



- Upgrade required substation facilities, infrastructures, and bus work to support new station equipment
- Supply and install required Protection, Control and Telecommunications equipment

**Exclusions:**

- GST
- Permits
- Right-of-Way & property costs

**Key Assumptions:**

- Construction by contractor
- 24 months of construction is considered
- No construction during winter season
- Execution of early Engineering and Procurement Agreement
- No expansion of existing stations or control buildings to accommodate new equipment
- Impact Benefit Agreements with First Nations are not considered

**Key Risks:**

- Expansion of the existing control building may be required leading to increased costs and/or a longer project schedule
- Major equipment delivery presents potential project cost and schedule risks, based on variance in equipment lead times
- No defined supply chain strategy; construction costs may increase depending on delivery method
- Project schedule may be longer than expected, leading to increased overhead costs
- Ground improvements may be required leading to increased construction costs
- Contaminated soil may be encountered leading to increased construction costs
- Cost of materials and major equipment may be affected by market conditions and escalation

**Study Limitations and Exclusions*****Protection, Control, and Telecommunications***

The Interconnection Feasibility Study does not include a detailed review of the protection, control, and telecommunications system requirements specific to your Interconnection Request. Based on a high-level review, we have identified proxy costs for protection, control, and telecom Network Upgrades drawn from comparable interconnection projects with similar scope and complexity; these proxy costs have been included solely for indicative budgeting purposes. The relative interconnection cost determined by the Interconnection Feasibility Study includes a telecommunications component based on an assumed solution to deliver teleprotection and telecontrol circuit requirements necessary for the Interconnection Request. Protection, control, and telecommunications system requirements will be reviewed in detail in the System Impact Study if you are a successful participant of the CEAP and meet applicable requirements.

For Interconnection Feasibility Study purposes, it is assumed that any applicant-proposed works that could obstruct or impair the performance of existing BC Hydro microwave systems or new links from the proposed Interconnection Customer Interconnection Facilities (ICIF) to the BC Hydro microwave system would be identified and either relocated or repositioned as determined in a System Impact Study if you are a

successful participant of the CEAP and meet applicable requirements. Such works may include, but are not limited to, towers, turbines, dams, support structures, panels, surface materials deposited or redistributed, water surface changes, or vegetation.

### ***Generation Shedding/Curtailment Scheme and Electromagnetic Transient (EMT) Studies***

The generation shedding/curtailment scheme reviews (e.g., Remedial Action Scheme (RAS), and a direct transfer trip for anti-islanding scheme) and EMT studies are completed in a System Impact Study. The outcomes of these studies may result in additional requirements, which could include Network Upgrades or ICIF. Any costs associated with completion of these studies, and resulting requirements, are not included in the Interconnection Feasibility Study cost estimate.

### ***Revenue Metering***

Please note that revenue metering requirements have not been determined with the Interconnection Feasibility Study. As such, any costs associated with revenue metering and other interconnection components are not included in the cost estimate provided above. Once these requirements are defined, costs that are attributable to the Interconnection Customer are to be paid in cash. For more details on revenue metering requirements and responsibilities, please refer to:

<https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/distribution/standards/ds-rmr-complex-revenue-metering.pdf>.

### **Schedule**

Based on the Interconnection Feasibility Study, the non-binding good faith estimated in-service date for your Interconnection Request's Network Upgrades is Quarter 4 2031 (calendar year). To achieve this timeline, we may need to expedite certain activities, including engineering design and procurement of long-lead equipment.

Timely actions required from you to minimize risks to the schedule:

- Submission of additional technical data required for the System Impact Study and Facilities Study
- Submission of any required information or document such as demonstration of Site Control
- Execution of Combined Study Agreement and Standard Generator Interconnection Agreement
- Financial commitments and securities

Please note that changes to your Interconnection Request or delays in data submission or financial commitments may also impact the target in-service date.

If you have any questions, please contact the BC Hydro CEAP team at [ceap2025@bchydro.com](mailto:ceap2025@bchydro.com).

