

**Hydro One Networks Inc.**

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**Susan Frank**

Vice President and Chief Regulatory Officer  
Regulatory Affairs



BY COURIER

March 19, 2010

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

Dear Ms. Walli:

**EB-2009-0425 – Hydro One Networks' Section 92 – Toronto Midtown Transmission Reinforcement Project – Responses to Interrogatory Questions**

I am attaching a text-searchable Acrobat electronic version of the Hydro One Networks' interrogatory responses to questions from OEB Staff, Toronto District School Board, North Rosedale Ratepayers Association and Energy Probe.

Also attached is additional evidence to the application that was filed with the Board on December 23, 2009 as well as an update to Exhibit B, Tab 1, Schedule 2 and a Letter of Endorsement submitted by One Shaftesbury Community Association (Exhibit B, Tab 6, Schedule 2).

The additional evidence is the Customer Impact Assessment for Midtown Transmission System Reinforcement Project dated March 10, 2010 (Exhibit B, Tab 6, Schedule 4).

The electronic copy of the responses and the evidence has been filed using the Board's Regulatory Electronic Submission System (RESS) and the proof of successful submission slip is attached. Three (3) paper copies of the responses will be sent to the Board on Monday, March 22, 2010.

Sincerely,

ORIGINAL SIGNED BY SUSAN FRANK

Susan Frank

Attach.

c. EB-2009-0425 Intervenor

**Hydro One Networks Inc.**

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BY COURIER

February 10, 2010

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

Dear Ms. Walli:

**EB-2009-0425 – Hydro One Networks' Section 92 – Toronto Midtown Transmission Reinforcement Project – Evidence Filing**

Hydro One Networks Inc. is filing additional evidence to this application filed with the Board on December 23, 2009.

The additional filing includes the IESO System Impact Assessment Addendum dated January 25, 2010 and the IESO System Impact Assessment Report dated August 11, 2009 (Exhibit B, Tab 6, Schedule 3, Attachments 1 and 2). Hydro One indicated in its application that this material would be filed in January 2010.

Please note that there is a typing error in the System Impact Assessment Addendum. On page 8, Table 1 the 2009 total actual forecast should read 286 MW versus the 288 MW shown in the report. The IESO has been notified of this correction however their report had already gone to print by the time the error was noticed.

An electronic copy of the complete application, including the attached updates, has been filed using the Board's Regulatory Electronic Submission System (RESS) and the confirmation of successful submission slip is provided with this letter.

Sincerely,

ORIGINAL SIGNED BY ANDREW SKALSKI  
FOR SUSAN FRANK

Andrew Skalski  
for Susan Frank

Attach.

**Hydro One Networks Inc.**

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**Susan Frank**

Vice President and Chief Regulatory Officer  
Regulatory Affairs



BY COURIER

December 23, 2009

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

Dear Ms. Walli:

**EB-2009-0425 – Hydro One Networks' Section 92 – Toronto Midtown Transmission Reinforcement Project – Application and Evidence Filing**

I am attaching two (2) copies of the Hydro One Networks' Application and Prefiled Evidence in support of an Application pursuant to Section 92 of the Ontario Energy Board Act for leave to construct 5.3 km of transmission line facilities in the City of Toronto.

An electronic copy of the complete application has been filed using the Board's Regulatory Electronic Submission System (RESS) and the proof of successful submission slip is attached.

Hydro One Networks' contacts for service of documents associated with this Application are listed in Exhibit A, Tab 2, Schedule 1.

Sincerely,

ORIGINAL SIGNED BY ANDREW SKALSKI FOR SUSAN FRANK

Susan Frank

Attach.

**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., for an Order or Orders granting leave to construct new transmission line facilities (“Toronto Midtown Transmission Reinforcement Project” of “Midtown Project”) in the City of Toronto.

**APPLICATION**

1. The Applicant is Hydro One Networks Inc. (“Hydro One”), a subsidiary of Hydro One Inc. The Applicant is an Ontario corporation with its head office in the City of Toronto. Hydro One carries on the business, among other things, of owning and operating transmission facilities within Ontario.
2. Hydro One hereby applies to the Ontario Energy Board (“the Board”) pursuant to Section 92 of the *Ontario Energy Board Act, 1998* (“*OEB Act*”), for an Order or Orders granting leave to construct 5.3 kilometers of transmission line facilities in the City of Toronto. These facilities are required to:
  - a) Replace an end-of-life underground cable section of the 115 kV L14W circuit between Bayview Junction (“Jct.”) and Birch Jct.
  - b) Provide a new circuit between Leaside TS and Bridgman TS to address the overloading of the existing circuits and provide additional capacity to address long term load growth in the City of Toronto Midtown area.



3. The proposed transmission line facilities between Leaside TS and Bridgman TS (referred to as the “Midtown Project”) in the part of the City of Toronto (referred to as the “Midtown”) will include:

a) Between Leaside TS and Bayview Jct.: Building a 115 kV three circuit overhead line between Leaside TS and Bayview Jct (approximately 1.7 km in length) as a replacement to the existing L14W/ L15W two circuit overhead line. Two circuits are to replace the existing circuits and the third circuit is to be used as a new circuit to address the need for increased capacity. The existing towers will not support the addition of the third circuit.

b) Between Bayview Jct. and Birch Jct.: Installing two underground cable circuits between Bayview Jct. and Birch Jct. in a deep rock tunnel (approximately 2.2 km in length) along the Canadian Pacific Railways (CPR) right-of-way (ROW), City of Toronto property, Hydro One property and City of Toronto road allowance. One cable will replace the end-of-life underground section of the existing L14W circuit. The second cable circuit will be used to address the need for increased capacity in the area.

c) Between Birch Jct. and Bridgman TS: Reconductoring the overhead section of the existing L14W line (about 1.4 km in length) between Birch Jct. and Bridgman TS. This line section also carries an idle 115 kV circuit which will be reconducted and energized as part of the new circuit.

4. The proposed transformer station facilities include installing a new 115 kV circuit breaker at Leaside TS, reconfigurations at Bridgman TS as well as protection, control and telecommunication (PCT) facilities required to connect the new 115 kV circuit, at the existing Leaside TS and Bridgman TS.

- 1     5.     The project will be undertaken along existing rights-of-way. However, Hydro One's  
2           land rights between Leaside TS and Birch Jct. will have to be renegotiated as new  
3           land rights are required at select locations along the reference ROW. Some  
4           temporary access rights are also required to construct the proposed facilities. A map  
5           showing the general location of the proposed facilities is provided in Exhibit B, Tab  
6           2, Schedule 2.  
7
- 8     6.     The proposed facilities are endorsed by Toronto Hydro Electric System ("THES"),  
9           the Local Distribution Company ("LDC"), serving the City of Toronto as shown in  
10          Exhibit B, Tab 6, Schedule 2 . THES's preferred in-service date is 2012. Due to  
11          construction complexities the earliest expedited in-service date is anticipated to be  
12          April 2013 subject to receiving S.92 approval for the project by July.  
13
- 14    7.     Hydro One received prior approval of the need for this project in its 2007  
15          Transmission rates filing, EB-2006-0501. As a result of the lapse in time between  
16          that approval and the submission of this Section 92 application, which is largely due  
17          to the above-noted construction complexities, the company is not relying on the prior  
18          approval and is resubmitting the project's need in this application. The primary need  
19          for the proposed facilities, as it was for the prior approval, is to replace the existing  
20          underground cable which is at the end of its useful service life. In addition and again  
21          as in the prior approval, the project addresses load growth in the area by providing for  
22          increased transmission capacity so as to avoid any physical disruptions to the  
23          community in the foreseeable future.  
24
- 25    8.     The Independent Electricity System Operator (IESO) plans to complete a System  
26          Impact Assessment ("SIA") of the proposed facilities in accordance with the Grid  
27          Connection Requirements of the Market Rules and the associated IESO Connection  
28          Assessment and Approval Process in January 2010. The IESO's preliminary findings

confirm the need for this project and indicate that Hydro One's proposed transmission solution is adequate and will not adversely impact the IESO-controlled grid. The SIA will be filed as Exhibit B, Tab 6, Schedule 3 in January 2010.

9. Hydro One has completed a preliminary Customer Impact Assessment ("CIA") in accordance with its customer connection procedures, and the results confirm there are no adverse impacts on transmission customers as a result of this project. The final document will be filed as Exhibit B, Tab 6, Schedule 4 by mid February 2010.

10. The total cost of the project is \$105 million the details are provided in Exhibit B, Tab 4, Schedule 2. The cost is to be shared between THES and Hydro One. The project economics as filed in Exhibit B, Tab 4, Schedule 3 indicate that the project will result in a minor increase in the Line Connection pool rate and no increase in the Transformation Connection pool rate. It is estimated that there is a minimal impact (0.05%) on the overall average Ontario consumer's electricity bill.

11. Hydro One is seeking approval of the proposed transmission facilities in accordance with the *Class Environmental Assessment for Minor Transmission Facilities* ("Class EA") approved by the Ministry of Environment ("MOE"). The Class EA process is described in Exhibit B, Tab 6, Schedule 1 and an Environmental Study Report ("ESR") is planned to be submitted in January 2010 for review by stakeholders.

12. Hydro One has consulted stakeholders in the Midtown Area to identify potential concerns associated with the construction and operation of the proposed transmission facilities. The feedback received from stakeholders was considered and incorporated into the preparation of this Application. The stakeholder process is described in Exhibit B, Tab 6, Schedule 5. Hydro One will continue consulting with stakeholders and the local community as part of the Class EA process to ensure that potential

1 concerns during the construction and commissioning stages of the proposed facilities  
2 are addressed.

3  
4 13. This Application is supported by written evidence. This evidence includes details of  
5 the Applicant's proposal for the new transmission line and station facilities. The  
6 written evidence is pre-filed as attached and may be amended from time to time, prior  
7 to the Board's final decision on this Application. Further, the Applicant may seek  
8 meetings with Board Staff and intervenors in an attempt to identify and reach  
9 agreements to settle issues arising out of this Application.

10  
11 14. Hydro One requests a written hearing for this proceeding.

12  
13 15. Hydro One requests that a copy of all documents filed with the Board be served on  
14 the Applicant and the Applicant's counsel, as follows:

15  
16 a) The Applicant:

17  
18 Ms. Anne-Marie Reilly  
19 Regulatory Coordinator  
20 Hydro One Networks Inc.

21  
22 Mailing Address: 8<sup>th</sup> Floor, South Tower  
23 483 Bay Street  
24 Toronto, Ontario  
25 M5G 2P5

26 Telephone: (416) 345-6482

27 Fax: (416) 345-5866

28 Electronic access: [regulatory@hydroone.com](mailto:regulatory@hydroone.com)

b) The Applicant's counsel:

Michael Engelberg  
Assistant General Counsel,  
Hydro One Networks Inc.

Mailing Address: 15<sup>th</sup> Floor, North Tower  
483 Bay Street  
Toronto, Ontario  
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**EXHIBIT LIST**

<b><u>Exh</u></b>	<b><u>Tab</u></b>	<b><u>Schedule</u></b>	<b><u>Contents</u></b>
<b><u>A</u></b>			<b><u>Administration</u></b>
	1	1	Application
	2	1	Exhibit List
	3	1	Summary of Prefiled Evidence
	4	1	Procedural Orders/Affidavits/Correspondence
	5	1	Notices of Motion
<b><u>B</u></b>			<b><u>Applicant's Prefiled Evidence</u></b>
	1	1	Project Location and Existing Transmission System
		2	Map of Existing Facilities
		3	Schematic Diagram of Existing Facilities
		4	Need for the Proposed Facilities
	2	1	Description of the Proposed Facilities
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	3	1	Alternatives Considered

<b><u>Exh</u></b>	<b><u>Tab</u></b>	<b><u>Schedule</u></b>	<b><u>Contents</u></b>
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	4	1	Project Costs, Economics, and Other Public Interest Considerations
		2	Project Costs
		3	Project Economics
		4	Other Public Interest Considerations
	5	1	Construction and Project Administration
		2	Table Showing Construction and In-Service Schedule
	6	1	Other Matters / Agreements / Approvals
		2	Letter of Endorsement for the Project
		3	IESO's System Impact Assessment
		4	Customer Impact Assessment
		5	Stakeholder and Community Consultation
		6	Land Matters
		7	Legal Agreement Forms

## **SUMMARY OF PREFILED EVIDENCE**

Hydro One has applied to the Board for an order granting leave to construct transmission line facilities in the Midtown Toronto Area pursuant to Section 92 of the *OEB Act*.

The proposed facilities, to be constructed, owned and operated by Hydro One are as described in Exhibit B, Tab 2, Schedule 1 (Description of the Proposed Facilities).

The planned in-service date for the proposed line and station facilities is April 2013. A map showing the location of the proposed transmission facilities is provided in Exhibit B, Tab 2, Schedule 2.

The need for the project, to relieve overloading of the existing lines between Leaside TS and Birch Junction, was approved in EB-2006-0501. This core need has remained unchanged. Further evidence on need is found in Exhibit B, Tab 1, Schedule 4. The need for the proposed facilities was also confirmed in a Hydro One "City of Toronto Electric Supply Study" filed in EB-2006-0501, Exhibit J, Tab 1, Schedule 167 Attachment A conducted with input from the LDC.

The IESO is near completion of the SIA study of the proposed facilities in accordance with the Grid Connection Requirements of the Market Rules and the associated IESO Connection Assessment and Approval Process. The IESO's preliminary findings indicate that Hydro One's proposed transmission solution is desirable and will not adversely impact the IESO Controlled Grid. The SIA will be filed in January 2010 as Exhibit B, Tab 6, Schedule 3.

Hydro One has completed a preliminary Customer Impact Assessment ("CIA") in accordance with its customer connection procedures, and the results confirm there are no



1 adverse impacts on transmission customers as a result of this project. The final CIA  
2 document will be filed as Exhibit B, Tab 6, Schedule 4 by mid February 2010.

3  
4 The total cost of the project is estimated to be \$105 million. The proposed new  
5 transmission facilities are line connection and transformation assets with the costs to be  
6 funded through a combination of incremental transmission Line Connection and  
7 Transformation pool revenues and customer capital contributions. Details of the project  
8 economics are filed in Exhibit B, Tab 4, Schedule 3.

9  
10 The design of the proposed facilities is in accordance with good utility practice and meets  
11 the requirements of the Transmission System Code for licensed transmitters in Ontario.

12  
13 Hydro One, with Toronto Hydro, has consulted with stakeholders in the Midtown Area to  
14 identify potential concerns associated with the construction and operation of the proposed  
15 transmission facilities. The feedback received from stakeholders was considered and  
16 incorporated into the preparation of this Application. Details regarding the consultation  
17 process are filed as Exhibit B, Tab 6, Schedule 5. Hydro One will continue to consult  
18 with the local community, and will ensure that potential concerns identified as part of the  
19 Environmental Approvals process, and during the construction phase, are addressed.

20  
21 A letter of support for the proposed facilities from Toronto Hydro, is filed in Exhibit B,  
22 Tab 6, Schedule 2.

23  
24 A detailed construction schedule is filed as Exhibit B, Tab 5, Schedule 2. This schedule  
25 assumes Board approval of the leave to construct application under Section 92 of the  
26 *OEB Act* by July 2010 and approvals under the Environmental Assessment Act by May  
27 2010. This should enable Hydro One to meet the anticipated April 2013 in-service date.

1 Hydro One will, in cooperation with its customers, suppliers and other stakeholders,  
2 attempt to expedite the project to the extent possible to advance the in-service date.

3  
4 Hydro One requests a written hearing for this proceeding and submits that the evidence  
5 supports granting the requested Order based on the following grounds:

- 6
- 7 • The need for the replacement of the existing, end-of-life facilities and addition of  
8 the new line facilities has been established;
  - 9 • The facilities will increase the availability of supply and the capacity of the  
10 transmission system to the Midtown Area
  - 11 • The facilities will address long term load growth in the area and avoid any  
12 physical disruptions to the community in the congested urban area. This need  
13 cannot be met through addition of new generation resources or conservation and  
14 demand management initiatives
  - 15 • The need for the project is supported by the LDC
  - 16 • The proposed facilities are consistent with the LDC's longer term plans, in that  
17 they provide additional capability for future load growth
  - 18 • There are no adverse system or customer impacts from the project
  - 19 • The project will be fully compliant with the relevant codes, rules and licences
  - 20 • There will be a minor (0.05%) customer bill impact as a result of the new line  
21 facilities.
- 22

23 In order for the proposed project to proceed, it must be considered to be in the "public  
24 interest". Subsection 96(2) of the *Ontario Energy Board Act, 1998* specifies that, for  
25 section 92 purposes, "the Board shall only consider the interests of consumers with  
26 respect to prices and the reliability and quality of electricity service" and "where  
27 applicable and in a manner consistent with the policies of the Government of Ontario, the  
28 promotion of the use of renewable energy sources."

1 Hydro One submits that the proposed facilities are in the public interest because they  
2 will:

- 3
- 4 • Maintain reliable electricity supply to consumers in the Midtown Area through  
5 the replacement of end-of-life equipment;
  - 6 • Increase transmission capacity in the Midtown Area to meet expected load growth  
7 in a reliable manner through installation of additional transmission capacity;
  - 8 • Maintain required quality of supply; and
  - 9 • Have no material impact on the price of electricity.
- 10

11 For the reasons provided above, Hydro One respectfully submits that the proposed  
12 transmission line facilities should be approved under Section 92 of the *OEB Act*.  
13 Accordingly, Hydro One requests an Order from the Board pursuant to Section 92 of the  
14 *OEB Act* granting leave to construct the proposed transmission line facilities.

1

2

**PROCEDURAL ORDERS / AFFIDAVITS / CORRESPONDENCE**

3

1

2

## **NOTICES OF MOTION**

3

## **PROJECT LOCATION AND EXISTING TRANSMISSION SYSTEM**

### **1.0 PROJECT LOCATION**

The project is located on Hydro One facilities lying alongside the Canadian Pacific Railways (CPR) right-of-way between Leaside TS and Bridgman TS in the City of Toronto referred to as the Midtown area. Please see Map 1 in Exhibit B, Tab 1, Schedule 2.

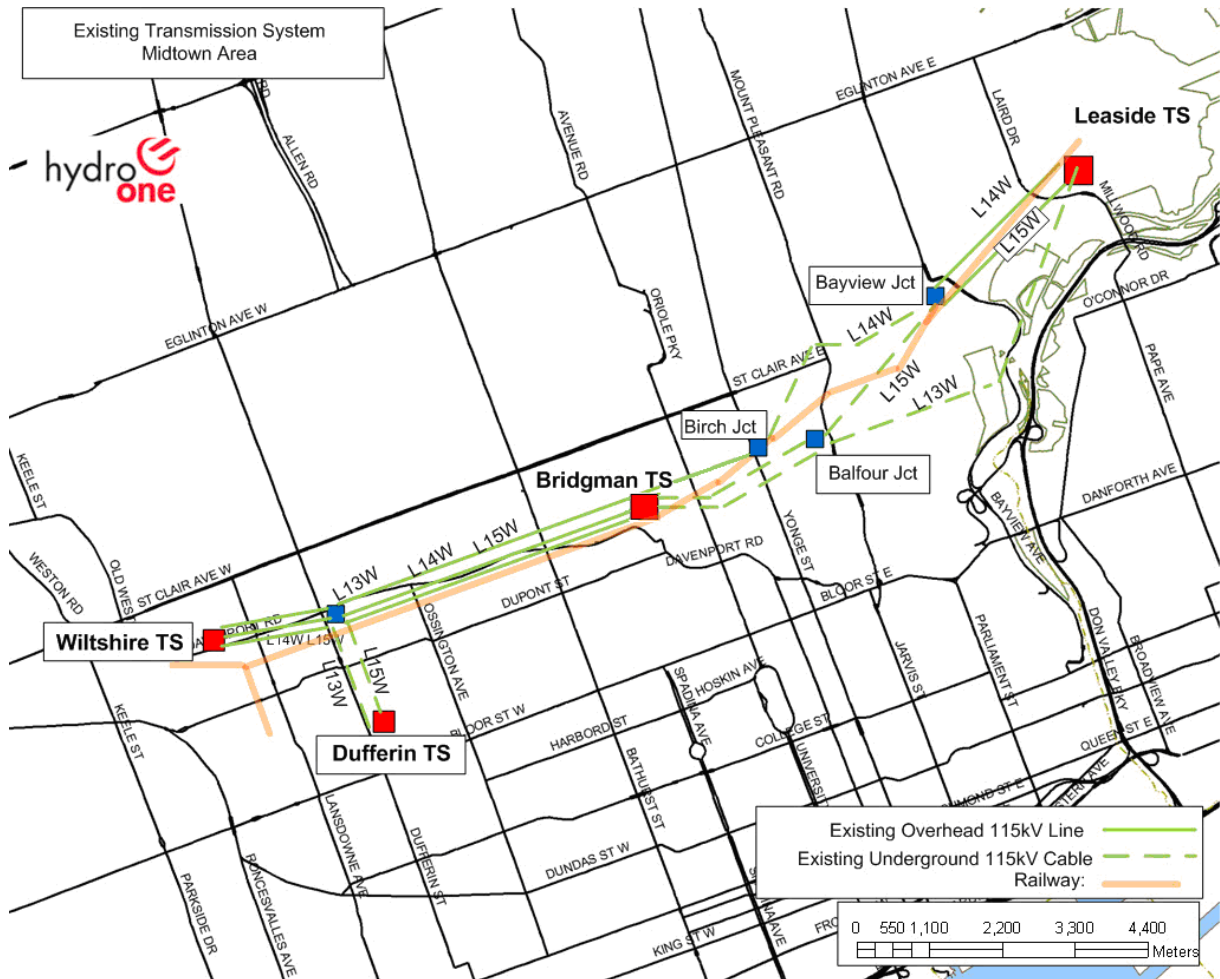
### **2.0 EXISTING TRANSMISSION FACILITIES**

The existing transmission facilities in the Midtown area include 115 kV transmission lines L13W, L14W and L15W that run between Leaside TS and Wiltshire TS. These lines provide the supply to Toronto Hydro customers served via Bridgman TS and Dufferin TS (see Exhibit B, Tab 1, Schedule 2).

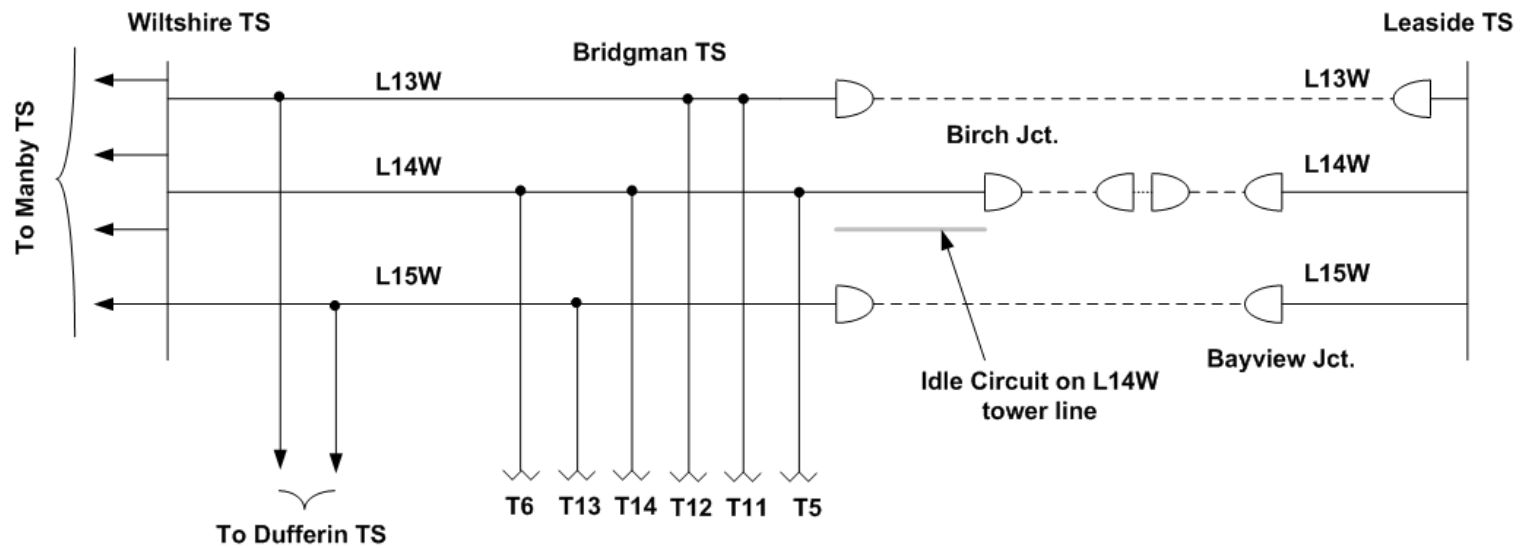
A schematic diagram showing connection of the existing facilities is given in Exhibit B, Tab 1, Schedule 3.

Combined capacity of the above mentioned three parallel circuits is 272 MW. This corridor limit is based on the loss of either one of the 115 kV circuits L13W or L15W. As identified in the Exhibit B, Tab 1, Schedule 4, the most recent summer peak load (Year 2009) in this area was approximately 286 MW and hence, the line is over-capacity.

MAP OF EXISTING FACILITIES



**SCHEMATIC DIAGRAM OF EXISTING FACILITIES**



**Leaside TS x Bridgman TS x Wiltshire TS 115kV Circuits  
Existing Facilities**



## NEED FOR THE PROPOSED FACILITIES

### 1.0 BACKGROUND

In Hydro One Transmission's 2007 rates filing, EB-2006-0501, the company requested the OEB to approve the need for the Leaside TS x Birch Junction Transmission Reinforcement Project (currently re-named the "Midtown Project"). The Board in its subsequent decision, dated 16 August 2007, accepted Hydro One's need for the project and stated:

"The Board finds that the need to relieve loading on the existing lines between Leaside TS and Birch Junction TS has been demonstrated." (page 45)

Since the 2007 approval, Hydro One has been working with many stakeholders (such as, Toronto Hydro, City of Toronto, CPR, GO Transit, Loblaws) to assess the route options, environmental issues and land rights associated with this project. The stakeholder consultation process and pre-engineering work to develop alternate engineering solutions for this project, which has many construction complexities, took significantly longer than anticipated to finalize a preferred alternative. The core need for the project, to provide reliable supply in accordance with the Transmission System Code and IESO Market Rules, is essentially unchanged from that previously approved in 2007.

The two primary needs for this project are:

1. To replace an aging underground cable section of 115 kV L14W circuit between Bayview Jct. and Birch Jct. which is at the end of its useful life.
2. To address overloading of the transmission facilities in the area under single

contingency condition and provide for future load growth.

The project will enable the electrical supply for the Midtown area to maintain the existing level of reliability and also meet the forecast long term load growth.

## 2.0 NEED

The existing facilities between Leaside TS and Wiltshire TS consist of three 115 kV circuits L13W, L14W and L15W. These circuits supply Bridgman TS and Dufferin TS from Leaside TS and also provide load transfer capability between the Leaside TS and Manby TS. The existing transmission facilities are described in Exhibit B, Tab 1, Schedule 1 and are shown in Exhibit B, Tab 1, Schedule 2. The service area of the Bridgman TS and Dufferin TS is shown in Figure 1.

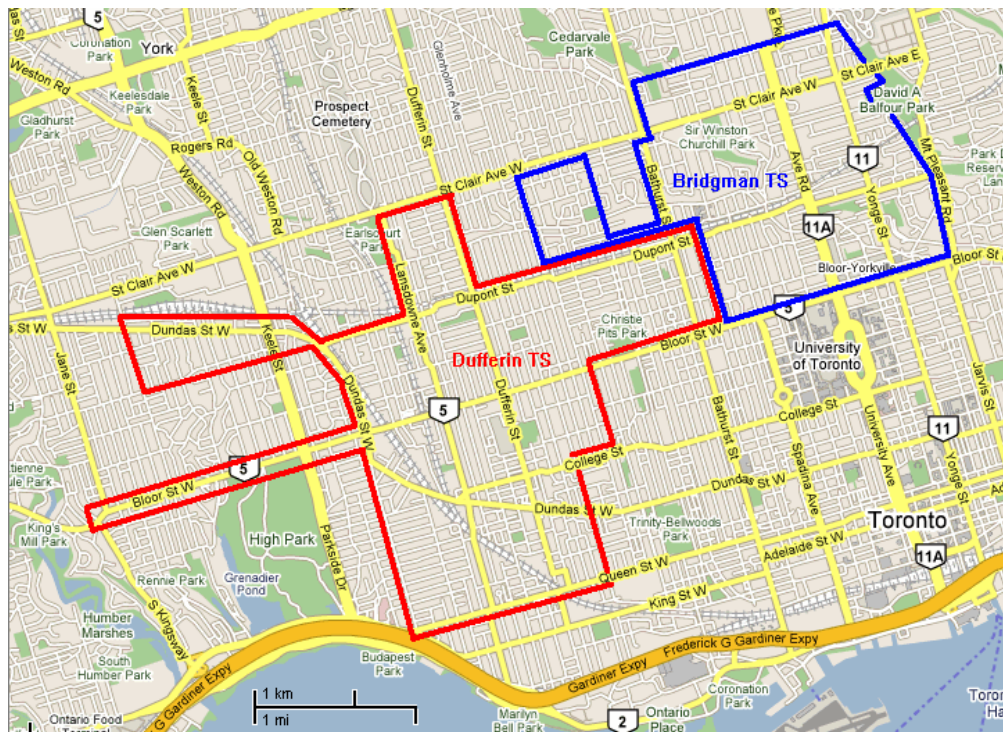


Figure 1. Service Area of the Bridgman TS and Dufferin TS

1 There is a need to replace the existing underground cable section of 115kV L14W circuit  
2 between Bayview Jct. and Birch Jct. This section of cable is 55 years old. It is one of the  
3 oldest transmission cables in the Hydro One fleet and has experienced electrical  
4 insulation failure in 2002 due to a contractor dig in. Results of the subsequent testing  
5 indicate significant deterioration of the cable jacket which will lead to risk of sheath  
6 failure. The cable sheath hermetically seals the cable insulation and provides containment  
7 for the system insulating oil. Results from cable system oil analysis, which provides  
8 indications of insulation condition, show significant aging of the insulation. The heat  
9 dissipation capability of the cable backfill has also been measured and assessed to be  
10 poor. This could lead to overheating and consequent cable failure. Hydro One has  
11 therefore deemed the cable to be at the end of its useful life and recommends  
12 replacement.

13  
14 There are risks and concerns that the cable section on L14W in its present weakened state  
15 may not be able to handle the increased load expected to occur in the future and  
16 particularly if an outage were to occur on one of the other two circuits (i.e. L13W or  
17 L15W). If either of these circuits has an outage, and if L14W was also to fail the one  
18 remaining circuit would trip, leading to a complete outage of the area load.

19  
20 The Midtown area load continues to experience natural load growth and the existing  
21 facilities will not be able to provide adequate capacity needs. Additional transmission  
22 capacity is required to relieve the existing overloading situation and also meet forecast  
23 load growth at these two stations (see Load Forecast table in the following section). This  
24 need was first identified in a 2006 Hydro One and Toronto Hydro joint study on the  
25 adequacy of the supply to the City of Toronto. The joint study recommended the  
26 provision of a new circuit from Leaside TS to Bridgman TS. This would reduce the risk  
27 of interruptions and provide additional capacity for the area served by Bridgman TS and  
28 Dufferin TS. The new circuit will also increase the capability for load transfer between

1 Leaside TS and Manby TS.

2  
3 It is important to note that these facilities are installed and run through densely populated  
4 communities and along one of the busiest rail corridors in the nation. Hydro One  
5 therefore plans to install at the same time, the replacement cable and the new circuit in  
6 the same location so as to minimize costs and avoid unnecessary disruption to the  
7 community and the environment.

8  
9 **3.0 LOAD FORECAST**

10  
11 This section provides the area load forecast and historical loads from 2006 - 2009. The  
12 load forecast is the latest load forecast information from Toronto Hydro. The forecast  
13 and the 2009 actual have both been adjusted upward by 6% for extreme weather to be  
14 consistent with IESO system design requirements.

15  
16 Table 1 shows the forecast peak load supplied from Bridgman TS and Dufferin TS. The  
17 table also shows that the 2009 summer load exceeded the 272 MW capacity of the  
18 existing 115 kV line facilities by about 14 MW. The corridor limit is based on the loss of  
19 either one of the 115 kV circuits L13W or L15W.

Table 1 – Area Load Forecast\*

	Actual				Forecast								
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Bridgman MW	171	162	159	163	164	165	167	168	170	171	173	174	176
Dufferin MW	131	123	118	123	127	128	129	130	131	132	134	135	136
Total	302	285	277	286	290	293	296	298	301	304	306	309	312
Corridor Limit	272	272	272	272	272	272	272	272	272	272	272	272	272
<b>Excess over Capacity</b>	30	13	5	14	18	21	24	26	29	32	34	37	40

\* The 2010 – 2018 forecast loads are adjusted for extreme weather.

The area load is growing by about 3 MW per year and the capacity deficiency will increase from 14 MW in 2009 to 24 MW in 2012 and is forecast to eventually reach 40 MW at the end of 2018, before the impact of Conservation and Demand Management (CDM). The loss of one MW represents the loss of supply to about 333 homes.

Toronto Hydro expects that implementation of various CDM programs will result in the peak demand reduction of approximately 1.5 MW per year. These programs are contingent upon funding from Ontario Power Authority (OPA), OEB, Green Energy Act, etc. This funding has not been secured. If successful, the cumulative effect of the CDM program would be to reduce the capacity deficiency from 40MW to about 27MW by the year 2018. Such CDM initiatives in the Midtown area will not entirely alleviate the overloading and address future long-term load growth in the area.

To address the capacity deficiency, there is a need to reinforce the transmission system. Otherwise, following a single contingency, the area load may have to be curtailed during summer peak periods to keep circuit loading within line limits. This would be non-

compliant with transmission planning criteria (see next section).

#### **4.0 RELEVANT TRANSMISSION PLANNING GUIDELINES**

The Transmission System Code and the IESO Market rules require that loadings on transmission circuits must not exceed the circuit ratings for the loss of a single circuit.

To meet the TSC and IESO Market Rules, Hydro One as a transmitter is required to ensure that adequate transmission supply capability is maintained following the loss of any one of the existing transmission circuits without interrupting customers.

#### **5.0 PROJECT CATEGORIZATION**

##### **5.1 Project Classification (Development, Connection, Sustainment)**

Per the Board's Filing Guidelines, the first stage of project categorization is the classification of a project as development, connection, or sustainment.

- *Development projects are for load growth or other changes to the system such as minimizing congestion on the transmission system*
- *Connection projects are those for providing connection of a customer to the transmission system.*
- *Sustainment projects are intended to maintain the performance of the transmission network at its current standard or replacing end-of-life facilities.*

Based on the above criteria this project is classified as a Development and Sustainment project as it incorporates elements of these two project types:

- 1 • The development part of the project is to provide adequate supply capacity and  
2 customer reliability for load growth in the mid-town Toronto area through installation  
3 of an additional 115 kV circuit.  
4
- 5 • The sustainment part of the project is to replace the underground portion of the 115  
6 kV L14W circuit between Bayview Jct. and Birch Jct. which is at the end of useful  
7 service life.  
8

## 9 **5.2 Need Classification**

10  
11 The second stage of project categorization is to distinguish whether the project need is  
12 determined beyond the control of the Applicant (“Non-discretionary”) or determined at  
13 the discretion of the Applicant (“Discretionary”). Non-discretionary projects may be  
14 triggered or determined by such things as:  
15

- 16 a) *Mandatory requirement to satisfy obligations specified by Regulatory*  
17 *Organizations including NPCC/NERC (NAERO in the near future) or by the*  
18 *Independent Electricity Market Operator (IESO);*  
19
- 20 b) *Need to accommodate new load (of a distributor or large user) or new generation*  
21 *(connection);*  
22
- 23 c) *To relieve system elements (transmission lines, circuit breakers, etc.) where the*  
24 *loading exceeded their capacities or where short circuit levels on these systems*  
25 *elements exceeded their withstand capabilities;*  
26
- 27 d) *Projects identified in an approved IPSP;*  
28

e) *To comply with direction from the Ontario Energy Board in the event it is determined that the transmission system's reliability is at risk.*

The Midtown Area project is considered as non-discretionary for both the development and sustainment needs. The non-discretionary triggers relating to this project are:

- The replacement of the L14W underground cable between Bayview Jct. and Birch Jct. that is at the end of service life is considered to be non-discretionary.
- The new circuit between Leaside TS and Bridgman TS and the station work (breakers disconnect switches, protection, control and telecommunication, and reconfiguration required to connect the new circuit at Leaside TS and Bridgman TS) are needed to relieve overloading and provide capacity for long term growth, as requested by the customer. The need to relieve the overloading of facilities makes this project non-discretionary.

The following table captures these two dimensions of the project categorization.

		PROJECT NEED	
		Non-discretionary	Discretionary
PROJECT CLASS			
	Development	<b>X</b>	
	Sustainment	<b>X</b>	



## DESCRIPTION OF THE PROPOSED FACILITIES

In order to meet the need described previously in Exhibit B, Tab 1, Schedule 4, Hydro One proposes to replace an underground cable section of the 115 kV circuit L14W between Bayview Jct. and Birch Jct. and also to provide an additional 115 kV transmission circuit between Leaside TS and Bridgman TS. Due to construction complexity the earliest project in-service date is anticipated to be April of 2013. This in-service date is based on the assumption that Hydro One can receive S.92 approval by July 2010 and EA approval by May 2010. As requested by Toronto Hydro, Hydro One will try to expedite the project to the extent possible to advance the in-service date of the project.

The proposed facilities will be owned and operated by Hydro One. The following is the specific work and facilities required as part of the proposed project:

### Line Work

- Build a three circuit 115 kV overhead line between Leaside TS and Bayview Jct. (about 1.7 km) to replace the existing L14W/L15W two circuit overhead line along existing ROWs. Two circuits will replace the existing circuits L14W and L15W and the third circuit will be used as a new circuit for supply to Bridgeman TS. The existing double-circuit towers will be replaced with higher towers to accommodate the additional circuit.
- Install two underground cable circuits between Bayview Jct. and Birch Jct. in a rock tunnel approximately 60 to 70 meters deep and 2.2 kms in length, primarily along existing ROWs, City of Toronto property, Hydro One property, and Toronto road allowance. One cable circuit will replace the existing L14W cable which has reached

1 end of its service life and the second cable circuit will be used as a new circuit to  
2 address the need for increased supply to Bridgman TS.

- 3 • Reconductor and uprate the two circuit overhead line section between Birch Jct. and  
4 Bridgman TS of the L14W circuit and the idle circuit (about 1.4 km). The uprated idle  
5 circuit will be used as a new circuit for supply to Bridgman TS.

6  
7 Station Work

- 8 • The proposed transformer station facilities include the addition of a new 115 kV  
9 circuit breaker at Leaside TS, reconfiguration at Bridgman TS and associated  
10 protection, control and telecommunication facilities to connect the new circuit.

11  
12 The planned in-service date for the proposed facilities is April 2013.

13  
14 A map showing the proposed transmission route and facilities is provided at Exhibit B,  
15 Tab 2, Schedule 2. A schematic electrical diagram of the proposed facilities is provided  
16 in Exhibit B, Tab 2, Schedule 3. Cross-sections of both the existing and proposed  
17 transmission structures on the reference ROW are provided in Exhibit B, Tab 2, Schedule  
18 4.

1

2

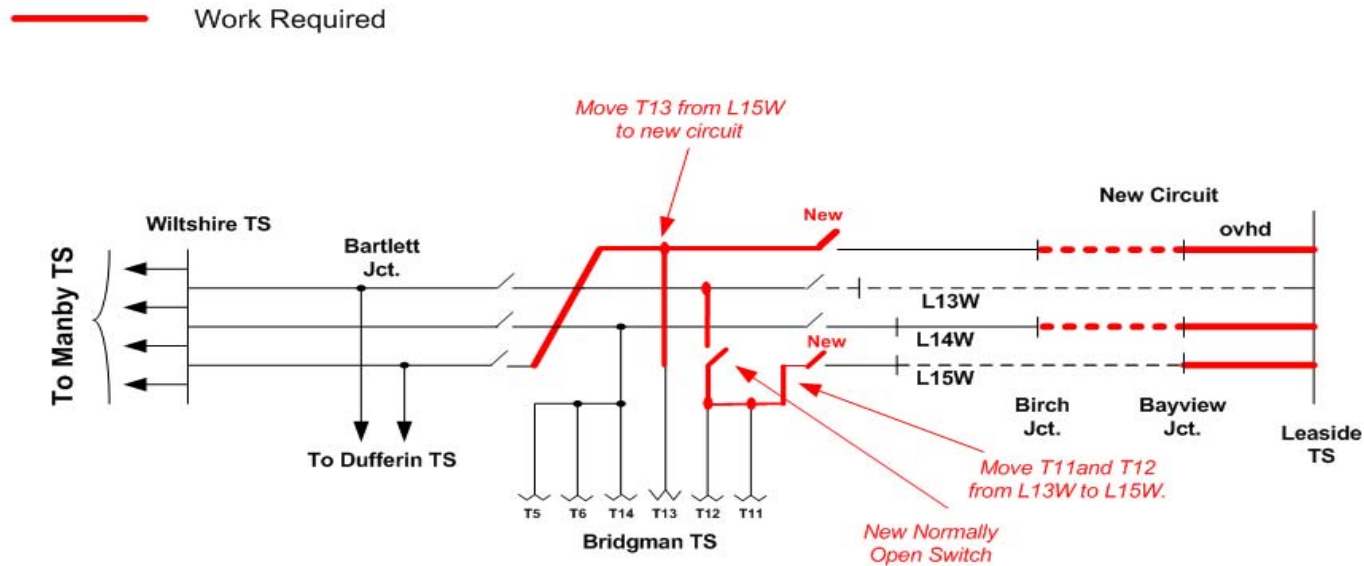
## **MAP OF PROPOSED FACILITIES**

3





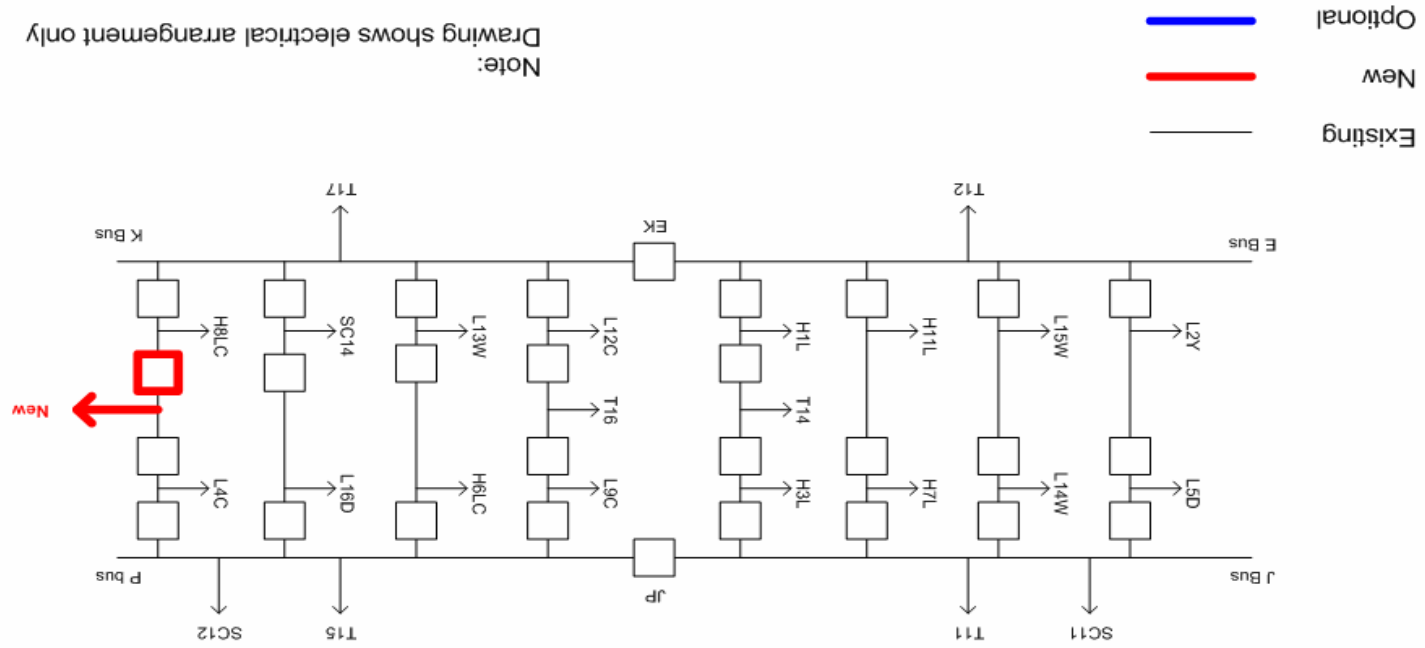
### Schematic Diagram of Proposed Facilities

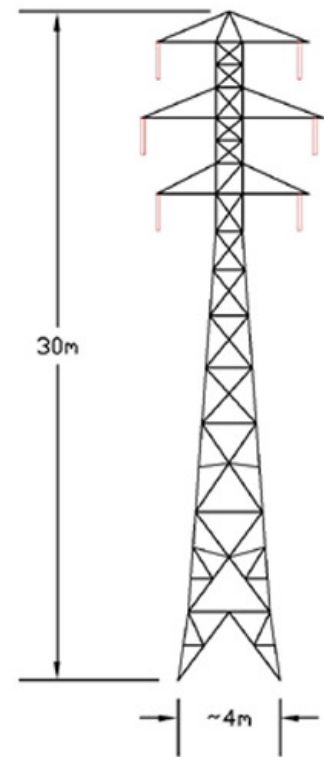


Work to be done:

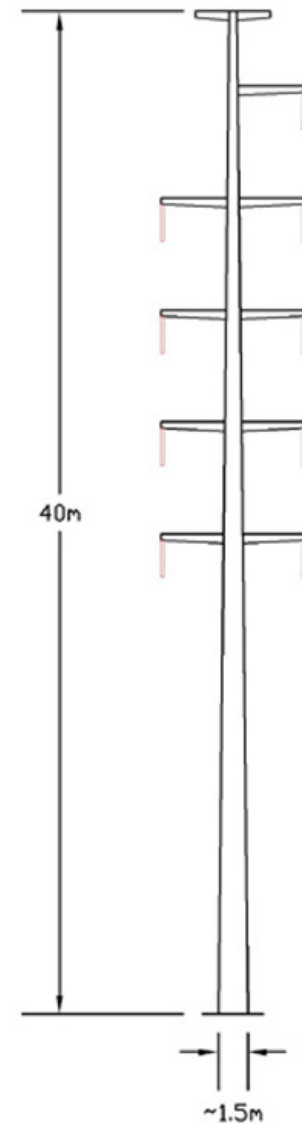
- Rebuild L14W/L15W as a 3 ckt line between Leaside TS and Bayview Jct. All three circuits are to have a rating of 1200A.
- Replace the existing L14W cable between Bayview Jct. and Birch Jct. with two new cable circuits with ratings of 1200A.

Leaside TS x Bridgman TS: Add new 115kV circuits

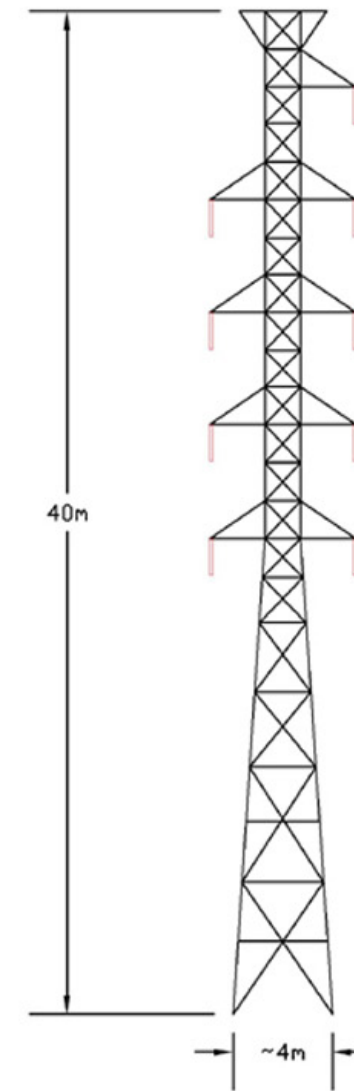




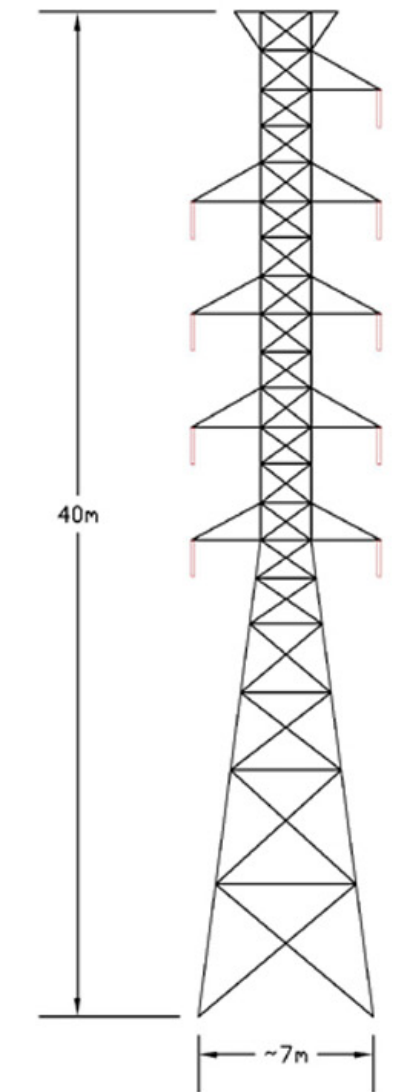
EXISTING  
115 kV 2CCT  
SEMI-ANCHOR  
TOWER



PROPOSED  
115 kV 3CCT  
STEEL POLE  
TOWER



PROPOSED  
115 kV 3CCT  
STEEL  
TOWER



PROPOSED  
115 kV 3CCT  
ANGLE STEEL  
TOWER

## ALTERNATIVES CONSIDERED

In determining the proposed facilities for replacing the end-of-life cable and addressing long term load growth, Hydro One and Toronto Hydro considered a number of alternatives. To facilitate alternative development and evaluation, separate options were developed for:

- Leaside TS x Bayview Jct. Line Section - S1
- Bayview Jct. x Birch Jct. Line Section - S2
- Birch Jct. x Bridgman TS Line section - S3

All options included station work covering terminal connection work at Leaside TS and Bridgman TS, as well as at the junction sites. A map showing the location of these sections and the options considered for each is provided in Exhibit B, Tab 3, Schedule 2. The recommended alternative was selected by combining the preferred option for each of these three sections.

