BC Hydro
Power smart

6911 Southpoint Drive (B03)
Burnaby, BC
V3N 4X8

July 30, 2024

[redacted]

[redacted]

[redacted]

**RE: CEAP IR 86 - Willow Wind Project - Interconnection Feasibility Study Report**

Enclosed is the Interconnection Feasibility study report for the proposed Willow Wind Project submitted under Attachment M-2: Transmission Service and Interconnection Service Procedures for Competitive Electricity Acquisition Process (CEAP) of the Open Access Transmission Tariff (OATT). This letter provides a non-binding good faith estimate of the cost and time to construct the facilities required to interconnect your project to BC Hydro's Transmission System, being the Network Upgrades, based on the findings of the Interconnection Feasibility study.

**Open Access Transmission Tariff**

The OATT defines Network Upgrades as additions, modifications, and upgrades to BC Hydro's Transmission System required at or beyond the Point of Interconnection to accommodate the interconnection of the Generating Facility to the BC Hydro's Transmission System. Pursuant to the OATT, BC Hydro will design, procure, construct, install, and own the Network Upgrades. While BC Hydro will pay the costs for the Network Upgrades, the Interconnection Customer provides security for such costs.

**Cost Estimate**

Based on the Interconnection Feasibility study, the non-binding good faith estimated cost (typical accuracy range of +150%/-50%) for Network Upgrades required to interconnect your project is $87.5 M.

**Major Scope of Work Identified:**

- Acquire adequate property for a new switching substation close to the existing transmission line 2L96
- Construct a new outdoor 230kV, 3-circuit breaker ring bus switching substation
- Construct a new control building and other required substation facilities and infrastructure
- Replace tangent transmission line structures (on circuit 2L096) with 230kV H-frames to strengthen or satisfy the required ground clearance to accommodate the required optical fibre line (Approx. 16km) for telecom with the existing transmission line
- Supply and install mid span structures for the fibre addition
- Supply and install 16km optical fibre line
- Supply and install protection relays and other required protection equipment
- Other Telecom and Protection work, as required

**Exclusions:**

- GST
- Right-of-Way or Property costs
- Permits

**Key Assumptions:**

- Construction will be done by contractor
- Early Engineering and Procurement
- 3 years of construction
- No expansion station or control building to accommodate new equipment
- No ground improvements will be required
- No contaminated soil will be encountered during construction

**Key Risks:**

- Transmission routing may be different than assumed, including number of disconnect switches and structure types may change
- Additional right of way or acquisition of more property may be required
- No defined supply chain strategy, construction costs may increase depending on delivery method
- Cost of construction may increase based on geotechnical condition of the actual project site
- Project schedule may be longer than expected, leading to increased costs
- Costs may be affected by market conditions and escalation

Please note that the Revenue Metering requirements and associated costs required to interconnect your project have not been determined at this stage and, therefore, not included in the above estimate. Revenue Metering 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 project's Network Upgrades is Quarter 3, 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, delays in data submission, or financial commitments may also impact the target in-service date.

**Next Steps**

In September 2024, we will issue a final invoice for the Feasibility Study costs. This invoice will reflect the total amount due, taking into account the $15,000 Feasibility Study deposit you have already paid and any remaining amount on the non-refundable $15,000 Interconnection request deposit that we did not spend in reviewing and validating your interconnection request.

If you have any questions, please contact the BC Hydro CEAP Team at ceap2024@bchydro.com.

Sincerely,

Senior Manager, Transmission Interconnections

BC Hydro

Encl.: CEAP2024_IR_86_Willow Wind_FeS_Report_final.pdf

[redacted]

Willow Wind Project

# Interconnection Feasibility Study

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

**2024 CEAP IR # 86**

Prepared for: [redacted]

[redacted]

[redacted]

# Report Metadata

| | |
|---|---|
| Header: | Willow Wind Project |
| Subheader: | Interconnection Feasibility Study |
| Title: | Willow Wind Project |
| Subtitle: | 2024 CEAP IR # 86 |
| Report Number: | 850-APR-00010 |
| Revision: | 0 |
| Confidentiality: | Public |
| Date: | 2024 Jul 30 |
| Volume: | 1 of 1 |

[redacted]

| | |
|---|---|
| Related Facilities: | 2L96 |
| Additional Metadata: | Transmission Planning 2024-092<br>Filing Subcode 1350 |

