Ontario Energy Board | Commission de l'énergie de l'Ontario

Ontario

DECISION AND ORDER

EB-2019-0077

HYDRO ONE NETWORKS INC.

HYDRO OTTAWA LTD.

Application for leave to rebuild and extend an existing transmission line and to build a municipal transformer station.

BEFORE: Michael Janigan
Presiding Member

Robert Dodds
Member

Cathy Spoel
Member

October 17, 2019

Ontario Energy Board | Commission de l'énergie de l'Ontario

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1 INTRODUCTION AND SUMMARY

This is a decision of the Ontario Energy Board (OEB) on an application filed by Hydro One Networks Inc. (Hydro One) and Hydro Ottawa Ltd. (Hydro Ottawa) or collectively (the applicants) under sections 92 and 97 of the *Ontario Energy Board Act, 1998* (the Act) for leave to construct transmission facilities.

Hydro One and Hydro Ottawa are requesting approval to:

- rebuild a 10.9 km section of an existing 115 kV single circuit line as a double circuit 230 kV line from a point at West Hunt Club Road to Cambrian Road JCT
- build a new 1.3 km section of double circuit 230kV line from the Cambrian Road JCT to a new proposed Municipal Transformer Station (South Nepean MTS)
- construct the South Nepean MTS

The line connection and station work together are referred to as the Power South Nepean Project ("Project"). These facilities are required to increase supply capacity to accommodate Hydro Ottawa's customer load growth in the South Nepean area of Ottawa.

A map showing the location of the Project is attached as Appendix A to this Decision and Order.

Hydro One and Hydro Ottawa are also requesting approval under section 97 of the Act for the forms of agreements they offer to landowners to use their land for routing or construction of the proposed line.

The OEB's authority to grant an applicant leave to construct transmission facilities arises from subsection 92(1) of the Act which provides that:

> No person shall construct, expand, or reinforce an electricity transmission line or an electricity distribution line or make an interconnection without first obtaining from the Board an order granting leave to construct, expand or reinforce such line or interconnection.

Subsection 96(2) of the Act provides that, in making a determination on an application under subsection 92(1), the OEB shall only consider the following:

1. The interests of consumers with respect to prices and the reliability and quality of electricity service.

2. Where applicable and in a manner consistent with the policies of the government of Ontario, the promotion of the use of renewable energy resources.

The provisions of subsection 96(2) define the parameters the OEB uses to consider the public interest in granting leave to construct approval. Other considerations relating to the construction of transmission facilities, including environmental considerations and local economic impacts, are outside the OEB's jurisdiction.

Section 97 of the Act provides that the form of agreement offered to landowners along the approved route is subject to OEB approval. This section states:

> Leave to construct shall not be granted until the applicant satisfies the Board that it has offered or will offer to each owner of land affected by the approved route or location an agreement in a form approved by the Board.

The OEB finds that the applicants' proposal is in the public interest in accordance with the provisions of subsection 96(2) of the Act. Pursuant to the OEB's authority under subsection 92(1) of the Act, the OEB grants the applicants leave to construct the Project. The leave is subject to the OEB's standard conditions of approval, attached as Schedule B to this Decision and Order, as well as approval of the forms of agreement set out in the application.

In granting leave, the OEB has considered the criteria for its determination of the public interest set out in subsection 96(2) of the Act and details of its findings with respect to each of these criteria is set out in this decision.

2 THE PROCESS

Hydro One and Hydro Ottawa filed the application on May 28, 2019. The OEB issued a Notice of Hearing on June 26, 2019.

The Independent Electricity System Operator (IESO) and Pollution Probe applied for intervenor status. In its intervention request, Pollution Probe advised that it intends to seek a cost award for its participation in this hearing and requested the OEB confirm that it is eligible for costs.

On July 31, 2019, the OEB issued Procedural Order No. 1 approving the IESO and Pollution Probe as intervenors. The OEB confirmed that Pollution Probe is eligible to apply for an award of costs under the OEB's *Practice Direction on Cost Awards*. The OEB also stated that being eligible to apply for recovery of costs is not a guarantee of recovery of any costs claimed and that costs awards are made by way of an OEB order at the end of a hearing.

