EB-2011-0140

IN THE MATTER OF sections 70 and 78 of the Ontario Energy Board Act 1998, S.O. 1998, c. 15 (Schedule B);

AND IN THE MATTER OF a Board-initiated proceeding to designate an electricity transmitter to undertake development work for a new electricity transmission line between Northeast and Northwest Ontario: the East-West Tie Line.

Submission of Great Lakes Power Transmission LP pursuant to Phase 1, Procedural Order No. 2

1. Great Lakes Power Transmission LP ("GLPT") is pleased to provide its submission on the Issues List for Phase 1 of this proceeding pursuant to Procedural Order No. 2. GLPT will address only Issue 19, which asks "What information should Hydro One Networks Inc. and Great Lakes Power Transmission LP be required to disclose?". GLPT will address this issue only insofar as it concerns information belonging to GLPT and will make no comment with respect to any information of Hydro One Networks Inc.

Issue 19 - "What information should Hydro One Networks Inc. and Great Lakes Power Transmission LP be required to disclose?"

2. On March 26, 2012, at the request of Board Staff, GLPT provided a list of information, as follows:

> GLPT has in its possession the following information that it can provide following approval from the Board for release:
>
> - Outage statistics with respect to the W23K portion of its 230kV system
> - Vegetation Management Program Overview
> - Transmission Line Condition Assessment Program Overview
> - LIDAR data for GLPT circuits emanating from Anjigami TS and Wawa TS
> - PLS CADD "Plan and Profile" drawings for its 230kV circuit (W23K) connected to Wawa TS
> - Ortho View of its 230kV circuit connected to Wawa TS and Anjigami TS

- GIS data related to W23K the transmission Line

3. In GLPT's view, the majority of the information on this list would not be helpful in the designation process. The information's limited usefulness is due to the significant differences between GLPT's transmission network and both the existing East-West Tie Line ("EWT") and EWT proposed Reference Option.

4. For ease of reference with regard to the Reference Option, attached hereto is Appendix A to the OPA Report of June 30, 2011, being the "Minimum Design Criteria for the Reference Option for the E-W Tie (230kV Wawa to Thunder Bay Transmission Line)". In particular, GLPT notes Table 10 on page 13 regarding Structure Data, which describes the Structure Type as Lattice Steel Tower, and Table 16 on page 15 regarding Materials, which describes the Structures as "To be determined - latticed steel transmission towers".

Description of GLPT's 230kV transmission network

5. GLPT's 230 kV transmission network is approximately 318 circuit kilometers in length. The system is part of the Ontario Bulk Electric System (BES) and stretches from Thessalon (Mississagi Transmission Station (TS) - owned by Hydro One) to Sault Ste Marie (Third Line TS – owned by GLPT). From Sault Ste Marie, the circuit continues Northwest to Montreal River, Ontario (Mackay TS – owned by GLPT) and then to Wawa, again terminating at a Hydro One-owned TS (Wawa TS).

6. The GLPT network is comprised of 1377 structures with approximately 90% of the structures being wood pole.

7. The transmission line that is located in the geographic area that most resembles that of the EWT is the W23K circuit which runs from Montreal River (Mackay TS) to Wawa (Wawa TS). GLPL submits that any data pertaining to any of its lines other than W23K, which are located in geographic areas with significantly different terrain, vegetation and access characteristics to the location of the EWT, would be unhelpful and possibly misleading to the proponents in this process.

8. The Reference Option is described as a new double-circuit 230 kV overhead transmission line with a continuous capacity of approximately 465 MVA and an emergency capacity of approximately 600 MVA per circuit. The Reference Option has two circuits and, therefore, the continuous capacity is to be approximately 930 MVA and the emergency capacity is to be approximately 1200 MVA. In contrast, the construction of the W23K transmission line is comprised of 362 low profile, single-circuit, H-frame, wood pole structures, strung with 1272 (Bittern) conductor. W23K has a summer continuous rating of approximately 500 MVA and a summer emergency rating of approximately 780 MVA. Therefore, while the terrain in which the W23K circuit is located might be similar to that where the EWT is located, the construction and capacity characteristics differ significantly from the Reference Option. Accordingly, GLPT queries whether much of its data could be helpful to the designation process. We will address each informational item in turn.

