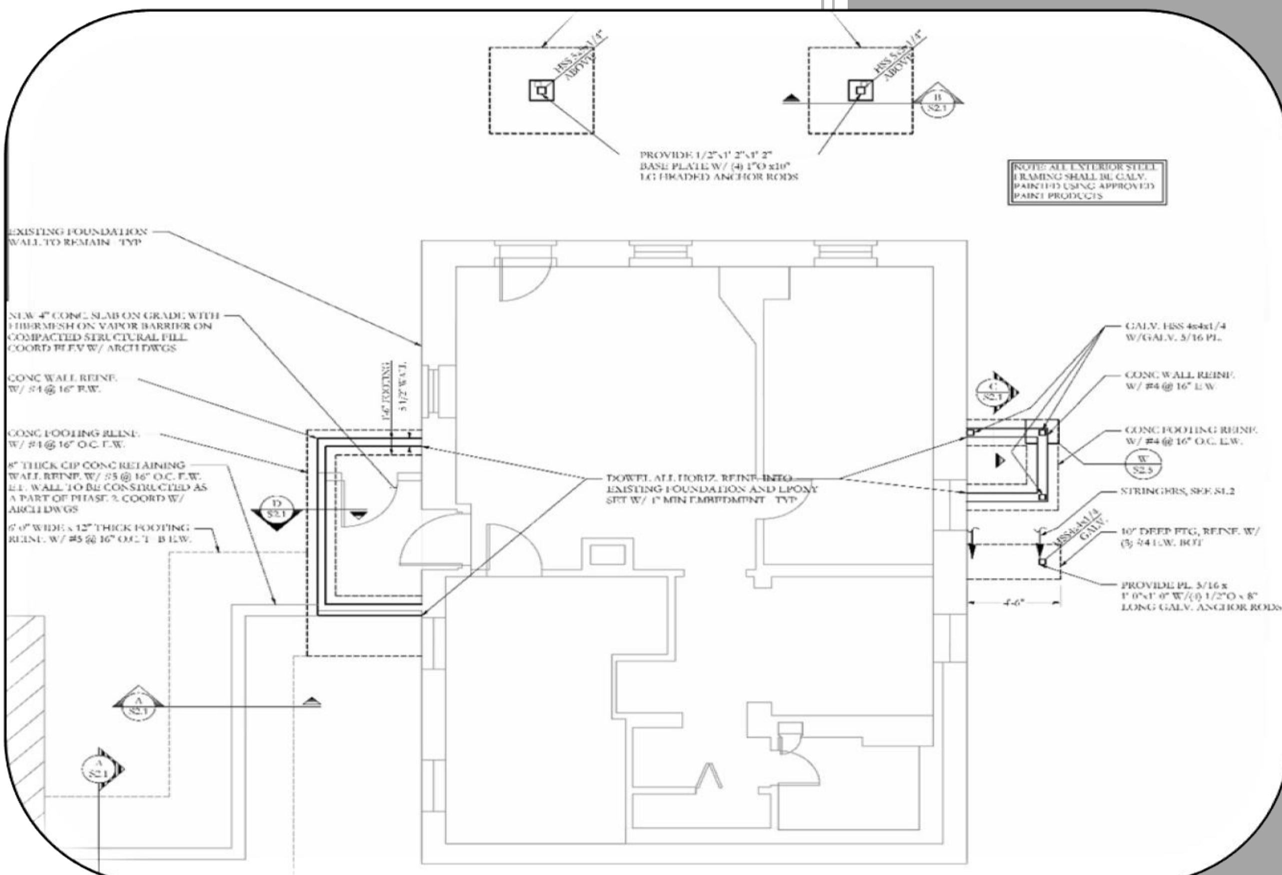
The key to success starts with a solid foundation.
ENGINEERING | EXPLORATION | EXPERIENCE

Geotechnical Report

Proposed Deck and Entry Additions
123 Cumberland Ave, Portland, Maine



SUMMIT GEOENGINEERING SERVICES

145 Lisbon Street (PO Box 7216) Lewiston, Maine 04243 | (207) 576-3313
173 Pleasant Street Rockland, Maine 04841 | (207) 318-7761
www.summitgeoeng.com

