

# STORMWATER MANAGEMENT REPORT

**Prepared For:** 

Redfern Properties, LLC 667 Congress Street Redevelopment Portland, Maine 04101

**Prepared By:** 

Acorn Engineering, Inc. PO Box 3372 Portland, Maine 04104



**July 2015** 

#### **INTRODUCTION**

Acorn Engineering, Inc. has been retained by Redfern Properties, LLC to provide civil engineering services for the proposed development of Joe's Variety Store. The proposed redevelopment project is located at 665 Congress Street (Map, Book, Lot 46 C020 and C019) bordered by Congress Street, Vernon Place, and Avon Street in Portland, Maine. The existing commercial building and parking lot are to be redeveloped to include:

- > 1 Commercial Spaces on the first floor (approximately 4500 SF).
- > 139 Residential Units on seven floors.
- 44 Parking Spaces on the first floor off of Commercial Street and 37 spaces located below in a lower level parking garage.

A stormwater analysis will be prepared to demonstrate that the project will meet the following requirements of the City of Portland (the City):

- City of Portland Land Use Ordinance Chapter 14, Article V. Site Plan Section 14-523. Required Approvals and Applicability (F) Level III Site Plan Review.
- City of Portland Technical Manual Section 5 Portland Stormwater Management Standards and Maine DEP Chapter 500 Stormwater Management Amended January 11, 2015.

On May 12<sup>th</sup> representatives of Acorn Engineering met with Frank Rubino onsite to discuss the condition existing sewer main with Avon St. Under Frank's supervision the City of Portland – Department of Public Services tv'd approximately 246 lf of the existing 10" vitrified clay pipe starting at the intersection with Deering St working south. Overall the condition of the existing sewer main was found to be in good condition with relatively few cracks. A copy of the video inspection and observation and report with still images was provided for Acorn Engineering documenting the results.

Acorn has also coordinated with Woodard & Curran Deering Street Reconstruction Plans Sheets 4 and 7, dated 3/23/2015. Specifically the separation of the combined sewer with the construction of CB12A and Pipe 9D within Avon Street. Should field conditions change the inverts of CB12A we would request that the City provide the applicant with a set of As-Built Plans.

#### **EXISTING CONDITIONS**

The proposed redevelopment project is located at 667 Congress Street (Map, Book, Lot 46 C020 and C019) bordered by Congress Street, Vernon Place, and Avon Street in Portland, Maine. There is an existing smoke shop/variety store building and parking lot located within the project location which are to be demolished as part of the proposed project.

The City of Portland has rezoned the entire parcel as a B-3 zone due to its proximity to Commercial Street and Downtown Portland.

Abutting Uses:

➢ North R-6 Zone − Single and Multi-Family Residential

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- $\geq$ East B-3 Zone – Green Hand Bookshop, Parking Lot Southwest B-3 Zone – Boda/Bangkok Thai Northwest R-6 Zone – Single and Multi-Family Residential  $\geq$
- $\triangleright$
- South B-3 Zone – Video Expo, Empire Theater, Barber Shop

The existing project area is made up of a single paved and gravel parking area with a single, existing building. The distribution of surfaces is as follows:

- Paved Surface: 81%
- ▶ Existing Building: 14%
- ➢ Gravel with Limited Overgrowth: 5%

All surfaces are impervious with an existing grade ranging from approximately 0-10%.

Based on the most recent survey data, all surface runoff can be defined in two subcatchments ending in the existing catch basins located in the Northeast and Northwest corners of the property. The majority of runoff, about 96%, flows from the existing building, parking lot, and eastmost border to the newly proposed catchbasin and separated storm drain piping on Avon Street. The remaining runoff, about 4%, consists of flow from the westmost border along an overgrown gravel area to the catch basin at the end of Vernon Place. This catch basin also flows to the newly built catch basin on Avon St.

The project team is not aware of the presence of any existing significant natural features located on the site. Given the urban setting and existing impervious surfaces, a field inventory of significant natural feature was not undertaken. The project is also not located within a watershed classified as an Urban Impaired Stream.

#### **PROPOSED DEVELOPMENT**

The 667 Congress Street Redevelopment is an eight floor, 139-unit residential and commercial building with parking garage features on the basement and first floors. Both the basement and first floor will include mechanical and electrical facilities for development as well as two elevator shafts located at the North and South ends of the building.

The parking lot grading topography will be kept between 1% to 2% slopes directing stormwater towards internal floor drains on the eastern and western sides of the development; all stormwater flow, including snowmelt, from the first floor parking with be redirected to the basement floor and then connected to the existing municipal system. The majority of the first floor parking will be covered by the proposed building while the perimeter parking will be open (no roof). The drainage collection points are located as not to direct surface below the proposed building. The basement parking will be covered by the first floor parking with the exception of the basement entrance ramp.

Due to proposed basement grades the existing 12" RCP pipe along the northern property line will need to be rebuilt to lower the elevations. The work will be coordinated with recently completed catch basin along Avon St.

No landscape is anticipated and all undeveloped areas are assumed to be covered with mulch. Currently, only overgrown weeds cover a very small section of non-paved impervious gravel adjacent to a guardrails and signage.



The development is anticipated to be served by the Portland Water District, underground power/cable/communications, natural gas and the municipal sewer system. Solid waste and recycling will be contracted through a private waste disposal and recycling provider.

#### **GENERAL STANDARDS - WATER QUALITY**

It is our understanding that the project will not be required to meet the General Standards because of the exception set forth in the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and Maine DEP Chapter 500, B. General Standards (3) Exception from the general standards, (e).

"Stormwater Management Law project including redevelopment. For a project requiring a Stormwater Management Law permit that includes redevelopment of impervious area that was in existence as of November 16, 2005 (the effective date of Chapter 500 revisions), the redevelopment of that impervious area is not required to meet General standards provided the department determines that the new use of the existing impervious area is not likely to increase stormwater impacts resulting from the proposed project's stormwater runoff beyond the level of impact already caused by the runoff from the existing impervious area. The requirements of Appendix D must still be met, if applicable."

Although additional stormwater treatment is not required, the project has been designed to improve upon the existing condition for the following reasons:

- > The significant change in land use from surface parking to the building/covered parking.
- > The stabilization of the existing gravel areas with pavement or landscaping.
- > The elimination surface stormwater flows directly to the municipal sewer.
- > The installation of catch basins with catch basin hoods to mitigate transport of oil, floating debris, and larger suspended particles into the storm drain piping.
- > The installation of catch basins which incorporates a deeper 3-ft (2 ft typ.) sump to store items listed above until routine cleaning is performed.

#### FLOODING STANDARD – WATER QUANTITY

To review the Section E. Flooding Standard, the proposed development was modeled using HydroCAD to verify that the post-development conditions do not exceed the pre-development conditions. A 24-hour SCS Type III storm distribution for the 2, 10, and 25 year storm events were used. The corresponding rainfall amounts for these storms are 3.00", 4.70", and 5.50" respectively. Rainfall amounts from the Maine DEP Volume III: BMPs Technical Design Manual Chapter 2 Stormwater Hydrology Table 2-1 Rev. 4/10/92.

Due to the numerous variables, and inherent inaccuracies with the modeling program used to calculate stormwater runoff it is custom at Acorn Engineering, Inc. to round to the nearest whole number. However due to the small size of the project the stormwater runoff shall be rounded to the nearest tenth of a cubic feet per second (cfs). Given the relatively small watershed areas, urban setting, and predominance of impervious area, a 5 minute time of concentration ( $T_c$ ) was applied to each subcatchment for both the pre and post-development conditions.

**Pre-development** Calculations



The pre-development condition was modeled as two subcatchments. Subcatchment 1 is tributary to the catch basin at the end of Vernon Place. Subcatchment 2 is tributary to the newly constructed catch basin on Avon Street at the Northeast end of the property line.

- Subcatchment 1, Existing Northwest Subcatchment Area (337 SF, 0.02 acres) tributary to the existing municipal sewer (POI#1) on Avon Street.
- Subcatchment 2, Existing Northeast Subcatchment Area (20,856 sf, 0.58 acres) tributary to the existing municipal storm drain catch basin on Avon Street. This storm drain is then tributary to the municipal sewer (POI#1) also located on Avon Street.

The surface flows tributary to the municipal storm sewer are also included below. A Predevelopment Watershed Map developed for this project can be viewed in Attachment A, and a copy of the HydroCAD calculations is included within Attachment D of this report. Peak flow rates for the storm events are as follows:

Table 1 – Pre-Development Peak Stormwater Flows								
	2 – Year Storm	10 – Year Storm	25 – Year Storm					
Drainage Area	Event (cfs)	Event (cfs)	Event (cfs)					
Subcatchment 1	.1	.1	.1					
Subcatchment 2	1.7	2.7	3.1					
Point of	1 0	9.0	3.3					
Interest #1	1.8	2.8						

#### Post-development Calculations:

The post-development condition was modeled as one subcatchment with the same point of interest, as all stormwater is anticipated to leave the site through one location and connect to the recently completed 15" storm drain within Avon. The proposed Grading and Drainage Plan was designed to maintain the historical area tributary to the municipal storm sewer on Avon Street.

Subcatchment 1 – Area (0.60 acres) tributary to the existing municipal sewer within Avon Street

The post development calculations assumed that there was no land change; all surfaces on the property will remain impervious and therefore did not result in a net stormwater increase. The post-development conditions now convey all stormwater flows to the municipal sewer on Avon Street (POI #1). The following table represents comparison of predevelopment and post-development condition peak runoff rates at the respective point of interest.

Table 2 – Comparison of Peak Flows								
Drainage	2 – Year S	torm	10 – Year	Storm	25 – Year Storm Event			
Area	Event (cfs)		Event	(cfs)	(cfs)			
	Pre	Post	Pre	Post	Pre	Post		
<b>POI #1</b>	1.8	1.8	2.8	2.8	3.3	3.3		

As shown in Table 2, the post development peak flows shall remain at or below the predevelopment levels. A Post-development Watershed Map developed for this project can be viewed in Attachment B, and a copy of the HydroCAD calculations is included within Attachment D, of this report.

Pipe sizes were generated using the rational method.

### SOILS

Onsite soil information includes the following:

- Summit Geoengineering Services Soil Boring Logs, dated March 31<sup>st</sup>, 2015 and April 15<sup>th</sup>, 2015. A formal Geotechnical Report has also been prepared by Summit Geoengineering Services for the project, dated May 2015.
- > Soil Conservation Service Medium Intensity Soil Survey for Cumberland County.

Given the soils information, listed above, and the fact that greater than 50% of the proposed development site is currently developed, it is Acorn Engineering's professional opinion that a more intense hydric soil boundary delineation is not required because the waiver requirements set forth in the City of Portland Technical Manual – Section 7 – Soil Survey, Rev. 6/17/11 are met.

The area within and surrounding the project includes soils types listed in the table below. The susceptibility of soils to erosion is indicated on a relative "K" scale of values over a range of 0.02 to 0.69. Higher "K" values indicate more erodible soils.

Table 1 - "K" Value						
Soils Type	Subsurface	Substratum				
Hinckley	.17	.17				

The soil "K" values for the soils, listed above, indicate a low susceptibility to erosion. The site's susceptibility to erosion is from the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County. The site's soils map from the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County is included as Attachment C.

#### **Conclusion**

The proposed development was designed to meet the requirements implemented by the MDEP under the Stormwater Management Statute (38 M.R.S.A. § 420-D) as well as the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards. The proposed project as envisioned shall improve upon the existing stormwater management.

#### Attachments

Attachment A: Pre Development Watershed Map Attachment B: Post Development Watershed Map Attachment C: Soils Map Attachment D: HydroCAD Calculations Attachment E: Summit Geoengineering Services – Soil Boring Logs, dated May 2015









665 CONGRESS STREET, PORTLAND, MAINE

Data Sources: MEGIS, City of Portland, Acorn Engineering, Inc.

