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NEEDS ASSESSMENT REPORT

Greater Bruce Huron Region

Date: May 31, 2019

Prepared by: Greater Bruce-Huron Region Study Team

Distribution

Transmission

Disclaimer

This Needs Assessment Report was prepared for the purpose of identifying potential needs in the Greater Bruce-Huron Region and to recommend which need may require further assessment and/or regional coordination to develop a preferred plan. The results reported in this Needs Assessment are based on the input and information provided by the Study Team.

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Executive Summary

REGION	Greater Bruce-Huron Region		
LEAD	Hydro One Networks Inc. ("HONI")		
START DATE	April 2, 2019	**END DATE**	May 31, 2019

1. INTRODUCTION

The first cycle of the Regional Planning process for the region was initiated in spring 2016 and was completed in August 2017 with the publication of the Regional Infrastructure Plan ("RIP"). The RIP provided a description of needs and recommendations of preferred wires plans to address near- and mid-term needs at the time.

The purpose of the second cycle Needs Assessment ("NA") is to review the staus of needs identified in the previous regional planning cycle and to identify any new needs based on the new load forecast.

2. REGIONAL ISSUE/TRIGGER

In accordance with the Regional Planning process, the Regional Planning cycle should be triggered at least every five years. In light of the increasing amount of load connection requests in 2018, the second Regional Planning cycle was triggered for the region.

3. SCOPE OF NEEDS ASSESSMENT

The scope of this NA includes:

- Review and reaffirm needs/plans identified in the previous RIP; and
- Identification and assessment of any new system capacity, reliability, operation, and aging infrastructure needs.

The Study Team may also identify additional needs during the next phases of the planning process, namely Scoping Assessment ("SA"), IRRP and RIP, based on updated information available at that time.

4. INPUTS/DATA

The Study Team representatives from Local Distribution Companies ("LDC"), the Independent Electricity System Operator ("IESO"), and Hydro One provided input and relevant information for the Greater Bruce-Huron Region regarding capacity needs, reliability needs, operational issues, and major assets/facilities approaching end-of-life ("EOL").

5. ASSESSMENT METHODOLOGY

The assessment's primary objective is to identify the electrical infrastructure needs, recommend further mitigation or action plan(s) to address these needs, and determine whether further regional coordination or broader study would be beneficial.

The assessment reviewed available information including load forecasts, conservation and demand management ("CDM") and distributed generation ("DG") forecasts, reliability needs, operational issues, and major high voltage equipment identified to be at or near the end of their life and requiring replacement/refurbishment.

A technical assessment of needs was undertaken based on:

i. Planning criteria outlined in IESO-ORTAC (section 2.7.2) for analysis of current and future station capacity and transmission adequacy;
ii. Planning criteria outlined in IESO-ORTAC (section 7) for system reliability;
iii. Analysis of major high voltage equipment reaching the end of their life, in conjunction with emerging system needs; and
iv. Analysis of operational concerns relevant to Regional Planning

6. NEEDS

I. Station & Transmission Supply Capacity

i. Based on planning criteria, no station transformation capacity needs were identified in this cycle of Needs Assessment.
ii. Based on planning criteria, transmission line capacity on 115 kV circuit L7S is not adequate. Sections of the circuit are approaching their emergency and continuous thermal rating in the near and mid-term planning horizon.

II. System Reliability

Based on summer gross coincident load forecast for the region, load security and load restoration criteria can be met over the study period.

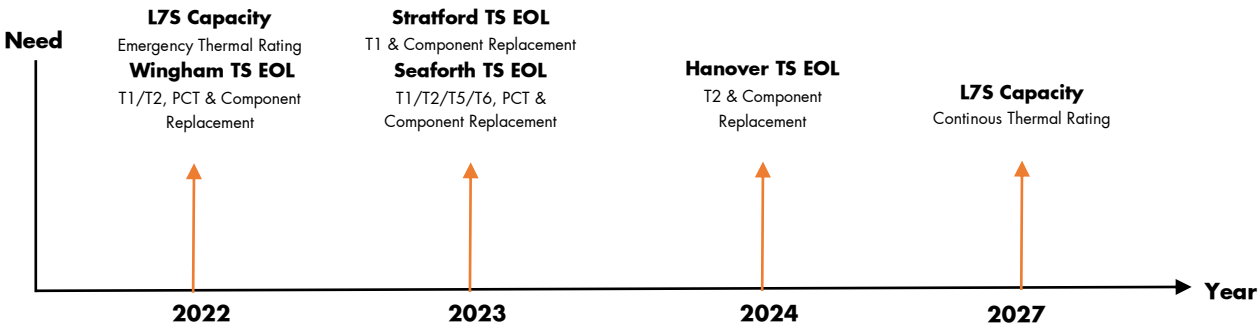
III. Aging Infrastructure – Transformer Replacements

- Future Projects:
  a. Wingham TS – T1/T2, PCT and Component Replacement (2022)
  b. Stratford TS – T1 and Component Replacement (2023)
  c. Seaforth TS – T1/T2/T5/T6, PCT & Component Replacement (2023)
  d. Hanover TS – T2 and Component Replacement (2024)

IV. Operational Concerns

No operational concerns pertaining to regional planning were identified.

Needs Timeline Summary



7. RECOMMENDATIONS

The Study Team's recommendations for the above identified needs are as follows:

A. Overloading of 115 kV circuits L7S (under contingency) – Options to mitigate the near-term need of upgrading the emergency thermal ratings of L7S are outlined in the Local Plan, prepared in the last Regional Planning cycle. Hydro One Transmission and the LDCs will revisit and asses the viability of the options proposed in the Local Plan.

B. Overloading of 115 kV circuits L7S (all in-service condition) – Further analysis in the Scoping Assessment phase of Regional Planning is required for the limited capacity of circuit L7S. IESO will lead the Scoping Assessment phase to recommend planning approaches to address potential load growth in the region. As a part of this assessment, a broader review of the region's system may be required to help identify solutions.

C. Replacement of end-of-life equipment does not require further regional coordination. The implementation and execution plan for these needs will be coordinated between Hydro One and the affected LDCs, where required:
   a. Wingham TS – T1/T2, PCT and Component Replacement
   b. Stratford TS – T1 and Component Replacement
   c. Seaforth TS – T1/T2/T5/T6, PCT & Component Replacement
   d. Hanover TS – T2 and Component Replacement

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1 INTRODUCTION

This is the second cycle of Regional Planning for the Greater Bruce-Huron region. The first cycle of the Regional Planning process for the region was initiated in spring 2016 and was completed in August 2017 with the publication of the Regional Infrastructure Plan ("RIP"). The RIP provided a description of needs and recommendations of preferred wires plans to address near- and medium-term needs at the time.