[redacted]

# Revisions

| Revision | Date | Description |
|---|---|---|
| 0 | 2024 Jul | Initial release |

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# Executive Summary

[redacted] the interconnection customer (IC), requests to interconnect its Willow Wind Project (2024 CEAP IR # 86) to the BC Hydro (BCH) system. Willow Wind Project Willow Wind Project has thirty-two (32) [redacted] 6.2 MW type-4 wind turbine generators with total installed capacity of 198.4 MW. The proposed Point of Interconnection (POI) is a new switching station on BC Hydro's 230 kV line 2L96 between the Barlow substation (BLW) and Williston substation (WSN), approx.16 km from BLW. The IC's project will connect to the POI via a 34.77 km customer-built 230 kV interconnection line. The IC's proposed commercial operation date (COD) is November 1, 2029.

To interconnect the Willow Wind Project and its facilities to the BCH Transmission System at the proposed POI, this Feasibility Study has identified the following conclusions and requirements:

1. A new 230 kV switching station (referred to as "P86T") on 2L96 is required as the proposed POI for interconnecting the IC's generating project to the BCH system. With the new switching station P86T, 2L96 will be segregated into two new lines, temporarily referred to as: 2L96_A (BLW-P86T), 2L96_B (P86T-WSN). The proposed customer built 230 kV transmission line from P86T to their site substation (P86) is designated as 2L96_C. The temporary line designations will be replaced by permanent designations at a later stage of interconnection study.

2. The connection of Willow Wind Project does not cause any performance violation (i.e. thermal overload, voltage performance violation or voltage stability concern) under system normal and single contingency conditions.

3. An Anti-islanding Transfer Trip scheme to P86T is required to isolate the wind farm when it is islanded with local loads during various operation conditions or under system contingencies (such as loss of both 2L95&2L96_B, or loss of both 2L354&2L96_B…). In addition, the IC is required to install anti-islanding protection within their facility to disconnect the IC's wind farm from the grid when an inadvertent island with the local load forms.

4. The existing line 2L96 is in the Bulk Electric System (BES) list. The new line section 2L96_C will become IC's BES and the IC will be responsible for the compliance with applicable MRS requirements.

5. BC Hydro will provide line protections for 2L96_A, 2L96_B and 2L96_C protections. As part of the line protection replacements for each of the three lines, telecommunication facilities will be required to accommodate the new protection schemes. The IC shall provide required relays, telecom facility and associated equipment at its facilities to accommodate the new protection schemes.

6. For telecommunication purpose, furnish and install fibre optic cable on 2L96_A (from BLW to P86T, approximately 16 km) are required. Structure replacement and mid span structures may be required due to this fibre addition to 2L96_A.

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 May 22, 2024.

A 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.

# Contents



## Appendices

# 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 |
| 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 |
| EDM | Edmonds Office |
| FVO | Fraser Valley Office |
| WSN | Williston Substation |
| BLW | Barlow Substation |
| SCK | Soda Creek Substation |
| P86T | Willow Wind Terminal (unofficial site code) |
| P86 | Willow Wind Independent Power Producer (unofficial site code) |

# 1 Introduction

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

Table 1-1 Summary of Project Information

| | | |
|---|---|---|
| Project Name | Willow Wind Project | |
| Name of Interconnection Customer (IC) | [redacted] | |
| Point of Interconnection (POI) | 230 kV bus of a new switching station on 2L96, 16 km from BLW | |
| IC's Proposed COD | 1st November 2029 | |
| Type of Interconnection Service | NRIS ☒ | ERIS ☐ |
| Maximum Power Injection [1] (MW) | 191.94 MW (Summer) | 191.94 MW (Winter) |
| Number of Generator Units | 32 x 6.2 MW | |
| Plant Fuel | Wind | |

[redacted] the interconnection customer (IC), requests to interconnect its Willow Wind Project (2024 CEAP IR # 86) to the BC Hydro system. Willow Wind Project has thirty-two (32) [redacted] 6.2 MW type-4 wind turbine generators with total installed capacity of 198.4 MW. The IC's proposed Point of Interconnection (POI) is at 230 kV bus of a new switching station on BC Hydro's 230 kV line 2L96, approx. 16 km from the Barlow substation (BLW). The IC's project will connect to the POI via a customer built 34.77 km 230 kV interconnection line. The proposed commercial operation date (COD) is November 1, 2029.