Date: 4/8/2015 by Acorn Engineering, Inc. for Redfern Properties, LLC



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# Area Listing (all nodes)

Area	CN	Description		
(acres)		(subcatchment-numbers)		
0.028	96	Gravel (1S,2S)		
0.084	98	Building (2S)		
0.487	98	Pavement (1S,2S)		
0.599		TOTAL AREA		

# Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Goup	Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.599	Other	1S, 2S
0.599		TOTAL AREA

JSH Pre-Development 7-24-15	Type III 24-hr 2-year Rainfall=3.00"
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HydroCAD® 8.50 s/n 000620 © 2007 HydroCAD	Software Solutions LLC Page 4
Time span=5.00-2 Runoff by S0 Reach routing by Stor-Ind+Trar	20.00 hrs, dt=0.04 hrs, 376 points CS TR-20 method, UH=SCS ns method - Pond routing by Stor-Ind method
Subcatchment 1S: Existing Northwest	Runoff Area=0.024 ac 33.33% Impervious Runoff Depth>2.50" Tc=5.0 min CN=97 Runoff=0.07 cfs 0.005 af
Subcatchment 2S: Existing Northeast	Runoff Area=0.575 ac 97.91% Impervious Runoff Depth>2.59" Tc=5.0 min CN=98 Runoff=1.71 cfs 0.124 af
Reach 1R: POI#1	Inflow=1.78 cfs 0.129 af Outflow=1.78 cfs 0.129 af
Total Runoff Area = 0.599 ac	Runoff Volume = 0.129 af Average Runoff Depth = 2.59

al Runoff Area = 0.599 ac Runoff Volume = 0.129 af Average Runoff Depth = 2.59" 4.67% Pervious = 0.028 ac 95.33% Impervious = 0.571 ac

#### Summary for Subcatchment 1S: Existing Northwest Subcatchment

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 0.005 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 2-year Rainfall=3.00"

	Area	(ac)	CN	Desc	cription		
*	0.	800	98	Pave	ement		
*	0.	000	98	Build	ling		
*	0.	016	96	Grav	rel		
	0.	024	97	Weig	hted Aver	age	
	0.	0.016 Pervious Area					
	0.	).008 Impervious Area			ervious Are	ea	
	Tc (min)	Leng (fee	th et)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	5.0						Direct Entry, Minimum 5





### Summary for Subcatchment 2S: Existing Northeast Subcatchment

Runoff = 1.71 cfs @ 12.07 hrs, Volume= 0.124 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 2-year Rainfall=3.00"

	Area	(ac)	CN	Desc	ription		
*	0.	012	96	Grav	el		
*	0.	084	98	Build	ling		
*	0.	479	98	Pave	ement		
	0.	).575 98 Weighted Average					
	0.	0.012 Pervious Area				•	
	0.	563		Impe	rvious Are	a	
	Tc (min)	Lengt (fee	t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	5.0						Direct Entry, Minimum 5

### Subcatchment 2S: Existing Northeast Subcatchment



# Summary for Reach 1R: POI#1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area	a =	0.599 ac, 9	95.33% Impe	ervious,	Inflow De	epth > 2	2.59"	for 2-ye	ear event
Inflow	=	1.78 cfs @	12.07 hrs,	Volume	=	0.129 a	f		
Outflow	=	1.78 cfs @	12.07 hrs,	Volume	=	0.129 a	f, Att	ten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs



Reach 1R: POI#1

JSH Pre-Development 7-24-15 Prepared by {enter your company name h HydroCAD® 8.50 s/n 000620 © 2007 HydroCAD	Type III 24-hr 10-year Rainfall=4.70" here} Printed 7/27/2015 O Software Solutions LLC Page 8
Time span=5.00-2 Runoff by S0 Reach routing by Stor-Ind+Trai	20.00 hrs, dt=0.04 hrs, 376 points CS TR-20 method, UH=SCS ns method - Pond routing by Stor-Ind method
Subcatchment 1S: Existing Northwest	Runoff Area=0.024 ac 33.33% Impervious Runoff Depth>4.07" Tc=5.0 min CN=97 Runoff=0.11 cfs 0.008 af
Subcatchment 2S: Existing Northeast	Runoff Area=0.575 ac 97.91% Impervious Runoff Depth>4.14" Tc=5.0 min CN=98 Runoff=2.70 cfs 0.199 af
Reach 1R: POI#1	Inflow=2.81 cfs 0.207 af Outflow=2.81 cfs 0.207 af
Total Runoff Area = 0.599 ac	Runoff Volume = 0.207 af Average Runoff Depth = 4.14

Total Runoff Area = 0.599 acRunoff Volume = 0.207 afAverage Runoff Depth = 4.14"4.67% Pervious = 0.028 ac95.33% Impervious = 0.571 ac

#### Summary for Subcatchment 1S: Existing Northwest Subcatchment

Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.008 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 10-year Rainfall=4.70"

	Area	(ac)	CN	Desc	cription		
*	0.	800	98	Pave	ement		
*	0.	000	98	Build	ling		
*	0.	016	96	Grav	rel		
	0.	024	97	Weig	hted Aver	age	
	0.	).016 Pervious Area					
	0.	).008 Impervious Area			ervious Are	a	
	Т	1		<u>Olana</u>	Mala altra	0	Description
	IC	Leng	in	Slope	velocity	Capacity	Description
_	(min)	(fee	et)	(tt/ft)	(tt/sec)	(cfs)	
	5.0						Direct Entry, Minimum 5

# Subcatchment 1S: Existing Northwest Subcatchment



#### Summary for Subcatchment 2S: Existing Northeast Subcatchment

Runoff = 2.70 cfs @ 12.07 hrs, Volume= 0.199 af, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 10-year Rainfall=4.70"

	Area	(ac)	CN	Desc	ription		
*	0.0	012	96	Grav	el		
*	0.0	084	98	Build	ling		
*	0.4	479	98	Pave	ement		
	0.	575	98	Weig	hted Aver	age	
	0.0	012		Perv	ious Area	•	
	0.	0.563 Impervious Area			rvious Are	a	
	_						
	Tc	Lengt	h	Slope	Velocity	Capacity	Description
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
	5.0						Direct Entry, Minimum 5

# Subcatchment 2S: Existing Northeast Subcatchment



# Summary for Reach 1R: POI#1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area	a =	0.599 ac, 9	5.33% Imp	ervious,	Inflow De	epth >	4.1	4" for 10-	year event
Inflow	=	2.81 cfs @	12.07 hrs,	Volume	=	0.207 a	af		
Outflow	=	2.81 cfs @	12.07 hrs,	Volume	=	0.207 a	af, J	Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs



Reach 1R: POI#1

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Time span=5.00-2 Runoff by S0 Reach routing by Stor-Ind+Tra	0.00 hrs, dt=0.04 hrs, 376 CS TR-20 method, UH=SC ns method - Pond routing	points S by Stor-Ind method			
Subcatchment1S: Existing Northwest	Runoff Area=0.024 ac 33.3 Tc=5.0 mi	33% Impervious Runoff Depth>4.80" n CN=97 Runoff=0.13 cfs 0.010 af			
Subcatchment 2S: Existing Northeast	Runoff Area=0.575 ac 97.9 Tc=5.0 mi	91% Impervious Runoff Depth>4.87" n CN=98 Runoff=3.16 cfs 0.234 af			
Reach 1R: POI#1		Inflow=3.29 cfs 0.243 af Outflow=3.29 cfs 0.243 af			
Total Runoff Area = 0.599 ac	Runoff Volume = 0.243	af Average Runoff Depth = 4.87			

Area = 0.599 ac Runoff Volume = 0.243 af Average Runoff Depth = 4.87" 4.67% Pervious = 0.028 ac 95.33% Impervious = 0.571 ac Runo

#### Summary for Subcatchment 1S: Existing Northwest Subcatchment

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 0.010 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 25-year Rainfall=5.50"

	Area	(ac)	CN	Desc	cription		
*	0.	800	98	Pave	ement		
*	0.	000	98	Build	ling		
*	0.	016	96	Grav	rel		
	0.	024	97	Weig	hted Aver	age	
	0.	016		Perv	ious Area	•	
	0.	800		Impe	ervious Are	ea	
	Tc (min)	Leng (fee	th t)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	5.0						Direct Entry, Minimum 5

# Subcatchment 1S: Existing Northwest Subcatchment



#### Summary for Subcatchment 2S: Existing Northeast Subcatchment

Runoff = 3.16 cfs @ 12.07 hrs, Volume= 0.234 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 25-year Rainfall=5.50"

	Area	(ac)	CN	Desc	ription		
*	0.	012	96	Grav	el		
*	0.	084	98	Build	ling		
*	0.	479	98	Pave	ement		
	0.	575	98	Weig	hted Aver	age	
	0.	012		Perv	ious Area	-	
	0.	563		Impe	rvious Are	ea	
	То	Long	h	Slope	Volocity	Conocity	Description
	TC (maine)	Leng	.11 .1	Siope		Capacity	Description
	(min)	(iee	t)	(11/11)	(IT/Sec)	(CIS)	
	5.0						Direct Entry, Minimum 5

# Subcatchment 2S: Existing Northeast Subcatchment



# Summary for Reach 1R: POI#1

[40] Hint: Not Described (Outflow=Inflow)

Inflow A	Area =	=	0.599 ac, 9	95.33% Impe	ervious,	Inflow D	Depth >	4.8	7" for 25-	year eve	nt
Inflow	=		3.29 cfs @	12.07 hrs,	Volume	=	0.243 a	af			
Outflow	/ =		3.29 cfs @	12.07 hrs,	Volume	=	0.243 a	af, .	Atten= 0%,	Lag= 0.0	0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs



Reach 1R: POI#1



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# Area Listing (all nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.599	98	Building & Parking (1S)
0.599		TOTAL AREA

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# Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Goup	Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.599	Other	1S
0.599		TOTAL AREA

JSH Post-Development 7-24-15 7 Prepared by {enter your company name here} HydroCAD® 8.50 s/n 000620 © 2007 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: 667 Congress Proposed Runoff Area=0.599 ac 100.00% Impervious Runoff Depth>2.59" Tc=5.0 min CN=98 Runoff=1.78 cfs 0.129 af

Inflow=1.78 cfs 0.129 af Outflow=1.78 cfs 0.129 af

Reach 1R: POI#1

Total Runoff Area = 0.599 ac Runoff Volume = 0.129 af Average Runoff Depth = 2.59" 0.00% Pervious = 0.000 ac 100.00% Impervious = 0.599 ac

### Summary for Subcatchment 1S: 667 Congress Proposed

1.78 cfs @ 12.07 hrs, Volume= Runoff 0.129 af, Depth> 2.59" =

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 2-year Rainfall=3.00"



# Summary for Reach 1R: POI#1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area	a =	0.599 ac,10	0.00% Impe	ervious,	Inflow De	epth > 2	2.59"	for 2-ye	ear event
Inflow	=	1.78 cfs @	12.07 hrs,	Volume	=	0.129 a	f		
Outflow	=	1.78 cfs @	12.07 hrs,	Volume	=	0.129 a	f, At	ten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs



Reach 1R: POI#1

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Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: 667 Congress Proposed Runoff Area=0.599 ac 100.00% Impervious Runoff Depth>4.14" Tc=5.0 min CN=98 Runoff=2.81 cfs 0.207 af

Inflow=2.81 cfs 0.207 af Outflow=2.81 cfs 0.207 af

Reach 1R: POI#1

Total Runoff Area = 0.599 ac Runoff Volume = 0.207 af Average Runoff Depth = 4.14" 0.00% Pervious = 0.000 ac 100.00% Impervious = 0.599 ac

### Summary for Subcatchment 1S: 667 Congress Proposed

Runoff = 2.81 cfs @ 12.07 hrs, Volume= 0.207 af, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 10-year Rainfall=4.70"