Outage Statistics

9. The outage statistics regarding GLPT's W23K single-circuit are not likely to be comparable to that of a double-circuit structure design such as the Reference Option. Indeed, GLPT queries whether its outage statistics might be misleading for a proponent of the EWT, who will most certainly be proposing a structure quite unlike that of the W23K line even if its proposal deviates considerably from the Reference Option. Outage statistics for any of GLPT's lines aside from the W23K would also be unhelpful, given the different geography and, therefore, different lightning performance in those areas.

Vegetation Management Program Overview

10. GLPT does believe that its Vegetation Management Program Overview for W23K might be helpful given its geographic that area resembles that of the EWT. GLPT would be pleased to provide it to Board Staff or refer the parties to the relevant portion of GLPT's evidence in rate application materials available on the Board's website.

Transmission Line Condition Assessment Program Overview

11. GLPT submits that the line condition assessment program for the EWT would differ dramatically from that of W23K, given that W23K is a single-circuit, H-frame, wood-based construction. As such, GLPT believes its line condition assessment program overview would not be helpful information to designation participants.

PLS CADD "Plan and Profile" drawings

12. The PLS CADD "Plan and Profile" drawings are design-specific for the W23K circuit, with different framing, structural and geographical "profile" characteristics and, in GLPT's view, the drawings would not be helpful to a proponent planning for the construction of the EWT. Similarly, PLS CADD "Plan and Profile" drawings for any of GLPT's other circuits would not be helpful given the differences stated above.

Ortho View Data and LIDAR Data

13. The Ortho View Data is essentially a digital movie of GLPT's network from an aerial perspective. LIDAR stands for Light Detection and Ranging, and is an optical remote sensing technology that can measure the distance to, or other properties of, a target by illuminating the target with light. It images a wide range of targets, including non-metallic objects, rocks, rain, and chemical compounds. A narrow laser beam is used to map physical features with very high resolution.

14. GLPT believes that it's LIDAR Data, specifically for circuits emanating from Anjigami TS and Wawa TS, combined with the Ortho View of data might be helpful to proponents in the designation process, as this data might provide insight into the challenges of working around these circuits. GLPT does have some public security concerns about release of this data to the public at large, discussed below.

GIS Data

15. The GIS Data is a software application which lays out a base map of GLPT's network, showing the network in its geographical context, including all lakes and terrain variations. GLPT does not believe that this data would be helpful given that the EWT is not being built in the same area. Furthermore, it is important to note that this data is not easily printed, would be labour intensive to produce, and would result in significant volumes of information that is not easily transmittable.

16. This data also raises infrastructure security concerns, particularly in connection with other data on this list. The Ortho View and GIS Data, when used together, give specifics as to the exact structure, precise locations and accessibility by road of transmission assets. The GIS Data literally pinpoints the precise road to take to reach a particular transmission asset seen in the Ortho View. Accordingly, GLPT submits that this information should not be shared with the general public in order to maintain security of the transmission infrastructure.

Conclusion

17. GLPT asks that the Board consider what information would truly be helpful to the proponents and the Board in the designation process before ordering GLPT to make production. In this regard, GLPT notes that caution in the Board's *Practice Direction on Confidential Filings*, at page 2, that "it is particularly important that all parties remain mindful that only materials that are clearly relevant to the proceedings should be filed".

18. If the Board determines that any of the LIDAR Data, Ortho View Data or GIS Data must to be produced, GLPT asks that the information be designated as confidential pursuant to the Board's *Practice Direction on Confidential Filings*. Detailed information as to the exact structure, precise locations and accessibility of transmission assets raises public security concerns.

