David Stevens
Direct: 416.865.7783
E-mail: dstevens@airdberlis.com

April 30, 2018

BY EMAIL AND RESS

Kirsten Walli
Board Secretary
Ontario Energy Board
2300 Yonge Street, Suite 2700
Toronto ON M4P 1E4

Dear Ms. Walli:

Re: Hydro One Networks Inc. Lake Superior Link Project Leave to Construct Application
EB-2017-0364
NextBridge Additional Material

In accordance with the schedule outlined in the Board's Notice of Hearing of Motion in the proceeding dated April 6, 2018, as updated by Procedural Order No. 1 Hearing of Motion issued April 27, 2018, NextBridge hereby files the attached additional material that it intends to rely on at the hearing of the motion.

NextBridge intends to make witnesses, including Messrs Nickerson, Russo, Bolbrock, and Pietrewicz, available to speak to the NextBridge evidence at the technical conference scheduled for May 16 and 17, 2018.

Yours truly,

AIRD & BERLIS LLP

(Original Signed)

David Stevens

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998*;

AND IN THE MATTER OF an Application by Hydro One Networks Inc. pursuant to s. 92 of the *Act* for an order or Orders granting leave to construct new transmission facilities ("Lake Superior Link") in northwestern Ontario;

AND IN THE MATTER OF an Application by Hydro One Networks Inc. pursuant to s. 97 of the *Act* for an Order granting approval of the forms of the agreement offered or to be offered to affected landowners.

NEXTBRIDGE - ADDITIONAL MATERIAL

As part of the Board's April 6, 2018 Notice of Hearing of Motion ("Notice"), the Board concluded that it was appropriate and expedient to explore certain questions relating to factors that have a particular bearing on the proposed timelines and costs identified in Hydro One's application.[1] In the Notice, the Board invites the parties to address the following specific questions set forth in Schedule A.

Questions 2a-c in Schedule A to the Notice relate to the relief requested by NextBridge and ask the following:

a. Should the OEB grant an order dismissing Hydro One's Lake Superior Link application?
b. Should the OEB issue a decision or order determining that the Lake Superior Link application will not be processed because it is incomplete?
c. Should the OEB issue a decision or order determining that the Lake Superior Link application does not comply with the OEB's *Filing Requirements for Electricity Transmission Applications* and suspending that application until Hydro One has complied with those *Filing Requirements*?

Question 2g in Schedule A to the Notice relates to environmental assessment work and asks the following:

[1] EB-2017-0364 OEB Notice of Hearing of Motion date April 6, 2018 at p.3.

g. Can NextBridge's environmental assessment work for the East-West Tie line project be used by Hydro One for the purpose of complying with *Environmental Assessment Act* requirements?

The additional material that NextBridge intends to rely on at the hearing of the motion in relation to questions 2a, b, c and g is attached as Attachment A to this evidence.

Question 2d in Schedule A to the Notice relates to routing and asks the following:

d. Hydro One's transmission licence allows the OEB to order it to expand or reinforce its transmission system in order to ensure and maintain system integrity or reliable and adequate capacity and supply of electricity. What legal or other issues may arise if the OEB were to require Hydro One to reinforce the section of its transmission system that runs through the Pukaskwa National Park and to connect with the proposed NextBridge transmission line at both borders of the Park?

Questions 2e and f in Schedule A to the Notice relate to in-service date and ask the following:

e. What are the implications of Hydro One's proposed in-service date of 2021 in the context of the Priority Project OIC and subsequent correspondence and reports?
f. Should the IESO be asked to provide any updated information regarding the in-service date necessary to serve the need and any impacts of a delay to the in-service date to 2021 or beyond?

To assist NextBridge in addressing questions 2 d and e set forth in Schedule A, NextBridge retained Mr. Robert Nickerson, a consulting engineer with expertise in the analysis, design and full-scale testing of transmission structures. Mr. Nickerson reviewed the proposed structure modifications for the Ontario East-West Tie Line Project by Hydro One in order to assess, based on the information available, the viability of the Hydro One design. Attached to this evidence as Attachment B is Mr. Nickerson's memorandum in response to NextBridge's request. Attached as Attachment C to this evidence is Mr. Nickerson's curriculum vitae.

To assist NextBridge further in addressing questions 2 d and e, NextBridge retained Mr. Richard Bolbrock, an engineering consultant with expertise in system planning and operations. Mr. Bolbrock evaluated whether the Hydro One Lake Superior Link proposal is consistent with the Independent electricity System Operator ("IESO") Need Assessment reports. Attached to this evidence as Attachment D is Mr. Bolbrock's

memorandum in response to NextBridge's request. Attached as Attachment E to this evidence is Mr. Bolbrock's biographical summary.

To assist NextBridge further in addressing question 2 e, NextBridge retained Mr. Christopher Russo of Charles River Associates, an energy economist with expertise in the areas of electricity market dynamics. Mr. Russo reviewed the Hydro One Lake Superior Link proposal to evaluate whether the proposal is consistent with the IESO Need Assessment reports. Attached to this evidence as Attachment F is Mr. Russo's memorandum in response to NextBridge's request. Attached as Attachment G to this evidence is Mr. Russo's curriculum vitae.

To assist NextBridge further in addressing questions 2 e and f, NextBridge retained Mr. Andrew Pietrewicz, a consultant with expertise in power system planning. Mr. Pietrewicz reviewed the Hydro One Lake Superior Link proposal to evaluate whether the proposal is consistent with the IESO Need Assessment reports and to consider whether there is value in the IESO providing updated information. Attached to this evidence as Attachment H is Mr. Pietrewicz's memorandum in response to NextBridge's request. Attached as Attachment I to this evidence is Mr. Pietrewicz's biography.

In the Hydro One Lake Superior Link application submitted February 15, 2018, Hydro One has put forward an incomplete application for leave to construct. NextBridge puts forward the following facts for the Board to consider as it addresses the assumptions underlying Hydro One's incomplete application for leave to construct the Lake Superior Link.

In its application, Hydro One identifies key assumptions that are critical to the completion of the Project as proposed. Specifically, Hydro One identifies the following key assumptions:

1. CO-OPERATION WITH MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE: It will be necessary that the MOECC work collaboratively with Hydro One to implement a regulatory measure, such as a Cabinet exemption to typical EA requirements. This regulatory measure would allow Hydro One to utilize the EA-specific development work already completed by NextBridge, and address changes in the proposed route through additional study, consultation and regulatory approval…[1] (Hydro One Assumption 1);
2. UTILIZATION BY HYDRO ONE OF EXISTING EA: Given that the competitive process established by the OEB clearly states the ability for any transmitter to submit a leave to construct to build the project, Hydro One has assumed that the EA-specific development work will be made available to the transmitter designated to ultimately construct the Project…[2] (Hydro One Assumption 2);
3. DISCLOSURE OF THE NEXTBRIDGE EA: The effects of the EA Amendment currently being prepared by NextBridge will need to be made available to Hydro One prior to the end of the third quarter of 2018 in order to ensure changes are addressed. Approval of NextBridge's EA must be received by the end of the third quarter of 2018 and Hydro One must receive EA approval of the route changes

[1] HYDRO ONE Exhibit B, Tab 7, Schedule 1 at p.6.
[2] *Ibid*.

by June 2019 in order to meet both the in-service date and the costs as outlined in the Lake Superior Link application.[3] (Hydro One Assumption 3);

4. AGREEMENT WITH IMPACTED INDIGENOUS COMMUNITIES : This leave to construct application is conditional upon Hydro One finalizing agreements with directly impacted Indigenous communities to be established on mutually agreeable terms within a short period of time (in order of 45 days) from receipt of OEB approval.[4] (Hydro One Assumption 4).

Hydro One advises that it will not be able to complete the Project as proposed in the Application if all of the assumptions do not materialize.[5]

Hydro One further qualifies its application by identifying key timelines that are critical to the completion of the Project as proposed. Specifically, the following key timelines are outlined:

a) NextBridge EA approval by the end of the third quarter of 2018[6];
b) OEB LTC approval by October 2018[7];
c) MOECC approval of EA route changes by June 2019[8];
d) Parks Canada approval to convert approximately 35 kilometers of the existing 230kV double-circuit transmission line by upgrading to a four-circuit transmission line, replacing existing double circuit towers with four circuit guyed towers and adding conductors and insulators to the two new circuits[9] in advance of construction start; and
e) Construction start by July 2019.[10]

[3] HYDRO ONE Exhibit B, Tab 7, Schedule 1 at p.7.
[4] *Ibid*.
[5] HYDRO ONE Exhibit B, Tab 7, Schedule 1, at p.6.
[6] HYDRO ONE Exhibit B, Tab 7, Schedule 1, at p.7.
[7] HYDRO ONE Exhibit B, Tab 11, Schedule 1, at p.1.
[8] HYDRO ONE Exhibit B, Tab 7, Schedule 1, at p.7.
[9] HYDRO ONE Exhibit B, Tab 1, Schedule 1, at p.8.
[10] *Ibid*.

The likelihood that certain assumptions will materialize, either within the timeframes put forward by Hydro One so as to achieve a 2021 in service date or at all, is very low for the reasons explained below.

Chronology of Key Correspondence Related to the Lake Superior Link

Hydro One has been engaging with multiple ministries and other parties related to the Lake Superior Link, including options available to meet EA requirements for the project, for some time. The following is a chronology of key correspondence.

Date	Correspondence
September 22, 2017	Hydro One writes to the Board informing it of its intention to file an application for an Order granting leave to construct the EWT Line Project. In this correspondence Hydro One advises that, dependent upon the Independent Electricity System Operator (IESO) updated needs assessment, Hydro One is prepared to submit a leave to construct application, which will include a not-to-exceed price, by December 2017. A copy of this correspondence is included as Appendix 1 to this evidence.
November 14, 2017	In response to correspondence from Hydro One outlining Hydro One's intent to apply to the OEB to build, own and operate the EWT Line Project and detailing changes to current EWT Line Project routing, MOECC writes to Hydro One to confirm that Hydro One's project would likely be considered a new undertaking for EA purposes: Based on the information provided to date, it is unlikely that an amendment provision in the proposed NextBridge EA would be capable of accommodating Hydro One's proposed changes to the current Project. As such, Hydro One's project would not likely be able to take advantage of the proposed NextBridge EA and Hydro One's project would likely be considered a new undertaking for the purpose of the Environmental Assessment Act. A copy of this correspondence is included as Appendix 2 to this evidence.
December 21, 2017	Hydro One reiterates its intention to file an application for leave to construct the EWT Tie Line Project to the Board, advising that a final decision will be made in early January 2018. Hydro One advises that it

	anticipates being prepared to submit the leave to construct application by mid-January. A copy of this correspondence is included as Appendix 3 to this evidence.
February 15, 2018	Hydro One submits an application for leave to construct the Lake Superior Link. The application does not include a not-to-exceed price.
March 5, 2018	Messrs. Angus and Hebert of Common Voice Northwest write to Hydro One regarding February 2018 correspondence received from Hydro One with respect to the Lake Superior Link project. In this letter, Common Voice Northwest suggests that Hydro One should be focusing on upgrading the Hydro One transmission and distribution lines elsewhere in northwest Ontario instead of looking to build the Lake Superior Link. Common Voice Northwest further highlights the value, from its perspective, of separation between the existing Hydro One transmission infrastructure and the new EWT Line Project: > The farther apart the lines are the less likely that both will be taken down by the same forest fire or ice storm, ensuring some level of supply to the region. A copy of this correspondence is included as Appendix 4 to this evidence.
March 14, 2018	Hydro One replies to Messrs. Angus and Hebert from Common Voice Northwest advising, among other things, that: > Hydro One is currently working with the Ministries of Energy and Environment and Climate Change to finalize a regulatory measure allowing the use of relevant portions of the completed Environmental Assessment work, while addressing required approvals for the revised route through the Park. This letter is copied to over twenty other parties. A copy of this correspondence is included as Appendix 5 to this evidence.
March 16, 2018	MOECC writes to Hydro One to clarify that, contrary to Hydro One's March 14, 2018 statement to Common Voice Northwest, MOECC is not finalizing a regulatory measure to allow use of NextBridge EA work:

	The ministry is not currently working to finalize a regulatory measure to allow the use of the current unapproved NextBridge environmental assessment. The initial position of the ministry was discussed with you as well as outlined in our letter of November 14, 2017. MOECC further requests Hydro One clarify the incorrect statement: As the ministry is not currently working on a regulatory measure to allow the use of the East West Tie Transmission project environmental assessment, the ministry respectfully requests that a letter of clarification be sent to Messrs. Angus and Hebert as well those copied on the letter. A copy of this correspondence (excluding attachment) is included as Appendix 6 to this evidence.
March 21, 2018	MOE writes to NextBridge confirming that: …the ministries of Energy and Environment and Climate Change are not working to finalize a regulatory measure related to environmental assessment work and that: The Ministry of the Environment and Climate Change has responded in a letter to Hydro One on March 16, 2018 (attached) and has requested that Hydro One issue a letter of clarification to Common Voice Northwest. A copy of this correspondence (excluding attachment) is included as Appendix 7 to this evidence.
April 19, 2018	As requested by MOECC on March 16, 2018, Hydro One writes to Common Voice Northwest to clarify the March 14, 2018 Hydro One statement that Hydro One is working with the Ministries of Energy and Environment and Climate Change to finalize a regulatory measure allowing the use of relevant portions of the completed Environmental Assessment work. By way of clarification, Hydro One provides that the statement was intended to reference meetings and discussion that have occurred between Hydro One and MOECC staff regarding options available to meet EA obligations for the Lake Superior Link project, and was not to suggest that such a measure was approved or in place. A copy of this correspondence is included as Appendix 8 to this evidence.

April 20, 2018	MOECC responds to Hydro One's April 19, 2018 clarification letter to Messrs. Angus and Hebert of Common Voice Northwest confirming that MOECC is not working with Hydro One to finalize a regulatory measure authorizing use of NextBridge EA work: To confirm, the Ministry of the Environment and Climate Change (ministry) is not working with Hydro One to finalize a regulatory measure allowing the use of relevant portions of the Environmental Assessment work undertaken by NextBridge Infrastructure, while addressing required approvals for the revised route through the Park. MOECC goes on to reiterate that it considers the Lake Superior Link to be a new undertaking requiring completion of an Individual EA: The ministry would like to emphasize, as outlined in our November 14, 2017 letter to Hydro One and reiterated in the March 16, 2018 correspondence, Hydro One's proposed Lake Superior Link project is considered a new undertaking for the purpose of the Environmental Assessment Act. As such, to initiate the Individual Environmental Assessment process, Hydro One is required to submit a Notice of Commencement for a Terms of Reference to the Director of the Environmental Assessment and Permissions Branch. A copy of this correspondence (excluding attachments) is included as Appendix 9 to this evidence.
April 25, 2018	Hydro One responds to MOECC April 20, 2018 correspondence describing discussions Hydro One has had with MOECC in relation to regulatory options. A copy of this correspondence is included as Appendix 10 to this evidence.

Facts Related to Hydro One Assumptions 1, 2 and 3

Regulatory Measure related to Use of NextBridge EA work

In the place of Hydro One completing its own EA work, Hydro One seeks to use the EA work completed by NextBridge in support of the Lake Superior Link project.[11] Hydro One communicated that it is currently working with the Ministries of Energy and Environment and Climate Change to finalize a regulatory measure to allow Hydro One

[11] HYDRO ONE Exhibit B, Tab 1, Schedule 1 at p.10.

the use of relevant portions of the EA work completed by NextBridge.[12] The Ministries of Energy and Environment and Climate Change have both confirmed that they are not in fact working to finalize a regulatory measure related to EA work however.[13]

Even if Hydro One were engaged with MOE and MOECC in relation to finalizing a regulatory measure to allow Hydro One to use portions of the Environmental Assessment work completed by NextBridge, a position which the ministries have both confirmed is not the case, the environmental assessment work completed belongs to NextBridge, and is not available for use as contemplated by Hydro One without NextBridge's consent. NextBridge is the owner of the environmental assessment and the analysis and data that underlies it[14]. NextBridge contracted environmental consultants to complete environmental assessment data collection and analysis activity and prepare an environmental assessment report and amendment based on that activity. It is a term of the consulting services agreement that NextBridge owns the copyrights and works of authorship resulting from the consulting agreement. NextBridge therefore owns the exclusive rights associated with use of the environmental assessment reports and underlying analysis and data. Consent from relevant First Nation and Métis groups would also be required in relation to authorizing Hydro One to use the traditional land use data and information collected as part of the NextBridge EA work.

In August 2010 the Board published a policy for a framework for new transmission investment in Ontario (EB-2010-0059), attached here as Appendix 11 to this evidence. NextBridge relied on this Policy in seeking designation and completing development work in relation to the EWT Line Project. The Policy does not expressly or impliedly provide that EA or other work completed as part of project development work by a

[12] Hydro One letter to Common Voice Northwest dated March 14, 2018 (Appendix 5 to this evidence), at p.2.
[13] MOECC letter to Hydro One dated March 16, 2018 (Appendix 6 to this evidence) and MOE letter to NextBridge dated March 21, 2018 (Appendix 7 to this evidence}.
[14] Excepting the traditional land use data that has been collected and provided to NextBridge by 9 First Nations and the Métis Nation of Ontario, which NextBridge is expressly authorized to use.

designated transmitter loses its character as proprietary work product and becomes public property. To the contrary, the Policy highlights that an undesignated transmitter, while authorized to complete development work, would be undertaking that development at its own cost, which would not be recoverable from ratepayers.[15]

A regulatory measure related to use of the NextBridge EA work is not under negotiation between MOECC, MOE and Hydro One and in any event, the NextBridge EA work is not available for use by Hydro One without NextBridge consent.

Regulatory Measure Related to Exemption from Typical EA requirements

Hydro One's application further assumes that, in addition to obtaining authorization from MOECC through a regulatory measure to use NextBridge EA work, a regulatory measure is also available to exempt the Hydro One Lake Superior Link project from typical EA requirements.[16]

As part of the Lake Superior Link project, Hydro One has proposed routing changes of approximately 89 km[17], or approximately 20% of the project route, including:

- Traversing Pukaskwa National Park (approximately 35km)[18];
- Segments on each side of Pukaskwa National Park where the NextBridge EWT Line Project route is not proposed to travel (approximately 34 km to the northwest and 19km to the south-east, for a total of 53 km)[19];
- Proposed T1M relocation to avoid infrastructure crossings (2-3 km[20]); and

[15] EB-2010-0059 Board Policy: Framework for Transmission Project Development Plans (August 26, 2010), at p.17 (Appendix 11 to this evidence).
[16] HYDRO ONE Exhibit B, Tab 1, Schedule 1 at p.10.
[17] HYDRO ONE Exhibit C, Tab 1, Schedule 1 at p.8.
[18] HYDRO ONE Exhibit B, Tab 2, Schedule 1 at p.4.
[19] Calculations are approximate, based on GIS analysis of existing Hydro One corridor route as shape files are not available related to the Lake Superior Link project at this time.
[20] HYDRO ONE Exhibit B, Tab 2, Schedule 1 at p.4.

- Temporary workspaces and access roads where locations differ from NextBridge's EWT Line Project route and construction and access proposal.

Three months before Hydro One submitted its application for leave to construct the Lake Superior Link containing Hydro One Assumptions 1, 2, and 3, the MOECC communicated to Hydro One that, in light of the changes it proposed to NextBridge's project route, Hydro One's project as a whole would likely be considered a new undertaking for the purposes of the *Environmental Assessment Act (EA Act)*, and that Hydro One's project would not likely be able to take advantage of the proposed NextBridge EA.[21] Since that time, the MOECC has definitively confirmed that the Lake Superior Link project is considered a new undertaking for the purpose of the *EA Act* and as such, Hydro One is required to submit a Notice of Commencement for a Terms of Reference to the Director of the Environmental Assessment and Permissions Branch to initiate the Individual Environmental Assessment process in relation to the Project.[22]

That Hydro One may choose to pursue an alternative regulatory mechanism (i.e. a declaration order) at a future time instead of completing the Individual EA process does not alter the fact that MOECC considers an Individual EA to be required in relation to the Lake Superior Link project.

A regulatory measure to exempt the Hydro One Lake Superior Link project from typical EA requirements does not currently exist and has not been applied for by Hydro One. MOECC has clearly stated that an Individual EA process is required by Hydro One in relation to the Lake Superior Link project.

Non-MOECC EA requirements

Whatever MOECC may or may not be prepared to exempt Hydro One from completing in relation to Ontario EA requirements, MOECC is not the only provincial ministry whose

[21] MOECC letter to Hydro One dated November 14, 2017 (Appendix 2 to this evidence).
[22] MOECC letter to Hydro One dated April 20, 2018 (Appendix 9 to this evidence).

jurisdiction is engaged by the Lake Superior Link project. The Class EA requirements of both the Ministry of Natural Resources and Forestry and Infrastructure Ontario are also engaged by the Hydro One Lake Superior Link project, requiring additional ministerial decision making related to satisfaction of Class EA requirements.

MOECC is also not in a position to exempt Hydro One from completing federal EA requirements. Parks Canada outlined to Hydro One a range of next steps which included, among other things, submission of a written plan for construction and completion of either a Basic or Detailed Impact Assessment (IA) under section 67 of the CEAA 2012.[23] A Basic IA is usually conducted using a standard Parks Canada template that enables an IA practitioner to lay out how a proposed project will interact with the environment, particularly with valued components such as specific natural or cultural resources. The length of time typically required to complete a Basic IA would be a minimum of 3 months, with the level of detail required contingent on the level of complexity and risk posed by the project. Generally, projects that do not generate significant concern from the public and stakeholders in relation to potential effects of the project proposal are assigned to this pathway. A Detailed IA is the most comprehensive level of assessment and is intended for complex projects that require in-depth analysis of project interactions with valued components that may affect a particularly sensitive environmental setting or threaten a particularly sensitive valued component. These types of projects may lead to high levels of concern from public, stakeholders and Indigenous peoples in relation to the potential for adverse effects. A Detailed IA may require evaluation of alternatives, expert advice, and development of a follow-up monitoring program. In addition, this level of IA requires public engagement and consultation which includes notification to relevant parties and an opportunity to review and comment on any draft impact assessment. The length of time typically required to complete a Detailed IA ranges from 6-12 months. It is not clear whether Hydro One has initiated preparing such plans and completing such assessments. Similar federal EA

[23] HYDRO ONE Exhibit C, Tab 1, Schedule 2, Attachment 2.

processes would also apply in relation to the areas where the Lake Superior Link is proposed to cross federal reserve lands, specifically the Pays Plat First Nation Reserve and the Michipicoten First Nation Reserve.

EA and Permitting requirements and timelines

Construction of a new 230kV transmission line that is over 50km in length requires completion of an Individual EA for the undertaking.[24] Hydro One acknowledges that the Lake Superior Link is subject to an Individual EA.[25] Depending on the complexity of the project, the conduct of an Individual EA can take anywhere from 15 months to 3 years to complete from start to finish, allowing time for engagement, conduct of studies across multiple seasons, and response to comments from stakeholders and regulatory agencies. Based on the fact that no other relief is available, Hydro One, like any other proponent, must start at the beginning of the process with issuance of a Notice of Commencement of Preparation of a Terms of Reference, and follow the prescribed steps. The MOECC's Code of Practice for Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario includes a detailed schematic of the process and is included here as Appendix 12. Consultation expectations are also outlined for individual EAs in the same Code of Practice, attached here at Appendix 13.

Attached to this evidence as Appendix 14 is a potential schedule that incorporates the timelines for environmental assessment of the Lake Superior Link Project in accordance with the MOECC's published Environmental Assessment Process timelines.[26] This potential schedule assumes minimum notice periods, no submission of a Draft EA for MOECC or public review and comment, no delays, no requests for additional

---

[24] *Electricity Projects Regulation, Ontario Regulation* 116/01.
[25] HYDRO ONE Exhibit C, Tab 1, Schedule 2 at p.2.
[26] As of April 30, 2018, the MOECC online list of Environmental Assessment projects, available at https://www.ontario.ca/search/search-results?external_tag=Environmental%20Assessment%20Project, does not refer to any Notice of Commencement being filed in relation to the Lake Superior Link project, or make any reference to the Lake Superior Link project at all.

information from any party and no extensions from minimum timelines to reflect holiday periods or otherwise. In accordance with this schedule, the earliest possible date for Individual EA approval of the Lake Superior Link project is July 2019. If Hydro One experiences land access limitations, has to complete multi-year environmental studies, is requested by MOECC to complete a full alternatives assessment as NextBridge was, or experiences any number of other unanticipated circumstances that routinely arise in the context of project development, then the timelines would be considerably longer.

Even by its own evidence, Hydro One does not anticipate obtaining EA approval as needed before August 2019 – Hydro One states that:

> For the route alternative proposed by Hydro One, it is assumed that an approval process can be agreed upon which will allow approximately 12 months for Hydro One to complete the necessary study, consultation and reporting to meet the EA obligations and approximately six months for regulatory approval.[27]

The Lake Superior Link project schedule and cost proposal are expressly contingent on this assumption.[28]

In the circumstances and based on the information available, Hydro One cannot obtain EA approval for the Lake Superior Link project by June 2019 as Hydro One states is required in order to proceed with the project in accordance with the application.

Consultation

Meaningful engagement is an important part of the development of any project, and takes time to execute properly. Consultation includes engaging with local elected officials, municipalities and related associations, Indigenous communities, government agencies, affected landowners, local interest groups and the general public, and represents a required component of environmental assessment processes.

[27] HYDRO ONE Exhibit C, Tab 1, Schedule 2 at p.2.
[28] *Ibid*.

At the time of filing its application in February 2018, Hydro One had not yet undertaken any consultation in relation to the Lake Superior Link Project – in accordance with Hydro One's project schedule, First Nations & Métis Consultation and Consultation with Stakeholders was scheduled to start February 2018.[29]

That the Lake Superior Link project has been developed by Hydro One in the absence of consultation and engagement with stakeholders and Indigenous groups is contrary to Hydro One's own advice and recommendation. Attached to this evidence as Appendix 15 is an excerpt from the Hydro One application for designation to develop the EWT Line Project, submitted January 4, 2013 (Hydro One Designation Application).[30] As part of the Hydro One Designation Application, Hydro One highlighted that experienced developers understand that input from the environmental assessment, public consultations and First Nations and Métis consultation can significantly affect line routing and design. [31] Hydro One goes on to declare that a new line cannot be meaningfully designed in the absence of these critical inputs[32], and that any transmitter that commits to a design, without first considering these fundamentals, risks serious delays in project development and construction to accommodate design and route changes.[33] Relevant passages are excerpted below.

> Historically, the first step in a transmission project has been to determine the technical design for the new line, assuming that the necessary right of way would be readily available regardless of the height of the towers, the span lengths, the width of the corridor and the location of the line. However, this approach has often proven not to be successful. Experienced developers now understand that the input from the environmental assessment, public consultations and First Nations and Métis consultation can significantly affect the line routing and design. Indeed a new line cannot be meaningfully designed in the absence of these critical inputs. Any transmitter that commits to a design, without first considering these fundamentals, risks serious delays in project development and construction to accommodate design and route changes. For example, a theoretical desktop design developed in the absence of environmental studies

[29] HYDRO ONE Exhibit B, Tab 1, Schedule 1 at p.12; HYDRO ONE Exhibit B, Tab 11, Schedule 1 at p.1.
[30] Hydro One applied for designation to build the EWT Line Project in partnership with Great Lakes Power Transmission EWT LP and Bamkushwada LP, under the name "EWT LP". EWT LP was not selected to complete the development work for the EWT Line Project.
[31] Hydro One Designation Application at Part B- Exhibit 6, p. 8 of 21, excerpted at Appendix 15 to this evidence.
[32] *Ibid*.
[33] *Ibid*.

> and consultation may have latent fatal flaws that prevent the Minister of the Environment from giving approval to proceed. Any design, regardless of its theoretical technical excellence and cost-effectiveness, that is environmentally unacceptable to the Minster cannot legally be built.[34]
>
> …
>
> Design assumptions that do not take into account the public preferences are rarely validated, especially where the developer has finalized its designs and routing in advance of public consultation.[35]

Hydro One considers the Lake Superior Link to constitute a "transfer of proponency" scenario.[36] Proponent-specific relationships are critical in the context of consultation. Even where an undertaking is identical in all things but for the proponent, which is not the case here, a record of consultation is proponent-specific and is not appropriately transferrable to another proponent. MOECC has been clear that it does not consider the Lake Superior Link to be a transfer of proponency, but rather a new undertaking[37], which crystalizes the need for extensive project-specific consultation related to the Lake Superior Link project by Hydro One.

Introducing consultation activities in relation to an additional project proposal is likely to put a strain on community and stakeholder resources (to review applications, attend meetings and open houses) and may lead not just to consultation fatigue, confusion and frustration, but also delay.

Facts Related to Hydro One Assumption 4

Hydro One's application is expressly contingent on finalizing agreements with directly impacted Indigenous communities within a short period of time (in the order of 45 days) from receipt of OEB approval. With respect to Indigenous economic participation, agreements would need to be negotiated with the potentially affected Indigenous communities in advance of meaningfully engaging in relation to the project. Hydro One

[34] *Ibid*.
[35] Hydro One Designation Application at Part B- Exhibit 6, p. 9 of 21, excerpted at Appendix 15 to this evidence.
[36] HYDRO ONE B.7.1 Table 5 at p.11.
[37] MOECC letter to Hydro One dated April 20, 2018.

acknowledges the need to explore and discuss various benefits, including, but not limited to capacity funding to participate in the engagement process, procurement and subcontracting opportunities, job training, employment and equity participation.[38] Hydro One does not intend to implement economic participation activity with Indigenous communities until Hydro One is designated to construct the line.[39]

In NextBridge's experience, it is unrealistic to meaningfully engage and negotiate economic participation in relation to a new project with eighteen First Nations and Métis groups within the timelines proposed by Hydro One.

[38] HYDRO ONE H.1.1 at p.5.
[39] HYDRO ONE B.1.1 at p.11; HYDRO ONE H.1.1 at p.3; and HYDRO ONE H.1.1 at p.5;

Hydro One Networks Inc.
7th Floor, South Tower
483 Bay Street
Toronto, Ontario M5G 2P5
www.HydroOne.com

Tel: (416) 345-5680
Cell: (416) 568-5534
frank.dandrea@HydroOne.com

Frank D'Andrea
Vice President
Regulatory Affairs & Chief Risk Officer

BY COURIER

September 22, 2017

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
Suite 2700, 2300 Yonge Street
P.O. Box 2319
Toronto, ON M4P 1E4

Dear Ms. Walli:

Hydro One Networks' Letter of Intent to file Leave to Construct Application - East West Tie Line

This letter is to inform the Ontario Energy Board of Hydro One's intention to file an Application pursuant to Section 92 of the *Ontario Energy Board Act, 1998* for an Order granting leave to construct the East West Tie Lines project.

Hydro One believes it can deliver a cost-effective transmission solution to meet the energy needs and ensure reliable and adequate supply of electricity to Ontario's northwest. Our efforts will result in a timely and beneficial project; for the Province, the electricity system and the homes and businesses of Northern Ontario.

Dependent upon the IESO's updated needs assessment, Hydro One is prepared to submit a Leave to Construct application, which will include a not-to-exceed price, by December of this year. We believe we are uniquely positioned to provide a cost-effective alternative while substantively meeting the timeline needs for the East-West Tie transmission line. Hydro One's East West Tie Station Project (EB-2017-0194) will still be required.

An electronic copy of this letter has been filed through the Ontario Energy Board's Regulatory Electronic Submission System (RESS).