Figure 1-1 shows the Central Interior region transmission system diagram. The 230 kV line corridor 2L96/2L354/2L95 is connected from Williston substation (WSN) to Barlow substation (BLW) to Red Bluff substation (RBF) to Soda Creek substation (SCK) in order to supply the local 66kV/230kV loads.

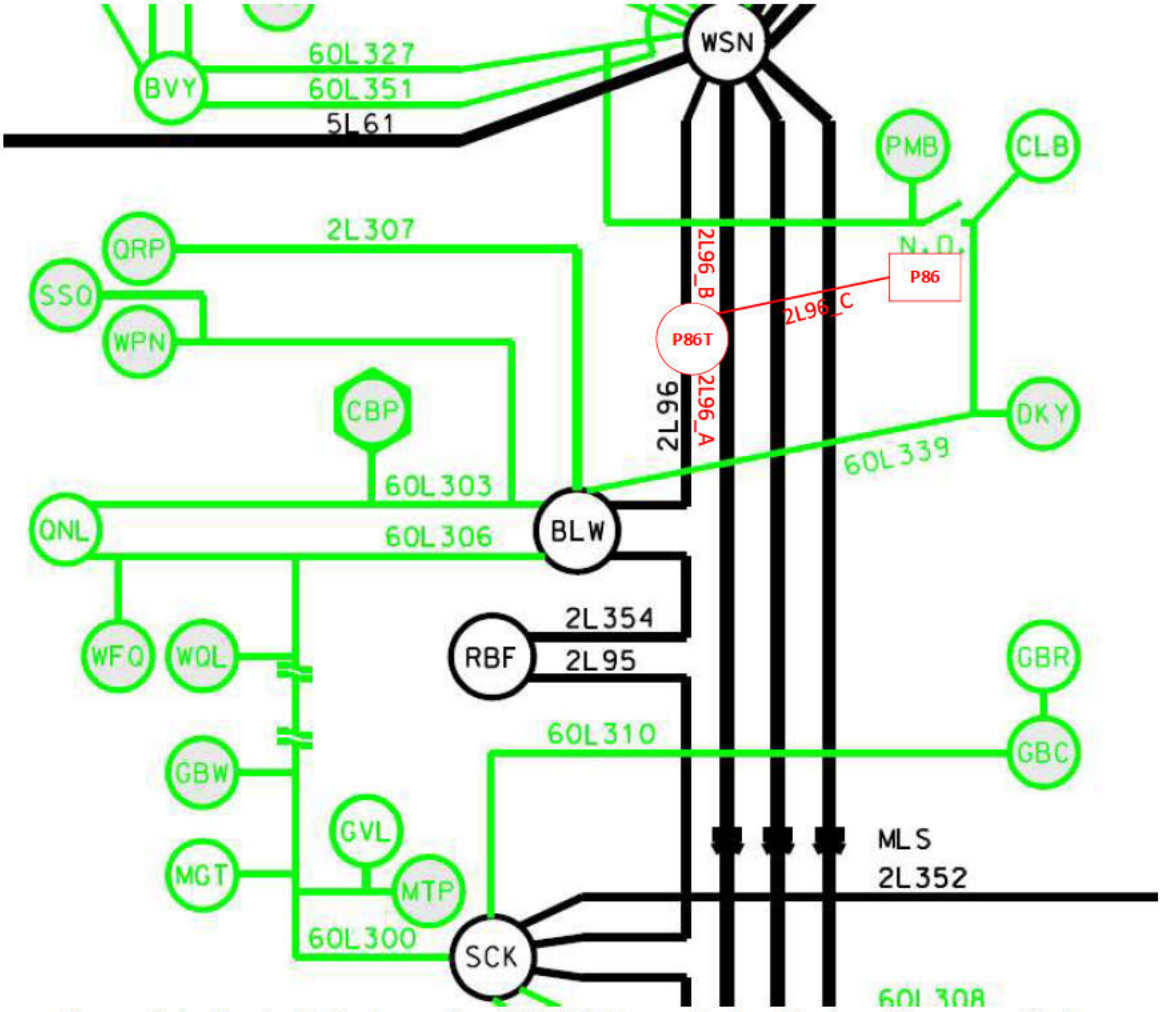


Figure 1-1: Central Interior region 230 kV Transmission System Diagram with the Proposed Willow Wind Project Interconnection

In the Central Interior region, there are five major generation plants.