# Summary for Reach 1R: POI#1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area	a =	0.599 ac,10	0.00% Impe	ervious,	Inflow De	epth >	4.1	4" for 10-	year event
Inflow	=	2.81 cfs @	12.07 hrs,	Volume	=	0.207 a	af		
Outflow	=	2.81 cfs @	12.07 hrs,	Volume	=	0.207 a	af, J	Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs



Reach 1R: POI#1

JSH Post-Development 7-24-15 *Ty* Prepared by {enter your company name here} HydroCAD® 8.50 s/n 000620 © 2007 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: 667 Congress Proposed Runoff Area=0.599 ac 100.00% Impervious Runoff Depth>4.87" Tc=5.0 min CN=98 Runoff=3.29 cfs 0.243 af

Reach 1R: POI#1

Inflow=3.29 cfs 0.243 af Outflow=3.29 cfs 0.243 af

Total Runoff Area = 0.599 ac Runoff Volume = 0.243 af Average Runoff Depth = 4.87" 0.00% Pervious = 0.000 ac 100.00% Impervious = 0.599 ac

### Summary for Subcatchment 1S: 667 Congress Proposed

Runoff = 3.29 cfs @ 12.07 hrs, Volume= 0.243 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs Type III 24-hr 25-year Rainfall=5.50"



# Summary for Reach 1R: POI#1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Are	a =	0.599 ac,10	0.00% Imp	ervious,	Inflow De	epth > 4	.87"	for 25-	year event	t
Inflow	=	3.29 cfs @	12.07 hrs,	Volume	=	0.243 a	f			
Outflow	=	3.29 cfs @	12.07 hrs,	Volume	=	0.243 at	f, Atte	n= 0%,	Lag= 0.0 ı	min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs



Reach 1R: POI#1







# **EXPLORATION COVER SHEET**

The exploration logs are prepared by the geotechnical engineer from both field and laboratory data. Soil descriptions are based upon the Unified Soil Classification System (USCS) per ASTM D2487 and/or ASTM D2488 as applicable. Supplemental descriptive terms for estimated particle percentage, color, density, moisture condition, and bedrock may also be included to further describe conditions.

#### Drilling and Sampling Symbols:

SS = Split Spoon Sample UT = Thin Wall Shelby Tube SSA = Solid Stem Auger HSA = Hollow Stem Auger RW = Rotary Wash SV = Shear Vane PP = Pocket Penetrometer RC = Rock Core Sample Hyd = Hydraulic Advancement of Drilling Rods Push = Direct Push of Drilling Rods WOH = Weight of Hammer WOR = Weight of Rod PI = Plasticity Index LL = Liquid Limit W = Natural Water Content USCS = Unified Soil Classification System

#### Water Level Measurements:

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations. Groundwater monitoring wells may be required to record accurate depths and fluctuation.

#### **Gradation Description and Terminology:**

Boulders:	Over 12 inches	Trace:	Less than 5%
Cobbles:	12 inches to 3 inches	Little:	5% to 15%
Gravel:	3 inches to No.4 sieve	Some:	15% to 30%
Sand:	No.4 to No. 200 sieve	Silty, Sandy, etc.:	Greater than 30%
Silt:	No. 200 sieve to 0.005 mm		
Clay:	less than 0.005 mm		

#### Density of Granular Soils and Consistency of Cohesive Soils:

CONSISTENCY OF C	OHESIVE SOILS	DENSITY OF GRANULAR SOILS				
SPT N-value blows/ft	Consistency	SPT N-value blows/ft	<b>Relative Density</b>			
0 to 2	Very Soft	0 to 4	Very Loose			
2 to 4	Soft	5 to 10	Loose			
5 to 8	Firm	11 to 30	Compact			
9 to 15	Stiff	31 to 50	Dense			
16 to 30	Very Stiff	>50	Very Dense			
>30	Hard					

	SUMMIT. GEOENGINEERING SERVICES					S	OIL BORI	NG LOG	Boring #:	B-1
		SIINA	INAN			Project:	Proposed Apart	ment Building	Project #:	15040
		GEOENGINISED				Location:	665 Congress S		Sheet:	1 of 1
		GEOENGINEERI	ING SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Summit Geoen	igineering Ser	vices		Boring Elevation:		115.9'		
Driller:	Stoff.	C. Coolidge, P.	E.			Reference:	Site Survey by	Litcomb Associates	2/21/2015	
						Date starteu.	3/31/2013			
Vehicle	Tracker		Lenath.	24" SS		Date	Depth	Flevation	REKDELTT	ference
Model:	AMS Po	wer Probe	Diameter:	2"OD/1.5"	ID	3/31/2015	-	Elevation	None observed	
Method:	2-1/2	" H.S.A.	Hammer:	140 lb						
Hammer	Style: /	Auto	Method:	ASTM D15	86					
Depth		1	1	I.			SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>		DESCRIP	TION	Test Data	Stratum
1						2" to 2.5" of Pave	ement			PAVEMENT 0.2'
I '-	S-1	24/4	1 to 3	6		Dark tan Gravelly	SAND, little Sili	, compact, humid,		FILL
2				11		SP-SM			<b>_</b>	
3				*		* Spoon sampler blow counts. Like	skewed horizor	tally, unable to collect		2.0'
						blow counts. Elice				
4						Auger advanceme	ent produced no	cuttings, likely rubble		
5						fill with large voic	ds			
- <sup>-</sup>	S-2	24/3	5 to 7	WH		Light gray Sandy	GRAVEL, cobble	e pieces, little white Ash		
6				1		trace Silt, very loo	ose, humid, GP			
7				3						
· -						ł				
8						1				
0										
9_										9.0'
10						İ				GLACIAL TILL
11	S-3	24/20	10 to 12	6		Olive green SILT,	, little Clay and S	Sand, trace Gravel,		
· · · -				8		compact, numid,	IVIL		PP = 8,000  to 9.000 psf	
12				12		İ			.,	
10						l				
13						ł				
14										
45						Į				
15	S-4	24/9	15 to 17	6		Same as above	slightly mottled			
16	54	24/7	13 (0 17	50/3"			signity motieu			
I						End of Exploratio	n at 15.8', Auge	r and Spoon refusal		15.8'
17_						-				BEDROCK
18						1				
19						ł				
20						t				
l						Į				
21						ł				
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25						ł				
26						t				
I						Į				
27_						ł				
Granula	ar Soils	Cohesiv	ve Soils	% Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	2487	]	LL = Liquid Limit	, PI = Plastic Index	-	Dry: S = 0%
0-4	V. Loose	<2	V. soft			Bedrock Joints				Humid: S = 1 to 25%
5-10	Loose	2-4	Soft	< 5%	Frace	Shallow = 0 to $35$	degrees			Damp: S = 26 to 50%
11-30	Compact	5-8	Firm	5-15%	Little	Dipping = $35$ to $55$	degrees			Moist: $S = 51 \text{ to } 75\%$
≥50	V Dense	9-15 16-30	SUIT V Stiff	> 30%	Some With	Sieeh = 22 10 A0 q	legrees			vvet: S = 70 t0 99% Saturated: S = 100%
200		>30	Hard	- 5070		Boulders = diamete	er > 12 inches, C	obbles = diameter < 12 inche	es and > 3 inches	001010100. 0 = 10070
						Gravel = < 3 inch a	and > No 4, Sand	= < No 4 and >No 200, Silt/	/Clay = < No 200	

	SUMMIX GEOENGINEERING SERVICES					S	OIL BORI	NG LOG	Boring #:	B-2
		SIIN	MAN			Project:	Proposed Apart	ment Building	Project #:	15040
		SUIVI	IVII			Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling (	Co:	Summit Geoen	gineering Ser	vices		Boring Elevation:		114 ft		
Driller:		C. Coolidge, P.	Ε.			Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.1.			Date started:	3/31/2015	Date Completed:	3/31/2015	
DF	RILLING	METHOD	S	AMPLER			n	ESTIMATED GROUND W	ATER DEPTH	
Vehicle:	Tracked		Length:	24" SS		Date	Depth	Elevation	Re	eference
Model:	AMS Pov	wer Probe	Diameter:	2"OD/1.5"	ID	3/31/2015	-		None observed	
Method:	2-1/2	H.S.A.	Hammer:		07					
Hammer	Style: I	4010	method:	ASTIVI DT5	80		CAMPI		Coological/	Coological
Depth (ft )	No	Don/Doc (in)	Dopth (ft)	blowc/4"	N.,	+	DESCRIPT		Tost Data	Stratum
(11.)	NO.	Pen/Rec (III)		DIOWS/0	1460	2" to 2.5" of Pave	ement	TON	Test Data	PAVEMENT
1						2 10 2.0 011 01				0.2'
-	S-1	24/20	1 to 3	3		Dark brown Grav	elly SAND, little	Silt and black/white Ash,		FILL
2				6		loose to compact	, frozen, SP-SM			
3				5		ł				
				5		ł				
4						1				
-						4				
5_	S-2	24/22	5 to 7	10		Same as above				
6	5-2	27/22	5107	13		Olive green slight	tly mottled SILT	, little Sand, trace Clay		5.2'
-				13		and Gravel, comp	pact, damp, ML	,		GLACIAL TILL
7				14		]				
0						+				
8						ł				
9						+				
-						1				
10	6.0	04/1/	10 1 . 10			C				
11	5-3	24/16	10 to 12	8		Same as above, i	neavily mottled	seam at 10.8', dense	PP = 4,000 to 7,000 psf	
- ''				32		ł			to 7,000 psi	
12				50/1"		End of Exploratio	n at 11.6', Spoc	n refusal		11.6'
						]				BEDROCK
13						1				
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20						ł				
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Granul	ar Soils	Cohesiv	e Soils	% Compo	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	2487		LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft	50/ -		Bedrock Joints	1			Humid: $S = 1$ to 25%
5-10	Loose	2-4	Soft	< 5% T	race	Shallow = 0 to $35$	aegrees			Damp: $S = 26 \text{ to } 50\%$
11-30	Compact	5-8 0.15	FIRM Stiff	5-15%	LILLIE Somo	Dipping = $35$ to $55$	uegrees			Wot: $S = 51 \text{ to } /5\%$
>50	V Dense	16-30	V Stiff	> 30%	With	Siech = 32 10 40 0	1041003			Saturated: S = 1010 99%
200	V. Denst	>30	Hard	- 3070		Boulders = diameter	er > 12 inches C	obbles = diameter < 12 inche	s and $> 3$ inches	Saturateu. 5 - 10070
	>30 Hard					Gravel = < 3 inch	and > No 4, Sanc	$I = \langle No 4 and \rangle No 200, Silt/$	Clay = < No 200	