Sincerely,

ORIGINAL SIGNED BY FRANK D'ANDREA

Frank D'Andrea
cc. Miriam Heinz, IESO

Ministry of the Environment and Climate Change

Environmental Approvals Branch

135 St. Clair Avenue West
1st Floor
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement et de l'Action en matière de changement climatique

Direction des autorisations environnementales

135, avenue St. Clair Ouest
Rez-de-chaussée
Toronto ON M4V 1P5
Tél : 416 314-8001
Téléc. : 416 314-8452

Ontario

November 14, 2017

Elise Croll, Director, Environmental Services
Hydro One Networks Inc.
483 Bay Street, South Tower, 12th Floor
Toronto ON M4V 1P5

Dear Ms. Croll:

We are in receipt of your October 31, 2017 letter regarding the East-West Tie Transmission Project (the Project) for which NextBridge Infrastructure LP (NextBridge) is currently undertaking an individual environmental assessment (EA). As you know, NextBridge submitted a final EA for the Project for review in July 2017. As a result of the comments received during the review, NextBridge has since expressed its intent to amend its EA.

Your letter outlines Hydro One's intent to apply to the Ontario Energy Board (OEB) to build, own and operate the Project, and detailed changes to NextBridge's proposed project routing that Hydro One would make if successful in its OEB application. I am pleased to respond to your request for input from the Ministry of the Environment and Climate Change (the ministry) as to the degree to which Hydro One may adopt the EA currently being prepared by NextBridge through an amendment to the EA.

As outlined in the *Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario*, unless changes are accounted for in the EA or through a condition of approval, proposed changes to an undertaking made after its approval to proceed has been issued are considered a new undertaking for the purposes of the *Environmental Assessment Act*. As the NextBridge EA is currently being amended by NextBridge and therefore has not been approved by the Minister, the ministry cannot comment on the possible amending procedure that may be in the amended EA or required as a condition of approval, if approved.

Based on the information provided to date, it is unlikely that an amendment provision in the proposed Nextbridge EA would be capable of accommodating Hydro One's proposed changes to the current Project. As such, Hydro One's project would not likely be able to take advantage of the proposed Nextbridge EA and Hydro One's project would likely be considered a new undertaking for the purpose of the *Environmental Assessment Act.*

The ministry encourages Hydro One to work with NextBridge to seek alternative approaches to addressing routing alternatives during the current EA process for the Project.

Sincerely,

Kathleen O'Neill

Kathleen O'Neill
Director
Environmental Approvals Branch

Hydro One Networks Inc.
7th Floor, South Tower
483 Bay Street
Toronto, Ontario M5G 2P5
www.HydroOne.com

Tel: (416) 345-5680
Frank.Dandrea@HydroOne.com

Frank D'Andrea
Vice President
Regulatory Affairs

December 21, 2017

BY COURIER

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
Suite 2700, 2300 Yonge Street
P.O. Box 2319
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: EB-2017-0182/EB-2017-0194 – HONI East-West Tie Leave to Construct Application

On September 22, 2017 Hydro One informed the Ontario Energy Board of its intention to file an application pursuant to Section 92 of the Ontario Energy Board Act, 1998 for an Order granting leave to construct the East West Tie Lines project. In that letter we indicated that we were prepared to submit the Section 92 application by December of 2017.

Hydro One is still intending to file this application, however a final decision will be made in early January 2018. We anticipate that we will be prepared to submit the Leave to Construct application by mid-January.

Sincerely,

ORIGINAL SIGNED BY FRANK D'ANDREA

Frank D'Andrea

Common Voice Northwest
672 Churchill Place, Thunder Bay, ON P7C 5Y8
Ph: 1-(807) 474-0926 **Fax:** (807) 474-0881
Email: iainangus@tbaytel.net
Chair: Wendy Landry **Executive Director:** Iain Angus

ENERGY TASK FORCE

Andrew Spence
Vice President, Transmission and Stations
Hydro One Networks Inc.
483 Bay St 12th Floor North Tower
Toronto ON M5G 2P5

March 5, 2018

Dear Mr. Spence

This will acknowledge receipt of your letter of Feb 21, 2018 in which you outline Hydro One Networks application to the Ontario Energy Board for leave to construct a bulk transmission line connecting the Lakehead TS to Wawa.

The Common Voice Northwest Energy Task Force is the leading voice regarding energy issues across the Northwest, particularly in the area of electrical transmission, distribution and generation. We have been engaged in the East-West Tie issue since before the process formally commenced.

We are pleased that Hydro One Networks is interested in aiding the Northwest in advancing its economy through the development of electrical transmission facilities in this region. However, in our opinion, Hydro One Networks should be focusing on upgrading its own transmission and distribution lines throughout the Northwest rather than trying to undo a decision already made by the regulatory authorities – that is to award the East-West Tie to NextBridge.

NextBridge has already made significant progress in the pre-construction phase of the project.

- The route has been finalized, much to the satisfaction of a number of people and areas that intervened during the route selection process
- The Environmental Assessment is close to conclusion
- Valard and Nextbridge have an agreement for the construction of the East West Tie.
- Supercom, an economic development company, owned by 6 Northern Superior First Nations has a negotiated equity stake in the project.

- Training, under Supercom, is underway with15 modules now and 10+ more later. The training is led by Confederation College & AETS targeting 244 already identified Indigenous trainees, from north shore communities .(to be ultimately trained.).
- Twelve to 14 companies are partnered with Supercom for service and supply (from heavy lift helicopters to temporary bridges/swamp mat for access construction).
- Valard has set up shop at the former Thunder Bay Mill site starting with trailers and some equipment.

The proposed NextBridge corridor and the existing HONI corridor are somewhat separate from each other and the Energy Task Force is pleased with that. The farther apart the lines are the less likely that both will be taken down by the same forest fire or ice storm, ensuring some level of supply to the region. In fact, it was input from the Enegy Task Force regarding the volatility of the weather at the Wawa end that convinced NextBridge to modify their proposal accordingly.

This project is well advanced and all that is required to commence the actual construction is approval from the Ontario Energy Board on NextBridge's Leave to Construct Application that will enable the project to be in-service in 2019 as scheduled.

It is essential that this project receive the immediate approval from the OEB. The application by Hydro One Networks will only delay the commencement of the required work not to mention the in-service date and this will further delay the economic benefits that the region desperately requires. In fact, a review of HONI's application indicates a number of variables that if not achieved will delay the in-service date well beyond the date of December2021 proposed by HONI.

It is the position of the Common Voice Northwest Energy Task Force that itshould be NextBridge's Leave to Construct application that is approved not that of Hydro One Networks.

Reference was made earlier in this letter of the need for Hydro One Networks to invest in their own system elsewhere in the Northwest. It is essential that HONI upgrade the three major radial lines serving our Northern communities. Two of those lines do not meet ORTAC Standards and have not for some prolonged time. The third does not provide sufficient capacity to allow the communities economy to grow.

The two lines not meeting the ORTAC Standard serve the communities of Ear Falls & Red Lake and Greenstone. As well, the Greenstone Circuit does not have sufficient capacity to allow for a proposed gold mine or for any future growth in the Greenstone area, including the anticipated Ring of Fire development.

The third line serves Sioux Lookout. The following will provide you with the background to the Red Lake and Greenstone service:

RED LAKE

Major gold exploration projects in Red Lake are advancing to production. Pure Gold Mining (Madsen Mine) by 2020, Goldcorp (Cochenour) by 2018, Goldcorp (H.G. Young) by 2019, Premier Gold (Hasaga) by 2020 and potentially Rubicon (Phoenix) will require power as will the flagship mine of the district, Goldcorp-Red Lake Mine. Red Lake only has 9 MW of surplus power.

Projected loads for the area serviced by the E2R that connects Red Lake to the provincial grid indicate the need for an additional 15 to 20 MW in the near term, in part to service the Goldcorp-Cochenour Mine, a new gold producer at Red Lake coming into production in 2018. The Northern First Nations will require an additional 6-9 MW once they are connected to the grid later this year. As well, Pure Gold Mining Inc.'s planned new mine development will require an additional 10 MW.

There have been continued calls to upgrade to the Transmission Lines between Ear Falls and Red Lake (E2R) and between Ear Falls and Dryden (E4D) since the 2011 LTEP and again in the 2013 North of Dryden IRRSP.

The employment levels and economy of the communities of Ear Falls and Red Lake along with the improvement in the living conditions of the First Nations north of Red Lake are contingent on the appropriate power upgrades to this area. The existing line requires replacement or upgrade in 2018 and the improvement of voltage compensation at Ear Falls and Red Lake.

Greenstone

Greenstone Gold Mines, located in the community of Geraldton in Greenstone, completed a feasibility study for the Hardrock Gold Deposit, in late 2016. The open pit mine and processing mill will create: 400+ direct jobs and 1200+ indirect and induced jobs; $301M annual GDP contribution from mine of this size; and $106M annual taxes and royalties to government ($63M to Ontario per year).

Greenstone Gold Mines requires 45 MW of power for the Hardrock mine. There is insufficient existing transmission capacity to meet this need. The Mine is planning on building gas fired generating capacity of 65 MW (to ensure for redundancy) as the current line is neither sufficient in terms of capacity or reliability. In addition; there is only 3-4 MW of surplus power in the Greenstone area at present

Filed: 2018-04-30
EB-2017-0364
Attachment A
Appendix 4
Page 4 of 5

For over ten years, Common Voice Northwest, NOMA, the Municipality of Greenstone and other communities in the region have consistently informed the government and their agencies that the transmission line to the Municipality of Greenstone and neighbouring First Nations, built circa 1937, is insufficient to serve the needs of the area both from a security of supply and the quantity of power available. This position has been confirmed through the Sub-Regional Planning process conducted by the IESO this past year.

The members of the IESO Local Advisory Committee for the Greenstone/Marathon had reviewed the process and their recommendation is to move to a new 230 KV circuit now, to accommodate the projected load growth and improve the security of supply.

The lack of adequate power will result in Greenstone Gold Mines not proceeding with the Geraldton mine or investing in a natural gas fired generation to only serve their needs, flying in the face of the stated policy of the Government of Ontario to reduce carbon based fuel use. It may also run afoul of the Federal Government's goal of reducing natural gas as a source of electricity production. The emergence of a group of eight First Nations with an interest in developing a new transmission line to Greenstone is a positive sign of self-determination.

These communities have aligned and have a common interest in leading this transmission development. In June 2016 the First Nations signed an MOU and have established a working group to pursue this project.

In 2017, Common Voice Northwest joined with NOMA, the Mayors of Greenstone, Red Lake and Thunder Bay, the President of the Northwestern Ontario Associated Chambers of Commerce, the Thunder Bay Chambers of Commerce, and the Chiefs of Aroland First Nation, Animbiigoo Zaagi'igan Anishinaabek, Biinjitiwaabik Zaaging Anishinaabek, Bingwi Neyaashi Anishinaabek, Ginoogaming First Nation, Long Lake #58 First Nation, Red Rock Indian Band and Whitesand First Nation in requesting that the Government of Ontario declare that the upgrading of the transmission line connecting Nipigon to Greenstone be declared a priority project and that the proposed upgrades to the transmission facilities connecting Dryden to Red Lake be upgraded or replaced in 2018 as a priority of the Government.

It should be noted that the economic impact of all of the above transmission projects will not only be significantly felt in the immediate areas but the treasuries of Ontario and Canada will receive an ongoing and substantive return on the required investment as a result of the capital investment, ongoing operation of the mines and the employment created.

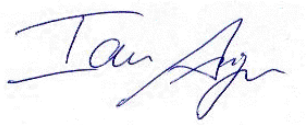
Mr. Spence, it is clear that HONI believes that it has the financing available to enable it to construct the East-West Tie. Common Voice Northwest encourages HONI to use those financial resources and indeed the transmission construction capabilities that your company has developed over many decades of serving Northwestern Ontario to

Filed: 2018-04-30
EB-2017-0364
Attachment A
Appendix 4
Page 5 of 5

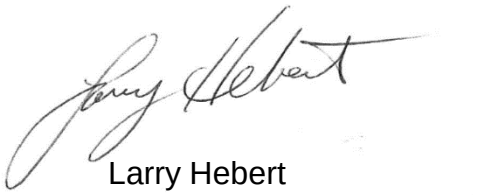
improve the existing infrastructure servicing those three clusters of communities. The end result will improve the bottom line of HONI, the tax revenue of Ontario and most importantly the economy of Northwestern Ontario.

We will be sharing this view with the Ontario Energy Board.

Yours truly



Iain Angus
Co-Chair
Energy Task Force
CVNW



Larry Hebert
Co-Chair
Energy Task Force
CVNW

Copy to: Northwestern Ontario Municipal Association
Northwestern Ontario Associated Chambers of Commerce
Hon. Michael Gravelle, Minister of Northern Development and Mines
Hon. Bill Mauro, Minister of Municipal Affairs
Mayor and Council of the Municipality of Greenstone
Mayor and Council of the Municipality of Sioux Lookout
Mayor and Council of the Municipality of Red Lake
Mayor and Council of the City of Thunder Bay
SuperCom Development Corporation
Chief and Council of Aroland First Nation,
Chief and Council of Animbiigoo Zaagi'igan Anishinaabek
Chief and Council of Biinjitiwaabik Zaaging Anishinaabek
Chief and Council of Bingwi Neyaashi Anishinaabek
Chief and Council of Ginoogaming First Nation
Chief and Council of Long Lake #58 First Nation
Chief and Council of Red Rock Indian Band
Chief and Council of Whitesand First Nation
Bob Chow, Director, Transmission Integration, IESO Bob.Chow@ieso.ca
Carolyn Calwell, ADM, Strategic, Network and Agency Policy Division, Ministry of Energy Carolyn.Calwell@ontario.ca
Nancy Marconi, Manager, Supply & Infrastructure, Applications, Ontario Energy Board Nancy.Marconi@oeb.ca
Jennifer Tidmarsh, President, NextEra Energy Transmission - Canada
NextEra Energy Canada, LP

483 Bay St 12th Floor North Tower
Toronto ON M5G 2P5
www.HydroOne.com

Andrew Spencer
Vice President, Transmission & Stations

March 14, 2018

Messrs. Iain Angus and Larry Hebert
Co-Chairs
Energy Task Force
Common Voice Northwest
672 Churchill Place
Thunder Bay ON P7C 5Y8

Dear Messrs. Angus and Hebert,

Thank you for the letter sent on March 5th regarding Hydro One's application to the Ontario Energy Board to construct a bulk transmission line between Lakehead TS and Wawa TS.

As you both know, when concerns were raised in August 2017 by Ontario's Minister of Energy about the increased costs of Nextbridge's East West Tie proposal, Hydro One saw an opportunity to provide a brighter future with a more cost-effective, reliable, environmentally-friendly transmission solution that will truly benefit the people and businesses of Northern Ontario. We believe in advocating for communities and customers first. That is why we introduced our Lake Superior Link project: it is our belief that competition will benefit everyone involved, especially in Northern Ontario. At a difference of over $100 million in construction costs along with ongoing annual savings of over $3 million, introducing competition to this market will provide real benefits on electricity costs, as compared to the alternate filed application. We could not ignore this opportunity to provide a better solution.

We are confident in our prospect for success. Together with our Canadian construction partner SNC-Lavalin, we bring more than 200 years of construction, maintenance and operations experience to Northern Ontario. Our proposal was created with our unmatched experience and knowledge of the unique challenges of operating in Ontario's North. Through our Company's history of electrifying the North, living among and working with local communities, elected officials and Indigenous communities in the area, Hydro One is best positioned to deliver the right project at the right price. In addition to this advantage, we offer a Canadian-made solution that will provide an economic benefit to local communities through the project's construction and operation.

While there have been a number of commitments made by the other proponent, the Lake Superior Link will require similar resources and follow the same general path; there is no reason that Hydro One and SNC-Lavalin would not be able to honour those commitments. As mentioned above, Hydro One's Lake Superior Link project offers a cost-effective transmission solution that saves rate payers over $100 million in construction costs and over $3 million in annual operating and maintenance costs. These savings translate directly into lower rates for all of Ontario's electricity customers, keeping more money – approximately $13 million annually – in their pockets to reinvest in their communities. It is our belief that our local advantage, along with the long-term cost

savings of our proposal, more than offset the additional months delay in construction startup. The difference between Hydro One's 2021 in-service date and Nextbridge's 2020 date only result in a few months difference in actual construction startup; a gap that we can bridge to ensure no significant interruptions to economic development plans.

In addition, Hydro One's proposed route is approximately 50 km shorter and requires approximately 50% less corridor area in the overall route than the NextBridge solution, resulting in a far smaller environmental footprint. Our plan eliminates the need to cut a new corridor through relatively undisturbed lands around the Park. As the owner of the existing East-West Tie line which crosses through Pukaskwa National Park, Hydro One has the unique ability to meet the requirements of the *Canada National Parks Act* and Parks Canada policies. No new development is permitted within national parks, but Hydro One has received Parks Canada's conditional support to modify its existing east-west tie line through Pukaskwa National Park by ensuring a project that respects the Park's unique beauty and results in less required maintenance in the coming decades. This contributes significantly to Hydro One's ability to minimize impacts on the environment and deliver the project at a lower cost. Hydro One is currently working with the Ministries of Energy and Environment and Climate Change to finalize a regulatory measure allowing the use of relevant portions of the completed Environmental Assessment work, while addressing required approvals for the revised route through the Park.

The Lake Superior Link proposal is also positioned to be the most reliable solution for the North. While Nextbridge brings much to the table with their experience in Alberta and Florida, Hydro One powers the North and has since the beginning. Our extensive knowledge of the unique equipment and operating needs of Northern Ontario leave us second to none in our ability to provide the most reliable solution. The Lake Superior Link has been designed using a mix of equipment and tower designs to ensure the complex weather and topographical challenges of Northern Ontario are matched to the best possible specifications. You do raise an important question on whether the distance between the existing and proposed lines represent a reliability risk; the answer is no. In fact, in the over 40 years of the current East West Tie's lifespan, there has only been one "tower down" situation which took place during the 2009 ice storm – a weather phenomenon that would have most likely had the same effect on any equipment in the region.

Both Hydro One and SNC-Lavalin have a successful history of partnering with Indigenous communities on other projects and will continue to act as conscientious partners with Indigenous peoples in this endeavour. Hydro One's work with Indigenous communities resulted in the historic partnership on the Bruce to Milton transmission line and reflects well on the Company's commitment to Indigenous partnership, let alone the fact that 129 Ontario First Nations have an ownership stake in Hydro One Limited.

For the Lake Superior Link Project our partnership will actively procure goods and services from Indigenous suppliers and companies with strong relationships with local Indigenous communities and businesses, to participate throughout the life of the project. Similarly, we will seek to maximize employment opportunities for members from local Indigenous communities, including those who have received or are currently enrolled in the Anishinabek Employment and Training Services (AETS) skills training.

Both Hydro One and SNC-Lavalin believe that qualified local Indigenous companies have strategic advantages over other businesses to complete a number of construction activities, including: site clearing, access road construction, camp construction and operation, establishment and management of material storage and assembly facilities along the right-of-way and various other support services throughout the construction period. However, to date we have respected requests from Supercom Industries LP representatives to refrain from contacting and communicating with local Indigenous companies.

Finally, we would like to acknowledge the issues you presented with respect to the level of supply and our operating assets in the Ear Falls, Red Lake, and Greenstone areas. The Independent Electricity System Operator (IESO) is responsible for ensuring that the electricity grid meets provincial standards and is adequately supplied with energy both now and into the future. As you are aware, plans are under way for a new 230 kV transmission line from south of Dryden to Pickle Lake. This project, which has been awarded to Wataynikaneyap Power and expected to be in-service by the end of 2020, will increase the available capacity for both the Pickle Lake and Red Lake areas and improve the reliability for customers connected through the E1C transmission line. With regard to Greenstone, a working group has been setup to assess the options for increased capacity and improve reliability for the Greenstone area. Hydro One presented a number of creative options as a part of that work and continues to advocate for the line's implementation. Meanwhile, Hydro One's improvements in distance-to-fault detection technology for the A4L circuit that feeds Greenstone are expected to considerably reduce the duration of interruptions in the area. Hydro One's near-term investments include refurbishment of long sections of circuits E1C and A4L, in order to maintain and improve their performance.

Although the IESO holds the pen on regional planning, Hydro One plays an active role in advocating in this process and influencing positive outcomes for communities. We respect your position as a key contributor in this valuable exercise, and we see an ongoing opportunity to partner with Common Voice Northwest to develop an integrated and connected plan that goes beyond Hydro One's construction of Lake Superior Link to contemplate the needs and economic opportunities that a renewed focus on electricity infrastructure can bring to the North. We look forward to working together to ensure that our vision is aligned in a way that benefits all communities we commonly serve.

We look forward to further engaging with you both and the Common Voice Northwest membership and would like to arrange a meeting at your convenience to discuss these and other matters in more depth.

Kind regards,

Andrew Spencer
Vice President, Transmission & Stations
Hydro One Networks Inc.

cc: Northwestern Ontario Municipal Association
Northwestern Ontario Associated Chambers of Commerce
Hon. Michael Gravelle, Minister of Northern Development and Mines
Hon. Bill Mauro, Minister of Municipal Affairs
Mayor and Council of the Municipality of Greenstone
Mayor and Council of the Municipality of Sioux Lookout
Mayor and Council of the Municipality of Red Lake
Mayor and Council of the City of Thunder Bay
SuperCom Development Corporation
Chief and Council of Aroland First Nation,
Chief and Council of Animbiigoo Zaagi'igan Anishinaabek
Chief and Council of Biinjitiwaabik Zaaging Anishinaabek
Chief and Council of Bingwi Neyaashi Anishinaabek
Chief and Council of Ginoogaming First Nation
Chief and Council of Long Lake #58 First Nation

Chief and Council of Red Rock Indian Band
Chief and Council of Whitesand First Nation
Bob Chow, Director, Transmission Integration, IESO Bob.Chow@ieso.ca
Carolyn Calwell, ADM, Strategic, Network and Agency Policy Division, Ministry of Energy
Carolyn.Calwell@ontario.ca
Nancy Marconi, Manager, Supply & Infrastructure, Applications, Ontario Energy Board Nancy.Marconi@oeb.ca
Jennifer Tidmarsh, President, NextEra Energy Transmission - Canada
NextEra Energy Canada, LP

Ministry of the Environment and Climate Change

Environmental Assessment and Permissions Division

135 St. Clair Avenue West
1st Floor
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement et de l'Action en matière de changement climatique

Direction des évaluations et des permissions environnementales

135, avenue St. Clair Ouest
Rez-de-chaussée
Toronto ON M4V 1P5
Tél : 416 314-8001
Téléc. : 416 314-8452

March 16, 2018

Andrew Spencer
Vice President, Transmission & Stations
Hydro One Networks Inc.
483 Bay St 12th Floor North Tower
Toronto ON M5G 2P5

Dear Mr. Spencer:

The Ministry of Environment and Climate Change (ministry), Environmental Assessment and Permissions Division is writing to respond to your March 14, 2018 letter to Messrs. Angus and Hebert from the Energy Task Force, Common Voice Northwest.

On page two, paragraph one of this letter you state that, *"Hydro One is currently working with the Ministries of Energy and Environment and Climate Change to finalize a regulatory measure allowing the use of relevant portions of the completed Environmental Assessment work, while addressing required approvals for the revised route through the Park."*

The ministry is not currently working to finalize a regulatory measure to allow the use of the current unapproved NextBridge environmental assessment. The initial position of the ministry was discussed with you as well as outlined in our letter of November 14, 2017. Please see attached.

As the ministry is not currently working on a regulatory measure to allow the use of the East West Tie Transmission project environmental assessment, the ministry respectfully requests that a letter of clarification be sent to Messrs. Angus and Hebert as well those copied on the letter.

If you would like to speak further regarding this matter please let me know.

Sincerely,

Dolly Goyette
Assistant Deputy Minister (Acting)
Environmental Assessment and Permissions Division

Attachment

Ministry of Energy

Office of the Minister

4th Floor, Hearst Block
900 Bay Street
Toronto ON M7A 2E1
Tel.: 416-327-6758
Fax: 416-327-6754

Ministère de l'Énergie

Bureau du ministre

4e étage, édifice Hearst
900, rue Bay
Toronto ON M7A 2E1
Tél. : 416 327-6758
Téléc. : 416 327-6754

Ontario

MAR 2 1 2018

MC-2018-325

Ms Jennifer Tidmarsh
Project Director
Nextbridge Infrastructure
1720–390 Bay Street
Toronto ON M5H 2Y2

Dear Ms Tidmarsh:

Thank you for your letter of March 19, 2018, regarding the East-West Tie (EWT) Transmission Project.

With respect to the statement you highlighted in correspondence between Hydro One and Common Voice Northwest dated March 14, 2018, I can confirm that the ministries of Energy and Environment and Climate Change are not working to finalize a regulatory measure related to environmental assessment work.

The Ministry of the Environment and Climate Change has responded in a letter to Hydro One on March 16, 2018 (attached) and has requested that Hydro One issue a letter of clarification to Common Voice Northwest.

Sincerely,

Glenn Thibeault
Minister

Enclosure

c: Hon. Chris Ballard, Minister of the Environment and Climate Change

483 Bay St 12th Floor North Tower
Toronto ON M5G 2P5
www.HydroOne.com

Andrew Spencer
Vice President, Transmission & Stations

April 19, 2018

Messrs. Iain Angus and Larry Hebert
Co-Chairs
Energy Task Force
Common Voice Northwest
672 Churchill Place
Thunder Bay, ON P7C 5Y8

Re: March 14, 2018, Correspondence to Energy Task Force, Common Voice Northwest

Dear Messrs. Angus and Hebert:

Hydro One wishes to clarify the following statement included in our March 14, 2018, correspondence: "Hydro One is currently working with the Ministries of Energy and Environment and Climate Change to finalize a regulatory measure allowing the use of relevant portions of the completed Environmental Assessment work, while addressing required approvals for the revised route through the Park".

We understand there has been some misunderstanding regarding this statement. Hydro One would like to clarify that the intent of our statement was with reference to the meetings and discussions that have taken place between Hydro One and Ministry of Environment and Climate Change (MOECC) staff regarding options available to meet Environmental Assessment (EA) obligations for the Lake Superior Link (LSL) project, including discussions with MOECC staff which took place on November 23, 2017, and at a formal meeting on February 2, 2018. These discussions included a discussion of regulatory measures that Hydro One could pursue for certain aspects of the project. We did not intend to suggest that such a measure was approved or in place, and we fully understand that any submission for such a regulatory measure would still be subject to review and decision by the MOECC and Cabinet.

We have been very clear in any public messaging and discussions that we are working to establish an appropriate regulatory option or approach, but we have never claimed that an EA approval or exemption is currently in place. We apologize for any confusion the statement in our correspondence may have caused.

Should you have any questions or comments, please don't hesitate to contact me directly.

Kind regards,

Andrew Spencer
Vice President, Transmission & Stations
Hydro One Networks Inc.

cc: Northwestern Ontario Municipal Association
Northwestern Ontario Associated Chambers of Commerce
Hon. Michael Gravelle, Minister of Northern Development and Mines
Hon. Bill Mauro, Minister of Municipal Affairs
Mayor and Council of the Municipality of Greenstone
Mayor and Council of the Municipality of Sioux Lookout
Mayor and Council of the Municipality of Red Lake
Mayor and Council of the City of Thunder Bay
SuperCom Development Corporation
Chief and Council of Aroland First Nation
Chief and Council of Animbiigoo Zaagi'igan Anishinaabek
Chief and Council of Biinjitiwaabik Zaaging Anishinaabek
Chief and Council of Bingwi Neyaashi Anishinaabek
Chief and Council of Ginoogaming First Nation
Chief and Council of Long Lake #58 First Nation
Chief and Council of Red Rock Indian Band
Chief and Council of Whitesand First Nation
Bob Chow, Director, Transmission Integration, IESO Bob.Chow@ieso.ca
Carolyn Calwell, ADM, Strategic, Network and Agency Policy Division, Ministry of Energy
Carolyn.Calwell@ontario.ca
Nancy Marconi, Manager, Supply & Infrastructure, Applications, Ontario Energy Board, Nancy.Marconi@oeb.ca
Jennifer Tidmarsh, President, NextEra Energy Transmission - Canada
NextEra Energy Canada, LP
Dolly Goyette, Assistant Deputy Minister (Acting), Ministry of Environment and Climate Change
Kathleen O'Neill, Director Environmental Approvals Branch, Ministry of Environment and Climate Change

Ministry of the Environment and Climate Change

Environmental Assessment and Permissions Division

135 St. Clair Avenue West
1st Floor
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement et de l'Action en matière de changement climatique

Direction des évaluations et des permissions environnementales

135, avenue St. Clair Ouest
Rez-de-chaussée
Toronto ON M4V 1P5
Tél : 416 314-8001
Téléc. : 416 314-8452

Ontario

April 20, 2017

Andrew Spencer
Vice President, Transmission & Stations
Hydro One Networks Inc.
483 Bay St. 12th Floor North Tower
Toronto ON M5G 2P5

Dear Mr. Spencer:

Thank you for circulating your April 19, 2018 letter to Messrs. Angus and Hebert clarifying statements made in your March 14, 2018 letter to them and those copied here within.

To confirm, the Ministry of the Environment and Climate Change (ministry) is not working with Hydro One to finalize a regulatory measure allowing the use of relevant portions of the Environmental Assessment work undertaken by NextBridge Infrastructure, while addressing required approvals for the revised route through the Park.

The ministry would like to emphasize, as outlined in our November 14, 2017 letter to Hydro One and reiterated in the March 16, 2018 correspondence, Hydro One's proposed Lake Superior Link project is considered a new undertaking for the purpose of the *Environmental Assessment Act*. As such, to initiate the Individual Environmental Assessment process, Hydro One is required to submit a Notice of Commencement for a Terms of Reference to the Director of the Environmental Assessment and Permissions Branch.

If you have any questions or would like to speak further regarding this matter please contact me at kathleen.oneill@ontario.ca or 416-314-0934.

Sincerely,

Kathleen O'Neill

Kathleen O'Neill
Director
Environmental Assessment and Permissions Branch

Attachment: Nov. 14 2017 response letter; March 16, 2018 response letter

cc:

Annamaria Cross, Manager, Environmental Assessment Services
Messrs. Iain Angus and Larry Hebert;
Northwestern Ontario Municipal Association
Northwestern Ontario Associated Chambers of Commerce
Hon. Michael Gravelle, Minister of Northern Development and Mines Hon. Bill Mauro, Minister of Municipal Affairs
Mayor and Council of the Municipality of Greenstone
Mayor and Council of the Municipality of Sioux Lookout
Mayor and Council of the Municipality of Red Lake
Mayor and Council of the City of Thunder Bay
SuperCom Development Corporation
Chief and Council of Aroland First Nation,
Chief and Council of Animbiigoo Zaagi'igan Anishinaabek
Chief and Council of Biinjitiwaabik Zaaging Anishinaabek
Chief and Council of Bingwi Neyaashi Anishinaabek
Chief and Council of Ginoogaming First Nation
Chief and Council of Long Lake #58 First Nation
Chief and Council of Red Rock Indian Band
Chief and Council of Whitesand First Nation
Bob Chow, Director, Transmission Integration, IESO Bob.Chow@ieso.ca
Carolyn Calwell, ADM, Strategic, Network and Agency Policy Division, Ministry of Energy
Carolyn.Calwell@ontario.ca
Nancy Marconi, Manager, Supply & Infrastructure, Applications, Ontario Energy Board Nancy.Marconi@oeb.ca
Jennifer Tidmarsh, President, NextEra Energy Transmission - Canada
NextEra Energy Canada, LP

Hydro One Networks Inc.
483 Bay St., 12th Floor, North Tower
Toronto, ON M5G 2P5
www.HydroOne.com

Andrew Spencer
Vice President, Transmission & Stations

April 25, 2018

Ms. Kathleen O'Neill
Director, Environmental Assessment and Permissions Branch
Ministry of Environment and Climate Change (MOECC)
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5

Re: MOECC April 20, 2018 correspondence regarding Common Voice Northwest clarification

Dear Ms. O'Neill:

We are in receipt of your correspondence of April 20, 2018 regarding Hydro One's clarification to the Common Voice Northwest letter. Although we acknowledge that Hydro One is not at the stage of finalizing a regulatory option for the Lake Superior Link (LSL) project under the Ontario *Environmental Assessment Act*, your response suggests that we have not been in discussions regarding regulatory options, including the declaration order, which is incorrect. Specifically, your letter omits the fact that Hydro One and the MOECC have been in discussions regarding the process for a declaration order and the MOECC has even assigned an officer to assist Hydro One with that process after the last meeting.

