

## REPORT

20-0662 S

September 24, 2021

# Subsurface Explorations and Laboratory Testing Services

Overlook Circle Barrington, New Hampshire

Prepared For: Hoyle, Tanner & Associates, Inc. Attention: Heidi J. Marshall, PE 150 Dow Street Manchester, NH 03101

Prepared By: S. W. Cole Engineering, Inc. 10 Centre Road Somersworth, NH 03878 T: (603) 692-0088

www.swcole.com | info@swcole.com

Geotechnical Engineering | Construction Materials Testing | Special Inspections

### TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 Scope and Purpose	1
1.2 Site and Proposed Construction	1
2.0 EXPLORATION AND TESTING	2
2.1 Explorations2	2
2.2 Field Testing2	2
2.3 Laboratory Testing2	2
3.0 SUBSURFACE CONDITIONS	3
3.1 Pavement	3
3.2 Base and Subbase	4
3.3 Groundwater	4
4.0 EVALUATION	5
4.1 Summary	5
4.2 Clarifications	5
4.3 Additional Testing6	3
5.0 CLOSURE	3

Appendix A	Limitations
Appendix B	Figures
Appendix C	Exploration Logs & Key
Appendix D	Laboratory Test Results

www.swcole.com



20-0662 S

September 24, 2021

Hoyle, Tanner & Associates, Inc. Attention: Heidi J. Marshall, PE 150 Dow Street Manchester, NH 03101

Subject: Subsurface Explorations and Laboratory Testing Services Overlook Circle Barrington, New Hampshire

Dear Heidi:

In accordance with our Proposal, dated July 12, 2021, we have performed subsurface explorations and performed laboratory testing for the subject project. This report summarizes our findings and its contents are subject to the limitations set forth in Appendix A.

### **1.0 INTRODUCTION**

### 1.1 Scope and Purpose

The purpose of our services was to explore subsurface conditions at the site, provide laboratory testing and compare the findings to the approved construction plans. Our scope of services included 8 test boring explorations, soils laboratory testing, comparison of findings to the approved plans, and preparation of this report.

### 1.2 Site and Proposed Construction

We understand Overlook Circle was constructed and paved in late 2019. The roadway is about 3,000 feet long. The roadway was constructed by a private developer and the Town of Barrington is now being requested to take possession and maintenance responsibility for the road. According to Hoyle, Tanner & Associates, Inc. (HTA) the pavement section shown on the approved plans consists of 1" asphalt wearing course, 2" asphalt binder course, 6" of NHDOT 304.3 Crushed Gravel, and 12" NHDOT 302.4 Bank Run Gravel. We



understand that the wearing course pavement was placed in late Fall and there was an agreement to increase the wearing course to 1.5".

It is our understanding the Town Is looking to determine if the existing pavement section complies with the approved plans. Further, we understand there is a question of if the aggregate base course was a "crushed" product per NHDOT 304.3.

The road configuration is shown on the "Exploration Location Plan" attached in Appendix B.

### 2.0 EXPLORATION AND TESTING

#### 2.1 Explorations

Eight test borings (B-1 through B-8) were made at the site on August 13, 2021 by S. W. Cole Engineering, Inc. (S.W.COLE). The exploration locations were selected by S.W.COLE and the Town of Barrington Highway Department and established in the field by S.W.COLE using taped measurements with the intersection of Overlook Circle and Boulder Drive established as Station 0+00 progressing around the circle clockwise with stationing. The approximate exploration locations are shown on the "Exploration Location Plan" attached in Appendix B. Logs of the explorations and a key to the notes and symbols used on the logs are attached in Appendix C.

### 2.2 Field Testing

The test borings were made using a portable electric core drill with a 6-inch diameter core barrel to penetrate the pavement and hand excavation tools to extract the base and subbase soils. Bulk samples of the base and subbase (where encountered) were collected, labeled, and returned to our laboratory. The pavement cores were collected, labeled and returned to our laboratory.

#### 2.3 Laboratory Testing

Laboratory testing included gradation testing (ASTM C-117 / C-136) on 4 select samples of base material and 4 select samples of subbase material. Laboratory testing included Bulk Specific Gravity (AASHTOT 166) on 4 pavement cores of the wearing course and 4 pavement cores of the binder course. Theoretical Maximum Specific



Gravity (AASHTO T 209) was performed on one sample of the wearing course pavement and one sample of the binder course pavement.

Laboratory results are presented in Appendix D.

### 3.0 SUBSURFACE CONDITIONS

#### 3.1 Pavement

The pavement obtained at the core locations was measured as follows:

Boring	Wearing Course Thickness (in)	Targeted Wearing Course Thickness <sup>1</sup> (in)	Binder Course Thickness (in)	Specified Binder Course Thickness (in)	Total Thickness (in)	Specified Total Thickness (in)
B-1	2	1.5	1.25	2	3.25	3.5
B-2	1.125	1.5	1.5	2	2.625	3.5
B-3	1.25	1.5	1.75	2	3	3.5
B-4	1.875	1.5	1.75 – 2	2	3.625 - 3.875	3.5
B-5	1	1.5	1.75	2	2.75	3.5
B-6	1	1.5	1.5 – 2	2	2.5 – 3	3.5
B-7	1.25	1.5	2	2	3.25	3.5
B-8	1.25	1.5	2	2	3.25	3.5

**Bold** denotes the result is less than the required specification.

<sup>1</sup> Design Specified Wearing Course Thickness is 1 inch, however given the late time of year the wearing course pavement was placed (as low as 40 degree surface temperature), we understand the agreement was to increase the thickness to 1.5 inches.

Bulk Specific Gravity testing indicates the in-situ density of samples of wearing course from B-2, B-4, B-6, and B-8 result in 87.7, 90.9, 91.0, and 93.0 percent of the Theoretical Maximum Specific Gravity, respectively.



Bulk Specific Gravity testing indicates the in-situ density of samples of binder course from B-2, B-4, B-6, and B-8 result in 92.3, 90.7, 90.6, and 93.4 percent of the Theoretical Maximum Specific Gravity, respectively.

Although no compaction percentage was specified a typical industry standard is to achieve greater than 92 percent of the Theoretical Maximum Specific Gravity.

#### 3.2 Base and Subbase

The base material varied in thickness from 6.75 to 18 inches of 1.5-inch minus bank run gravel. The material consisted of sand and gravel with trace silt. Gradation testing on samples from explorations B-1, B-3, B-5, and B-7 when compared to NHDOT 304.3 Crushed Gravel did not meet the specification on the No. 4 sieve for each sample and did not meet the specification on the 1" sieve for 3 of the 4 samples. The results indicate the material is finer than the specified product. Further, based on observations the material was not a crushed product as required by the specification.