The “Do Nothing” or “Delay” alternative was considered. This alternative maintains the status quo with the aging cable section of the L14W line remaining in-service and overloading occurring with the loss of a single circuit under peak load conditions. This alternative does not provide the requisite supply reliability and was therefore not carried forward. Additionally, as noted in Need (Exhibit B, Tab 1, Schedule 4), conservation savings are not forecast to be sufficient to eliminate the need for the new line, which provides an additional reason for dismissal of the “Do Nothing” or “Delay” options.



1 **Section S1 - Leaside TS x Bayview Jct.**

2  
3 Three options were considered for this section as follows:

4 Option S1-1: Rebuild the existing double circuit overhead line L14W/L15W line as a  
5 three circuit overhead line on the existing right-of-way

6 Option S1-2: Build a single circuit underground cable on existing right-of-way

7 Option S1-3: Build a single circuit underground cable on road allowance  
8

9 Two construction methods were proposed for the underground cable options – trenching  
10 and tunneling.  
11

12 The trenching option consists of a 2 metre deep by 1.5 metre wide trench excavation.  
13 This option affects residents, property owners, businesses, and creates possible conflicts  
14 with existing infrastructure, and potential adverse effects on the environment.  
15

16 The tunneling method consists of an approximate 3 metre diameter tunnel approximately  
17 60 – 70 metres below the surface. This option results in very little excavation at the street  
18 level and minimizes vehicular and pedestrian traffic disruption, inconvenience to  
19 businesses, interference with other underground infrastructure and the public, health and  
20 safety risk from open trenching.  
21

22 Table 1 provides a comparative evaluation of the three alternatives based on technical,  
23 cost and environmental criteria. From a cost perspective, S1-1 is the cheapest as this is  
24 the shortest route, utilizing existing corridor and rights-of-way to the extent possible. The  
25 costs of the other options are estimated to be significantly higher. As such, option S1-1:  
26 Rebuilding the double circuit line as a three circuit line is the preferred option as it has  
27 lower costs, easier constructability and is less impactful on the community and  
28 environment.

Hydro One's policy is to build all high-voltage transmission lines above ground, where possible. It considers placing a transmission line underground only if there are technical constraints that prevent the construction of an overhead line, or if in a particular area the cost of constructing an overhead line exceeds the cost of placing the line underground. During its consultation process, Hydro One was asked to consider underground options in this section by a local residents' association. However, undergrounding in this situation does not meet the above-noted criteria.

**Table 1: Evaluation of Option for Section 1: Leaside TS x Bayview Jct.**

Evaluation Criteria	S1-1: Overhead Line	S1-2: Underground Cable on Rail Corridor		S1-3: Underground Cable on Road Allowance	
		Trench	Tunnel	Trench	Tunnel
Estimated Cost	<b>Lowest</b>	Higher	Higher	Higher	Higher
Constructability	<b>Relatively Easier</b>	Moderate	Moderate	Difficult	Moderate
Effect on Traffic/ Business	<b>Low</b>	High (rail track)	Low	High	Low
Interference with Other Infrastructure	<b>Low</b>	High	Low	High	Low
Environment	<b>Low</b>	High	Low	High	Low

**Section S2 – Bayview Jct. x Birch Jct.**

An overhead option is not possible in this section because there is no land available that will provide sufficient ROW requirements. Two cable options (utilizing trenching and tunneling methods) were considered for this section:

**Option S2-1:** Build two new 115kV underground cable circuits between Bayview Jct. and Birch Jct. predominantly along the CP rail corridor.

**Option S2-2:** Build two new 115kV underground cable circuits between Bayview Jct. and Birch Jct. partly on CP rail corridor, private land and along public road allowances.

Table 2 provides a comparative evaluation of the two alternatives based on technical, cost and environmental criteria. From a cost perspective, S2-1 is the shortest route, avoids

acquisition of land from home owners and extremely low productivity associated with coordination of outages with CP Rail train traffic on a daily basis. For this section, Option S2-1: Build two new 115kV underground cable circuits between Bayview Jct. and Birch Jct. using the tunnel method predominantly along the CP rail corridor is the preferred option. The tunnel option will also provide capability for other future end-of-life cable replacement.

**Table 2: Evaluation of Option for Section 2: Bayview Jct. x Birch Jct.**

Evaluation Criteria	S2-1: Underground Cable on Rail Corridor		S2-2: Underground Cable on Road Allowance	
	Trench	<b>Tunnel</b>	Trench	<b>Tunnel</b>
Estimated Cost	Lower	<b>Lower</b>	Lower	<b>Higher</b>
Constructability	Moderate	<b>Moderate</b>	Difficult	<b>Moderate</b>
Effect on Traffic/ Business	High (rail track)	<b>Low</b>	High	<b>Low</b>
Interference with Other Infrastructure	High	<b>Low</b>	High	<b>Low</b>
Environment	High	<b>Low</b>	High	<b>Low</b>

Note: The trenching options costs are escalated due to extremely high construction costs associated with coordination of work with CP Rail traffic because of safety clearances

### **Section S3 – Birch Jct. x Bridgman TS**

There is only one option for this section as follows:

Option S3-1: Re-conductor the existing two circuit overhead line between Birch Jct. and Bridgman TS. One circuit carries circuit L14W, the other circuit, presently idle, will carry the new circuit.

### **Other Options**

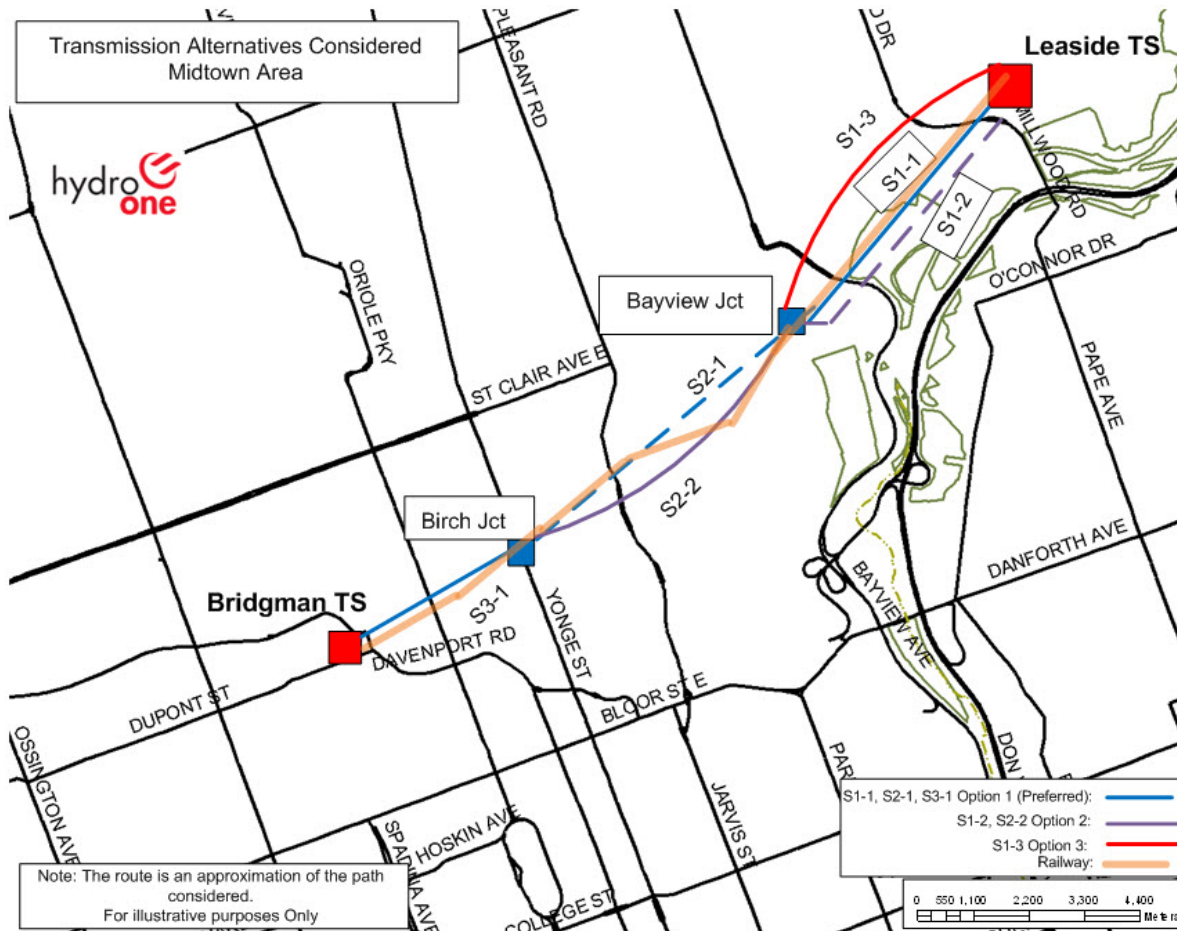
Other options including building a double circuit cable between Leaside TS and Birch Jct. on public road allowances, park lands, and the CP rail corridor, and bypassing Bayview Jct., were considered. These options were not preferred as they were more costly and had a greater environmental impact primarily because of their longer length.

1    **Recommended Alternative**

2    The recommended alternative was determined by combining the preferred options for  
3    each of the three sections

- 4    •    Re-build the existing double circuit overhead line L14W/L15W line as a three  
5        circuit overhead line between Leaside TS and Bayview Jct.
- 6    •    Build two new 115kV underground cable circuits between Bayview Jct. and Birch  
7        Jct. on the existing corridor predominantly along the CP Rail corridor and city road  
8        allowance.
- 9    •    Re-conductor the existing two circuit overhead line between Birch Jct. and  
10        Bridgman TS.

## Map of Alternatives



**PROJECT COSTS, ECONOMICS, AND OTHER  
PUBLIC INTEREST CONSIDERATIONS**

This set of exhibits describes the costs of the proposed facilities and the economics of the project including the economic feasibility, rate impacts, and benefits to Ontario electricity consumers. Other public interest considerations are also discussed.

Under the *OEB Act, 1998*, “public interest” is defined to mean the interest of consumers with respect to prices and the adequacy, reliability and quality of electricity service and where applicable and in a manner consistent with the policies of the Government of Ontario, the promotion of the use of renewable energy sources. Consumers are defined as those who use electricity that was not self-generated for their own consumption.

## PROJECT COSTS

The total estimated capital cost for the installation of a new 115 kV circuit from Leaside Transformer Station to Bridgman Transformer Station, and replacing the existing 115 kV L14W circuit line from Bayview Jct. to Birch Jct., as well as related station work, including overheads and an Allowance for Funds Used During Construction ("AFUDC"), is summarized as follows:

**Table 1**

**Total Project Costs (Lines & Stations)**

	<i>Estimated Cost</i>
	(\$millions)
Transmission Line Facilities (Table 2)	\$100.8
Station & PCT Facilities (Table 3)	\$4.1
<b>Total</b>	<b>\$ 104.9</b>

In Hydro One's Transmission Rates Filing, EB-2008-0272, Hydro One provided an Investment Summary Document which provided a gross project cost for this project of \$56.6 million. The current cost increase to \$104.9 million is due to the following factors:

- Real Estate costs for the preferred route are \$11.7M (including contingency and overhead) higher following a study of existing land values on the preferred route
- Increase in contingency from 10% to 25% in light of complexities and unknowns associated with this project
- The tunnel option, being the only way to cross Yonge St, is significantly more expensive than the solution in the previous estimate which did not contemplate the need for tunneling
- Construction cost escalation over the intervening period

- The balance of the difference in cost is attributed to additional and increased interest and overhead charges on the increased base costs.

**Table 2**  
**Cost of Line Work**

	<i>Estimated Cost</i>
	(\$millions)
Project Management (see note below)	\$0.5
Engineering	1.7
Procurement*	50.2
Construction	3.6
Preliminary Engineering and Studies	0.9
Contingencies	15.7
Real Estate	9.9
<b>Costs before Overhead and AFUDC</b>	<b>\$82.5</b>
Overhead **	9.7
AFUDC ***	8.6
<b>Total Line Work</b>	<b>\$ 100.8</b>

\* Procurement includes preliminary cost estimate for design/build cost of a 3m diameter concrete lined rock tunnel including shafts as well as cable supply and installation.

\*\* All overhead costs allocated to the project are for asset management and corporate services costs. These costs are charged to capital projects through a standard overhead capitalization rate. As such they are considered "Indirect Overheads". Hydro One does not allocate any project activity to "Direct Overheads" but rather charges all other costs directly to the project.

\*\*\* The AFUDC amount is derived by applying Hydro One's forecast average cost of long-term debt to the project's forecast monthly cash flows and the carry-forward closing balance from the preceding month. The forecast AFUDC rates are:

2009	6.9%
2010	6.4%
2011	7.7 %
2012	8.3%
2013	8.4%



**Table 3**  
**Cost of Station Work**

	<i>Estimated Cost</i>
	(\$millions)
Project Management	\$0.1
Engineering	0.2
Procurement	1.3
Construction	1.1
Contingencies	0.7
<b>Costs before Overhead and AFUDC</b>	<b>\$3.3</b>
Overhead	0.4
AFUDC	0.3
<b>Total Station Work</b>	<b>\$4.1</b>

**RISKS AND CONTINGENCIES**

As with most projects, there is some risk associated with estimating costs. Hydro One's cost estimate includes an allowance for contingencies in recognition of these risks. Based on past experience, the estimates for this project include allowance in the contingencies to cover the following potential risks:

- Adverse weather conditions.
- To minimize impact on customer reliability and security during construction, some circuit outages may not be available when required, resulting in additional project cost.
- Material cost changes due to the volatility of copper prices.
- Unexpected under ground utility facilities encountered at the access shafts and the egress and entrance to the TS's.

- 1 • Unexpected surface conditions at the access shafts and the egress and entrance to the  
2 TS's.
- 3 • Delay caused by CPR requirements while installing new towers and stringing  
4 conductor in close proximity of railway.

5  
6 The following potential risks should not be considered to be included in the allowance for  
7 contingencies:

- 8 • No detailed engineering has been done on the tunnel option, which comprises  
9 approximately 30% of the total project cost, pending issuance of an RFP to  
10 engineering consultants. The tunnel cost estimate is based on historical experience  
11 and discussions with contractors. Further refinement of this estimate will involve  
12 extensive borehole drilling and testing to confirm underground conditions. Due to its  
13 preliminary nature, there is a significant risk that cost and schedule could be  
14 impacted.
- 15 • Unexpected EA conditions or change to selected route due to EA
- 16 • No detailed engineering has been done for stations.

## 17 18 **COSTS OF COMPARABLE PROJECTS**

19  
20 Per the OEB EB-2006-0170 Filing Requirements the costs of comparable projects are  
21 shown in Tables 5 - 7 below.

22  
23 This transmission line project, composed of overhead and underground sections in a very  
24 compact high-density urban area, has no projects that are directly comparable. The  
25 overhead line section from Leaside TS to Bayview Jct. is located in one of the most  
26 restricted transmission corridors along the busiest CPR rail track in the nation.  
27 Construction complexity and CPR outages are a challenge unique to this project. The  
28 reconductoring of the line from Birch Jct. to Bridgman TS is also relatively higher in cost

than for typical 115 kV projects because of its close proximity to the CPR rail track. For these reasons, a comparison of costs for the overhead sections of line may not be informative. However, a 115kV line reinforcement from Hawthorne TS in the Ottawa area (2003) has some similarities which included building a new double circuit 115kV line (2.7kms) and adding a second 115 kV circuit (2.9kms) to an existing line. Cost comparisons for these projects against the Midtown project overhead line sections are shown in Table 5 and Table 6 below.

Table 7 below shows the cost comparison for the underground section of the Midtown project, from Leaside to Bridgman, against the previously completed Esplanade x John St. tunnel project. The main drivers for the increase in cost of the underground section (tunnel) of the line, relative to the Esplanade x John St. project (completed in 2007) are that this tunnel is expected to be twice as deep vs. Esplanade x John, along with the cost of escalation over the five (5) plus years since the Esplanade x John circuits were built.

**Table 5**  
**Costs of Comparable Projects**

<b>Project</b>	<b>Leaside TS x Bayview Jct. (Estimate)</b>	<b>Hawthorne TS x Blackburn Jct.</b>
Type*	3 overhead circuits on single structures	2 x 115 kV on single structures
Length (km)	1.7 km	2.7 km
In-Service Date	2013-04-30	2003-02
Total Cost**	\$7.3M/km	\$1.8/km

\* Four circuit higher tower design vs. double ckt

\*\* Does not include station work or property cost but includes major modifications/rebuilding of Bayview Junction

**Table 6**  
**Costs of Comparable Projects**

<b>Project</b>	<b>Birch Jct. x Bridgman TS (Estimate)</b>	<b>Blackburn Jct. x Russel TS (Actual)</b>
Type *	Reconductor double ckt x 115 kV on existing structures	Add second circuit on existing double ckt 115 kV tower
Length (km)	1.4 km	2.9 km
In-Service Date	2013-04-30	2003-02
Total Cost**	\$1.6M/km	\$0.5M/km

\* Removal and restringing two circuits in close proximity of rail track vs. only adding one circuit.

\*\* Does not include station work or property costs but includes major modifications/rebuilding of Birch Junction.

**Table 7**  
**Costs of Comparable Projects**

<b>Project</b>	<b>Bayview Jct. x Birch Jct. Tunnel (Estimate)</b>	<b>Esplanade TS x John TS Tunnel (Actual)</b>
Type	2 x 115 kV XLPE cables installed in 3m dia. tunnel	2 x 230 kV XLPE cables installed in 3m dia. tunnel
Length (km)	2.2 km	2.2 km
In-Service Date	2013-04-30	2007-12
Total Cost*	\$28M/km	\$23M/km

\* Does not include station work or property cost.

## PROJECT ECONOMICS

### 1.0 ECONOMIC FEASIBILITY

The proposed transmission reinforcement facilities in Midtown Toronto comprise both line and transformation assets. The line assets, which include an end-of-life replacement of the underground cable section of 115 kV transmission line from Bayview Junction to Birch Junction, a new 115 kV overhead transmission line between Leaside TS and Birch Junction, and re-conductoring of an idle circuit between Birch Junction and Bridgman TS will be included in the Line Connection Pool for rate-making purposes. The transformation assets, various equipment at Leaside TS and Bridgman TS, will be included in the Transformation Connection pool. The design of the new physical infrastructure for new and replacement line capacity will also provide for future end-of-life replacement of existing circuits, to maintain system security and reliability. Given the mix of replacement and capacity needs, cost responsibility for the line asset will be shared between the customer and the pool. More details concerning the assignment of costs is provided in section 1.1 below.

See Exhibit B, Tab 2, Schedule 1, for information on cost classification. A Discounted Cash Flow (DCF) calculation has been completed for each pool consistent with the economic evaluation requirements of the Transmission System Code to determine whether a capital contribution is required. For the Line Connection Pool capital contributions totaling \$43.7 million, plus GST, are required and for the Transformation Connection Pool no capital contributions are required.

<b><u>Capital Contribution Required</u></b>			
<i>in \$ millions, excluding GST</i>			
	Line Pool	Transformation Pool	Total
Toronto Hydro-Electric System (THES)	43.7	0	43.7
<b>Total</b>	<b>43.7</b>	<b>0</b>	<b>43.7</b>

**2.0 COST RESPONSIBILITY**

Line Connection Pool

In determining the capital contribution regarding the line connection assets, the costs assigned to customers for cost responsibility purposes are \$39.8 million. This amount covers the incremental cost of constructing one additional 115kV transmission line for additional capacity to address load growth in the Midtown Toronto area, including the cost of replacing existing facilities that are not at end-of-life and would otherwise not be replaced, but for the addition of the new circuit which cannot be accommodated on the existing facilities.

The following principles were used in allocating costs to the customer:

- Leaside TS to Bayview Jct. – The majority of the cost was allocated to the customer as this work was initiated for capacity addition purposes. The work involves building a three circuit overhead line as a replacement to the existing two circuit overhead line. The existing towers cannot accommodate the additional circuit and so require replacement even though they are not at end-of-life. Accordingly, the only cost allocated to the pool is for the replacement of the existing overhead line conductor that is approximately 70 year old and considered at end-of-life. The remainder of the cost is assigned to the customer.
- Bayview Jct. to Birch Jct. – The work involves building a tunnel to house two underground cable circuits. One of the circuits is a replacement for an existing end-of-life circuit. This work would proceed regardless of any other need. The other circuit is being added to meet the customer's capacity needs. As the work is being driven by end-of-life considerations and as the tunnel option involves no upsizing of the tunnel to meet capacity needs (see below for further detail), the pool is assigned the costs of the tunnel and the replacement cable. The customer

1 is assigned the cost of the new cable. It should be noted that the tunnel is a  
2 standard size 3-meter diameter tunnel which is not being upsized to accommodate  
3 the second (capacity-driven) circuit, and hence its cost is appropriately assigned to  
4 the replacement driver. It should also be noted that the standard tunnel will be  
5 able to accommodate an additional circuit to replace future end-of-life cable  
6 circuits.

- 7
- 8 • Birch Jct. to Bridgeman TS – The work involves re-conductoring an existing  
9 circuit as well as re-conductoring a currently idle circuit, both on the same tower.  
10 Both circuits will be used to meet the customer's needs for capacity and  
11 accordingly the cost is allocated 100% to the customer.
- 12

13 The remaining \$61.0 million of line connection costs covers the cost of rebuilding the  
14 existing end-of-life line. This additional work has been identified and planned for and is  
15 being done to replace an underground cable section and overhead conductors on an  
16 existing line as well as to make provision for the replacement of an additional circuit in  
17 the future. The replacement of these end-of-life facilities will address the reliability of  
18 the transmission system. As such, all these costs have been assigned to the pool for cost  
19 responsibility purposes and excluded from the project economic analysis, in accordance  
20 with Section 6.7.2 of the *Transmission System Code*, respecting the replacement at no  
21 charge to the customer of existing facilities that are at end-of-life. Please see the  
22 discussion in Need for the Proposed Facilities (Exhibit B, Tab 1, Schedule 4) and  
23 Transmission Alternatives Considered (Exhibit B, Tab 3, Schedule 1) for details  
24 regarding the area supply needs and transmission plans, including the installation of a two  
25 circuit line.

The costs assigned to customers for cost responsibility purposes in relation to the Transformation Connection pool are \$4.1 million for work at Leaside TS and Bridgman TS (Exhibit B, Tab 4, Schedule 2, Table 3). These are 100% of the costs of the work to be done in relation to the Transformation Connection Pool assets.

The table below indicates the cost responsibility for the elements of work to be done on the project.

<b><u>Cost Responsibility</u></b> <i>in \$ million, excluding GST.</i> <i>Numbers may not add due to rounding</i>	Connection Pool	Cost of Work (per B-4-2)	Cost Responsibility		Capital Contribution
			Customer	Pool	
<b>Transmission Line Facilities</b> <i>% of total cost</i>	Line	100.8 <i>100%</i>	39.8 <i>39%</i>	61.0 <i>61%</i>	43.7 <sup>1</sup>
<b>Station Facilities</b> <i>% of total cost</i>	Transformation	4.1 <i>100%</i>	4.1 <i>100%</i>	--	--
<b>Total</b> <i>% of total cost</i>		<b>104.9</b> <i>100%</i>	<b>43.9</b> <i>42%</i>	<b>61.0</b> <i>58%</i>	<b>43.7</b>

<sup>1</sup> Capital contribution exceeds the customer's cost responsibility as it includes recovery of OM&A

## **2.1 Line Connection Pool**

A 25-year discounted cash flow analysis for the Line Connection facilities is provided in Table 1 below. The results indicate that the forecast incremental revenues are expected to be insufficient to pay for the incremental capital and operating costs and therefore a capital contribution will be required. The capital contribution is estimated to be \$43.7 million for THES.

## **2.2 Transformation Connection Pool**



1 A 25-year discounted cash flow analysis for the Transformation Connection facilities is  
2 provided in Table 2 below. The results indicate that the forecast incremental revenues  
3 are expected to be sufficient to pay for the incremental capital and operating costs and  
4 therefore as noted above, no capital contribution will be required.

### 5 6 **3.0 RATE IMPACT ASSESSMENT**

7  
8 The analysis of the Line Connection Pool and Transformation Connection Pool rate  
9 impacts has been carried out on the basis of Hydro One's transmission revenue  
10 requirement for the year 2009, and the most recently approved Ontario Transmission  
11 Rate Schedules. The network pool revenue requirement would be unaffected by the new  
12 reinforcement facilities, based on the criteria used to allocate transmission costs to the  
13 three pools as approved by the Board in its RP-1999-0044 decision.

#### 14 15 Line Connection Pool

16  
17 Based on the Line Connection Pool incremental cash flows associated with the net capital  
18 cost of the project, \$57.1 million (\$100.8 million gross cost less \$43.7 million capital  
19 contribution), there will be a change in the Line Connection pool revenue requirement  
20 once the project's impacts are reflected in the transmission rate base, net of capital  
21 contribution, at the projected in-service date in April of 2013. The maximum revenue  
22 shortfall related to the proposed Line Connection facilities will be \$6.5 million in the year  
23 2020, which will result in a rate impact of 4.3% on the provincial Line Connection pool  
24 rates. Accordingly, the project will cause the Line Connection Pool rate to increase from  
25 the current rate of \$0.70/kW/month to \$0.73/kW/month by 2017 and then to decline to  
26 \$0.72/kW/month in the fourteenth year after in-service. The detailed analysis illustrating  
27 the calculation of the incremental Line Connection revenue shortfall and rate impact is  
28 provided in Table 3 below.

Transformation Connection Pool

Based on the Transformation Connection pool incremental cash flows associated with the project and assigned to customers there will be a minor change in the Transformation Connection pool revenue requirement once the project's impacts are reflected in the transmission rate base, net of capital contribution (which is zero), at the projected in-service date in April of 2013. The maximum revenue shortfall related to the proposed Transformation Connection facilities will be \$0.1 million in the year 2015, which will result in no impact on the provincial Transformation Connection pool rates. The Transformation Connection Pool revenue requirement will have initial minor shortfalls until the fifth year after in-service. Thereafter, surpluses will be recorded and will increase annually. These surpluses will eventually lower the rate from the current \$1.57/kw/month to \$1.56/kW/month commencing in the nineteenth year after in-service. The detailed analysis illustrating the calculation of the incremental Transformation Connection revenue shortfalls and surpluses and associated rate impacts is provided in Table 4 below.

Impact on Typical Residential Customer


Adding the costs of the new facilities to the respective pools will cause a slight increase in the total customer bill. The table below shows this result for a typical residential customer.

A. Typical monthly bill (Residential R1 in a high density zone at 1,000 kWh per month with winter commodity prices.)	\$137.53 per month
B. Transmission component of monthly bill (RPP total transmission components)	\$10.96 per month
C. Line Connection Pool and Transformation Connection Pool share of Transmission component (RPP transmission line and transformation component)	\$5.21 per month
D. Impact on Line Connection Pool and Transformation Connection Pool Provincial Uniform Rates (Tables 3 and 4. Combined Impact of Line 4.29% and Transformation 0.00%)	1.33%
E. Increase in Transmission costs for typical monthly bill (C x D)	\$0.07 per month or \$0.83 per year
F. Net increase on typical residential customer bill (E / A)	0.05%

*Note: Values rounded to two significant digits*

1  
2  
3

**Table 1 – DCF Analysis, THES, Line Connection Pool, page 1**

Date: 21-Dec-09		SUMMARY OF CONTRIBUTION CALCULATIONS														
Project # 13609		Planner's estimate														
Facility Name: Midtown Toronto																
Scope: Line Pool																

Start Date: 1-Jan-09


In-Service Date: 30-Apr-13

Payback Year: 2038


No. of years required for payback: 25

Note: Payback not achieved during the economic horizon period.

**Table 1 – DCF Analysis, THES, Line Connection Pool, page 2**

Date: 21-Dec-09		SUMMARY OF CONTRIBUTION CALCULATIONS														
Project # 13609		Planner's estimate														
Facility Name:		Midtown Toronto														
Scope:		Line Pool														
	Month	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	
	Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038		
		13	14	15	16	17	18	19	20	21	22	23	24	25		
Revenue & Expense Forecast																
Load Forecast (MW)		40.0	42.8	45.6	48.4	51.3	54.1	57.0	60.0	62.9	65.9	69.0	72.0	75.1		
Tariff Applied (\$/kW/Month)		0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70		
Gross Revenue - \$M		0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6		
OM&A Costs (Removals & On-going Incremental) - \$M		(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)		
Ontario Capital Tax and Municipal Tax - \$M		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Net Revenue/(Costs) before taxes - \$M		(0.3)	(0.3)	(0.3)	(0.2)	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.0)	(0.0)		
Income Taxes (incl. LCT)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0		
Operating Cash Flow (after taxes) - \$M		(0.2)	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.0)	(0.0)	(0.0)		
PV Operating Cash Flow (after taxes) - \$M	(A)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)		
Capital Expenditures - \$M																
Upfront - capital cost before overheads & AFUDC																
- Overheads																
- AFUDC																
Total upfront capital expenditures																
On-going capital expenditures		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
PV On-going capital expenditures																
Total capital expenditures - \$M																
PV Proceeds on disposal of assets - \$M																
PV CCA Residual Tax Shield - \$M																
PV Working Capital - \$M																
PV Capital (after taxes) - \$M	(B)															
Cumulative PV Cash Flow (after taxes) - \$M	(A) + (B)	(41.5)	(41.6)	(41.6)	(41.7)	(41.8)	(41.8)	(41.8)	(41.9)	(41.9)	(41.9)	(41.9)	(41.9)	(41.9)		

**Table 2 – DCF Analysis, THES, Transformation Connection Pool, page 1**

Date: 21-Dec-09		SUMMARY OF CONTRIBUTION CALCULATIONS													
Project # 13609		Planner's estimate													
Facility Name:		Midtown Toronto													
Scope:		Transformation Pool													
		Month	In-Service Date	Project year ended - annualized from In-Service Date											
		Year	Apr-30 2013	Apr-30 2014	Apr-30 2015	Apr-30 2016	Apr-30 2017	Apr-30 2018	Apr-30 2019	Apr-30 2020	Apr-30 2021	Apr-30 2022	Apr-30 2023	Apr-30 2024	Apr-30 2025
				1	2	3	4	5	6	7	8	9	10	11	12
Revenue & Expense Forecast															
Load Forecast (MW)				8.9	11.3	13.8	16.3	18.9	21.4	24.0	26.6	29.2	31.9	34.6	37.3
Tariff Applied (\$/kW/Month)				1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
Gross Revenue - \$M				0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.7	0.7
OM&A Costs (Removals & On-going Incremental) - \$M			0.0	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Ontario Capital Tax and Municipal Tax - \$M			0.0	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Net Revenue/(Costs) before taxes - \$M			0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Income Taxes (incl. LCT)			0.0	0.0	0.1	0.0	0.0	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)
Operating Cash Flow (after taxes) - \$M			0.0	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5
		Cumulative PV @ 5.43%													
PV Operating Cash Flow (after taxes) - \$M (A)		5.9	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Capital Expenditures - \$M															
Upfront - capital cost before overheads & AFUDC			(3.3)												
- Overheads			(0.4)												
- AFUDC			(0.3)												
Total upfront capital expenditures			(4.1)												
On-going capital expenditures				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PV On-going capital expenditures				0.0											
Total capital expenditures - \$M			(4.1)												
PV Proceeds on disposal of assets - \$M			0.0												
PV CCA Residual Tax Shield - \$M			0.0												
PV Working Capital - \$M			(0.0)												
PV Capital (after taxes) - \$M (B)		(4.0)	(4.0)												
Cumulative PV Cash Flow (after taxes) - \$M (A) + (B)		1.9	(4.0)	(3.9)	(3.7)	(3.5)	(3.3)	(3.1)	(2.9)	(2.7)	(2.4)	(2.2)	(2.0)	(1.7)	(1.5)

Discounted Cash Flow Summary			
(Based on Economic Study Horizon -Years):			
Discount Tariff - %		5.43%	
	Before Contribution	After Contribution	Impact of Contribution
	\$M	\$M	\$M
PV Incremental Revenue	8.7	8.7	
PV Incremental OM&A Costs	(0.7)	(0.7)	
PV Ontario Capital Tax and Municipal Tax	(0.4)	(0.4)	
PV Income Taxes and LCT	(2.5)	(2.5)	
PV CCA Tax Shield	0.8	0.8	
PV Capital - Upfront	(4.1)	(4.1)	
Add: PV Capital Contribution	0.0	0.0	
PV Capital - On-going	0.0	0.0	
PV Proceeds on disposal of assets	0.0	0.0	
PV Working Capital	(0.0)	(0.0)	
PV Surplus / (Shortfall)	1.9	1.9	N/A
Profitability Index*	1.5	1.5	
*PV of total cash flow, excluding net capital expenditure & on-going capital & proceeds on disposal / PV of net capital expenditure & on-going capital & proceeds on disposal			


Start Date:	01-Jan-09
In-Service Date:	30-Apr-13
Payback Year:	2031
No. of years required for payback:	18

Contribution Required (before GST) - \$M	0.0
GST @ 5% - \$M	0.0
Contribution Required (incl. GST)* - \$M	0.0

\* Payment from customer must include GST.

Start Date: 01-Jan-09  
In-Service Date: 30-Apr-13  
Payback Year: 2031  
No. of years required for payback: 18

**Table 2 – DCF Analysis, THES, Transformation Connection Pool, page 2**

Date: 21-Dec-09		SUMMARY OF CONTRIBUTION CALCULATIONS													
Project # 13609		Planner's estimate													
Facility Name:		Midtown Toronto													
Scope:		Transformation Pool													
	Month Year	Apr-30 2026 13	Apr-30 2027 14	Apr-30 2028 15	Apr-30 2029 16	Apr-30 2030 17	Apr-30 2031 18	Apr-30 2032 19	Apr-30 2033 20	Apr-30 2034 21	Apr-30 2035 22	Apr-30 2036 23	Apr-30 2037 24	Apr-30 2038 25	
Revenue & Expense Forecast															
Load Forecast (MW)		40.0	42.8	45.6	48.4	51.3	54.1	57.0	60.0	62.9	65.9	69.0	72.0	75.1	
Tariff Applied (\$/kW/Month)		1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	
Gross Revenue - \$M		0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.4	1.4	
OM&A Costs (Removals & On-going Incremental) - \$M		(0.0)	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	
Ontario Capital Tax and Municipal Tax - \$M		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	
Net Revenue/(Costs) before taxes - \$M		0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.3	1.3	
Income Taxes (incl. LCT)		(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.4)	(0.4)	(0.4)	(0.4)	
Operating Cash Flow (after taxes) - \$M		0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.9	
PV Operating Cash Flow (after taxes) - \$M (A)		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	
Capital Expenditures - \$M															
Upfront - capital cost before overheads & AFUDC															
- Overheads															
- AFUDC															
Total upfront capital expenditures															
On-going capital expenditures		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
PV On-going capital expenditures															
Total capital expenditures - \$M															
PV Proceeds on disposal of assets - \$M															
PV CCA Residual Tax Shield - \$M															
PV Working Capital - \$M															
PV Capital (after taxes) - \$M (B)															
Cumulative PV Cash Flow (after taxes) - \$M (A) + (B)		(1.2)	(0.9)	(0.7)	(0.4)	(0.2)	0.1	0.3	0.6	0.9	1.1	1.4	1.6	1.9	

2

3

Ontario Capital Tax	0.225%	2009 Ontario capital tax rate
Grants in Lieu of Municipal tax	0.648%	Transmission system average
Depreciation	2.0%	Reflects 50 year average service life for towers, conductors and station equipment, excluding land
Interest and Return on Rate Base	6.53%	Includes OEB-approved ROE of 8.01% and 4% on short-term debt, 5.84% forecast cost of long-term debt and 40/60 equity/debt split
Income Tax Provision	33.00%	2009 federal and provincial corporate income tax rate including surtax
Large Corporations Tax	0.000%	2009 large corporations tax rate
Capital Cost Allowance	8.0%	100% Class 47 assets
Incremental OM&A	1.6%	1.6% of Initial Capital per year





**Table 4 – Revenue Requirement and Transformation Connection Pool Rate Impact, page 1**

<i>Midtown Toronto</i>		Project YE 30-Apr 2014	Project YE 30-Apr 2015	Project YE 30-Apr 2016	Project YE 30-Apr 2017	Project YE 30-Apr 2018	Project YE 30-Apr 2019	Project YE 30-Apr 2020	Project YE 30-Apr 2021	Project YE 30-Apr 2022	Project YE 30-Apr 2023	Project YE 30-Apr 2024	Project YE 30-Apr 2025
<i>Calculation of Incremental Revenue Requirement (\$'000)</i>		1	2	3	4	5	6	7	8	9	10	11	12
In-service date	30-Apr-13												
Capital Cost	4,051												
Removal Cost	-												
Less: Capital Contribution Required	0												
Net Project Cost	4,051												
Average Rate Base		1,985	3,929	3,848	3,767	3,686	3,605	3,524	3,443	3,362	3,281	3,200	3,119
Incremental OM&A Costs		42	42	42	42	42	42	42	42	42	42	42	42
Ontario Capital Tax	0.225%	9	8	7	7	6	6	5	5	4	4	4	3
Grants in Lieu of Municipal tax	0.648%	26	26	26	26	26	26	26	26	26	26	26	26
Depreciation	2.0%	81	81	81	81	81	81	81	81	81	81	81	81
Interest and Return on Rate Base	6.53%	130	256	251	246	241	235	230	225	219	214	209	204
Income Tax Provision	33.00%	(9)	(51)	(40)	(30)	(21)	(13)	(5)	1	7	13	18	23
Large Corporations Tax	0.000%	-	-	-	-	-	-	-	-	-	-	-	-
<b>REVENUE REQUIREMENT PRE-TAX</b>		<b>279</b>	<b>362</b>	<b>368</b>	<b>372</b>	<b>375</b>	<b>377</b>	<b>379</b>	<b>380</b>	<b>381</b>	<b>381</b>	<b>380</b>	<b>379</b>
Incremental Revenue		167	213	260	307	355	403	451	500	550	600	651	702
<b>SUFFICIENCY/(DEFICIENCY)</b>		<b>(112)</b>	<b>(149)</b>	<b>(107)</b>	<b>(64)</b>	<b>(20)</b>	<b>25</b>	<b>72</b>	<b>120</b>	<b>169</b>	<b>219</b>	<b>271</b>	<b>323</b>
Transformation Pool Revenue Requirement including sufficiency/(deficiency)	Base Year 332,475	332,754	332,838	332,843	332,847	332,850	332,853	332,855	332,856	332,856	332,856	332,855	332,854
Transformation MW	212,009	212,116	212,145	212,175	212,205	212,236	212,266	212,297	212,329	212,360	212,392	212,424	212,457
Transformation Pool Rate (\$/kw/month)	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
Increase/(Decrease) in Network Pool Rate (\$/kw/month), relative to base year		-	-	-	-	-	-	-	-	-	-	-	-
<b>RATE IMPACT relative to base year</b>		<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>

**Assumptions**

Ontario Capital Tax	0.225%	2009 Ontario capital tax rate
Grants in Lieu of Municipal tax	0.648%	Transmission system average
Depreciation	2.0%	Reflects 50 year average service life for towers, conductors and station equipment, excluding land
Interest and Return on Rate Base	6.53%	Includes OEB-approved ROE of 8.01% and 4% on short-term debt, 5.84% forecast cost of long-term debt and 40/60 equity/debt split
Income Tax Provision	33.00%	2009 federal and provincial corporate income tax rate including surtax
Large Corporations Tax	0.000%	2009 large corporations tax rate
Capital Cost Allowance	8.0%	100% Class 47 assets
Incremental OM&A	1.0%	\$42 k for years 1-15; and \$65 k for years 16-25



**Table 5 – Derivation of Load used in DCF, page 1**

		Annual Non-Coincident Peak Load Forecast for Midtown Toronto												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Relevant Midtown Toronto Loads														
Bridgman TS	MW	158.7	160.3	161.9	163.5	165.1	166.8	168.4	170.1	171.8	173.5	175.3	177.0	178.8
Dufferin TS	MW	122.6	123.8	125.1	126.3	127.6	128.9	130.1	131.5	132.8	134.1	135.4	136.8	138.2
115kV Load Sub-total	MW	281.3	284.1	286.9	289.8	292.7	295.6	298.6	301.6	304.6	307.6	310.7	313.8	316.9
Line Capacity	MW	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0
Load in excess of capacity, calendar-year basis	MW	9.3	12.1	14.9	17.8	20.7	23.6	26.6	29.6	32.6	35.6	38.7	41.8	44.9
PLI-adjustment		87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%
PLI-adjusted load in excess of capacity	MW	8.1	10.5	13.0	15.5	18.0	20.5	23.1	25.7	28.3	31.0	33.7	36.4	39.1
Adjust for in-service month:														
Project Year														
		30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
		to	to	to	to	to	to	to	to	to	to	to	to	to
		29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr	29-Apr
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2025
Load in excess of capacity, project-year basis*	MW	8.9	11.3	13.8	16.3	18.9	21.4	24.0	26.6	29.2	31.9	34.6	37.3	37.3

\* Project-year load = 4/12 of current calendar-year load + 8/12 of previous calendar-year load, based on April 30, 2013 in-service date

Note – Load forecast above is based on Toronto Hydro information. See Appendix A to this exhibit for details.

**Table 5 – Derivation of Load used in DCF, page 2**

		Annual Non-Coincident Peak Load Forecast for Midtown Toronto												
		13	14	15	16	17	18	19	20	21	22	23	24	25
		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
<b>Relevant Midtown Toronto Loads</b>														
Bridgman TS	MW	180.6	182.4	184.2	186.0	187.9	189.8	191.7	193.6	195.5	197.5	199.5	201.5	203.5
Dufferin TS	MW	139.5	140.9	142.3	143.8	145.2	146.7	148.1	149.6	151.1	152.6	154.1	155.7	157.2
<b>115kV Load Sub-total</b>	MW	320.1	323.3	326.5	329.8	333.1	336.4	339.8	343.2	346.6	350.1	353.6	357.1	360.7
Line Capacity	MW	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0	272.0
Load in excess of capacity, calendar-year basis	MW	48.1	51.3	54.5	57.8	61.1	64.4	67.8	71.2	74.6	78.1	81.6	85.1	88.7
PLI-adjustment		87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%	87%
PLI-adjusted load in excess of capacity	MW	41.9	44.6	47.5	50.3	53.2	56.1	59.0	61.9	64.9	68.0	71.0	74.1	77.2
Adjust for in-service month:														
Project Year		30-Apr 2025 to 29-Apr 2026	30-Apr 2026 to 29-Apr 2027	30-Apr 2027 to 29-Apr 2028	30-Apr 2028 to 29-Apr 2029	30-Apr 2029 to 29-Apr 2030	30-Apr 2030 to 29-Apr 2031	30-Apr 2031 to 29-Apr 2032	30-Apr 2032 to 29-Apr 2033	30-Apr 2033 to 29-Apr 2034	30-Apr 2034 to 29-Apr 2035	30-Apr 2035 to 29-Apr 2036	30-Apr 2036 to 29-Apr 2037	30-Apr 2037 to 29-Apr 2038
<b>Load in excess of capacity, project-year basis*</b>	MW	40.0	42.8	45.6	48.4	51.3	54.1	57.0	60.0	62.9	65.9	69.0	72.0	75.1

\* Project-year load = 4/12 of current calendar-year load + 8/12 of previous calendar-year load, based on April 30, 2013 in-service date

**Table 6 – DCF Assumptions**

**Hydro One Networks – Transmission Connection Economic Evaluation Model  
2009 Parameters and Assumptions**

**Transmission rates** are based on current OEB-approved uniform provincial transmission rates.

Monthly Rate (\$ per kW)	
Network	2.66
Transformation	1.57
Line	0.70

**Grants in lieu of Municipal tax** (% of up-front capital expenditure, a proxy for property value):

**0.648%**

Based on Transmission system

**Ontario Capital tax** (% of UCC, a proxy for taxable capital):

**0.225%**

2009 provincial rate

**Overhead rate:**

Varies from year to year; latest forecast as follows:

2009	12.0%
2010	13.0%
2011	11.0%
2012	9.0%
2013	8.0%
2014	7.0%

Fully allocated overheads per TSC section 6.5.2 (c) using Hydro One Networks forecast Transmission capitalized overhead rate

**AFUDC rate:**

Varies from year to year; latest forecast as follows:

2009	6.9%
2010	6.4%
2011	7.7%
2012	8.3%
2013	8.4%
2014	8.4%

Based on Hydro One Networks Transmission forecast of the DEX Mid Term Corporate Bond Index Yield. Charged on construction work in progress to in-service date of capital.

**Income taxes:**

Basic Federal Tax Rate (before surtax) - % of taxable income:

2009 **19.00%**

Current rate

Federal Surtax - % of taxable income:

2009 **0.00%**

Current rate

Ontario corporation income tax - % of taxable income:

2009 **14.00%**

Current rate

Large Corporation Tax - % of UCC (a proxy for taxable capital)

2009 **0.000%**

Current rate

**Capital Cost Allowance Rate, Class 47:**

*\*Rate change retroactively enacted in 2006 to 8% for assets added after Feb. 22/05; formerly Class 1*

2009 **8.0%**

Current rate \*

**After-tax Discount rate:**

**5.43%**

Based on OEB-approved ROE of 8.01% on common equity and 4% on short-term debt, 5.84% forecast cost of long-term debt and 40/60 equity/debt split, and current enacted income tax rate of 33%

**Other Assumptions:**

**Estimated Incremental OM&A:**

Project specific (\$ k):

Single Transformer Station

**\$26**

each year for years 1 - 15

**\$40**

each year for years 16 - 25

Dual Transformer Station

**\$42**

each year for years 1 - 15

**\$65**

each year for years 16 - 25

Non-grandfathered projects

**1.60%**

of up-front capital expenditure each year

**TORONTO HYDRO ELECTRIC SYSTEM LIMITED**  
**2010-2038 BRIDGMAN TS and DUFFERIN TS LOAD FORECAST (MW)**

Date: November 30, 2009

Date: November 30, 2009

STATION / BUS	YEAR																															
	2009*	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038		
Summer																																
BRIDGMAN TS (MW)	154	154	156	157	159	160	162	163	165	167	168	170	172	174	175	177	179	181	182	184	186	188	190	192	194	196	197	199	201	203		
DUFFERIN TS (MW)	119	119	120	121	123	124	125	126	128	129	130	131	133	134	135	137	138	140	141	142	144	145	147	148	150	151	153	154	156	157		

Winter																														
BRIDGMAN TS (MW)	139	139	140	142	143	145	146	148	149	151	152	154	155	157	158	160	161	163	165	166	168	170	171	173	175	176	178	180	182	184
DUFFERIN TS (MW)	119	119	120	121	123	124	125	126	128	129	130	131	133	134	135	137	138	140	141	142	144	145	147	148	150	151	153	154	156	157

\* Actual 2009 Summer & Winter Peaks

**Assumptions and Comments**

1. No weather correction factor was applied to the above station load forecast. THESL only determines weather correction factor at bus level, not at station level.  
For transmission line load forecast, weather correction factor needs to be applied at Station level. THESL do not forecast load on transmission line.
2. There is no planned station to station load transfers to occur in 2010 and 2011 for both Bridgman TS and Dufferin TS.
3. For new customer loads, a 0% growth rate is used for the first two years (2010 and 2011) of the forecast period.  
This is due to the customer load build-up is shown in the service connection request.  
If there is no customer specific data then 70% of the total load is estimated in the first year with the remaining 30% estimated in the second year.
4. A station load growth rate of 1% has been utilized from 2012 onwards.
5. Summer station peak load of Bridgman TS and Dufferin TS occurred on August 17, 2009 when THESL system peak load occurred in summer (during Jun 1 to Aug 31).
6. Winter station peak load of Bridgman TS and Dufferin TS occurred on January 14, 2009 when THESL system peak load occurred in winter (during Dec 1 to Feb 28)
7. The summer Power Factor for the Bridgman TS is 0.902 and for the Dufferin TS is 0.933. Power Factor is obtained when the station peak load occurred.
8. The winter Power Factor for Bridgman TS is 0.939 and for Dufferin TS is 0.972.
9. The station peak load for Bridgman TS and Dufferin TS as shown above are obtained by selecting the maximum value from a series of station peaks after removing all station to station load transfers.

Filename: Bridgman TS and Dufferin TS Forecast\_from 2009 to 2038\_Nov\_30\_2009.xls

**OTHER PUBLIC INTEREST CONSIDERATIONS**

**1.0 AVAILABILITY, RELIABILITY, AND QUALITY IMPACTS**

The proposed facilities will improve the availability and quality of electricity service to consumers in the Midtown Area. Replacing the existing end-of-life section of the 115 kV L14W transmission line from Bayview Jct. to Birch Jct. and providing an additional 115 kV circuit between Leaside TS and Bridgman TS will maintain reliable supply and also provide the increase in the capability of the transmission system to supply the area well into the future.

Preliminary findings of the IESO's SIA, the draft CIA and Hydro One's Load and Capacity analysis, confirm the facilities will improve the availability and quality of electric service to consumers and will not adversely impact the transmission system or other transmission customers.



## CONSTRUCTION AND PROJECT ADMINISTRATION

Hydro One is targeting an April 2013 in-service date for the proposed facilities assuming leave to construct for the proposed facilities is received by July 2010.

To complete the project, Hydro One is proposing the following transmission line work:

### Transmission Line:

- Rebuild the existing double circuit 115kv line L14W/L15W as a three circuit 115 kV line between Leaside TS and Bayview Junction and replace the existing double-circuit towers with higher three-circuit structures
- Build two new underground circuits in a 3m (approximate) diameter tunnel in rock approximately 60m to 70m deep between Bayview Jct. to Birch Jct. Cable circuits will be physically separated or in duct to avoid outages of adjacent circuit during inspection or repair
- Reconductor the existing overhead line between Birch Jct. and Bridgman TS on existing towers.

