

Service Proposal (SP)

TransAlta Windrise Wind MPC

AML D.0757/AESO P2041

Rev. 1

September 18, 2019

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CONFIDENTIAL

REVISIONS HISTORY

Rev.	Date (MM-DD-YYYY)	Sections Changed	Changes
0	08-30-2019	N/A	Initial version.
1	09-18-2019	Multiple	As per AESO Review and Comment Sheet.

GLOSSARY

A	Amp
AC	Alternating Current
AESO	Alberta Electric System Operator
AIES	Alberta Interconnected Electrical System
AFUDC	Allowance for Funds Used During Construction
AML	AltaLink Management Ltd.
AUC	Alberta Utilities Commission
BIL	Basic Insulation Levels
CSS	Connection Study Scope
CT	Current Transformer
DC	Direct Current
DER	Distributed Energy Resource
DFO	Distribution Facilities Operator
EPC	Engineering, Procurement and Construction
EZE	Easement
FA	Facility Application
IED	Intelligent Electronic Device
ISD	In-Service Date
IPP	Independent Power Producer
IR	Information Request
ISO	Independent System Operator, now AESO
kV	Kilovolt
kVA	Kilovolt Ampere
LTC	Load Tap Changing
Mb	Megabyte
MOD	Motor Operated Disconnect
MPLS	Multiprotocol Layer Switching
MSL	Mining Surface Lease
MVA	Megavolt Ampere
NEMA	National Electrical Manufacturers Association
NID	Needs Identification Document
NGR	Neutral Grounding Reactor
OHSW	Overhead Shield Wires

P&C	Protection and Control
P&L	Permit and License
PT	Potential Transformer
RAS	Remedial Action Scheme
ROW	Right-of-Way
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SP	Service Proposal
SLD	Single Line Diagram
SMU	Synchrophasor Measurement Unit
SONET	Synchronous Optical Networking
SP	Service Proposal
T	Transformer (ie T1 for transformer #1)
TFO	Transmission Facilities Operator
VCE	Vegetation Control Easement

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1.0 PROJECT OVERVIEW

In accordance with the Terms and Conditions of Service, AltaLink Management Ltd. (AML) has prepared this Service Proposal (SP) for the TransAlta Windrise Wind MPC Project (referred to as “the Project”), in support of the Alberta Electric System Operator’s (AESO’s) development.

The scope of work for the Project includes, but is not limited to, the following major components:

- Add one 240/138 kV LTC auto-transformer and one 138 kV circuit breaker at the existing Windy Flats 138S substation.
- Add or modify associated equipment as required to connect the new 497L to existing Windy Flats 138S substation.

The project development is illustrated in the single-line diagrams (SLDs) in [Appendix A](#).

The estimated cost for the proposed development is \$8.03M. The SP cost estimate is provided in [Appendix B](#). Costs are attributable to the customer.

The cash flow is shown in the attached cash flow estimate in [Appendix B](#).

The original requested In-Service-Date (ISD) is Nov 1, 2020. The scheduled ISD is December 17, 2020. The project schedule is shown in [Appendix C](#).

This SP meets the requirements outlined in the AESO’s direction letter, dated July 19, 2019 as well as the P2041 Functional Specification Version 1, dated July 15, 2019. This Service Proposal takes into account all applicable AESO Authoritative Documents and technical standards in effect as of July 15, 2019.

2.0 SCOPE OF WORK

AML is accountable for all project management, land or land-use acquisition, siting, and applicable regulatory approvals and permits, material procurement, construction, commissioning, acceptance, energization, and closeout documentation requirements for its facilities to interconnect to the Alberta Interconnected Electrical System (AIES).

2.1 Transmission Lines

497L construction is in the scope of Windrise MPC. Windrise is to supply and install the transmission line conductor, OHSW and all hardware and insulators necessary to connect from the last structure outside the fence to the A-Frame at 138S Windy Flats. Windrise will supply the NEMA pad on the transmission line to enable AltaLink to connect the jumper from the disconnect switch to the line.

AltaLink scope includes providing an A-Frame at 138S Windy Flats and the jumper from the line to the line Motor Operated Disconnect (MOD). AltaLink will provide details of the 138kV A-Frame at 138S Windy Flats to Windrise MPC for their design of the slack span.

2.2 Substations

2.2.1 Windrise 1063S

Windrise substation 1063S is not an AltaLink owned substation. However, AltaLink will own protection, SCADA and telecommunication equipment at this location.