The subbase material appeared very similar in composition to the base with the exception that the maximum particle size increased to about 5 inches. The material consisted of bank run sand and gravel with trace silt. The subbase was not specifically encountered in explorations B-4, B-5 and B-8 where the base material was observed to continue deeper. Where encountered the subbase varied in thickness from 6 to 11 inches. Explorations B-2 and B-3 were terminated on a refusal (cobble) within the subbase at depths of 1.6 and 1.3 feet, respectively. Exploration B-4 was terminated on a refusal (cobble) at a depth of 1.3 feet which was inferred as the top of the subbase layer. Gradation testing on samples from explorations B-1, B-2, B-6, and B-7 when compared to NHDOT 304.2 Gravel meet the specification.

#### 3.3 Groundwater

No free water or evidence of groundwater was observed within the depth explored at the explorations. Groundwater and surface water conditions can change in response to seasonal conditions.



### 4.0 EVALUATION

#### 4.1 Summary

Based on our observations, explorations, and laboratory testing, the following is a summary of our services compared to the approved plans:

- The pavement layer (wearing and binder) thickness and total pavement thickness at the boring locations is thinner than the specified thickness at 6 or more of the 8 locations.
- The base material thickness exceeds the minimum requirement of 6 inches as outlined in the approved project plans, thus meets the requirement.
- The base material consists of a bank run product and is not a crushed material as required by the approved plans.
- The base material does not meet the gradation specification for NHDOT 304.3 as required by the approved plans.
- The combined base and subbase material thickness, where refusal was not met, exceeds the minimum requirement of 18 inches as outlined in the approved project plans, thus in our opinion meets the requirement.
- The subbase material meets the gradation specification for NHDOT 304.2 as required by the approved plans.

### 4.2 Clarifications

It must be understood that minimum sample sizes as required by ASTM for gradation testing could not be obtained within the explorations due to the size of the pavement penetration. Proper sample size would require a larger, more intrusive pavement penetration. The implication of small sample size can impact materials with large maximum particle size, such as in the subbase. The presence or lack of larger rock particles obtained with small samples can render the sample unrepresentative of the



overall product, resulting in a gradation that does not accurately represent the overall material.

### 4.3 Additional Testing

Additional gravel and pavement samples obtained from the explorations are stored in our facility. Additional testing can be performed on the stored samples upon request.

### 5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. Please contact us if you have any questions relative to our findings

Sincerely,

### $S_{n}W$ . Cole Engineering, Inc.

Chad B. Michaud, P.E. Principal Geotechnical Engineer

CBM:rec



APPENDIX B

Figures



LEGEND:

APPROXIMATE BORING LOCATION

## NOTES:

Job No.:

Date :

20-0662

09/01/2021

- 1. EXPLORATION LOCATION PLAN WAS PREPARED FROM IMAGERY PROVIDED BY MICROSOFT AND AUTODESK.
- 2. THE BORINGS WERE LOCATED IN THE FIELD BY MEASUREMENTS FROM EXISTING SITE FEATURES.
- 3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
- 4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.





Scale: 1" = 100'

Sheet: 1

### APPENDIX C

Exploration Logs and Key

		S		CC	DLE g,ing		LIENT: <u>Hoy</u> ROJECT: <u>0</u> OCATION: _,	le, Ta veric Bari	BORING LOG anner & Associates, Inc. ok Circle rington, NH	BORING SHEET: PROJECT DATE ST DATE FIN	NO.:   NO ART:   SH:	<b>B-1</b> 1 of 1 20-0662 8/13/2021 8/13/2021
Drillin Locat Drilli Rig Ty Hamm Hamm Wate	ng Info 110N: NG CO.: 7PE: ER TYP ER EFFI R LEVEL	Eee Exp S. V S. V E: CIENC . DEPT	DI Dioration I V. Cole Er A Y FACTO 'HS (ft):	Location Pla	n E Inc. C P F F	Elevatio Driller: Auger ID IAMMER IAMMER	DN (FT): Chad Michar D/OD: WEIGHT (Ibs) DROP (inch):	ud I/A :N/A	TOTAL DEPTH (FT):         1.8         L           DRILLING METHOD:         Core Drill / H           SAMPLER:	OGGED BY: land Sampler ORE BARRE	<u>Chad I</u>	<u>Vichaud</u>
GENEI KEY TC AND S	RAL NOT NOTES (MBOLS:	ES: ⊻ At ⊻ At ⊻ At ⊻ Af	er <u>Level</u> time of Dri Completio ter Drilling	lling n of Drilling	D = Split S U = Thin W R = Rock ( V = Field \	poon Sam Valled Tub Core Samp /ane Shea	pple Pen. = e Sample Rec. = ble bpf = r mpf =	= Pen = Rec Blows Minu	etration Length         WOR = Weight of Rods $S_v = Fi$ overy Length         WOH = Weight of Hammer $q_u = U_i$ $s_i$ per Foot         RQD = Rock Quality Designation         Ø = Fri           te per Foot         PID = Photoionization Detector         N/A = I	eld Vane Shea nconfined Com ction Angle (Es Not Applicable	r Strength pressive S stimated)	, kips/sq.ft. Strength, kips/sq.ft.
Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	Sample No.	SAMPL	E INFOF Pen./ Rec. (in)	RMATIO Blow Count or BOD	N Field / Lab Test Data	Graphic Log	Sample Description & Classification	H <sub>2</sub> 0 Depth	F	Remarks
	_								2" Wearing Course Pavement     1.25" Binder Course Pavement     1.25" Binder Course Pavement     9.75" of 1.5-inch minus Bank Run Gravel     (SAND and GRAVEL trace silt - Base)     1.1     8" of 5-inch minus Bank Run Gravel (SAN     and GRAVEL trace silt - Subbase)			
									-1.8 Bottom of Exploration at 1.75 feet			
Stratific boundar be grad made a Fluctuat other fa measur	ation lines y betwee ual. Wate t times an ions of gr ctors than ements w	represent n soil ty r level re d under oundwa those p ere mad	ent approxi pes, transit eadings hay conditions ter may oc present at the	mate ions may ve been stated. cur due to ne time						BORING	NO.:	B-1