In addition to our discussions regarding the declaration process, your correspondence of April 10, 2018 (attached) also reiterated the declaration process as an option. That reference was a follow-up to the discussions that took place on March 26, 2018 regarding appropriate templates for submission of a declaration order request, and relevant examples of other declaration order submissions.

As you know, declaration orders are usually considered when a proposal is in the public interest; where potential environmental effects are likely to be minimal; and where environmental impacts are already being adequately addressed. Having regard to these guidelines, Hydro One believes that its proposed LSL project is a strong candidate for a declaration order for the following reasons which we would like to discuss further with the MOECC:

- The proposal is in the public interest. The proposed savings of $100 million in capital costs and additional annual operating costs are of significant benefit to electricity customers and the Province. The avoidance of further costs associated with, in essence, duplicating Environmental Assessment (EA) work already completed is also in the public interest.

- The potential environmental effects of the LSL routing are expected to be minimal. In fact, the Hydro One LSL proposed park route reduces the linear distance of the line proposed by NextBridge by approximately 50 km and reduces the required corridor width by approximately 50%. No widening would be required within Pukaskwa National Park.

- The environmental impacts of the project will already be adequately addressed through the existing EA submitted by NextBridge, which assesses approximately 78% of the proposed Hydro One LSL route. Additional studies and consultation, which are currently being conducted by Hydro One, will address any further differences in the LSL proposal.

We expect that Hydro One's LSL project and associated $100 million cost savings and smaller environmental footprint will be of interest to the Ontario Energy Board (OEB) during the continuing competitive process, specifically, with respect to the Leave to Construct process, under Section 92 of the *Ontario Energy Board Act, 1998*. It would be in the provincial interest to avoid duplication of effort and cost in the EA process when a publicly-available document, already paid for by Ontario electricity customers, is available. That approach was contemplated in the OEB's 2013 designation order when it was made clear that the development work, which included the EA work and work product, was to be carried out for the benefit of the project and for the ultimate builder designated through the OEB's Leave to Construct process.

We believe that we have been working with the MOECC to establish an appropriate regulatory option or approach that avoids the unnecessary cost and duplication associated with completion of an individual EA and that considers the interest of electricity customers and the Province. We want to be clear, accurate and transparent about the discussions that have taken place to date.

Should you have any questions or comments, please don't hesitate to contact me directly.

Kind regards,

Andrew Spencer
Vice President, Transmission & Stations
Hydro One Networks Inc.

Attachment: April 10, 2018 letter from MOECC to Hydro One

cc: Dolly Goyette, Assistant Deputy Minister (Acting), Environmental Assessment and Permissions Branch, MOECC
Annamaria Cross, Manager, Environmental Assessment Services, MOECC
Messrs. Iain Angus and Larry Hebert, Co-Chairs, Common Voice Northwest Energy Task Force
Northwestern Ontario Municipal Association
Northwestern Ontario Associated Chambers of Commerce
Hon. Michael Gravelle, Minister of Northern Development and Mines
Hon. Bill Mauro, Minister of Municipal Affairs
Mayor and Council of the Municipality of Greenstone
Mayor and Council of the Municipality of Sioux Lookout

Mayor and Council of the Municipality of Red Lake
Mayor and Council of the City of Thunder Bay
SuperCom Development Corporation
Chief and Council of Aroland First Nation
Chief and Council of Animbiigoo Zaagi'igan Anishinaabek
Chief and Council of Biinjitiwaabik Zaaging Anishinaabek
Chief and Council of Bingwi Neyaashi Anishinaabek
Chief and Council of Ginoogaming First Nation
Chief and Council of Long Lake #58 First Nation
Chief and Council of Red Rock Indian Band
Chief and Council of Whitesand First Nation
Bob Chow, Director, Transmission Integration, IESO Bob.Chow@ieso.ca
Carolyn Calwell, ADM, Strategic, Network and Agency Policy Division, Ministry of Energy
Carolyn.Calwell@ontario.ca
Nancy Marconi, Manager, Supply & Infrastructure Applications, Ontario Energy Board Nancy.Marconi@oeb.ca
Jennifer Tidmarsh, President, NextEra Energy Transmission - Canada
NextEra Energy Canada, LP

Ministry of the Environment and Climate Change

Environmental Assessment and Permissions Division

135 St. Clair Avenue West
1st Floor
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement et de l'Action en matière de changement climatique

Direction des évaluations et des permissions environnementales

135, avenue St. Clair Ouest
Rez-de-chaussée
Toronto ON M4V 1P5
Tél : 416 314-8001
Téléc. : 416 314-8452

Ontario

April 10, 2018

Elise Croll, Director, Environmental Services
Hydro One Networks Inc.
483 Bay Street, South Tower, 1st Floor
Toronto ON M4V 1P5

Dear Ms. Croll:

Attached are the Ministry of the Environment and Climate Change's (the ministry) revisions to the meeting minutes provide by Hydro One based on the meeting between Hydro One, Ministry of Energy and this ministry on March 26, 2018.

The ministry would like to emphasize that as outlined in our November 14, 2017 letter to Hydro One and reiterated in the March 16, 2018 correspondence; based on information provided to date, Hydro One's proposed Lake Superior Link project is considered a new undertaking for the purpose of the *Environmental Assessment Act*. As such, to initiate the Individual Environmental Assessment process, Hydro One will need to submit a Notice of Commencement for a Terms of Reference to the Director of the Environmental Assessment and Permissions Branch. For further details regarding this process please visit the Preparing Environmental Assessments website (https://www.ontario.ca/page/preparing-environmental-assessments) specifically Section 3 where it outlines the Individual Environmental Assessment process.

Once the ministry receives this Notice of Commencement for the proposed project, ministry staff would be happy to meet with Hydro One to discuss next steps in the development of its Terms of Reference.

If Hydro One chooses to pursue an alternative regulatory mechanism instead of completing the Individual Environmental Assessment process for the proposed project, Hydro One is encouraged to refer to the ministry's website for more information on these processes. Specifically, for information relating to Declaration Orders please visit the Environmental Assessment: Declaration Orders webpage (https://www.ontario.ca/page/environmental-assessment-declaration-orders).

Should you have any questions, please feel free to contact Annamaria Cross by email or phone (416-314-7967).

Sincerely,

Kathleen O'Neill

Kathleen O'Neill
Director, Environmental Assessment and Permissions Branch

cc: Dolly Goyette, Assistant Deputy Minister (Acting), Environmental Approvals and Permissions Division
Annamaria Cross, Manager, Environmental Assessment Services

Attachment: Nov. 14 2017 response letter

Ontario Energy Board

EB-2010-0059

Board Policy:

Framework for Transmission Project Development Plans

August 26, 2010

Table of Contents

1 Introduction

1.1 Purpose

This document sets out the policy of the Ontario Energy Board for a framework for new transmission investment in Ontario, in particular with regard to transmission project development planning. The policy describes how project development planning will work in conjunction with existing Board processes for licensed transmitters.

This policy is the end result of a consultation on facilitation of the timely and cost effective development of major transmission facilities that may be required to connect renewable generation in Ontario. The goal is the implementation of a process that provides, among other things, greater regulatory predictability in relation to cost recovery for development work. The Board believes that this policy will:

- allow transmitters to move ahead on development work in a timely manner;
- encourage new entrants to transmission in Ontario bringing additional resources for project development; and
- support competition in transmission in Ontario to drive economic efficiency for the benefit of ratepayers.

This introduction includes a background of the issue and history of the consultation. Section 2 of this paper describes principles and goals that the Board used to evaluate staff's proposal and the stakeholder comments in order to devise the final policy. Section 3 outlines the licensing process for transmitters intending to participate in the Board designation process. Section 4 outlines the process to be followed in designating a transmitter to undertake development work on enabler facilities and network expansions including: the method for identification of eligible projects; the trigger for the process; the decision criteria for designation and the filing requirements intended to solicit the information; and the implications of approval of a plan.

The Filing Requirements for Transmission Project Development Planning are published under separate cover on the Board's website[1].

[1] http://www.oeb.gov.on.ca/OEB/Industry/Rules+and+Requirements/Rules+Codes+Guidelines+and+Forms

1.2 Background

As a consequence of the passage of the *Green Energy and Green Economy Act, 2009* ("GEA"), there has been enormous interest in connecting renewable generation to both distribution and transmission systems. However, the ability of existing or approved transmission facilities in Ontario to accommodate more generation is limited. Based in part on the number of applications for contracts under the Feed-in Tariff ("FIT") program, the Board understands that significant investment in transmission infrastructure will be required to accommodate current FIT applicants as well as any future renewable generation projects.

Advance knowledge of the location and timing of new infrastructure should allow developers to site prospective generation projects along anticipated transmission corridors in order to reduce overall connection costs. Developers should be able to anticipate development of the system and plan its construction schedule to coincide with economic connection.

Board staff met with licensed transmitters to discuss how the transmission planning process might work. Transmitters have indicated the need for a clear process, including an articulation of the overall transmission planning, approval and rate recovery framework.

On April 19, 2010, the Board released a staff Discussion Paper[2] for comment by stakeholders. Board staff's proposals built on earlier work by the Board with respect to transmission connection cost responsibility and in particular on the process that the Board has developed for "enabler" transmission facilities. Staff's proposals focused specifically on development work for projects identified by the Ontario Power Authority ("OPA") as it assesses transmission investments associated with the connection of generation under the FIT program.

The Board received 27 comments[3] on staff's proposals from entities representing a variety of stakeholder groups: current Ontario transmitters and those who would be new to Ontario; generator groups; ratepayer groups; special interest groups; one distributor; the IESO and the OPA.

[2] http://www.oeb.gov.on.ca/OEB/_Documents/EB-2010-0059/Staff_paper_Tx_Project_Dev_20100419.pdf
[3] Complete text of stakeholder comments is available at the Board's website at: http://www.oeb.gov.on.ca/OEB/Industry/Regulatory+Proceedings/Policy+Initiatives+and+Consultations/Transmission+Project+Development+Planning/Transmission+Project+Development+Planning

2 Board Principles

The Board's goal in developing a policy for transmission project development planning is to facilitate the timely development of the transmission system to accommodate renewable generation.

In developing this policy, the Board is guided by its objectives in relation to the electricity sector under the *Ontario Energy Board Act, 1998* (the "OEB Act"). Of particular relevance in this instance are the objectives of protecting the interests of consumers with respect to price, quality and reliability of electricity supply and facilitating economic efficiency in the development of the transmission system including the maintenance of a financially viable electricity industry. Also important in this instance is the new objective of the Board to promote the use of energy from renewable generation sources.

The Board has previously identified the principles it uses in fulfilling its objectives in transmission policy[4]: economic efficiency; regulatory predictability; and administrative efficiency. The Board has reviewed the staff proposal and the stakeholder comments with the goal of fulfilling its objectives and promoting these principles.

Within the context of transmission investment policy, economic efficiency can be understood to mean achieving the expansion of the transmission system in a cost effective and timely manner to accommodate the connection of renewable energy sources. The Board believes that economic efficiency will be best pursued by introducing competition in transmission service to the extent possible within the current regulatory and market system.

Regulatory predictability allows proponents to understand how and on what basis regulatory decisions are likely to be made. The Board achieves this through policy statements and guidance to the industry and through transparent processes leading to consistency in the determinations it makes and the orders that it issues. Transmission planning is an ongoing procedure. The Board intends to put in place a transmission investment policy and project development planning process that is robust enough to provide consistency of process through many cycles of planning.

Administrative efficiency relates to the level of effort required from the perspective of proponents and other interested parties for effective participation in processes. In

[4] Most recently in the Staff Discussion Paper: Generation Connections for Transmission Connection Cost Responsibility Review (EB-2008-0003) available at: http://www.oeb.gov.on.ca/OEB/_Documents/EB-2008-0003/Staff_Discussion_Paper_20080708.pdf

devising this process, the Board has sought to avoid duplication and unnecessary effort for transmitters, Board staff and other stakeholders.

Taken together, regulatory predictability and administrative efficiency should facilitate investment, planning and decision-making by transmission proponents and should help them to manage business risks.

These aims are consistent with broader movements in energy regulation around the world. In particular, the United Kingdom and the United States are both currently consulting on policy changes along similar lines.

Ofgem in the U.K. is proposing[5] to evolve its regulatory framework to the RIIO model: Revenue set to deliver strong Incentives, Innovation and Outputs. Ofgem acknowledges that changes are needed to "meet the demands of moving to a low carbon economy…whilst maintaining safe, secure and reliable energy supplies"[6]. Ofgem's new proposed framework to deliver long-term value for money for network services includes involving third parties in design, build, operation and ownership of large, separable enhancement projects. Third party participation is to be considered where long-term benefits, especially for new technologies, new delivery solutions and new financing arrangements, are expected to exceed long-term costs. Ofgem would be responsible for any competitive process.

FERC in the U.S. released a Notice of Proposed Rulemaking on June 17, 2010.

> "With respect to transmission planning, the proposed rule would (1) provide that local regional transmission planning processes account for transmission needs driven by public policy requirements established by state or federal laws or regulations; (2) improve coordination between neighbouring transmission planning regions with respect to interregional facilities ; and (3) remove from Commission-approved tariffs or agreements a right of first refusal created by those documents that provides an incumbent transmission provider with an undue advantage over a nonincumbent transmission developer."[7]

---

[5] "Regulating energy networks for the future: RPI-X@20 Recommendations" available at: http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?file=RPI-X@Recommendations.pdf&refer=Networks/rpix20/ConsultDocs

[6] Ibid: Executive Summary.

[7] The Notice of Proposed Rulemaking: Transmission Planning and Cost Allocation By Transmission Owning and Operating Public Utilities (Docket No. RM10-23-000) by the Federal Energy Regulatory Commission, pg 1. available at: http://www.ferc.gov/whats-new/comm-meet/2010/061710/E-9.pdf .

The Board sees this proposal to improve interstate planning and align it with state and federal policy drivers (particularly clean energy requirements) and to level the playing field between incumbent and nonincumbent transmitters to be analogous to its own goals for transmission in Ontario.

3 Licensing

Section 57 of the OEB Act prohibits persons from undertaking various activities in the electricity industry in Ontario, including owning or operating a transmission system, unless they are licensed to do so by the Board.

In the Discussion Paper, Board staff proposed that new entrant transmitters who want to participate in the designation process should be licensed by the Board as transmitters. Board staff stated that the licensing process could be used to ensure that a new entrant transmitter meets certain minimum requirements in relation to both financial and technical capability, and that this would provide comfort that the new entrant transmitter is both qualified and committed to doing business in Ontario should it be designated.

Many stakeholders, including the existing transmitters and most of the new entrant transmitters, agreed with Board staff's proposal. Others suggested that the licensing process was a barrier to entry by being onerous, time-consuming or expensive and suggested a separate, rigorous pre-qualification stage before any designation process. Some stakeholders noted that certain provisions of the transmitter licence, such as the Affiliates Relationship Code or the legislative provisions pertaining to the planning requirement or smart grid development, were too burdensome on a prospective basis. The IESO suggested that new entrants could have a more general form of licence.

The Board considers it reasonable to require that new entrant transmitters be licensed in order to participate in the designation process. The licensing process will allow the Board to evaluate the financial viability and technical capabilities of the new entrant transmitters. The Board would need to evaluate these items regardless of whether it was done in a licensing process or another type of pre-qualification process. The Board's licensing process is neither unduly onerous nor time consuming.

Licence applications to the Board are usually handled through a written process and may involve interrogatories from Board staff to clarify information. Other parties may intervene in the application. Licences are generally issued within 90 days of a complete

application being received by the Board. An application form and sample licence is available on the Board's website[8].

The Board notes that some of the requirements in the transmission licence may not apply unless a transmitter has assets in Ontario. If a new entrant transmitter feels that there are particular requirements that should not apply to them, it may raise those issues as part of its application process.

Existing transmitters that are already licensed by the Board can participate in the designation process under their existing licence. No additional requirements or actions are needed.

Board Policy on Transmission Licensing

Transmitters will need a transmission licence from the Board to participate in the designation process.

Existing transmitters that are already licensed by the Board will participate in the designation process under their existing licence.

New entrant transmitters will need to apply for, and obtain, a transmission licence before being able to participate in the designation process.

4 Hearing to Designate a Transmitter

4.1 Identification of Facilities Requiring Designation

The staff Discussion Paper noted that one of the legislated objectives of the OPA is to conduct independent planning for electricity generation, demand management, conservation and transmission and to develop integrated power system plans[9] (the "IPSP"). By regulation, an IPSP is to be filed with the Board every three years. The Board's role is to review and either approve the IPSP or to refer it back to the OPA for further consideration.

In addition, the OPA intends to assess transmission investments that in its view are required and economically justified to connect the FIT applications whose projects

---

8 http://www.oeb.gov.on.ca/OEB/Industry/Licences/Apply+for+a+Licence/Apply+for+a+Licence+-+Electricity+Transmission

9 *The Electricity Act, 1998* section 25.2(1)(b)

cannot be accommodated by existing transmission capacity i.e. those in the FIT production line and FIT reserve. The OPA's assessment process is known as the Economic Connection Test ("ECT") and is expected to be completed every six months.

Further, the Board is aware that on May 7, 2010[10], the Minister of Energy and Infrastructure (as it was then known) asked the OPA to provide an updated transmission plan considering the sequencing necessary to meet the needs of the FIT program and the Korean Consortium.

The staff Discussion Paper proposed to use the results of the ECT as the inputs for a Board initiated process whereby interested transmitters would be designated to develop the enabler facilities and network expansions identified in the ECT. Staff proposed that the results of the ECT be accepted without prejudice and that a final determination of need for each project be deferred until the leave to construct hearing.

While most stakeholders accepted the ECT as a starting point, one ratepayer group noted that development funds would be spent by transmitters and recovered from ratepayers for projects that were subsequently found to be unnecessary or uneconomical. It argued that no approval should be given for any costs to be recovered from ratepayers until the economic feasibility of the projects could be fully tested, including the value of the energy being enabled. Some stakeholders suggested that the ECT must be fully tested in the designation process and others insisted that the only valid starting point is an IPSP.

The need for transmission projects may emerge in a number of different ways. New transmission is meant to achieve several purposes: increasing supply to new and existing load customers; facilitating interconnections; ensuring security, reliability and robustness of the system; and facilitating connection of FIT, non-FIT renewable, and non-renewable generation. The Board recognizes that, to the extent that the OPA's various planning tools and reports address differing combinations of these purposes, there is a hierarchy to the reports. An IPSP that considers all uses for transmission and all inputs from economic planning is preferable as a base for provincial transmission planning. However, an approved IPSP is not expected before the later half of 2011. The Board believes that waiting for an approved IPSP would be inconsistent with its statutory objective to promote timely expansion of the transmission system to facilitate connection of renewable generation. And while the hearing to approve an IPSP will be a thorough and comprehensive process, the evidence is not

[10] The letter from the Minister can be found at: http://www.powerauthority.on.ca/Storage/118/16599_MEI_Directive_to_update_H1_09_instruction_May_7_10.pdf

expected to be detailed enough over the three year planning cycle to allow final determination of need for any particular transmission project.

The Board agrees that the starting point for transmission project development planning should be an informed, effective plan from the province's transmission planner, the OPA. The Board believes that the ECT fits that description and is, therefore also a valid starting point for the process. Since the staff Discussion Paper was issued, the OPA has made progress in developing the process and substance of the ECT such as the announcement that the objective is 5% congestion of the system and an economic threshold of $500 of anticipated project cost per kW of new generation enabled[11].

The designation process is intended to be a preliminary stage in an increasingly disciplined process. The ECT is expected to provide a preliminary analysis of need sufficient for approving funding of preliminary development budgets. As budgetary and technical information becomes available, the Board will test need and prudence with increasing vigor. The Board considers that ensuring recovery of development costs before a final determination of need will advance the development of projects compared to the current process. In this way, it will promote the timely expansion of the transmission system and the use of energy from renewable sources.

While the ECT is focused on two of the many purposes of transmission, designation is simply the beginning of the development process and the Board expects the selected transmitter to consult with the OPA and IESO regarding the purposes of the project in order to bring a full justification of need to a leave to construct hearing. Therefore testing of the more detailed information developed after designation will take place in the next stage of the process, likely a leave to construct hearing.

One stakeholder objected to the enabler screening criteria described in clause 3A of the Transmission System Code being replaced by the ECT. The Board sees no conflict as the OPA has used the requirement of the Transmission System Code (the "TSC") in defining and scoping enabler facilities within the ECT. The Board notes that the staff Discussion Paper clarified that the proposal dealt specifically with enablers identified by the OPA through the ECT but the process could also apply to enabler facilities identified in the other two ways set out in the TSC. i.e. a renewable resource cluster is identified in an IPSP or the enabler facility and associated renewable resource cluster is the subject of a direction by the Minister to the OPA. The Board agrees.

[11] A presentation by the OPA on the ECT can be found here: http://fit.powerauthority.on.ca/Page.asp?PageID=122&ContentID=10630&SiteNodeID=1137&BL_ExpandID=272

A few stakeholders commented that the Board's proposed approach presumes the approval of the IPSP in relation to transmission and, as such, the approach pre-empts the due process of an IPSP proceeding and aboriginal consultation and accommodation requirements. The same argument was made in the consultation on transmission connection cost responsibility, in which the Board stated that:

> "The Board is not, through this process, determining whether [transmission] facilities will be identified in an IPSP, nor what those facilities might be nor when or on what conditions the Board might approval the IPSP once it has been re-filed with the Board. Any aboriginal consultation and accommodation requirements associated with the IPSP and/or with the siting and construction of any [transmission] facilities remain unaffected by the Board's proposals…"[12]

The Board maintains the view set out above and reiterates that the OPA remains responsible for independent transmission planning in Ontario. The Board's mandate is restricted to those review and approval authorities given in the legislation. Further, the Board notes that legislation grants to the Minister of Energy the authority to direct the OPA to implement procedures for consulting aboriginal peoples (among others) in relation to the planning and development of transmission systems and to establish measures to facilitate the participation of aboriginal peoples in the development of renewable generation facilities and transmission systems.

Board policy on project identification

When the Board receives the results of an ECT from the OPA, it will begin a process on its own motion to designate a transmitter to undertake development work on any incremental enabler facilities or network expansions identified. If a recently approved IPSP is available, its transmission recommendations may be used for the designation process.

4.2 Notice and Invitation to File a Plan

Under section 70 (2.1) of the OEB Act, every transmitter's license is deemed to have as a condition that the licensee is required to prepare plans, in the manner and at the times required by the Board regarding expansion or reinforcement of the system to accommodate the connection of renewable generation. Plans may also be required for the development of the smart grid in relation to the licensee's system.

[12] Notice of Revised Proposal to Amend a Code dated April 15, 2009: http://www.oeb.gov.on.ca/OEB/_Documents/EB-2008-0003/Notice_REVISED_Proposed_Amendments_TCCRR_20090415b.pdf

In order to promote the connection of renewable generation, the Board will use the planning provision to ensure that needed transmission projects are being actively developed. As existing transmitters undertake capital planning as part of their normal business operations and the Board already has the authority to require transmitters to build projects for reliability purposes, the Board does not, at this time, anticipate requiring general "Green Energy Plans" under this section. There may be a future requirement for smart grid plans, either specifically or as part of cost of service rate filings.

The staff Discussion Paper anticipated that the ECT would identify four types of projects.

1. Capacity enhancements;
2. Network reinforcement;
3. Enabler facilities; and
4. Network expansions.

Staff proposed that the Board give Notice of a Hearing (a "Notice") on its own motion to designate a transmitter to develop projects of types 3 and 4. Staff proposed that the incumbent transmitter be directed and other licensed transmitters be invited to file plans in three months from the date of the Notice.

Several of the transmission companies pointed out that clarification was required with respect to the definition of network expansions, specifically if new lines in existing or widened transmission corridors were expansions or reinforcements. One transmitter noted that new entrants might harm the existing relationships between incumbent transmitters and landowners along corridors.

The Board notes that transmission corridors typically have multiple uses and therefore multiple companies have landowner agreements. The rights of way for most transmission corridors belong to the provincial government through the Ontario Realty Corporation[13] and should not be considered a part of existing infrastructure or a transmission asset. The Board believes that introducing competition in transmission development will improve economic efficiency and lead to better outcomes for the consumer. It is, therefore, in the public interest to keep the definition of network

[13] Pursuant to Part IX.1 of the *Electricity Act, 1998*, ownership of corridor land was transferred from Hydro One Inc. (and its subsidiaries) to Her Majesty in right of Ontario in 2002.

expansion as broad as possible and to classify new lines on existing or widened corridors as expansions subject to designation.

Several stakeholders requested clarification as to whether all transmitters who file a plan and/or the designated transmitter will be permitted to recover the costs of preparing plans. In addition some stakeholders commented that the ability of the incumbent transmitter to recover the cost of preparing the plan as directed by the Board could provide an unfair advantage for the incumbent.

The Board agrees and, similar to the situation regarding corridors above, the Board sees benefit in keeping the process as open and unbiased[14] as possible. Also the Board does not consider it appropriate for consumers to fund a transmitter's efforts to expand its commercial business through preparation of a plan seeking designation.

Therefore, when the Board receives an ECT report from the OPA and issues Notice of a designation hearing, the Board will invite all licensed transmitters to submit plans in the form mandated by the filing requirements. The incumbent transmitter is not obligated to file a plan at this point. Only the transmitter that is successful in being designated will be able recover the costs of preparing a plan. This is comparable to the more usual business model in which proponents prepare proposals or bids at their own cost and own risk. In this way, the Board seeks to ensure that all transmitters will be on equal footing when submitting plans and ratepayers will not pay for multiple plan preparation.

If there are no plans filed for a particular project, the Board will direct the incumbent to file a plan. The incumbent will then be able to recover the costs of plan preparation.

The staff Discussion Paper asked for comment on the period of time between a Notice and the filing deadline for plans. The paper gave examples of the Ofgem and Texas PUC contracting processes that allowed three months for an apparently similar stage of information. Some stakeholders questioned the comparison of plan preparation with either the Qualification to Tender for Ofgem or the statement of intent for Texas PUC. While many stakeholders felt that three months was an appropriate period for some projects depending on the level of detail expected in plans, some stated that larger or more complex projects would require more time to prepare adequately.

[14] The Notice of Proposed Rulemaking: Transmission Planning and Cost Allocation By Transmission Owning and Operating Public Utilities (Docket No. RM10-23-000) by the Federal Energy Regulatory Commission states that neither incumbent nor nonincumbent transmission facility developers should…receive different treatment in a regional transmission planning process. http://www.ferc.gov/whats-new/comm-meet/2010/061710/E-9.pdf .

The Board agrees. Therefore, the Notice will specify a deadline for filing of plans: the default period will be three months but will be as long as six months for some projects at the Board's discretion.

Some stakeholders also felt that the knowledge advantage of the incumbent transmitter with respect to the technical configuration of connections points created an unfair advantage and suggested that the Board create rules regarding the timing and information that must be provided to proponents. The TSC primarily references requirements for the incumbent transmitter to provide connection information to customers (loads); the IESO; and neighbouring transmitters and primarily for the purposes of connection impact assessments, system operations or third party design. The Board agrees that the incumbent could frustrate other transmitters by delay in providing technical information on the relevant potential connection points and thus gain a competitive advantage. The Board therefore intends to begin a process to amend the TSC in order to provide specific instruction to incumbent transmitters on the level and timing of information to be provided. Comment on these issues will be received in the Notice and Comment process for those TSC amendments.

Board policy on notice and invitation to file

Definitions

Enabler facilities (subject to designation and plan approval process): As defined in Board's Transmission System Code, these are transmitter-owned connection facilities designed to connect clusters of renewable resources to the existing network; and

Network expansions (subject to designation and plan approval process): Transmission work undertaken to expand the transmission network, in particular the major bulk transmission system, through construction of new network facilities. For clarity, this includes greenfield projects and new lines in existing or expanded transmission corridors.

When the Board receives an ECT report from the OPA, it will issue a Notice of a hearing to designate development of any enabler facilities and network expansions identified in the ECT report. In the Notice, the Board will invite all licensed transmitters to submit plans in the form mandated by the filing requirements. Only the transmitter that is successful in being designated will be able recover its costs of preparing a plan.

If no plans are submitted for a particular project, the Board will require the incumbent transmitter to file a plan.

The Notice will specify a deadline for filing of plans. The period will be at least three months but may be as long as six months for larger or more complex projects.

4.3 Decision Criteria

In the Discussion Paper, Board staff had suggested project decision criteria that built on the general threshold of licensing to look at specific project related issues: organization and experience; technical capability; schedule; costs; financing; and landowner and other consultations. Staff asked for comments on the proposed criteria and prospective weightings for each one.

Many stakeholders commented that the criteria were appropriate. A few stakeholders suggested that organization, technical capability and financial capacity should be threshold (pass/fail) criteria and that cost, schedule and consultation should be evaluated. Most stakeholders suggested that the Board should balance the criteria at their discretion on a case by case basis. Others suggested that cost or consultation should be the most important.

The Board agrees that it would be irresponsible to risk the ratepayers' money with an entity (either a single transmitter or an identified consortium) that does not have the ability to see a project through to completion and that the criteria of organization, technical capability and financial capacity are crucial. However, the Board's process is not the same as a procurement process. The Board's hearing process does not lend itself to threshold tests nor is the Board convinced that it will be possible to examine those three criteria without substantial reference to the evidence regarding cost, scheduling, and consultation plans for the project.

The decision criteria and filing requirements are in regard to a specific project and are all critical to the successful construction of the project. However, the Board acknowledges that depending on the size, complexity and location of a particular line, some criteria will be relatively more important than the others. Therefore, the criteria will be weighted by the Board, based on the evidence in the proceeding, taking into account the individual circumstances of the project.

In fact, a few stakeholders suggested that socio-economic benefits (local employment or First Nation ownership) or environmental sustainability interests should be included as specific criteria. The IESO suggested that by focusing only on the rate-regulated model of transmission, the Board was excluding other models such as merchant generation.

The Board notes that, while the environmental assessment is a separate process, the criteria listed were meant to emphasize the Board's priorities, not to be exclusive. The filing requirements include an allowance for "any other information that [the applicant] considers relevant to its plan." It is here that a transmitter could include information on local employment, community partnerships, innovative models, etc. Where projects were otherwise equivalent or close in the other factors, this information could prove

decisive. In particular, financial models that do not put the risk on ratepayers or increase rates would be of interest to the Board, although it is hard to see how these might arise in the context of FIT-associated transmission.