In accordance with Procedural Order No. 1, OEB staff and Pollution Probe filed interrogatories on August 9, 2019 and the applicants responded to interrogatories on August 23, 2019. OEB staff and Pollution Probe filed written submissions on September 6, 2019 and the applicants filed reply submissions on September 16, 2019.

3 DECISION ON THE ISSUES

In reviewing applications under section 92 of the Act, the OEB typically considers the need for the project and alternatives to the proposed project. The OEB's findings regarding the need for the Project; the alternatives considered; the impact of the Project on price, reliability, quality of service; land matters; and the conditions of approval for the Project are addressed in this chapter.

3.1 Need

Electricity demand in the South Nepean area is primarily supplied through a 115kV transmission network, which was originally developed to supply a relatively small number of customers in a rural area. According to the evidence, the area is being transformed into denser residential communities and commercial areas resulting in significant growth in the demand for electricity.

The applicants submitted that each of the three stations supplying South Nepean is reaching, or has already exceeded, its planned capacity. As well, the 115 kV single circuit transmission line, S7M, which provides the primary supply to this area, is also approaching its limit with forecast demand on this circuit expected to reach its capacity of 108 MW in 2026[1].

The need for the Project was identified in the IESO's Ottawa Area Integrated Regional Resource Plan (IRRP) dated April 28, 2015, and in the Greater Ottawa Regional Infrastructure Plan (RIP) dated December 2, 2015.

On April 25, 2016, the IESO sent a letter to Hydro One and Hydro Ottawa, requesting that these two utilities initiate work for the development of a new transmission station and connection line in the South Nepean area to target an in-service date of 2021. The IESO letter stated that, based on the timeline and magnitude of the need for additional supply capacity in South Nepean, it will not be feasible to address the need through additional conservation and local generation. The regional plans and letter were provided with the application[2].

OEB staff requested that the applicants provide updated planning forecasts for the Ottawa sub-region and the South Nepean area, given that the second regional planning cycle is now underway. The response provided demonstrates a higher planning forecast

[1] Exh B-3-1/Att 3/p.4
[2] Exhibit B/Tab 3/Sch 1/Attachments 1 and 2

for the Ottawa sub-region compared to the forecast provided in the pre-filed evidence[3] while the forecast for the South Nepean area remained unchanged. The total existing supply capacity in the South Nepean area is 56 MW, and based on the forecast for the area, demand, net of conservation and distributed generation, is expected to be 120 MW by 2032[4].

The applicants submitted that the discontinuation of the 2015-2020 Conservation First Framework has affected the energy efficiency programs and the contracted renewable distributed generation capacity, which has contributed to an increase in the Ottawa sub-region demand forecast.

Pollution Probe submitted that the change in the demand forecast reinforces the need to use more recent IRRP information, and suggested that the IESO provide a more current letter to confirm that the Project is the most cost-effective approach to meet the system's needs[5].

Pollution Probe also submitted that there appears to be a future need for infrastructure, but that the application may overstate the capital investment needed to meet the needs of the community given other potential alternatives. In its view, the IESO's conservation and demand management (CDM) programs and upcoming Transitional Capacity Auction (TCA) could be viable alternatives for meeting the identified need.

In reply submissions, the applicants disagreed with Pollution Probe's assertions that the IESO's CDM and TCA programs are viable alternatives to meet the identified need, stating that Pollution Probe has not offered any detail regarding these programs and how or why they would be conducive to meeting the identified need more effectively. The applicants submitted that the IESO has intervened in the proceeding, and has neither made representations regarding the potential viability of CDM or TCA, nor has it presented evidence to indicate that the information in its April 2016 letter is no longer valid with respect to the solution identified in meeting the recognized need.

Pollution Probe recommended that the applicants collaborate more closely with the IESO, the City of Ottawa, customers and interested stakeholders to assess options to use the upcoming demand auction, CDM, Distributed Energy Resources (DER) and other innovative solutions that align with the City of Ottawa community energy plan in their current and future planning cycle. Pollution Probe also recommended that the applicants undertake complete studies regarding longer-term supply options and file

[3] OEB Staff Interrogatory 1(c)
[4] OEB Staff IR 1(a)
[5] Pollution Probe Submission, p. 4

them with the OEB in order to inform a more robust assessment of future options[6].

