

**mccarthy  
tétrault**

McCarthy Tétrault LLP  
PO Box 48, Suite 5300  
Toronto-Dominion Bank Tower  
Toronto ON M5K 1E6  
Canada  
Tel: 416-362-1812  
Fax: 416-868-0673

**Gordon M. Nettleton**  
Partner  
Email: gnettleton@mccarthy.ca

**November 25, 2016**

**VIA RESS AND COURIER**

Kirsten Walli  
Board Secretary  
Ontario Energy Board  
P.O. Box 2319  
2300 Yonge Street, 27th Floor  
Toronto, Ontario M4P 1E4

Dear Ms. Walli:

**RE: EB-2016-0160 Hydro One Networks Inc. ("Hydro One") Transmission Rates  
Application – Response to OEB Staff Pre-Hearing Undertakings**

Hydro One's response to Board Staff Pre-hearing Undertakings 1-3 is enclosed.

Yours truly,

**McCarthy Tétrault LLP**

Per:



For: Gordon M. Nettleton

GMN

**Ontario Energy Board (Board Staff) Pre-Hearing UNDERTAKING #1**

**Undertaking**

The attached document, “Table A - 2016 HONI Projects” lists the capital projects filed in EB-2016-0160 with budgeted expenditures in 2017 & 2018 above \$3 million.

a) For each capital project for which the currently budgeted 2017 & 2018 expenditures are significantly different than the forecast 2017 & 2018 expenditures for that project in EB-2014-0140 (e.g.: new project, cost change, scope change or schedule change), identify, as applicable:

- i. 2017 & 2018 forecast expenditures from EB-2014-0140
- ii. which of the four reasons for the increased capital expenditures provided in HONI’s response to Staff IR 106 (Exhibit I-1-106) by four factors: Reliability Risk Analysis Results, Customer Preference, System needs arising from OPG’s planned nuclear refurbishments and retirements, New information that has arisen since the last filing regarding specific asset class needs; is the primary driver of the proposed change, or indicate if the change is driven by a factor other than the four identified.

b) The attached document “Table B - 2014 HONI Projects” lists the capital projects filed in EB-2014-0140 with budgeted expenditures in 2015 & 2016 above \$3 million. For each listed project, identify, as applicable:

- i. the 2017 & 2018 capital expenditure forecast for that project that was included in the overall 2017 & 2018 forecasts in Table 1: Transmission Capital Expenditures (EB-2014-0140, Exhibit A, Tab 16, Schedule 8, Page 3-4)
- ii. The ISD Reference Number from EB-2016-0160 for that project if it still exists in the 2016 filing, or alternatively, the reason the project was cut since 2014.

1 **Response**

2  
3 In response to Pre-Hearing Undertaking No.1, (part a, ii) the references to reliability risk  
4 analysis results and system needs arising from OPG's planned nuclear refurbishments  
5 and retirements require clarification.

6  
7 The reliability risk is an outcome measure to gauge the impact of Hydro One's  
8 investment plan on future system reliability performance. It does not determine individual  
9 investment, which is determined by asset needs and other factors as described in Exhibit  
10 B1, Tab 2, Schedule 5. Therefore, reliability risk analysis is not used as a primary reason  
11 to explain the changes between EB-2014-0140 and EB-2016-0160 investments.

12  
13 The notion behind Bruce Power and OPG nuclear refurbishments and retirements  
14 affecting Hydro One's investments is that it is not prudent to carry a backlog of  
15 sustainment investments into 2022, when a large reduction of based load generation will  
16 become unavailable. No investment has been advanced from beyond 2022. The  
17 objective is not to further defer sustainment investments and enter 2022 with a  
18 backlog. Therefore, nuclear refurbishment is not used as a primary reason to explain the  
19 changes between EB-2014-0140 and EB-2016-0160 investments.

20  
21 Please refer to Attachment 1 (Table A - 2016 HONI Projects) and Attachment 2 (Table B  
22 - 2014 HONI Projects) for the completed tables.

**Ontario Energy Board (Board Staff) Pre-Hearing Undertaking 1 Attachment 1**

**Table A: EB-2016-0160: List of Capital Investment Programs or Projects Requiring in Excess of \$3 Million in Test Year 2017 or 2018<sup>1</sup>**

| Sustaining Capital Projects |               |              |             |                              |               |  |
|-----------------------------|---------------|--------------|-------------|------------------------------|---------------|--|
| ID                          | Project       | EB-2016-0160 |             | If included in EB-2014-0140: |               | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change. |
|                             |               | 2017 Budget  | 2018 Budget | 2017 Forecast                | 2018 Forecast |  |
| S01                         | Beck #1 SS    | \$5.9        | \$12.0      | 35.00                        | 13.00         | Scope Change   |
| S02                         | Beck #2 TS    | \$29.8       | \$14.9      | 0.00                         | 0.00          | Scope Change   |
| S03                         | Bruce A TS    | \$13.8       | \$19.7      | 17.39                        | 0.00          | Scope Change / Schedule Change   |
| S04                         | Bruce B SS    | \$0.9        | \$24.6      |                              |               | New Project  |
| S05                         | Cherrywood TS | \$1.4        | \$3.8       | 0.00                         | 20.68         | Schedule Change  |
| S06                         | Lennox TS     | \$26.1       | \$16.9      | 0.16                         | 10.56         | Schedule Change  |
| S07                         | Richview TS   | \$16.9       | \$13.5      | 18.80                        | 0.00          | Scope Change / Schedule Change   |
| S08                         | Beach TS      | \$16.5       | \$15.9      | 0.00                         | 0.49          | Scope Change   |
| S09                         | Centralia TS  | \$12.5       | \$6.2       | 0.94                         | 17.86         | Schedule Change  |
| S10                         | Dryden TS     | \$16.2       | \$0.1       | 0.19                         | 14.10         | Schedule Change  |
| S11                         | Elgin TS      | \$22.6       | \$17.8      | 0.00                         | 0.00          | Scope Change / Schedule Change   |
| S12                         | Espanola TS   | \$3.0        | \$0.0       | 0.00                         | 0.00          | Scope Change   |
| S13                         | Gage TS       | \$1.2        | \$12.4      | 15.59                        | 0.00          | Scope Change   |
| S14                         | Kenilworth TS | \$5.6        | \$11.2      | 3.29                         | 22.56         | Scope Change   |
| S15                         | Nelson TS     | \$10.9       | \$20.2      | 4.40                         | 12.56         | Customer Preference  |
| S16                         | Palmerston TS | \$8.8        | \$11.6      |                              |               | New Project  |

<sup>1</sup> EB-2016-0160, Exhibit B1, Tab 3, Schedule 11

| Sustaining Capital Projects |                    |              |             |                              |               |  |
|-----------------------------|--------------------|--------------|-------------|------------------------------|---------------|--|
| ID                          | Project            | EB-2016-0160 |             | If included in EB-2014-0140: |               | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change. |
|                             |                    | 2017 Budget  | 2018 Budget | 2017 Forecast                | 2018 Forecast |  |
| S17                         | Wanstead TS        | \$13.7       | \$14.3      | 17.86                        | 0.00          | Customer Preference  |
| S18                         | Alexander SS       | \$14.4       | \$8.8       |                              |               | New Project  |
| S19                         | Allanburg TS       | \$4.7        | \$1.0       | 0.00                         | 0.65          | Scope Change   |
| S20                         | Aylmer TS          | \$3.5        | \$0.0       | 1.99                         | 9.03          | Schedule Change  |
| S21                         | Barrett Chute SS   | \$9.3        | \$3.9       |                              |               | New Project  |
| S22                         | Birch TS           | \$12.1       | \$13.8      |                              |               | New Project  |
| S23                         | Bronte TS          | \$3.7        | \$17.1      |                              |               | New Project  |
| S24                         | Bridgman TS        | \$0.2        | \$3.3       | 0.00                         | 1.32          | Scope Change   |
| S25                         | Buchanan TS        | \$4.2        | \$0.0       | 0.19                         | 4.70          | Scope Change   |
| S26                         | Cecil TS           | \$9.6        | \$0.0       |                              |               | New Project  |
| S27                         | Chenau TS          | \$7.5        | \$2.1       | 0.00                         | 0.00          | Schedule Change  |
| S28                         | Crawford TS        | \$4.2        | \$0.0       |                              |               | New Project  |
| S29                         | DeCew Falls SS     | \$4.9        | \$0.0       |                              |               | New Project  |
| S30                         | Dufferin TS        | \$6.5        | \$7.4       |                              |               | New Project  |
| S31                         | Ear Falls TS       | \$10.9       | \$0.0       | 0.00                         | 0.00          | Scope Change / Schedule Change   |
| S32                         | Frontenac TS       | \$3.8        | \$1.5       |                              |               | New Project  |
| S33                         | Hanmer TS          | \$24.4       | \$11.0      |                              |               | New Project  |
| S34                         | Hawthorne TS       | \$1.6        | \$4.3       | 0.14                         | 0.00          | Scope Change / Schedule Change   |
| S35                         | Horning TS         | \$14.3       | \$14.9      |                              |               | New Project  |
| S36                         | Leaside TS Bulk    | \$5.9        | \$5.6       |                              |               | New Project  |
| S37                         | Leaside TS 27.6 kV | \$6.3        | \$6.5       | 5.45                         | 0.00          | Scope Change   |
| S38                         | Main TS            | \$5.4        | \$8.4       |                              |               | New Project  |

