SUMMIT
GEOENGINEERING SERVICES

GEOTECHNICAL REPORT

193 Kennebec Street
Portland, Maine

Prepared for:

Northland Enterprises

Prepared by:

Summit Geoengineering Services
145 Lisbon St.
Lewiston, Maine

Project #15001
January 2015

January 27, 2015
Summit #15001

Brad Fries
Northland Enterprises
17 South Street, Unit 3
Portland, Maine 04101

Reference: Geotechnical Investigation, Commercial Development
193 Kennebec Street, Portland, Maine

Dear Mr. Fries;

We have completed the geotechnical investigation for the construction of new additions to the existing buildings at the site referenced above. Our scope of service included six borings and one test pit conducted on the site and this geotechnical report summarizing our findings and providing geotechnical recommendations for the construction of a new continuous frost wall foundation, construction of footings for new interior and exterior column supports, and re-use of both building slabs.

Our scope of services for this project did not include an environmental site assessment or further investigation for the presence or absence of hazardous or toxic material on, below, or around the site. Any statements in this report, or on the soil boring logs, regarding odors or unusual and suspicious conditions observed are for informational purposes and are not intended to constitute an environmental assessment.

1.0 Project and Site Description

The site is located at 193 Kennebec St. in Portland, Maine, in between the split of Marginal Way and Kennebec St. off of Forest Ave. There are two existing buildings on the site. The first is a 1 ½ story brick wall structure with a footprint of 4,545 square feet and finished floor elevation of 11.0 feet located at the northern portion of the site. The second, currently a Century Tire warehouse, is a CMU bearing wall structure located in the southern portion of the site with a footprint of 11,783 square feet and finish floor elevation of approximately 11.5 feet. Both structures are assumed to have been constructed with conventional frost wall on continuous spread footing foundations. The remaining area of the existing site is paved drive and parking. The existing grade at the site slopes downwards gently in a northern direction.

The project consists of the construction of single story additions to and renovations of the existing buildings at the site. The eastern sections of the Century Tire building in the southern portion of the site will be demolished and replaced with parking, leaving 4,430 square feet of

existing building. The finished floor elevation of the remaining building will be raised to an elevation of 12.5 feet. The eastern wall of the remaining building will be demolished and replaced with a new wall supported by columns on isolated footings. There is an existing interior wall parallel to the newly proposed eastern wall which will be demolished. This building is titled "Building A" on the Test Boring Location Plan in Appendix A.

The existing building in the north portion of the site will be demolished except for the southern and eastern walls. New columns will be constructed throughout the new building footprint and a new frost wall will be constructed on the north, east, and west sides of the building beyond the extent of the existing building. Finish floor elevation of the slab will be raised to 12 feet. This new building is titled "Building B" on the Test Boring Location Plan in Appendix A.

2.0 Explorations

Summit Geoengineering Services (SGS) observed the subsurface conditions at the site with the drilling of 6 test borings on July 1, 2014 and a test pit excavated on January 21, 2015. All borings were drilled using a 2 1/2" hollow stem auger with split spoon samples collected continuously in the fill layer and at 5 foot intervals below the fill layer. Standard Penetration Testing (SPT) was conducted in general accordance with *ASTM D1586* to collect blow counts during the advancement of the split spoon sampler. The test pit was excavated to 7' below ground surface, where the presence of groundwater inhibited further observation of the subsurface. The test pit was excavated to a depth of 6.5 feet by Colex, LLC under contract to SGS.

Borings B-1 and B-2 were drilled inside the existing Century Tire building and were advanced to 11.5' and 9.5' below existing finished floor elevation, respectively. Borings B-3 and B-4 were drilled in the parking lot between the two existing buildings. Borings B-5 and B-6 were drilled on the southern end of the existing parking lot, near the site entrance from Kennebec Street. Borings B-3 through B-6 were advanced to 22' below ground surface. Refusal was not encountered during any of the borings at the site.

Locations of borings were based on the proposed project at the time of the exploration, which was different than the current proposed concept. Boring locations were marked prior to the day of drilling by taping from the existing building. The location of each boring and test pit can be found on the Test Boring Location Plan in Appendix A. A copy of the boring logs can be found in Appendix B.

3.0 Subsurface Conditions

3.1 Soil

The soil conditions at the site generally consist of ***fill*** overlying ***stiff clay*** overlying ***soft silty clay***. In borings B-5 and B-6, a dense gravelly ***sand*** layer was encountered above the soft clay.

The ***fill*** encountered at the site consists of brown gravelly sand to dark brown silty sand to black and white coal ash mixed with sand and silt. Wood fibers, organics, and brick fragments were

present in some of the collected samples of fill and evident in the excavated test pit. Thickness of fill ranges from 4 feet in the southern end of the parking lot (Boring B-5) to 10.8 feet within the existing Century Tire building (Boring B-1).