The applicants commented that there is no basis for Pollution Probe's suggestion to link the completion and filing of longer-term studies with the assessment of the need for the Project, or to imply that these studies will negate the evidence supporting the Project.

Pollution Probe submitted that the applicants did not give adequate consideration to alternative options – CDM and DER– to meet the identified need. The applicants disagreed, stating that there was an extensive evaluation of the potential role of DERs throughout the regional planning cycle, as well as in the supplemental public engagement which followed the releases of the IRRP and RIP. The applicants submitted that the IESO's determination that it was not feasible to address the need through additional CDM and local generation was based on robust analysis of those options compared to the level of supply needed immediately and in the future in the area.

The applicants further asserted that the Project will support greater deployment of renewable resources as the South Nepean MTS transformers have been specifically designed to accommodate injection of renewable energy into the local area's transmission system.

Findings

The IESO is responsible for leading the IRRP process, which determines the optimal mix of solutions to meet the needs of a region (e.g., generation, CDM, wires), in combination with the transmitter, LDCs, and stakeholders. All necessary regulatory and other approvals are then pursued to implement recommended actions. The OEB notes that the IESO has established a stakeholder advisory group to review the existing regional planning process to identify potential areas of improvement based on lessons learned such as how to better address the evolution of the system; e.g., increasing penetration of DERs.

As part of the OEB's required consideration of prices, the OEB is satisfied that the applicants have established the need for the project, a need that has been confirmed by the IESO. The Project is in conformance with the IESO's 2015 Ottawa Area IRRP and in keeping with the IESO's assessment of the growing electricity demand of customers to be served by the Project. The OEB acknowledges Pollution Probe's concern about the exclusion of CDM benefits from the projected demand submitted by the applicants.

[6] Pollution Probe Submission, p.5

However, the IRRP process considered whether the need could be addressed through additional CDM or local generation, and determined that immediate needs could not be met by either of these alternatives. Pollution Probe did not place any evidence on the record to contradict this conclusion. The OEB notes that as part of the IESO's announcement of the release of interim energy efficiency framework targets, the IESO has advised that "as part of its preparations for 2020 and beyond, the IESO will reach out to consumers and stakeholders alike to develop new approaches to ensure that Ontario's electricity system can rely on conservation as the most cost-effective form of supply."[7]

3.2 Alternatives

The applicants considered four transmission alternatives[8]:

1. Construct a new 115 kV / 27.6 kV station and upgrade 115 kV circuit S7M. The new station would be supplied at 115 kV and the existing 115kV circuit would be rebuilt to be able to supply the new station load.

2. Construct a new 230 kV / 27.6 kV station and rebuild of a section of 115kV Circuit S7M as double circuit 230 kV line. One circuit would continue to operate at 115 kV and supply the existing stations. The second circuit would operate at 230 kV and supply the new 230 kV / 27.6 kV station.

3. Construct a new 230 kV / 115 k / 27.6 kV station and rebuild a section of 115 kV circuit S7M as a double circuit 230 kV line. The existing S7M line would continue to operate at 115 kV capacity, supplying the existing stations as well as the new station. The second circuit would operate at 230 kV and supply the new station. The new station would have dual supply capability.

4. Construct a new 230 kV/115 kV/27.6 kV station and rebuild a section of 115 kV circuit L2M as a double circuit 230 kV line. One circuit, the existing L2M 115 kV line, would continue to operate at 115 kV capacity, supplying the existing stations as well as the new station. The second circuit would operate at 230 kV and supply the new station. The new station would have dual supply capability.

[7] http://www.ieso.ca/en/Sector-Participants/Energy-Efficiency/2019-2020-Interim-Framework
[8] Exh B/Tab 5/Sch 1/p.1

The applicants selected Alternative 3 as the recommended alternative, submitting that it is the lowest cost alternative that permits dual supply capacity to the MTS and has the least community, landowner and environmental impact.

Alternatives 1 and 2 were rejected by the applicants as they provide only a single circuit supply to the proposed MTS, and do not meet the load security criteria set out in the IESO's Ontario Resource and Transmission Assessment Criteria (ORTAC), which requires that not more than 150 MW of load may be interrupted by configuration.