Sincerely,

[Redacted signature]

[Redacted name]

Manager, Customer Interconnections

BC Hydro

Encl.: CEAP\_2025\_IR3\_ [Redacted] Feasibility\_Study.pdf



# Interconnection Feasibility Study

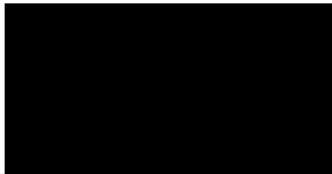
**BC Hydro EGBC Permit to Practice No: 1002449**

**2025 CEAP IR # 3**

Prepared for:



Prepared by:



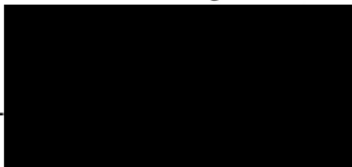
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Planning

Accepted by:



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Division Manager, Transmission Planning

## Report Metadata

Header: 2025 CEAP IR # 3  
Subheader: Interconnection Feasibility Study  
Title: [REDACTED]  
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Prepared for: [REDACTED]  
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Title: Specialist Engineer, Transmission Planning  
Checked by: N/A  
Title: N/A  
Reviewed by: [REDACTED] P.Eng.  
Title: Technical Strategic Principle, Transmission Planning

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## Revisions

Revision	Date	Description
0	2025 Nov	Initial release

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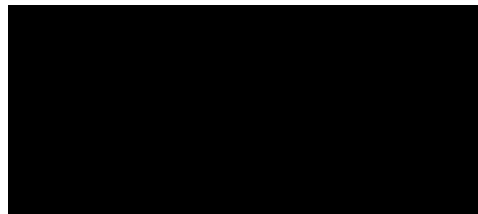
**Section:**

Entire report  
except listed  
below

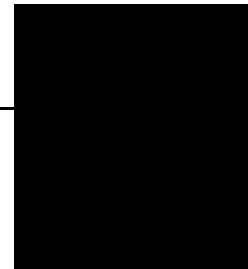
**Discipline:**

Transmission Planning

Contributed by:



Specialist Engineer, Transmission  
Planning



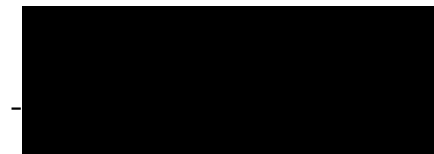
**Section:**

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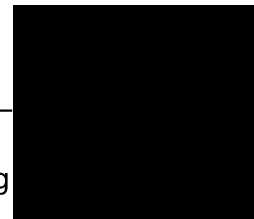
**Discipline:**

Stations Planning

Contributed by:



Specialist Engineer, Station Planning





protection scheme is required to isolate the IC's wind project at the IC's entrance circuit breaker to avoid potential islanding operations with the existing loads.

5. The [REDACTED] is required to have the dynamic reactive power capability at a minimum of +/- 33% of its MPO at the high voltage side of the IC's switchyard over the full MW operating range, per BC Hydro's TIR Section 6.4.2. Based on the power flow model data submitted by the IC, the [REDACTED] does not meet this requirement, which needs to be addressed if the project proceeds to the next stage of the interconnection process.
6. The "STATCOM option" for the proposed type-4 WTGs is required so that each turbine can provide reactive power capability at zero MW output during turbine standstill.
7. Fast Frequency Response (FFR), as per BCH TIR Section 6.4.5, is required at the [REDACTED]. The proposed wind turbine generators, when the FFR function is enabled, are expected to temporarily boost the MW output to limit the system frequency drop during a major frequency event. The FFR settings should be determined in coordination with BC Hydro in the later stage of the interconnection process.

The above conclusions are made based on the IC's input data and study assumptions listed in Section 4, which represent the best available information on October 14, 2025.

A non-binding good faith cost for required network upgrades and estimated schedule for construction are included in a separate letter to the IC.

Please note that, this Feasibility Study report does not include the descriptions of Protection, Control, and Telecommunications requirements and the associated upgrade scopes; however, as discussed in Section 2 "Purpose and Scopes of Study, the associated cost implications are captured and delivered in the cover letter to the IC".

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## Appendices

Appendix A	Schematic Diagram of the IC's Project
Appendix B	Power Flow Study Results
Appendix C	One-Line Sketch for Work at WSN Substation

## Acronyms

The following are acronyms used in this report.