19. Moreover, GLPT asks that a formal process be put in place for information requests going forward and for any transmittal of information which might be required either as a result

of submissions for Phase 1 or otherwise. GLPT proposes that all information requests be accompanied by the reasons why the requesting participant believes the information would be helpful, that the request and reasons be submitted to Board staff, and that Board staff, following brief written submissions (and a Board decision if necessary), make a determination as to whether the data might be helpful to the process and if so, whether confidential treatment is required. If the information must be produced, GLPT submits that it make production to Board Staff for posting on a secure website in accordance with any the confidentiality requirements. Password protection should be required for data which ought not to be accessible to the general public.

20. As stated above, GLPT submits that the Board should specifically require that, when a participant requests information from GLPT, the participant put forward its rationale for requesting the information. As is evident from the submissions herein, GLPT does not believe it has much information which can assist this process and, therefore, bald or blanket requests appear to GLPT to be wasteful of its resources. That being said, GLPT would certainly be prepared to be convinced of the helpfulness of any particular body of data and assist the Board where possible. Board determinations might prove unnecessary if reasonable explanations are provided for information requests going forward.

ALL OF WHICH IS RESPECTFULLY SUBMITTED

Kelly Friedman
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Counsel for Great Lakes Power Transmission LP

Ontario Energy Board

Commission de l'énergie de l'Ontario

ONTARIO ENERGY BOARD

Appendix A

Minimum Design Criteria for the Reference Option of the E-W Tie Line (230kV Wawa to Thunder Bay Transmission Line)

November 9, 2011

Appendix A – Minimum Design Criteria for the Reference Option

Date: November 9, 2011

1. CODES, STANDARDS AND DOCUMENTS REFERENCED IN THIS APPENDIX			
	DOCUMENT	DATE	REVISION
Design Codes:	CSA C22.3 No.1-06 "Overhead Systems"	Jul-07	06
	CSA C22.3 No. 60286 "Design Criteria of Overhead Transmission Lines"	2006	
Documents:	Ontario Energy Board "Transmission System Code"	Jun 10-10	N/A
	Ontario Energy Board "Minimum Technical Requirements for the Reference Option of the East-West Tie"	Aug 12-11	R4.0
	Ontario Power Authority "Long Term Electricity Outlook for the Northwest and Context for the East-West Tie Expansion"		
	Independent Electricity System Operator "Feasibility Study: An assessment of the westward transfer capability of various options for reinforcing the East-West Tie"		
Reference Documents:	ASCE 74, "Guidelines for Electrical Transmission Line Structural Loading"	2010	3rd Edition

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2. CONDUCTOR DATA			
Type	**ACSR or ACSR Trapezoidal Stranded**		
Application	230 kV Overhead Phase Conductor		
N: number of subconductors	To be determined by Proponent		
Condition for Maximum Sag	100 ºC or ice loaded, final, whichever governs		
Rated Max Temperature	Short Term 127 ºC (<50 hrs per year); Continuous 93 ºC		
Design Fault Level and Duration	Wawa TS: 30 kA, Marathon TS: 30kA, Lakehead TS: 40kA Duration: 12 Cycles (for Breaker Fail)		
Line Design Load(for each circuit of the new double circuit line)	466 MVA Continuous at a voltage of 240 kV and at Limit Temp 93 ºC 599 MVA Contingency at a voltage of 240 kV and at Limit Temp 127 ºC (max 50 hrs/yr) (Based on the use of 1192.5 kcmil 54/19 conductors as assumed by the IESO in its Feasibility Study dated August 18, 2011)		
	Line Rating Parameters:	**Summer**	**Winter**
	Emmissivity of Conductor	0.6	0.6
	Absorptivity of Conductor	0.8	0.8
	Wind Velocity (m/s)	0.6	0.6
	Ambient Air Temperature (ºC)	30	10
	Elevation (m)	720	720
	Latitude (degrees North)	46	46
	Line Direction	East - West	East - West
	Day of Year	June 21	Dec. 21