2.2.1.1 Control Building

All AltaLink-owned protection, SCADA and telecommunication equipment at this location:

- It is assumed that “A” and “B” protection relays on 497L at 1063S Windrise shall send breaker failure initiation signals to the Windrise breaker fail relay. Windrise breaker fail relay shall trip AltaLink’s remote breaker at 138S Windy Flats via inputs into 138S Windy Flats 497L line protection relays.
- It is assumed that AltaLink telecom equipment will be installed on racks inside cabinets in the 1063S Windrise substation. Windrise shall provide and install the conduit necessary for the fibre up to a new fibre patch panel located inside the AltaLink telecom cabinet.
- It is assumed that Windrise will be purchasing a Telecom Switch for Voice, SCADA, and PMU services to the AESO. This equipment will be installed and owned by Windrise. The telecom switch will not be mounted on AML racks. The length of cable required between the AltaLink MPLS 7705 Node will be supplied by Windrise.
- It is assumed that the OPGW terminating point at 138S Windy Flats will be the splice can on the last structure outside the substation. AML is to supply the ADUG from the splice can to the control building.
- Transient Recovery Voltage (TRV) requirements have not been studied. It is assumed that three bus CVTs will be required and that the CVT minimum capacitance will be sufficient for TRV control.

2.2.2 Windy Flats 138S

- The Windy Flats Substation 138S location is SW 03-17-08-26W4 (South of Highway 3 and West of Highway 810).
- Engineering studies conducted on TFO’s behalf, as required by the AESO. The TFO will also be conducting an AC Study, DC Study, Arc Flash and Grounding Studies.
- No fence expansion is required. New access is not required.
- The ground grid shall be modified as required for the addition of the new structures and equipment.

2.2.2.1 Control Building

The existing control building at 138S Windy Flats has designated space for the Protection and Control equipment and racks for this project. It is also assumed that the existing control building at 83S Taber has enough space for the RAS equipment required.

2.2.2.2 Substation

The following studies need to be completed for this project:

- EMF Study
- Audible Noise Study

Other studies, such as the AC, DC, Battery Sizing, Arc Flash, and grounding will be updated by the EPC Contractor.

Major new equipment is shown in the table below:

Quantity	Equipment	Comments
1	240kV, 900kV BIL, 2000A, Motor operated Vertical break switch	Motorized disconnect switch for T1 240kV isolation and T1 240kV energization. (138s1789)
1	245/144kV LTC Autotransformer 240/320/400 MVA	New T1 (TX18979) – to be supplied by AML
1	138kV, 550kV BIL, 2000A, Motor operated Vertical break switch	Motorized disconnect switch for T1 138kV isolation (138s1889)
1	145kV, 650kV BIL, 3000A, 40kA Dead Tank circuit breaker with 18 bushing CTs 2.5L400@1200:5	138kV line breaker (138s1852)
2	138kV, 550kV BIL, 2000A, Manual operated Center Side break switches	Disconnect Switches for breaker isolation
3	145kV, 650kV BIL, single phase CVTs with a 1200/700:1 ratio, 2 windings	138kV CVT, one set of 3 CVTs for the 138kV bus
1	138kV, 650kV BIL, magnetic voltage transformers	138kV VT, one MVT for 497L
3	138kV, 120kV Rated, 98kV Station Class MCOV Surge Arresters	Three (3) for the 138kV 497L entrance into the Substation
1	550kV BIL, 2000A, Motor Operated, Under-hung, Centre Side Break Switches for transmission line isolation	Motorized disconnect switch for one (1) 138kV line isolation

- The standalone CTs /PTs are shown in the SLD.
- New substation A-Frame including the MOD

- New foundation for the circuit breaker
- New foundation for the new 144/245kV autotransformer.
- New foundations and support structure for the surge arrestors, post insulators, disconnect switches, and VTs
- Engineering and design standards utilized in the project are AltaLink standards and ISO Rules.
- Mobilization and de-mobilization areas will be located on AltaLink owned land close to Windy Flats 138S substation.
- No camp requirements.
- Laydown / storage yards will be located on AltaLink-owned land, near Windy Flats 138S substation.
-

2.3 Telecommunication Facilities

This project will require fibre-optic connection between 138S Windy Flats and 1063S Windrise. The communication media will use new OPGW cable installed on 497L transmission line

2.3.1 Windy Flats 138S

The communication infrastructure for a 138 kV substation shall be installed at Windy Flats 138S. The telecommunication system at Substation 138S shall consist of a fiber-optic link to Substation 1063S via OPGW on 138 kV line 497L.

- Design and Install (1) new MPLS node.
- Create new TPR circuits for the RAS scheme and 497L protection.