With Alternative 4, the supply would come from the 115kV circuit L2M located further east, requiring a longer length line to be built to connect the new station (18 km versus 12.2 km for Alternative 3). This would require additional towers, conductor and associated facilities' costs, and would also require Hydro One to acquire a new greenfield right-of-way (ROW) of approximately 9 km, compared to the new ROW distance required in Alternative 3 (1.3 km).

The applicants submitted that Alternative 4 was not recommended as it was expected to be significantly more costly, and would have a broader impact on landowners, the environment and the South Nepean community. OEB staff requested a cost estimate for Alternative 4[9]. In its response, Hydro One stated that it did not incur the cost to develop a cost estimate for Alternative 4 as the benefits in construction and land use costs of Alternative 3 considerably outweighed Alternative 4.

OEB staff submitted that although the applicants did not provide a cost estimate for Alternative 4, the new greenfield ROW that would be required, and the associated impact on landowners, environment and community, are sufficient to justify the selection of the applicants' preferred alternative.

Findings

The OEB finds that the applicants' recommended choice from four project alternatives is best able to provide the anticipated benefits at the lowest cost to ratepayers.

[9] OEB Staff IR 3

3.3 Impact on Price of Electricity Service

The total cost of the Project is $85.8 million, consisting of $58.8 million in line costs and $27 million in station costs[10]. Hydro One submits that in the absence of the need for the project, it would have undertaken sustainment work on a section of the existing S7M that has been identified as being at end of life. The avoided cost of the sustainment work is estimated to be $8.7 million. Consequently, the cost allocated to Hydro Ottawa for the line work is limited to the incremental costs relative to the cost of the avoided sustainment work, consistent with section 6.7.2(b) of the Transmission System Code.

The incremental cost to Hydro Ottawa for the line work is $50.1 million. This cost will be met through a capital contribution of $48.2 million and load revenue[11]. The station facilities' costs of $27.0 million will be included in Hydro Ottawa's rate base once in service.

The applicants provided cost information for three comparable line projects - the Guelph Area Transmission Reinforcement Project (GATR), the Woodstock Area Transmission Project (WATP) and the GTA-Parkway Station and Parkway to Richmond Hill Line Project (Parkway). The applicants consider these projects to be similar in that they all involved building a relatively short length (5 to 15 km) of double circuit 230kV transmission line in an urban/semi-urban environment on existing Hydro One ROW with limited ROW clearances. The line cost per km for the Project is $3.6 million/km, which lies between the $2.7 million/km to $5.1 million/km of the comparator projects provided[12].

The applicants provided comparisons for the construction costs of the station facilities, comparing the South Nepean station cost of $27 million to two stations, Terry Fox MTS ($28 million) and Ellwood MTS ($25 million), both of which were recently constructed by Hydro Ottawa[13]. Hydro Ottawa submits that these stations were chosen as good comparators because of their similar construction conditions and design configurations.

The applicants submit that that Project will have no impact on the provincial line pool transmission rate, which the applicants forecast will be unchanged over the 25 year time horizon at $0.94/kW/month. The applicants have forecasted that the network pool transmission rate will decrease slightly from $3.71/kW/month to $3.70/kW/month. The applicants expect that based on the load forecast, initial capital costs, and ongoing maintenance costs, there will be a minor overall decrease in the transmission

[10] Exh B/Tab 7/Sch1/p.6
[11] Exh B/Tab 9/Sch1/p.5
[12] Exh B/Tab 7/Sch 1/p.9
[13] Exh B/Tab 7/Sch 1/p.14

component of the residential customer bill, although that decrease will be so small that it will not be noticeable to the typical residential customer.

OEB staff submitted that the evidence provided by the applicants on cost information for comparable projects suggests that the cost estimates for the Project are reasonable. OEB staff also submitted that the applicants' evidence demonstrates that the proposed project will have no adverse impact on transmission rates or customer bills.

Findings

The OEB finds that the applicants' evidence demonstrates that the Project will have no adverse impact on transmission rates or customer bills.

3.4 Impact on Reliability and Quality of Service

The Project will provide dual supply (115 kV and 230 kV) to the new MTS station. The applicants submitted that by having dual supply, reliability for customers in the area can be improved as a result of shorter restoration times following an outage.