| Sustaining Capital Projects |   |              |             |                              |               |  |
|-----------------------------|---|--------------|-------------|------------------------------|---------------|--|
| ID                          | Project   | EB-2016-0160 |             | If included in EB-2014-0140: |               | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change. |
|                             |   | 2017 Budget  | 2018 Budget | 2017 Forecast                | 2018 Forecast |  |
| S39                         | Manby TS  | \$3.1        | \$1.8       | <b>0.80</b>                  | <b>0.60</b>   | Scope Change   |
| S40                         | Martindale TS   | \$18.6       | \$18.6      |                              |               | New Project  |
| S41                         | Minden TS   | \$4.2        | \$7.0       |                              |               | New Project  |
| S42                         | Mohawk TS   | \$4.6        | \$4.7       | <b>0.00</b>                  | <b>0.96</b>   | Scope Change   |
| S43                         | N.R.C. TS   | \$7.1        | \$0.7       | <b>0.00</b>                  | <b>0.00</b>   | Scope Change / Schedule Change   |
| S44                         | Pine Portage SS                                       | \$1.9        | \$5.9       |                              |               | New Project  |
| S45                         | Richview TS   | \$7.3        | \$0.0       |                              |               | New Project  |
| S46                         | Sheppard TS   | \$9.8        | \$9.3       | <b>5.38</b>                  | <b>1.90</b>   | Scope Change   |
| S47                         | St. Isidore TS  | \$9.1        | \$0.0       | <b>0.00</b>                  | <b>0.00</b>   | Scope Change   |
| S48                         | Stanley TS  | \$0.5        | \$6.1       |                              |               | New Project  |
| S49                         | Strachan TS   | \$5.1        | \$2.8       |                              |               | New Project  |
| S50                         | Strathroy TS  | \$5.3        | \$0.0       | <b>18.80</b>                 | <b>0.00</b>   | Schedule Change  |
| S51                         | Demand Capital – Power Transformers                   | \$8.0        | \$8.2       | <b>6.54</b>                  | <b>6.68</b>   | Ongoing Program  |
| S52                         | Minor Component Demand Capital                        | \$4.7        | \$4.7       |                              |               | New Ongoing Program  |
| S53                         | Operating Spare Transformer Purchases                 | \$8.2        | \$8.3       | <b>8.56</b>                  | <b>8.73</b>   | Ongoing Program  |
| S54                         | Transformer Protection Replacement                    | \$4.6        | \$4.6       |                              |               | New Project  |
| S55                         | Replace Legacy SONET Systems                          | \$2.1        | \$5.3       | <b>6.14</b>                  | <b>7.22</b>   | Scope Change   |
| S56                         | Physical Security for Critical Stations (non CIP-014) | \$5.0        | \$5.0       | <b>4.50</b>                  | <b>2.00</b>   | Scope Change   |
| S57                         | CIP V6 Transient Cyber Assets & Removable Media       | \$2.0        | \$10.0      |                              |               | New Project  |
| S58                         | PSIT Cyber Equipment EOL                              | \$5.0        | \$6.0       |                              |               | New Ongoing Program  |
| S59                         | CIP-014 Physical Security Implementation              | \$6.0        | \$6.0       |                              |               | New Project  |

| Sustaining Capital Projects |   |              |             |                              |               |  |
|-----------------------------|---|--------------|-------------|------------------------------|---------------|--|
| ID                          | Project   | EB-2016-0160 |             | If included in EB-2014-0140: |               | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change. |
|                             |   | 2017 Budget  | 2018 Budget | 2017 Forecast                | 2018 Forecast |  |
| S60                         | NERC CIP V6 CAPEX - Low Impact Facilities                   | \$5.0        | \$5.0       |                              |               | New Project  |
| S61                         | Transmission Site Facilities                                | \$6.7        | \$6.7       | <b>8.60</b>                  | <b>8.60</b>   | Scope Change   |
| S62                         | Line Refurbishment Project - C22J/C24Z/C21J/C23Z            | \$18.5       | \$2.5       |                              |               | New Project  |
| S63                         | Line Refurbishment Project - D2L Dymond x Upper Notch       | \$8.4        | \$0.0       |                              |               | New Project  |
| S64                         | Line Refurbishment Project - C1A/C2A/C3A                    | \$1.8        | \$3.5       |                              |               | New Project  |
| S65                         | Line Refurbishment Project - N21W/N22W                      | \$4.1        | \$11.9      |                              |               | New Project  |
| S66                         | Line Refurbishment Project - B5G/B6G                        | \$4.4        | \$11.4      |                              |               | New Project  |
| S67                         | Line Refurbishment Project - D2L Upper Notch x Martin River | \$18.3       | \$21.1      |                              |               | New Project  |
| S68                         | Line Refurbishment Project - B3/B4                          | \$0.9        | \$6.4       |                              |               | New Project  |
| S69                         | Line Refurbishment Project - A8K/A9K                        | \$0.4        | \$6.6       |                              |               | New Project  |
| S70                         | Line Refurbishment Project - A7L/R1LB and 57M1              | \$0.9        | \$20.5      |                              |               | New Project  |
| S71                         | Line Refurbishment Project - K1/K2                          | \$0.9        | \$7.4       |                              |               | New Project  |
| S72                         | Line Refurbishment Project - E1C                            | \$0.9        | \$12.8      |                              |               | New Project  |
| S73                         | Line Refurbishment Project - D6V/D7V                        | \$2.6        | \$5.7       |                              |               | New Project  |
| S74                         | Line Refurbishment Project - D2H/D3H                        | \$0.9        | \$12.5      |                              |               | New Project  |
| S75                         | Wood Pole Replacements                                      | \$35.3       | \$35.3      | <b>28.81</b>                 | <b>29.38</b>  | Improved Forecast  |

| Sustaining Capital Projects |  |              |             |                              |               |  |
|-----------------------------|--|--------------|-------------|------------------------------|---------------|--|
| ID                          | Project  | EB-2016-0160 |             | If included in EB-2014-0140: |               | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change. |
|                             |  | 2017 Budget  | 2018 Budget | 2017 Forecast                | 2018 Forecast |  |
| S76                         | Steel Structure Coating                        | \$42.5       | \$54.4      | 11.79                        | 13.37         | New Information  |
| S77                         | Steel Structure Foundation Refurbishments      | \$7.8        | \$7.8       | 5.55                         | 5.74          | Scope Change   |
| S78                         | Shieldwire Replacements                        | \$7.0        | \$7.1       | 4.52                         | 4.61          | Scope Change   |
| S79                         | Insulator Replacements                         | \$63.9       | \$61.4      | 3.76                         | 3.84          | New Information  |
| S80                         | Transmission Lines Emergency Restoration       | \$8.7        | \$8.8       | 11.35                        | 11.58         | Improved Forecast  |
| S81                         | Gordie Howe International Bridge (Recoverable) | \$12.7       | \$12.5      | 0.00                         | 0.00          | Customer Preference  |
| S82                         | Manvers – Lafarge Aggregate Pit (Recoverable)  | \$1.0        | \$3.8       | 0.00                         | 0.00          | Customer Preference  |
| S83                         | H7L/H11L Cable Replacement                     | \$1.3        | \$21.1      | 14.83                        | 15.12         | Schedule Change  |