	SUMMIT. GEOENGINEERING SERVICES					S	OIL BORI	NG LOG	Boring #:	B-3
		SIINA	INANT			Project:	Proposed Apart	ment Building	Project #:	15040
		SUIVI	IVIII			Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Summit Geoen	gineering Ser	vices		Boring Elevation:		112.9 ft		
Driller:		C. Coolidge, P.	E.			Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.l.			Date started:	3/31/2015	Date Completed:	3/31/2015	
DF	RILLING	METHOD	S	AMPLER				ESTIMATED GROUND W	ATER DEPTH	
Vehicle:	Tracked		Length:	24" SS		Date	Depth	Elevation	Re	eference
Model:	AMS Pov	wer Probe	Diameter:	2"OD/1.5"	ID	3/31/2015	-		None observed	
Method:	2-1/2"	' H.S.A.	Hammer:	140 lb						
Hammer	Style: A	Auto	Method:	ASTM D15	86			_		
Depth					N	+	SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>	21 to 2 Ell of Down	DESCRIP	ION	Test Data	Stratum
1						3 10 3.5 01 Pave	ement			0 3'
·-	S-1	24/12	1 to 3	4		Dark brown SILT	, large brick frac	ment in spoon, small		FILL
2				11*		brick fragment in	spoon tip, loos	e, humid, ML		
				4						
3				2		* blow count due	e to brick fragme	ent		
4						ł				
· -						+				
5										
,	S-2	24/12	5 to 7	12		Olive green SILT,	little Sand, trac	e Clay and Gravel,		5' +/-
6				18		compact, numid,	ML		PP = 5,000  psr	GLACIAL TILL
7				00/0		End of Exploratio	n at 6.2'. Spoon	and Auger refusal		6.2'
-								5		BEDROCK
8						]				
0						1				
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Grapula	ar Soile	Cohoch	e Soils	% Comp	osition	NOTES	PD - Pockot Don	etrometer MC - Moisture Co	ntent	Soil Moisture Condition
Blows/ft	n JUIIS Density	Blows/ft	Consistency	ло сотпр ⊿стм г	03110f1 )2487	NUTES.	rr = rouket ren	PI = Plastic Index	ment	Drv: $S = 0\%$
0-4	V. Loose	<2	V, soft		270/	Bedrock Joints				Humid: $S = 1 \text{ to } 25\%$
5-10	Loose	2-4	Soft	< 5%	Trace	Shallow = 0 to $35$	degrees			Damp: $S = 26$ to 50%
11-30	Compact	5-8	Firm	5-15%	Little	Dipping = $35$ to $55$	degrees			Moist: $S = 51 \text{ to } 75\%$
31-50	Dense	9-15	Stiff	15-30%	Some	Steep = $55$ to $90$ d	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	> 30%	With		-			Saturated: S = 100%
		>30	Hard			Boulders = diameter	er > 12 inches, C	obbles = diameter < 12 inche	es and > 3 inches	
						Gravel = < 3 inch	and > No 4, Sand	$I = \langle No 4 and \rangle No 200, Silt$	/Clay = < No 200	

		$\wedge$				S	OIL BORI	NG LOG	Boring #:	B-4
1		SIINA	INAN			Project:	Proposed Apart	ment Building	Project #:	15040
						Location:	665 Congress S	St.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Summit Geoen	gineering Ser	vices		Boring Elevation:		112.5 ft		
Driller:	Stoff.	C. Coolidge, P.	E.			Reference:	Site Survey by	Titcomb Associates	2/21/2015	
Summit			.i. s			Date started:	3/31/2015		3/31/2015	
Vehicle:	Tracked		Lenath.	24" SS		Date	Depth	ESTIMATED GROUND W		ference
Model:	AMS Po	wer Probe	Diameter:	2"OD/1.5"	ID	3/31/2015	-	Elevation	None observed	
Method:	2-1/2'	' H.S.A.	Hammer:	140 lb						
Hammer	Style: A	Auto	Method:	ASTM D15	86					
Depth				1		+	SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>	2 F" of Dovomont	DESCRIPT	FION	Test Data	Stratum
1						2.5 OF Pavement	L			0.2'
-	S-1	24/10	1 to 3	2		Brown Sandy SIL	T, little fine Gra	vel and black Ash, loose,		FILL
2_				2		humid, ML				
3				2		ł				
-						Auger cuttings sh	now increasing a	ash content with depth		
4_	6.0	24/2	4 E to 4 E	E0/E"		and some brick fi	ragments	aan tin		
5	3-2	24/2	4.5 10 0.5	50/5		Weathered Tock I	ragments in spo			4.5'
-						Augered through	weathered rock	to competent refusal		WEATHERED ROCK
6_						+				
7						ł				
-						End of Exploratio	n at 7.2', Auger	refusal		7.2'
8_						+				BEDROCK
9						ł				
-						1				
10_						+				
11						ł				
-						1				
12_						+				
13						ł				
-						1				
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0	r C-!!	0.1	io Soil-	01.0	oolt!	NOTES	DD DID	stromotor MC Malala a	ntant	Soil Maintern Country
Granula Blows/ft	II SOIIS	Cohesiv Blows/ft	Consistency	% Comp дстм г	051(10N )2487	NUTES:	rr = Pocket Pen	enometer, MC = Moisture Co PI = Plastic Index	ment	Sui involsture Condition Drv: $S = 0\%$
0-4	V. Loose	<2	V. soft	AJ TIVI L	/UTU/	<u>Bedroc</u> k Joints	בב – בוקטוט בווחונ			Humid: $S = 1 \text{ to } 25\%$
5-10	Loose	2-4	Soft	< 5%	Trace	Shallow = 0 to 35	degrees			Damp: S = 26 to 50%
11-30	Compact	5-8	Firm	5-15%	Little	Dipping = 35 to 55	degrees			Moist: S = 51 to 75%
31-50	Dense	9-15	Stiff	15-30%	Some	Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	> 30%	With	Pouldoro - Harra I	or > 10 inch 0	obbloc - diamotor - 10 in the	and > 2 instra	Saturated: S = 100%
		>30	naru			Gravel = $< 3$ inch	and > No 4, Sand	$I = \langle No 4 and \rangle No 200, Silt/$	Clay = < No 200	

		$\wedge$				S	OIL BORI	NG LOG	Boring #:	B-5
		SIIN	MAN			Project:	Proposed Apart	ment Building	Project #:	15040
		SUIVI				Location:	665 Congress S	St.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	Co:	Summit Geoen	gineering Ser	vices		Boring Elevation:		112.5 ft		
Driller:		C. Coolidge, P.	E.			Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.l.			Date started:	3/31/2015	Date Completed:	3/31/2015	
DE		METHOD	5/	AMPLER		Data	D. U	ESTIMATED GROUND W		
Venicie: Model:		wor Probo	Length: Diamotor:	24" 55	חוי	Date 2/21/2015	Depth	Elevation	None observed	sterence
Method:	2-1/2		Hammer:	2 UD/1.5	ID	3/31/2015	-		None observed	
Hammer	Style:	Auto	Method:	ASTM D15	86					
Depth							SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>	+	DESCRIP	LION	Test Data	Stratum
. ,						2.5" of Pavement				PAVEMENT
1										0.2'
2	S-1	24/8	1 to 3	15		Dark brown to bl	ack Sandy SILT, II	, little Gravel and black		FILL
2				6		and write Ash, w	IL.			
3				2		1				
						Į				
4_						Dense drilling at	4 8'			
5	S-2	24/1	4.8 to 6.8	50/3"		Rock in spoon tip	4.0			
-						End of Exploratio	n at 4.8', Spoor	and Auger refusal		4.8'
6						ł				BEDROCK
7						ł				
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7-						ł				
10						1				
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26						ļ				
27						ł				
<i>2'</i> -						t				
Granula	ar Soils	Cohesiv	e Soils	% Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ontent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	02487	1	LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft		-	Bedrock Joints				Humid: $S = 1$ to 25%
5-10	Loose	2-4	Soft	< 5%	Irace	Shallow = 0 to $35$	degrees			Damp: $S = 26$ to 50%
11-30 31 EO	Dorse	5-8 0.1F	F IFM Stiff	5-15%	LITTIE	Dipping = $35$ to $55$	uegrees			Wolst: $S = 51 \text{ to } /5\%$
>50	V. Dense	16-30	V. Stiff	> 30%	With	Siech = 32 10 40 0	icyi ees			Saturated: S = 100%
		>30	Hard	. 5070		Boulders = diamete	er > 12 inches, C	obbles = diameter < 12 inche	es and > 3 inches	
						Gravel = < 3 inch	and > No 4, Sand	$I = \langle No 4 and \rangle No 200$ , Silt	/Clay = < No 200	

	SUMMIX GEOENGINEERING SERVICES					S		NG LOG	Boring #:	B-101
		SIINA	INAN			Project:	Proposed Apart	ment Building	Project #:	15040
		SUN				Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	ING SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	:o:	Great Works T	est Boring			Boring Elevation:		118.5 ft		
Driller:		Jeff Lee				Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E				Date started:	4/15/2015	Date Completed:	4/15/2015	
DF	RILLING	METHOD	Si	AMPLER		_		ESTIMATED GROUND W	ATER DEPTH	-
Vehicle:	Tracked	1	Length:	24" SS	15	Date	Depth	Elevation	Re	eference
Model:	Mobile E	Stom Augor	Diameter:	2"0D/1.5"	ID	4/15/2015	-		None observed	
Hammer	4 50110 Style: 1		Method:		86					
Denth	Style.	Nac -	metriou.	ASTIMUDIS	00		SAMDI	F	Geological/	Geological
(ft)	No	Pen/Rec (in)	Denth (ft)	blows/6"	Neo	ł	DESCRIPT		Test Data	Stratum
(11.)	110.		Doptil (ity	510113/0	00	3" Pavement	DECONT		TOST Data	PAVEMENT
1	S-1	24/4	0.5 to 2.5	4		Brown Silty SAND	), loose, humid,	SM		0.25'
				3		+				FILL
2_				3		+				
3	-			5		ł				
-						1				
4						Possible rubble e	ncountered at 4	' during drilling		
5						ł				
5_	S-2	24/4	5 to 7	7		Brown Silty SAND	), trace Gravel,	compact humid, SM		
6				7		1	1			
-				7		+				
				/		ł				
8						ł				
-						1				
9_						+				
10						+				
10	S-3	24/12	10 to 12	4		Dark olive green	SILT, little Sand	and Gravel, trace Clay,		10.0' +/-
11				8		dense/very stiff,	slightly mottled,	humid, ML	PP = *1,000 to	GLACIAL TILL
12				30		* – Specimen fai	led via tension (	crack low clay content	*3,000 psf	
12				50/5		End of Exploratio	n at 11 9'. Auge	er and Spoon refusal		11 9'
13							in dr. i i i i i i i i i i i i i i i i i i i			BEDROCK
	-					1				
14						+				
15						ł				
-						1				
16						Į				
17						ł				
						+				
18						1				
10	<u> </u>					ł				
19						ł				
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21						ł				
22	<u> </u>					ł				
						1				
23						ļ				
24	┝───					ł				
<sup>24</sup>						ł				
25						1				
						ļ				
26						ł				
27						ł				
						<u> </u>				
Granula	ar Soils	Cohesiv	ve Soils	% Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	2487	4	LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft			Bedrock Joints				Humid: $S = 1$ to 25%
5-10	Loose	2-4	Soft	< 5% 1	race	Shallow = 0 to $35$	aegrees			Damp: $S = 26 \text{ to } 50\%$
11-30	Lompac	5-8 0.1F	Firm Stiff	5-15%	LITTLE	Dipping = $35$ to $55$	uegrees			Moist: $S = 51$ to 75%
>50	V Dense	9-10 16-30	Suil V Stiff	10-30% > 30%	With	Sieep = 55 10 90 0	iegi ees			vvei. S = 70.00.99% Saturated: S = 10.0%
230	. Dense	>30	Hard	- 3070		Boulders = diameter	er > 12 inches. C	obbles = diameter < 12 inche	es and > 3 inches	Saturateu. 5 - 10070
						Gravel = < 3 inch	and > No 4, Sanc	$I = \langle No 4 and \rangle No 200$ , Silt	/Clay = < No 200	