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OPGW	
Type	**48 fiber single mode; Configuration to be determined**
Application	Communication/Lightning protection
Size	To be determined
Unit Mass (kg/m)	TBD
Outside Diameter (mm)	TBD
Area (mm^2)	TBD
Ultimate Tensile Strength (kN)	TBD
Installation	Self Supporting
Condition for Maximum Sag	50 ºC or ice loaded, final, whichever governs
Rating (kA^2*s)	TBD (215 ºC temperature limit, 50 ºC ambient)
OHSW	
Type	**To be determined by Proponent**
Application	Overhead Shield Wire
Size	TBD
Unit Mass (kg/m)	TBD
Outside Diameter (mm)	TBD
Area (mm^2)	TBD
Ultimate Tensile Strength (kN)	TBD
Condition for Maximum Sag	50 ºC or ice loaded, final, whichever governs
Rating (kA^2*s)	TBD based on fault current and OHSW type, 50 ºC ambient

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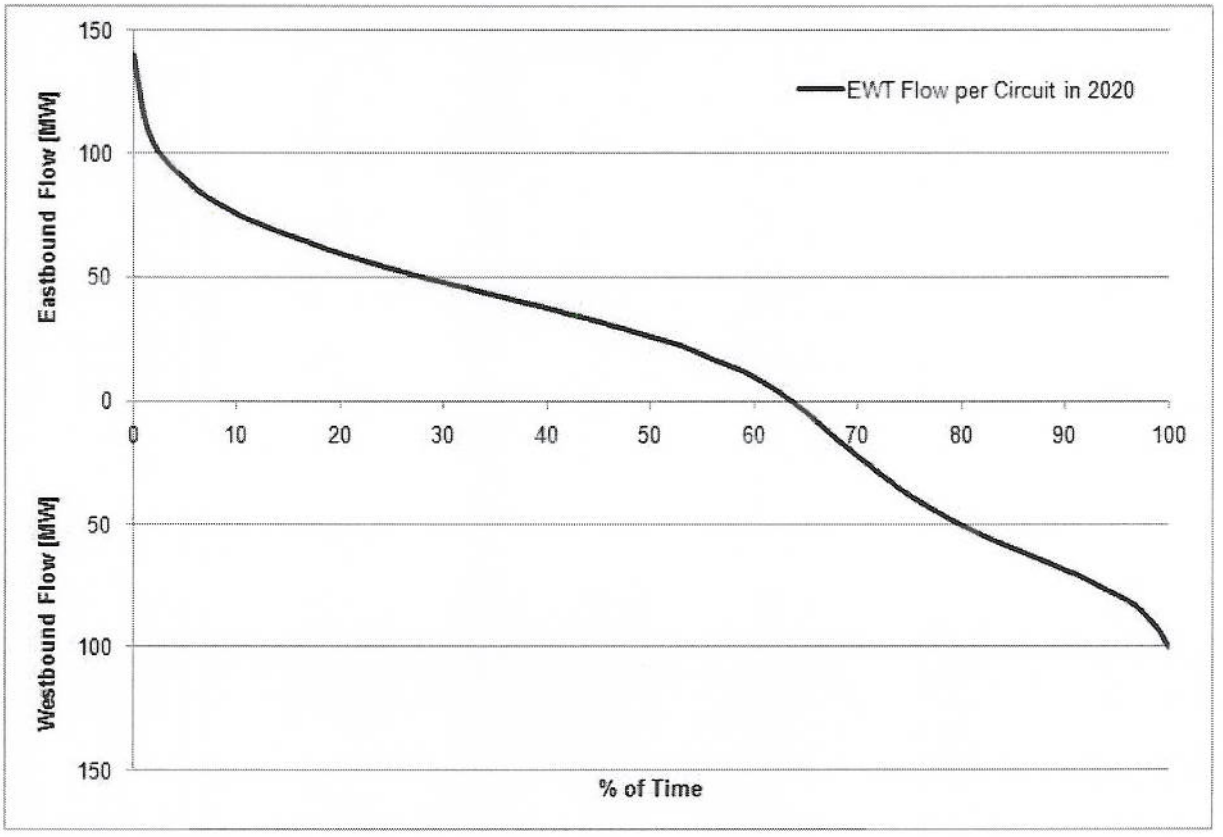
Optimization	(Values to be assumed for conductor optimization purposes)
Evaluation Period	25 Years
Year of Energization	2015
Energy Cost ($/MWhr)	$40 (Production Cost)
Inflation Rate	3% per annum for energy cost
AFUDC Rate	5.6% per annum
Discount Rate	7% per annum (for PV of Losses)