2.3.2 Windrise 1063S

Windrise MPR project is to install and supply the fibre cable from the splice enclosure through the conduit to the fibre distribution panel on the AltaLink rack in the building.

AltaLink to design and install the following equipment at 1063S:

- One (1) VOIP phone
- One (1) Standard Telecom Switch.
- One (1) Standard Telecom Firewall – includes 48/12VDC power converter in template
- One (1) 130/48 VDC power converter with modules and 48VDC distribution breaker panel as per AltaLink Standard.
- One (1) AltaLink standard fibre distribution panel. Connect fibre patch cords between 497L line
- Protection relays and FDP for relay to relay communication.
- Install fibre patch cords between MPLS node and FDP

2.4 Protection and Control

2.4.1 Windy Flats 138S

- Install 497L Line Protections A&B using SEL 411L and GE L90 relays.

- Modify 240kV Bus Protection A&B Siemens 7UT635 and GE UR B90 relays.
- Install T1 Transformer Protection A&B SEL 387E and GE UR T60 relays.
- Install 138kV Breaker Protection GE UR C60
- Modify existing wirings and settings as required for the project.

2.4.2 Windrise 1063S

- Install 497L Line Protections A&B using SEL 411L and GE L90 relays.

2.4.3 RAS

Per the Functional Specification, a RAS is planned for P1719. As the Scheme Actions are yet to be defined by AESO Ops Planning, it is assumed that for 172L overload conditions at 83s, the 138kV breaker at 1063S Windrise is required to be tripped.

2.5 SCADA

AltaLink assumes the following will be installed by Windrise MPC and requires telemetry at 1063S from Windrise MPC include the following:

- AltaLink should have supervisory trip and indication of the 138kV MOD and breaker at 1063S Windrise.
- Install one (1) Eaton SMP SG-4250 RTU/HMI. Use SCA02.01.06 as a guideline and order with HMI license as per standard.
- Install one (1) rack mountable touchscreen monitor.
- Install one (1) Absopulse DC/AC Inverter for touchscreen monitor. Use SCA60.02.02 as a guideline.
- Install one (1) SEL-2440 alarm rack unit. The RJ45 version is to be ordered. Use SCA10.02.02 as a guideline. Connect all new alarms to this SEL-2440.
- Install one (1) SEL-2440 control rack unit. The RJ45 version is to be ordered. Use SCA10.03.03 as a guideline. Status and controls shall be wired to this SEL-2440.
- Install one (1) Hirschmann GRS1140 Ethernet Switch. Use MIC 5992116. Connect new P&C relays and SCADA equipment to this switch for remote access and DNP connections.
- Install one (1) Siemens RS416 Terminal Server for remote access and DNP connections.
- Add the 1063s Windrise 138 kV breaker status and MOD status to the SEL-2440 control unit. Add DC-DC converter alarm and Protection alarms to the SEL-2440 alarm unit.

2.6 Salvaged Equipment

- There is no major equipment to be salvaged in the project scope of work.

2.7 Spatial and Technical Diagrams

The following spatial and technical diagrams are provided in [Appendix A:](#)

- **Project Area/Transmission Line Route Map**
- **Single Line Diagram**

3.0 COST ESTIMATES

3.1 AESO Cost Template

The estimated cost for the proposed development is \$8,034,361 CAD, and it has an accuracy of +20%/–10% and a base year of 2020. The cost estimate is valid for 90 days.

The SP spreadsheets are in [Appendix B](#), and the cash flow is shown in [Appendix B](#). The entire cost is customer cost.

AML requests involvement in any third-party discussions regarding the project estimate or schedule. As agreed, the price estimates are only for informational and tracking purposes, pursuant to Section 9 of the ISO Rules, approved by the Alberta Utilities Commission (AUC). The cost estimate is not binding; however, if the Project proceeds, AML will capitalize the actual costs of the final project as part of the AESO's Direct Assignment letter.

3.2 Additional Work

There is no additional work required to support the maintenance and the operations work for the project scope of work.

4.0 PROJECT SCHEDULE

The original requested ISD for the project is Nov 1, 2020. The scheduled ISD is December 17, 2020. The schedule is attached in [Appendix C](#); the schedule shows the project milestones for the major components of the Project. Meeting the schedule is contingent upon, but not limited to, receiving timely AESO direction to file, obtaining regulatory approval, construction conditions, environmental restrictions, and other factors that are outside AML's control.