Hydro One is also proposing the following stations work:

- Install a new 115 kV circuit breaker, associated buswork, remote disconnect switches and protective relaying as required at Leaside TS and Bridgman TS. Underground tie cable and terminations are also required to connect lines to station equipment at Leaside TS and Bridgman TS
- Cable terminations, surge arrestors and line tap provisions at Bayview Jct. and Birch Jct.
- Supervisory control from Ontario Grid Control Centre (OGCC) and IESO System Control Centre for new equipment

1 A project schedule showing the tasks leading up to the in-service date is provided in  
2 Exhibit B, Tab 5, Schedule 2.

3

4 The proposed work requires certain components of the power system to be removed from  
5 service during portions of the construction period. To maintain the existing supply to the  
6 area, it is necessary to plan work at specific times when outages can be obtained. These  
7 outage constraints have been considered in developing the schedule.

8

9 Although it is proposed that the existing transmission ROW between Leaside TS and  
10 Bridgman TS be utilized for the new transmission line where possible, additional land  
11 rights will or may be required at some locations from CPR, City of Toronto, GO Transit  
12 and Loblaws. The exact location and extent of the additional rights required will be  
13 determined after the completion of a legal and engineering survey.

## CONSTRUCTION AND IN-SERVICE SCHEDULE

<b>TASK</b>	<b>START</b>	<b>FINISH</b>
Submit Section 92		Dec 2009
Projected Section 92 Approval		July 2010*
Projected EA Approval		May 2010
Land Acquisition*	July 2010	April 2011
<b>STATIONS</b>		
Detailed Engineering	Jan 2010	Dec 2010
Tender & Award Major Station Equipment	Jan 2011	June 2011
Receive Major Station Equipment	Jan 2012	June 2012
Construction	Jan 2012	Nov 2012
Commissioning	Jan 2013	April 2013
<b>LINES</b>		
Detailed Engineering	Jan 2010	Dec 2010
Tender & Award Structural Steel	Sept 2010	March 2011
Receive Structural Steel	Sept 2011	Sept 2012
Construction	Sept 2011	Nov 2012
Construction (Road Removal, Restoration)	April 2012	Nov 2012

\* An earlier approval than July is requested by Toronto Hydro to meet expedited in-service date.

1

<b>Tunnel</b>		
Tunnel Design	Jan 2010	May 2010
Tender & Award Tunnel Contract	May 2010	July 2010
Tunnel construction	Aug 2010	June 2012
Tender and Award Cable Contract	April 2011	June 2011
Cable Installation	July 2012	March 2013
In Service		April 2013

2

\*assumes no expropriation

**OTHER MATTERS / AGREEMENTS / APPROVALS**

**1.0 SYSTEM IMPACT ASSESSMENT**

Under the Market Rules, any party planning to construct a new or modified connection to the IESO-controlled grid must request an IESO SIA of these facilities. The IESO is close to completing a SIA of the proposed facilities under the IESO Connections Assessment and Approval process. The SIA will be filed in January 2010 as Exhibit B, Tab 6, Schedule 3.

The IESO assessment addresses the impact of the proposed facilities on system operating voltage, system operating flexibility, and on the ability of other connections to deliver or withdraw power supply from the IESO-controlled grid. The IESO's preliminary findings confirm that Hydro One's proposed transmission facilities will improve voltage profile and increase supply capability in the Midtown Area, and will not adversely impact the reliability of the IESO-controlled grid.

**2.0 CUSTOMER IMPACT ASSESSMENT**

Hydro One has completed a preliminary CIA in accordance with its customer connection procedures, and results confirm there are no adverse impacts on transmission customers as a result of this project. The final CIA document will be filed as Exhibit B, Tab 6, Schedule 4 by mid February 2010.

**3.0 STAKEHOLDER AND COMMUNITY CONSULTATION**

Hydro One conducted a stakeholder and community consultation process to identify potential local impacts and concerns associated with this project. The government

1 ministries, agencies, municipal staff and elected officials, and residents in a defined study  
2 area were consulted through personal contact, direct mailing, newspaper notices, and  
3 public information centres. The feedback received through the consultation process  
4 regarding visual impacts, potential effects on the natural environment, Electric and  
5 Magnetic Fields (“EMFs”), and potential construction impacts were considered and  
6 incorporated as appropriate. The details of Hydro One’s stakeholder consultation process  
7 are described in Exhibit B, Tab 6, Schedule 5.

#### 8 9 **4.0 ENVIRONMENTAL ASSESSMENT**

10  
11 The proposed Midtown Area transmission facilities fall within the definition of the  
12 projects covered by the *Class Environmental Assessment for Minor Transmission*  
13 *Facilities* (“Class EA”), which is approved by the Ontario Ministry of Environment  
14 (“MOE”) under the Ontario Environmental Assessment (“EA”) Act.

15  
16 The Class EA process for this project includes preparing a Draft Environmental  
17 Assessment Report (“ESR”) that documents the following:

- 18 • Data collection of environmental and socio-economic features within the defined  
19 Study Area;
- 20 • Identification of any environmental effects of the proposed transmission facilities and  
21 the corresponding mitigation measures;
- 22 • Route selection and evaluation;
- 23 • Public and stakeholder consultation (e.g. First Nations and Métis communities,  
24 municipal officials, provincial ministries, conservation authorities, interest groups,  
25 affected property owners and members of the general public) to further identify issues  
26 and concerns with the project and to address those concerns through mitigation.

1 As part of the consultation process a first set of Public Information Centres (“PIC”) were  
2 held in Toronto on February 17, 18, and 24, 2009, where the public had the opportunity  
3 to learn about the project and meet the project team. A second set of PICs were held on  
4 December 1 and December 2, 2009, to present the details of the proposed undertaking,  
5 including details of the new proposed transmission facilities. For both PICs, a direct  
6 mailing was sent to property owners along and adjacent to the existing transmission  
7 corridor from Leaside TS to Bridgman TS, along the CPR corridor.

8  
9 Hydro One will issue a Draft ESR in January 2010 to initiate the 30-day public review  
10 and comment period as required by the Class EA process. The Draft ESR is made  
11 available to the public, First Nations and Métis communities, municipal officials,  
12 provincial ministries, conservation authorities and interest groups through a Hydro One  
13 Project Website, and in local libraries or public offices. Details of the review period will  
14 be advertised on local newspapers. If no concerns are expressed during the review period,  
15 the ESR is finalized and filed with the MOE. Hydro One will confirm the completion of  
16 the EA process with the Board once the final ESR is filed.

## 17 18 **5.0 COMPLIANCE WITH INDUSTRY STANDARDS AND CODES**

19  
20 The proposed facilities will be constructed, owned and operated by Hydro One. The  
21 design and maintenance of these facilities will be in accordance with good utility  
22 practice, as established in the Transmission System Code.

## 23 24 **6.0 LAND MATTERS**

25  
26 The proposed facilities will mostly be located along the transmission corridor between  
27 Leaside TS and Bridgman TS which follows CPR corridor in this area. Details on land

requirements, existing and required land rights, and the process for acquiring the required land rights are provided in Exhibit B, Tab 6, Schedule 6.

## **7.0 OTHER APPROVAL REQUIREMENTS**

As required, Hydro One will also address the Provincial and Federal regulatory requirements shown below, however, additional requirements may be identified during the EA process and hence the following list should not be interpreted as all inclusive.

Provincial	Federal
<ul style="list-style-type: none"><li>• Heritage Act</li><li>• Conservation Authorities Act</li><li>• Ontario Water Resources Act</li><li>• Environmental Protection Act</li></ul>	<ul style="list-style-type: none"><li>• Canadian Transportation Act</li><li>• Canadian Environmental Assessment Act</li><li>• Canadian Aviation Regulations, Standards, Obstruction Markings</li></ul>

There are also other approvals and permits that may be required as part of the construction process, including the following:

- Encroachment permits and land use permits from Ministry of Transportation;
- Agreements from rail and pipeline companies for crossings
- Approval and permits for road crossings, vehicle restrictions, etc.
- Building permits

Hydro One also voluntarily complies with Municipal Site Development Plan requirements and municipal noise bylaws.



**Letter of Endorsement for the Project**

1  
2  
3  
4  
5  
6

1. Letter from Toronto Hydro
2. Letter from One Shaftesbury Community Association

|

14 Carlton St.  
Toronto, Ontario  
M5B 1K5

[www.torontohydro.com](http://www.torontohydro.com)



December 17, 2009

Ajay Garg  
Hydro One Networks Inc.  
483 Bay Street, 4<sup>th</sup> Floor, South tower  
Toronto ON.  
M5G 2P5

Re: Mid Town Project

Dear Mr. Garg:

With this letter Toronto Hydro Electric-System Limited (THESL) supports Hydro One Networks Inc. (HONI) in its application to the Ontario Energy Board (OEB) for enhancements to the Transmission Network System necessary to address supply security, reliability and long term load growth in the Midtown area. The need for this project is November 2012 and asks OEB to approve the application on a priority basis so that HONI could complete the Project by the above need date.

Over the past several years, THESL and HONI have been actively working together in system studies, Environmental Assessment, preparation of data for this application, lending support at the Public Information Centres and engagement at Municipal and Provincial Government level. THESL has already made/committed a capital contribution to HONI for its share of the above work.

Midtown area, supplied by two of HONI's Transformer Stations (TSs), utilizes a section of underground cable which is almost 60 years old that is in urgent need of replacement. Additionally, the loading on the transmission lines is such that under single contingency load shedding may be required. THESL is concerned that the cable in its present weakened state may not be able to handle the increased loading expected to occur in the future and particularly if an outage were to occur on one of the other two circuits. Also, load forecast shows that this area will continue to experience a consistent increase in loading associated with constant increase in population and businesses.

Midtown Project will address the above mentioned issues by replacement of the end-of-life underground cable circuit. In addition to this, an additional circuit, running in parallel with existing L14W circuit will address long term load growth in the area. Also, the additional circuit would increase the transmission route capacity and facilitate in replacement of the other old circuits in the future.

We understand that HONI is tentatively projecting an in-service date for April 2013 assuming OEB and MOE approvals by May 2010. THESL has stressed to HONI to explore all other possible avenues to advance the in-service date so as to meet the need date of November 2012.

THESL will share the cost of the project with HONI based on the capital contribution principles as set out by the OEB in the Transmission System Code (TSC).

In closing, THESL is requesting OEB to extend the necessary approval to HONI so that HONI could meet the need date of the Project.

Sincerely,



Ivano Labricciosa, P.Eng., M.Sc., MBA  
Vice President, Asset Management



***ONE SHAFTESBURY COMMUNITY ASSOCIATION***

**TO WHOM IT MAY CONCERN**

**On behalf of the residents of the One Shaftesbury Community Association – comprising 55 households (30 apartments and 25 Town houses from 21-53 Shaftesbury Avenue) this letter is to give our complete support to Hydro One/Toronto Hydro regarding their proposal to the Ontario Energy Board and to the Environmental Assessment Board for the routing of the upgrade to the Midtown electricity infrastructure project.**

**We commend Hydro One/Toronto Hydro for their consultation with residents along the route of the construction from the Leaside junction to the Bridgman junction and for their continuing sharing of information during the pre-construction phase. In our opinion, the Hydro One/Toronto Hydro proposal is responsible, environmental sound and designed to minimize the disruption to local communities.**

**With thanks**

*Laurie MacKay*

**Laurie MacKay**

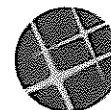
**Director**

**OSCA**

*December 2009*

**IESO's System Impact Assessment**

The SIA document will be filed in January 2010



**ieso**

Power to Ontario.  
On Demand.

February 2, 2010

Mr. Naren Pattani  
Manager- Department of Transmission System Development  
Hydro One Networks Inc.  
483 Bay Street, 15<sup>th</sup> Floor North Tower  
Toronto, Ontario,  
M5G 2P5

*Dear Mr. Pattani:*

***Leaside to Bridgman Transmission Reinforcement  
Notification of Addendum of Conditional Approval of Connection Proposal  
CAA ID Number: 2006-238***

Thank you for the updated information regarding the proposed *Leaside to Bridgman Transmission Reinforcement* project.

From the new information provided, we have concluded that the proposed changes at *Leaside to Bridgman Transmission Reinforcement* project will not result in a material adverse impact on the reliability of the integrated power system.

The IESO is therefore pleased to grant **conditional approval** for the modification detailed in the attached addendum to the System Impact Assessment (SIA) report. Any material changes to your proposal may require re-assessment by the IESO in accordance with Market Manual 2.10, and may nullify your conditional approval.

**Final approval** to connect the facility to the IESO-controlled grid will be granted upon successful completion of the IESO Market Entry process including, without limitation, satisfactory completion of the requirements set out in the addendum to the SIA report. During this process you will be expected to demonstrate that you have fulfilled the requirements and that the facility you have installed is materially unchanged from the proposal assessed by the IESO. Please refer to the 'External Guidelines for Connection to the IESO' attachment in your approval email for key steps in the Market Entry process. In order to initiate this process, please contact Market Entry at [market.entry@ieso.ca](mailto:market.entry@ieso.ca) at least eight months prior to your energization date.

For further information, please contact the undersigned.

Yours truly,

Barbara Constantinescu  
Manager – Market Facilitation  
Telephone: (905) 855-6406  
Fax: (905) 855-6319  
E-mail: [barbara.constantinescu@ieso.ca](mailto:barbara.constantinescu@ieso.ca)  
cc: IESO Records

---

All information submitted in this process will be used by the IESO solely in support of its obligations under the *Electricity Act, 1998*, the *Ontario Energy Board Act, 1998*, the *Market Rules* and associated policies, standards and procedures and in accordance with its licence. All information submitted will be assigned the appropriate confidentiality level upon receipt.





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# **System Impact Assessment Addendum**

## **Connection Assessment & Approval Process**

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**Project:** Leaside to Bridgman Reinforcement  
CAA ID 2006-238

**Applicant:** Hydro One Networks Inc.

Market Facilitation Department

Date: January 25<sup>th</sup>, 2010

**ADDENDUM**



Document ID	IESO_REP_0602
Document Name	System Impact Assessment Addendum
Issue	Issue 1.0
Reason for Issue	Addendum to SIA report dated August 11th, 2009
Effective Date	January 25th, 2010

## **System Impact Assessment Addendum**

### **Acknowledgement**

The IESO wishes to acknowledge the assistance of Hydro One in completing this assessment.

### **Disclaimers**

#### **IESO**

This addendum has been prepared solely for the purpose of assessing whether the connection applicant's proposed connection with the IESO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether the IESO should issue a notice of conditional approval or disapproval of the proposed connection under Chapter 4, section 6 of the Market Rules.

Conditional approval of the proposed connection is based on information provided to the IESO by the connection applicant and Hydro One at the time the assessment was carried out. The IESO assumes no responsibility for the accuracy or completeness of such information, including the results of studies carried out by Hydro One at the request of the IESO. Furthermore, the conditional approval is subject to further consideration due to changes to this information, or to additional information that may become available after the conditional approval has been granted.

If the connection applicant has engaged a consultant to perform connection assessment studies, the connection applicant acknowledges that the IESO will be relying on such studies in conducting its assessment and that the IESO assumes no responsibility for the accuracy or completeness of such studies including, without limitation, any changes to IESO base case models made by the consultant. The IESO reserves the right to repeat any or all connection studies performed by the consultant if necessary to meet IESO requirements.

Conditional approval of the proposed connection means that there are no significant reliability issues or concerns that would prevent connection of the proposed facility to the IESO-controlled grid. However, the conditional approval does not ensure that a project will meet all connection requirements. In addition, further issues or concerns may be identified by the transmitter(s) during the detailed design phase that may require changes to equipment characteristics and/or configuration to ensure compliance with physical or equipment limitations, or with the Transmission System Code, before connection can be made.

This addendum has not been prepared for any other purpose and should not be used or relied upon by any person for another purpose. This addendum has been prepared solely for use by the connection applicant and the IESO in accordance with Chapter 4, section 6 of the Market Rules. The IESO assumes no responsibility to any third party for any use, which it makes of this addendum. Any liability which the IESO may have to the connection applicant in respect of this addendum is governed by Chapter 1, section 13 of the Market Rules. In the event that the IESO provides a draft of this addendum to the connection applicant, the connection applicant must be aware that the IESO may revise drafts of this addendum at any time in its sole discretion without notice to the connection applicant. Although the IESO will use its best efforts to advise you of any such changes, it is the responsibility of the connection applicant to ensure that the most recent version of this addendum is being used.

## Hydro One

The results reported in this addendum are based on the information available to Hydro One, at the time of the study, suitable for a preliminary assessment of this transmission system reinforcement proposal.

The short circuit and thermal loading levels have been computed based on the information available at the time of the study. These levels may be higher or lower if the connection information changes as a result of, but not limited to, subsequent design modifications or when more accurate test measurement data is available.

This study does not assess the short circuit or thermal loading impact of the proposed facilities on load and generation customers.

In this addendum, short circuit adequacy is assessed only for Hydro One circuit breakers. The short circuit results are only for the purpose of assessing the capabilities of existing Hydro One circuit breakers and identifying upgrades required to incorporate the proposed facilities. These results should not be used in the design and engineering of any new or existing facilities. The necessary data will be provided by Hydro One and discussed with any connection proponent upon request.

The ampacity ratings of Hydro One facilities are established based on assumptions used in Hydro One for power system planning studies. The actual ampacity ratings during operations may be determined in real-time and are based on actual system conditions, including ambient temperature, wind speed and facility loading, and may be higher or lower than those stated in this study.

The additional facilities or upgrades which are required to incorporate the proposed facilities have been identified to the extent permitted by a preliminary assessment under the current IESO Connection Assessment and Approval process. Additional facility studies may be necessary to confirm constructability and the time required for construction. Further studies at more advanced stages of the project development may identify additional facilities that need to be provided or that require upgrading.

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## **Summary**

Hydro One is proposing to install a new 115 kV circuit from Leaside TS to Bridgman Junction and to upgrade various sections of the existing L14W and L15W circuits. The new 115 kV circuit would be configured to supply Bridgman T13, and will be connected to the existing L15W Bridgman Junction x Wiltshire section; the L15W circuit would end at Bridgman TS; Bridgman T11 and T12 transformers would be transferred from L13W to L15W Leaside x Bridgman section. A new 115 kV motorized disconnect switch is also proposed to be installed on the new circuit at Bridgman Junction. The project has an expected in-service date of April, 2013.

The purpose of this addendum is to analyze the effects of the proposed connection arrangement on the reliability of the IESO controlled grid using revised/updated load forecasts from the original forecasts provided by Hydro One and used in the original SIA. The new proposal also contains two more motorized disconnect switches to be installed at Bridgman Junction: a normally open disconnect switch between L13W and Bridgman T11+T12, and a normally closed disconnect switch between L15W and Bridgman T11+T12.

## **Conclusions, Requirements and Recommendations**

The study results concluded the following:

1. Using extreme weather peak load forecasts provided for years 2010 - 2025, the loadings with all elements in service on the Leaside to Wiltshire circuits remain well below their continuous ratings.
2. When one element is on outage, the loadings remain below the long term emergency thermal ratings, for load forecasts up to and including the year 2025.
3. Using extreme weather peak load forecasts provided for years 2010 - 2025, configurations with two Leaside to Wiltshire circuits out of service, resulting from single-element contingencies when one circuit is out-of-service pre-contingency, can result in the loading of the remaining two circuits above the long term emergency (LTE) ratings and short term emergency ratings (STE). A possible mitigating measure to the overloading of the circuits is to open LV breakers behind the Bridgman transformers during outages, so that load is lost by configuration following a contingency.

Further planned load curtailment at Dufferin TS and Bridgman TS, which must occur within 15 minutes after the contingency, will return the post-contingency loading of the remaining circuits to below their LTE values. Planned load curtailment or load rejection of up to 150 MW is an acceptable control action as a response to N-2 conditions (i.e. two elements out of service), to help obey the Load Security Criteria, as per the *IESO Transmission Assessment Criteria*.

### ***Recommendations***

The revised recommendations are given below. These recommendations replace the recommendations in the original SIA.

1. The original SIA recommended the new circuit to have its own terminal at Leaside TS for operation flexibility and to prevent operating challenges during switching, and potential feed-back during certain element outages and system configurations. Hydro One decided to create a terminal for the new circuit by installing one additional 115 kV breaker at Leaside TS on the same diameter with the

circuits L4C and H8LC, resulting in the three circuits connecting to a one-and-a-third breaker diameter configuration, as shown in Figure 2.

2. Even though the 230 kV Richview x Manby circuits were not part of the scope of the original SIA study, it was identified that the flow on the R15K circuit was approaching or was above its long term emergency rating for various contingencies. Future assessments are recommended to be carried out for Richview-Manby-Cooksville area and reinforcements to be identified for the region.
3. Under certain system conditions, in order to maintain the reliability of the bulk system, the IESO may have to transfer load from Leaside to Manby East supply. The process of transferring Dufferin TS from normal Leaside supply to Manby East supply would not change under the proposed configuration.

The original SIA identified that when Bridgman TS is on Manby East supply, Bridgman T11 and T12 transformers would have to be offloaded or removed from service. In this configuration, a next single contingency would result in load loss at Bridgman TS. To ensure a greater load supply security when Bridgman TS is connected to Manby East, Hydro One decided to install two more motorized disconnect switches at Bridgman Junction, which will allow Bridgman T11 and T12 to be transferred back to the L13W circuit.

## **Notification of Approval for Connection Proposal**

It is recommended that a Notification of Conditional Approval be issued for the new 115 kV circuit and the refurbishing of the L14W and L15W circuits. Final approval will be subject to the requirements described below under the heading “IESO Requirements”.

## **IESO Requirements**

### ***General Requirements:***

1. Appendix 4.1, reference 2 of the Market Rules states that under normal conditions voltages in the south are maintained within the range of 113 kV to 127 kV. Thus, the IESO requires that the 115 kV equipment in southern Ontario must have a maximum continuous voltage rating of at least 127 kV.

Fault interrupting devices must be able to interrupt fault current at the maximum continuous voltage of 127 kV.

2. The Transmission System Code (TSC), Appendix 2 establishes maximum fault levels for the transmission system. For the 115 kV system, the maximum 3 phase symmetrical fault level is 50 kA and the single line to ground (SLG) symmetrical fault level is 50 kA.

The TSC requires that new equipment be designed to sustain the fault levels in the area where the equipment is installed. If any future system enhancement results in an increased fault level higher than the equipment’s capability, the connection applicant is required to replace the equipment at their own expense with higher rated equipment capable of sustaining the increased fault level, up to the TSC’s maximum fault level of 50 kA for the 115 kV system.

3. In accordance with the telemetry requirements for transmitters (see Appendices 4.16, 4.20 and 4.21 of the Market Rules) the connection applicant must install equipment at this project with specific performance standards to provide telemetry data to the IESO. The data is to consist of certain equipment status and operating quantities which will be identified during the IESO Market Entry Process.

As part of the IESO Facility Registration/Market Entry process, the connection applicant must also complete end to end testing of all necessary telemetry points with the IESO to ensure that standards are met and that sign conventions are understood. All found anomalies must be corrected before IESO final approval to connect any phase of the project is granted.

4. Prior to connecting to the IESO controlled grid, the proposed facility must be compliant with the applicable reliability standards set by the North American Electric Reliability Corporation (NERC) and the North East Power Coordinating Council (NPCC). A list of applicable standards, based on the proponent's/connection applicant's market role/OEB licence can be found here:

<http://www.ieso.ca/imoweb/ircp/reliabilityStandards.asp>

In support of the NERC standard EOP-005, the proponent/ connection applicant may meet the restoration participant criteria. Please refer to section 3 of Market Manual 7.8 (Ontario Power System Restoration Plan) to determine its applicability to the proposed facility.

The IESO monitors and assesses market participant compliance with these standards as part of the IESO Reliability Compliance Program. To find out more about this program, visit the webpage referenced above or write to [ircp@ieso.ca](mailto:ircp@ieso.ca).

Also, to obtain a better understanding of the applicable reliability obligations and find out how to engage in the standards development process, we recommend that the proponent/ connection applicant join the IESO's Reliability Standards Standing Committee (RSSC) or at least subscribe to their mailing list at [rssc@ieso.ca](mailto:rssc@ieso.ca). The RSSC webpage is located at:

[http://www.ieso.ca/imoweb/consult/consult\\_rssc.asp](http://www.ieso.ca/imoweb/consult/consult_rssc.asp).

5. The connection applicant must complete the IESO Facility Registration/Market Entry process in a timely manner before IESO final approval for connection is granted. Models and data, including any controls that would be operational, must be provided to the IESO. This information should be submitted at least seven months before energization to the IESO-controlled grid, to allow the IESO to incorporate this project into IESO work systems and to perform any additional reliability studies.

As part of the IESO Facility Registration/Market Entry process, the connection applicant must provide evidence to the IESO confirming that the equipment installed meets the Market Rules requirements and matches or exceeds the performance predicted in this assessment. This evidence shall be either type tests done in a controlled environment or commissioning tests done on-site. In either case, the testing must be done not only in accordance with widely recognized standards, but also to the satisfaction of the IESO. Until this evidence is provided and found acceptable to the IESO, the Facility Registration/Market Entry process will not be considered complete and the connection applicant must accept any restrictions the IESO may impose upon this project's participation in the IESO administered market or connection to the IESO-controlled grid.

The evidence must be supplied to the IESO within 30 days after completion of commissioning tests. Failure to provide evidence may result in disconnection from the IESO-controlled grid.

If the submitted models and data differ materially from the ones used in this assessment, then further analysis of the project will need to be done by the IESO.

#### ***Protection Requirements:***

1. Protection systems must be designed to satisfy all the requirements of the Transmission System Code as specified in Schedules E and G of Appendix 1 and any additional requirements identified by the transmitter. New protection systems must be coordinated with existing protection systems.

2. The new facilities must be protected by two redundant protection systems according to section 8.2.1a of the TSC. These redundant protection systems must satisfy all requirements of the TSC but in particular they may not use common components, common battery banks or common secondary CT or PT windings.
3. Protective relaying must be set to ensure that transmission equipment remains in-service for voltages between 94% of the minimum continuous and 105% of the maximum continuous values in the Market Rules, Appendix 4.1.
4. The transmitter shall identify any protection relay modifications (e.g. equipment and settings) required to incorporate the new facility into the integrated power system. To allow sufficient time to assess the impact on power system reliability, the transmitter must submit any proposed protection relay modifications to the IESO as soon as the protection assessment for the new facility is finished or at least six (6) months before any actual modifications are to be implemented on the existing protection systems.

The IESO will evaluate the impact on system reliability due to any protection relay modifications and any modifications to functionality, timing or reach. The IESO will not assess aspects of protection systems which are solely the accountability of the transmitter (e.g. coordination of protection relays).

Send documentation for protection modifications triggered by new or modified primary equipment (i.e. new or replacement relays) to [connection.assessments@ieso.ca](mailto:connection.assessments@ieso.ca).

For protection modifications that are not associated with new or modified equipment (i.e. protection setting modifications) please send documentation to [protection.settings@ieso.ca](mailto:protection.settings@ieso.ca).

**– End of Section –**



# 1. Project Description

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In 2006 Hydro One and Toronto Hydro commissioned the *City of Toronto Electric Supply Study – Adequacy of Transmission Facilities and Transmission Supply Plan for the Central Toronto Area 2006-2021*. The study identified a series of reinforcements in the power system required to ensure an adequate transmission system to meet the electricity demand over the next 15 years. Part of the study focused on the Leaside to Manby 115 kV system.

To eliminate thermal overload issues in the Leaside to Manby 115 kV area resulting from the local load growth, Hydro One proposed the following changes:

- Construct a new 115kV circuit from Leaside TS to Bridgman Junction
- Upgrade various sections of the existing L14W and L15W circuits
- Reconfigure the new 115kV circuit from Leaside TS to Bridgman Junction so that it would supply Bridgman T13, and be connected to the existing L15W Bridgman Junction x Wiltshire section
- Reconfigure the existing L15W circuit such that it would end at Bridgman TS and supply T11 and T12, transferred from L13W.
- Install a new 115 kV motorized disconnect switch on the new circuit at Bridgman Junction.
- Install two more motorized disconnect switches at Bridgman Junction: a normally open disconnect switch between L13W and Bridgman T11+T12, and a normally closed disconnect switch between L15W and Bridgman T11+T12.

The SIA assessing the impact of these proposed changes was completed in 2006 and noted that under the proposed system configuration and with Hydro One forecasted load growth estimates, post-contingency thermal overloading of the L13W circuit was a possibility by the year 2014.

Due to changes in load growth and load patterns since that time, Hydro One and Toronto Hydro have submitted revised forecasts for the load supplied by Dufferin TS and Bridgman TS.

The purpose of this Addendum is to identify the impact these new load forecasts on system reliability.

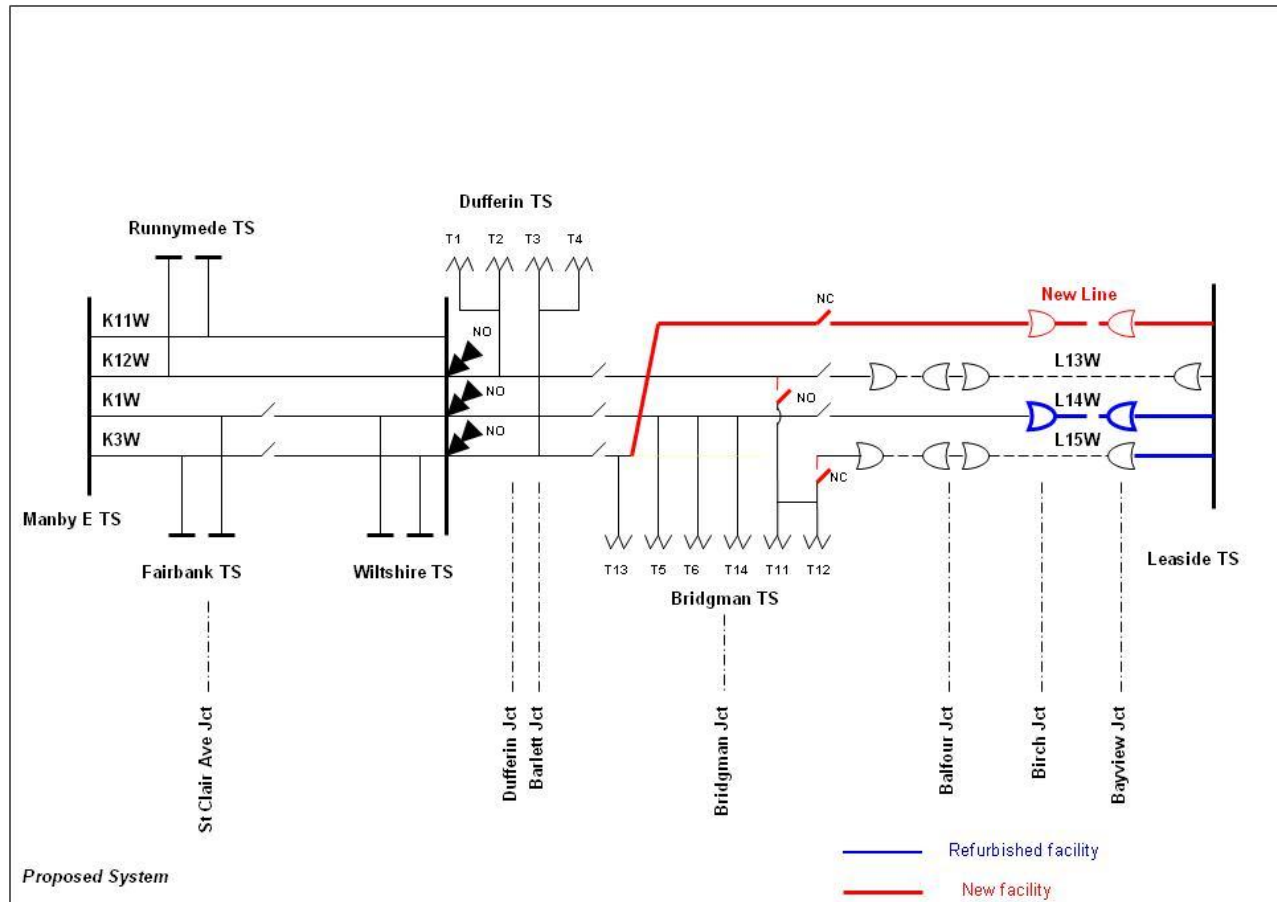
The new facilities have a scheduled initial in-service of April 2013.

– End of Section –

## 2. Review of Connection Proposal

### 2.1 Connection Arrangement

The proposed connection arrangement with the proposed changes highlighted is presented in Figure 1 below:



**Figure 1: Proposed Connection**

(a) L14W/L15W will be rebuilt as a three circuit 115 kV line between Leaside TS and Bayview Jct. (about 1.7km). All three circuits will have an ampacity rating of 1200A at 35°C ambient temperature.

(b) Two underground 115kV cable circuits will be built between Bayview Jct. and Birch Jct. (about 2.2km). Both U/G cable circuits will have an ampacity rating of 1200A. One cable will replace the old L14W cable in that section. The other cable will be for the new circuit.

(c) Birch Jct. x Bridgman TS overhead section of line L14W carries an idle 115kV circuit. The idle section on this line will be used for the new circuit. It will have an ampacity rating of 1200A at 35°C ambient temperature.

(d) The new circuit will be incorporated at Leaside on the same diameter with L4C and H8LC, by adding a new 3000 A breaker – see Figure 3.

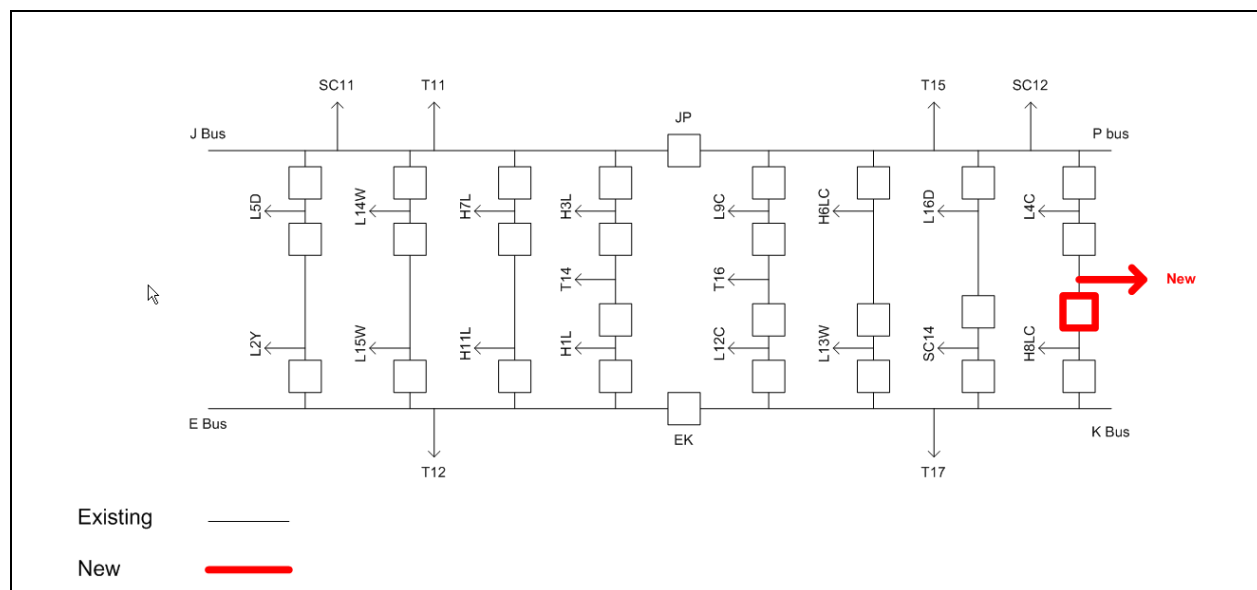
(e) A new motorized disconnect switch will be installed on the new circuit at Bridgman Junction, on Leaside side.

(f) The L15W circuit will be open at Bridgman TS. The new circuit will be connected to the Bridgman TS to Wiltshire TS section of the L15W circuit, and will supply Bridgman T13, and Dufferin T3 and T4.

(g) Bridgman T11 and T12 will be disconnected from L13W and connected to L15W, on Leaside side. Two motorized disconnect switches at Bridgman Junction, a normally open disconnect switch between L13W and Bridgman T11+T12, and a normally closed disconnect switch between L15W and Bridgman T11+T12, will allow this transfer.

As a result of the proposed changes, Bridgman TS will be supplied by L14W, L15W and the new circuit, and Dufferin TS will be supplied by the new circuit and L13W.

The original SIA recommended the new circuit to have its own terminal at Leaside TS for operation flexibility and to prevent operating challenges during switching, and potential feed-back during certain element outages and system configurations. Hydro One decided to create a terminal for the new circuit by installing one additional 115 kV breaker at Leaside TS on the same diameter with the circuits L4C and H8LC, resulting in three circuits connecting to a one-and-a-third breaker diameter configuration, as shown in Figure 2.



**Figure 2: Proposed Connection at Leaside**

– End of Section –

### 3. Load Forecasts

Table 1 below, shows the revised Hydro One extreme weather forecasts from 2010 – 2025. They are based on summer 2009 loads and Toronto Hydro load forecasts for Dufferin and Bridgman TS load.

	Actual	Forecast MW													
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2023	2025
<b>Bridgman</b>	163	164	165	167	168	170	171	173	174	176	178	179	181	184	187
<b>Dufferin</b>	123	127	128	129	130	131	132	134	135	136	137	138	140	142	145
<b>Total</b>	288	290	293	296	298	301	304	306	309	312	315	317	320	326	332

**Table 1:** Hydro One Revised Load Forecasts

Table 2 shows the original Hydro One forecasts provided in 2006 which were used in the original SIA studies and report. A comparison of the old forecast with the actual peak load condition in 2009 shows a 27 MW total lower than expected actual demand than what was forecasted in 2006. The revised forecast for subsequent years shows a slower average expected growth in demand than the original forecast (1.0089% vs. 1.25%).

	Forecast MW												
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bridgman	172	174	176	177	179	181	183	184	186	188	190	192	194
Dufferin	143	144	146	147	149	150	152	153	155	156	158	159	161
Total	315	318	322	324	328	331	335	337	341	344	348	351	355

**Table 2:** Original Hydro One 2006 Load Forecast

Table 3 shows the IESO forecasted extreme weather demand for all of Ontario and the Toronto area.

	Ontario Demand (MW)	Toronto Demand (MW)
<b>2010</b>	26,863	10,273
<b>2011</b>	26,658	10,964
<b>2012</b>	26,300	10,860
<b>2013</b>	25,881	10,644
<b>2014</b>	25,655	10,692
<b>2015</b>	25,428	10,597
<b>2016</b>	25,482	10,620
<b>2017</b>	25,346	10,563
<b>2018</b>	25,298	10,543

**Table 3:** IESO Ontario and Toronto Area Demand Forecast

– End of Section –

## 4. System Impact Studies

This connection assessment study focused on pre and post contingency thermal analysis on all main sections of the 115 kV circuits between Leaside TS and Manby East TS and the 230/115 kV Leaside TS autotransformers supplying the area.

No steady state voltage decline studies have been completed as the original SIA identified no voltage issues, using more conservative system conditions than system conditions used in the studies for this addendum.

### 4.1 Study Assumptions

The PSS/E software was used to carry out the thermal analyses.

Based on the information provided by Hydro One, the following elements have been added to the load flow model. Hydro One has provided the following equipment specifications for new components:

#### *(a) Transmission Line Data*

The equivalent R, X, B parameters for the Leaside x Bridgman portion of L13W, L14W, L15W and the new circuit remain unchanged from the SIA report and are shown below.

<b>Circuit</b>	<b>R</b>	<b>X</b>	<b>B</b>	<b>km</b>
L13W:	0.00134	0.00633	0.17903	5.9
L14W:	0.00296	0.01226	0.05083	5.2
L15W:	0.00261	0.00829	0.09966	5.6
New:	0.00296	0.01226	0.05083	5.2

The following thermal ratings were used for the studies:

<b>Circuit</b>	<b>Section</b>		<b>Continuous</b>		<b>LTE</b>		<b>STE (15 Minute LTR)</b>	
			<b>Amp</b>	<b>MVA</b>	<b>Amp</b>	<b>MVA</b>	<b>Amp</b>	<b>MVA</b>
L13W	Leaside TS	Bridgman Jct	985	205	1138	237	2249	467
	Bridgman Jct	Dufferin Jct	680	141	890	185	970	202
	Dufferin Jct	Wiltshire TS	680	141	890	185	970	202
L14W	Leaside TS	Birch Jct	1200	249	1200	249	1308	272
	Birch Jct	Bridgman TS	810	168	1070	222	1350	281
	Bridgman Jct	Wiltshire TS	690	143	890	185	1090	227
New Circuit	Leaside TS	Bridgman Jct	1200	249	1200	249	1308	272
(former L15W)	Bridgman Jct	Barlett Jct	750	156	980	204	1100	229
(former L15W)	Barlett Jct	Wiltshire TS	750	156	980	204	1100	229
L15W	Leaside TS	Bayview Jct	1200	249	1200	249	1308	272
	Bayview Jct	Bridgman TS	670	139	790	164	2990	621

The continuous ratings for the overhead conductors were calculated at the lowest of the sag temperature or 93°C operating temperature, with a 35°C ambient temperature and 4 km/h wind speed.

The long term emergency ratings for the overhead conductors were calculated at the lowest of the sag temperature or 127°C operating temperature, with a 35°C ambient temperature and 4 km/h wind speed.

For the underground lines, the continuous rating was calculated at the normal operating temperatures, with the cables from vicinity assumed to be in service. The long term emergency rating used was the 10 day LTR rating.

The short term emergency ratings (15 Minute LTR) for all conductors were calculated at the sag temperature, with a 35°C ambient temperature, 4 km/h wind speed and 75% continuous preload.

The continuous rating and long term emergency rating, the 10-Day LTR, used for autotransformers were obtained from the Hydro One secure website.

The continuous, long term emergency and short term emergency MVA ratings for 115 kV lines were calculated assuming 120 kV.

If any of the above data is inaccurate, the applicant should provide the correct data to the IESO prior to the completion of IESO Facility Registration process.

*(b) Configuration Changes*

The existing L15W Bridgman TS x Wiltshire TS section, including Bridgman T13, has been disconnected from L15W and connected to the new circuit. Bridgman T11 and T12 have been disconnected from L13W and connected to L15W.

As a result, L13W will supply only Dufferin T1 and T2 transformers. The L14W circuit will continue to supply Bridgman T5, T6 and T14 transformers. The L15W circuit will supply Bridgman T11 and T12 transformers, with the new circuit supplying Bridgman T13, and Dufferin T3 and T4.

*(c) Power System Modeling*

To conduct the computer analysis, the IESO summer 2010 base case model was used with the following adjustments.

The Toronto zone load was scaled to match the IESO 2014 extreme weather monthly peak load forecast as shown in Section 3 of this addendum. The 2014 demand was used as it provides the largest load estimate of the Toronto area after the proposed in-service date of the project.

Dufferin TS and Bridgman TS loads were adjusted to the revised 2025 extreme peak values provided by Hydro One and shown in Section 3 of this report

Leaside 115 kV and Hearn 115 kV buses were split to respect the maximum short-circuit levels.

The new Leaside x Bridgman circuit was added and the Leaside x Wiltshire lines configurations were changed to reflect the proposed arrangement.

Dufferin TS and Bridgman TS are being supplied from Leaside TS.

*Summary of Study conditions:*

Total Ontario Demand	27,162 MW	Total Dufferin TS Load	145 MW
Total Ontario Generation	26,693 MW	Total Bridgman TS Load	187 MW
Total Ontario Losses	711 MW	Portlands Center GS	550 MW
Toronto Zone Load	10,690 MW		

## 4.2 Thermal Loading Assessment

During the thermal loading assessment, the pre and post contingency flows were monitored on all main sections of the 115 kV circuits between Leaside TS and Manby East TS and all 230/115 kV Leaside TS autotransformers supplying the area.

All contingencies were simulated with loads modeled as constant power, post ULTC action. Only contingencies on the Leaside x Wiltshire area were simulated, since the proposed changes do not impact the Manby x Wiltshire part of the system.

The pre-contingency flows were compared to the continuous ratings of the equipment.

The *IESO Transmission Assessment Criteria* requires that all line and equipment loadings to be within their continuous rating with all elements in service.

The single element post-contingency line flows were compared to the long term emergency ratings. The *IESO Transmission Assessment Criteria* requires the post-contingency loading on local transmission lines and local transformers to be within their long term emergency ratings.

The single element post-contingency line flows with outage conditions to lines pre-contingency were compared to the short term emergency rating (15 minute Limited Time Ratings). The *IESO Transmission Assessment Criteria* requires that with any two elements out of service, either through double-element contingencies or single-element contingencies with one element out-of-service pre-contingency, the post-contingency loading on local transmission lines and local transformers to be within their short term emergency ratings.

The results of the pre-contingency and single element post-contingency simulations are presented in Table 4.

The results of the single element post-contingency simulations with one L x W circuit out of circuit pre-contingency are presented in Table 5.

The following observations resulted from the analysis of the new configuration:

1. The pre-contingency loadings of the Leaside to Wiltshire circuits are well below their continuous ratings.
2. All simulated single element contingencies result in post-contingency loadings below the long term emergency thermal ratings, for load forecasts up to and including the year 2025.
3. Using extreme weather peak load forecasts provided for years 2010 - 2025, contingencies resulting in two of the new proposed CCT, L14W or L15W circuits out of service, through a single-element contingency with one other L x W circuit out-of-service pre-contingency will result

in the loading of the remaining circuits above their STE. This is a result of one remaining circuit supplying the entire Bridgman TS load on its own. A possible mitigating measure to the overloading of the STE ratings is to open LV breakers behind the Bridgman transformers during outages, so that load is lost by configuration following a contingency. A simulation of one of these scenarios is shown in Table 6.

Further planned load curtailment at Dufferin TS and Bridgman TS, which must occur within 15 minutes after the contingency, will return the post-contingency loading of the remaining circuits to below their LTE values. Planned load curtailment or load rejection of up to 150 MW is an acceptable control action as a response to N-2 conditions (i.e. two elements out of service), to help obey the Load Security Criteria, as per the *IESO Transmission Assessment Criteria*.



# Addendum - Leaside to Bridgman Reinforcement

			Continuous Rating		Long Term Emergency Rating		Pre-Contingency System – Duff + Bridg on Leaside Supply		Loss of L13W		Loss of L14W		Loss of L15W		Loss of new CCT	
Monitored Element			AMPS	AMPS	AMPS	Cont	AMPS	LTE	AMPS	LTE	AMPS	LTE	AMPS	LTE	AMPS	LTE
Cct	From	To				%		%		%		%		%		%
<b>115 kV Circuits</b>																
L13W	Leaside TS	Bridgman Jct	985	1138	423.7	43.0	0.0	0.0	434.1	38.1	431.9	37.9	864.4	76.0		
L13W	Bridgman Jct	Dufferin Jct	680	890	424.1	62.4	0.0	0.0	434.4	48.8	432.2	48.6	864.8	97.2		
L13W	Dufferin Jct	Wiltshire TS	680	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
L14W	Leaside TS	Birch Jct	1200	1200	408.4	34.0	417.7	34.8	0.0	0.0	788.9	65.7	524.8	43.7		
	Birch Jct	Bridgman Jct	810	1070	408.6	50.4	417.9	39.1	0.0	0.0	789.2	73.8	525.0	49.1		
	Bridgman Jct	Wiltshire TS	690	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
L15W	Leaside TS	Bayview Jct	1200	1200	427.3	35.6	436.7	36.4	756.3	63.0	0.0	0.0	535.7	44.6		
	Bayview Jct	Bridgman Jct	670	790	451.5	67.4	461.4	58.4	783.4	99.2	0.0	0.0	561.9	71.1		
NEW	Leaside TS	Bridgman Jct	1200	1200	572.1	47.7	1045.8	87.1	705.4	58.8	709.4	59.1	0.0	0.0		
Former L15W	Bridgman Jct	Barlett Jct	750	980	383.4	51.1	868.2	88.6	378.6	38.6	375.7	38.3	0.0	0.0		
Former L15W	Barlett Jct	Wiltshire TS	750	980	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
<b>Autotransformers</b>			MVA	MVA	MVA	LTE %	MVA	LTE %	MVA	LTE %	MVA	LTE %	MVA	LTE %	MVA	LTE %
	Leaside	T11	281	347	105.4	37.5	105.5	30.3	99.5	28.7	98.5	28.4	112.7	32.5		
	Leaside	T12	317	419	91.4	28.8	91.5	21.8	85.5	20.4	84.6	20.2	99.2	23.7		
	Leaside	T14	281	332	94.6	33.7	94.9	28.6	88.8	26.8	87.9	26.5	102.8	30.9		
	Leaside	T15	287	369	195.7	68.2	199.0	53.9	203.3	55.1	203.8	55.2	187.9	50.9		
	Leaside	T16	281	347	190.2	67.7	193.9	55.9	198.0	57.1	198.5	57.2	182.4	52.6		
	Leaside	T17	317	347	185.8	58.2	188.1	54.2	192.2	55.4	192.7	55.5	176.7	50.9		

**Table 4: Pre-Contingency and Single Element Contingency Thermal Study Results for 2025 Load Forecast**

Addendum - Leaside to Bridgman Reinforcement

			Long Term Emergency Rating	Short Term Emergency Rating	L13W + L15W Out of Service			L13W + L14W Out of Service			L13W + New CCT Out of Service			L14W + New CCT Out of Service			L14W + L15W Out of Service			L15W + New CCT Out of Service		
Cct	Monitored Element From To		AMPS	AMPS	AMPS	LTE %	STE %	AMPS	LTE %	STE %	AMPS	LTE %	STE %	AMPS	LTE %	STE %	AMPS	LTE %	STE %	AMPS	LTE %	STE %
<b>115 kV Circuits</b>																						
L13W	Leaside TS	Bridgman Jct	1138	2249	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	875.0	76.9	38.9	482.9	42.4	21.5	872.8	76.7	38.8
	Bridgman Jct	Dufferin Jct	890	970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	875.4	98.4	90.2	483.3	54.3	49.8	873.2	98.1	90.0
	Dufferin Jct	Wiltshire TS	890	970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L14W	Leaside TS	Birch Jct	1200	1308	800.3	66.7	61.2	0.0	0.0	0.0	513.2	42.8	39.2	0.0	0.0	0.0	0.0	0.0	0.0	1427.6	119.0	109.1
	Birch Jct	Bridgman Jct	1070	1350	800.5	74.8	59.3	0.0	0.0	0.0	513.4	48.0	38.0	0.0	0.0	0.0	0.0	0.0	0.0	1427.8	133.4	105.8
	Bridgman Jct	Wiltshire TS	890	1090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
L15W	Leaside TS	Bayview Jct	1200	1308	0.0	0.0	0.0	771.5	64.3	59.0	533.8	44.5	40.8	1482.9	123.6	113.4	0.0	0.0	0.0	0.0	0.0	0.0
	Bayview Jct	Bridgman Jct	790	2290	0.0	0.0	0.0	798.7	101.1	26.7	560.7	71.0	18.8	1520.8	192.5	50.9	0.0	0.0	0.0	0.0	0.0	0.0
NEW	Leaside TS	Bridgman Jct	1200	1308	1219.6	101.6	93.2	1206.2	100.5	92.2	0.0	0.0	0.0	0.0	0.0	0.0	1402.1	116.8	107.2	0.0	0.0	0.0
Former L15W	Bridgman Jct	Barlett Jct	980	1100	883.8	90.2	80.3	882.3	90.0	80.2	0.0	0.0	0.0	0.0	0.0	0.0	361.1	36.8	32.8	0.0	0.0	0.0
Former L15W	Barlett Jct	Wiltshire TS	980	1100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Table 5: Double Element Contingency Thermal Study Result for 2025 Load Forecasts**

– End of Report –

# Addendum - Leaside to Bridgman Reinforcement

			Long Term Emergency Rating	Short Term Emergency Rating	L14W + New CCT Out of Service with T12XH breaker open pre-contingency		
Monitored Element			AMPS	AMPS	AMPS	LTE	STE
Cct	From	To				%	%
<b>115 kV Circuits</b>							
L13W	Leaside TS	Bridgman Jct	1138	2249	864.4	76.0	38.4
L13W	Bridgman Jct	Dufferin Jct	890	970	864.8	97.2	89.2
L13W	Dufferin Jct	Wiltshire TS	890	970	0.0	0.0	0.0
L14W	Leaside TS	Birch Jct	1200	1308	0.0	0.0	0.0
	Birch Jct	Bridgman Jct	1070	1350	0.0	0.0	0.0
	Bridgman Jct	Wiltshire TS	890	1090	0.0	0.0	0.0
L15W	Leaside TS	Bayview Jct	1200	1308	814.4	67.9	62.3
	Bayview Jct	Bridgman Jct	790	2290	847.5	103.1	28.3
NEW	Leaside TS	Bridgman Jct	1200	1308	0.0	0.0	0.0
Former L15W	Bridgman Jct	Barlett Jct	980	1100	0.0	0.0	0.0
Former L15W	Barlett Jct	Wiltshire TS	980	1100	0.0	0.0	0.0

**Table 6: Double Element Contingency Study Results with Preventative Pre-Contingency Control Actions**

**Notes:** 59 MW of load are lost by configuration

**– End of Report –**



Power to Ontario.  
On Demand.

