing slope topography based on Plan titled "Boring Plan, 218 Washington Avenue", by Sebago Technics, dated August 15, 2006.
2. Refer to Figure 1 for profile location.
3. Geogrid shall meet the requirements of StrataGird SG200 or equal, with a long term design strength of at least 1,900 lbs/ft after appropriate reduction factors.
4. The geotextile for slope wrapping shall meet the requirements of Mirafi 180N or equal.
5. The embankment backfill shall meet the requirements of MDOT 703-05 b, Type D.
6. The rip rap shall have a D50 of 12 inches, and be angular rock. Rounded or subrounded stone is not acceptable.

**Detail A
Slope Wrapping**



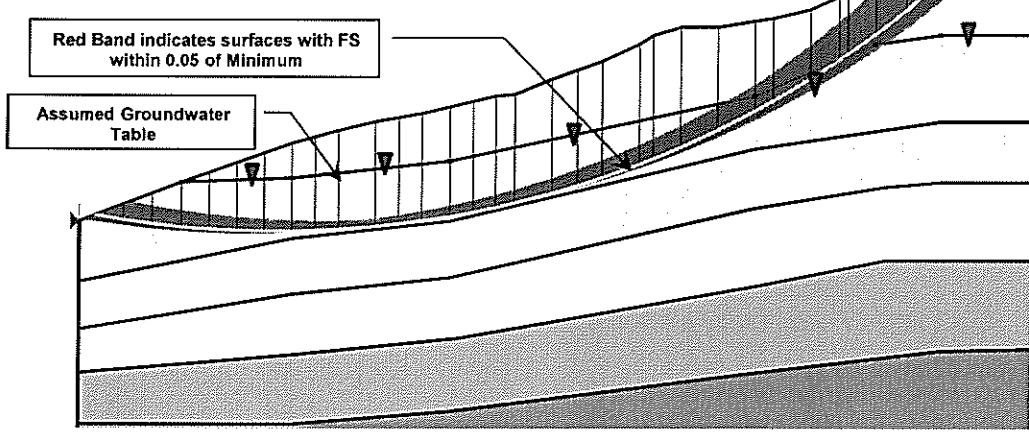
SolMetrics LLC
Geotechnical Engineering
13 Farm Road, Cape Elizabeth, Maine 04107