											BORIN	NG LOG	E	BORING I SHEET:	NO.: _	<b>B-2</b>
	$' \equiv$		S	$\lambda$	(			CL	LIENT: Hoy	le, Ta	anner & Asso	ociates, Inc.	F	PROJECT	NO.	20-0662
		7						- PF	ROJECT: 0	verlo	ok Circle		I	DATE ST	ART:	8/13/2021
			EN	GIN	ΕE	KIN	G, INC		DCATION: _,	Barr	rington, NH		[	DATE FIN	IISH:	8/13/2021
	Drillin Locat DRILLI	i <b>g Info</b> 10N: _ <u>§</u> NG CO.:	r <b>matio</b> See Exp : _S. V	on oloration V. Cole E	Loca	ition Pla eering,	in E Inc. D	LEVATIO	N (FT):N/A Chad Micha	ud		TOTAL DEPTH (FT): 1.6 DRILLING METHOD: Core D	LOG Drill / Han	GED BY: d Sampler	Chad	Michaud
Ľ	RIG TY		E. N/	^			A		/OD: <u>N/A / N</u>	1/A	/^		005			
Ľ		ER I TP FR FFF		A X FACTO	∩R∙		H		DROP (inch)	: <u>IN/</u> N/A	<u>A</u>	CASING ID/OD: N/A/N/A	04	KE BARRE	L:	
1	VATE	RLEVE	DEPT	HS (ft):						,/	. <u> </u>					
-	GENEF	RAL NO	TES:													
	KEY TC AND SY	NOTES MBOLS:	<u>Wate</u> ⊻ At ⊻ At ⊻ Af	e <u>r Level</u> time of Dr Completic ter Drilling	illing on of [	Drilling	D = Split S U = Thin W R = Rock 0 V = Field V	poon Samp alled Tube Core Sampl ane Shear	ble Pen. Sample Rec. le bpf = mpf =	= Pen = Rec Blows Minu	etration Length overy Length s per Foot te per Foot	WOR = Weight of Rods WOH = Weight of Hammer RQD = Rock Quality Designation PID = Photoionization Detector	$S_v = Field$ $q_U = Uncolor \emptyset = Frictionnoise N/A = Not$	Vane Shear nfined Com on Angle (Es Applicable	r Strengtl pressive stimated)	n, kips/sq.ft. Strength, kips/sq.ft
					S	SAMPL	E INFOF	RMATION	N	g						
	Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Lo		Sample Description & Classification		H <sub>2</sub> 0 Depth		Remarks
											1.12	5" Wearing Course Pavement		_		
L											0.1 1.5"	Binder Course Pavement				
											0.2 9" of (SAN	1.5-inch minus Bank Run Grav	el e)			
											, ,		,			
		-									1.0 7" of	5-inch minus Bank Run Gravel	(SAND	_		
											and	GRAVEL trace silt - Subbase)	(0,			
											1.6	Refusal at 1.6 feet				
												refusal on cobble				
	Stratifica oundar oe gradu	ation lines y betwee ıal. Wate	s repres n soil ty r level re	ent approx pes, transi eadings ha	imate tions we be	e may een										
	nade at luctuat	times an	d under oundwa	conditions	s state ccur d	ed. lue to										
	other fac neasure	tors than ements w	those pere mad	bresent at l de.	the tin	ne							E	BORING	NO.:	B-2

											BORI	NG LOG	BORING	NO.:	<b>B-3</b>
	Æ		S	X/	1	$^{\frown}$	) F	- c	LIENT: Hoy	le, Ta	anner & Ass	ociates, Inc.	PROJEC	T NO.	20-0662
Difficient         District         District         District         District           Difficient         See Explanation location Plan         ELEXATION (FT): NA         TOTAL DEPTH (FT):		フ	EN	GIN	ΕE	ERIN	G,IN(	- P		verlo			DATE ST	ART: _	8/13/2021
Drilling information         ELEVATION (PT):         NA         TOTAL DEPTH (PT):         1									OCATION,	Dall				чэп	0/13/2021
RG TYPE:	Drillii Loca <sup>-</sup> Drill	ng Infoi TION: ING CO.:	See Exp S. V	oloration /. Cole E	Loc Engi	cation Pla neering,	in E Inc. E	ELEVATIO DRILLER:	<b>DN (FT):</b> N/A :Chad Micha	۸ ud		TOTAL DEPTH (FT): <u>1.4</u> L DRILLING METHOD: <u>Core Drill / H</u>	OGGED BY: land Sample	Chad r	Michaud
NAMER EFFICIENCY FACTOR:         HAMMER DROP (Inch):         NA           CENERAL NOTE:	RIG T	YPE: IFR TYP	F· N/	Δ			/ _	AUGER IE	D/OD: <u>N/A / N</u> WEIGHT (lbs)	<u>I/A</u> • N/	/A	SAMPLER: CASING ID/OD: N/A /N/A C		=1 ·	
WATER LEVEL DEPTIS (tr):           DENRAL MOTES:           TOTORTS:         Value Lating           D'I TOUTS:         Value Lating	HAMM	IER EFFI	CIENC	Y FACT	OR:		i	AMMER	DROP (inch):	N/A	A			- <b>-</b>	
Control Line:       Display Line and Unity of the Scool Sample up to The American Scoo			DEPT	'HS (ft):											
Abd SWBCS:       2: At time of Duling, the multivale status sample file: = Record Legal       WOH = Weight of Hammer, the multivale and the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the multivale of the sample file: = Record Legal       the sample file: = Record Legal <td>KEYT</td> <td>O NOTES</td> <td><u>Wate</u></td> <td>er Level</td> <td></td> <td></td> <td>D = Split S</td> <td>Spoon Sam</td> <td>ple Pen.:</td> <td>= Pen</td> <td>etration Length</td> <td>WOR = Weight of Rods <math>S_v = Fie</math></td> <td>eld Vane Shea</td> <td>ar Strength</td> <td>n, kips/sq.ft.</td>	KEYT	O NOTES	<u>Wate</u>	er Level			D = Split S	Spoon Sam	ple Pen.:	= Pen	etration Length	WOR = Weight of Rods $S_v = Fie$	eld Vane Shea	ar Strength	n, kips/sq.ft.
Eler.         Dept         Careto (h)         Sample (h)         Sample (h)         Sample (h)         Base (h)         Remarks           I	AND S	YMBOLS:	∑ At ∑ At ∑ Af	time of D Completion ter Drilling	rillin on o J	g f Drilling	U = Thin V R = Rock V = Field V	Valled Tub Core Samµ √ane Shea	e Sample Rec. = ple bpf = r mpf =	= Rec Blows Minu	overy Length s per Foot te per Foot	$      WOH = Weight of Hammer \qquad q_u = Ur \\ RQD = Rock Quality Designation \qquad \not \emptyset = Fri \\ PID = Photoionization Detector \qquad N/A = I $	nconfined Con ction Angle (E Not Applicable	pressive stimated)	Strength, kips/sq.ft.
Etw.       Depth       Sample       Sample       Hold       Hold       Field / Lab       Description & Cassification       Hold       Hold<						SAMPL	E INFO	RMATIO	N	_ bo		- ·			
Statilization fines represent approximate production fines reproduction fines production fines represent approximate p	Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic L		Sample Description & Classification	H₂0 Depth		Remarks
Statilization lines represent approximate backadory obviewen solity (vise, finalitions may be gradual. Water interling the solity of the so					Π						1.25	" Wearing Course Pavement			
Statilization lines represent approximate boundary between oil (yrse, finallines may be gradual. Water finally be weet finally and statilization in the server of the finally be weet finally and statilization in the server of the finally be weet finally and statilization in the server of the finally be weet finally be weet finally be weet finally and statilization in the server of the finally be weet finally be weet finally be weet finally be weet finally be weet finally be weet finally be server of the finally be weet finally be weet finally be weet finally be weet finally be server of the finally be server finally be weet finally be server of the finally be server finally be weet finally be server of the finally be server finally be server of the finally be server of the finally be server finally be server of the finally be server of the finally be server finally be server of the finally be server of the finally be server finally be server of the finally be server of the finally be server finally be server of the finally be server of the											0.1 1.75	" Binder Course Pavement			
Extended on lines represent approximate         Boundows of groundwater may cool due to gradual. Water frequency is and in the represent approximate in the reset of the											0.3 8" o (SAI	f 1.5-inch minus Bank Run Gravel ND and GRAVEL trace silt - Base)			
Entification lines represent approximate biordary between sol types, familions may be gradual. Water biorder biorder in the service of the											,	,			
Statification lines represent approximate bordary between sol types, franctions margh log dadu. Wath how fragering that the fragering of the frag															
Statification lines represent approximate       Boundary tetween soil types, transitions may be gradual. Water level represent approximate       Boundary tetween soil types, transitions may be gradual. Water level represent approximate       Boundary tetween soil types, transitions may be gradual. Water level represent approximate       Boundary tetween soil types, transitions may be gradual. Water level level tetwee terms															
Stratification lines represent approximate boundary tervises and upper conflictors may how a times and upper conflictors may how a times and upper conflictors may											0.9 6" 0	f E inch minus Bank Bun Croual (SAN			
Stratification lines represent approximate       begins public to the second state of public to the second state of public to the factors from the second state of public to the		-									and	GRAVEL trace silt - Subbase)			
Statification lines represent approximate bondary it ween sad types, transitions may bondary it ween sad types,															
Statication lines represent approximate refusal on cobbie															
Statication lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur use to		I					I	1				Refusal at 1.4 feet	I		
Straffication lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factos than these greener at the time.															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time BORING NO: B-3															
Statification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions states Pruduations of groundwater may occur due to other factors than those present at the time time to the time time time to the time time time time time time time tim															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Vater level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time BORING NO.: R-3															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water revel readings have been made at times and unvelocity of a strategy court due to drive factors than those promit at the time															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were mode.															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time massic measurements were made															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measuremets were made.															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time massurements were made															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time massurements were made															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time massurements were made															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time massurements were made															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made															
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time massurements were made															
be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made	Stratific	ation lines	repres	ent approx	kima	te									
Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made <b>BORING NO.: R_3</b>	be grad made a	i y betwee lual. Wate it times an	n soll ty r level re d under	pes, trans eadings ha condition	ave l s st	s may been ated.									
	Fluctua other fa	tions of gr ictors than	oundwa those p	ter may o present at	ccur the t	due to time							BORING	NO.:	B-3