| Development Capital Projects |  |              |             |                              |                         |   |
|------------------------------|--|--------------|-------------|------------------------------|-------------------------|---|
| ID                           | Project  | EB-2016-0160 |             | If included in EB-2014-0140: |                         | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change.  |
|                              |  | 2017 Budget  | 2018 Budget | 2017 Budget (Gross \$M)      | 2018 Budget (Gross \$M) |   |
| D01                          | Clarington TS: Build new 500/230kV Station                           | \$68.6       | \$14.8      | 53.2                         | 0.0                     | Project schedule delayed to Q4 2018 as described in ISD Ref # D01.  |
| D02                          | Nanticoke TS: Connect HVDC Lake Erie Circuit                         | \$5.0        | \$13.0      | N/A                          | N/A                     | New project initiated by customer request.  |
| D03                          | Merivale TS to Hawthorne TS: 230 kV Conductor Upgrade                | \$2.5        | \$8.0       | N/A                          | N/A                     | New project required to address inter-area network transfer capability need.  |
| D04                          | East-West Tie Expansion: Station Work                                | \$3.0        | \$30.0      | N/A                          | N/A                     | New project required to address inter-area network transfer capability need. However, was referenced in EB-2014-0140, Exhibit D1, Tab 3, Schedule 3, page 33 as a major project with limited scope definition and no cash flow projections were provided at the time. |
| D05                          | Milton SS: Station Expansion and Connect 230kV Circuits              | \$2.0        | \$5.0       | N/A                          | N/A                     | New project per the regional planning report, "Northwest Greater Toronto Area Integrated Regional Resource Plan."   |
| D06                          | Galt Junction: Install In-Line Switches on M20D/M21D Circuits        | \$3.6        | \$0.1       | N/A                          | N/A                     | Alternative project to defer the Preston TS Transformation project (ISD Ref # D06 in EB-2014-0140) at a reduced cost from \$24.9M to \$4.5M.  |
| D07                          | York Region: Increase Transmission Capability for B82V/B83V Circuits | \$22.6       | \$0.2       | 7.0                          | 0.0                     | Original cash flows were based on a preliminary cost estimate. The current cash flows are based on a detailed cost estimate. The project schedule was delayed by 6 months.  |

| Development Capital Projects |   |              |             |                              |                         |  |
|------------------------------|---|--------------|-------------|------------------------------|-------------------------|--|
| ID                           | Project   | EB-2016-0160 |             | If included in EB-2014-0140: |                         | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change.         |
|                              |   | 2017 Budget  | 2018 Budget | 2017 Budget (Gross \$M)      | 2018 Budget (Gross \$M) |  |
| D08                          | Hawthorne TS: Autotransformer Upgrades                                | \$8.0        | \$5.8       | 4.5                          | 0.0                     | Original cash flows were based on a preliminary cost estimate. The current cash flows are based on a detailed cost estimate. The project schedule was delayed by 1 year. |
| D09                          | Brant TS: Install 115kV Switching Facilities                          | \$5.0        | \$6.0       | N/A                          | N/A                     | New project per the regional planning report, "Brant Area Integrated Regional Resource Plan."  |
| D10                          | Riverdale Junction to Overbrook TS: Reconfiguration of 115kV Circuits | \$2.4        | \$4.2       | N/A                          | N/A                     | New project per the regional planning report, "Greater Ottawa Area Regional Infrastructure Plan."  |
| D11                          | Southwest GTA Transmission Reinforcement                              | \$0.9        | \$5.0       | N/A                          | N/A                     | New project per the regional planning report, "Metro Toronto Regional Infrastructure Plan."  |
| D12                          | Barrie TS: Upgrade Station and Reconductor E3B/E4B Circuits           | \$4.0        | \$20.0      | N/A                          | N/A                     | New project per the IESO regional planning letter. (Refer to Exhibit B1, Tab 2, Schedule 3, Attachment 11.)  |
| D13                          | Ear Falls TS to Dryden TS: Upgrade 115kV Circuit E4D                  | \$10.0       | \$5.9       | N/A                          | N/A                     | New project requested by the customer and also per the regional planning report, "North of Dryden Integrated Regional Resource Plan."                                    |
| D14                          | Supply to Essex County Transmission Reinforcement                     | \$33.0       | \$31.4      | 10.0                         | 0.0                     | Project schedule was delayed by 15 months due to delays in major project approvals.  |
| D15                          | Horner TS: Build 230/27.6kV Transformer Station                       | \$16.0       | \$13.0      | N/A                          | N/A                     | New project requested by the customer and also per the regional planning report, "Metro Toronto Regional Infrastructure Plan."   |
| D16                          | Lisgar TS: Transformer Upgrades                                       | \$10.3       | \$2.5       | N/A                          | N/A                     | New project requested by the customer and also per the regional planning report, "Greater Ottawa Regional  |

| Development Capital Projects |   |              |             |                              |                         |  |
|------------------------------|---|--------------|-------------|------------------------------|-------------------------|--|
| ID                           | Project   | EB-2016-0160 |             | If included in EB-2014-0140: |                         | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change. |
|                              |   | 2017 Budget  | 2018 Budget | 2017 Budget (Gross \$M)      | 2018 Budget (Gross \$M) |  |
|                              |   |              |             |                              |                         | Infrastructure Plan.” This project was cancelled by the customer on August 16, 2016.   |
| D17                          | Seaton MTS: Rebuild 230 kV Circuit (Provide 230kV Line Connection)                | \$3.3        | \$3.0       | 8.0                          | 0.0                     | Scope change from building the transformer station and line connection work to only the line connection work.  |
| D18                          | Hanmer TS: Build 230/44kV Transformer Station                                     | \$9.5        | \$18.5      | N/A                          | N/A                     | New project requested by the customer and also per the regional planning report, “Sudbury Algoma Needs Assessment.”  |
| D19                          | Runnymede TS: Build 115/27.6kV Transformer Station and Reconductor 115kV Circuits | \$23.0       | \$17.0      | N/A                          | N/A                     | New project requested by the customer and also per the regional planning report, “Metro Toronto Regional Infrastructure Plan.”                                   |
| D20                          | Toyota Woodstock: Upgrade Station   | \$3.0        | \$2.5       | N/A                          | N/A                     | New project requested by the customer.   |
| D21                          | Enfield TS: Build 230/44kV Transformer Station                                    | \$10.0       | \$15.0      | N/A                          | N/A                     | New project requested by the customer and also per the regional planning report, “Oshawa-Clarington Sub-Region Local Plan.”                                      |
| D22                          | TransCanada: Energy East Pipeline Conversion                                      | \$1.9        | \$10.2      | N/A                          | N/A                     | New project requested by the customer. This project was cancelled by the customer in July 2016.  |
| D23                          | Protection and Control Modifications for Distributed Generation                   | \$6.0        | \$5.5       | 6.7                          | 0.1                     | All 2017/2018 expenditures are recoverable.  |
| D24                          | Nanticoke TS: New Station Service Supply  | \$10.0       | \$0.0       | N/A                          | N/A                     | New project initiated for risk mitigation as a result of OPGI decommissioning the existing Nanticoke station service supply.                                     |

| Operations Capital |  |              |             |                              |             |  |
|--------------------|--|--------------|-------------|------------------------------|-------------|--|
| ID                 | Project  | EB-2016-0160 |             | If included in EB-2014-0140: |             | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change.                               |
|                    |  | 2017 Budget  | 2018 Budget | 2017 Budget                  | 2018 Budget |  |
| O01                | Integrated System Operations Centre - New Facility Development | \$4.2        | \$10.5      | \$6.0                        | \$3.3       | New information on asset / facility deficiencies within the Network Operating Backup Control Centre, Security Operations Centre and the Backup Integrated Telecommunication Management Centre. |
| O02                | Station Local Control Equipment Sustainment                    | \$3.6        | \$3.7       | \$0.0                        | \$0.0       | New Information  |
| O03                | Grid Control Network Sustainment                               | \$5.8        | \$3.0       | \$2.0                        | \$2.0       | New Information  |

| Capital Common Corporate Costs And Other Costs |   |              |             |                              |             |  |
|--|---|--------------|-------------|------------------------------|-------------|--|
| ID   | Project                                   | EB-2016-0160 |             | If included in EB-2014-0140: |             | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change. |
|  |   | 2017 Budget  | 2018 Budget | 2017 Budget                  | 2018 Budget |  |
| IT1  | Hardware/Software Refresh and Maintenance | \$5.1        | \$5.1       | \$5.4                        | \$5.4       | This is an ongoing program.  |
| IT2  | MFA Servers and Storage                   | \$4.2        | \$2.8       | \$4.4                        | \$2.9       | This is an ongoing program.  |
| IT3  | Work Management and Mobility              | \$5.0        | \$3.0       | \$4.3                        | \$1.1       | Scope expanded beyond provincial lines organization to now include provincial lines, stations, and forestry organizations.                                       |