From visual inspection, the fill generally contained approximately 70% mineral soil and 30% ash content by weight. Ash content appeared to be lower in the fill below locations of existing buildings. A summary of the collected SPT-N blow counts in the fill are presented below. Generally the higher the mineral soil content the higher the SPT-N values.

	SPT-N BLOW COUNT		
Fill Material	Min	Max	Average
Sand & Silt	8	18	14
Sand & Silt with Ash	2	14	9
Ash with Sand & Silt	WH	9	4
Ash	2	2	2

WH = Weight of Hammer

The ***stiff clay*** is described as black clayey silt to gray silty clay. The soil is wet, ranges from soft to firm, and contains a trace of black organic streaking in the location of Boring B-3. Pocket penetrometer measurements (an approximation of the unconfined compressive strength) ranges from 0.30 tsf to 2.25 tsf. Thickness of the layer ranges from 5 to 12 feet. The soil classifies as ML or CL in accordance with the Unified Soil Classification System

A pocket of ***sand*** was encountered below the fill and stiff clay layers in Borings B-5 and B-6. The sand is described as gray medium to coarse sand with gravel and trace silt. This layer was wet and ranges from compact to dense. The thickness of this layer is approximately 6 feet. The soil classifies as SP or SW in accordance with the Unified Soil Classification System.

The ***soft clay*** layer is described as gray, wet, very soft silty clay. The surface of this layer was encountered from approximately 20 feet to 14 feet below ground surface (elevation -9 feet to -3 feet). This soil classifies as CL in accordance with the Unified Soil Classification System.

3.2 Groundwater

Groundwater at the site ranged from 6.5 feet to 5.4 feet below existing ground surface (elevation 4.8 feet to 6.1 feet).

3.3 Bedrock

Bedrock was not encountered at the site.

4.0 Foundation, Column, and Slab Layout Concepts

4.1 Building A

We understand that the proposed renovations to Building A will involve the following:

- Demolition of the longer portion of the current "L" shaped Century Tire building, totaling 7,353 square feet.
- Removal of the eastern exterior wall and entire foundation. This wall will be replaced with a glass storefront supported by columns on isolated exterior footings
- Removal of the interior wall parallel to the eastern wall. The existing interior columns along this wall will remain.
- Raising the finish floor elevation of the entire building slab to 12.5 feet. The existing slab elevation on the eastern portion of the building (which is currently separated from the western portion of the building by the interior wall to be removed) is 11.5 feet and the existing slab elevation of the western portion of the building is 12.0 feet.

4.2 Building B

We understand that the proposed renovations to Building B will involve the following:

- Removing the existing walls on the northern portion of the building facing Marginal Way, and the wall running north-south which connects them.
- Keeping the east, west, and southern walls in place and construct new building walls supported by frost walls on conventional spread footings on the north, east, and west sides of the building beyond the extent of the existing building walls.
- Raising the finish floor elevation to 12.0 feet. The existing slab (at elevation 10.96 feet) will be kept in place.
- Constructing three rows of columns running north-south supported on isolated footings. This includes interior and exterior columns.

5.0 Evaluation

The primary geotechnical issues at the site include the following:

- Potential for excessive total and differential settlement of constructed columns footings and new frost wall footings. Based on existing and proposed grades, the interior and exterior footings will be supported by fill which contains varying amounts of compressible coal ash and miscellaneous non-mineral material underlain by soft silty clay.
- Re-use of the existing floor slabs to support the new slabs for both the remaining portion of the Century Tire building (titled "Building A") and the proposed expansion of the northern building (titled "Building B"). Some cracking and deterioration was observed in the east portion of the existing Century Tire ("Building A") slab.
- Existing slabs and foundations obstructing excavations for proposed column locations.

6.0 Foundation Design Recommendations

6.1 Allowable Bearing Pressure

Based on existing and proposed grades and finished floor slab elevations, the footings for the newly constructed interior and exterior columns for both Building A and Building B renovations will be supported by existing fill. The new spread footings for the expansion of Building B will also be founded on this fill. We recommend that all column footings and spread footings be proportioned with an allowable bearing capacity of 1,500 pounds per square foot (psf). Total settlement for the net allowable bearing pressure is estimated to be less than 1 inch. Differential settlement is estimated at less than a deflection of 1/300 (δ/L, deflection divided by span length). The bearing pressure and associated settlement are based on the following:

- The base of all column and strip footings (interior and exterior) are constructed on a minimum of 12 inches of ¾ inch crushed stone overlying a woven geotextile fabric.
- Exposed existing fill on which the geotextile fabric will be placed is compacted with a minimum of 4 passes in each perpendicular direction with a walk-behind plate compactor.
- Exterior perimeter perforated underdrains are constructed continuously at the base of the spread footings.

The geotextile should consist of a woven material, such as Mirafi HP570 (or approved equivalent). It should extend a minimum of ½ the footing width beyond the edges of isolated column footings in all directions and a minimum of the footing width beyond the edges of the footings for continuous spread footings.

