HOOKSETT SEWER DEPARTMENT DATE RECEIVED 7-2-/8

Hooksett Sewer Commission June 18, 2018 Minutes

INICAL	COMMENTS
ponuminos de la constitución de la	
JAK J	
	SS University and the second s

The meeting was called to order at 12:00pm. Present were Chairman Sidney Baines, Commissioner Frank Kotowski, Jeff Burd (University Heights), Superintendent Bruce Kudrick, John Clark, John Jackman, Don Winterton, Jeff Larabee, David Scarpetti, Alden Beauchemin, Dan Tatem, Rene Labranch and Kim Langlois

It is with a heavy heart that we have to announce the passing of our beloved Commissioner Roger Bergeron on Monday June 11, 2018. He will be missed.

Approve and Sign Manifests

Approve minutes of June 4, 2018 meeting: Commissioner Frank Kotowski made motion to accept the minutes as read, Chairman Sidney Baines seconded. The motion was carried unanimously.

Read Correspondence

Financial Report: None

Scheduled Appointments: 12:15pm Jeff Burd RE: University Heights

1:00pm Stantec RE: Rte 3A Pump Station and River Crossing

University Heights: Jeff Burd from the University Heights project came in to touch base with the commission regarding the remaining phases of this project. Jeff showed the commissioner a set of plans with 12 lots that are going to be developed. There are 6 lots on Crawford and 6 lots on University circle, that are on schedule to be completed this year. There are 59 lots total, including the above mentioned 12 that can still be developed. Jeff came in to discuss how the board would like to proceed with this project. Chairman Sidney Baines voiced his concern with how long it is taking the complete the sewer portion of this project. Chairman Baines would like to see the sewer completed sooner rather than later. The University Heights project still owes the Sewer Commission for 8 lots that have been sewer completed. The commissioners would like the remaining 12 lots that are scheduled for completion this year paid for together not individually like in the past and they would like to have Jeff Burd take a bond out in the amount of \$25,000 to cover remainder of the project. It was mentioned to Jeff that after the twelve lots are completed, if they wish to go any further the remainder of the sewer needs to be completed. Commissioner Frank Kotowski made motion that the 12 lots due to be completed this year at University Heights be bonded in the amount of \$25,000, the 12 lots need to be paid for together and if any lots are done beyond the 12 lots then the whole sewer needs to be completed. Chairman Sidney Baines seconded. The motion was carried unanimously.

Stantec: Dan Tatem handed out the results of the boring test that was done for the Route 3A pump station and river crossing (see attached). No ledge or boulders were found but there is a lot of sand and other coarse media. The results were "pretty good, not horrible, not great." Stantec has produced a list of nine contractors that they are going to contact regarding this project. It was discussed that they would ask for pricing from at least 6 of them and ask for bids to be in, in two weeks. The results of this will be discussed at the next commissioners meeting. Chairman Sidney Baines asked Jeff Larabee that if the two million that we are willing to spend on this project only gets us so far in connecting 3A to sewer how far is he willing to go. Jeff would like to have his hotel built and running by Memorial Day next year. He did not have a definitive answer and tossed around the idea of putting in a septic and waiting for the rest of the money to be raised elsewhere in order to connect to the sewer.

Superintendent's Report: Bruce went out to SNHU last week and met with the President of SNHU and the contractor doing the work on the sewer lines at the school. There was an air leak in the sewer lines and it was discovered that one of the gaskets in the 10 inch main line had rolled and this is what was causing the line to fail the air test. To ensure the gasket was fixed properly it was decided upon to replace the whole pipe rather than just the effected section. This meant having to dig up 60 feet of pipe. Bruce was content with the schools decision.

Thursday June 21st the DES is coming out to meet with the sewer commission to go over the Energy Audit.

Saturday June 23rd Bruce is participating in the touch a truck day in Hooksett

John Clark from the plant will be handling the TV hookup in the commissioner's office, this week the plant employees will be working on cleaning tanks 1 and 2.

Bruce told the commissioners that he spoke with Commissioner Roger Bergeron's daughter at his services on Saturday and that he told her that we would help her in any way that we could with her father's passing.

Old Business: None

New Business: Chairman Sidney Baines and Commissioner Frank Kotowski made a decision on whom they would like to appoint as the new commissioner to fill Roger Bergeron's place. They decided on Richard Bairam. Commissioner Frank Kotowski made motion to appoint Richard Bairam as the new commissioner, to fill Roger Bergeron's place. Chairman Sidney Baines seconded. The motion was carried unanimously.

Non Public Session: None

Public Input: None

Adjournment: Commissioner Frank Kotowski made motion to adjourn at 1:41pm. Chairman Sidney Baines seconded. The motion was carried unanimously.

Respectfully Submitted

Stank K Law Elver

Frank Kotowski

Clerk

Route 3A Pump Station HDD Design Phase

June 18, 2018

<u>Status</u>

- 1. Soil boring program completed
- 2. HDD designer selected
- 3. HDD contractor list developed
- 4. Engineering design fees updated

Soil Boring Memo

- 1. General descriptions of soils encountered
- 2. Depths of borings
- 3. Full Geotech report completed by end of July

Survey

- Detailed topographic survey for the HDD design only completed by July 6th
- 2. Remainder of project area survey completed by the end of July

HDD Design

- 1. Process Pipeline Services selected for HDD design
- 2. Significant experience with similar designs
- 3. Design to include river and RR track crossings and temporary access on both sides of the river
- 4. Preliminary design by June 29th
- 5. Final HDD design completed a week after the survey is complete, by July 13th

Easements

- 1. Develop easements for pump station, force main, and gravity sewer on Tri-Town, Pan Am, and NHDOT properties
- 2. Easement plan and written easements
- 3. Not included in original fee estimate

Pan Am Railways

1. Immediately begin process to obtain permission/permit to work on the Pan Am property

2. HDD Contractor to provide RR protective insurance policy and execute permit

HDD Bidding Phase Services

- 1. Prepare basic front-end bid documents with HDD design
 - a. Bonds
 - b. Insurances
 - c. Pan Am requirements
- 2. Notify HDD Contractors of upcoming bid request
- 3. Send bid package to 8-10 HDD Contractors
- 4. 2-week bid period Bid opening on July 26th
- 5. Award recommendation on July 30th

HDD Construction Phase Engineering Services

- 1. Work to start by August 20th (45 days)
- 2. Construction Administration
- 3. Construction Monitoring
- 4. As-built plans

Pump Station Design

- Pump station design can begin immediately (does not need to follow HDD design)
- 2. Design to include PS, connections to FM and interceptor, and gravity sewer to Rte. 3A
- 3. Design and permitting estimated to take 120 days

HDD Design, Geotech & Bidding Services Cost

- 1. HDD design and specs \$21,670
- 2. Preliminary and final Geotech report \$6,182.80
- 3. Pan Am Coordination and permit \$4,669.20
- 4. Bid services and award recommendation \$5,728.72
- 5. Field Survey \$13,200
- 6. Shoreland Permit and NHDES Coord \$1,500
- 7. Total HDD design, Pan Am permitting, survey, and bidding services \$52,950.72

Pump Station Design & Bidding Services Cost

- 8. Pump Station HDD design and specs \$99,442.28 Items not included in the original design fee:
 - 1. Temporary and permanent easements
 - 2. Bidding Phase Services

Original design fee - \$222,393







To:

Daniel Tatem

From:

Trey Dykstra

Auburn, NH

Auburn, NH

File:

195113295

Date:

June 18, 2018

Reference:

Route 3A Pump Station and Merrimack River Crossing

Hooksett, New Hampshire

PROJECT DESCRIPTION

As part of the Hooksett Sewer Commission's proposed expansion of the municipal sewer system along Route 3A in Hooksett, New Hampshire, a new pump station and river crossing is planned. The pump station will be located in the parking lot of the Tri-Town Ice Arena and will convey sewage from the west side of the Merrimack River, under the river and the Pan Am railroad tracks to an existing sewer interceptor on the east side of the river. The conceptual layout is shown on the attached plan. It is anticipated that the force mains between the pump station and the interceptor will consist of two 8-inch diameter HDPE pipes. We anticipate the force mains will be installed using the Horizontal Direction Drilling (HDD) method, below the Merrimack River. It is anticipated that the two lines will be installed in a single HDD operation. Below the railroad tracks the force mains must be installed in two separate HDD operations. Therefore, the HDD operation will be a two-step process, one will cross the Merrimack River and one will cross under the railroad tracks.

In support of the HDD design Stantec has recently conducted eleven test borings on the proposed alignment. The draft borehole logs are attached. Laboratory soil testing and survey will be conducted in the future. The ground surface presented on the attached profile should be considered approximate.

EXPLORATION PROGRAM

The subsurface investigation program consisted of eleven test borings drilled by Geologic, Inc. between May 22 and May 29, 2018. The soil borings, designated B-1 through B-11, were observed and logged by a Stantec personnel. Soil samples at the boring locations were generally obtained at the ground surface and then at 5-foot intervals to the bottom of the boring. The borings were generally terminated at a depth of 40 feet below the ground surface. In an effort to locate bedrock, selected borings were continued without sampling to a maximum depth of 59 feet below the ground surface.

