Appendix G

Geotechnical Data

GEOTECHNICAL DATA REPORT

ASHTON HYDROELECTRIC DEVELOPMENT STREAMDIVER TURBINE CONCEPT CUMBERLAND, RHODE ISLAND

Prepared for:

New England Hydropower Company Beverly, Massachusetts

Prepared by:

Kleinschmidt Associates

January 2022



GEOTECHNICAL DATA REPORT

To: Mr. Michael Kerr

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From: Helen Russell, E.I. Travis Carpenter, P.E. (Maine)

Staff Geotechnical Engineer Senior Geotechnical Engineer

Date: January 7, 2022

Re: Geotechnical Data Report

Ashton Hydroelectric Development – StreamDiver Concept

Cumberland, Rhode Island Project No. 4161008.01

1.0 Introduction and Purpose

Kleinschmidt Associates (Kleinschmidt) is pleased to present this Geotechnical Data Report to New England Hydropower Company, LLC (NEHC) to summarize geotechnical investigation data obtained at the Ashton Dam site (Site) in Cumberland, Rhode Island. The investigation will be used to support the design and construction of the proposed Ashton Hydroelectric Project with the Voith StreamDiver turbine concept (Project). Geotechnical explorations and laboratory testing were conducted in general accordance with Kleinschmidt's Proposals for Engineering Services, which were submitted to NEHC on August 31, 2020 and November 9, 2020.

The purpose of this geotechnical investigation was to obtain information on the subsurface conditions at/near the left (looking downstream) end of the existing dam, proximate to the footprint of the proposed development. Data from this investigation will inform the design and construction of the Project, including seepage analyses, seepage cutoff evaluation/design, cofferdam design, preliminary dewatering estimates, and evaluation of foundation support and subgrade preparation.

Geotechnical explorations were performed in July and September 2021, and geotechnical laboratory testing was completed in July and October 2021. This report briefly summarizes

applicable project background information, presents the geotechnical exploration and laboratory testing programs, and describes the subsurface conditions encountered. The contents of this report are subject to the attached Limitations (Attachment 1).

2.0 Project Information

The following subsections identify the project datum and provide general descriptions of the Site, the regional geologic setting, and the proposed development.

2.1 Project Datum

Elevations reported herein are based on the North American Vertical Datum (NAVD) of 1988. Elevations are reported in units of feet.

Any references in this report to "left" and "right" are based on looking downstream.

2.2 Existing Conditions

The existing Ashton Dam is located on the Blackstone River in the towns of Cumberland and Lincoln, in Providence County, Rhode Island. The dam is classified as a low hazard dam by the Rhode Island Department of Environmental Management (RIDEM). The dam was constructed in 1885 and consists of a stone-masonry gravity dam with a main spillway, a low-level gate structure, a lower-level spillway (with a crest approximately 2.5 feet below the crest of the main spillway), and stone-masonry abutments on each side of the river.

An 1894 Commissioning Report describes the dam's foundation as a "well-bonded rubble-masonry laid close in cement mortar." Wood sheet piling was reportedly installed across the width of the river/dam to create a water-tight work area, but the final depth and/or extents of the timber cofferdam was not recorded. The foundation of the downstream apron reportedly consists of concrete and rubble masonry laid on top of timbers to create a mattress. The upstream end was reportedly bolted to the dam, while the downstream end was fixed in place with a steel sheet pile, with final depth unknown.

The dam spans approximately 260 feet across the river and has high and low spillway crest elevations of +73.6 feet and +71 feet, respectively. The total impoundment surface area is approximately 35 acres, which provides a storage capacity of about 200 acre-feet at normal pond/flow conditions.

The existing dam has remained in satisfactory condition for over 130 years and has survived a flood comparable to the 100-year flood without noticeable structural damage.

2.3 Regional Geologic Setting

The Site is situated within the southern portion of the Blackstone River basin, where the surficial terrain has been characterized and shaped by erosional and glacial processes. The near-surface soils in the region typically consist of glacial outwash material and glacial till blanketing the bedrock. Near the river, however, the near-surface soils are normally characterized by alluvial deposits consisting of stratified silt, sand, and gravel.

According to the Bedrock Geologic Map of Rhode Island (Hermes, Gromet, and Murray, 1994), bedrock in this region is characterized as metamorphic rock of the Blackstone Group and typically consists of quartzite, greenstone, and/or schist. Bedrock is mapped as dipping sharply to the east at angles of 45 to 80 degrees from horizontal.

2.4 Proposed Development

The proposed development (i.e., Project) involves the removal of the lower-level (auxiliary) spillway and construction of a new concrete powerhouse that will house four (4) new Voith StreamDiver turbines. The proposed development will also include a new control building, a transformer and containment pad, a crushed stone access road and parking area, and a bioretention basin, all to be constructed along the left riverbank.

The new powerhouse will be approximately 54 feet wide and will span between the existing low-level gate structure and the left abutment wall. The structure will include upstream and downstream training walls and aprons, with riprap likely to be placed upstream and downstream of the aprons to provide additional erosion protection.

The new powerhouse, training walls, and associated aprons will require excavation of approximately 8.5 to 12.5 feet below the existing river bottom to achieve the target subgrade/bottom of foundation elevation of about +51.5 feet. This is approximately 28.5 feet below the left riverbank/top of retaining wall and about 22 feet below the normal pond/river elevation of +73.6 feet. The foundation details are still being evaluated, but the design is considering a mat (concrete) foundation to be founded on piles or upon native alluvial soils.

3.0 GEOTECHNICAL EXPLORATIONS & LABORATORY TESTING

The primary components of the geotechnical exploration and laboratory testing programs, as completed, are described in the following subsections.

3.1 2021 Geotechnical Explorations

3.1.1 Sonic Borings

In September of 2021, Kleinschmidt subcontracted Cascade Drilling (Cascade) to drill three (3) angled test borings (designated as B-01-21, B-02-21, and B-03-21) and one (1) vertical test boring (designated as B-1V-21) via a track-mounted TerraSonic TSi 150CC Compact-Crawler drill rig. Kleinschmidt selected the boring locations in relation to existing Site features and the proposed development, and under the constraints of drill rig access and any underground or overhead utility conflicts. The as-drilled boring locations are depicted on Figure 1.

The angled test borings were advanced 126 to 150 feet at angles ranging from 40 to 45 degrees relative to horizontal, which corresponds to vertical boring depths of about 89 to 100 feet below the ground surface (bgs). The vertical test boring (B-1V-21) was advanced to a depth of 68 feet bgs.

The borings were performed using sonic drilling methods using a 4-inch inside-diameter core barrel and 6-inch outer-diameter casing. Each soil/rock core retrieved was photographed, and grab samples were collected at the discretion of the Kleinschmidt engineer on-site. Kleinschmidt directed the drilling, testing, and sampling activities and logged the subsurface conditions encountered at each boring location.

Upon completion, each sonic boring was backfilled with cement-bentonite grout placed via tremie methods. Selected soil samples were sealed in moisture-tight containers and returned to Kleinschmidt's office for further review, classification, and/or geotechnical laboratory testing. Detailed records of the drilling, sampling/testing, and subsurface conditions observed at each test boring location are provided on the attached Sonic Boring Logs (Attachment 2A).

3.1.2 Drive-and-Wash Borings

In July of 2021, Kleinschmidt subcontracted Northern Test Boring (NTB) to drill three (3) vertical geotechnical test borings (designated as B-04-21, B-05-21, and B-06-21) via a track-mounted Diedrich D50 drill rig. Kleinschmidt selected the boring locations in relation to existing Site features and the proposed development, and under the constraints of drill rig access and any underground or overhead utility conflicts. The asdrilled boring locations are depicted on Figure 1.

These borings were advanced to depths ranging from about 37 to 70 feet bgs via drive-and-wash drilling methods using 4-inch inside-diameter flush-joint steel casing, a roller bit, and water. As the borings were advanced, standard penetration tests (SPTs) were conducted at regular intervals and soil samples were obtained via 2-inch outside-diameter split-spoon samplers driven by a 140-pound automatic hammer. SPTs were performed in general accordance with ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Kleinschmidt directed the drilling, testing, and sampling activities and logged the subsurface conditions encountered at each boring location. Detailed records of the drilling, testing/sampling, and subsurface conditions observed at each boring location are provided on the attached Drive-and-Wash Boring Logs (Attachment 2B).

Upon completion, boring B-04-21 was backfilled with cement-bentonite grout placed via tremie methods. Borings B-05-21 and B-06-21 were restored as traditional standpipe piezometers. The Piezometer Construction Diagrams (Attachment 3) provide details of each piezometer installation.

Selected soil samples were sealed in moisture-tight containers and returned to Kleinschmidt's office for further review, classification, and/or geotechnical laboratory testing.

3.1.3 As-Drilled Survey

NEHC subcontracted DGT Associates (DGT) to survey the horizontal location and elevation of each boring and piezometer upon completion of the geotechnical exploration program. Vertical elevations including the ground surface, the top of riser (TOR), and/or the rim of the protective casing were surveyed to an accuracy of 0.01 feet.

3.2 2021 Geotechnical Laboratory Testing

Kleinschmidt selected representative soil samples for geotechnical laboratory testing. Kleinschmidt subcontracted Soil Metrics, LLC to perform the testing. The following tests were completed:

- 8 moisture contents (ASTM D2216), and
- 8 particle-size analyses (washed sieve only) (ASTM D422).

Geotechnical laboratory testing was performed in general accordance with ASTM procedures. The results are summarized in Table 1 (attached). Test results are provided in Attachment 4.

4.0 SUBSURFACE CONDITIONS

The following subsections briefly describe the soil, bedrock, and groundwater conditions encountered at the site, based on results of the geotechnical explorations and laboratory testing. Detailed descriptions of the conditions observed at each test boring are provided on the attached Boring Logs (Attachment 2). Figures 2 and 3 (attached) provide Interpreted Subsurface Profiles along/through the footprint of the proposed development.

4.1 Soils

The overburden soils encountered at the exploration locations appear to be generally consistent with the regional geologic maps/published data described herein (Section 2.3). The primary soil strata encountered are briefly described in the paragraphs below.

4.1.1 Existing Fill

Existing Fill materials were encountered at the ground surface at each test boring location. The Existing Fill extended to depths ranging from about 9 to 11 feet bgs (vertical) at the exploration locations. It is our understanding that there used to be a canal along the left bank of the river, land-side of the existing shoreline stone retaining wall.

Most of the Existing Fill material was described as brown to dark brown silt (ML), sandy silt (ML), silty sand (SM), or sand (SW) with trace to some gravel-sized particles and

occasional cobbles, boulders, and organics. The Existing Fill is interpreted to be re-worked alluvium that was likely sourced from local/nearby areas.

In boring B-02-21, rock fill and/or boulders were encountered from approximately 3.5 to 10.5 feet bgs (4.5 to 15 feet of angled drilling). Similarly, in boring B-04-21, a layer of gravel with sand (GW) and occasional cobbles was encountered from about 5 to 10 feet bgs. These coarse granular fill/rock fill materials are likely associated with backfilling of the former canal.

The Existing Fill was described generally as loose to medium dense based on SPT N-values that ranged from 4 to 11. The average N-value was about 9.

4.1.2 Native Alluvium

Native soils typically described primarily as brown to gray sand with trace amounts of silt and trace to some gravel (SW/SP) and/or silty sand (SM) were encountered beneath the Existing Fill at each boring location. This stratum includes occasional layers of gravel with some sand and trace silt (GP). This stratum also contains occasional cobbles and boulders and is interpreted to be Native Alluvium. The Alluvium extended to the termination depths of 70 feet bgs and 37 feet bgs, respectively, in borings B-04-21 and B-05-21; to 56 feet bgs at boring B-06-21; to 64 feet bgs in boring B-1V-21; and to depths ranging between 86 and 89 feet bgs (121 to 134.5 feet of angled drilling) in the three angled sonic borings (B-01-21, B-02-21, and B-03-21).

The Alluvium was described as loose to dense based on N-values ranging from 5 to 46. The average N-value was about 17. Eight (8) particle-size analyses indicate that the Alluvium is comprised of about 2 to 49% gravel, 43 to 86% sand, and 1 to 25% fines (silt/clay). The results of eight (8) moisture content tests ranged from 7.5 to 18.7%.

4.1.3 Glacial Till

Native soil described as gray silty sand with some angular gravel (SM) was encountered beneath the Alluvium at a depth of 89 feet bgs (131 feet of angled drilling) at boring B-01-21. This stratum is interpreted to be Glacial Till.

4.2 Bedrock

Bedrock was encountered in the three angled test borings at depths ranging between 86 and 93 feet bgs (121 and 136.5 feet of angled drilling). These depths correspond to top

of rock elevations of about -7.7 feet to -11.7 feet beneath the left side of the river. Bedrock was encountered and/or interpreted to have been encountered based on practical refusal to further penetration in borings B-1V-21 and B-06-21 at depths of 64 and 56 feet bgs, respectively. These depths correspond to top of rock elevations of about +16.5 feet and +22.2 feet along the shoreline, land-side of the existing retaining wall. The interpreted top of bedrock depths/elevations are depicted on Figures 1, 2, and 3.

In general, the top of the bedrock was found to be slightly to moderately weathered but became less weathered/more competent with increasing depth bgs. The bedrock was described as gray, hard, and fractured to severely fractured.

4.3 Groundwater

Wet soils and/or groundwater were encountered in borings B-01-21, B-02-21, B-03-21, and B-4-21 at depths ranging between 8.5 and 11.5 feet bgs (vertically). These depths correspond to elevations ranging between +66 and +74 feet. Short-term (i.e., at time of drilling) observations of wet soils and/or groundwater in test borings should be considered approximate. Kleinschmidt estimates that this investigation occurred during a period of seasonally normal groundwater. Site groundwater levels should be expected to fluctuate with changes to the water level in the Blackstone River, seasonally, and in response to precipitation events, construction activity, site use, and adjacent site use.

Going forward, the depth to groundwater can be measured in prior wells/piezometers installed by others (see below) and the new piezometers (B-05-21 and B-06-21) installed as part of this investigation.

5.0 Prior Investigations and Testing (By Others)

In 2016, Ransom Consulting (Ransom) completed a limited geotechnical/environmental investigation consisting of three (3) borings along the left bank of the Blackstone River, proximate to the existing Ashton Dam. Figure 1 shows the location of the prior Ransom borings in relation to the currently proposed development. The 2016 boring logs are provided in Attachment 5.

Subsurface conditions encountered within the borings indicate that the area consists of fill soils ranging in thickness from 8 to 15 feet, overlying a native deposit of loose to dense alluvium consisting of silt, sand, and gravels. Near a depth of 10 to 15 feet bgs, at an elevation of +66 feet (NAVD 88), dense to very dense sand and gravel was encountered.

This material was approximately 5 feet thick and reported high SPT N-values. Marginal sample recovery prevented full classification of the soils. Minimal laboratory testing was performed on samples, leading to partial characterization of these soils.

Underlying this dense alluvium is a loose to medium dense sand with minimal gravel. The deepest boring was advanced to 49 feet bgs, at an approximate elevation of +28.2 feet. Split-spoon sampling at this depth indicated practical refusal to further penetration. This refusal is/was interpreted to be the probable top of bedrock.

6.0 DISCUSSION

Key findings from this investigation are summarized as follows:

- The Native Alluvium appears to consist primarily of relative "clean" (i.e., minimal fines content) sand with variable amounts of gravel. These soils are estimated to be quite permeable.
- No continuous layers of low-permeability soil were encountered at depth.
- The top of bedrock appears to slope down fairly steeply (and/or step down in a terraced fashion) from left to right. A terraced bedrock surface is exposed along the existing bike path and railroad tracks just to the west of the Project area.
- The top of bedrock also appears to slope or steep down gradually from downstream to upstream, proximate to the existing dam.

The findings from this investigation (and prior investigations/testing by others) will be used to inform the design and construction of the Project, including seepage analyses, seepage cutoff evaluation/design, cofferdam design, preliminary dewatering estimates, and evaluation of foundation support and subgrade preparation.

Attached:

Figures

Tables

Attachment 1: Limitations

Attachment 2: 2021 Boring Logs

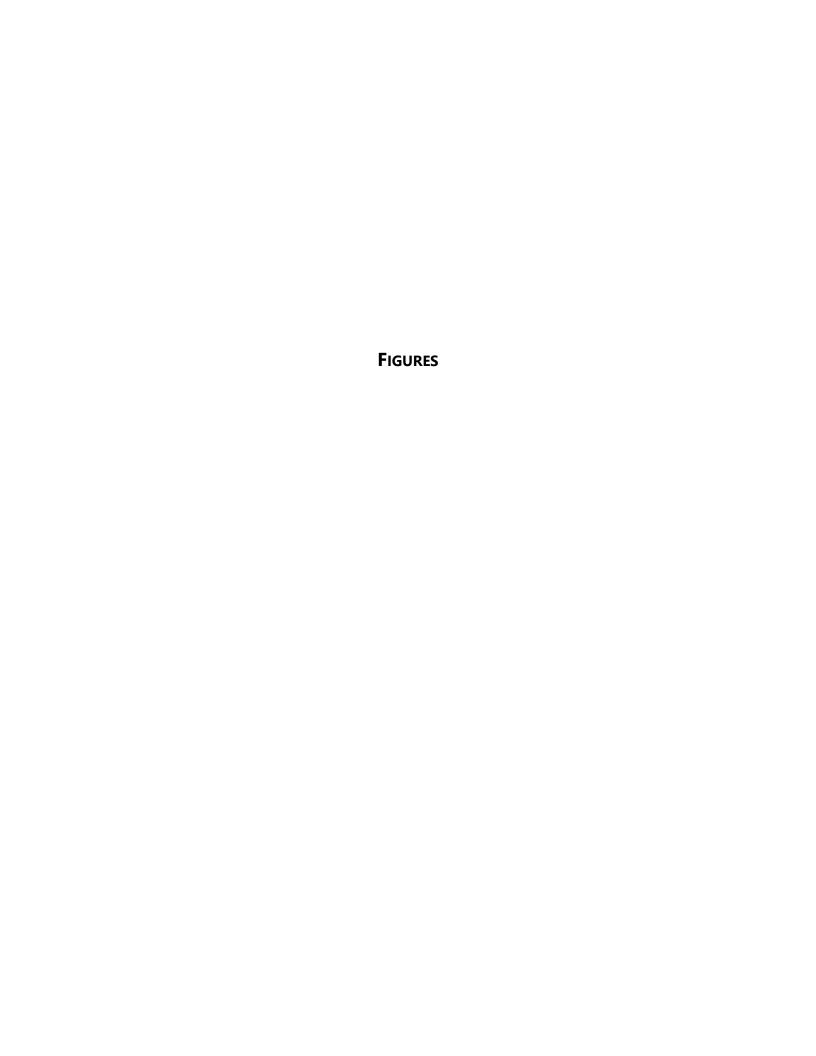
Attachment 2A: Sonic Borings

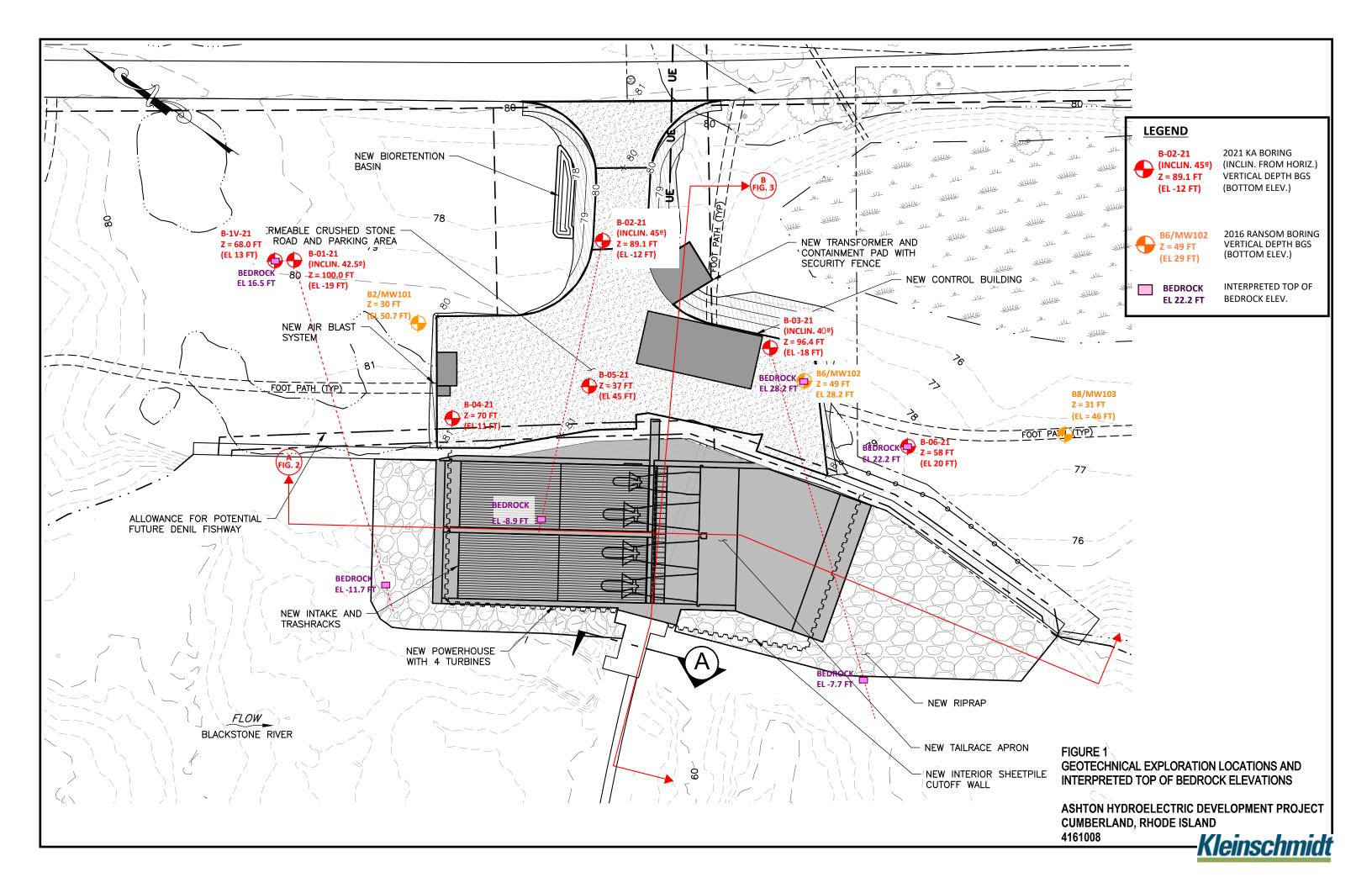
Attachment 2B: Drive-and-Wash Borings

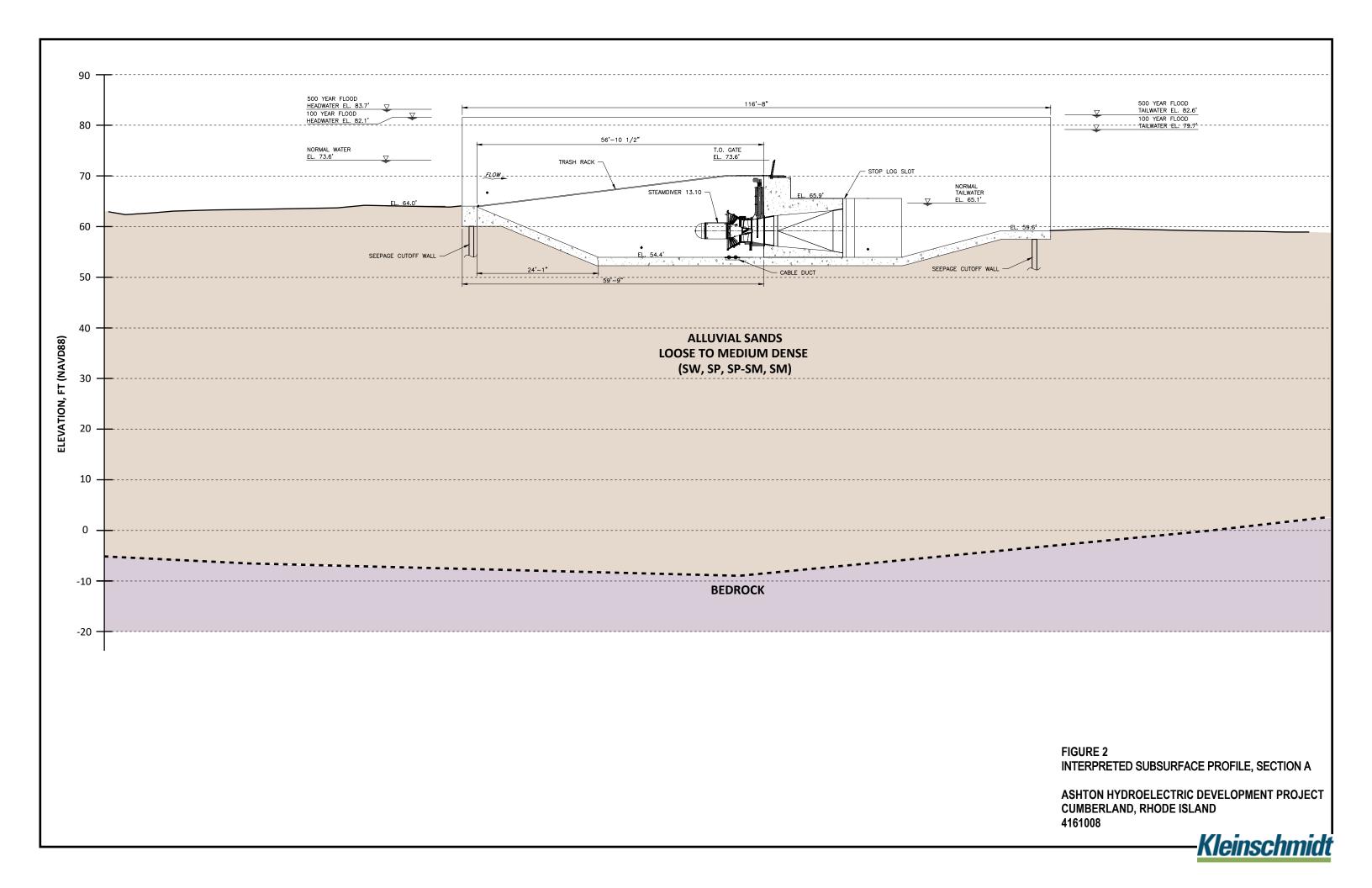
Attachment 3: 2021 Piezometer Construction Diagrams

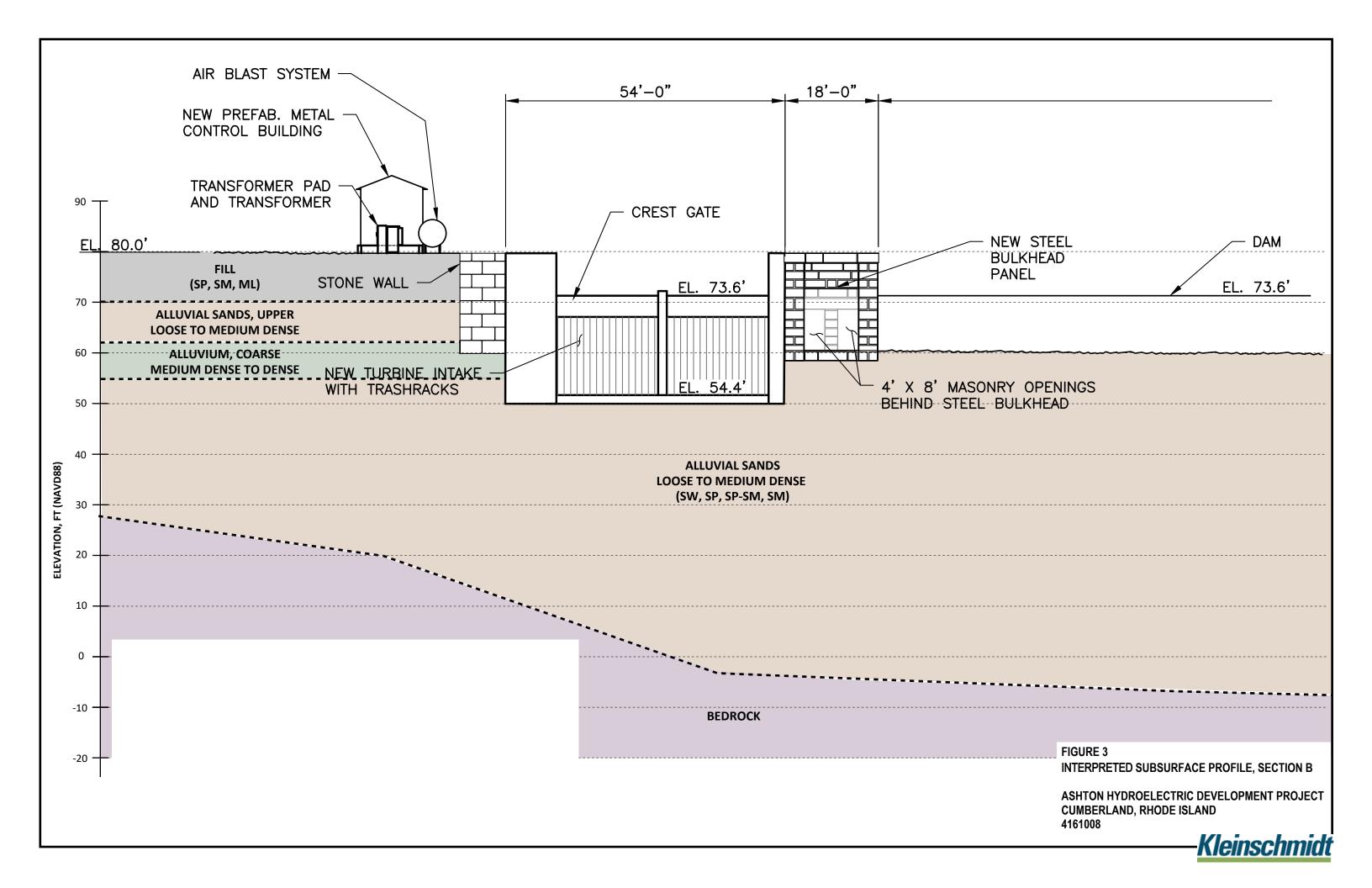
Attachment 4: 2021 Geotechnical Laboratory Testing

Attachment 5: Prior Investigation(s) and Testing by Others









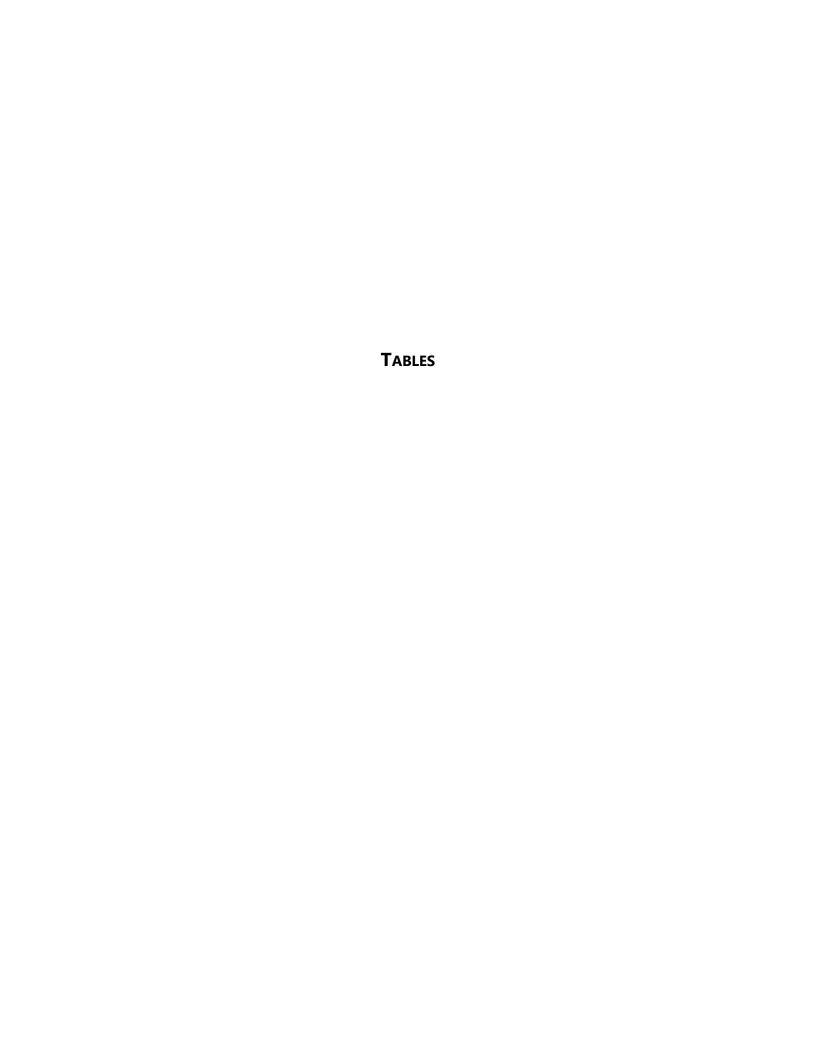




Table 1
Summary of Geotechnical Laboratory Testing Data

Exploration Info	rmation		Samp	le Information			L	aboratory	Testing	Data / R	esults		
Type	No.	No.	Depth	Primary	USCS	Water	Organic	Particle-Size Analysis			Atterberg Limits		
			Interval	Stratum		Content	Content		D 422				
					D 2487	D 2216	D 2974				D4318		
					D 2488			Gravel	Sand	Fines	LL	PL	PI
			(ft bgs)			(%)	(%)	(%)	(%)	(%)			
	B-01-21	GS-01-21-4	33 - 35	Alluvium	SW	8.8		48.5	49.2	2.4			
Sonic	D-01-21	GS-01-21-10	95 - 98	Alluvium	SW-SM	13.7		6.4	82.1	11.5	1		
Borings	B-02-21	GS-02-21-6	51 - 53	Alluvium	SM	16.1		1.9	86.0	12.2			
	B-03-21	GS-03-21-3	55 - 60	Alluvium	SP	9.5		16.2	79.0	4.8	1		
	B-04-21	SS-07	30 - 32	Alluvium	SP	13.1		30.7	68.0	1.3	1		
Drive-and-Wash	B-05-21	SS-07	35 - 37	Alluvium	SM	7.5		32.0	42.8	25.2	1		
Borings		SS-04A	30 - 31	Alluvium	SW-SM	10.1		23.2	65.7	11.1	-		
	B-06-21		40 - 42	Alluvium	SM	18.7		2.0	81.5	16.5			

Prepared By: HR Checked By: TC

ATTACHMENT **1**

LIMITATIONS

LIMITATIONS

Explorations

- 1. The boring logs and related information depict subsurface conditions only at the specific locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at these boring locations. The data and analyses presented in this report are based in part upon the information obtained from widely-spaced subsurface explorations. Subsurface conditions between exploration locations may vary from those encountered at the exploration locations.
- 2. The subsurface conditions described in this report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed based on interpretation of widely-spaced explorations and associated testing/sampling data. Actual strata transitions may be more gradual, but could be more erratic, particularly for transitions between existing/historic fill materials and native soils. For specific information, refer to the individual boring logs.
- 3. Groundwater levels reported on the logs, piezometer construction diagrams, summary tables, and/or in the body of the report are factual data only for the dates shown. These data have been reviewed and interpretations have been made in the text of this report. Fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

Use of Report

- 4. This report has been prepared for the exclusive use of New England Hydropower Company, LLC in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
- 5. Kleinschmidt has prepared this report for the specific project described herein. This report was completed to support design of the proposed Ashton Hydroelectric Project with the Voith StreamDiver Turbine Concept. Contractors wishing to receive a copy of this report may secure it with the understanding that its scope is limited to preliminary geotechnical review of site conditions made based on widely-spaced explorations and information available at the time of the investigation.

