newfoundland labrador hydro
a nalcor energy company

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September 21, 2020

Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL A1A 5B2

Attention: Ms. Cheryl Blundon
Director of Corporate Services & Board Secretary

Dear Ms. Blundon:

Re: 2021 Capital Budget Application – Overview Presentation – Additional Information

In response to queries made during Newfoundland and Labrador Hydro's ("Hydro") overview presentation of its 2021 Capital Budget Application which took place on September 16, 2020, Hydro provides further information on the following.

1) Prioritization Matrix: the prioritization template used by Hydro for prioritizing the capital projects included in its capital budget applications, as well as explanatory information; and

2) Refurbishment of the Ebbegunbaeg Control Structure: further information on the Ebbegunbaeg Control Structure proposal included in Hydro's 2021 Capital Budget Application.

Hydro provides this information to assist the Board of Commissioners of Public Utilities and the intervening parties in their assessment of Hydro's application.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Shirley A. Walsh
Senior Legal Counsel, Regulatory
SAW/sk

Encl.

ecc: **Board of Commissioners of Public Utilities**
Jacqui Glynn
Mike McNiven
Sam Banfield
Mike James
Kim Simms
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Newfoundland Power
Gerard M. Hayes
Kelly C. Hopkins
Jack Casey
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Consumer Advocate
Dennis M. Browne, Q.C., Browne Fitzgerald Morgan & Avis
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Industrial Customer Group
Paul L. Coxworthy, Stewart McKelvey
Denis J. Fleming, Cox & Palmer
Dean A. Porter, Poole Althouse

Labrador Interconnected Group
Senwung Luk, Olthuis Kleer Townshend LLP
Phil Raphals, Helios Centre

Attachment 1

Prioritization Matrix Template & Explanatory Information

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Newfoundland and Labrador Hydro's Prioritization Matrix

Newfoundland and Labrador Hydro ("Hydro") takes a two-pronged approach to prioritizing its capital investments. First, Hydro qualitatively undertakes an assessment of projects that are put forward by operations and asset management professionals. Projects are assessed based on scope and justification and Hydro critically evaluates whether there is opportunity for deferral. Once satisfied that the projects should be considered as part of the annual capital budget submission, the projects are then prioritized based on the matrix model.

It has been Hydro's experience that the matrix model confirms the judgements completed through the first step in the process—that is, that items that have the ability to be deferred, without any major reliability or customer impact, have been removed and those that are put forward for submission are necessary and prudent expenditures.

Detailed information on Hydro's project prioritization for the 2021 Capital Budget Application is found in Appendix A of the 2021 Capital Projects Overview. Enclosed is a template of Hydro's project prioritization spreadsheet, as well as an explanation of the information contained within.

NEWFOUNDLAND AND LABRADOR HYDRO
2021 CAPITAL BUDGET APPLICATION
PROJECT PRIORITIZATION

Confidence Level:	Low = 1 Medium = 2 High = 3

Probability:	Not Likely = 1 Low Likelihood = 2 Likely = 3 Highly Likely = 4 Near Certain = 5

For reference columns are as follows

	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	XI	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
	*	I		II		III		IV		V		VI		VII		VIII		IX		X		XI		XII		XIII		XIV				
Extreme		Work		Net Present		Goal 1		Goal 2		Goal 3-5		Schedule		Continue Service		# Customers		System Impact:		Impact		Loss Type:		Loss		% Improvement: 5 Yr		Estimated Project				
Safety		Classification		Value		Safety		Environment		Alignment		Risk		to Customers		Impacted		Critical to		Intensity		Loss of		Mitigation		Avg. SAIDI or SAIFI		Cost Range			PRIORITY	
OR		Normal=5		NPV($0)=0		Minor=10		None=10		None=15		Externals & Internal		Can=20		<100=10		None Specific=5		Minor=5		No Type=5		Redundant		%Improve(0)=0		N.R.P.=0			HIGH	
Mandatory		Justifiable:		NPV(<$100K)=5		Treatment=50		Minor=50		Maps but no		Conflicts=10		Can but with		<1000=30		System with		Moderate=40		Equipment=40		Unit=30		%Improve(<1)=10		>$1M=5			OR	
OR		Payback(70)=15		NPV(<$500K)=15		Lost Time=80		Moderate=80		document=40		Externals Affecting		High Costs=50		<10000=50		Standby Unit=50		Significant=70		Facility=50		Backup		%Improve(<2)=15		$500K-$1M=15			MEDIUM	
Load Driven		Payback(40)=45		NPV(<$1M)=45		Disability=100		Significant=100		Maps but with		Completion=20		Cannot=70		>10000=70		Plant or		High=90		Production=70		Option=60		%Improve(<3)=30		$200K-$500K=30			OR	
(If "Yes" then		Payback(10)=85		NPV(>$1M)=85						document=65		NO Extr. but Intr.						Station=70				Customer		Nothing=90		%Improve(>3)=50		<$200K=50			LOW	
HIGH priority)												Conflicts=40						Entire				Delivery=90										
												NO Conflicts=65						System=90												SCORE		RANK