Project: 218 Washington Avenue Slope
Date: January 26, 2011
By: SJR

Subject: Reinforcing Details for Slope

Project No: 144-01
Date: January 26, 2011
By: SJR

Figure No: 9



Red Band indicates surfaces with FS within 0.05 of Minimum

Assumed Groundwater Table

Existing Factor of Safety = 1.5 to 1.6

SoilMetrics LLC
Geotechnical Engineering

By: SJR
Checked: sjr
Date: 1/26/11
Scale: NTS

Stability Analysis Results - Existing

218 Washington Avenue
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Project No.
144-01

Figure No.
3

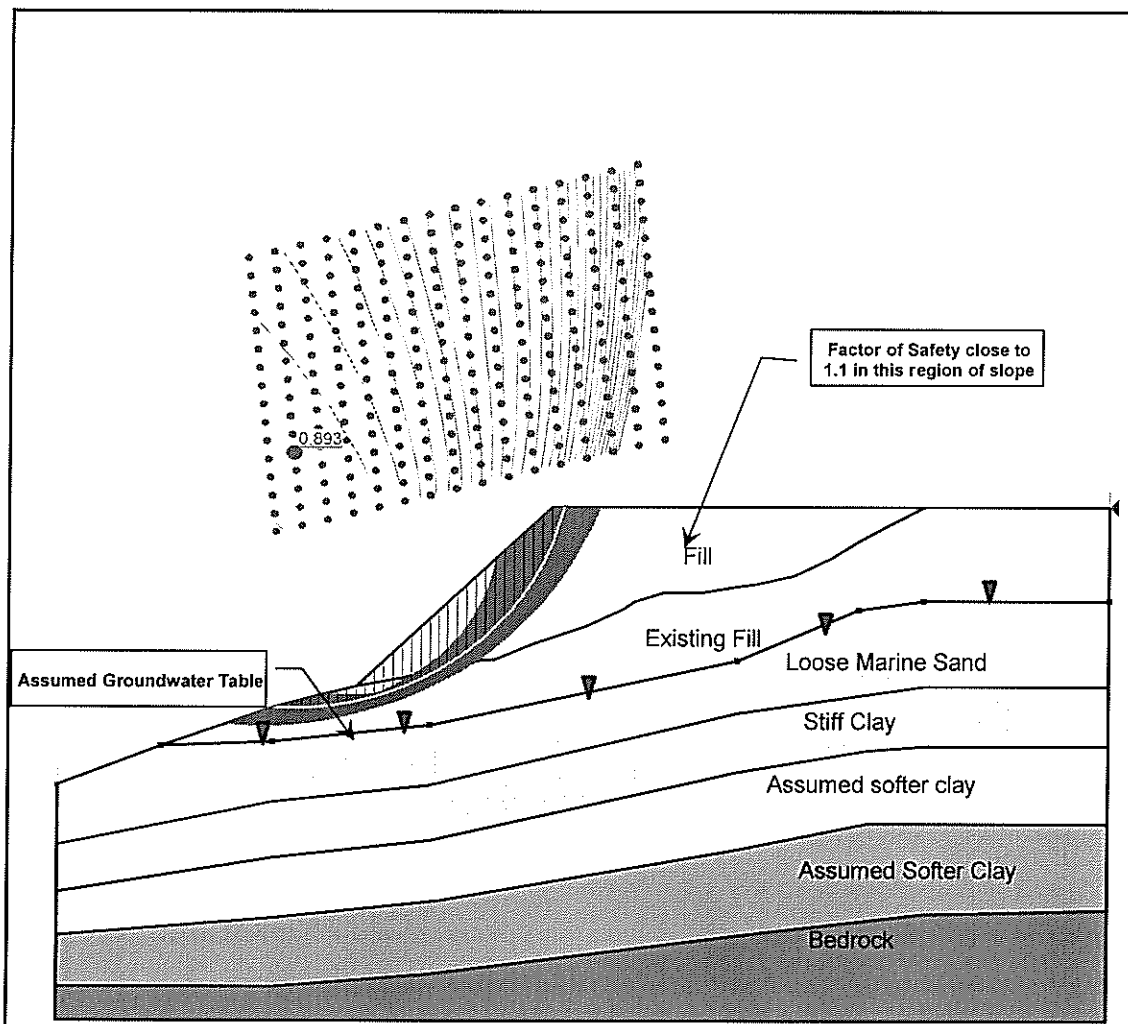
By: SJR
Checked: sjr
Date: 1/26/11
Scale: NTS

**Stability Analysis Results
Embankment - No Reinforcement**

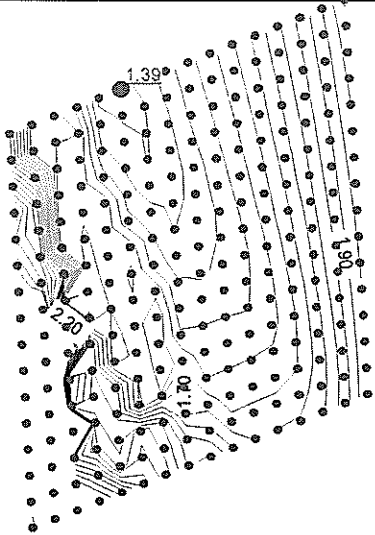
218 Washington Avenue
Morse Construction

