SUMMIT
GEOENGINEERING SERVICES

Preliminary Geotechnical Report

Munjoy Heights Development
Walnut Street
Portland, Maine

Prepared for:

Redfern Properties
P.O. Box 8816
Portland, Maine 04104

Prepared by:

Summit Geoengineering Services, Inc.
640 Main Street
Lewiston, Maine

SGS #13067
July 2013

July 29, 2013
SGS #13067

Jonathan Culley
Redfern Properties
P.O. Box 8816
Portland, Maine 04104

Reference: Preliminary Geotechnical Investigation, Munjoy Heights
Walnut Street, Portland, Maine

Dear Jonathan;

We have completed a preliminary geotechnical investigation for the proposed Munjoy Heights project. Our scope of services included excavating 5 test pits at the proposed site, and preparing this preliminary geotechnical letter summarizing our findings and general geotechnical recommendations.

Exploration and Testing

Summit observed the subsurface conditions at the site with the excavation of 5 test pits on May 23, 2013. The test pits were excavated to depths ranging from 7 to 14 feet, using a tracked excavator. The test pits were field located by SGS during the exploration based on identifiable site features. The location of the test pits is shown on Figure 1, Test Pit Location Plan. Logs of the test pits are also attached. The test pits are limited to the southeast half of the site. We originally planned to excavate test pits over the entire site; however, the test pits in the northern portion of the site were not completed due to the steep wooded topography and the necessity to limit disturbance.

Subsurface Conditions

The soil at the site generally consists of topsoil overlying a sand and gravel marine near shore deposit, overlying glacial till. A glacial marine layer (silt, sand, and clay) was encountered beneath the near shore deposit at TP-1, TP-3, and TP-5. A 2 foot layer of fill was observed at the surface at TP-2.

The topsoil ranged from 1 foot to 1.5 feet in thickness. It is described as dark brown sandy silt or silty sand with a trace of rootlets. This soil is moist and is classified as ML or SM in accordance with the USCS Classification System.

The fill, encountered in the upper 2 feet of soil profile at TP-2, is described as dark brown sandy silt with a trace of ash and rootlets. The fill contained glass fragments and pieces of metal; it was moist, loose, and is classified as ML.

The marine near shore deposit, encountered at all the test pit locations, is described as brown gravelly sand or brown sand with cobbles and boulders. This soil was compact and is visually classified as SP or SW in accordance with the USCS.

The glacial marine deposit, encountered beneath the marine near shore deposits at TP-1, TP-3, and TP-5, varies from brown silty fine sand to olive-brown fine sandy silt to olive-brown silty clay. The glacial marine layer was 1 to 4 feet thick and is classified as SM or ML in accordance with the USCS.

The glacial till was observed at TP-1 and TP-4. It is described as olive-brown to olive-gray sandy silt with a little clay and gravel. The glacial till is stiff and has a USCS classification of ML.

Groundwater was not observed in the test pits. No mottling was observed.

Bedrock was not encountered in the test pits.

Evaluation and Preliminary Recommendations

The existing ground surface at the site slopes relatively steeply toward the west. We anticipate that there will be significant cut on the east half of the site and a significant amount of fill placed to raise the existing grade on the west side of the site. Grading at the site will require the construction of retaining walls near both the east and west property lines.

Based on preliminary grading plans, the retaining walls required to support the proposed cut along the east property line, will be up to 25 feet high. We anticipate the following permissible OSHA excavation slopes.

OSHA Excavation Soil Classification	
Soil Type	**Permissible Slope**
Marine Near Shore and Fill	1.5H:1V
Glacial Marine	1H:1V
Glacial Till	0.75H:1V

The excavations required to install many sections of the east retaining walls will disturb soil on the abutting properties. This disturbance will occur in many cases despite the type of wall system used. Options to install walls in these areas could include obtaining permission to disturb abutters properties, purchasing these properties or portions of these properties, or using a retaining system that does not require excavation to install, such as soldier pile and lagging or sheet piling. A secondary issue with this portion of the site is the potential presence of bedrock.

Test pits were not excavated in the area of the proposed retaining wall in the north portion of the site. It is possible at the proposed cut depths that bedrock could be encountered. The presence of bedrock would further limit the type of soil retention system possible for this area.