| Capital Common Corporate Costs And Other Costs |                                      |              |             |                              |             |  |
|--|--------------------------------------|--------------|-------------|------------------------------|-------------|--|
| ID   | Project                              | EB-2016-0160 |             | If included in EB-2014-0140: |             | If project is new, or if planned expenditures in 2017 or 2018 have increased since 2014 application, identify which of the four cited reasons drives the change. |
|  |                                      | 2017 Budget  | 2018 Budget | 2017 Budget                  | 2018 Budget |  |
| CC1  | Real Estate Field Facilities Capital | \$18.4       | \$20.9      | \$17.2                       | \$19.9      | No material net change.  |
| CC2  | Transport & Work Equipment           | \$20.9       | \$21.8      | \$15.5                       | \$17.2      | New information that contributed to an increased transmission work program. This increased the requirement for fleet assets.                                     |
| CC3  | Service Equipment                    | \$3.2        | \$3.2       | \$4.2                        | \$3.8       | No material net change.  |

**Ontario Energy Board (Board Staff) Pre-Hearing Undertaking 1 Attachment 2**

**Table B: EB-2014-0140 - List of Capital Investment Programs or Projects Requiring in Excess of \$3 Million in Test Year 2015 or 2016<sup>1</sup>**

| <b>Sustaining Capital Projects</b> |   |                      |                      |   |
|------------------------------------|---|----------------------|----------------------|---|
| <b>ID</b>                          | <b>Project</b>  | <b>EB-2014-0140</b>  |                      | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b> |
|                                    |   | <b>2017 Forecast</b> | <b>2018 Forecast</b> |   |
| S01                                | Oil Circuit Breaker Replacements                      | 10.27                | 10.48                | Consolidated into Station-Centric Investments   |
| S02                                | SF6 Circuit Breaker Replacements                      | 8.43                 | 11.05                | Consolidated into Station-Centric Investments   |
| S03                                | GTA Metalclad Switchgear Replacements                 | 6.38                 | 5.28                 | Consolidated into Station-Centric Investments   |
| S04                                | Air Blast Circuit Breaker Replacement - Richview TS   | 18.80                | 0.00                 | S07   |
| S05                                | Air Blast Circuit Breaker Replacement - Beck #2 TS    | 0.00                 | 0.00                 | S02   |
| S06                                | Air Blast Circuit Breaker Replacement - Bruce A TS    | 17.39                | 0.00                 | S03   |
| S07                                | Air Blast Circuit Breaker Replacement - Burlington TS | 0.00                 | 0.00                 | Project is scheduled to be completed by year-end 2016   |
| S08                                | End of Life Station Reconfiguration - Gage TS         | 15.59                | 0.00                 | S13   |

<sup>1</sup> EB-2014-0140, Exhibit I, Tab 10, Schedule 14

| <b>Sustaining Capital Projects</b> |  |                      |                      |   |
|------------------------------------|--|----------------------|----------------------|---|
| <b>ID</b>                          | <b>Project</b>   | <b>EB-2014-0140</b>  |                      | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b> |
|                                    |  | <b>2017 Forecast</b> | <b>2018 Forecast</b> |   |
| S09                                | End of Life Station Reconfiguration – Timmins TS           | 0.00                 | 0.00                 | Project Completed   |
| S10                                | End of Life Station Reconfiguration - Hanmer TS            | 0.00                 | 0.00                 | Project Completed   |
| S11                                | Integrated DESN Replacement - Dunnville TS                 | 0.00                 | 0.00                 | Project Completed   |
| S12                                | Integrated DESN Replacement – National Research Council TS | 0.00                 | 0.00                 | S43   |
| S13                                | Integrated DESN Replacement - Espanola TS                  | 0.00                 | 0.00                 | S12   |
| S14                                | Integrated DESN Replacement - Strathroy TS                 | 18.80                | 0.00                 | S50   |
| S15                                | Integrated DESN Replacement - Elgin TS                     | 0.00                 | 0.00                 | S11   |
| S16                                | Integrated DESN Replacement - Gerrard TS                   | 0.00                 | 0.00                 | Project Completed   |
| S17                                | Integrated DESN Replacement – Chenaux TS                   | 0.00                 | 0.00                 | S27   |
| S18                                | Integrated DESN Replacement - Overbrook TS                 | 0.00                 | 0.00                 | Project Completed   |
| S19                                | Integrated DESN Replacement – Ear Falls TS                 | 0.00                 | 0.00                 | S31   |
| S20                                | Integrated DESN Replacement - Wiltshire TS                 | 0.00                 | 0.00                 | Project Completed   |
| S21                                | Integrated DESN Replacement - Bridgman TS                  | 0.00                 | 0.00                 | Project Completed   |
| S22                                | Integrated DESN Replacement – Dundas TS                    | 0.00                 | 0.00                 | Project Completed   |
| S23                                | Integrated DESN Replacement - Goderich TS                  | 6.58                 | 0.00                 | Project is scheduled to be completed by year-end 2017   |
| S24                                | Integrated DESN Replacement - Leaside TS                   | 5.45                 | 0.00                 | S37   |

| Sustaining Capital Projects |   |               |               |  |
|-----------------------------|---|---------------|---------------|--|
| ID                          | Project                                   | EB-2014-0140  |               | ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion |
|                             |   | 2017 Forecast | 2018 Forecast |  |
| S25                         | Integrated Station Component Replacements | 1.84          | 16.27         | Consolidated into Station-Centric Investments  |
| S26                         | Power Transformer Replacements            | 21.47         | 37.12         | Consolidated into Station-Centric Investments  |
| S27                         | Operating Spare Transformer Purchases     | 8.56          | 8.73          | S53  |
| S28                         | Disconnect Switch Replacements            | 8.69          | 8.86          | Consolidated into Station-Centric Investments  |
| S29                         | Capacitor Bank Replacements               | 6.62          | 6.69          | Consolidated into Station-Centric Investments  |
| S30                         | Instrument Transformer Replacements       | 3.28          | 3.35          | Consolidated into Station-Centric Investments  |
| S31                         | Insulator Replacements                    | 4.61          | 4.73          | Consolidated into Station-Centric Investments  |
| S32                         | Station Service Replacements              | 12.61         | 12.61         | Consolidated into Station-Centric Investments  |
| S33                         | Spill Containment                         | 10.98         | 11.20         | Consolidated into Station-Centric Investments  |
| S34                         | Integrated Station P&C Replacements       | 32.02         | 18.61         | Consolidated into Station-Centric Investments  |



| <b>Sustaining Capital Projects</b> |   |                      |                      |   |
|------------------------------------|---|----------------------|----------------------|---|
| <b>ID</b>                          | <b>Project</b>                          | <b>EB-2014-0140</b>  |                      | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b> |
|                                    |   | <b>2017 Forecast</b> | <b>2018 Forecast</b> |   |
| S35                                | Protection Replacements                 | 22.08                | 21.24                | Consolidated into Station-Centric Investments   |
| S36                                | RTU and SER Replacements                | 8.34                 | 8.51                 | Consolidated into Station-Centric Investments   |
| S37                                | DC Signaling (Remote Trip) Replacements | 1.02                 | 0.00                 | Consolidated into Station-Centric Investments   |
| S38                                | Protection Tone Channel Replacements    | 4.32                 | 4.41                 | Consolidated into Station-Centric Investments   |
| S39                                | PLC Device Replacements                 | 4.83                 | 4.92                 | Consolidated into Station-Centric Investments   |
| S40                                | Cyber Security NERC CIP V5 Readiness    | 0.25                 | 0.00                 | Project Completed   |
| S41                                | Cyber Security of Load Stations         | 4.50                 | 2.00                 | S56   |
| S42                                | Station Building Infrastructure         | 8.60                 | 8.60                 | Consolidated into Station-Centric Investments   |
| S43                                | Station Civil Infrastructure            | 12.53                | 12.77                | Consolidated into Station-Centric Investments   |
| S44                                | Wood Pole Replacements                  | 28.81                | 29.38                | S75   |
| S45                                | Steel Structure Coating                 | 11.79                | 13.37                | S76   |
| S46                                | Steel Structure Replacements            | 5.78                 | 5.89                 | Consolidated into Line  |