ATTACHMENT 2

2021 BORING LOGS

N	MAJOR DIVISION	IS	GROUP SYMBOLS	GENERAL	DESCRIPTIONS			TYPICAL	SYMBOLS			
		CLEAN	GW	Well graded gravels mixtures; trace or no	or gravel-sand fines.	Sh	nelby Tube		Auger	Cuttings		
	GRAVELS (More than 50% of coarse fraction	GRAVELS (Less than 5% fines)	GP	Poorly graded gravel mixtures; trace or no		Standard Split Spoon Sample			3" Spli	3" Split Spoon Sample		
COARSE	DETAINED on	GRAVELS WITH FINES	GM	Silty gravels or gravel-sand-silt mixtures.			ock Core		Dynan	ic Cone Penet	rometer	
GRAINED SOILS		GRAVELS WITH FINES (More than 12% fines)	GC	Clayey gravels or gravel-sand-clay mixtures.		Va	ane Shear		Bulk/C	rab Sample		
(More than 50% RETAINED on No. 200 sieve)	a	CLEAN	SW	SW Well graded sands or sand-gravel mixtures; trace or no fines. Geoprobe Sample		ole	Sonic	or Vibro-Core	Sample			
	SANDS (50% or more of coarse fraction	SANDS (Less than 5% fines)	SP	Poorly graded sands or sand-gravel mixtures, trace or no fines.		<u> </u>	ater Table at	time of drilling	▼ Water	Table after 24	hours	
	PASSES the No. 4 sieve)	SANDS WITH FINES (More than 12% fines)	SM	Silty sands or sand-g	ravel-silt mixtures.	(O PENETRATION TEST (SPT) 'Y AND CONSISTENCY		
			// sc	Clavey sands or sand	l-gravel-clay mixtures.	GRAVI	EL, SAND, & S	ILT (NON-PLASTIC)	SIL	T (PLASTIC) & 0	CLAY	
				Clayey sailes of saile	r-graver-etay mixtures.	N	N-Value	Relative Density	N-Value	Su (psf)	Consistency	
			$\ \cdot\ _{\mathrm{ML}}$	Inorganic silts or roc	k flour. Non-plastic or very		0 - 4	Very Loose	0 - 2	0 - 250	Very Soft	
					4 or plots below "A" line.		4 - 10	Loose	2 - 4	250 - 500	Soft	
	SILTS AND CLAYS (Liquid Limit LESS than 50)		//// CL	Inorganic lean clay. PI > 7 and plots on o	Low to medium plasticity.		10 - 30	Medium Dense	4 - 8	500 - 1000	Medium Stif	
FINE							30 - 50 Over 50	Dense Very Dense	8 - 15 15 - 30	1000 - 2000 2000 - 4000	Stiff Very Stiff	
GRAINED SOILS			OL	Organic silts, clays, a medium plasticity.	and silty clays. Low to		JVEI 30	very Dense	Over 30	Over 4000	Hard	
(50% or more			ПП	Inorganic elastic silt. PI plots below "A" line. Inorganic fat clay. High plasticity. PI plots on or above "A" line. Organic silts and clays. High plasticity.			SPT Notes: WR = Weight of F					
PASSES the No. 200 sieve)			МН				ERMS DESCI	RIBING SOILS	TERMS DESCRIBING MATERIAL			
		ND CLAYS 50 or GREATER)	СН			(excludes particles > 3", organics, debris, etc.)		(i.e. particles > 3", organics, debris, etc.)				
	(Liquid Littiit of	30 01 OKEATEK)				Trace: Particles present, but < 5%			Occasional: Particles present, but < 109			
			€				Few: 5% to 15% Little: 15% to 25%		Frequent: 10% to 25% Many: > 25%			
			<u> </u>	Doot and ather hist-1-1-	v organia soila Dasserra 1		25% to 50%		iviany.	× 43/0		
HIGI	HLY ORGANIC S	OILS	<u>/, \ \ /, </u> PT	vegetable tissue. Fib	y organic soils. Decomposed brous to amorphous texture.			BING MOISTURE	TERMS D	ESCRIBING S	TRUCTURI	
					-	Dry:		moisture; dusty	Layer:	> 3" thick	meeren	
	A GGIFFIG A FFIGNICA	a 11		C.		Moiet		o visible water	Seam:	1/16" to 3" thic	ck	
BOUNDARY CL	ASSIFICATIONS	 Soils possessing of group symbols. 	haracteristics	of two groups are o	lesignated by combinations	Wet:	Visible/free		Parting:	< 1/16" thick		
		or group symbols.					KEV		MDOI		<u> </u>	
		SAND		GRAVEL			KC 1	Y TO SYN		. –	U	
SILT	OR CLAY				Cobbles Boulders	DESCRIPTIONS						
			lium Coarse	Fine Coarse								
	No	0.200 No.40 U.S. STANDA	No.10 No ARD SIEVE S		3" 12"		K	leins	chr	nidt		
References: AST	M D 2487 (Unified	d Soil Classification	System) and	ASTM D 2488 (Vis	sual-Manual Procedure).							

ATTACHMENT 2A

SONIC BORINGS

Klei	11361			Location:	Cumberland, RI	Project No.	4161008	
iller:	Casca	de Environme	ntal Pr	oject Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6"	OD
erator:	Rober			evation:	80.5'	Hammer Type:	N/A	
gged By:	Helen	Russell	Da	ntum:	NAVD88	Rod Size:	3.5"	
te Start/Finish:		1-9/27/21	Ri	g Type:	TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75'	' OD
ring Location:	See Ex	xploration Plan	1 Di	rilling Method:	Sonic Drilling	Water Level*: ~ 9.1	I' bgs (vertical) at	time of drilli
Definitions IS = Split Spoon Sample ISS = Unsuccessful Spli J = Thin Wall Tube Sam MU = Unsuccessful Thin I = Insitu Vane Shear Te MV = Unsuccessful Insitu IV = Unsuccessful Insitu	t Spoon Sample attempt ple Wall Tube Sample atter st	SS H npt Ro W	= Rock Core Samples = Solid Stem Aug SA = Hollow Stem Aug C = Roller Cone 'OH = weight of han OR = Weight of rod	ger Auger nmer	Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	WC LL PL Pi: G=	(lab) = Lab Vane Shear Strengt C = Water Content, percent = Liquid Limit = Plastic Limit = Plasticity Index = Grain Size Analysis = Consolidation Test	h (psf)
	San	iple Informat	tion					
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Re	marks		Laboratory Test Results
0 -1 -2 -3				• 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Dark brown to brown, silt (MI trace gravel, trace organics, m			
-4 -5 -6 -7 -8 -9 -10 -11 -12	CR-1	0-10	10.0/5.5					
- 13	CR-2	10-18	8.0/3.5		Dark brown, subangular to subfine to coarse sand, trace silt, of ALLUVIUM			
- 20 - 21 - 22 - 23	CR-3	18-28	10.0/6.0		Brown, silty fine sand (SM), s ALLUVIUM	ome rounded gra	avel, wet:	
- 24								
marks:								
	ly 0.68 feet o				ative to horizontal. Each linear for ed at 148 feet of angled drilling v			100

Page 1 of 6

Boring No.:

B-01-21 (Angled)

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Kloi	nsc	hmi	11	Pro	ject:	Ashton Hydroelectric Develop.	Boring No.:	B-01-21 (Angled)
MGI	11361			Loc	ation:	Cumberland, RI	Project No.	4161008	
Driller:	Cascac	le Environme	ental	Project	Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6" (OD
Operator:	Robert			Elevatio	n:	80.5'	Hammer Type:	N/A	
Logged By:	Helen	Russell		Datum:		NAVD88	Rod Size:	3.5"	
Date Start/Finish:		1-9/27/21		Rig Type:		TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75"	OD
Boring Location:		ploration Pla	ın	Drilling	Method:	Sonic Drilling	Water Level*: ~ 9.	1' bgs (vertical) at	
U = Thin Wall Tube Sai MU = Unsuccessful Thi V = Insitu Vane Shear T	le blit Spoon Sample attempt mple in Wall Tube Sample attem	ipt I	R = Rock Core Sa SSA = Solid Stem HSA = Hollow Ste RC = Roller Cone WOH = weight of WOR = Weight of	Auger em Auger hammer		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	W LI PI Pi G	n(lab) = Lab Vane Shear Strengtl C = Water Content, percent = Liquid Limit = Plastic Limit = Plasticity Index = Grain Size Analysis = Consolidation Test	h (psf)
	Sam	ple Informa	tion						
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/	Medivery (II.)	Graphic Log	Visual Description and Rei	narks		Laboratory Test Results
- 25 - 26 - 27 - 28 - 29 - 30 - 31 - 32 - 33 - 34 - 35 - 36 - 37 - 38 - 39 - 40 - 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49	CR-4	28-38	10.0/	7.5		Brown, silty fine sand (SM), so ALLUVIUM Gray-brown, medium to coarse subrounded gravel, trace silt, w. Grab sample GS-01-21-4 (33 t	e sand (SW), so vet: ALLUVIU	 me M	WC = 8.8% Fines = 2.4%
- 47 - 48 - 49 - Remarks: Boring drill	ely 0.68 feet o					ative to horizontal. Each linear for			100

Page 2 of 6

Boring No.:

B-01-21 (Angled)

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Klei	nsc	<i>hmia</i>	lt		oject: cation:	Ashton Hydroelectric Develop. Cumberland, RI	Boring No.: Project No.	B-01-21 (4161008	Angled)
Driller:	Casca	de Environmen	ntal	Project	Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6"	OD
Operator:	Rober	t		Elevati	on:	80.5'	Hammer Type:	N/A	
Logged By:	Helen	Russell		Datum	:	NAVD88	Rod Size:	3.5"	
Date Start/Finish:	9/24/2	1-9/27/21		Rig Ty	pe:	TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75'	OD
Boring Location:	See E	xploration Plan	ı	Drilling	g Method:	Sonic Drilling	Water Level*: ~	9.1' bgs (vertical) at	time of drilling
U = Thin Wall Tube Sa MU = Unsuccessful Th V = Insitu Vane Shear	plit Spoon Sample attempt mple in Wall Tube Sample atter	SS. HS npt RC	= Rock Core Sa SA = Solid Sterr SA = Hollow St C = Roller Cone OH = weight of OR = Weight o	Auger em Auger hammer		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value		$\begin{split} & Su(lab) = Lab \ Vane \ Shear \ Strengt \\ & WC = Water \ Content, \ percent \\ & LL = Liquid \ Limit \\ & PL = Plastic \ Limit \\ & Pi = Plasticity \ Index \\ & G = Grain \ Size \ Analysis \\ & C = Consolidation \ Test \end{split}$	h (psf)
	San	nple Informat	ion						
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/	necovery (it.)	Graphic Log	Visual Description and Rea	marks		Laboratory Test Results
50 - 51 - 52						Gray-brown, medium to coarse subrounded gravel, trace silt, v			

Depth (ft.)	Sample N	Barrel/C Driven (f	Penetrati Recovery	Graphic		Results
50 - 51					Gray-brown, medium to coarse sand (SW), some subrounded gravel, trace silt, wet: ALLUVIUM	
- 52 - 53	CR-6	48-58	10.0/8.0			
- 54						
- 55						
- 56						
- 57						
- 58						
- 59 - 60						
- 61						
- 62				_		
- 63	CR-7	58-68	10.0/3.0	_		
- 64						
- 65 - 66						
- 67						
- 68				_		
- 69				_		
- 70				_		
- 71 - 72				- 		
- 72 - 73	CR-8	68-78	10.0/6.5]		
- 74				_		
1		I	1	T	7	

Remarks:

Boring drilled at an angle of approximately 42.5 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.68 feet of vertical drilling. Boring terminated at 148 feet of angled drilling which equates to approximately 100 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual. *Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to	Page 3 of 6	
conditions other than those present at the time measurements were made	Boring No.: B-01-21 (Angled)	

nsc	hmia	lt		•		Boring No.: Project No.	B-01-21 (4161008	Angled)
Cascao	de Environmer	ıtal	Project	Feature:	Proposed Powerhouse	Borehole ID/OD: 5.5" ID / 6" OI		OD
Robert	t		Elevation	on:	80.5'	Hammer Type:	N/A	
Helen	Russell		Datum:		NAVD88	Rod Size:	3.5"	
9/24/2	1-9/27/21		Rig Tyl	pe:	TSi 150CC Compact-Crawler	Core Barrel: 4" ID / 4.75" OD		
See Ex	xploration Plan	l	Drilling	g Method:	Sonic Drilling	Water Level*: ~ 9.1'	bgs (vertical) at	time of drilling
MSS = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample U = Thin Wall Tube Sample MC = RC = Roller C V = Insitu Vane Shear Test WOH = weigl					Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	WC LL = PL = Pi = G = G	= Water Content, percent : Liquid Limit ! Plastic Limit Plasticity Index Grain Size Analysis	h (psf)
San	nple Informat	ion						
Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	(iii)	Graphic Log	Visual Description and Rei	narks		Laboratory Test Results
CR-9	78-88							
	Cascar Rober Helen 9/24/2 See Ex le biti Spoon Sample attempt mple in Wall Tube Sample atter tut Vane Shear Test attem San CR-9	Cascade Environmer Robert Helen Russell 9/24/21-9/27/21 See Exploration Plan le History His	Helen Russell 9/24/21-9/27/21 See Exploration Plan R = Rock Core Sa SSA = Solid Stem HSA = Hollow Stem RC = Roller Cone WOH = weight of WOR =	Cascade Environmental Robert Elevati Helen Russell 9/24/21-9/27/21 Rig Tyl See Exploration Plan R = Rock Core Sample SSA = Solid Stem Auger RISA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods Sample Information Sample Information CR-9 78-88 10.0/7.0	Cascade Environmental Robert Helen Russell 9/24/21-9/27/21 See Exploration Plan R = Rock Core Sample SSA = Solid Stem Auger BSA = Solid Stem Auger BSA = Roller Cone WOR = Weight of hammer WOR = Weight of rods Sample Information Sample Information ON Plan	Cascade Environmental Robert Robert Elevation: 80.5' Helen Russell 9/24/21-9/27/21 Rig Type: TSi 150CC Compact-Crawler See Exploration Plan Prilling Method: See Exploration Plan Sear—Rock Core Sample Star—Solid Stem Auger HAN—Rollow Stem Auge	Cascade Environmental Robert Elevation: Robert Free Robert See Exploration Plan Drilling Method: Sonic Drilling Water Levet': ~ 9.1' Water Levet': ~ 9.1' Elevation: Robert Feel Superior Surgely (pt) Robert Feel Superior Surgely (pt) Robert Feel Surgel	Location: Cumberland, RI Project No. 4161008

Remarks:

97

98 99

Boring drilled at an angle of approximately 42.5 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.68 feet of vertical drilling. Boring terminated at 148 feet of angled drilling which equates to approximately 100 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual. Page 4 of 6 *Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to B-01-21 (Angled) conditions other than those present at the time measurements were made **Boring No.:**

coarse sand, few gravel, moist to wet: ALLUVIUM

Grab sample GS-01-21-10 (95 to 98 ft linear drilling)

WC = 13.7%

Fines = 11.5%

Klei	neel	hmid	4 Pr	oject:	Ashton Hydroelectric Develop.	Boring No.: B-01-21 (Angled)
Mei	11561	IIIIU	Lo	cation:	Cumberland, RI	Project No. 4161008	
Driller:	Cascac	de Environmen	tal Projec	t Feature:	Proposed Powerhouse	Borehole ID/OD: 5.5" ID / 6"	OD
Operator:	Robert	t	Elevat	ion:	80.5'	Hammer Type: N/A	
Logged By:	Helen	Russell	Datun	1:	NAVD88	Rod Size: 3.5"	
Date Start/Finish:		1-9/27/21	Rig T	pe:	TSi 150CC Compact-Crawler	Core Barrel: 4" ID / 4.75'	OD
Boring Location:		xploration Plan	Drilli	g Method:	Sonic Drilling	Water Level*: ~ 9.1' bgs (vertical) at	
U = Thin Wall Tube San MU = Unsuccessful Thin V = Insitu Vane Shear T	e lit Spoon Sample attempt nple n Wall Tube Sample atten	R = SSA HSA npt RC WO	Rock Core Sample A = Solid Stem Auger A = Hollow Stem Auger = Roller Cone H = weight of hammer R = Weight of rods		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	Su(lab) = Lab Vane Shear Strengt WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit Pi = Plasticity Index G = Grain Size Analysis C = Consolidation Test	h (psf)
	San	iple Informati	on				
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Rea	narks	Laboratory Test Results
100 F				7::::::	3		
101				_ ::::::::::::::::::::::::::::::::::::	Gray-brown, fine to medium s		
102					coarse sand, few gravel, moist	to wet: ALLUVIUM	
	CR-11	98-108	10.0/8.5		:]		
103				-	:]		
104					:]		
105				_	:]		
106					?-]		
					?-]		
107					3]		
108				- ::::::::	<u>:</u>		
- 109				<u>-</u> ::::::::	: <u>:</u>		
- 110				_ :::::::	:		
					:		
- 111				 :::::::	:		
112	CD 12	100 110	10.0/7.5	- ::::::::			
- 113	CR-12	108-118	10.0/7.5	 :-::: :::	<u>+</u>		
- 114					Brown, fine to coarse sand (SV		
- 115					gravel, trace silt, moist to wet:	ALLUVIUM	
					-occasional to some cobbles		
- 116				 			
117				- :::::::	:-		
- 118				- ::::::::	·]		
- 119				_l::::::::	:]		
					:]		
120] ::::::::	:]		
121				1::::::	:]		
- 122				- ::::::	·]		
- 123	CR-13	118-128	10.0/2.0	<u> </u>	? :]		
				_::::::::	:		
- 124					3-1		
Remarks:							
					ative to horizontal. Each linear fo		100

feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made Page 5 of 6 B-01-21 (Angled) **Boring No.:**

Driller: Cascade Environmental Project Feature: Proposed Powerhouse Borchole ID/OD: 5.5" ID / 6" O Operator: Robert Elevation: 80.5" Hammer Type: N/A Logged By: Helen Russell Datum: NAVD88 Rod Size: 3.5" Date Start/Finish: 9/24/21-9/27/21 Rig Type: TSi 150CC Compact-Crawler Core Barrel: 4" ID / 4.75" (Core Barrel: 4"	Klei	nsc	hmia	I	Project:	Ashton Hydroelectric Develop.	Boring No.:	B-01-21 (Angled)
Operator: Robert Elevation: 80.5 Hammer Type: N/A					Location:	Cumberland, RI	Project No.	4161008	
Logged By: Helen Russell Datum: NAVD88 Rod Size: 3,5"	Driller:	Casca	de Environmen	ntal P	roject Feature:	Proposed Powerhouse	Borehole ID/OD: 5.5" ID / 6"		OD
Date Start/Finish: 9/24/21-9/27/21 Rig Type: TSi 150CC Compact-Crawler Core Barrel: 4" ID / 4,75" (Boring Location: See Exploration Plan Drilling Method: Sonic Drilling Water Level*: ~ 9.1" bgs (vertical) at tire Drilling Method: Sonic Drilling Water Level*: ~ 9.1" bgs (vertical) at tire Drilling Method: See Spalt Spoon Sample attempt MS = Unaccessful Split Spoon Sample attempt MC - Unaccessful Split Spoon Sample attempt MC - Unaccessful Split Spoon Sample attempt MC - Unaccessful Thin Wall Tube Sample attempt MC - Unaccessful Tube Wall T		Rober	t	E	Elevation:		1,712		
Baring Location: See Exploration Plan Drilling Method: Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Drilling Method: Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Sonic Drilling Sonic Drilling Water Level*: ~ 9.1' bgs (vertical) at tir Wc-Water Content, precent Wc-W	Logged By:	Helen	Russell					3.5"	
Sample Information	Date Start/Finish:					TSi 150CC Compact-Crawler			
SS = Spit Spoon Sample MSS = Unsuccessful Spit Spoon Sample attempt U = Thin Wall Tube Sample U = Thin Wall Tube U =	Boring Location:	See E	xploration Plan	D	Orilling Method:	Sonic Drilling	Water Level*: ~ 9.1'	bgs (vertical) at	time of drilling
Visual Description and Remarks Part Par	SS = Split Spoon Samp MSS = Unsuccessful Sp U = Thin Wall Tube Sa MU = Unsuccessful Th V = Insitu Vane Shear	olit Spoon Sample attempt mple in Wall Tube Sample atter Fest	t SS. HS mpt RC	A = Solid Stem Au A = Hollow Stem C = Roller Cone OH = weight of ha	uger Auger ammer	Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value	WC = LL = PL = Pi = 1 G = C	Water Content, percent Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis	h (psf)
Brown, fine to coarse sand (SW), trace to some subrounded gravel, trace silt, moist to wet: ALLUVIUM - 128 - 129 - 130 - 131 - 132 - CR-14 - 128-138 - 10.0/8.5 - Gray, silty fine to medium sand (SM), few coarse sand, some angular gravel, wet: GLACIAL TILL	Depth (ft.)	_	ĺ		Graphic Log	Visual Description and Re	marks		Laboratory Test Results
Gray, silty fine to medium sand (SM), few coarse sand, some angular gravel, wet: GLACIAL TILL	- 126 - 127 - 128 - 129 - 130					gravel, trace silt, moist to wet:		subrounded	
134	- 132 - 133	CR-14	128-138	10.0/8.:	5	. 1	· /·	se sand, some	

seams: BEDROCK

Grab sample GS-01-21-14 (134.5 to 135.5 ft linear drilling)

fractured to severely fractured, including apparent vertical

Bottom of boring at 148' angled drilling and approximately

Gray, bedrock/weathered bedrock, hard, recovery is

Remarks:

135136

137

138

139140141142

143144145146147148

149

Boring drilled at an angle of approximately 42.5 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.68 feet of vertical drilling. Boring terminated at 148 feet of angled drilling which equates to approximately 100 feet of vertical drilling.