Soil samples were obtained by driving a 24-inch long, 2-inch outside diameter split spoon sampler with a 140-pound safety hammer falling 30 inches, in substantial accordance with ASTM D1586, the Standard Penetration Test (SPT). The blows for each 6-inches of penetration are recorded for a total of 24-inches. The sum of the blows required to drive the sampler from 6-inches to 18-inches penetration is referred to as the Standard Penetration Resistance, or N-value, which is an index of measure of in-situ soil density or consistency. For granular soils N values less than 4 are considered to very loose, between 4 and 10 loose; between 10 and 30 medium dense; between 30 and 50 dense; and greater than 50 very dense.

SUBSURFACE CONDITIONS

The subsurface conditions encountered at the boring locations are presented on the attached draft borehole logs prepared by Stantec. In general, the soil conditions along the proposed HDD alignment consist of either fine sand with trace silt to some silt or coarse to medium sand with trace silt. Based on the N-values the soil consistency generally ranges from loose to medium dense, with some areas being very loose. The presence of cobbles was noted in two of the borings. Trace amounts of organics were noted in B-8 drilled in the eastern



June 18, 2018 Daniel Tatem Page 2 of 2

Reference:

Route 3A Pump Station and Merrimack River Crossing

Hooksett, New Hampshire

side of the river. Laboratory testing will consist of grain size distribution analysis and will be used to verify the field descriptions presented on the draft borehole logs. The laboratory test results will also be used to develop engineering parameters for the HDD analysis.

PRELIMINARY CONCLUSIONS

Based on a preliminary assessment of the subsurface conditions encountered in the test borings, it is feasible to install the proposed sewer lines using HDD. We anticipate the proposed HDD will be at least 25 feet below the river channel and will likely encounter deposits of sand for the entire length of the alignment. Isolated cobbles may also be encountered along the alignment. It is unlikely that bedrock will be encountered along the alignment.

Stantec Consulting Services Inc.

Trey Dykstra, PE Associate/Geotechnical Engineer

Phone: (603) 206-7552

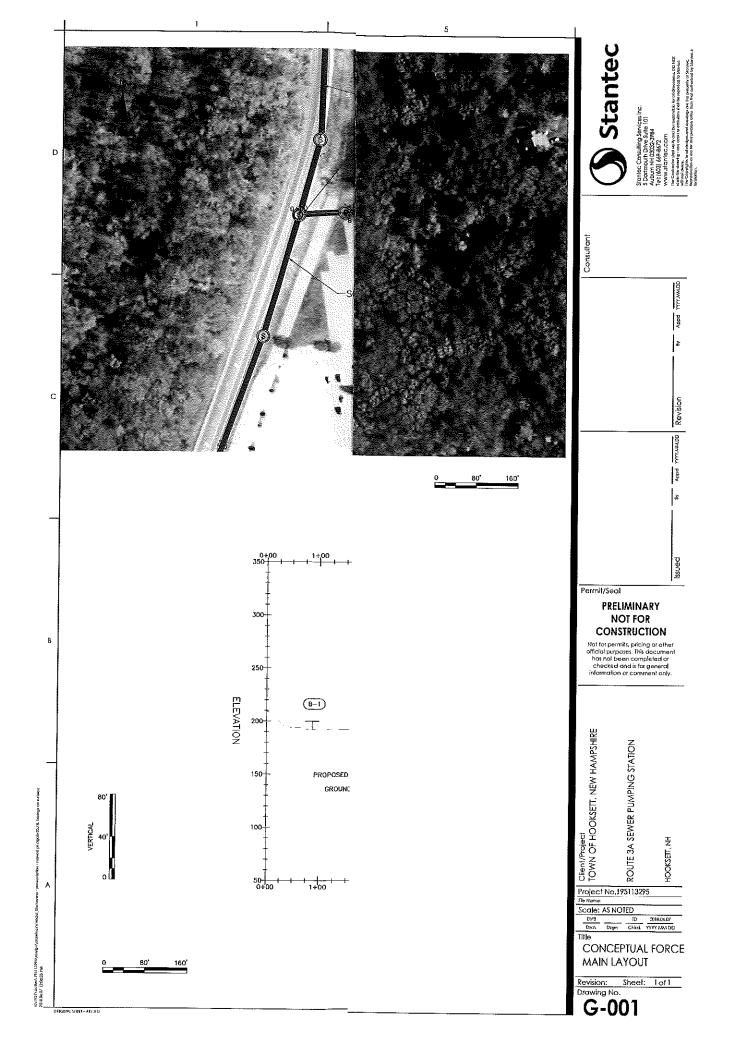
Fax

Trey.Dykstra@stantec.com

Attachment:

Draft Plan and Profile Draft Borehole Logs

c. XX



~~	E እም	Town of Hooksett Sewer Comi	ssion									1	DDO:	ЕСТ	N-	-	1951	131	21
	ENT CATION	Merrimack River HDD, Hooks														-	o		
		ON DATE 5/29/2018 to 5/29/201		TE	R LEVE	т								UM		14 14	N/A		_
T		ON DATE	VY /	T			MPLI	ze -			_			Shea		enath			=
	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	ТҮРЕ	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyn	ter Co	onteni Pene	2 & Atte tration	erberg	3 g Limit , blow	w ts H		4 + w ← * •
†	190.0						in.				1						vs/foot 0 70		81
t	189.7	3 inches of topsoil	JE.	1				4											1
		Loose, light brown fine sand, some silt			SS	1	10	4 4 4	8		•		·			-			
	188.0											-							
	186.0	Loose, light brown fine sand, some silt						4											
_					SS	2	6	4	8		•		: -						_
-	184.0							4											
			1	N					areava sig	S 7 5 6 6	5								
_	181.0		f																
7		Loose, light brown fine sand, some silt, la coarse Brown sand below sample	yer of		SS	3	8	8 15 16	31					•					
1	179.0							14						:					
Ī																			
-											·								
-																			
1																			
1	176.0	14.15 1 15.14	M - 3	-					-										
-		Medium dense light brown coarse sand, l	ttie siit					22 11											
1					SS	4	4	7	18			-		ļ	-				-
1	174.0							6											
+						1													
1																			
1																			
+	171.0	Loose, light brown coarse sand, little silt		-							+								
1								5 4											_
+		r: Seaboard Drilling, CME 45 track mounte																	

STN13-GEO-L-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

	Sta	BOR	Eŀ	101	LE	L	.00	3								B-	1			
CLIE	NT	Town of Hooksett Sewer Comis										.			ECT ORA			9511		
	ATION -	ON DATE 5/29/2018 to 5/29/201		W.	TER	LEVE	τ.					_			DKA IM -			N/A		_
EXPL		JN DATE				LLVL		MPLI	ES						Shear		gth -	tsf		
	ON (ff)			PLOT	LEVEL					e <u>r</u> e	ĝuj		1		2		3		4 ─┤	
	ELEVATION	MATERIAL DESCRIPTION		STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)				& Atte	-			• w • •	V
\perp	ш								Ω	S	ш				tration				•	
20		and the same of th				SS	-5	in.	5	9		10	20	30	40	50	60	70	80	9
1	169.0								5								-			
1	105.0																			
-																				٠
															.					
+	166.0	Loose, light brown fine sand, little silt and	d fine						6			1								
.5 -		gravel				ss	6	1	5	11			•					-	\dashv	
	164.0								6						.					
1	104.0				1			_												
_						A														
-						1			9000ganis											
]																	:			
-	161.0	Loose, light brown coarse sand, trace salt	V						5	-		H								
30	ĺ					SS	7	12	6	12		-	•							-
-	159.0								8											
+	1.39.0	A A A A A A A A A A A A A A A A A A A										1								
-																				
												1								
+	156.0	Loose, light brown fine sand, trace silt, k	ayer of	-				-	4	-										
35-		gravel below sample				SS	8	6	5 6	11		-	 - -	-	-					
-	15/10								7											
154.0																				
-																				
1																				
-	151.0	Loose, light brown fine to medium sand,	, trace silt	-					3			1								
40									4			1	_		1		<u>L</u> .			
		er: Scaboard Drilling, CME 45 track moun or: Robert Nothnagle	nted 140 lb au	to ha	mme	r, driv	e and	wash	4" cas	ing;					ned Co ne Tes			Test Rem	oldec	j
<u> </u>	anher Arac	21. 7100 41. 110 mm Riv										1			enetro	omete	r / To	rvane nued i	Novt	Dage

