

Hydro One Networks Inc.

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

Tel: (416) 345-5393
Fax: (416) 345-6833
Joanne.Richardson@HydroOne.com

Joanne Richardson

Director – Major Projects and Partnerships
Regulatory Affairs



BY COURIER

May 3, 2018

Ms. Nancy Marconi
Manager, Supply and Infrastructure Applications
Ontario Energy Board
Suite 2700, 2300 Yonge Street
Toronto, ON M4P 1E4

Dear Ms. Marconi:

EB-2009-0425 - Hydro One Networks' Section 92 Toronto Midtown Transmission Reinforcement Project – Post Construction Financial Report

On June 17, 2010 the Ontario Energy Board approved Hydro One Networks Inc.'s ("Hydro One") Leave to Construct Application for the Toronto Midtown Transmission Reinforcement Project. Appendix A, Section 3.3 of that Decision and Order requires Hydro One to file with the Board a written Post Construction Financial Report.

The Post Construction Financial Report is attached.

Sincerely,

ORIGINAL SIGNED BY JOANNE RICHARDSON

Joanne Richardson

Post Construction Financial Report

Toronto Midtown Transmission Reinforcement Project

Prepared for:
Ontario Energy Board
File No. EB-2009-0425

May 2018

Prepared by:



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

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1.0 Introduction

On June 17, 2010 Hydro One Networks Inc. ("**Hydro One**") was granted leave to construct facilities associated with the Toronto Midtown Transmission Reinforcement Project for the purposes of (i) constructing and/or renewing 5.3 km of overhead and underground transmission line facilities in the City of Toronto and associated facilities. The construction work commenced in the fall of 2011 and was completed by November of 2016. This report is being filed in compliance with Condition 3.3 of the Board Order which required Hydro One to file a written Post Construction Financial Report. Hydro One is required to provide actual capital costs of the project and explain all significant variances from the estimates filed with the Board.

2.0 Background

- Hydro One filed an Application under section 92 of the Ontario Energy Board Act, 1998 (the "Act") dated December 24, 2009, seeking an Order of the Board granting leave to construct electricity transmission facilities in the Toronto Midtown area to reinforce and enhance its existing 115 kilovolt ("kV") transmission system between Leaside TS and Bayview TS, between Bayview Jct and Birch Jct, and Between Birch Jct and Bridgman TS
- On July 17, 2010, the Board approved Hydro One's Application for leave to construct the Toronto Midtown Transmission Reinforcement Project, subject to the Conditions of Approval attached to the Order. The approved cost of the project was \$104.9 million with an in-service date of April 2013.
- On December 7, 2012, Hydro One advised the Board that the in-service date was delayed due to construction challenges at the main tunnel shaft and that further information on the construction schedule and costs would be provided at a later time.
- On July 18, 2013, Hydro One provided an update to the Board that the in-service date was expected to be December 2015.
- On September 15, 2015, Hydro One provided an additional update to the Board that the in-service date was further delayed to December 2016 and the revised cost estimate was \$123 million.
- On November 1, 2016, Hydro One notified the Board by way of written correspondence that the Toronto Midtown Transmission Reinforcement Project was complete.
- Hydro One now files this Post Construction Financial Report in accordance with section 3.3 of the Conditions of Approval.

3.0 Scope of Work

The scope of work for the Toronto Midtown Transmission Reinforcement Project was as follows:

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 Right-of-Ways ("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 km 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 end of its service life and the second cable circuit will be used as a new circuit to address the need for increased supply to Bridgman TS.

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

Station Work:

- 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 protection, control and telecommunication facilities to connect the new circuit.

The Board assigned File No. EB-2009-0425 to this Application.

4.0 Schedule Status

	Planned In-Service	Actual In-Service/Completion
Toronto Midtown Project	April 2013	November 2017

5.0 Schedule Variance

Explanations:

- Hydro One's contractor encountered challenges with the construction of the main tunnel shaft at the Rose Hill site adjacent to Mt. Pleasant Road. The learning curve with the use of new technology (ground freeze for excavation of shafts), and outage constraints during the summer months led to the delays in the construction schedule causing delays to the in-service date of the project.
- Challenges with the construction of the tunnel from Bayview Junction to Birch Junction. Due to the location and ground conditions this tunnel is the deepest and longest of its type in Canada at approximately 2.3 km in length, with one of the access shafts being 75m in depth. The added complexity of this project is due to its geographical location in a densely populated urban area. The initial expectation was that the tunnel would be completed within 25 months of the June 2011 commencement date. The tunnel construction was completed in July 2015. Contractor delays due to complications with equipment and construction methodologies, the requirement by the cable manufacturer for tunnel ventilation which also required a new ventilation building (not included in the initial project's scope), the requirement of a Partial Discharge system (a cable health monitoring system to provide a warning for potential failure), increased project coordination, led to the in-service delay.