100' bgs

- bgs: below ground surface

CR-15

138-148

10.0/5.0

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Page 6 of 6

Boring No.:

B-01-21 (Angled)

Kloin	schmidt	Project:	Ashton Hydroelectric Develop.	Boring No.:	B-01V-21 (Vertical)
MGII	SCHIII	Location:	Cumberland, RI	Project No.	4161008
Driller:	Cascade Environmental	Project Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6" OD
Operator:	Robert	Elevation:	80.5'	Hammer Type:	N/A
Logged By:	Helen Russell	Datum:	NAVD88	Rod Size:	3.5"
Date Start/Finish:	9/27/2021	Rig Type:	TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75" OD
Boring Location:	See Exploration Plan	Drilling Method:	Sonic Drilling	Water Level*:	Not Measured
Definitions					

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf)
Tv = Pocket Torvane Shear Strength (psf)
qp = Unconfirmed Compressive Strength (ssf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value

Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

	saccessiai ins	situ Vane Shear Test attemp	pt '	VOR = Weight of rods		Hammer Efficiency Factor – Annual Canoration Value	C = Consolidation Test	
		Sam	ple Informa	tion				
Elevation (ft.)	Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
 80	$\begin{bmatrix} 0 \\ -1 \end{bmatrix}$					Casing and core barrel advanced with no soil		
	-2					sampling. Objective to tag rock at the boring location.		
	-3			1				
	-4			1				
 - 75	-5							
	-6 -7							
	-8							
	-9			<u> </u>				
 - 70	- 10							
'0	-11			+				
	12							
	- 13 - 14							
	15			1				
-65	- 16							
	- 17			+				
	- 18			1				
	- 19 - 20							
60	20			1				
	- 22							
	- 23							
	- 24							

Remarks:

Boring location offset 5' from B-1-21. Boring was advanced vertically with no soil sampling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual. *Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 1 of 3

Boring No.:

B-01V-21 (Vertical)

Kleins	schmidt	Project: Location:	Ashton Hydroelectric Develop. Cumberland, RI	Boring No.: Project No.	B-01V-21 (Vertical) 4161008
Driller:	Cascade Environmental	Project Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6" OD
Operator:	Robert	Elevation:	80.5'	Hammer Type:	N/A
Logged By:	Helen Russell	Datum:	NAVD88	Rod Size:	3.5"
Date Start/Finish:	9/27/2021	Rig Type:	TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75" OD
Boring Location:	See Exploration Plan	Drilling Method:	Sonic Drilling	Water Level*:	Not Measured

Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf)
Tv = Pocket Torvane Shear Strength (psf)
qp = Unconfirmed Compressive Strength (ssf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value

Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Visual Description and Remarks Sample No. Casing and core barrel advanced with no soil sampling. Objective to tag rock at the boring location.	Laboratory Test Results	AASHTO and Unified Class.
26 -27 -28 -26 -27 -28		
- 27 - 28 location.		1
28	I	
	l	
30		
50 31		
32		
33		
34		
45 35		
37		
38		
40 40 41		
43		
45		
35 46		
47		
48		
49		

Remarks:

Boring location offset 5' from B-1-21. Boring was advanced vertically with no soil sampling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual. *Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 2 of 3

Boring No.:

B-01V-21 (Vertical)

Boring No.: *Kleinschmid* B-01V-21 (Vertical) Ashton Hydroelectric Develop. **Project:** 4161008 Cumberland, RI Location: Project No. Borehole ID/OD: Driller: Cascade Environmental **Project Feature:** Proposed Powerhouse 5.5" ID / 6" OD Operator: Elevation: 80.5' Hammer Type: Robert N/A Rod Size: Logged By: Datum: 3.5" NAVD88 Helen Russell Date Start/Finish: Rig Type: TSi 150CC Compact-Crawler Core Barrel: 4" ID / 4.75" OD 9/27/2021 **Boring Location:** See Exploration Plan **Drilling Method:** Water Level*: Sonic Drilling Not Measured

Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plasticity Index
G = Grain Size Anallysis
C = Consolidation Test

011	successiui msi	itu Vane Shear Test atten	ipi	OR = Weight of rods		C = Cc	ensolidation Test	
		San	nple Informat	ion				
Elevation (ft.)	Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
-30	50 51					Casing and core barrel advanced with no soil sampling. Objective to tag rock at the boring		
	- 52 - 53					location.		
	- 54 - 55							
25	- 56 - 57							
	- 58							
- 20	- 59 - 60							
	- 61 - 62							
	- 63 - 64					Gray, bedrock/weathered bedrock, hard,		
15	- 65 - 66	CR-1	64-68	4.0/2.0		recovery is severely fractured: BEDROCK		
	- 67 - 68					Core barrel stopped at 64' bgs and hard drilling was encountered. Core barrel advanced to 68' bgs and sample retrieved.		
	- 69 - 70				_	Bottom of boring at 68' bgs.		
-10	- 71 - 72							
	73							

Remarks:

Boring location offset 5' from B-1-21. Boring was advanced vertically with no soil sampling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual. *Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 3 of 3

Boring No.:

B-01V-21 (Vertical)

Kloi	<i>Kleinschmidt</i>		 	Project:	Ashton Hydroelectric Develop.	Boring No.: B-02-21 (Angled)		Angled)
MGI				ocation:	Cumberland, RI	Project No.	4161008	
Driller:	Cascad	e Environmen	ital Proj	ect Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6" (DD
Operator:	Robert		Elev	ation:	76.7'	Hammer Type:	N/A	
Logged By:	Helen I	Russell	Date	ım:	NAVD88	Rod Size:	3.5"	_
Date Start/Finish:	9/22/21	-9/23/21	Rig	Type:	TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75"	OD
Boring Location:	See Ex	ploration Plan	Dril	ling Method:	Sonic Drilling	Water Level*:~ 10.6' b	ogs (vertical) at	time of drilling
U = Thin Wall Tube Sar MU = Unsuccessful Thi V = Insitu Vane Shear T	e lit Spoon Sample attempt nple n Wall Tube Sample attemp	R = SS. HS HS RC	= Rock Core Sample A = Solid Stem Auger A = Hollow Stem Aug E = Hollow Stem Aug DH = weight of hamm DR = Weight of rods		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	WC = W LL = Li PL = Pla Pi = Pla G = Gra	= Lab Vane Shear Strength Vater Content, percent quid Limit astic Limit sticity Index in Size Analysis soolidation Test	(psf)
_	Sam	ple Informati	ion					
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Rea	Visual Description and Remarks		Laboratory Test Results
0 -1 -2 -3 -4					Brown, fine to coarse sand wit organics, moist: EXISTING F		ce silt, trace	
-4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15	CR-1	10-20	10.0/7.5		Possible boulder(s)/rock fill, h overheating from 4.5' to 15', samples: EXISTING FILL	amples similar to b	edrock	
- 16 17 18 19 20 21 22 23 24	CR-3	20-30	10.0/3.0		Gray-brown, subangular to sub fine to coarse sand, trace silt, v		SP), some	
Boring drille	ely 0.71 feet o				ive to horizontal. Each linear foo ed at 126 feet of angled drilling v			39 feet

Page 1 of 6

Boring No.:

B-02-21 (Angled)

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Kleinschmidt			lt	Project: Location:	Ashton Hydroelectric Develop. Cumberland, RI		B-02-21 (Angled) 4161008		
Driller:	Cascac	de Environmen	ital Pr	roject Feature:	Proposed Powerhouse	Borehole ID/OD: 5	.5" ID / 6" OD		
Operator:	Robert			levation:	76.7'		I/A		
Logged By:	Helen Russell		Da	atum:	NAVD88		.5"		
Date Start/Finish:		1-9/23/21	Ri	ig Type:	TSi 150CC Compact-Crawler		" ID / 4.75" OD		
Boring Location:		xploration Plan	Di	rilling Method:	Sonic Drilling		(vertical) at time of drilling		
Definitions				ger Auger nmer	Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	Su(lab) = Lab	Vane Shear Strength (psf) Content, percent imit limit Index e Analysis		
	Sam	nple Informati	ion						
Depth (ft.)			Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Remarks		Laboratory Test Results		
- 25 - 26 - 27 - 28 - 29 - 30 - 31 - 32 - 33 - 34 - 35 - 36 - 37 - 38 - 39 - 40 - 41	CR-4	30-40	10.0/6.5	13.0	Gray-brown, subangular to sub fine to coarse sand, trace silt, v Grab sample GS-02-21-4 (34 t Gray, fine to medium sand wit sand, trace gravel, wet: ALLU	o 36 ft linear drilling)			
				legrees relat	tive to horizontal. Each linear foo				
approximate	approximately 0.71 feet of vertical drilling. Boring terminated at 126 feet of angled drilling which equates to approximately 89 feet of vertical drilling.								

Page 2 of 6

Boring No.:

B-02-21 (Angled)

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Klei	<i>hmia</i>	It	Projec Locati		Ashton Hydroelectric Develop.	Boring No.: Project No.	B-02-21 (4161008	Angled)	
Driller:	Casca	de Environmer	ntal	Project Fea	ture:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6"	OD
Operator:	perator: Robert			Elevation:		76.7'	Hammer Type:	N/A	
Logged By:	gged By: Helen Russell			Datum:		NAVD88	Rod Size:	3.5"	
Date Start/Finish:	ate Start/Finish: 9/22/21-9/23/21			Rig Type:		TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75"	OD
Boring Location:	Boring Location: See Exploration Plan		1	Drilling Method: Sonic Drilling Water Level*:~ 10.6' bgs (vertice)		6' bgs (vertical) at	time of drilling		
Definitions			A = Solid Stem A SA = Hollow Ster C = Roller Cone OH = weight of I	Auger m Auger hammer		$\begin{split} Su &= institu Field \ Vane \ Shear \ Strength \ (psf) \\ Tv &= Pocket \ Torvane \ Shear \ Strength \ (psf) \\ qp &= Unconfirmed \ Compressive \ Strength \ (ksf) \\ N-uncorrected &= Raw \ field \ SPT \ N-value \\ Hammer \ Efficiency \ Factor &= Annual \ Calibration \ Value \end{split}$	WC LL: PL: Pi= G=	lab) = Lab Vane Shear Strengt = Water Content, percent = Liquid Limit = Plastic Limit + Plasticity Index Grain Size Analysis Consolidation Test	h (psf)
Sample Information			ion						
_	No.	asing ft.)	tion/ y (ft.)		c Log	Visual Description and Rer	narks		Laboratory Test

	Sar	mple Informat	rmation				
Depth (ft.)	Sample No.	Sample No. Barrel/Casing Driven (ft.) Penetration/		Graphic Log	Visual Description and Remarks	Laboratory Test Results	
50					Gray, fine to medium sand with little silt (SM), trace coarse		
- 51				- ::::::::	sand, trace gravel, wet: ALLUVIUM	/	
- 52				- ::::::::	Grab sample GS-02-21-6 (51 to 53 ft linear drilling)	WC = 16.1% Fines = 12.2%	
- 53	CR-6	48-58	10.0/6.0	- ::::::::		1 11165 121270	
- 54				- ::::::::			
- 55				- ::::::::			
- 56				- ::::::::			
- 57							
- 58							
- 59				-			
- 60				_			
- 61							
- 62				_			
- 63	CR-7	58-68	10.0/8.0				
- 64							
- 65							
- 66				0 A 0 A	Gray, subrounded to rounded gravel with fine to coarse sand (GP), trace silt, occasional cobbles, wet: ALLUVIUM		
- 67				00.00	(G1), trace siit, occasional coobles, wet. ALLO VIOW		
- 68				0			
- 69				0.00			
- 70				0			
- 71				04.0			
72				00.00			
73	CR-8	68-78	10.0/8.5	_ ::::::::	Gray, fine to coarse sand with rounded gravel (SW), trace		
74				_ ::::::::	silt, wet: ALLUVIUM		
'.				· · · · · · · ·	- limited sample recovery from 88' to 108'		

Remarks:

Boring drilled at an angle of approximately 45 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.71 feet of vertical drilling. Boring terminated at 126 feet of angled drilling which equates to approximately 89 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradu *Water level readings have been made at times and under conditions stated. Groundwater fluctuat		_
conditions other than those present at the time measurements were made	Boring No.: B-02-21 (Angled)	

Klei	nsc	hmin	f P	roject:	Ashton Hydroelectric Develop.		02-21 (Angled)
				ocation:	Cumberland, RI		61008
Driller:	Casca	de Environmen	tal Proj	ect Feature:	Proposed Powerhouse	Borehole ID/OD: 5.5"	ID / 6" OD
Operator:	Robert	t	Elev	ation:	76.7'	Hammer Type: N/A	
Logged By:	Helen	Russell	Datu	m:	NAVD88	Rod Size: 3.5"	
Date Start/Finish:	9/22/2	1-9/23/21	Rig	Гуре:	TSi 150CC Compact-Crawler	Core Barrel: 4" II	D / 4.75" OD
Boring Location:	See Ex	xploration Plan	Drill	ing Method:	Sonic Drilling	Water Level*:~ 10.6' bgs (ve	rtical) at time of drilling
Definitions					Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	Su(lab) = Lab Vane WC = Water Conte LL = Liquid Limit PL = Plastic Limit Pi = Plasticity Inde G = Grain Size C = Consolidation 1	c lysis
	San	nple Informati	on				
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Rea	narks	Laboratory Test Results
- 75 - 76 - 77 - 78 - 79 - 80 - 81 - 82 - 83 - 84 - 85 - 86 - 87 - 88 - 89 - 90 - 91 - 92 - 93 - 94 - 95 - 96 - 97 - 98	CR-9	78-88	10.0/9.0		Gray, fine to coarse sand with silt, wet: ALLUVIUM - limited sample recovery from	-	ace
Remarks: Boring drill	ed at an angle	e of approxim	ately 45 de	grees relat	ive to horizontal. Each linear foo	t of angled drilling equat	es to

approximately 0.71 feet of vertical drilling. Boring terminated at 126 feet of angled drilling which equates to approximately 89 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made Page 4 of 6 B-02-21 (Angled) **Boring No.:**

Klei	nsch	hmidt	Pro	3	Ashton Hydroelectric Develop. Cumberland, RI	Boring No.: B-02-21 (Project No. 4161008	(Angled)	
				t Feature:			<u> </u>	
Driller: Operator:	Robert	le Environmental	Elevati		Proposed Powerhouse 76.7'	Borehole ID/OD: 5.5" ID / 6" Hammer Type: N/A	ОБ	
Logged By:			Datum					
	Helen I				NAVD88	5.5		
Date Start/Finish:		1-9/23/21	Rig Ty		TSi 150CC Compact-Crawler	Core Barrel: 4" ID / 4.75"		
Boring Location:	See Ex	ploration Plan	Drillin	g Method:	Sonic Drilling	Water Level*:~ 10.6' bgs (vertical) a	t time of drilling	
U = Thin Wall Tube Sar MU = Unsuccessful Thi V = Insitu Vane Shear T	lit Spoon Sample attempt nple n Wall Tube Sample attemj	SSA = : HSA = RC = R WOH =	ck Core Sample Solid Stem Auger Hollow Stem Auger toller Cone = weight of hammer = Weight of rods		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	Su(lab) = Lab Vane Shear Streng WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit Pi = Plasticity Index G = Grain Size Analysis C = Consolidation Test	th (psf)	
	Sam	ple Information	1					
Depth (ft.)	Sample No. Barrel/Casing Driven (ft.) Penetration/ Recovery (ft.)		Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Rer	narks	Laboratory Test Results	
- 100 - 101 - 102					Gray, fine to coarse sand with silt, wet: ALLUVIUM	rounded gravel (SW), trace		
- 103 - 104	CR-11	98-108	10.0/1.0		- limited sample recovery from	1 88' to 108'		
- 105 - 106 - 107								
- 108 - 109					Brown, fine to coarse sand (SV ALLUVIUM	own, fine to coarse sand (SW), trace rounded gravel, wet:		
- 110 - 111 - 112	CR-12	108-118	10.0/6.0					
- 113 - 114 - 115								
- 116 - 117 - 118								
- 119 - 120 - 121	CR-13	118-126	10.0/4.0		Gray, bedrock/weathered bedro	ook hard recovery is		
- 122 - 123 - 124	CR-13	118-126	10.0/4.0		fractured to severely fractured, seams: BEDROCK			
					1			
approximate of vertical d	ely 0.71 feet o rilling.	f vertical drillin			ve to horizontal. Each linear foot ed at 126 feet of angled drilling w		89 feet	
_	ground surfa	ce imate boundaries be	etween soil type	es; transition	is may be gradual.	Page 5 of 6		
*Water level read	ings have been ma		er conditions st	ated. Groun	dwater fluctuations may occur due to	Boring No.: B-02-21 (A	Angled)	

Klei	nscl	hmia	f Pro	•	Ashton Hydroelectric Develop. Cumberland, RI	Boring No.: Project No.	B-02-21 (An 4161008	gled)
Driller:		de Environmer		t Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6" OD	
Operator:	Robert		Elevati		76.7'	Hammer Type:	N/A	<u> </u>
Logged By:		Russell	Datum	:	NAVD88	Rod Size:	3.5"	
Date Start/Finish:		1-9/23/21	Rig Ty	pe:	TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75" OI	D
Boring Location:	See Ex	xploration Plan	Drillin	g Method:	Sonic Drilling	Water Level*:~ 10.6	bgs (vertical) at tim	ne of drilling
U = Thin Wall Tube Sar MU = Unsuccessful Thi V = Insitu Vane Shear T	olit Spoon Sample attempt mple in Wall Tube Sample atten	SS HS npt RC	= Rock Core Sample A = Solid Stem Auger SA = Hollow Stem Auger C = Roller Cone OH = weight of hammer OR = Weight of rods		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	WC = LL = PL = Pi = 1 G = C	b) = Lab Vane Shear Strength (psf = Water Content, percent Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test)
	San	ple Informat	ion					
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Re	marks	1	Laboratory Test Results
- 125 F						1 1 1		
- 126					Gray, bedrock/weathered bedra fractured to severely fractured			
- 127					seams: BEDROCK	s, meraamg appare	one vertical	
128					Bottom of boring at 126' angle	ed drilling and app	proximately	
- 129					89' bgs			
130								
- 131				1				
132								
- 133								
134								
135				1				
- 136				1				
- 137				-			1	
- 138			-	-			[
- 139				-			1	
- 140				-			1	
- 141							1	
- 142							1	
- 143							1	
- 144				1				
- 145				1			1	
- 146				\mathbf{f}			1	
- 147				-			1	
- 148				-			1	
L ₁₄₉ L								