OEB staff asked the applicants to comment on the impact on reliability for the three existing stations - Fallowfield MTS, Richmond South MTS, and Manotick DS - if the 115kV S7M single circuit were not available[14]. In its reply submission, the applicants indicated that a large number of customers currently supplied from the Fallowfield MTS will be moved over and be supplied from the new South Nepean MTS. As the South Nepean MTS will have dual supply capability, the customers that transfer over can expect to see a significant improvement in their supply reliability. As well, when the new MTS comes into service, Hydro Ottawa will have feeder transfer capability between Fallowfield MTS and South Nepean MTS so that all customers can be temporarily supplied in the event of an outage on the S7M circuit until supply is restored.

The applicants submitted that the Project will relieve demand on the existing 28 kV distribution system, which is currently operating at or above the planning rating. During peak or near-peak conditions, additional switching or sectionalizing of circuits is required to restore customers, which can increase the duration of outages. By relieving the demand on the 28 kV distribution system and bringing the system below planning

[14] OEB Staff Interrogatory 2

rating, less switching will be required for restoration and reliability for customers will be improved.

The applicants filed both the IESO's Final System Impact Assessment (SIA) for the connection of the transmission facilities and Hydro One's final Customer Impact Assessment (CIA). The conclusion of the IESO's SIA is that the proposed connection of the Project and the connection facilities is expected to have no material adverse impact on the reliability of the integrated power system, provided that the requirements in the IESO report are implemented. Hydro One's CIA concludes that the Project will not have any adverse effects on the transmission-connected customers of the area, provided that the requirements of the SIA and CIA are met.

OEB staff submitted that based on the evidence provided, there are no concerns with respect to reliability and quality of electricity service.

Findings

The OEB has reviewed the IESO's Final SIA and Hydro One's Final CIA for the Project. The OEB finds that both documents confirm that the Project will have no adverse effect on the reliability and quality of the power system and electricity service provided to Hydro Ottawa's customers.

3.5 Land Matters

Hydro One has confirmed that it will be utilizing its existing land rights for the Project, and will be acquiring additional permanent and temporary land rights. In response to OEB staff interrogatories, Hydro One confirmed that it has initiated land acquisition activities with all impacted private landowners and has completed four of the seventeen permanent land right agreements[15]. Hydro One also confirmed that it has obtained six of the twenty-eight required temporary by-pass agreements. The applicants submitted that no significant concerns have been raised by impacted landowners. The applicants confirmed that they have applied for the required permits for the use of federal and municipal lands and rail and water crossings and do not have any concerns with obtaining these permits.

[15] OEB Staff Interrogatory 7

Hydro One and Hydro Ottawa seek approval of the forms of agreements offered, or to be offered, to affected landowners.

Hydro One submits that the Temporary Land Use Agreement and the Damage Claim Agreement have been previously approved by the OEB in past leave to construct decisions. In this application, Hydro One is requesting approval of several forms of agreements not previously approved by the OEB[16]:

- Early Access Agreement
- Option to Purchase a Limited Interest Agreement – Easement
- Compensation and Incentive Agreement – Easement
- Option to Purchase Agreement – Fee Simple
- Compensation and Incentive Agreement – Fee Simple Corridor
- Temporary By-Pass Agreement

Hydro Ottawa has entered into an Agreement of Purchase and Sale with the landowner of the property that is to serve as the site for the South Nepean MTS and is seeking approval for this form of agreement.

OEB staff submitted that it had reviewed the proposed forms of agreements and has no issues or concerns with the applicants' proposed forms of land agreements. OEB staff further submitted that these agreements are consistent with the forms of agreements previously approved by the OEB in past Hydro One leave to construct applications and with the OEB's Filing Requirements For Electricity Transmission Applications.

Findings

The OEB's leave to construct is subject to the necessary easements and land use permits to be acquired by the applicants. The OEB approves the form of land use agreements proposed by the applicants.

3.6 Conditions of Approval

Under Subsection 23(1) of the Act, the OEB may, in making an order, impose such conditions as it considers proper.

[16] Exhibit E-1-1/Attachments 2, 3,4,5,6,9

OEB staff supported the applicants' proposal and submitted that leave to construct the Project should be granted subject to the OEB's existing standard conditions of approval for an electricity leave to construct application:

1. Leave to construct is granted pursuant to section 92 of the Act and in accordance with the OEB's Decision and Order and shall be subject to fulfillment of the requirements of the SIA, CIA, and all other necessary approvals, permits, licences, certificates, agreements and rights required to construct, operate and maintain the proposed facilities.