| Sustaining Capital Projects |   |                  |                  |   |
|-----------------------------|---|------------------|------------------|---|
| ID                          | Project                                     | EB-2014-0140     |                  | ISD Reference Number<br>from EB-2016-0160 if<br>project is included in 2016<br>filing, or reason for deletion |
|                             |   | 2017<br>Forecast | 2018<br>Forecast |   |
|                             |   |                  |                  | Refurbishment projects  |
| S47                         | Steel Structure Foundation Refurbishments   | 5.55             | 5.74             | S77   |
| S48                         | Shieldwire Replacements                     | 4.52             | 4.61             | S78   |
| S49                         | Insulator Replacements                      | 3.76             | 3.84             | S79   |
| S50                         | Transmission Lines Emergency Restoration    | 11.35            | 11.58            | S80   |
| S51                         | C25H Line Refurbishment                     | 0.00             | 0.00             | Project Completed   |
| S52                         | H24C Line Refurbishment                     | 0.00             | 0.00             | Project is scheduled to be<br>completed by year-end 2016  |
| S53                         | D10S/D9HS Line Refurbishment                | 0.00             | 0.00             | Project Completed   |
| S54                         | Q11S/Q12S Line Refurbishment                | 0.00             | 0.00             | Project Completed   |
| S55                         | Secondary Land Use and Recoverable Projects | 0.00             | 0.00             | S81, S82  |
| S56                         | H2JK/K6J Cable Replacement                  | 0.00             | 0.00             | Project Completed   |
| S57                         | H7L/H11L Cable Replacement                  | 14.83            | 15.12            | S83   |

| <b>Development Capital Projects<sup>2</sup></b> |   |                                  |                                  |   |
|---|---|----------------------------------|----------------------------------|---|
| <b>ID</b>                                       | <b>Project</b>  | <b>EB-2014-0140</b>              |                                  | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b> |
|   |   | <b>2017<br/>Budget<br/>(\$M)</b> | <b>2018<br/>Budget<br/>(\$M)</b> |   |
| D01   | New 500 kV Bruce to Milton Double Circuit Transmission Line                           | 6.5                              | 0.0                              | Other Projects <\$3M  |
| D02   | Clarington TS: Build new 500/230kV Station  | 53.2                             | 0.0                              | ISD Ref # D01   |
| D03   | Installation of Shunt Capacitor Banks at Cherrywood TS                                | 7.0                              | 3.5                              | Other Projects <\$3M  |
| D04   | Midtown Transmission Reinforcement Plan   | 0.0                              | 0.0                              | Project in-service November 2016  |
| D05   | Guelph Area Transmission Reinforcement  | 0.0                              | 0.0                              | Project in-service November 2016  |
| D06   | Preston TS Transformation   | 10.0                             | 0.0                              | Project deferred and replaced by Galt Jct. switches. Refer to ISD Ref # D06                                 |
| D07   | Toronto Area Station Upgrades for Short Circuit Capability: Manby TS Equipment Uprate | 0.0                              | 0.0                              | Expected in-service December 2016.  |
| D08   | Hawthorne TS: Replace two existing Transformers                                       | 4.5                              | 0.0                              | ISD Ref # D08   |
| D09   | York Region – Increase Transmission Capability for B82V/B83V Circuits                 | 7.0                              | 0.0                              | ISD Ref # D07   |
| D10   | Copeland MTS: Build line connection for Toronto                                       | 0.0                              | 0.0                              | In-service date delayed to Q1 2018 by   |

<sup>2</sup> Some forecast costs were provided in EB-2014-0140 Exhibit 1, Tab 4, Schedule 20, Page 2 of 4

| <b>Development Capital Projects<sup>2</sup></b> |   |                                  |                                  |   |
|---|---|----------------------------------|----------------------------------|---|
| <b>ID</b>                                       | <b>Project</b>                                    | <b>EB-2014-0140</b>              |                                  | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b> |
|   |   | <b>2017<br/>Budget<br/>(\$M)</b> | <b>2018<br/>Budget<br/>(\$M)</b> |   |
|   | Hydro   |                                  |                                  | customer in August 2016. Project is expected to be fully recoverable.                                       |
| D11   | Seaton TS: Build New 230-28kV Transformer Station | 8.0                              | 0.0                              | ISD Ref # D17   |
| D12   | Supply to Essex County Transmission Reinforcement | 10.0                             | 0.0                              | ISD Ref # D14   |
| D13   | Napanee Gas Generation Connection                 | 0.5                              | 0.0                              | Other Projects <\$3M  |
| D14   | Transmission Station P&C Upgrades for DG          | 6.7                              | 0.1                              | ISD Ref # D23   |

| <b>Operations Capital</b> |                                    |                     |                    |  |
|---------------------------|------------------------------------|---------------------|--------------------|--|
| <b>ID</b>                 | <b>Project</b>                     | <b>EB-2014-0140</b> |                    | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b>  |
|                           |                                    | <b>2017 Budget</b>  | <b>2018 Budget</b> |  |
| O1                        | NMS Capital Sustainment            | 0.0                 | 0.0                | In-serviced in February 2016. Investment Complete.   |
| O2                        | BUCC New Facility Development      | 6.0                 | 3.3.               | ISD Ref # O01 – Investment name changed from BUCC New Facility Development to Integrated System Operations Centre – New Facility Development (ISD-O01) |
| O3                        | Wide Area Network Outreach Program | 5.0                 | 1.0                | Cancelled due to negative test results. No cash flow greater than \$3M in test years   |
| O4                        | Station LAN Infrastructure Program | 5.9                 | 6.0                | Majority of the work has been combined with integrated station investment projects. No cash flow greater than \$3M in test years                       |
| O5                        | Fault Locating Program             | 3.0                 | 0.0                | The plan is being re-evaluated and combined with other control infrastructure  |

| <b>Operations Capital</b> |                                  |                     |                    |   |
|---------------------------|----------------------------------|---------------------|--------------------|---|
| <b>ID</b>                 | <b>Project</b>                   | <b>EB-2014-0140</b> |                    | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b> |
|                           |                                  | <b>2017 Budget</b>  | <b>2018 Budget</b> |   |
|                           |                                  |                     |                    | initiatives.<br><br>No cash flow greater than \$3M in test years.   |
| O6                        | Grid Control Network Sustainment | 2.0                 | 2.0                | ISD Ref# O02  |
| O7                        | Hub Site Management Program      | 3.9                 | 3.3                | No cash flow greater than \$3M in test years.   |

| <b>Capital Common Corporate Costs And Other Costs</b> |   |                     |                    |   |
|---|---|---------------------|--------------------|---|
| <b>ID</b>   | <b>Project</b>                            | <b>EB-2014-0140</b> |                    | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b> |
|   |   | <b>2017 Budget</b>  | <b>2018 Budget</b> |   |
| IT1   | Hardware/Software Refresh and Maintenance | \$5.4               | \$5.4              | ISD Ref #IT1 - Ongoing Capital Program.   |
| IT2   | MFA Servers and Storage                   | \$4.4               | \$2.9              | ISD Ref #IT2 - Ongoing Capital Program.   |
| IT3   | MFA PC and Printer Hardware               | \$2.9               | \$2.5              | No cash flow in excess of \$3M in   |

| <b>Capital Common Corporate Costs And Other Costs</b> |   |                     |                    |   |
|---|---|---------------------|--------------------|---|
| <b>ID</b>   | <b>Project</b>  | <b>EB-2014-0140</b> |                    | <b>ISD Reference Number from EB-2016-0160 if project is included in 2016 filing, or reason for deletion</b>   |
|   |   | <b>2017 Budget</b>  | <b>2018 Budget</b> |   |
|   |   |                     |                    | 2017 or 2018. Ongoing Capital Program.  |
| IT4   | Field Workforce Optimization and Mobile IT                | \$4.3               | \$1.1              | ISD Ref #IT3  |
| IT5   | Customer Experience                                       | \$0.0               | \$0.0              | Entire associated costs are allocated to Distribution.  |
| IT6   | Corporate Support Optimization                            | \$0.0               | \$1.6M             | No cash flow in excess of \$3M in 2017 or 2018. In proceeding EB-2016-0160, this investment is described as specific human resource, environment health and safety functions associated projects. |
| C1  | Real Estate Head Office & GTA Facilities Capital for 2015 | 0                   | 0                  | Project completed.  |
| C2  | Real Estate Field Facilities Capital                      | \$17.2              | \$19.9             | ISD Ref #CC1 - Ongoing program.   |
| C3  | Transport & Work Equipment                                | \$15.5              | \$17.2             | ISD Ref #C3   |
| C4  | Service Equipment   | \$4.2               | \$3.8              | ISD Ref #C4   |

**Ontario Energy Board (Board Staff) Pre-Hearing UNDERTAKING #2**

**Undertaking**

Please provide the most current business cases supporting the complete rebuild of the following four substations in the Hamilton area as listed in **Exhibit B1, Tab 3, Schedule 11**

- #S08 – Station Reinvestment – Beach TS;
- #S11 – Station Reinvestment – Elgin TS;
- #S13 – Station Reinvestment – Gage TS;
- #S14 – Station Reinvestment – Kenilworth TS.