Remarks:

Boring drilled at an angle of approximately 45 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.71 feet of vertical drilling. Boring terminated at 126 feet of angled drilling which equates to approximately 89 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 6 of 6

Boring No.: B-02-21 (Angled)

Boring No.: B-03-21 (Angled) Kleinschmia Ashton Hydroelectric Develop. Project: 4161008 Cumberland, RI Location: Project No. Borehole ID/OD: Driller: Cascade Environmental **Project Feature:** Proposed Powerhouse 5.5" ID / 6" OD Operator: Elevation: 78.8' Hammer Type: Robert N/A Rod Size: Logged By: Datum: 3.5" NAVD88 Helen Russell Date Start/Finish: Rig Type: TSi 150CC Compact-Crawler Core Barrel: 4" ID / 4.75" OD 9/20/21-9/22/21 **Boring Location: Drilling Method:** Water Level*: ~ 9.3' bgs (vertical) at time of drilling See Exploration Plan Sonic Drilling Definitions Su(lab) = Lab Vane Shear Strength (psf) Definitions SS = Split Spoon Sample MSS = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample attempt V = Insitu Vane Shear Test MV = Unsuccessful Insitu Vane Shear Test attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods Su(lab) = Lab Vane Shear Stre WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit Pi = Plasticity Index G = Grain Size Analysis Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value C = Consolidation Test

	Sar	nple Informat	ion			
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Remarks	Laborator Test Results
0	•			·	Dark brown to black, silty fine sand (SM), trace medium to	
-1					coarse sand, trace to some gravel, trace organics, moist: EXISTING FILL	
-2	CR-1	0-5	5.0/4.5		EXISTING FILL	
-3				 		
-4				40 A		
-5 -6						
-7						
-8	CR-2	5-10	5.0/6.0			
-9				• 0		
- 10				」 .▼○ ♪.		
- 11						
- 12				· O D.		
- 13	CR-3	10-15	5.0/6.0		Grab sample GS-03-21-3 (12.5 to 14.5 ft linear drilling)	İ
- 14				00		
- 15					Brown to dark brown, subangular to subrounded gravel with	1
- 16				0.00	fine to coarse sand and silt (GM), occasional cobbles, wet:	
- 17	CR-4	15-20	5.0/4.5	00	ALLUVIUM	
- 18				0 0		
19						
20				00.00		
- 21 - 22				0.00		
22 - 23				0 0		
- 24				0.00		
	CR-5	20-30	10.0/6.0	00.00		

Remarks:

Boring drilled at an angle of approximately 40 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.64 feet of vertical drilling. Boring terminated at 150 feet of angled drilling which equates to approximately 96 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 1 of 7

Boring No.:

B-03-21 (Angled)

Sample Information	Kloi	neel	hmid	4 Pro	ject:	Ashton Hydroelectric Develop.	Boring No.: B-03-21 ((Angled)	
Department Robert	MGI	11361	IIIIIU	Loc	cation:	Cumberland, RI	Project No. 4161008		
Date StartFlinish: 9/20/21-9/22/21 Rig Type: ISSUE Compact-Crawler Core Barret: 4" D/4.75" O Description of Date StartFlinish: 9/20/21-9/22/21 Rig Type: Start	Driller:	Cascac	le Environmen	tal Project	Feature:	Proposed Powerhouse	Borehole ID/OD: 5.5" ID / 6"	OD	
Date StartFishiots 9/20/21-9/22/21 Sig Type: TSi 150CC Compact-Crawler Gore Rarel: 4" ID / 4/35" OD Poling Location Poling P	Operator:	Robert	;	Elevation	on:	78.8'	Hammer Type: N/A		
See Exploration See Exploration Plan Drilling Method: Sonic Drilling Water Level** - 9.3 bgs (verifical) at time of of the second process of t	Logged By:	Helen	Russell	Datum:	:	NAVD88	Rod Size: 3.5"		
Solid South Section Solid Soli	Date Start/Finish:			Rig Ty	e:	TSi 150CC Compact-Crawler	Core Barrel: 4" ID / 4.75" OD		
Somple Information Sample Information Sample Information Sample Information Sample Information Sample Information Sample Information Gray-brown, subangular to subrounded gravel with fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt,	Boring Location:	See Ex	ploration Plan	Drilling	Method:	Sonic Drilling	Water Level*: ~ 9.3' bgs (vertical) at	time of drilling	
CR-6 30-40 10.04.0 30-40 41 42 43 63-80 40 41 42 43 64-80 45-50 5.01.0 48 48 66 47 48 45-50 5.01.0 48 48 66 47 48 48 48 48 48 48 48	SS = Split Spoon Samp MSS = Unsuccessful Sp U = Thin Wall Tube Sa MU = Unsuccessful Thi V = Insitu Vane Shear T	olit Spoon Sample attempt mple in Wall Tube Sample attem Fest	SSA HS. apt RC WC	A = Solid Stem Auger A = Hollow Stem Auger = Roller Cone DH = weight of hammer		Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value	WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit Pi = Plasticity Index G = Grain Size Analysis	th (psf)	
25 26 27 28 29 30 31 31 32 33 34 35 CR-6 30-40 10.004.0 41 42 43 CR-7 40-45 5.001.0 48 CR-8 45-50 5.001.0 Brown to dark brown, subangular to subrounded gravel with fine to coarse sand and silt (GM), occasional cobbles, wet: ALLUVIUM Grab sample GS-03-21-5 (25 to 30 ft linear drilling) Gray-brown, fine to coarse sand with subrounded to rounded gravel (SW), few to trace silt, occasional cobbles, wet: ALLUVIUM 41 42 43 CR-7 40-45 5.001.0		Sam	ple Informati	ion					
26 27 28 29 30 31 31 32 33 34 43 45 40 41 42 43 48 48 48 48 48 48 48 48 48 48 48 48 48	Depth (ft.)				Graphic Log	Visual Description and Rer	narks	Laboratory Test Results	
4	- 26 - 27 - 28 - 29 - 30 - 31 - 32 - 33 - 34 - 35 - 36 - 37 - 38 - 39 - 40 - 41 - 42 - 43 - 44 - 45 - 46 - 47	CR-7	40-45	5.0/1.0		fine to coarse sand and silt (GN ALLUVIUM Grab sample GS-03-21-5 (25 the Gray-brown, fine to coarse sand gravel (SW), few to trace silt, or the Gray-brown of the coarse sand gravel (SW), few to trace silt, or the Gray-brown of t	M), occasional cobbles, wet: o 30 ft linear drilling) d with subrounded to rounded		
Remarks: Boring drilled at an angle of approximately 40 degrees relative to horizontal. Each linear foot of angled drilling equates to	Remarks:	ad at an1	af am	ataly 40 4-	200 m=1=4	yo to homizontal Early lives Co.	t of an alad duilling a secretary t		

Boring drilled at an angle of approximately 40 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.64 feet of vertical drilling. Boring terminated at 150 feet of angled drilling which equates to approximately 96 feet of vertical drilling.

- bgs: below ground surface

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Boring No.:

B-03-21 (Angled)

Klei	nsc	hmir	H Pro	oject:	Ashton Hydroelectric Develop.	Boring No.:	B-03-21 (Angled)
MG	IIJGI		Loc	cation:	Cumberland, RI	Project No.	4161008	
Driller:	Casca	de Environme	ntal Project	Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6"	OD
Operator:	Rober	t	Elevati	on:	78.8'	Hammer Type:	N/A	
Logged By:	Helen	Russell	Datum	:	NAVD88	Rod Size:	3.5"	
Date Start/Finish:	9/20/2	1-9/22/21	Rig Ty	pe:	TSi 150CC Compact-Crawler			
Boring Location:	See Ex	xploration Plan	n Drilling	g Method:	Sonic Drilling	Water Level*: ~ 9.3' bgs (vertical) at time of drilling		
U = Thin Wall Tube Sa MU = Unsuccessful Th V = Insitu Vane Shear	olit Spoon Sample attempt mple in Wall Tube Sample atter	Si H npt R	E = Rock Core Sample SA = Solid Stem Auger ISA = Hollow Stem Auger IC = Roller Cone WOH = weight of hammer WOR = Weight of rods		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	WC = LL = PL = Pi = G = 0	b) = Lab Vane Shear Strengt = Water Content, percent Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	h (psf)
	Sample Information							
Depth (ft.)	Sample No. Sample No. Barrel/Casing Driven (ft.) Penetration/ Recovery (ft.)		Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Re	marks		Laboratory Test Results
50					Gray, subrounded to rounded	gravel with fine to	coarse sand	
- 51			1	00	(CD) 1 1 1			
- 52				0o.				
- 53	CR-9	50-55	5.0/0.0	0.00				
- 54				0.00				
				00.00				
- 55					Gray, fine to coarse sand (SW) trace to some g	ravel trace	
- 56				 :::::::	silt, occasional cobbles, moist			WC = 9.5%
- 57			1		Grab sample GS-03-21-10 (55			Fines = 4.8%
- 58	CR-10	55-60	5.0/5.5			to oo it iiiida di	6)	
- 59]:::::::				
- 60			†					
- 61			+		:			
- 62			1		:			
- 63	CR-11	60-65	5.0/4.0		:			
					:			
- 64]:::::::::::::::::::::::::::::::::::::	•			
- 65			1					
- 66								
- 67			1		}			
- 68	CR-12	65-70	5.0/2.5					
- 69]:::::::	•			
- 70					•			
- 71			1	 ::::::::	•			
- 72				 :::::::	•			
- 73	CR-13	70-75	5.0/5.5	 ::::::	•			
]	•			
- 74] ::::::::	•			

Remarks

Boring drilled at an angle of approximately 40 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.64 feet of vertical drilling. Boring terminated at 150 feet of angled drilling which equates to approximately 96 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 3 of 7

Boring No.:

B-03-21 (Angled)

Klei	nco	hmid	14	Project:	Ashton Hydroelectric Develop.	Boring No.:	B-03-21 (Angled)
MEI	115GI	IIIIIU		Location:	Cumberland, RI	Project No.	4161008	
Driller:	Casca	de Environmen	tal P	Project Feature:	Proposed Powerhouse	Borehole ID/OD:	5.5" ID / 6"	OD
Operator:	Rober	t	E	Elevation:	78.8'	Hammer Type:	N/A	
Logged By:	Helen	Russell	D	Datum:	NAVD88	Rod Size:		
Date Start/Finish:	9/20/2	1-9/22/21	R	Rig Type:	TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75'	' OD
Boring Location:	See Ex	xploration Plan	D	Orilling Method:	Sonic Drilling	Water Level*: ~ 9.3'	bgs (vertical) at	time of drilli
U = Thin Wall Tube Sar MU = Unsuccessful Thi V = Insitu Vane Shear T	dit Spoon Sample attempt mple n Wall Tube Sample atter	SSA HSA npt RC WC	= Rock Core Samp A = Solid Stem Au A = Hollow Stem C = Roller Cone DH = weight of hat DR = Weight of roo	uger 1 Auger ammer	Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	WC LL = PL = Pi = G =	ab) = Lab Vane Shear Strengt = Water Content, percent = Liquid Limit + Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	h (psf)
	San	nple Informati	ion					
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Remarks			Laborato Test Results
- 75 - 76 - 77 - 78 - 79 - 80 - 81 - 82 - 83 - 84	CR-14	75-80	5.0/5.0		Gray, fine to coarse sand (SW silt, occasional cobbles, moist			

Remarks:

- 86 - 87 - 88 - 89 - 90 - 91 - 92 - 93 - 94

- 95 - 96 - 97 - 98 - 99

Boring drilled at an angle of approximately 40 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.64 feet of vertical drilling. Boring terminated at 150 feet of angled drilling which equates to approximately 96 feet of vertical drilling.

- bgs: below ground surface

CR-16

90-100

10.0/10.0

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 4 of 7

Boring No.:

B-03-21 (Angled)

Klei	nsc	hmin	 	Project:	Ashton Hydroelectric Develop.	Boring No.: B-03-21 (Angled)
MUI				ocation:	Cumberland, RI	Project No. 4161008	
Driller:	Casca	de Environmen	tal Proj	ect Feature:	Proposed Powerhouse	Borehole ID/OD: 5.5" ID / 6"	OD
Operator:	Rober	t	Elev	ation:	78.8'	Hammer Type: N/A	
Logged By:	Helen	Russell	Date	ım:	NAVD88	Rod Size: 3.5"	_
Date Start/Finish:	9/20/2	21-9/22/21	Rig	Гуре:	TSi 150CC Compact-Crawler	Core Barrel: 4" ID / 4.75'	OD
Boring Location:	See Ex	xploration Plan	Dril	ing Method:	Sonic Drilling	Water Level*: ~ 9.3' bgs (vertical) at	time of drilling
Definitions SS = Split Spoon Sample MSS = Unsuccessful Spl U = Thin Wall Tube San MU = Unsuccessful Thir V = Insitu Vane Shear T. MV = Unsuccessful Insit	lit Spoon Sample attempt nple 1 Wall Tube Sample atter est	SSA HSA mpt RC WC	= Rock Core Sample A = Solid Stem Auger A = Hollow Stem Aug := Roller Cone OH = weight of hammon OR = Weight of rods		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) up = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	Su(lab) = Lab Vane Shear Strengt WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit Pi = Plasticity Index G = Grain Size Analysis C = Consolidation Test	h (psf)
	San	nple Informati	ion				
Depth (ft.)	Sample No. Barrel/Casing Driven (ft.) Penetration/			Graphic Log	Visual Description and Rei	narks	Laboratory Test Results
100 F				=:::::::	:र		
101				_ :::::::	Gray, fine to coarse sand (SW)		
					silt, occasional cobbles, moist	to wet: ALLUVIUM	
102				$\exists : : : : : :$:		
103				$\dashv :::::::$:		
- 104	4 CR-17 100-110 10.0/10.0			$\dashv \cdots \cdots$:		
105			10.0/10.0	_ ::::::::	:]		
	5			:1			
- 106					Gray, silty fine to medium san	d (SM), wet: ALLUVIUM	
107				$\dashv ::::::::$	Grab sample GS-03-21-17 (10		
- 108				$\dashv \vdots \vdots \vdots \vdots$		o to 110 it inical arining)	
- 109					: <u>:</u>		
- 110				_ :::::::	: <u>:</u>		
					:		
- 111				⊟։։։։	: <u>:</u>		
112				⊣∷∷∷			
- 113				- :::::::			
- 114				_ :::::::	:		
	CR-18	110-120	10.0/8.0				
115				$\exists : : : : : : :$	1		
116				$\dashv ::::::::$:		
- 117				$\dashv ::::::::$:		
- 118					:		
- 119				_ :::::::	:}		
					:1		
120					Gray to brown, silty fine to me	edium sand (SM) trace gravel	
121				⊣ :::::::	wet: ALLUVIUM	willing (Olvi), nuoe giuvei,	
- 122				- :::::::	·]		
123		_ :::::::	:]				
					.]		
- 124				<u> </u>	<u> </u>		
Remarks:							
Boring drille					ive to horizontal. Each linear foot		06 foot

Boring drilled at an angle of approximately 40 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.64 feet of vertical drilling. Boring terminated at 150 feet of angled drilling which equates to approximately 96 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 5 of 7

Boring No.:

B-03-21 (Angled)

Kloi	nec	hmia	4 Pro	oject:	Ashton Hydroelectric Develop.	Boring No.:	B-03-21 ((Angled)
MG	11361		Lo	cation:	Cumberland, RI	Project No. 4161008		
Driller:	Casca	de Environmen	ntal Project	t Feature:	Proposed Powerhouse	Borehole ID/OD: 5.5" ID / 6" (OD
Operator:	Rober	t	Elevati	ion:	78.8'	Hammer Type:	N/A	
Logged By:	Helen	Russell	Datum	:	NAVD88	Rod Size:	3.5"	
Date Start/Finish:	9/20/2	1-9/22/21	Rig Ty	pe:	TSi 150CC Compact-Crawler	Core Barrel:	4" ID / 4.75'	' OD
Boring Location:	See Ex	xploration Plan	Drillin	g Method:	Sonic Drilling	Water Level*: ~ 9.3'	ogs (vertical) at	time of drilling
U = Thin Wall Tube Sa MU = Unsuccessful Th V = Insitu Vane Shear	olit Spoon Sample attempt mple in Wall Tube Sample atter	SS. HS npt RC	= Rock Core Sample A = Solid Stem Auger A = Hollow Stem Auger = Roller Cone OH = weight of hammer OR = Weight of rods		Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	WC = LL = PL =! Pi = P G = G	o) = Lab Vane Shear Streng Water Content, percent Liquid Limit Plastic Limit lasticity Index rain Size Analysis onsolidation Test	th (psf)
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log	Visual Description and Re	marks		Laboratory Test Results
- 125 - 126 - 127 - 128 - 129 - 130 - 131 - 132	CR-19	120-130	10.0/10.0		Gray to brown, silty fine to mowet: ALLUVIUM	edium sand (SM),	trace gravel,	

142 - 143 - 144 - 145 - 146 - 147 - 148 - 149

130-140

10.0/7.0

Gray, bedrock/weathered bedrock, hard, recovery is fractured to severely fractured, including apparent vertical seams: BEDROCK

Remarks:

134

135

136

137138139140141

CR-20

Boring drilled at an angle of approximately 40 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.64 feet of vertical drilling. Boring terminated at 150 feet of angled drilling which equates to approximately 96 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 6 of 7

Boring No.:

B-03-21 (Angled)

Kloi	neel	hmia	Pro	ject:	Ashton Hydroelectric Develop.	Boring No.: B-03-21 ((Angled)
MGI	11361		Loc	cation:	Cumberland, RI	Project No. 4161008	
Driller:	Casca	de Environmen	tal Project	Feature:	Proposed Powerhouse	Borehole ID/OD: 5.5" ID / 6"	OD
Operator:	Rober	t	Elevati	on:	78.8'	Hammer Type: N/A	
Logged By:		Russell	Datum		NAVD88	Rod Size: 3.5"	
Date Start/Finish:		1-9/22/21	Rig Ty		TSi 150CC Compact-Crawler		
Boring Location:	See Ex	xploration Plan	Drilling	g Method:	Sonic Drilling	Water Level*: ~ 9.3' bgs (vertical) at	time of drilling
U = Thin Wall Tube San MU = Unsuccessful Thi V = Insitu Vane Shear T	lit Spoon Sample attempt nple n Wall Tube Sample atter	HS. npt RC	Rock Core Sample A = Solid Stem Auger A = Hollow Stem Auger = Roller Cone DH = weight of hammer DR = Weight of rods		Su = insitu Field Vane Shear Strength (psf) Ty = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value	Su(lab) = Lab Vane Shear Streng WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit Pi = Plasticity Index G = Grain Size Analysis C = Consolidation Test	th (psf)
	San	nple Informati	ion				
2	OZ	asing ft.)	ion/ y (ft.)	c Log	Visual Description and Re	marks	Laboratory Test
Depth (ft.)	Sample No.	Barrel/Casing Driven (ft.)	Penetration/ Recovery (ft.)	Graphic Log			Results
- 150 F				<u>, </u>			
150					Bottom of boring at 150' angle	ed drilling and approximately	
					96' bgs		1
- 152				1			
- 153				1			
154				1			
- 155				1			
- 156				-			
- 157							
- 158							
- 159							
160]			
161							
162				1			
163				1			
- 164				1			
165				1			
- 166				1			
- 167				1			
- 168				1			
- 169				-			
170							
- 171]			
171							

Remarks:

Boring drilled at an angle of approximately 40 degrees relative to horizontal. Each linear foot of angled drilling equates to approximately 0.64 feet of vertical drilling. Boring terminated at 150 feet of angled drilling which equates to approximately 96 feet of vertical drilling.