Q	y St	antec	BOREI	НО	LE	L	-00	3								B	-1		
	ENT	Town of Hooksett Sewer Comi													ΓNo				
	CATION														ATIC				1
EXI	PLORATI	ON DATE <u>5/29/2018 to 5/29/201</u>	18 WA	TER	LEVI	EL -				_	_							<u> </u>	_
.	€		TO	垣		SA	MPLI						Iraine 1		ear Str 2	-	-tsf 3		4
מו שו שם מ	Ď	MATERIAL DESCRIPTION	A PL	Ē		œ	잝	.9/9	alue	ding (i		-		 		Ī
į	ELEVATION (ft)	WATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blaws / 6"	SPT N-Value	PID Reading (PPM)	Wa	ter C	onten	it & At	terber	g Lim	its	ν Ρ /	₩
_	ᆸ		ST	WA	_	Z	REC	PT 8	SPT	문 ,	1				n Tes				*
		OF THE PARTY OF TH			· · · · · · · · · · · · · · · · · · ·		in.	- 0,			1				on Tes 40 - 5				•
٥†					SS	9	12	П	15		<u> </u>	2		- 0.	,,,		7	0 0	T
1	149.0							14											
1		Bottom of boring at 41 feet. No refusal.																	
-		No iciusai.																	
1																			
1											}								
-																			
1																			
i															<u> </u>				t
1																			ŀ
1																			
+					Λ						:								
1																			
]					+														
+																			
+																			
)-															ļ				ł
-			·												İ				
1																			
	İ																		
											:								
+																			
1														:					
i																			t
1																	•		
$\left\{ \right.$	Ì																		
+																			
-																			
1																			
) 🕇		: Seaboard Drilling, CME 45 track mounted	d 140 lb auto han	nmer,	drive	and w	ash 4	" casir	ıg;		Δ	Unc	onfine	ed Co	mpre	ssion `	Test	L	.L
15		: Robert Nothnagle									1			e Tes				olded	ı

STN13-GEO-I-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

⁄ ا	•																		ı
0	St LIENT	Town of Hooksett Sewer Comission	REH	HC	DLE		LO	G 	_,				ROJ		No.	_	1951	1329	
L	OCATION	Merrimack River HDD, Hooksett, NH										E	XPL	ORA	TIOI	N No	0. ~	B-2	—
Е	XPLORATI	ON DATE 5/29/2018 to 5/29/2018	WA	TE	R LEV	EL						Ι)ATC	JM .			N/A		
	æ		 -	_		S	AMPL	.ES				Undn	ained	Shea	r Stre	ngth -	- tsf		
DEРТН (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyn	amic I		ration	erberg Test,	blow	w		w _L ─-1
,	190.0						in.				10) 20	30	3 40	50) 60	70	80	90
- 0	189.7	4 inches of topsoil Very loose, light brown fine sand, some silt			SS	3 1	24	2 3 2	5		•								
- - -	188.0							3							-				
-	186.0	Loose, light brown fine sand, some silt	-		S		12	3 4	10							-			
_ 5	184.0				3.	S 2	12	6 8	10							-			
	-	DR															-		
	181.0		1.7	7							i.::					. !			
Γ.		Medium dense, dark brown coarse sand, little silt		1		-		7											
10					s	s 3	9	8 7	15			•						\vdash	
	179.0							10									-		
_													-						
_	176.0																		
- 15		Loose, dark brown coarse sand, little silt, trace fine gravel			S	S 4	6	3 2 3	5		•								
1	+			1				3			1		ļ	.					1 F

STN13-GEO-I-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

20

174.0

171.0

Driller: Seaboard Drilling, CME 45 track mounted 140 lb auto hammer, drive and wash 4" casing; Supervisor: Robert Nothnagle

Medium dense, light brown fine sand, little silt, 4"

△ Unconfined Compression Test

7

- ☐ Field Vane Test Remolded
- ★ Pocket Penetrometer / Torvane Continued Next Page

(St	antec BOF	REH	10	LE	L	.00	3								B	-2		
	JENT	Town of Hooksett Sewer Comission									_			ECT			951		
	CATION THE OR AT	Merrimack River HDD, Hooksett, NH ON DATE5/29/2018 to 5/29/2018	WA	TER	LEVE	T.								.or <i>a</i> um		N N	0. – N/A		_
Î		ORDATE			DEVE		MPLI	ES		:				Shea		ngth	· tsf		
DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyn	amic	ntent Pene	tratior	erberg Test,	blow	w s }	*	—
- 20					ss	5	in. 14	12	19		11	0 2	0 3	0 40	50	60	70	80	9
	169.0						17	18											.*
- 25	166.0 164.0	Medium dense, light brown fine to medium sand, little silt			ss	6	12	8 6 9	15			-							
 - 	161.0	DR																	
	101.0	No Recovery	Y			18.		3								,			
- 30					SS	7	0	4 5 5	9									•	
	159.0																		
	156.0															:			
- 35-		Medium dense, light brown fine to medium sand, little silt	-		SS	8	5	6 7 7	14			•							
	154.0							6											

2 5

△ Unconfined Compression Test

➤ Pocket Penetrometer / Torvane Continued Next Page

☐ Field Vane Test

■ Remolded

STN13-GEO-I-VOC 13285- B1 TO B11,GPJ JW NHP,GDT 6/7/18

151.0

No Recovery

Supervisor: Robert Nothnagle

Driller: Scaboard Drilling, CME 45 track mounted 140 lb auto hammer, drive and wash 4" casing;

) St	antec BOI	REH	łO	LE	L	.00	3								B-			
	ENT	Town of Hooksett Sewer Comission Merrimack River HDD, Hooksett, NH												ECT			9511 		_
	CATION PLORATI		- WA	TER	LEVI									JM -			N/A		_
Ī	·		٦			SA	MPL	ES						Shear	Stren	_	tsf		
?	ELEVATION (ft)	ALANTONIA DESCRIPTICA	STRATA PLOT	WATER LEVEL		갦	RY	3/6"	alue	ding (1		2		3	We	 - W	,
(a)	EVAT	MATERIAL DESCRIPTION	RAT/	ATER	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	ı			& Alte			s É	0	
	ᆸ		S	×		Z	RE	SPT	SP	PIC	l i			ration tration				*	
0			_		.		in.		10		10	20	30	40	50	60	70	80)
, <u> </u>		•			SS	9	U	7	10										
+	149.0	Bottom of boring at 41 feet.				-													
1		No refusal																	
-													ļ						
1																			
$\frac{1}{2}$																			
																	\dashv	\dashv	_
1																			
1																			
+					A					,									
								ļ. <u></u>											
				F															
-						W													
,-											-								
-																			
]																		!	
-																			
							į												
-																			
-																			
5 -												-							
-																			
-																			
-															-				
-																			
-																			

Driller: Seaboard Drilling, CME 45 track mounted 140 lb auto hammer, drive and wash 4" casing;

△ Unconfined Compression Test

X Pocket Penetrometer / Torvane

☐ Field Vane Test

■ Remolded

STN13-GEO-I-VOC 13285- B1 TO B11.GPJ JW NHP.GDT 6/7/18

- 60

	Stantec
--	---------

STN13-GEO-I-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

BOREHOLE LOG

B-3

CL	IENT	Town of Hooksett Sewer Comission										F	ROJ	ECT	No.	_1	<u>951</u>	1329	<u>)5</u>
	CATION	Merrimack River HDD, Hooksett, NH										E	XPL	ORA	TIO			B-3	
EX	PLORATI	ON DATE 5/22/2018 to 5/22/2018	WA	TER	LEVE	EL -							TAC				N/A		
DEРТН (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	ТҮРЕ	NUMBER S	RECOVERY N	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Wal Dyn	1 ter Co amic	ntent Penel	2 	erberg Test,	angth - 3 - Limits blows	w s F s/foot	*	→-
- 0	167.9		<u> </u>				in.				11	0 20	30	0 40	50	60	70	80	90
	165.9	No Recovery			SS	1	0 7	WOH/24	' 0	,									-
_	163.9	Very loose, dark brown fine sand, some silt, trace gravel			SS	2	6	1 1 1 10	2		•					-			
 - 5 - 		Medium dense, dark brown fine sand, some silt, trace gravel			SS	3	2	9 10 11 18	21				· .						: -
- 10-	161.9 159.9 157.9	Medium dense, lig brown fine and, ame silt			SS			9 8 11 12	19			r in the state of							
15-	154.9 152.9	Medium dense, light brown fine sand, some silt			ss	5	18	7 9 9 10	18										
- 20	149.9	Medium dense, light brown fine sand, some silt			SS		18	10	13			•							
		er: Seaboard Drilling, CME 55 Skid mounted 140 lb dou or: Robert Nothnagle	ıgnnt	at IIA	пинег,	ari ve	auu '	wasii 4	casiff	·6·] Fiel	d Var	ne Tes	st omete	ssion i Tor Contin	Rem rvane	iolded	ĺ



STN13-GEO-I-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

BOREHOLE LOG

B-3

Town of Hooksett Sewer Comission 195113295 PROJECT No. CLIENT Merrimack River HDD, Hooksett, NH EXPLORATION No. B-3 LOCATION 5/22/2018 to 5/22/2018 EXPLORATION DATE _ DATUM -WATER LEVEL Undrained Shear Strength - tsf SAMPLES ELEVATION (ft) WATER LEVEL STRATA PLOT DEPTH (ft) PID Reading (PPM) SPT blows / 6" SPT N-Value RECOVERY NUMBER WL MATERIAL DESCRIPTION Water Content & Atterberg Limits Dynamic Penetration Test, blows/foot Standard Penetration Test, blows/foot 10 20 30 40 50 60 70 80 20 144.9 Medium dense, light brown fine sand, some silt 16 7 SS 16 34 18 13 142.9 25 139.9 Medium dense, lig brown fine 11 21 10 137.9 30 134.9 Medium dense, light brown fine sand, some silt 6 7 SS 9 12 15 8 10 132.9 35 129.9 Medium dense, light brown fine sand, some silt 8 13 SS 10 18 32 19 40 Driller: Seaboard Drilling, CME 55 Skid mounted 140 lb doughnut hammer, drive and wash 4" casing; △ Unconfined Compression Test Supervisor: Robert Nothnagle □ Field Vane Test ■ Remolded ➤ Pocket Penetrometer / Torvane Continued Next Page