Client
Lynne and Larry Robinson
310 Spring Street
Portland, Maine 04102

Project #: 18139
Date: 5/23/2018

May 23, 2018
Summit #18139

Lynne and Larry Robinson
310 Spring St.
Portland, Maine 04102

Reference: Geotechnical Investigation, Deck and Entry Additions
123 Cumberland Avenue, Portland, Maine

Dear Mr. and Mrs. Robinson:

Summit Geoengineering Services, Inc. (SGS) has completed a geotechnical investigation for the proposed new development at the site referenced above. Our scope of services included the observation of one boring at the site and preparing this geotechnical report summarizing our findings and providing geotechnical recommendations. Our investigation is focused on the design and construction of the new deck foundations.

1.0 Project and Site Description

The project consists of the construction of a new multi-story deck and entrance. The addition of the deck is to be supported by two footings. The area of the new footings is a landscaped backyard area.

A foundation plan was provided to SGS showing two 5 foot square conventional spread footings. No foundation loads were provided.

2.0 Subsurface Exploration

SGS observed the subsurface conditions with the drilling of one boring on May 10, 2018 using a rubber track mounted AMS Power Probe. The boring reached a depth of 19.4 feet below the ground surface; bedrock was encountered at this depth.

The location of the boring is shown on the Boring Location Plan in Appendix A. The Boring Log is provided in Appendix B.

3.0 Subsurface Conditions

The following subsurface layers and thicknesses were encountered in our geotechnical investigation, starting from the ground surface:

- ***Fill,*** 1 to 4 feet
- ***Glacial Marine,*** 4 to 19.4 feet

145 Lisbon Street (PO Box 7216) Lewiston, Maine 04243 | (207) 576-3313
173 Pleasant Street Rockland, Maine 04841 | (207) 318-7761
www.summitgeoeng.com

The ***Fill*** was encountered starting at the ground surface, and reaches a depth of 4 feet. It consists of a brown silty sand with a trace amount of gravel. The fill is dry and loose and visually classifies as SM in accordance with USCS.

The ***Glacial Marine*** deposit was encountered starting at a depth of 4 feet and reaches a depth of 19.4 feet. From a depth of 4 feet to 10 feet, the soil is described as olive-brown to orange-brown silty sand. It is somewhat moist and compact, and visually classifies as SM in accordance with USCS. From a depth of 10 to 15 feet, the soil can be described as a brown fine sand with trace to light silt. The soil is wet, slightly mottled, loose, and visually classifies as SM. Finally, from a depth of 15 feet to the end of the boring at 19.4 feet the soil is described as a gray silty clay. The clay is wet and very soft and classifies as CL in accordance with USCS.

Groundwater was not observed in the boring. The borehole caved at 7 feet indicating the possible location of the groundwater table at the time of drilling.

4.0 Foundation Recommendations

Based on our explorations and our recommended frost protection depth, we anticipate that the deck support footings will be supported on the silty sand glacial marine deposit. We recommend that these footings and the proposed entry way addition footings be proportioned using an allowable bearing pressure of 2,000 psf. The total estimated settlement for this contact pressure is estimated to be less than ¾ of an inch. Differential settlement between footings will be negligible. This allowable bearing pressure is based on the following conditions:

- The footings are constructed at the required frost protection depth of 4 feet below the finished ground surface.

- The soil at the base of the footings is proofrolled using a large vibratory plate compactor and making a minimum of 4 passes in each of two perpendicular directions.

The design air freezing index for the Portland area is approximately 950 degree F days (10 year, 90% probability). Based on this, a total of 4 feet of frost protection should be provided for the exterior footings exposed to freezing temperatures.

The footings can be backfilled with the existing fill soil excavated to construct the footings. We recommend that the soil be placed in 12 inch lifts and be compacted with a vibratory plate compactor. No compaction tests are necessary.