Details for the construction of exterior and interior column footings and spread footings are included in Appendix C.

6.2 Frost Protection

Based on a 10-year design Air Freezing Index of 1,200 degree days for Portland, the recommended minimum frost protection depth is 4 feet. In order to provide a cushion between the bottom of the footing and the silty clay and the wet ash soil and to keep the excavations above groundwater, we recommend that the bottom of the exterior footing be constructed at a depth of 3 feet on a 12 inch layer of ¾ inch crushed stone. Since the crushed stone is considered a non-frost-susceptible soil, this will provide a minimum 4 foot frost protection depth. We recommend that the exterior foundations be backfilled with Foundation Backfill (FB) to protect against the potentially damaging effects of frost heave. The portion of FB passing the 3 inch sieve opening should meet the gradation requirements presented in the table below.

FOUNDATION BACKFILL (FB)	
Sieve Size	**Percent finer**
3 inch	100
¼ inch	25 to 100
No. 40	0 to 50
No. 200	0 to 7

(Maine DOT 703.06 (2014), Type E)

FB should be placed in lifts no greater than 12" and compacted to a minimum of 95% of its maximum dry density determining in accordance with ASTM D1557, Modified Proctor Density. Maximum particle size should be limited to 6"

The inside of foundation walls and interior column footings should be backfilled with Structural Fill (SF, see Section 6.3).

6.3 Slab-on-grade

We understand that the existing slabs for Building A and Building B will remain in place and the new slabs for each building be constructed on top. We also understand that the proposed finish floor elevation (FFE) for Building A and Building B is 12.5 feet and 12 feet, respectively. From visual inspection, the quality of the existing slab in the east portion of Building A is fair to poor. The existing slab for Building B and the west potion of Building A are in fair to good condition. Recommendations for construction of the new slabs are proposed below. All soil placed between the existing and new slabs should consist of Structural Fill (SF). The portion of SF passing the 3 inch sieve should meet the gradation requirement presented in the table below.

STRUCTURAL FILL	
Sieve Size	**Percent finer**
½ inch	45 to 70
¼ inch	30 to 55
No. 40	0 to 20
No. 200	0 to 6.0

Reference: MDOT Specification 703.06 (2014), Type A

Maximum particle size should be limited to 4 inches.

6.3.1 Building A

The eastern portion of the existing slab in Building A is approximately 6 inches below the existing slab in the western portion. Structural Fill (SF) should be placed on top of the eastern portion of the existing slab to match the elevation of the existing slab in the western portion. This layer should be placed in one lift. Placed SF should be compacted with a minimum of four passes in each of two perpendicular directions with a 5 ton vibratory roller.

The new slab will be constructed on SF in the east portion of the building and directly on the existing slab in the west portion. We recommend a construction joint be placed at the location where the SF butts the existing slab.

6.3.2 Building B

In the portion of the proposed Building B footprint with no existing slab, SF should be used to raise the grade. After removing the pavement and any exposed debris, the soil should be proofrolled. Proofrolling should consist of making a minimum of four passes in each of two perpendicular directions with a 5 ton vibratory roller. SF can be placed in a single lift and should be compacted to 95% of its optimum dry density in accordance with ASTM D1557.

In the portion of the proposed Building B footprint where the existing slab will remain, SF should be placed on top and compacted with a minimum of four passes in each of two perpendicular directions with a 5 ton vibratory roller. The new slab can be constructed directly on top of the SF.

6.4 Groundwater Considerations

We do not expect that groundwater will be an issue during construction of the building foundations. However, if groundwater seepage into footing excavations becomes significant, SGS should be notified so we can provide de-watering recommendations.

Perimeter underdrains should consist of 4 inch rigid perforated PVC surrounded by a minimum of 6 inches of ¾" crushed stone wrapped in filter fabric to prevent clogging from the migration of the fine soil particles in the foundation backfill soils. The underdrain pipe should be outlet to a location where it will be free flowing. Where exposed at the ground surface, the ends of pipes should be screened or otherwise protected from entry and nesting of wildlife to prevent clogging.

In order to reduce the potential for surface water to infiltrate the Foundation Backfill used to backfill the foundation excavations, we recommend the exterior grades where possible should slope away from the perimeter of the foundation at a minimum slope of 1%.

6.5 Seismic Design

The subgrade profile at the site is categorized as Site Class D "stiff soil profile" in accordance with the 2009 International Building Code.