- bgs: below ground surface

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

Page 7 of 7

Boring No.: B-03-21 (Angled)

ATTACHMENT 2B

DRIVE-AND-WASH BORINGS

Boring No.: *Kleinschmid* B-04-21 (Vertical) Ashton Hydroelectric Develop. **Project:** 4161008 Cumberland, RI Location: Project No. Borehole ID/OD: Driller: **Project Feature:** Proposed Powerhouse 4" OD Northern Test Boring Operator: Michael Nadeau Elevation: 81.2' Hammer Type: Automatic Logged By: Datum: Rod Size: NAVD88 NQJ Rods **ENE** Date Start/Finish: Rig Type: Diedrich D50 track-mount Core Barrel: 7/12/21 **Boring Location: Drilling Method:** Water Level*: ~ 8.5' bgs at time of drilling See Exploration Plan Drive and Wash

Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
G = Consolidation Test

C = Consolidation Test

			S	ample l	nformation						
Elevation (ft.)	Depth (ft.)	Sample No.	Sample Interval (ft.)	Pen./Rec. (in.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
80	$\begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$	SS-01	0-2	14	4-5-5-4	10		.∳€	Dark brown, silt, some sand, some organics, little gravel, loose to medium dense, moist: EXISTING FILL		ML
	-3 -4							. • C	Orange-brown, f-c sand, some gravel, loose to medium dense, moist: EXISTING FILL		
75	-5 -6 -7	SS-02	5-7	10	3-5-5-8	10		. • ·	Brown, angular to subrounded gravel, some f-c sand, little silt, loose, moist: EXISTING FILL		GW
	-8 -9								- Auger grinding until ~8' bgs		
70	10 11 12	SS-03	10-12	14	3-3-2-2	5	26		Brown to light brown, f-c sand, some silt, little angular to subrounded gravel, loose, moist: ALLUVIUM		SW-SM
	- 13 - 14						19 21 22	 	Dark brown, silt, some f-m sand, loose, wet: ALLUVIUM		
65	15 16 17	SS-04	15-17	16	1-2-4-10	6		· — · · · · ·	Olive brown, silty fine sand, loose, wet: ALLUVIUM		SP-SM
	- 18 - 19						71		- 16.8' bgs: Becomes dark gray w/occasional organics		
60	20 - 21	SS-05	20-22	6	6-14-24-14	38	124	000000	Brown, angular to subrounded gravel, some f-c sand, trace silt, dense, wet: ALLUVIUM		GW
	22 23 24						57 91	00000			
							163	0			

- SSA to 5-7' and 10-12' samples, then switched to drive & wash.
- 4" casing advanced to 65' bgs. Casing came detached at 60' bgs. Used 3" roller bit to advance through offset casing down to 70'
- River level at approximately 75.5' El. at time of drilling.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.	Page 1 of 3	
*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made	Boring No.:	B-04-21 (Vertical)

Kleinschmid **Boring No.:** B-04-21 (Vertical) Ashton Hydroelectric Develop. **Project:** 4161008 Cumberland, RI Location: Project No. Borehole ID/OD: Driller: **Project Feature:** Proposed Powerhouse 4" OD Northern Test Boring Operator: Michael Nadeau Elevation: 81.2' Hammer Type: Automatic Logged By: Datum: Rod Size: NAVD88 NQJ Rods **ENE** Rig Type: Date Start/Finish: Core Barrel: 7/12/21 Diedrich D50 track-mount **Boring Location: Drilling Method:** Water Level*: ~ 8.5' bgs at time of drilling See Exploration Plan Drive and Wash

Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

				S	ample I	nformation						
Elevation (ft.)		Depth (ft.)	Sample No.	Sample Interval (ft.)	Pen/Rec. (in.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
ĺ		25	SS-06	25-27	5	4-5-5-2	10			Gray-brown f-c sand, some subrounded		SW
55		26 27								gravel, trace silt, loose to medium dense, wet: ALLUVIUM		
		27 28								ALLUVION		
		20 29										
		30									WC =	
50		31	SS-07	30-32	6	2-3-3-4	6				13.1% Fines =	SW
30		32									1.3%	
	- 3	33						45				
	-3	34						51				
	-3	35	SS-08	35-37	2	3-6-6-7	12	68	• O A	Gray-brown subangular to subrounded gravel,		GW
45		36	33-06	33-37		3-0-0-7	12	33	00	some f-c sand, little silt, medium dense, wet:		Gw
		37						51	000	ALLUVIUM		
		38						71	0			
		39						69	00			
		40 41	SS-09	40-42	1	4-5-6-6	11			Gray-brown f-c sand, some subrounded		sw
40		42						44		gravel, trace silt, medium dense, wet: ALLUVIUM		
		43						52		11220 11311		
		44						79				
	- 4	45						84				
35	_	46	SS-10	45-47	6	5-6-5-6	11					SW
	- 4	47						51		- 46.8' bgs: 2" dark gray coarse gravel layer		
	- 4	48						68 79				
	- 4	49						79				

- SSA to 5-7' and 10-12' samples, then switched to drive & wash.
- 4" casing advanced to 65' bgs. Casing came detached at 60' bgs. Used 3" roller bit to advance through offset casing down to 70'
- River level at approximately 75.5' El. at time of drilling.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.	Page 2 of 3	
*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made	Boring No.:	B-04-21 (Vertical)

Boring No.: *Kleinschmid* B-04-21 (Vertical) Ashton Hydroelectric Develop. **Project:** 4161008 Cumberland, RI Location: Project No. Borehole ID/OD: Driller: **Project Feature:** Proposed Powerhouse 4" OD Northern Test Boring Operator: Michael Nadeau Elevation: 81.2' Hammer Type: Automatic Logged By: Datum: Rod Size: NAVD88 NQJ Rods **ENE** Rig Type: Date Start/Finish: Core Barrel: 7/12/21 Diedrich D50 track-mount **Boring Location: Drilling Method:** Water Level*: ~ 8.5' bgs at time of drilling See Exploration Plan Drive and Wash

Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

		Sample Information									
Elevation (ft.)	Depth (ft.)	Sample No.	Sample Interval (ff.)	Pen./Rec. (in.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
30 — 25 — 20 — 15 —	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73	SS-11	50-52	7	3-5-6-6	11			- 55' bgs: Light gray, some silt, little gravel - 60' bgs: Casing became offset. Unable to take any more samples below 55-57' sample. A 3" roller bit was used to go through the offset casing down to 70' bgs. - Bottom of boring at 70' bgs. No refusal.		SW-SM
	74										

- SSA to 5-7' and 10-12' samples, then switched to drive & wash.
- 4" casing advanced to 65' bgs. Casing came detached at 60' bgs. Used 3" roller bit to advance through offset casing down to 70'
- River level at approximately 75.5' El. at time of drilling.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.	Page 3 of 3	
*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made	Boring No.:	B-04-21 (Vertical)

Boring No.: *Kleinschmid* B-05-21 (Vertical) Ashton Hydroelectric Develop. **Project:** 4161008 Cumberland, RI Location: Project No. Borehole ID/OD: Driller: **Project Feature:** Proposed Powerhouse 4" OD Northern Test Boring Operator: Michael Nadeau Elevation: 81.9' Hammer Type: Automatic Logged By: Rod Size: Datum: NAVD88 NQJ Rods **ENE** Date Start/Finish: Rig Type: Core Barrel: 7/13/21 Diedrich D50 track-mount **Boring Location: Drilling Method:** Water Level*: Not measured See Exploration Plan Drive and Wash

Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

				S	ample 1	Information						
	Elevation (ft.)	Depth (ft.)	Sample No.	Sample Interval (ff.)	Pen./Rec. (in.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
		$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$	SS-01	0-2	13	2-5-6-6	11			Dark brown, silt, some fine sand, trace gravel,		ML
	80 -	2							• 6	trace organics, medium dense, moist: EXISTING FILL		
		-3										
		4							•			
		5	SS-02	5-7	8	2-3-5-6	8		- _ -	Brown, silty f-c sand, little to some gravel,		SM
	75	6							. 4 C			
	/5	-7 -8										
		.9 .							• 6			
		10							. 4 _C	Tild C 1801 1 1	-	
		11	SS-03	10-12	17	9-8-4-4	12			Light brown, f-c sand, little subangular to subrounded fine gravel, medium dense, moist:		SM
	70	12						21		ALLUVIUM		
		13						27				
		15						27				
		16	SS-04	15-17	18	2-2-3-2	5			Brown, silty f-c sand, trace fine gravel, loose to medium dense, wet: ALLUVIUM		SM
	65	17								to mediam dense, wet. ALDE VIEW		
		18										
		19										
		20 21						41				
	60 –	22						59				
		23						81				
		24						77				
_		L					1	58	<u> </u>			

- SSA to 5-7' and 10-12' samples, then switched to drive & wash.
- Advanced 4" casing to 40' bgs. Casing came detached at 35' bgs. 3" roller bit could not get through offset casing. Casing from 35-40' left in ground and never washed out.
- Piezometer was installed to depth 33.5' bgs.
- Top of Piezometer Riser surveyed at 83.05'.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.	Page 1 of 2	
*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made	Boring No.:	B-05-21 (Vertical)
·		

Boring No.: Kleinschmid B-05-21 (Vertical) Ashton Hydroelectric Develop. **Project:** 4161008 Cumberland, RI Location: Project No. Borehole ID/OD: Driller: **Project Feature:** Proposed Powerhouse 4" OD Northern Test Boring Operator: Michael Nadeau Elevation: 81.9' Hammer Type: Automatic Logged By: Rod Size: Datum: NAVD88 NQJ Rods **ENE** Date Start/Finish: Rig Type: Core Barrel: 7/13/21 Diedrich D50 track-mount **Boring Location: Drilling Method:** Drive and Wash Water Level*: Not measured See Exploration Plan

Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

			Sample Information									
Elevation (ft.)		Depth (ft.)	Sample No.	Sample Interval (ft.)	Pen/Rec. (in.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
	2		S-05	25-27	1	4-4-6-8	10			- 25' bgs: some fine gravel, little silt		sw
55 -	$-\begin{vmatrix} 2\\2\\2\end{vmatrix}$	7						82		- 25-30' bgs: roller bit grinding		
	2							79 80				
	3	9	S-06	30-32	5	4-6-4-5	10			- 30' bgs: gray-brown, some silt, trace gravel		SM
50	- 3	2						55 68				
	3							86				
	3	5						72		25111	WC = 7.5%	
45	3	6	S-07	35-37	5	8-23-23-17	46			- 35' bgs: brown, some gravel, dense - Casing advanced to 40' bgs and became	Fines = 25.2%	SM
45	- 3 3									offset at 35' bgs. A 3" rollerbit was unable to get past the offset easing. Bottom of boring at		
	3									37' bgs.		
40	4											
40	- 4 -4											
	4											
	4											
35	- 4											
	4											

- SSA to 5-7' and 10-12' samples, then switched to drive & wash.
- Advanced 4" casing to 40' bgs. Casing came detached at 35' bgs. 3" roller bit could not get through offset casing. Casing from 35-40' left in ground and never washed out.
- Piezometer was installed to depth 33.5' bgs.
- Top of Piezometer Riser surveyed at 83.05'.

*Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to	Page 2 of 2	B-05-21 (Vertical)
conditions other than those present at the time measurements were made	Boring No.:	2 00 21 (* 010000)

Kleinschmid Boring No.: B-06-21 (Vertical) **Project:** Ashton Hydroelectric Develop. 4161008 Cumberland, RI Location: Project No. Borehole ID/OD: Driller: Northern Test Boring **Project Feature:** Proposed Powerhouse 4" OD Operator: Michael Nadeau Elevation: 78.2' Hammer Type: Automatic Logged By: Datum: Rod Size: NAVD88 NQJ Rods **ENE** Date Start/Finish: Rig Type: Core Barrel: 7/13/21 Diedrich D50 track-mount **Boring Location: Drilling Method:** Drive and Wash Water Level*: Not measured See Exploration Plan Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

			S	Sample l	Information			1			
Elevation (ft.)	Depth (ft.)	Sample No.	Sample Interval (ft.)	Pen./Rec. (in.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
75	0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10	SS-01	10-12	19	1-2-2-3	4			Dark brown, silt, some f-c sand, trace fine gravel, trace organics, loose, moist: EXISTING FILL		ML
65	- 12 - 13 - 14						94		Brown, fine sand, some silt, trace coarse sand, loose, moist: ALLUVIUM - 13-15' bgs: rollerbit grinding		SM
55 —	15 16 17 18 19 20 21 22 23	SS-02	15-17	10	12-16-29-16	45	75 93 87 68 78 92		Orange-brown, subangular to subrounded gravel, some silt, little f-c sand, trace clay, dense, wet: ALLUVIUM		GW-GM
	- 24						59	000			

- SSA to 10-12' sample, then switched to drive & wash.
- Piezometer was installed to depth of 42' bgs.
- Top of Piezometer Riser surveyed at 81.18'.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual. *Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to	Page 1 of 3	
conditions other than those present at the time measurements were made	Boring No.:	B-06-21 (Vertical)

Kleinschmid **Boring No.:** B-06-21 (Vertical) Ashton Hydroelectric Develop. **Project:** 4161008 Cumberland, RI Location: Project No. Driller: Borehole ID/OD: Northern Test Boring **Project Feature:** Proposed Powerhouse 4" OD Operator: Michael Nadeau Elevation: 78.2' Hammer Type: Automatic Logged By: Datum: Rod Size: NAVD88 NQJ Rods **ENE** Date Start/Finish: Rig Type: Diedrich D50 track-mount Core Barrel: 7/13/21 **Boring Location: Drilling Method:** Drive and Wash Water Level*: Not measured See Exploration Plan

Definitions

Definitions
SS = Split Spoon Sample
MSS = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = weight of hammer WOR = Weight of rods

Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value Su(lab) = Lab Vane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
Pi = Plastic Limit
Pi = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

(Vertical)

			Sample Information		Sample Information							
Elevation	(ft.)	Depth (ft.)	Sample No.	Sample Interval (ft.)	Pen./Rec. (in.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Graphic Log	Visual Description and Remarks	Laboratory Test Results	AASHTO and Unified Class.
50		25 - 26 - 27 - 28	SS-03	25-27	0	5-6-7-7	13			Gray, f-c sand, some silt, little fine gravel, medium dense, wet: ALLUVIUM		SM
50		- 29 - 30 - 31	SS-04	30-32	12	6-13-19-15/3"- 50/0"	32			Brown, f-c sand, some gravel, little silt, very	WC = 10.1% Fines =	SM
45	_	- 32 - 33 - 34								dense, wet: ALLUVIUM - 31.5 - 32' bgs: cobble	11.1%	
		- 35 - 36	SS-05	35-37	12	19-10-7-6	17			- 34 - 34.5' bgs: cobble - 35' bgs: gray to gray-brown - 36' bgs: gray, silty fine sand		SM
40	-	- 37 - 38 - 39						60 61				
		- 40 - 41 - 42	SS-06	40-42	15	2-3-3-5	6	76		Brown, fine sand, little medium to coarse sand, little silt, trace gravel, loose, wet: ALLUVIUM	WC = 18.7% Fines = 16.5%	SM
35	-	- 43 - 44 - 45							000000000	Advanced hole with 3" rollerbit from 42' to 58' bgs.		
30		- 46 - 47 - 48							00000000	- 46' bgs: gravel on rollerbit		
		- 49							000	- 49' bgs: gravel on rollerbit		

- SSA to 10-12' sample, then switched to drive & wash.
- Piezometer was installed to depth of 42' bgs.
- Top of Piezometer Riser surveyed at 81.18'.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual. *Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to	Page 2 of 3	
conditions other than those present at the time measurements were made	Boring No.:	B-06-21 (

Kleinschmid Ashton Hydroelectric Develop. **Project:** 4161008 Location: Cumberland, RI Project No. Borehole ID/OD: Driller: **Project Feature:** Proposed Powerhouse 4" OD Northern Test Boring Operator: Elevation: 78.2' Hammer Type: Michael Nadeau Automatic Logged By: Datum: NAVD88 Rod Size: NQJ Rods **ENE** Rig Type: Date Start/Finish: Diedrich D50 track-mount Core Barrel: 7/13/21 **Boring Location: Drilling Method:** Water Level*: Not measured Drive and Wash See Exploration Plan Su(lab) = Lab Vane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit Pi = Plastic Limit Pi = Plasticity Index G = Grain Size Analysis C = Consolidation Test Definitions R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger Definitions SS = Split Spoon Sample MSS = Unsuccessful Split Spoon Sample attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample attempt V = Insitu Vane Shear Test MV = Unsuccessful Insitu Vane Shear Test attempt Su = insitu Field Vane Shear Strength (psf) Tv = Pocket Torvane Shear Strength (psf) qp = Unconfirmed Compressive Strength (ksf) N-uncorrected = Raw field SPT N-value Hammer Efficiency Factor = Annual Calibration Value RC = Roller Cone WOH = weight of hammer WOR = Weight of rods **Sample Information** AASHTO Laboratory and Sample Interval (ft.) Blows (/6 in.) Shear Strength (psf) or RQD (%) Test Pen./Rec. (in.) l-uncorrected Visual Description and Remarks Elevation (ft.) Graphic Log Unified Results Depth (ft.) Class. Casing Blows 50 51 52 53 25 54 55 - 55' bgs: f-m sand with gravel, gravel on 56 rollerbit 57 Rollerbit grinding on boulder or possible bedrock 58 20 - Bottom of boring at 58' bgs. 59 60 61 62 63 15 64 65 66 67 **68** 10 69 70 71

Remarks:

72 73 **74**

- SSA to 10-12' sample, then switched to drive & wash.
- Piezometer was installed to depth of 42' bgs.
- Top of Piezometer Riser surveyed at 81.18'.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual. *Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made