Project No.
144-01

Figure No.
4

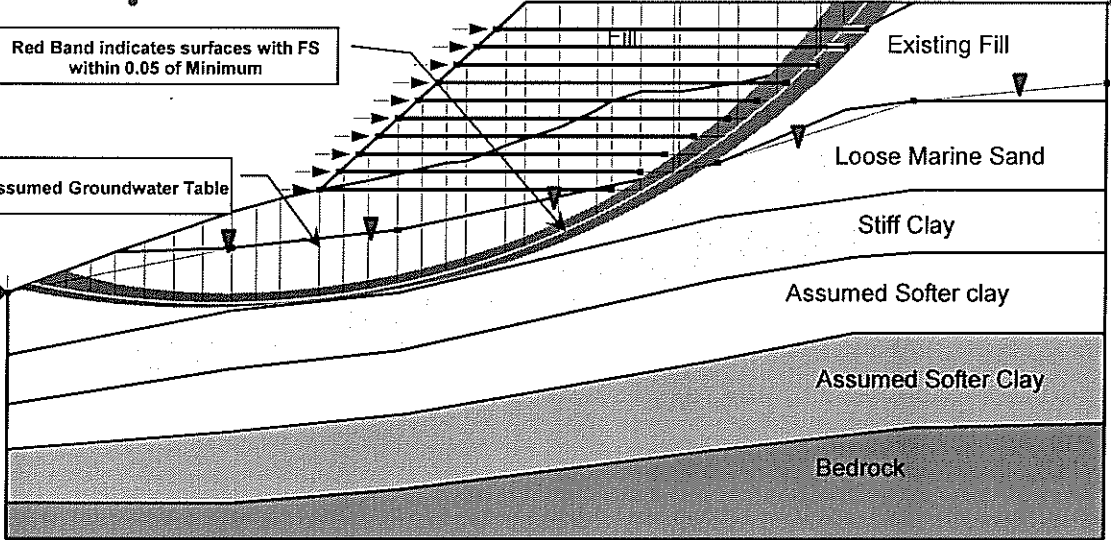


Embankment - No Reinforcement FS = 0.9 to 1.1



Red Band indicates surfaces with FS within 0.05 of Minimum

Assumed Groundwater Table



Embankment Reinforcement Surfaces Beyond Grid FS = 1.4

SoilMetrics LLC
Geotechnical Engineering

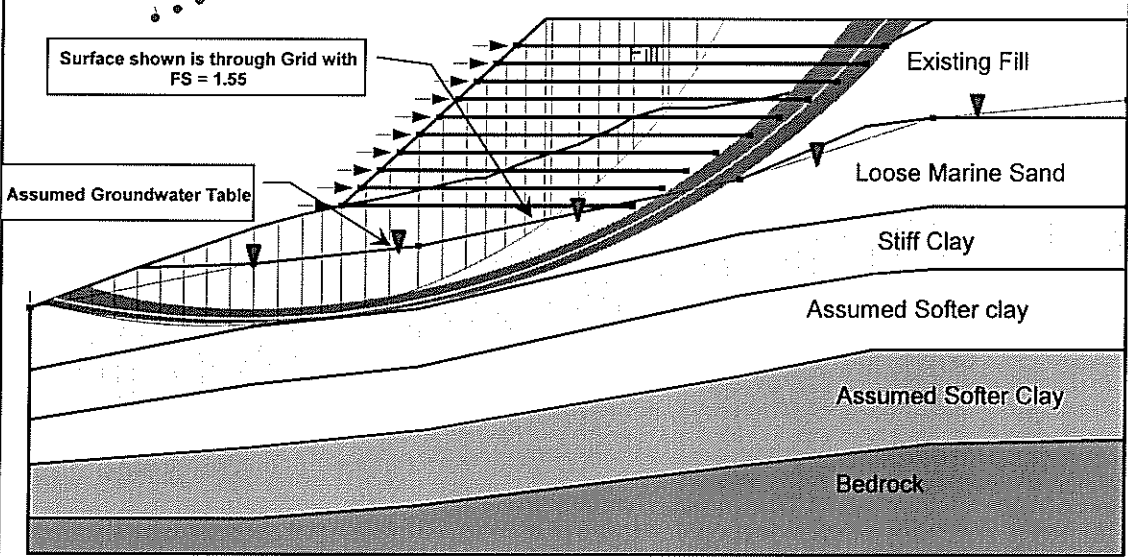
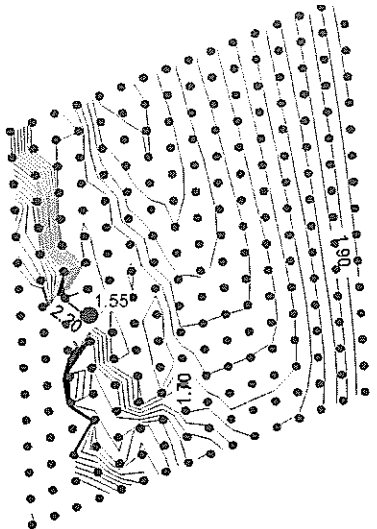
By : SJR
Checked: sjr
Date: 1/26/11
Scale: NTS