E-W Tie Duration Curve*



**EWT flow duration curve, per circuit, in 2020 based on reference case with a new double circuit*

3. INSULATION					
3.1	230 kV Phase Suspension and Strain Insulation Properties for Typical Strings (see note 10)				
Type	Porcelain		Toughened Glass		
	14 x ANSI 52-5 NGK CA-501MR (Suspension)	14 x ANSI 52-11 NGK CA-589MK (Dead-end)	14 x ANSI 52-5 Sediver N12/146 (Suspension)	14 x ANSI 52-11 Sediver N21/156 (Dead-end)	OEB (Min. Requirements)
Section Length (m)	2.045	2.178	2.044	2.184	
Mass per Unit (kg)	5.4	8.8	4.0	7.2	
Leakage Distance (m)	4.09	5.33	4.48	5.32	3.98
60 Hz Dry Flashover (kV)	785	790	785	Not provided	
60 Hz Wet Flashover (kV)	565	545	565	Not provided	
Positive Critical Impulse Flashover - CIFO (kV)	1265	1330	1265	Not Provided	1155
Negative Critical Impulse Flashover - CIFO (kV)	1275	1330	1275	Not Provided	
Specified Mechanical Load/ANSI Strength (kN)	120	220	120	222	
Routine Test Load/M&E Strength (kN)	60	110	60	111	
Grading Rings	N/R	N/R	N/R	N/R	
3.2	Guy Insulation				
Type	TBD – Generally not required for latticed steel construction.				

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4. 230 kV AIRGAPS & INSULATOR SWING CRITERIA (Note [1])					
	CSA C22.3 No. 1-06	**60 Hz Flashover 5yr Gust (OEB)**		**Moderate Wind (OEB)**	**Uplift**
Loading Area[2]	-	-		-	-
Wind Pressure (Pa)	230	350		230	0
Conductor Temperature (ºC)	4	4		-30	-50
Conductor and Tension Condition	bare, final tension	bare, final tension		bare, final tension	bare, final tension
Minimum Air Gap (m)	1.586 Table A1	Phase to ground	Phase to Phase	1.20	N/A - No Uplift (+'ve weight)
		0.60	1.020[3]		

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5. STRUCTURAL DESIGN CRITERIA				
	C22.3 No. 1-06 Heavy Loading	Cold Temperature	1/50 Year Return Wind Gust (HONi)	Static Ice Load (HONi)
Zone	N/A	N/A	N. Ont.	N. Ont.
Radial Ice Thickness (mm)	12.5	0.0	0	25.0
Wind Pressure on Conductor (Pa)	400	0	770	0
Wind Pressure on Tower (Pa)	1200	0	2110	0
Ice/Snow Density (kg/m^3)	900	0	0	900
Temperature (ºC)	-20.0	-50.0	10.0	0