SEISMIC DESIGN COEFFICIENTS	
Seismic Coefficient	**Site Class D**
Short period spectral response (S_S)	0.315
1 second spectral response (S_1)	0.077
Maximum factored spectral response (S_{MS})	0.488
1 second factored spectral response (S_{M1})	0.185
Design short period spectral response (S_{DS})	0.325
Design 1 second spectral response (S_{D1})	0.123

7.0 Construction and Earthwork Considerations

Interior column footings should be constructed as shallow as possible below new finish floor elevation on top of a 12 inch minimum thick layer of ¾" crushed stone overlying woven geotextile fabric. The total depth of the footing and crushed stone layer will be a minimum of 3 feet. The geotextile should consist of a woven material such as Mirafi HP570 (or approved equivalent). Geotextile and crushed stone should be extended in all directions beyond the footing edges as shown in Appendix C. Exposed existing fill on which the geotextile will be placed should be compacted with a minimum of four passes with a walk-behind plate compactor.

Existing slabs will need to be removed in locations of newly constructed interior column footings. Any gaps in the soil caused by undermining of existing slabs or sloughing of material from the face of excavations made for interior column footings should be filled with flowable fill or chinked with SF (See gradation table in Section 6.3).

We recommend that the entire existing foundation for the eastern wall of Building A be removed and replaced with isolated column footings. Any exposed fill surface which will bear footings should be compacted with a minimum of four passes with a walk-behind plate compactor.

It is expected that there will be excess fill. This material should be used as fill in non-structural areas of the site, if possible. Fill which is removed from the site should be disposed of in accordance with pertinent protocols and regulations.

8.0 Closure

Our recommendations are based on professional judgment and generally accepted principles of geotechnical engineering. Although unanticipated at this site, some changes in subsurface conditions from those presented in this report may occur. Should soil conditions differ materially from those described in this report or should the building configuration or renovations change, Summit should be notified so that we can re-evaluate our recommendations.

We recommend that a qualified geotechnical consultant be retained to monitor and test soil materials used during construction and confirm that soil conditions and construction methods are consistent with this report. SGS will perform 2 to 3 site visits during foundation construction to address the Special Inspections listed in items #1 and #2 of Table 1704.7 in the 2009 International Building Code.

We appreciate the opportunity to provide geotechnical engineering services on this phase of the project. If there are any questions please do not hesitate to contact us.

Sincerely,
Summit Geoengineering Services, Inc.