The purpose of the second cycle Needs Assessment ("NA") is to review the staus of needs identified in the previous Regional Planning cycle and to identify any new needs based on the new load forecast.

This report was prepared by the Greater Bruce-Huron Region Study Team ("Study Team"), led by Hydro One Networks Inc. Participants of the Study Team are listed below in Table 1. The report presents the results of the assessment based on information provided by Hydro One Transmission, the Local Distribution Companies ("LDC") and the Independent Electricity System Operator ("IESO").

Table 1: Greater Bruce-Huron Region Study Team Participants

Company
Hydro One Networks Inc. (Lead Transmitter)
Entegrus
ERTH Power Corp.
Festival Hydro Inc.
Hydro One Networks Inc. (Distribution)
Independent Electricity System Operator
Wellington North Power Inc.
Westario Power Inc.

2 REGIONAL ISSUE/TRIGGER

In accordance with the Regional Planning process, the Regional Planning cycle should be triggered at least every five years. In light of timelines of needs identified in last RIP report, along with an increasing amount of load connection requests in 2018, the second Regional Planning cycle was triggered for the region.

3 SCOPE OF NEEDS ASSESSMENT

The scope of this NA covers the Greater Bruce-Huron Region and includes:

- Review of the status of needs/plans identified in the previous Regional Planing cycle; and
- Identification and assessment of any new system capacity, reliability, operation, and aging infrastructure needs.

The Study Team may identify additional needs during the next phases of the Regional Planning process, namely Scoping Assessment ("SA"), IRRP, and/or RIP.

4 REGIONAL DESCRIPTION AND CONNECTION CONFIGURATION

The Greater Bruce-Huron Region covers the counties of Bruce, Huron and Perth, as well as portions of Grey, Wellington, Waterloo, Oxford and Middlesex counties. The boundary of the Greater Bruce-Huron Region is shown in Figure 1.

Figure 1: Geographic Area of the Greater Bruce-Huron Region

Electricity supply for the region is provided through a network of 230 kV and 115 kV transmission lines supplied mainly by generation from the Bruce Nuclear Generating Station and local renewable generation facilities in the region. The bulk of the electrical supply is transmitted through 230 kV circuits (B4V, B5V, B22D, B23D, B27S and B28S) radiating out from Bruce A TS. These circuits connect the region to the adjacent South Georgian Bay/Muskoka Region and the adjacent Kitchener-Waterloo-Cambridge-Guelph (KWCG) Region.

Listed in Table 2 and shown in Figure 2, is the transmission system infrastructure in the Greater Bruce-Huron Region. In addition, the summer coincident and non-coincident regional load forecast is provided in Appendix A. Appendix B lists all step-down transformer stations, Appendix C lists transmission circuits and Appendix D lists all the LDCs in the Greater Bruce-Huron Region.

Table 2: Greater Bruce-Huron Region Transmission Assets

115 kV Circuits	230 kV Circuits	Hydro One Transformer Stations	Customer Transformer Stations
61M18, D8S, D10H, L7S, S1H	B4V/B5V, B20P/B24P, B22D/B23D, B27S/B28S	Bruce HWP B TS, Centralia TS, Douglas Point TS, Goderich TS, Hanover TS, Owen Sound TS, Palmerston TS, Seaforth TS, St. Marys TS, Stratford TS, Wingham TS	Constance DS, Festival MTS, Grand Bend East DS, Customer CTS #1, Customer CTS #2, Customer CTS #3, Customer CTS #4