# REPORT

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## System Impact Assessment Report

### CONNECTION ASSESSMENT & APPROVAL PROCESS

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Issue 1.0

#### *FINAL REPORT*

**Project:** Leaside to Bridgman Reinforcement

**Applicant:** Hydro One Networks Inc.

*CAA ID 2006-238*

Transmission Assessments & Performance Department

August 11, 2009



# **SYSTEM IMPACT ASSESSMENT REPORT**

## **Bridgman to Leaside Reinforcement**

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# **System Impact Assessment Report**

## **Bridgman to Leaside Reinforcement**

### **Acknowledgement**

The IESO wishes to acknowledge the assistance of Hydro One in completing this assessment.

### **Disclaimers**

#### **IESO**

This report has been prepared solely for the purpose of assessing whether the connection applicant's proposed connection with the IESO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether the IESO should issue a notice of approval or disapproval of the proposed connection under Chapter 4, section 6 of the Market Rules.

Approval of the proposed connection is based on information provided to the IESO by the connection applicant and the transmitter(s) at the time the assessment was carried out. The IESO assumes no responsibility for the accuracy or completeness of such information, including the results of studies carried out by the transmitter(s) at the request of the IESO. Furthermore, the connection approval is subject to further consideration due to changes to this information, or to additional information that may become available after the approval has been granted. Approval of the proposed connection means that there are no significant reliability issues or concerns that would prevent connection of the proposed facility to the IESO-controlled grid. However, connection approval does not ensure that a project will meet all connection requirements. In addition, further issues or concerns may be identified by the transmitter(s) during the detailed design phase that may require changes to equipment characteristics and/or configuration to ensure compliance with physical or equipment limitations, or with the Transmission System Code, before connection can be made.

This report has not been prepared for any other purpose and should not be used or relied upon by any person for another purpose. This report has been prepared solely for use by the connection applicant and the IESO in accordance with Chapter 4, section 6 of the Market Rules. The IESO assumes no responsibility to any third party for any use, which it makes of this report. Any liability which the IESO may have to the connection applicant in respect of this report is governed by Chapter 1, section 13 of the Market Rules. In the event that the IESO provides a draft of this report to the connection applicant, you must be aware that the IESO may revise drafts of this report at any time in its sole discretion without notice to you. Although the IESO will use

its best efforts to advise you of any such changes, it is the responsibility of the connection applicant to ensure that it is using the most recent version of this report.

## **HYDRO ONE**

### **Special Notes and Limitations of Study Results**

The results reported in this preliminary feasibility study are based on the information available to Hydro One, at the time of the study, suitable for a preliminary assessment of a new generation or load connection proposal.

The short circuit and thermal loading levels have been computed based on the information available at the time of the study. These levels may be higher or lower if the connection information changes as a result of, but not limited to, subsequent design modifications or when more accurate test measurement data is available.

This study does not assess the short circuit or thermal loading impact of the proposed connection on facilities owned by other load and generation (including OPGI) customers.

In this preliminary feasibility study, short circuit adequacy is assessed only for Hydro One breakers and does not include other Hydro One facilities. The short circuit results are only for the purpose of assessing the capabilities of existing Hydro One breakers and identifying upgrades required to incorporate the proposed connection. These results should not be used in the design and engineering of new facilities for the proposed connection. The necessary data will be provided by Hydro One and discussed with the connection proponent upon request.

The ampacity ratings of Hydro One facilities are established based on assumptions used in Hydro One for power system planning studies. The actual ampacity ratings during operations may be determined in real-time and are based on actual system conditions, including ambient temperature, wind speed and facility loading, and may be higher or lower than those stated in this study.

The additional facilities or upgrades which are required to incorporate the proposed connection have been identified to the extent permitted by a preliminary assessment under the current IESO Connection Assessment and Approval process. Additional facility studies may be necessary to confirm constructability and the time required for construction. Further studies at more advanced stages of the project development may identify additional facilities that need to be provided or that require upgrading.

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# SIA Findings

## **Conclusions and Recommendations**

This System Impact Assessment examined the impact of the proposed reinforcements in the Leaside TS to Bridgman TS area on the reliability of the IESO-controlled grid. The applicant proposes to install a new 115 kV circuit from Leaside TS to Bridgman Junction and to upgrade various sections of the existing L14W and L15W circuits.

The four circuits would then be reconfigured as the new circuit to supply Bridgman T13, and be connected to existing L15W Bridgman Junction x Wiltshire section; the L15W circuit would end at Bridgman TS; Bridgman T11 and T12 transformers would be transferred from L13W to L15W Leaside x Bridgman section.

A new 115 kV motorized disconnect switch is also proposed to be installed on the new circuit at Bridgman Junction. The proposed system configuration is shown in Figure 2.

### ***The study results concluded the following:***

- (1) Under the 2009 peak load conditions and the existing system configuration, there are various contingencies resulting in thermal overloading of the Leaside to Wiltshire circuits. If these contingencies do occur, the only option is to curtail load in the area.
- (2) The transfer of Bridgman and Dufferin, or only Dufferin load onto Manby supply to off-load Leaside to Wiltshire circuits is not a valid option under 2009 peak load conditions, as this configuration would result in post-contingency thermal overloading of Manby to Wiltshire 115 kV circuits, and would add thermal stress on the Richview to Manby 230 kV circuits.
- (3) In the new configuration, with all elements in service, the pre-contingency flows would be within the continuous ratings of the equipment under 2009 summer peak conditions, respecting the *IESO Transmission Assessment Criteria*.
- (4) In the proposed configuration, flows following a single contingency would be within the long term emergency ratings of the equipment under 2009 summer peak conditions, respecting the *IESO Transmission Assessment Criteria*.
- (5) Under the proposed system configuration, future load growth may result in post-contingency overloading of the L13W circuit by year 2014: following the loss of the new circuit, L13W will carry the entire Dufferin TS load. Based on the load growth forecast, the thermal overloading condition is expected to occur in 2014. There are several feasible mitigating measures to be implemented, which include the upgrade of L13W Bridgman x Dufferin section, or the installation of the local reactive resources at Dufferin TS.
- (6) In the proposed configuration under the 2009 peak load conditions, the voltage declines that occur following recognized contingencies in the area would be within the *IESO Transmission Assessment Criteria*.

***Recommendations:***

(1) Based on the actual load forecast, the proposed system is expected to be adequate until 2014. To avoid post-contingency overloading of the L13W circuit, Hydro One Networks will have to implement future mitigating measures before 2014. The mitigating measures would include the upgrade of L13W Bridgman x Dufferin section, or the installation of the local reactive support at Dufferin TS.

(2) It is recommended the new circuit to have its own terminal. If the new circuit is connected to the existing L4C terminal, the operation flexibility would be reduced, there would be operating challenges during switching, and potential feed-back during certain element outages and system configurations.

(3) Even though the 230 kV Richview x Manby circuits are not part of the scope of this study, it was identified that the flow on R15K circuit is approaching or is above its long term emergency rating for various contingencies under the 2009 peak load conditions. Future assessments are recommended to be carried out for Richview-Manby-Cooksville area and reinforcements to be identified for the region.

(4) Under certain system conditions, in order to maintain the reliability of the bulk system, the IESO may have to transfer load from Leaside to Manby East supply. The process of transferring Dufferin TS from normal Leaside supply to Manby East supply would not change under the proposed configuration.

However, to transfer Bridgman TS to Manby East supply, Bridgman T11 and T12 transformers would have to be offloaded or removed from service. In this configuration, a next single contingency may result in load loss at Bridgman TS. The performance of the rest of the *IESO Controlled Grid* is still acceptable in this state.

Hydro One is advised to review the consequences of this load curtailment with its customers.

To ensure a greater load supply security when Bridgman TS is on alternate Manby East supply, IESO recommends that Hydro One to install a normal open disconnect switch between L13W and L14W which would allow the transfer of Bridgman T11 and T12 between these two circuits.

## **IESO's Requirements for Connection**

The following requirements were identified in this assessment:

1) Hydro One Networks is required to install all the equipment needed to monitor the information required by the IESO on a continuous basis as described in Appendix 4.16 of the market rules. The IESO requires that the status of the new disconnect switch at Bridgman Junction and the status of new breaker at Leaside TS, as well as voltage and active/reactive power flow on the new circuit at Leaside TS to be monitored.

2) The 115 kV equipment connected to terminal stations must be capable of continuously operating in the range between 113 kV and 127 kV (Appendix 4.1, Reference 2 of the Market Rules).

In particular, the IESO requires that the 115 kV connection equipment meet the following requirements:

- connection equipment must have a maximum continuous voltage rating of at least 127 kV in southern Ontario,

- equipment must be able to interrupt rated fault current for voltages up to the maximum continuous rating, and
- equipment must remain in service, and not automatically trip, for voltages up to 5% above the maximum continuous rating, for up to 30 minutes, to allow the system to be re-dispatched to return voltages within their normal range.

3) Based on the Transmission System Code (Appendix 2), all 115 kV interrupting devices should have an interrupting capability of 50 kA. The new breaker is rated at this performance standard set in the TSC and it can be concluded that the interrupting rating of the new breaker is adequate.

4) The new protections will have to be coordinated with the existing schemes. The new protection systems must be fully duplicated and supplied from separate batteries. The existing protections for Leaside x Wiltshire circuits at all ends must to be verified and modified, as required.

## **Notification of Approval for Connection Proposal**

From the information provided, our review concludes that the proposed changes will not result in a material adverse effect on the reliability of the IESO-controlled grid

It is recommended that a Notification of Conditional Approval be issued for the new 115 kV circuit and the refurbishing of the L14W and L15W circuits. Final approval will be subject to the proponent carrying out the work specified in the IESO connection requirements section.

## System Impact Assessment Report

# 1. Project Description

---

In 2006 Hydro One and Toronto Hydro commissioned the *City of Toronto Electric Supply Study – Adequacy of Transmission Facilities and Transmission Supply Plan for the Central Toronto Area 2006-2021*. The study identified a series of reinforcements in the power system required to ensure an adequate transmission system to meet the electricity demand over the next 15 years. Part of the study focused on the Leaside to Manby 115 kV system. This SIA addresses only the reinforcements proposed for Leaside to Wiltshire 115 kV region. Future reinforcements will be reviewed and assessed in separate SIA studies, when they are requested by the applicant.

Under the existing transmission system configuration, there are two sources of supply to the 115 kV load in the area: Leaside and Manby East 230/115 kV autotransformer stations. There are three 115 kV circuits from Leaside TS to Wiltshire TS supplying Bridgman TS and Dufferin TS, and four 115 kV circuits from Manby East TS to Wiltshire TS supplying Runnymede TS, Fairbank TS and Wiltshire TS. Relief for either Manby East TS or Leaside TS has been generally provided in the past by transferring load from one supply station to the other station.

With the increasing load in the area, operating with the normal split at Wiltshire would result in overloading of L13W, L14W and L15W circuits under contingency conditions during peak load periods. Similarly, transferring load to Manby East supply would result in post-contingency overloading of the Manby to Wiltshire 115 kV circuits, as well as R2K and R15K 230 kV circuits. The study results presented in section 6.2.1 *Existing System Assessment* confirm that the existing system is not adequate to reliably supply the area load.

As a result, Hydro One is planning to construct a new 115kV circuit from Leaside TS to Bridgman Junction and to upgrade various sections of the existing L14W and L15W circuits. The four circuits would then be reconfigured as the new circuit to supply Bridgman T13, and be connected to existing L15W Bridgman Junction x Wiltshire section; the L15W circuit would end at Bridgman TS and supply T11 and T12, transferred from L13W. A new 115 kV motorized disconnect switch is also proposed to be installed on the new circuit at Bridgman Junction. The proposed system configuration is shown in Figure 2.

The new facilities are scheduled to be in service in summer 2009.

The purpose of the System Impact Assessment is to identify the benefit of the new facilities and their effect on system reliability.

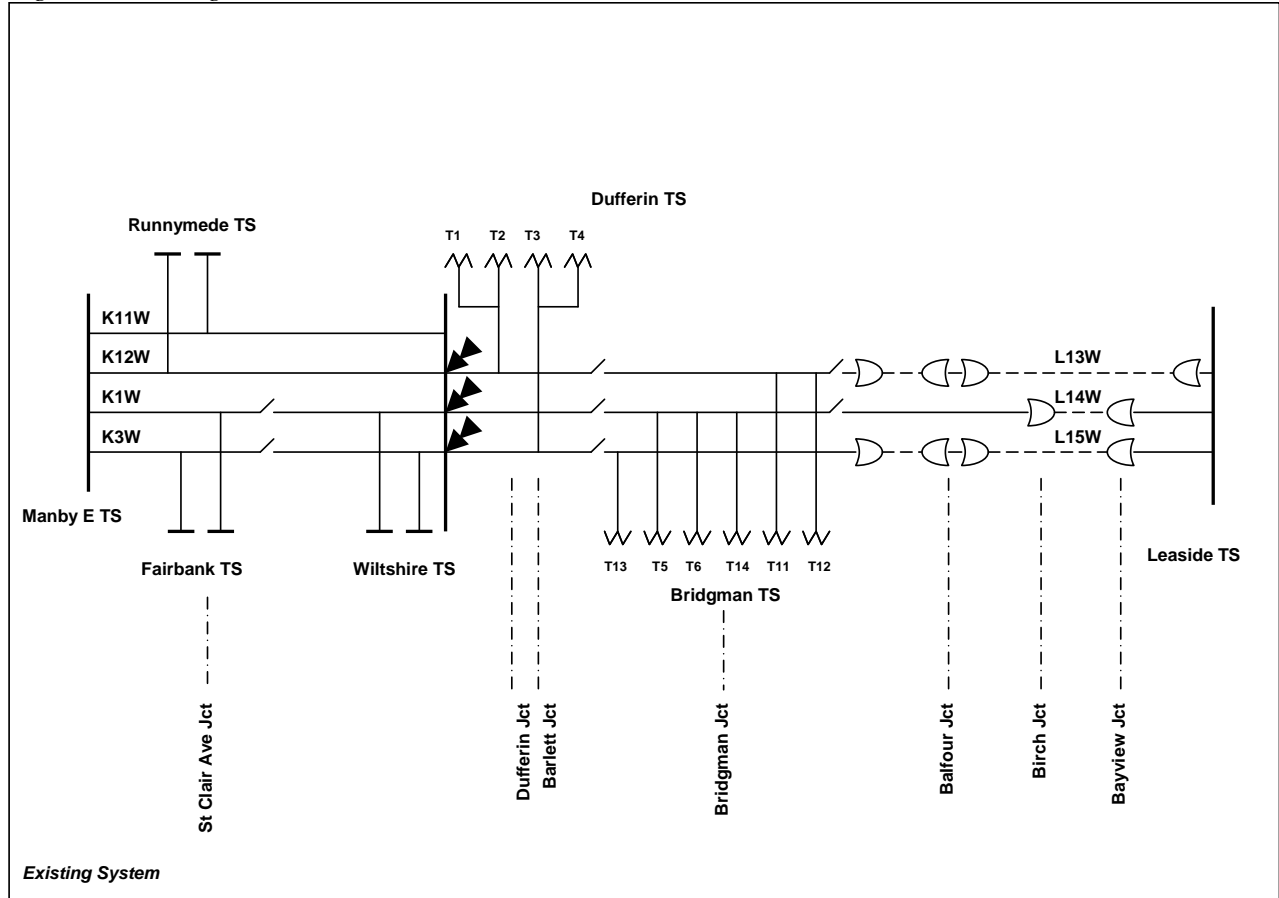
– End of Section –

## 2. Review of Connection Proposal

### 2.1 Connection Arrangement

The existing connection arrangement is shown in Figure 1 below.

Figure 1: Existing Connection



The applicant proposes the following changes to the existing system:

- L14W/L15W will be rebuilt as a three circuit 115kV line between Leaside TS and Bayview Jct. (about 1.7km). All three circuits will have an ampacity rating of 1200A at 35°C ambient temperature.
- Two underground 115kV cable circuits will be built between Bayview Jct. and Birch Jct. (about 2.2km). Both U/G cable circuits will have an ampacity rating of 1200A. One cable will replace the old L14W cable in that section. The other cable will be for the new circuit.
- Birch Jct. x Bridgman TS overhead section of line L14W carries an idle 115kV circuit. The idle section on this line will be used for the new circuit. It will have an ampacity rating of 1200A at 35°C ambient temperature.

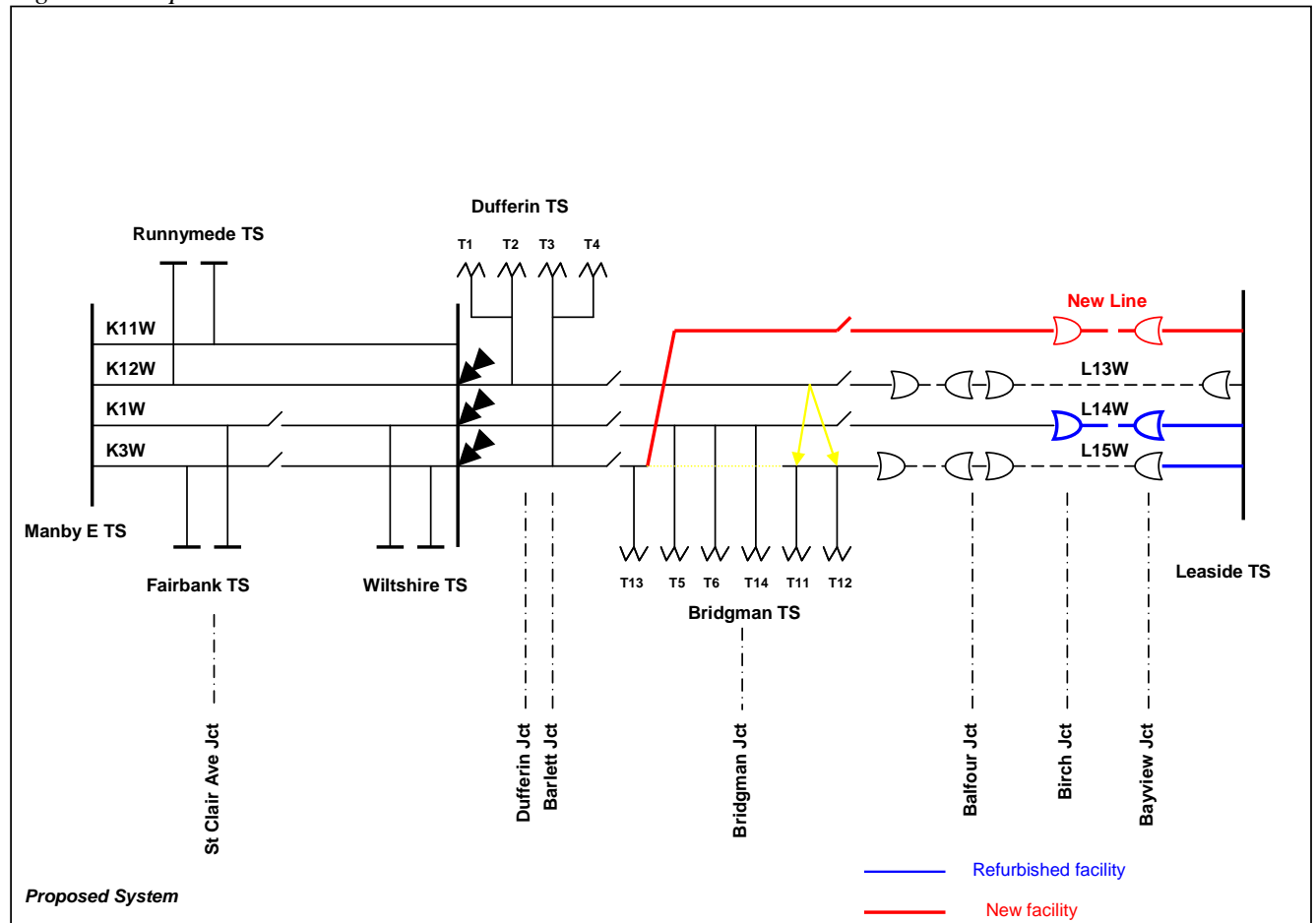
(d) The new circuit will be incorporated at Leaside on the same diameter with L4C and H8LC, by adding a new 3000 A breaker – see Figure 3.

(e) A new motorized disconnect switch will be installed on the new circuit at Bridgman Junction, on Leaside side.

(f) The L15W circuit will be open at Bridgman TS. The new circuit will be connected to the Bridgman TS to Wiltshire TS section of the L15W circuit, and will supply Bridgman T13, and Dufferin T3 and T4.

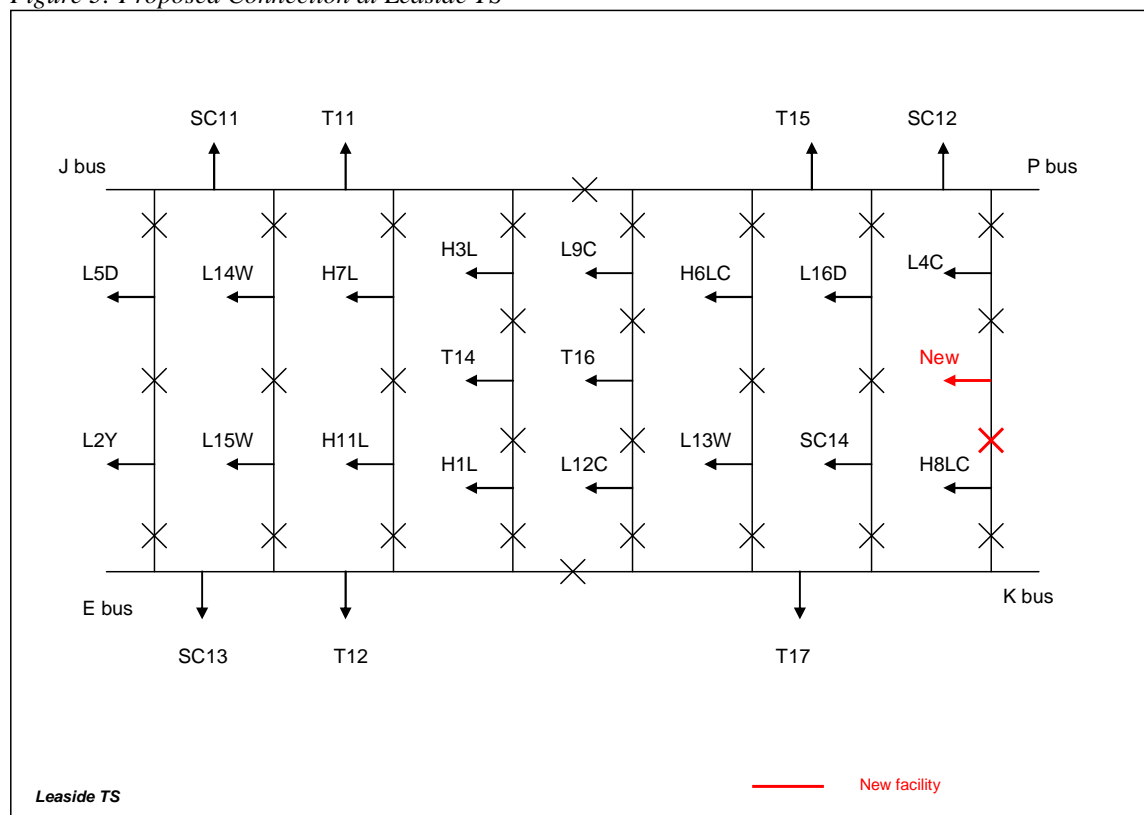
(g) Bridgman T11 and T12 will be disconnected from L13W and connected to L15W, on Leaside side.

Figure 2: Proposed Connection



As a result of the proposed changes, Bridgman TS will be supplied by L14W, L15W and the new circuit, and Dufferin TS will be supplied by the new circuit and L13W.

Figure 3: Proposed Connection at Leaside TS



Under certain system conditions, in order to maintain the reliability of the bulk system, the IESO may have to transfer load from Leaside to Manby East supply. The process of transferring Dufferin TS from normal Leaside supply to Manby East supply would not change under the proposed configuration.

However, to transfer Bridgman TS to Manby East supply, Bridgman T11 and T12 transformers would have to be offloaded or removed from service. In this configuration, a next single contingency may result in load loss at Bridgman TS. The performance of the rest of the *IESO Controlled Grid* is still acceptable in this state.

Hydro One is advised to review the consequences of this load curtailment with its customers.

To ensure a greater load supply security when Bridgman TS is on alternate Manby East supply, IESO recommends that Hydro One to install a normal open disconnect switch between L13W and L14W which would allow the transfer of Bridgman T11 and T12 between these two circuits.

## 2.2 On-line Monitoring

The Market Rules (Chapter 4 section 7.4) require that each transmitter shall provide the IESO on a continual basis with on-line monitored quantities as specified in Appendix 4.16. It is required that Hydro One installs all the equipment needed to monitor the information required by the IESO on a continuous basis. The IESO requires that the status of the new Leaside breaker and disconnect switches at Leaside

and Bridgman, as well as voltages and active/reactive power flow on the new line at Leaside TS to be transmitted.

## 2.3 Protection Systems

Hydro One will have to follow the *Transmission System Code* technical requirements for adequate protection at Leaside TS, Wiltshire TS, Bridgman TS and Dufferin TS.

The new protections will have to be coordinated with the existing schemes, must be fully duplicated and supplied from separate batteries.

The existing protections for Leaside x Wiltshire circuits at all ends must be verified and modified, as required.

– End of Section –



### 3. Data Verification

---

Hydro One has provided the following equipment specifications for new components:

*115 kV Circuit Breaker:*

Voltage Class:	115 kV
Number required:	1
Maximum operating voltage:	127 kV
BIL	650 kV
Rated interrupting time	3 cycles
Continuous current capacity	3000 A
3 Phase short circuit rating	50 kA
L-G Short circuit rating	50 kA

*115 kV Disconnect Switches:*

Continuous current capacity	3000 A
Motorized and suitable for remote supervisory control	

*115 kV Overhead Transmission Lines:*

Maximum operating voltage:	127 kV
Approximate length	
Leaside TS x Bayview Jct	1.7 km
Birch Jct x Bridgman TS	1.4 km
Cont. summer rating	1200 A

*115 kV Underground Transmission Lines:*

Rated Normal Voltage:	127 kV
BIL:	550 kV
Shortcircuit withstand:	50 kA symmetrical with a pre-fault voltage of 127 kV for up to 0.2 seconds shortcircuit duration
Cont. Summer Rating:	1200 A
2 Hours LTR:	1350 A
Operating Temperature:	85°C

The applicant stated that the equivalent R, X, B parameters for Leaside x Bridgman portion of L13W, L14W and L15W circuits remain unchanged and the R, X, B parameters for the new circuit are identical to those of L14W.

<b>Circuit</b>	<b>R</b>	<b>X</b>	<b>B</b>	<b>km</b>
L13W:	0.00134	0.00633	0.17903	5.9
L14W:	0.00296	0.01226	0.05083	5.2
L15W:	0.00261	0.00829	0.09966	5.6
New:	0.00296	0.01226	0.05083	5.2

If any of the above data is inaccurate, the applicant should provide the correct data to the IESO prior to the completion of IESO Facility Registration process.

**– End of Section –**

## 4. System Description

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### 4.1 Existing Transmission

Under the existing transmission system, there are two sources of supply to the 115 kV load in the area: Leaside TS 230/115 kV and Manby East TS 230/115 kV autotransformer stations. There are three 115 kV circuits from Leaside TS to Wiltshire TS supplying loads at Bridgman TS and Dufferin TS, and four 115 kV circuits from Manby East TS to Wiltshire TS supplying Runnymede TS, Fairbank TS and Wiltshire TS. The normal open point is at Wiltshire TS on the Leaside x Wiltshire circuits. Relief for either Manby East TS or Leaside TS has been generally provided in the past by transferring load from one supply station to the other station.

With the increasing load in Central Toronto, normal operation with the split at Wiltshire would result in overloading of L13W and L15W circuits under contingency conditions during peak load periods. Similarly, transferring any load from Leaside to Manby East supply would result in post-contingency overloading of the Manby to Wiltshire 115 kV circuits, as well as R2K and R15K 230 kV circuits.

### 4.2 Area Loads and Load Growth

Figure 4 and Figure 5 represent the load at the stations connected on the 115 kV corridor Leaside TS to Manby East TS from June 1<sup>st</sup> to Aug 31<sup>st</sup>, 2006: Bridgman TS and Dufferin TS, respectively Wiltshire TS, Fairbank TS and Runnymede TS.

Figure 4: Bridgman TS and Dufferin TS load

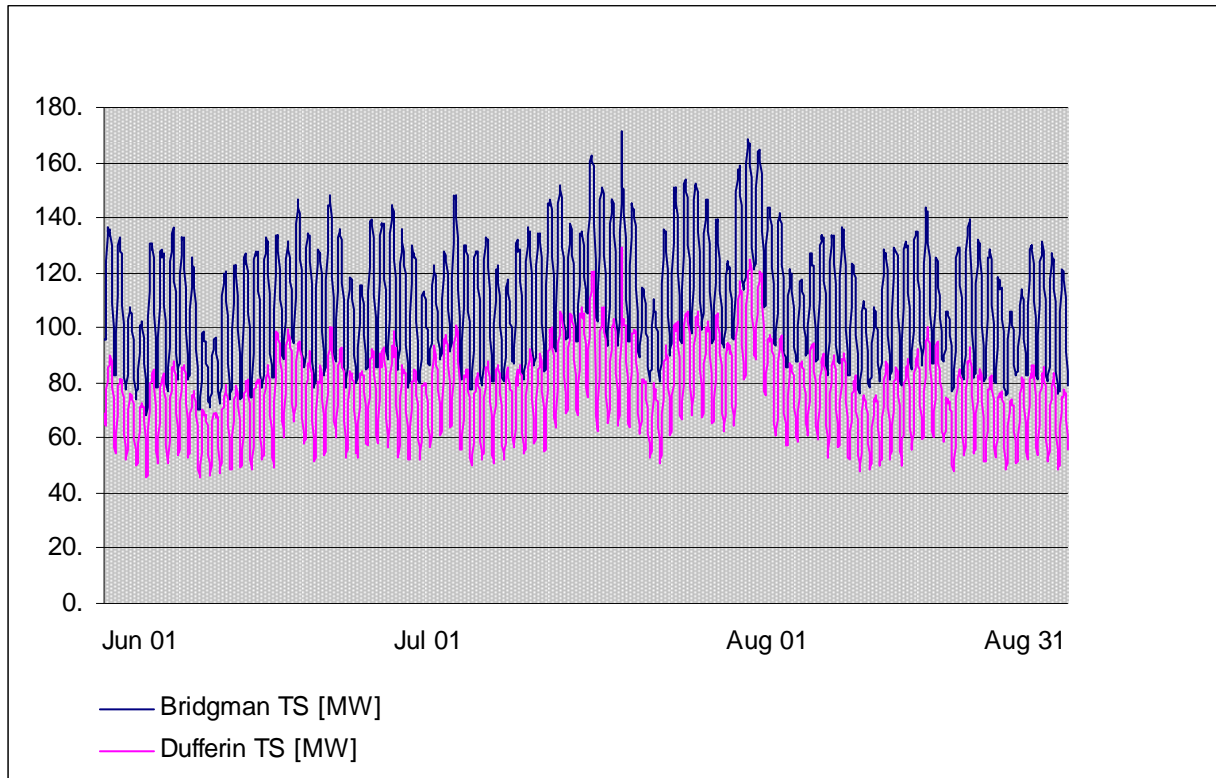


Figure 5: Wiltshire TS, Runnymede TS and Fairbank TS load

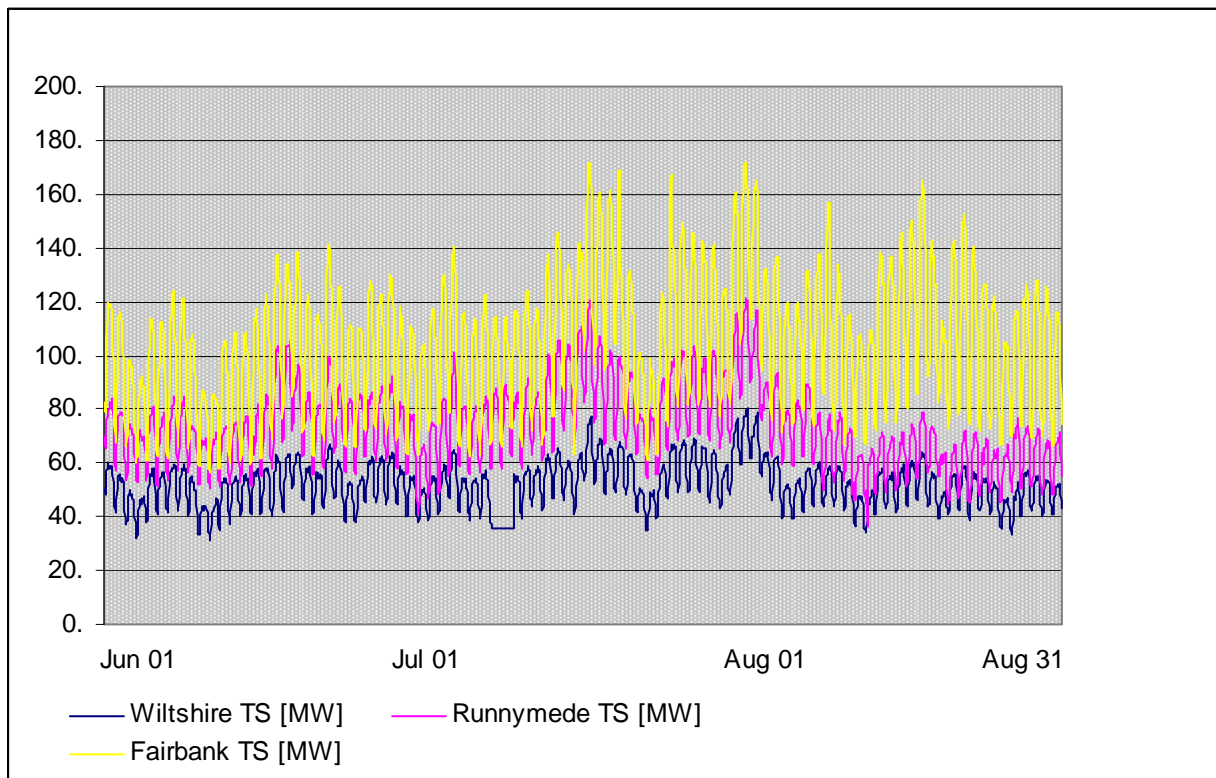
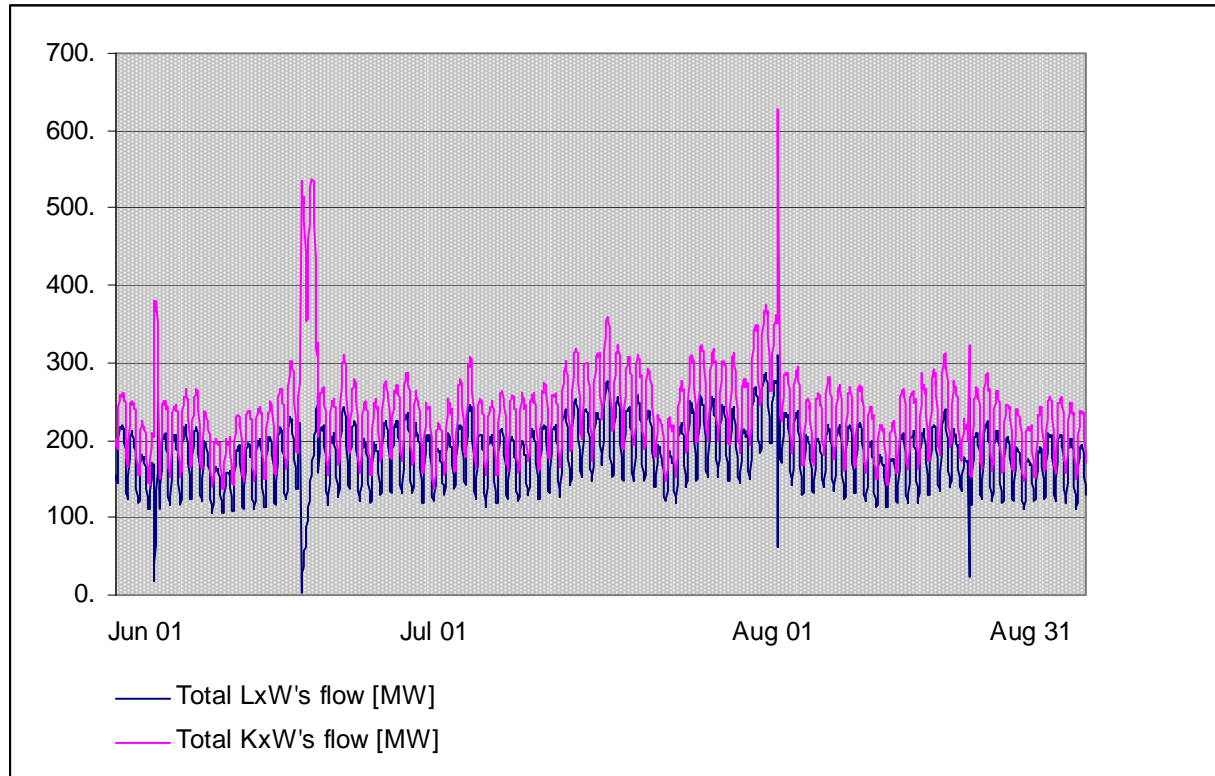


Figure 6 represents the flow at Leaside TS on the Leaside x Wiltshire circuits, and at Manby East TS on the Manby East x Wiltshire circuits, during the same period, June 1 to August 31, 2006.

Figure 6: Leaside TS x Wiltshire TS and Manby East TS x Wiltshire TS Flows



Based on the joint study produced by HydroOne and Toronto Hydro, the load in City of Toronto is expected to increase at an average rate of about 1.25% annually over the long term. The growth rate varies across the City, from about 0.7 % in the Scarborough area to 1.9 % in the downtown district.

Table 1 shows the coincident peak load forecast for 2007 until 2021 for stations within the City of Toronto. The stations forecast were developed by projecting 2005 loads by growth rates given in the Toronto Hydro's February 2006 summer load forecast.

The load forecasts prepared by Hydro One and Toronto Hydro was compared with the loading that occurred on August 1, 2006 when the highest Ontario system peak was set and it was found that the forecast is reflecting a fair load distribution.

Table 1 – Coincident Summer Peak Load Forecast

Station	Forecast MW														
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Warden	140	141	142	144	145	147	148	150	151	152	154	155	157	158	160
Bermondsey	177	178	179	180	182	183	185	187	189	191	193	195	197	199	201
Sheppard	177	179	181	182	184	186	188	190	192	194	196	198	200	202	204
Scarboro	274	276	277	280	283	286	289	292	295	298	301	304	307	310	313
Leaside	138	139	141	142	143	145	146	148	149	151	152	154	156	157	159
Ellesmere	146	171	148	149	151	152	154	155	157	159	160	162	164	165	167
CxL	1053	1060	1067	1078	1089	1099	1110	1121	1133	1144	1156	1168	1180	1192	1204
Basin	43	43	44	44	44	45	45	46	46	47	47	48	48	49	50
Terauley	202	202	207	212	217	222	226	231	236	241	246	251	256	261	266
Bridgman	167	169	172	174	176	177	179	181	183	184	186	188	190	192	194
Carlaw	60	61	61	62	62	63	63	64	65	65	66	67	68	69	70
Cecil	143	148	153	156	160	163	166	169	173	176	179	182	185	188	192
Charles	139	142	144	146	148	149	151	153	154	156	157	159	160	161	163
Duferin	135	139	143	144	146	147	149	150	152	153	155	156	158	159	161
Duplex	106	108	109	111	112	113	114	115	116	118	119	120	121	122	124
Main	66	66	67	67	68	69	69	70	71	71	72	73	74	75	76
Esplanade	142	144	146	149	152	155	159	162	165	168	172	175	178	182	186
Glengrove	58	58	59	60	60	60	61	61	62	63	63	64	65	65	66
Gerard	38	38	38	38	38	39	39	39	39	40	40	40	40	40	41
Leaside 115kV	1298	1321	1344	1363	1382	1402	1421	1441	1461	1481	1502	1522	1544	1565	1587
Total CxL	2351	2381	2412	2441	2471	2501	2531	2562	2594	2625	2658	2690	2723	2757	2791
Manby E+W	232	234	236	238	240	243	246	249	252	255	258	261	264	267	270
Honer	143	144	146	147	149	150	151	153	155	156	158	159	161	163	164
Other 230kV Loads	392	396	399	402	406	409	412	415	419	422	426	429	432	436	439
Manby 230kV	767	775	781	788	795	802	809	817	825	833	841	849	857	865	874
Wiltshire	80	80	80	81	83	85	87	88	90	92	94	96	98	100	102
Runnymede	122	123	124	125	126	128	129	130	132	133	134	136	137	138	139
Fairbanks	163	164	165	166	168	170	171	173	175	176	178	180	182	184	186
Manby East 115kV	365	367	368	373	378	382	387	392	397	401	406	411	416	421	427
Strachan	102	104	107	110	114	118	122	127	129	131	134	137	139	142	145
John	268	272	277	283	288	293	298	304	310	316	323	329	336	343	350
Manby West 115kV	370	377	384	393	402	411	421	431	439	448	457	466	475	485	494
Richview x Manby 230kV	1502	1518	1533	1554	1574	1595	1617	1639	1661	1682	1704	1726	1749	1772	1795

### 4.3 Deliverability and Transmission Assessment Criteria

The deliverability levels for the IESO Controlled Grid are defined in *IESO Supply Deliverability Guidelines* as follows:

*“For loads between 250MW and 500MW:*

*With all transmission elements in service pre-contingency, any single element contingency should not result in an interruption of supply to a load level greater than 250 MW.*

*With all transmission elements in service, for any double circuit contingency that results in a supply interruption of between 250 MW and 500 MW, all load should be restored by switching operations within a typical period of 30 minutes.”*

However, the second requirement does not apply to local areas. The 115 kV system in the central GTA is defined as a local area.

The line and equipment loading pre and post contingency levels are defined in the *IESO Transmission Assessment Criteria*, as follows:

*“All line and equipment loads shall be within their continuous ratings with all elements in service.”*

*“The post contingency loading for a local transmission line shall be within its long term emergency rating.”*

Under existing transmission system, the loss of anyone of L13W, L14W, or L15W circuits would result in flows above the long term emergency rating of the remaining lines, requiring load at Bridgman TS or Dufferin TS to be curtailed. Since the total load level of these two stations is about 300MW, both the IESO’s *Supply Deliverability Guideline* and the *IESO’s Transmission Assessment Criteria* are exceeded.

Since both the IESO deliverability criteria for loads between 250 MW and 500 MW and transmission assessment criteria are exceeded, Hydro One is required to implement as soon as practical their plan for reinforcing the Leaside to Wiltshire area.

**– End of Section –**

## 5. Short Circuit Assessment

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Fault level studies are normally completed by Hydro One to specifically examine the effect of the proposed system changes on fault levels at existing facilities in the area. Studies for the area were recently performed to analyze the effects on fault levels when the Portlands Energy Center generating plant connection at Hearn TS was assessed. It was found that the Hearn TS and Leaside TS breaker capabilities will be exceeded and a set of mitigating actions were recommended.

In general, radial connections like the one proposed in this SIA do not have a large impact on the system fault levels.

With the insignificant contribution of the new development to the area fault levels and with the control actions resulted from the Portlands Energy Center SIA implemented, it is considered that the interrupting capability of the Leaside breakers will be adequate.

Therefore, no detailed fault level studies were required for this particular project.

**– End of Section –**



## 6. System Impact Studies

This connection assessment study focused on:

1) Pre and post contingency thermal analysis on all main sections of the 115 kV circuits between Leaside TS and Manby East TS, all 230/115 kV autotransformers supplying the area, and the 230 kV circuits between Richview TS and Manby TS.

2) Post-contingency voltage declines at main buses in the area for various 115 kV and 230 kV contingencies.

### 6.1 Study Assumptions

The PSS/E software was used to carry out the thermal and voltage analyses.

Based on the information provided by Hydro One, the following elements have been added to the load flow model. Hydro One has provided the following equipment specifications for new components:

#### (a) Transmission Line Data

The applicant stated that the equivalent R, X, B parameters for the Leaside x Bridgman portion of L13W, L14W and L15W circuits remain unchanged and the R, X, B parameters for the new circuit are identical to those of L14W.

Circuit	R	X	B	km
L13W:	0.00134	0.00633	0.17903	5.9
L14W:	0.00296	0.01226	0.05083	5.2
L15W:	0.00261	0.00829	0.09966	5.6
New:	0.00296	0.01226	0.05083	5.2

The following thermal ratings were used for the existing system and the proposed system:

Section	Leaside TS	Jct Point	Bayview Jct	J B #1 Jct	Birch Jct	Balfour Jct	Bridgman TS	Barlett Jct / Dufferin Jct	Wiltshire TS
L13W existing									
L13W proposed				985/1138 A			985/1138 A	680/890 A	680/890 A
L14W existing	680/890 A	810/1070 A	640/710 A	740/820 A		810/1070 A		690/890 A	
L14W proposed	1200 A		1200 A						
L15W existing	680/890 A	810/1070 A		670/790 A		1030 A		750/980 A	750/980 A
L15W proposed	1200 A								
New Cct proposed	1200 A		1200 A		1200 A				

The first value represents the design rating, used as a continuous rating. The second value represents the long term emergency rating. For sections where only one value was provided, that value was used for both continuous and long term emergency rating.

## System Impact Assessment Leaside to Bridgman Reinforcement

The calculated MVA ratings for the 115 kV Leaside x Wiltshire corridor are presented below. The most limiting section of each segment was used to calculate the ratings of different segments of the circuits.

Circuit	Section		120kV MVA		120kV MVA	
Existing System						
L13W	Leaside TS	Bridgman Jct	985	205	1138	237
	Bridgman Jct	Dufferin Jct	680	141	890	185
	Dufferin Jct	Wiltshire TS	680	141	890	185
L14W	Leaside TS	Bridgman Jct	640	133	710	148
	Bridgman Jct	Wiltshire TS	690	143	890	185
L15W	Leaside TS	Bridgman Jct	670	139	790	164
	Bridgman Jct	Barlett Jct	750	156	980	204
	Barlett Jct	Wiltshire TS	750	156	980	204
Proposed System						
L13W	Leaside TS	Bridgman Jct	985	205	1138	237
	Bridgman Jct	Dufferin Jct	680	141	890	185
	Dufferin Jct	Wiltshire TS	680	141	890	185
L14W	Leaside TS	Bridgman Jct	810	168	1070	222
	Bridgman Jct	Wiltshire TS	690	143	890	185
New Circuit (former L15W) (former L15W)	Leaside TS	Bridgman Jct	1200	249	1200	249
	Bridgman Jct	Barlett Jct	750	156	980	204
	Barlett Jct	Wiltshire TS	750	156	980	204
L15W	Leaside TS	Bridgman Jct	670	139	790	164

The continuous rating for the overhead conductors was calculated at the lowest of the sag temperature or 93°C operating temperature, with a 35°C ambient temperature and 4 km/h wind speed.