	Stantec
--	---------

BOREHOLE LOG

B-3

CLIENT	Town of Hooksett Sewer Comission Merrimack River HDD, Hooksett, NH												ECT			95113 	
LOCATION	ON DATE 5/22/2018 to 5/22/2018	WA	TER	LEVI	EL -					_		atu Atu			110.	N/A	_
	ON DATE	1	Ι.			MPLE					Undra			Stren	gth - t	sf	
DEPTH (ft) ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	ТҮРЕ	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyn	1 er Con amic P	enetr	ration	Test, b	lows/	foot	4
40					<u> </u>	in.				11	20	30	40	50	60	70	80
45-	Advanced roller bit as a probe from 40 to 59 feet.																
50 -																	
108.9	Bottom of boring at 59 feet. No Refusal. ler: Seaboard Drilling, CME 55 Skid mounted 140 lb d	oughi	nut ha	aminei	drive	e and	wash 4	n casi	ng;		∆ Uno	confin	ned Co	mores	sion	Test	

C	St	antec	BORE	ΞΗ	Ol	_E	L	.00	3								В	-4			
CL	JENT	Town of Hooksett Sewer Comis	ssion									_	F	ROJ	ECT	No.	_1	1951	132	<u>95</u>	
	CATION												E	EXPI	.ORA	TIO	N N	o	B-4		
EX	PLORATI	ON DATE5/23/2018 to 5/23/201	8 v	TAW	ER I	LEVE	EL –						I	DAT	UM .			N/A			
	Œ		ŀ	<u>_</u>			SA	MPL	ES	1			Undr	ained	Shea	r Stre	_				
DEРТН (ft)	ELEVATION (ft)		i	STRATA PLOT	WATER LEVEL		œ	≿	/ 6"	ne <u>re</u>	ing		1		2		 		4		
EPTI	VAT	MATERIAL DESCRIPTION	1	¥ ≿	TER.	TYPE	NUMBER	OVE	lows	-\ -\	Read PM)	Wat	er Co	ntent	& Atte	rberg	Limit	W s I⊦	' _P ₩	₩ 	
				STR	ΜA	F	S N	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)				tration				*		
	162.5			+				in.	တ		_				etration						
- 0 +	162.7	No Recovery		1				111.	_			10) 21	0 3	0 40	50) 60	70	80	90	-
1	,	1.01.000,000,				00			6 3	_										}	
_						SS	1	0	2	5		•	-								_
	160.7		-						4												_
																				-	
- 1																					_
_]																					_
												-						l			_
- 5 -																			-		-
												:			:	Ì					_
]																					-
	155.7	Medium dense, brown fine san trace at			1				NAME OF												
-		Medidin dense, of the mine sain face it			A	M			8											•	-
		1 1 [H	LS1	2		11	20											_
	153.7				_				12												
-		Roller bit grinding from 9 to 12 feet, possicobbles	ible	1													٠.				-
- 10-																					_
																					_
-																					-
	150.7	Loose, grey fine sand, trace silt, layer of b	rown fine	_																	_
- 1		sand					_	1.	6 5	10										•	ľ
						SS	3	12	5 6	10											F
	148.7		-	_					0												-
-				-																	F
- 15 -																					
_																					Ĺ
]				-																	L

STN13-GEO-F-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

145.7

143.7

sand

- 20 Driller: Seaboard Drilling, CME 55 Skid mounted 140 lb doughnut hammer, drive and wash 4" casing; Supervisor: Robert Nothnagle

Loose, grey fine sand, trace silt, layer of brown fine

△ Unconfined Compression Test

5

5

7

10

SS 4 18

> ■ Remolded ☐ Field Vane Test

X Pocket Penetrometer / Torvane Continued Next Page

STN13-GEO-I-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

BOREHOLE LOG

B-4

CI	JENT	Town of Hooksett Sewer Comission										I	PROJ	ECT	No.	_1	951	1329	<u>)5</u>
\mathbf{r}	CATION	Merrimack River HDD, Hooksett, NH									_	I	EXPL	OR.A	TIO	n N		B-4	
ЕΣ	(PLORATI	ON DATE5/23/2018 to 5/23/2018	WA	TEF	R LEVI	EL -					_	I	JTAC	ЛМ		_	N/A		
(#)	ON (#)		PLOT	EVEL			MPL		e e	Ē.		Undi	rained	Shea 2		ngth -	· tsf	4	
DЕРТН (#)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyr	ter Co namic ndard	Penet	tration	Test,	blow		*	w _L
- 20 -							in.				1	0 2	0 30) 4() 50) 60	70	80	90
	140.7	Medium dense, light brown fine sand, trace silt						6						-		-			
	138.7				ss	5	14	6 5 5	11							-			
-														.					
- 25-												-							
_	135.7	Medium dense, lig brown fine and, a ce silt		4	Λ			7											
-	133.7	UK		-	.s.	6		7 8	14			•							
- 30 -																			
-	130.7	Medium dense, light brown fine sand, trace silt						7											
	100.7				SS	7	14	7 6 5	13			•							
-	128.7																	.	_
- 35- - 																			
_	125.7	Medium dense, brown coarse sand layer above light							_									-	
		brown fine sand, trace silt, layer of coarse brown sand			SS	8	24	7 8 12 13	20										
	123.7	Bottom of boring at 39 feet. No refusal.						13											
40 -		er: Seaboard Drilling, CME 55 Skid mounted 140 lb door: Robert Nothnagle	ughnu	t ha	nuner,	drive	and v	vash 4"	casin	ıg;		Und Fiel	d Van	e Tes	it		Rem	oldeđ	

~					LE											1	9511	22
_	IENT	Town of Hooksett Sewer Comission									_			ECT				
LO	CATION .	Merrimack River HDD, Hooksett, NH															o N/A	D-3
EX	PLORATIO	ON DATE 5/23/2018 to 5/23/2018	. WA	TER	LEVE									JM Shea				_
	Œ		P	世		SAI	MPLE					Onur 1		2		3	เอเ	4
(11) (11)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL		<u>بر</u>	RY	9/8	SPT N-Value	PID Reading (PPM)				1		+	WE	
	.VA	WATERIAL DESCRIPTION	RAT	閆	TYPE	NUMBER	RECOVERY	blow	\ <u>2</u>	Rea PPN							s ⊢	-0
,	긥		ST	×		z	REC	SPT blows / 6"	SPT	립)	'						s/foot	*
\dashv	162.7		-				in.				1						/s/foot) 70	80
) 	162.7	No Recovery	+	-		_										T	Ť	Ī
1					ss	1	0	WH	0									
1					ادد	1		***11						:		. :		
4	160.7		-	-														
-																		
1																		
1																		
														·				
5 -																		-
1	ļ		·										!	:				
																-		
4	155.7			1	A							ŀ						
-		Loose, grey fine sail, trace sile						10			: ::							
-				L	S.	2		5	10									
	153.7		V	7	<u> </u>			6										
-		_	T				_											
10-											-							
1														. :				
											1							
-	150.7	The second secon	-	-	<u> </u>			-			1							
-		Loose, grey fine sand, trace silt						10 10										
-					SS	3	8	9	19			'						
	148.7							8	-									
4																		ĺ
15-													-					7
-																		
											1:							
_	145.7	Medium dense, light brown fine sand, trace silt	-	\dashv			-	+	1	-	+							İ
-		Medium neuse, ugut brown time samt, trace site					_	5			. :				-			
_					SS	4	5	8	13			•						
_	143.7					_		7	-		_							
_																		
20 -		er: Seaboard Drilling, CME 55 Skid mounted 140 lb d			Ш	<u></u>					+	<u> </u>	1			ssion		<u></u>