PROJECT DESCRIPTION

		Impact	*Con Lvl*	*Impact*	*Con Lvl*	*Impact*	*Prob.*	*Impact*	*Prob.*	*Impact*	*Con Lvl*	*Impact*	*Con Lvl*	*Impact*	*Con Lvl*	*Impact*	*Prob.*	*Impact*	*Con Lvl*	*Impact*	*Prob.*	*Impact*	*Con Lvl*	*Impact*	*Con Lvl*	*Impact*	*Con Lvl*	*Impact*	*Con Lvl*			

CALL OUT BOX 1

IF(C30="YES",99999,D30*E30+F30*G30+H30*I30+J30*K30+L30*M30+N30*O30+P30*Q30+R30*S30+T30*U30+V30*W30+X30*Y30+Z30*AA30+AB30*AC30+AD30*AE30)

CALL OUT BOX 2

Score Results >	1,668	HIGH
Score Results >	977	MEDIUM
Score Results >	125	LOW

CALL OUT BOX 3

Numbered ranking submitted in the capital budget application

Using the Prioritization Matrix

Project Description

- The information found in the column titled Project Description aligns with the Project Description column found in Table A-1: 2021 Project Prioritization found on pg. A-1 of the 2021 Capital Projects Overview, Appendix A.

Column C

- This column provides information as to whether the project has safety, mandatory or load driven requirements. The input is either a "yes" or a "no."
- If identified as "yes," then the project automatically obtains a high priority score and is ranked as a number 1 priority (i.e., receives a score of 99999 as indicated in Call Out Box 1 "IF (C30="YES",99999…"). No further scoring is completed.
- If identified as "no," then scoring on the remainder of the categories takes place.

Columns D to AE

- Scoring in these columns are completed in line with the prioritization and weight factors identified in Table A-2: Prioritization Criteria and Weight Factors found on page A-3 of the 2021 Capital Projects Overview, Appendix A.
- The "Impact" value reflects the factor weight chosen for each category, as identified in the yellow cells on the spreadsheet.
- The "Confidence Level" is reflective of the ranking scores found in the green call out box at the top of the spreadsheet.
- The "Probability" is reflective of the ranking scores found in the purple call out box at the top of the spreadsheet.
- As identified in the formula found in the Call Out Box 1, the impact score is multiplied by either the confidence level score or the probability score to obtain an overall score for each category of prioritization criteria.

- Each of these individual scores are then totalled to produce an overall project score (column AF).

Priority Ranking – High, Medium, or Low

- Based on the overall project score, the project is given a ranking of either high, medium, or low as identified on the spreadsheet (Column AG and Call Out Box 2)

Overall Rank

- The projects are ranked based on the score produced following a review of each project score by Hydro personnel (Column AH and Call Out Box 3).

Attachment 2

Refurbishment of the Ebbegunbaeg Control Structure

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Ebbengunbaeg Control Structure – Further Information

The Ebbegunbaeg control structure is critical in managing the Bay d'Espoir reservoir system in a safe and reliable manner. It is located at the outlet of the Meelpaeg Reservoir downstream of the Granite Canal Generating Station and upstream of the Upper Salmon Generating Station. The purpose of the control structure is to regulate flows to the Upper Salmon and Bay d'Espoir Hydroelectric Generating Facilities as well as to control the operating levels of the small reservoirs in the Great Burnt Lake system. The control structure was constructed in 1967 and is critical to Newfoundland and Labrador Hydro's ("Hydro") ability to safely operate within the watershed. The control structure is necessary for the following reasons:

- Flood control of the Meelpaeg Reservoir;
- Management of high water levels and inflows downstream;
- Optimization of water management within Hydro's overall system; and
- Maximization of value for customers from Hydro's hydroelectric resources.