	F		C	W/	C								B(	ORING N HEET:	0.:	<b>B-4</b>
	t	フ	D EN	.W.	E E.R		G.INC			e, la verlo	ok Circle	DCIATES, INC.	Pf	ATE STA	NU	20-0662 8/13/2021
	Drillin	a Info	rmatio				G, 114 C		DCATION: _,	Barr	ington, NH		D/	ATE FINI	SH:	8/13/2021
-	LOCAT DRILLI RIG TY HAMM HAMM	10N: NG CO.; 'PE: ER TYP ER EFF	E: <u>N/</u>	A Y FACTO	Location nginee DR:	on Pla ering, I	n E Inc. D A 	ilevatic Riller: Uger ID Iammer Iammer	DN (FT):	id /A 	A	TOTAL DEPTH (FT): 1.3 DRILLING METHOD: Core D SAMPLER: CASING ID/OD: N/A /N/A	LOGO rill / Hand CORE	SED BY: Sampler	<u>Chad I</u>	Michaud
	GENER KEY TO AND SY	RAL NO NOTES (MBOLS:	TES: ⊻ At ▼ At	time of Dri Completio	illing n of Dr	illing	D = Split S U = Thin W R = Rock C	poon Sam alled Tube Core Samp	ple Pen. = e Sample Rec. = le bpf = f	Pen Rec Blows	etration Length overy Length per Foot	WOR = Weight of Rods WOH = Weight of Hammer ROD = Rock Quality Designation	$S_v = Field V_{q_U} = Unconf$ $\emptyset = Friction$	ane Shear S ined Comp Angle (Esti	Strength ressive \$ mated)	, kips/sq.ft. Strength, kips/sq.ft.
┢			⊥¥ Ar		S				mpr =		te per Foot	PID = Photoionization Detector	N/A = NOT A	ppiicable		
	Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	Sample No.	D D	epth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Log		Sample Description & Classification		H <sub>2</sub> 0 Depth	F	Remarks
ľ											1.87	5" Wearing Course Pavement				
											0.2 varia Pave 0.3 12"	able thickness - 1.75 - 2" Binder ( ement of 1.5-inch minus Bank Run Grav				
											(SAI	ND and GRAVEL trace silt - Base	e)			
		_														
┢											1.3	Refusal at 1.3 feet		_		
												refusal on coddle				
17/																
7.2000-02																
v WELL v	Stratifica boundar be gradu made at	ation lines y betwee ual. Wate	s represent n soil ty r level re	ent approxi pes, transit eadings ha conditions	mate tions m ve beel stated	iay n I.										
	Fluctuat other fac measure	ions of gr ctors than ements w	oundwa those p ere mad	ter may oc present at t le.	cur due	e to e							В	oring N	0.:	B-4

		S	\λ/	(	$\sim$	)I.F	С	LIENT: Hoy	le, Ta	BORING	LOG s, Inc.	B S P	ORING N HEET: ROJECT	NO	<b>B-5</b> 1 of 1 20-0662
	フ	EN	GINI	ΞE	RIN	G, I N C		ROJECT: <u>0</u> OCATION:	verlo Barr	ok Circle inaton. NH		D.	ATE STA ATE FIN	ART:  SH:	8/13/2021 8/13/2021
Drillin LOCA DRILL RIG T HAMM HAMM WATE	ng Infoi TION: <u>S</u> ING CO.: (PE: IER TYPI IER EFFI R LEVEL	matic           See Exp           S. W           S. W           See Exp           S. W           See Exp           See Exp	DIDIDIDIDIDIDIDIDIDIDIDIDIDIDIDIDIDIDI	Loca	ition Pla eering, l	n E Inc. D A H H	LEVATIC RILLER: UGER ID AMMER AMMER	DN (FT):	ud I/A : <u>N/</u> N/A	TOT. DRIL SAM A CAS	AL DEPTH (FT): <u>1.1</u> LING METHOD: <u>Core</u> IPLER: ING ID/OD: <u>N/A /N/A</u>	LOGO Drill / Hand CORE	GED BY: Sampler		/lichaud
KEY TO AND S	D NOTES YMBOLS:	<u>Wate</u> ⊈ At ⊈ At ⊈ Af	e <u>r Level</u> time of Dr Completic ter Drilling	illing on of I	Drilling	D = Split Sj U = Thin W R = Rock C V = Field V	ooon Sam alled Tube ore Samp ane Shear	ple Pen. = e Sample Rec. = ele bpf = r mpf =	= Pene = Reco Blows Minu	etration Length WO overy Length WO per Foot RQI e per Foot PID	R = Weight of Rods H = Weight of Hammer D = Rock Quality Designation = Photoionization Detector	$S_v = Field V$ $q_U = Unconf$ Ø = Friction N/A = Not A	ane Shear fined Comp Angle (Est opplicable	Strength ressive S imated)	kips/sq.ft. trength, kips/sq.ft.
				;	SAMPL	E INFOR	MATIO	N	-og		Quarter				
Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic L		Sample Description & Classification		H₂0 Depth	F	Remarks
										0.1 1" Wearing	g Course Pavement		-		
										0.2 10.25" of (SAND an	I.5-inch minus Bank Run d GRAVEL trace silt - Ba	Gravel se)			
	_									1.1	Defued at 4.4 feet				
Stratific	ation lines	r repress	ent approx	imate	may						Refusal at 1.1 feet refusal on cobble				
bounda be grad made a Fluctua other fa measur	ual. Water t times an tions of gr ctors than rements w	those pere mac	ees, transi eadings ha conditions ter may oc present at t le.	tive be s state cur d the tin	een ed. lue to ne							В	ORING N	0.:	B-5