➤ Pocket Penetrometer / Torvane Continued Next Page

	Sta	antec B	ORE	HC)LE		LO	G]	B-	5		
	ENT	Town of Hooksett Sewer Comission			<u></u>									ECT ORA			9511 1		
	CATION -	Merrimack River HDD, Hooksett, N ON DATE 5/23/2018 to 5/23/2018	W	ATE	DIE									.ora UM -			 N/A		_
EXI	1	ON DATE 5/23/2018 to 5/23/2018	Ī	Τ.	1		AMPI	_ES						I Shear	-	igth - i	tsf		
DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	<u> </u>	T	٦.		Value	ading M)		 		2		3	Wp	_	
DEP	ELEVA		STRA	WATE	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyn	amic	Pene	& Atte tration etration	Test,	blows	foot	*	1
20	-				<u> </u>		in.				1			0 40			70	80	90
- 20 -														-					
_	140.7	Medium dense, light brown fine sand, trace silt																	
-		Medium dense, fight brown time said, trace site			s	S 5	6	6 7	13			•							
- -	138.7					-		9											:
- 25	:		:								-								
				-										. :					-
- -	135.7	Medium dense, light brown fine and, ice silt			N			8											
					/ S		6	11 13	21						.				
	133.7															-			i .
- 30 -																			
	130.7																		
	150.7	Medium dense, light brown fine sand, trace silt of orange fine sand	, layer			ss	7 1	8 8	20										
	128.7							12	:							:			
- 35-											_				_				<u> </u>
-																			
	125.7	Medium dense, light brown fine sand, trace silt	,											:					
-		Modulin dense, ngar orown rine said, direction				SS	8 1	8 1	20)			•	-					
-	123.7	Advanced roller bit as a probe from 39 to 47 for	eet.			-		9											
40 -		er: Seaboard Drilling, CME 55 Skid mounted 140 or: Robert Nothnagle	0 lb doug	hnut	hamm	er, dri	ve an	d wash	4" cas	ing;				fined C			Test Rem	-دين	

X Pocket Penetrometer / Torvane
Continued Next Page

J	St	antec	BORE	HC	LE	L	.00	3								B-	_	
CL	ENT	Town of Hooksett Sewer Comiss	sion		_							P	ROJ	ECT	No.	_1	9511	329
	CATION .										_)	B-5
EX	PLORATIO	ON DATE5/23/2018 to 5/23/2018	WA	TE	R LEV									ЛМ .			N/A	
۱	Œ		to	핕		SA	MPL		T		'	Undr 1		Shear 2		ngin - 3	LSI	4
	NO	MATERIAL DESCRIPTION	A P	3 LE	ш	띪	ERY	9 / s/	/alue	ading /i)		-		+			WF	 - W
۱	ELEVATION (ft)	WINTERWINE BESSION FROM	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	1			& Atte				
			'v	3		Z	쮼	SPT	S	뭅	l ′			tration				•
					<u> </u>		in.				10	26	3	0 40	50	60	70	80
)																		
4			-															
1																		
7																		
-																		
1												•						
1																		
-																		
1																		
1									⊥.									
+	115.7	Bottom of boring : 47 feet.			Λ							ı						
1		No refusal.			Λ													
				F		1												
+		The state of the s																
, - J -													<u> </u>					
'																		
+														:				
-																		
-																		
-																		
1																		
_																:		
5-	1												-	1				
_																		
-											٠.							
-																		
-																		
_														:				
-																		
-																		
i0 -	Drill	er: Seaboard Drilling, CME 55 Skid mounte	d 140 lb dough	nut ł	hamme	r, drive	and	wash 4	l" casi	ng;	1			ned Co	-		Test Rem	vlyo
	Supervis	or: Robert Nothnagle												ne Te Penetr			rvane	

U		antec BO			LE								nor	D.CVT	37 -	10)511	32
	ENT	Town of Hooksett Sewer Comission Merrimack River HDD, Hooksett, NH												ECT Or a	No. TION			
	CATION . PLORATIO	ON DATE 5/24/2018 to 5/24/2018		TER	LEVE	- L -								JM .			N/A	
		TVDITTO -	Τ.	TT			MPL	ES .				Undr	ained	Shear	r Stren	gth - t	sf	_
	E Z		5				>	0	ō	D		1		2		3		4 —⊢
	ATIC	MATERIAL DESCRIPTION	IA	띪	TYPE	BER	VER	/ sw	-Valt	eadir M)	Mak	مه <i>ر</i> ړه ۱	ntant	9 AHA	rberg (imite	₩ _P	, V
	ELEVATION (ft)		STRATA PLOT	WATER LEVEL	Ξ	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)					Test, b			,
_	ш		-					<u>R</u>	ß	Q.	Stan	darđ	Pene	tration	Test,	blows	/foot	•
1	165.7						in.				10) 20	30	0 40	50	60	70	8
1		Very loose, dark brown medium sand, trace silt																
+					SS	1	5	WH	0	•								
1	163.7																	
1																		
+														-				
1												•						
+												·					+	-
1	159.7] [
1		Roller bit heavy grinding from 6 to 7 feet, possible										<u> </u>						
4	158.7	cobbles Very loose, dark bown medius to coase sand, trad-						N. 1										
1		silt																
1																		
4	156.7						-				H							
.					90	3		2 2	4									
0-					SS	3	6	2	4									
4							-				-							
-	153.7										:							
1	133.7	Loose, dark brown coarse sand with fine gravel,																
1	152.7	trace silt Rock in tip of spoon																
-	151.7	Roller bit heavy grinding from 13 to 17 feet, possib	le															
1	151.7	cobbles						6										
5-					ss	4	1	4 3	7		•		<u> </u>			4	\dashv	
-								2								-		
-																		
]	148.7	Wantana dadaharan San are-1	\vdash															
-		Very loose, dark brown fine gravel																
4																		
	146.7	,	_ _					_	_	-								
-		Roller bit heavy grinding from 19 to 21 feet, possible cobbles	le					6										
20 -		er: Seaboard Drilling, CME 55 Skid mounted 140 lb c		ust bas	=	ا_ا		2 wash 4'	Langie	<u> </u>	•			1	mpres			

X Pocket Penetrometer / Torvane
Continued Next Page

	ENT CATION _	Merrimack River HDD, Hookse	ett, NH								_	F	XPL	ORA'	TIOI). <u> </u>	B-6	<u>; </u>
		ON DATE5/24/2018 to 5/24/2018	8 WA	TER I	LEVE	Ĺ _						I	JTAC	М -			N/A		_
	(£)		OT .		-	SAI	MPLE					Undr 1		Shear 2	Stren	ngth - 3	tsf	4	
	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	161	8	ERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)				+		-	W _E	 - w	,
į	EVA	WATERIAL DECORAL FIOR	IRAT	ATE	TYPE	NUMBER	RECOVERY	plow	N-Z-Z	PPN (PPN				& Atte				- ⊕	
	ᆲ		တ	3		Z	RE	SPT	SP	딦	l '			ration Iration				*	
,							in.				10) 2	30	40	50	60	70	80)
0 🕇					SS	5	1	2 4	4										
-																			
1	143.7																		
1		Medium dense, light brown fine sand, trac	e silt																
+																			
-	141.7																		i
_			-		SS	c	7	6 5	11										L
5					99	6	7	6 6	''										
_																			
	138.7																		
-		Medium dense, light brown find and,	ce silt		N						::::								
+					Ц														
1	136.7					1					H								
_ {	i i				00	7	0	10 12	25										
0-					SS	7	8	13 7	43										
+	!																		
1	133.7		_																
		Medium dense, light brown fine to mediu trace silt	m sand,																
+		·																	
1	131.7									-	+								
-					95	.	20	11 8	22										
35-					SS	8	20	14 19	22					-					
-						-				-									
1	128.7																		
1		Medium dense, light brown fine to mediu trace silt	ım sand,									-							
-																			
1	126.7					<u> </u>		-			-								
-		Advanced roller bit as a probe from 39 to	0					16 11			1.								
40 -	Drille	er: Seaboard Drilling, CME 55 Skid mounte	ed 140 lh dough	nut har	nmer	drive	and s		' casii	-i		۱ He	- 'e iconfir	od Co	mnre	eeian	Test		

U	y St	antec	BORE	НО	LE	L	.00	3								В-	O	
CLI	ENT	Town of Hooksett Sewer Comis	sion											ECT				
	CATION										_			ORA				<u>B-6</u>
EX	PLORATI	ON DATE 5/24/2018 to 5/24/201	8 WA	ATER	LEVE	L _								Л			N/A	_
	Æ		5	世		SA	MPL		1			Undr 1		Shea 2		ngth - 1 3	tst	4
	OL	MATERIAL DESCRIPTION	A PL			EK.	Ή	.9/s	alue	ding (-		-	Wg	
	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	ТҮРЕ	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	ı			& Atte	-		;	-0
1			ST	×	-	Σ J	Ä	SPT	SPT	8	l			ration				*
1		Marrie Ma					in.							tration 0 40				80
o+		Harry .			SS	9	24	71	22									\top
1								21										
1																.		
+																		
1																		
1																		
4																		
5 🕂	120.7	Bottom of boring at 45 feet.									1						-	
1		No refusal.									ļ							
1															ļ			
4																		
-		1										 						
1																		
1																		
1							-				1							
0											-							
+																:		
													·					
1																		
4																		
1																:		
1																·		
5-												ļ			<u></u>			
۲																		ı
-																		
-												-						
-																		
1																		
4																		
-																		
50 	Drill	 er: Seaboard Drilling, CME 55 Skid mounte	d 140 lb doughr	ut ha	ııı. mmer.	drive	and v	wash 4	" casi	.⊥ ng;		L Un	confir	ed Co	ompre	ssion '	Test	L
- 1		or: Robert Nothnagle	٠		,					-				_				olded