**Response**

Attached are business case summary approval documents for Elgin TS(S11) and Beach TS (S08).

Kenilworth TS (S14) and Gage TS (S13) are under detailed estimating. As such, business case summary documents are not available at this time. Business case summary documents are produced upon finalizing the cost estimate as the vehicle for seeking authorization to proceed with expenditure.

In recent discussions with the IESO, Hydro One agreed that there is merit in looking at Gage and Kenilworth from a broader coordinated regional perspective as these projects have not been committed. We will be reviewing them with the IESO and LDC's as part of the Burlington to Nanticoke Regional Infrastructure Plan. The review will shape their final business case documents to achieve the best overall solution for the system and rate payers. Conducting regional planning review for these and other future major investments will ensure full coordination with the planning activities of the IESO and the regional planning partners to optimize ratepayer value.





Investment Driver: N.T.C.1.08  
AR Number: 17148

Date: July 27, 2015  
Title: Elgin TS: EOL Replacement Project

## Hydro One Networks - Business Case Summary - 50004070

### Elgin TS: End of Life (EOL) Replacement Project

#### Investment Driver:

**In-Service date:** November 2, 2019

N.T.C.1.08: System Re-investments (2015 - \$226M, 2016 - \$180M, 2017 - \$153M, 2018 - \$154M, 2019 - \$106M) are intended to integrate the replacement of multiple station assets that are approaching end of life.

**This Approval:** \$58.2M

**Previous Approval:** \$0.2M

**Project Total:** \$58.4M

#### Need:

To replace assets at Elgin TS that are at end of life (EOL) due to their deteriorated condition, obsolescence and high maintenance costs. Not proceeding with this work will increase the risk of further equipment deterioration and result in reduced reliability to Horizon Utilities' customers in downtown City of Hamilton. There is an increased level of urgency to address the risk of equipment failure due to the fact that the station is adjacent to a school and daycare centre.

#### Investment Summary:

Elgin TS is a transmission station that transforms 115 kV into 13.8 kV, supplying load delivery to customer Horizon Utilities in the downtown core of the City of Hamilton.

The Elgin TS T1/T2 and T3/T4 transformer switchyards were built in 1968. These assets are in degraded condition as verified through visual inspection and diagnostic testing. Further, the equipment within these two switchyards are obsolete and some of the parts are no longer supported by the manufacturer.

This investment will result in the complete rebuild and reconfiguration of the T1/T2 and T3/T4 switchyards, replacing existing EOL and degraded infrastructure, including the T1/T2 and T3/T4 transformers and associated switchgear, with new Medium Voltage Gas Insulated Switchgear (MVGIS) equipment built to current HONI standards. These two existing switchyards will be reconfigured into a single switchyard and avoid the need to procure additional land to expand the station.

Reconfiguration of the station into a single facility will minimize ongoing lifecycle cost and integration of the replacement of multiple end-of-life components into a single station project, allows additional efficiencies to be realized during the design, construction, and commissioning stages of the work.

#### Results:

Improved reliability, standardized design and reduced ongoing lifecycle costs.

#### Costs:

|                        | 2015 M | 2016 M | 2017 M | 2018 M | 2019 M | Total M |
|------------------------|--------|--------|--------|--------|--------|---------|
| Capital* and MFA       | 0.9    | 7.1    | 13.4   | 22.5   | 13.5   | 57.4    |
| OM&A and Removals      | 0.1    | 0.7    | 0.0    | 0.0    | 0.0    | 0.8     |
| Gross Investment Cost* | 1.0    | 7.8    | 13.4   | 22.5   | 13.5   | 58.2    |
| Recoverable            | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     |
| Net Investment Cost    | 1.0    | 7.8    | 13.4   | 22.5   | 13.5   | 58.2    |

Cost includes interest and overhead at current rates

Investment Driver: N.T.C.1.08

Date: July 27, 2015

AR Number: 17148

Title: Elgin TS: EOL Replacement Project

## **Alternatives**

### **ALTERNATIVES CONSIDERED AND REJECTED**

#### **Status Quo or Do nothing Alternative**

The existing Pioneer Electric, Ferranti Packard and English Electric transformers and associated equipment at Elgin TS are EOL, in deteriorated condition and are in need of replacement to maintain the reliability of supply to Horizon Utilities downtown City of Hamilton loads. This status quo option is rejected because it does not address the condition of the assets, reliability of the station and risk of equipment failure which is magnified by the fact that the station is adjacent to a school and daycare centre.

#### **Alternative One**

This alternative maintains the existing two switchyard arrangement by replacing like-for-like four transformers and associated low voltage facilities in two switchyards. This alternative was rejected because the existing station property footprint does not provide the necessary space required to meet current HONI switchyard requirements e.g. holding tanks and spill containment facilities required for four transformers.

#### **Alternative Two**

Due to the lack of additional space available within the existing station footprint this alternative purchases additional property and reroutes underground 115kV power supply cables. It would also require extensive rerouting and re-termination of the distribution system cables. This alternative was rejected because of the high cost of rebuilding and rerouting the underground cables through City of Hamilton streets and the increased time required for approvals including real estate, environmental and OEB Section 92.

### **RECOMMENDED ALTERNATIVE AND RATIONALE**

#### **Alternative Three**

This alternative consists of reconfiguring the station's two switchyards to a single switchyard with MVGIS to reduce station switchgear assemblies supplying Horizon Utilities. Along with the transformer and switchgear upgrades, spill containment, protection, control and telecommunication equipment would also be upgraded to meet current HONI standards. Proceeding with this option consolidates the station facilities into one switchyard within the existing station footprint and improves the reliability of supply to Horizon Utilities in the City of Hamilton.

Alternative three is the recommended alternative because it addresses all deteriorated equipment at Elgin TS, improves the reliability of supply to the customer, addresses the safety concerns and minimizes OM&A costs by reducing the number of DESN's from two to one.

Investment Driver: N.T.C.1.08

Date: July 27, 2015

AR Number: 17148

Title: Elgin TS: EOL Replacement Project

#### Alternatives Compared

| Business Value                 | Project Level Risk |      | Comparison   |
|--------------------------------|--------------------|------|--|
|                                | Current Risk       | Alt3 |  |
| Reliability                    | HIGH               | LOW  | Alternative three will increase reliability of supply by providing MVGIS switchgear facilities to meet customer requirements and HONI standards. This station refurbishment will also aim to reduce the 20 delivery point interruptions since 2005 and improve the 174 deficiency reports related to the station over the last 7 years.  |
| Customer                       | HIGH               | LOW  | Alternative three will ensure a robust and reliable supply to Horizon Utilities by consolidating station facilities into one switchyard within the existing station footprint. This avoids the need to expand the station and minimizes the impact to the customer during construction.  |
| Competitiveness                | HIGH               | LOW  | Alternative three will minimize ongoing lifecycle costs by consolidating and reconfiguring the station into one DESN station.  |
| Safety and environment         | MED                | LOW  | The existing transformers T1/T2 have no spill containment facilities, while transformers T3/T4 spill containment facilities are not up to current HONI standard. No noise mitigation or fire barrier facilities exist for T1 and T2. Spill containment, noise mitigation and fire separation for new transformers will mitigate environmental risks and comply with MOE requirements. There is an increased level of urgency to address the risk of equipment failure due to the fact that the station is adjacent to a school and daycare centre. |
| Regulatory / Legal             | MED                | LOW  | Replacement of EOL facilities will ensure that Hydro One continues to meet its license obligations under the Transmission System Code.   |
| Reputation                     | N/A                | N/A  | Not influential in the investment decision.  |
| Initial Cost (\$M)             |                    | 58.4 |  |
| Financial: PV Cost / NPV (\$M) |                    |      | NPV costs were not calculated as there is only one viable alternative and the decision was not primarily based on financial factors  |

#### Project Risk and Mitigation:

##### Cost:

Project costs of \$58.4M are based on estimates which have an accuracy of +/- 20% and include interest charges, overheads and an allowance of \$3.9M for contingency.