Stability Analysis Results
Embankment Reinforcement - Surfaces Beyond Grid

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Morse Construction

Project No.
144-01

Figure No.
5



**Embankment Reinforcement
Surfaces Through Grid FS = 1.55**

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Geotechnical
Engineering

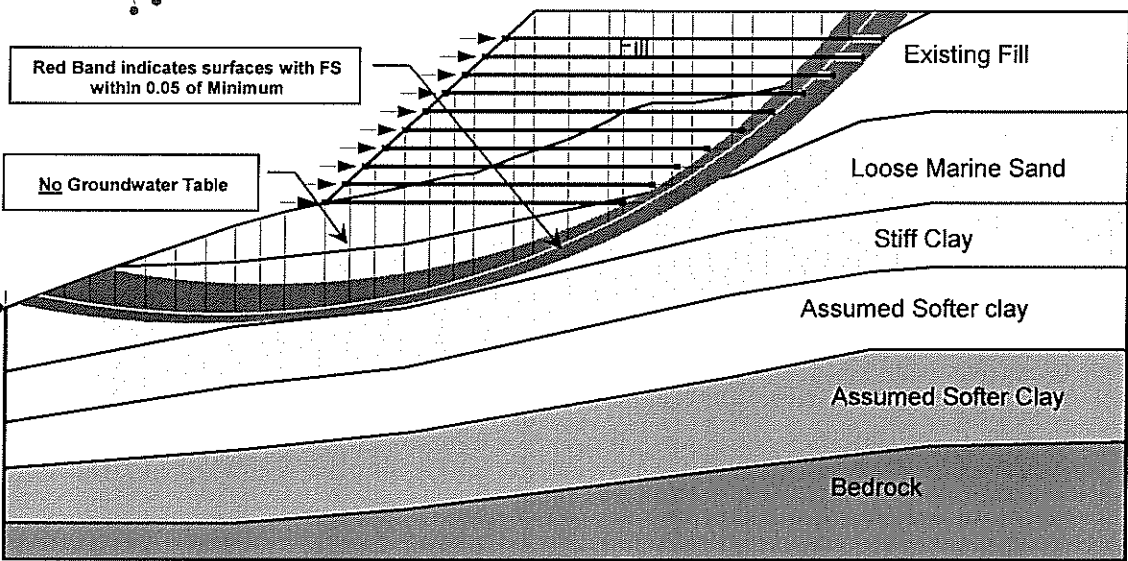
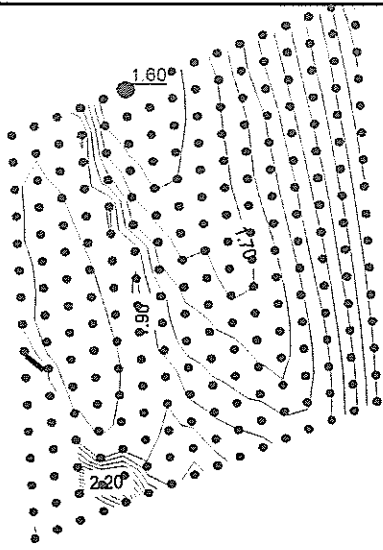
By: SJR
Checked: sjr
Date: 1/26/11
Scale: NTS