2. Unless otherwise ordered by the OEB, authorization for leave to construct shall terminate 12 months from the date of the Decision and Order, unless construction has commenced prior to that date.

3. The applicants shall advise the OEB of any proposed material change in the project including, but not limited to changes in: the proposed route, construction schedule, the necessary environmental assessment approvals, and all other approvals, permits, licences, certificates and rights required to construct the proposed facilities.

4. Each of the applicants shall designate an employee as a project manager who will be responsible for fulfilment of the conditions of approval. The employee's name and contact information should be provided to the OEB and to all the appropriate landowners, and be clearly posted on construction sites.

   The OEB's designated representative for the purpose of the conditions of approval is the OEB's Manager of Generation and Transmission (or the Manager of any OEB successor department that oversees electricity leave to construct applications).

Pollution Probe proposed additional conditions of approval, if the OEB approves the application[17]:

- The applicants be required to provide an updated forecast annually and provide a variance explanation against the forecast provided in the application.

- The applicants be required to summarize specific actions (e.g. funding support, barrier removal, projects development), support (e.g. CDM, technical or regulatory) and outcomes (i.e. reduced demand, increased DER capacity, and

[17] Pollution Probe Submission, p. 8

additional benefits aligned with the Energy Evolution initiative) in their next rate proceeding.

The applicants rejected Pollution Probe's proposals, arguing that Pollution Probe has not made a compelling case in support of the imposition of such conditions.

Findings

The OEB's mandate under subsection 23(1) of the Act specifies that the OEB, in making an order, may impose such conditions as it considers proper. The OEB approves the application, subject to the OEB's standard conditions of approval but declines to approve the additional conditions proposed by Pollution Probe.

4 ORDER

THE ONTARIO ENERGY BOARD ORDERS THAT:

1. Hydro One and Hydro Ottawa are granted leave, pursuant to section 92 of the Act, to construct the Project as described in the application.

2. Leave to construct is subject to Hydro One and Hydro Ottawa complying with the Conditions of Approval set forth in Schedule B.

3. The OEB approves the proposed forms of agreements that Hydro One and Hydro Ottawa have offered or will offer to each owner of land affected by the Project.

4. Pollution Probe shall file its cost claim with the OEB and forward it to the applicants on or before October 27, 2019.

5. The applicants shall file with the OEB and forward to the intervenors any objections to the claimed costs by November 11, 2019.

6. Pollution Probe shall file with the OEB and forward to the applicants any responses to any objections to the claimed costs by November 18, 2019.