Mathew Hardison, EI
Geotechnical Engineer

William M. Peterlein, PE
Principal Geotechnical Engineer

APPENDIX A

TEST BORING LOCATION PLAN

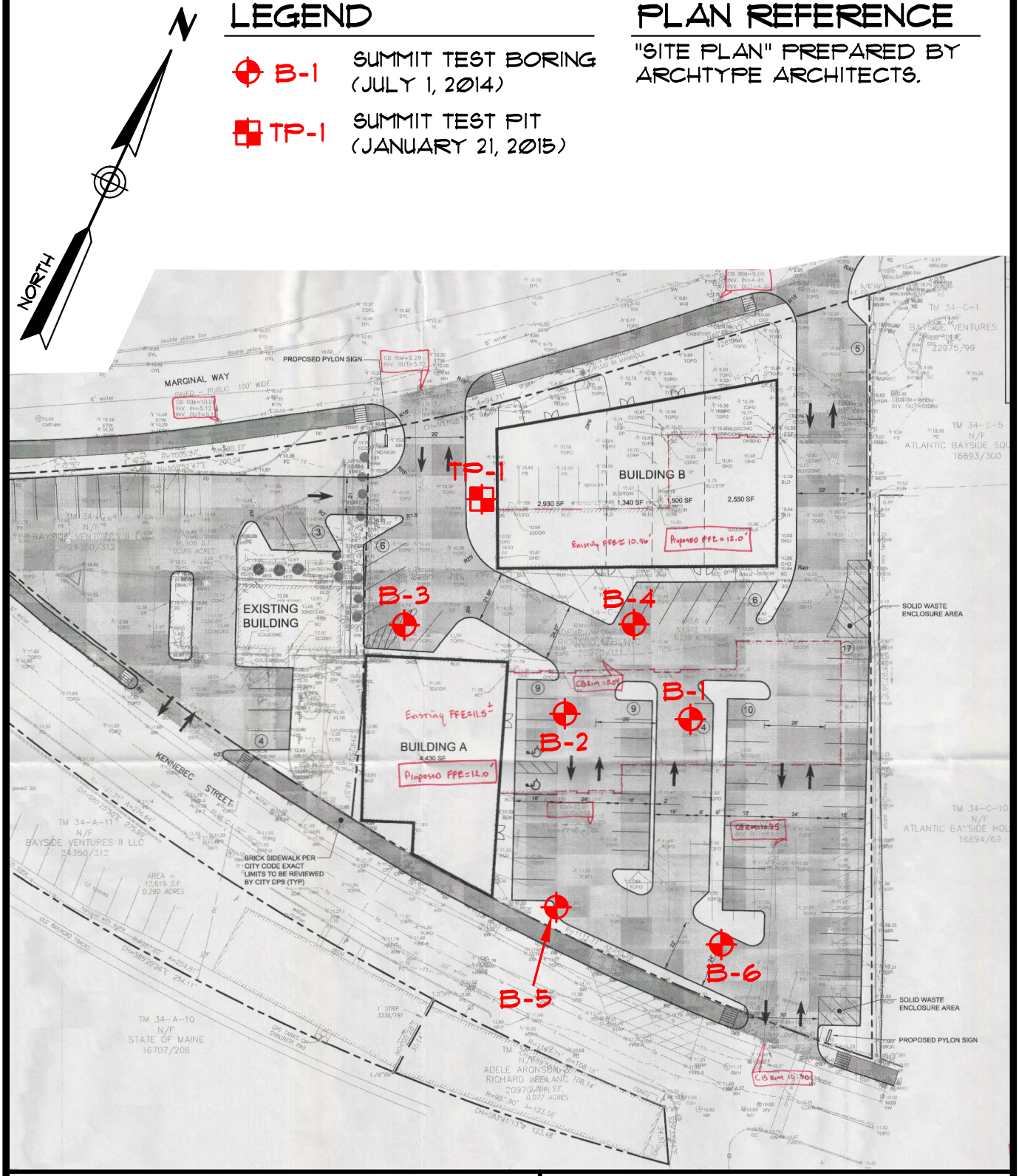
LEGEND

B-1 SUMMIT TEST BORING (JULY 1, 2014)

TP-1 SUMMIT TEST PIT (JANUARY 21, 2015)

PLAN REFERENCE

"SITE PLAN" PREPARED BY ARCHTYPE ARCHITECTS.



TEST BORING LOCATION PLAN
PROPOSED COMMERCIAL DEVELOPMENT

193 KENNEBEC STREET - PORTLAND, MAINE

PREPARED FOR

NORTHLAND ENTERPRISES

DATE: JAN 21, 2015	DRAWN BY: KRF	CHECKED BY: WMP
JOB: 15001	SCALE: 1" = 60'	FILE: 15001 SKT

145 LISBON ST. - SUITE 601
LEWISTON, ME 04240
Tel.: (207) 576-3313

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

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www.summitgeoeng.com

APPENDIX B

TEST PIT LOG AND BORING LOGS

SUMMIT GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Addition	Boring #:	**B-1**
Location:	193 Kennebec St.	Project #:	14066
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 7/1/2014	Date Completed: 7/1/2014

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

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
7/1/2014	5.4 ft		After casing removal

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
1						Concrete 8", poor condition		CONCRETE FLOOR
2	S-1	24/8	1.5 to 3.5	9		Brown gravelly SAND, trace silt, moist, compact, SP		
				8		Obstruction at 2.7' (6" Brick)		
3				10				
				13		6" Brown silty SAND, trace gravel, moist, compact		
4	S-2	24/12	3.5 to 5.5	9				
				4		Grayish brown SAND mixed with black and white coal ash, damp, soft		
5				4				
				4				
6	S-3	24/12	5.5 to 7.5	4				
				3		Same as above, red and black hard ash particles, moist to wet, loose (no white ash)		FILL
7				2				
				2				
8	S-4	24/12	7.5 to 9.5	1				
				1		Black coal ASH, wet, very loose		
9				1				
				1				
10	S-5	24/2	9.5 to 11.5	1		Black rock in tip of spoon, water in spoon with ash		
				1				
11				1				
				2				
12						End of Boring at 11.5'		
13								
14								
15								
16								
17								
18								
19								
20								
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

Bedrock Joints
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%

SUMMIT GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Addition	Boring #:	**B-2**
Location:	193 Kennebec St.	Project #:	14066
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 7/1/2014	Date Completed: 7/1/2014

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

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
7/1/2014	5.5 ft		Observed in sample

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
1						8" Concrete, very poor condition		CONCRETE FLOOR
	S-1	24/12	1 to 3	7		Brown SAND mixed with brick and black and white coal ash, higher resistance from 2.6' to 2.8', dry, compact		FILL
2				8				
				6				
3				12				
	S-2	24/12	3 to 5	10		Same as above		
4				8				
				6		SAND mixed with black and white coal ash, damp, loose		
5				4				
	S-3	24/12	5 to 7	4				
6				3		White coal ASH mixed with sand, wet, loose		
				2				
7				2				
	S-4	24/12	7 to 9	1				
8				1		Same as above, very loose		
				1				
9				1				
						End of Boring at 9' (Hole caved)		
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
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

Bedrock Joints
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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%

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GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Addition	Boring #:	**B-3**
Location:	193 Kennebec St.	Project #:	14066
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 7/1/2014	Date Completed: 7/1/2014

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

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
7/1/2014	6.2 ft		After casing removal