The long term emergency rating for the overhead conductors was calculated at the lowest of the sag temperature or 127°C operating temperature, with a 35°C ambient temperature and 4 km/h wind speed.

For the underground lines, the continuous rating was calculated at the normal operating temperatures, with the cables from vicinity assumed to be in service. The long term emergency rating used was the 10 day LTR rating.

The continuous rating and long term emergency rating, the 10-Day LTR, used for autotransformers were obtained from the HydroOne secure website.

The continuous and long term emergency MVA ratings for 115kV lines were calculated assuming 120 kV, while for the 230 kV lines it was assumed 240 kV.

If any of the above data is inaccurate, the applicant should provide the correct data to the IESO prior to the completion of IESO Facility Registration process.

### *(b) Configuration Changes*

The existing L15W Bridgman TS x Wiltshire TS section, including Bridgman T13, has been disconnected from L15W and connected to the new circuit. Bridgman T11 and T12 have been disconnected from L13W and connected to L15W.

As a result, L13W will supply only Dufferin T1 and T2 transformers. The L14W circuit will continue to supply Bridgman T5, T6 and T14 transformers. The L15W circuit will supply Bridgman T11 and T12 transformers, with the new circuit supplying Bridgman T13, and Dufferin T3 and T4.

*(c) Power System Modeling*

To conduct the computer analysis, the IESO July 2006 base case model was used with following adjustments.

The Toronto zone load was scaled to match the IESO 2009 extreme weather monthly peak load forecast.

The Central Toronto individual station MW loads were adjusted to match the 2009 load forecast as per HydroOne – Toronto Hydro joint study. The assumed load power factor was 0.9. The above loads were compared with loading that occurred on August 1, 2006 when the highest record on Ontario system peak demand was set and it was found that the forecast reflects a fair load distribution.

Sithe Goreway GS was added to the system with 900 MW output.

Portlands Center GS was added to the system with 550 MW output.

Leaside 115 kV and Hearn 115 kV buses were split to respect the maximum short-circuit levels.

The new circuit Leaside x Bridgman was added and the Leaside x Wiltshire lines configuration was changed to reflect the proposed arrangement.

*Summary of Study conditions:*

Total Ontario Load	27,316 MW	Leaside 230/115 kV Transfer	855 MVA
Total Ontario Generation	28,246 MW	Manby E 230/115 kV Transfer	396 MVA
Total Ontario Losses	812 MW	Portlands Center GS	550 MW
Toronto Zone Load	10,742 MW		

## 6.2 Thermal Loading Assessment

During the thermal loading assessment, the pre and post contingency flows were monitored on all main sections of the 115 kV circuits between Leaside TS and Manby East TS, all 230/115 kV autotransformers supplying the area, and the 230 kV circuits between Richview TS and Manby TS.

Depending on the system configuration being analyzed, various contingencies were simulated. All contingencies were simulated with loads modeled as constant power, post ULTC action.

The pre-contingency flows were compared to the continuous ratings of the equipment.

The *IESO Transmission Assessment Criteria* requires that all line and equipment loadings to be within their continuous rating with all elements in service.

The post-contingency line flows were compared to both continuous ratings and long term emergency ratings. The *IESO Transmission Assessment Criteria* requires the post-contingency loading on local transmission lines and local transformers to be within their long term emergency ratings.

## 6.2.1 Existing System Assessment

The existing system prior to any changes was evaluated under the 2009 load forecast conditions. The assessment was conducted to identify the existing problems and the need to reinforce the area.

Two system configurations were evaluated for the existing system.

In the first configuration, Dufferin and Bridgman loads were supplied from Leaside TS, with L13W, L14W and L15W circuits open at Wiltshire. The results are presented in Table 2.

The second configuration evaluated was with Dufferin load being transferred onto Manby East supply-circuits L13W, L14W and L15W are closed at Wiltshire TS and open at Bridgman TS. The results for local contingencies, including the loss of a Manby East autotransformer are presented in Table 3. The results for contingencies involving 230 kV circuits supplying Manby and Cooksville area are listed in Table 4.

The following observations are to be mentioned:

- a) Under the 2009 peak load forecast conditions, there are contingencies resulting in unacceptable thermal overloading in both configurations.
- b) With both Dufferin and Bridgman loads connected to Leaside supply, the loss of either L13W, L14W or L15W will result in one of the remaining two lines loaded above its short term emergency rating, as presented in table 2.
- c) If Dufferin TS is transferred to Manby East supply, the Leaside to Bridgman circuits would be loaded within acceptable limits, both pre and post contingency. However, contingencies on Manby 115 kV side would result in circuit overloadings: K12W would be loaded above its long term emergency rating following the loss of K11W circuit, as shown in table 3.
- d) Under both studied configurations, the loss of a 230/115 kV autotransformer at either Leaside TS or Manby East TS would no result in loadings above the emergency ratings. To stress the system, the autotransformer contingencies at the above stations were simulated for bus faults, which removes both an autotransformer and one high voltage capacitor connected to the bus.
- e) Outside the scope of this assessment, it was identified that the flows on 230 kV circuits from Richview TS supplying Manby and Cooksville area are approaching or exceeding their emergency thermal ratings post-contingency, under the 2009 peak load conditions. This would happen even before any load being transferred from Leaside to Manby supply. By transferring the load, the post-contingency overloading becomes more accentuated. This can be seen in tables 2 and 4 under the *230 kV circuits* section.
- f) It was of interest to identify the load distribution on the 500 / 230 kV autotransformers when load was transferred from Leaside TS to Manby East TS. By transferring Dufferin TS load of 164MVA, Cherrywood autotransformers were offloaded by 57MVA, or 46% of the load being transferred. Claireville autotransformers picked up 36 %, or 44 MVA, Trafalgar TS assumed 13 %, or 16 MVA, and Parkway TS undertook 4 %, or 5 MVA. The results are shown in Table 5.

# System Impact Assessment Leaside to Bridgman Reinforcement

Table 2: Existing System Analysis - Dufferin TS and Bridgman TS supplied from Leaside TS

			Continuous Rating	Long Term Emergency Rating	Existing System - Duff + Bridg on Leaside Supply		Loss of L14W			Loss of L13W			Loss of L15W			Loss of Leaside P Bus			Loss of R2K		
Monitored Element			MVA	MVA	MVA	Cont %	MVA	Cont %	LTE %	MVA	Cont %	LTE %	MVA	Cont %	LTE %	MVA	Cont %	LTE %	MVA	Cont %	LTE %
Cct	From	To																			
115 kV Circuits																					
L13W	Leaside TS	Bridgman Jct	205	237	130	63	197	96	83	0	0	0	248	121	105	106	52	45	130	63	55
L13W	Bridgman Jct	Dufferin Jct	141	185	74	52	66	47	36	0	0	0	181	128	98	61	43	33	74	52	40
L13W	Dufferin Jct	Wiltshire TS	141	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L14W	Leaside TS	Bridgman Jct	133	148	94	70	0	0	0	147	111	100	132	99	89	104	78	70	94	70	63
	Bridgman Jct	Wiltshire TS	143	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L15W	Leaside TS	Bridgman Jct	139	164	130	94	166	119	101	237	170	145	0	0	0	147	106	90	130	94	79
	Bridgman Jct	Barlett Jct	156	204	91	59	99	64	49	179	115	88	0	0	0	105	67	52	91	59	45
	Barlett Jct	Wiltshire TS	156	204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K11W	Manby E TS	Runnymede Jc	141	184	103	73	103	73	56	103	73	56	103	73	56	103	73	56	103	73	56
	Runnymede Jct	Wiltshire TS	141	184	39	28	39	28	21	39	28	21	39	28	21	39	28	21	39	28	21
K12W	Manby E TS	Runnymede Jc	141	184	103	73	103	73	56	103	73	56	103	73	56	103	73	56	103	73	56
	Runnymede Jct	Wiltshire TS	141	184	39	27	39	27	21	39	27	21	39	27	21	39	27	21	39	27	21
K1W	Manby E TS	St Claire Jct	141	184	86	61	86	61	47	86	61	47	86	61	47	86	61	47	86	61	47
	St Claire Jct	Wiltshire TS	141	184	2	2	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1
K3W	Manby E TS	St Claire Jct	141	184	86	61	86	61	47	86	61	47	86	61	47	86	61	47	86	61	47
	St Claire Jct	Wiltshire TS	141	184	2	2	2	2	1	2	2	1	2	2	1	2	2	1	2	2	1
230 kV Circuits																					
R1K	Richview TS	Manby E TS	482	636	307	64	307	64	48	307	64	48	307	64	48	306	64	48	355	74	56
R13K	Richview TS	Manby E TS	482	636	304	63	304	63	48	304	63	48	304	63	48	304	63	48	351	73	55
R24C	Richview TS	Applewood Jct	561	690	206	37	206	37	30	206	37	30	206	37	30	206	37	30	275	49	40
	Applewood Jct	Cooksville TS	561	690	206	37	206	37	30	206	37	30	206	37	30	206	37	30	275	49	40
K23C	Cooksville	Applewood Jct	561	690	157	28	157	28	23	157	28	23	157	28	23	157	28	23	246	44	36
	Applewood Jct	Manby E TS	561	690	157	28	157	28	23	157	28	23	157	28	23	157	28	23	246	44	36
R2K	Richview TS	Manby Jct	482	636	405	84	405	84	64	405	84	64	405	84	64	405	84	64	0	0	0
	Manby Jct	Manby W TS	482	636	334	69	334	69	53	334	69	52	334	69	52	334	69	52	0	0	0
R15K	Richview TS	Manby Jct	482	636	407	84	407	84	64	407	84	64	407	84	64	407	84	64	640	133	101
	Manby Jct	Manby W TS	482	636	331	69	331	69	52	331	69	52	331	69	52	331	69	52	500	104	79
K21C	Cooksville TS	Applewood Jct	647	647	155	24	155	24	24	155	24	24	155	24	24	155	24	24	144	22	22
	Applewood Jct	Applewood Jct	647	647	72	11	72	11	11	72	11	11	72	11	11	72	11	11	66	10	10
	Applewood Jct	Applewood Jct	647	647	72	11	72	11	11	72	11	11	72	11	11	72	11	11	66	10	10
	Applewood Jct	Manby Tie	647	647	72	11	72	11	11	72	11	11	72	11	11	72	11	11	66	10	10
	Manby Tie	Manby W TS	647	647	142	22	142	22	22	142	22	22	142	22	22	142	22	22	130	20	20
Autotransformers																					
	Leaside	T11	281	347	131	47	120	43	34	161	57	46	110	39	32	175	62	50	131	47	38
	Leaside	T12	317	419	121	38	109	34	26	152	48	36	99	31	24	118	37	28	121	38	29
	Leaside	T14	281	332	122	43	111	39	33	153	55	46	101	36	30	119	42	36	122	43	37
	Leaside	T15	287	369	165	58	179	63	49	133	46	36	191	67	52	0	0	0	166	58	45
	Leaside	T16	281	347	159	57	174	62	50	126	45	36	186	66	53	225	80	65	159	57	46
	Leaside	T17	317	347	157	49	171	54	49	124	39	36	183	58	53	222	70	64	157	49	45
	Manby E	T7	250	307	125	50	125	50	41	125	50	41	125	50	41	125	50	41	125	50	41
	Manby E	T8	362	362	146	40	146	40	40	146	40	40	146	40	40	146	40	40	146	40	40
	Manby E	T9	250	307	125	50	125	50	41	125	50	41	125	50	41	126	50	41	126	50	41
	Trafalgar	T15	939	1155	717	76	717	76	62	717	76	62	717	76	62	718	76	62	718	76	62
	Trafalgar	T14	837	1019	709	85	709	85	70	709	85	70	709	85	70	710	85	70	710	85	70
	Claireville	T13	750	840	675	90	675	90	80	675	90	80	675	90	80	676	90	80	676	90	80
	Claireville	T14	750	840	689	92	689	92	82	690	92	82	690	92	82	690	92	82	690	92	82
	Claireville	T15	750	840	681	91	681	91	81	681	91	81	681	91	81	682	91	81	682	91	81
	Claireville	T16	750	840	633	84	633	84	75	633	84	75	633	84	75	634	84	75	634	85	75
	Parkway	T3	953	1141	605	63	606	64	53	606	64	53	606	64	53	607	64	53	607	64	53
	Parkway	T4	953	1141	605	64	606	64	53	607	64	53	606	64	53	608	64	53	607	64	53
	Cherrywood	T15	750	840	568	76	569	76	68	571	76	68	570	76	68	573	76	68	569	76	68
	Cherrywood	T16	750	840	571	76	572	76	68	573	76	68	573	76	68	576	77	69	572	76	68
	Cherrywood	T14	750	840	583	78	583	78	69	585	78	70	585	78	70	587	78	70	583	78	69
	Cherrywood	T17	1122	1315	574	51	575	51	44	576	51	44	576	51	44	578	52	44	575	51	44

# System Impact Assessment Leaside to Bridgman Reinforcement

Table 3: Existing System Analysis - Dufferin TS supplied from Manby East TS – Local Contingencies

			Continuous Rating	Long Term Emergency Rating	Existing System - Duff on Manby			Loss of L14W			Loss of L13W			Loss of L15W			Loss of K11W			Loss of Manby H2 Bus (T7 + SC22)		
Cct	Monitored Element From To		MVA	MVA	MVA Cont	MVA Cont	LTE	MVA Cont	LTE	MVA Cont	LTE	MVA Cont	LTE	MVA Cont	LTE	MVA Cont	LTE	MVA Cont	LTE	MVA Cont	LTE	
115 kV Circuits																						
L13W	Leaside TS	Bridgman Jct	205	237	59	29	128	63	54	0	0	0	79	38	33	59	29	25	59	29	25	
L13W	Bridgman Jct	Dufferin Jct	141	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
L13W	Dufferin Jct	Wiltshire TS	141	185	83	59	83	59	45	83	59	45	83	59	45	83	59	45	84	59	45	
L14W	Leaside TS	Bridgman Jct	133	148	92	69	0	0	0	144	108	97	120	90	81	92	69	62	92	69	62	
	Bridgman Jct	Wiltshire TS	143	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
L15W	Leaside TS	Bridgman Jct	139	164	40	29	67	48	41	58	42	35	0	0	0	40	29	24	40	29	24	
	Bridgman Jct	Barlett Jct	156	204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Barlett Jct	Wiltshire TS	156	204	83	53	83	53	41	83	53	41	83	53	41	83	53	41	83	53	41	
K11W	Manby E TS	Runnymede Jct	141	184	146	103	146	103	79	146	103	79	146	103	79	0	0	0	149	105	81	
	Runnymede Jct	Wiltshire TS	141	184	78	55	78	55	42	78	55	42	78	55	42	0	0	0	79	56	43	
K12W	Manby E TS	Runnymede Jct	141	184	146	103	146	103	79	146	103	79	146	103	79	234	166	127	149	105	81	
	Runnymede Jct	Wiltshire TS	141	184	78	55	78	55	42	78	55	42	78	55	42	75	53	41	79	56	43	
K1W	Manby E TS	St Claire Jct	141	184	126	89	126	89	69	126	89	69	126	89	69	174	124	95	129	91	70	
	St Claire Jct	Wiltshire TS	141	184	43	30	43	30	23	43	30	23	43	30	23	88	63	48	43	30	23	
K3W	Manby E TS	St Claire Jct	141	184	127	90	127	90	69	127	90	69	127	90	69	175	124	95	129	91	70	
	St Claire Jct	Wiltshire TS	141	184	43	31	43	31	23	43	31	23	43	31	23	89	63	49	43	31	24	
230kV Circuits																						
R1K	Richview TS	Manby E TS	482	636	356	74	356	74	56	356	74	56	356	74	56	358	74	56	381	79	60	
R13K	Richview TS	Manby E TS	482	636	353	73	353	73	55	353	73	55	353	73	55	355	74	56	377	78	59	
R24C	Richview TS	Applewood Jct	561	690	217	39	217	39	31	217	39	31	217	39	31	218	39	32	221	39	32	
	Applewood Jct	Cooksville TS	561	690	216	39	216	39	31	216	39	31	216	39	31	217	39	31	220	39	32	
K23C	Cooksville	Applewood Jct	561	690	116	21	116	21	17	116	21	17	116	21	17	110	20	16	115	20	17	
	Applewood Jct	Manby E TS	561	690	116	21	116	21	17	116	21	17	116	21	17	110	20	16	115	20	17	
R2K	Richview TS	Manby Jct	482	636	415	86	415	86	65	415	86	65	415	86	65	414	86	65	414	86	65	
	Manby Jct	Manby W TS	482	636	343	71	343	71	54	343	71	54	343	71	54	342	71	54	340	71	53	
R15K	Richview TS	Manby Jct	482	636	417	87	417	87	66	417	86	66	417	87	66	416	86	65	416	86	65	
	Manby Jct	Manby W TS	482	636	340	71	340	71	54	340	71	54	340	71	54	339	70	53	337	70	53	
K21C	Cooksville TS	Applewood Jct	647	647	183	28	183	28	28	183	28	28	183	28	28	195	30	30	225	35	35	
	Applewood Jct	Applewood Jct	647	647	86	13	86	13	13	86	13	13	86	13	13	92	14	14	107	16	16	
	Applewood Jct	Applewood Jct	647	647	86	13	86	13	13	86	13	13	86	13	13	92	14	14	107	16	16	
	Applewood Jct	Manby Tie	647	647	86	13	86	13	13	86	13	13	86	13	13	92	14	14	107	16	16	
	Manby Tie	Manby W TS	647	647	171	26	171	26	26	171	26	26	171	26	26	183	28	28	212	33	33	
Autotransformers																						
	Leaside	T11	281	347	111	40	102	36	29	122	44	35	106	38	30	111	40	32	111	39	32	
	Leaside	T12	317	419	100	32	91	29	22	112	35	27	95	30	23	100	32	24	100	32	24	
	Leaside	T14	281	332	102	36	93	33	28	114	40	34	97	34	29	102	36	31	102	36	31	
	Leaside	T15	287	369	144	50	159	55	43	129	45	35	149	52	40	144	50	39	144	50	39	
	Leaside	T16	281	347	138	49	152	54	44	122	43	35	142	51	41	138	49	40	138	49	40	
	Leaside	T17	317	347	135	43	150	47	43	119	38	34	139	44	40	135	43	39	135	43	39	
	Manby E	T7	250	307	183	73	183	73	60	183	73	60	183	73	60	199	79	65	0	0	0	
	Manby E	T8	362	362	214	59	214	59	59	214	59	59	214	59	59	232	64	64	332	92	92	
	Manby E	T9	250	307	184	73	184	73	60	184	74	60	184	73	60	199	80	65	285	114	93	
	Trafalgar	T15	939	1155	725	77	725	77	63	725	77	63	725	77	63	727	77	63	732	78	63	
	Trafalgar	T14	837	1019	717	86	717	86	70	717	86	70	717	86	70	719	86	71	724	86	71	
	Claireville	T13	750	840	686	91	686	91	82	686	91	82	686	91	82	688	92	82	695	93	83	
	Claireville	T14	750	840	700	93	701	93	83	701	93	83	701	93	83	703	94	84	710	95	85	
	Claireville	T15	750	840	692	92	692	92	82	692	92	82	692	92	82	695	93	83	701	93	83	
	Claireville	T16	750	840	643	86	643	86	77	643	86	77	643	86	77	645	86	77	651	87	78	
	Parkway	T3	953	1141	608	64	608	64	53	608	64	53	608	64	53	610	64	53	616	65	54	
	Parkway	T4	953	1141	608	64	608	64	53	609	64	53	608	64	53	610	64	53	616	65	54	
	Cherrywood	T15	750	840	554	74	555	74	66	555	74	66	555	74	66	555	74	66	558	74	66	
	Cherrywood	T16	750	840	557	74	558	74	66	558	74	66	558	74	66	558	74	66	561	75	67	
	Cherrywood	T14	750	840	568	76	569	76	68	569	76	68	569	76	68	569	76	68	572	76	68	
	Cherrywood	T17	1122	1315	560	50	561	50	43	561	50	43	561	50	43	561	50	43	563	50	43	

# System Impact Assessment Lease to Bridgman Reinforcement

Table 4: Existing System Analysis - Dufferin TS supplied from Manby East TS – 230kV Line Contingencies

			Continuous Rating	Long Term Emergency Rating	Loss of K23C			Loss of R1K			Loss of R2K			Loss of R13K			Loss of R15K			Loss of R24C		
Monitored Element			MVA	MVA	MVA Cont	LTE		MVA Cont	LTE		MVA Cont	LTE		MVA Cont	LTE		MVA Cont	LTE		MVA Cont	LTE	
Cct	From	To			%	%		%	%		%	%		%	%		%	%		%	%	
<b>115 kV Circuits</b>																						
L13W	Leaside TS	Bridgman Jct	205	237	59	29	25	59	29	25	59	29	25	59	29	25	59	29	25	59	29	25
L13W	Bridgman Jct	Dufferin Jct	141	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L13W	Dufferin Jct	Wiltshire TS	141	185	83	59	45	83	59	45	83	59	45	83	59	45	83	59	45	83	59	45
L14W	Leaside TS	Bridgman Jct	133	148	92	69	62	92	69	62	92	69	62	92	69	62	92	69	62	92	69	62
	Bridgman Jct	Wiltshire TS	143	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L15W	Leaside TS	Bridgman Jct	139	164	40	29	24	40	29	24	40	29	24	40	29	24	40	29	24	40	29	24
	Bridgman Jct	Barlett Jct	156	204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Barlett Jct	Wiltshire TS	156	204	83	53	41	83	53	41	83	53	41	83	53	41	83	53	41	83	53	41
K11W	Manby E TS	Runnymede Jct	141	184	145	103	79	146	103	79	146	103	79	146	103	79	146	103	79	146	103	79
	Runnymede Jct	Wiltshire TS	141	184	78	55	42	78	55	42	78	55	42	78	55	42	78	55	42	78	55	42
K12W	Manby E TS	Runnymede Jct	141	184	146	103	79	146	103	79	146	104	79	146	103	79	146	104	79	146	103	79
	Runnymede Jct	Wiltshire TS	141	184	78	55	42	78	55	42	78	55	42	78	55	42	78	55	42	78	55	42
K1W	Manby E TS	St Claire Jct	141	184	126	89	68	126	89	69	126	90	69	126	89	69	126	90	69	126	89	69
	St Claire Jct	Wiltshire TS	141	184	43	30	23	43	30	23	43	30	23	43	30	23	43	30	23	43	30	23
K3W	Manby E TS	St Claire Jct	141	184	126	90	69	127	90	69	127	90	69	127	90	69	127	90	69	127	90	69
	St Claire Jct	Wiltshire TS	141	184	43	30	23	43	31	23	43	31	23	43	31	23	43	31	23	43	31	23
<b>230kV Circuits</b>																						
R1K	Richview TS	Manby E TS	482	636	304	63	48	0	0	0	407	84	64	579	120	91	407	85	64	398	83	63
R13K	Richview TS	Manby E TS	482	636	301	62	47	577	120	91	403	84	63	0	0	0	404	84	63	395	82	62
R24C	Richview TS	Applewood Jct	561	690	252	45	36	258	46	37	288	51	42	257	46	37	289	51	42	0	0	0
	Applewood Jct	Cooksville TS	561	690	251	45	36	257	46	37	287	51	42	256	46	37	288	51	42	0	0	0
K23C	Cooksville	Applewood Jct	561	690	0	0	0	50	9	7	211	38	31	49	9	7	213	38	31	199	35	29
	Applewood Jct	Manby E TS	561	690	0	0	0	50	9	7	211	38	31	49	9	7	213	38	31	199	35	29
R2K	Richview TS	Manby Jct	482	636	451	93	71	460	95	72	0	0	0	459	95	72	655	136	103	480	100	75
	Manby Jct	Manby W TS	482	636	378	78	59	388	80	61	0	0	0	387	80	61	512	106	81	407	85	64
R15K	Richview TS	Manby Jct	482	636	453	94	71	462	96	73	657	136	103	462	96	73	0	0	0	482	100	76
	Manby Jct	Manby W TS	482	636	375	78	59	386	80	61	513	107	81	385	80	61	0	0	0	405	84	64
K21C	Cooksville TS	Applewood Jct	647	647	256	40	40	246	38	38	148	23	23	245	38	38	145	22	22	290	45	45
	Applewood Jct	Applewood Jct	647	647	123	19	19	119	18	18	67	10	10	119	18	18	66	10	10	142	22	22
	Applewood Jct	Applewood Jct	647	647	123	19	19	119	18	18	67	10	10	119	18	18	66	10	10	142	22	22
	Applewood Jct	Manby Tie	647	647	123	19	19	119	18	18	67	10	10	119	18	18	66	10	10	142	22	22
	Manby Tie	Manby W TS	647	647	246	38	38	238	37	37	132	20	20	237	37	37	130	20	20	283	44	44
<b>Autotransformers</b>																						
	Leaside	T11	281	347	111	40	32	111	40	32	111	40	32	111	40	32	111	40	32	111	40	32
	Leaside	T12	317	419	100	32	24	100	32	24	100	32	24	100	32	24	100	32	24	100	32	24
	Leaside	T14	281	332	102	36	31	102	36	31	102	36	31	102	36	31	102	36	31	102	36	31
	Leaside	T15	287	369	144	50	39	144	50	39	144	50	39	144	50	39	144	50	39	144	50	39
	Leaside	T16	281	347	138	49	40	138	49	40	138	49	40	138	49	40	138	49	40	138	49	40
	Leaside	T17	317	347	135	43	39	135	43	39	135	43	39	135	43	39	135	43	39	135	43	39
	Manby E	T7	250	307	183	73	60	183	73	60	184	73	60	183	73	60	184	73	60	183	73	60
	Manby E	T8	362	362	214	59	59	214	59	59	214	59	59	214	59	59	214	59	59	214	59	59
	Manby E	T9	250	307	184	73	60	184	74	60	184	74	60	184	74	60	184	74	60	184	74	60
	Trafalgar	T15	906	1098	725	77	63	725	77	63	726	77	63	725	77	63	726	77	63	725	77	63
	Trafalgar	T14	808	974	717	86	70	717	86	70	718	86	70	717	86	70	718	86	70	717	86	70
	Claireville	T13	810	957	686	91	82	686	91	82	687	92	82	686	91	82	688	92	82	686	91	82
	Claireville	T14	808	962	700	93	83	701	93	83	702	94	84	701	93	83	702	94	84	701	93	83
	Claireville	T15	808	962	692	92	82	692	92	82	694	92	83	692	92	82	694	92	83	692	92	82
	Claireville	T16	936	1109	643	86	77	643	86	77	644	86	77	643	86	77	645	86	77	643	86	77
	Parkway	T3	960	1142	608	64	53	608	64	53	609	64	53	608	64	53	609	64	53	608	64	53
	Parkway	T4	960	1142	608	64	53	608	64	53	610	64	53	608	64	53	610	64	53	608	64	53
	Cherrywood	T15	847	1007	554	74	66	554	74	66	555	74	66	554	74	66	555	74	66	554	74	66
	Cherrywood	T16	803	955	557	74	66	557	74	66	558	74	66	557	74	66	558	74	66	557	74	66
	Cherrywood	T14	803	955	568	76	68	568	76	68	569	76	68	568	76	68	569	76	68	568	76	68
	Cherrywood	T17	1158	1209	560	50	43	560	50	43	561	50	43	560	50	43	561	50	43	560	50	43

Table5: Load distribution when Dufferin TS is transferred to Manby East TS

Autotransformer Station	500 kV to 230 kV load transfer			
	Dufferin and Bridgman on Leaside supply	Dufferin (164 MVA) transferred to Manby supply	Difference	Difference [%]
Trafalgar TS	1426 MVA	1441 MVA	-16 MVA	13 %
Claireville TS	2677 MVA	2721 MVA	-44 MVA	36 %
Parkway TS	1211 MVA	1216 MVA	-5 MVA	4 %
Cherrywood TS	2296 MVA	2239 MVA	57 MVA	46 %

The main conclusion is that under the existing system and 2009 peak load forecast, both possible operating configurations will result in unacceptable post-contingency loading on transmission elements.

## 6.2.2 Proposed System Assessment

The assessment of the proposed system was carried out under the 2009 peak load forecast conditions, with both Dufferin TS and Bridgman TS being supplied from Leaside TS.

Only contingencies on the Leaside x Wiltshire area were simulated, since the proposed changes do not impact the Manby x Wiltshire part of the system.

The results of the pre-contingency and post-contingency simulations are presented in Table 6.

The following observations resulted from the analysis of the new configuration:

- The pre-contingency loadings of the Leaside to Wiltshire circuits are well below continuous ratings.
- Even though there are contingencies resulting in flows above the continuous ratings, all the simulated contingencies resulted in post-contingency loadings below the long term emergency thermal ratings, respecting the *IESO Transmission Assessment Criteria*.
- There is one section where the load growth will create thermal concerns in the next future. If the new circuit is faulted, the L13W Bridgman Jct. x Bartlett Jct. section would carry the entire Dufferin TS load. This resulted in the above section being loaded at 177 MVA, or 95 % of its long term emergency rating of 185 MVA. With the only 8 MVA room on the line, it is estimated that the rating will be adequate until 2014, when Dufferin TS load is forecasted to be 150 MW, i.e. 7 MW more than in 2009.



Table6: Proposed System

				Continuous Rating		Long Term Emergency Rating		Proposed System Pre-contingency		Loss of L13W			Loss of L14W			Loss of L15W			Loss of New Cct			Loss of Leaside E bus (T12 + SC13)			Loss of Leaside P bus (T15 + SC12)			
Monitored Element				MVA	MVA	MVA	Cont	MVA	Cont	LTE	MVA	Cont	LTE	MVA	Cont	LTE	MVA	Cont	LTE	MVA	Cont	LTE	MVA	Cont	LTE	MVA	Cont	LTE
From To							%		%	%		%	%		%	%		%	%		%	%		%	%		%	%
115 kV Circuits																												
L13W	Leaside TS	Bridgman Jct	205	237	79	38	0	0	0	80	39	34	80	39	34	167	82	71	79	39	33	79	38	33				
	Bridgman Jct	Dufferin Jct	141	185	86	61	0	0	0	88	62	48	88	62	47	177	125	95	87	61	47	86	61	47				
	Dufferin Jct	Wiltshire TS	141	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
L14W	Leaside TS	Bridgman Jct	168	222	90	54	92	55	41	0	0	0	153	91	69	112	66	50	88	52	40	95	56	42				
	Bridgman Jct	Wiltshire TS	143	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
New CCT (former L15W)	Leaside TS	Bridgman Jct	249	249	111	44	207	83	83	135	54	54	131	53	53	0	0	0	115	46	46	104	41	41				
	Bridgman Jct	Barlett Jct	156	204	79	51	176	113	86	77	50	38	78	50	38	0	0	0	79	50	39	79	51	39				
(former L15W)	Barlett Jct	Wiltshire TS	156	204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
L15W	Leaside TS	Bridgman Jct	139	164	72	52	74	53	0	147	105	89	0	0	0	90	65	55	71	51	43	76	55	47				
Autotransformers																												
	Leaside T11		281	347	121	43	121	43	35	115	41	33	115	41	33	126	45	36	157	56	45	163	58	47				
	Leaside T12		317	419	110	35	110	35	26	105	33	25	105	33	25	115	36	28	0	0	0	103	32	25				
	Leaside T14		281	332	112	40	112	40	34	106	38	32	107	38	32	117	42	35	149	53	45	105	37	32				
	Leaside T15		287	369	179	62	179	62	49	185	64	50	184	64	50	172	60	46	175	61	47	0	0	0				
	Leaside T16		281	347	173	62	174	62	50	179	64	52	178	63	51	166	59	48	170	61	49	252	90	73				
	Leaside T17		317	347	170	54	171	54	49	176	56	51	175	55	51	163	51	47	197	62	57	249	78	72				
	Trafalgar T15		939	1155	717	76	717	76	62	717	76	62	717	76	62	717	76	62	718	76	62	718	76	62				
Trafalgar T14		837	1019	709	85	709	85	70	709	85	70	709	85	70	709	85	70	709	85	70	710	85	70					
	Claireville T13		750	840	675	90	675	90	80	675	90	80	675	90	80	675	90	80	676	90	80	676	90	80				
	Claireville T14		750	840	689	92	689	92	82	689	92	82	689	92	82	689	92	82	690	92	82	690	92	82				
	Claireville T15		750	840	681	91	681	91	81	681	91	81	681	91	81	681	91	81	682	91	81	682	91	81				
	Claireville T16		750	840	633	84	633	84	75	633	84	75	633	84	75	633	84	75	633	84	75	634	84	75				
	Parkway T3		953	1141	605	63	606	64	53	605	64	53	606	64	53	606	64	53	607	64	53	607	64	53				
	Parkway T4		953	1141	605	64	606	64	53	606	64	53	606	64	53	606	64	53	607	64	53	607	64	53				
	Cherrywood T15		750	840	568	76	570	76	68	569	76	68	569	76	68	569	76	68	572	76	68	573	76	68				
	Cherrywood T16		750	840	571	76	572	76	68	572	76	68	572	76	68	572	76	68	574	77	68	576	77	69				
	Cherrywood T14		750	840	582	78	584	78	70	583	78	69	583	78	69	584	78	69	586	78	70	587	78	70				
	Cherrywood T17		1122	1315	574	51	575	51	44	575	51	44	575	51	44	575	51	44	577	51	44	578	52	44				

## 6.3 Voltage Assessment

*IESO's Transmission Assessment Criteria* states that after a contingency, with all facilities in service pre-contingency, system **voltage declines** are to be limited to 10%.

As shown in Table 7, all simulated contingencies resulted in voltage declines below 10%. Therefore, the *IESO Transmission Assessment Criteria* regarding voltage decline is respected.

All the simulations presented in the tables below were conducted with load being modeled as constant power for both pre and post-ULTC movement conditions.

Table6: Proposed System – Voltage Decline

Bus			Leaside KP bus	Leaside EJ bus	Bridgman L13W	Bridgman L14W (T6, T14, T15)	Bridgman L15W (T11, T12)	Bridgman New Line (T13)	Dufferin L13W (T1, T2)	Dufferin New Line (T3, T4)	Hearn
Pre-contingency		kV	126.2	128.5	125.9	127.5	128.0	125.2	125.1	124.6	128.6
Loss of L13W	pre-ULTC	kV	125.2	127.9	0.0	126.9	127.4	122.9	0.0	121.3	128.0
		%dV	0.8	0.5	100.0	0.5	0.5	1.8	100.0	2.6	0.5
	post-ULTC	kV	125.3	128.0	0.0	127.0	127.5	123.2	0.0	121.6	128.1
		%dV	0.7	0.4	100.0	0.4	0.4	1.6	100.0	2.4	0.4
Loss of L14W	pre-ULTC	kV	125.8	128.1	125.4	0.0	127.1	124.4	124.6	123.8	128.3
		%dV	0.3	0.3	0.4	100.0	0.7	0.6	0.4	0.6	0.2
	post-ULTC	kV	125.8	128.1	125.4	0.0	127.1	124.4	124.6	123.9	128.3
		%dV	0.3	0.3	0.4	100.0	0.7	0.6	0.4	0.6	0.2
Loss of L15W	pre-ULTC	kV	125.8	128.0	125.4	126.5	0.0	124.5	124.6	123.9	128.2
		%dV	0.3	0.4	0.4	0.8	100.0	0.6	0.4	0.6	0.3
	post-ULTC	kV	125.8	128.0	125.4	126.5	0.0	124.5	124.6	123.9	128.2
		%dV	0.3	0.4	0.4	0.8	100.0	0.6	0.4	0.6	0.3
Loss of New Cct	pre-ULTC	kV	125.6	127.6	124.7	126.4	127.0	0.0	123.0	0.0	127.8
		%dV	0.5	0.7	1.0	0.9	0.8	100.0	1.7	100.0	0.6
	post-ULTC	kV	125.8	127.7	124.9	126.5	127.1	0.0	123.2	0.0	127.9
		%dV	0.3	0.6	0.8	0.8	0.7	100.0	1.5	100.0	0.5
Loss of Leaside E bus	pre-ULTC	kV	125.4	125.5	125.2	123.8	124.8	124.3	123.9	123.7	124.7
		%dV	0.6	2.3	0.6	2.9	2.5	0.7	1.0	0.7	3.0
	post-ULTC	kV	125.4	125.5	125.2	123.8	124.8	124.4	123.9	123.7	124.7
		%dV	0.6	2.3	0.6	2.9	2.5	0.6	1.0	0.7	3.0
Loss of Leaside P Bus (T15 + SC12)	pre-ULTC	kV	122.1	126.7	121.7	125.7	126.3	121.1	120.9	120.4	126.8
		%dV	3.2	1.4	3.3	1.4	1.3	3.3	3.4	3.4	1.4
	post-ULTC	kV	122.1	126.8	121.8	125.8	126.3	121.1	121.0	120.5	126.9
		%dV	3.2	1.3	3.3	1.3	1.3	3.3	3.3	3.3	1.3
Loss of Leaside E Bus (T12 + SC13)	pre-ULTC	kV	125.1	126.1	124.7	125.2	125.7	124.0	123.9	123.3	126.3
		%dV	0.9	1.9	1.0	1.8	1.8	1.0	1.0	1.0	1.8
	post-ULTC	kV	125.1	126.1	124.7	125.2	125.7	124.0	123.9	123.3	126.3
		%dV	0.9	1.9	1.0	1.8	1.8	1.0	1.0	1.0	1.8
Loss of New Cct + L4C	pre-ULTC	kV	124.8	127.2	123.9	126.0	126.6	0.0	122.1	0.0	127.4
		%dV	1.1	1.0	1.6	1.2	1.1	100.0	2.4	100.0	0.9
	post-ULTC	kV	125.0	127.3	124.2	126.1	126.8	0.0	122.5	0.0	127.5
		%dV	1.0	0.9	1.4	1.1	0.9	100.0	2.1	100.0	0.9

– End of Report –

Hydro One Networks Inc.  
483 Bay Street  
Toronto, Ontario  
M5G 2P5

**CUSTOMER IMPACT ASSESSMENT**  
**MIDTOWN TRANSMISSION SYSTEM**  
**REINFORCEMENT PROJECT**

Revision: Final  
Date: 10 March 2010

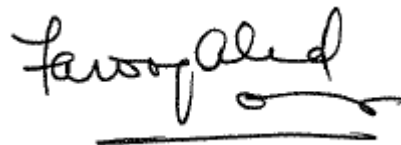
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## Disclaimer

This Customer Impact Assessment was prepared based on information available about the connection of the proposed Midtown Electricity Infrastructure Renewal Project. It is intended to highlight significant impacts, if any, to affected transmission customers early in the project development process and thus allow an opportunity for these parties to bring forward any concerns that they may have. Subsequent changes to the required modifications or the implementation plan may affect the impacts of the proposed connection identified in Customer Impact Assessment. The results of this Customer Impact Assessment are also subject to change to accommodate the requirements of the IESO and other regulatory or municipal authority requirements.

Hydro One shall not be liable to any third party which uses the results of the Customer Impact Assessment under any circumstances whatsoever for any indirect or consequential damages, loss of profit or revenues, business interruption losses, loss of contract or loss of goodwill, special damages, punitive or exemplary damages, whether any of the said liability, loss or damages arises in contract, tort or otherwise.

## CUSTOMER IMPACT ASSESSMENT MIDTOWN TRANSMISSION REINFORCEMENT PROJECT

### 1.0 INTRODUCTION:

Hydro One Networks (HON) is proposing to reinforce the transmission system in midtown Toronto. The planned work includes replacing an aging underground cable section of 115kV circuit L14W between Bayview Junction and Birch Junction and adding a new 115kV circuit between Leaside TS and Bridgman TS. Overhead sections of L14W and L15W from Leaside TS to Bayview Jct will be rebuilt. This work is required to maintain reliability of service and to address long term load growth. The expected in-service date for the project is April 2013.

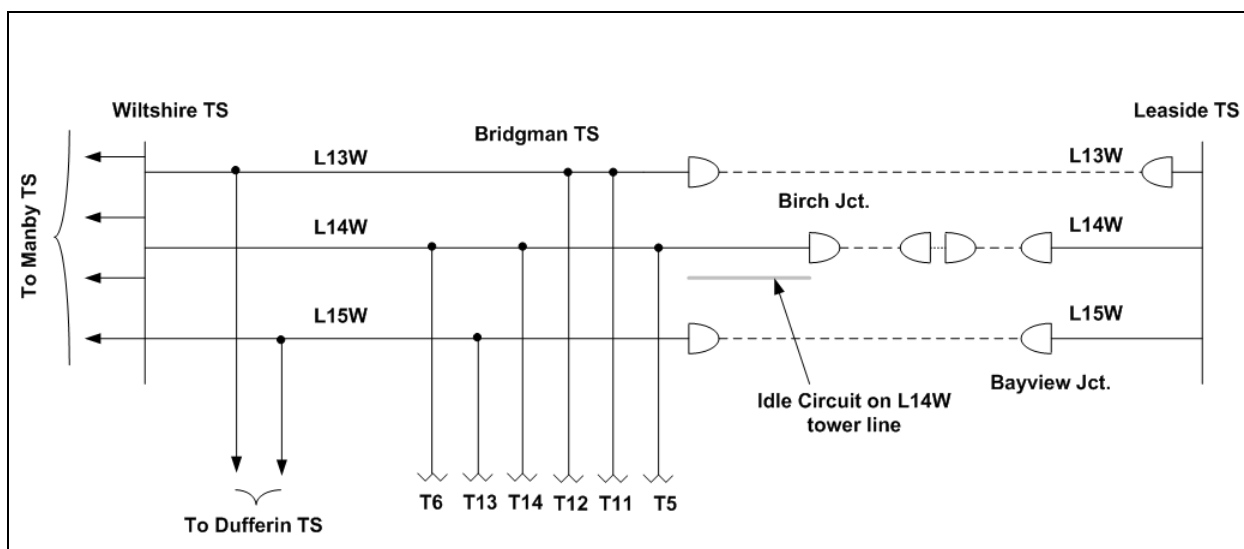


Figure 1. Existing Leaside TS x Bridgman TS x Wiltshire TS 115kV Circuits

This report presents the results of a Customer Impact Assessment completed by Hydro One to determine the impact of the new system configuration of Leaside TS x Bridgman TS on existing customers connected to the transmission system.

*This study does not evaluate the overall impact of the new configuration of the Midtown Electricity Infrastructure Renewal on the bulk system. The impact of the new configuration on the bulk system is the subject of the System Impact Assessment issued by the Independent Electricity System Operator (IESO).*

## **2.0     PROPOSED CONNECTION**

The proposed connection will consist of the following changes:

- 1) L14W and L15W circuits will be rebuilt into a three circuit 115kV line from Leaside TS to Bayview Jct. Each of the three circuits will have an ampacity rating of 1200A at 35°C ambient temperature and a length of about 1.7km.
- 2) Two underground 115kV cables with an ampacity of 1200A will be built between Bayview Jct. x Birch Jct. Each cable circuit will have a length of about 2.2 km. One cable will replace the existing L14W circuit the other cable will be designated as the new circuit.
- 3) The existing double circuit 115kV line between Birch Jct. and Bridgman TS will be re-conducted. One circuit on the line carries the L14W circuit. The other circuit which is presently idle will be used for the new circuit. Each of the circuits will have an ampacity rating of 1200A at 35°C ambient temperature.
- 4) A new 3000 A breaker will be added at Leaside TS to terminate the new circuit.
- 5) A new disconnect switch to be installed at Bridgman Jct. on Leaside side.
- 6) Bridgman T11 and T12 will be disconnected from L13W and connected to L15W, on Leaside side.
- 7) Bridgman T13 will be disconnected from L15W and connected to the new circuit. The section from Bridgman TS x Wiltshire TS of L15W will be connected to the new circuit while L15W will disconnect at Bridgman Junction. Dufferin TS will be supplied from L13W and the new circuit.

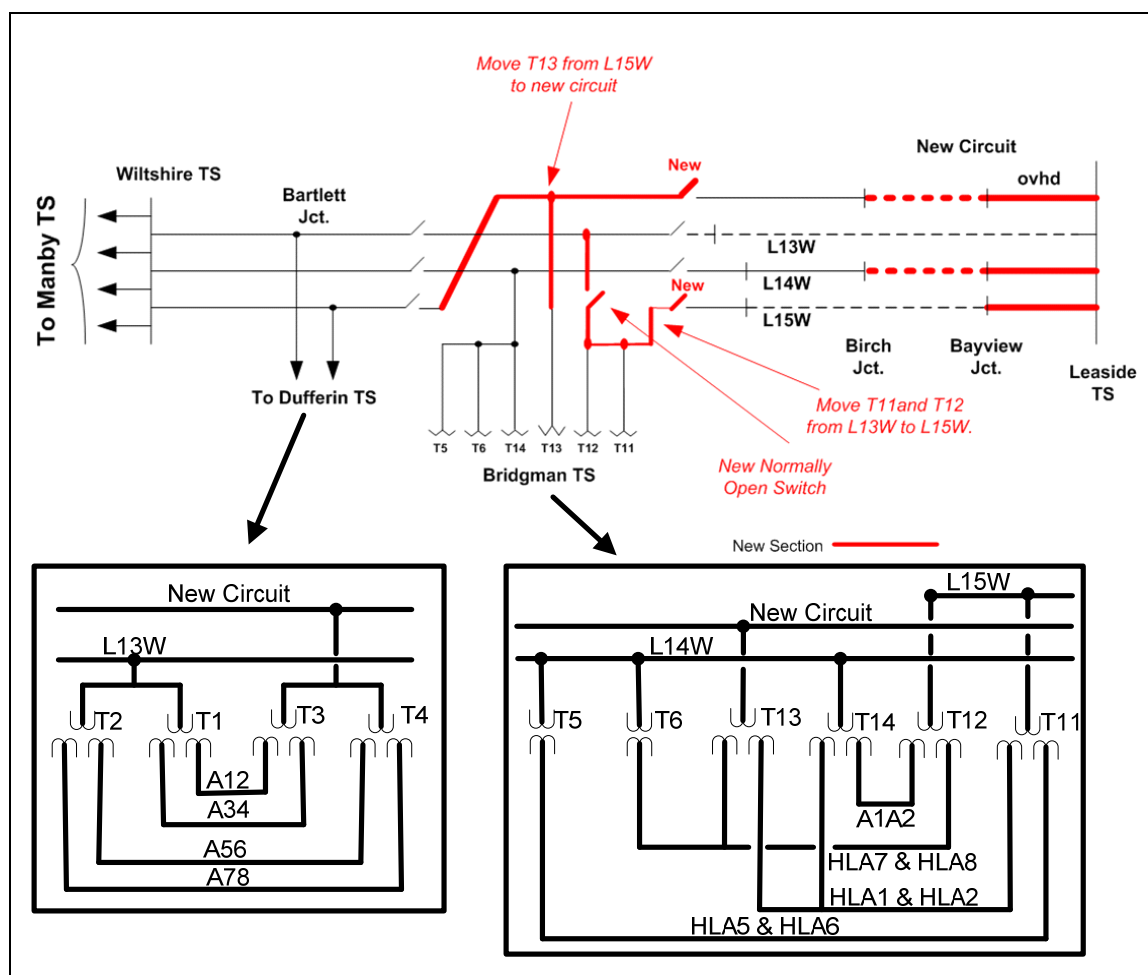


Figure 2. Proposed connection of Leaside TS x Bridgman TS circuits.

### 3.0 CUSTOMER IMPACT ASSESSMENT (CIA)

The Customer Impact Assessment (CIA) Study is a requirement of the Ontario Energy Board (OEB) to assess the potential impacts of the proposed Midtown Reinforcement Project on the existing transmission connected customer(s). The primary focus of this study is on customers supplied by stations located in the Wiltshire-Leaside area. Table 1 summarizes the customers connected at each station. The projected load growth up to 2018 is shown in Table 2.

Table 1 - Transmission Customers connected to the Leaside Area Circuits –L13W, L14W and L15W

Station	Customer
Bridgman TS	THESL (Toronto Hydro Electric System Limited)
Dufferin TS	THESL

Table 2 - Load Forecast (MW)

	Actual Load (MW)	Forecasted Load (MW)								
Station	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Bridgman TS	163	164	165	167	168	170	171	173	174	176
Dufferin TS	123	127	128	129	130	131	132	134	135	136
Total	286	290	293	296	298	301	304	306	309	312

The following potential impacts at the connection points for the existing customers were conducted for this CIA:

- Supply Capacity
- Supply Reliability
- Voltage Performance
- Short-Circuit Analysis
- Preliminary Outage Impact Assessment



## **4.0 RESULTS OF CIA**

The proposed reinforcement upgrades will increase the availability of power transfer to Dufferin TS and Bridgman TS. The addition of the new circuit will provide line loading relief on L13W, L14W, and L15W. It will provide a solution to the L15W overload during a contingency of L13W and vice versa. It is not expected to adversely impact the transmission customers in the area. The findings of this Customer Impact Assessment are summarized below:

### **4.1 SUPPLY CAPACITY/RELIABILITY**

Load flow studies were carried out for the incorporation of the proposed system reinforcement. The addition of the new circuit helps reduce the loading on the Wiltshire TS to Leaside TS lines and thereby improves customer reliability under contingency conditions. The new circuit provides relief to three existing circuits by off loading Dufferin TS load from L15W and supplying Bridgman T13 loads. Please also refer to the IESO's system impact assessment on this project - IESO Report - CAA 2006 -238<sup>1</sup>.

### **4.2 VOLTAGE PERFORMANCE**

The voltage performance was assessed for the conditions listed in Appendix A. Voltage performance was improved with the proposed system reinforcement. Following a contingency and before the ULTC action, all the HV and LV buses were within the 10% voltage change allowed by the *Transmission System Code* (TSC). Following the ULTC response, the HV buses were within the 10 % voltage change allowed by the TSC, and all the LV buses were within the 5 % voltage change allowed.

### **4.3 SHORT CIRCUIT STUDY**

Short-circuit studies were carried out to assess the fault level with the proposed system configuration. The system conditions assumed are summarized in Appendix B.