7. Hydro One and Hydro Ottawa shall pay the OEB's costs incidental to this proceeding upon receipt of the OEB's invoice.

DATED at Toronto October 17, 2019

ONTARIO ENERGY BOARD

Original Signed By

Christine E. Long
Registrar and Board Secretary

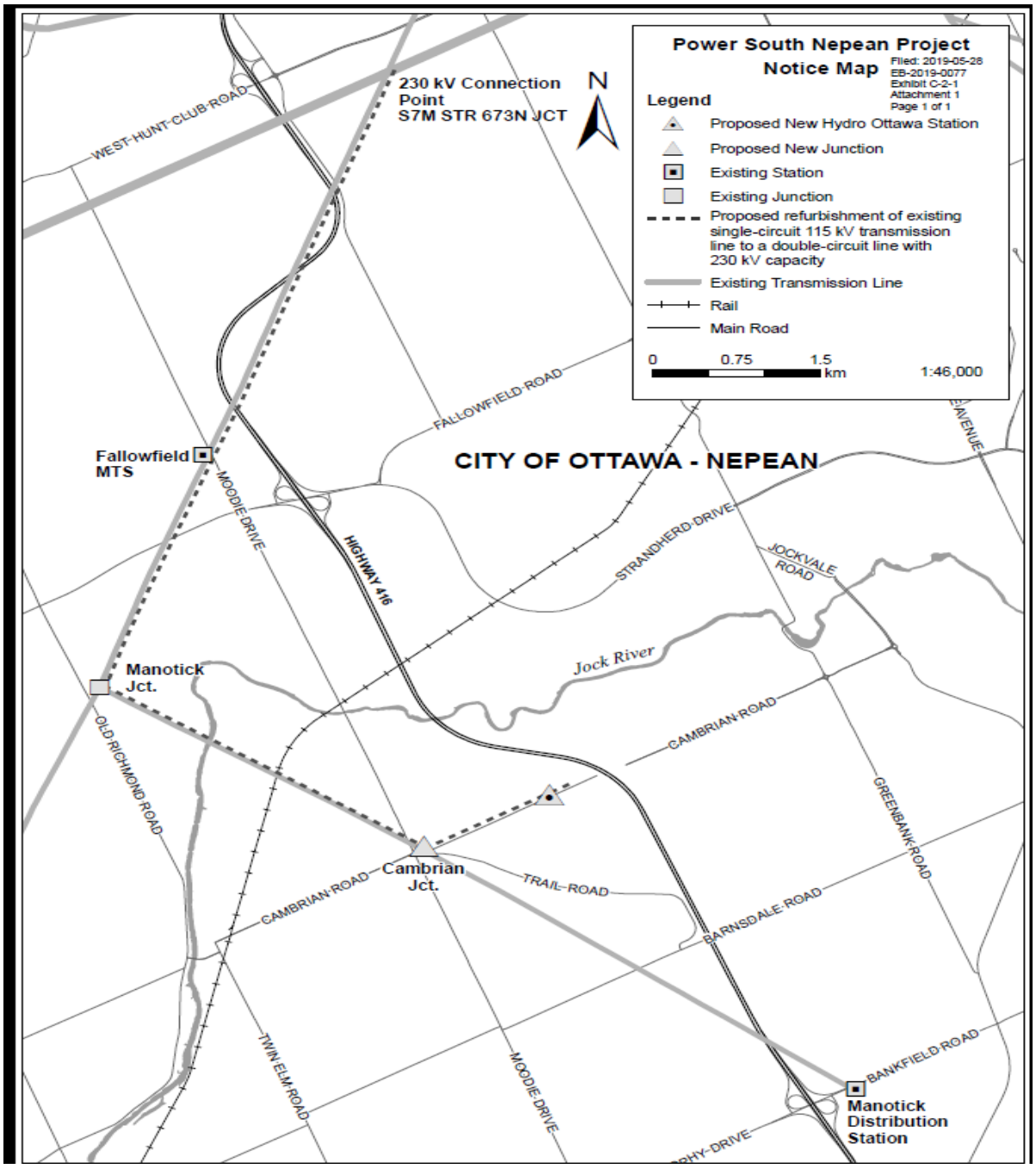
SCHEDULE A

DECISION AND ORDER

HYDRO ONE NETWORKS INC. & HYDRO OTTAWA LTD.

EB-2019-0077

OCTOBER 17, 2019



[18]Exhibit C/Tab2/Sch 1/Attachment 1, p.1

SCHEDULE B

DECISION AND ORDER

HYDRO ONE NETWORKS INC. & HYDRO OTTAWA LTD.

EB-2019-0077

OCTOBER 17, 2019

CONDITIONS OF APPROVAL

1. Leave pursuant to section 92 of the OEB Act shall be subject to the fulfillment of the requirements of the SIA and CIA and all other necessary approvals, permits, licences and certificates required to construct, operate and maintain the proposed facilities.

2. Unless otherwise ordered by the OEB, authorization for leave to construct shall terminate 12 months from the date of the Decision and Order, unless construction has commenced prior to that date.

3. The applicants shall advise the OEB of any proposed material change in the project, including but not limited to changes in: the proposed route, construction schedule, the necessary environmental assessment approvals, and all other approvals, permits, licences, certificates and rights required to construct the proposed facilities.

4. The applicants shall designate one of their employees as project manager who will be responsible for the fulfillment of these conditions, and shall provide the employee's name and contact information to the OEB and to all the appropriate landowners and shall clearly post the project manager's contact information in a prominent place at the construction site.

   The OEB's designated representative for the purpose of these Conditions of Approval shall be the OEB's Manager of Generation and Transmission (or the Manager of any OEB successor department that oversees electricity leave to construct applications).