	SUMMIX GEOENGINEERING SERVICES					S	OIL BORI	NG LOG	Boring #:	B-102
		SIINA	INANT			Project:	Proposed Apart	ment Building	Project #:	15040
		SUIVI	IVIII			Location:	665 Congress S	St.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Great Works T	est Boring			Boring Elevation:		118.7 ft		
Driller:		Jeff Lee				Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.l.			Date started:	4/15/2015	Date Completed:	4/15/2015	
DF	RILLING	METHOD	S	AMPLER				ESTIMATED GROUND W	ATER DEPTH	
Vehicle:	Tracked		Length:	24" SS		Date	Depth	Elevation	Re	eference
Model:	Mobile E	8-53	Diameter:	2"OD/1.5"	ID	4/15/2015	-		None observed	
Method:	4" Solic	l Stem Auger	Hammer:	140 lb						
Hammer	Style: F	7&C	Method:	ASTM D15	86					1
Depth						-	SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>	2" Deversert	DESCRIP	FION	Test Data	Stratum
1	S 1	24/4	0.5 to 2.5	4		3 Pavement	SAND little Cra	vol. Gravol piecos in		
'-	3-1	24/4	0.5 10 2.5	4		spoon tip, loose.	drv. SM	ver, Graver pieces in		0.25 FILI
2				5						
-				3		1				
3						Rubble fill, large	voids apparent	from open hole inpection		
4						Augor opeounter	ad rational at 1.0	) during drilling Moved		
4_						Auger encountere	ed refusal at 4.9	auring arilling. Novea		
5						in second hole at	3.2'	st, refusal encountered		
- <sup>-</sup>						End of Exploratio	n at 4.9', Auger	refusal on rubble		4.9'
6						] .	5			
I _						4				
7						+				
8						+				
°-						1				
9						1				
						1				
10						4				
11						+				
· · · -						+				
12						1				
-						1				
13						4				
14						+				
14						+				
15						1				
-						1				
16						]				
17				-		4				
						+				
18						1				
l	1					1				
19						]				
	<u> </u>					4				
20						4				
21						ł				
	1					1				
22						]				
22						4				
23	<u> </u>					4				
24						1				
l <sup>- ·</sup> -						1				
25						]				
~ /	<u> </u>					4				
26						+				
27						ł				
	1					1				
Granula	ar Soils	Cohesiv	re Soils	% Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	2487		LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft			Bedrock Joints	-			Humid: S = 1 to 25%
5-10	Loose	2-4	Soft	< 5%	race	Shallow = 0 to 35	degrees			Damp: S = 26 to 50%
11-30	Compact	5-8	Firm	5-15%	Little	Dipping = 35 to 55	degrees			Moist: S = 51 to 75%
31-50	Dense	9-15	Stiff	15-30%	Some	Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	> 30%	With					Saturated: S = 100%
1		>30	Hard			Boulders = diameter	er > 12 inches, C	obbles = diameter < 12 inche	es and > 3 inches	
						Gravel = $< 3$ inch a	and > No 4, Sand	$I = \langle No \ 4 \text{ and } \rangle No \ 200, \text{ Silt}$	/Clay = < No 200	

		$\wedge$				S		NG LOG	Boring #:	B-103	
		SIINA	INAN			Project:	Proposed Apart	ment Building	Project #:	15040	
						Location:	665 Congress S	it.	Sheet:	1 of 1	
		GEOENGINEERI	ING SERVICES			City, State:	Portland, ME		Chkd by:		
Drilling C	:0:	Great Works T	est Boring			Boring Elevation:		115.0 ft			
Driller:	o	Jeff Lee				Reference:	Site Survey by	Titcomb Associates			
Summit	Staff:	M. Hardison, E	.l. -			Date started:	4/15/2015	Date Completed:	4/15/2015		
Dh			Longth:	AIVIPLEK		Data	Donth	ESTIMATED GROUND WA		foronco	
Model·		ı 3-53	Lengin: Diameter	24 35 2"0D/1 5"	ID	4/15/2015	Depin	Elevation	Ke None observed	arenence	
Method:	4" Solid	Stem Auger	Hammer:	140 lb		4/13/2013					
Hammer	Style: I	R&C	Method:	ASTM D15	86						
Depth							SAMPL	E	Geological/	Geological	
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>		DESCRIPT	TION	Test Data	Stratum	
1	C 1	24/0	0 E to 2 E	4		3" Pavement	our CAND troo	o oilt lorgo briek frogmont		PAVEMENT	
'-	2-1	24/8	0.5 10 2.5	4		in top 4" of samp	own SAND, trac	e sin, large blick fragment ent in spoon tip, loose.		0.25 FILL	
2				7		humid, SP		···· ··· ··· ··· ··· ··· ··· ··· ··· ·			
2				9		Į					
3-						+					
4						1					
_						ļ					
5_	S_2	24/6	5 to 7	5		same as above in	no brick fragmer	nt. some white Ash			
6	5-2	27/0	5.07	7			io briok irayifici	R, SOME WHILE ASH			
_				15		1					
7				15		ł					
8						ł					
						1					
9_											
10						ł				9.0 +/- GLACIAL TILL	
	S-3	24/20	10 to 12	14		Olive green SILT,	little Gravel, Sa	and, and Clay, cobble	PP = 6,000 to		
11				24		pieces fro 10.5 to	o 11.0', humid, o	lense/hard, ML	> 9,000 psf		
12				20		ł					
12				20		+					
13						1					
14						+					
14_						ł					
15						End of Exploratio	n at 14.5', Auge	er refusal		14.5'	
16						+				BEDROCK	
10						ł					
17						1					
10	-					+					
18						ł					
19						1					
20						ł					
20						ł					
21						1					
22						ł					
22						ł					
23						1					
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24_						ł					
25						ł					
						Į					
26						ł					
27						ł					
						<u> </u>					
Granula	ar Soils	Cohesiv	e Soils	% Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Cor	ntent	Soil Moisture Condition	
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	2487	Deducation in the	LL = Liquid Limit	, PI = Plastic Index		Dry: $S = 0\%$	
0-4	V. Loose	<2 2/	V. soft	, EQ/ 7	Traco	Bedrock Joints	dogroos			Humid: $S = 1 \text{ to } 25\%$	
5-10 11-30	LUUSE	2-4 5-8	SUIT	< 5% 5_15%	i ace Littlo	Dipping $= 35 \text{ to } 55$	dearees			Damp: $S = 20 \ 10 \ 50\%$ Moist: $S = 51 \ to \ 75\%$	
31-50	Dense	9-15	Stiff	15-30%	Some	Steep = $55 \text{ to } 90 \text{ d}$	learees			Wet: $S = 76 \text{ to } 99\%$	
>50	V. Dense	16-30	V. Stiff	> 30%	With					Saturated: $S = 100\%$	
		>30	Hard			Boulders = diamete	er > 12 inches, C	obbles = diameter < 12 inche	s and > 3 inches		
						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					

	SUMMIX GEOENGINEERING SERVICES					S		NG LOG	Boring #:	B-104
		SIINA	INANT			Project:	Proposed Apart	ment Building	Project #:	15040
		SUIVI	IVIIA			Location:	665 Congress S	jt.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	co:	Great Works T	est Boring			Boring Elevation:		113.1 ft		
Driller:		Jeff Lee				Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.l.			Date started:	4/15/2015	Date Completed:	4/15/2015	
Ur	Trackod		Jonath:	AIVIPLER		Data	Dopth	ESTIMATED GROUND W		foronco
Model:	Mobile B	1	Lengin: Diameter:	24 33 2"0D/1 5"	ID	4/15/2015	Depth	Elevation	None observed	ererence
Method:	4" Solid	Stem Auger	Hammer:	140 lb		4/13/2013			None observed	
Hammer	Style: F	7&C	Method:	ASTM D15	86					
Depth							SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>		DESCRIP	TION	Test Data	Stratum
1						4" Pavement				PAVEMENT
'-						Augered to 5', re	lativelv easv dril	llina (no rubble)		0.3 FILL
2							, i j i i j i	5 ( )		
2						1				
3_						ł				
4						t				
_						]				
5_	S-1	24/18	5 to 7	7		Olive green SILT	little Gravel Sa	and and Clay mottled	PP - 5 000 to	5.0' +/-
6	3-1	24/10	5107	7		damp, compact/\	ery stiff, cobble	pieces at 6.5', ML	7,000 psf	GLACIAL TILL
	ļ			17			<b>3</b>	•	•	
7_				23		+				
8						ł				
9_						+				8.5'
10						End of Exploratio	n at 9.5'. Auger	refusal		9.5'
							in at the things.			BEDROCK
11						]				
12						ł				
12						+				
13						1				
14						+				
14_						ł				
15						1				
14						+				
10						ł				
17						İ				
10						]				
18_						ł				
19						ł				
I						Į				
20						ł				
21						t				
						Į				
22						ł				
23						ł				
I -						1				
24						ł				
25						ł				
I						1				
26						ł				
27						ł				
						<u>†</u>				
Granula	ar Soils	Cohesiv	e Soils	% Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	2487		LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft		F	Bedrock Joints				Humid: $S = 1$ to 25%
5-10	LOOSE	2-4 5 0	Soft	< 5%	i race	Snallow = 0 to 35 Dipping = $25$ to $55$	uegrees			Damp: $S = 26 \text{ to } 50\%$
31-50	Dense	9-15	Stiff	5-15% 15-30%	Some	Steep = $55 \text{ to } 90 \text{ d}$	learees			Wet: $S = 76 \text{ to } 99\%$
>50	V. Dense	16-30	V. Stiff	> 30%	With					Saturated: S = 100%
		>30	Hard			Boulders = diamete	er > 12 inches, C	obbles = diameter < 12 inch	es and > 3 inches	
						Gravel = < 3 inch	and > No 4, Sand	$I = \langle No 4 and \rangle No 200$ , Silt	/Clay = < No 200	

	SUMMIT GEOENGINEERING SERVICES					S	OIL BORI	NG LOG	Boring #:	B-105
		SIINA	AAN			Project:	Proposed Apart	ment Building	Project #:	15040
		SUIVI				Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	co:	Great Works T	est Boring			Boring Elevation:		113.8 ft		
Driller:		Jeff Lee				Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.1.			Date started:	4/15/2015	Date Completed:	4/15/2015	
DF	RILLING	METHOD		SAMPLER		_		ESTIMATED GROUND W	ATER DEPTH	-
Vehicle:	Tracked		Length:	24" SS		Date	Depth	Elevation	Re	eference
Mothod:		sod Wash	Diameter:	2 UD/1.5 ID		4/15/2015	-		None observed	
Hammer	Style: I		Method <sup>.</sup>	ASTM D1586						
Depth			motriour	10111101000			SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>		DESCRIP	TION	Test Data	Stratum
			,			3" Pavement				PAVEMENT
1										0.25'
2						Augered to refuse	al for Rock Core			
<u> </u> _						-				
3										
4						-				
4										
5										
,						4				
°_						1				
7										
8_						-				
9						-				
				-						9.1' +/-
10	DUN	ROC								WEATHERED ROCK
11	C-1a	10 to 13.3	40"	70%	0%	Moderately weath	nered, verv thin	v spaced vertical joints.	_	BEDROCK
-						very hard, light to	o medium gray	SCHIST		
12						-			1	
13						-			N.	
	C-1b	13.3 to 15	20"	100%	80%	Same as above, r	noderately space	ed joints		
14									<b>E</b>	
15						-				
						End of Exploratio	n at 15.0', rock	core terminated		15.0'
16										
17						-				
18										
19						-				
-						1				
20						4				
21						1				
<u> </u>						1				
22						4				
23						1				
20-						1				
24										
25						1				
20						1				
26										
27						4				
27						-				
Granula	ar Soils	Cohesive	Soils	% Compos	sition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2	487	1	LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft			Bedrock Joints				Humid: $S = 1$ to 25%
5-10	Loose	2-4	Soft	< 5% Tr	ace	Shallow = 0 to $35$	degrees			Damp: $S = 26 \text{ to } 50\%$
11-30 31 EO	Compac	5-8 0.1F	Firm Stiff	5-15% L	ome	Dipping = $35$ to $55$	uegrees			Moist: $S = 51 \text{ to } 75\%$
>50	V. Dense	16-30	V. Stiff	> 30% V	Vith	Siech = 22 10 40 0	icyi ees			Saturated: S = 100%
		>30	Hard	- 5070 V		Boulders = diamete	er > 12 inches, C	obbles = diameter < 12 inche	es and > 3 inches	
						Gravel = < 3 inch a	and > No 4, Sand	$I = \langle No 4 and \rangle No 200, Silt$	/Clay = < No 200	