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6. LOAD AND STRENGTH FACTORS (OVERLOAD FACTORS FOR DETERMINISTIC LOADS - LF) [4]				
6a) Strength Factors for Reliability Based Design				
	SF Tangent	SF Angle	SF Deadend	Remarks
Metal Structures	1.0	0.9	0.9	
Support Hardware	1.0	1.0	0.9	
Guy Wire	0.9			
6b) Load Factors for Deterministic Design (with consideration for non-linear behavior)				
	Vertical	Transverse	Longitudinal	Remarks
Steel Towers	1.15	1.1	1.1	Minimum Grade of Construction - CSA C22.3 No.1-06 Grade 2 unless otherwise indicated. Stated LF's are for Grade 2 construction and are to be adjusted accordingly for alternate Grades.
Guy Assemblies	1.25			
Anchor in Soil	2.00			
Anchor Rod	1.25			
Insulators, including guy strains	2.00			

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7. SAG TENSION CRITERIA (Note 5)				
	Condition	Maximum % UTS	Conductor Condition	Remarks
Phase Conductor				
Tension limiting conditions	-30.0 ºC	25.0	Initial	OEB vibration limit
	3 ºC	35.0	Initial	CSA C22.3 No. 1-06 vibration guideline. OEB limit at -30 ºC condition will govern with its colder temperature criteria
	3 ºC	25.0	Final	CSA C22.3 No. 1-06 vibration guideline
	C22.3 No. 1-06 Heavy Loading	60.0	Final	CSA 22.3 No. 1-06 requirement
Overhead Shield Wire				
Tension limiting conditions	-30.0 ºC	25.0	Initial	OEB vibration limit
	3 ºC	20.0	Initial	CSA C22.3 No. 1-06 vibration guideline.
	3 ºC	15.0	Final	CSA C22.3 No. 1-06 vibration guideline. ISO 502.2 specifies 20% UTS
	C22.3 No. 1-06 Heavy Loading	60.0	Final	CSA C22.3 No. 1-06 requirement

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8. GROUND CLEARANCES (Note 6)				
Clearance Description	Basic Clearance, Maintained [7]		Design Safety Factor (m) (OEB)	Total Design Clearance (m)
	Code/Standard	230 kV (m)		
Roads and Alleys: Over land likely to be travelled by road vehicles (including highways, streets, lanes, alleys, and driveways other than to residences or residence garages)	CSA C22.3	6.1	1.2	7.3
Pipelines: Over the right of way of pipelines	CSA C22.3	6.1	1.2	7.3
Alongside land likely to be travelled by road vehicles or within the limits (with no overhang) of streets and highways	CSA C22.3	6.1	1.2	7.3
Agricultural: Across or along rural areas likely to be traveled by agricultural and other equipment	CSA C22.3	6.1	3.9	10.0
Alongside Roads unlikely to be traveled: by road vehicles within 1.5 m of the ROW	CSA C22.3	5.5	1.2	6.7
Approaches: Across or alongside driveways to residences or residence garages	CSA C22.3	6.1	1.2	7.3
Highways: Primary and Secondary highways, unless part of a high load corridor	CSA C22.3	7.9	1.2	9.1
High Load Corridor: high load corridor for unescorted 9 metre high loads		N/A		11.5
Extra High Load Corridor: High load corridor for unescorted 12.8 metre high loads		N/A		15.3
Railway: Above top of rails at railway crossing	CSA C22.3	9.0	0.6	9.6

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9. GROUND CLEARANCES, Navigable Waters				
Clearance Description	Basic Clearance, Maintained		Design Safety Factor (m) (OEB)	Total Design Clearance (m)
	Code/Standard	230 kV (m)		
Main lakes, main navigation routes H=14m	CSA C22.3	17.3	1.2	18.5
Large lakes, main rivers in resort areas H=12m	CSA C22.3	15.3	1.2	16.5
Small resort lakes, rivers connecting small lakes, crossings adjacent to bridges and roads H=10m	CSA C22.3	13.3	1.2	14.5
Very small isolated lakes and rivers H=8m	CSA C22.3	11.3	1.2	12.5