**Stability Analysis Results
Embankment Reinforcement - Surfaces Through Grid**

218 Washington Avenue
Morse Construction

Project No.
144-01

Figure No.
6



Embankment Reinforcement
No Groundwater Table FS = 1.60

SoilMetrics
LLC
Geotechnical
Engineering

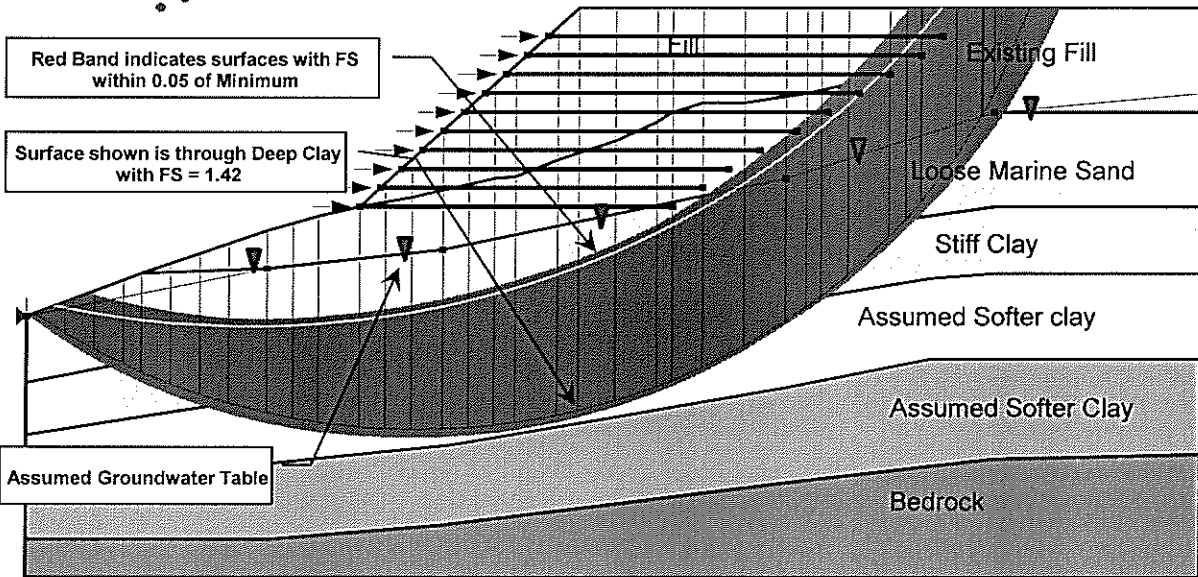
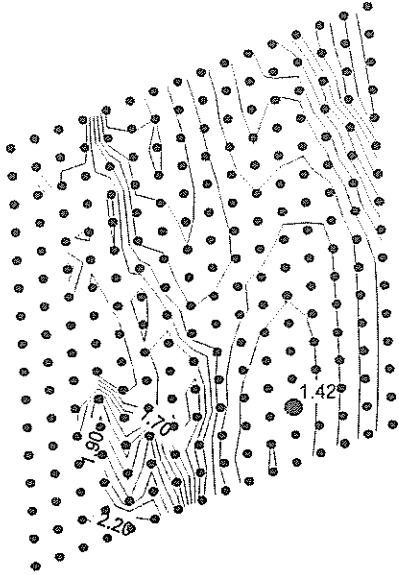
By: SJR
Checked: sjr
Date: 1/26/11
Scale: NTS

Stability Analysis Results
Embankment Reinforcement - No Groundwater Table

218 Washington Avenue
Morse Construction

Project No.
144-01

Figure No.
7



**Embankment Reinforcement
Assumed Deeper Clay - FS = 1.42**

By: SJR
Checked: sjr
Date: 1/26/11
Scale: NTS

**Stability Analysis Results
Embankment Reinforcement - Assumed Deeper Clay**

218 Washington Avenue
Morse Construction

Project No.
144-01

Figure No.
8

APPENDIX A

BORING LOGS

SEBAGO TECHNICS, INC.		TEST BORING REPORT						BORING NO. B1																					
		Page 1 of 1																											
PROJECT		PROPOSED APARTMENT BUILDING				STI JOB NO.		06172																					
LOCATION		218 WASHINGTON AVENUE, PORTLAND, MAINE				PROJECT MGR.		S. FRANK																					
CLIENT		MORSE CONSTRUCTION				FIELD REP.		K. B. STEPHENSON																					
CONTRACTOR		MAINE TEST BORINGS, INC.				DATE STARTED		7/28/2006																					
DRILLER		D. McKEEN				DATE FINISHED		7/28/2006																					
Elevation		ft. Datum		Boring Location		See Plan																							
Item		Casing		Sampler		Core Barrel		Rig Make & Model		B47/53		Hammer Type		Drilling Mud		Casing Advance													
Type		HSA		SS		--		<input type="checkbox"/> Truck <input type="checkbox"/> ATV <input checked="" type="checkbox"/> Track <input type="checkbox"/> Skid		<input type="checkbox"/> Tripod <input type="checkbox"/> Geoprobe <input type="checkbox"/> Air Track		<input checked="" type="checkbox"/> Cat-Head <input checked="" type="checkbox"/> Winch <input type="checkbox"/> Roller Bit <input checked="" type="checkbox"/> Cutting Head		<input checked="" type="checkbox"/> Safety <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic		<input type="checkbox"/> Bentonitic <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None		Type Method Depth HSA/Spin/15.0											
Inside Diameter (in.)		2.5		1.375		--																							
Hammer Weight (lb.)																													
Hammer Fall (in.)																													
Drilling Notes:																													
Depth (ft.)		Sampler Blows per 6 in.		Sample No. & Recovery (in.)		Sample Depth (ft.)		Well Diagram		Stratum Change (ft.)		USCS Symbol		Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)				% Gravel		% Sand		Field Test							
0		1		S1		0.0				0.2		SW-SM		Medium dense, brown well-graded SAND with silt and gravel (SW-SM), mps = 1.1 in., wood at 1.8 ft., dry				10		10		30		20		20		10	
7																													
10/4		8		1.9																									
5		3		S2		5.0				8.0		SM		Loose, dark brown silty SAND with gravel (SM), wood, mps = 0.25 in., dry				10		5		30		20		15			
3																													
3																													
2		3		7.0																									
10		7		S3		10.0				14.5		SW		Medium dense, brown well-graded SAND with gravel (SW), mps = 1.3 in., damp				10		10		30		35		10		5	
10																													
10																													
10		14		12.0																									
15		11		S4		15.0						SW		Medium dense, light brown well-graded SAND with gravel (SW), mps = 1.2 in., damp				15		10		35		30		10			
14																													
16																													
37		14		17.0																									