4.1 Substations

	Start date	Finish Date
Engineering	16-Jan-20	06-May-20
Procurement: Transformer	30-Aug-19	15-Sep-20
Procurement	30-Sep-19	01-May-20
Construction	06-Aug-20	09-Dec-20
Commissioning	06-Nov-20	17-Dec-20

4.2 Telecommunication Facilities

	Start date	Finish Date
Engineering	16-Jan-20	06-May-20
Procurement	30-Sep-19	01-May-20
Construction	06-Aug-20	09-Dec-20
Commissioning	06-Nov-20	17-Dec-20

4.3 Scheduled ISD

The scheduled ISD for the Project is December 17, 2020.

4.4 Construction Limitations and Constraints

- There are no environmental constraints known at the time of Service Proposal submission.
- There are no construction limitations known at the time of the Service Proposal submission.

5.0 ASSUMPTIONS

5.1 Scope

- One round of consultation is required;
- No AUC hearing;
- The estimate does not include cost for permits or agreements such as Environmental Permits, Road Use Agreements, Permitting requirement with Transportation Canada, etc.;
- Outages are available and do not delay the project schedule;
- All approvals, access, permits, funding and P&L are available when required;
- No funding delays;
- Project construction proceeds in an uninterrupted fashion;
- Assume fall construction;
- Assume limited construction matting is included;
- Assume no mobile substation is required;
- Storage costs for material not included (material is delivered directly to site);
- No unusual considerations for substation access (normal setback for roads);
- Assume construction survey is required;
- Roads accessible during construction (especially for moving heavy equipment);
- Change in the scope of work, foundations or substation locations may affect the cost of the work;
- Disposal and removal of containment soil or other materials is not included in the cost estimate;
- Traffic accommodation costs not included;
- Detailed design has not been completed for specific foundation types based on existing ground conditions;

- Light reclamation work has been included;
- Cash flow is based on milestone schedule, AML functional group estimates, and EPC milestone payments;
- It is assumed that “A” and “B” protection relays on 497L at 1063S Windrise shall send breaker failure initiation signals to the Windrise breaker fail relay. Windrise breaker fail relay shall trip AltaLink’s remote breaker at 138S Windy Flats via inputs into 138S Windy Flats 497L line protection relays;
- It is assumed that AltaLink telecom equipment will be installed on racks inside cabinets in the 1063S Windrise substation. Windrise shall provide and install the conduit necessary for the fibre up to a new fibre patch panel located inside the AltaLink telecom cabinet;
- It is assumed that Windrise will be purchasing a Telecom Switch for Voice, SCADA, and PMU services to the AESO. This equipment will be installed and owned by Windrise. The telecom switch will not be mounted on AML racks. The length of cable required between the AltaLink MPLS 7705 Node will be supplied by Windrise;
- It is assumed that the OPGW terminating point at 138S Windy Flats will be the splice can on the last structure outside the substation. AML is to supply the ADUG from the splice can to the control building;
- Transient Recovery Voltage (TRV) requirements have not been studied. It is assumed that three bus CVTs will be required and that the CVT minimum capacitance will be sufficient for TRV control;
- For the purposes of estimating, it is assumed that the customer will be terminating the new 138kV 497L line from the south side of 138S Windy Flats substation on existing AltaLink property and that there is no substation fence expansion required. Provisions are made in the existing substation design to enter 138S Windy Flats from the north, but costs associated with any modifications to existing line assets have not been included in this DBM;
- There are no costs included for the impact of a hearing related to the Facility Applications for the TransAlta Facilities that may impact AltaLink’s portion of the wind farm development. If a hearing does occur, there will be significant additional costs associated (regulatory costs, project delay costs, equipment storage and other cost related to the project), which are not included in the Service Proposal. AltaLink would require a Project Change Proposal for these additional costs.

5.2 Weather and Environmental

- Normal weather assumed for the time of year in which construction is scheduled (no unusual factors such as periods of severe heat or cold, heavy rain, etc.);
- No mitigation costs for any extraordinary environmental considerations;
- No Water Act Approval;
- No construction schedule delays or interruptions due to environmental restrictions or wildlife setbacks.

5.3 Operational Outages

Outages on the 240kV Bus 1 line are available in fall/winter.

5.4 Allowances

There is no AFUDC included in the SP estimate as the In Service Date is planned for within the 2020 calendar year.

5.5 Escalation

Includes current standard estimating Escalation rate of 2.4% per annum; based on a projected cash flow (24 month project duration from initiation to In Service Date). Applied to AML supplied equipment and EPC cost only.

6.0 DEVIATIONS FROM THE FUNCTIONAL SPECIFICATION

There are no deviations from the AESO P2041 Functional Specification V1 dated July 15, 2019.