BCH	BC Hydro
CEAP	Competitive Electricity Acquisition Process
COD	Commercial Operation Date
DTT	Direct Transfer Trip
ERIS	Energy Resource Interconnection Service
FeS	Feasibility Study
IBR	Inverter-Based Resources
IC	Interconnection Customer
IR	Interconnection Request
LAPS	Local Area Protection Schemes
MPO	Maximum Power Output
NERC	North American Electric Reliability Corporation
NRIS	Network Resource Interconnection Service
OATT	Open Access Transmission Tariff
POI	Point of Interconnection
RAS	Remedial Action Scheme
TIR	BC Hydro “60 KV to 500 kV Technical Interconnection Requirements for Power Generators”
WECC	Western Electricity Coordinating Council
WTG	Wind Turbine Generator

# 1 Introduction

Table 1-1 below summarizes the project reviewed in this Feasibility Study.

Table 1-1 Summary of Project Information

Project Name	[REDACTED]	
Name of Interconnection Customer (IC)	[REDACTED]	
Point of Interconnection (POI)	WSN 230 kV bus	
IC's Proposed COD	30 November 2031	
Type of Interconnection Service	NRIS <input checked="" type="checkbox"/>	ERIS <input type="checkbox"/>
Maximum Power Injection (MW)	251.6 MW (Summer)	251.6 MW (Winter)
Number of Turbines	38 x 7 MW WTGs	
Plant Fuel	Wind	

[REDACTED] the interconnection customer (IC), requests to interconnect its [REDACTED] (2025 CEAP IR # 3) to the BC Hydro system. [REDACTED] has thirty-eight (38) [REDACTED] type-4 wind turbine generators, adding a total capacity of 266 MW with a maximum power injection of 251.6 MW into the BC Hydro system. A 34.5 kV collector system transmits the energy from the wind turbines to a 34.5/230 kV substation. The IC proposes to connect the IBR plant to Williston substation (WSN) 230 kV bus at a new line position via a customer-built, approximately 38 km long, 230 kV transmission line (temporarily designated as 2LXXX). 2LXXX will radially connect to the IC's IBR plant. The Point of Interconnection (POI) for this study is the WSN 230 kV bus.

Figure 1-1 shows the Central Interior (CI) region 138/230/500 kV transmission system diagram. The CI electric system, in general, has two 500 kV sources located at the WSN 500 kV and KLY 500 kV substation. The region does not have any major generation. However, generation projects from 2024 CEAP have been considered in this study. One project, [REDACTED] interconnects approximately 140 MW of generation on 2L96 in September 2031.

There are no existing branch overload or voltage stability concerns for single or multiple contingencies in the CI region, after considering all applicable RAS. There is, however, the G.M. Shrum (GMS) Area Gen Shedding RAS that is relied on to

address any overload or transient stability concerns on the 500 kV system from which the CI region is supplied.