Board policy regarding decision criteria

Organization; technical capability; financial capacity; schedule; costs; landowner and other consultations; and other factors will be weighted by the Board, based on the evidence in the proceeding, taking into account the individual circumstances of the project.

4.4 Filing Requirements

Stakeholders were generally supportive of the filing requirements proposed by Board staff. Some suggested that they should be high level as befits the level of information available before development of a project begins. Others suggested that they should be as specific as possible to avoid ambiguity and wasted effort by the transmitters.

Where specific suggestions were made regarding the Filing Requirements, the Board has generally incorporated them. The general question regarding major risks and mitigation strategies has been bolstered by specific inquiries regarding permitting and consultations. The Board acknowledges that major projects may be in a very preliminary stage of plan development and has allowed transmitters to identify alternatives with a method for subsequent selection.

In addition, the Board has removed a question that implied that transmitters must undertake consultation as part of plan preparation.

The Filing Requirements published as G-2010-0059[15] are adopted by the Board as the manner required for transmitters filing plans seeking designation for a project identified in a Notice by the Board. The Board considers them appropriate until it has gained more experience with the practice of transmission plans and the amount of information available.

The Board reminds prospective participants in the process that filing requirements are the starting point for the public record and additional information may be required as the hearing progresses.

[15] Available on the Board's website at:
http://www.oeb.gov.on.ca/OEB/Industry/Rules+and+Requirements/Rules+Codes+Guidelines+and+Forms

In fact, the Board emphasizes that the designation hearing is an open, public process. Information that the transmitter considers to be commercially sensitive should be identified as such and confidentiality requested according to the Board's "Practice Direction on Confidential Filings"[16]. The Board will then make a determination of the degree of confidentiality to be provided to balance the competing interests of private intellectual property and commercially sensitive information with the public interest in a transparent process. Potential solutions include redacted evidence, *in camera* proceedings, and undertakings by counsel to maintain confidentiality.

4.5 Implications of Plan Approval

The staff Discussion Paper recommended that the budgeted development costs of the designated transmitter be determined to be recoverable in a future rate proceeding. Most stakeholders supported the recovery of budgeted development costs for the designated transmitter provided that normal Board practices apply, including material overages being at risk until subsequently approved. Some stakeholders requested greater clarity as to what costs are considered "development costs".

The Board accepts the premise that designation should carry with it the assurance of recovery of the budgeted amount for project development. When subsequent analysis by the OPA suggests that a project has ceased to be needed or economically viable (e.g. FIT applications have dropped out of the reserve such that the project falls below the economic threshold), the transmitter is entitled to amounts expended and reasonable wind-up costs. Threshold materiality for amounts beyond the approved budget could be established in the order and would likely be in relation to the total budget.

From the Board's perspective, the objective of the development phase is to bring a project to the point where there is sufficient information for the transmitter to submit a leave to construct application. Therefore development costs begin when a transmitter is designated and end when a leave to construct application is submitted. The Board expects, therefore, the development budget to include route planning, engineering, site/environmental reports and some (but not all) consultation.

Where a leave to construct is not required for a designated project[17], the end point is when costs begin to be capitalized against the project.

---

[16] Available on the Board's website at: http://www.oeb.gov.on.ca/documents/practice_direction-confidentiality_161106.pdf

[17] Ontario Regulation 161/99 clause 6.2 lists situations where Subsection 92(1) of the OEB Act does not apply. http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_990161_e.htm

In recent rate cases, Hydro One Networks Inc. (EB-2009-0416)) and Great Lakes Power Transmission LP ("GLPT") (EB-2009-0409) received approval of deferral accounts for IPSP and other long term projects' preliminary planning costs and GEA related planning expenses, respectively.

In its Decision and Order in each case, the Board stated that each company "is cautioned that this approval does not provide any assurance, either explicit or implicit, that the amounts recorded in the account will be recovered from ratepayers. No finding of prudence is being made at this time….A full test of prudence will be undertaken when [the company] applies for disposition of the account[s]."

The staff Discussion Paper also suggested that the Board's order for designation might have conditions such as milestones or reporting requirements. The purpose of establishing the designation process is to promote timely expansion of the transmission system for connection of renewable generation by ensuring that identified projects are being developed. If a designated transmitter is failing to make progress on developing the project and is not making progress toward bringing a leave to construct application, the Board needs the ability to rescind the designation both to limit the exposure of the ratepayer and to allow a different transmitter to be designated. Therefore, the Board order of designation will have conditions such as performance milestones (in particular, a deadline for application for leave to construct) and reporting requirements on progress and spending that, if not met, will result in the designation being rescinded and will put further expenditures at risk. Designated transmitters who are having trouble meeting the milestones for any reason, but intend to carry through with the work may apply to the Board for an amended schedule.

In the Discussion Paper, Board staff asked for comments on the potential of two transmitters being designated to develop the same project. Some stakeholders did not feel that it would ever be appropriate to allow ratepayers to fund development of two projects when only one will need to be constructed. Others felt that there may be extra-ordinary conditions where it might be justified.

The Board agrees with stakeholders that designation of two transmitters should be an exceptional circumstance where the Board is persuaded that:

- Two proposed projects to meet the same need cannot be directly compared since they are so significantly different
    - as to route, or
    - as to technology to be employed; or
- The amount saved on construction cost could be more than the cost added by the funding of a second development project.

The staff Discussion Paper also noted limitations on the Board's ability to guarantee a transmitter the ability to construct and operate a particular project. Many stakeholders expressed concern over this issue and looked for further assurance that the successful transmitter would be able to construct and operate the facilities.

The designation process of the Board is not a procurement process where the end result is a contract. Neither the Board, the OPA, nor the IESO has statutory authority to procure transmission. Under normal circumstances, the Board would expect that the transmitter who is designated would construct and operate the facilities. There are two instances where this might not be the case.

One circumstance is where the designated transmitter makes arrangements to assign the project to another transmitter. A project designation, particularly once a leave to construct has been issued, could have commercial value. The Board would not preclude this option but would have to grant permission to assign the project and be assured that there was no adverse ratepayer impact of the transaction and that the assignee was also licensed and equally qualified to undertake the work.

The other possibility is that another transmitter brings a leave to construct application for a different project that meets the same need in a better way. The Board cannot prevent any person from submitting an application for any matter under its jurisdiction. However, the undesignated transmitter would have undertaken development at its own cost which would not be recoverable from ratepayers. The transmitter would also need to adequately explain why it had not taken part in the designation process. Once a leave to construct is granted, the Board would not grant another transmitter approval for duplicative facilities.

Board Policy regarding implications of plan approval

The transmitter designated for a particular project will be assured of recovery of the budgeted amount for project development. Material overages will be at risk until a future prudence review. Threshold materiality for amounts beyond the approved budget could be established in the designation order and would likely be in relation to the total budget. When subsequent analysis by the OPA suggests that the project has ceased to be needed or is no longer economically viable, the transmitter will be entitled to appropriate wind-up costs.

The Board order of designation will have conditions such as performance milestones based on the project schedules (in particular, a deadline for application for leave to construct) and reporting requirements on progress and spending that, if not met, will result in the designation being rescinded and will put further expenditures at risk.

Under exceptional circumstances, the Board may designate two transmitters to proceed to the development phase where the Board is persuaded that:

- Two proposed projects to meet the same need cannot be directly compared since they are so significantly different
    - as to route, or
    - as to technology to be employed; or
- The amount saved on construction cost could be more than the cost added by the funding of a second development project.

Final project selection will take place after application for leave to construct.

5 Hearing for Leave to Construct

Section 92 of the OEB Act prohibits any person from constructing, expanding or reinforcing a transmission line without an order of the Board granting leave. Clause 92(2) and Ontario Regulation 161/99 provide exceptions to this requirement including relocation or reconstruction of a line without new land requirements; lines that are less than 2 km in length; and interconnections between two adjacent transmission systems. Section 96 specifies the issues that the Board may consider in finding that proposed work is in the public interest. The GEA amended the OEB Act to include as one of those issues the use of energy from renewable resources, where applicable and in a manner consistent with the policies of the Government of Ontario.

A designated transmitter is ensured recovery of development costs with the objective of submitting a leave to construct application. The requirements of a leave to construct application are described in the Board's existing Filing Requirements for Transmission and Distribution Applications[18].

The staff Discussion Paper included an illustrative flow chart of the Board's processes. One stakeholder stated that it did not show the Environmental Assessment approval process. Stakeholders should note that it does not include any stages of a project that are not under the Board's jurisdiction, such as the System Impact Assessment from the IESO that must be filed as part of the leave to construct application or the Connection Impact Assessment that must be completed by any transmitter to which the new project will connect.

The flow chart has been updated to show the Board's policy.

[18] http://www.oeb.gov.on.ca/documents/minfilingrequirements_report_141106.pdf

The following is an illustrative flow chart of the OEB designation and transmission project plan approval process, and where it fits with leave to construct and rate proceedings. For convenience, the chart shows the recovery of cost flowing from a cost of service rate hearing. However, a rate rider could be approved at other points in the process.

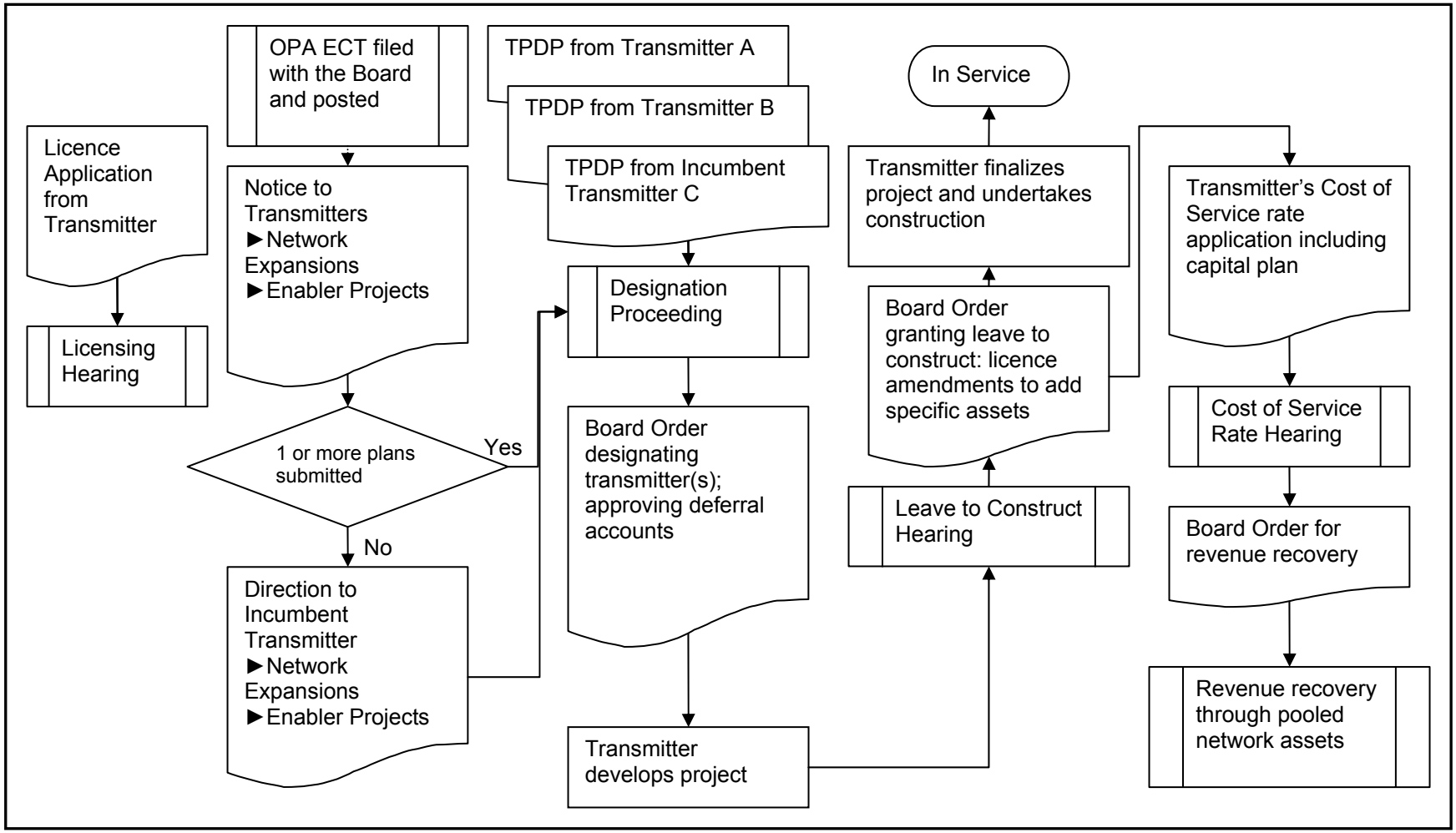


Figure 1: OEB Process for Transmitter Designation and Transmission Project Development Plan Approval

The ECT focuses on transmission needed to accommodate FIT applications and the projects of the Korean Consortium. As mentioned above, transmission serves other needs as well. The Board expects that during the development phase, the designated transmitter will consult with the OPA and the IESO regarding capacity, configuration and final routing that would support those other needs.

The Board expects that the OPA will support transmitters in preparing evidence of need for a transmission project.

There are two types of projects that could be identified in the ECT that would not be subject to designation: capacity enhancements and network reinforcements. As these types of projects are work on the incumbent transmitter's system, the incumbent will undertake them directly. It is highly likely that network reinforcements will require a leave to construct. The incumbent transmitter should develop these projects and prepare a leave to construct under the assurance that reasonable development costs will be recoverable from ratepayers at a future proceeding by reference to the ECT results. The Board expects that the OPA will support proof of need at this time.

6 Hearing for Rate Recovery

In the staff Discussion Paper, Board staff suggested that development costs by both incumbents and new entrants could be recovered through the Uniform Transmission Rates of Ontario (the "UTR"). Several stakeholders requested clarification of the workings of the Uniform Transmission Rate.

Section 78.(1) of the OEB Act prohibits a transmitter from charging for transmission of electricity except in accordance with an order of the Board. The UTR is a Board ordered schedule of tariffs charged to all transmission customers. There are 5 currently licensed transmitters that are rate regulated. Each one has a periodic hearing to determine its cost of service revenue requirement. After each Hydro One Networks Inc. hearing,[19] these revenue requirements are summed to determine the total transmission revenue requirement in Ontario. This revenue requirement is then spread over the total transmission service in the province to determine appropriate postage stamp transmission rates. The IESO is tasked with charging out this rate, collecting it from transmission customers and then paying it out to the transmitters. The payments to

[19] The most recent proceeding to set and allocate the Uniform Transmission Rate resulted in an Order released January 21, 2010 (EB-2008-0272). It is expected that the current Hydro One Networks Inc. case (EB-2010-0002), will result in a revised UTR.

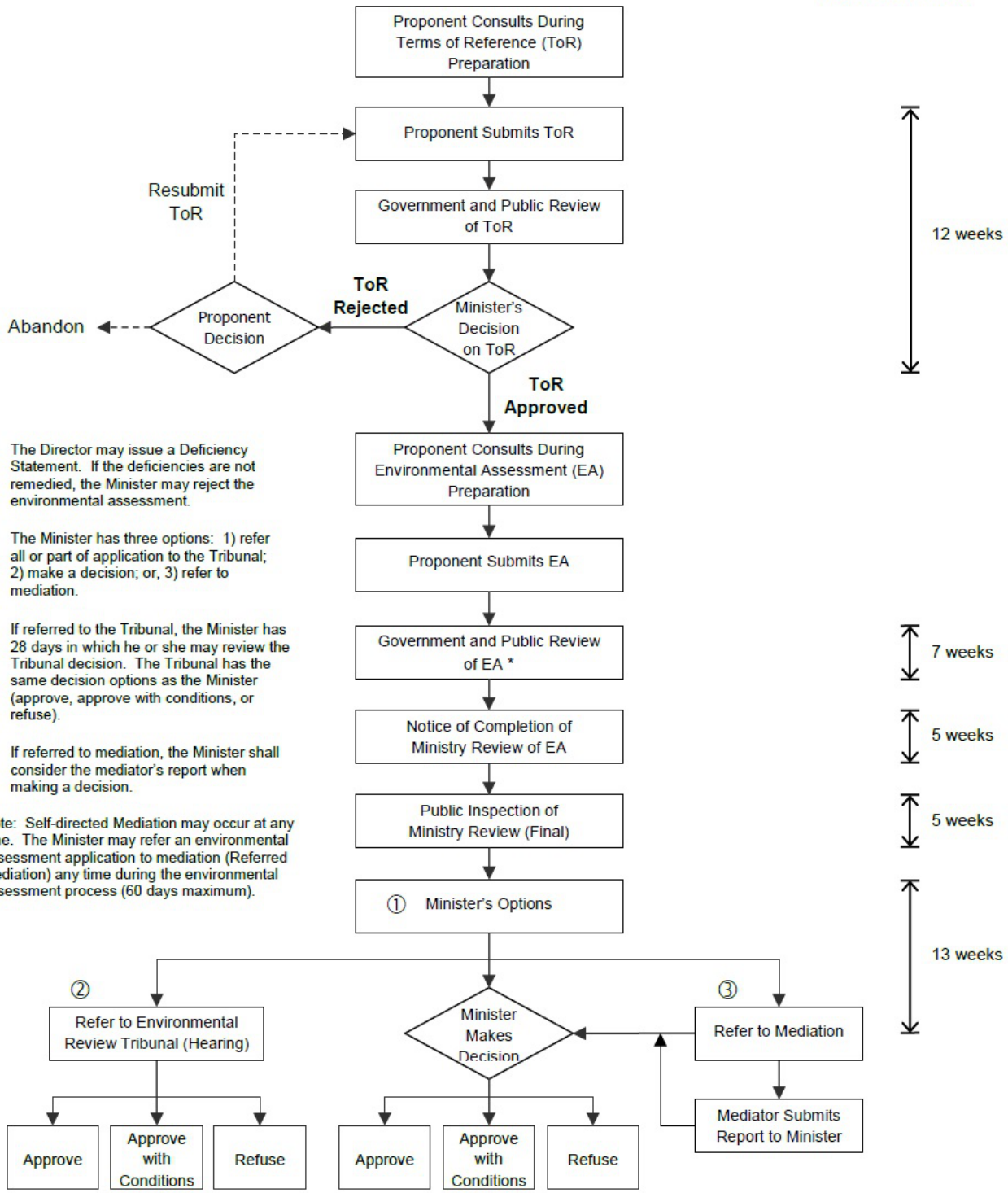
transmitters are according to an allocation that has been predetermined by the Board based on each transmitter's percentage of the total transmission revenue requirement.

If a designated transmitter had development costs but did not construct the facilities[20], those costs could be converted into a regulatory asset for rate recovery. The regulatory asset would create a revenue requirement that would be added to the total provincial transmission revenue requirement and included in the calculation of the UTR. Then, the IESO would bill all transmission customers, collect the revenues and remit the appropriate amount to the designated transmitter.

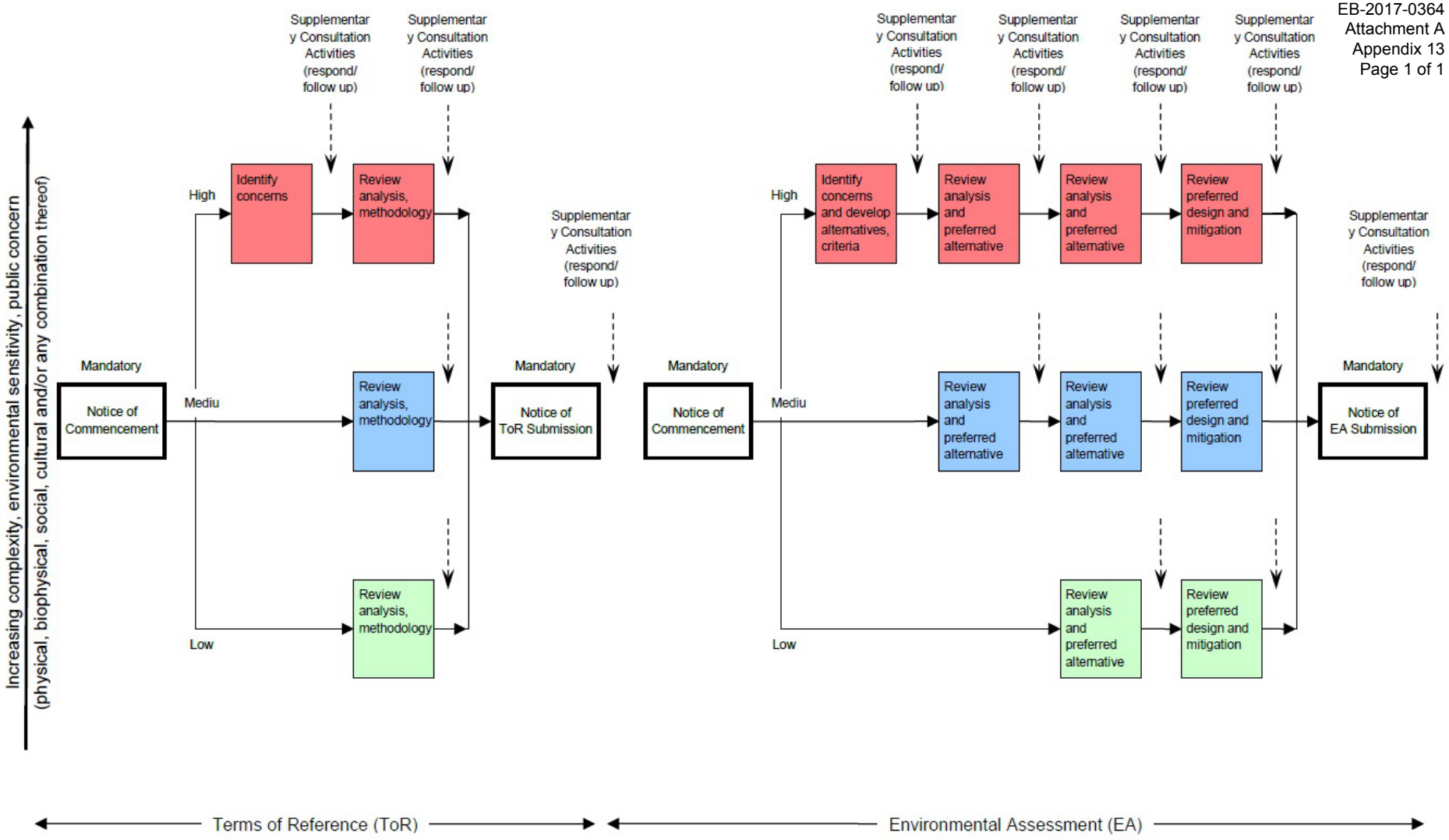
Construction budgets would be part of the capital budget for a transmitter's cost of service rate hearing. Alternative mechanisms as set out in the "Report of the Board: The Regulatory Treatment of Infrastructure Investment in Connection with the Rate-regulated Activities of Distributors and Transmitters in Ontario" (EB-2009-0152)[21] could be requested.

Some network reinforcement and many capacity enhancement projects (not subject to designation) may not require a leave to construct. The incumbent transmitter should proceed to develop the projects and include them in the capital budget for the appropriate cost of service application. The project's inclusion in an ECT is sufficient support for recovery of reasonable development costs. Approval of construction budgets is subject to a determination of need for the capital budget. The Board expects that the OPA will support proof of need at that time.

[20] E.g. the facilities were ultimately determined to be not necessary.
[21] Available on the Board's website at http://www.oeb.gov.on.ca/OEB/_Documents/EB-2009-0152/Board_Report_Infrastructure_Investment_20100115.pdf



1. Proponent consults during terms of reference (ToR) preparation.
2. Proponent submits ToR to the ministry.
3. Government and public review the ToR.
4. The minister makes a decision to either reject or approve the ToR.


Increasing complexity, environmental sensitivity, public concern
(physical, biophysical, social, cultural and/or any combination thereof)
Supplementary Consultation Activities (respond/ follow up)
Supplementary Consultation Activities (respond/ follow up)
Supplementary Consultation Activities (respond/ follow up)
Supplementary Consultation Activities (respond/ follow up)
Supplementary Consultation Activities (respond/ follow up)
Supplementary Consultation Activities (respond/ follow up)
High
Identify concerns
Review analysis, methodology
Mediu
Review analysis, methodology
Low
Review analysis, methodology
Mandatory
Notice of Commencement
Mandatory
Notice of ToR Submission
Supplementary Consultation Activities (respond/ follow up)
Mandatory
Notice of Commencement
High
Identify concerns and develop alternatives, criteria
Review analysis and preferred alternative
Review analysis and preferred alternative
Review preferred design and mitigation
Mediu
Review analysis and preferred alternative
Review analysis and preferred alternative
Review preferred design and mitigation
Low
Review analysis and preferred alternative
Review preferred design and mitigation
Supplementary Consultation Activities (respond/ follow up)
Mandatory
Notice of EA Submission
Terms of Reference (ToR)
Environmental Assessment (EA)

Potential Schedule for Hydro One Lake Superior Link EA Process

EA Process Milestone	Date
Notice of Commencement of Preparation of Terms of Reference	April 30, 2018
Consultation on Preparation of Terms of Reference	May and June 2018
Submit Terms of Reference	July 2, 2018
ToR Review Period	July 3 to September 25, 2018 (12 weeks)
Ministers Decision on Terms of Reference/ToR Approved	September 26, 2018
Notice of Commencement of Initiation of EA	October 5, 2018
Consultation on Preparation of the EA	October and November 2018
Submit EA to MOECC / Notice of EA Submission	December 10, 2018
Government and Public Review of EA	December 11, 2018 to January 25, 2019 (7 weeks)
Government issues Notice of Completion of Ministry Review of EA	January 28 to March 1, 2019 (5 weeks)
Public Inspection of Ministry Review (Final)	March 4 to April 5, 2019 (5 weeks)
Minister's Decision	April 8, 2018 to July 5, 2019 (13 weeks)
EA Approval	July 8, 2019

6.4 Deviations from the Reference Option

6.4.1 Variations on the Reference Option for the Purposes of the Application

As discussed in Section 6.1, EWT LP's Reference-Based Design varies from the Reference Option only with respect to the right-of-way width. In addition, the Reference-Based Design uses certain parameter designs that are not specified in the Reference Option. For example, given that the Reference Option is silent on the tower design, EWT LP has adopted the X10 tower family for the purpose of the Reference-Based Design, given that it has a suitable head frame geometry to manage the galloping criteria, albeit with relatively shorter spans than optimal.

6.4.2 Plan to Revisit the Reference-Based Design During the Development Phase

6.4.2.1 Key Assumptions Underlying the Reference-Based Design

Historically, the first step in a transmission project has been to determine the technical design for the new line, assuming that the necessary right of way would be readily available regardless of the height of the towers, the span lengths, the width of the corridor and the location of the line. However, this approach has often proven not to be successful. Experienced developers now understand that the input from the environmental assessment, public consultations and First Nations and Métis consultation can significantly affect the line routing and design. Indeed a new line cannot be meaningfully designed in the absence of these critical inputs. Any transmitter that commits to a design, without first considering these fundamentals, risks serious delays in project development and construction to accommodate design and route changes. For example, a theoretical desktop design developed in the absence of environmental studies and consultation may have latent fatal flaws that prevent the Minister of the Environment from giving his or her approval to proceed. Any design, regardless of its theoretical technical excellence and cost-effectiveness, that is environmentally unacceptable to the Minister cannot legally be built. Moreover, such an approach is inconsistent with EWT LP's community-centric, local stakeholder sensitive approach to transmission development.

Because it is not yet informed by the environmental assessment and consultation processes, the Reference Option, although valuable as a framework for this Application, contains certain assumptions that must be revisited during the development phase. Any technical design for the Project at this stage will be subject to similar assumptions. Prudent developers must revisit these assumptions in the development phase, and cannot commit to certain technical design parameters before doing so. The following are some of the key assumptions that EWT LP plans to test as part of its early development work:

- EWT LP has assumed, based on the HONI Study, that the Reference Option can be met with an X10 tower family design. EWT LP plans to revisit this assumption during project development. In particular, although the X10 family has a suitable head frame geometry to manage the galloping criteria, it is likely too short and weak to accommodate the longer spans that are likely necessary to minimize the capital cost of the line. There may therefore be significant cost savings involved in revisiting the galloping criteria and reinforcing the X10 tower design to accommodate longer spans (see Section 6.4.2.3 below for further detail).

- The results of EWT LP's consultation process may also show that certain concerns may be mitigated by using different design specifications. Design assumptions that do not take into account the public preferences are rarely validated, especially where the developer has finalized its designs and routing in advance of public consultation. For example, the consultation process may show that stakeholders prefer taller, shorter, wider or narrower towers in a conventional structure, a "Y", delta, guyed "V", guyed cross rope suspension, 'H"-pole, some other tower configuration. EWT LP plans to incorporate feedback received during the consultation process into its final technical design.

- The Reference Option assumes a route for the Project along the existing East-West Tie line. However, that assumption is made without incorporating the results of the environmental assessment, the land acquisition work and the consultation program. Therefore, the route assumed in the Reference Option is necessarily preliminary. It does not, for example, reflect an assessment of the Project's potential impact on traditional First Nation and Métis land use. Legitimate concerns may yet be raised, including with respect to potential impacts on traditional lands, hunting and harvesting practices, and archaeological sites. As another example, the Reference Option route does not reflect a careful study of the sensitive environmental features in the Project area. That assessment may show that a deviation from the Reference Option route is necessary. Assumptions about the Project route that are made prior to the development phase are therefore subject to change.

- Significant data on the terrain and surficial geology of northern Ontario that will affect the choice of foundations (such as pile, pad and chimney, grillage or rock anchor) is

available from the Ontario Geological Survey and the Ontario Department of Mines. This data allows for a preliminary assessment of suitable tower specifications. However, this data is not granular enough to allow for a rigorous assessment of the best tower design or of the best foundation at individual tower locations. Because the exact ground conditions will have a significant impact on the type and cost of foundations that will be suitable for the Project, any assumptions about those conditions that are made before the route has been established and field studies completed will be subject to change.

- Furthermore, although much of the Project area is on Crown Land, it would be inappropriate to assume that all land rights necessary for the Project are readily available. Certain private landowners may not want to grant land rights to the Project. Other land uses may also limit or preclude the construction of the Project in certain areas, or may make construction access more difficult and expensive. For example, newly created Provincial Parks and the new management practices for National Parks may preclude certain transmission activities in those areas. As another example, Crown land use polices may not allow, or may place restrictions on, development on Crown land. As discussed in Part 9, EWT LP has developed a comprehensive plan to acquire the necessary land rights for the Project. Those rights will help determine the Project route, which will then have to be considered in finalizing the technical design.

6.4.2.2 Methodology for Revisiting Underlying Assumptions

EWT LP has developed a comprehensive methodology for testing the underlying assumptions of the Reference Option. This methodology, which is tightly linked to EWT LP's development process, consists of three basic components:

- Routing: As described in detail in Part 9 of this Application, the routing process will determine the terrain over which the line will run, which in turn will affect the technical design of the Project. Establishing a route requires consultation with the agencies, landowners and the public, and completing environmental and other studies to determine the preferred route for the new line. The preferred route takes in to account existing and traditional land use, including agriculture, housing, schools, historical and archaeological sites, sites of special scientific interest, conservation areas, provincial parks, First Nation Reserves, compliance with provincial and municipal land use policies, use of other utilities and utility corridors, crossings, visual intrusiveness and access both for construction and ongoing operations.