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10. STRUCTURE DATA					
Name	Configuration	Structure Name	Structure Type	Typical Maximum Span (m)	Line Deflection (º)
Tangent	Tangent – self supporting	TBD	Latticed Steel Tower	385	0-1°
Light Angle	Light Angle – self supporting	TBD	Latticed Steel Tower	385	1-5°
Medium Angle	Medium Angle – self supporting	TBD	Latticed Steel Tower	385	5-15°
Heavy Angle	45 Degree Angle/DE – self supporting	TBD	Latticed Steel Tower	385	0-45°
Deadend	90 Degree Deadend – self supporting	TBD	Latticed Steel Tower	385	0-90°

11. FOUNDATIONS AND ANCHORS	
Foundation Type	To be determined. Alternatives will be considered based on encountered soil conditions. These may include concrete and earth grillages, cast in place concrete piles, rock anchors, and others.
Backfill Material for Excavated Foundations	Where excavated foundations are chosen, backfill will generally consist of the excavated soils if they are suitable for re-compaction. If not, imported fills will be considered.

12. GROUNDING AND BONDING	
General	Ground as per OEB Transmission Performance Specification.
Shield Wire / System Ground	Effectively grounded; Two shield wires and/or OPGW
Ground Resistance	Maximum tower ground resistance shall be 20 Ω or less unless otherwise specified.
Ground Rods	Ground rods and/or counterpoise may be required to obtain ground resistance.
Guys	Only where free standing towers are not used.
Hardware Bonding	As per OEB "Minimum Technical Requirements for the Reference Option of the East-West Tie"

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13. Lightning Protection	
Circuit Performance	Long term average number of circuit outages per 100 circuit miles per year < 3.0
Multi-Circuit Performance	Long term average number of multi-circuit outages per 100 circuit miles per year < 1.0
Max. Shield Angle	Double Circuit: 15 degrees maximum at the structure Single Circuit: 20 degrees maximum at the structure
Lightning Arrestors	N/A

14. Phasing	
Substation Terminations	System phase A connects with transformer primary bushing TBD from TFO records.
	System phase B connects with transformer primary bushing TBD from TFO records.
	System phase C connects with transformer primary bushing TBD from TFO records.

15. Right of Way, Setbacks, Power Line Marking, Bird Diverters	
230 kV Right of Way Width	Minimum 50 m for Greenfield construction fully on easement (for estimating purposes).
Aerial Markers	Aerial markers at highway, railway, pipeline right of way, and navigable water crossings to be in accordance with utility standard. Markers balls or cones to be in accordance with utility standard.
Roadway Setbacks	Generally a minimum of 15.3 m, may vary according to specific site requirements.
Aerial Boards	One aerial number board on every tenth tower and on the first / last tower in the transmission line.
Bird Diverters	Not anticipated at this time.

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16. MATERIALS	
General	Power line material based on standard utility stocked items where available.
Structures	To be determined - latticed steel transmission towers.
Dampers	Conductor: Spacer dampers for bundled conductor, Stockbridge-type for single conductor OPGW: Stockbridge-type, 2 dampers per span / OPGW. OHSW: Stockbridge –type.

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Notes:

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[1] For Angle structures where the insulators are free to swing, the clearance requirements must be maintained with both forward and reverse wind and for both initial and final tensions.

[2] Loading areas yet to be defined for Ontario beyond those specified in CSA C22.3. Further analysis may be conducted.

[3] To be used for galloping clearances.

[4] Stated load factors are for non-linear analysis methods where buckling and p-delta effects are taken into account.

[5] Tension limiting conditions represent the maximum allowable tensions in a given ruling span. Tensions may be reduced below these values for uplift and/or structural reasons.

[6] Ground clearance requirements are based on CSA C22.3 No.1-06 "Overhead Systems", which are quoted in the left column and give the minimum acceptable clearances. The OEB adds a design buffer to these minimum clearances to arrive at the design clearances, given in the right column.

[7] Voltage indicated is phase to phase. Clearances are based on phase to ground voltage.

[10] Insulator string properties are obtained from data published by the manufacturers. Required insulator specification may vary on light and medium angle suspension structures pending detailed design.