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" Pavement		PAVEMENT
1	S-1	24/8	0.5 to 2.5	3		Dark brown silty SAND mixed with black ash, bricks, dry, compact		
				7				
2				4				
				6				
3	S-2	24/18	2.5 to 4.5	3		Black and white ASH mixed with sand, moist, very loose		
				2				
4				2				FILL
5								
	S-3	24/2	5 to 7	WH				
6				WH		White ASH mixed with silt and sand, wet, very loose		
				WH				
7				WH				
8								
9								
10								
	S-4	24/12	10 to 12	WH				
11				WH		Black clayey SILT with trace black organics, wet, very soft, ML		
				WH				
12				WH				
13								
14								
15								GLACIAL MARINE
	S-5	24/24	15 to 17	1				
16				2		Olive gray silty CLAY, wet, soft, CL	PP = 1.0 tsf	
				2				
17				1				
18								
19								
20								
	S-6	24/24	20 to 22	WH				
21				WH		Gray silty CLAY, wet, very soft, CL		
				WH				
22				1				
						End of Boring at 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
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Bedrock Joints
Shallow = 0 to 35 degrees
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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%
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Saturated: S = 100%

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SOIL BORING LOG

Project:	Proposed Addition	Boring #:	B-4
Location:	193 Kennebec St.	Project #:	14066
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 7/1/2014	Date Completed: 7/1/2014

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

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
7/1/2014	5.5 ft		After casing removal

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" Pavement		PAVEMENT
1	S-1	24/18	0.5 to 2.5	6		Brown gravelly SAND, trace silt, dry, loose, SP		
				5				
2				3		Black SILT mixed with wood fibers and organics, moist, loose		
				3				
3	S-2	24/18	2.5 to 4.5	5				
				4		SAND mixed with gray and black coal ash, loose		
4				2		White and black coal ASH mixed with silty sand, damp, loose		
				3				
5								
	S-3	24/18	5 to 7	2				FILL
6				1		Same as above		
				1				
7				1				
8								
9						Casing pushed easily from 8 to 10'		
10								
	S-4	24/18	10 to 12	1		Same as above		
11				WH		Dark gray silty CLAY, wet, very soft, CL		
				WH				
12				1				
13								
14								
15								
	S-5	24/24	15 to 17	1			PP = 1.2 tsf	
16				2		Gray silty CLAY, damp to wet, firm, CL		
				3			PP = 0.6 tsf	GLACIAL MARINE
17				2				
18								
19								
20								
	S-6	24/12	20 to 22	WH				
21				WH		Gray silty CLAY, wet, very soft, CL		
				WH				
22				WH				
						End of Boring at 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

Bedrock Joints
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%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Addition	Boring #:	B-5
Location:	193 Kennebec St.	Project #:	14066
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 7/1/2014	Date Completed: 7/1/2014

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

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
7/1/2014	6.4 ft		After casing removal

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" Pavement		PAVEMENT
1	S-1	24/12	0.5 to 2.5	6		Black ASH mixed with silty sand, moist, loose		FILL
				4				
2				5				
				4				
3	S-2	24/12	2.5 to 4.5	2		Black ASH mixed with silt, dry, hard, little white ash in seams		
				2				
4				3				
				2				
5								
	S-3	24/12	5 to 7	4		Dark gray sandy SILT, little to trace clay, wet, loose, ML		GLACIAL MARINE
6				5				
				2				
7				6				
8								
9								
10								
	S-4	24/18	10 to 12	15				
11				9		Gray gravelly SAND, trace silt, wet, compact, SP		
				15				
12				7				
13								
14								
15								
	S-5	24/24	15 to 17	1			PP = 2.25 tsf	
16				2		Gray silty CLAY, wet, soft, CL		
				2			PP = 0.8 tsf	
17				2				
18								
19								
20								
	S-6	24/24	20 to 22	WH				
21				WH		Same as above, very soft		
				WH				
22				WH				
						End of Boring at 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

Bedrock Joints
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%

SUMMIT GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Addition	Boring #:	**B-6**
Location:	193 Kennebec St.	Project #:	14066
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 7/1/2014	Date Completed: 7/1/2014

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

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
7/1/2014	6.5 ft		After casing removal

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						2-1/2" Pavement		PAVEMENT
1	S-1	24/20	0.5 to 2.5	5		Olive brown sandy SILT, trace gravel and clay, brick pieces, ML		
				9				
2				6				
				5				
3	S-2	24/18	2.5 to 4.5	4		White ASH mixed with silt and sand, moist, loose		FILL
				3				
4				2				
				2				
5								
	S-3	24/18	5 to 7	1				
6				1		Same as above, wet, very loose		
				WH				
7				1				
8								
9						Gray medium to coarse SAND, wet, dense, SP or SW		
10								
	S-4	24/12	10 to 12	27				
11				28				
				10				
12				6				
13								
14								
15								GLACIAL MARINE
	S-5	24/24	15 to 17	WH				
16				WH		Gray silty CLAY, wet, very soft, CL		
				WH				
17				1				
18								
19								
20								
	S-6	24/24	20 to 22	WH				
21				WH				
				WH		Same as above		
22				WH				
						End of Boring at 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

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
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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%

SUMMIT
GEOENGINEERING SERVICES

TEST PIT LOG

Test Pit # **TP-1**

Project: Proposed Commercial Devel.
193 Kennebec St.
Portland, ME

Project #: 15001

Groundwater: 6' depth

Contractor: Colex, LLC

Ground Surface Elevation: 10.5 ft. +/-

Equipment: Hitachi mini excavator - Zaxis 60 USB

Reference: "Century Tire Concept 3" by FST (12/31/14)

Summit Staff: M. Hardison, E.I.