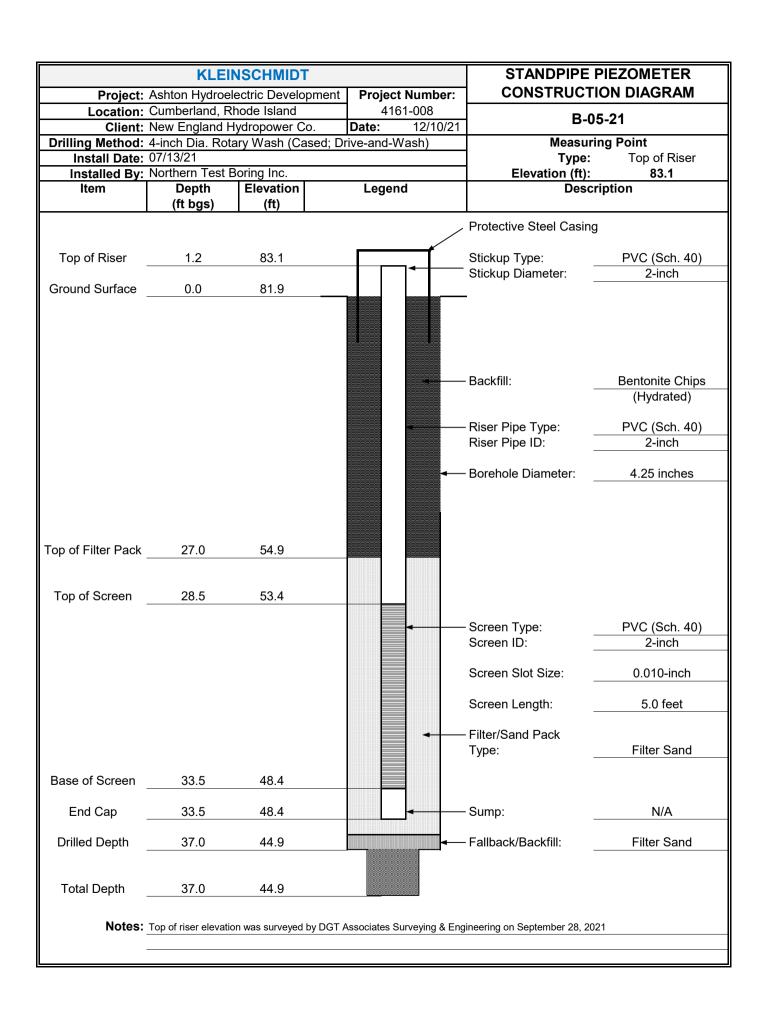
Page 3 of 3

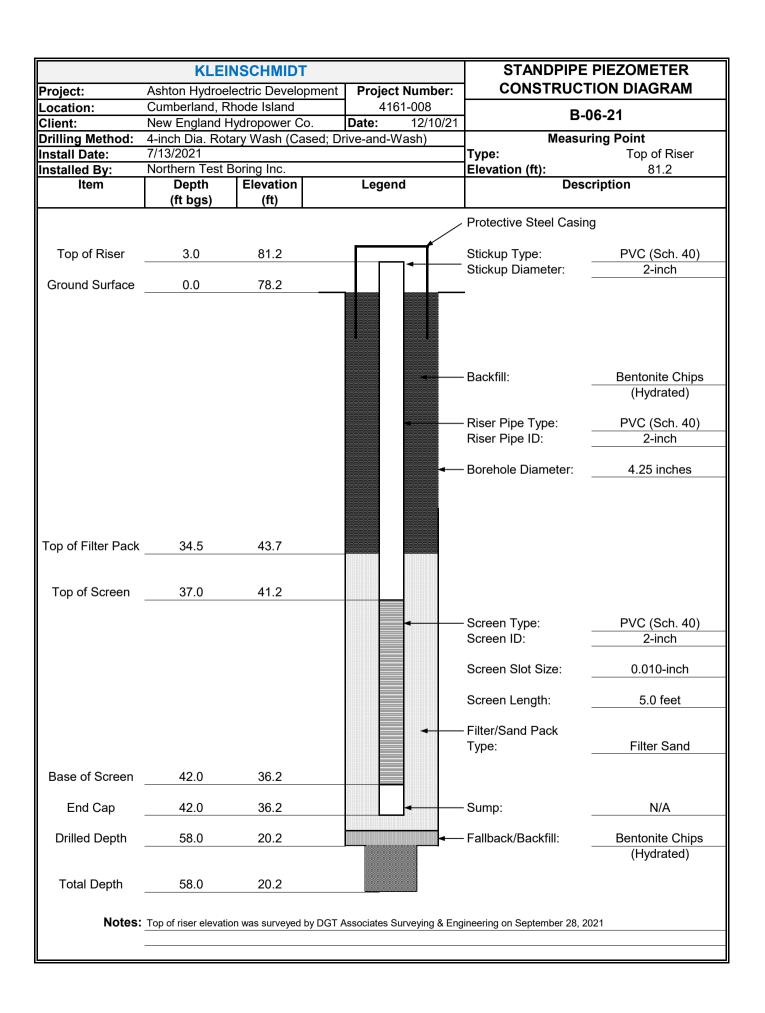
Boring No.:

B-06-21 (Vertical)

B-06-21 (Vertical) **Boring No.:**

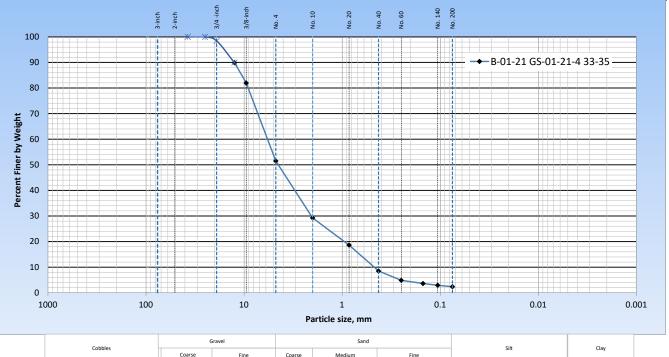
ATTACHMENT 3 2021 PIEZOMETER CONSTRUCTION DIAGRAMS





ATTACHMENT 4 2021 GEOTECHNICAL LABORATORY TESTING

	Particle Size Distribution	Job No.:	104-122
	Particle Size Distribution	Client:	Kleinschmidt
Site Name	Ashton Hydro Development	Client Project No.:	
Site Name	ASIROH Hydro Development	Boring/Test Pit No:	B-01-21
Site Location	Ashton, RI	Sample No:	GS-01-21-4
Site Location	ASTROIT, KI	Depth:	33-35
Test Method	AASHTO 311	Sample Type:	Grab
rest Method	AASHIO 311	KeyLabID:	0



Sieving				
Particle Size	% Passing			
mm	70 Fassing			
100	100.0			
75	100.0			
50	100.0			
37.5	100.0			
25	100.0			
19	98.4			
12.5	89.9			
9.5	82.0			
4.75	51.5			
2	29.2			
0.85	18.6			
0.425	8.5			
0.25	4.9			
0.15	3.6			
0.106	2.9			
0.075	2.4			

Sample Proportions	% Dry Mass
Very Coarse > 75 mm	0.0
Coarse Gravel 75 mm - 19 mm	1.6
Fine Gravel 19 mm - 4.75 mm	46.9
Coarse Sand 4.75 to 2.0 mm	22.3
Medium Sand 2.0 to 0.435 mm	20.8
Fine Sand: 0.425 to 0.075 mm	6.1
Fines: <0.075 mm	2.4

Soil Classification		
Brown Gravelly medium to coarse SAND, trace fine sand		
and silt (SW)		

Moisture Content: 8.8

Tested by	1	Checked b	У	Approved b	у	Printed Date	Figure No.
CID	Date	cir	Date	cir	Date		
SJR	11/5/2021	sjr	11/6/2021	sjr	11/6/2021		



	Particle Size Distribution	Job No.:	104-122
	Particle Size Distribution	Client:	Kleinschmidt
Site Name	Ashton Hydro Development	Client Project No.:	
Site Name	itori nyaro bevelopinent	Boring/Test Pit No:	B-01-21
Site Location	Ashton, RI	Sample No:	GS-01-21-10
Site Location	ASTROIT, KI	Depth:	95-98
Test Method	AASHTO 311	Sample Type:	Grab
rest Method	MASITIO 311	KeyLabID:	0



Sieving				
Particle Size	% Passing			
mm	70 Fassing			
100	100.0			
75	100.0			
50	100.0			
37.5	100.0			
25	100.0			
19	95.7			
12.5	95.7			
9.5	95.2			
4.75	93.6			
2	87.1			
0.85	71.7			
0.425	51.5			
0.25	35.0			
0.15	22.4			
0.106	15.9			
0.075	11.5			

Sample Proportions	% Dry Mass
Very Coarse > 75 mm	0.0
Coarse Gravel 75 mm - 19 mm	4.3
Fine Gravel 19 mm - 4.75 mm	2.1
Coarse Sand 4.75 to 2.0 mm	6.5
Medium Sand 2.0 to 0.435 mm	35.6
Fine Sand: 0.425 to 0.075 mm	40.0
Fines: <0.075 mm	11.5

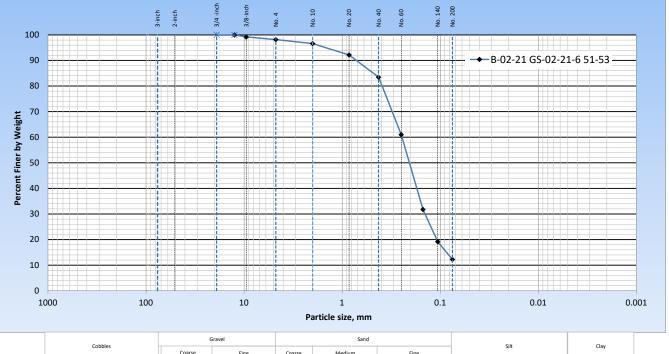
Soil Classification		
Grayish brown fine to coarse SAND, little silt, trace fine		
gravel (SM)		

Moisture Content: 13.7

Tested by	1	Checked b	У	Approved b	у	Printed Date	Figure No.
SJR	Date	cir	Date	cir	Date		
SJK	11/5/2021	sjr	11/6/2021	sjr	11/6/2021		



	Particle Size Distribution	Job No.:	104-122
	Particle Size Distribution	Client:	Kleinschmidt
Site Name	Ashton Hydro Development	Client Project No.:	•
Site Name A	Ashton nyuro Development 	Boring/Test Pit No:	B-02-21
Site Location	Ashton, RI	Sample No:	GS-02-21-6
Site Location		Depth:	51-53
Test Method	AASHTO 311	Sample Type:	Jar
rest ivietilou	MASIIIO 311	KeyLabID:	0



Sieving				
Particle Size	% Passing			
mm	70 T d33111g			
100	100.0			
75	100.0			
50	100.0			
37.5	100.0			
25	100.0			
19	100.0			
12.5	100.0			
9.5	99.2			
4.75	98.1			
2	96.6			
0.85	92.2			
0.425	83.5			
0.25	61.0			
0.15	31.8			
0.106	19.2			
0.075	12.2			

Sample Proportions	% Dry Mass
Very Coarse > 75 mm	0.0
Coarse Gravel 75 mm - 19 mm	0.0
Fine Gravel 19 mm - 4.75 mm	1.9
Coarse Sand 4.75 to 2.0 mm	1.6
Medium Sand 2.0 to 0.435 mm	13.1
Fine Sand: 0.425 to 0.075 mm	71.3
Fines: <0.075 mm	12.2

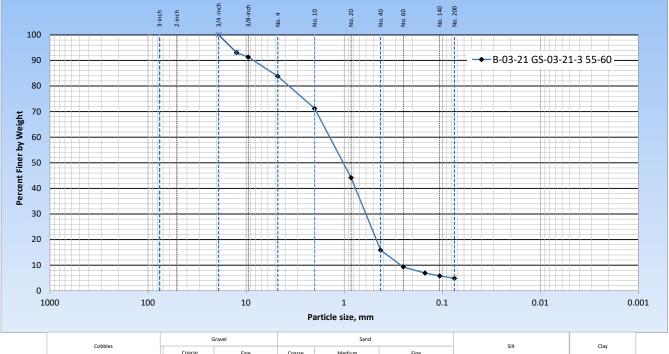
Soil Classification	
Gray fine SAND, little medium to coarse sand and silt,	
trace fine gravel (SP/SM)	

Moisture Content: 16.1

Tested by Checked by Approved by		у	Printed Date	Figure No.			
CID	Date	cir	Date	sir	Date		
SJR	11/5/2021	sjr	11/6/2021		11/6/2021		



	Particle Size Distribution	Job No.:	104-122
	Particle Size Distribution	Client:	Kleinschmidt
Site Name	Ashton Hydro Development	Client Project No.:	•
Site Name	ASIILOH NYUFO DEVELOPHIENL	Boring/Test Pit No:	B-03-21
Site Location	Ashton, RI	Sample No:	GS-03-21-3
Site Location	ASTROIT, NI	Depth:	55-60
Test Method A	AASHTO 311	Sample Type:	Jar
rest ivietilou	AASHIO SII	KeyLabID:	0



Sieving				
Particle Size	% Passing			
mm	70 T 033111g			
100	100.0			
75	100.0			
50	100.0			
37.5	100.0			
25	100.0			
19	100.0			
12.5	93.1			
9.5	91.3			
4.75	83.8			
2	71.2			
0.85	44.2			
0.425	15.8			
0.25	9.3			
0.15	6.9			
0.106	5.8			
0.075	4.8			

Sample Proportions	% Dry Mass
Very Coarse > 75 mm	0.0
Coarse Gravel 75 mm - 19 mm	0.0
Fine Gravel 19 mm - 4.75 mm	16.2
Coarse Sand 4.75 to 2.0 mm	12.6
Medium Sand 2.0 to 0.435 mm	55.4
Fine Sand: 0.425 to 0.075 mm	11.0
Fines: <0.075 mm	4.8

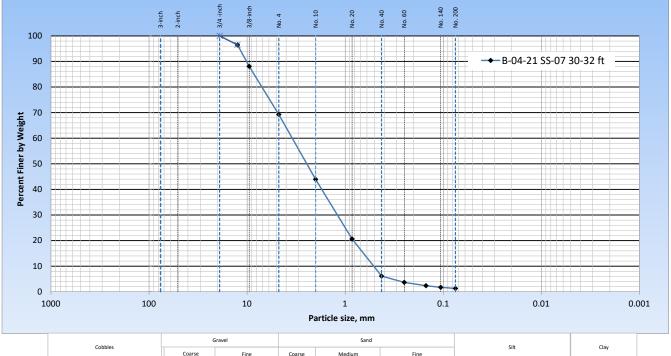
Soil Classification
Gray/brown fine to coarse SAND, little fine gravel, trace
silt. (SW)

Moisture Content: 9.5

Tested by Checked by		Approved by		Printed Date	Figure No.		
SJR	Date	cir	Date	cir	Date		
SJK	11/5/2021	sjr	11/6/2021	sjr	11/6/2021		



	Particle Size Distribution	Job No.:	104-180
	Particle Size Distribution	Client:	Kleinschmidt
Site Name	Ashton Hydro Development	Client Project No.:	NA
Site Name	Asilton Hydro Development	Boring/Test Pit No:	B-04-21
Site Location	Ashton, RI	Sample No:	SS-07
Site Location	ASTROIT, KI	Depth:	30-32 ft
Test Method	AASHTO 311	Sample Type:	Jar
rest ivietilou	MASITIO 311	KeyLabID:	0



Sieving				
Particle Size	% Passing			
mm	70 T 0331116			
100	100.0			
75	100.0			
50	100.0			
37.5	100.0			
25	100.0			
19	100.0			
12.5	96.5			
9.5	88.1			
4.75	69.3			
2	44.0			
0.85	20.6			
0.425	6.1			
0.25	3.6			
0.15	2.3			
0.106	1.7			
0.075	1.3			

Sample Proportions	% Dry Mass
Very Coarse > 75 mm	0.0
Coarse Gravel 75 mm - 19 mm	0.0
Fine Gravel 19 mm - 4.75 mm	30.7
Coarse Sand 4.75 to 2.0 mm	25.3
Medium Sand 2.0 to 0.435 mm	37.9
Fine Sand: 0.425 to 0.075 mm	4.8
Fines: <0.075 mm	1.3

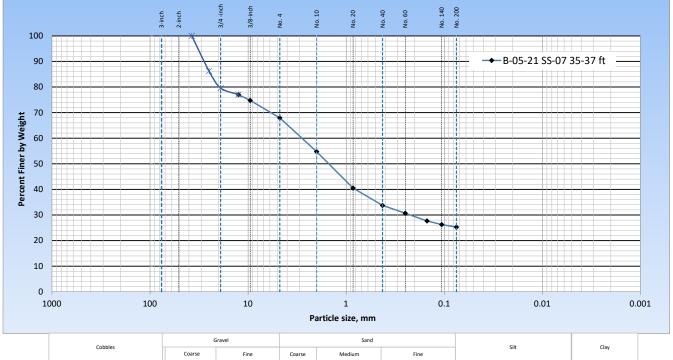
Soil Classification
Brown Gravelly SAND, trace silt (SW)

Moisture Content: 13.1

Tested by Checked by		Approved by		Printed Date	Figure No.		
CID	Date	air.	Date	ei e	Date		
SJR	7/23/2021	sjr	7/23/2021	sjr	7/23/2021		



	Particle Size Distribution	Job No.:	104-180
	Particle Size Distribution	Client:	Kleinschmidt
Site Name	Ashton Hydro Development	Client Project No.:	NA
Site Name	Ashton Hydro Development	Boring/Test Pit No:	B-05-21
Site Location	Ashton, RI	Sample No:	SS-07
Site Location		Depth:	35-37 ft
Test Method	AASHTO 311	Sample Type:	Jar
i est ivietiiou	MASITIO 311	KeyLabID:	0



Sieving			
Particle Size	% Passing		
mm	70 T 033111g		
100	100.0		
75	100.0		
50	100.0		
37.5	100.0		
25	86.3		
19	79.6		
12.5	77.1		
9.5	74.8		
4.75	68.0		
2	54.8		
0.85	40.5		
0.425	33.7		
0.25	30.7		
0.15	27.7		
0.106	26.2		
0.075	25.2		

Sample Proportions	% Dry Mass
Very Coarse > 75 mm	0.0
Coarse Gravel 75 mm - 19 mm	20.4
Fine Gravel 19 mm - 4.75 mm	11.6
Coarse Sand 4.75 to 2.0 mm	13.2
Medium Sand 2.0 to 0.435 mm	21.1
Fine Sand: 0.425 to 0.075 mm	8.5
Fines: <0.075 mm	25.2

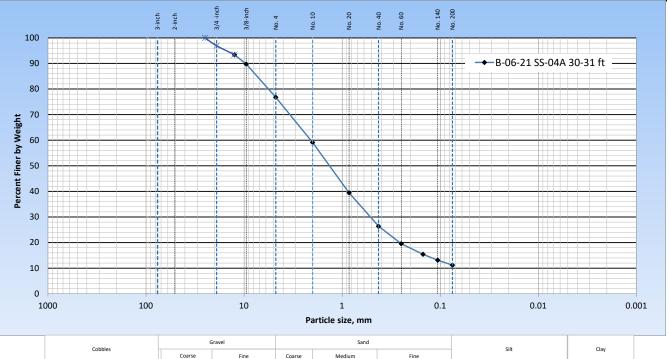
Soil Classification
Brown Gravelly Silty SAND, (SM)

Moisture Content: 7.5

Tested by	Tested by Checked by		у	Approved by		Printed Date	Figure No.
SJR	Date	cir	Date	cir	Date		
SJK	7/23/2021	sjr	7/23/2021	sjr	7/23/2021		



	Particle Size Distribution	Job No.:	104-180
	Particle Size Distribution	Client:	Kleinschmidt
Site Name A	Ashton Hydro Development	Client Project No.:	NA
Site Name	Asilton Hydro Development	Boring/Test Pit No:	B-06-21
Site Location	Ashton, RI	Sample No:	SS-04A
Site Location		Depth:	30-31 ft
Test Method	AASHTO 311	Sample Type:	Jar
rest ivietilou	MASIIIO 311	KeyLabID:	0