Retaining walls will be required to retain the fill, up to 23 feet, on the west side of the site. These walls will be constructed at the top of a steep slope (up to 4H:1V) in close proximity to existing houses. Based on this, a segmental type retaining wall with geogrid tiebacks is highly recommended for these walls. The geogrid will create a stable fill embankment for this condition. We recommend that final geotechnical analyses include a global stability for these walls.

In general, the soil at this site is suitable for support of the proposed building foundations. Proofrolling of the exposed footing subgrade soils will be required in cut areas and beneath the fill in built-up areas. For preliminary design, we recommend an allowable bearing pressure of 4,000 psf for footing constructed on the proofrolled native soil and compacted fill soil at this site. Some footings may be constructed at of near bedrock. Special preparation of the soil/bedrock subgrade in these areas will be required to minimize potential differential settlement.

Based on the test pits, we classify the soil at the site as Site Class D, Stiff Soil Profile. It is possible that the site could be reclassified as Site Class C at some locations. Reclassifying would require test boring explorations at the site to confirm.

Groundwater was not observed in the test pits. TP-1 was dry at a depth of 14 feet. Groundwater could be present, however, in areas where excavations exceed this depth.

The marine near shore deposits at the site are reusable as fill for most areas of the development. Reuse of the glacial marine and glacial till soil is also possible.

Closure

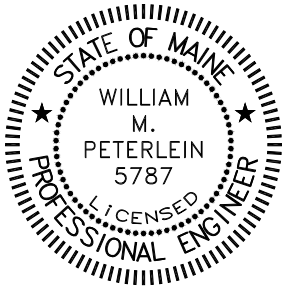
The preliminary recommendations above are based on professional judgment and generally accepted principles of geotechnical engineering. Some changes in subsurface conditions from those presented in this report may occur.

The development of building and site plans is on-going. Once final plans are available, SGS should be provided an opportunity to review them and prepare a final geotechnical report. The explorations at this site were limited. It may be desirable to obtain additional subsurface information in conjunction with our final report.

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 yours,
Summit Geoengineering Services, Inc.

William M. Peterlein, P.E.
Principal Geotechnical Engineer



ACCESS AND 40' FRONTAGE ON SHERIDAN STREET

PORTLAND TRAILS "JACK PATH"

TWO WAY PRIVATE ROAD

ONE WAY

RAIN GARDEN

RETAINING WALL TYPICAL

EAST COVE STREET

CITY STREET

STREET FRONTAGE

SHERIDAN ST EXT

TP-1

TP-2

TP-3

TP-4

TP-5

LEGEND

TP-1 SUMMIT TEST PIT (MAY 23, 2013)

NOTE

PLAN REFERENCE - "SITE CONCEPT, MUNJOY HEIGHTS", DATED MAY 10, 2013, PREPARED BY RYAN SENATORE ARCHITECTURE.

SCALE: 1" = 30'

0 15 30 60 90

NORTH

PROJECT: MUNJOY HEIGHTS
SHERIDAN STREET EXTENTION - PORTLAND, ME

CLIENT: REDFERN PROPERTIES

TITLE: TEST PIT LOCATION PLAN

DRAWN BY: KRF
APPR. BY: WAP

SCALE: 1" = 30'
DATE: MAY 24, 2013

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PROJ.#: 13067

FIGURE: 1

SUMMIT GEOENGINEERING SERVICES	TEST PIT LOG	Test Pit # TP-1
	Project: Munjoy Heights Walnut Street Portland, Maine	Project #: 13067 Groundwater: None observed
Contractor:	Ground Surface Elevation	
Equipment: Large Tracked Excavator	Reference:	
Summit Staff: B. Peterlein, P.E.	Date: 5/23/2013	Weather: Overcast

Depth (ft)	DESCRIPTION	
	ENGINEERING	**GEOLOGIC/GENERAL**
1	Dark brown Silty SAND, trace rootlets, moist, loose, SM	TOPSOIL
2	Brown Gravelly SAND, trace Cobbles, damp, compact, SP	MARINE NEAR SHORE
3		
4	Olive-brown fine Sandy SILT, damp, firm, ML	GLACIAL MARINE
5	Olive-brown Silty CLAY, moist, firm, CL	
6		
7	Brown Silty fine SAND, moist, compact, SM	
8	Olive-gray Sandy SILT, little Clay and Gravel, moist, stiff, ML	GLACIAL TILL
9	Cobbles	
10		
11	Becomes gray at 10.5 ft	
12		
13		
14		
15	End of Test Pit at 14 feet	
16		
17		