		$\sim$				S	OIL BORII	NG LOG	Boring #:	B-106
		SIINA	AAIT			Project:	Proposed Apart	ment Building	Project #:	15040
		CEOENCIPEE				Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	Co:	Great Works T	est Boring			Boring Elevation:		112.0 ft		
Driller:	01.00	Jeff Lee				Reference:	Site Survey by	Titcomb Associates	1/15/05:5	
Summit	Staff:	M. Hardison, E	l. I			Date started:	4/15/2015	Date Completed:	4/15/2015	
Dh	Trookod	METHOD	Longth.	SAMPLER		Data	Donth	ESTIMATED GROUND W		foronoo
Venicie: Model:	Mobile F	1	Lengin: Diamotor:	24 55	1	Date 4/15/2015	Depth	Elevation	None observed	erence
Method:	4" Cas	sed Wash	Hammer:	140 lb		4/13/2013			None observed	
Hammer	Style: I	R&C	Method:	ASTM D1586	)					
Depth							SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>	-	DESCRIPT	ION	Test Data	Stratum
						3" Pavement				PAVEMENT
1_						Augered to refus	al for Pock Core			0.25'
2						Augered to reluse				
-										
3_										
4						Dense drilling from	m approximatel	y 2' to 8', frequent		
-										
5										
,						4				
6_						-				
7										
-										
8						-				
9						-				
í –										
10		ROC	ck core da	TA						
11	RUN	DEPTH	RUN	RECOVERY	RQD	Madaratak	arad yory think	wannaad lainta warv		10.0'
- ''	C-2	10 10 15	60	66%	33%	hard light gray to	blue SCHIST	ly spaced joints, very	1	BEDROCK
12						nara ngitt gray to	5100 0011101			
						most fractures ra	nge from 45° to	vertical		
13						-			A	
14									M	
· · · -										
15										
14	C-3	15 to 19	48"	96%	65%	Same as above, r	nost joints and	fractures are vertical		
10										
17						-			~	
10									2	
18						-				
19						1				
-						End of Exploratio	n at 19.0', rock	core terminated		19.0'
20						4				
21						4				
l - '-	L					]				
22										
22						-				
23	-					1				
24						1				
						4				
25						4				
26						1				
-						]				
27						-				
Granula	ar Soils	Cohosive	Soils	% Compo	sition	NOTES	PP = Pocket Pop	etrometer MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft	Densitv	Blows/ft.	Consistency	ASTM D2	487		LL = Liquid Limit	, PI = Plastic Index	mont	Drv: $S = 0\%$
0-4	V. Loose	<2	V. soft			Bedrock Joints		,		Humid: $S = 1 \text{ to } 25\%$
5-10	Loose	2-4	Soft	< 5% Tr	ace	Shallow = 0 to $35 \circ$	degrees			Damp: S = 26 to 50%
11-30	Compact	5-8	Firm	5-15% L	ittle	Dipping = 35 to 55	degrees			Moist: S = 51 to 75%
31-50	Dense	9-15	Stiff	15-30% S	ome	Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	> 30% V	Vith					Saturated: S = 100%
1		>30	Hard			Boulders = diamete	er > 12 inches, C	obbles = diameter < 12 inche	es and > 3 inches	
		1		1		Gravel = < 3 inch a	and > No 4, Sand	$I = \langle No \ 4 \text{ and } \rangle No \ 200, \ Silt/$	/Clay = < No 200	1

	SUMMIX GEOENGINEERING SERVICES					S		NG LOG	Boring #:	B-107
		SIINA	INAN			Project:	Proposed Apart	ment Building	Project #:	15040
		SUIVI				Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	ING SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	co:	Great Works T	est Boring			Boring Elevation:		112.9 ft		
Driller:	a	Jeff Lee				Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	l. -			Date started:	4/15/2015	Date Completed:	4/15/2015	
DF	Track	METHOD	S.	AMPLER		Dete	Deville	ESTIMATED GROUND W		f
venicle:	Mobilo F	ı 2-53	Length: Diameter	24 55	חו	Date 4/15/2015	Depth	LIEVATION	None observed	ererence
Method.	4" Solid	Stem Auger	Hammer:	140 lb		TI 13/2013	-			
Hammer	Style: I	R&C	Method:	ASTM D15	86					
Depth							SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>	Ť	DESCRIPT	TION	Test Data	Stratum
1	6.1	0.4.1/	0.5.1.0.5	2		4" Pavement				PAVEMENT
'-	5-1	24/6	0.5 10 2.5	3 4		Dark brown Sand	IY SILL, trace As	sh and Brick Tragments,		0.3 FILI
2				4		10000, a. j.				
-				3		]				
3_						ł				
4						+				
						Į				
5	S_2	24/24	5 to 7	7		Olive green SILT	slight mottling	litte fine Sand trace		5 0' +/-
6	52	27/29	5.07	10		Gravel and Clay,	compact/very s	tiff, humid, ML		GLACIAL TILL
				14		1				
7_				14	-	+				
8						+				
-						1				
9_										0.0'/
10						Soft rock encount	tered during au	gering, drilled 1.5' into		WEATHERED ROCK
-						rock to hard refu	sal	5.5.		
11_						End of Exploratio	n at 10.5', Auge	er refusal		10.5'
12						ł				DEDRUCK
-						1				
13				-		+				
14						+				
						1				
15						+				
16						ł				
-						1				
17				-		+				
18						ł				
						1				
19						ł				
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25						ł				
26						İ				
						Į				
27						ł				
Granula	ar Soils	Cohesiv	ve Soils	% Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D	2487		LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft			Bedrock Joints				Humid: S = 1 to 25%
5-10	Loose	2-4	Soft	< 5% 1	race	Shallow = 0 to 35	degrees			Damp: S = 26 to 50%
11-30	Compac	5-8	Firm	5-15%	Little	Dipping = 35 to 55	degrees			Moist: $S = 51 \text{ to } 75\%$
31-50 >50	Vense V Dense	9-15 16-30	SUIT V Stiff	15-30%	SOME With	Sieep = 55 to 90 d	legrees			wet: $S = 76 \text{ to } 99\%$ Saturated: $S = 100\%$
230	. Dense	>30	Hard	- 3070		Boulders = diamete	er > 12 inches. C	obbles = diameter < 12 inche	es and > 3 inches	Saturateu. 5 - 10070
						Gravel = < 3 inch a	and > No 4, Sand	$I = \langle No 4 and \rangle No 200, Silt$	/Clay = < No 200	

		$\wedge$				S		NG LOG	Boring #:	B-108	
		SIINA	INAN			Project:	Proposed Apart	ment Building	Project #:	15040	
		SUIVI	IVIIA			Location:	665 Congress S	it.	Sheet:	1 of 1	
		GEOENGINEERI	ING SERVICES			City, State:	Portland, ME		Chkd by:		
Drilling C	co:	Great Works T	est Boring			Boring Elevation:		110.2 ft			
Driller:	01.00	Jeff Lee				Reference:	Site Survey by	Titcomb Associates	4/45/0045		
Summit	Staff:	M. Hardison, E	l.			Date started:	4/15/2015	Date Completed:	4/15/2015		
Ur	Trackor		J.	AIVIPLER		Data	Dopth	ESTIMATED GROUND W		foronco	
Model.	Mohile F	1 3-53	Length: Diameter	24 33 2"0D/1 5"	ID	4/15/2015	ererence				
Method:	4" Solid	Stem Auger	Hammer:	140 lb		4/13/2013			None observed		
Hammer	Style: I	R&C	Method:	ASTM D15	86						
Depth							Geological/	Geological			
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N <sub>60</sub>		DESCRIP	TION	Test Data	Stratum	
1	C 1	24/10		0		4" Pavement		t composy humid		PAVEMENT	
· -	5-1	24/10		8 9		SW-SM	e sand, iittie si	t, compacy, numid,		0.3	
2				8		large Brick fragm	ent and white A	SH	<b></b>	1.1' +/-	
2				3		+				<b>E</b> 111	
3_						+				FILL	
4						1					
- F						4					
5_	S-2	24/4		*50/6"		l ight brown Grav	elly SAND, cobb	ble piece in spoon tip.			
6		201		00/0		humid, SP		ie piece in spoon up,			
_						* high blow coun	t due to cobble	in fill			
/_						4					
8						1					
9_						End of Exploratio	n at 8.5', Auger	refusal		8.5' BEDROCK	
10						4				DEDITOOR	
11						+					
12						4					
-						1					
13						+					
14						4					
15						+					
16						4					
17				-		+					
18						4					
						1					
19						ł					
20				+		1					
l						1					
21						4					
22				1		1					
						]					
23						4					
24						1					
						1					
25						4					
26						1					
						]					
27						4					
Granular Soils Cohesive Soils % Composition					osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition	
Blows/ft. Density Blows/ft. Consistency ASTM D2487					2487		LL = Liquid Limit	, PI = Plastic Index		Dry: $S = 0\%$	
0-4	V. Loose <2 V. soft					Bedrock Joints				Humid: $S = 1$ to 25%	
5-10	Loose	2-4	Soft	< 5% 1	Trace	Shallow = 0 to 35 of	degrees			Damp: S = 26 to 50%	
11-30	Compac	5-8	Firm	5-15%	Little	Dipping = 35 to 55		Moist: $S = 51$ to 75%			
31-50	31-50 Dense 9-15 Stiff 15-30% Some 3					e Steep = 55 to 90 degrees				Wet: $S = 76 \text{ to } 99\%$	
>50 V. Dense 16-30 V. Stiff > 30% With > 30 Hard					VVILII	VITN Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches					
	>30 Hard						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 PRO	BE LOG	Boring #:	P-1
		SIINA	MAN				Project: Proposed Apartment Building			Project #: 15040	
		GEOENGINEED					Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES				City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Summit Geoen	gineering Ser	vices			Boring Elevation:		114.9 ft		
Driller:	Stoff.	C. Coolidge, P.	E.				Reference:	Site Survey by	Titcomb Associates	2/21/2015	
Summit			.l. c		ED		Date started:	3/31/2015			
Vehicle:	Tracked		Lenath:		LK		Date	Denth	ESTIMATED GROUND W		eference
Model:	AMS Pov	ver Probe	Diameter:	N/A			3/31/2015				elerence
Method:	2-1/2"	' H.S.A.	Hammer:	N/A							
Hammer	Style: A	Auto	Method:	N/A							
Depth			1					SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blov	vs/6"	N <sub>60</sub>		DESCRIP	TION	Test Data	Stratum
1				PR	OBF		2.5" of Pavement	t			PAVEMENT
- '-							1				FILL
2											
3							Dense drilling at	3' likely rubble			
							Dense unning at	s, intery rubble			
4							Auger advancem	ent produced no	o cuttings, large voids		
5				<u> </u>			apparent from ho	pie inspection, li	kely rubble fill		
- <sup></sup>				-			t				
6							]				
7							-				
· -							ł				
8											
0											
9-											9.0' +/-
10				Ň	/						WEATHERED ROCK
11							End of Probe at 1	10.0', Auger Ref	usal		10.0'
···-							•				DEDRUCK
12							1				
12											
13							•				
14							1				
15											
15											
16											
17											
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18							1				
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27							ł				
				L			<u> </u>				
Granula	ar Soils	Cohesiv	e Soils	%	Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	A	STM C	2487		LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft		. 50/ -	Frace	Bedrock Joints	dograa-			Humid: $S = 1$ to 25%
5-10 11-20	LOOSE	2-4 5.9	SOIT		5%	Little	Snallow = 0 to 35 Dipping = $25$ to $55$	uegrees degrees			Damp: $S = 26 \text{ to } 50\%$
31-50	Dense	9-15	Stiff	15	5-30%	Some	Steep = 55 to 90 c	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	>	· 30%	With					Saturated: S = 100%
		>30	Hard				Boulders = diameter	er > 12 inches, C	obbles = diameter < 12 inche	es and > 3 inches	
	>30 naru						$Gravel = \langle 3 \text{ inch and } > No 4$ , $Sand = \langle No 4 \text{ and } > No 200$ , $Silt/Clay = \langle No 200$				