Table B1 compares fault levels at station with the equipment rating for the existing configuration and the new configuration. All fault levels are within equipment capability and within the limits specified in Appendix 2 of the TSC. The applicable TSC limits for this project are summarized below for reference:

Nominal Voltage (kV)	Max. 3-Phase Fault (kA)	Max. SLG Fault (kA)
115	50	50
44	20	19
27.6	17	12 (4 wire)/ 0.45 (3 wire)
13.8	21	10

<sup>1</sup> CAA 2006-238 please see [http://www.ieso.ca/imoweb/pubs/caa/caa\\_SIAReport\\_2006-238.pdf](http://www.ieso.ca/imoweb/pubs/caa/caa_SIAReport_2006-238.pdf)

#### **4.4 Preliminary Outage Impact assessment**

It is planned to supply both Bridgman Dufferin TS and Bridgman TS from the Wiltshire TS side during the time the L14W and L15W circuits are out of service for constructions. This will allow the midtown transmission reinforcement project to be completed with minimal impact to the existing customers.

#### **5.0 CONCLUSIONS AND RECOMMENDATIONS**

This CIA study has reviewed the impact of the Midtown Transmission Reinforcement Project on the existing transmission customers connected to the L13W/L14W/L15W circuits. The new configuration helps reduce the loading on the transmission circuits, and has no negative effect on the voltage in the area.

Fault levels at low voltage buses are in accordance with the Transmission System Code Requirement. Fault levels at all buses are within equipment ratings and TSC limits.

All customers are required to check to ensure that the equipment and grounding system at their stations meet the expected increase in fault level.

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## **A1     APPENDIX**

### **VOLTAGE PERFORMANCE**

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Table A1. Bus voltage changes of New Configuration.

Station	Bus	Nom. Voltage (kV)	Contingency	Pre-CNT (kV)	Before ULTC (kV)	%	After ULTC (kV)	%
Dufferin	A1A2	13.8	L13W	13.8	13.2	-3.5%	13.7	-0.3%
Dufferin	A3A4	13.8	L13W	13.8	13.4	-3.1%	13.6	-1.2%
Dufferin	A5A6	13.8	L13W	13.7	12.9	-5.9%	13.7	-0.1%
Dufferin	A7A8	13.8	L13W	13.8	13.3	-3.7%	13.7	-0.3%
Bridgman	A1A2	13.8	L14W	13.9	13.2	-3.4%	13.5	-1.7%
Bridgman	HLA7HLA8	13.8	L14W	13.9	13.0	-4.8%	13.4	-2.2%
Bridgman	HLA1HLA2	13.8	L15W	13.7	13.0	-4.2%	13.3	-2.2%
Bridgman	HLA7HLA8	13.8	L15W	13.9	13.3	-2.8%	13.4	-1.6%
Dufferin	A1A2	13.8	New Circuit	13.8	13.3	-2.8%	13.6	-0.8%
Dufferin	A3A4	13.8	New Circuit	13.8	13.5	-2.3%	13.8	-0.2%
Dufferin	A5A6	13.8	New Circuit	13.7	13.0	-5.4%	13.8	0.6%
Dufferin	A7A8	13.8	New Circuit	13.8	13.3	-3.3%	13.8	0.2%

Note:

- Only cases where the voltage change is more than 2% are shown prior to movement of the tap changer.
- Dufferin L15W Bus becomes the New Circuit Bus in the proposed system

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## **APPENDIX B**

### **Short Circuit Study**



*CIA – Midtown Transmission System Reinforcement*

*10 March 2010*

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The short circuit levels at the customers interface point as well as the major buses in the GTA are shown in Table B1.

The following base conditions were assumed for the combined short circuit analysis:

**Generation:**

8 Bruce units  
4 Darlington units  
6 Pickering units  
8 Nanticoke units  
4 Lambton units  
4 Lennox units  
All hydraulic generation  
GTAA (44 kV buses at Bramalea TS and Woodbridge TS)  
TransAlta Douglas (44 kV buses at Bramalea TS)  
TransAlta Sarnia (N6S/N7S)  
West Windsor Power (J2N)  
Brighton Beach (J20B/J1B)  
Imperial Oil (N6S/N7S)  
Greenfield Energy Centre (Lambton SS)  
St. Clair Energy Centre (L25N & L27N)  
Erie Shores WGS (W8T)  
Kingsbridge WGS (Goderich TS)  
Amaranth WGS – Amaranth I (B4V) & Amaranth II (B5V)  
Ripley WGS (B22D/B23D)  
Prince I & II WGS (K24)  
Underwood (B4V/B5V)  
Kruger Port Alma (C23Z/C24Z)

**B. New generation facilities**

Wolfe Island (X4H & X2H)  
Kingsbridge II (159 MW)  
Sithe Goreway GS (V41H(V72RS)/V42H(V73RS))  
Thorold GS (Q10P)

East Windsor Cogen (E8F & E9F) + existing Ford generation  
Beck I G7 conversion to 60 Hz  
Greenfield South GS (R24C)  
Halton Hills GS (T38B/T39B)  
Portlands GS (Hearn SS)  
Bruce standby generators  
Kruger Energy Chatham Wind Project  
Greenwich Wind farm  
Talbot Wind farm  
Raleigh Wind Energy Centre  
Byran Wind Project  
Gosfield Wind Project  
York Energy Centre

### **C. New Transmission facilities**

500kV Bruce x Milton double-circuit line  
Bruce x Orangeville 230 kV circuits up-rated  
Hurontario SS in service with R19T+V41H(V72RS) open from R21T+V42H(V73RS) (230 kV circuits V41H(V72RS) and V42H (V73RS) extended and connected from Cardiff TS to Hurontario SS)  
Allanburg x Middleport 230 kV circuits (Q35M and Q26M) installed  
Claireville TS 230 kV re-configured as per SIA CAA ID 2006-220 and operated *open*  
V75R terminated at Richview for a total of six 230 kV circuits between Claireville TS and Richview TS  
Two 245 Mvar (@ 230 kV) shunt capacitor banks installed at Orangeville TS and Detweiler TS, one per station  
Four 250 Mvar (@ 250 kV) shunt capacitor banks installed at Middleport TS  
Two 250 Mvar (@ 250 kV) shunt capacitor banks installed at Nanticoke TS  
One 250 Mvar (@ 250 kV) shunt capacitor banks installed at Buchanan TS  
LV shunt capacitor banks installed at Meadowvale and Halton TS  
Essa-Stayner 115 kV circuit replaced by 2 x 230 kV circuits; Stayner TS converted to 230 kV; 230/115 kV auto installed to supply Meaford TS  
New 230/115 kV autotransformer at Cambridge-Preston TS  
1250 MW HVDC line ON-HQ in service  
Tilbury West DS second connection point for DESN arrangement using K2Z and K6Z  
Windsor area transmission reinforcement:

- 230 kV transmission line from Sandwich JCT (C21J/C22J) to Lauzon TS

- New 230/27.6 DESN, Leamington TS, that will connect C21J and C22J and supply part of the existing Kingsville TS load
- Replace Keith 230/115 kV T11 and T12 transformers
- 115 kV circuits J3E and J4E upgrades

#### **D. System configuration**

Lambton TS 230 kV operated *open*

Richview TS 230 kV operated *open*

Claireville TS 230 kV operated *open*

Leaside TS 230 kV operated *open*

Leaside TS 115 kV operated *open*

Middleport TS 230 kV bus operated *open*

Hearn SS 115 kV bus operated *open* – as required in the Portlands SIA

Cooksville TS 230 kV bus operated *closed*

Cherrywood TS north & south 230kV buses operated *open*

All capacitors in service

All tie-lines in service and phase shifters on neutral taps

Maximum voltages on the buses

**Short circuit levels.**

Table B1. Short Circuit Levels Availability compared with Breaker Interrupting Ratings after the transmission reinforcement (New Configuration).

Bus Name	kV	Fault Current kA				Breaker Ratings	
		Existing Configuration		New Configuration			
		3 ph sym kA	l-g sym kA	3 ph sym kA	l-g sym kA	Transformer Breakers	Feeder Breakers
LEASIDE BY	27.6	13.6	12.4	13.6	12.4	20.9	20.9
LEASIDE AQ	13.8	18.4	11.3	18.4	11.3	25	19
BRIDGMAN A1A2	13.8	16.9	6.1	16.9	6.1	25.5	20.9*
BRIDGMAN HLA1HLA2	13.8	16.7	0.0	16.8	0.0	25.5	20.9*
BRIDGMAN HLA5HLA6	13.8	19	0.0	19	0.0	25.5	20.9*
BRIDGMAN HLA7HLA8	13.8	18.5	0.0	18.5	0.0	25.5	20.9*
DUFFERIN A12	13.8	17.8	10.1	17.8	10.1	25	20.9*
DUFFERIN A34	13.8	17.7	10.0	17.7	10.0	18.1	20.9*
DUFFERIN A56	13.8	16.3	10.1	16.3	10.1	25	20.9*
DUFFERIN A78	13.8	16.3	10.1	16.3	10.1	25	20.9*

\* THESL to confirm.

## **STAKEHOLDER AND COMMUNITY CONSULTATION**

### **1.0 INTRODUCTION**

Hydro One identified and consulted with the public, stakeholders and First Nations and Métis who may have an interest in the proposed facilities. This schedule describes Hydro One's consultation program, input received and the results to date. Hydro One intends to continue consultation with stakeholders and area residents along the preferred route throughout project implementation to ensure their concerns regarding the proposed transmission facilities are addressed. Toronto Hydro Electric System ("Toronto Hydro") actively supported Hydro One throughout this process participating in meetings and consultation events. Hydro One has also committed to keep City of Toronto councillors, school board officials, and local residents' associations informed, as well as staff of relevant provincial government ministries and agencies.

### **2.0 OBJECTIVES AND APPROACH TO CONSULTATION**

The intent of the consultation program is to inform area residents and businesses, government agencies and ministries, First Nations and Métis, stakeholders, and members of the general public about the project, identify any issues, develop project plans that address those issues where appropriate, and ensure that there are opportunities for input at each stage in the process.

Hydro One has used a variety of methods to ensure two-way communication and deliver its consultation program with stakeholders, the public and First Nation and Métis communities about the Midtown Project. This has included public information centres, face-to-face meetings and presentations, newspaper advertisements, newsletters, project

1 website, project DVD, telephone hotline, and email. The details of these activities and  
2 outcomes are documented in the following sections.

3  
4 A wide range of project stakeholders were identified as potentially having an interest in  
5 the Midtown Project. These include the City of Toronto elected officials, departments and  
6 agencies, other government agencies, residents' associations, environmental and other  
7 local interest groups, First Nation and Métis communities, and members of the general  
8 public.

### 9 10 **3.0 CONTACT WITH STAKEHOLDERS**

#### 11 12 **3.1 Meetings with City of Toronto Councillors**

13  
14 The initial step in the consultation process involved meetings held jointly by Hydro One  
15 and Toronto Hydro with City of Toronto elected officials and staff. These included  
16 representatives from the Mayor's office, and the councillors from the wards within the  
17 study area. At these meetings, Hydro One and Toronto Hydro provided a briefing about  
18 the project including the need to renew aging infrastructure and the need for additional  
19 supply capacity along the corridor to address steady load growth in Midtown and areas to  
20 the west. The requirements for Ontario Energy Board Section 92 and Class  
21 Environmental Assessment approvals process for this project, and proposed project  
22 timelines were also discussed. Hydro One also obtained contact information for relevant  
23 residents' associations and other interest groups that should be included in the  
24 consultation process. A second series of meetings were held with City of Toronto  
25 officials following the selection of the preferred route.

26  
27 City officials and staff agreed that there was a need for infrastructure renewal in the area.  
28 They noted that residents might be concerned about the removal of trees, construction

1 disturbances affecting local roads and neighbourhoods, any potential health concerns  
2 associated with electric and magnetic fields (EMFs). Hydro One described its mitigation  
3 approach to address these issues.

4  
5 The following is a summary of meetings and presentations held with City of Toronto  
6 councillors and staff, resident associations and other stakeholders:

- 7
- 8 • Representative of Mayor Miller and Councillor Kyle Rae, Ward 27 Toronto Centre –  
9 Rosedale ( November 6, 2008)
  - 10
  - 11 • Councillor John Parker, Ward 26 Don Valley West (November 27, 2008)
  - 12
  - 13 • Councillor Case Ootes, Ward 29 Toronto – Danforth (December 4, 2008)
  - 14
  - 15 • Councillor Michael Walker, Ward 22 St. Paul's (October 21, 2009)
  - 16

### 17 **3.2 First Nations & Métis Consultation**

18  
19 The existing transmission corridor for this project is located completely within the city of  
20 Toronto. On August 29, 2008 Hydro One sent letters to the Department of Indian and  
21 Northern Affairs Canada (INAC) and the Ministry of Aboriginal Affairs (MAA) to  
22 inquire about any potential claims that occur within the general vicinity of the Project  
23 study area.

24  
25 Hydro One received a letter of response on September 19, 2008 from the Specific Claims  
26 Branch at INAC indentifying the Mississaugas of the New Credit First Nation and Six  
27 Nations of the Grand River as First Nations communities located within the vicinity of  
28 the Project. Furthermore, Hydro One decided to include the Mississaugas of Scugog First  
29 Nation as their community is located within the geographic vicinity of the project study  
30 area.



1 Hydro One also received letters of response from the Litigation Management and  
2 Resolution Branch of INAC dated September 10, 2008 advising that their “inventory did  
3 not include any active litigation in the vicinity of the property”, and the Ministry of  
4 Aboriginal Affairs dated October 20, 2008 stating that “the project does not appear to be  
5 located in an area where First Nation(s) may have existing or asserted rights that could be  
6 impacted by your project”. No Métis communities were identified by INAC or the MAA  
7 in their letters of response to Hydro One.

8  
9 On February 9, 2009 Hydro One notified in writing the above-mentioned First Nations  
10 communities about our plans to replace the aging cable between Leaside TS and Birch  
11 Jct., while also increasing capacity by adding an additional circuit. The letters also  
12 extended an invitation to attend the first set of Public Information Centres (PIC) that were  
13 held in late-February 2009. Follow-up telephone calls were made in mid-August 2009.  
14 Voice messages were left with the Mississaugas of the New Credit and Mississaugas of  
15 Scugog. The Six Nations of the Grand River Territory requested that we keep them on  
16 the distribution list for further project information, and indicated that they will notify  
17 Hydro One if questions or concerns arise. On November 20, 2009, Hydro One sent letters  
18 to invite the communities to attend the second set of PICs that were held in early-  
19 December 2009.

20  
21 Hydro One will continue consultation with these First Nations relating to the Midtown  
22 Project. To date, no issues or concerns have been raised by the First Nations  
23 communities. Hydro One will work to resolve any issues or concerns in the event that  
24 some do arise.

1     **3.3     Consultation with Government Agencies and Ministries**

2  
3     Throughout the planning process, Hydro One informed and sought input on the proposed  
4     undertaking from a broad range of government agencies, including:

- 5  
6     • Ministry of the Environment  
7     • Ministry of Transportation  
8     • Ministry of Culture  
9     • Ministry of Natural Resources  
10    • Toronto and Regional Conservation Authority  
11    • City of Toronto Parks and Forestry and Recreation  
12    • City of Toronto Transportation Planning  
13    • City of Toronto Transportation Services  
14    • City of Toronto Technical Services  
15    • City of Toronto Emergency Services  
16    • City of Toronto Municipal Licensing and Standards  
17    • City of Toronto Economic Development  
18    • Toronto Board of Health  
19    • Toronto District School Board  
20    • Toronto Catholic District School Board

21  
22    **3.4     Meetings with Residents' Associations**

23  
24    Following initial discussions with City of Toronto officials and staff in November and  
25    December 2008, subsequent briefings were provided by Hydro One and Toronto Hydro  
26    to the board members of a number of the affected residents' associations. These  
27    representatives agreed there was a need for the project, most supported rebuilding the  
28    infrastructure on the existing corridor to minimize disruption, and indicated that their

1 members would likely agree that there is a need for transmission refurbishment. Concerns  
2 included alternative route options, the need for taller transmission towers, and road and  
3 neighbourhood disruptions associated with construction and health effects associated  
4 with electric and magnetic fields (EMFs). The representatives indicated that they would  
5 communicate project details to the members of their associations. Hydro One advised  
6 that it would continue to keep them informed and would consult with them throughout  
7 the duration of the project.

8  
9 Summary of meetings with residents' associations:

- 10
- 11 • Bennington Heights Residents' Association (December 18, 2008)
  - 12
  - 13 • Moore Park Ratepayers' Association and North Rosedale Ratepayers' Association
  - 14 (December 19, 2008)
  - 15
  - 16 • Leaside Property Owners Association Executive Committee (February 4, 2009)
  - 17
  - 18 • Summerhill Residents' Association and Mark Wilson, Executive Assistant to
  - 19 Councillor Kyle Rae, Ward 27, Toronto-Centre Rosedale (February 26, 2009)
  - 20
  - 21 • Governor's Bridge Residents' Association (October 5, 2009)
  - 22

23 On November 2, 2009, Hydro One and Toronto Hydro held a Residents' Association  
24 Presentation to present the preferred route option. This meeting was held at Hydro One's  
25 offices in Toronto with Toronto Hydro staff. Representatives of the residents'  
26 association were provided information about the preferred route option, alternative  
27 routes, tunnelling technology, shaft locations, construction activities and mitigation,  
28 landscape approach and predicted EMF levels.

29  
30 A number of residents' groups were represented at the meeting and these included:  
31 Governors' Bridge Residents', Shaftsbury Community Association, Bennington Heights  
32 School Council, Bennington Heights Residents' Association, Moore Park Ratepayers'

1 Association, Leaside Property Owners' Association, North Rosedale Ratepayers'  
2 Association and the Rathnally Area Residents' Association. Overall, the representatives  
3 were in support of the route option and tunnel option in that it would reduce impacts on  
4 local neighbourhoods, and a preference for the steel poles was expressed for the overhead  
5 line section. Other discussion points included EMF and landscaping post construction.

6  
7 **3.5 Other Stakeholder Groups**  
8

9 Hydro One staff met with representatives of both the Toronto District School Board and  
10 the Toronto Catholic District School Board as there are a number of elementary schools  
11 such as Bennington Heights Elementary School, Whitney Junior Public School, and Our  
12 Lady of Perpetual Help, located in proximity of the existing transmission corridor.  
13 School board officials were provided background information about the need for the  
14 project, as well as a list of schools that are in the vicinity of the existing transmission  
15 corridor. They were also provided information on EMFs, including a Health Canada fact  
16 sheet stating its position. Subsequently, school board officials provided materials to the  
17 principals of the schools near the existing transmission corridor and the principals were  
18 provided a Hydro One contact name and phone number. Hydro One staff will continue to  
19 update school board officials on the project as we move through approvals and  
20 construction.

21  
22 Hydro One met with representatives from the Toronto Board of Health to provide  
23 briefing and to understand the Medical Officer of Health's (MOH) and his staff's issues  
24 and answer questions. The MOH indicated that they would be willing to work with  
25 Hydro One and Toronto Hydro, if needed, to answer public inquiries on EMF. The MOH  
26 will make its own independent assessment of the EMF modeling information for the  
27 refurbished facilities and will comment on Hydro One's projected EMF modeling details.  
28 Hydro One indicated that EMF levels were predicted to be lower along the existing

1 corridor following the addition of a new 115 kV circuit between Leaside TS and Bayview  
2 Jct. and with the tunnel construction, EMF would be negligible at street level. Hydro One  
3 committed to providing modeling details and specific modeling results to MOH when  
4 final results were available.

#### 6 **4.0 PUBLIC INFORMATION CENTRES**

8 Hydro One used various methods to notify and engage the local community and  
9 stakeholders about the project and the associated public information centres (PIC).  
10 Newspaper ads were used to advertise the first round of PICs and were placed in the *City*  
11 *Centre Mirror*, *East York Mirror* and *Annex Guardian* on February 6 and 13, 2009 and  
12 the *Leaside - Rosedale Town Crier* on February 5, 2009. The second round of PICs  
13 focused on the preferred route, construction method and the alternate route options.  
14 Newspaper ads to advertise the second round of PICs were placed in the *East*  
15 *York/Riverdale/Beach Mirror*, *Bloor West Villager/Annex Guardian* and the *Toronto City*  
16 *Centre Mirror* on November 20 and November 27, 2009. Copies of the Notices are  
17 available in Appendix A.

19 The newspaper ads for both rounds of PICs provided details about the project, study area,  
20 maps, the dates and locations for the PICs, a project website, and contact information for  
21 both Hydro One and Toronto Hydro project staff.

23 In addition, invitations to the PICs were mailed to residents living 100 metres on either  
24 side to the existing corridor for the first PIC and 120 metres on either side of the existing  
25 corridor for the second PIC.

27 Copies of the invitation and newspaper ad for both PICs were provided to public officials  
28 including: City of Toronto officials, residents' associations, members of provincial

parliament (MPPs), Toronto District Public and Catholic School Board officials, the Toronto Board of Health, government agencies and ministries, and other groups and individuals on our project mailing list (approximately 2000).

To facilitate public access to project information and feedback, the Midtown Project website was created at [www.HydroOne.com](http://www.HydroOne.com) with a direct link from the Toronto Hydro website. The website provides an overview of the project, the approvals process, newsletters, notices, the ability to view the project DVD, and the maps and panels presented at the PICs. The website will continue to be kept up to date as new information becomes available, and through the approvals and construction process.

#### **4.1 Public Information Centre Schedule**

	Date	Time	Location	Attendance
Public Information Centre #1	February 17, 2009	5 pm to 9 pm	Leaside Memorial Gardens	29
	February 18, 2009	6 pm to 9:30 pm	Rosedale Heights School of the Arts	4
	February 24, 2009	5 pm to 9 pm	Timothy Eaton Memorial Church	13
Public Information Centre #2	December 1, 2009	6 pm to 9:30 pm	Bennington Heights Elementary School	21
	December 2, 2009	6 pm to 9:30 pm	Whitney Junior Public School	15

The PICs provided interested stakeholders with the opportunity to review the project plans and maps, provide input to Hydro One and discuss their concerns with the project team. A DVD explaining the project need and approvals process, construction challenges, and post-construction mitigation (e.g., landscaping) was played throughout the sessions, as well as posted on the project website, and copies available for home

1 viewing. Aerial photographs of the study area allowed property owners to identify their  
2 properties relative to the existing transmission facilities. Other information on EMFs and  
3 Toronto Hydro energy conservation materials were also available.

4  
5 Hydro One also developed a project newsletter which was distributed at the PICs. The  
6 first issue of the Midtown Project newsletter explained the need for the project, the  
7 approvals process, and respective roles of Hydro One and Toronto Hydro. The second  
8 issue of this newsletter described the preferred route, alternatives, evaluation process,  
9 tunnelling technology, potential construction impacts and mitigation. Both issues of the  
10 newsletter are available on the Midtown Project website at  
11 [www.HydroOne.com/projects/Midtown](http://www.HydroOne.com/projects/Midtown) and are filed as Appendix B to the exhibit.

12  
13 Hydro One and Toronto Hydro staff at the PICs represented a variety of disciplines and  
14 technical expertise enabling them to address a broad range of issues including,  
15 construction methods, impacts, and mitigation, environmental issues, real estate matters,  
16 regulatory approvals, public consultation and communications.

#### 17 18 **4.2 Summary of Public Information Centre #1**

19  
20 In total, 46 individuals attended the first set of PICs: 29 at Leaside Memorial Gardens,  
21 four at Rosedale Heights School of the Arts, and 13 at Timothy Eaton Memorial Church.  
22 Attendees included staff from the City of Toronto, Councillor John Parker, and  
23 representatives from Toronto Public Health, the Ontario Energy Board, and Moore Park  
24 and Bennington Heights Residents' Associations. Seventeen written comment forms  
25 were submitted (see Appendix C). In general, most attendees agreed that there was a  
26 need for upgraded transmission facilities along the CP railway corridor and that the most  
27 sensible solution would be to replace the aging cable and add the additional circuit at the

1 same time. The main issues focused on tree removal, other environmental effects, road  
2 disruptions and potential concerns with EMFs.

3  
4 **4.3 Summary of Public Information Centre #2**

5  
6 In total, 36 people attended the second set of PICs: 21 people at Bennington Heights  
7 Elementary School, and 15 people at Whitney Junior Public School. The majority of  
8 attendees were residents living in the vicinity of proposed facilities (e.g., junction sites  
9 and shaft locations), in addition to representatives from Councillor John Parker's office,  
10 Bennington Heights and Summerhill Residents' Associations, and the Ontario Energy  
11 Board.

12  
13 Overall, residents were in favour of the proposed route using the tunnel technology and  
14 the proposed shaft locations. Residents living near shaft locations were generally more  
15 concerned about noise, vibrations, visual impacts and tree loss. Some residents expressed  
16 a preference for steel poles instead of lattice towers. Other concerns identified included  
17 construction impacts and traffic disruption, and a few indicated potential health concerns  
18 associated with EMFs. Where concerns were identified Hydro One presented mitigation  
19 options that would address many of these concerns, and residents were overall satisfied  
20 with the information. Fourteen written comment forms were submitted by the  
21 participants at the PICs.

22  
23 Issues identified at stakeholder meetings and the PICs are discussed in Section 5.0.



## 5.0 SUMMARY OF KEY ISSUES AND HYDRO ONE RESPONSES

Below is a summary table of the main issues expressed during the consultation process and the Company's response or proposed method to address or mitigate the issues.

Issue	Description of Issue	Hydro One Response
Route Selection	<p>Preferences for use of existing rights of way; specifically the CPR corridor route, to minimize disturbance to city streets and residents.</p> <p>The Summerhill Residents' Association were concerned about trenching along the existing route which would affect a tract of mature trees and suggested an alternative route south of the CPR tracks along Shaftsbury Ave.</p>	<p>Alternative routes were identified as part of the EA process and evaluated based on effects on the natural and socio-economic environment, costs and meeting the electrical system requirements. This evaluation included a comparison of alternative technology options to select the preferred technology (overhead, trench and/or tunnel) as part of the final route.</p> <p>The proposed deep rock tunnel would run along Shaftsbury Ave. within the city road allowance approximately 60 m – 75 m underground in bedrock. The proposed tunnel would not affect or require removal of mature trees along Shaftsbury Ave. There may be a requirement to drill a borehole to determine rock elevation prior to construction. If a borehole is required on Shaftsbury Ave. the disruption would be less than one week.</p>
Reliability and Capacity for Meeting Load Growth	Concerns relating to old infrastructure and its ability to meet load growth and provide sufficient reliability.	Hydro One, together with Toronto Hydro, has identified a need to refurbish the existing infrastructure and add capacity along the midtown power corridor. This project will replace the aging underground cable between Leaside TS and Birch Jct. An additional circuit to increase capacity will be installed at the same time to minimize future electricity supply disruption to the community.
Tower structure	Type for towers from Leaside TS to Birch Jct.	The proposed towers would be lattice towers, steel poles or a combination. All replacement towers will be approximately 40 m in height.

Issue	Description of Issue	Hydro One Response
Re-construct Existing Overhead Lines into an Underground Cable	<p>Suggestion to replace the overhead line between Leaside TS to Bayview Jct with an underground line.</p> <p>Can't Hydro One bury the line for its entire length?</p>	<p>This option was evaluated as part of the route selection process. A number of technical/construction challenges were identified for underground installation of the additional 115 kV circuit adjacent to the overhead double-circuit transmission line compared to the installation of nine tower structures for the overhead three-circuit line.</p> <p>The underground trenching would require greater vegetation clearing, - greater adverse environmental effects on Crothers's Woods ESA, noise and dust due to soil disturbance - and trenching construction scheduling would need to be coordinated with CPR operations.</p> <p>In addition, an overhead transmission line would have greater ease of maintenance and repair resulting in faster service restoration.</p>
Cost of Burying Transmission Line	Difference in cost between building overhead vs. underground transmission lines	The cost of burying a transmission line is approximately seven times more expensive than installing overhead lines.
Electric and Magnetic Fields (EMF)	<p>Concerns regarding potential health effects of the transmission line, particularly with the addition of a new line to the existing corridor.</p> <p>Concern expressed over "radiation".</p>	<p>For more than 30 years, research studies have examined questions about EMF and health. Health agencies and a large number of reputable scientific organizations around the world have concluded that scientific research does not demonstrate that EMFs cause or contribute to adverse health effects. However, some scientific questions remain and these are subject to ongoing research. At present, it is Health Canada's position that there is no compelling scientific evidence that EMF in living and school environments, regardless of locations from power transmission lines, cause ill health such as cancer. Links to expert agencies have been made available to the public via the Hydro One website EMF page: <a href="http://www.hydroone.com/en/environment/emf/">http://www.hydroone.com/en/environment/emf/</a>.</p> <p>The strength of a magnetic field is dependent on many factors including the number and height of the conductors (wires), the amount of current flow, and the configuration (termed optimal phasing) of the conductors. Due to perceived public concerns, Hydro One will aim to maintain or reduce EMF levels in areas of public exposure, by using options such as optimal phasing.</p> <p>Transmission towers, electrical equipment and power cords produce electric and magnetic fields (EMF), not radiation. Power frequency EMFs have no ionizing effects and typically no thermal effects, unlike radiation produced by x-rays and microwaves (see EMF Issue for further information).</p>

Issue	Description of Issue	Hydro One Response
		<p>Hydro One has conducted an EMF modelling exercise which indicates no significant change in EMF levels between Leaside TS and Bayview Jct.</p>
<p>Altered Visual Appearance due to Tower Type and Landscape Changes</p> <p>Aesthetic Effects at Shaft Locations</p>	<p>Concerns regarding the potential change in the tower height and type, and the resulting effects on views and aesthetics of the area. This was seen as negatively affecting property values.</p> <p>Potential loss of vegetation affecting landscape character expressed by residents living near Shaftesbury Avenue Carstowe Road and Rosedale Heights Road</p> <p>Potential aesthetic effects to neighbours at the Birch Jct shaft location</p> <p>Plans to landscape Bayview Jct.</p>	<p>An option under consideration is to replace the existing 115 kV lattice towers with 115 kV steel pole towers between Leaside TS and Bayview Jct. Although these poles are equal in height to the proposed lattice structure, their base footprint and associated vertical width are smaller, thereby reducing the visual effect. For this reason, some residents and stakeholders expressed support for this proposal. Steel poles have a more streamlined appearance than lattice and are therefore generally more preferred in more urban areas.</p> <p>Hydro One has provided pre- and post-development photorealistic visual simulations of existing and proposed tower designs and changes in landscape character and work with the community on screening in key areas especially in the Bennington and Mallory Heights areas.</p> <p>Vegetation loss and changes in landscape character will be minimized through route and construction option selection, as well as landscape mitigation to offset any potential losses or changes in character within the community. Most of the valley/ridge vegetation will remain intact and unaffected throughout the project area.</p> <p>Hydro One will work with neighbors, the local councilor and the business improvement area association (BIA) on the streetscape/landscape design in front of the Junction. However, there will not be much of a landscape buffer remaining after the shaft and electrical arrangement is built.</p> <p>Hydro One will work with the residents in the Bayview Jct area, and Bennington Heights Residents' Association on the final landscaping plan around Bayview Jct. The access road following the old Pottery Road allowance will be restored as a pathway/track for use by the community/school after construction and final restoration</p>

Issue	Description of Issue	Hydro One Response
Safety	<p>Replacement/repair of chain link fence at Standish Avenue and Astley Avenue and along Glen Road</p> <p>Replace the wood board fence at Birch Jct and extend the Durisol wall at Bayview Jct.</p>	<p>These openings will be repaired to secure the project site before and after construction.</p> <p>For aesthetic and security concerns at Bayview Jct. the height of the proposed wall will be increased and the top of the wall fixed with a deflector panel to discourage access.</p> <p>The wall material should be specified to reflect adjacent residential character and provide sound attenuation</p>
Protecting the Local Natural Environment	<p>Importance of protecting the natural environment within the study area.</p> <p>Potential damage to vegetation from equipment and road widening</p> <p>Potential effects of the main shaft on the Iroquois Shoreline Environmentally Sensitive Area</p> <p>Underground stream in an area near Bayview Jct.</p>	<p>A number of mitigation and restoration measures will be proposed to avoid or reduce potential project effects. Approaches to mitigation have been developed based on Hydro One's experience developing and operating transmission facilities throughout Ontario. The implementation of these conventional, proven mitigation and restoration measures, as well as those recommended by provincial and federal agencies, during the EA and permitting processes, will ensure the protection of the natural environment.</p> <p>Some mature trees will need to be removed at tower locations, along the access routes to these towers, and possibly as part of the expansion of Bayview Jct. Hydro One will work with the City Forestry Department in the development of a replacement plan for these trees.</p> <p>The main shaft at Carstowe Road is located in the Iroquois Shoreline ESA, affecting less than 1% of the ESA. The information obtained from a future geotechnical survey will provide a better understanding of local glacial stratigraphy.</p> <p>The location of underground Cudmore Creek is indicated on City utility services plans and will be taken into account in the shaft location at Bayview Jct and the final design of junction expansion.</p> <p>The proposed plan for the section between Bayview Jct and Birch Jct is a deep rock tunnel at approximately 60 to 75 m underground. The tunnel would pass through bedrock underneath Moore Park Ravine and Vale of Avoca. The shaft locations for the tunnel will be more than 120 m from the two ESAs. Therefore, no environmental effects are anticipated on these two ESAs.</p>

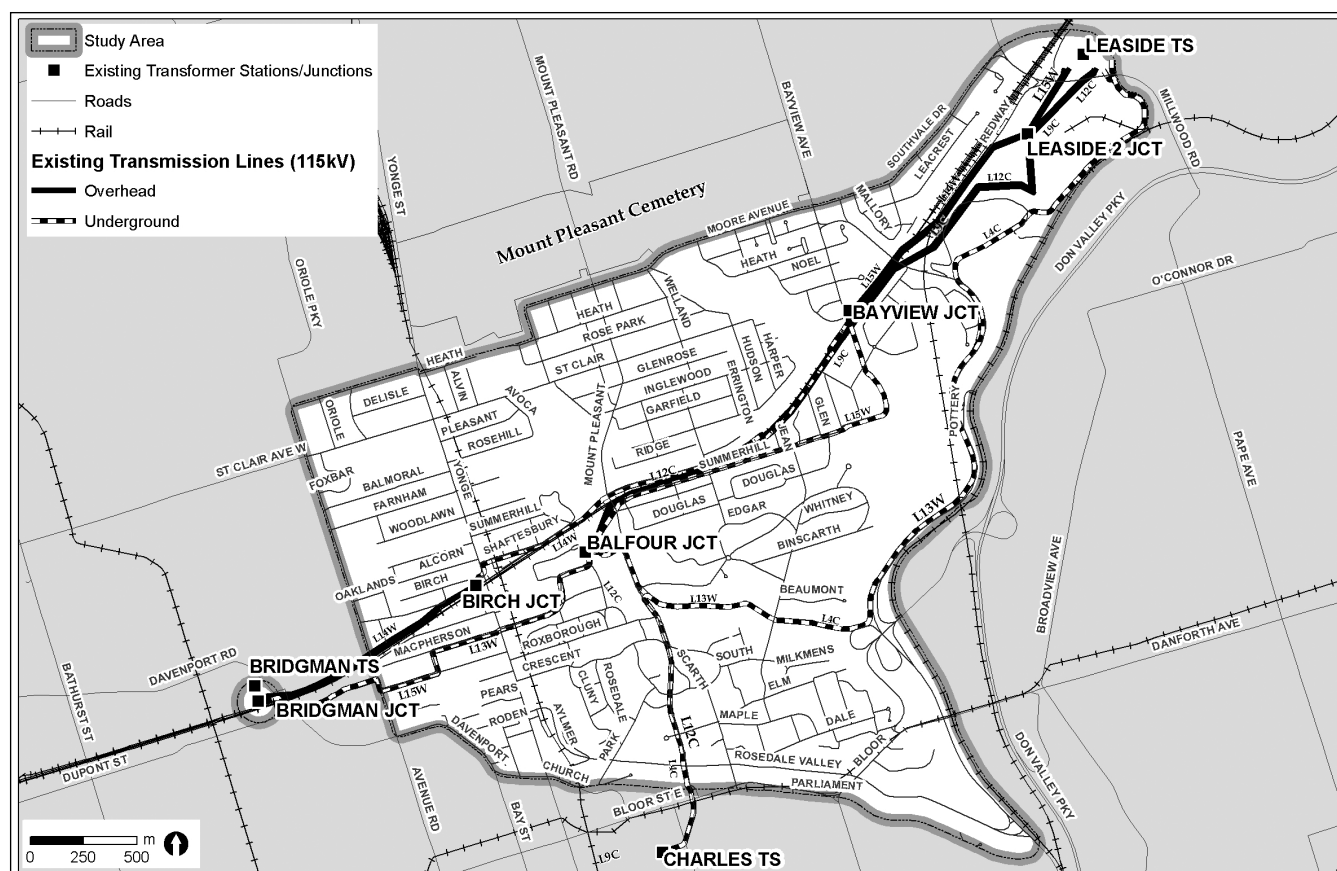
Issue	Description of Issue	Hydro One Response
	<p>Potential impacts to Moore Park Ravine, Vale of Avoca and Crothers' Woods ESAs</p>	<p>Hydro One will minimize tree clearing to accommodate the construction compound of the proposed main shaft, which is located east of Carstowe Road and south of Old Bridal Path.</p>
Wildlife Preservation	<p>Some residents noted wildlife preservation as an important issue.</p>	<p>Most urban wildlife species are used to human activities and are mobile. The construction disturbance will be sufficiently local and transitory that little displacement of wildlife is expected. Any sensitive resident animals can relocate temporarily to avoid noise and disturbance associated with construction activities and return after construction is complete. If possible, vegetation clearing will be avoided during the bird breeding season (May 1 – July 31).</p>
Construction disruption	<p>Effects and inconvenience created by the construction process.</p> <p>Duration of construction</p> <p>Disruption to businesses and residents</p>	<p>Hydro One recognizes that some neighbourhood disruption will occur during construction. However, this temporary disruption will be minimized by mitigation and restoration measures addressing resident concerns.</p> <p>Construction of the main shaft east of Carstowe Rd. is anticipated to begin in the fall of 2010 and take approximately 6 to 9 months. Following excavation of the shaft a tunnel boring machine would be used to construct the tunnel taking approximately 12 to 18 months. During it is proposed that trucks will be removing rock/debris via Carstowe Rd.</p> <p>Exit and intermediate shafts will take 2 to 4 weeks to drill. All shafts will be used as portals to pour concrete into the tunnel for a permanent liner and floor and concreting would likely occur throughout 2012. In 2012, Hydro One would also be completing all station work at Leaside TS, Bridgman Jct, Bayview Jct and Birch Jct and replacing the conductors on the towers from Birch Jct to Bridgman Jct, as well as build new towers and string conductors from Leaside TS to Bayview Jct. In 2013, the new cables would be installed in the tunnel and final connections at the Junctions.</p> <p>In general, disruption to businesses and residents would be localized at the shaft locations. There will be construction traffic using Carstowe Rd. and Mt. Pleasant Ave throughout the construction period. There will be excavating equipment and a crane at the Carstowe compound until the end of 2012. At the exit and intermediate shafts there will be augers and trucks during the drilling of the shafts and concrete trucks later in the project.</p>

Issue	Description of Issue	Hydro One Response
Location of Shafts	Appearance of shaft locations during and after construction	During the drilling of the shafts there will be construction fencing or boarding around the perimeter. Following construction the exit shafts will be inside of the expanded junction fences. Intermediate shafts will be covered with an access cover similar to those used by other utilities. The main shaft area will be landscaped following the project and will have an accessible cover or small building for future maintenance and access.
Traffic	Short term disruption of traffic due to equipment and materials delivery, worker vehicle traffic and construction activities.	Hydro One will make best efforts to schedule construction activities in order to minimize adverse effects on the community. Hydro One will develop a traffic plan with City of Toronto officials, as well as monitor and respond to resident complaints.
Noise	Increased noise levels during daytime hours associated with construction equipment and worker vehicles.  Emissions from vehicles during construction.	Construction activities will comply with the municipal noise by-law.  Standard best practices will be followed to ensure typical construction disturbances, such as noise, are minimized. Hydro One utilizes well maintained equipment and, as required, noise silencers.  Hydro One will implement best practices to minimize effects on air quality
Vibration	Vibration during tunnel and shaft construction	During the boring of the deep rock tunnel there will be no noticeable vibration at surface. There will be some vibration felt during the auguring of the shafts but only at distances very close to the drilling.
Power Outages	Questions regarding whether power outages would be necessary during construction.	Hydro One expects no power outages will be required to facilitate project construction.
Vegetation Management	Concerns expressed about cutting mature trees and suggestions that Hydro One attempt to utilize existing corridors to minimize impact on trees.	Vegetation removal will be minimized given the preferred route and tunnel construction approach selected. As indicated above, Hydro One will develop a replacement plan for trees that are cut in consultation with the City of Toronto Urban Forestry Department.
Energy Conservation	Would energy conservation be enough to solve the capacity issue.	While Toronto is conserving electricity, managing its power use and exploring the potential of renewable power, the proposed undertaking is still necessary to replace the aging infrastructure which is reaching the end of the service life and to increase the capacity to meet the economic growth in the central Toronto neighbourhoods.  During peak times, transmission circuits along the power corridor are running at or near their reliability limit, which

Issue	Description of Issue	Hydro One Response
		means the potential for equipment failures and power outage increase. Energy conservation would not be enough to solve the capacity issue. The proposed undertaking is necessary.
OEB Hearing Process	How can the general public get involved	As part of the OEB Section 92 approval process, there are numerous ways one can participate. Interested groups or individuals who may be affected can actively participate in the written or oral hearing (intervenors). Those who want to monitor the progress of the proceeding may file a request with the Board to receive documents. One may also submit a written comment, or provide an oral comment if a hearing is convened. . Information on how to get involved is provided on the OEB website <a href="http://www.oeb.gov.on.ca">www.oeb.gov.on.ca</a>

# NOTICE OF COMMENCEMENT AND PUBLIC INFORMATION CENTRES

## Class Environmental Assessment Midtown Electricity Infrastructure Renewal Project



### Ontario Energy Board (OEB) Approval

The project also requires a Leave to Construct approval, pursuant to section 92 of the *Ontario Energy Board Act, 1998*. The OEB, which regulates Ontario's electricity industry, will determine whether the construction and operation of the proposed facilities are in the public interest.

### Consultation

The Class EA process also provides opportunities for public and stakeholder consultation and your feedback is very important to us. Members of the public, businesses, stakeholder groups, First Nations and Métis, government agencies and other interested parties are encouraged to actively participate in the planning process. At the first public information centres (PICs), Hydro One and Toronto Hydro will provide information about the project need, alternatives, environmental considerations, technical options and approvals processes, and will seek community input.

We encourage you to drop into one of the upcoming PICs to learn more about the project, provide your input, and discuss any issues or concerns with our project team.

Hydro One Networks Inc. (Hydro One) and Toronto Hydro-Electric System Limited (Toronto Hydro) have jointly identified a need to refurbish the existing 115 kilovolt (kV) transmission infrastructure which serves the midtown Toronto area. The need for the "Midtown Project" was also confirmed by the Independent Electricity System Operator (IESO). To ensure that Toronto Hydro customers continue to receive an adequate and reliable supply of electricity, the following needs must be addressed:

1. Replace an aging underground cable located between Bayview Junction (Jct) and Birch Jct, installed in 1956 which is nearing its end of life;
2. Install an additional 115 kV circuit between Leaside Transformer Station (TS) and Birch Jct to relieve loading on the existing circuits that are currently operating above their capacity; and
3. Install new equipment at Leaside TS, Bayview, Birch and Bridgman Junctions.

Electricity demand in the midtown area continues to steadily increase as a result of redevelopment and land use intensification. These infrastructure refurbishments will reduce the risk of power outages and improve reliability for Toronto customers. Subject to the necessary approvals, construction could begin in 2010 with the new facilities in-service by spring of 2012.

### The Environmental Assessment (EA) Process

This project is subject to the Ontario *Environmental Assessment Act* in accordance with the *Class EA for Minor Transmission Facilities*. The Class EA study will investigate alternative methods and options to refurbish the transmission infrastructure. The existing transmission corridor between Leaside TS and Birch Jct will be considered as a potential route to address the identified needs. Alternative underground cable routes will also be identified and evaluated as part of the EA process.

### Public Information Centres

Tuesday, February 17, 2009  
 Leaside Memorial Gardens  
 1078 Millwood Rd.  
 William Lea Room  
 5 – 9 p.m.

Tuesday, February 24, 2009  
 Timothy Eaton Memorial Church  
 230 St. Clair Ave. West  
 Flora McCrea Auditorium  
 5 – 9 p.m.

Wednesday, February 18, 2009  
 Rosedale Heights School of the Arts  
 711 Bloor Street East  
 Cafeteria  
 6 – 9:30 p.m.

### For more information

If you wish to be added to the project mailing list to receive regular updates, or you would like more information about the project, please visit our project website at: [www.HydroOneNetworks.com/Midtown](http://www.HydroOneNetworks.com/Midtown) or contact:

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 Supervisor, Marketing,  
 Communications and Public Affairs  
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 Fax: 416-542-2655  
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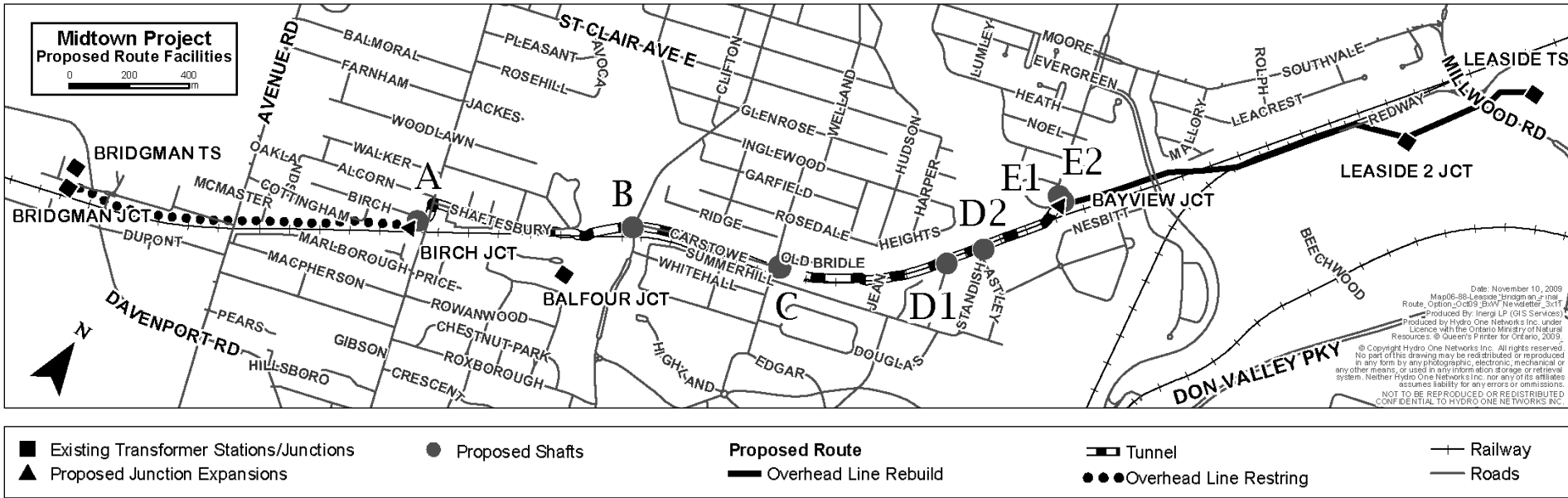
Ms. Enza Cancilla  
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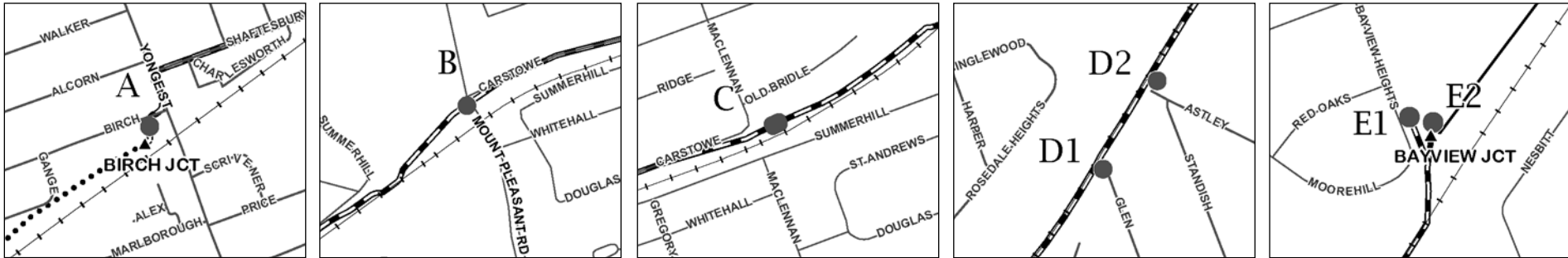
# NOTICE OF SECOND PUBLIC INFORMATION CENTRE

## Class Environmental Assessment

### Midtown Electricity Infrastructure Renewal Project



#### Approximate Locations of Proposed Shafts



In February 2009, Hydro One Networks (Hydro One) held its first series of public information centres to initiate a Class Environmental Assessment (EA) to refurbish the existing 115 kilovolt (kV) transmission infrastructure which currently serves the midtown Toronto area. The project addresses two needs: an aging underground cable is reaching the end of its service life and must be replaced; and continued growth in power demand as a result of development and land use intensification has resulted in the need for additional power supply. The project would reduce the risk of power outages and improve power reliability for Toronto Hydro customers. With the necessary approvals, construction could begin fall 2010 with the new facilities in-service by fall 2012.

As part of the Class EA and based on community input, alternative routes and methods to refurbish this transmission infrastructure were evaluated. The process included consultation with government agencies, stakeholders and members of the community. The preferred option uses a combination of overhead lines and underground cables predominantly following the existing route along the CPR corridor and City of Toronto road allowance. The preferred option limits disruption to the community and natural environment and was widely supported by stakeholders during the consultation process.