SUMMIT GEOENGINEERING SERVICES	TEST PIT LOG	Test Pit # TP-2
	Project: Munjoy Heights Walnut Street Portland, Maine	Project #: 13067 Groundwater: None observed
Contractor:	Ground Surface Elevation	
Equipment: Large Tracked Excavator	Reference:	
Summit Staff: B. Peterlein, P.E.	Date: 5/23/2013	Weather: Overcast

Depth (ft)	DESCRIPTION	
	ENGINEERING	**GEOLOGIC/GENERAL**
1	Dark brown Sandy SILT with trace of ash, rootlets, glass, metal, moist, loose, ML	FILL
2		
3	Brown SAND, well graded, damp, compact, SW	MARINE NEAR SHORE
4		
5		Bag sample at 5 ft
6		
7		
8		
9	End of Test Pit at 8 ft	
10		
11		
12		
13		
14		
15		
16		
17		

SUMMIT GEOENGINEERING SERVICES	**TEST PIT LOG**	Test Pit # **TP-3**
	Project: Munjoy Heights Walnut Street Portland, Maine	Project #: 13067 Groundwater: None observed
Contractor:	Ground Surface Elevation	
Equipment: Large Tracked Excavator	Reference:	
Summit Staff: B. Peterlein, P.E.	Date: 5/23/2013	Weather: Overcast

Depth (ft)	**DESCRIPTION**	
	ENGINEERING	**GEOLOGIC/GENERAL**
1	Dark brown Sillty SAND, trace rootlets, moist, loose, SM	TOPSOIL
2	Brown SAND, well graded, Cobbles and Boulders, moist compact, SW	MARINE NEAR SHORE
3		Bag sample at 3 ft
4		
5	Olive-gray Silty CLAY, moist, stiff, ML	GLACIAL MARINE
6	Olive-brown fine Sandy SILT with fine sand seams (<1mm), damp, stiff, ML	
7		
8	End of Test Pit at 7 ft	
9		
10		
11		
12		
13		
14		
15		
16		
17		

SUMMIT GEOENGINEERING SERVICES	TEST PIT LOG	Test Pit # TP-4
	Project: Munjoy Heights Walnut Street Portland, Maine	Project #: 13067 Groundwater: None observed
Contractor:	Ground Surface Elevation	
Equipment: Large Tracked Excavator	Reference:	
Summit Staff: B. Peterlein, P.E.	Date: 5/23/2013	Weather: Overcast

Depth (ft)	DESCRIPTION	
	ENGINEERING	**GEOLOGIC/GENERAL**
1	Dark brown Silty SAND, trace rootlets, moist, loose, SM	TOPSOIL
2	Brown Gravelly SAND, Cobbles and boulders, damp, compact, SW	MARINE NEAR SHORE
3		
4		
5		
6	Olive-brown Sandy SILT, trace Clay and Gravel, damp, stiff, ML	GLACIAL TILL
7		
8		
9		
10	End of Test Pit at 9 ft	
11		
12		
13		
14		
15		
16		
17		

SUMMIT GEOENGINEERING SERVICES	TEST PIT LOG	Test Pit # TP-5
	Project: Munjoy Heights Walnut Street Portland, Maine	Project #: 13067 Groundwater: None observed
Contractor:	Ground Surface Elevation	
Equipment: Large Tracked Excavator	Reference:	
Summit Staff: B. Peterlein, P.E.	Date: 5/23/2013	Weather: Overcast

Depth (ft)	DESCRIPTION	
	ENGINEERING	**GEOLOGIC/GENERAL**
1	Dark brown Silty SAND, trace rootlets, moist, loose, SM	TOPSOIL
2	Brown Gravelly SAND, Cobbles, damp, compact, SW	MARINE NEAR SHORE
3		
4		Grab sample at 3 ft
5		
6		
7	Olive-brown Sandy SILT, trace clay, damp, stiff, ML	GLACIAL MARINE
8		
9	End of Test Pit at 8 ft	
10		
11		
12		
13		
14		
15		
16		
17		