7.0 RISK MANAGEMENT

AML will work with the AESO, as well as internal departments and vendors, to mitigate generic risks through continual communication and observance of timelines.

Table 7-1 refers to the project-specific risks associated with the Project.

Table 7-1 – Risk Identification and Mitigation Strategy

	Risk	Mitigation
1	There is a risk that Transformer delivery after September 1, 2020 may delay the ISD of December 17, 2020.	Accept, Working closely with Procurement to secure the manufacturing slot
2	There is a risk that FA and NID is file after November 2019	Accept, Ensure that the customer and the AESO efficiently complete their AUC requirements
3	There is a risk of Safety incidents / Stand-down / additional Safety requirements	Accept, AML will work with the EPC and subcontractor on the safety plan to avoid incidents
4	There is a risk of outages not being available as required + mobile substation required or temporary adjustment to accommodate the outage	Early coordination with the outage planner is required
5	There is a risk of Interface Management among AML and the MPC project portion that create delays and increase budget	Accept, early coordination with EPC and Customer

	Risk	Mitigation
6	There is a risk of Increment weather to reduce productivity of construction crew - Winter condition worst then expected	Accept
7	There is a risk of construction delay due to migratory birds species at risk: schedule delay, environmental consultant to monitor the site	Accept, Proceed with Environmental Mitigation Plan
8	There is a risk of RAS implementation with the AESO to update the FS: FA, Engineering and cost impact due to Telecom tower	Accept, AML to monitor the AESO to choose the right technical solution
9	There is a risk of Engineering Field changed due to brownfield site	Accept
10	There is a risk of U/G condition worst than expected: cables, piling issues	Reducing the risk in using geotechnical report and the use of underground penetration radar

8.0 OPERATION AND OUTAGES

Outages will be required on the 240kV Bus of the Windy Flats 138S substation. This preliminary high-level construction and outage plan is provided in Table 8-1 for reference purposes. A detailed outage plan will be developed well in advance with proper coordination with all the stakeholders.

Table 8-1 – Preliminary Outage Plan

Outage Element	Approximate Duration	Work to be Performed
240kV Bus 1 138s252, 138s552, 138s752, 138s1052, 138s1652 breakers 138s65 PT	2 weeks	Connect new transformer to 240kV bus. Install transformer protections. Functional and trip test new protections. Change existing breaker fail protection settings and functional test.

9.0 APPROVAL

The signature on the title page of this Service Proposal represents the Approval.