- Engineering: As described in detail in Appendix 6C to this Part, the bulk of the engineering work must be completed during the development phase. As discussed, this will require the re-evaluation of the Reference Option compared to EWT LP's alternative designs to determine the technical design that fits within the envelope determined through the routing process and that also meets the needs

Memorandum

DATE: April 30, 2018

TO: NextBridge Infrastructure LP
FROM: Robert E. Nickerson, P.E., Consulting Engineer

RE: Review of Proposed Structure Modifications for the Ontario East-West Tie Line Project by Hydro One Networks Inc.; EB-2017-0364

Overview

I have been requested by NextBridge Infrastructure LP (NextBridge) to review Hydro One Networks, Inc.'s (Hydro One) proposal to replace a two circuit tower design with a quad circuit tower design for 87 towers for approximately 35 kilometers (km) in Pukaskwa National Park.

My professional background is in the analysis, design, and full-scale testing of transmission structures. My career includes design of latticed towers and tubular poles for a fabricator, research, and full-scale testing at the Electric Power Research Institute (EPRI) Mechanical Research Center and as independent consultant working with utilities in developing upgrades for existing transmission lines and the design of new latticed structures for new lines. My biography and experience are attached to this memorandum.

My review included Hydro One's Lake Superior Link Leave to Construct Application (Application), along with the IESO's System Impact Assessment Report (Additional Evidence) and Hydro One's tower designs that were provided to me by NextBridge. It is my understanding the tower designs were shown by Hydro One to the public at an open house event on March 15, 2018 in Thunder Bay at the Victoria Inn. (See pictures and drawings attached.)[1] The drawings are an illustration of what is believed to be Hydro One's basic design.

Unfortunately, as explained in this memorandum, even with this information, the Hydro One Application does not provide sufficient information to determine that it has followed a prudent design and testing regime for this relatively unique quad circuit tower design, particularly since Hydro One proposes to use existing foundations and the fact that the towers are located in a region that has extreme weather/with severe icing.

[1] The attachments to this memorandum initially provide the picture of the tower drawing presented at the open house, then the original tower drawing used for the existing two circuit transmission line through the Park, and, thereafter, I present a series of drawings developed by NextBridge, including a summary of the side slopes through the Park, to technically depict the quad circuit design, including showing the likely range of some anchor guys.

References to Hydro One Network Inc.'s Application and Evidence

Hydro One proposes the following:

> Within the Pukaskwa National Park, the existing Hydro One, double-circuit X7S structures will be replaced with new guyed, four circuit lattice-steel towers. The towers have been designed to support the existing Drake 795 conductor and the new Grackle 1192 conductors and also cause minimal impact to the National Park. The new four circuit structures have been designed to stand on the existing foundations utilized by the current double-circuit structures, while the tower guys will restrain the higher overturning moment caused by the four circuits on the longer crossarms.

Application, Exhibit C, Tab 2, Schedule 1, page 3.

Later in the Application Hydro One states "… anti-cascade structures will be installed every 10 km. These structures can withstand all conductors broken on one side at maximum ice condition in the area." Exhibit C, Tab 2, Schedule 1, page 4. In Table 4 at Exhibit B, Tab 7, Schedule 1, page 8 Hydro One also states "Scheduled 15-days continuous double-circuit outage to replace (87) towers in Pukaskwa National Park."

Further in the Additional Evidence at page 2, Executive Summary, Findings, the IESO findings include the following:

> 7. Extreme contingencies that result in the loss of the four 230 kV circuits of the East-West Tie such as failure of a quadruple circuit tower can result in separation between the Northwest transmission zone and the rest of the IESO-controlled grid. Following such events, timely system restoration is critical to avoid the risk of supply shortages to the customers in the zone; and
>
> 8. Outages to the existing East-West Tie circuits will be required to install the project, especially the 35 km section between Wawa TS and Marathon TS where the existing double circuit towers of W21M and W22M will be replaced with quadruple circuit towers to accommodate the new W35M and W36M circuits. An outage plan that contains the details of this replacement has not been presented to the IESO at the time of this report."

These specific sections are highlighted for reference later in the memorandum.

Industry Accepted Process to Design, Full-Scale Test, and Verify the Integrity of Existing Foundations

It is accepted industry practice that unique and new transmission tower configurations (such as that proposed by Hydro One), should be designed and full-scale tested to verify the ability of the structure to support design loads and meet code requirements. The process to design and fully test transmission towers generally involves the following steps or tasks:

- Develop phase spacing and clearance requirements that meet or exceed required codes. These should include climbing clearances required for live line maintenance as well as phase to ground clearances.
- Develop loading conditions that must be supported by the structure including extreme events, broken wire loading, unbalanced ice, and construction loading.
- Develop a geometric model that meets clearance requirements and defines the points of attachments for the conductor insulators and overhead ground wire.
- Verify that structure geometry meets or exceeds galloping clearances.
- Design the structure to meet the loading conditions and clearances.
- Complete fabrication drawings including details, erection, layouts, and bill of materials.
- Conduct a full-scale test of the prototype structure to validate the design assumptions and detailing.
- Finalize the design based on changes required to support the test loads.
- Finalize the details based on any changes during testing.
- Issue detail drawing package with “Released for Construction”.
- If existing foundations are to be utilized, a thorough inspection of each foundation should be completed. Foundation inspections should include a review of the original design and any original construction documentation.

For one tower structure design, this process could take well over one year. In addition, if the inspection of the foundations show that some or all of the foundations require repair or replacement, the effort and time necessary to develop an acceptable plan to mitigate and implement repairs to the foundations could also take a year. Thus, unless Hydro One can provide information and evidence that it has completed all of the above steps and tasks with acceptable results, it is likely Hydro One is over a year or more away from being able to provide the Ontario Energy Board (OEB) and stakeholders with the information and evidence needed to show it can safety and reliably construct and operate the new quad circuit towers on either existing foundations or new foundations, if needed.

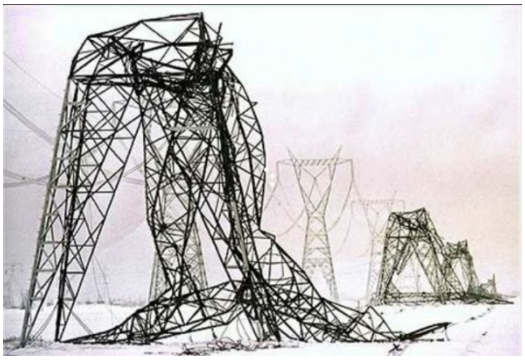
The Application and Additional Evidence does not provide any information that Hydro One has completed any of these tasks or steps. If Hydro One has completed these tasks for its proposed design, I would want to review the supporting data and conclusions. I am concerned that a new quad circuit tower, as proposed by Hydro One, is not appropriate, safe, and reliable given the likely loading on the lines, icing conditions experienced at the

Park, and the use of existing foundations. Below are high level and fundamental considerations that should be considered in the context of Hydro One's proposal.

Considerations

Clear Designation of Loading Condition Requirements:

Hydro One has not defined the loading requirements for the structures. Included within loading requirements is the ability to resist unbalance longitudinal loading icing events. The severe longitudinal cascade on the Hydro-Quebec system in January 1998 prompted stronger requirements to meet both vertical and longitudinal loads imposed under heavy ice conditions. Specifically Jean-Pierre Giroux, director of Planning at Hydro-Québec, stated in an overview:



> Now, our new construction standards limit the potential for that effect. The mechanical strength of our grid has been increased. For instance, by making every tenth tower along a transmission line a very robust anti-cascading tower, we limit the damage that results from the collapse of a single tower.

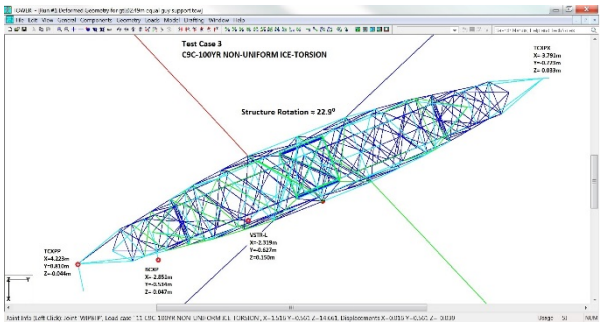
With a single mast guyed structure pinned at the base, the structure movement allows redistribution of the load, an important benefit in resisting longitudinal and torsional loading. A freestanding structure's rigidity does not allow this movement and guy pre-tension is critical to support of the structure. Hydro One's quad circuit proposal is more likely to be susceptible to a severe longitudinal cascade on the Hydro One system than the current double circuit design. However, given the limited information provided by Hydro One it is not possible to determine whether Hydro One tower design will or will not be at a high risk for a severe longitudinal cascade. It is self-evident that any event on the Hydro One quad circuit structures akin to what occurred on the Hydro-Quebec system would result in a prolonged outage and restoration effort. Therefore, it is prudent to understand how Hydro One will design its quad circuit structures so not to result in a Hydro-Quebec type event, and, how Hydro One will timely restore its transmission line in the event of a single point of failure event on the quad circuit structures. To date, this information has not been provided by Hydro One for review by the OEB and stakeholders.

Full-scale Test Structure: A full-scale tested structure provides validation of tower design assumptions, detailing, and structure performance. Any special foundation attachments should be included in the full-scale test. It would take at least 4-5 months for bidding the testing, development of the test plan, fabrication, prototype assembly, shipping to the test site, assembly, erection, rigging, and testing. Test site backlogs are on average 3-4 months

at this time, thus it is unlikely Hydro One can accomplish full-scale testing in less than 8-9 months. If the testing shows design flaws, redesign of the tower and re-testing can take up to 2-3 months. Without a full-scale test of this new quad structure, Hydro One is not meeting an industry accepted approach for ensuring its tower design is safe and reliable.

Location and Installation of "new" Guy Anchors: It is likely that contrary to Hydro One's plans, the newly installed guy anchors on the quad towers will require additional construction within the Park. There is no basis in Hydro One's evidence (Exhibit C, Tab 1, Schedule 1, page 8), that the use of guy anchors will not result in a widening of the transmission corridor. Hydro One must provide fully designed and tested quad towers for each of the 87 locations to know whether it can implement its proposed design without widening the transmission corridor. If the anchors are installed outside of the right-of-way (ROW), land acquisition and additional clearing may be necessary. Sidehill variations can result in long guy leads and further clearing in the Park and a greater widening of the ROW. Of additional concern is impact to a guy from a tree falling which could result in a failure to the tower. To illustrate this point, attached to this memorandum is a depiction of how far from the tower the anchor guys will need to be placed because of the terrain in the Park.

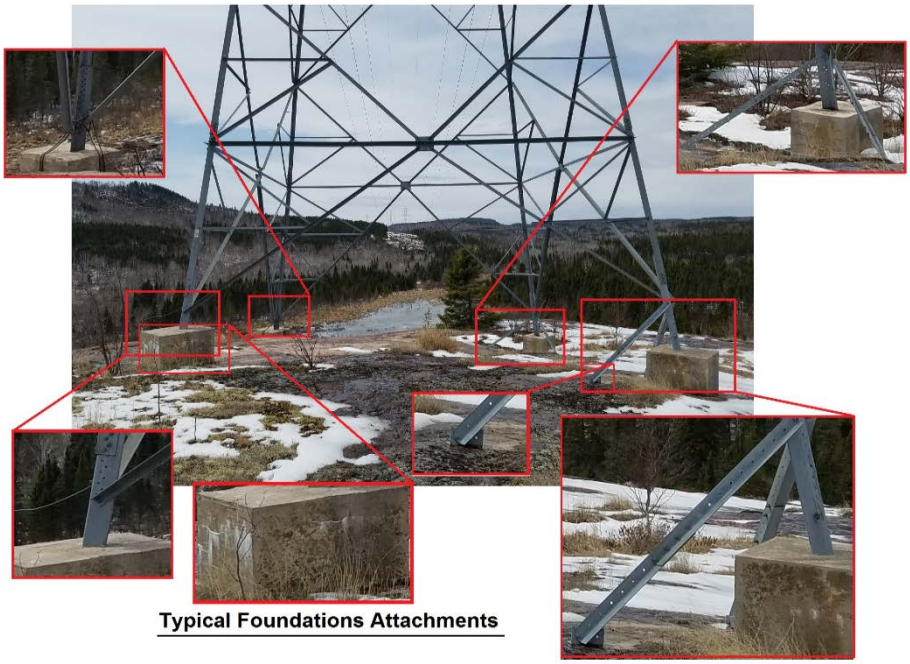
Second-order Effects on the Freestanding "Guyed" Structure with Regards to Structure Displacement: The interaction of the structure and guys are unknown without a review of the proposed structure model. However, as shown in the figure, the amount of torsional displacement for a pinned guyed structure shows the torsional effect on the structure. The rotational movement reduces the longitudinal loading with a "pinned" mast, but it must be resisted by a freestanding structure. Guy pre-tension in guyed pinned structures allows some variability as the structure is free to move until equilibrium is met. For freestanding guyed structures, it is critical that the guy pretension is maintained. If the pretension slacks off, the support at the guy location will not be effective, and, thus, it will not support the structure. Maintaining a proper pretension in the guy for freestanding towers requires an additional level of maintenance. Hydro One has not provided the information necessary to understand whether it has addressed these issues in its tower design.



The Lack of Any Failure Containment Structures Within the 35km (≈22 mile) Corridor: Utilizing the existing foundations and ROW limits the ability to install a containment structure in this line segment. Thus, if a cascade occurs, it is possible the entire section would be impacted. The installing of at least two failure containment structures would require additional effort, and, at this time, it does not appear that Hydro One has considered, analyzed, or will include containment structures in this section.

Existing Foundation to Structure Connections:

The existing foundations need to be inspected. As indicated in the photo below of a typical structure on this line, the original design provided some flexibility for installation of the tower, but, also, resulted in large unbraced lengths of the stub angle. For example, as seen in the left front foundation, the stub angle is unsupported from the diagonal bracing to the top of foundation (about 41cm (16”) assuming a 20cm (8”) leg width). This section must resist combined axial load and shear and it is very unlikely even the original tower leg load with combined shear is sufficient under current design codes. As seen on the right front and back leg, the stub angle is braced below the diagonal and secured to the ground with a clip angle and one bolt. To assume adequate support, this diagonal member, bolts, and anchor bolt need to be inspected to assure the integrity of this support system. Based on this limited information (one photo) and no original design drawings, a complete review of the existing foundation capacity must be undertaken. A new guyed tower will develop much higher axial loads and likely the existing stub angles will be inadequate as currently braced. In addition, the concrete is starting to develop cracks that are propagating as seen in the lower left corner detailed view below. Without a more thorough investigation it is not clear if the stub angle or reinforcement is compromised. Below grade conditions are also unknown.



Typical Foundations Attachments

Additional Considerations

The attached configuration presented by Hydro One at the open house does not meet the following requirements: (1) the OEB’s shielding requirement of 15^{o} (shown as 32^{o}); (2) the OEB’s galloping clearances of 1.02M between phases; and (3) the horizontal phase to phase separation between circuits as required by CSA 22.3 No. 1. Also, the conductor blow out will exceed the ROW limits under high wind conditions.

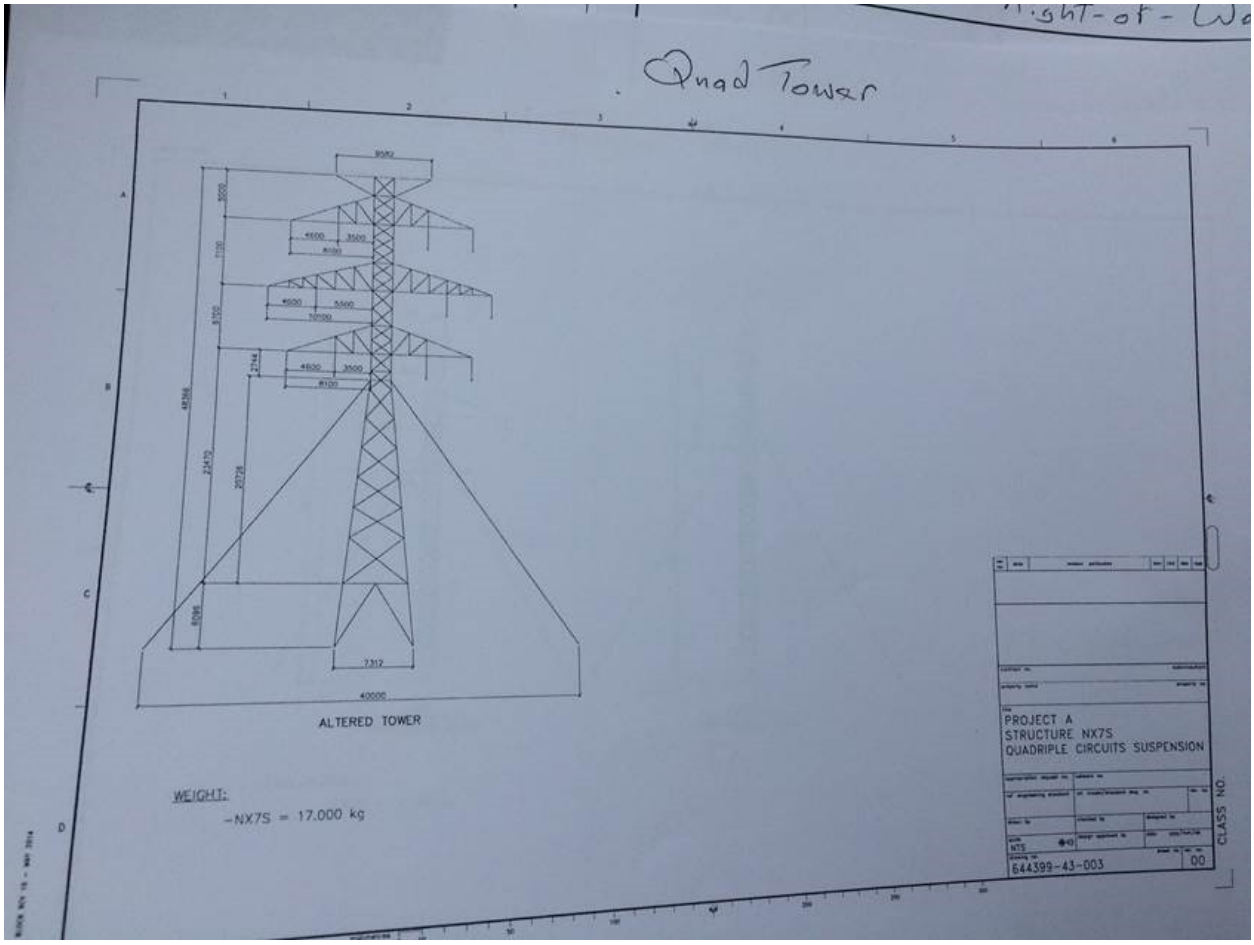
Conclusion

In conclusion, using the Hydro One existing line section in the Park with guyed quad circuit structures and existing foundations poses high risks. For example, a thorough review of all foundations above and below grade is critical. The stub angle design needs to be reviewed since, as detailed herein, it likely will not support the existing design loads, and with greater axial loads it would need to be modified. While it may appear expedient to use the existing line and foundations to reduce initial costs, future maintenance efforts and costs will likely be greater with forty year old foundations and existing conductors and insulators. Also, without a full understanding that the new quad circuit tower designs have been fully tested, it is questionable whether Hydro One has accurately accounted for the costs of the design, as it appears the design is far from final. New guy anchor installation may require additional ROW. Acquisition of new ROW would impact the project by potentially delaying the installation of the guy anchors. Installation and testing of the guy anchors will also impact the Park. Further, the potential impact to the Park could be significant if a major failure such as a longitudinal cascade occurs. Without a failure containment structure, there is a significant risk associated with Hydro One's proposal. Since the guy system is critical to the support of the proposed quad tower, a failure of one guy could result in a transverse failure under high wind loading. A failure containment structure would not prevent this type of tower failure.

As mentioned, the IESO recognizes the significant impact of the loss of only one structure on the 35km section and states "[e]xtreme contingencies that result in the loss of the four 230 kV circuits of the East-West Tie such as failure of a quadruple circuit tower can result in separation between the Northwest transmission zone and the rest of the IESO-controlled grid." The IESO acknowledges the risks of failure in the 35km section in the Park which would affect four circuits (two important lines) yet Hydro One is proposing to build a new quad structure on forty year old foundations. Hydro One has not provided information and evidence demonstrating that it has conducted industry accepted steps and tasks related to the consideration of a new tower design. As explained herein, there are fundamental processes, including industry accepted testing, that need to be completed prior to understanding the implications of Hydro One's proposal on the ability of the designs to be constructed and operated reliably.

ATTACHMENTS

Hydro One Quad Structure shown at Open House



Hydro One Park Terrain Summary		
Side Slope	**Str. Quantity**	**%**
< 5˚	5	6%
5˚ to 10˚	17	20%
10˚ to 15˚	15	17%
15˚ to 20˚	13	15%
20˚ to 25˚	11	13%
25˚ to 30˚	8	9%
> 30˚	17	20%
Total Str.	86	

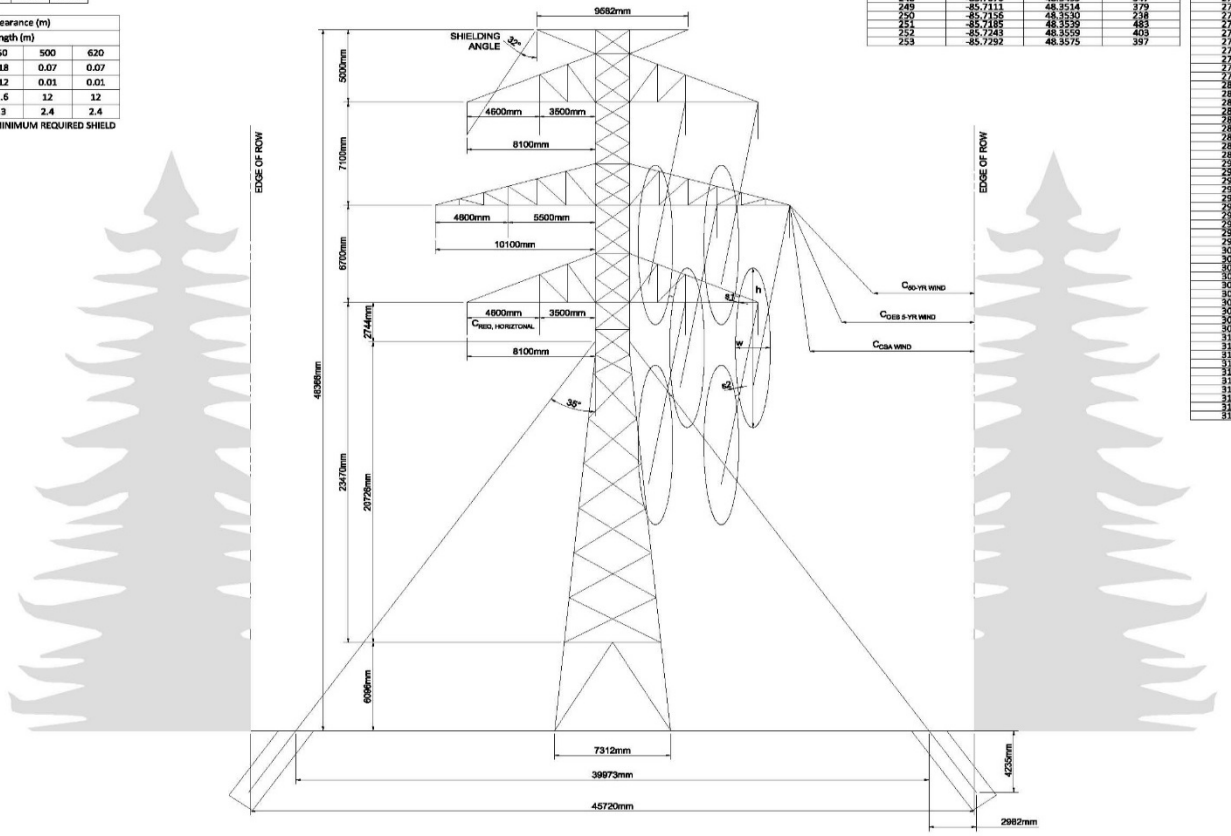
Wind Condition	Required ROW Width (m)					Clearance to Edge of ROW (m)					Clearance Variable
	Span Length (m)					Span Length (m)					
	350	400	450	500	620	350	400	450	500	620	
50-Year Wind	46.4	50.76	55.6	60.88	75.18	0.76	-1.42	-3.84	-6.48	-13.63	$C_{50\text{-YR WIND}}$
CSA Moderate Wind	39.44	41.32	43.4	45.7	52.02	6.84	5.9	4.86	3.71	0.55	$C_{CSA\ WIND}$
OEB 5-Year Gust	36.04	38.64	41.56	44.76	53.64	5.44	4.14	2.68	1.08	-3.36	$C_{OEB\ 5\text{-YR WIND}}$

CSA 22.3 No.1-2015 Minimum Horizontal Wire-Wire Separation at Structure For 230-kV Circuits with 1.1pu Overvoltage					
Span Length (m)	350	400	450	500	620
Phase Conductors, Same Circuit	4659	5045	5455	5891	6251
Phase Conductors, Different Circuits	5003	5390	5800	6236	6596

Parameter	Galloping Clearance (m)				
	Span Length (m)				
	350	400	450	500	620
S1	0.48	0.31	0.18	0.07	0.07
S2	0.41	0.25	0.12	0.01	0.01
h	10.4	11	11.6	12	12
W	2.1	2.2	2.3	2.4	2.4

NOTE: PER OEB MINIMUM TECHNICAL REQUIREMENTS, THE MINIMUM REQUIRED SHIELD ANGLE FOR MULTI-CIRCUIT STRUCTURES IS 15 DEGREES

NOTES:
1. CONFIGURATION DOES NOT PROVIDE OEB MINIMUM REQUIRED SHIELD ANGLE OF 15 DEGREES FOR MULTI-CIRCUIT STRUCTURES.
2. CONFIGURATION DOES NOT PROVIDE OEB REQUIRED GALLOPING CLEARANCES OF 1.02 M BETWEEN PHASES.
3. CONFIGURATION DOES NOT PROVIDE HORIZONTAL PHASE-TO-PHASE SEPARATION BETWEEN CIRCUITS AS REQUIRED BY CSA 22.3 NO. 1.
4. HIGH WINDS WILL RESULT IN CONDUCTOR BLOWOUT BEYOND THE LIMITS OF THE ROW DEPICTED.



Existing Structure Locations in Pukaskwa National Park
Hydro One Circuit W21M/W22M

Number	Longitude	Latitude	Span Ahead (m)
232	-85.6332	48.3234	433
233	-85.6382	48.3234	526
234	-85.6442	48.3259	406
235	-85.6489	48.3276	407
236	-85.6535	48.3298	428
237	-85.6585	48.3318	261
238	-85.6615	48.3330	439
239	-85.6666	48.3349	340
240	-85.6705	48.3364	476
241	-85.6757	48.3383	426
242	-85.6807	48.3402	329
243	-85.6846	48.3416	330
244	-85.6885	48.3431	324
245	-85.6923	48.3445	408
246	-85.6971	48.3463	432
247	-85.7024	48.3482	387
248	-85.7070	48.3499	347
249	-85.7111	48.3514	379
250	-85.7156	48.3530	238
251	-85.7185	48.3539	483
252	-85.7243	48.3559	403
253	-85.7292	48.3575	397

Existing Structure Locations in Pukaskwa National Park
Hydro One Circuit W21M/W22M

Number	Longitude	Latitude	Span Ahead (m)
254	-85.7340	48.3591	401
255	-85.7388	48.3607	524
256	-85.7452	48.3629	521
257	-85.7515	48.3650	388
258	-85.7549	48.3661	393
259	-85.7597	48.3677	509
260	-85.7658	48.3697	338
261	-85.7699	48.3711	371
262	-85.7734	48.3726	517
263	-85.7818	48.3751	772
264	-85.7851	48.3762	522
265	-85.7914	48.3783	492
266	-85.7974	48.3802	462
267	-85.8029	48.3821	325
268	-85.8068	48.3834	480
269	-85.8126	48.3853	386
270	-85.8173	48.3869	367
271	-85.8218	48.3884	471
272	-85.8274	48.3903	460
273	-85.8330	48.3921	470
274	-85.8387	48.3940	461
275	-85.8443	48.3959	402
276	-85.8491	48.3975	281
277	-85.8525	48.3986	386
278	-85.8572	48.4001	221
279	-85.8605	48.4012	542
280	-85.8670	48.4034	278
281	-85.8703	48.4046	371
282	-85.8747	48.4062	512
283	-85.8807	48.4085	455
284	-85.8860	48.4106	286
285	-85.8893	48.4119	222
286	-85.8919	48.4129	619
287	-85.8992	48.4157	381
288	-85.9036	48.4174	233
290	-85.9064	48.4184	577
291	-85.9131	48.4210	458
292	-85.9185	48.4231	261
293	-85.9215	48.4243	346
294	-85.9256	48.4258	407
295	-85.9304	48.4276	217
296	-85.9329	48.4286	491
297	-85.9386	48.4308	280
298	-85.9419	48.4321	261
299	-85.9448	48.4334	591
300	-85.9514	48.4364	356
301	-85.9554	48.4382	385
302	-85.9597	48.4402	361
303	-85.9638	48.4420	461
304	-85.9689	48.4443	360
305	-85.9730	48.4461	443
306	-85.9779	48.4483	462
307	-85.9831	48.4507	489
308	-85.9886	48.4531	184
309	-85.9907	48.4540	366
310	-85.9948	48.4559	398
311	-85.9992	48.4579	315
312	-86.0028	48.4595	284
313	-86.0059	48.4609	365
314	-86.0103	48.4627	401
315	-86.0158	48.4657	520
316	-86.0226	48.4684	446
317	-86.0276	48.4706	518
318	-86.0334	48.4732	139
319	-86.0349	48.4739	577

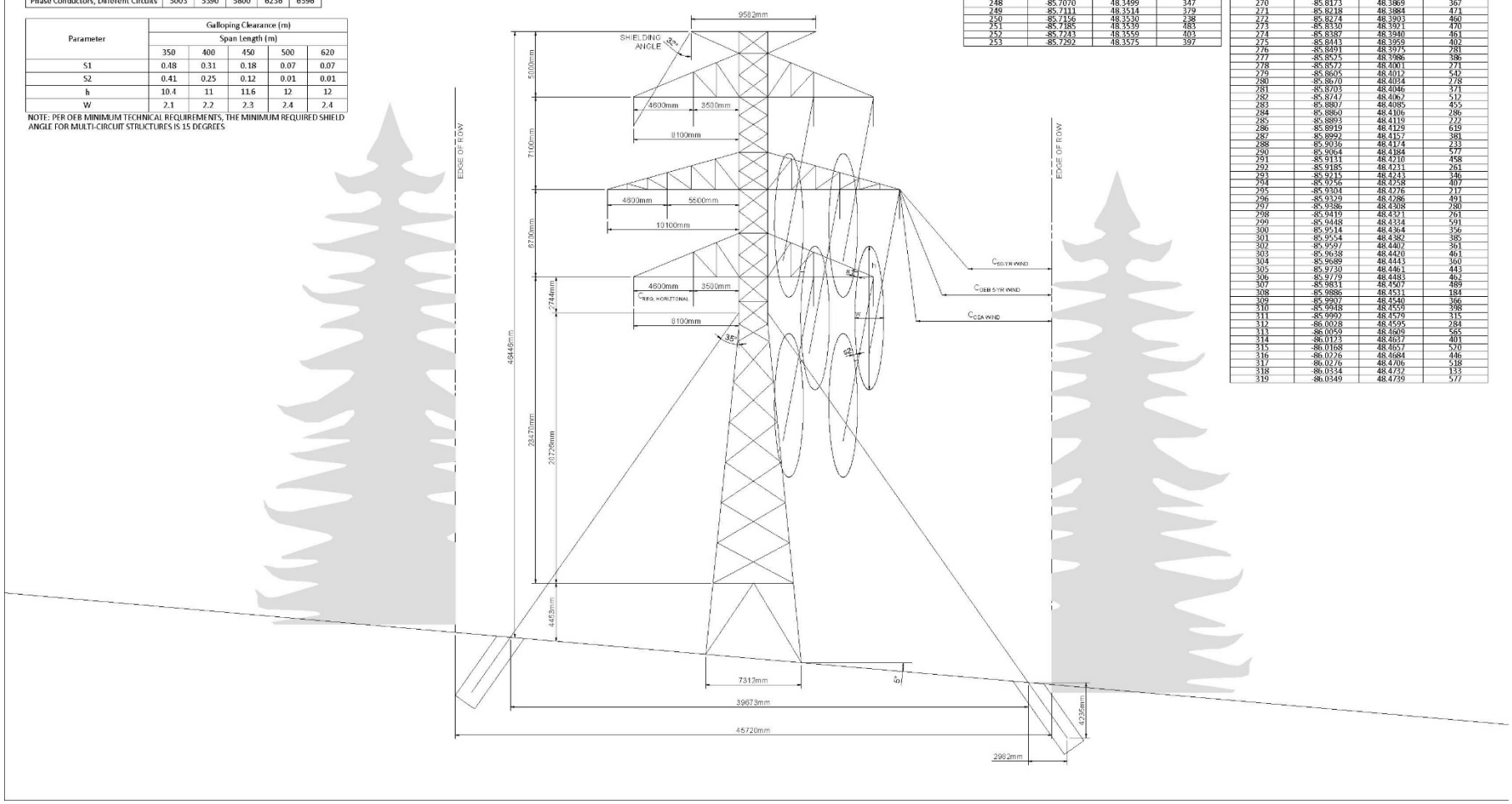
Wind Condition	Required ROW Width (m)					Clearance to Edge of ROW (m)					Clearance Variable
	Span Length (m)					Span Length (m)					
	350	400	450	500	620	350	400	450	500	620	
50-Year Wind	46.4	50.76	55.6	60.88	75.18	0.76	-1.42	-3.84	-6.48	-13.63	$C_{50\text{-YR WIND}}$
CSA Moderate Wind	39.44	41.32	43.4	45.7	52.02	6.84	5.9	4.86	3.71	0.55	$C_{CSA\ WIND}$
OEB 5-Year Gust	36.04	38.64	41.56	44.76	53.64	5.44	4.14	2.68	1.08	-3.36	$C_{OEB\ 5\text{-YR WIND}}$

NOTES:
1. CONFIGURATION DOES NOT PROVIDE OEB MINIMUM REQUIRED SHIELD ANGLE OF 15 DEGREES FOR MULTI-CIRCUIT STRUCTURES.
2. CONFIGURATION DOES NOT PROVIDE OEB REQUIRED GALLOPING CLEARANCES OF 1.02 M BETWEEN PHASES.
3. CONFIGURATION DOES NOT PROVIDE HORIZONTAL PHASE-TO-PHASE SEPARATION BETWEEN CIRCUITS AS REQUIRED BY CSA 22.3 NO. 1.
4. HIGH WINDS WILL RESULT IN CONDUCTOR BLOWOUT BEYOND THE LIMITS OF THE ROW DEPICTED.