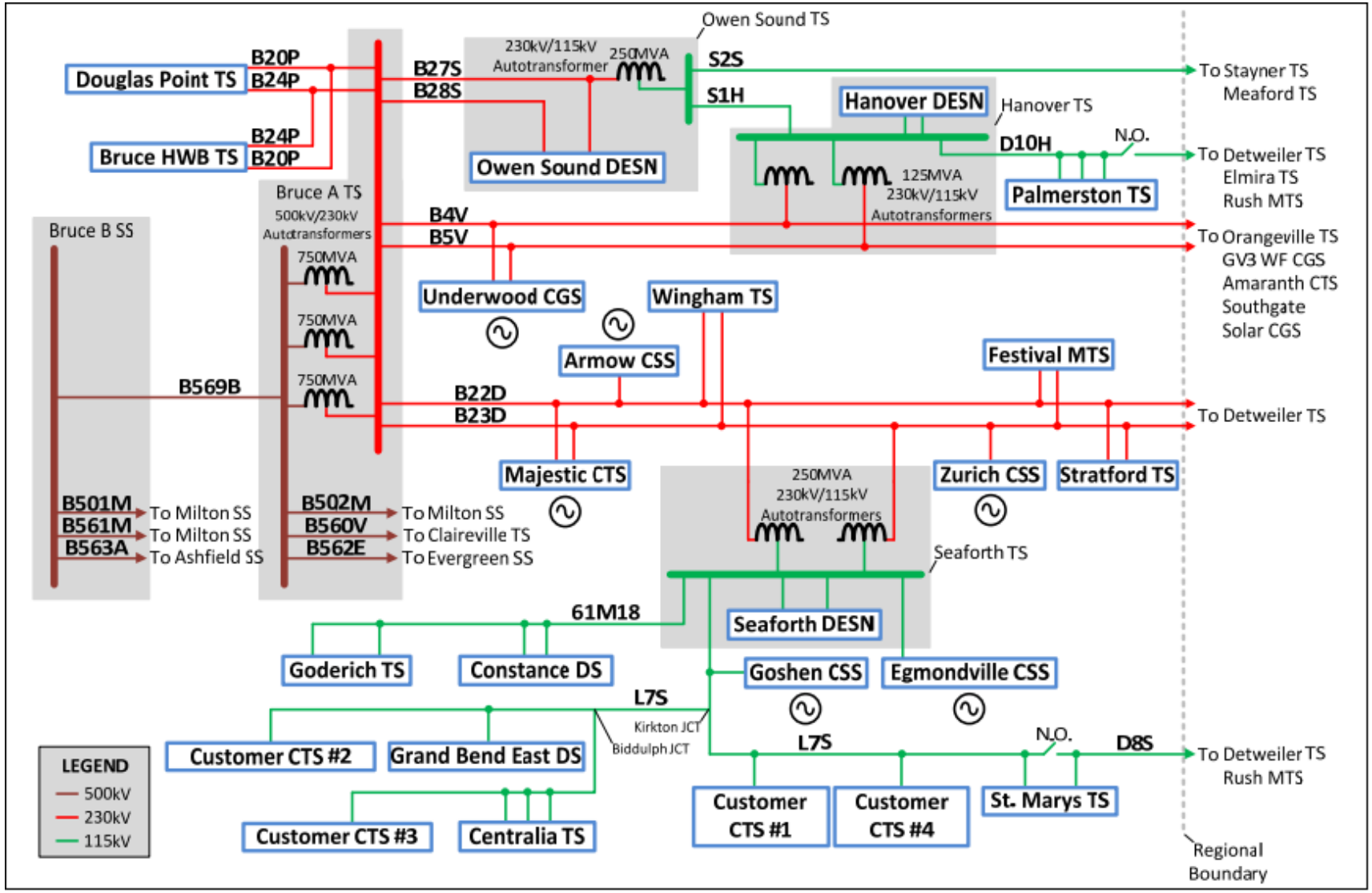

Figure 2: Greater Bruce-Huron Region – Single Line Diagram

5 INPUTS AND DATA

Study Team participants, including representatives from LDCs, IESO, and Hydro One provided information and input for the Greater Bruce-Huron Region NA. The information provided includes the following:

- Greater Bruce-Huron winter and summer Load Forecast for all supply stations;
- Known capacity and reliability needs, operating issues, and/or major assets approaching the end-of-life ("EOL"); and
- Planned/foreseen transmission and distribution investments that are relevant to regional planning for the Greater Bruce-Huron Region.

6 ASSESSMENT METHODOLOGY

The following methodology and assumptions are made in this Needs Assessment:

Information gathering included:

i. Load forecast: The LDCs provided load forecasts for all the stations supplying their loads in the Greater Bruce-Huron region for the 10 year study period. The IESO provided a Conservation and Demand Management ("CDM") and Distributed Generation ("DG") forecast for the Greater Bruce-Huron region. The region's extreme summer non-coincident peak gross load forecast for each station were prepared by applying the LDC load forecast growth rates to the actual coincident and non-coincident 2018 summer peak extreme weather corrected loads. The extreme summer weather correction factor was provided by Hydro One. The net extreme weather summer load forecasts were produced by reducing the gross load forecasts for each station by the percentage CDM and then by the amount of effective DG capacity provided by the IESO for that station. The coincident and non-coincident summer and winter load forecasts for the individual stations in the Greater Bruce-Huron region are given in Appendix A. Based on the forecasts, the equipment rating proved to be more limiting in summer than in winter. Therefore the summer load forecast was used to perform the analysis;

ii. Relevant information regarding system reliability and operational issues in the region; and

iii. List of major high voltage transmission equipment planned and/or identified to be refurbished and/or replaced due to the end of life which is relevant for regional planning purposes. This includes autotransformers, step-down transformers, breakers, underground cables and overhead transmission lines.

A technical assessment of needs was undertaken based on:

i. Planning criteria outlined in IESO-ORTAC (section 2.7.2) for analysis of current and future station capacity and transmission adequacy;
ii. Planning criteria outlined in IESO-ORTAC (section 7) for system reliability and operational concerns;

iii. Analysis of major high voltage equipment reaching the end of their life, in conjunction with emerging system needs; and
iv. Analysis of operational concerns relevant to Regional Planning.

7 NEEDS

This section assesses the adequacy of regional infrastructure to meet the forecasted load in the Greater Bruce-Huron Region and identify needs. The section also reviews and/or reaffirms needs already identified in the last regional planning cycle.

7.1 Review of Needs Identified in the Last Regional Planning Cycle

This section, reviews the status of needs identified in the previous cycle of Regional Planning as summarized in Table 3 below.

Table 3: Needs Identified in the Previous RIP report

Type of Needs identified in the previous RP cycle	Needs Details	Current Status
Transmission Supply Capacity of Circuit L7S	Overload on sections of 115 kV radial single circuit line L7S	Monitor closely as per Local Plan in first cycle of regonal planning.
Delivery Point Performance for L7S	Poor performance of delivery points supplied by circuit L7S	Projects to address frequency and duration of outages to be executed over next 5 years.
Step-down Transformation Capacity in Kincardine area	Load growth expected in Kincardine area	Need deferred based on current load forecast.

a. Transmission Supply Capacity of Circuit L7S

In the last Regional Planning cycle, overloading on sections of 115 kV circuit L7S was expected in 2019, based on gross summer load forecast. A Local Plan to mitigate the overload on the circuit was developed. The preferred option at the time was to closely monitor loading and trigger mitigation in advance.
The need based on revised load forecast has been updated and discussed in Section 7.2.

b. Delivery Point Performance for circuit L7S

Delivery points supplied by circuit L7S have often been classified as Outliers for frequency and duration of unplanned outages. Based on the findings of field screening resulting from the last cycle of Regional Planning, projects to reduce the frequency and duration of interruptions have been developed. Frequent outages due to weather will be addressed by installation of inter-phase spacers along the line and improving grounding of high resistance line structures. As well the long duration of outages will be reduced by installation of, remotely operable, motorized in-line switches along L7S. These projects will be executed in the near-term to improve realibility of the circuit.

c. Step-down capacity in the Kincardine area

Station capacity at Douglas Point TS was approaching limits based on anticipated load growth in the Kincardine area, in the last Regional Planning cycle. Possible solutions to address the increase load demand, such as upsizing existing transformers, permanent load transfers to neighbouring load supply stations and building a new DESN facility were considered. Due to lack of committed load, and the incoming of natural gas in the Kincardine area, a decline in winter load demand is observed at Douglas Point TS, based on new load forecast. Therefore no mitigation is required at the time.

7.2 Assessment of Station and Transmission Capacity Needs in the Region

Based on planning criteria, no station transformation capacity needs were identified in this cycle of Needs Assessment. However, the following transmission supply capacity need has been identified during the study period of 2019 to 2028. This need is consistent with the what was identified in the last Regional Planning cycle.

a. Transmission Supply Capacity of Circuit L7S

115 kV circuit L7S runs between Seaforth TS and St. Mary's TS and is isolated from circuit D8S running between St Mary's TS and Detweiler TS with a Noramally Open switch at St. Mary's TS. Analysis was performed based on gross summer coincident load forecast for the assessing thermal load capacity of circuit L7S.

Upon the loss of circuit D8S, the entire St. Mary's station load will be supplied by L7S. When the supply from D8S is lost, L7S will exceed it's short-term emergency (STE) and long-term emergency (LTE) rating in the near-term (summer 2022).