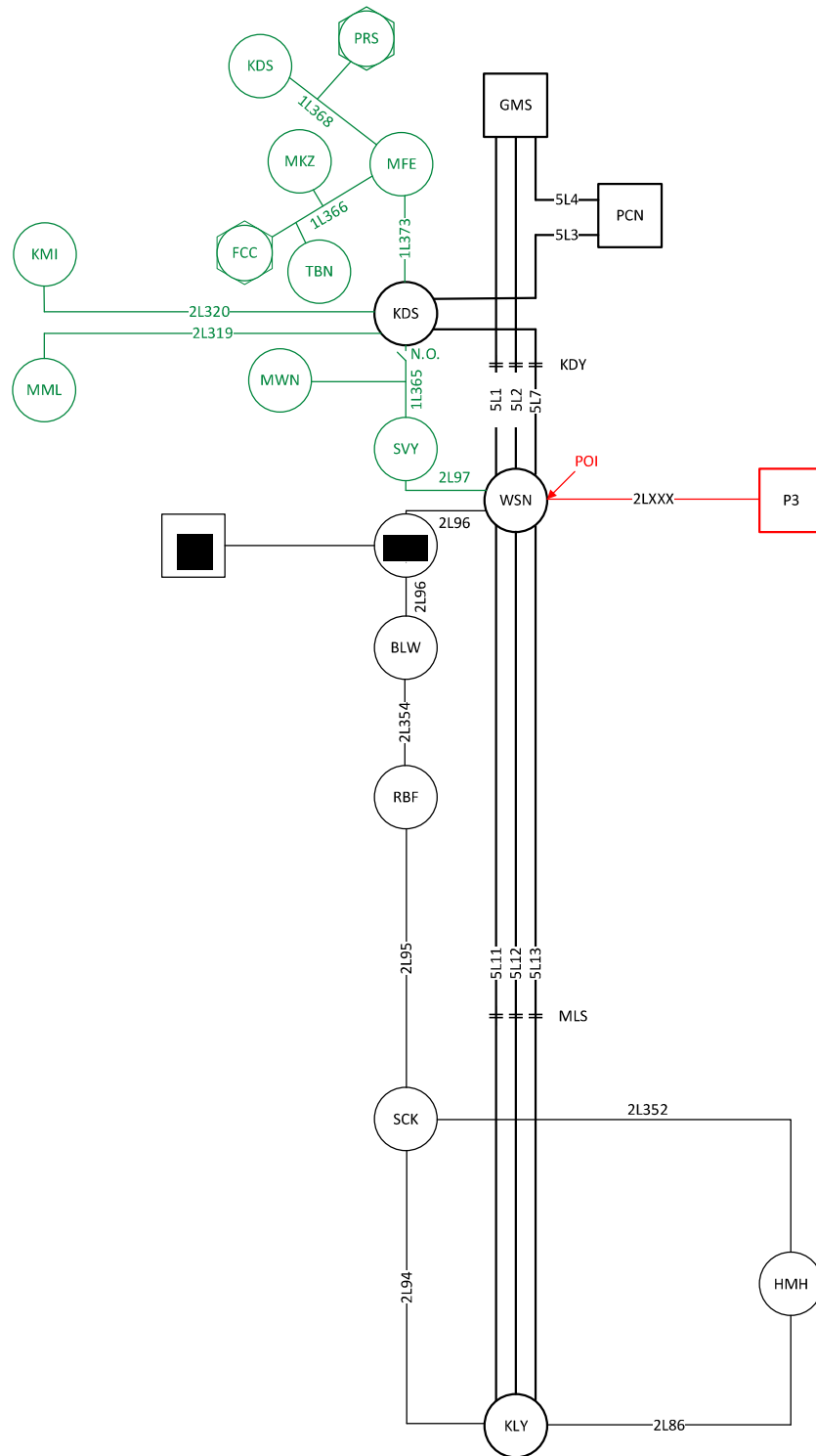


Figure 1-1: CI Region 138/230/500 kV Transmission System Diagram. The IC's IBR plant and POI are shown in red.

## 2 Purpose and Scopes of Study

This Feasibility Study is a preliminary evaluation of the system impact of interconnecting the proposed project to the BC Hydro system based on power flow and short circuit analysis in accordance with BCH's Open Access Transmission Tariff (OATT) and produces the estimated cost of required Network Upgrades and the implementation schedule.

Per OATT, the Feasibility Study is performed individually for each of the participating projects in the CEAP process and focuses specifically on the BC Hydro regional transmission system where the proposed generating project is connected and affects.

This is a "limited scope" study which is restricted to power flow studies of P0, P1 and P2 planning events as defined in TPL-001-4 and short circuit analysis. The study does not address other technical aspects such as transient stability and switching transients and impact of multiple contingencies. These subjects will be addressed in subsequent System Impact Study if the project proceeds further. In addition, any potential impacts to the adjacent external systems to BC Hydro would be addressed in subsequent detailed and coordinated studies with the relevant adjacent entities if the proposed generator project proceeds further.

Please note that, due to the compressed study timeline for 2025 CEAP Feasibility Study, this report does not include the descriptions of the Protection, Control, and Telecommunication requirements and the associated upgrade scopes. Instead, the network upgrades associated with Protections, Controls and Telecommunications are incorporated with cost estimates in a separate cover letter to the IC.

### 3 Standard and Criteria

The Feasibility Study is performed in compliance with the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) reliability standards, and the BCH interconnection requirements in the TIR, and upon the ratings of the existing BCH transmission facilities described in Operating Orders, specifically:

- NERC standards: TPL-001-4 and FAC-002-3 relevant to the scope of this Feasibility Study.
- WECC criteria TPL-001-WECC-CRT-4 Transmission System Planning Performance, July 1, 2023.
- BC Hydro's 60 kV to 500 kV Technical Interconnection Requirements for Power Generators, Rev 2.1.1, Effective: Sept 22, 2025.
- BC Hydro Operating Order 5T-10, Ratings for All Transmission Circuits 60 kV or Higher, Sept 17, 2025.
- BC Hydro Operating Order 5T-14, Ratings for All Transmission and Distribution Transformer, Sept 22, 2025.
- BC Hydro System Operating Order 7T-22 System Voltage Control, Sept 19, 2023.