TEST BORING REPORT

PROJECT	PROPOSED APARTMENT BUILDING	STI JOB NO.	06172
LOCATION	218 WASHINGTON AVENUE, PORTLAND, MAINE	PROJECT MGR.	S. FRANK
CLIENT	MORSE CONSTRUCTION	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	7/28/2006
DRILLER	D. McKEEN	DATE FINISHED	7/28/2006

Elevation	ft.	Datum	Boring Location	See Plan
Item	Casing	Sampler	Core Barrel	Rig Make & Model
Type	FISA	SS	--	B47/53
Inside Diameter (in.)	2.5	1.375	--	<input type="checkbox"/> Truck <input type="checkbox"/> Tripod <input type="checkbox"/> Cat-Head <input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe <input checked="" type="checkbox"/> Winch <input checked="" type="checkbox"/> Track <input type="checkbox"/> Air Track <input type="checkbox"/> Roller Bit <input checked="" type="checkbox"/> Skid <input type="checkbox"/> Cutting Head
Hammer Weight (lb.)				<input checked="" type="checkbox"/> Safety <input type="checkbox"/> Bentonite <input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer <input type="checkbox"/> Automatic <input checked="" type="checkbox"/> None
Hammer Fall (in.)				Drilling Notes: Hammer Type: <input checked="" type="checkbox"/> Safety <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic Drilling Mud: <input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None Casing Advance: Type Method Depth: H5A/Sptn/15.0

Depth (ft.)	Sampler Blows per 6 In.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0	1/12"	S1	0.0			SM	Very loose, brown silty SAND with gravel (SM), traces concrete, mps = 1.3 in., dry to damp	5	10	20	20	30	15							
	1																			
	2	4	2.0		2.0		-FILL-													
5	3	S2	5.0		5.4	SM	Medium dense, dark brown silty SAND (SM), brick, trace ash, mps = 0.2 in., dry			20	30	30	20							
	5						-FILL-													
	7					SP-SM	Medium dense, brown poorly-graded SAND with silt (SP-SM), mps = 0.1 in., dry				20	70	10							
	9	18	7.0		7.0		-FILL-													
					8.0		Note: plastic, dark brown silty sand with gravel in cuttings from 7.0 to 8.0 ft.													
							-FILL-													
10	7	S3	10.0			SP	Medium dense, brown poorly-graded SAND (SP), occasional mottles, mps = 0.1 in., damp					5	90	5						
	9																			
	10																			
	11	18	12.0				-MARINE DEPOSITS-													
					14.0															
15	4	S4	15.0			CL	Stiff, gray-brown mottled lean CLAY (CL), frequent sand partings to seams, mps = 0.02 in., damp					10	90	N	M	M				
	5																			
	6																			
	8	24	17.0				-MARINE DEPOSITS-													
							Bottom of exploration at 17.0 ft. below ground surface													
							No refusal													

Water Level Data			Depth In feet to:			Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Bottom of Casing	Bottom of Hole	Water	O	Open End Rod		Riser Pipe	Overburden (Linear ft.)	17.0
7/28/06	0742		--	13.5	Dry	T	Thin Wall Tube		Screen	Rock Cored (Linear ft.)	--
						U	Undisturbed Sample		Cuttings	Number of Samples	45
						S	Split Spoon Sample		Grout	BORING NO.	B2
						G	Geoprobe		Concrete		
									Bentonite Seal		
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 identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.											