								SOIL PRO	BE LOG	Boring #:	P-2
		SIINA	MAN				Project: Proposed Apartment Building			Project #: 15040	
		GEOENGINEED					Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES				City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Summit Geoen	gineering Ser	vices			Boring Elevation:	au 6	113.9 ft		
Driller:	Stoff.	C. Coolidge, P.	E.				Reference:	Site Survey by	Titcomb Associates	2/21/2015	
Summit			.l. c		ED		Date started:	3/31/2015			
Vehicle:	Tracked		Lenath:		LK		Date	Denth	ESTIMATED GROUND W		ference
Model:	AMS Pov	wer Probe	Diameter:	N/A			3/31/2015	Deptil	Elevation		
Method:	2-1/2"	' H.S.A.	Hammer:	N/A							
Hammer	Style: A	Auto	Method:	N/A							
Depth			1					SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blov	vs/6"	N <sub>60</sub>		DESCRIP	TION	Test Data	Stratum
1				PR	I ORF		2.5" of Pavement	t			PAVEMENT
· -							+				FILL
2							Auger cuttings: ta	an Sandy SILT,	some brick fragments,		
3							+				
°-							ł				
4							1				
5				<u> </u>			ł				
- J				L			t				
6						[	Į				
7				-			ł				
· -							ł				
8							1				
q							+				
· -											9.0' +/-
10				\ \	/						WEATHERED ROCK
11							End of Probe at 1	10.0', Auger refu	Isal		10.0' BEDROCK
···-							+				DEDITOOR
12							1				
13							+				
							+				
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27				<u> </u>			ł				
							1				
Granula	ar Soils	Cohesiv	e Soils	%	Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	A	STM C	2487	Podrock loint-	LL = Liquid Limit	, PI = Plastic Index		Dry: $S = 0\%$
0-4 5-10		<2 2-4	v. sort Soft		5%	Frace	$\frac{\text{Dedrock Joints}}{\text{Shallow} = 0 \text{ to } 35}$	dearees			Fumilia: $S = 1 \text{ to } 25\%$ Damp: $S = 26 \text{ to } 50\%$
11-30	Compact	5-8	Firm	5	-15%	Little	Dippina = $35$ to $55$	degrees			Moist: $S = 51 \text{ to } 75\%$
31-50	Dense	9-15	Stiff	15	5-30%	Some	Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	>	30%	With		-			Saturated: S = 100%
		>30	Hard				Boulders = diameter	er > 12 inches, C	obbles = diameter < 12 inche	s and > 3 inches	
							Gravel = $<$ 3 inch and $>$ No 4, Sand = $<$ No 4 and $>$ No 200, Silt/Clay = $<$ No 200				

								SOIL PRO	BE LOG	Boring #:	P-3
		SIINA	INAN				Project: Proposed Apartment Building			Project #:	15040
		GEOENCINEED					Location:	665 Congress S	it.	Sheet:	1 of 1
L		GEOENGINEERI	ING SERVICES				City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Summit Geoen	gineering Ser	vices			Boring Elevation:		112.8 ft		
Driller:	-toff	C. Coolidge, P.	E				Reference:	Site Survey by	Titcomb Associates	2/24/2045	
		wi. maruison, E	.1.		FD		Date started:	3/31/2015		3/31/2015	
Ur Vehicle:	Tracked		ک ۱ enath		∟r∖		Date	Denth	ESTIMATED GROUND W		ference
Model:	AMS Pou	wer Probe	Diameter:	N/A			3/31/2015	Deptil		KE	
Method:	2-1/2	' H.S.A.	Hammer:	N/A							
Hammer	Style: A	Auto	Method:	N/A			<u> </u>			<u> </u>	
Depth								SAMPL	E	Geological/	Geological
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blov	NS/6"	N <sub>60</sub>		DESCRIP	TION	Test Data	Stratum
1				PR	OBF		3.5" of Pavement	t			PAVEMENT 0.3'
· -							Dense drilling at	8", moved over	and started new hole		FILL
2_											
3							Auger cuttings: L	Dark tan SAND,	ittle Silt and Gravel		
°-							ł				
4							Į				
5				<u> </u>			ł				
- J				L			1				5.0' +/-
6						[	Auger cuttings: s	imilar to above,	little Clay		GLACIAL TILL
7				<u> </u>			ł				
í –				L			1				7.0' +/-
8				Ē			Augor	abt too fire of	ID (real durt)		WEATHERED ROCK
9							Auger cuttings: Ii	ight tan fine SAI	ND (rock dust)		
- ´-							+				
10				``	$\checkmark$				-1		
11							End of Probe at 9	9.9°, Auger refus	a		9.9" BEDROCK
··-							t				DEDITOOR
12							ļ				
13							ł				
							İ				
14							+				
15							ł				
-							1				
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25							1				
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27							1				
		0.1	Collin	~	0		NOTES				Call Matter of a little
Granula Blows /ft	Ir Soils	Cohesiv Blows /ft	Consistency	% ^	Comp	osition	NUTES:	PP = Pocket Pen	etrometer, MC = Moisture Co PL - Plastic Index	ntent	Soil Moisture Condition
0-4	V. Loose	<2	V. soft	A	JIVIL	/240/	Bedrock Joints	LL = LIQUIO LIMI	, FI = FIASUL HILLEX		Humid: $S = 1 \text{ to } 25\%$
5-10	Loose	2-4	Soft	<	< 5% -	Trace	Shallow = 0 to $35$	degrees			Damp: S = 26 to 50%
11-30	Compact	5-8	Firm	5	5-15%	Little	Dipping = 35 to 55	degrees			Moist: S = 51 to 75%
31-50	Dense	9-15	Stiff	15	5-30%	Some	Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	>	> 30%	With	D. LL.				Saturated: S = 100%
	>30 Hard						Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches Crawl = $< 3$ inche and > No 4 Sand = $< No 4$ and $> No 200 Sit/Clay = > No 200$				
1				1			Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200				

		$\wedge$						SOIL PROE	BE LOG	Boring #:	P-4
		SIINA	INANT				Project:	Proposed Apart	ment Building	Project #:	15040
		SUIVI	IVIII				Location:	665 Congress S	St.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES				City, State:	Portland, ME		Chkd by:	
Drilling (	Co:	Summit Geoen	gineering Ser	vices			Boring Elevation:		112.9 ft		
Driller:		C. Coolidge, P.	E.				Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.l.				Date started:	3/31/2015	Date Completed:	3/31/2015	
DF	RILLING	METHOD	S	AMPLE	R				ESTIMATED GROUND V	VATER DEPTH	
Vehicle:	Tracked		Length:	N/A			Date	Depth	Elevation	R	eference
Model:	AMS Pov	wer Probe	Diameter:	N/A			3/31/2015				
Method:	2-1/2"	' H.S.A.	Hammer:	N/A							
Hammer	Style: A	Auto	Method:	N/A							
Depth								Geological/	Geological		
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blow	s/6"	N <sub>60</sub>		DESCRIP	FION	Test Data	Stratum
1				PRC	DRF		3.5" of Pavement	I			PAVEMENT
'-							Auger refusal at 3	2' moved over a	and started new hole		0.3 FILL
2											
_							Encountered den	se drilling at 2'	again in second hole,		
3_							drilled past it. De	nse driilling eco	untered again at 4'.		
4					,		Likely rubble				
4-				v v			End of Probe at 4	1.0'. Auger refus	al		4.0'
5								,			RUBBLE
1 -							Į				
6							ł				
7							ł				
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8											
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10											
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27							ł				
L					_ †		<u>t                                     </u>				
Granula	ar Soils	Cohesiv	e Soils	%	Compo	sition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture C	ontent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	AS	STM D2	2487	ļ	LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft				Bedrock Joints				Humid: S = 1 to 25%
5-10	Loose	2-4	Soft	<	5% Tr	race	Shallow = 0 to $35$	degrees			Damp: S = 26 to 50%
11-30	Compact	5-8	Firm	5-	15% L	ittle	Dipping = 35 to 55	degrees			Moist: S = 51 to 75%
31-50	Dense	9-15	Stiff	15	30% S	Some	Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	>	30% V	Nith					Saturated: S = 100%
1	>30 Hard						Boulders = diamete	er > 12 inches, C	obbles = diameter < 12 inch	nes and > 3 inches	
				1			Gravei = < 3 inch	ano > No 4, Sano	a = < NO 4 and >No 200, Si	u/clay = < No 200	1

		$\wedge$					SOIL PROE	BE LOG	Boring #:	P-5
		SIIN	INAN			Project:	Proposed Apart	ment Building	Project #: 15040	
		GEOENGINEEDI				Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Summit Geoen	gineering Ser	vices		Boring Elevation:		112.3 ft		
Driller:	Staff.	C. Coolidge, P.	<u>E.</u>			Reference:	Site Survey by	Date Completed:	3/31/2015	
DF		METHOD	Si Si	AMPI FR		Date started.	3/31/2013	ESTIMATED GROUND W	ATER DEPTH	
Vehicle:	Tracked		Lenath:	N/A		Date	Depth	Elevation	Re	eference
Model:	AMS Pov	wer Probe	Diameter:	N/A		3/31/2015				
Method:	2-1/2"	' H.S.A.	Hammer:	N/A						
Hammer	Style: /	Auto	Method:	N/A						
Depth		D (D (I))			NI	+	SAMPL	E	Geological/	Geological
(11.)	NO.	Pen/Rec (In)	Depth (It)	DIOWS/6	IN <sub>60</sub>	3" of Pavement	DESCRIP	TON	Test Data	
1						Auger refusal at 9	9"', moved over	and started new hole,		0.3'
_				V		encounered same	e refusal. Likely	cobble		
2_						End of Probe at C	0.8°, Auger refus	al		0.8" COBBLE
3						ł				OODDEL
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4_						ł				
5						1				
,						ł				
°_						ł				
7						1				
8						+				
- <sup>0</sup>						+				
9						Į				
10						ł				
10_						+				
11						1				
12						+				
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13						Į				
14						ł				
						1				
15_						+				
16						ł				
-						1				
17						+				
18						ł				
10						Į				
19						ł				
20						1				
21	<u> </u>					ł				
<sup>21</sup> -						ł				
22						1				
23						ł				
2.5						1				
24						ļ				
25						ł				
l						1				
26	<u> </u>					ł				
27	<u> </u>					ł				
Granula	ar Soils	Cohesiv	e Soils	% Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ontent	Soil Moisture Condition
BIOWS/ft.	V Looso	BIOWS/ft.	Consistency	ASTMIC	2487	Bedrock loints	LL = LIQUID LIMIT	, PI = Plastic Index		Ury: $S = 0\%$ Humid: $S = 1 \text{ to } 25\%$
5-10	Loose	2-4	Soft	< 5%	Trace	Shallow = 0 to $35$	degrees			Damp: $S = 26$ to 50%
11-30	Compact	5-8	Firm	5-15%	Little	Dipping = 35 to 55	degrees			Moist: S = 51 to 75%
31-50	Dense	9-15	Stiff	15-30%	Some	Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	> 30%	With	Douldors	or . 10 last	abblaa diamatar 10 '	on and a Directory	Saturated: S = 100%
>30 Hard						Gravel = $< 3$ inch	t/Clay = < No 200			