	CATION - PLORATION	Merrimack River HDD, Hooksett, NH ON DATE 5/24/2018 to 5/24/2018	- WA	TER	LEVE	և _		-			_			JM			N/A	
			DT.	Щ		SAI	MPL	ES				Undr 1		Shea 2		ngth - 3	tsf	4
	ELEVATION (ff)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyn	er Co amic	ntent Pene	& Atte	erberg Test,	Limits	W _f s H s/foot	
	166.2						in₊										70	8
†		No recovery																
+					SS	1	0	WH	0	•								
\mathbf{I}	164.2																	
1	104.2																	
\perp																		
1																		
1																		
1																		
\downarrow															-	:		
1																		
	159.2		<u>.</u>						- 1							:		
4		Medium dense, da brown fine rave and coarse sand			N			7										
-		Salid	1	Z	S.	2		6	12			•						
1	157.2							5										
1																		
0-																		
1			i															
1											1							
4	154.2	No was a second amount	-						-		-							
-		No recovery, drove second spoon. Meidum dense, grey fine sand, trace silt						9				_						
1					SS	3	2	8	14			•						
1	152.2					-		7	-		-						.	
-											:							
5-			-									T						
-																		
+	149.2	Loose, grey fine sand, trace silt and fine black	+	-		-		4			1							1
-		particulate			SS	4	12	5	9								'	
					1 22	1	124	6										
-	147.2		-	+			-	+	-	+	-							
-											1							

CI	JENT	Town of Hooksett Sewer Comiss Merrimack River HDD, Hookset		НО	LE	L	-0	G
	CATION (PLORATI	ON DATE5/24/2018 to 5/24/2018		ATEF	R LEVE	 EL -		
	Œ)		TC	旧		SA	MPL	ES
оертн (#)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	13 / oming 14 14 14 14 14 14 14 14 14 14 14 14 14
- 20 -					ļ		in.	
	144.2	Meidum dense, light brown fine sand, trace	silt		SS	5	16	
	142.2						<u> </u>	1

B-7

PID Reading (PPM)

SPT N-Value

SPT blows / 6"

6 7

8

15

21

13

23 29

19 20

26 25 46

26

SS 7 20

SS 8 24

195113295 PROJECT No. <u>B-7</u> EXPLORATION No. DATUM _ Undrained Shear Strength - tsf Water Content & Atterberg Limits Dynamic Penetration Test, blows/foot Standard Penetration Test, blows/foot 60 80 90 10 20 30 40 50 △ Unconfined Compression Test

■ Remolded

➤ Pocket Penetrometer / Torvane
Continued Next Page

☐ Field Vane Test

STN13-GEO-L-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

- 25

30

35-

139.2

137.2

134.2

132.2

129.2

127.2

Supervisor: Robert Nothnagle

Meidum dense, lig

Dense, light brown coarse to medium sand, trace silt

Dense, light brown medium sand, trace silt

Advnaced roller bit as a probe from 39 to 45 feet.

Driller: Seaboard Drilling, CME 55 Skid mounted 140 lb doughnut hammer, drive and wash 4" casing;

V	7 31	ante		BOR	ا سا	10	<u>ــاــ</u>	1		٠									-7		
	IENT		f Hooksett Sewer Comis													ECT			1951		
	CATION		ack River HDD, Hooks 5/24/2018 to 5/24/201										_					ΝN	o N/A		<u>/_</u>
EX	I	ON DATE -	3/24/2018 to 3/24/201	18	WA	TER	LEVI		MPL				_			UM Shea		nath :			_
£	Œ Z				LOT	Ä	·-···	32	F 1		o)	7 3		1		2		3		4	ļ
DEPTH (ft)	ATIO	1	MATERIAL DESCRIPTION		TAP	R. B.	щ	BER	VER	ws /	-Valu	adin M)				0.511			w		V
	ELEVATION (ft)				STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)							ts I /s/foot	*	j k
					-					R R	S S	α.							vs/foot	•	Þ
10 +							1		in.				1	0 20	3(0 40) 50) 60	0 70	80	0
1					•																
4																					
-																					
1																					
-				:															.		
_	121.2																				
5			poring at 45 feet.																		
\exists		No refusal.																			
1										. 5											
1																					
-				$\overline{}$																	
-													i i.								
1								-				_									
0																		-			╀
1																			.		
<i></i>																					
+													:								
1																					
4																					
_																		-			
i5-																					T
4																					
4											į										
]													.								
+																					
1																					
50 												<u> </u>	1							L	\perp
JU T	Deith	er: Seaboard I	Drilling, CME 55 Skid mounte	ed 140 lb dou	ghnu	t har	nmer.	drive	and v	vash 4'	' casin	g:	1 ^	Line	onfin	ed Co	mare	ssion	Test		

✗ Pocket Penetrometer / Torvane

STN13-GEO-L-VOC 13295- B1 TO B11.GPJ JW NHP,GDT 6/7/16

ELEVATION (ft)	RATIO	Merrimack River HDD, Hooksett, NH DN DATE 5/24/2018 to 5/25/2018 MATERIAL DESCRIPTION Very loose, black fine sand trace silt	STRATA PLOT	WATER LEVEL HENDER	SS	SAI	8 SECOVERY	% SPT blows / 6" WH	SPT N-Value	PID Reading (PPM)	Wate Dyna Stan	Da Undra 1 er Con amic P dard F	ATU lent a	ORA' JM - Shear 2 & Atter & Atter tration tration 0 40	Stren rberg Test, Test,	agth - 3 - Limits blows	N/A tsf W _f s	4 - W *
ELEVATION (ft)	72.2	MATERIAL DESCRIPTION			TYPE	NUMBER	.ii RECOVERY	SPT blows / 6"		PID Reading (PPM)	Wate Dyna Stan	Undra 1 er Con amic P dard F	lent denet	Shear 2	rberg Test, Test,	3 Limits blows blow	W _f s H	* •
17	72.2		STRATA PLOT	WATER LEVE			in.			PID Reading (PPM)	Dyna Stan	er Con amic P dard F	eneti Penet	& Atter	Test, Test,	Limits blows	s F s/foot s/foot	* •
		Very loose, black fine sand trace silt			SS	1		WH	0		10	20	30	9 40	50	60	70	80
17		Very loose, black fine sand trace silt			SS	1	8	WH	0						-			
	70.2											-						
														1	ļ	-		
										1								
	1																	
		DR		F		Liver												
) — 1+	62.2	Very loose, black fine sand trace silt														-		
1	60.2	very loose, black fille saile date site			ss	3	12	1 WH-6' 2 2	2		•						-	
	157.2																	
i-	131.6	Loose, grey fine sand, trace silt			SS	4	18	5 3 4	7		•							
1	155.2							5										

Driller: Seaboard Drilling, CME 55 Skid mounted 140 lb doughnut hammer, drive and wash 4" casing;

△ Unconfined Compression Test

➤ Pocket Penetrometer / Torvane Continued Next Page

☐ Field Vane Test

STN13-GEO-I-VOC 13285- B1 TO B11,GPJ JW NHP.GDT 6/7/18

20

						-														
C	St	antec BC	REF	Ю	LE	Ĺ	-00	3								В	-8			
CI	LIENT	Town of Hooksett Sewer Comission										Ī	PROJ	ECT	No.	_]	1951	132	95	
	CATION	Merrimack River HDD, Hooksett, NH		····													0	B-8	}	
E	XPLORATI	ON DATE 5/24/2018 to 5/25/2018	WA	TER	LEVE	EL -					_						N/A		_	
	£		<u> </u>	ایرا		SA	MPL	ES				Undr	ained		ar Stre	-				
DЕРТН (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyn	amic	Pene	tration	erberg n Test, n Test	, blow	v ts I s/foot	t *	r	% ∟
							in.				ı				0 50					0
- 20 - - 		Loose, grey fine sand, trace silt			ss	5	18	3 4 5	9		•									
	150.2							5									•			-
														:					-	
- 25 - -	147.2	Medium dense, grey fine sand, trace silt						5								-				
- - 	145.2				SS	6	18	, 7 6	14			•		:] 			İ	_
- 		I)K																		-
 - 30-	142.2					N														-
		Loose, grey fine sand, trace silt			SS	7	12	3 3 5 6	8		•									
- -	140.2																			
- - -																		-		
- 35 -	137.2	Medium dense, grey fine sand, trace silt						5			<u> </u>								-	F

13

△ Unconfined Compression Test

X Pocket Penetrometer / Torvane Continued Next Page

☐ Field Vane Test

■ Remolded

8 18

Driller: Seaboard Drilling, CME 55 Skid mounted 140 lb doughnut hammer, drive and wash 4" casing;