- There are two steam turbine generators at Cariboo Pulp & Paper Company Substation (CBP) with MPO-NITS capacity of 27.7 MW in total, connected with BCH station at BLW. There is one thermal waste IPP generating unit [redacted] Williams Lake Power Plant (NWE) with MPO-NITS capacity of 68 MW, connected with BCH station at Williams Lake Substation (WLM) and Soda Creek Substation (SCK). The two generating stations are included in this study area of the Windfarm interconnection.

- The other three generations in the Central Interior transmission system are connected to WSN substation via 60 kV transmission lines and include Canfor Pulp Ltd. - Northwood Pulp Mill (NWP), Canfor Pulp Ltd. - Prince George Pulp & Paper Mills Intercontinental Site Substation (ICP), and Canfor Pulp Ltd. - Prince George Pulp & Paper Mills Substation (PGP).

# 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). A non-binding good faith and produces the estimated cost of required Network Upgrades and estimated time to construct will be provided.

Per OATT, the Feasibility Study is performed individually for each of the participating projects in the CEAP and focuses specifically on the BC Hydro regional transmission system where the proposed generating project is proposed to be constructed. An assessment of the incremental effect on the 500kV bulk transmission system is beyond this study scope.

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 would be addressed in subsequent System Impact Study if the project is a Successful Participant of the CEAP.

In case impact to the adjacent external systems to BC Hydro is observed, such impact would be addressed in subsequent detailed and coordinated studies with the relevant adjacent entities if the proposed interconnection proceeds further.

# 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.
- BC Hydro Operating Order 5T-10, Ratings for All Transmission Circuits 60 kV or Higher, April 16, 2024.
- BC Hydro Operating Order 5T-14, Ratings for All Transmission and Distribution Transformer, November 8, 2022.
- BC Hydro System Operating Order 7T-22 System Voltage Control, September 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 May 22, 2024 for the study purpose. Appendix A shows the plant single line diagram for the IC's project used in the study model. Certain assumptions were, as set out below, made to the extent required.

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 generations, 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 regional generation are dispatched to the patterns that stress the transmission system in the study area. In these patterns, the regional generations are typically set to their Maximum Power Outputs (MPO) unless otherwise specified.

# 5 System Studies and Results

Based upon the IC's submitted information and the area system conditions, a new switching station (referred to as "P86T") as the proposed POI on 2L96 is required to interconnect the IC's generating project to the BCH system. There are multiple terminals and multiple sources on the existing line 2L96. The new switching station would help to maintain reliability and adequate protection performance to serve the existing customers and the new addition.

With the new switching station P86T, the existing line 2L96 will be segregated into two new lines, temporarily referred to as: 2L96_A (BLW-P86T), 2L96_B (P86T-WSN). The customer built 230 kV transmission line from P86T to the customer's substation (P86) is designated as 2L96_C. The temporary line designations will be replaced by permanent designations at a later stage of interconnection study.

The existing line 2L96 is in the Bulk Electric System (BES) list. The new line 2L96_C will become IC's BES and the IC will be responsible for the compliance with applicable MRS requirements.

## 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 reinforcement requirement based on steady state performance analysis.

The study focuses on the 2030 light summer (30LS) system load condition which is typically a stressed condition for a generation interconnection project, taking into considerations of factors such as load conditions, seasons, and generation patterns. The 2030 heavy summer (30HS) and 2030 heavy winter (30HW) cases are also checked at a high level to capture any possibility of performance violations under high load conditions.

### 5.1.1 Branch Loading Analysis

Table 5-1 shows a summary of branch loading analysis under system normal and single contingencies (P1, P2) for various load conditions.

For all the studied load conditions (30ls, 30hs, 30hw), there is no branch or transformer overload identified under system normal condition and single contingencies.