APPENDIX A:
FIGURES

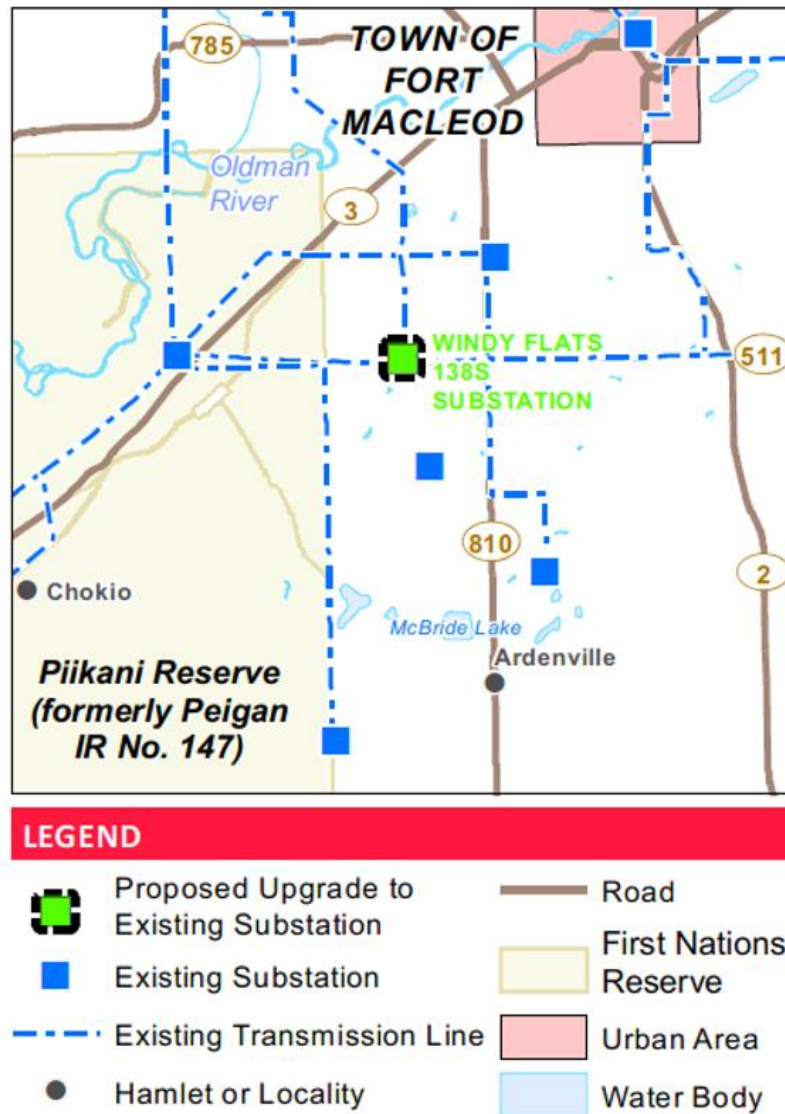


Figure A-1 – Project Area Map

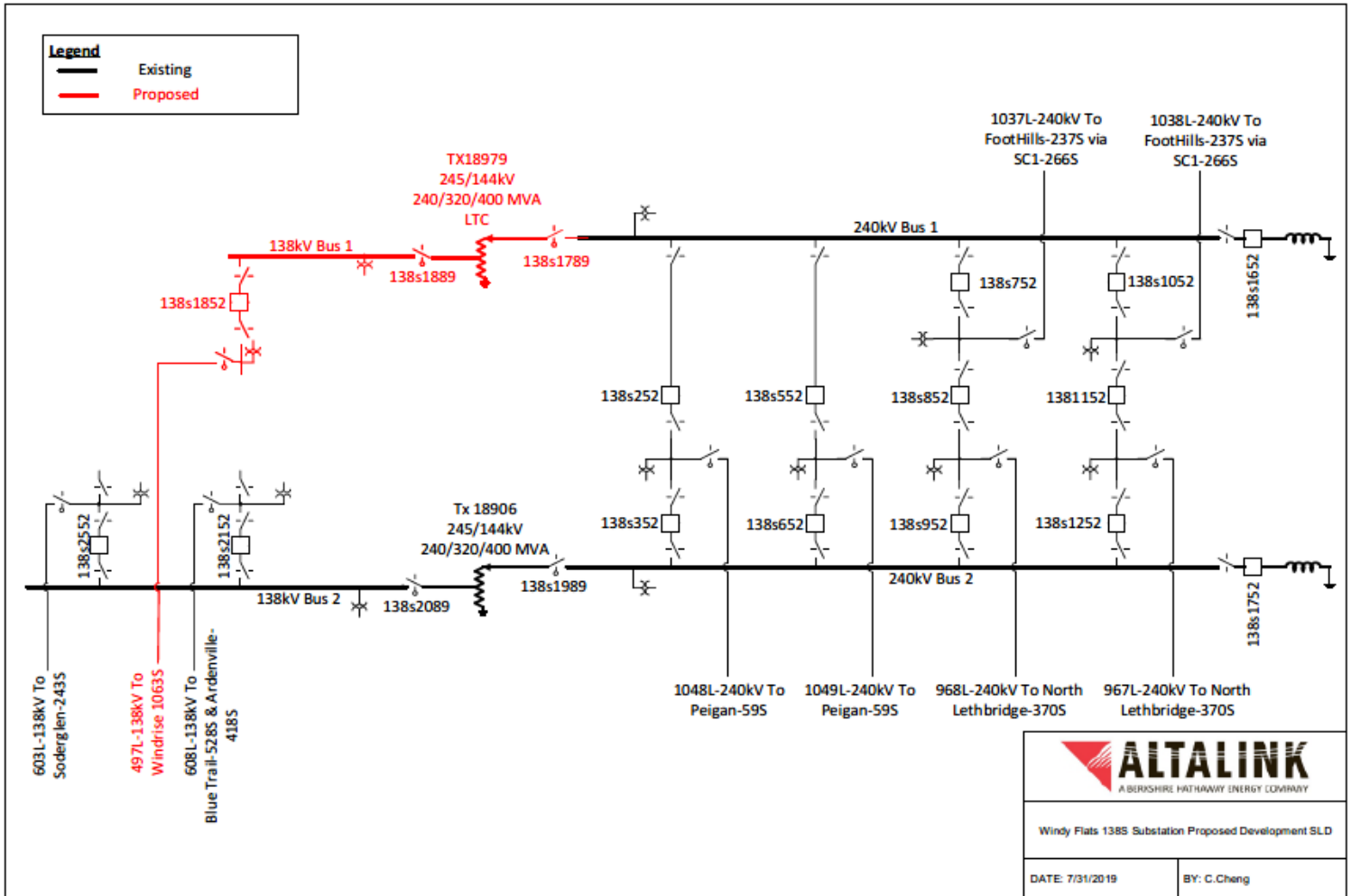


Figure A-2 – Single Line Diagram

APPENDIX B:
COST ESTIMATE

AESO Project Name & No.	Transalta Windrise MPC Wind		P2041 / D0757	TRANSMISSION PROJECT ESTIMATE SUMMARY
Prepared by:	Altalink Management Ltd.			
AACE Class:	3	Estimate Basis	SP	
High Range	20%	Low Range	-10%	
Date of Estimate:	30-Aug-19	Base Year	2020	
In Service Date	17-Dec-20	In Service Year	2020	
	SYSTEM	PARTICIPANT	TOTAL	ASSUMPTIONS
TRANSMISSION LINE				
Material	\$ -	\$ -	\$ -	
Labour	\$ -	\$ -	\$ -	
Supply & Install	\$ -	\$ -	\$ -	
TOTAL TRANSMISSION LINE	\$ -	\$ -	\$ -	
SUBSTATION				
Material	\$ -	\$ 3,667,454	\$ 3,667,454	
Labour	\$ -	\$ 1,690,813	\$ 1,690,813	
Supply & Install	\$ -	\$ -	\$ -	
TOTAL SUBSTATION	\$ -	\$ 5,358,267	\$ 5,358,267	
TELECOMMUNICATION				
Material	\$ -	\$ 35,991	\$ 35,991	
Labour	\$ -	\$ 191,312	\$ 191,312	
Supply & Install	\$ -	\$ -	\$ -	
TOTAL TELECOMMUNICATIONS	\$ -	\$ 227,303	\$ 227,303	