STN13-GEO-I-VOC 13285- 61 TO 811.GPJ JW NHP.GDT 6/7/18

135.2

132.2

_		antec BOF Town of Hooksett Sewer Comission										D	рОп	ECT	No	195	1132	29
	ENT	TE I I DE YEDD II I I AND		-												No.		
	CATION	ON DATE 5/24/2018 to 5/25/2018	WA	TFR	LEVE	π.										B.7.6		
EA		ON DATE	T				MPLI	 ES								gth - tsf		_
2	E z		ļ						o o	D)		1		2		3	4	4
(יו) רו דם	ATIO	MATERIAL DESCRIPTION	TAF	밁	щ	3ER	ÆŘ	ws/	.Valu	sadin M)	,,,,	-			J 1		W _P V	
	ELEVATION (ft)		STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blaws / 6"	SPT N-Value	PID Reading (PPM)					rberg L Test, b	.imits :lows/fo	-	⊖ *
	Ш		ι O	5			8	ВP	R.	<u>a</u>	1 -					olows/fo		•
							in.		_		10	20	30	40	50	60	70 8	30
0 +		Medium dense, grey fine sand, trace silt						6										Ì
4					SS	9	22	6 7	13			•						
-	130.2							7										
1	130.2	Avanced roller bit as a probe from 42 to 50 feet.		1 [
1																		
-																		
+																		
15-																_	1	1
13-7				-														
-														:				
1								/m	1	t garage								
1					Λ													
4															l			
-																		
┪										-	'							
50	122.2						-				<u> </u>	_	_				+	-
-		Bottom of boring at 50 feet. No Refusal.														:		
-																		
-			ļ								١.							
-																		
											·							
55-											\vdash	-	\vdash	-			-	_
-												-						
-																		
_																		
-																		
-																		
-																		
-											1.							
- 60 -			\perp								1		1					_

Sta	antec
CLIENT	Town of
LOCATION _	Merrima

STN13-GEO-I-VOC 13295- B1 TO B11,GPJ JW NHP,GDT 6/7/18

BOREHOLE LOG

B-9

	LIENT	Town of Hooksett Sewer Comission										1	PROJ.	ect	Mo	1	1951	132	.95
	DCATION					***************************************	***************************************						EXPL						
Е	KPLORAT!	ION DATE5/21/2018 to 5/21/2018	WA	ATEI	R LEVI	EL -							DAT				N/A		
	€		TC			SA	MPLI	ES				Und	rained			_		_	
H.(#)	NO N	MATERIAL DESCRIPTION	A PL	E		iκ	Ϋ́	3/6"	alue	Jing (<u> </u>	2		3		4	
DЕРТН (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Wa	ter Co	ontent	& Atte	erberg	} Limit		V _P W I →	
<u> </u>	ᆸ		ST	W		ž	REC	SPT	SPT	민			Penel						
	190.0						in.						Penei						90
- 0 -																		\Box	
																			H
																			-
								ı											
_								ı											-
- 5 -								ı								\rightarrow	\dashv	\dashv	+
_								ı											
-																			ŀ
			À		Λ														H
]			'																_ [!
-		_/ <i> </i>		r							<u> </u>								. !
-		Loose, light brown tine sand, trace silt						3											. H
- 10-					SS	1		3						-					[
-	170.0							4 6											
	179.0																		
-]																			. [!
1														:					. :
	176.0	T Rabeharran San sand tenna silt		-					ļ										, -
-		Loose, light brown fine sand, trace silt						3			:				,				
- 15 -					SS	2		3						-					
	174.0		<u> </u>					4	<u> </u>										,
1												:.				.	.		
											:								
											:								ı
	171.0																		
		Very loose, light brown fine sand, trace silt						1											
- 20 -	70-11.	C 1 -1D-11 CB E 45 (-1-1						1	<u> </u>			<u> </u>	\coprod						\perp
		er: Seaboard Drilling, CME 45 track mounted 140 lb aut or: Robert Nothnagle	o han	nmei	r, drive	and v	vasn 4	i" casın	g;		1		onfine d Vane				Test Remo	olded	
	į										×	Pod	ket Pe	netro				Vext P	'aoe

CLI	IENT	Town of Hooksett Sewer Comission	l]	PRO	ЈЕСТ	` No.		1951	132	29
	CATION	Merrimack River HDD, Hooksett,	NH								_]	EXP	LOR	ATIC	N N	lo.	B-9	9
EX	PLORATI	ON DATE5/21/2018 to 5/21/2018	WA	TER	LEVE	EL -				···········				TUM			N/A		_
T	₽		F	ايا		SA	MPLE	ES				Und	Iraine	d She	ar Stre	ength	- tsf		
	ELEVATION (ft)		STRATA PLOT	WATER LEVEL		~	≿	.9/	말	פֿ			1 		! 	 	} ├	4	4
	VATI	MATERIAL DESCRIPTION	ATA	띪	TYPE	NUMBER) VE	ows	t-Val	(eadi PM)	Wa	ter Co	onten	nt & Att	.erber	a Limi	its f	V _P W	N
			STR	WAT	۴	Š	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)				etratio		-		*	*
╀								ιχ	ഗ	u.	l			etratio					•
+					SS	3	in.				1	0 2	20 :	30 4 	0 5	0 6	0 70	0 80	JO T
1	169.0							2											
	105.0																		Ì
																			ļ
-																			
1								•											
1	166.0																		
$\frac{1}{1}$		Loose, grey fine sand. trace silt						2											
┨					SS	4		2 5							· ·				-
1	164.0							2			:								
1																			
1								<u>:</u>											
1					Λ											:			
-			\	L															
1	161.0				· ·														
-		Medium dense, light brown medium sand, trace	silt T				-			_									
1					SS	5		2.4.7.14	1										-
1	159.0								ļ										
1																			
1				-							ļ								
1																			
																:			
4	156.0	Dense, light brown fine sand, trace silt																	
1		Dense, fight brown the said, trace shi						12 14									-		
1					SS	6		16											
]	154.0					<u> </u>		17	ļ									ĺ	
$\left\{ \right.$																			
1																			
j				-							' '		1						
1																			
+	151.0	Medium dense, light brown fine sand, trace silt		-					\vdash		1								
1		ricaium dense, agai biown mic sand, trace sin						7 11									1		
+	Drille	r: Seaboard Drilling, CME 45 track mounted 140) lb auto har	1	· drive	ands	wach 4		1	-	١.	Llm		ned Co	4		T4		_i

STN13-GEO-4-VOC 13295- B1 TO B11,GPJ JW NHP,GDT 6/7/18

V	7 30		ORE		/ LL.		.00	<i></i>									-9		
	JENT	Town of Hooksett Sewer Comission			<u></u>						_			JECT			1951		
	CATION	Merrimack River HDD, Hooksett, NI ION DATE 5/21/2018 to 5/21/2018		· 44C							<u></u>			LORA			lo N/A		<u>9</u>
EA		ON DATE SIZIZOTO to SIZIZOTO			R LEVE		**4DI				_			UM d Shea					_
£	Ä,		LoT	VEL	-	ÞΛ	AMPLE		T 63	_ !	ĺ	1	(anc.	u Sriea 2 :		3 1		4	4
DEPTH (ft)	ATIO	MATERIAL DESCRIPTION	TAP	RIE	Й	3ER	Æ	ws/E	Value	ading M)									w
	ELEVATION (ff)		STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	1			t & Atte etration	_	-			○
	——			>		<u>-</u>	\vdash	SP	R.	<u> </u>	1			etration					•
40				/	■ SS	7	in.	13	<u> </u> '	 	11	0 20	0 3	30 40	0 50	J 60	J 70	3 80	30 T
1	149.0				55	, , 		14				1							
1	145.0	Advanced roler bit as a probe from 41 to 59 feet.				'			+			1.	1.				ı.		
1						i ,		ĺ	'	'						,		ļ	
1						i		İ	1									,	
1						1		1	1	,								,	
4				!		1		1		-								,	
-				!		t		1										,	
45						ĺ												, 🗇	+
+				1				1				'				.			
-				1		1												, }	
1				1/		1							'						
-		I)H		1		A							1			1		, 1	
1								•										, !	
1	-															-		1	
50-						1								\square		\vdash		_	+
4						1					!							1	
						1					1							()	
1						ŧ													
						ĺ					. !							1	
1						į						'	'			.			
-						ĺ					. '								
55						Ė												'	
" [ĺ					. '	'				[]			
-						ĺ													
1						ĺ						1. 1	. '		-			1	
-			1.			ĺ							'	.		-			
-						ĺ													
. 1	131.0			'		<u> </u>					. '			.				'	
		Bottom of boring 59 feet. No refusal.										1						'	
1	1	NO iciusai.	1	4 .	11 .	1		1	ı	1	11.	1 -	1	1 .	1 -	F .	1 .	1 1	- 1