Investment Driver: N.T.C.1.08

Date: July 27, 2015

AR Number: 17148

Title: Elgin TS: EOL Replacement Project

#### Business Planning:

This investment was included in the 2015-2019 Business Plan at a cost of \$42.2M. Current estimated costs are \$58.4M. This increase is due to improved project definition as a result of detailed estimate and a site assessment with engineering and field personnel. Additional required funding will be provided through the reprioritization of projects within the Tx capital envelope.

#### Execution Risks:

Approvals - Low

S.92 - N/A

EA - N/A

Outages - Medium (due to coordination with Horizon Utilities required)

Resourcing - Low

First Nations - N/A

Real Estate - Medium (construction staging area requires City of Hamilton approval to use nearby parking lot)

Agreements - N/A

Technology - N/A

#### Regulatory Considerations:

This investment was included in Hydro One's 2015/2016 Transmission Rate Filing at a total cost of \$33M (to be spent by 2016) and with an in-service date in 2017. Funding for the additional proposed TX capital expenditures will be redirected from projects that are delayed or through the reprioritization of work within the Transmission capital envelope. Any impact to the total transmission 2015 and 2016 capital in-service additions target, as a result of reprioritization of projects, will be coordinated and managed.

The current capital project's expenditures forecast of \$13.4M, \$22.5M and \$13.5M planned to be spent in 2017, 2018 and 2019 respectively, will be included in HONI's next transmission rates application, as it was outside the window of the previous Transmission rate filing.

No other significant regulatory issues are anticipated other than the standard need and prudence justification.

|   |   |   |
|---|---|---|
| <b>Funds Included in Business Plan: N</b> | <b>Director:</b> Chong Kiat Ng                | <b>Planner:</b> Fred Kouhdani                   |
| <b>This Approval(\$M):</b><br>58.2        | <b>Previous Approval(\$M):</b><br>0.2         | <b>Current Est. of Total Cost(\$M):</b><br>58.4 |
| <b>Signature Block:</b>                   |   |   |
| <b>Submitted by:</b><br>Sandy Struthers   | <b>Title:</b><br>COO & EVP Strategic Planning | <b>Date:</b><br>Aug 26/15                       |
| <b>Reviewed by:</b><br>Michael Vels       | <b>Title:</b><br>Chief Financial Officer      | <b>Date:</b><br>8/20/15                         |
| <b>Recommended by:</b><br>Carmin Marcello | <b>Title:</b><br>President and CEO            | <b>Date:</b><br>Aug 31/15                       |
| <b>Approved by:</b>                       | <b>Title:</b><br>Board of Directors Advice    | <b>Date:</b><br>Aug 31/15                       |

#### Scientific Research & Experimental Development Tax Credits (SR&ED)

- Do you anticipate that the initiative to meet the set of business requirements in this document will result in a **Technological Advancement**? N
- Do you anticipate that the initiative will resolve a **Technological Uncertainty**? N

Hydro One Limited / Hydro One Inc.  
**ADVICE OF DECISION OF BOARD OF DIRECTORS**  
(excerpt from minutes of Board of Directors)

Filed: 2016-11-25  
EB-2016-0160  
Response to OEB Staff 2  
Attachment 2  
Page 1 of 1

to \_\_\_\_\_ date of meeting February 2, 2016

copies to: File agenda number 7.2

subject: Capital Projects

Beach Transformer Station Upgrade

After consideration, upon motion duly made, seconded, and unanimously carried, it was RESOLVED:

THAT the Board of Directors approve the investment of \$77.7 million for the Beach Transformer Station Upgrade.



SECRETARY

Issued on February 4, 2016

**Hydro One Limited/ Hydro One Inc.**  
Submission to the Board of Directors



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**Date:** February 2, 2016

**Re:** Approval for Beach Transformer Station Integrated Station Upgrade

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At the board meeting, I will present a proposal to spend \$77.7 million to replace end of life equipment at Beach Transformer Station. The station serves Hamilton's industrial centre and part of its downtown core. The completed planned in-service date is December 2019.

We are asking for approval of the project, as per the attached board resolution.

Yours sincerely,

A handwritten signature in blue ink, appearing to be "Sandy Struthers", with a long horizontal line extending to the right.

Sandy Struthers  
Chief Operating Officer and  
Executive Vice President, Strategic Planning

**Beach Transformer Station Upgrade**

**Resolution:**

After consideration, upon motion duly made, seconded, and unanimously carried, be it  
RESOLVED:

THAT the Board of Directors of Hydro One Inc. approve the investment of \$77.7 million for the Beach Transformer Station Upgrade.

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Hydro One Inc.

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## ***Hydro One Board of Directors***

### ***Approval – Beach Transformer Station Integrated Station Upgrade***

***February 2, 2016***



## Overview

We are requesting approval for \$77.7 million to replace end of life equipment by rebuilding the Beach Transformer Station 230 kV switchyard in a greenfield location, on the existing property, consistent with current Hydro One design standards and Northeast Power Coordinating Council requirements. The station has deteriorated assets and conditions that are negatively impacting the reliability of supply to local distribution companies and direct industrial customers in the Hamilton/Niagara and Burlington areas.

The planned completed in-service date is December 2019.

## Investment Details

Built in the late 1940's, Beach Transformer Station is located within Hamilton's industrial core. It is connected to Hydro One's networks in the area. Beach Transformer Station directly supplies two major industrial customer stations owned by ArcelorMittal Dofasco and a local distribution company (Horizon Utilities). The station also serves as a primary supply point for twenty other transformer stations within Hamilton-Niagara Region.

Due to the condition of the assets at Beach, since 2008, there have been 20 cooling or oil level/temperature related issues on transformers T3 and T4 and a total of over 280 corrective and emergency work orders. These transformers are located adjacent to administrative buildings and lack the necessary fire protection and separation, resulting in increased safety risk.

Furthermore, spill containment, drainage and oil/water separator facilities currently do not meet current Ministry of Environment and Climate Change requirements and are assessed to be the second greatest spill risk of the 291 Hydro One stations. Separate investments are already underway to correct the deficiency at the highest (Wanstead) and third highest risk (Birch) transformer stations.

We had initially approved the investment in 2014 with an estimated total cost of \$25.4 million based on using a brownfield, like-for-like, in-situ asset replacement, and using unit cost estimates.

Subsequent engineering revealed that the station layout makes in-situ asset replacement unfeasible and confirmed that the only viable approach would be to rebuild the existing 230kV switchyard in a greenfield location, replace and relocate transformers T3 and T4, install spill containment to meet regulatory requirements and upgrade the protection, control and telecommunication facilities.

We have undertaken significant work to date, including the refurbishment of the existing protection, control and telecommunication building, construction of AC/DC station service, and construction of the new switchyard ground grid, foundations, steel structures, and associated buses. These past expenditures were required to support the increased scope of the project and will form part of the useful in-service additions starting in 2016. This approval seeks the remaining funds required to upgrade the station to required standards.



Oil Circuit Breaker in poor condition



T3/T4 in close proximity to building

## Hydro One Inc.



## Benefits

Beach Transformer Station is key to the reliable supply to a major distributor and a large industrial customer, and to twenty customer owned and Hydro One stations. As such, any improvements in reliability and reduced interruption cost impact a large number of our customers. The investment will provide the following benefits:

- (a) Reduce the risk of customer interruptions and improve reliability of supply by 30%
- (b) Reduce outage constraints for improved work execution efficiency and minimize the risk of interruptions to Horizon Utilities and ArcelorMittal Dofasco
- (c) Increase station short circuit capability to enable future integration of generation
- (d) Address an ongoing safety concern
- (e) Reduce loading on the 115kV network in Hamilton and Burlington
- (f) Meet current Hydro One design standards and Northeast Power Coordinating Council requirements.