TEST BORING REPORT

PROJECT: PROPOSED APARTMENT BUILDING
 LOCATION: 218 WASHINGTON AVENUE, PORTLAND, MAINE
 CLIENT: MORSE CONSTRUCTION
 CONTRACTOR: MAINE TEST BORINGS, INC.
 DRILLER: D. McKEEN

STI JOB NO.: 06172
 PROJECT MGR.: S. FRANK
 FIELD REP.: K. B. STEPHENSON
 DATE STARTED: 7/27/2006
 DATE FINISHED: 7/27/2006

Elevation	ft	Datum	Boring Location	Set Plan
Item	Casing	Sampler	Core Barrel	Rig Make & Model
Type	HSA	SS	--	B47/53
Inside Diameter (in.)	1.5	1.375	--	
Hammer Weight (lb.)				
Hammer Fall (in.)				

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0	3	S1	0.0		0.3	SM	Loose, brown silty SAND (SM), grass roots, mps = 0.1 in., dry -TOPSOIL-							10	75	15				
	5					SM	Loose, brown silty SAND with gravel (SM), wood, bituminous concrete, mps = 0.5 in., dry	5	10	20	20	30	15							
	5						-FILL-													
	4	14	2.0																	
5	2	S2	5.0			SM	Loose, brown silty SAND (SM), traces brick and cinder, mps = 0.2 in., dry			15	30	40	15							
	2																			
	2																			
	1	8	7.0				-FILL-													
10	5	S3	10.0		10.0	SW	Medium dense, light brown well-graded SAND with gravel (SW), mps = 0.75 in., dry	5	10	30	50	5								
	6																			
	5																			
	6	16	12.0				-MARINE FAN DEPOSITS-													
					14.5															
15	2	S4	15.0			SW	Loose, light brown well-graded SAND with gravel (SW), mps = 1.0 in., 1.2 in., dry	10	5	40	40	5								
	4																			
	5																			
	5	14	17.0				-MARINE FAN DEPOSITS-													
							Bottom of exploration at 17.0 ft. below ground surface													
							No refusal													

Water Level Data						Sample ID		Well Diagram		Summary												
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	T	U	S	G	Riser Pipe	Screen	Filter Sand	Cuttings	Grout	Concrete	Bentonite Seal	Overburden (Linear ft.)	Rock Cored (Linear ft.)	Number of Samples		
			Bottom of Casing	Bottom of Hole	Water																	
7/27/06	1530		--	14.0	Dry															17.0	--	45
																	BORING NO.	B3				
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 V - Very 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 identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.																						