Details for each section of the preferred option now involve:

#### 1. Leaside Transformer Station (TS) to Bayview Junction (Jct)

- Install an additional 115 kV overhead circuit (line) to relieve loading on the existing two circuits between Leaside TS and Bayview Jct. New towers (lattice, steel poles or a combination) will replace the existing towers on the existing right-of-way.

#### 2. Bayview Jct to Birch Jct

- Replace an aging underground cable and add a second cable using a deep-rock tunnel 75 metres below ground. This option would also require the installation of five shafts along the proposed route to provide access for construction and future maintenance. The main shaft and construction staging area will be located on Hydro One's property east of Carstowe Road (C). The approximate locations of the proposed exit and intermediate shafts are shown in more detail on the maps above.

#### 3. Birch Jct to Bridgman TS

- Replace and restrung the 115 kV overhead lines on the existing towers.

#### 4. Leaside TS, Bayview, Birch and Bridgman Junctions

- Install new equipment associated with the line and cable refurbishments within Hydro One's property at these sites.

#### The EA Process

This project is subject to the Ontario *Environmental Assessment Act* in accordance with the Class EA for Minor Transmission Facilities. The Class EA process provides opportunities for public and stakeholder consultation and your feedback is very important to us. At the public information centres (PICs), Hydro One and Toronto Hydro will provide information about environmental considerations and mitigation, alternative options, construction methods, the preferred route option and the approvals processes. We encourage you to drop into one of the upcoming PICs to learn more about the project, provide your input, and discuss any issues or concerns with our project team.

#### Public Information Centres

Tuesday, December 1, 2009  
Bennington Heights Elementary School  
76 Bennington Heights Drive  
6 p.m. to 9:30 p.m.

Wednesday, December 2, 2009  
Whitney Junior Public School  
119 Rosedale Heights Drive  
6 p.m. to 9:30 p.m.

#### For more information

Please visit our project website at: [www.HydroOne.com/Midtown](http://www.HydroOne.com/Midtown) or contact:

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toronto hydro  
electric system



Partners in Powerful Communities

# MidtownProject

## ELECTRICITY INFRASTRUCTURE RENEWAL



### Hydro One

Hydro One Networks Inc. is responsible for delivering electricity safely, reliably and responsibly to homes and businesses in Ontario. We own and operate Ontario's 29,000 kilometre high-voltage transmission network, and our job also includes building new transmission facilities.

### Toronto Hydro-Electric System Limited (Toronto Hydro)

Toronto Hydro is an electrical distribution company serving over 680,000 residential and commercial customers across the City of Toronto. Hydro One transmits electricity along high voltage lines and cables to Toronto Hydro transfer stations, where it is reduced in voltage for safe distribution across Toronto Hydro's city-wide grid.

## STRENGTHENING THE CORRIDOR

Welcome to the second edition of *Midtown Project*, Hydro One's newsletter to keep you informed about our efforts to strengthen the midtown Toronto power corridor which runs from Leaside Transformer Station (TS) via Birch Junction (Jct) to Bridgman TS. In this issue, we present our preferred solution, the process to get there, including public and stakeholder consultation, and the next steps in the planning and approvals process.

While more and more Toronto is conserving electricity, managing its power use and exploring the potential of renewable power, it is still necessary to renew this aging electricity infrastructure for two reasons. First, the existing 115 kV cable between Bayview Jct and Birch Jct is more than 50 years old and reaching the end of its service life; and secondly, economic growth in the central Toronto neighbourhoods served by the corridor has remained constant.

During peak times, transmission circuits along the power corridor are running at or near their reliability limit, which means the potential for equipment failures and power outages increase. We need to replace the aging cable, and it makes sense at the same time, to increase capacity in the corridor for future generations.

### Talking... Planning... Together

Last February, Hydro One with Toronto Hydro held three public information centres (PICs) to introduce the project and explain the project approval processes to residents and stakeholders in the study area. We were pleased to meet with you, listen to your concerns, and begin a dialogue to address these matters.

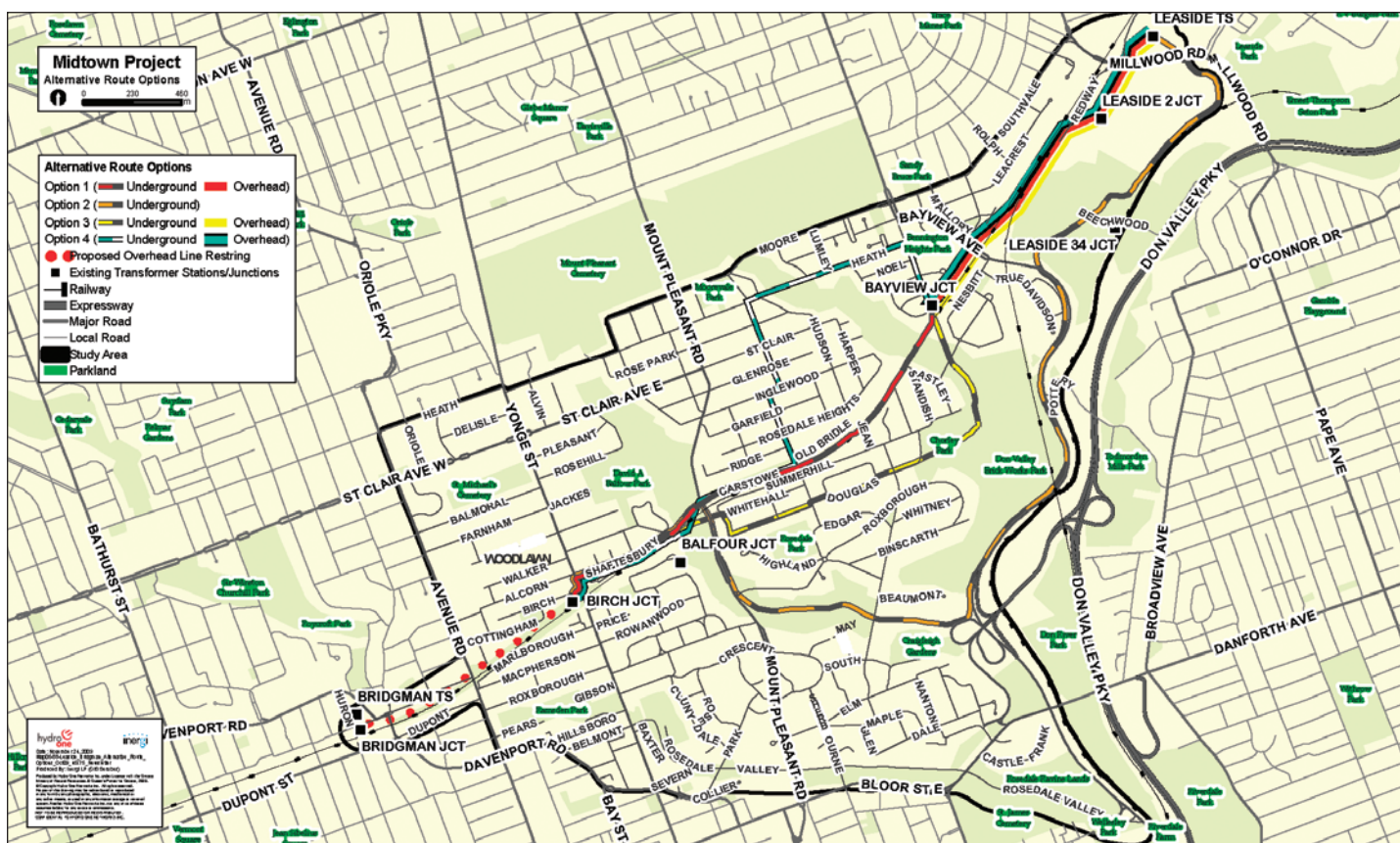
We've also continued to consult with representatives of local residents' associations, City of Toronto councillors, staff and agencies, the Toronto and Region Conservation Authority, Canadian Pacific Railway (CPR), and other interested groups. There is strong support to replace and improve facilities in the locations (or close to) where they already exist. But, there are also questions about the process and how we will manage the impact of the work on the community.

### INSIDE

- 2 Alternative Route Options
- 3 Following the Footprint – The Preferred Route
- 4 The Tunnel
- 4 Constructing the Preferred Route
- 5 Mitigation – Building Sustainably, Building Smart
- 6 Next Steps – Seeking Approvals



## MIDTOWN PROJECT - STUDY AREA AND ALTERNATIVE ROUTE OPTIONS



### WHAT WE HEARD FROM YOU

While the need to refurbish aging infrastructure was well understood and supported by residents and other stakeholders, some concerns were raised. These included changes in tower height, removal of trees, potential loss of wildlife habitat, potential health effects associated with electric and magnetic fields (EMFs), and construction effects.

With decades of experience building transmission projects, we know effective ways to protect the environment, minimize and replace tree loss, and mitigate traffic and construction disruptions. We will work directly with residents, their associations and local councillors to ensure construction effects are kept to a minimum.

### Alternative Route Options

Four route options for renewing the midtown electricity infrastructure were considered. Three options use a combination of overhead and underground circuits, and have a common overhead component – refurbishing the line section between Leaside TS and Bayview Jct. One option follows an existing underground route from Leaside TS to Birch Jct.

Options #2, #3 and #4 are longer routes, have greater environmental effects and pose a higher level of disruption to the community than Option #1.

### PUBLIC AND STAKEHOLDER CONSULTATION

Fall 2008	Winter 2009	Late Fall 2009
Briefing of City of Toronto municipal officials and staff and community organizations	Initiate Class Environmental Assessment	Public Information Centre #1
		Public Information Centre #2 (Alternatives and Preferred Option)
		Section 92 Application Submitted to Ontario Energy Board



**TUNNEL BORING MACHINE**



**EXCAVATED TUNNEL**



**TUNNEL WITH CABLES**

#### Option #1

**4.0 km**

Hydro One's preferred option closely follows the corridor of the existing lines installed starting in the 1920s, and cables in the 1950s. With this option all construction work will take place on lands where Hydro One already has most of the required property rights.

#### Option #2

**6.3 km**

Follows an existing underground cable route from Leaside TS south through Crothers' Woods and along Bayview Ave., and through Craigleigh Gardens, and Park Drive Ravine to Birch Jct.

#### Option #3

**4.5 km**

Follows an underground cable route from Bayview Jct to Balfour Jct via Moore Park Ravine, Chorley Park and Douglas Drive, and along CPR corridor to Birch Jct.

#### Option #4

**4.9 km**

An underground cable along Bayview Heights Drive, Heath Street (through Moore Park Ravine), Welland Avenue, Inglewood Drive and MacLennan Avenue to Birch Jct.

#### Common Elements

Options 1, 3 and 4 propose a common overhead line section between Leaside TS and Bayview Jct. The Birch Jct to Bridgman Jct line replacement is common to all options (1.2 km). Trench construction method used for all underground options.

Once the preferred route Option #1 was selected, it was determined that using tunnel construction between Bayview Jct and Birch Jct would provide additional advantages. While using a shallow trench is a feasible construction method, tunnelling in deep rock would further address technical constraints, minimize environmental effects (e.g., need to cross environmentally sensitive areas, mature woodlots, parklands and watercourses), and minimize community disruption.

### Following the Footprint – The Preferred Route

#### I. Leaside TS to Bayview Jct

Rebuild the existing double circuit overhead transmission line as a three circuit line along the existing Hydro One right-of-way (runs along CPR corridor, GO Transit and City of Toronto property) using new lattice or steel pole structures, or a combination of both.

#### II. Bayview Jct to Birch Jct

Replace the existing aging underground cable and installation of a second new cable, both encased in a tunnel, approximately 60-75m deep, through bedrock.

#### III. Birch Jct to Bridgman Jct

Refurbish the existing overhead double circuit transmission line using the existing lattice structures between Birch Jct and Bridgman Jct by restringing both circuits and activating the currently idle circuit.

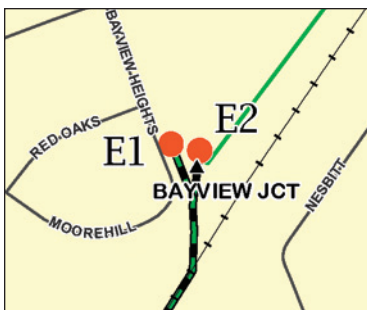
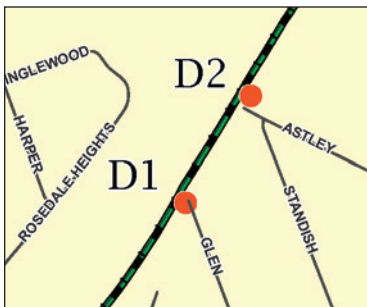
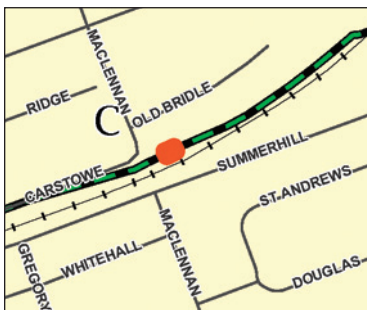
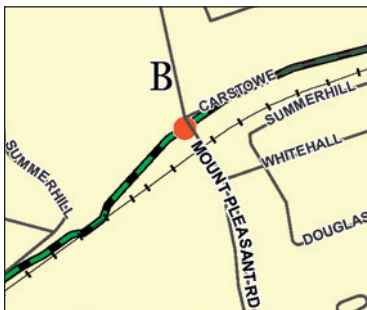
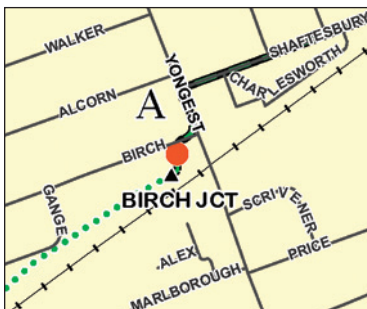
#### IV. Leaside TS, Bayview, Birch and Bridgman Junctions

Install new equipment at these sites.

### PUBLIC AND STAKEHOLDER CONSULTATION

Winter 2010	Spring 2010	Summer 2010	2010	2012
Draft Environmental Study Report (ESR) available for 30-Day Review Period	Anticipated Filing Submission of Final ESR to the Ministry of the Environment	Anticipated OEB Approval	Begin Construction	Project In-Service





APPROXIMATE SHAFT LOCATIONS

## The Tunnel

Rock tunnelling will allow us to run the cable far below existing infrastructure such as building foundations, the subway and water, sewer, gas and electrical conduits. This method will reduce noise, dust and disruption to homes, businesses, and other community activities during the period of construction along the majority of the cable route.

We successfully used a similar approach to install the John TS to Esplanade TS cables in one of the busiest parts of downtown Toronto and found that it had minimal impact on traffic and businesses on the streets above.

## Constructing the Preferred Route

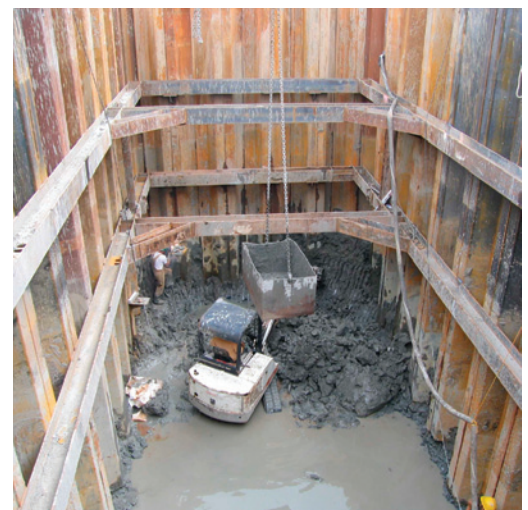
The tunnel would be constructed using a state-of-the-art boring machine with the main shaft on Hydro One property at Carstowe Road. End shafts are proposed at Bayview Jct (E1 or E2) in the east and Birch Jct (A) in the west, and two intermediate shafts proposed south of the Rosehill Pumping Station (B) and one at either the top of Glen Road (D1) or Astley Avenue (D2) south of the CPR tracks. These shafts will be used for cable and personnel access and will be the areas where construction activities are localized.

During construction, the main shaft at Carstowe Road (C) will be used to lower and raise the tunnel boring machine in and out of the shaft, as well as to remove rock debris during boring operations. This shaft will also serve as the main access point for future maintenance requirements.

Rock tunnelling technology is a logical solution to install the replacement and new cables. For most of the 2 km cable route, there will be minimal excavation at street level, limited disturbance or interruptions to homes, businesses and other community activities, and limited traffic congestion. In addition, the tunnel will be designed to carry additional cables if needed, thereby reducing future disruption to the community if further capacity is required.

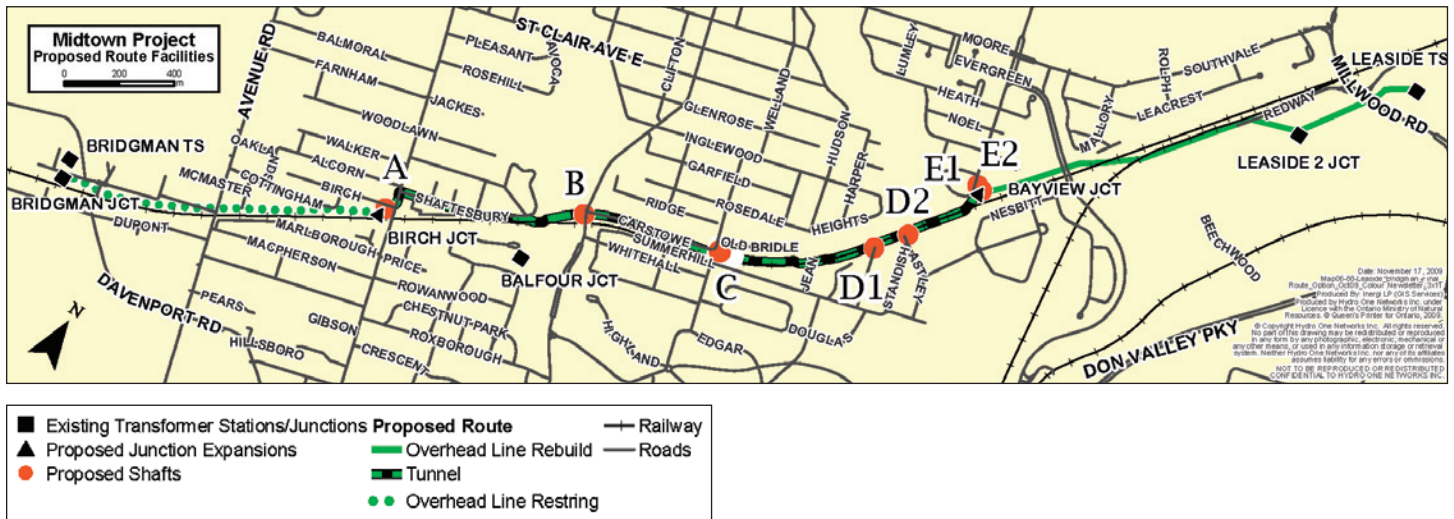


AUGERING A SHAFT IN DOWNTOWN TORONTO



REMOVING ROCK AND DEBRIS FROM A CONSTRUCTION SHAFT, SIMILAR TO CARSTOWE ROAD

## PREFERRED ROUTE OPTION AND APPROXIMATE SHAFT LOCATIONS



### Mitigation – Building Sustainably, Building Smart

We know that construction activities can sometimes be disruptive and our goal is to minimize effects on your neighbourhoods. Since the preferred option runs overhead along an existing right-of-way and then the cables run underground using the deep rock tunnel – we believe effects will be effectively managed with limited disruption.

We do expect residents and businesses around the shaft locations to experience some nuisance effects and an increase in vehicle traffic. We will employ techniques such as noise and visual barriers and dust suppression measures at the construction sites to help ensure disruption is reduced.

Hydro One will work with the community on landscape options to screen key areas after construction, including Bayview Jct and Birch Jct, and other areas of concern.

Replacing the existing line from Birch Jct to Bridgman Jct will require some tree trimming and brush removal along the existing tower line. Our landscape architect will again work with the community to develop appropriate landscape plans.

Our goal is to lower or maintain EMF levels through tower design and optimal phasing on overhead structures. EMFs at ground level from the cables in the deep tunnel will be negligible.



HYDRO ONE LANDSCAPING AT COTTINGHAM STREET AND GANGE AVENUE



LEASIDE TS TO BAYVIEW JCT CORRIDOR



## Next Steps – Seeking Approvals

Construction of the Midtown Project is subject to the provincial *Environmental Assessment Act (EA Act)* in accordance with the Class EA for Minor Transmission Facilities and Ontario Energy Board (OEB) approval prior to construction. Both processes offer opportunities for you to participate.

In January 2010 we plan to release the Midtown Project draft Environmental Study Report (ESR) for a 30 day public and stakeholder review period. Local community newspapers ads and our website will provide details on the process and how to get a copy of the draft ESR for review and comment.

If no concerns are expressed during the review period, the project is considered acceptable and Hydro One will file the final ESR with the Ministry of the Environment (MOE). If

concerns are expressed during the review period, Hydro One will attempt to resolve them in order to complete the Class EA process. If stakeholders are dissatisfied with the process or recommendations, they can request that the Minister of the Environment *bump up* the project to an individual EA.

Prior to constructing new transmission facilities, Hydro One must also obtain OEB Leave to Construct (section 92) approval. The OEB process will examine whether the project is in the public interest by considering the impacts it may have on consumers with respect to price, reliability and quality of electricity service.

Depending on EA and OEB approvals, construction could begin in the summer of 2010 and the new transmission corridor would be fully operational by late fall of 2012.

### PUBLIC INFORMATION CENTRE SCHEDULE

Tuesday, December 1, 2009	Wednesday, December 2, 2009
Bennington Heights Elementary School 76 Bennington Heights Drive 6 p.m. to 9:30 p.m.	Whitney Junior Public School 119 Rosedale Heights Drive 6 p.m. to 9:30 p.m.

To ensure we continue to keep you informed and get your input, we are holding a second set of Public Information Centres. The preferred option, other alternative options considered and our plans to mitigate the effects during construction will be presented. Hydro One and Toronto Hydro staff will be available to answer your questions.

## MidtownProject

Project Website: [www.HydroOne.com/Projects/Midtown](http://www.HydroOne.com/Projects/Midtown)  
Project Hotline : 416-345-6799

Your input is very important to us, and there are many ways you can reach us. If you would like more information about this project and want to be included on the project mailing list, please contact:

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# MidtownProject

## ELECTRICITY INFRASTRUCTURE RENEWAL



### Hydro One

Hydro One Networks Inc. is responsible for delivering electricity safely, reliably and responsibly to homes and businesses in Ontario. We own and operate Ontario's 29,000 kilometre high-voltage transmission network, and our job also includes building new transmission facilities.

### Toronto Hydro-Electric System Limited (Toronto Hydro)

Toronto Hydro is an electrical distribution company serving almost 700,000 residential and commercial customers across the City of Toronto. Hydro One transmits electricity along high voltage lines and cables to Toronto Hydro transfer stations, where it is reduced in voltage for safe distribution across Toronto Hydro's city-wide grid.

### Ontario Energy Board (OEB)

The OEB regulates Ontario's natural gas and electricity industries. It is also responsible for ensuring that construction and operation of proposed transmission facilities are in the public interest. As part of this process, the OEB will review Hydro One's application to strengthen the midtown power corridor, make the information public and provide opportunities for stakeholder input.

## A STRONG CITY DESERVES A STRONG TRANSMISSION SYSTEM

Welcome to the Midtown Project newsletter, the first in a series of newsletters that will keep you informed of our plans to refurbish and strengthen the power transmission system through midtown Toronto. We believe our plan strikes the right balance between the need to renew aging, vital infrastructure and our desire to both conserve electricity and fully consult the community. We hope you'll agree.

Much has changed in the years since the power transmission corridor from Leaside Transformer Station (Millwood Ave. south of Laird Dr.) to Birch Junction (Yonge and Summerhill) was originally built through midtown Toronto and the first underground cable was laid in the 1950s. But two things have remained constant – the City's continued ability to grow and prosper and its need for reliable power.

Toronto in the 1950s was a city entering an exciting new era of subways, expressways, and skyscrapers.

Today the midtown area is attracting new homes, businesses and people. The streets buzz with the energy and vibrancy that come with being North America's fifth largest city. And with Toronto's policy of focusing development along arterial streets and adjacent mass transit

corridors, the midtown area will continue to grow.

All of this activity is putting a strain on the aging transmission facilities in midtown Toronto and on the reliable supply of energy.

### INSIDE

- 2 Need for infrastructure renewal
- 2 Project study area
- 3 Aging infrastructure
- 4 Strengthening the corridor
- 4 Glossary of terms
- 5 Approval process
- 5 Conservation
- 6 Public consultation
- 6 Public Information Centres



## A need for infrastructure renewal

Overhead towers and underground cables have stood the test of time; and after 50 years of dependable, reliable service, it's time for them to be renewed to meet the needs of our growing dynamic city. For the past several summers, this electrical equipment has been delivering more electricity than it was designed to handle. When the equipment operates above capacity, the potential for equipment failure and power outages to the area increases. Should any part of this grid fail, restoration time could be significant. And while Torontonians are working hard to conserve power, electricity load growth in the areas served by the midtown power corridor continues to grow steadily, due in large part to redevelopment.

Just as our roads, water and sewer systems need renewal, so does the electrical infrastructure that serves midtown. That's why we've been working with Toronto Hydro on options to strengthen the midtown transmission corridor

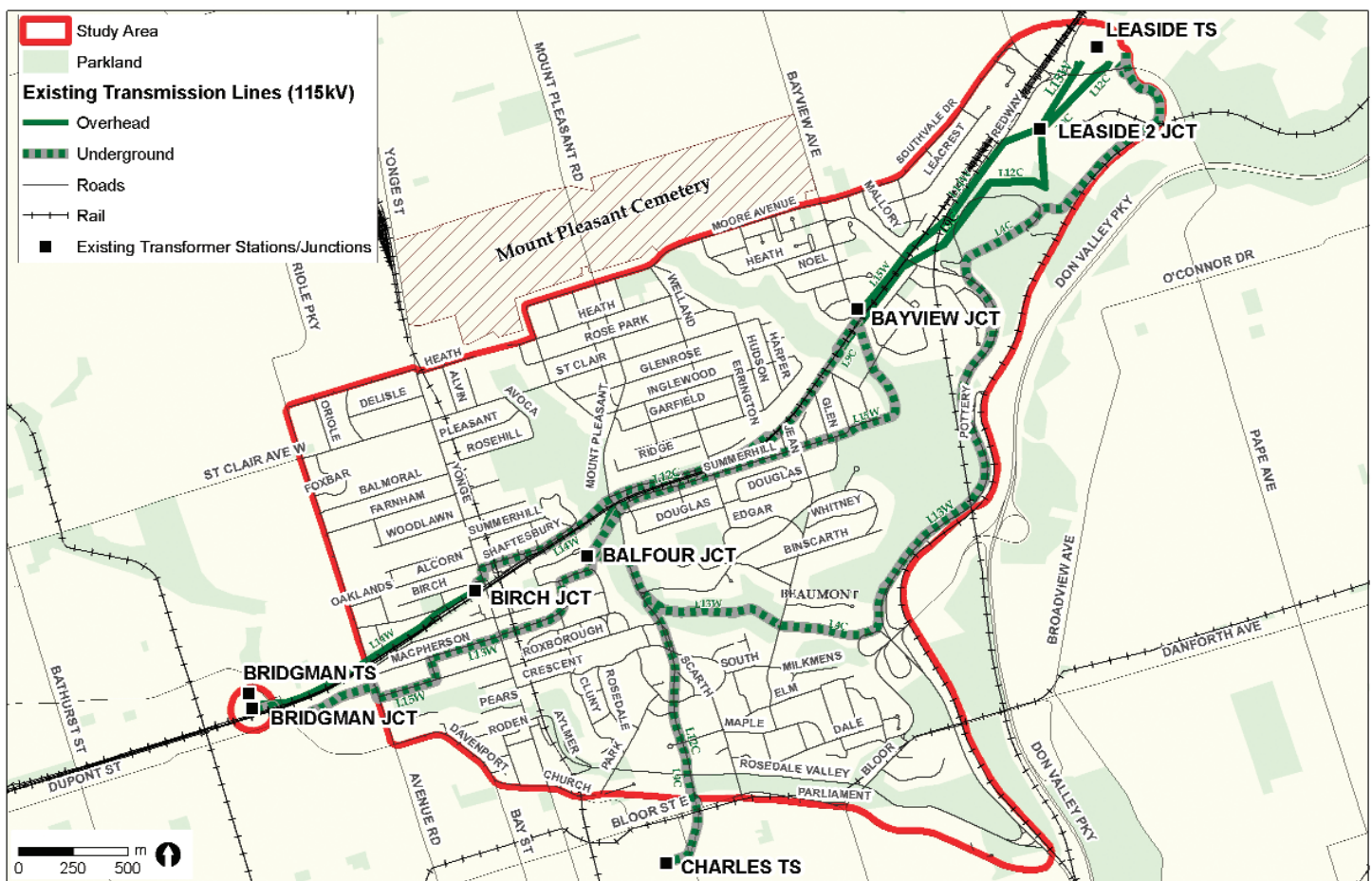
by refurbishing existing infrastructure and adding capacity. After much study, we propose to boost reliability and capacity of our high voltage system by replacing an aging existing underground circuit between Leaside Transformer Station (TS) to Birch Junction (Jct) and at the same time adding an additional 115 kilovolt (kV) circuit to minimize disruption to your community.

A number of approvals are required before this project can proceed, including *Environmental Assessment Act (EA Act)* and approval from the Ontario Energy Board (OEB). Both processes offer members of the community ample opportunity to participate in the review and approvals for the project.

Subject to these necessary approvals, construction could begin in 2010, and the reinforced corridor could be fully operational 2012. However, the in-service date will depend on the route chosen and associated engineering plans.

We look forward to working with the midtown Toronto community to achieve this goal together.

## MIDTOWN TRANSMISSION REFURBISHMENT STUDY AREA





## A growing city, a growing demand

With the City's policy of intensifying development in existing high density locations, growth in the central city areas served by the midtown transmission corridor is expected to continue, and so will the demand for power. Despite energy savings achieved through Toronto Hydro's conservation programs, load growth is increasing steadily, and conservation alone cannot fill the gap. Toronto Hydro has examined other solutions like distributed generation. It can only play a very limited role at this time, and building new distribution lines which is costly and disruptive to city neighbourhoods. Most importantly, these options can only defer the need for a new circuit for a few years, and does not address our problem of an aging cable. A new circuit will ensure that electrical supply to the area is secured for existing and future growth. The need for a new circuit was identified in a 2006 joint study by Toronto Hydro and Hydro One, is supported by the Independent Electricity

System Operator, and the need approved by the Ontario Energy Board as part of Hydro One Networks' 2007/2008 Transmission Revenue Requirement.

## Aging infrastructure

Maintaining and renewing this critical electrical infrastructure, like keeping a house in good condition, is a non-stop process. Hydro One invests more than \$500 million every year to maintain more than 29,000 kilometres of high voltage transmission lines, cables and stations. Its rigorous process of examination and timely upgrades ensures a continual, safe and reliable flow of power to local homes and businesses across Toronto and Ontario.

As part of Hydro One's maintenance program, the condition of the midtown corridor is monitored regularly. While it is difficult to predict when a cable might fail, test results indicate that the aging cable should be replaced now. The potential risk of not replacing the cable is very high as the cable serves some

## PUBLIC AND STAKEHOLDER CONSULTATION

Fall 2008	Winter 2009	Spring 2009	Summer 2009
Briefing of City of Toronto municipal officials and staff and key community organizations	Initiate Class Environmental Assessment	Public Information Centre #2 (Preferred Option)	Environmental Study Report available for 30-Day Review Period
	Public Information Centre #1 (Options)		
	Stakeholder Workshop		

of Toronto's critical loads like the University of Toronto, Yorkville, Yonge and St. Clair business areas. The lead time to replace a cable from approvals through construction to commissioning can take up to three years, so the replacement must be planned well in advance.

Aging electricity infrastructure and increasing demand for power place increasing pressure on this key transmission corridor. It makes sense to replace the aging cable and install the new circuit at the same time. This means disrupting city neighbourhoods only once and achieving certain economies of scale.

## Strengthening the midtown transmission corridor

The midtown transmission corridor today consists of three circuits carrying electricity from Leaside TS to Bridgman TS (near Davenport Road and Dupont Street).

At Bridgman TS, power from these circuits is reduced in voltage and distributed by Toronto Hydro to its customers west of Mt. Pleasant Rd. We propose to add a fourth circuit to the existing equipment between Leaside TS and Bridgman TS, boosting reliability and capability in the corridor.

We are examining several different underground cable options to address this need. A practical approach would be to use the existing corridor, thus avoiding the need to affect new land elsewhere. However, all options will be examined as part of the Class EA process.

We believe that replacing the existing double circuit 115 kV tower line along the existing corridor between Leaside TS and Bayview Jct with a new three circuit tower, and replacing an existing underground circuit running along the CP railway corridor with two new underground circuits over to Birch Jct, just west of Yonge Street, makes the most

## GLOSSARY OF TERMS

**Speaking of circuits, lines and cables** Here is a guide to some terms you'll encounter when reading about our plan to strengthen the high-voltage midtown transmission corridor through midtown Toronto.

A **watt** is a standard unit of power equal to one ampere of current per second. A kilowatt (kW) is one thousand watts, and a megawatt (MW) is one million watts, enough power to supply 333 homes.

A **volt** is a unit of electrical force, pressure or potential. One volt is the force required to send one ampere of electrical current through a resistance of one ohm. A kilovolt (kV) is one thousand volts.

A **circuit** is used for moving power from point A to point B on the transmission system. It consists of three wires. These wires can be carried on a tower (what we call an **overhead circuit**) or buried underground (**underground cable circuit**).

## PUBLIC AND STAKEHOLDER CONSULTATION

Summer 2009	Late Summer 2009	Summer 2010	Summer 2010	TBD
Section 92 Application Submitted to OEB	Anticipated EA Approval from Ministry of the Environment	OEB Approval	Begin Construction	Project In-Service



sense. These circuits would then carry on to Bridgman TS, using an existing overhead tower. The overhead single circuit tower running primarily on the south side of the railway corridor would be unaffected by this project, as it is not used to transmit power to Bridgman TS.

We believe this option is the most practical approach. Underground circuits, while more expensive, occupy a smaller real estate footprint and are less conspicuous than overhead lines. Other options hinge on acquiring additional property, come with difficult work conditions and have a higher potential to disrupt neighbourhoods and city streets.

### Approvals process

Hydro One designs, builds and operates its facilities with strict adherence to Provincial regulations. Prior to constructing new transmission facilities, Hydro One must seek and obtain OEB and EA approvals.

This winter we will begin a Class EA process for Minor Transmission Facilities for this project to strengthen the midtown transmission corridor: this process will include the identification of possible alternative options and routes. We fully support your input to the EA process and invite and encourage stakeholders in the community to participate in the consultations that will take place.

Stakeholders are also encouraged to participate in the OEB Leave to Construct process, which will examine whether the project is in the public interest by considering the impacts it may have on consumers with respect to price, reliability and quality of electricity service. The OEB is ultimately responsible for approving the cost of all new transmission projects and the MOE the final route.

## CONSERVATION – A KEY PART OF THE EQUATION



Conservation is an important part of Toronto's long-term energy plan. The Ontario Power Authority is projecting that creating a conservation culture will shave 25 per cent off peak demand over the next 20 years – more than 6,300 megawatts (MW). That's a lot of new generating stations that won't have to be built. It's good for the environment and good for our pocketbooks.

More and more Torontonians are responding enthusiastically to conservation programs such as Peaksaver, which adjusts home and business air conditioners at times of peak demand. As Toronto Hydro introduces additional programs, we'll save even more electricity, but we'll still need a sound transmission system to deliver the power. Even our best conservation efforts will not eliminate or even defer the need to refurbish this aging infrastructure.

Hydro One and Toronto Hydro fully support the Province's goal to create a culture of conservation and also in maintaining and enhancing the important infrastructure that Ontarians have built together, like the midtown Toronto transmission corridor. Both are critical to Toronto's – and Ontario's – future prosperity.

## Public and Stakeholder Consultation

Toronto is a city of neighbourhoods, and Hydro One and Toronto Hydro are mindful that the midtown transmission corridor runs through some of Toronto's oldest and most picturesque neighbourhoods: Rosedale, Summerhill, Moore Park, South Leaside and Bennington Heights. We are committed to working with residents, businesses and schools in an open and transparent manner to minimize the impact and inconvenience of this important project. We believe in, and we practise, a two-way consultation approach that values your input and addresses your concerns.

Your input is very important to us. This is your community and your opportunity to contribute to a better plan. We welcome and rely on your feedback.

Hydro One and Toronto Hydro will hold a series of Public Information Centres (PICs) to outline our proposal to strengthen the midtown transmission corridor. This is an important opportunity for the community to talk personally with Hydro One and Toronto Hydro staff and learn more about the project. See times and dates for the PICs listed on this page.



### PUBLIC INFORMATION CENTRE SCHEDULE

February 17, 2009	February 18, 2009	February 24, 2009
Leaside Memorial Gardens 1078 Millwood Rd., Toronto William Lea Room 5 – 9 p.m.	Rosedale Heights School of the Arts 711 Bloor Street East Cafeteria 6 – 9:30 p.m.	Timothy Eaton Memorial Church 230 St. Clair Ave. W. Flora McCrea Auditorium 5 – 9 p.m.

## MidtownProject

Project Website: [www.HydroOneNetworks.com/Midtown](http://www.HydroOneNetworks.com/Midtown)  
Project Hotline : 416-345-6799

Your input is very important to us, and there are many ways you can reach us. If you would like more information about this project and want to be included on the project mailing list, please contact:

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Partners in Powerful Communities

# MidtownProject

## ELECTRICITY INFRASTRUCTURE RENEWAL

### **COMMENT FORM** **Midtown Electricity Infrastructure Renewal Project** Public Information Centre Leaside Memorial Gardens February 17, 2009

THANK YOU for attending our Public Information Centre to learn more about Hydro One's plans to strengthen the existing electricity transmission facilities in your area. Please take a moment to answer a few questions and note your comments and questions below. Comments received will be considered during the environmental assessment process.

Please specify how you heard about the Public Information Centre:

- ☐ Newspaper ad  
☐ Flyer delivered to your home  
☐ Hydro One website  
☐ Other \_\_\_\_\_

In your opinion, what are the most significant issues, potential effects or benefits associated with the proposed Midtown Project?

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What criteria do you feel are important when identifying alternative routes for the transmission cables and selecting a preferred route?

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Were the information displays and maps helpful in explaining the project? Yes / No

Were Hydro One and consultant staff able to adequately answer your questions? Yes / No

Additional Comments or Questions:

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- ☐ Please check here if you would like to be on the mailing list for this project and provide your contact information below. Also indicate your preferred method of receiving project information by circling Mailing Address or Email.

Name: \_\_\_\_\_

Mailing Address & Postal Code: \_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_

**With the exception of personal information, all comments will become part of the public record.**

**Please give your comment form to one of Hydro One's representatives at the Public Information Centre, or send your comments to:**

Marylena Stea  
Hydro One Networks Inc.  
483 Bay Street, 8<sup>th</sup> Floor, South Tower  
Toronto, Ontario M5G 2P5  
Tel. (416) 345-5706; Fax: 416-345-6984  
Email : [Community.Relations@HydroOne.com](mailto:Community.Relations@HydroOne.com)



# MidtownProject

## ELECTRICITY INFRASTRUCTURE RENEWAL

### **COMMENT FORM** **Midtown Electricity Infrastructure Renewal Project** Public Information Centre December 1, 2009

THANK YOU for attending our Public Information Centre to find out more about Hydro One's plans to strengthen the existing electricity transmission facilities in your area. Please take a moment to answer a few questions and note your thoughts, comments or questions below.

Please specify how you heard about the Public Information Centre:

- ☐ Newspaper ad
- ☐ Flyer delivered to your home
- ☐ Hydro One website
- ☐ Other\_\_\_\_\_

What is your opinion on the preferred option for the Midtown Project?

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Have we provided you with enough information on the preferred option, the selection process, and proposed mitigation measures?

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Were the information displays and maps helpful in explaining the project?  
Yes / No

Were Hydro One and consultant staff able to adequately answer your questions? Yes / No

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Please note any questions, comments, or concerns you may have regarding the information presented to you today.

Additional Comments or Questions:

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☐ Please check here if you would like to be on the mailing list for this project and provide your contact information below.

Name: \_\_\_\_\_

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**Please give your comment form to one of Hydro One's representatives at the Public Information Centre, or send your comments to:**

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Hydro One Networks Inc.  
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Tel. (416) 345-5706; Fax: 416-345-6984  
Email : [Community.Relations@HydroOne.com](mailto:Community.Relations@HydroOne.com)



*With the exception of personal information, all comments will become part of the public record.*

## LAND MATTERS

### 1.0 LAND DESCRIPTION

#### 1.1 Width(s) of any Right-of-Way (ROW) required on new and/or existing easements

The Midtown Electricity Infrastructure Renewal Project has been proposed to strengthen the transmission service from Leaside TS to Bridgman TS and will utilize existing and new (yet-to-be-acquired) easement rights/licences/permits. The newly configured transmission alignment includes an additional 115 kV overhead circuit from Leaside TS to Bayview Jct., a new underground tunnel from Bayview Jct. to Birch Jct., and the activation of an existing idle overhead double circuit 115 kV line from Birch Jct. to Bridgman TS.

- Between Leaside TS and Bayview Jct.: There is an existing 33.5 meter wide right-of-way easement/licence that will remain the same. However, land rights may have to be renegotiated and easements amended because of a change in type of structures for the new line, from the current steel lattice ones (see Exhibit B, Tab 2, Schedule 4 for a cross-sectional view of the existing and proposed towers).
- Between Bayview Jct. and Birch Jct.: A new sub-surface six (6) meter right-of-way will be required from CPR along rail track and City of Toronto along Road Allowance for the deep rock tunnel section.
- Between Birch Jct. and Bridgman TS: There is an existing 33.5 meter wide right-of-way easement/licence and that will remain the same. However, some additional land rights and easements have to be renegotiated at Birch Jct. for the expansion of the junction

**1.2 Location and ownership of land with existing easements and/or any new easements or land use rights that will be required**

Hydro One has existing easement/licence rights on private and government-owned lands from Leaside TS west to Bridgman TS. This encompasses easements on both public/governmental bodies and on private lands owned by the City of Toronto, Loblaw's Companies Limited, CPR, GO Transit (Metrolinx), Toronto Parks Authority and the Toronto Regional Conservation Authority. These easements covering the overhead sections of the project (Leaside TS to Bayview Jct. and Birch Jct. to Bridgman TS), may need to be modified to accommodate higher towers. The underground section of the project (from Bayview Jct. to Birch Jct.) will require new easements.

**1.3 Need and amount of additional temporary working rights required at designated locations such as roads, railways, shafts and private landowners**

Additional temporary construction and working rights will be required. These rights may be required to assist in construction and access when paralleling existing CPR and GO-Transit corridors, and when encroaching on private landowner property adjacent to Bayview Jct. along Moorehill Drive, and on Rosedale Heights Drive. Additional access rights may be required when accessing overhead towers from Birch Jct. to Bridgman TS. Access shafts for tunnel rights-of-way may be located on Hydro One or private land pending final engineering design. Road allowances may be utilized as locations for access, tunnel shafts and temporary construction areas.

## **2.0 DESCRIPTION OF LAND RIGHTS**

### **2.1 Type of land rights proposed to be acquired for the project and related facilities(e.g. permanent easement, fee simple)**

The new land rights required could be secured by way of registered easement or licence. Acquisition of land rights depends on property owner and parcel size.

### **2.2 Nature and relative proportions of land ownership along the proposed route (e.g. Freehold, Crown, or Government Entity)**

There are numerous different public, corporate, and private parcels affected by the project.

The route will cross municipal road allowances, some of which could be unopened road allowances. The provisions of the *Electricity Act, 1998* as amended, permits the use of public roads and road allowances for electrical utility installations. Adequate notice and coordination of occupation needs and construction impacts will be communicated with the municipality affected.

The rights along the CPR and GO-Transit (Metrolinx) corridors for the new rights-of-way are secured by way of licences. Current licences for the existing tower structures will have to be amended to include additional 115 kV overhead circuits and different type of structure.

Permit easement rights may be secured to allow for construction of underground tunnel line crossing green space held in public trust by the Toronto Parks Authority and the Toronto Regional Conservation Authority.

**2.3 Where no new land rights are required or slight amendments to land rights maybe required, provide a description of the existing land rights that allow for the project**

From Leaside TS to Bayview Jct. there are approximately 1.7 km of existing 33.5 meter wide right-of-way easement/licence. The corridor easement/licence will accommodate the additional 115 kV overhead circuit in this area.

From Birch Jct. to Bridgman TS there is approximately 1.4 km of existing corridor easement. This will allow for the activation of an existing idle overhead double circuit 115 kV line.

In both of the above overhead steel tower occupations, it should be noted that in the event the existing lattice steel towers are replaced with steel poles, new easements will be needed in the “footprint area” of the new structures only. These new easements will reflect the change to the original easement.

**3.0 LAND ACQUISITION PROCESS**

**3.1 Identification of the properties and the property owners and/or tenants affected by the proposed construction**

The properties that will be impacted by the new construction may vary from private landowners to governmental institutions. Hydro One will notify and carry out negotiations with affected landowner(s) and will attempt to secure appropriate voluntary settlements/agreements with the landowner(s). If voluntary agreements are not achieved with the landowner(s) Hydro One will be using the expropriation process to secure all private land owner property rights required by the project.

#### **4.0 FORMS**

Copies of the following documents are filed as Exhibit B, Tab 6, Schedule 7:

- Easement Agreement (Appendix A);
- Agreement of Purchase and Sale (Appendix B);
- Offer to Grant an Easement (Appendix C);
- Option to Purchase (Appendix D);
- Damage Claim Form (Appendix E);
- Damage Release Form (Appendix F);
- Testing and Associated Access Routes (Appendix G); and,
- Off-Corridor Temporary Access and Access Roads (Appendix H)

## EASEMENT AGREEMENT

### Schedule "A"

The Transferor is the owner in fee simple and in possession of xxxxxxxxx

(the "**Lands**")

Hydro One Networks Inc. (the "Transferee") has erected, or is about to erect, certain Works [as more particularly described in paragraph 1(a)] in, through, under, over, across, along and upon the Lands.

1. The Transferor hereby grants and conveys to the Transferee, its successors and assigns the rights and easement, free from all encumbrances and restrictions, the following unobstructed and exclusive rights, easements, rights-of-way, covenants, agreements and privileges in perpetuity (the "**Rights**") in, through, under, over across, along and upon that portion of the Lands of the Transferor described herein as xxxxxxxxxxxxxx described as Part xxxxxx of Reference Plan xxxxxxxxxxxx hereto annexed (the "**Strip**") for the following purposes:

(a) To enter and lay down, install, construct, erect, maintain, open, inspect, add to, enlarge, alter, repair and keep in good condition, move, remove, replace, reinstall, reconstruct, relocate, supplement and operate and maintain at all times in, through, under, over, across, along and upon the Strip and electrical transmission system and telecommunications system consisting in both instances of pole structures, steel towers, anchors, guys and braces and all such aboveground or underground lines, wires, cables, telecommunications cables, grounding electrodes, conductors, apparatus, works, accessories, associated material and equipment, and appurtenances pertaining to or required by either such system (all or any of which are herein individually or collectively called the ("**Works**") as in the opinion of the Transferee are necessary or convenient thereto for use as required by Transferee in its undertaking from time to time, or a related business venture.

- 1 (b) To enter on and selectively cut or prune, and to clear and keep clear, and remove all trees  
2 (subject to compensation to owners for merchantable wood values), branches, bush and  
3 shrubs and other obstructions and materials, over or upon the Strip, and without  
4 limitation, to cut and remove all leaning or decayed trees located on the Lands whose  
5 proximity to the Works renders them liable to fall and come in contact with the Works or  
6 which may in any way interfere with the safe, efficient or serviceable operation of the  
7 Works or this easement by the Transferee.
- 8 (c) To conduct all engineering, legal surveys, and make soil tests, soil compaction and  
9 environmental studies and audits in, under, on and over the Strip as the Transferee in its  
10 discretion considers requisite.
- 11 (d) To erect, install, construct, maintain, repair and keep in good condition, move, remove,  
12 replace and use bridges and such gates in all fences which are now or may hereafter be on  
13 the Strip as the Transferee may from time to time consider necessary.
- 14 (e) Except for fences and permitted paragraph 2(a) installations, to clear the Strip and keep it  
15 clear of all buildings, structures, erections, installations, or other obstructions of any  
16 nature (hereinafter collectively called the “**obstruction**”) whether above or below  
17 ground, including removal of any materials and equipment or plants and natural growth,  
18 which in the opinion of the Transferee, endanger its Works or any person or property or  
19 which may be likely to become a hazard to any Works of the Transferee or to any person  
20 or property or which do or may in any way interfere with the safe, efficient or serviceable  
21 operation of the Works or this easement by the Transferee.
- 22 (f) To enter on and exit by the Transferor’s access routes and to pass and repass at all times  
23 in, over, along, upon and across the Strip and so much of the Lands as is reasonably  
24 required, for Transferee, its respective officers, employees, agents, servants, contractors,  
25 subcontractors, workmen and permittees with or without all plant machinery, material,  
26 supplies, vehicles and equipment for all purposes necessary or convenient to the exercise  
27 and enjoyment of this easement subject to compensation afterwards for any crop or other  
28 physical damage only to the Lands or permitted structures sustained by the Transferor  
29 caused by the exercise of this right of entry and passageway.
- 30 (g) To remove, relocate and reconstruct the line on or under the Strip subject to payment by  
31 the Transferee of additional compensation for any damage caused thereby.
- 32



1     2. The Transferor agrees that:

- 2
- 3       (a) It will not interfere with any Works established on or in the Strip and shall not, without
- 4           the Transferee's consent in writing, erect or cause to be erected or permit in, under or
- 5           upon the Strip any obstruction or plant or permit any trees, bush, shrubs, plants or natural
- 6           growth which does or may interfere with the Rights granted herein. The Transferor
- 7           agrees it shall not, without the Transferee's consent in writing, change or permit the
- 8           existing configuration, grade or elevation of the Strip to be changed, and the Transferor
- 9           further agrees that no excavation or opening or work which may disturb or interfere with
- 10          the existing surface of the Strip shall be done or made unless consent therefor in writing
- 11          has been obtained from Transferee, provided however, that the Transferor shall not be
- 12          required to obtain such permission in case of emergency. Notwithstanding the foregoing,
- 13          in cases where in the reasonable discretion of the Transferee, there is no danger or
- 14          likelihood of danger to the Works of the Transferee or to any persons or property and the
- 15          safe or serviceable operation of this easement by the Transferee is not interfered with, the
- 16          Transferor may at its expense and with the prior written approval of the Transferee,
- 17          construct and maintain roads, lanes walks, drains, sewers water pipes, oil and gas
- 18          pipelines, fences (not to exceed 2 metres in height) and service cables on or under the
- 19          Strip (the "**Installation**") or any portion thereof; provided that prior to commencing such
- 20          Installation, the Transferor shall give to the Transferee thirty (30) days' notice in writing
- 21          thereof to enable the Transferee to have a representative present to inspect the proposed
- 22          Installation during the performance of such work, and provided further that Transferor
- 23          comply with all instructions given by such representative and that all such work shall be
- 24          done to the reasonable satisfaction of such representative. In the event of any
- 25          unauthorized interference aforesaid or contravention of this paragraph, or if any
- 26          authorized interference, obstruction or Installation is not maintained in accordance with
- 27          the Transferee's instructions or in the Transferee's reasonable opinion, may subsequently
- 28          interfere with the Rights granted herein, the Transferee may at the Transferor's expense,
- 29          forthwith remove, relocate, clear or correct the offending interference, obstruction,
- 30          Installation or contravention complained of from the Strip, without being liable for any
- 31          damages cause thereby.
- 32       (b) Notwithstanding any rule of law or equity, the Works installed by the Transferee shall at
- 33           all times remain the property of the Transferee, notwithstanding that such Works are or
- 34           may become annexed or affixed to the Strip, and shall at anytime and from time to time
- 35           be removable in whole or in part by Transferee.