It was also identified that under normal operating conditions, with all elements in-serivce, L7S will exceed its continuous ratings towards the end of the study period (summer 2027).

The sections of circuit that will exceed their ratings are: Seaforth Jct x Goshen Jct. and Goshen Jct x Kirkton Jct. The emergency ratings of these sections are same as the continuous ratings because they are limited by the ground clearance in some spans of the sections.

The Local Plan in the last Regional Planning cycle outlined options to address the thermal capacity need of the circuit. The preferred mitigation option will marginally improve ratings to address only the near-term summer 2022 need. However, this will not differ the capacity need of the circuit expected in year 2027.

7.3 Assessment of Supply Security and Restoration Needs in the Region

Based on planning criteria, analysis shows that load supply security and restoration capability is acceptable. Based on the gross regional coincident peak load forecast with all transmission facilities in-service and coincident with the outage of the largest local generation units, all facilities are within applicable ratings. The largest local generation unit is a 230 kV connected Bruce Nuclear unit on the 230 kV system while on the 115 kV system, Goshen windfarm is assumed out of service.

Based on gross regional coincident load forecast, the loss of one element will not result in load interruption greater than 150 MW load by configuration, by planned load curtailment or by load rejection.

Based on gross regional coincident load forecast, the loss of two elements will not result in load interruption greater than 600 MW by configuration, by planned load curtailment or by load rejection.

Specifically, based on the load forecast, the largest load loss is expected to be 350 MW in summer 2028 for the loss of double circuit lines, B22D/B23D. By the use of existing 230 kV in-line switches at Seaforth TS, Hydro One can quickly resupply approximately 218 MW from Bruce A TS or 268 MW from Detweiler TS.

Therefore, based on the above information, load security and restoration criteria in the region are met.

7.4 Assessment of End-Of-Life Equipment Needs in the Region

Hydro One and LDCs have provided high voltage equipment information under the following categories that have been identified at this time and are likely to be replaced over the next 5 years:

- Autotransformers
- Power transformers
- High voltage breakers
- Transmission lines requiring refurbishment where an uprating is being considered for planning needs

The assessment for the EOL high voltage equipment considered the following options:

1. Maintaining the status quo/do nothing;
2. Replacing equipment with similar equipment of lower ratings (right-sizing) due to forecasted decrease in demand and built to current standards;
3. Replacing equipment with lower ratings (right-sizing) and built to current standards due to transferring load to other facilities;
4. Eliminating equipment by transferring all of the load to other existing facilities;
5. Replacing equipment with similar rated equipment and built to current standards (i.e., “like-for-like” replacement); and

6. Replacing equipment with higher ratings (right-sizing) due to forecasted increase in demand or due to load transfer and built to current standards.

Note that, from Hydro One Transmission's perspective as a facility owner and operator of its transmission equipment, do nothing is generally not an option for major high voltage equipment due to safety and reliability risk of equipment failure.

Accordingly, the following major high voltage equipment have been identified as approaching end of their life over the next 5 years.

a. Wingham TS – T1/T2 and Component Replacement

Wingham TS is a load supply station built in 1965. The station has two 50/67/83 MVA step-down transformers connected to the 230 kV circuits B22D and B23D (Bruce x Detweiler) and supplies Hydro One Distribution via four 44 kV feeders.

The current scope of this project is to replace the 230/44 kV step-down transformers, T1 and T2 and associated surge arrestors.

Based on the load forecast, similar equipment ratings are required for the EOL replacement. The planned in-service date for the project is in year 2022.

b. Stratford TS – T1 and Componenet Replacement

Stratford TS is a load supply station built in 1950. The station has two 50/67/83 MVA step-down transformers connected to 230 kV circuits B22D and B23D (Bruce x Detweiler) and supplies Festival Hydro Inc., Hydro One Distribution as well as other embedded LDCs, via eight 27.6 kV feeders. Transformers T1 and T2 are in service since 1970 and 1997 respectively.

The current scope of this project is replacement of 230/27.6 kV transformer T1 and associated equipment.

Based on the load forecast similar equipment ratings are required for EOL replacement. The planned in-service date for the project is in year 2023.

c. Seaforth TS – T5/T6/T1/T2 and Component Replacement

Seaforth TS is a major station and consists of two 230/115 kV, 150/200/250 MVA autotransformers supplied by 230 kV circuits B22D and B23D (Bruce x Detweiler). The 115 kV yard from Seaforth TS supplies nearly 200 km of single circuit supply along the circuits L7S and 61M18. Seaforth TS also consists of two 115/27.6 kV, 25/33/42 MVA step-down transformers and supplies Hydro One Distribution and embedded LDCs via four 27.6 kV feeders.

The current scope of this project is to replace 230/115 kV autotransformers T5, T6, step-down transformers T1, T2, the capacitor breaker SC1B and several high voltage and low voltage switches that are at end of their life. Operations has identified the need for refined voltage control on the 115 kV

system. Therefore, the new autotransformers at Seaforth TS will be equipped with Under Load Tap Changers (ULTCs).

Based on the load forecast for the station similar equipment ratings are required for EOL replacement of all equipment discussed above. The planned in-service date for the project is in year 2023.

d. Hanover TS – T2 and Component Replacement

Hanover TS consists of two 230/115 kV, 75/100/125 MVA autotransformers supplied by 230 kV circuits B4V and B5V (Bruce x Orangeville). The 115 kV yard has connectivity to Detweiler TS via 115 kV transmission circuit D10H with a Normally Open point at Palmerston TS. Another 115 kV transmission circuit S1H connects to Owen Sound TS. Hanover TS also consists of two 115/44 kV, 50/67/83 MVA step-down transformers connecting to six feeders and one capacitor bank, supplying Hydro One Distribution and embedded LDCs.

The current scope of this project is to replace 230 kV motorized switches, 115/44 kV step-down transformer T2 and associated equipment, 115 kV motorized swithes, surge arrestors, auto-ground switches and potential transformers.

Based on the load forecast for the station similar equipment ratings are required for EOL replacement. The planned in-service date for the project is in year 2023.

8 CONCLUSION AND RECOMMENDATIONS

Based on the findings of the Needs Assessment, the study team's recommendations are as follows:

A. The study team has reaffirmed the overloading of 115 kV circuit L7S, under contingency. Options to mitigate the near-term need of upgrading the emergency thermal ratings of L7S are outlined in the Local Plan prepared in the last Regional Planning cycle. Hydro One Transmission and the LDCs will revisit and asses the viability of the options proposed in the Local Plan.