Cast in place retaining wall footings should be constructed at a minimum depth of 4 feet below the exterior finished grade for frost protection. The maximum retaining wall footing contact pressure should be limited to 2,000 psf. We recommend that the foundation walls not free to rotate at the top, but which are drained at their base be designed using an at-rest equivalent

145 Lisbon Street (PO Box 7216) Lewiston, Maine 04243 | (207) 576-3313
173 Pleasant Street Rockland, Maine 04841 | (207) 318-7761
www.summitgeoeng.com

fluid pressure of 45 psf per foot of wall height. The passive pressure in front of the wall can be taken as 250 psf per foot of embedment depth. Values of 0.40 should be used for the friction coefficient at the base of the wall for footings on the silty sand glacial marine deposit.

5.0 Earthwork Considerations

The existing fill/native soils are classified as OSHA Type C. Based on this, occupied excavations less than a depth of 20 feet are limited to a maximum side slope of 1.5 horizontal to 1 vertical in the existing fill/native soils.

The existing fill can be used as backfill above the deck footings. We recommend that the entry way footings be backfilled with a non-frost susceptible granular soil having a maximum of 65 passing a #200 sieve.

Groundwater will not be encountered within footing excavations.

If conditions other than those described above are observed, SGS should be notified so we can make any necessary adjustments to our recommendations.

6.0 Closure

Our recommendations are based on professional judgment and generally accepted principles of geotechnical engineering and project information provided by others. Some changes in subsurface conditions from those presented in this report may occur. Should these conditions differ materially from those described in this report, SGS should be notified so that we can re-evaluate our recommendations.

We appreciate the opportunity to serve you during this phase of your project. If there are any questions or additional information is required, please do not hesitate to call.

Sincerely,
Summit Geoengineering Services, Inc.

William M Peterlein

William M. Peterlein, PE
President & Principal Engineer

APPENDIX A

EXPLORATION LOCATION PLAN

N

NORTH

LEGEND

B-1 SUMMIT TEST BORING (MAY 10, 2018)

PLAN REFERENCE

AERIAL IMAGE (2006) WAS OBTAINED FROM MAINE OFFICE OF G.I.S. WEBSITE.

TEST BORING LOCATION PLAN
DECK & ENTRY ADDITIONS

123 CUMBERLAND AVENUE - PORTLAND, MAINE

PREPARED FOR

LARRY & LYNNE ROBINSON

DATE: 5-25-2018	DRAWN BY: KRF	CHECKED BY: WMP
JOB: 18139	SCALE: 1" = 20'	FILE: 18139 BOR

145 LISBON ST. - SUITE 701
LEWISTON, ME 04240
Tel.: (207) 576-3313

173 PLEASANT STREET
ROCKLAND, ME 04841
Tel.: (207) 318-7761

SUMMIT
GEOENGINEERING SERVICES
www.summitgeoeng.com

APPENDIX B

BORING LOGS

SUMMIT GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Robinson	Boring #:	**B-1**
Location:	123 Cumberland Ave	Project #:	18139
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering, Inc.	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 5/10/2018	Date Completed: 5/10/2018

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	3" Casing	Hammer:	140 lb
Hammer Style:	Auto	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
5/10/2018			Hole Caved at 7 ft depth

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	Elev. (ft.)	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	S-1	18/12	0 to 2	1		Brown Silty SAND, trace gravel, very loose, SM		
1				1				
				1				
2								FILL
3								
4								
5								
	S-2	24/12	5 to 7	3		Olive Brown to Orange Brown Silty SAND, moist,		GLACIAL MARINE
6				5		compact, SM		
				6				
7				5				
8								
9								
10								
	S-3	24/18	10 to 12	2		Brown Fine SAND, trace to light Silt, wet, slightly mottled,		
11				3		loose, SM		
				3				
12				3				
13								
14								
15								
	S-4	24/24	15 to 17	WH		Gray Silty CLAY, wet, very soft, CL		
16				WH				
				WH				
17				WH				
18								
19								
20						End of boring at 19.4' on bedrock		
21								
22								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index, FV = Field Vane Test
Bedrock Joints Su = Undrained Shear Strength, Su(r) = Remolded Shear Strength
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%