- 1 (c) No other easement or permission will be transferred or granted and no encumbrances will  
2 be created over or in respect to the Strip, prior to the registration of a Transfer of this  
3 grant of Rights.
- 4 (d) The Transferor will execute such further assurances of the Rights in respect of this grant  
5 of easement as may be requisite.
- 6 (e) The Rights hereby granted:
- 7 (i) shall be of the same force and effect to all intents and purposes as a covenant running  
8 with the Strip; and
- 9 (ii) are declared hereby to be appurtenant to and for the benefit of the Works and  
10 undertaking of the Transferee described in paragraph 1(a).
- 11
- 12 3. The Transferee covenants and agrees to obtain at its sole cost and expense all necessary  
13 postponements and subordinations (in registrable form) from all current and future prior  
14 encumbrancers, postponing their respective rights, title and interest to the transfer of  
15 easement herein so as to place such Rights and easement in first priority on title to the Lands.  
16
- 17 4. There are no representations, covenants agreements, warranties and conditions in any way  
18 relating to the subject matter of this grant of Rights whether expressed or implied, collateral  
19 or otherwise except those set forth herein.
- 20
- 21 5. No waiver of a breach or any of the covenants of this grant of Rights shall be construed to be  
22 a waiver of any succeeding breach of the same or any other covenant.
- 23
- 24 6. The burden and benefit of this transfer of Rights shall run with the Strip, and the Works and  
25 undertaking of the Transferee and shall extend to, be binding upon and enure to the benefit of  
26 the parties hereto and their respective heirs, executors, administrators, successors and assigns.  
27

## **AGREEMENT OF PURCHASE AND SALE**

**THIS AGREEMENT** made and entered into as of this        th day of        , 20XX,  
**BETWEEN:**

(collectively the "**Vendor**")

OF THE FIRST PART

**AND:**

**HYDRO ONE NETWORKS INC.**

(the "**Purchaser**")

OF THE SECOND

PART

**WITNESSETH THAT** in consideration of the mutual covenants, agreements and payments herein provided, the parties hereto covenant and agree as follows:

### **1.0 OFFER**

- 1.1 The Purchaser hereby offers to buy from the Vendor certain lands and premises of the Vendor, more particularly described as ●, (the "**Property**") and more particularly described in Schedule "A" attached hereto, upon and subject to the terms and conditions hereinafter set forth.
- 1.2 The Purchaser acknowledges having inspected the Property prior to submitting this Offer and understands that upon acceptance of this Offer by the Vendor there shall be a binding agreement of Purchase and Sale between the Purchaser and the Vendor.
- 1.3 Included in the Purchase Price is the purchase of all of the Vendor's interest in all fixtures, improvements, and appurtenances located on the Property except those listed below which are expressly excluded: nil

### **2.0 PURCHASE PRICE**

- 2.1 The purchase price to be paid by the Purchaser to the Vendor for the Property shall be the sum of ● THOUSAND (\$●,000.00) Canadian Dollars, (the "**Purchase Price**") payable as follows:
  - (a) ● (\$●.00) dollars submitted by the Purchaser upon the execution of this Agreement as a deposit to be held in trust pending completion or other termination of this Agreement and to be credited on account of the Purchase Price on completion (the "**Deposit**")

- (b) the balance of the Purchase Price by cash, bank draft or uncertified cheque at the time of closing in accordance with section 3.2 (b) of this Agreement.

### **3.0 CLOSING**

- 3.1 The closing of this transaction shall take place at \_\_\_\_:\_\_\_\_ am/pm on the • th day of •, 20●● or such earlier time and at such place as shall be agreed in writing by the parties hereto (the "**Closing**").

#### **3.2 On Closing,**

- (a) Vacant possession of the Property shall be given to the Purchaser.
- (b) Purchaser shall pay the balance of the Purchase Price to the Vendor in accordance with section 2.1(b) of this Agreement;
- (c) Rents, realty taxes, local improvement charges, water and unmetered utility charges and the cost of fuel as applicable shall be apportioned and allowed to the date of completion (the day itself to be apportioned to the Purchaser).
- (d) In addition to the Purchase Price, the Purchaser shall pay and the Vendor will collect Goods and Services Tax ("**GST**") on Closing in the amount of 7% of the Purchase Price (or the amount then applicable) together with the balance of the Purchase Price on Closing, unless the Purchaser provides at the time of Closing a satisfactory declaration and indemnity in favour of the Vendor stating that the Purchaser is a registrant for the purposes of GST under the Excise Tax Act, R.S.C. 1985, c. E-15, as amended, and covenants with the Vendor to pay all GST payable in connection with this transaction directly to Revenue Canada, indicating the Purchaser's registration number, that such registration is in good standing, that the Purchaser is acquiring the Property as principal, and that the Purchaser agrees to indemnify and save harmless the Vendor against all loss or costs incurred as a result of any claim, suit or liability whatever with respect to the payment of any GST arising out of the sale of the Property, including any penalties, interest or other charges.

### **4.0 REPRESENTATIONS AND WARRANTIES OF VENDOR**

- 4.1 The Purchaser shall be allowed thirty (30) days from the date of this Agreement (the "**Inspection Period**") to satisfy itself with respect to all matters respecting the Property including its present state of repair and condition and any structures thereon, all encumbrances and all regulations and by-laws governing the Property and the Vendor grants to the Purchaser the right to enter upon the Property and to conduct such inspections, surveys and tests as the Purchaser, acting reasonably, deems necessary in this regard, provided the Purchaser takes all reasonable care in the conduct of such inspections, surveys and tests and restores the Property to its prior condition so far as reasonably possible following such inspections and tests. The Vendor assumes no responsibility for and the Purchaser shall indemnify and save harmless the Vendor from and against all claims, demands, costs, damages, expenses and liabilities whatsoever arising out of its presence on the Property or of its activities on or in connection with the Property during the Inspection Period.

- 4.2 If for any reason, the Purchaser, acting reasonably, is not satisfied with respect to such matters arising from its activities in Section 4.1, it may deliver a notice (the "**Notice of Termination**") to the Vendor prior to the expiry of the Inspection Period indicating that it is not satisfied with respect to such matters and desires to terminate this Agreement and release the Vendor from any further obligations. Upon delivery by the Purchaser of a Notice of Termination to the Vendor, and this Agreement shall be at an end and the Vendor shall return the deposit to the Purchaser without interest or deduction and neither Party shall have any further obligation to the other respecting the Agreement.

## **5.0 TITLE SEARCH PERIOD**

- 5.1 The Purchaser shall be allowed thirty (30) days from the date of this Agreement to investigate title to the Property at its own expense (the "**Title Search Period**"), to satisfy itself that there are no outstanding encumbrances, or liens save and except those listed in Schedule "B" attached hereto and until the earlier of: (i) thirty (30) days from the later of the last date of the title search period or the date on which the conditions in this Agreement are fulfilled or otherwise waived or; (ii) five (5) days prior to completion, to satisfy itself that there are no outstanding work orders or deficiency notices affecting the property. Vendor hereby consents to the Municipality or other governmental agencies releasing to the Purchaser details of all outstanding work orders affecting the Property and the Vendor agrees to execute and deliver such further authorizations in this regard as Purchaser may reasonably require.
- 5.2 Provided that the title to the Property is good and free from all registered restrictions, charges, liens and encumbrances except those listed in Schedule "B" attached hereto, if within the Title Search Period, any valid objection to title is made by the Purchaser in writing to the Vendor together with documentary verification thereof, and which the Vendor shall be unwilling or unable to remove and which the Purchaser will not waive, this Agreement, notwithstanding any intermediate acts or negotiations in respect of such objections, shall be at an end and the Deposit shall be returned to the Purchaser, without interest or deduction, and the Vendor shall not be liable for any costs or damages and the Vendor and the Purchaser shall be released from all obligations hereunder, and the Vendor shall also be released from all obligations under this Agreement, save and except those covenants of the Purchaser expressly stated to survive Closing or other termination of this Agreement. Save as to any valid objection to title made in accordance with this Agreement and within the Title Search Period, and except for any objection going to the root of title, Purchaser shall be conclusively deemed to have accepted Vendor's title to the Property.
- 5.3 The Vendor and Purchaser agree that there is no condition, express, or implied, representation or warranty of any kind that the future intended use of the Property by the Purchaser is or will be lawful except as may be specifically stipulated elsewhere in this Agreement.
- 5.4 The Vendor agrees to provide to the Purchaser any existing survey of the property, within Fifteen (15) days from the date of the Agreement herein.

## **6.0 REPRESENTATIONS AND WARRANTIES OF PURCHASER**

- 6.1 Purchaser shall, at its own cost, forthwith make such investigation as the Purchaser deems appropriate of the Property and Vendor's title as provided for in this Agreement and shall notify the Vendor of any objection to title, together with a complete copy of any documents and other material

information related thereto prior to the expiry of the Inspection Period and Title Search Period.

## **7.0 INSURANCE**

- 7.1 The Vendor covenants and agrees that the Property and all structures or fixtures being purchased are insured, and that such insurance will remain in force until closing. The Property and all structures or fixtures being purchased shall be and remain at the risk of the Vendor until Closing.
- 7.2 Pending completion, Vendor shall hold all insurance policies and the proceeds thereof in trust for the parties as their interests may appear and in the event of substantial damage to the Property the Purchaser may either terminate this Agreement and have all monies paid by the Purchaser returned to the Purchaser without interest or deduction or else take the proceeds of any insurance and complete the purchase.

## **8.0 RESTRICTIONS AND LIMITATIONS**

- 8.1 This Agreement shall be effective to create an interest in the Property only if the applicable subdivision control provisions of the Planning Act, R.S.O. 1990, as amended, are complied with by the Vendor prior to Closing. The Vendor shall forthwith make any application to the local Committee of Adjustment or Land Division Committee for any consent that may be required pursuant to the Planning Act. In the event that any such application for consent is denied, or any condition imposed by such body is unacceptable to the Vendor, this Agreement shall be terminated and the Deposit returned to the Purchaser without interest or deduction.

## **9.0 ADDITIONAL PROVISIONS**

- 9.1 The Transfer/Deed of Land (the "**Transfer**"), save for Land Transfer Tax Affidavits, shall be prepared in registrable form by the Vendor, and the Purchaser covenants at its cost to register the Transfer on Closing. If requested by Purchaser, Vendor covenants that the Transfer Deed to be delivered on completion shall contain the statements contemplated by s. 50(22) of the Planning Act, R.S.O. 1990.
- 9.2 Time shall in all respects be of the essence hereof provided that the time for doing or completing of any matter provided for herein may be extended or abridged by an agreement in writing signed by the Parties or by their respective solicitors who are specifically authorized in that regard.
- 9.3 Any tender of documents or money hereunder may be made upon the Parties or their respective solicitors on the Closing day. Money may be tendered by bank draft or uncertified cheque.
- 9.4 The Vendor shall be responsible for and agrees to pay any applicable commission, negotiated and payable in accordance with a listing agreement with the Vendor's agent, upon successful Closing of the transaction contemplated by this Agreement, which commission shall be paid out of the proceeds of the Purchase Price.
- 9.5 Where this Agreement requires notice to be delivered by one party to the other, such notice shall be given in writing and delivered either personally, or by pre-paid registered post or by

facsimile, by the party wishing to give such notice, or by the solicitor acting for such party, to the other party or to the solicitor acting for the other party at the addresses noted below:

To: Vendor

Facsimile No:

Phone:

Attention:

To: Purchaser

Hydro One Networks Inc.  
Real Estate Services  
P.O. Box 4300  
Markham, ON  
L3R 5Z5

Facsimile No:

Phone:

Attention:

Such notice shall be deemed to have been given, in the case of personal delivery, on the date of delivery, and, where given by registered post, on the third business day following the posting thereof, and if sent by facsimile, the date of delivery shall be deemed to be the date of transmission if transmission occurs prior to 4:00 p.m. (Toronto time) on a business day and on the business day next following the date of transmission in any other case. It is understood that in the event of a threatened or actual postal disruption in the postal service in the postal area through which such notice must be sent, notice must be given personally as aforesaid or by facsimile, in which case notice shall be deemed to have been given as set out above.

- 9.6 The Parties acknowledge that there are no covenants, representations, warranties, agreements or conditions, express or implied, collateral or otherwise, forming part of or in any way affecting or relating to this Agreement save as expressly set out in this Agreement and that this Agreement and all Schedules hereto constitute the entire agreement between the parties and may not be modified except as expressly agreed between the Vendor and Purchaser in writing.
- 9.7 Should any provision or provisions of this agreement be declared illegal or unenforceable, it or they shall be considered separate and severable from the Agreement and its remaining provisions shall remain in force and be binding upon the parties hereto as though the said provision or provisions had never been included.
- 9.8 No act or omission or delay in exercising any right or enforcing any term, covenant or agreement to be performed under this Agreement shall impair such right or be construed as

to be a waiver of any default or acquiescence in such failure to perform, unless such waiver shall be given or acknowledged in writing.

- 9.9 This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario.
- 9.10 This Agreement shall constitute the entire Agreement between the Purchaser and Vendor and there is no representation, warranty, collateral agreement or condition affecting this Agreement or the Property or supported hereby other than as expressed herein in writing. This Agreement shall be read with all changes of gender or number required by the context.
- 9.11 This Agreement and everything herein contained shall operate to the benefit of, and be binding upon, the respective heirs, successors, permitted assigns and other legal representatives, as the case may be, of each of the Parties hereto.
- 9.12 Each of the Vendors warrants that spousal consent is not necessary to this transaction under the provision of the Family Law Act, R.S.O. 1990 unless each of the Vendors' spouse has executed the consent hereinafter provided.
- 9.13 Where each of the Vendor and the Purchaser retain a solicitor to complete this Agreement and where the transaction contemplated herein will be completed by electronic registration pursuant to Part 111 of the Land Registration Reform Act, R.S.O. 1990, and any amendments thereto, the Vendor and the Purchaser acknowledge and agree that the delivery of documents and the release thereof to the Vendor and the Purchaser may, at the solicitor's discretion; (a) not occur contemporaneously with the registration of the Transfer/Deed of Land (and other registrable) documentation), and (b) be subject to conditions whereby the solicitor receiving documents and/or money will be required to hold them in trust and not release them except in accordance with the terms of a written agreement between the solicitors.
- 9.14 Except as otherwise provided herein, each Party shall be responsible to pay its own taxes, legal costs, and the cost of preparation and registration of its own documents.
- 9.15 This Agreement and any right or interest transferred hereby may be registered on title to the Property.
- 9.16 The provisions of the attached Schedules "A" and "B" shall form part of this Agreement as if set out herein.
- 9.17 The Vendor and Purchaser agree to take all necessary precautions to maintain the confidentiality of the terms and conditions contained herein. The Vendor acknowledges that this Agreement and any information or documents that are provided to the Purchaser may be released pursuant to the provisions of the *Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. F.31, as amended. This acknowledgment shall not be construed as a waiver of any right to object to the release of this Agreement or of any information or documents.



**IN WITNESS WHEREOF** the Parties have hereunto set their respective hands and seals to this Agreement of Purchase and Sale.

SIGNED, SEALED AND DELIVERED

In the presence of

(seal)

SIGNED, SEALED AND DELIVERED

In the presence of

(seal)

Vendor

Consent Signature & Release of  
Vendor's Spouse, if non-owner.

**HYDRO ONE NETWORKS INC.**

Per: \_\_\_\_\_

Title: \_\_\_\_\_

I have authority to bind the Corporation

**OFFER TO GRANT AN EASEMENT TO  
HYDRO ONE NETWORKS INC.**

I/We, [Insert Transferor's Name(s)] (the "**Transferor(s)**"), being the owner/owners of [Insert Complete Legal Description] (herein called the "**Lands**") in consideration of payment of the sum of five (\$**5.00**) **DOLLARS** (the "**Offer Consideration**"), and other good and valuable consideration (the sufficiency of which consideration is hereby acknowledged), hereby covenants and agrees as follows:

1(a) THE Transferor hereby grants to Hydro One Networks Inc. its successors and assigns (the "**Transferee**") the exclusive right, irrevocable during the periods of time below specified in paragraph 2, (the "**Offer**") to purchase free from all encumbrances upon the terms and conditions hereinafter set out the perpetual rights, easements and privileges set out in the Transfer and Grant of Easement document (the "**Transfer of Easement**") annexed hereto as Schedule "A" (the "**Rights**") in, through, under, over, across, along and upon that portion of the above Lands as shown highlighted in red on Schedule "B" hereto annexed (the "**Strip**").

1(b) THE purchase price for the Rights shall be the sum of [Insert amount] (\$) **00.00** (Dollars) (the "**Purchase Price**") of lawful money of Canada to be paid by cash or uncertified cheque to the Transferor on Closing.

2. THIS Offer may be accepted by Transferee any time within 60 days from the date of this Agreement by a letter delivered or facsimile transmission or mailed postage prepaid and registered, to the Transferor at the address set out in paragraph 12. If this Offer is not accepted within this time frame, this Agreement and everything herein contained shall be null, void and of no further force and effect. If this offer is accepted by the Transferee in the manner aforesaid, this Agreement and the letter accepting such Offer shall then become a binding contract between the parties, and the same shall be completed upon the terms herein provided for.

3. THE Transfer of Easement arising from the acceptance of this Offer shall be executed and delivered to the Transferee on or before the One Hundred and Twentieth (120<sup>th</sup>) day after the date of Transferee's acceptance of this Offer (the "**Closing**") subject to the availability of a satisfactory survey, if required, and time shall in all respects be of the essence hereof. If no satisfactory survey is then available, the date for Closing shall be extended in Transferee's sole discretion to a date not exceeding sixty (60) days from the said One Hundred and Twentieth (120<sup>th</sup>) day and this purchase transaction shall then be completed on such extended date for Closing.

4. IF the Transferee accepts the Offer herein: a) the Transferee shall not grant or transfer an easement or permission, or create any encumbrance over or in respect of the Strip prior to registration of the Transfer of Easement, and b) the Transferee has permission to approach prior encumbrancers to obtain all necessary consents, postponements or subordinations (in registrable form) from all current

and future prior encumbrancers, consenting to this Transfer of Easement, and/or postponing their respective rights, title and interest so as to place such Rights and Transfer of Easement in first priority on title to the Strip.

5. TITLE to the Strip shall at Closing be good and free from all registered restrictions, charges, liens, easements and encumbrances of any kind whatsoever except for those title matters disclosed in Schedule "C".

6. THE Transfer of Easement and all ancillary documents necessary to register same on title shall be prepared by and at the expense of the Transferee and shall be substantially in the form as the annexed Schedule "A". The Transferor hereby covenants and agrees that the Transferee may, at its option, register this Agreement or Notice thereof, and the Transfer of Easement on title to the Lands, and the Transferor hereby covenants and agrees to execute, at no further cost or condition to the Transferee, such other instruments, plans and documents as may reasonably be required by the Transferee to effect registration of this Agreement or Notice thereof prior to Closing and the Transfer of Easement at any time thereafter.

7. THE Transferor covenants and agrees with Transferee that it has the right to convey the Rights without restriction and that Transferee will quietly possess and enjoy the Rights and that Transferor will execute upon request such further assurances of the Rights as may be requisite to give effect to the provisions of this Agreement.

8. AS of the date of the Transferee's acceptance of the Offer, the Transferor grants to the Transferee, in consideration of the Offer Consideration, free from all encumbrances and restrictions the following rights, easements, rights of way, covenants, agreements and privileges in, through, under, over, across, along and upon the Strip:

- (a) to erect, maintain, operate, repair, replace, relocate, upgrade, reconstruct, and remove at any time and from time to time, an electrical transmission line or lines and communication line or lines consisting of all necessary pole structures and steel towers, poles and anchors with all guys, braces, wires, cables and associated material and equipment (all or any of which works are herein called "the line");
- (b) to erect, maintain and use such gates in all fences which are now or may hereafter be on the Strip as the Transferee may from time to time consider necessary;
- (c) to mark the location of the line under the Strip by suitable markers, but said markers when set in the ground shall be placed in fences or other locations which will not interfere with any reasonable use the Transferor shall make of the Strip;
- (d)
  - (i) to cut selectively trees and shrubs on the Strip and to keep it clear of all trees, shrubs and brush which may interfere with the safe operation and maintenance of the line;
  - (ii) subject to payment of additional compensation therefore, to cut prune, and remove if necessary trees located outside the Strip whose condition renders them liable to interfere with the safe operation and maintenance of the line;

- (e) To conduct engineering and legal surveys in, on and over the Strip;
- (f) To clear the Strip and keep it clear of all buildings, structures and other obstructions of any nature whatever including removal of any materials which in the opinion of the Transferee are hazardous to the line. Notwithstanding the foregoing, in all cases where in the sole discretion of the Transferee the safe operation and maintenance of the line is not endangered or interfered with, the Transferor from time to time or the person or persons entitled thereto, may with prior written approval of Transferee, at his or her own expense construct and maintain roads, lanes, walks, drains, sewers, water pipes, oil and gas pipelines, and fences (not to exceed 2 metres in height) on or under the Strip or any portion thereof, provided that prior to commencing any such installation, the Transferor shall give the Transferee 30 days notice in writing so as to enable Transferee to have a representative inspect the site and be present during the performance of the work and that the Transferor complies with any instructions which may be given by such representative in order that such work may be carried out in such a manner as not to endanger, damage or interfere with the line.
- (g) To enter on, and exit from, and to pass and repass at any and all times in, over, along, upon, across, through and under the Strip and so much of the Lands as may be reasonably necessary, at all reasonable times, for the Transferee and its respective officers, employees, workers, permittees, servants, agents, contractors and subcontractors, with or without vehicles, supplies, machinery, plant, material and equipment for all purposes necessary or convenient to the exercise and enjoyment of the said rights and easement subject to payment by the Transferee of compensation for any crop or other physical damage only to the Land caused by the exercise of this right of entry and passageway; and
- (h) To remove, relocate and reconstruct the line on or under the Strip, subject to payment by the Transferee of additional compensation for any damage caused thereby.

9. THE Transferor consents to the Transferee, its respective officers, employees, agents, contractors, sub-contractors, workers and permittees or any of them entering on, exiting and passing and repassing in, on, over, along, upon, across, through and under the Strip and so much of the Lands as may be reasonably necessary, at all reasonable times after the date of this Agreement until such time as this Offer is accepted and the purchase is completed with or without all plant, machinery, material, supplies, vehicles, and equipment, for all purposes necessary or convenient to the exercise and enjoyment of the Rights, subject to compensation afterwards for any crop or other physical damage only to the Lands or permitted structures sustained by the Transferor caused by the exercise of this right of entry and passageway.

10. THIS Agreement and Transfer and Grant of Easement Rights shall both be subject to the condition that the provisions of The Planning Act, R.S.O. 1990, c. P. 18, as amended, have, in the opinion of Transferee, been satisfactorily complied with. If after consultation with Provincial Agencies and Municipalities, the Transferee decides that the provisions of the Planning Act, R.S.O. 1990, c.P.18, and amendments thereto, have not been or cannot be complied with, it may, at its option, cancel this Agreement.

11. ANY documents or money payable hereunder may be tendered upon the parties hereto or their respective solicitors and money may be tendered by negotiable uncertified cheque or cash.

12. ANY acceptance of this Offer, demand, notice or other communication to be given in connection with this Agreement shall be given in writing and shall be given by personal delivery, by registered mail postage prepaid, or by facsimile transmission, addressed to the recipient as follows:

To: Transferee

To: Transferor

Hydro One Networks Inc.  
185 Clegg Road,  
Markham, Ontario  
L6G 1B7

Facsimile No:

Facsimile No.

Phone:

Phone:

Attention:

Attention:

or to such other address, facsimile number or individual as may be designated by notice given by either party to the other. Any acceptance of this offer, demand, notice or other communication shall be conclusively deemed to have been given when actually received by the addressee or upon the second day after the day of mailing.

13. THE Transferor represents that he is not now and at the time of Closing shall not be a spouse within the meaning of the Family Law Act, R.S.O. 1990, c. F. 3, as amended, failing which, the Transferor shall cause this Agreement and all related documents to be accepted and consented to in writing by the spouse of the Transferor to the satisfaction of the Transferee and at no further cost or condition.

14. IN the event of and upon acceptance of this Offer by the Transferee in manner aforesaid this Agreement and the letter accepting such Offer shall then become a binding contract of sale and purchase between the parties, and the same shall be completed upon the terms herein provided for.

15. The Transferee will covenant and agree with the Transferor to indemnify and save harmless the Transferor, his tenants, or other lawful occupiers of the Strip for any loss, damage and injury caused by the acceptance of the Offer and the granting and transfer of Rights or anything done pursuant thereto or arising from any accident (not excluding any Act of God) that would not have happened but for the presence of its line on the Strip, provided, however, that the Transferee shall not be liable to the extent to which such loss, damage, or injury is caused or contributed to by the neglect or default of the Transferor, his tenants guests, invitees or other lawful occupiers of the Strip or their servants, agents, or workmen.

16. THE Transferor covenants and agrees that if and before the Transferor sells, transfers, assigns, disposes (or otherwise parts with possession) of all or part of the Lands to a third party (the "Third Party") the Transferor shall use best efforts to ensure that the third party assumes the burden and benefit of this Agreement, and agrees to be bound by it. Accordingly the Transferor covenants and agrees to use best efforts to obtain from the Third Party a written acknowledgement and agreement that the Third Party is aware of this Agreement and will continue to be bound by the terms, conditions and stipulations of this Agreement.

17. ALL covenants herein contained shall be construed to be several as well as joint, and wherever the singular and the masculine are used in this Agreement, the same shall be construed as meaning the plural or the feminine or neuter, where the context or the identity of the Transferor/Transferee so requires.

18. THE burden and benefit of this Agreement shall run with the Strip and the works and undertaking of the Transferee and shall be binding upon and enure to the benefit of the parties hereto and their respective heirs, executors, administrators, successors and assigns.

**IN WITNESS WHEREOF** the Transferor has hereunto set their hands and seals to this Agreement, this \_\_\_\_\_ day of \_\_\_\_\_, 20XX

SIGNED

In the presence of

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\_\_\_\_\_  
Transferor's Name

\_\_\_\_\_  
Transferor's Name

Consent Signature & Release of  
Transferor's Spouse, if non-owner.

\_\_\_\_\_

## SCHEDULE "A"

### (7) INTEREST / ESTATE TRANSFERRED

The Transferor is the owner in fee simple and in possession of \_\_\_\_\_ ( "**Lands**").

The Transferee has erected, or is about to erect, certain Works (as more particularly described in paragraph 1(a) hereof) in, through, under, over, across, along and upon the Lands.

1 The Transferor hereby grants and conveys to Hydro One Networks Inc, its successors and assigns the rights and easement, free from all encumbrances and restrictions, the following unobstructed and exclusive rights, easements, covenants, agreements and privileges in perpetuity (the "**Rights**") in, through, under, over, across, along and upon that portion of the Lands of the Transferor described herein and shown highlighted on Schedule "B" hereto annexed (the "**Strip**") for the following purposes:

- (a) To enter and lay down, install, construct, erect, maintain, open, inspect, add to, enlarge, alter, repair and keep in good condition, move, remove, replace, reinstall, reconstruct, relocate, supplement and operate and maintain at all times in, through, under, over, across, along and upon the Strip an electrical transmission system and telecommunications system consisting in both instances of a pole structures, steel towers, anchors, guys and braces and all such aboveground or underground lines, wires, cables, telecommunications cables, grounding electrodes, conductors, apparatus, works, accessories, associated material and equipment, and appurtenances pertaining to or required by either such system (all or any of which are herein individually or collectively called the "**Works**") as in the opinion of the Transferee are necessary or convenient thereto for use as required by Transferee in its undertaking from time to time, or a related business venture.
- (b) To enter on and selectively cut or prune, and to clear and keep clear, and remove all trees (subject to compensation for merchantable wood values), branches, bush and shrubs and other obstructions and materials in, over or upon the Strip, and without limitation, to cut and remove all leaning or decayed trees located on the Lands whose proximity to the Works renders them liable to fall and come in contact with the Works or which may in any way interfere with the safe, efficient or serviceable operation of the Works or this easement by the Transferee.
- (c) To conduct all engineering, legal surveys, and make soil tests, soil compaction and environmental studies and audits in, under, on and over the Strip as the Transferee in its discretion considers requisite.
- (d) To erect, install, construct, maintain, repair and keep in good condition, move, remove, replace and use bridges and such gates in all fences which are now or may hereafter be on the Strip as the Transferee may from time to time consider necessary.

- (e) Except for fences and permitted paragraph 2(a) installations, to clear the Strip and keep it clear of all buildings, structures, erections, installations, or other obstructions of any nature (hereinafter collectively called the "**obstruction**") whether above or below ground, including removal of any materials and equipment or plants and natural growth, which in the opinion of the Transferee, endanger its Works or any person or property or which may be likely to become a hazard to any Works of the Transferee or to any persons or property or which do or may in any way interfere with the safe, efficient or serviceable operation of the Works or this easement by the Transferee.
- (f) To enter on and exit by the Transferor's access routes and to pass and repass at all times in, over, along, upon and across the Strip and so much of the Lands as is reasonably required, for Transferee, its employees, agents, contractors, subcontractors, workmen and permittees with or without all plant machinery, material, supplies, vehicles and equipment for all purposes necessary or convenient to the exercise and enjoyment of this easement, subject to compensation afterwards for any crop or other physical damage only to the Lands or permitted structures sustained by the Transferor caused by the exercise of this right of entry and passageway.

2. The Transferor agrees that:

- (a) It will not interfere with any Works established on or in the Strip and shall not, without the Transferee's consent in writing, erect or cause to be erected or permit in, under or upon the Strip any obstruction or plant or permit any trees, bush, shrubs, plants or natural growth which does or may interfere with the Rights granted herein. The Transferor agrees it shall not, without the Transferee's consent in writing, change or permit the existing configuration, grade or elevation of the Strip to be changed and the Transferor further agrees that no excavation or opening or work which may disturb or interfere with the existing surface of the Strip shall be done or made unless consent therefore in writing has been obtained from Transferee, provided however, that the Transferor shall not be required to obtain such permission in case of emergency. Notwithstanding the foregoing, in cases where in the reasonable discretion of the Transferee, there is no danger or likelihood of danger to Works of the Transferee or to any persons or property and the safe or serviceable operation of this easement by the Transferee is not interfered with, the Transferor may at its expense and with the prior written approval of the Transferee, construct and maintain roads, lanes, walks, drains, sewers, water pipes, oil and gas pipelines and service cables on or under the Strip (the "**Installation**") or any portion thereof; provided that prior to commencing such Installation, the Transferor shall give to the Transferee a minimum of ten days notice in writing thereof to enable the Transferee to have a representative present to inspect the proposed Installation during the performance of such work, and provided further that Transferor comply with all instructions given by such representative and that all such work shall be done to the reasonable satisfaction of such representative. In the event of any unauthorised interference aforesaid or contravention of this paragraph, or if any authorised interference, obstruction or Installation is not maintained in accordance with the Transferee's instructions or in the Transferee's reasonable opinion, may subsequently interfere with the Rights granted herein, the Transferee may at the Transferor's expense, forthwith remove, relocate, clear or correct the offending



interference, obstruction, Installation or contravention complained of from the Strip, without being liable for any damages caused thereby.

- (b) notwithstanding any rule of law or equity, the Works installed by the Transferee shall at all times remain the property of the Transferee, notwithstanding that such Works are or may become annexed or affixed to the Strip and shall at anytime and from time to time be removable in whole or in part by Transferee.
- (c) No other easement or permission will be transferred or granted and no encumbrances will be created over or in respect to the Strip, prior to the registration of a Transfer of this grant of Rights.
- (d) the Transferor will execute such further assurances of the Rights in respect of this grant of easement as may be requisite.
- (e) the Rights hereby granted:
  - (i) shall be of the same force and effect to all intents and purposes as a covenant running with the Strip.
  - (ii) is declared hereby to be appurtenant to and for the benefit of the Works and undertaking of the Transferee described in paragraph 1(a).

- 3. The Transferee covenants and agrees to obtain at its sole cost and expense all necessary postponements and subordinations (in registrable form) from all current and future prior encumbrancers, postponing their respective rights, title and interests to the Transfer of Easement herein so as to place such Rights and easement in first priority on title to the Lands.
- 4. There are no representations, covenants, agreements, warranties and conditions in any way relating to the subject matter of this grant of Rights whether expressed or implied collateral or otherwise except those set forth herein.
- 5. No waiver of a breach or any of the covenants of this grant of Rights shall be construed to be a waiver of any succeeding breach of the same or any other covenant.
- 6. The burden and benefit of this transfer of Rights shall run with the Strip and the Works and undertaking of the Transferee and shall extend to, be binding upon and enure to the benefit of the parties hereto and their respective heirs, executors, administrators, successors and assigns.

CHARGEES

THE CHARGEEE of land described in a Charge/Mortgage of Land dated \_\_\_\_\_

Between \_\_\_\_\_ and \_\_\_\_\_

and registered as Instrument Number \_\_\_\_\_ on \_\_\_\_\_ does

hereby consent to this Easement and releases and discharges the rights and easement herein from the said

Charge/Mortgage of Land.

Name

Signature(s)

Date of Signatures

Y      M      D

Per:

\_\_\_\_\_

\_\_\_\_\_

I/We have authority to bind the Corporation

Schedule “B”

Schedule “C”

**OPTION AGREEMENT**

**THIS AGREEMENT** made as of the \* day of \*, 20XX.

**B E T W E E N :**

\*

(hereinafter referred to as the "**Grantor**")

**OF THE FIRST PART;**

- and -

**HYDRO ONE NETWORKS INC.**

(hereinafter referred to as "**HONI**")

**OF THE SECOND PART.**

The Grantor hereby grants to HONI an option to purchase an easement (the "**Option**") upon the following terms:

**1. Description of Property**

The lands and premises subject to the Option are the lands described on Schedule "A" (the "**Option Property**").

**2. Purchase Price**

The Option purchase price shall be \* (\$\*) Dollars payable by way of certified cheque on closing, subject to usual adjustments.

**3. Exercise of Option**

The Option may be exercised by HONI any time prior to \* and shall be exercised by notice in writing by HONI to the Grantor.

**4. Agreement of Purchase and Sale**

On and upon the date of the exercise of the Option by HONI, the Grantor shall be deemed to have made, and HONI shall be deemed to have accepted, an Offer to Grant an Easement to Hydro One Networks Inc. (the “**Offer to Grant an Easement**”) in exactly the form set out in Schedule “A” hereto.

5. **Grantor's Covenants**

Upon the exercise of the Option the Grantor shall execute and deliver at the request of HONI any authorizations that may be required by HONI addressed to any relevant government authority, agency or department (the “**Authority**”) allowing the inspection of the Option Property by the Authority and permitting the release by the Authority of any relevant information concerning the Option Property to HONI or its solicitors.

6. **The Planning Act**

The agreement resulting from the exercise of the Option shall be effective to create an interest in the Option Property only if the applicable subdivision control provisions of the *Planning Act*, R.S.O. 1990, as amended, are complied with by the Grantor prior to closing. The Grantor shall forthwith make any application to the local Committee of Adjustment or Land Division Committee for any consent that may be required pursuant to the Planning Act.

7. **Time Of The Essence**

Time shall be of the essence of the Option and the agreement resulting from the exercise thereof.

8. **Closing**

The Transfer of Easement arising from the Offer to Grant an Easement shall be completed on the Closing date set out therein, since the Offer to Grant an Easement becomes a binding contract between the parties when the parties are deemed to have made and accepted the Offer, as of the date of the exercise of the Option.

9. **Enurement**

This agreement and everything herein contained shall operate to the benefit of, and be binding upon, the respective heirs, successors, permitted assigns and other legal representatives, as the case may be, of each of the parties hereto.

10. **Tender**

Any tender of documents or money hereunder may be made upon the Grantor or HONI or upon the solicitor acting for the party on whom tender is desired.

## **11. Notices**

Where this agreement requires notice to be delivered by one party to the other, such notice shall be given in writing and delivered either personally, or by pre-paid registered post or by facsimile, by the party wishing to give such notice, or by the solicitor acting for such party, to the other party or to the solicitor acting for the other party at the addresses noted below:

To: Grantor

Facsimile No:

Phone:

Attention:

To: HONI

Hydro One Networks Inc.  
Real Estate Services  
P.O. Box 4300  
Markham, ON  
L3R 5Z5

Facsimile No: (416) 345-6242

Phone: (416) 562-9184

Attention:

Such notice shall be deemed to have been given, in the case of personal delivery, on the date of delivery, and, where given by registered post, on the third business day following the posting thereof, and if sent by facsimile, the date of delivery shall be deemed to be the date of transmission if transmission occurs prior to 4:00 p.m. (Toronto time) on a business day and on the business day next following the date of transmission in any other case. It is understood that in the event of a threatened or actual postal disruption in the postal service in the postal area through which such notice must be sent, notice must be given personally as aforesaid or by facsimile, in which case notice shall be deemed to have been given as set out above.

## **12. Registration**

This agreement and any right or interest transferred hereby may be registered on title to the Option Property.

13. Should any provision or provisions of this Agreement be declared illegal or unenforceable, it or they shall be considered separate and severable from the Agreement and its remaining provisions shall remain in force and be binding upon the parties hereto as though the said provision or provisions had never been included.

14. This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario.

15. Unless otherwise defined herein, all capitalized terms herein shall have the meaning ascribed to them in the Offer to Grant an Easement.

**IN WITNESS WHEREOF** the Parties have hereunto set their respective hands and seals to this Agreement of Purchase and Sale.

SIGNED, SEALED AND DELIVERED

In the presence of )  
(seal) )  
) Grantor  
)  
)  
)

SIGNED, SEALED AND DELIVERED

In the presence of ) Consent Signature & Release of  
(seal) ) Grantor's Spouse, if non-owner.  
)  
)

**HYDRO ONE NETWORKS INC.**

Per: \_\_\_\_\_

Title: \_\_\_\_\_

I have authority to bind the Corporation



91824 new 83-06 Damage Claim

**THIS MEMORANDUM OF AGREEMENT** dated the \_\_\_\_\_ day of \_\_\_\_\_ 20XX

Between: \_\_\_\_\_ herein called the "Claimant"

- and-

**Hydro One Networks Inc.**

**Witnesseth:**

The Claimant agrees to accept .....

( \$ \_\_\_\_\_ ) in full payment and satisfaction of all claims or demands for damages of whatsoever kind, nature or extent which may have been done to date by Hydro during the construction, completion, operation or maintenance of the works of Hydro constructed on Lot(s) \_\_\_\_\_ , Concession(s) .....or according to Registered Plan No. ....in the ..... of .....of which property the Claimant is the .....and which damages may be approximately summarized and itemized as :

Subject to Approval by Hydro One Networks Inc.

**Witness**

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Address*

W.O. \_\_\_\_\_

Damage Release Form

**FULL AND FINAL RELEASE**

IN CONSIDERATION of the payment or of the promise of payment to the undersigned of the aggregate sum of [Insert settlement amount](\$), the receipt and sufficiency of which is hereby acknowledged, I/We, the undersigned, on behalf of myself/ourselves, my/our heirs, executors, administrators, successors and assigns (hereinafter the "Releasors"), hereby release and forever discharge HYDRO ONE NETWORKS INC., its officers, directors, employees, servants and agents and its parent, affiliates, subsidiaries, successors and assigns (hereinafter the "Releasees") from any and all actions, causes of action, claims and demands of every kind including damages, costs, interest and loss or injury of every nature and kind, howsoever arising, which the Releasors now have, may have had or may hereafter have arising from or in any way related to the destruction and/or removal of

[Insert description of the damage caused] on the Releasors' property situated at [Insert legal description], Ontario in or about the [Insert timeline when damage occurred], and specifically including all damages, loss and injury not now known or anticipated but which may arise or develop in the future, including all of the effects and consequences thereof.

AND FOR THE SAID CONSIDERATION, the Releasors further agree not to make any claim or take any proceedings against any other person or corporation who might claim contribution or indemnity under the provisions of the *Negligence Act* and the amendments thereto from the persons or corporations discharged by this release.

AND FOR THE SAID CONSIDERATION, the Releasors further agree not to disclose, publish or communicate by any means, directly or indirectly, the terms, conditions and details of this settlement to or with any persons other than immediate family and legal counsel.

AND THE RELEASORS hereby confirm and acknowledge that the Releasors have sought or declined to seek independent legal advice before signing this Release, that the terms of this

Release are fully understood, and that the said amounts and benefits are being accepted voluntarily, and not under duress, and in full and final compromise, adjustment and settlement of all claims against the Releasees.

IT IS UNDERSTOOD AND AGREED that the said payment or promise of payment is deemed to be no admission whatsoever of liability on the part of the Releasees.

AND IT IS UNDERSTOOD AND AGREED that this Release may be executed in separate counterparts (and may be transmitted by facsimile) each of which shall be deemed to be an original and that such counterparts shall together constitute one and the same instrument, notwithstanding the date of actual execution.

IN WITNESS WHEREOF, the Releasors have hereunto set their respective hands this ..... day of ....., 200 .

SIGNED, SEAL AND DELIVERED

in the presence of

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Address

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\_\_\_\_\_

SIGNED, SEAL AND DELIVERED

in the presence of

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Address

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\_\_\_\_\_

Access – Testing and Associated Access Routes

THIS AGREEMENT made as of this \_\_\_\_\_ day of \_\_\_\_\_, 20XX.

B E T W E E N:

**HYDRO ONE NETWORKS INC.**

(hereinafter called “HONI”)  
OF THE FIRST PART

-and-

(hereinafter called the “Owner”)  
OF THE SECOND PART

WHEREAS:

1. The Owner is the registered owner of the lands legally described as

(the “Lands”).

2. HONI desires to enter onto the Lands to perform certain tests, inspections, studies, and surveys (collectively, the “Tests”) on the Lands; and, to construct and utilize access routes (“Access Routes”) that may be required to conduct such Tests on the Lands, in connection with its “Midtown Project” (the “Project”).

3. The Owner is agreeable to allowing HONI to enter onto the Lands for these purposes, subject to the terms and conditions contained herein.

**NOW THEREFORE THIS AGREEMENT WITNESSES THAT** in consideration of the sum of Two Dollars (\$2.00) now paid by each party to the other and the respective covenants and agreements of the parties hereinafter contained (the receipt and sufficiency of which are hereby acknowledged by the parties hereto), the parties hereto agree as follows:

1. The Owner hereby grants to HONI: a) the right to enter upon the Lands, as of the date hereof, for the purpose of conducting such Tests as HONI, in its sole discretion and acting reasonably, deems necessary to determine the suitability of the Lands for the Project; and, b) the right to enter upon the Lands to construct and utilize Access Routes necessary to conduct such Tests.

2. HONI agrees that it shall take all reasonable care in the conduct of the Tests, and that it shall : a) compensate the Owner for any crop damage to the Lands caused by the Tests and/or Access Routes; b) restore the Lands to its prior condition so far as possible and practicable following such Tests; c) compensate the Owner for any land compaction relief required to reinstate the Lands' soil to its original condition, to the extent possible and practicable; and, d) place within the Access Routes area any necessary drainage works to maintain any required water flows.
3. All agents, representatives, officers, directors, employees and contractors and any property of HONI located at any time on the Lands shall be at the sole risk of HONI and the Owner shall not be liable for any loss or damage or injury (including loss of life) to them or it however occurring except and to the extent to which such loss, damage or injury is caused by the negligence or wilful misconduct of the Owner.
4. HONI agrees that it shall indemnify and save harmless the Owner from and against all claims, demands, costs, damages, expenses and liabilities (collectively the "Costs") whatsoever arising out of HONI's presence on the Lands or of its activities on or in connection with the Lands arising out of the permission granted herein except to the extent any of such Costs arise out of or are contributed to by the negligence or willful misconduct of the Owner.
5. This Agreement and the permission granted herein shall automatically terminate upon the completion by HONI of the Tests and the removal of the Access Routes.
6. This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable herein. The parties hereto submit themselves to the exclusive jurisdiction of the Courts of the Province of Ontario.
7. Any amendments, modification or supplement to this Agreement or any part thereof shall not be valid or binding unless set out in writing and executed by the parties with the same degree of formality as the execution of this Agreement.
8. This Agreement and everything herein contained shall operate to the benefit of, and be binding upon, the respective heirs, successors, permitted assigns and other legal representatives, as the case may be, of each of the Parties hereto.

**IN WITNESS WHEREOF**, the parties hereto have caused this Agreement to be executed by the signatures of their proper officers duly authorized in that behalf.

**OWNER**

SIGNED  
IN THE PRESENCE OF :

Per: \_\_\_\_\_  
Print Name: \_\_\_\_\_

**HYDRO ONE NETWORKS INC.**

Per: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Print Title: \_\_\_\_\_

I have authority to bind the corporation.

73207 rev. 7-73  
Temporary Access and Temporary Access Road

**THIS INDENTURE** made in duplicate the \_\_\_\_\_ day of \_\_\_\_\_ 20XX

Between:

[Insert name of Owner].  
(hereinafter referred to as the "Grantor")

OF THE FIRST PART

--- and ---

HYDRO ONE NETWORKS INC.  
(hereinafter referred to "HONI")

OF THE SECOND PART

**WHEREAS** the Grantor is the owner in fee simple and in possession of [Customize by inserting correct legal description], which land is referred to herein as the "Lands";

**WHEREAS** HONI desires the right to enter on the Lands in order to obtain access to its electrical transmission lines and other works associated with its "Midtown Project" (the "Project")

**NOW THEREFORE THIS AGREEMENT WITNESSETH** that in consideration of the payment of [Insert consideration] by HONI to the Grantor, and the mutual covenants herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. The Grantor hereby grants, conveys and transfers to HONI in, over, along, and upon that part of the Lands as shown in Schedule "A" attached hereto, (the "Access Lands") the rights privileges, and easements, for the servants, agents, contractors and workmen of HONI at all times with all necessary vehicles and equipment: a) to pass and repass over the Access Lands for the purpose of access to its electrical transmission lines and other works in the area during the construction associated with the Project, subject to payment of compensation for damages to any crops or lanes caused thereby; b) to construct, use and maintain upon the Access Lands a temporary road, with such gates, bridges and drainage works as may be necessary for HONI's purposes (collectively, the "Works"), all of which Works shall be removed by HONI upon completion of the construction associated with the Project.; and, c) to cut and remove all trees, brush and other obstructions made necessary by the exercise of the rights granted hereunder
2. HONI shall remedy any physical damage to the Access Lands and / or property that results from HONI's use of the Access Lands; and, shall restore the Access Lands to its prior condition so far as possible and practicable following the construction.
3. All agents, representatives, officers, directors, employees and contractors and property of HONI located at any time on the Access Lands shall be at the sole risk of HONI and the Grantor shall not be liable for any loss or damage or injury (including loss of life) to them or it however occurring except and to the extent to which such loss, damage or injury is caused by the negligence or willful misconduct of the Grantor.
4. HONI agrees that it shall indemnify and save harmless the Grantor from and against all claims, demands, costs, damages, expenses and liabilities (collectively the "Costs") whatsoever arising out of HONI's presence

on the Access Lands or of its activities on or in connection with the Access Lands arising out of the permission granted herein except to the extent any of such Costs arise out of or are contributed to by the negligence or willful misconduct of the Grantor.

5. This Agreement and the permission granted herein shall automatically terminate upon the completion by HONI of the construction of the Project and the removal of the Works.

6. This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable herein. The parties hereto submit themselves to the exclusive jurisdiction of the Courts of the Province of Ontario.

7. Any amendments, modification or supplement to this Agreement or any part thereof shall not be valid or binding unless set out in writing and executed by the parties with the same degree of formality as the execution of this Agreement.

8. This Agreement and everything herein contained shall operate to the benefit of, and be binding upon, the respective heirs, successors, permitted assigns and other legal representatives, as the case may be, of each of the Parties hereto.

**IN WITNESS WHEREOF** the parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the day and year first above written.

Signed in the presence of:

\_\_\_\_\_  
Grantor

\_\_\_\_\_  
Grantor

\_\_\_\_\_  
Address

\_\_\_\_\_  
Phone

Signed in the presence of:

\_\_\_\_\_  
Hydro One Networks Inc.

\_\_\_\_\_  
I have authority to bind the Corporation

File \_\_\_\_\_



**SCHEDULE “A”**

**PROPERTY SKETCH**