## 4 Assumptions and Conditions

This Feasibility Study is performed based on the IC's submitted data and information available to BC Hydro on Oct 14, 2025, for the study purpose. Assumptions are made wherever the IC's input is unavailable. Appendix A shows the schematic diagram of the IC's Project used in the study model.

The power flow study cases used in this Feasibility Study are established based upon the BC Hydro's base resource plan and load forecasts available at the time of performing the study, which includes existing and future generators, transmission facilities, and loads in addition to the subject interconnection project in this study. Applicable seasonal conditions and the appropriate study years for the study planning horizon are also incorporated. Additional assumptions are listed as follows.

- 1) The generation in the study area are dispatched to the patterns that stress the transmission system in the study area. In these patterns, the associated generators are typically set to their Maximum Power Outputs (MPO) unless otherwise specified.
- 2) The 2024 Distribution Substation Load Forecast, 2025 Transmission Voltage Customer (TVC) Load Forecast and 2025 System Peak Forecast are used.
- 3) 2LXXX has sufficient capacity to accommodate the IC's wind project.
- 4) Appropriate BCH future TVC loads with their associated system reinforcement are considered in this study.
- 5) [REDACTED] wind project will be in service on 30 September 2031.

## 5 System Studies and Results

### 5.1 Power Flow Study Results

Power flow studies were performed to evaluate whether the IC's generating project would cause any unacceptable system performance (e.g. equipment overloads, steady-state voltage violation and voltage instability) and to determine the system reinforcement requirement based on steady state performance analysis.

The study focuses on the base scenario — 31HW/32HS/32LS — system conditions that include all the higher-queued generation projects in the region. These base cases were prepared based on factors such as load conditions, seasonal variation in ambient temperatures, and generation patterns that stress the transmission system.

The studies are performed for system normal conditions and under critical system contingencies specified in the P1 and P2 events by NERC TPL-001-4. Study results are summarized below.

#### 5.1.1 Thermal Overload Analysis

The study shows that the addition of [REDACTED] may not cause any additional thermal overload under System Normal (P0) or single contingency (P1) conditions in heavy winter and summer scenarios.

However, for light load conditions in summer, the study finds overloads of 500 kV series capacitors at McLeese Series Capacitor Station (MLS) under single 500 kV contingencies.

These overloads are mostly associated with the existing generation in the Peace Region and new generation projects and addressed by the existing GMS Area Gen Shedding RAS.

The [REDACTED] marginally contributes to these overloads and may need to participate in the existing generation shedding RAS, which will be determined during the System Impact Study (SIS) stage in future, if needed.

Appendix B contains the details of thermal overload analysis results.

### 5.1.2 Steady-State Voltage Analysis

With the connection of the IC's project, the steady-state voltage performance under system normal and single contingency conditions is acceptable for all studied conditions (31HW, 32HS, and 32LS).

Appendix B contains the details of steady-state voltage study results.

### 5.1.3 Reactive Power Capability Evaluation

The BC Hydro TIR requires IBR power plant to have the dynamic reactive power capability at a minimum of +/- 33% of its MPO at the high voltage side of the IC's switchyard over the full MW operating range.

Based on the power flow model data submitted by the IC, the proposed [REDACTED] does not meet the requirement above, which needs to be addressed if the project proceeds to the next stage of the interconnection process.

In addition, according to the IC-provided reactive capability data, the proposed WTG would provide +3.75 MVar to -3.5 MVar reactive capability at the zero MW output if the turbine's "STATCOM" function is enabled. This function needs to be re-confirmed if the IC's project proceeds to next stage of the interconnection process.

### 5.1.4 Anti-Islanding Requirements

[REDACTED] is not arranged for islanded operation. In addition, the IC is required to install anti-islanding protection within its facility to disconnect the IC's wind farm from the grid when an inadvertent island with the local load forms.

The [REDACTED] could be islanded with the existing or future BCH loads for certain fault and no-fault contingencies at WSN. A Direct Transfer Trip (DTT) protection scheme is required to isolate the IC's wind project at the IC's entrance circuit breaker to avoid potential islanding operations with the existing or future loads.