B. The study team has identified the overloading of 115 kV circuit L7S, with all elements in-service. Further analysis in the Scoping Assessment phase of Regional Planning is required for the limited capacity of circuit L7S. IESO will lead the Scoping Assessment phase to recommend planning approaches to address potential load growth in the region. As a part of this assessment, a broader review of the region's system may be required to help identify solutions.

C. Replacement of end-of-life equipment does not require further regional coordination. The implementation and execution plan for these needs will be coordinated between Hydro One and the affected LDCs, where required:
    a. Wingham TS – T1/T2 and Component Replacement
    b. Stratford TS – T1 and Component Replacement
    c. Seaforth TS – T5/T6/T1/T2 and Component Replacement
    d. Hanover TS – T2 and Component Replacement

9 REFERENCES

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[2] Local Plan for L7S Thermal Capacity – November 2016
https://www.hydroone.com/abouthydroone/CorporateInformation/regionalplans/greaterbrucehuron/Documents/Local%20Planning%20Report%20-%20L7S%20Thermal%20Overload.pdf

[3] Planning Process Working Group Report to the OEB - https://www.oeb.ca/oeb/_Documents/EB-2011-0043/PPWG_Regional_Planning_Report_to_the_Board_App.pdf

[4] Ontario Resource and Transmission Assessment Criteria (ORTAC) – Issue 5.0 – August 2007
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Appendix A: Greater Bruce-Huron Region Coincident & Non-Coincident Summer &Winter Load Forecast

Table A-1: Summer Regional Coincident Peak Load Forecast (MW)

Transformer Station	Summer LTR (MVA)	Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Festival MTS #1	62.0	Load	25.0	25.2	25.4	25.5	25.7	25.9	26.1	26.3	26.5	26.7
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0
		Net (MW)	**24.7**	**24.7**	**24.9**	**25.0**	**25.1**	**25.2**	**25.3**	**25.5**	**25.6**	**25.7**
Centralia TS*	61.1	Load	29.9	33.2	33.6	36.8	37.2	37.5	37.8	38.1	38.4	38.7
		DG	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		CDM	0.3	0.6	0.6	0.8	0.9	1.0	1.1	1.2	1.4	1.4
		Net (MW)	**29.6**	**32.4**	**32.7**	**35.7**	**36.0**	**36.2**	**36.4**	**36.6**	**36.8**	**37.0**
Douglas Point TS	97.2	Load	51.0	60.6	69.7	77.6	78.6	79.5	80.4	81.3	82.3	83.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.5	1.0	1.3	1.7	1.9	2.2	2.4	2.6	2.9	3.1
		Net (MW)	**50.5**	**59.5**	**68.4**	**75.9**	**76.6**	**77.3**	**78.0**	**78.7**	**79.4**	**80.2**
Goderich TS	126.5	Load	31.8	32.2	35.2	37.2	37.6	37.9	38.2	38.5	38.8	39.1
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.5
		Net (MW)	**31.5**	**31.7**	**34.5**	**36.4**	**36.7**	**36.9**	**37.0**	**37.2**	**37.4**	**37.7**
Hanover TS (T1/T2 DESN)	109.9	Load	75.9	78.5	80.4	83.7	85.8	88.9	90.9	93.0	95.2	97.5
		DG	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		CDM	0.8	1.3	1.5	1.8	2.1	2.4	2.7	3.0	3.4	3.7
		Net (MW)	**74.6**	**76.6**	**78.4**	**81.3**	**83.1**	**85.9**	**87.6**	**89.5**	**91.3**	**93.3**
Owen Sound TS (T3/T4 DESN)	208.5	Load	92.7	94.8	95.7	96.7	97.8	98.4	98.9	99.5	100.1	100.8
		DG	1.7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
		CDM	0.9	1.6	1.8	2.1	2.4	2.7	3.0	3.2	3.5	3.8
		Net (MW)	**90.0**	**91.1**	**91.8**	**92.5**	**93.3**	**93.6**	**93.8**	**94.2**	**94.5**	**94.9**
Palmerston TS	83.3	Load	52.3	55.0	57.3	58.4	59.2	60.0	60.5	61.1	61.8	62.4
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.5	0.9	1.1	1.2	1.5	1.6	1.8	2.0	2.2	2.3
		Net (MW)	**51.8**	**54.0**	**56.2**	**57.2**	**57.8**	**58.3**	**58.7**	**59.2**	**59.6**	**60.1**
Seaforth TS (T1/T2 DESN)	45.1	Load	29.7	32.1	32.6	33.2	33.7	34.3	34.8	35.3	35.9	36.5
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.6	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4
		Net (MW)	**29.4**	**31.6**	**32.0**	**32.5**	**32.9**	**33.3**	**33.7**	**34.2**	**34.6**	**35.1**
St. Marys TS*	52.8	Load	22.7	22.9	23.9	23.2	23.4	23.5	23.6	23.7	23.9	24.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9
		Net (MW)	**22.4**	**22.5**	**23.5**	**22.7**	**22.8**	**22.9**	**22.9**	**23.0**	**23.0**	**23.1**
Stratford TS	117.3	Load	73.6	75.7	76.3	78.2	78.9	79.4	79.9	80.5	81.0	81.6
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.7	1.3	1.4	1.7	1.9	2.2	2.4	2.6	2.9	3.1
		Net (MW)	**72.8**	**74.4**	**74.9**	**76.5**	**76.9**	**77.2**	**77.5**	**77.9**	**78.2**	**78.5**

Transformer Station	Summer LTR (MVA)	Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Wingham TS	97.0	Load	36.9	38.8	44.7	52.2	52.4	52.4	52.4	52.5	52.7	52.8
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.4	0.7	0.8	1.1	1.3	1.4	1.6	1.7	1.9	2.0
		Net (MW)	**36.5**	**38.2**	**43.9**	**51.1**	**51.1**	**50.9**	**50.9**	**50.9**	**50.8**	**50.8**
Constance DS	25.0	Load	17.4	17.7	17.8	17.9	18.0	18.1	18.1	18.2	18.2	18.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7
		Net (MW)	**17.3**	**17.4**	**17.5**	**17.5**	**17.6**	**17.6**	**17.6**	**17.6**	**17.6**	**17.6**
Grand Bend East DS*	31.3	Load	16.5	17.3	17.9	18.1	18.3	18.4	18.5	18.6	18.7	18.8
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.7
		Net (MW)	**16.4**	**17.0**	**17.5**	**17.7**	**17.8**	**17.9**	**17.9**	**18.0**	**18.1**	**18.1**
Bruce HWP B TS	113.2	Load	4.3	4.6	4.6	4.5	4.5	4.4	4.3	4.3	4.3	4.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
		Net (MW)	**4.3**	**4.6**	**4.5**	**4.4**	**4.3**	**4.3**	**4.2**	**4.1**	**4.1**	**4.1**
Customer CTS #1*	NA	Load	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
		Net (MW)	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
Customer CTS #2*	NA	Load	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
		Net (MW)	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**
Customer CTS #3*	NA	Load	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Net (MW)	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Customer CTS #4*	NA	Load	13.9	13.9	13.9	18.6	18.6	18.6	18.6	18.6	23.2	23.2
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.6	0.8	0.9
		Net (MW)	**13.8**	**13.7**	**13.7**	**18.2**	**18.1**	**18.0**	**18.0**	**18.0**	**22.4**	**22.3**