CSA 22.3 No.1-2015 Minimum Horizontal Wire-Wire Separation at Structure For 230-kV Circuits with 1.1pu Overvoltage					
Span Length (m)	350	400	450	500	620
Phase Conductors, Same Circuit	4659	5045	5455	5891	6251
Phase Conductors, Different Circuits	5003	5390	5800	6236	6596

Parameter	Galloping Clearance (m)				
	Span Length (m)				
	350	400	450	500	620
S1	0.48	0.31	0.18	0.07	0.07
S2	0.41	0.25	0.12	0.01	0.01
h	10.4	11	11.6	12	12
W	2.1	2.2	2.3	2.4	2.4

NOTE: PER OEB MINIMUM TECHNICAL REQUIREMENTS, THE MINIMUM REQUIRED SHIELD ANGLE FOR MULTI-CIRCUIT STRUCTURES IS 15 DEGREES.



Existing Structure Locations in Pukaskwa National Park Hydro One Circuit W21M/W22M			
Number	Longitude	Lattitude	Span Ahead (m)
232	-85.6332	48.3214	433
233	-85.6382	48.3234	526
234	-85.6442	48.3259	406
235	-85.6489	48.3278	407
236	-85.6535	48.3298	428
237	-85.6585	48.3318	261
238	-85.6615	48.3330	439
239	-85.6666	48.3349	340
240	-85.6706	48.3364	426
241	-85.6757	48.3383	426
242	-85.6807	48.3402	329
243	-85.6846	48.3416	330
244	-85.6885	48.3431	324
245	-85.6923	48.3445	408
246	-85.6971	48.3463	452
247	-85.7024	48.3482	387
248	-85.7070	48.3499	347
249	-85.7111	48.3514	379
250	-85.7156	48.3530	238
251	-85.7185	48.3539	483
252	-85.7243	48.3559	403
253	-85.7292	48.3575	397

Existing Structure Locations in Pukaskwa National Park Hydro One Circuit W21M/W22M			
Number	Longitude	Lattitude	Span Ahead (m)
254	-85.7340	48.3591	401
255	-85.7388	48.3607	524
256	-85.7452	48.3629	521
257	-85.7515	48.3650	288
258	-85.7549	48.3661	393
259	-85.7597	48.3677	509
260	-85.7658	48.3697	348
261	-85.7699	48.3711	371
262	-85.7744	48.3726	617
263	-85.7818	48.3751	272
264	-85.7851	48.3762	522
265	-85.7914	48.3783	492
266	-85.7974	48.3802	462
267	-85.8029	48.3821	325
268	-85.8068	48.3834	480
269	-85.8126	48.3853	386
270	-85.8173	48.3869	367
271	-85.8218	48.3884	471
272	-85.8274	48.3903	460
273	-85.8330	48.3921	470
274	-85.8387	48.3940	461
275	-85.8443	48.3959	402
276	-85.8491	48.3975	281
277	-85.8525	48.3986	386
278	-85.8572	48.4001	271
279	-85.8605	48.4012	542
280	-85.8670	48.4034	278
281	-85.8703	48.4046	371
282	-85.8747	48.4062	512
283	-85.8807	48.4085	455
284	-85.8860	48.4106	286
285	-85.8893	48.4119	272
286	-85.8919	48.4129	619
287	-85.8992	48.4157	381
288	-85.9036	48.4174	233
289	-85.9064	48.4184	577
291	-85.9131	48.4210	458
292	-85.9185	48.4231	261
293	-85.9215	48.4243	346
294	-85.9256	48.4258	407
295	-85.9304	48.4276	217
296	-85.9329	48.4286	491
297	-85.9386	48.4308	280
298	-85.9419	48.4321	261
299	-85.9448	48.4334	591
300	-85.9514	48.4364	356
301	-85.9554	48.4382	385
302	-85.9597	48.4407	361
303	-85.9638	48.4420	461
304	-85.9689	48.4443	360
305	-85.9730	48.4461	443
306	-85.9779	48.4483	462
307	-85.9831	48.4507	489
308	-85.9886	48.4531	184
309	-85.9907	48.4540	366
310	-85.9948	48.4559	398
311	-85.9992	48.4579	315
312	-86.0028	48.4595	284
313	-86.0059	48.4609	565
314	-86.0123	48.4637	401
315	-86.0168	48.4657	570
316	-86.0226	48.4684	446
317	-86.0276	48.4706	518
318	-86.0334	48.4732	133
319	-86.0349	48.4739	577

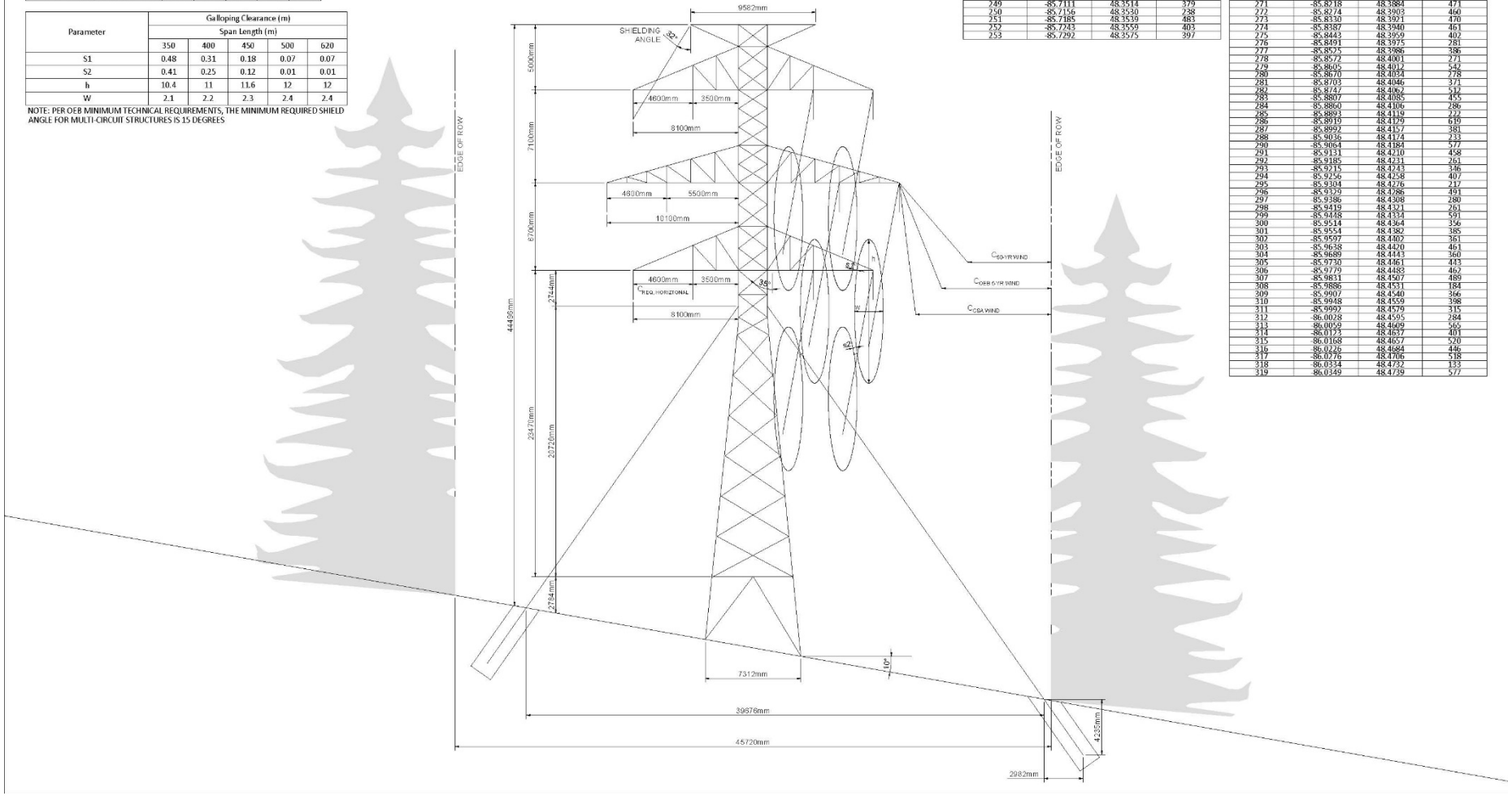
Wind Condition	Required ROW Width (m)					Clearance to Edge of ROW (m)					Clearance Variable
	Span Length (m)					Span Length (m)					
	350	400	450	500	620	350	400	450	500	620	
50-Year Wind	46.4	50.76	55.6	60.88	75.18	0.76	-1.42	-3.84	-6.48	-13.63	$C_{50\text{-YR WIND}}$
CSA Moderate Wind	39.44	41.32	43.4	45.7	52.02	6.84	5.9	4.86	3.71	0.55	$C_{CSA\ WIND}$
OEB 5-Year Gust	36.04	38.64	41.56	44.76	53.64	5.44	4.14	2.68	1.08	-3.36	$C_{OEB\ 5\text{-YR WIND}}$

CSA 22.3 No.1-2015 Minimum Horizontal Wire-Wire Separation at Structure For 230-kV Circuits with 1.1pu Overvoltage					
Span Length (m)	350	400	450	500	620
Phase Conductors, Same Circuit	4659	5045	5455	5891	6251
Phase Conductors, Different Circuits	5003	5390	5800	6236	6596

Parameter	Galloping Clearance (m)				
	Span Length (m)				
	350	400	450	500	620
S1	0.48	0.31	0.18	0.07	0.07
S2	0.41	0.25	0.12	0.01	0.01
h	10.4	11	11.6	12	12
W	2.1	2.2	2.3	2.4	2.4

NOTE: PER OEB MINIMUM TECHNICAL REQUIREMENTS, THE MINIMUM REQUIRED SHIELD ANGLE FOR MULTI-CIRCUIT STRUCTURES IS 15 DEGREES

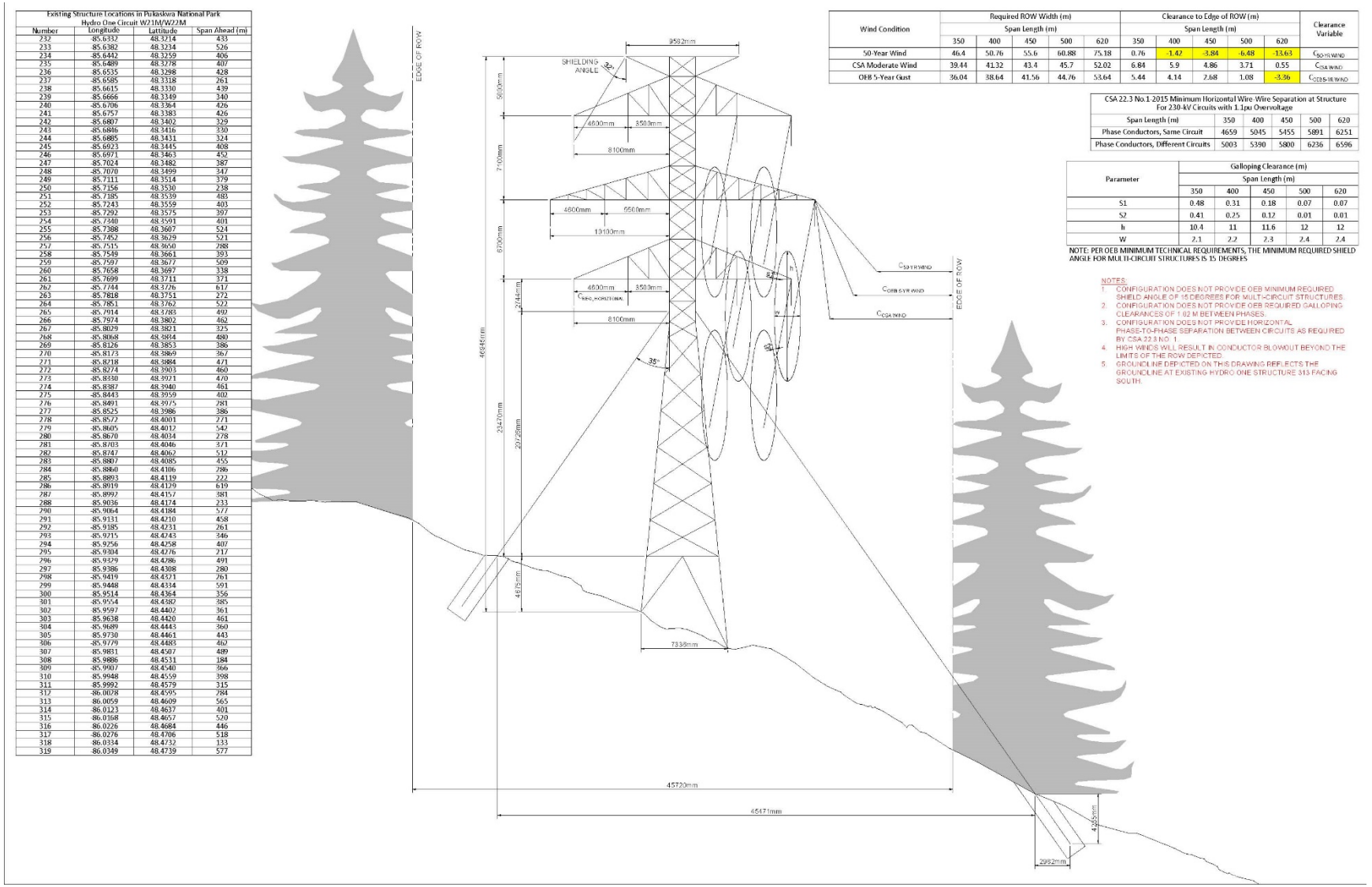
NOTES:
1. CONFIGURATION DOES NOT PROVIDE OEB MINIMUM REQUIRED SHIELD ANGLE OF 15 DEGREES FOR MULTI-CIRCUIT STRUCTURES.
2. CONFIGURATION DOES NOT PROVIDE OEB REQUIRED GALLOPING CLEARANCES OF 1.02 M BETWEEN PHASES.
3. CONFIGURATION DOES NOT PROVIDE HORIZONTAL PHASE-TO-PHASE SEPARATION BETWEEN CIRCUITS AS REQUIRED BY CSA 22.3 NO. 1.
4. HIGH WINDS WILL RESULT IN CONDUCTOR BLOWOUT BEYOND THE LIMITS OF THE ROW DEPICTED.



Existing Structure Locations in Pukaskwa National Park Hydro One Circuit W21M/W22M			
Number	Longitude	Latitude	Span Ahead (m)
232	-85.6332	48.3214	433
233	-85.6382	48.3234	526
234	-85.6442	48.3259	406
235	-85.6489	48.3278	407
236	-85.6535	48.3298	428
237	-85.6585	48.3318	761
238	-85.6615	48.3330	439
239	-85.6666	48.3349	340
240	-85.6706	48.3364	426
241	-85.6757	48.3383	426
242	-85.6807	48.3402	329
243	-85.6846	48.3416	330
244	-85.6885	48.3431	324
245	-85.6923	48.3445	408
246	-85.6971	48.3463	452
247	-85.7024	48.3482	387
248	-85.7070	48.3499	347
249	-85.7111	48.3514	379
250	-85.7156	48.3530	238
251	-85.7185	48.3539	483
252	-85.7243	48.3559	403
253	-85.7292	48.3575	397

Existing Structure Locations in Pukaskwa National Park Hydro One Circuit W21M/W22M			
Number	Longitude	Latitude	Span Ahead (m)
254	-85.7340	48.3591	401
255	-85.7388	48.3607	524
256	-85.7452	48.3629	521
257	-85.7515	48.3650	288
258	-85.7549	48.3661	393
259	-85.7597	48.3677	509
260	-85.7658	48.3697	338
261	-85.7699	48.3711	371
262	-85.7744	48.3726	617
263	-85.7818	48.3751	272
264	-85.7851	48.3762	522
265	-85.7914	48.3783	492
266	-85.7974	48.3802	462
267	-85.8029	48.3821	325
268	-85.8068	48.3834	490
269	-85.8126	48.3853	386
270	-85.8173	48.3869	367
271	-85.8218	48.3884	471
272	-85.8274	48.3903	460
273	-85.8330	48.3921	470
274	-85.8387	48.3940	461
275	-85.8443	48.3959	402
276	-85.8491	48.3975	281
277	-85.8525	48.3986	386
278	-85.8572	48.4001	271
279	-85.8605	48.4012	542
280	-85.8670	48.4034	778
281	-85.8703	48.4046	371
282	-85.8747	48.4062	512
283	-85.8807	48.4085	455
284	-85.8860	48.4106	286
285	-85.8893	48.4119	222
286	-85.8919	48.4129	619
287	-85.8997	48.4157	381
288	-85.9036	48.4174	233
290	-85.9064	48.4184	577
291	-85.9131	48.4210	458
292	-85.9185	48.4231	261
293	-85.9215	48.4243	346
294	-85.9256	48.4258	407
295	-85.9304	48.4276	217
296	-85.9329	48.4286	491
297	-85.9386	48.4308	280
298	-85.9419	48.4321	261
299	-85.9448	48.4334	591
300	-85.9514	48.4364	356
301	-85.9554	48.4382	385
302	-85.9597	48.4402	361
303	-85.9638	48.4420	461
304	-85.9689	48.4443	360
305	-85.9730	48.4461	443
306	-85.9779	48.4483	462
307	-85.9831	48.4507	489
308	-85.9886	48.4531	184
309	-85.9907	48.4540	366
310	-85.9948	48.4559	398
311	-85.9997	48.4579	315
312	-86.0028	48.4595	284
313	-86.0059	48.4609	565
314	-86.0123	48.4637	401
315	-86.0168	48.4657	520
316	-86.0226	48.4684	446
317	-86.0276	48.4706	518
318	-86.0334	48.4732	133
319	-86.0349	48.4739	577

Existing Structure Locations in Pukaskwa National Park Hydro One Circuit W21M/W22M			
Number	Longitude	Latitude	Span Ahead (m)
232	-85.6332	48.3214	433
233	85.6382	48.3234	526
234	-85.6442	48.3259	406
235	85.6489	48.3278	407
236	85.6535	48.3298	428
237	-85.6585	48.3318	261
238	85.6615	48.3330	439
239	85.6666	48.3349	340
240	-85.6706	48.3364	426
241	85.6757	48.3383	426
242	-85.6807	48.3402	329
243	-85.6846	48.3416	330
244	85.6885	48.3431	324
245	-85.6923	48.3445	408
246	85.6971	48.3463	452
247	85.7024	48.3482	387
248	-85.7070	48.3499	347
249	85.7111	48.3514	379
250	-85.7156	48.3530	238
251	-85.7185	48.3539	488
252	85.7243	48.3559	403
253	-85.7292	48.3575	397
254	-85.7340	48.3591	401
255	85.7388	48.3607	524
256	-85.7452	48.3629	521
257	-85.7515	48.3650	288
258	-85.7549	48.3661	393
259	-85.7597	48.3677	509
260	85.7658	48.3697	338
261	-85.7699	48.3711	371
262	-85.7744	48.3726	617
263	85.7818	48.3751	272
264	-85.7851	48.3762	522
265	-85.7914	48.3783	492
266	-85.7974	48.3802	462
267	-85.8029	48.3821	325
268	-85.8068	48.3834	480
269	-85.8126	48.3853	386
270	-85.8173	48.3869	367
271	-85.8218	48.3884	471
272	-85.8274	48.3903	460
273	-85.8330	48.3921	470
274	-85.8387	48.3940	461
275	-85.8443	48.3959	402
276	-85.8491	48.3975	781
277	-85.8525	48.3986	386
278	-85.8572	48.4001	771
279	-85.8605	48.4012	542
280	-85.8670	48.4034	278
281	-85.8703	48.4046	571
282	-85.8747	48.4062	512
283	-85.8807	48.4085	455
284	-85.8860	48.4106	786
285	-85.8893	48.4119	222
286	-85.8919	48.4129	619
287	-85.8992	48.4157	381
288	-85.9036	48.4174	233
290	-85.9064	48.4184	577
291	-85.9131	48.4210	458
292	-85.9185	48.4231	261
293	-85.9215	48.4243	346
294	85.9256	48.4258	407
295	-85.9304	48.4276	717
296	-85.9379	48.4286	491
297	85.9386	48.4308	280
298	-85.9419	48.4321	761
299	-85.9488	48.4334	591
300	85.9514	48.4364	356
301	-85.9554	48.4382	385
302	85.9597	48.4402	361
303	-85.9638	48.4420	461
304	-85.9689	48.4443	360
305	85.9730	48.4461	443
306	-85.9779	48.4483	462
307	-85.9831	48.4507	489
308	85.9886	48.4531	184
309	-85.9907	48.4540	366
310	85.9948	48.4559	398
311	-85.9992	48.4579	315
312	-86.0028	48.4595	784
313	86.0059	48.4609	565
314	-86.0123	48.4637	401
315	-86.0168	48.4657	520
316	86.0226	48.4684	446
317	-86.0276	48.4706	518
318	86.0334	48.4732	133
319	-86.0349	48.4739	577



Wind Condition	Required ROW Width (m)					Clearance to Edge of ROW (m)					Clearance Variable
	Span Length (m)					Span Length (m)					
	350	400	450	500	620	350	400	450	500	620	
50-Year Wind	46.4	50.76	55.6	60.88	75.18	0.76	-1.42	-3.84	-6.48	-13.63	$C_{50\text{-YR WIND}}$
CSA Moderate Wind	39.44	41.32	43.4	45.7	52.02	6.84	5.9	4.86	3.71	0.55	$C_{CSA\ WIND}$
OEB 5-Year Gust	36.04	38.64	41.56	44.76	53.64	5.44	4.14	2.68	1.08	-3.36	$C_{OEB\text{-}5YR\ WIND}$

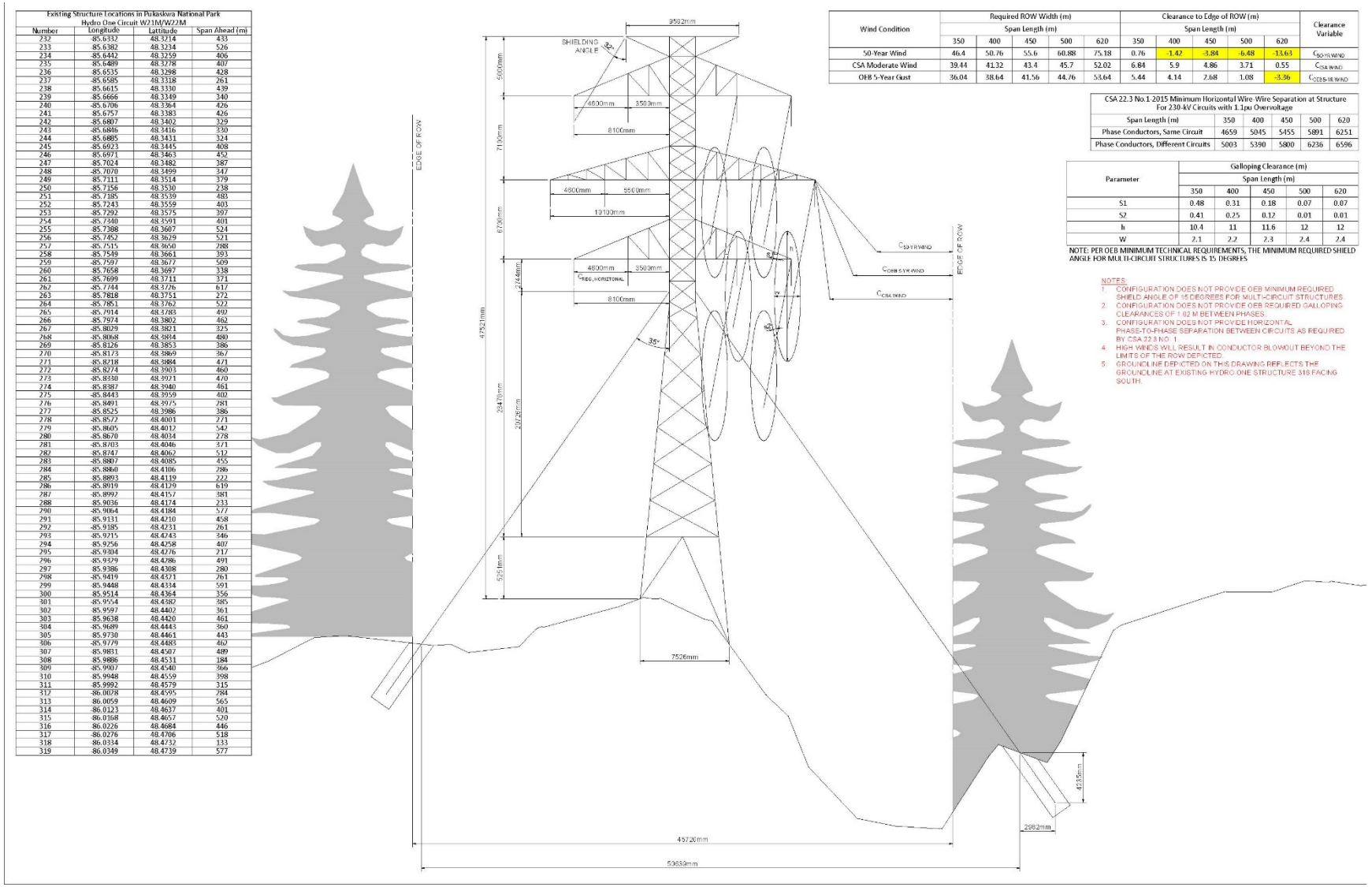
CSA 22.3 No.1-2015 Minimum Horizontal Wire-Wire Separation at Structure For 230-kV Circuits with 1.1pu Overvoltage					
Span Length (m)	350	400	450	500	620
Phase Conductors, Same Circuit	4659	5045	5455	5891	6251
Phase Conductors, Different Circuits	5003	5390	5800	6236	6596

Parameter	Galloping Clearance (m)				
	Span Length (m)				
	350	400	450	500	620
S1	0.48	0.31	0.18	0.07	0.07
S2	0.41	0.25	0.12	0.01	0.01
h	10.4	11	11.6	12	12
W	2.1	2.2	2.3	2.4	2.4

NOTE: PER OEB MINIMUM TECHNICAL REQUIREMENTS, THE MINIMUM REQUIRED SHIELD ANGLE FOR MULTI-CIRCUIT STRUCTURES IS 15 DEGREES

NOTES:
1. CONFIGURATION DOES NOT PROVIDE OEB MINIMUM REQUIRED SHIELD ANGLE OF 15 DEGREES FOR MULTI-CIRCUIT STRUCTURES.
2. CONFIGURATION DOES NOT PROVIDE OEB REQUIRED GALLOPING CLEARANCES OF 1.02 M BETWEEN PHASES.
3. CONFIGURATION DOES NOT PROVIDE HORIZONTAL PHASE-TO-PHASE SEPARATION BETWEEN CIRCUITS AS REQUIRED BY CSA 22.3 NO. 1.
4. HIGH WINDS WILL RESULT IN CONDUCTOR BLOWOUT BEYOND THE LIMITS OF THE ROW DEPICTED.
5. GROUNDLINE DEPICTED ON THIS DRAWING REFLECTS THE GROUNDLINE AT EXISTING HYDRO ONE STRUCTURE 313 FACING SOUTH.