Figure 1 provides an image of the Meelpaeg Reservoir and the location of the Ebbegunbaeg Control Structure.

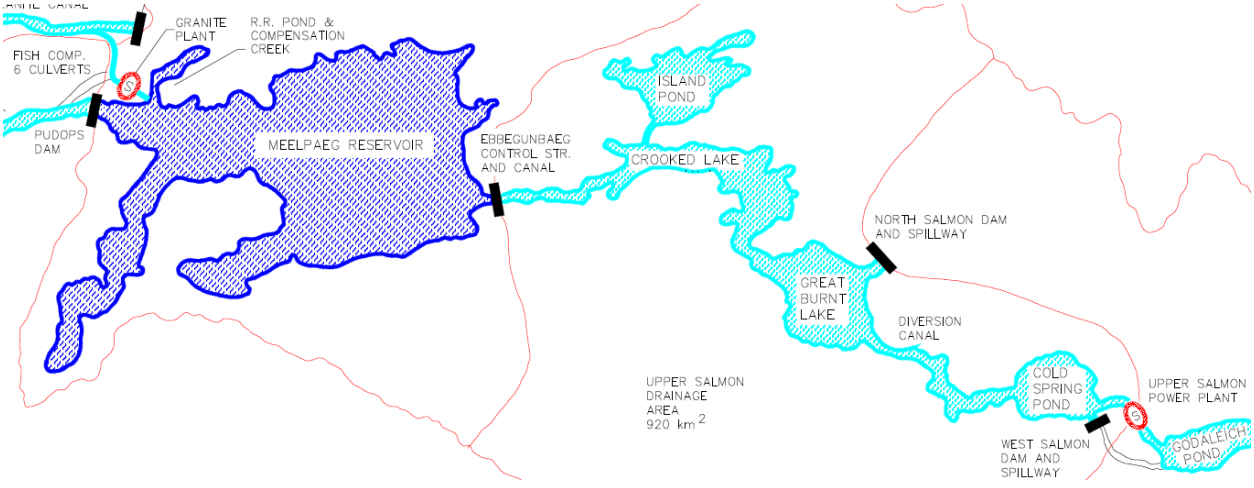

Figure 1: Location of Ebbegunbaeg Control Structure

Description of the Structure

The concrete structure is comprised of three gates that discharge water through a two kilometer downstream canal. This structure measures 13.7 metres in height and 26 metres in length. The crest elevation of the structure is 276.13 metres and the maximum operating level of the reservoir is 272.45 metres. The Control Structure is remotely operated from the Energy Control Centre in St. John's, Newfoundland and Labrador.

2021 Capital Budget Application Proposal

The project, as outlined in Hydro's 2021 Capital Budget Application,[1] is comprised of two parts:

1) refurbishment of the control structure; and
2) refurbishment of the stoplog monorail hoist system.

The work identified to refurbish the control structure was informed by a level two condition assessment completed by an external consultant, RD Energie ("RDE"). Hydro typically undertakes level two condition assessments to identify opportunities to extend the service life of its assets. Through its assessment, RDE noted that refurbishment was possible and identified operational issues with the gates, including damage to the gates, main rollers, embedded parts, and lifting systems. The assessment also identified concrete deterioration on the piers, decking, and around the embedded parts. As a result of this assessment, it was evident that refurbishment work is required on the control structure to maintain the reliable operation of a critical component of Hydro's infrastructure.