		C	XX)						BORIN	IG LOG	B Si	ORING N HEET:	0.:	<b>B-6</b> 1 of 1
	=	5	.W	.C	JLi		<b>CLIENT</b> : <u>Hoy</u> PROJECT: O	le, Ta verlo	anner & Asso ok Circle	ociates, Inc.	Pi	ROJECT	NO	20-0662 8/13/2021
		EN	GINI	EERI	NG,IN	C.		Barı	rington, NH		D	ATE FIN	SH:	8/13/2021
Drillin LOCA DRILL RIG T HAMW HAMW WATE	ng Info TION: <u></u> ING CO. YPE: IER TYP IER EFFI R LEVEI	rmatic See Exp :S. V E:N/A CIENC _ DEPT	DI Dioration V. Cole E A X FACTO	Location ingineeri	I Plan ng, Inc	elevati Driller Auger I Hammef Hammef	ION (FT):// R:Chad Micha D/OD://A / N R WEIGHT (Ibs) R DROP (inch):	4 ud 1/A : 	/A	TOTAL DEPTH (FT): <u>1.8</u> DRILLING METHOD: <u>Core D</u> SAMPLER: <u>CASING ID/OD: N/A /N/A</u>	_ LOGO rill / Hand _ CORE	GED BY: Sampler	<u>Chad N</u>	Michaud
KEY TO AND S	D NOTES YMBOLS:	<u>Wate</u> ⊻ At ¥ At ¥ Af	er <u>Level</u> time of Dr Completic ter Drilling	illing on of Drilli	D = Split U = Thin ng R = Rock V = Field	Spoon Sar Walled Tub Core Sam Vane Shea	mple Pen. be Sample Rec. pple bpf = ar mpf =	= Pen = Rec Blows Minu	etration Length overy Length s per Foot te per Foot	WOR = Weight of Rods     S       WOH = Weight of Hammer     RQD = Rock Quality Designation       PID = Photoionization Detector     I	S <sub>v</sub> = Field V q <sub>u</sub> = Unconf Ø = Friction N/A = Not A	ane Shear fined Comp Angle (Esti Applicable	Strength ressive S imated)	, kips/sq.ft. Strength, kips/sq.ft.
<u> </u>				SAN	APLE INFC	RMATIC	ON	0						
Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	Sample No.	ed Der ⊢ (fi	oth ) Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Lo		Sample Description & Classification		H₂0 Depth	F	Remarks
									0.1 1" W varia 0.2 Pave	earing Course Pavement ble thickness 1.5 - 2" Binder Co ment	urse	- ,		
									7" of (SAN	1.5-inch minus Bank Run Grave ID and GRAVEL trace silt - Base	el >)			
	-								0.8 11" c and (	f 5-inch minus Bank Run Grave GRAVEL trace silt - Subbase)	I (SAND			
							_			Bottom of Exploration at 1.8 fe	et			
Stratific bounda be grad made a Fluctua other fa	ation lines ry betwee ual. Wate t times an tions of gr ctors than	s represent n soil ty r level re d under oundwa those p	ent approx pes, transi eadings ha conditions ter may or present at t	umate tions may we been s stated. ccur due t the time	o D						В	ORING N	0.:	B-6

										BORINGIOG	BORING	NO.:	B-7
F		C	TT 7	6		ТТ	-				SHEET:	_	1 of 1
		5	W/				<b>≺</b> ,   c	LIENT: Hoy	le, Ta	anner & Associates, Inc.	PROJEC	T NO	20-0662
		E N	GINI	ΞĒ	RIN	GINC	- P	ROJECT: 0	verlo	ok Circle	DATE ST		8/13/2021
					1/11/			OCATION: _	Bari	Ington, NH	DATE FI	NISH:	8/13/2021
Drillin LOCA DRILL RIG T HAMM	ng Info TION: ING CO.: ('PE: IER TYP IER EFF	rmatio See Exp :: _S. V E: _N/ CIENC	DIORATION V. Cole E A X FACTO	Loca ngin <b>)R:</b>	ation Pla eering, I	n E nc. C A H	ELEVATIO DRILLER AUGER II IAMMER IAMMER	ON (FT):	4 ud 1/A : <u>N</u> /A	TOTAL DEPTH (FT):         1.8         Li           DRILLING METHOD:         Core Drill / H           SAMPLER:	DGGED BY: and Sample ORE BARR	: <u>Chad</u> er EL:	Michaud
WATE	R LEVEI	DEPT	'HS (ft):	· ·				, <i>j</i> .					
GENE	RAL NO	TES:											
KEY TO AND S	O NOTES YMBOLS:	<u>Wate</u> ⊻ At ⊻ At ⊻ At	e <u>r Level</u> time of Dr Completic ter Drilling	illing on of	Drilling	D = Split S U = Thin W R = Rock ( V = Field \	Spoon Sam Valled Tub Core Sam /ane Shea	nple Pen. : e Sample Rec. : ple bpf = ar mpf =	= Pen = Rec Blows Minu	$ \begin{array}{lll} \mbox{tration Length} & WOR = Weight of Rods & S_v = Fie \\ \mbox{overy Length} & WOH = Weight of Hammer & q_{tj} = Ur \\ \mbox{sper Foot} & RQD = Rock Quality Designation & \emptyset = Fri \\ \mbox{te per Foot} & PID = Photoionization Detector & N/A = N \\ \end{array} $	ld Vane Shea confined Con tion Angle (E lot Applicable	ar Strength npressive Estimated)	h, kips/sq.ft. Strength, kips/sq.ft.
				:	SAMPL	E INFOR	RMATIO	N	b				
Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data	Graphic Lo	Sample Description & Classification	H₂0 Depth		Remarks
										1.25" Wearing Course Pavement			
										0.1 2" Binder Course Pavement	]		
										0.3 6.75" of 1.5-inch minus Bank Run Gravel (SAND and GRAVEL trace silt - Base)			
	_									0.8 11" of 5-inch minus Bank Run Gravel (SAN and GRAVEL trace silt - Subbase)	ID		
									-	Bottom of Exploration at 1.8 feet			
Stratific	ation lines	; repres	ent approx	imate	3								
bounda be grad made a Fluctua other fa measur	ry betwee ual. Wate t times an tions of gr ctors than rements w	n soil ty r level re d under oundwa those p ere mad	pes, transi eadings ha conditions ter may oc present at t de.	tions ve be s stat cur c he tir	may een ed. due to me						BORING	NO.:	B-7