*Load forecast all stations connected to L7S is coincident with peak load flow on circuit L7S
NA – Not Available

Table A-2: Summer Regional Non-coincident Peak Load Forecast (MW)

Transformer Station	Summer LTR (MVA)	Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Festival MTS #1	62.0	Load	32.6	32.9	33.1	33.4	33.6	33.9	34.1	34.4	34.6	34.9
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.6	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
		Net (MW)	**32.3**	**32.3**	**32.5**	**32.7**	**32.8**	**33.0**	**33.1**	**33.3**	**33.4**	**33.6**
Centralia TS	61.1	Load	34.5	38.2	38.6	42.3	42.8	43.2	43.5	43.8	44.2	44.6
		DG	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		CDM	0.3	0.7	0.7	0.9	1.1	1.2	1.3	1.4	1.6	1.7
		Net (MW)	**34.1**	**37.3**	**37.7**	**41.2**	**41.5**	**41.7**	**41.9**	**42.2**	**42.4**	**42.6**
Douglas Point TS	97.2	Load	51.2	60.8	70.0	77.9	78.9	79.8	80.7	81.6	82.6	83.6
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.5	1.0	1.3	1.7	1.9	2.2	2.4	2.6	2.9	3.1
		Net (MW)	**50.7**	**59.7**	**68.7**	**76.2**	**76.9**	**77.6**	**78.2**	**79.0**	**79.7**	**80.5**
Goderich TS	126.5	Load	38.2	38.7	42.2	44.7	45.2	45.5	45.9	46.2	46.6	47.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.4	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.6	1.8
		Net (MW)	**37.8**	**38.1**	**41.4**	**43.8**	**44.0**	**44.3**	**44.5**	**44.7**	**45.0**	**45.2**
Hanover TS (T1/T2 DESN)	109.9	Load	75.9	78.5	80.4	83.7	85.8	88.9	90.9	93.0	95.2	97.5
		DG	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		CDM	0.8	1.3	1.5	1.8	2.1	2.4	2.7	3.0	3.4	3.7
		Net (MW)	**74.6**	**76.6**	**78.4**	**81.3**	**83.1**	**85.9**	**87.6**	**89.5**	**91.3**	**93.3**
Owen Sound TS (T3/T4 DESN)	208.5	Load	104.1	106.4	107.4	108.6	109.9	110.5	111.1	111.7	112.4	113.1
		DG	1.7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
		CDM	1.0	1.8	2.0	2.3	2.7	3.0	3.3	3.6	4.0	4.2
		Net (MW)	**101.3**	**102.5**	**103.3**	**104.2**	**105.1**	**105.4**	**105.6**	**106.0**	**106.4**	**106.8**
Palmerston TS	83.3	Load	62.6	65.8	68.5	69.9	70.9	71.8	72.4	73.2	73.9	74.7
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.6	1.1	1.3	1.5	1.7	1.9	2.2	2.3	2.6	2.8
		Net (MW)	**62.0**	**64.7**	**67.3**	**68.4**	**69.1**	**69.8**	**70.3**	**70.8**	**71.3**	**71.9**
Seaforth TS (T1/T2 DESN)	45.1	Load	31.4	33.9	34.4	35.0	35.6	36.2	36.7	37.3	37.9	38.5
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.6	0.6	0.7	0.9	1.0	1.1	1.2	1.3	1.4
		Net (MW)	**31.0**	**33.3**	**33.8**	**34.3**	**34.7**	**35.2**	**35.6**	**36.1**	**36.6**	**37.1**
St. Marys TS	52.8	Load	24.9	25.1	26.2	25.4	25.6	25.8	25.9	26.0	26.2	26.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0
		Net (MW)	**24.6**	**24.7**	**25.7**	**24.9**	**25.0**	**25.1**	**25.1**	**25.2**	**25.3**	**25.3**
Stratford TS	117.3	Load	82.2	84.5	85.2	87.3	88.0	88.6	89.2	89.8	90.5	91.1
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.8	1.4	1.6	1.9	2.2	2.4	2.7	2.9	3.2	3.4
		Net (MW)	**81.3**	**83.1**	**83.6**	**85.4**	**85.9**	**86.2**	**86.5**	**86.9**	**87.3**	**87.7**

Transformer Station	Summer LTR (MVA)	Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Wingham TS	97.0	Load	51.2	53.9	62.1	72.5	72.7	72.7	72.8	72.9	73.1	73.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.5	0.9	1.1	1.5	1.8	2.0	2.2	2.3	2.6	2.7
		Net (MW)	**50.7**	**53.0**	**60.9**	**70.9**	**70.9**	**70.7**	**70.6**	**70.6**	**70.5**	**70.5**
Constance DS	25.0	Load	18.2	18.4	18.5	18.6	18.8	18.8	18.9	18.9	19.0	19.1
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.7
		Net (MW)	**18.0**	**18.1**	**18.2**	**18.2**	**18.3**	**18.3**	**18.3**	**18.3**	**18.3**	**18.3**
Grand Bend East DS	31.3	Load	22.1	23.1	23.9	24.1	24.4	24.5	24.7	24.8	25.0	25.2
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.4	0.4	0.5	0.6	0.7	0.7	0.8	0.9	0.9
		Net (MW)	**21.9**	**22.7**	**23.4**	**23.6**	**23.8**	**23.9**	**23.9**	**24.0**	**24.1**	**24.2**
Bruce HWP B TS	113.2	Load	8.3	8.9	8.8	8.7	8.6	8.4	8.3	8.2	8.2	8.2
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
		Net (MW)	**8.2**	**8.8**	**8.6**	**8.5**	**8.3**	**8.2**	**8.1**	**7.9**	**7.9**	**7.9**
Customer CTS #1	NA	Load	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Net (MW)	**3.4**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**
Customer CTS #2	NA	Load	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
		Net (MW)	**5.7**	**5.7**	**5.7**	**5.7**	**5.6**	**5.6**	**5.6**	**5.6**	**5.6**	**5.6**
Customer CTS #3	NA	Load	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
		Net (MW)	**4.5**	**4.5**	**4.4**	**4.4**	**4.4**	**4.4**	**4.4**	**4.4**	**4.4**	**4.4**
Customer CTS #4	NA	Load	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	25.0	25.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.9	0.9
		Net (MW)	**14.8**	**14.7**	**14.7**	**19.6**	**19.5**	**19.5**	**19.4**	**19.4**	**24.1**	**24.1**