## Cost Summary

This is a multi-year project, with expenditures planned over four years. However, we are able to segregate and measure discrete elements of the project to enable capital to be placed into service during the project duration, thus limiting the lag between capital spending and inclusion of the investment in the Company's rate base. The following is the planned schedule of placing asset in-service:

|                         | 2016(\$M) | 2017(\$M) | 2018 (\$M) | 2019 (\$M) | Total (\$M) |
|-------------------------|-----------|-----------|------------|------------|-------------|
| In-Service \$ Additions | 19.1      | 13.2      | 38.2       | 5.5        | 76.0        |

The cost breakdown is as follows:

| Category  | Cost (\$M)  |
|---|-------------|
| Material  | 24.3        |
| Construction                                    | 24.0        |
| Project Management, Engineering & Commissioning | 11.0        |
| Contingency                                     | 2.0         |
| Interest & Overhead                             | 16.4        |
| <b>Total</b>                                    | <b>77.7</b> |

\* \$1.7 million of construction expenditures is OM&A for removal of old assets

Contingency represents only 2.6% of the total project cost as a majority of the materials have already been procured, significant engineering and make ready construction work has been completed and dedicated resources have been allocated to manage outage requirements.

## Alternatives Considered

Due to asset condition, performance and safety concerns; there is no other viable alternative.

## Regulatory Impacts

The 2015 and 2016 capital spend for this project were not included in Hydro One's approved 2015/16 Transmission Rate Filing. The funding for the project will require redirection from other projects which will be delayed or deferred without impacting committed in-service capital amounts.

The total planned project expenditures and related in-service commitments will be included in the 2017/2018 rate application that will be filed with the Ontario Energy Board in May 2016. We consider the risk of non-recovery of these amounts to be low as this investment is required to address equipment risks that exist at the station, potential significant impact to customers in the network and the clear and supportable benefits to the system of proceeding.

No other significant regulatory issues are anticipated other than the standard need and prudence justification.

## Risks and Mitigation

### *Outages*

Obtaining the necessary outages at this station will require outage coordination with ArcelorMittal Dofasco and Horizon Utilities. ArcelorMittal Dofasco has two customer owned stations which are supplied directly from Beach Transformer Station and have limited acceptable outage windows and durations. The customer outage windows are also constrained by distribution system outages that may be required by Horizon Utilities. The risk is considered to be medium. Unforeseen delays in securing the required outages will directly impact the project cost and schedule, until the next outage opportunity becomes available.

These risks are being mitigated by Horizon Utilities cooperating to facilitate load transfers to adjacent stations and working with the two customers to agree upon and complete a detailed outage staging plan

### *First Nations*

The work to be completed will take place within the existing station footprint and a Class Environmental Assessment is not required. However, Hydro One will notify the surrounding First Nations to maintain its ongoing positive relationship. We do not consider this element to be a high risk for this project.

## SAP Information & Signature Sheet

### Annual Expenditures:

|                       | 2015(\$M) | 2016(\$M) | 2017(\$M) | 2018 (\$M) | 2019 (\$M) | Total (\$M) |
|-----------------------|-----------|-----------|-----------|------------|------------|-------------|
| Capital*              | 28.2      | 9.7       | 14.3      | 18.3       | 5.5        | 76.0        |
| OM&A and Removals     | -         | 0.9       | 0.8       | -          | -          | 1.7         |
| Gross Investment Cost | 28.2      | 10.6      | 15.1      | 18.3       | 5.5        | 77.7        |

\* Includes capitalized interest and overheads

|  |  |  |
|--|--|--|
| <b>Investment Name:</b>                        | Beach Transformer Station Integrated Station Upgrade |  |
| <b>Final In-service Date:</b>                  | December 31, 2019                                    |  |
| <b>Business Case Summary #:</b><br>50004331    | <b>Acquisition Request (AR) #:</b><br>23020          | <b>Investment Driver:</b><br>N.T.C.1.10            |
| <b>Funds Included in Business Plan:</b><br>Yes | <b>Director:</b><br>Chong Kiat Ng                    | <b>Planner:</b><br>Nimesh Mistry                   |
| <b>This Approval (\$):</b><br>\$52.3M          | <b>Previous Approval (\$):</b><br>\$25.4M            | <b>Current est. of Total Cost (\$):</b><br>\$77.7M |
| <b>Signature Block:</b>                        |  |  |
| <b>Submitted by:</b><br>Sandy Struthers        | <b>Title:</b><br>COO & EVP Strategic Planning        | <b>Date:</b>                                       |
| <b>Reviewed by:</b><br>Michael Vels            | <b>Title:</b><br>Chief Financial Officer             | <b>Date:</b>                                       |
| <b>Recommended by:</b><br>Mayo Schmidt         | <b>Title:</b><br>President and CEO                   | <b>Date:</b>                                       |
| <b>Approved by:</b>                            | <b>Title:</b><br>Board of Directors Advice           | <b>Date:</b>                                       |

**Scientific Research & Experimental Development Tax Credits (SR&ED): \_CONFIRM WITH TAX IF REQUIRED**

- Do you anticipate that an initiative to meet the set of business requirements in this document will result in a **Technological Advancement**? No
- Do you anticipate that the initiative will resolve a **Technological Uncertainty**? No

**Ontario Energy Board (Board Staff) Pre-Hearing UNDERTAKING #3**

**Undertaking**

OEB staff has compiled the following tables using information in the current EB-2016-0160 application as well as the previous EB-2014-0140 application. Staff requests that Hydro One confirm the calculations, totals and percentages in the tables.

**Table 1- Average Capital Expenditure and Investment Percentage  
by Category 2012 – 2021 (\$ Million)**

| Category             | Historic and Bridge Year Expenditures (2012 – 2016) |                        | Test Year and Forecast Expenditures (2017 – 2021) |                        | Forecast Increase in Average Annual Expenditures vs. Historical Spend by Cost Category |
|----------------------|---|------------------------|---|------------------------|--|
|                      | Average Expenditures                                | % of Total Expenditure | Average Expenditures                              | % of Total Expenditure |  |
| Sustaining           | 581.84  | 68%                    | 895.58  | 73%                    | 54%  |
| Development          | 192.94  | 23%                    | 224.58  | 18%                    | 16%  |
| Operations           | 21.4  | 2%                     | 32.16   | 3%                     | 50%  |
| Common Corp Costs    | 61.04   | 7%                     | 77.56   | 6%                     | 27%  |
| <b>Total Capital</b> | <b>857.2</b>  | <b>100%</b>            | <b>1,229.86</b>                                   | <b>100%</b>            | <b>43%</b>   |

**Table 2- Forecast Expenditure Increases Compared to 2015/16  
COS Filing in 2014 (EB-2014-0140) (\$ Million)**

| Investment Category  | EB-2014-0140 <sup>1</sup> |              |              | EB-2016-0160   |                |                | Comparison between Filings |               |               |
|----------------------|---------------------------|--------------|--------------|----------------|----------------|----------------|----------------------------|---------------|---------------|
|                      | Forecast Years            |              |              | Test Year 1    | Test Year 2    | Forecast Year  | 2017 Increase              | 2018 Increase | 2019 Increase |
|                      | 2017                      | 2018         | 2019         | 2017           | 2018           | 2019           |                            |               |               |
| Sustaining           | 597.4                     | 636.7        | 600.1        | 776.8          | 842.1          | 825.7          | 30.0%                      | 32.3%         | 37.6%         |
| Development          | 148.0                     | 116.4        | 155.5        | 196.4          | 170.2          | 244.0          | 32.7%                      | 46.2%         | 56.9%         |
| Operations           | 44.4                      | 25.2         | 18.8         | 25.4           | 30.8           | 58.8           | -42.8%                     | 22.2%         | 212.8%        |
| Common Corp Costs    | 58.0                      | 60.4         | 57.0         | 77.6           | 79.1           | 79.1           | 33.8%                      | 31.0%         | 38.8%         |
| <b>Total Capital</b> | <b>847.8</b>              | <b>838.7</b> | <b>831.4</b> | <b>1,076.1</b> | <b>1,122.2</b> | <b>1,207.5</b> | <b>26.9%</b>               | <b>33.8%</b>  | <b>45.2%</b>  |

<sup>1</sup> EB-2014-0140, Exhibit A, Tab 16, Schedule 8, Page 3-4: Table 1: Transmission Capital Expenditures

1 *Response*

2

3 Hydro One has reviewed Table 1 and 2 as provided by the OEB staff and confirms the  
4 calculations, totals and percentages in the table are correct.