6.0 Cost Status Report

Table 1 - Total Project Costs (Lines and Stations)
(\$000's)

	Estimated Costs¹	Revised Cost Estimate²	Actual Costs	Variance from S.92 approval
Stations	3,323	5,123	10,911	7,588
Lines	82,497	93,771	85,603	3,106
Cost Before Overhead and AFUDC	85,820	98,894	96,514	10,694
Overhead	10,133	13,833	13,740	3,607
AFUDC	8,923	9,823	5,151	(3,772)
Total Project work	104,876	122,550	115,405	10,529
				10%

Table 2 - Total Station Project Costs
(\$000's)

	Estimated Costs¹	Revised Cost Estimate²	Actual Costs	Variance from S.92 approval
Project Management	56	56	378	322
Engineering	221	221	1,627	1,406
Procurement	1,262	1,262	2,929	1,667
Construction	1,057	1,657	4,758	3,701
Commissioning	0	1,200	1,219	1,219
Contingency	727	727	0	(727)
Cost Before Overhead and AFUDC	3,323	5,123	10,911	7,588
Overhead	393	1,593	1,583	1,190
AFUDC	334	434	428	94
Total Station work	4,050	7,150	12,922	8,872
				219%

¹ See EB-2009-0425, Application and Evidence – Exhibit B, Tab 4, Schedule 2 – December 24, 2009

² See EB-2009-0425, Post Hearing Filings – September 15, 2015

**Table 3 - Total Lines Project Costs
(\$000's)**

	Estimated Costs	Revised Cost Estimate	Actual Costs	Variance from S.92 approval
Planning and Estimating	829	829	0	(829)
Real Estate	9,877	9,877	4,525	(5,352)
Project Management	478	478	4,760	4,282
Engineering	1,714	1,714	6,510	4,796
Procurement	50,244	64,718	61,767	11,523
Construction	3,648	3,648	7,961	4,313
Commissioning	0	0	80	80
Contingency	15,707	12,507	0	(15,707)
Cost Before Overhead and AFUDC	82,497	93,771	85,603	3,106
Overhead	9,740	12,240	12,157	2,417
AFUDC	8,589	9,389	4,723	(3,866)
Total Line work	100,826	115,400	102,483	1,657
				2%

7.0 Cost Change Analysis

The Project was completed for \$115.4M, approximately \$7.2M dollars less than budgeted, but \$10,483k over the initial estimated cost in 2009. The Project was initially granted leave to construct approval based on an estimated cost of \$104.9M. The actual cost of the Project was \$115.4M.

Cost variance from \$104.9M to \$115.4M is primarily attributable to:

- Planning and Estimating

Part of the conceptual and basic engineering was done during the planning phase to provide preliminary design and tender documents. The cost was charged to Engineering Work Breakdown Structure ("WBS") since there is no designated WBS element for planning work. As a result, Planning and Estimating cost was reduced by \$829k and Engineering cost was increase by the same amount.

- Project Management

Project duration was extended by 4 years due to unforeseen delays. Project Management ("PM") cost was increased proportionally. Additional item that contributed to a PM cost increase was the addition of site

coordinator. Due to the nature and location (in midtown Toronto) of the work and difficulties with Contractors, site coordinator was assigned to monitor the contractor, inspect the work, and protect Hydro One interests. During estimation PM cost is derived by percentage of overall project cost. Due to geographical location and nature of the work PM was more engaged in day to day work resulting in higher cost. All these items contributed to increase of \$4,604 in PM cost over the life of the project. Part of contingency budget was designated to address risks that came up during the project.

- Engineering

Engineering cost included Planning and Scoping cost that was budgeted separately during estimating phase. It also included additional work at terminal stations that was not initially planned. Some of the work includes switches replacement at Bridgeman TS, and significant protection and control work at Leaside, Bridgeman, Dufferin, and Wiltshire TS.

- Procurement

Major changes to procurement cost resulted due to significant changes to excavation and tunneling methodology, unforeseen difficulties in tunnel excavation and the requirement for tunnel ventilation on a permanent basis. Due to the uncertainty with underground work, the contingency budget allocated for this project covered a large proportion of the additional cost.

- Construction

Additional station work identified during execution of the project resulted in increased construction costs.

- Contingency

The contingency budget was used to fund foreseen and unforeseen risks, and changes throughout the project. Major changes included difficulties in tunnel installation, construction of ventilation building, and extensive restoration of the area around Bayview JCT.

- Interest

Changes in interest rates and efficient project staging allowed minimization of interest cost despite significant delay to the schedule.

- Overhead

Overhead cost increased as a result of the unforeseen difficulties encountered on the project that extended the project's duration and increased its costs.

End of Report