OWNERS				
Pre-SP Cost	\$ -	\$ 21,265	\$ 21,265	
Service Proposal	\$ -	\$ 56,571	\$ 56,571	
Facility Applications	\$ -	\$ 104,655	\$ 104,655	
Regulatory & Compliance	\$ -	\$ -	\$ -	
Land Rights - Easements	\$ -	\$ 11,686	\$ 11,686	
Land - Damage Claims	\$ -	\$ -	\$ -	
Land - Acquisitions	\$ -	\$ -	\$ -	
Land - Other	\$ -	\$ -	\$ -	
TOTAL OWNERS COST	\$ -	\$ 194,177	\$ 194,177	
DISTRIBUTED				
Procurement Management	\$ -	\$ 51,566	\$ 51,566	
Project Management	\$ -	\$ 579,190	\$ 579,190	
Construction Management	\$ -	\$ 255,503	\$ 255,503	
Contingency	\$ -	\$ 533,000	\$ 533,000	
Escalation	\$ -	\$ 76,849	\$ 76,849	
TOTAL DISTRIBUTED	\$ -	\$ 1,496,108	\$ 1,496,108	
SALVAGE				
Transmission Line Labour	\$ -	\$ -	\$ -	
Substation Labour	\$ -	\$ -	\$ -	
Telecom Labour	\$ -	\$ -	\$ -	
Land Remediation and Reclamation	\$ -	\$ -	\$ -	
TOTAL SALVAGE	\$ -	\$ -	\$ -	
OTHER COSTS				
AFUDC	\$ -	\$ -	\$ -	
E&S	\$ -	\$ 758,506	\$ 758,506	
TOTAL OTHER	\$ -	\$ 758,506	\$ 758,506	
TOTAL PROJECT	\$ -	\$ 8,034,361	\$ 8,034,361	