Existing Structure Locations in Pukaskwa National Park Hydro One Circuit W21M/W22M			
Number	Longitude	Latitude	Span Ahead (m)
232	-85.6332	48.3214	433
233	-85.6382	48.3234	526
234	-85.6442	48.3259	406
235	-85.6489	48.3278	407
236	-85.6535	48.3298	428
237	-85.6585	48.3318	261
238	-85.6615	48.3330	439
239	-85.6666	48.3349	340
240	-85.6706	48.3364	426
241	-85.6757	48.3383	426
242	-85.6807	48.3402	329
243	-85.6846	48.3416	330
244	-85.6885	48.3431	324
245	-85.6923	48.3445	408
246	-85.6971	48.3463	452
247	-85.7024	48.3482	387
248	-85.7070	48.3499	347
249	-85.7111	48.3514	379
250	-85.7156	48.3530	238
251	-85.7185	48.3539	483
252	-85.7243	48.3559	403
253	-85.7292	48.3575	397
254	-85.7340	48.3591	403
255	-85.7388	48.3607	524
256	-85.7452	48.3629	521
257	-85.7515	48.3650	288
258	-85.7549	48.3661	393
259	-85.7597	48.3677	509
260	-85.7658	48.3697	338
261	-85.7699	48.3711	371
262	-85.7744	48.3726	617
263	-85.7818	48.3751	272
264	-85.7851	48.3762	522
265	-85.7914	48.3783	492
266	-85.7974	48.3802	462
267	-85.8029	48.3821	325
268	-85.8068	48.3834	480
269	-85.8126	48.3853	386
270	-85.8173	48.3869	367
271	-85.8218	48.3884	471
272	-85.8274	48.3903	460
273	-85.8330	48.3921	470
274	-85.8387	48.3940	461
275	-85.8443	48.3959	402
276	-85.8491	48.3975	781
277	-85.8525	48.3986	386
278	-85.8572	48.4001	771
279	-85.8605	48.4012	542
280	-85.8670	48.4034	278
281	-85.8703	48.4046	571
282	-85.8747	48.4062	512
283	-85.8807	48.4085	455
284	-85.8860	48.4106	786
285	-85.8893	48.4119	222
286	-85.8919	48.4129	619
287	-85.8992	48.4157	381
288	-85.9036	48.4174	233
290	-85.9064	48.4184	577
291	-85.9131	48.4210	458
292	-85.9185	48.4231	261
293	-85.9215	48.4243	346
294	-85.9256	48.4258	407
295	-85.9304	48.4276	717
296	-85.9379	48.4286	491
297	-85.9386	48.4308	280
298	-85.9419	48.4321	761
299	-85.9488	48.4334	591
300	-85.9514	48.4364	356
301	-85.9554	48.4382	385
302	-85.9597	48.4402	361
303	-85.9638	48.4420	461
304	-85.9689	48.4443	360
305	-85.9730	48.4461	443
306	-85.9779	48.4483	467
307	-85.9831	48.4507	489
308	-85.9886	48.4531	184
309	-85.9907	48.4540	366
310	-85.9948	48.4559	398
311	-85.9992	48.4579	315
312	-86.0028	48.4595	784
313	-86.0059	48.4609	565
314	-86.0123	48.4637	401
315	-86.0168	48.4657	520
316	-86.0226	48.4684	446
317	-86.0276	48.4706	518
318	-86.0334	48.4732	133
319	-86.0349	48.4739	577



Wind Condition	Required ROW Width (m) Span Length (m)					Clearance to Edge of ROW (m) Span Length (m)					Clearance Variable
	350	400	450	500	620	350	400	450	500	620	
50-Year Wind	46.4	50.76	55.6	60.88	75.18	0.76	-1.42	-3.84	-6.48	-13.63	$C_{50\text{-YR WIND}}$
CSA Moderate Wind	39.44	41.32	43.4	45.7	52.02	6.84	5.9	4.86	3.71	0.55	$C_{CSA\ WIND}$
OEB 5-Year Gust	36.04	38.64	41.56	44.76	53.64	5.44	4.14	2.68	1.08	-3.36	$C_{OEB\text{-}5YR\ WIND}$

CSA 22.3 No.1 2015 Minimum Horizontal Wire-Wire Separation at Structure For 230-kV Circuits with 1.1pu Overvoltage					
Span Length (m)	350	400	450	500	620
Phase Conductors, Same Circuit	4659	5045	5455	5891	6251
Phase Conductors, Different Circuits	5003	5390	5800	6236	6596

Parameter	Galloping Clearance (m) Span Length (m)				
	350	400	450	500	620
S1	0.48	0.31	0.18	0.07	0.07
S2	0.41	0.25	0.12	0.01	0.01
h	10.4	11	11.6	12	12
W	2.1	2.2	2.3	2.4	2.4

NOTE: PER OEB MINIMUM TECHNICAL REQUIREMENTS, THE MINIMUM REQUIRED SHIELD ANGLE FOR MULTI-CIRCUIT STRUCTURES IS 15 DEGREES

NOTES:
1. CONFIGURATION DOES NOT PROVIDE OEB MINIMUM REQUIRED SHIELD ANGLE OF 15 DEGREES FOR MULTI-CIRCUIT STRUCTURES.
2. CONFIGURATION DOES NOT PROVIDE OEB REQUIRED GALLOPING CLEARANCES OF 1.02 M BETWEEN PHASES.
3. CONFIGURATION DOES NOT PROVIDE HORIZONTAL PHASE-TO-PHASE SEPARATION BETWEEN CIRCUITS AS REQUIRED BY CSA 22.3 NO. 1.
4. HIGH WINDS WILL RESULT IN CONDUCTOR BLOWOUT BEYOND THE LIMITS OF THE ROW DEPICTED.
5. GROUNDLINE DEPICTED ON THIS DRAWING REFLECTS THE GROUNDLINE AT EXISTING HYDRO ONE STRUCTURE 318 FACING SOUTH.

Robert E. Nickerson, P.E.
Consulting Engineer
37 Bay View Road
Harwich Port, MA 02646
Cell: 817-319-8779
email: renicker@flash.net

General Qualifications

Robert E. Nickerson, P.E. is a consulting engineer. He has been a licensed engineer in the state of Texas since 1984. Mr. Nickerson has extensive experience in the analysis, design, and full-scale testing of transmission structures. Mr. Nickerson has been an independent consultant since 1999. He works with a number of national electric utilities. In addition, Mr. Nickerson has worked with other consultants to complete large projects. During his career, he has developed relationships with national and international experts that are used as necessary to support project activities.

He is very active in the Structural Engineering Institute (SEI) of the American Society of Civil Engineers and is currently a member of the SEI Board of Governors as well as the Executive Committee of the Technical Activities Division of SEI which has oversight of nine Technical Activity Committees. These committees develop technical publications, technical sessions for conferences, specialty conferences, provide articles for journals, manuals of practice, committee reports and more. He is the Chair of the ASCE Standards Committee on Design of Lattice Steel Transmission Structures (ASCE Standard 10) and is a member of the ASCE Standards Committee on Design of Steel Transmission Pole Structures (ASCE Standard 48).

In 2007 Mr. Nickerson was the recipient of the Gene Wilhoite Innovations in Transmission Line Engineering Award given by the Structural Engineering Institute of ASCE.

In 2013 Mr. Nickerson was the recipient of the SEI President's Award in recognition of his exemplary leadership and contributions to the success of the Structural Engineering Institute of ASCE.

Mr. Nickerson has 39 years of professional experience in the electric transmission industry.

Professional Experience

Consulting Engineer – Fort Worth, Texas
1999 - Present Consulting Engineer

Consulting and engineering project development for utility clients. Structural assessment, analysis, and design of lattice transmission towers and tubular poles, substation structures, and telecommunication structures. Upgrade and uprate analysis of transmission line systems.

J.A. Jones Power Delivery, Inc.
1995-1999 Vice President and Consulting Engineer

Vice President and Consulting Engineer, January 1998 – April 1999. Served as Vice President and General Manager, EPRI Power Delivery Center, January 1996-December 1997, and Operations Manager, EPRI Power Delivery Center, January 1995-December 1995.

Sverdrup Technology, Inc.
1989-1994 Operations Manager
Responsible for program and project management as operations contractor at EPRI Power Delivery Center, January 1989-December 1994

Anchor Metals, Inc.
1978-1989 Structural Engineer
Manager of Engineering, 1987-1989, Assistant Chief Engineer, 1983-1987, Senior Design Engineer, 1981-1983, Design Engineer, 1978-1981

EDUCATION AND PROFESSIONAL DEVELOPMENT

- Southeastern Massachusetts University**,** BS Civil Engineering, (now the Univ. of Massachusetts at Dartmouth)
- Managing Managers, Texas Christian University, 1993.
- Team Leader/ Facilitator Training, Sverdrup Technology, 1992.
- Design of Transmission Line Structures and Foundations, University of Wisconsin, 1982.

PROFESSIONAL REGISTRATION AND AFFILIATIONS

- Professional Engineer, Texas, 1984, #55224
- Professional Engineer, West Virginia, 2008, #17890
- Professional Engineer, Georgia, 2010, PE034943
- Professional Engineer, North Carolina, 2010, #036994
- Professional Engineer, South Carolina, 2010, #28291
- Professional Engineer, Maryland, 2010, #38687
- Professional Engineer, Virginia, 2010, #0402047714
- Professional Engineer, Ohio, 2010, #74874
- Professional Engineer, Indiana, 2015, PE11500388
- Professional Engineer, Massachusetts, 2017, 53271
- Member since 1976, American Society of Civil Engineers (ASCE/SEI)
- Governor, SEI Board of Governors 2016-Present
- Member, Executive Committee of Technical Activities Division of SEI 2011-Present
- Chair, Special Design Issues Committee (ASCE/SEI) 2007-2010
- Chair, Electrical Transmission Structures Committee (ASCE/SEI) 2004-2007
- Steering Committee, 2002 Electrical Transmission Conference, September 9-12, 2002, Omaha, NE
- Chair, 2006 Electrical Transmission Conference, October 15-19, 2006, Birmingham, AL
- Steering Committee, 2009 Electrical Transmission Conference, November 5-11, 2009, Fort Worth, TX
- Steering Committee, 2012 Electrical Transmission Conference, November 4-8, 2012, Columbus, OH
- Steering Committee, 2016 Electrical Transmission Conference, September 27-October 1, 2016, Branson, MO
- Steering Committee, 2018 Electrical Transmission Conference, November 4-8, 2012, Atlanta, GA
- Chair, ASCE Standards Committee on Design of Lattice Steel Transmission Structures (ASCE 10)
- Past Member, ASCE Guidelines for Electrical Transmission Line Structural Loading, Manual No. 74, 3rd Edition revision.
- Previous Vice-Chairman, ASCE Guide to Design of Guyed Transmission Structures, Manual No. 91
- Previous Secretary, ASCE Standards Committee on Design of Steel Transmission Pole Structures and currently member of Standards Committee (ASCE 48).
- Member, Institute for Electrical and Electronics Engineers (IEEE)
- Member of CIGRE

AWARDS

- 2007 Recipient of the Gene Wilhoite Innovations in Transmission Line Engineering Award
- 2013 Recipient of the President's Award of the Structural Engineering Institute of ASCE

Memorandum

DATE: April 30, 2018

TO: NextBridge Infrastructure LP

FROM: Rich Bolbrock

RE: Ontario Lake Superior Link Project by Hydro One Networks Inc.; EB-2017-0364

Overview

I have been requested by NextBridge Infrastructure LP (NextBridge) to review Hydro One Networks, Inc.'s (Hydro One) proposal to build the Lake Superior Link (LSL).

My professional background involves extensive experience in bulk power system planning, operations, and wholesale markets. My biographical summary and experience are attached to this memorandum.

My review included Hydro One's LSL Leave to Construct Application (Application) with the IESO's System Impact Assessment Report (Additional Evidence), the IESO's December 15, 2015 Assessment of the Rationale for the East-West Tie Expansion (Third Update Report), and the IESO's December 1, 2017 Updated Assessment of the Need for the East-West Tie (EWT) Expansion (collectively IESO Needs Assessments), and applicable reliability standards and criteria.

In the LSL Application, Hydro One states that "Within the Pukaskwa National Park, the existing Hydro One, double-circuit X7S structures will be replaced with new guyed, four circuit lattice-steel towers." Application, Exhibit C, Tab 2, Schedule 1, page 3. In Exhibit C, Tab 1, Schedule 1, page 3, Hydro One further states:

> Upon reaching the boundary of the National Park, the new double circuit line will terminate on a dead-end structure and the two circuits will transfer to new, four-circuit structures shared with the existing East-West Tie Line (circuits W21M/W22M). The new line will then continue through the Park, supported by the four-circuit structures shared with the existing line for approximately 87 spans. Then, reaching the Park's southeastern boundary, the two new circuits will separate from the existing structures and return to being supported by double circuit, guyed masts, adjacent to the existing East-West Tie Line.

Hydro One states the in-service date for the LSL is December 2021. Application Exhibit B, Tab 1, Schedule 1 at Page 8.

Updated Assessment of the Need for the EWT Expansion (December 1, 2017)

From a transmission planning and operations perspective, the key findings in the IESO's 2017 Needs Assessment are:

- The IESO continues to recommend an in-service date of 2020 for the E-W Tie Expansion project. (Pages 2, 10).

- The E-W Tie planning limit, consistent with the December 2015 Report, is 155/175 MW which respects the loss of the E-W Tie from Marathon TS to Lakehead TS. Staying under this limit ensures that, following contingencies on the E-W Tie, voltage levels in the Northwest are within acceptable ranges, and equipment, including the Manitoba and Minnesota ties, stays within thermal limits. (Pages 12-13)

- However, as previously discussed, this E-W Tie planning limit relies on support from Manitoba following contingencies on the E-W Tie, which cannot be counted on for more than 30 minutes. As a result, there must be sufficient capacity in the Northwest to not only adequately supply the expected demand in the Northwest while staying under this planning limit, but also to reduce flows on the Manitoba and Minnesota ties to zero (or the scheduled transfer level) within 30 minutes. (Page 13)

- For example, following the loss of the E-W Tie from Wawa TS to Marathon TS, the Northwest will be separated from the rest of Ontario and power will automatically flow from Manitoba and Minnesota to supply the Northwest. Action must then be taken to re-dispatch resources within the Northwest to return to scheduled flow levels and there must be sufficient capacity in the Northwest to do so. (Page 13)

- A 100 MW capacity need already exists today, and this need continues to grow to approximately 240 MW by the original 2020 in-service date. By 2022, the capacity need exceeds 260 MW, and grows to approximately 400 MW by 2024. The need for additional capacity increases to about 500 MW by 2035 as demand continues to grow and as supply changes. (Page 13)

- In this update, expected westbound flows exceed the existing E-W Tie capability approximately 5% of the time. This is based on application of the winter rating of 175 MW throughout the year. Applying the more restrictive limit of 155 MW during the summer months would result in a higher level of westbound congestion. Eastbound congestion is expected to occur approximately 6% of the time in 2023. (Page 14).

- The E-W Tie Expansion provides additional benefits, beyond meeting the reliability requirements of the Northwest, which are unique to a transmission solution. These include system flexibility, removal of a barrier to resource development, reduced congestion payments, reduced line losses, increased economic imports from Manitoba, decreased carbon emissions, and improved operational flexibility. These benefits are additive to the economic benefits and form an important part of the rationale for the project. (Page 18).

In contrast to the IESO's Needs Assessments confirming the need for the EWT in 2020 for all of the above reasons, Hydro One is proposing an in-service date of December 2021. Hydro One, however, provides no technical analysis to support this proposed in-service date. From a transmission planning and operations perspective, the lack of technical analysis to support Hydro One's proposed in-service date of December 2021 is a fatal flaw.

Hydro One claims that a 2021 in-service date is appropriate because of ". . . the low probability of coincidental events resulting in a capacity shortfall, this delay [to December 2021] is manageable through existing operational practices." Exhibit B, Tab B, Schedule 1, Page 8. This statement is far from a technical analysis showing that it is acceptable to move the in-service date as Hydro One proposes. The significance of Hydro One's flawed position is magnified by the fact that IESO's Needs Assessments were undertaken with considerable technical acumen when deciding whether the EWT should be constructed by the end of 2020.

In addition, Hydro One's proposal to use 87 quad circuit towers for approximately 35 kilometers through Pukaskwa National Park is not congruent with the IESO's identification of the system and operational benefits associated with the proposed new two circuit EWT that was the subject of both the 2015 and 2017 Needs Assessments. Specifically, Hydro One's design includes a single point of failure for the existing and new EWT for the 87 quad circuit towers. This design does not mitigate, but, rather, perpetuates the following reliability risks which were to be addressed by the new EWT having separate towers and corridors:

> The E-W Tie planning limit, consistent with the December 2015 Report, is 155/175 MW which respects the loss of the E-W Tie from Marathon TS to Lakehead TS. Staying under this limit ensures that, following contingencies on the E-W Tie, voltage levels in the Northwest are within acceptable ranges, and equipment, including the Manitoba and Minnesota ties, stays within thermal limits.
>
> . . . this E-W Tie planning limit relies on support from Manitoba following contingencies on the E-W Tie, which cannot be counted on for more than 30 minutes. As a result, there must be sufficient capacity in the Northwest to not only adequately supply the expected demand in the Northwest while staying

> under this planning limit, but also to reduce flows on the Manitoba and Minnesota ties to zero (or the scheduled transfer level) within 30 minutes.
>
> For example, following the loss of the E-W Tie from Wawa TS to Marathon TS, the Northwest will be separated from the rest of Ontario and power will automatically flow from Manitoba and Minnesota to supply the Northwest. Action must then be taken to re-dispatch resources within the Northwest to return to scheduled flow levels and there must be sufficient capacity in the Northwest to do so.

Hydro One's proposal did not provide any technical analysis showing that it is acceptable for Northwest Ontario to be exposed to a single point of failure that could implicate these limits. From a transmission and operations perspective, the two double circuit design for all of the existing and new EWT is superior, because that design provides operational flexibility to address these limits in real-time.

The IESO System Impact Assessment Report

The IESO System Impact Assessment ("SIA") report, (filed by Hydro One on 2018-03-29, Additional Evidence, EB-2017-0364, Exhibit F-01-01, Attachment 3) has, in my opinion, only marginally endorsed the interconnection of the LSL project. For example, the IESO indicates that the quadruple circuits on common towers creates single failure point as an extreme contingency that can result in the Northwest system shedding a minimum of 100MW load[1] to keep the rest of the system reliable. Also, in the Additional Evidence at page 2, the IESO findings include concerns and suggest mitigation measures:

> Extreme contingencies that result in the loss of the four 230 kV circuits of the East-West Tie **such as failure of a quadruple circuit tower can result in separation between the Northwest transmission zone and the rest of the IESO-controlled grid**. **Following such events, timely system restoration is critical to avoid the risk of supply shortages to the customers in the zone**; and
>
> Outages to the existing East-West Tie circuits will be required to install the project, especially the 35 km section between Wawa TS and Marathon TS where the existing double circuit towers of W21M and W22M will be replaced with quadruple circuit towers to accommodate the new W35M and W36M circuits. **An outage plan that contains the details of this replacement has not been presented to the IESO at the time of this report.** (Emphasis added).

[1] Northwest Special Protection Scheme #2 (NW SPS 2) contains the contingency conditions arising from the reconfiguration of the 230 kV switchyards at the terminal transformer stations; actions include load rejection of around 100 MW to maintain post-contingency stability in the Lakehead TS 115 kV area. (Final SIA Report, CAA ID 2017-628, P. 20).

The SIA at page 13 further discussed the possible frequency of the loss of the quadruple circuits, stating that "The Northwest zone is prone to thunderstorms from April 1st to October 31st." Therefore, the IESO on this same page states that during this seven month period in a year it will have to prepare the system to withstand the loss of all four 230 kV circuits "either reducing the transfer pre-contingency or by arming load rejection". The listing of these concerns shows that the IESO views the quad circuit design as one that presents additional reliability risks. This discussion in the SIA is also indicating that Hydro One has not presented the requisite plans for the IESO to understand if the risks can be adequately mitigated.

In addition, as explained by the IESO on page 13, at the time of the SIA study, the load rejection scheme, referred to as NW SPS 2, did not provide features for detecting extreme contingencies involving more than 2 circuits – which is clearly an issue for a quad circuit configuration. The feasibility and implementation of such a load shedding scheme notwithstanding, the arming for two double-contingencies in preparation for the loss of the four circuits can and will result in unnecessary load disconnection if this extreme contingency occurs.

Further, the NW SPS 2 is already a very complex scheme. It becomes more complex with the modifications needed to accommodate the loss of a quad tower and its operation becomes more likely. These schemes are usually employed only when there are no other reasonable options. Thus, from an operational perspective, proceeding with quad circuit design without a resolution of the NW SPS 2 issue adds an additional layer of risk that has not been addressed by Hydro One's evidence.

SIA's references to the mid-term 650 MW need in the Northwest Zone

The IESO's SIA at page 7 states:

> . . . once the new SVC is installed at Marathon TS, the East-West Tie transfer capability can be increased to 650 MW westward. At this increased transfer level, Marathon TS, together with all of the 230 kV circuits that terminate at that station (existing: M23L, M24L, W21M and W22M, and new: M37L, M38L, W35M and W36M) **are expected to fall within the NPCC's BPS definition**. Additional tests will be required to determine the future status of the terminal transformer stations, once the model for the Marathon SVC becomes available.

This finding of the IESO is significant from a transmission planning perspective, because once the LSL project and its quad circuit design are classified as Bulk Power System (BPS) element, the Northeast Power Coordinating Council (NPCC) planning and operation reliability standards will apply. See NPCC Regional Reliability Reference Directory # 1, Design and Operation of the Bulk Power System: Table 1 - Planning Design Criteria: Contingency events, Fault type and Performance requirements to be applied to bulk power system elements; and

Table 3 - Operating Criteria: Contingency events, Fault type and Performance requirements to be applied to bulk power system elements to establish transfer capabilities.

NPCC standards do not favor quad circuit towers. In fact, NPCC states that "if multiple circuit towers are used **only for station entrance and exit purposes, and if they do not exceed five towers at each station**, then this condition is an acceptable risk and therefore can be excluded." The LSL will not be consistent with this NPCC standard, since it will consist of 87 quad circuit towers, not 5, and the towers are not entering or exiting a station. Therefore, as a result of the Hydro One proposal to have 87 quad circuit towers, the East West transfer limit cannot be increased to 650 MW without possibly violating the NPCC planning criteria under TPL-001-4. Again, Hydro One's Application and evidence does not address this issue, and, therefore, I view this as another fatal flaw in the Application from a transmission planning perspective. To overcome this possible violation, NPCC must grant an exception for exclusion of the LSL as BPS, or a third EWT transmission line will need to be constructed and operated in parallel to for the whole entire length of the quadruple circuits. It is my judgment, based on many years of service on various NPCC reliability committees, that it is unlikely that such an exception would be granted.

Conclusion

From a transmission planning and operations perspective, I view Hydro One's quad circuit design as flawed. As stated herein Hydro One's proposal increases a number of reliability risks and may cause a violation of NPCC reliability standard. In the face of these concerns, Hydro One has presented no technical analyses. Thus, I would recommend against the Ontario Energy Board proceeding with Hydro One's LSL proposal as currently designed.

Biographical Summary

RICHARD J. BOLBROCK, P.E.

Richard J. Bolbrock has been an independent consultant since 2008, serving the needs of power industry entities including Municipal electric utilities, law firms, infrastructure developers, and other consulting firms. He was formerly ***Executive Vice President - Power Markets*** for the Long Island Power Authority where he directed and controlled all aspects of LIPA's resource plans and policies, power and fuel operations, policies and procedures for day-to-day operations of generating facilities and transmission interconnections, energy efficiency and renewable technologies programs, transmission planning, energy risk management, environmental affairs, generation and transmission project management, and external agency coordination with three northeast ISOs, FERC, NYSRC, NPCC, and NERC. He designed, developed and implemented LIPA's retail access program as well as energy efficiency and renewable technologies programs (aka Clean Energy Initiative). He initiated and led development of the 330 Mw Cross Sound and 660 Mw Neptune HVDC submarine cable projects connecting Long Island to Connecticut and New Jersey respectively. For each project Mr. Bolbrock was responsible for developing and evaluating the RFPs, negotiating the Firm Transmission Capacity Purchase Agreements, overseeing project licensing and construction including required on-island infrastructure enhancements, developing scheduling protocols and day-to-day operation, and issuing RFPs and negotiating power purchase agreements for delivery over the cables. Mr. Bolbrock also managed the design, issuance and selection of multiple RFPs that culminated in the construction of 400 Mw of combustion turbines on a fast-track basis and a 350 Mw combined cycle plant. In addition, Mr. Bolbrock initiated and successfully led a joint effort with Northeast Utilities to replace and upgrade a 138kV submarine cable between Long Island and Connecticut. Mr. Bolbrock established LIPA's energy risk management function and conceptualized and developed the first comprehensive energy plan for Long Island. Prior to joining LIPA, he was ***Director of New England Power Planning*** (NEPLAN), the planning arm of the New England Power Pool and its successor organization ISO-New England. At NEPOOL his responsibilities included economic & load forecasting, transmission planning, power supply planning, information technology, public information & governmental affairs, and control center facilities management. His experience in New England included conduct of the various complex technical studies needed to integrate the 2000 Mw HVDC interconnection between Quebec and New England as well as the financial analyses and studies in support of contract negotiations with Hydro Quebec. Mr. Bolbrock received the Bachelor of Science degree in Electrical Engineering and the Master of Engineering degree in Electric Power Engineering from Rensselaer Polytechnic Institute. He was elected the first Chairman of the New York State Reliability Council, LLC, served as Interim Chairman of the Northeast Power Coordinating Council, Inc. Board of Directors, and as Acting Chairman of the NPCC Cross Border Regional Entity, Inc. Board of Directors. He was also a member of the NERC Member Representatives Committee, the NPCC Reliability Coordinating Committee, the Board of Directors of the New York Energy Group, Inc., and the Environment/Energy Committee of the Long Island Association. Mr. Bolbrock is a registered professional engineer and a Life Member of IEEE.

April 2018

CRA Charles River Associates

Prepared for:

NextBridge Infrastructure

Prepared by:

Christopher Russo

Vice President

Charles River Associates

401 Bay Street, Suite 600

PO Box #46

Toronto, ON M5H 2Y4

Date: April 30, 2018

1. Introduction

Charles River Associates was asked by NextBridge Infrastructure LP to review whether Hydro One Network, Inc.'s ("Hydro One") proposal to replace 87 double circuit transmission towers with quad circuit transmission towers through Pukaskwa National Park is consistent with the findings in the IESO's Assessment of the Rationale for the East-West Tie ("EWT") Expansion (Third Update Report) December 15, 2015, and the IESO's December 1, 2017 Updated Assessment of the Need for the EWT ("IESO Need Assessments"). As I explain below, I conclude that Hydro One's quad circuit proposal is inconsistent with the IESO Need Assessments and will pose a barrier to resource development in Northern Ontario. Therefore, Hydro One cannot rely on the IESO Needs Assessments to show a need for the Lake Superior Link.

2. Background

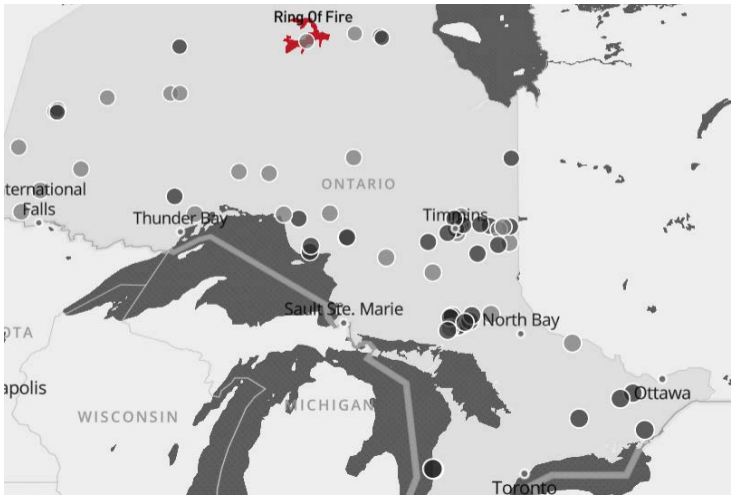
As cited in both the 2015 and 2017 IESO Need Assessments for the East-West Tie ("EWT"), the EWT was identified as a priority project in the Ontario Government's 2010 and 2013 Long-Term Energy Plans ("LTEP"). The 2013 LTEP at pages 52-53 stated:

> *Northwestern Ontario has recently received a lot of attention when it comes to electricity planning. That's in part because while provincial demand is generally flat, there could soon be a significant increase in energy demand in northwestern Ontario, largely because of an expected increase in mining activity...The new East-West Tie line will reduce transmission constraints and allow a greater two-way flow of electricity across Northern Ontario...While the new East-West Tie line will provide a new source of supply for the northwest, the 2013 LTEP anticipates that new resources may also be needed to make sure that users in specific parts of the northwest have the power they need.*

The 2017 IESO Needs Assessment also cited that on March 10, 2016, the Minister of Energy issued an Order in Council ("OIC") that stated, among other things, that the EWT was a priority project to be in-service by the end of 2020 to "…maintain a reliable and cost-effective supply of electricity in the Province's Northwest, increase operational flexibility, reduce congestion payments and remove a barrier to resource development in the region." Consistent with the LTEPs and OIC, the IESO Needs Assessments focus is on the reliable and cost-effective supply of electricity to Northwest Ontario in the context of load supply needs, with a continued focus on industrial development, including mining, in that region. In other words, the Needs Assessment does not attempt to resolve a future violation of a North American Electric Reliability Corporation Reliability Standard, but, rather, the Assessments confirm the need in 2020 for a reliable source of electric to meet the unique needs of the loads in Northwest Ontario.

For example, each of the IESO 2017 Need Assessment demand outlook cases focuses on the mining sector, and for good reason. Ontario is home to the largest mineral production in Canada, with an industry valued at approximately $10.6 billion in 2016. To give a sense of the number of industrial electricity consumers (in this case, mines) that would potentially be impacted by the EWT, I have included a map that illustrates the number of active mines as well as those in advanced exploration status in Northwestern Ontario today. Active mines are indicated by dark grey circles, while those in advanced exploration state are indicated by light grey circles.

Figure 1. Mines in Ontario[1]



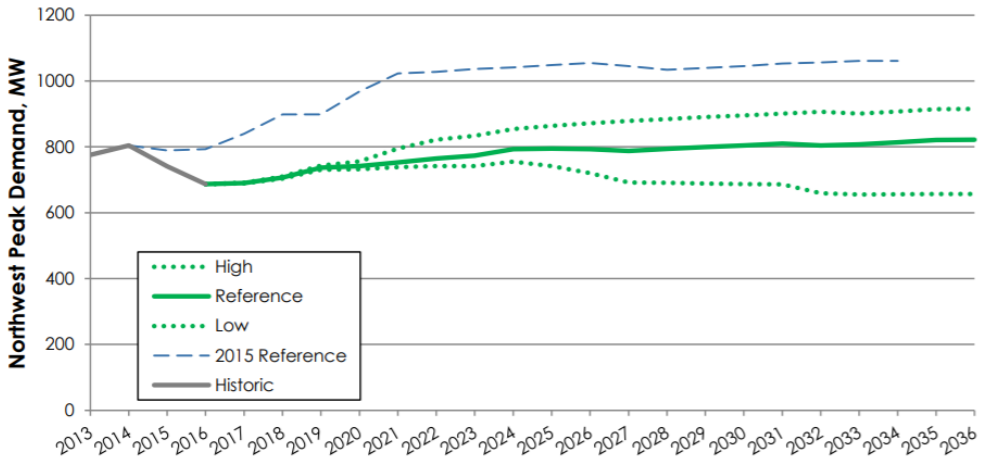
This figure serves to illustrate that there is a flurry of economic activity at the industrial level occurring in Northern Ontario. This is discussed in greater detail in the sections that follow.