V	,		REI			•		_							_		10	
	ENT	Town of Hooksett Sewer Comission									_			JECT			1951	
	CATION										_			LORA			0 N/A	B-1
EX	PLORATI	ON DATE5/21/2018 to 5/22/2018	WA	TER	LEVE									UM d Shea				
,	£		10.	힠	- 1	SA	MPLI		1			Unioi 1		3 Sile:		- iigaii 3		4
	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	ш	E E	ERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)						-+	V	— /⊳ v
ן נ	EVA		[RA]	ATE	TYPE	NUMBER	RECOVERY	blow	Ź.	Res (PPN	1			t & Att				·
1	山		ς,	3		Z	뿐	SPT	SP	문	l '			etratio etratio			rs/toot vs/foot	
	190.0						in.				l						0 70	
†	189.7	4 inches of topsoil	_H_	4				1					,					
4		Very loose, brown fine sand, trace silt			SS	1	18	1	2		•							
-	100.0							1			·							
1	188.0																	
]								
]																		
	186.0	Very loose, brown fine sand, trace silt	-	-														
1		ros j 10000, otoma fine sana, nace sin				_		2 2										
5					SS	2	15	3	5									
1	184.0					ļ		2	-		:							
-	1								╽.	<u> </u>								
-				$\ 1 \ $:							
1												,						
1				H	-											, 1		
4	181,0	Vary loose brown time and trace sile				A			-									
-		Very loose, brown fine sand, trace silt						4 1								•		
0-					SS	3	14	2	3		•		T					
1	179.0							4			.							
-											1							
4											1							
1																		
1																		
4	176.0	No. Providence in the Control of the		-		-			-		┨.							
-		Medium dense, light brown fine sand, trace silt, 5" layer red fine sand						5 6										
5		•			SS	4	18	11	17			┢	-	<u> </u>				
	174.0							8						.				
]																		
4																		
-																		
1																		
	171.0						ļ		_		4							
-		Medium dense, light brown fine sand, trace silt						9										
10 4		er: Seaboard Drilling, CME 45 track mounted 140 lb				<u> </u>		11			+	1	1	1	<u>L</u>	<u></u>	Test	

➤ Pocket Penetrometer / Torvane Continued Next Page

BOREHOLE LOG

B-10

		ILIENT Town of Hooksett Sewer Comission OCATION Merrimack River HDD, Hooksett, NH										ROJI XPL		No. IION		9511	329: 3-10			
			ON DATE 5/21/2018 to 5/22/2018	WA	TER	LEVE	L _							ATU				N/A		
	DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER &	RECOVERY 3	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Wat Dyn	Undra 1 er Cor amic I	ntent (2 	rberg l Test, l	3 	W _P s I−	4 	W _L
	- 20 -					- 00		in.	- 14	25		l						70	80	90
		169.0				SS	5	1	14	25										
	-	166.0															-			-
-	- 25 -	166.0	Medium dense, grey fine sand, trace silt			SS	6	8	9 8 8	16			•						-	
		164.0		-	1															
			DR											-			-			
	- 30	161,0	Medium dense, light brown fine sand, trace silt			ss	7	13	14 9 10	19		H					-			-
		159.0							10											
	- -																			
	 - - 35 -	156.0	Medium dense, grey fine sand, trace silt			ss	8	12	8 6 8	14			•					-		
J.W NHP,GDT 6/7/18	 	154.0							6							-				
STN13-GEO-L-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/16		151.0	Medium dense, light brown fine sand, trace silt Rock in tip of spoon						17 16				-				·			
STN13-GEO-I-V	40 -		er: Seaboard Drilling, CME 45 track mounted 140 lb au or: Robert Nothnagle, Brian Foley	ito ha	ımme	er, drive	e and	wash	4" casi	ng;		□	Und Fiel	d Van	e Tes	i meter	≓ ⁄Ton	Remo		age

Ų	St	antec BOF	REH	Ю	LE	L	-00	3]	B-	10		
CL	IENT	Town of Hooksett Sewer Comission									_			ECT			1951		
	CATION													.ORA		N N	o N/A		0
EX		ON DATE 5/21/2018 to 5/22/2018			LEVE		MPL	ES			<u> </u>			JM Shea		nath -			
חבייות (וו)	ELEVATION (#)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	ТҮРЕ	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Wat	er Co	ontent	2 + & Atte	erberg	3 	v ts I	_)
\dashv							in.	Ø	-		1			etration O 40					
0 🖠					SS	9	2	16 15	32										
-	149.0	Advanced roller bit as a probe from 41 to 59 feet	-																
+																			
1													·						-
1											·								
_									╽.										
1					A		7				:					- 1			
$\frac{1}{2}$		IJK													.				
			\bigvee																
		-				-													
																			t
-																			
1																			
1															·				
$\frac{1}{2}$																			
-																:	-		+
-																			
-					1														
-																			
-	131.0																ŀ		
1		Bottom of boring at 59 feet.																	İ

Driller: Seaboard Drilling, CME 45 track mounted 140 lb auto hammer, drive and wash 4" casing;

△ Unconfined Compression Test

➤ Pocket Penetrometer / Torvane

■ Remolded

☐ Field Vane Test

STN13-GEO-I-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

60

Supervisor: Robert Nothnagle, Brian Foley



BOREHOLE LOG

B-11

	CLIENT Town of Hooksett Sewer Comission PROJECT No. 195113295 LOCATION Merrimack River HDD, Hooksett, NH EXPLORATION No. B-11																			
l .		ON DATE 5/22/2018 to 5/22/2018	. WA	TEF	R LEVE	EL -							DATU				N/A		_	
П	· · · · · · · · · · · · · · · · · · ·		<u>_</u>	٦		SA	MPLI	≘s				Undr	ained			ngth -	tsf			
DЕРТН (#)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	ТУРЕ	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyn	amic	Penet	ration	erberg	Limits blows	/foot		w _L →1	
- 0	190.0						in.				1	0 20	0 30) 4(50	60	70	80	90	
	188.0	Very loose, brown fine sand, trace silt			SS	1	24	WP 2 1 2	3		•								-	
	186,0	Loose, light brown fine sand, trace silt						3								-				
- 5 - 	184.0	,			SS	2	17	2 3 5	5							-				
		ΠR										W		-		-				
 - 10-	181.0	Medium dense, light brown fine sand, trace silt			SS	3	0	10 10 12 10	22							:			-	
	179.0							10							-					
15-	176.0	No Recovery			SS	4	0	6 10 10	20								-			
	174.0							11												
- 20 -	171.0	Medium dense, light brown fine sand						5 5				•								_
		er: Seaboard Drilling, CME 45 track mounted 140 lb a or: Brian Foley	iuto hi	amm	er, driv	e and	wash	. 4" casi	ing;		[∃ Fie	eld Va	ne Te	st omete	ession E er/Tor Contir	Rem rvane		Page	

Sta	antec
CLIENT	Town of
LOCATION	Merrima

STN13-GEO-LVOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/16

BOREHOLE LOG

B-11

	LIENT	Town of Hooksett Sewer Comission]	РКОЛ	СТ	No.		1951				
	OCATION VDI OD AT	Merrimack River HDD, Hooksett, NH ION DATE 5/22/2018 to 5/22/2018	17/A	TTT							_		EXPL			1 N	lo N/A	B-1	1		
E		IONDATE SIZEZUTO to SIZEZUTO	WA		LEVE		MPL	E6			_		DATU			nath					
DEPTH (#)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	ТҮРЕ	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)	Dyr	Undrained Shear Strength - tsf 1 2 3							→		
- 20 -					- cc		in.	a	14		l		0 30						90		
	169.0				SS	5	12	9 10	14												
	166,0	Medium dense, light brown fine sand, 1/2" Clay layer						8 9													
- 25 - - 	164.0				SS	6	14	11 WH	20							:			. :		
	:	No Recovery													-				. :		
- 30-	161.0				SS	7	0	9 8 13	21							-			-		
-	159.0		-					9										•			
																			: -		
- 35-	156.0	Medium dense, brown fine sand, trace silt, silt lenses			SS	8	17	9	19												
-	154.0							11													
-																					
	151.0	Medium dense, brown fine sand, trace silt, some red																			
		sand layering						6 6								: '					
40 - -	Driller: Seaboard Drilling, CME 45 track mounted 140 lb auto hammer, drive and wash 4" casing; Supervisor: Brian Foley																				

	J 3T	antec BO	KEI	HL	LE	ļ	_U(5							İ	5- .	11			
	LIENT				. =									ECT				1329		
L	OCATION	Merrimack River HDD, Hooksett, NH									_			LORA					<u></u>	
EX		ON DATE 5/22/2018 to 5/22/2018	WA	WATER LEVEL									DATUM N/A Undrained Shear Strength - 1sf							
£	ELEVATION (ft)		LOT	VEL	SAMPLE			ω	D		1		2		3		4			
DЕРТН (#)	ATIC	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM))M/of	tor Co	entant	& Atte	urbora	Limite	W		w	
8	ELE\		STR	WAT			SECC		PTM	5 (P. P.)				tration				*	•	
							in.		S	LL-				etration				•	•	
- 40 -		· ·		-	SS	9	17	8	14		31	0 2	0 3	0 40	50	60	70	- 80	91	
	149,0	Advanced roller bit as a probe 41 to 59 feet		-				8												
F																•				
																			.	
-			İ																	
- 45									ľ								1			
-																				
					Λ															
		UK		1							:: ::									
			M	7																
,			T	1																
-50-	1										:								:	
																	• • •			
-																				
											ļ									
-																				
- 55 -																				
•																				
Γ -																				
	121.0]	ļ			

STN13-GEO-I-VOC 13295- B1 TO B11.GPJ JW NHP.GDT 6/7/18

-60

Bottom of boring at 59 feet.

Supervisor: Brian Foley

Driller: Seaboard Drilling, CME 45 track mounted 140 lb auto hammer, drive and wash 4" casing;

△ Unconfined Compression Test

× Pocket Penetrometer / Torvane

■ Remolded

☐ Field Vane Test