		S	<b>W</b> Igine	<b>CC</b> E E R I N	) <b>LE</b> g,ing		LIENT: <u>Hoy</u> ROJECT: <u>O</u> OCATION: _,	e, Ta veric Bari	BORIN anner & Ass ok Circle rington, NH	NG LOG	BORING N SHEET: PROJECT DATE STA DATE FINI	NO NO NRT: ISH:	<b>B-8</b> 1 of 1 20-0662 8/13/2021 8/13/2021
Drillin Loca Drill Rig T HAMM HAMM WATE	ng Info TION: <u></u> ING CO.: YPE: IER TYP IER EFFI R LEVEI	<u>mati</u> See Ex S. V E: <u>N/</u> CIENC DEPT	Dioration I V. Cole En A Y FACTO THS (ft):	_ocation Pla ngineering, PR:	Inc. E Inc. C A A L A F B	ELEVATIO RILLER: NUGER ID IAMMER IAMMER	DN (FT):	ud I/A : <u>N/</u> A N/A	/A	TOTAL DEPTH (FT): <u>1.8</u> L DRILLING METHOD: <u>Core Drill / H</u> SAMPLER: <u>CASING ID/OD: N/A /N/A</u> C	OGGED BY: land Sampler	<u>Chad M</u>	ichaud
GENE KEY TO AND S	RAL NOT D NOTES YMBOLS:	T <b>ES:</b> ⊻ At ⊈ At ⊈ At ⊈ Af	er <u>Level</u> time of Dri Completio ter Drilling	lling n of Drilling	D = Split S U = Thin W R = Rock ( V = Field V	poon Sam /alled Tub Core Samp /ane Shea	ple Pen. = e Sample Rec. = ble bpf = r mpf =	= Pen = Rec Blows Minu	etration Length overy Length s per Foot te per Foot	WOR = Weight of Rods $S_v = Fi$ WOH = Weight of Hammer $q_u = Ut$ RQD = Rock Quality Designation $Ø = Fri$ PID = Photoionization DetectorN/A = I	eld Vane Shear nconfined Comp ction Angle (Est Not Applicable	Strength, ressive St imated)	kips/sq.ft. rength, kips/sq.ft.
Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	Sample No.	SAMPL Bepth (ft)	E INFOF Pen./ Rec. (in)	RMATIO Blow Count or	N Field / Lab Test Data	Graphic Log		Sample Description & Classification	H <sub>2</sub> 0 Depth	R	emarks
									0.1 2" B	" Wearing Course Pavement inder Course Pavement of 1.5-inch minus BanK Run Gravel ND and GRAVEL trace silt - Base)			
										Bottom of Exploration at 1.8 feet			
Stratific	ration lines	a repres	ent approxi	mate						Bottom of Exploration at 1.8 feet			
bounda be grad made a Fluctua other fa measu	ry betwee lual. Wate it times an tions of gr ictors than rements w	n soil ty r level re d under oundwa those p ere mad	pes, transit eadings ha conditions ter may oc present at t le.	tions may ve been stated. cur due to he time							BORING N	0.:	B-8

#### KEY TO NOTES & SYMBOLS Test Boring and Test Pit Explorations

Stratification lines represent the approximate boundary between soil types and the transition may be gradual.

#### Key to Symbols Used:

- w water content, percent (dry weight basis)
- qu unconfined compressive strength, kips/sq. ft. laboratory test
- S<sub>v</sub> field vane shear strength, kips/sq. ft.
- $L_v$  lab vane shear strength, kips/sq. ft.
- q<sub>p</sub> unconfined compressive strength, kips/sq. ft. pocket penetrometer test
- O organic content, percent (dry weight basis)
- W<sub>L</sub> liquid limit Atterberg test
- W<sub>P</sub> plastic limit Atterberg test
- WOH advance by weight of hammer
- WOM advance by weight of man
- WOR advance by weight of rods
- HYD advance by force of hydraulic piston on drill
- RQD Rock Quality Designator an index of the quality of a rock mass.
- $\gamma_T$  total soil weight
- $\gamma_{\rm B}$  buoyant soil weight

#### **Description of Proportions:**

#### **Description of Stratified Soils**

		Parting:	0 to 1/16" thickness
Trace:	0 to 5%	Seam:	1/16" to 1/2" thickness
Some:	5 to 12%	Layer:	1⁄2" to 12" thickness
"Y"	12 to 35%	Varved:	Alternating seams or layers
And	35+%	Occasional:	one or less per foot of thickness
With	Undifferentiated	Frequent:	more than one per foot of thickness

**REFUSAL:** <u>Test Boring Explorations</u> - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

**REFUSAL:** <u>Test Pit Explorations</u> - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

### APPENDIX D

Laboratory Test Results



ASTM C-117 & C-136

Project Name	BARRINGTON NH - OVERLOOK CIRCLE - PAVEMENT	Project Number	20-0662
	EXPLORATIONS - GEOTECHNICAL ENGINEERING SERVICES	Lab ID	21053S
Client	HOYLE TANNER & ASSOCIATES, INC.	Date Received	8/13/2021
Material Type	1.5" MINUS SCREENED BANK RUN GRAVEL	Date Completed	8/20/2021
Material Source	B-1, 3-13"		0/20/2021

		Tested By	BRADLEY GERSCHWILER
SIEVE SIZE	AMOUNT PASSING (%)	NHDOT 304.3 CR. SPECIFICATIO	GRAVEL INS (%)
3"	100	100	
2"	100	95 - 100	
1-1/2"	98		
1"	91	55 - 85	†
3/4"	85		
1/2"	77		
3/8"	72		
1/4"	64		
No. 4	58	27 - 52	†
No. 10	42		
No. 20	25		
No. 40	13		
No. 60	8		
No. 100	5		
No. 200	3.1		
No. 200*	5.4	0 - 12	
	SIEVE SIZE 3" 2" 1-1/2" 1" 3/4" 1/2" 3/8" 1/4" No. 4 No. 4 No. 40 No. 40 No. 40 No. 60 No. 100 No. 200 No. 200*	SIEVE SIZE         AMOUNT PASSING (%)           3"         100           2"         100           1-1/2"         98           1"         91           3/4"         85           1/2"         77           3/8"         72           1/4"         64           No. 4         58           No. 10         42           No. 20         25           No. 40         13           No. 60         8           No. 100         5           No. 200         3.1           No. 200*         5.4	Tested By           SIEVE SIZE         AMOUNT PASSING (%)         NHDOT 304.3 CR. SPECIFICATIO           3"         100         100           2"         100         95 - 100           1-1/2"         98         1"           1"         91         55 - 85           3/4"         85         1/2"           1/2"         77         3/8"           3/8"         72         1/4"           1/4"         64         27 - 52           No. 4         58         27 - 52           No. 10         42         25           No. 40         13         0.60           No. 60         8         13           No. 100         5         0.200           No. 200         3.1         0.12