3. IESO's Needs Assessments and Hydro One's Quad Transmission Circuit Tower Design

Consistent with the 2013 LTEP, the IESO's Needs Assessments cited potential growth of the mining sector as a contributor to peak demand forecasts in the region. Figure 2 shows the historical demand outlooks from the IESO's 2015 and 2017 needs assessments with the green line representing the 2017 reference case.

1 InvestinOntario. Mining. <https://www.investinontario.com/mining>

Figure 2. Peak demand outlook for the Northwest (IESO)



Because one of the goals of the EWT is to remove barriers and incentivize resource development in the Northwest, the EWT must provide a level of reliability that will meet the power needs of those industries it plans to serve. Industrial reliability needs often differ from those demanded by commercial and residential sectors. For industrials and mining, the risk of a single point of failure is large enough to deter investment in the region. In 2012, a report on the opportunities and challenges for mining in Northwestern Ontario[2] was published to support this claim. The report stated that:[3]

> *The transmission line system in NWO [Northwestern Ontario] consists of 230KV and 115 KV lines, as well as secondary single sets of wires or radial lines. Figure 22 shows four areas within the region that have no redundancy. When these lines are broken, there is no means by which power supply can be continued without interruption. Power supply resumes only when the problem has been isolated and repaired. This situation can take several days and can result in the shut-down of home heating, mines, processing facilities, businesses, hospitals, etc. In addition, most of the existing radial lines are operating at maximum capacity and there is no additional power available for growth, whether it be for industrial, residential or institutional.*

The report further noted concern with reliance on the existing EWT:[4]

2 This report was commissioned by Ambassador's Northwest, with support from the City of Thunder Bay, Thunder Bay CEDC, Thunder Bay Ventures, Thunder Bay Chamber of Commerce, Northwestern Ontario Municipal Association, Lakehead University and Confederation College of Applied Arts and Technology.

3 The Northwestern Ontario Joint Task Force. *Mining in Northwestern Ontario: Opportunities and Challenges.* September 27, 2012 at 67. <http://www.thunderbay.ca/Assets/CEDC/docs/Mining+in+Northwestern+Ontario+-+opens+a+new+window.pdf>

4 Id. at 68.

> *The main East-West transmission line between Wawa and Marathon was down for 10 days last September as a result of a tower being knocked down during a severe storm.*

In contrast to removing barriers to resource development in the region and meeting the needs of Northwest Ontario as set forth in the LTEPs, OIC, and IESO Needs Assessments, the Hydro One proposed quad circuit tower design with a single point of failure is likely to create a disincentive to the mining and other industries to locate in the Northwest. In Hydro One's Additional Evidence at page 2 (the IESO System Impact Assessment ("SIA"), the IESO findings included concerns related to the single point of failure, stating:

> *Extreme contingencies that result in the loss of the four 230 kV circuits of the East-West Tie such as failure of a quadruple circuit tower can result in separation between the Northwest transmission zone and the rest of the IESO-controlled grid. Following such events, timely system restoration is critical to avoid the risk of supply shortages to the customers in the zone; [and]*
>
> *Outages to the existing East-West Tie circuits will be required to install the project, especially the 35 km section between Wawa TS and Marathon TS where the existing double circuit towers of W21M and W22M will be replaced with quadruple circuit towers to accommodate the new W35M and W36M circuits. An outage plan that contains the details of this replacement has not been presented to the IESO at the time of this report.*

The SIA at page 13 further stressed the likelihood of the occurrence of loss of quadruple circuits, stating that: "The Northwest zone is prone to thunderstorms from April 1st to October 31st." During this seven (7) month period in a year, the IESO's system operators will have to prepare the system to withstand the loss of all four 230 kV circuits "either reducing the transfer pre-contingency or by arming load rejection."

4. Concluding Remarks

Hydro One's quad circuit tower approach cannot be squared with the needs of the Northwest region as set forth in the LTEPs, OIC, and IESO Needs Assessments, including the need to remove barriers to resource development. Therefore, I conclude that Hydro One's Application and Additional Evidence has not adequately addressed the identified need.

In contrast, as studied in the IESO Needs Assessments, a redundant new double circuit EWT provides a level of reliability that meets the needs of Northwest Ontario, including the mining and industrial sectors. By incentivizing resource development and investment, the region stands to also benefit from broader socio-economic benefits that arise from job creation and

tax income.[5] In addition, the mining industry contributes on average, $2.6 billion per year in taxes and royalties.[6] Increasing transmission capacity reliability to the Northwest would also enhance the potential for development and connection of renewable energy facilities, which can be factored into future plans.

5 The Ontario Mining Association stated that Ontario's mineral production including indirect and induced economic impacts provides for more than $12 billion in Canadian GDP. On the employment side, total employment for the mineral sector is 78,800 in 2015. (Source: Ontario Mining Association. *Mining in Ontario: The Latest Trends and Industry Outlook*)

6 Canadian Intergovernmental Conference Secretariat. *Backgrounder – Energy and Mines Ministers' Conference 2017 – Mining.* 2017 Energy and Mines Ministers' Conference. < http://www.scics.ca/en/product-produit/backgrounder-energy-and-mines-ministers-conference-2017-mining/>

CRA Charles River Associates

Christopher J. Russo

Vice President

MS, Technology & Policy (Energy)
Massachusetts Institute of Technology

BS, Mechanical Engineering
Tufts University

Christopher Russo is a Vice President and the head of CRA's Energy Practice. He advises domestic and international clients in the electricity and gas industries in the areas of investment strategy and economic analysis, asset valuation, energy technology, and generation and transmission development. His expertise covers electricity and gas markets in North America, Europe, the Middle East, and worldwide.

He has testified in litigation and regulatory matters on issues regarding the economics, planning and operation of energy markets and has testified numerous times at trial. Mr. Russo also served on the Board of Directors of Neuco, a Boston-based company which provides software to enable neural network control of coal and gas-fired power plants.

Prior to joining CRA, Mr. Russo was a senior consultant with Cambridge Energy Research Associates in Paris, and prior to that, owned his own energy consulting firm as well as working for ABB Corporate Research in the US and Switzerland. He started his career at MIT as the Plant Engineer for the campus cogeneration power plant, and later held an academic appointment as a Visiting Scientist at the MIT Energy Laboratory where he investigated electricity technology and energy policy.

Areas of Expertise

Mr. Russo is an energy economist and consultant with expertise in the following areas:

- The dynamics of electricity and gas markets in North America, Europe and worldwide, including market operations, regulatory economics, system planning, physical and economic grid characteristics, generation/dispatch system operations, power systems, and power plant operations. His experience covers nuclear, coal-fired, gas, hydroelectric and renewable (including solar, wind and hydro) generation resources and transmission projects.
- Expert witness testimony and reports related to energy disputes in multiple venues
- Strategic planning and advice for companies engaged in energy markets
- Financial valuations and assessments of generation and transmission assets
- Master planning for energy systems, including assessments of upstream supply sources, energy conversion, transmission, and demand sectors

Professional History

2007–Present *Vice President & Practice Leader*, Charles River Associates, Boston

(*Previously held positions as Associate Principal, Principal and Vice President)*

2006 *Senior Consultant*, Cambridge Energy Research Associates (CERA), Paris

1999–2006 *Principal*, Russo & Associates LLC, Boston

- Worked with numerous market participants and regulators in markets in the US and abroad on the operations and software for restructured energy markets.
- Provided economic analysis for market participants and regulators on generation and transmission assets.

1998–2002 *Consultant*, Department of Energy & Global Change, ABB Corporate Research Center, Baden-Dättwil, Switzerland

- Investigated CO_2 reduction strategies, new generation, and end-use technologies and helped to initiate the China Energy Technology Program. Acted as liaison between ABB and MIT. Worked closely with researchers from ETHZ and PSI. Held a Visiting Scientist appointment at the MIT Energy Laboratory.

1995–1998 *Plant Engineer*, MIT Cogeneration Project, Massachusetts Institute of Technology, Cambridge, MA

- Managed gas turbine and cogeneration plant operations, negotiated environmental permits, managed gas market purchases and contracts, and performed regular performance analyses for a cogeneration and district energy plant. Was a guest lecturer in the Department of Aeronautics teaching students about gas turbine technology.

Selected Commercial Consulting Experience

- Mr. Russo has directed the analysis of over one hundred transmission and generation assets for utilities, equity and debt investors, infrastructure funds, regulators and market operators. He has analyzed assets in all major power markets, including ISO-NE, PJM, ERCOT, SPP, SERC, NYISO, CAISO, IESO, AESO, MISO and the Pacific Northwest. These include thermal, renewable, and hydro assets.
- Mr. Russo directed and lead due diligence efforts related to nuclear technology and power markets for a major private equity investor acquiring a nuclear fuel and services vendor in bankruptcy.
- Mr. Russo led the analysis for a major foreign investor entering the North American gas pipeline, processing and midstream market, consisting of strategic guidance and the analysis and due diligence of numerous North American and Mexican midstream assets.
- Mr. Russo supervised the analysis for the Alberta Electric System Operator on the development of new capacity market mechanisms in the provincial electricity market.
- Mr. Russo led the financial and transactional analysis for a group of investors on a combined heat and power gas-fired cogeneration plant.

- For a major renewable energy and transmission developer, Mr. Russo led the analysis of market impacts of proposed projects and assisted in developing commercial and regulatory strategy in New England and New York.
- Mr. Russo led the analysis for a major transmission project in PJM, including analysis of costs and benefits, production cost modeling, regulatory implications of FERC Order 1000 and other rules, and strategic advice on project development.
- For a transmission developer, Mr. Russo designed and directed the economic and technical analysis of a 2,000 MW HVDC project in the northeast US with detailed analysis of ISO-NE and NYISO markets.
- For a worldwide operator of data centers, Mr. Russo directed a risk exposure analysis of multiple markets, commodities and assets to assess the company's exposure to global trends.
- Mr. Russo directed the analysis of new regulatory approaches and energy technologies for a large African electric utility.
- Mr. Russo assessed the economic and technical suitability of large-scale photovoltaic technologies for a large Middle Eastern utility.
- Mr. Russo directed the analysis of renewable energy (solar and wind) procurement options for one of the largest renewable energy purchasers in the world. This evaluated technical, financial, and economic factors affecting the renewable technologies.
- Mr. Russo directed the analysis of capacity need and market conditions related to the siting of new capacity on Long Island for a client.
- Mr. Russo led a major review of new nuclear development strategy, including technical reviews, risk analyses, economic forecasts and prudence reviews for a US-based electric utility.
- Working for the mayor and city council of a major US city, Mr. Russo managed a due diligence effort to determine the feasibility of supporting new nuclear licensing applications for a municipally owned utility. This included a review of nuclear technology, market conditions, Nuclear Regulatory Commission (NRC) resource constraints, and federal regulatory policy related to nuclear loan guarantee programs.
- Mr. Russo led the analysis for a large industrial client of how electricity market rules related to reliability affected prices in installed capacity markets, including analyses of resource-adequacy and short-term grid contingency events.
- For a major municipal utility, Mr. Russo provided an independent review of the utility's investment analysis to retrofit emissions control equipment to a coal-fired power plant to comply with pending environmental regulations.
- For a transmission developer, Mr. Russo advised on the open-season transmission requirements and FERC process for a new merchant transmission line.
- Mr. Russo directed the analysis of the socioeconomic benefits of advanced coal technology in European, Chinese and South Asian markets, focusing on market effects, induced and indirect benefits and social impacts.

- Mr. Russo led the effort to develop an electrical market model for Europe for a Paris-based client. Working with the production-cost modeling software and his team, he assembled databases of resources, demand, fuel prices, and transmission network characteristics to build a comprehensive model of the EU grid.
- Mr. Russo directed and led a project to synthesize and summarize the nuclear technology risk and seismic hazard data for a two-unit nuclear reactor in North America.
- Mr. Russo directed an engagement for a client to assist in the purchase and contracting of large amounts of electricity to support aluminum smelting operations. This consisted of financial analysis of North American power markets including the MISO and PJM and financial evaluation of proposed contract structures.
- Mr. Russo managed a major effort for the City of New York to develop a Master Electrical Transmission Plan to address economic and reliability needs in the context of a multi-stakeholder process, incorporating the Mayor's Office, Economic Development Corporation, NYISO, ConEd, and the NYS Public Service Commission. The program addressed the economic and technical factors associated with AC and HVDC transmission, as well as the policy and financial impacts of public-private partnerships and equity investment strategies.
- For a major power development company, Mr. Russo led several projects to determine the optimal strategy for entering the gas-fired development market under pending environmental constraints and regulations. In a related project, he led efforts to investigate the feasibility of new and waste coal development in the PJM energy market.
- For the City of New York, Mr. Russo led a major effort to investigate the reliability and economic and environmental impact of the closure of the Indian Point Nuclear Energy Center on consumers and the economy. This comprised a report as well as testimony before various commissions.
- For a private equity firm, Mr. Russo directed the due diligence assessment of an energy storage technology manufacturer, focusing on the analysis of market opportunities for energy storage.
- For a major global semiconductor manufacturer, Mr. Russo led an effort to develop a global energy procurement strategy, analyze potential power contracts, and benchmark procurement activities against other similar firms
- Mr. Russo directed the review of the internal technical and financial modeling processes for an investor in the liberalized UK energy market.
- For a gas pipeline developer, Mr. Russo directed the analysis of a new pipeline project's impact on gas basis differentials.
- For a major European utility, Mr. Russo designed and managed a process to develop internally consistent analysis scenarios to enhance corporate planning. The effort involved soliciting input from different groups throughout the enterprise, designing scenarios, analyzing the results, and presenting the results to internal and external stakeholders.
- For a major Internet search provider, Mr. Russo directed the evaluation of potential sites for data centers in Europe and the US.

- For a major Asian utility, Mr. Russo managed an engagement to develop a growth strategy for a subsidiary of the parent firm, including a review of current operations, market positioning, potential risks, and strategic alliances, culminating in a concrete division growth plan.
- Working for the Executive Office of Sheikh Mohammed of Dubai, Mr. Russo was a principal in a major study examining the effectiveness of Dubai's current electric utility, petrochemical resources, and water resources. Working closely with local personnel, he spent significant time interviewing Dubai Electricity and Water Authority (DEWA) and Dubai Supply Authority (DUSUP) personnel, Emirati leaders, and stakeholders; evaluating petrochemical and water resources; and developing a comprehensive multi-attribute, multi-scenario energy system model of the emirate for evaluation of future energy strategies.
- Mr. Russo was a principal in a project to restructure a major utility in the United Arab Emirates, including long-term planning functions, regulatory efforts, customer service systems, IT architecture, and financial systems.
- Mr. Russo led a project for a major Hong Kong-based utility to help them adapt their management processes, planning infrastructure, and IT systems to pending emissions and energy trading regulations through performing needs assessments, sourcing strategies, and drafting RFPs.
- While with ABB, Mr. Russo helped design and organize the China Energy Technology Program, a joint ABB/AGS program to investigate sustainable energy systems in China, which included Electric Generation Expansion Analysis (EGEAS) modeling of the eastern China power network to identify long-term, cost-effective strategies for environmental improvement. The project was conducted in conjunction with the Swiss Federal Institute of Technology (ETHZ) and the Paul Scherrer Insitut (PSI).
- Working with the MIT Cogeneration Plant, Mr. Russo provided continuing guidance and expertise on cogeneration plant and gas turbine operations, as well as conducting several economic cost-benefit analyses to plan future plant expansion.
- For a major software firm and federal clients, Mr. Russo helped prepare and develop a wide-area synchronized phasor measurement system to measure phase angle and frequency perturbations across the Eastern Interconnection to enhance grid stability.
- For PJM, Mr. Russo developed software and systems to visualize market participant bidding behavior to assist market monitors and dispatchers.
- For New York ISO, Mr. Russo designed and implemented a PI data historian system for tracking all operational data. He also trained system operators on its use, played an integral part in the standard market design to implementation and EMS development and developed various software applications to analyze system operations.
- For the California ISO, Mr. Russo worked as a consultant during the startup, developing systems to track generator dispatch operations and identify anomalous generator behavior to assist market surveillance personnel. During the power crises and rolling blackouts, he managed and maintained a critical system in use by all ISO personnel and developed a system to analyze results of Stage 2 and 3 events.

- Mr. Russo began his career in power as an intern for the Trigen Energy Corporation analyzing the operations and economics of Trigen's fleet of cogeneration plants.

Testimonial History, Litigation Consulting & Major Public Reports (Prior Ten Years)

- *Massachusetts Superior Court,* Expert report submitted on behalf of a plant owner calculating damages from operational limitations on a district energy plant in the ISO-New England Market. Expert report submitted March 2018. Case is currently in mediation.
- *State of New Hampshire, e*xpert report submitted on behalf of a plant owner and operator in a tax certiorari proceeding in February 2018. Case was settled before hearing.
- *In re: Request for Advanced Ratemaking Principles by Interstate Power & Light Company*, Docket RPU-2017-0002, Iowa Utilities Board. Direct Testimony on behalf NextEra Energy Resources commenting on IPL's resource plan and the Duane Arnold Energy Center nuclear power plant. Direct, rebuttal and sur-rebuttal written testimony, and testimony at hearing, November 2017.
- *ABB AB v. Alstom Grid AB, Alstom Grid SAS and Alstom Grid UK Ltd., Stockholms Tingsrätt (Stockholm District Court), Cases 7403-15 and 11527-15*. Expert testimony submitted on behalf of Alstom related to damages resulting from the alleged IP infringement of HVDC technology. Report filed August 2017. Trial testimony (in English with translation), October 2017.
- *State of California v. Coral Power LLC et al., Docket EL02-71-057, Federal Energy Regulatory Commission*. Testimony on behalf of Shell Energy North America (f/k/a Coral Power) related to the causes of the 2000-2001 California Power Crisis and alleged energy market manipulation. Written testimony filed February 2017, deposition March 2017, trial testimony April 2017.
- *AAA Arbitration,* Lead economic expert in a dispute related to the economics of environmental regulations, coal-fired power plants, and railroad coal supply contracts in the US, with damages in excess of $700 million. Expert report filed September 2016, deposition November 2017, trial testimony December 2016.
- *In re: Direct Application Of MidAmerican Energy Company For The Determination Of Ratemaking Principles*, Docket RPU-2016-001, Iowa Utilities Board. Direct Testimony on behalf of Google Inc., Facebook Inc., and Microsoft Corporation related to the economics of MidAmerican's Wind XI proposal, filed June 2016. Case was settled before hearing.
- *MAG Energy Solutions Inc. v. TEC Energy Inc. et al., Province de Québec, Cour Supérieure, Case No. 500-17-087823-152*. Expert report submitted on behalf of TEC Energy on issues related to energy trading in Canada and the United States, filed May 2016.

- *Northern States Power Company, Southern Minnesota Municipal Power Agency, Aegis Insurance Services et al., v. General Electric Company, State of Minnesota, Tenth Judicial District, Case 71-CV-13-1472*, Expert report submitted on behalf of GE calculating damages related to the outage of the Sherburne county power plant, filed March 2016. Deposition June 2016.
- *Entergy Nuclear FitzPatrick, LLC v. Town of Scriba, et al.*, *Supreme Court of the State of New York,* Expert report of behalf of Entergy in a tax certiorari case projecting electricity revenue and nuclear fuel cycle costs for the James A. FitzPatrick Nuclear power plant, expert report filed January 2016. Case was settled before trial.
- *State of Maryland v. NRG, Case 09-RP-CH-261-265; 09-RP-CH-280-284; and 09-RP-CH-294-298.* Expert report on behalf of NRG projecting energy and capacity revenues for the coal-fired Mirant Mid-Atlantic Dickerson facility, 2014. Deposition March 2017, trial testimony, May 2014
- *In the Matter of Entergy Nuclear Indian Point 2, LLC & Entergy Nuclear Indian Point 3, LLC, DEC: 3-5522-00011/00004, SPDES: NY-0004472, DEC: 3-5522-00011/00030, DEC: 3-5522-00011/00031,* Direct and rebuttal pre-filed testimony on behalf of the City of New York related to the operations and economic impact of the Indian Point nuclear power plant, filed March 2014. Testimony at hearing April 2014
- *State of Maryland v. NRG, Case 09-RP-CH-261-265; 09-RP-CH-280-284; and 09-RP-CH-294-298*. Expert report on behalf of NRG, jointly filed with Robert B. Stoddard, projecting energy and capacity revenues for the coal-fired Mirant Mid-Atlantic Morgantown facility, January 2014
- *ThyssenKrupp Companhia Siderúrgica do Atlântico v. CITIC Group, ICC Case*, expert report for international arbitration submitted on behalf of CITIC group related to damages from improper operation of a power plant in Brazil, filed July 2012. Case was settled before hearing.
- *Indian Point Energy Center Retirement Analysis*, Prepared for the City of New York, August 2011
- *Summary of economic effects for proposed Spectra NJ-NY gas pipeline*, Memo prepared for Spectra Energy, and submitted to the New Jersey Bureau of Public Utilities, March 2011
- *Confidential Arbitration,* Expert report provided on behalf of a power plant investor regarding the appraised value of a coal-fired power plant in the PJM market, August 2011. Case was settled before hearing.
- *Proceedings before the New York State Assembly on the economic and reliability impact of the potential closure of the Indian Point Nuclear Energy Center.* Live testimony January 2012
- *Confidential Arbitration*, Expert report related to the valuation of a hydroelectric plant in California, which was settled before hearing, June 2013.
- *Coordination between Natural Gas and Electricity Markets, Docket AD12-12-000, Federal Energy Regulatory Commission*, Comments filed jointly with Dr. Richard Tabors and Scott Englander, 2012

- *In the Matter of Hudson Transmission Partners, LLC Case 08-T-0034*, direct and rebuttal pre-filed testimony on behalf of the City of New York before the New York State Public Service Commission in the Article VII proceeding for the proposed Hudson Transmission Partners HVDC cable. Live testimony April 2010
- *A Master Electrical Transmission Plan for New York City*, Prepared for the City of New York, May 2009
- *Public Utility Commission of Texas proceedings Cost-Benefit Analysis of the Texas Nodal Market.* Expert report on behalf of the Public Utilities Commission of Texas filed jointly with Alex Rudkevich and Ellen Wolfe December 2008. Live testimony January 2009
- Mr. Russo prepared testimony and analysis on behalf of a client accused of electricity market manipulation before the FERC. The case relates to alleged cross-product manipulation involving renewable and thermal assets and financial instruments. The case was settled before hearing.
- Mr. Russo assisted in the damages analysis for a case litigated in federal court related to damages associated with renewable power plant revenue as a result of market rule changes in the MISO market.
- Mr. Russo assisted in analyzing how transmission upgrade costs were allocated in Quebec for new development in support of testimony before the Régie d l'Ēnergie.
- Mr. Russo performed analysis on behalf of a party in FERC litigation resulting from the California energy crisis, including simulation of the CAISO market clearing process and trading strategies employed by different parties.

Ongoing & Settled Engagements

- Mr. Russo acted as an expert in a case concerning coal mines and fuel contracts with coal-fired power plants. The case was settled before his report was submitted and he was disclosed and thus remains confidential.
- Mr. Russo prepared an expert report calculating damages from the delayed construction of a gas-fired combined cycle power plant in the United States for a civil litigation matter. The case settled before his report was submitted and he was disclosed and thus remains confidential.
- Mr. Russo is currently acting as an expert in a case related to the solar power industry and the global market for solar panels.

Additional Professional Training

- New York ISO Market Operations Course
- New York ISO DSS Market Participants Course
- California ISO Market Participants Course

Selected Books

"*Economic Evidence of Market Manipulation,*" chapter in the *Guide to Energy Market Manipulation* with Robin Cohen, David Hunger and Brian Rivard. Published by Global Competition Review, March 2018

"*Data Collection*," chapter in *Integrated Assessment of Sustainable Energy Systems in China: The China Energy Technology Program*. Baldur Eliasson. Kluwer Academic Publishers, 2003.

Citizenship and Languages

Mr. Russo is a dual citizen of the United States and Italy.

- English (native)
- Italian (proficient)
- German and French (basic)

Memorandum

DATE: April 30, 2018

TO: NextBridge Infrastructure LP

FROM: Andrew Pietrewicz

RE: Ontario Lake Superior Link Project by Hydro One Networks Inc.; EB-2017-0364

I was requested by NextBridge Infrastructure LP (NextBridge) to review Hydro One Networks, Inc.'s (Hydro One) proposal to build the Lake Superior Link (LSL). This Memorandum summarizes the results of my review.

My professional background involves various director-level positions at Ontario's Independent Electricity System Operator (IESO) and Ontario Power Authority. In these positions I oversaw the development of an extensive array of long-term integrated planning assessments, plans and advisory products, including in the areas of electricity demand forecasting, conservation integration, resource adequacy assessment, power system production simulation, economic, financial and other decision analysis, and planning integration. My biographical summary and experience are attached to this memorandum.

My review included Hydro One's LSL Leave to Construct Application (Application) with the IESO's System Impact Assessment Report (Additional Evidence), the IESO's December 15, 2015 Assessment of the Rationale for the East-West Tie Expansion (Third Update Report), and the IESO's December 1, 2017 Updated Assessment of the Need for the East-West Tie (EWT) Expansion (collectively IESO Needs Assessments), and applicable reliability standards and criteria.

Hydro One's LSL Application proposed two significant departures from what was studied by the IESO in its Need Assessments: a new quad circuit transmission configuration and a new in-service date – December 2021. Hydro One explains its new configuration as follows:

> Upon reaching the boundary of the National Park, the new double circuit line will terminate on a dead-end structure and the two circuits will transfer to new, four-circuit structures shared with the existing East-West Tie Line (circuits W21M/W22M). The new line will then continue through the Park, supported by the four-circuit structures shared with the existing line for approximately 87 spans. Then, reaching the Park's southeastern boundary, the two new circuits will separate from the existing structures and return to being supported by double circuit, guyed masts, adjacent to the existing East-West Tie Line.

Hydro One also states the in-service date for the LSL is December 2021. Application Exhibit B, Tab 1, Schedule 1 at Page 8.

Hydro One claims that a 2021 in-service date is appropriate because of ". . . the low probability of coincidental events resulting in a capacity shortfall, this delay [to December 2021] is manageable through existing operational practices." Exhibit B, Tab B, Schedule 1, Page 8.

A fundamental deficiency in Hydro One's claims that the new quad circuit transmission structures in the Park and 2021 in-service date are appropriate is neither was studied in the context of the IESO's Need Assessment for the EWT. The IESO Needs Assessment is not a plug-and-play study in which different transmission configuration and in-service date can be substituted without thorough consideration, study, and analysis.

I am familiar with the IESO EWT Need Assessments from my time at the IESO. The Assessments confirmed that a new double circuit EWT cost-effectively addresses the reliability, load, and economic development needs of Northwest Ontario by the end of 2020. The 2017 Updated Needs Assessment set forth certain findings that the new EWT would address, including:

- . . . there must be sufficient capacity in the Northwest to not only adequately supply the expected demand in the Northwest while staying under this planning limit, but also to reduce flows on the Manitoba and Minnesota ties to zero (or the scheduled transfer level) within 30 minutes. (Page 13)

- . . . following the loss of the E-W Tie from Wawa TS to Marathon TS, the Northwest will be separated from the rest of Ontario and power will automatically flow from Manitoba and Minnesota to supply the Northwest. Action must then be taken to re-dispatch resources within the Northwest to return to scheduled flow levels and there must be sufficient capacity in the Northwest to do so. (Page 13)

- A 100 MW capacity need already exists today, and this need continues to grow to approximately 240 MW by the original 2020 in-service date. By 2022, the capacity need exceeds 260 MW, and grows to approximately 400 MW by 2024. The need for additional capacity increases to about 500 MW by 2035 as demand continues to grow and as supply changes. (Page 13)

- In this update, expected westbound flows exceed the existing E-W Tie capability approximately 5% of the time. This is based on application of the winter rating of 175 MW throughout the year. Applying the more restrictive limit of 155 MW during the summer months would result in a higher level of westbound congestion. Eastbound congestion is expected to occur approximately 6% of the time in 2023. (Page 14).

- The E-W Tie Expansion provides additional benefits, beyond meeting the reliability requirements of the Northwest, which are unique to a transmission solution. These include system flexibility, removal of a barrier to resource development, reduced

> congestion payments, reduced line losses, increased economic imports from Manitoba, decreased carbon emissions, and improved operational flexibility. These benefits are additive to the economic benefits and form an important part of the rationale for the project. (Page 18).

I do not view Hydro One's proposed in-service date of December 2021 as compatible with addressing these issues identified in the 2017 IESO Needs Assessment.

I further do not recommend that a new IESO Needs Assessment be completed that considers Hydro One's new proposal for quad circuit transmission towers and December 2021 in-service date. First, an Updated Needs Assessment was just completed in December 2017, which confirmed a 2020 in-service date, and, therefore, re-studying the same issue of need a few months later will not likely involve materially different assumptions or inputs that would move the need an entire year or more. Second, although a System Impact Assessment (SIA) has been issued on Hydro One's LSL proposal, that SIA raised several concerns with the reliability implications of the quad circuit towers that in the context of a Needs Assessment would take months of careful consideration to determine whether it is consistent with and meets the needs of Northwest Ontario. Based on my experience, I do not see Hydro One's proposal as addressing the needs of Northwest Ontario in an equal or superior manner to the NextBridge transmission design which has been recently confirmed as cost-effective and appropriately meeting the needs of Northwest Ontario.

Brief biography – Andrew Pietrewicz

Andrew Pietrewicz has 16 years of progressive experience in the Ontario electricity sector, with focus on long-term integrated power system planning.

He has held various director-level positions at Ontario's Independent Electricity System Operator and Ontario Power Authority where he oversaw the development of an extensive array of long-term integrated planning assessments, plans and advisory products, including in the areas of electricity demand forecasting, conservation integration, resource adequacy assessment, power system production simulation, economic, financial and other decision analysis and planning integration.

He is a member of the World Energy Council's Programme Committee and Global Energy Scenarios Study Group, and is the former chair of the Energy Council of Canada Studies Committee. He has appeared before the Ontario Energy Board at EB-2016-0152 and EB-2007-0707.

(Please see next page for chronology)

ANDREW PIETREWICZ

Employment Experience

Andrew Pietrewicz Consulting – Energy Intelligence, Insight & Integration (March 2018 - Present)

- **Principal** (March 2018 – present)

Independent Electricity System Operator - Power System Planning (2015 – February 2018)

- **Director, Resource Integration** (January 2015 – February 2018)

Ontario Power Authority - Power System Planning (2005 - 2014)

- **Director, Resource Integration** (May 2012 – December 2014)
- **Director, Conservation Integration** (November 2010 – April 2012)
- **Senior Planner** (November 2008 – October 2010)
- **Planner** (June 2005 – October 2008)

Independent Electricity System Operator - Regulatory Affairs & Market Evolution (2002 - 2005)

- **Analyst** (May 2002 – May 2005)

Affiliations

World Energy Council (2011 – present)

- **Member, Programme Committee** (November 2013 – present)
- **Member, Global Energy Scenarios Study Group** (July 2011 – present)

Energy Council of Canada (2013 – 2016)

- **Chair, Studies Committee** (March 2015 – September 2016)
- **Member, Studies Committee** (June 2013 – February 2015)

The Centre for Environmental Sustainability in Healthcare (2010 – 2012)

- **Member, Advisory Committee** (May 2010 – July 2012)

Education

Masters Program in Planning (2003)

M.Sc.Pl.

University of Toronto School of Graduate Studies, Department of Geography

Bachelor of Arts (2001)

B.A Hons. with distinction

University of Toronto Faculty of Arts and Sciences, Departments of Geography and Political Science