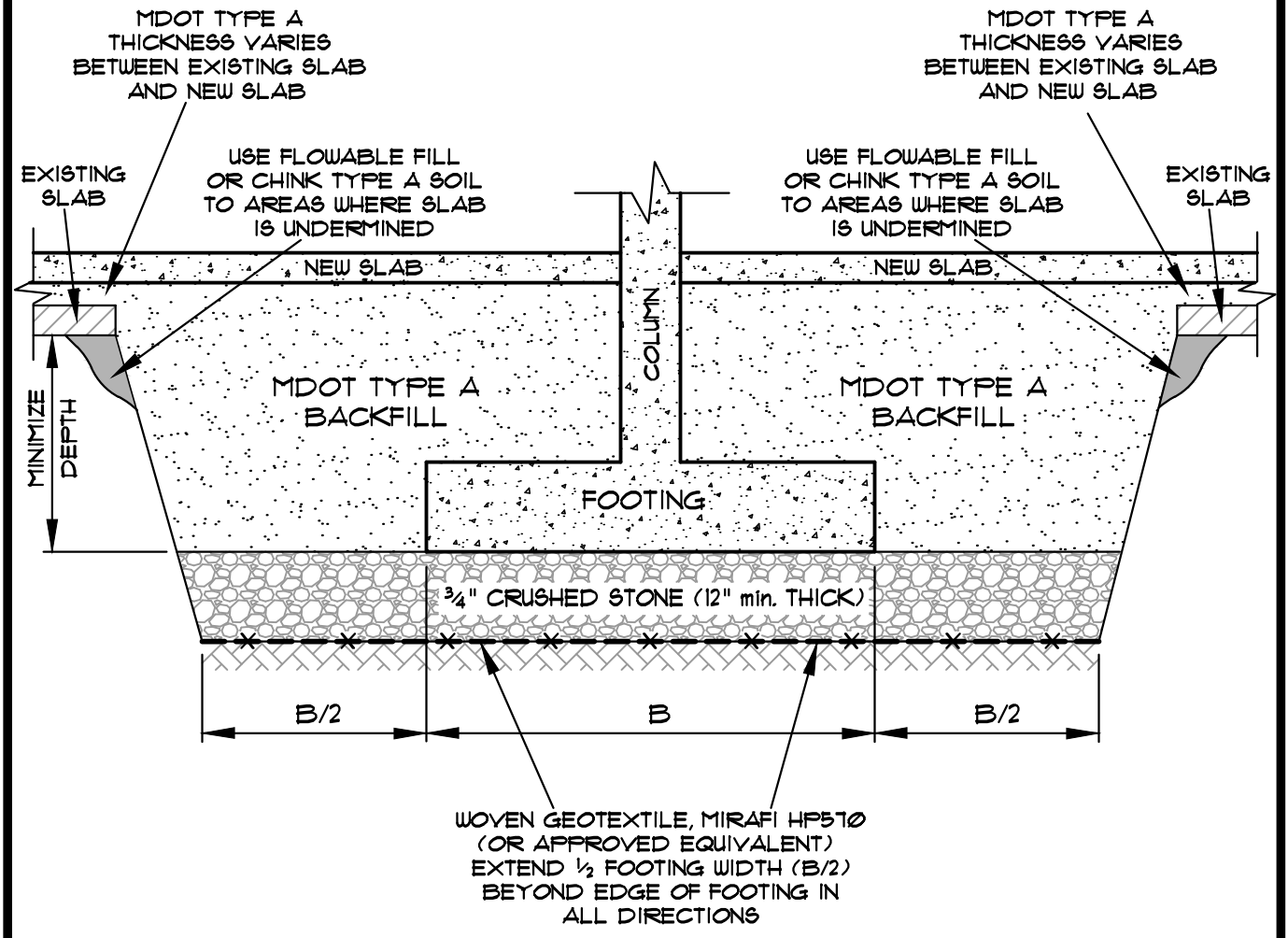
Date: 1/21/2015

Weather: 15° Sunny

Depth (ft)	DESCRIPTION	
	ENGINEERING	**GEOLOGIC/GENERAL**
	5.5" Pavement. 2" HMA course over 3.5" Macadam surface	PAVEMENT
1		
2	Black sandy SILT, little gravel and ash, occasional brick and glass fragments, moist	slight petroleum odor
3		
4		FILL
	Same as above, black and white ash, damp	moderate petroleum odor
5	Large wood piece at 5.5'	
6		
7	White ASH, some black ash, little silt, occasional brick fragments, glass pieces and wood pieces, wet	groundwater seepage rapid at 6'
8	End of Test Pit at 6.8', bottom of test pit submerged	
9		
10		
11		
12		
13		
14		
15		
16		
17		