SEBAGO TECHNICS, INC.	TEST BORING REPORT						BORING NO. B4													
PROJECT: PROPOSED APARTMENT BUILDING							STI JOB NO. 06172													
LOCATION: 218 WASHINGTON AVENUE, PORTLAND, MAINE							PROJECT MGR. S. FRANK													
CLIENT: MORSE CONSTRUCTION							FIELD REP. K. B. STEPHENSON													
CONTRACTOR: MAINE TEST BORINGS, INC.							DATE STARTED: 7/27/2006													
DRILLER: D. McKEEN							DATE FINISHED: 7/27/2006													
Elevation		ft Datum		Boring Location		Sec Plan														
Item	Casing	Sampler	Core Barrel	Rig Make & Model		B47/53														
Type	HSA	SS	--	<input type="checkbox"/> Truck	<input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head	<input checked="" type="checkbox"/> Safety													
Inside Diameter (in.)	2.5	1.375	--	<input type="checkbox"/> ATV	<input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input type="checkbox"/> Benlonite													
Hammer Weight (lb.)				<input checked="" type="checkbox"/> Track	<input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Polymer													
Hammer Fall (in.)				<input type="checkbox"/> Skid		<input checked="" type="checkbox"/> Cutting Head	<input checked="" type="checkbox"/> Automatic													
Drilling Notes:																				
Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0	2	S1	0.0			SM	Very loose, light brown silty SAND with gravel (SM), traces concrete, mps = 1.0 in., dry	5	10	10	30	25	20							
	2				1.5		-FILL-													
	2	6	2.0			SM	Very loose, brown silty SAND with gravel (SM), traces brick, mps = 1.0 in., damp	5	10	30	20	20	15							
5	2	S2	5.0			SM	Very loose, brown silty SAND with gravel (SM), traces paint, mps = 1.0 in., damp	10	5	30	20	20	15							
	1				6.0		-FILL-													
	2	12	7.0			SP-SM	Very loose, brown poorly-graded SAND with silt (SP-SM), mps = 0.02 in., damp					90	10							
	2						-MARINE DEPOSITS-													
					9.0															
10	5	S3	10.0			SP	Medium dense, light brown poorly-graded SAND (SP), occasional nodules, mps = 0.2 in., damp					100								
	6						-MARINE DEPOSITS-													
	8	18	12.0																	
	12				13.0															
15	3	S4	15.0			CL	Medium stiff, gray-brown mottled lean CLAY (CL), frequent sand seams, mps = 0.02 in., damp					30	70	N	M	M				
	5						-MARINE DEPOSITS-													
	5																			
	8	24	17.0																	
							Bottom of exploration at 17.0 ft. below ground surface. No refusal													
20																				
25																				
30																				
Date		Time	Elapsed Time (hr.)			Depth in feet to:			Sample ID		Well Diagram		Summary							
			Bottom of Casing	Bottom of Hole	Water	O	Open End Rod	<input type="checkbox"/>	Riser Pipe	Overburden (Linear ft.) 17.0										
7/27/2006		1635	--	14.0	Dry	T	Thin Wall Tube	<input type="checkbox"/>	Screen	Rock Cored (Linear ft.) --										
						U	Undisturbed Sample	<input type="checkbox"/>	Filler Sand	Number of Samples 4S										
						S	Split Spoon Sample	<input type="checkbox"/>	Cuttings											
						G	Geoprobe	<input type="checkbox"/>	Grout											
								<input type="checkbox"/>	Concrete											
								<input type="checkbox"/>	Bentonite Seal											
Field Tests		Dilatancy: R - Rapid S - Slow N - None				Plasticity: N - Nonplastic L - Low M - Medium H - High				Toughness: 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 identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.																				

TEST BORING REPORT

PROJECT: PROPOSED APARTMENT BUILDING
 LOCATION: 218 WASHINGTON AVENUE, PORTLAND, MAINE
 CLIENT: MORSE CONSTRUCTION
 CONTRACTOR: MAINE TEST BORINGS, INC.
 DRILLER: D. McKEEN

STI JOB NO.: 06372
 PROJECT MGR.: S. FRANK
 FIELD REP.: K. B. STEPHENSON
 DATE STARTED: 7/27/2006
 DATE FINISHED: 7/27/2006

Elevation	ft.	Datum	Boring Location	See Plan
Item	Casing	Sampler	Core Barrel	Rig Make & Model
Type	HSA	SS	-	B47/53
Inside Diameter (in.)	2.5	1.375	-	Hammer Type
Hammer Weight (lb.)				Drilling Mud
Hammer Fall (in.)				Casing Advance

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0	2	S1	0.0		0.3	SM	Very loose, brown silty SAND (SM), roots, mps = 0.1 in., dry -TOPSOIL-						10	75	15					
	1					SM	Very loose, brown silty SAND (SM), brick, traces ash and roots, mps = 0.2 in., dry						20	30	35	15				
	2	B	2.0				-FILL-													
					4.0															
5	8	S2	5.0			SM	Medium dense, brown mottled silty SAND (SM), mps = 0.02 in., damp								85	15				
	10																			
	9																			
	7	B	7.0				-MARINE DEPOSITS-													
					8.5															
10	6	S3	10.0			SP-SM	Medium dense, brown poorly-graded SAND with silt (SP-SM), mps = 0.1 in., damp						5	85	10					
	8																			
	9																			
	6	B	12.0				-MARINE DEPOSITS-													
							Bottom of exploration at 12.0 ft. below ground surface													
							No refusal													

Water Level Data			Depth In feet to:			Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Bottom of Casing	Bottom of Hole	Water	O	T	U	S	G	Overburden (Linear ft.)
7/27/06	1445		--	9.0	Dry						12.0
											Rock Core (Linear ft.)
											--
											Number of Samples
											35
Field Tests										BORING NO. B6	
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 identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.