NA – Not Available

Table A-3: Winter Regional Coincident Peak Load Forecast (MW)

Transformer Station	Winter LTR (MVA)	Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Festival MTS #1	66.7	Load	28.0	25.6	25.8	26.0	26.2	26.4	26.6	26.8	27.0	27.2
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.9	0.9
		Net (MW)	**27.7**	**25.2**	**25.4**	**25.5**	**25.6**	**25.8**	**25.9**	**26.0**	**26.1**	**26.3**
Centralia TS	65.4	Load	30.6	33.6	33.9	37.0	37.3	37.5	37.7	37.9	38.1	38.3
		DG	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		CDM	0.3	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
		Net (MW)	**30.3**	**32.8**	**33.0**	**36.1**	**36.2**	**36.3**	**36.4**	**36.6**	**36.7**	**36.8**
Douglas Point TS	109.8	Load	62.4	76.3	82.4	89.1	88.9	88.6	88.3	88.0	87.7	87.5
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.6	1.2	1.4	1.6	1.9	2.1	2.4	2.5	2.8	3.0
		Net (MW)	**61.8**	**75.1**	**81.0**	**87.5**	**87.0**	**86.4**	**85.9**	**85.4**	**84.9**	**84.5**
Goderich TS	132.0	Load	31.3	31.7	34.7	36.8	37.2	37.5	37.8	38.1	38.4	38.7
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
		Net (MW)	**31.0**	**31.2**	**34.2**	**36.2**	**36.4**	**36.6**	**36.8**	**37.0**	**37.2**	**37.4**
Hanover TS (T1/T2 DESN)	124.7	Load	68.8	70.1	70.7	72.4	73.2	74.8	75.4	76.0	76.7	77.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.6	1.1	1.2	1.3	1.6	1.8	2.0	2.2	2.4	2.6
		Net (MW)	**68.2**	**69.0**	**69.5**	**71.1**	**71.6**	**73.0**	**73.3**	**73.8**	**74.2**	**74.7**
Owen Sound TS (T3/T4 DESN)	232.5	Load	109.6	111.5	112.4	113.3	114.5	115.1	115.7	116.4	117.2	117.9
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	1.0	1.8	1.9	2.1	2.5	2.8	3.1	3.4	3.7	4.0
		Net (MW)	**108.5**	**109.7**	**110.5**	**111.2**	**112.0**	**112.3**	**112.6**	**113.0**	**113.4**	**113.9**
Palmerston TS	83.3	Load	70.1	73.4	75.0	77.8	78.7	79.6	80.3	81.0	81.7	82.5
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.6	1.2	1.3	1.4	1.7	1.9	2.1	2.3	2.6	2.8
		Net (MW)	**69.4**	**72.3**	**73.7**	**76.4**	**77.0**	**77.7**	**78.1**	**78.6**	**79.1**	**79.7**
Seaforth TS (T1/T2 DESN)	55.4	Load	28.7	30.8	31.0	31.3	31.5	31.6	31.8	32.1	32.3	32.5
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.5	0.5	0.6	0.7	0.8	0.9	0.9	1.0	1.1
		Net (MW)	**28.5**	**30.3**	**30.5**	**30.7**	**30.8**	**30.9**	**31.0**	**31.1**	**31.2**	**31.4**
St. Marys TS	59.0	Load	21.9	21.9	22.0	22.2	22.3	22.3	22.4	22.5	22.5	22.6
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.8
		Net (MW)	**21.7**	**21.5**	**21.6**	**21.8**	**21.8**	**21.8**	**21.8**	**21.8**	**21.8**	**21.9**
Stratford TS	128.6	Load	68.5	70.5	71.0	72.9	73.5	74.0	74.4	75.0	75.5	76.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.6	1.1	1.2	1.3	1.6	1.8	2.0	2.2	2.4	2.6
		Net (MW)	**67.9**	**69.4**	**69.8**	**71.5**	**71.9**	**72.2**	**72.5**	**72.8**	**73.1**	**73.4**

Transformer Station	Winter LTR (MVA)	Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Wingham TS	107.9	Load	40.5	42.3	46.6	51.9	52.4	52.8	53.1	53.5	53.9	54.4
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.4	0.7	0.8	1.0	1.1	1.3	1.4	1.5	1.7	1.8
		Net (MW)	**40.1**	**41.6**	**45.8**	**51.0**	**51.3**	**51.5**	**51.7**	**52.0**	**52.2**	**52.5**
Constance DS	35.0	Load	16.8	17.0	17.1	17.1	17.2	17.3	17.3	17.4	17.5	17.5
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6
		Net (MW)	**16.7**	**16.7**	**16.8**	**16.8**	**16.9**	**16.9**	**16.9**	**16.9**	**16.9**	**16.9**
Grand Bend East DS	40.0	Load	11.8	12.6	13.2	13.3	13.4	13.5	13.6	13.6	13.7	13.8
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5
		Net (MW)	**11.7**	**12.4**	**13.0**	**13.0**	**13.1**	**13.2**	**13.2**	**13.2**	**13.3**	**13.4**
Bruce HWP B TS	114.8	Load	10.4	11.2	11.1	10.9	10.8	10.6	10.5	10.3	10.3	10.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
		Net (MW)	**10.3**	**11.0**	**10.9**	**10.7**	**10.5**	**10.4**	**10.2**	**10.0**	**10.0**	**10.0**
Customer CTS #1	NA	Load	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
		Net (MW)	**2.6**	**2.6**	**2.6**	**2.6**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
Customer CTS #2	NA	Load	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Net (MW)	**3.3**	**3.2**	**3.2**	**3.2**	**3.2**	**3.2**	**3.2**	**3.2**	**3.2**	**3.2**
Customer CTS #3	NA	Load	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Net (MW)	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Customer CTS #4	NA	Load	13.8	13.8	13.8	18.4	18.4	18.4	18.4	18.4	23.0	23.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.7	0.8
		Net (MW)	**13.7**	**13.6**	**13.6**	**18.1**	**18.0**	**17.9**	**17.9**	**17.9**	**22.3**	**22.2**