APPENDIX C

CONSTRUCTION DETAILS



INTERIOR COLUMN FOOTING DETAIL

PROPOSED COMMERCIAL DEVELOPMENT

193 KENNEBEC STREET - PORTLAND, MAINE

PREPARED FOR

NORTHLAND ENTERPRISES

DATE: JAN 27, 2015	DRAWN BY: KRF	CHECKED BY: WMP
JOB: 15001	NOT TO SCALE	FILE: 15001 BOR

145 LISBON ST. - SUITE 601
LEWISTON, ME 04240
Tel.: (207) 576-3313

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

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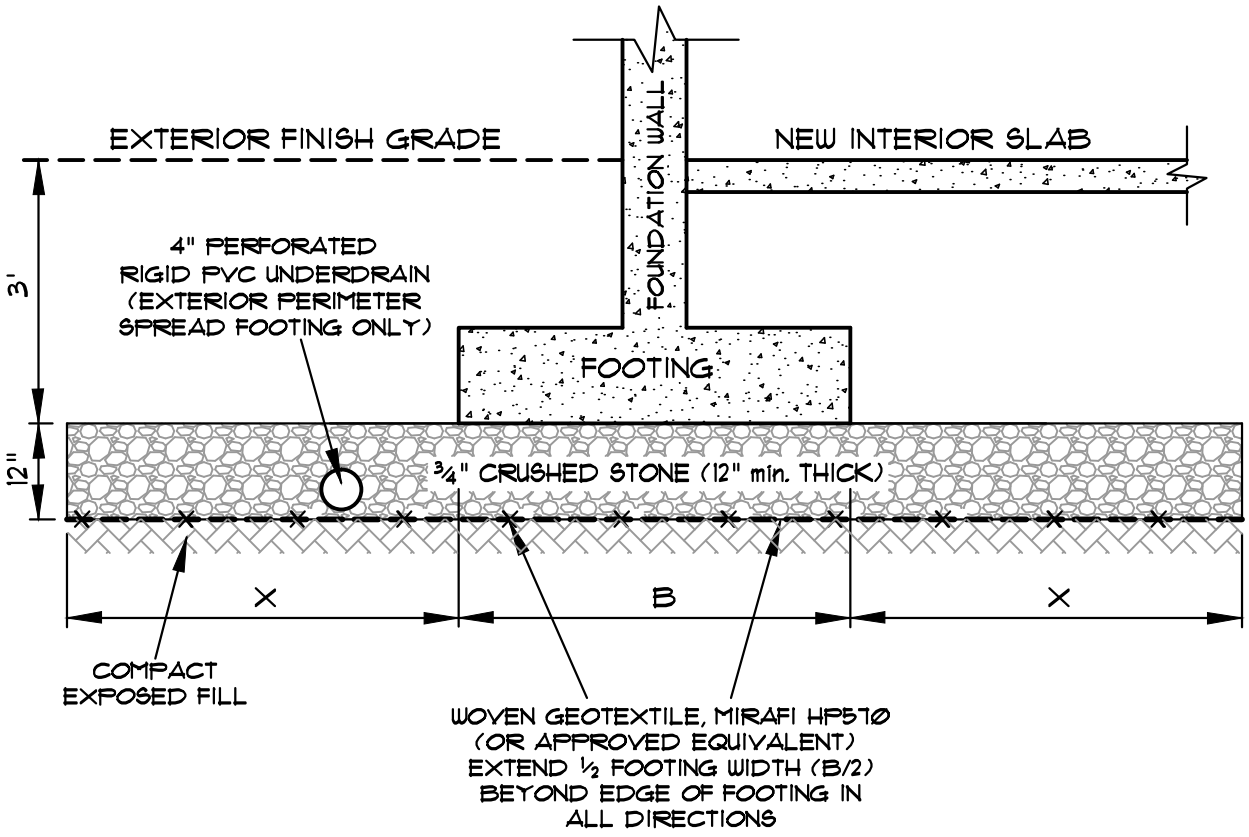

EXTERIOR SPREAD FOOTING DETAIL

CONTINUOUS FOOTINGS - X = B

ISOLATED FOOTINGS - X = B/2 (ALL SIDES)

PROPOSED COMMERCIAL DEVELOPMENT

193 KENNEBEC STREET - PORTLAND, MAINE

PREPARED FOR

NORTHLAND ENTERPRISES

DATE: JAN 27, 2015	DRAWN BY: KRF	CHECKED BY: WMP
JOB: 15001	NOT TO SCALE	FILE: 15001 BOR

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