### 5.1.5 Other Performance Requirements

Fast Frequency Response (FFR), as per BCH TIR Section 4.6.5, is required at the [REDACTED]. The proposed wind turbine generators, when the FFR

function is enabled, are expected to temporarily boost the MW output to limit the system frequency drop during a major frequency event. The FFR settings should be determined in coordination with BC Hydro in the later stage of the interconnection process.

## 5.2 Fault Analysis

The short circuit analysis in the FeS is based upon the latest BC Hydro system model, which includes the generating facility information and associated impedance data provided by the IC. A more detailed study will be performed at the system impact study stage if needed.

## 5.3 Stations Requirements

The scope of work at the WSN substation is as follows.

- Add one new 230 kV circuit breaker and associated disconnect switches as shown in Appendix C.
- Add one-line terminal 2LXXX for [REDACTED] including a motor-operated disconnect switch, surge arrester and capacitor voltage transformer.
- Install associated P&C, station service and other equipment in the existing control building.
- Other associated station work.
- No station expansion is required for the above-mentioned station works as a part of this interconnection project.

Refer to the one-line diagram in Appendix C for details.

## 6 Cost Estimate and Schedule

The non-binding good faith estimated cost and time to construct the Network Upgrades required to interconnect the proposed project will be provided in a separate letter to the IC.

## 7 Conclusions

To interconnect the [REDACTED] and its facilities to the BCH transmission system at the POI, this Feasibility Study has identified the following conclusions and requirements:

1. The proposed POI at the WSN 230 kV bus and a new 230 kV line position is required for interconnecting the IC's generating project to the BCH system.
2. In light summer conditions, potential thermal overloads of 500 kV series capacitors at MLS are observed for single 500 kV contingencies. These constraints can be addressed by the existing GMS Area Gen Shedding RAS. The new wind generators at [REDACTED] may need to participate in the existing GMS Area Gen Shedding RAS. The RAS function scope will be specified in the SIS, if the need for RAS is determined.
3. The [REDACTED] is required to install anti-islanding protection within its facility to disconnect the IC's generating plant from the grid when an inadvertent island with local loads forms. The anti-islanding protection shall be configured in the manner that does not compromise the required ride-through performance.
4. The [REDACTED] could be islanded with local loads for certain fault and no-fault contingencies at WSN. A DTT protection scheme is required to isolate the IC's wind project at the IC's entrance circuit breaker to avoid potential islanding operations with the existing loads.
5. The [REDACTED] is required to have the dynamic reactive power capability at a minimum of +/- 33% of its MPO at the high voltage side of the IC's switchyard over the full MW operating range, per BC Hydro's TIR Section 6.4.2. Based on the power flow model data submitted by the IC, the [REDACTED] does not meet the requirement above, which needs to be addressed if the project proceeds to the next stage of the interconnection process.
6. The "STATCOM option" for the proposed type-4 WTGs is required so that each turbine can provide reactive power capability at zero MW output during turbine standstill.

7. Fast Frequency Response (FFR), as per BCH TIR Section 6.4.5, is required at the [REDACTED]. The proposed wind turbine generators, when the FFR function is enabled, are expected to temporarily boost the MW output to limit the system frequency drop during a major frequency event. The FFR settings should be determined in coordination with BC Hydro in the later stage of the interconnection process.



## Appendix A

### Schematic Diagram of the IC's Project

Figure A-1 shows the schematic diagram for the [REDACTED]