Figure B-1 Estimate Summary

CONTINGENCY / RISK REGISTER SUMMARY							
RISK	DESCRIPTION	IMPACT	PROB	COST IMPACT	CONTINGENCY	ACTION	RESPONSE STRATEGY
1	Transformer delivery after September 1, 2020 may delay the ISD of December 17, 2020.	High	60%	\$ 180,000	\$ 108,000	Mitigate	Working closely with Procurement to secure the manufacturing slot
2	FA and NID is file after November 2019	high	20%	\$ 250,000	\$ 50,000	Mitigate	Ensure that the customer and the AESO efficiently complete their AUC requirements
3	There is a risk of outages not being available as required + mobile substation required or temporary adjustment to accommodate the outage	Medium	20%	\$ 400,000	\$ 80,000	Mitigate	Early coordination with the outage planner is required
4	Increment weather to reduce productivity of construction crew - Winter condition worst then expected	Medium	20%	\$ 250,000	\$ 50,000	Accept	
5	Engineering Field changed due to brownfield site	Low	20%	\$ 250,000	\$ 50,000	Accept	
6	U/G condition worst than expected: cables, piling issues	Low	20%	\$ 300,000	\$ 60,000	Mitigate	Reducing the risk in using geotechnical report and the use of underground penetration radar
7	Safety incidents / Stand-down / additional Safety requirements	Medium	10%	\$ 300,000	\$ 30,000	Mitigate	AML will work with the EPC and subcontractor on the safety plan to avoid incidents
8	Interface Management among AML and the MPC project portion that create delays and increase budget	Low	10%	\$ 250,000	\$ 25,000	Mitigate	Early coordination with EPC and Customer
9	Construction delay due to migratory birds species at risk: schedule delay, environmental consultant to monitor the site	Low	10%	\$ 100,000	\$ 10,000	Mitigate	Proceed with Env. Mitigation Plan
10	RAS implementation with the AESO to update the FS: FA, Engineering and cost impact due to Telecom tower	Medium	10%	\$ 700,000	\$ 70,000	Mitigate	AML to monitor the AESO to choose the right technical solution
				CONTINGENCY	\$ 533,000		<i>Total used in Sum-Tab 1</i>
Risk Simulation Use Only (below)							
				CONTINGENCY P50			<i>Total used in Sum-Tab 1</i>
				CONTINGENCY P70			<i>Total used in Sum-Tab 1</i>
					\$ 533,000		

Figure B-2 Contingency Summary

**Transalta Windrise MPC Wind
 Cumulative Cost Flow**

2018	ATD	Aug-19 Month 1	Sep-19 Month 2	Oct-19 Month 3	Nov-19 Month 4	Dec-19 Month 5	Jan-20 Month 6	Feb-20 Month 7	Mar-20 Month 8	Apr-20 Month 9	May-20 Month 10	Jun-20 Month 11	Jul-20 Month 12
Cost Flow	51,990	60,613	49,575	54,706	21,000	174,393	697,948	12,710	22,633	11,457	10,571	169,041	365,529
AFUDC	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumul. \$Flow	51,990	112,603	162,178	216,884	237,884	412,276	1,110,225	1,122,935	1,145,567	1,157,024	1,167,596	1,336,637	1,702,166

Aug-20 Month 13	Sep-20 Month 14	Oct-20 Month 15	Nov-20 Month 16	Dec-20 Month 17	Jan-21 Month 18	Feb-21 Month 19	Mar-21 Month 20	Apr-21 Month 21	May-21 Month 22	Jun-21 Month 23	Jul-21 Month 24
Cost Flow	2,413,654	1,196,381	1,078,519	505,740	810,721	47,165	115,406	107,830	42,045	6,310	7,955
AFUDC	0	0	0	0	0	0	0	0	0	0	0
Cumul. \$Flow	4,115,820	5,312,201	6,390,720	6,896,460	7,707,181	7,754,346	7,869,752	7,977,582	8,019,627	8,025,936	8,033,891

Figure B-3 Cash Flow Estimate

APPENDIX C:
PROJECT SCHEDULE

Activity/Milestone	Start	Finish
Issue Functional Specification		2019-07-22
AESO PIP Direction to TFO		2019-08-23
AESO S35 FA Direction to TFO		2019-07-29
AESO S39 SP Direction to TFO		2019-07-29
AESO S25 Materials Direction to TFO		NA
Submit SP to AESO		2019-08-30
File NID application		2019-11-20
Facilities Application		2019-11-22
NID Approval		2020-06-15
AUC Facilities Approval (P&L)		2020-06-15
AUC Connection Order		NA
Transmission Lines		
Engineering	N/A	N/A
Procurement	N/A	N/A
Construction	N/A	N/A
Commissioning	N/A	N/A
Substation		

CONFIDENTIAL

Engineering	2020-01-16	2020-05-06
Procurement: Transformer	2019-08-30	2020-09-15
Procurement	2019-09-30	2020-05-01
Construction	2020-08-06	2020-12-09
Commissioning	2020-11-06	2020-12-17
Telecommunications		
Engineering	2020-01-16	2020-05-06
Procurement	2019-09-30	2020-05-01
Construction	2020-08-06	2020-12-09
Commissioning	2020-11-06	2020-12-17
Energization Checklist		2020-10-21
In-Service Date		2020-12-17
Project Close Out		2021-05-13