As part of its preparation to complete work on the control structure,[2] the monorail hoist was assessed (as per the original project scope) and it was determined it was unsafe for use and required material refurbishment, greater than Hydro originally anticipated. The existing monorail hoist system is used to install the structure's stop logs. Hydro engaged RDE to complete an assessment of the refurbishment and/or replacement alternatives for the monorail hoist system as presented in Hydro's 2021 capital budget proposal. As the existing monorail hoist required major refurbishment, the recommended alternative (as proposed in Hydro's 2021 capital budget application) is an upgraded monorail hoist system which can move both the stop logs and the gates. The new system proposed will result in

[1] "2021 Capital Budget Application," Newfoundland and Labrador Hydro, rev 1, August 7, 2020 (originally filed August 4, 2020).
[2] As per Hydro's 2019 Capital Budget Application submission under the Hydraulic Generation Refurbishment and Modernization project. Hydro subsequently notified the Board of Commissioners of Public Utilities of its intention to cancel the Ebbegunbaeg Control Structure Refurbishment project on April 17, 2020

reduced costs with respect to gate maintenance or refurbishment as the gates can be removed through the side of the building; this is in comparison to the current set up which requires a large section of the structure's fixed roof to be removed and the use of a large crane for gate repair or refurbishment. The installation of the new monorail hoist system will result in cost savings on the execution of the refurbishment of the control structure currently proposed, as well as future work on the gates.

Criticality of the Structure to the System

From a system criticality perspective, the Ebbegunbaeg Control structure is the only structure that discharges water from the Meelpaeg reservoir. It continuously regulates flows into the Upper Salmon reservoir and subsequently to the Long Pond reservoir through generation at the Upper Salmon Hydroelectric Generating Station. It is essential for maintaining the flows required for generation at the Upper Salmon and Bay d'Espoir hydroelectric generating facilities during periods of low local inflows and in preventing or minimizing spill during high runoff events such as the snow melt period and during major rain storms. Deterioration of the gates and related parts poses a risk to the safe and reliable operation of this structure and consequently the Bay d'Espoir system as a whole.

If any of the gates were to fail by remaining open, the flow out of the Meelpaeg reservoir will be uncontrolled. Depending on the number of gate failures and therefore, the structure discharge, combined with the local inflows, the Upper Salmon Hydroelectric Generating Station may have to operate at maximum output for 24 hours per day. Further, water could eventually have to be bypassed around the Upper Salmon Hydroelectric Generating Station via the North or West Salmon Spillways, as the Upper Salmon reservoir does not have a large storage capacity and the generation station does not have the capability to turbine large amounts of uncontrolled flow. This requirement to bypass would result in a loss of energy for the system.

Additionally, if the gates were to fail by remaining closed, there would be no way to provide the required flows to the Upper Salmon and Long Pond reservoirs. Outside of the spring freshet and other periods of high inflows, local inflows would normally not be sufficient to support the reservoirs to maintain required operating levels for rated production at the Upper Salmon and Bay d'Espoir Hydroelectric Generating Facilities. This could pose a significant risk to generation capabilities, particularly during the winter, and thus reliability of supply to customers. This potential loss of generation would have to be made up by other sources of supply with the worst case scenario being the potential for unserved customer load. During periods of high inflows and water levels, an additional risk

to the system occurs as there is no direct spill capability out of the Meelpaeg reservoir. As per current practice, in the event the water level in this reservoir is high and spill becomes a requirement, the Ebbegunbaeg gates are opened and spill commences via the North Salmon Dam and/or the West Salmon Dams maintaining the integrity of the system. This would not be possible if the Ebbegunbaeg gates were to fail in a closed position.

Hydro implements a dam safety management program that follows the Canadian Dam Association ("CDA") guidelines which are considered best industry practice in Canada. An understanding of the consequence of dam failure underlies several of the principals of the CDA guidelines. The analyses leading to consequence assessment and classification of the dam is typically completed through an iterative process starting with the calculation of the inflow design flood. This flood is used in a dam breach analysis to determine the flood inundation downstream and the consequences of failure in the following categories: loss of life, environmental and cultural losses, and infrastructure and economic losses. The extent of the losses then governs the hazard classification for each dam. An overall dam safety classification is governed by the highest consequence classification in the three assessment categories. Traditionally under the CDA, damage to the dam owner's property is excluded from consideration. The analysis of the Ebbegunbaeg Control Structure classified the structure as "Low" under the CDA, given there is no population at risk downstream of the structure with no loss of life in the case of a dam failure. Additionally, the environmental losses associated with a structure failure are minimal and the third-party economic losses are expected to be low due to the absence of any private or public infrastructure downstream. However, it is important to note that classification under the CDA guidelines does not consider the reliability of the Newfoundland and Labrador Interconnected System or Hydro's ability to supply its customers and, further, does not take into consideration the physical and economical losses to the Owner, in this case Hydro.