Sie	ving
Particle Size	% Passing
mm	70 Fassing
100	100.0
75	100.0
50	100.0
37.5	100.0
25	100.0
19	96.9
12.5	93.4
9.5	89.8
4.75	76.8
2	59.1
0.85	39.4
0.425	26.4
0.25	19.5
0.15	15.4
0.106	13.1
0.075	11.1

Sample Proportions	% Dry Mass
Very Coarse > 75 mm	0.0
Coarse Gravel 75 mm - 19 mm	3.1
Fine Gravel 19 mm - 4.75 mm	20.1
Coarse Sand 4.75 to 2.0 mm	17.7
Medium Sand 2.0 to 0.435 mm	32.8
Fine Sand: 0.425 to 0.075 mm	15.2
Fines: <0.075 mm	11.1

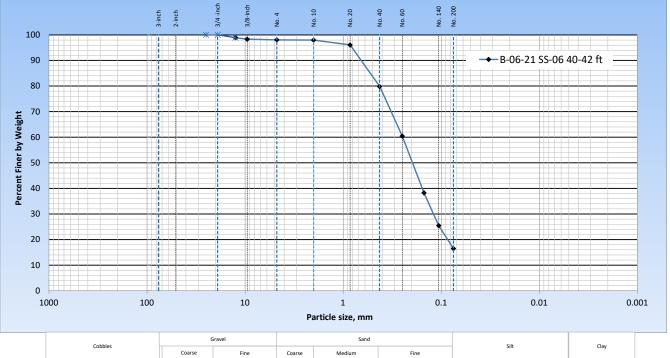
	Soil Classification	
Brown G	Gravelly SAND, little silt, (SM)	

Moisture Content: 10.1

Tested by	ested by Checked by		y Approved by		Printed Date	Figure No.	
CID	Date	air.	Date	ei e	Date		
SJR	7/23/2021	sjr	7/23/2021	sjr	7/23/2021		



	Particle Size Distribution	Job No.:	104-180
	Particle Size Distribution	Client:	Kleinschmidt
Site Name	Ashton Hydro Development	Client Project No.:	NA
Site Name	ASTROIT Hydro Development	Boring/Test Pit No:	B-06-21
Site Location	Ashton, RI	Sample No:	SS-06
Site Location		Depth:	40-42 ft
Test Method	AASHTO 311	Sample Type:	Jar
Test Method	AASITIO SII	KeyLabID:	0



Sieving			
Particle Size	% Passing		
mm	70 T 033111g		
100	100.0		
75	100.0		
50	100.0		
37.5	100.0		
25	100.0		
19	100.0		
12.5	98.9		
9.5	98.3		
4.75	98.0		
2	98.0		
0.85	96.1		
0.425	79.9		
0.25	60.5		
0.15	38.3		
0.106	25.4		
0.075	16.5		

Sample Proportions	% Dry Mass
Very Coarse > 75 mm	0.0
Coarse Gravel 75 mm - 19 mm	0.0
Fine Gravel 19 mm - 4.75 mm	2.0
Coarse Sand 4.75 to 2.0 mm	0.1
Medium Sand 2.0 to 0.435 mm	18.1
Fine Sand: 0.425 to 0.075 mm	63.4
Fines: <0.075 mm	16.5

Soil Classification
Brown fine SAND, trace gravel, little medium to coarse
sand, little silt, (SM)

Moisture Content: 18.7

Tested by	1	Checked b	У	Approved b	у	Printed Date	Figure No.
CID	Date	air.	Date	ei e	Date		
SJR	7/23/2021	sjr	7/23/2021	sjr	7/23/2021		



ATTACHMENT 5

PRIOR INVESTIGATION(S) AND TESTING BY OTHERS



			В	2/MW	101
Reviewed by: JPJ	Total Depth:	30 Feet	Logged By:		JPJ
Date Reviewed: ///u/16	Boring Diameter:	4 Inches	Date Drilled:	11/2/16 t	11/2/16
Surface Elevation: 80.7'	Well Stickup:	2.5' +/-	Driller: NEO	CB	

ОЕРТН	DESCRIPTION Based on USCS and modified Burmister Soil Classification System	SOIL PROFILE	SAMPLE	SAMPLE NUMBER	BLOWS (per 6")	SPT-N Value	PENETRATION/ RECOVERY	OVM (ppm) / DEXSIL (ppm)	WELL
1-	Loose, dark brown, fine to medium SAND, some silt, little gravel, little coal (Fill).	Fill		S1	2-4-4-	8	24/13	<1	
- 2- - 3- - 4- - 5- - 6- - 7-	Medium dense, brown to light brown, fine SAND, some silt, little gravel. Very dense, brown, fine to coarse SAND, some silt, some gravel.	Sand		S2 S3	6-8-9- 4 22-22- 29-26	17 51	24/13	<1	0000000000000
8-	Medium dense, brown, fine SAND and SILT, little rounded gravel.	Sand		S4	12-10- 9-10	19	24/15	<1	0.00
-10- -11- -12-	6" Loose, brown, fine to medium SAND, some silt, trace root fibers, over 7" loose, dark brown SILT, little root fibers.	Silt		S5A S5B	8-4-2- 5	6	24/13	<1 <1	
13	No recovery.			S6	6-5-5- 7	11	24/0	<1	
—14— —15— —16—	9" Very dense, brownish gray SILT, some fine sand, over 11" very dense, borwn, fine to coarse SAND and GRAVEL, trace silt.	Gravel		S7A S7B	3-10- 24-30	34	24/20	<1 <1	
—17— —18—	Very dense, brown GRAVEL and fine to coarse SAND, little silt.			S8	27-26- 25-28	51	24/19	<1	
—19— —20—	Very dense, brown GRAVEL, some fine to coarse sand, little silt.	Gravel		S9	30-34- 22-35	56	24/9	<1	
—22— —23— —24—	Medium dense, brown/gray, fine to coarse SAND, some gravel, trace silt.	Sand		S10	4-6-8- 9	14	24/9	<1	
WATER	RLEVELS:	WELL LEGEND:	AA1						1829 T-1828
During Di 15'	orilling End of Boring Date: ' +/- 14.3' 11/2/16 @ 14:15	30	A = 12			= -	B. 40.0		



Native Fill







	!	
- 2		

- Soil borings conducted using ATV drilling rig with 4" drive and wash casing.
 Standard penetration test conducted with 2" OD split barrel sampler driven by 140 lb. safety hammer.
- 3. NM=Not measured; NA=not applicable.

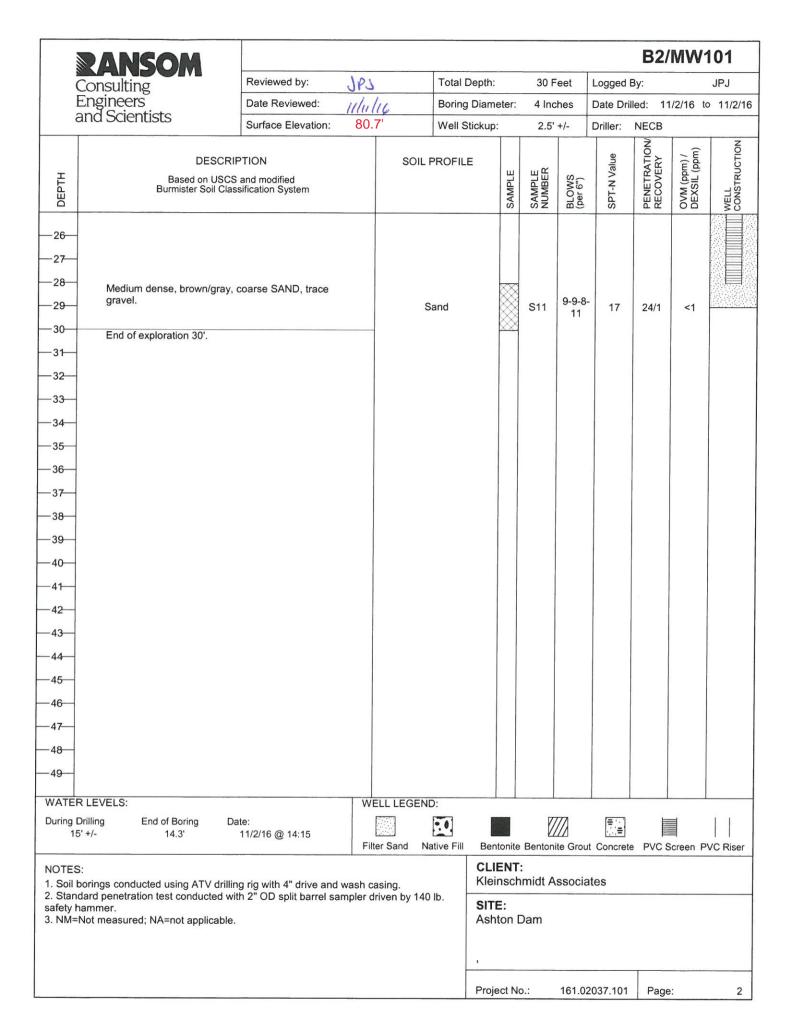
CLIENT:

Kleinschmidt Associates

SITE:

Ashton Dam

Project No.: 161.02037.101 Page:





			В	6/MW102
Reviewed by:	Total Depth:	49 Feet	Logged By:	JPJ
Date Reviewed: //////	Boring Diameter:	4 Inches	Date Drilled:	11/2/16 to 11/3/16
Surface Elevation: 77.2'	Well Stickup:	3' +/-	Driller: NEO	CB

								T	_
ОЕРТН	DESCRIPTION Based on USCS and modified Burmister Soil Classification System	SOIL PROFILE	SAMPLE	SAMPLE NUMBER	BLOWS (per 6")	SPT-N Value	PENETRATION/ RECOVERY	OVM (ppm) / DEXSIL (ppm)	WELL
1	2" TOPSOIL, over 8" medium dense, brown, fine to coarse SAND, some silt, some gravel, trace coal fragments, dry (Fill).	Fill		S1	4-13-9- 6	22	24/12	<1	. 0.
- 2- - 3-	1" Similar to above, over 16" brown, fine SAND, some silt, trace roots (Fill).			S2	7-4-6- 11	10	24/17	<1	. 0 . 0 . 0 . 0 . 0 .
- 4 - 5	No recovery (wash cuttings very dark brown).			S3	7-5-5- 7	10	24/0	NA	
- 6- - 7-	No recovery.	Silt		S4	3-3-4-	7	24/0	NA	8
- 8-	Loose, very dark brown SILT, some fine sand, trace	Siit		34	7	'	24/0	NA	
- 9 	organics (roots). Dense, 4" Similar to above, over 3" brown SILT,	Silt		S5	3-2-5- 7	7	24/7	<1	
-11 	some fine to coarse sand, trace gravel.			S6	5-11- 28-25	39	24/7	<1	
-13	Very dense, yellowish brown GRAVEL, some fine to coarse sand, little silt, wet.	Gravel		S7	25-87- 89-36	176	24/21	<1	
-14	Dense, brown/gray GRAVEL, some fine to coarse sand, wet.			S8	19-20- 22-26	42	24/5	<1	
-16— -17—	Dense, gray GRAVEL and fine to coarse SAND, some silt, wet.	Gravel		S9	14-20- 20-14	40	24/11	<1	
-18 -19	Medium dense, gray, fine to coarse SAND, some gravel, little silt, wet.	Sand		S10	7-12-	22	24/14	<1	
-20-				10025CT	10-12	-			
-21									
-23	Medium dense, gray SILT, some fine sand, wet.		XX						

WA	ΙĿ	ĸ	LE	٧Ŀ	=L	5:

During Drilling 12' +/-

End of Boring

Date:











- Soil borings conducted using ATV drilling rig with 4" drive and wash casing.
 Standard penetration test conducted with 2" OD split barrel sampler driven by 140 lb. safety hammer.
- 3. NM=Not measured; NA=not applicable.

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Kleinschmidt Associates

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Ashton Dam

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			В	6/IVIVV	102		
Reviewed by: JPJ	Total Depth:	49 Feet	Logged By:	JPJ			
Date Reviewed: ///////	Boring Diameter:	4 Inches	Date Drilled:	11/2/16 t	0 11/3/16		
Surface Elevation: 77.2'	Well Stickup:	3' +/-	Driller: NEO	CB			

ОЕРТН	DESCRIPTION Based on USCS and modified Burmister Soil Classification System	SOIL PROFILE	SAMPLE	SAMPLE NUMBER	BLOWS (per 6")	SPT-N Value	PENETRATION/ RECOVERY	OVM (ppm) / DEXSIL (ppm)	WELL
—26— —27—									
—28— —29— —30—	Loose, gray, fine SAND and SILT, wet.	Silt and Sand		S12	3-4-5-	9	24/19	<1	
-31- -32- -33-					100				
-34 -35 -36	Medium dense, gray, fine SAND and SILT, wet.			S13	5-5-7- 7	12	24/14	<1	
—37— —38—									
-39 -40- -41-	9" Gray, fine to coarse SAND, some gravel, some silt, over 4" brown, fine to medium SAND, some silt, over 7" gray, fine to coarse SAND, some gravel, some silt, wet.	Sand		S14	12-7-7- 12	14	24/20	<1	
42 43									
-45- -46-	Medium dense, gray, fine to medium SAND, trace silt, wet.	Sand		S15	4-4-6- 8	10	24/19	<1	
-47- -48-	Gray, fine to coarse SAND, some gravel.		XX	S16	100- 1/2"	100+	.5/.5	<1	
-49-	Split-spoon refusal, end of exploration 49'.			8 768	1/2			1	

Filter Sand Native Fill

During Drilling	
12' +/-	

 Soil borings conducted using ATV drilling rig with 4" drive and wash casing.
 Standard penetration test conducted with 2" OD split barrel sampler driven by 140 lb. safety hammer.
3. NM=Not measured; NA=not applicable.

Date:

End of Boring

CLIENT:

Kleinschmidt Associates

Bentonite Bentonite Grout Concrete PVC Screen PVC Riser

SITE:

Ashton Dam

Project No.: 161.02037.101 Page:

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				В	8/MW	103		
Reviewed by:	JPS	Total Depth:	31 Feet	Logged By:		JPJ		
Date Reviewed:	Mulie	Boring Diameter:	4 Inches	Date Drilled:	11/3/16	to 11/4/16		
Surface Elevation:	77.0'	Well Stickup:	3' +/-	Driller: NEO	CB			

ОЕРТН	DESCRIPTION Based on USCS and modified Burmister Soil Classification System	SOIL PROFILE	SAMPLE	SAMPLE NUMBER	BLOWS (per 6")	SPT-N Value	PENETRATION/ RECOVERY	OVM (ppm) / DEXSIL (ppm)	WELL
_ 1_	2" TOPSOIL. Loose, brown, fine SAND and SILT, trace gravel, trace coal fragments.			S1	2-3-4- 13	7	24/15	<1	
3	Medium dense, brown, fine SAND, some silt, trace gravel, trace brick and coal fragments.	Fill		S2	15-11- 13-10	24	24/14	<1	
5-	Medium dense, dark brown SILT, some fine sand, trace organics (roots).	Silt		S3	6-7-7- 9	14	24/17	<1	0.0.0.0.0.0.0.
- 6- - 7-	2" Similar to above, over 13" medium dense, gray/brown, fine SAND and SILT.			S4	7-9-10- 9	19	24/15	<1	
8-	Medium dense, brown, fine SAND, some silt, trace gravel, trace coarse sand.			S5	2-4-6- 6	10	24/14	<1	
-10- -11-	Dense, brown, fine to coarse SAND, some gravel, some silt, wet.			S6	10-15- 21-26	36	24/15	<1	
—12— —13—	Very dense, brown, fine to coarse SAND and GRAVEL, some silt, wet.	Sand		S7	32-27- 28-55	55	24/17	<1	
—14— —15—	Dense, yellowish brown, fine to coarse SAND and GRAVEL, some silt, wet.			S8	20-21- 23-18	44	24/14	<1	
—16— —17—	Medium dense, gray, fine to coarse SAND, some gravel, trace silt, wet.	Sand and Gravel		S9	8-7-8- 7	15	24/13	<1	
—18— —19—	Dense, gray, fine to coarse SAND and GRAVEL, wet.			S10	17-22- 8-7	30	24/7	<1	
—20— —21—									
—22— —23—	Medium dense grav medium to coarse CAND		~~						
-24-	Medium dense, gray, medium to coarse SAND, some gravel, wet.	Sand		S11	29-11- 5-5	16	24/5	<1	
WATER	R LEVELS:	WELL LEGEND:							

During Drilling 10' +/-

End of Boring 11.45'

Date:

11/4/16 @ 7:00



Filter Sand











Bentonite Bentonite Grout Concrete PVC Screen PVC Riser

- Soil borings conducted using ATV drilling rig with 4" drive and wash casing.
 Standard penetration test conducted with 2" OD split barrel sampler driven by 140 lb. safety hammer.
- 3. NM=Not measured; NA=not applicable.

CLIENT:

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Ashton Dam

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				В	8/MW	11	03		
Reviewed by:	JPS	Total Depth:	31 Feet	Logged By:		JPJ			
Date Reviewed:	ululu	Boring Diameter:	4 Inches	Date Drilled:	11/3/16	to	11/4/16		
Surface Elevation:	77.0'	Well Stickup:	3' +/-	Driller: NEO	CB				

		Surface Elevation:	77.0	Well Stickup:		3, +	-/-	Driller:	NECB		
рертн	DESCRIP Based on USCS Burmister Soil Class		SOIL	PROFILE	SAMPLE	SAMPLE NUMBER	BLOWS (per 6")	SPT-N Value	PENETRATION/ RECOVERY	OVM (ppm) / DEXSIL (ppm)	WELL
—26— —27—											
—2 8 —					9						
—29—	Damas annu fau ta annu C	AND			~~						
30	Dense, gray, fine to coarse Satrace silt, wet.	AND, some gravei,		Sand		S12	14-10-	. 44	24/4	<1	
—31—	End of exploration 31'.				\otimes		34-21				
—32—	End of exploration 31.										
—33—											
—34—											
—35—											
36											
—37—									3		
—38—						Ę					
—39—											
—40 —											
—41 —											
—42 —											
—43—											
—44 —											
—45—											
—46—											
—47—											
—48—											
											
WATE	R LEVELS:		WELL LEGEN	D:							
During 1	Drilling End of Boring Dai 0' +/- 11.45'	e: 11/4/16 @ 7:00	Filter Sand N	ative Fill Bent	tonite	-	te Grou	E Concrete	PVC S		VC Riser
	NOTES: 1. Soil borings conducted using ATV drilling rig with 4" drive and wash casing				ENT nsch	: midt A	ssocia	tes			

- Soil borings conducted using ATV drilling rig with 4" drive and wash casing.
 Standard penetration test conducted with 2" OD split barrel sampler driven by 140 lb. safety hammer.
- 3. NM=Not measured; NA=not applicable.

SITE:

Ashton Dam

Project No.:

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