Table 5-1: Summary of Branch Loading Analysis Results

| Case | IC's Plant Output | Contingency | | Branch Loading | |
|---|---|---|---|---|---|
| | | | | 2L96_A | 2L96_B |
| | | Cat. | Description | BLW-P86T | WSN-P86T |
| Winter Rating | | | | 1184 Amps | 1184 Amps |
| 30HW | Max | P0 | System Normal | 41% | 6% |
| | Max | P1 | 2L96_A | N/A | 41% |
| | Max | P1 | 2L96_B | 41% | N/A |
| Summer Rating | | | | 817 Amps | 817 Amps |
| 30HS | Max | P0 | System Normal | 53% | 12% |
| | Max | P1 | 2L96_A | N/A | 58% |
| | Max | P1 | 2L96_B | 58% | N/A |
| 30LS | Max | P0 | System Normal | 31% | 29% |
| | Max | P1 | 2L96_A | N/A | 58% |
| | Max | P1 | 2L96_B | 58% | N/A |

### 5.1.2 Steady-State Voltage Analysis

With the connection of the IC's project, the voltage performance under system normal condition and single contingencies is acceptable for all the three load conditions (30LS, 30HS, 30HW). Table 5-2 shows a summary of steady-state voltage performance under various system conditions and contingencies.

The study also finds that Willow Wind Project could improve the load bus voltage at BLW under heavy load conditions.

Table 5-2: Summary of Steady-State Voltage Study Results

| Case | IC's Plant Output | Contingency | | Bus Voltage (PU) | | |
|---|---|---|---|---|---|---|
| | | Cat. | Description | BLW 230 | WSN 230 | P86T 230 |
| 30HW | Max | P0 | System normal | 1.04 | 1.01 | 1.04 |
| 30HS | Max | P0 | System normal | 1.045 | 1.01 | 1.041 |
| | 0 MW | P0 | System normal | 1.05 | 1.01 | 1.05 |
| 30LS | Max | P0 | System normal | 1.04 | 1.01 | 1.04 |
| | 0 MW | P0 | System normal | 1.05 | 1.01 | 1.04 |

### 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 PSS/E power flow data submitted by the IC, the proposed generating project would be capable of meeting the BC Hydro's reactive capability requirement over the full MW operating range, which is subjected to further verification in the next stage of interconnection study.

### 5.1.4 Anti-Islanding Requirements

During various operation conditions or under system contingencies (such as loss of both 2L95&2L96_B, or loss of both 2L354&2L96_B), the IC's project will be inadvertently islanded with the existing generators and BC Hydro loads, which is not allowed. An Anti-islanding Transfer Trip to P86T is required to isolate the wind farm.

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.

## 5.2 Fault Analysis

The short circuit analysis in the FS 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

A new outdoor 230 kV, 3-circuit breaker ring bus switching station (P86T temporarily) will be built at the proposed POI, close to the existing 230 kV transmission line 2L96. The existing transmission line 2L96 will be cut and looped in to, and 230 kV line of Willow Wind Project (2L96_C) will be terminated at the new switching station.

The scope at the new switching station P86T is as follows.

- Acquire adequate property for a new switching station close to the existing transmission line 2L96.
- Construct a new outdoor 230 kV, three-circuit breaker ring bus switching station.
- Construct a new control building and other required switching station facilities and infrastructures.
- Cut the existing 2L96 and loop into the switching station.
- Terminate 230 kV transmission line Willow wind (2L96_C) at the station.

Refer to Appendix B one-line sketch for the new switching station P86T for details.

## 5.4 Transmission Line Requirements

For telecommunication purpose, furnish and install fibre optic cable on 2L96_A (from BLW to P86T, approximately 16km) are required. Structure replacement and mid span structures may be required due to this fibre addition to 2L96_A.

## 5.5 Protection & Control Requirements

BC Hydro will provide line protections for 2L96_A (BLW-P86T), 2L96_B (P86T-WSN) and 2L96_C (P86T-P86) protections. As part of the line protection replacements for each of the three lines, telecommunication facilities will be required to accommodate the new protection schemes.

The IC is to provide the following for the interconnection of Willow wind project.

- Entrance protection that complies with the latest version of the “60 kV to 500 kV BC Hydro Technical Interconnection Requirements for Power Generators.”
- Provide two SEL-411L-1 relays (firmware and options specified by BC Hydro) at the entrance of P86 to provide protection coverage for 2L96_C. BC Hydro P&C Planning will provide core protection settings for these relays to protect transmission line 2L96_C during a transmission line fault. Non-core protection such as local breaker failure, auto-reclosing, backup protection for station elements will not be provided by BC Hydro P&C Planning.
- The IC is responsible for NERC PRC-related tasks, settings to compliance standards within their facilities.

- The IC is responsible for providing a communications link for remote interrogation of the PPIS equipment by BCH servers.
- Provide anti-islanding protection as stated in Section 5.1.