\* OF THE FRACTION PASSING THE NO. 4 SIEVE

**† SAMPLE DOES NOT MEET SPECIFICATION** 



Comments



ASTM C-117 & C-136

Project Name	BARRINGTON NH - OVERLOOK CIRCLE - PAVEMENT EXPLORATIONS - GEOTECHNICAL ENGINEERING SERVICES
Client	HOYLE TANNER & ASSOCIATES, INC.
Material Type	5" MINUS SCREENED BANK RUN GRAVEL
Material Source	B-1, 13-21"

Project Number	20-0662
Lab ID	21054S
Date Received	8/13/2021
Date Completed	8/20/2021
Tested By	BRADLEY GERSCHWILER

<u>STANDARD</u> DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	NHDOT 304.2 GRAVEL SPECIFICATIONS (%)
150 mm	6"	100	100
75 mm	3"	87	
50 mm	2"	77	
38.1 mm	1-1/2"	74	
25.0 mm	1"	66	
19.0 mm	3/4"	62	
12.5 mm	1/2"	54	
9.5 mm	3/8"	50	
6.3 mm	1/4"	45	
4.75 mm	No. 4	41	25 - 70
2.00 mm	No. 10	32	
850 um	No. 20	20	
425 um	No. 40	12	
250 um	No. 60	8	
150 um	No. 100	5	
75 um	No. 200	2.9	
75 um	No. 200*	7.1	0 - 12

\* OF THE FRACTION PASSING THE NO. 4 SIEVE

SAMPLE MEETS SPECIFICATION



Comments



ASTM C-117 & C-136

Project Name	BARRINGTON NH - OVERLOOK CIRCLE - PAVEMENT EXPLORATIONS - GEOTECHNICAL ENGINEERING SERVICES
Client	HOYLE TANNER & ASSOCIATES, INC.
Material Type	5" MINUS SCREENED BANK RUN GRAVEL
Material Source	B-2, 12-19"

Project Number	20-0662
Lab ID	21055S
Date Received	8/13/2021
Date Completed	8/20/2021
Tested By	BRADLEY GERSCHWILER

<u>STANDARD</u> DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	NHDOT 304.2 GRAVEL SPECIFICATIONS (%)
150 mm	6"	100	100
25.0 mm	1"	86	
19.0 mm	3/4"	78	
12.5 mm	1/2"	69	
9.5 mm	3/8"	65	
6.3 mm	1/4"	58	
4.75 mm	No. 4	53	25 - 70
2.00 mm	No. 10	39	
850 um	No. 20	25	
425 um	No. 40	14	
250 um	No. 60	9	
150 um	No. 100	6	
75 um	No. 200	3.7	
75 um	No. 200*	7	0 - 12
* OF THE FRACTION	PASSING THE NO	0. 4 SIEVE	SAMPLE MEETS SPECIFICATION
3" 2" 1" 1/2" 1/4"	#10 #20	#40 #100 #200	
<sup>%</sup>			
%			



#### Comments

10 Centre Road, Somersworth, NH 03878-2926 • Tel (603) 692-0088 • Fax (603) 692-0044 • www.swcole.com



ASTM C-117 & C-136

Project Name	BARRINGTON NH - OVERLOOK CIRCLE - PAVEMENT	Project Number	20-0662
	EXPLORATIONS - GEOTECHNICAL ENGINEERING SERVICES	Lab ID	21056S
Client	HOYLE TANNER & ASSOCIATES, INC.	Date Received	8/13/2021
Material Type	1.5" MINUS SCREENED BANK RUN GRAVEL	Date Completed	8/20/2021
Material Source	B-3, 3-11"	Tested By	BRADLEY GERSCHWILER

<u>STANDARD</u> DESIGNATION (mm/um)	SIEVE SIZE	AMOUNT PASSING (%)	NHDOT 304.3 CR. GRAVEL SPECIFICATIONS (%)	
<u> </u>			<u> </u>	
50 mm	2"	100	95 - 100	
38.1 mm	1-1/2"	99		
25.0 mm	1"	85	55 - 85	
19.0 mm	3/4"	79		
12.5 mm	1/2"	70		
9.5 mm	3/8"	65		
6.3 mm	1/4"	58		
4.75 mm	No. 4	53	<b>27 - 52</b> †	
2.00 mm	No. 10	40		
850 um	No. 20	24		
425 um	No. 40	14		
250 um	No. 60	9		
150 um	No. 100	6		
75 um	No. 200	3.7		
75 um	No. 200*	7	0 - 12	

\* OF THE FRACTION PASSING THE NO. 4 SIEVE

**† SAMPLE DOES NOT MEET SPECIFICATION** 



Comments



ASTM C-117 & C-136

	STANDARD	NHDOT 204 2 CP	
wateriai Source	0-0, 0-10	Tested By	BRADLEY GERSCHWILER
Matarial Source		Date Completed	8/20/2021
Material Type	1.5" MININUS SCREENED BANK RUN GRAVEL		0/10/2021
Client	HOYLE TANNER & ASSOCIATES, INC.	Date Received	8/13/2021
	EXPLORATIONS - GEOTECHNICAL ENGINEERING SERVICES	Lab ID	21057S
Project Name	BARRINGTON NH - OVERLOOK CIRCLE - PAVEMENT	Project Number	20-0662

DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	SPECIFICATIONS (%)
50 mm	2"	100	95 - 100
25.0 mm	1"	98	<b>55 - 85</b> †
19.0 mm	3/4"	94	
12.5 mm	1/2"	82	
9.5 mm	3/8"	75	
6.3 mm	1/4"	67	
4.75 mm	No. 4	61	<b>27 - 52</b> †
2.00 mm	No. 10	46	
850 um	No. 20	28	
425 um	No. 40	15	
250 um	No. 60	8	
150 um	No. 100	5	
75 um	No. 200	3.1	
75 um	No. 200*	5	0 - 12

\* OF THE FRACTION PASSING THE NO. 4 SIEVE

**† SAMPLE DOES NOT MEET SPECIFICATION** 



#### Comments

10 Centre Road, Somersworth, NH 03878-2926 • Tel (603) 692-0088 • Fax (603) 692-0044 • www.swcole.com



ASTM C-117 & C-136

Project Name	BARRINGTON NH - OVERLOOK CIRCLE - PAVEMENT EXPLORATIONS - GEOTECHNICAL ENGINEERING SERVICES
Client	HOYLE TANNER & ASSOCIATES, INC.
Material Type	5" MINUS SCREENED BANK RUN GRAVEL
Material Source	B-6, 10-21"