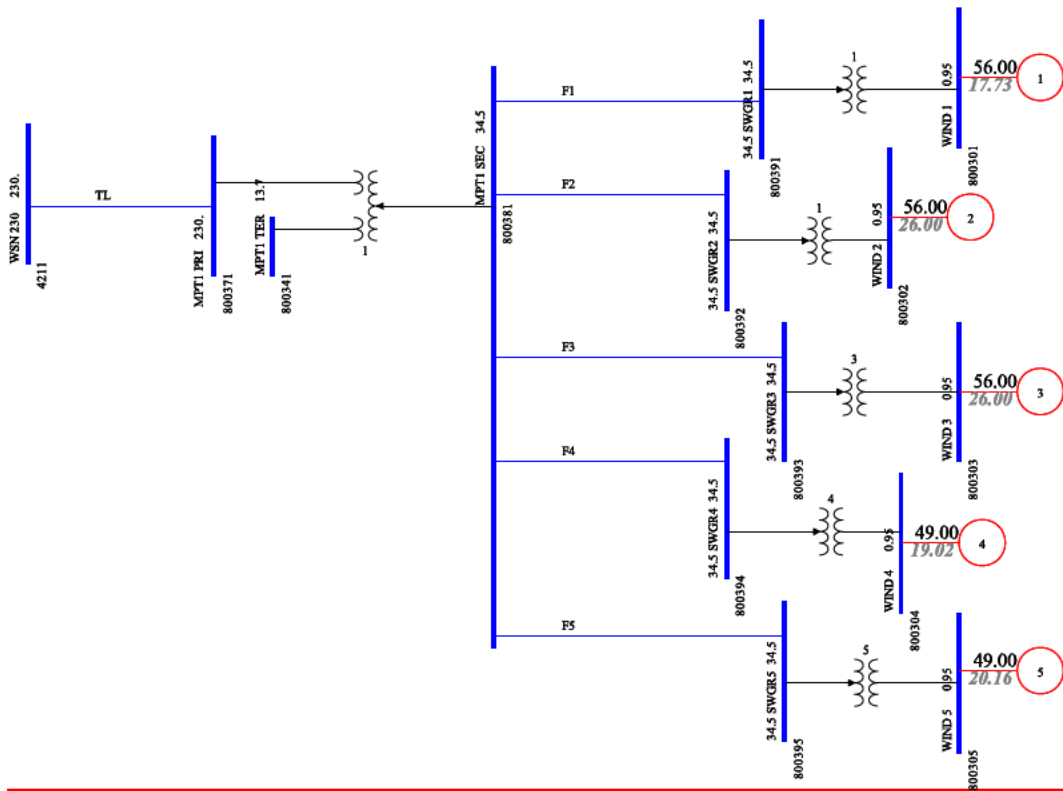


Figure A-1: The [REDACTED] Plant Schematic Diagram.

## Appendix B

### Power Flow Study Results

#### Base Scenario (31HW/32HS/32LS)

**Table B-1: Thermal Overload Study Results**

Case	IC's Gen Output	Contingency		Branch Loading (A/MVA/% of its seasonal normal rating)		
				2L354	2L95	2L96
		Cate.	Description	BLW-RBF	RBF-SMM	BLW-NETX
Winter Rating in A				800 A	356 MVA	1184 A
31HW	Max	P0	System Normal	565.50 A	485.30 A	755.10 A
				70.70%	61.00%	64.00%
		P1	2L86 OOS	754.78 A	677.22 A	956.61 A
				94.30%	84.70%	80.80%
		P1	5L13 OOS w/o RAS	693.60 A	614.70 A	891.50 A
				86.70%	77.20%	75.50%
Summer Rating in				574 A	515 A	817 A
32HS	Max	P0	System Normal	540.20 A	484.50 A	718.70 A
				94.10%	94.70%	88.20%
		P1	2L86 OOS	706.90 A	642.30 A	877.10 A
				123.20%	126.30%	107.70%
		P1	5L13 OOS w/o RAS	650.30 A	595.50 A	836.50 A
				113.30%	116.30%	102.70%
32LS	Max	P0	System Normal	565.60 A	519.70 A	694.30 A
				98.50%	101.70%	85.20%
		P1	2L86 OOS	689.90 A	654.30 A	828.40 A
				120.20%	127.00%	101.70%
		P1	5L13 OOS w/o RAS	685.40 A	642.00 A	824.20 A
				119.40%	125.30%	101.20%

*\* The overloads in black are attributed to TVC load interconnections in CI and SIW region and shall be resolved in the relevant TVC load interconnection SIS.*

**Table B-2: Steady-State Voltage Study Results**

Case	IC's Generator Output	Contingency		Bus Voltage (PU)	
		Category	Description	WSN 230 kV	
31HW	Max	P0	System Normal	1.019	1.042
	0 MW	P0	████████ OFF	1.016	1.018
	Max	P1	2L94 OOS	1.019	1.042
		P1	5L13 OOS	1.010	1.034
32HS	Max	P0	System Normal	1.015	1.039
	0 MW	P0	████████ OFF	1.017	1.018
	Max	P1	2L94 OOS	1.016	1.039
		P1	5L13 OOS	1.008	1.032
32LS	Max	P0	System Normal	1.018	1.041
	0 MW	P0	████████ OFF	1.020	1.021
	Max	P1	2L94 OOS	1.018	1.041
		P1	5L13 OOS	1.007	1.031