The System Protection Scheme requirements stated in Section 5.1 are mainly to address the islanding concerns, which are preliminary. These System Protection Scheme requirements may utilize the communication channels required for protection purposes included in the cost estimate. If the proposed project proceeds through the CEAP process, subsequent System Impact Studies may identify additional System Protection Scheme requirements for this interconnection. These System Protection Scheme functional requirements will include initiating events, control actions, and latency times. Depending on these supplementary requirements, additional telecommunication facilities may be needed to facilitate signal transmission between the BC Hydro substations and customer facilities.

## 5.6 Telecommunications Requirements

BC Hydro performed a high-level feasibility assessment of a telecom solution to meet the following requirements.

**Teleprotection Requirements for Telecom**

- WECC Level 3 PY & SY, BLW – P86T 2L96_A digital teleprotection with C37.94 interfaces.
- WECC Level 3 PY & SY, WSN – P86T 2L96_B digital teleprotection with C37.94 interfaces.
- WECC Level 3 PY & SY, P86T – P86 2L96_C digital teleprotection with C37.94 interfaces.
- WECC Level 3 PY & SY, SCK 2L95 transfer trip to P86T.

**Telecontrol Requirements for Telecom**

- Two P86T SCADA circuits off FVO & SIO.
- One P86 SCADA circuit off FVO and SIO.
- One P86T REMACC circuit off EDM.

**Other Requirements for Telecom**

- Provide PY & SY T1s between P86T-P86.
- Provide MPLS links and LSPs for new P86T and BLW MPLS nodes.
- Provide PY & SY multifunction teleprotection circuits between SCK-P86.
- Provide TMS circuit for P86T (end point TBD).

Certain assumptions were made for determining a potential telecom solution. Details of the telecom solution (e.g. assumptions made, alternatives investigated and work required for BCH and the IC) would be provided at the next study stage.

# 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 Willow Wind Project and its facilities to the BCH Transmission System at the POI, this Feasibility Study has identified the following conclusions and requirements:

1. A new 230 kV switching station (referred to as “P86T”) on 2L96 is required as the proposed POI for interconnecting the IC’s generating project to the BCH system. With the new switching station P86T, 2L96 will be segregated into two new lines, temporarily referred to as: 2L96_A (BLW-P86T) and 2L96_B (P86T-WSN). The proposed customer-built line (P86T-P86) will be designated as 2L96_C. The temporary line designations will be replaced by permanent designations at a later stage of interconnection study.

2. The connection of Willow Wind Project does not cause any performance violation (i.e. thermal overload, voltage performance violation or voltage stability concern) under system normal and single contingency conditions.

3. An Anti-islanding Transfer Trip scheme to P86T is required to isolate the wind farm when it is islanded with local loads during various operation conditions or under system contingencies (such as loss of both 2L95&2L96_B, or loss of both 2L354&2L96_B…). In addition, the IC is required to install anti-islanding protection within their facility to disconnect the IC’s wind farm from the grid when an inadvertent island with the local load forms.

4. The existing line 2L96 is in the Bulk Electric System (BES) list. The new line section 2L96_C will become IC’s BES and the IC will be responsible for the compliance with applicable MRS requirements.

5. BC Hydro will provide line protections for 2L96_A, 2L96_B and 2L96_C protections. As part of the line protection replacements for each of the three lines, telecommunication facilities will be required to accommodate the new protection schemes. The IC shall provide required relays, telecom facility and associated equipment at its facilities to accommodate the new protection schemes.

6. For telecommunication purpose, furnish and install fibre optic cable on 2L96_A (from BLW to P86T, approximately 16 km) are required. Structure

replacement and mid span structures may be required due to this fibre addition to 2L96_A.

# Appendix A
# Plant Single Line Diagram Used for Power Flow Study

Figure A-1 shows Willow Wind Project single line diagram used for power flow study.