Project Number	20-0662
Lab ID	21058S
Date Received	8/13/2021
Date Completed	8/20/2021
Tested By	BRADLEY GERSCHWILER

STANDARD DESIGNATION (mm/um)	SIEVE SIZE	AMOUNT PASSING (%)	NHDOT 304.2 GRAVEL SPECIFICATIONS (%)
	0.272 0.22		
150 mm	6"	100	100
50 mm	2"	91	
38.1 mm	1-1/2"	80	
25.0 mm	1"	76	
19.0 mm	3/4"	71	
12.5 mm	1/2"	60	
9.5 mm	3/8"	56	
6.3 mm	1/4"	50	
4.75 mm	No. 4	46	25 - 70
2.00 mm	No. 10	36	
850 um	No. 20	24	
425 um	No. 40	14	
250 um	No. 60	8	
150 um	No. 100	5	
75 um	No. 200	2.6	
75 um	No. 200*	5.7	0 - 12

#### **\* OF THE FRACTION PASSING THE NO. 4 SIEVE**

SAMPLE MEETS SPECIFICATION



Comments



ASTM C-117 & C-136

Project Name	ect Name BARRINGTON NH - OVERLOOK CIRCLE - PAVEMENT		20-0662
	EXPLORATIONS - GEOTECHNICAL ENGINEERING SERVICES	Lab ID	21059S
Client	HOYLE TANNER & ASSOCIATES, INC.	Date Received	8/13/2021
Material Type	1.5" MINUS SCREENED BANK RUN GRAVEL	Date Completed	8/20/2021
Material Source	B-7, 3.5-10"	Tested By	BRADLEY GERSCHWILER

STANDARD			NHDOT 304.3 CR. GRAVEL	
DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	SPECIFICATIONS (%)	
75 mm	3"	100	100	
50 mm	2"	100	95 - 100	
38.1 mm	1-1/2"	98		
25.0 mm	1"	96	<b>55 - 85</b> †	
19.0 mm	3/4"	91		
12.5 mm	1/2"	80		
9.5 mm	3/8"	74		
6.3 mm	1/4"	66		
4.75 mm	No. 4	60	<b>27 - 52</b> †	
2.00 mm	No. 10	44		
850 um	No. 20	26		
425 um	No. 40	14		
250 um	No. 60	8		
150 um	No. 100	5		
75 um	No. 200	2.8		
75 um	No. 200*	4.6	0 - 12	

\* OF THE FRACTION PASSING THE NO. 4 SIEVE

**† SAMPLE DOES NOT MEET SPECIFICATION** 



Comments



ASTM C-117 & C-136

Project Name	BARRINGTON NH - OVERLOOK CIRCLE - PAVEMENT EXPLORATIONS - GEOTECHNICAL ENGINEERING SERVICES	
Client	HOYLE TANNER & ASSOCIATES, INC.	
Material Type	5" MINUS SCREENED BANK RUN GRAVEL	
Material Source	B-7. 10-21"	

Project Number20-0662Lab ID21060SDate Received8/13/2021Date Completed8/20/2021Tested ByBRADLEY GERSCHWILER

<u>STANDARD</u> DESIGNATION (mm/um)	SIEVE SIZE	AMOUNT PASSING (%)	NHDOT 304.2 GRAVEL SPECIFICATIONS (%)
<u> </u>			<u> </u>
150 mm	6"	100	100
50 mm	2"	94	
38.1 mm	1-1/2"	84	
25.0 mm	1"	75	
19.0 mm	3/4"	69	
12.5 mm	1/2"	62	
9.5 mm	3/8"	58	
6.3 mm	1/4"	52	
4.75 mm	No. 4	49	25 - 70
2.00 mm	No. 10	37	
850 um	No. 20	23	
425 um	No. 40	14	
250 um	No. 60	8	
150 um	No. 100	5	
75 um	No. 200	2.5	
75 um	No. 200*	5.1	0 - 12

#### **\* OF THE FRACTION PASSING THE NO. 4 SIEVE**

SAMPLE MEETS SPECIFICATION



Comments



Barrington, NH

Wearing

Hoyle Tanner & Associates

**Overlook Circle - Pavement Explorations** 

Project Name:

Client:

**Project Location:** 

Material Supplier: Mix Type / Design ID:

Course Description: Placement Contractor:

### Report of Density of Compacted HMA Cores

ASTM D2726-11, AASHTO T 166

Project Number:	20-0662
Lab ID:	Multiple
Date Received:	08/13/21
Date Completed:	08/27/21
Tested By:	Z. Kirlin

			Thick	iness	Specif	c Gravity	Comp	action
Core Location	Lab ID	Core No.	Measured (in)	Required (in)	Bulk	Theoreical Maximum	Measured (%)	Required (%)
	21061S	B-2 wearing	1 1/8		2.165	2.469	87.7%	
	21062S	B-4 wearing	1 3/4 - 2		2.245	2.469	90.9%	
	21063S	B-6 wearing	1		2.247	2.469	91.0%	
	21064S	B-8 wearing	1 1/4		2.297	2.469	93.0%	

The TMD(s) used to calculate % Compaction are from Core Samples

Comments:

Reviewed By:

10 Centre Road, Somersworth, NH 03878-2926 • P: (603) 692.0088 • F: (603) 692.0044 • E: infosomersworth@swcole.com

Geotechnical Engineering Constru

Construction Materials Testing

Special Inspections



Barrington, NH

Binder

Hoyle Tanner & Associates

**Overlook Circle - Pavement Explorations** 

Project Name:

Client:

**Project Location:** 

Material Supplier: Mix Type / Design ID:

Course Description: Placement Contractor:

### Report of Density of Compacted HMA Cores

ASTM D2726-11, AASHTO T 166

Project Number:	20-0662
Lab ID:	Multiple
Date Received:	08/13/21
Date Completed:	08/27/21
Tested By:	Z. Kirlin

			Thick	iness	Specifi	c Gravity	Comp	action
Core Location	Lab ID	Core No.	Measured (in)	Required (in)	Bulk	Theoreical Maximum	Measured (%)	Required (%)
	21065S	B-2 Binder	1 1/2		2.366	2.564	92.3%	
	21066S	B-4 Binder	2		2.326	2.564	90.7%	
	21067S	B-6 Binder	1 1/2 - 2		2.324	2.564	90.6%	
	21068S	B-8 Binder	2		2.396	2.564	93.4%	

The TMD(s) used to calculate % Compaction are from Core Samples

Comments:

Reviewed By:

10 Centre Road, Somersworth, NH 03878-2926 • P: (603) 692.0088 • F: (603) 692.0044 • E: infosomersworth@swcole.com

Geotechnical Engineering Constru

Construction Materials Testing

Special Inspections