		$\wedge$					SOIL PRO	BE LOG	Boring #:	P-6
		SIINA	INANT			Project:	Proposed Apar	tment Building	Project #:	15040
		SUIVI	IVIII			Location:	665 Congress S	St.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES			City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Summit Geoen	gineering Ser	vices		Boring Elevation:	:	112.3 ft		
Driller:		C. Coolidge, P.	E.			Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.l.			Date started:	3/31/2015	Date Completed:	3/31/2015	
DF	RILLING	METHOD	S	AMPLER				ESTIMATED GROUND W	ATER DEPTH	
Vehicle:	Tracked		Length:	N/A		Date	Depth	Elevation	Re	eference
Model:	AMS Pov	wer Probe	Diameter:	N/A		3/31/2015				
Method:	2-1/2"	' H.S.A.	Hammer:	N/A						
Hammer	Style: A	Auto	Method:	N/A				_		
Depth	NL		Divide (0)			4	SAMPL	E	Geological/	Geological
(ft.)	NO.	Pen/Rec (In)	Depth (ft)	DIOWS	6" N <sub>60</sub>	2 E" of Davomon	DESCRIP	TION	Test Data	SITALUM
1				PRUE		2.5 OF Paverneri	L			0.2'
-						1				FILL
2						Auger cuttings: E	Black Sandy SIL	T, frequent brick		
2						fragments, little (	Clay and black A	Ash		
3_						4				
4						1				
						]				
5_				V		End of Drobo at 1	5 O' Augor rof			5.0'
6						Tenu or Probe at s	J.J., Auger refus	Sai	1	BEDROCK
Ŭ ~						1			1	SEBROOK
7						1				
0						4				
8					-	4				
9						1				
-						1				
10						-				
11						-				
						1				
12						1				
10						4				
13						4				
14						1				
-						1				
15						1				
16						4				
10						1				
17						1				
10						4				
81						4				
19						1				
I -						]				
20						4				
21						4				
<b>_ _ _ _</b>						1			1	
22						]			1	
22						4				
23						4				
24						1				
						]				
25						4				
26						4				
						1				
27						]				
<u> </u>	- C - 11		Coll:	04.2		NOTEC				Call Matter of Call
Granula Blowc /ft	Doneity	Cohesiv Blows /ft	Consistence	% Co	mposition	NUTES:	PP = Pocket Pen	eurometer, MC = Moisture Co	mient	Soli Moisture Condition
DIOWS/TL	V Looso	DIOWS/TL.	V soft	ASI	IVI UZ487	Bedrock Joints	LL = LIQUIA LIMI	I, FI = Plastic Index		U(y): S = 0% Humid: S = 1 to 25%
5-10	LOOSE	2-4	Soft	< 5	% Trace	Shallow = 0 to 35	dearees			Damp: $S = 26 \text{ to } 50\%$
11-30	Compact	5-8	Firm	5-1	5% Little	Dipping = $35$ to $55$	5 degrees			Moist: $S = 51 \text{ to } 75\%$
31-50	Dense	9-15	Stiff	15-3	0% Some	Steep = $55$ to $90$ c	degrees			Wet: S = 76 to 99%
>50	V. Dense	16-30	V. Stiff	> 3	0% With		-			Saturated: S = 100%
1		>30	Hard			Boulders = diamet	er > 12 inches, C	obbles = diameter < 12 inch	es and > 3 inches	
1	>30 natu					Gravel = < 3 inch				

									BE LOG	Boring #:	P-101
		SIINA	MAN				Project:	Proposed Apart	ment Building	Project #:	15040
		GEOENGINEED					Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES				City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Great Works T	est Boring				Boring Elevation:		116.4 ft		
Driller:	Stoff.	Jeff Lee	1				Reference:	Site Survey by	Titcomb Associates	4/15/2015	
			.1.	ΔΜΡΙ	FR		Date started.	4/15/2015			
Vehicle:	Tracked		Lenath.				Date	Depth	Flevation	Re	ference
Model:	Mobile B	8-53	Diameter:	N/A			4/15/2015	-	Lioration	None observed	
Method	4" Solid	Stem Auger	Hammer:	N/A							
Hammer	Style: F	R&C	Method:	N/A							
Depth						N	+	SAMPL	Geological/	Geological	
(ft.)	NO.	Pen/Rec (in)	Depth (ft)	blov PR	NS/6" OBE	IN <sub>60</sub>	3" Pavement	DESCRIP	ION	Test Data	Stratum
1							5 Tavement				0.25' +/-
							Very difficult drilli	ng, frequent ru	bbe encountered, refusal		FILL
2_							encountered in fi	rst hole at 4.5',	moved over 1' to start		
3							new noie				
							Į				
4				-			ł				
5							1				
۷				$\vdash$			ł				
°-				<u> </u>			ł				
7							1				
8							+				
							+				
9								· — - ,— ,- — - —		L	
10							Smoother drilling	started around	9°, assumed transizion		9' +/- GLACIAL TILL
				\	/						
11							End of Probe at 1	0.8', Auger refu	isal		10.8' BEDROCK
12							ł				DEDROCK
10	-						1				
13_							-				
14							1				
15							ł				
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16							ł				
17							ł				
10	<u> </u>					[	Į				
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19							1				
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<u> </u>							1				
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23				-			ł				
24							1				
25	<u> </u>						ł				
							1				
26							ł				
27				L			İ				
							NOTES				
Granula Blowc /ft	ar Soils	Cohesiv Blows /ft	e Soils	%	Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
0-4	V. Loose	<2	V, soft	A	JIVIL	/240/	Bedrock Joints	LL = LIQUIO LIMIT	, FI = Plastic Index		Humid: $S = 1 \text{ to } 25\%$
5-10	0-4         V. LOOSE         <2         V. SOTT           5-10         Loose         2-4         Soft         < 5% Trace				Shallow = 0 to 35 degrees				Damp: $S = 26 \text{ to } 50\%$		
11-30	Compact	5-8	Firm	5	6-15%	Little	<ul> <li>Dipping = 35 to 55 degrees</li> </ul>				Moist: S = 51 to 75%
31-50 Dense 9-15 Stiff 15-30% Some S				Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%			
>50 V. Dense 16-30 V. Stiff > 30% With				Vith Saturated: S = 100%							
	>30 Hard						Gravel = < 3 inch a	and $> No 4$ , Sance	$I = \langle No \ 4 \ and \ \rangle No \ 200, \ Silt/$	Clay = < No 200	

	$\sim$							SOIL PROE	BE LOG	Boring #:	P-102	
		SIIN	INAN				Project:	Proposed Apart	ment Building	Project #:	15040	
		SUIVI					Location:	665 Congress S	St.	Sheet:	1 of 1	
		GEOENGINEERI	ING SERVICES				City, State:	Portland, ME		Chkd by:		
Drilling C	0:	Great Works T	est Boring				Boring Elevation:		111.9 ft			
Driller:		Jeff Lee					Reference:	Site Survey by	Titcomb Associates			
Summit S	Staff:	M. Hardison, E			_		Date started:	4/15/2015	Date Completed:	4/15/2015		
DF		METHOD	S.	AMPL	ER				ESTIMATED GROUND W	ATER DEPTH		
Vehicle:	Tracked		Length:	24" \$	SS	10	Date	ference				
Mothod	MODILE E	Stom Augor	Diameter:	2"0L	)/1.5 <sup>~</sup>	ID	4/15/2015	None observed				
Hammer	4 JUIU Style: F	Ren Auger	Method:			86						
Denth		luo	method.	71011	II D TO	00		SAMPI	F	Geological/	Geological	
(ft.)	No.	Pen/Rec (in)	Depth (ft)	blov	vs/6"	N <sub>60</sub>	1	DESCRIP	LON	Test Data	Stratum	
()				PR	OBE		3" Pavement				PAVEMENT	
1												
2							+					
2_							Smooth drilling th	nroughout fill la	ver (no rubble/cobbles)			
3							oniootir annig ti	li ougriout ini iu				
_												
4_							-					
5							-					
<b>–</b>							Increased resista	nce at 4.8, pote	ential till or soft rock			
6							Į					
7							ł					
'-							ł					
8												
0												
9_							ł					
10							ł					
_												
11_							+					
12					/		ł					
-					,		End of Probe at 1	2.1', Auger refu	isal		12.1'	
13							]				BEDROCK	
14												
14							1					
15							1					
11							-					
10							ł					
17							ł					
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27				<u> </u>			ł					
Granula	ar Soils	Cohesiv	ve Soils	%	Comn	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition	
Blows/ft.	Densitv	Blows/ft.	Consistency	,3 A	STM D	2487		LL = Liquid Limit	, PI = Plastic Index		Dry: $S = 0\%$	
0-4	V. Loose	<2	V. soft				Bedrock Joints				Humid: $S = 1 \text{ to } 25\%$	
5-10	Loose	2-4	Soft	<	< 5% ]	Frace	Shallow = 0 to 35	degrees			Damp: S = 26 to 50%	
11-30	Compact	5-8	Firm	5	-15%	Little	Dipping = 35 to 55	degrees			Moist: S = 51 to 75%	
31-50	Dense	9-15	Stiff	15	5-30%	Some	Steep = 55 to 90 d	legrees			Wet: S = 76 to 99%	
>50	V. Dense	16-30	V. Stiff	>	30%	With	L				Saturated: S = 100%	
>30 Hard				Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches								
I							Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200					

									BE LOG	Boring #:	P-103
		SIINA	INAN				Project:	Proposed Apart	ment Building	Project #:	15040
		SUN					Location:	665 Congress S	it.	Sheet:	1 of 1
		GEOENGINEERI	NG SERVICES				City, State:	Portland, ME		Chkd by:	
Drilling C	0:	Great Works T	est Boring				Boring Elevation:		112.3 ft		
Driller:		Jeff Lee					Reference:	Site Survey by	Titcomb Associates		
Summit	Staff:	M. Hardison, E	.1.				Date started:	4/15/2015	Date Completed:	4/15/2015	
DF		METHOD	S.	AMPLI	ER			-	ESTIMATED GROUND W	ATER DEPTH	
Vehicle:	Tracked		Length:	24" \$	SS	10	Date Depth Elevation Re				ference
Mothers'	Nobile B	5-53	Diameter:	2"00	<u>ו/1.5"</u> ש	ID	4/15/2015	-		None observed	
Hammor	4 SOIID	Ren Auger	Method:	140 I	וט 1_ח 1_	86					
Denth	June. P	100		LO III	טוס א	00		SUMDI	F	Geological/	Geological
(ft )	No	Pen/Rec (in)	Depth (ft)	blow	vs/6"	Neo	ł	DESCRIPT	. <u> </u>	Test Data	Stratum
			5 opti (it)	PR	OBE	00	4" Pavement	SCONT			PAVEMENT
1							l				0.3'
							ļ				
2							Relatively easy d	rilling no rubbo	(cohhles encountered		
3							inclutively easy u	ming, no rubbe			
-							1				
4							ļ				
5							ł				
- <sup>3</sup>				-	-		ł				
6							1				
							ļ				
- /				-			ł				
8							t				
-							1				
9							1				
10				$\vdash$	V		End of Probe at C	6'. Auger refus	al		9.6'
											BEDROCK
11							Į				
10							ł				
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26							ł				
27				1			ł				
							<u> </u>				
Granula	ar Soils	Cohesiv	e Soils	%	Comp	osition	NOTES:	PP = Pocket Pen	etrometer, MC = Moisture Co	ntent	Soil Moisture Condition
Blows/ft.	Density	Blows/ft.	Consistency	A	STM D	2487	4	LL = Liquid Limit	, PI = Plastic Index		Dry: S = 0%
0-4	V. Loose	<2	V. soft		<b>FO</b> · · ·	<b>-</b>	Bedrock Joints				Humid: $S = 1$ to 25%
5-10	Loose	2-4	Soft	<	5% <sup>-</sup>	race	Shallow = 0 to $35$	aegrees			Damp: $S = 26 \text{ to } 50\%$
11-30	Compact	5-8	Firm Stiff	15	-15%	Little	Dipping = $35 \text{ to } 55$	aegrees			Moist: $S = 51$ to 75%
>50	V Dense	9-15 16-30	SUII V Stiff	15	-30% 30%	With	Sieep = 55 10 90 0	iegi ees			saturated: S = 10 10 99%
> 30	•. Dense	>30	Hard		5070	vvitil	Boulders = diameter	er > 12 inches. C	obbles = diameter < 12 inche	s and > 3 inches	Saturateu. 5 - 10070
	>30 Hara						Gravel = $< 3$ inch and > No 4, Sand = $<$ No 4 and >No 200, Silt/Clay = $<$ No 200				