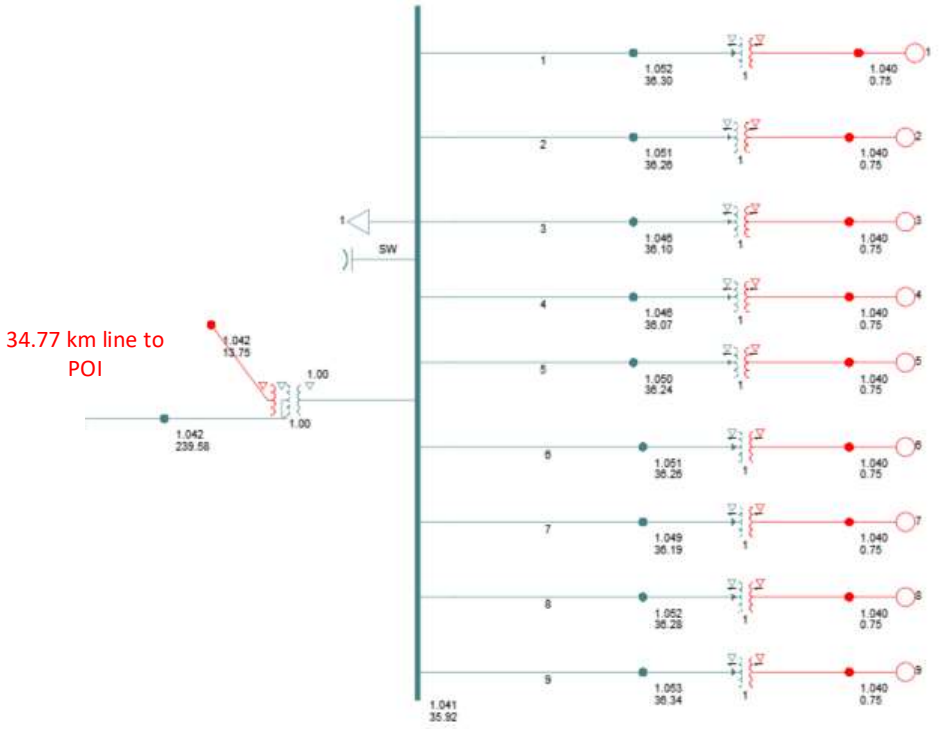


Figure A-1: Willow Wind Project Single Line Diagram for Power Flow Study.

As seen in the diagram, Willow Wind Project has one main power transformer with nine (9) feeders connecting thirty-two (32) wind turbines to the collector station, and two 20 MVAr switchable shunt capacitors.

# Appendix B
# One-Line Sketch for New Switching Station

Figure B-1 shows the Stations Planning One-Line Sketch for the New Switching Station P86T.

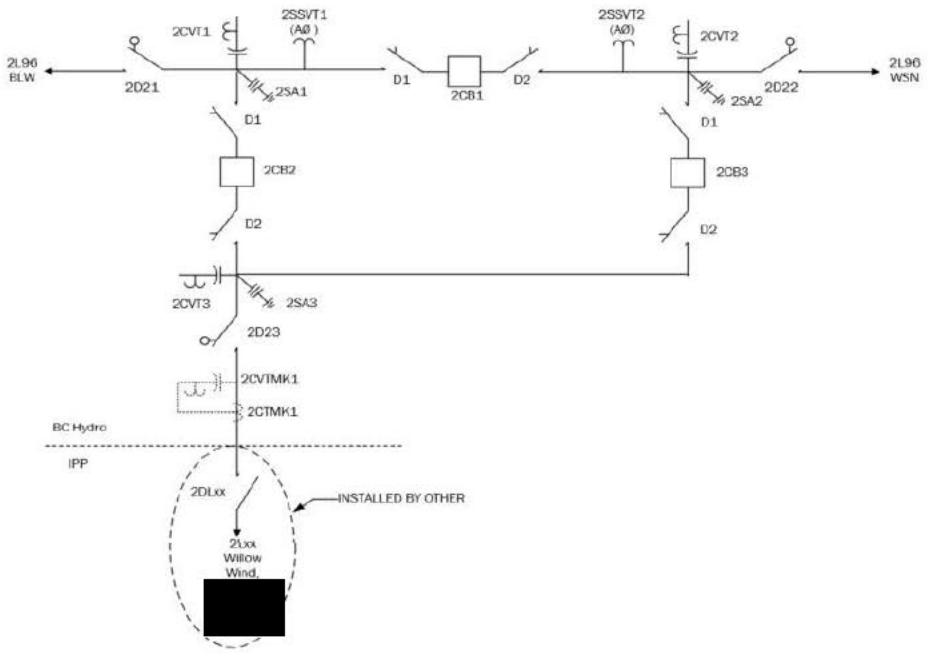


Figure B-1: Stations Planning One-Line Sketch for the New Switching Station P86T.