NA – Not Available

Table A-4: Winter Regional Non-coincident Peak Load Forecast (MW)

Transformer Station	Winter LTR (MVA)	Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Festival MTS #1	66.7	Load	29.7	27.2	27.4	27.6	27.8	28.1	28.3	28.5	28.7	28.9
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0
		Net (MW)	**29.5**	**26.8**	**27.0**	**27.1**	**27.2**	**27.4**	**27.5**	**27.7**	**27.8**	**27.9**
Centralia TS	65.4	Load	33.3	36.7	36.9	40.4	40.7	40.9	41.1	41.3	41.6	41.8
		DG	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		CDM	0.3	0.6	0.6	0.7	0.9	1.0	1.1	1.2	1.3	1.4
		Net (MW)	**33.0**	**35.8**	**36.0**	**39.4**	**39.5**	**39.6**	**39.7**	**39.9**	**40.0**	**40.1**
Douglas Point TS	109.8	Load	63.1	77.2	83.3	90.2	89.9	89.6	89.3	89.0	88.7	88.5
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.6	1.2	1.4	1.7	2.0	2.2	2.4	2.6	2.8	3.0
		Net (MW)	**62.6**	**75.9**	**81.9**	**88.5**	**88.0**	**87.4**	**86.9**	**86.4**	**85.9**	**85.5**
Goderich TS	132.0	Load	35.8	36.2	39.7	42.1	42.4	42.8	43.1	43.5	43.8	44.2
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.4	1.5
		Net (MW)	**35.4**	**35.6**	**39.0**	**41.3**	**41.5**	**41.7**	**42.0**	**42.2**	**42.4**	**42.7**
Hanover TS (T1/T2 DESN)	124.7	Load	72.0	73.4	74.0	75.8	76.6	78.3	78.9	79.5	80.2	80.9
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.7	1.2	1.2	1.4	1.7	1.9	2.1	2.3	2.5	2.7
		Net (MW)	**71.3**	**72.2**	**72.8**	**74.4**	**74.9**	**76.4**	**76.8**	**77.2**	**77.7**	**78.2**
Owen Sound TS (T3/T4 DESN)	232.5	Load	109.9	111.9	112.8	113.7	114.8	115.5	116.1	116.8	117.6	118.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	1.0	1.8	1.9	2.1	2.5	2.8	3.1	3.4	3.7	4.0
		Net (MW)	**108.9**	**110.1**	**110.9**	**111.6**	**112.3**	**112.7**	**113.0**	**113.4**	**113.8**	**114.3**
Palmerston TS	83.3	Load	70.3	73.7	75.3	78.1	79.0	79.9	80.6	81.3	82.0	82.8
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.6	1.2	1.3	1.4	1.7	1.9	2.2	2.3	2.6	2.8
		Net (MW)	**69.7**	**72.5**	**74.0**	**76.7**	**77.3**	**78.0**	**78.4**	**78.9**	**79.4**	**80.0**
Seaforth TS (T1/T2 DESN)	55.4	Load	34.8	37.3	37.5	37.9	38.1	38.3	38.6	38.8	39.1	39.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.3	0.6	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
		Net (MW)	**34.5**	**36.7**	**36.9**	**37.2**	**37.3**	**37.4**	**37.5**	**37.7**	**37.8**	**38.0**
St. Marys TS	59.0	Load	23.7	23.7	23.8	23.9	24.0	24.1	24.2	24.3	24.3	24.4
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.8
		Net (MW)	**23.4**	**23.3**	**23.4**	**23.5**	**23.5**	**23.5**	**23.5**	**23.6**	**23.6**	**23.6**
Stratford TS	128.6	Load	71.9	74.0	74.5	76.5	77.1	77.6	78.1	78.7	79.2	79.8
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.7	1.2	1.2	1.4	1.7	1.9	2.1	2.3	2.5	2.7
		Net (MW)	**71.2**	**72.8**	**73.3**	**75.1**	**75.4**	**75.7**	**76.0**	**76.4**	**76.7**	**77.1**

Transformer Station	Winter LTR (MVA)	Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Wingham TS	107.9	Load	62.6	65.3	71.9	80.2	81.0	81.5	82.1	82.7	83.3	84.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.6	1.0	1.2	1.5	1.8	2.0	2.2	2.4	2.6	2.8
		Net (MW)	**62.0**	**64.3**	**70.7**	**78.7**	**79.2**	**79.6**	**79.9**	**80.3**	**80.7**	**81.1**
Constance DS	35.0	Load	16.9	17.1	17.2	17.3	17.4	17.4	17.4	17.5	17.6	17.6
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6
		Net (MW)	**16.8**	**16.8**	**16.9**	**16.9**	**17.0**	**17.0**	**17.0**	**17.0**	**17.0**	**17.0**
Grand Bend East DS	40.0	Load	13.0	14.0	14.6	14.7	14.9	14.9	15.0	15.1	15.2	15.3
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.5
		Net (MW)	**12.9**	**13.8**	**14.4**	**14.4**	**14.5**	**14.6**	**14.6**	**14.7**	**14.7**	**14.8**
Bruce HWP B TS	114.8	Load	12.1	13.0	12.8	12.7	12.5	12.3	12.1	12.0	12.0	12.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4
		Net (MW)	**11.9**	**12.8**	**12.6**	**12.4**	**12.2**	**12.0**	**11.8**	**11.6**	**11.6**	**11.6**
Customer CTS #1	NA	Load	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Net (MW)	**3.4**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**
Customer CTS #2	NA	Load	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
		Net (MW)	**5.8**	**5.8**	**5.8**	**5.8**	**5.8**	**5.8**	**5.7**	**5.7**	**5.7**	**5.7**
Customer CTS #3	NA	Load	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
		Net (MW)	**4.6**	**4.6**	**4.6**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**
Customer CTS #4	NA	Load	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	25.0	25.0
		DG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CDM	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.8	0.8
		Net (MW)	**14.9**	**14.8**	**14.7**	**19.6**	**19.6**	**19.5**	**19.5**	**19.4**	**24.2**	**24.2**

NA – Not Available

Appendix B: Lists of Step-Down Transformer Stations

Sr. No.	Transformer Stations
1.	Bruce HWP B TS
2.	Centralia TS
3.	Douglas Point TS
4.	Goderich TS
5.	Hanover TS
6.	Owen Sound TS
7.	Palmerston TS
8.	Seaforth TS
9.	St. Marys TS
10.	Stratford TS
11.	Wingham TS
12.	Constance DS
13.	Festival MTS
14.	Grand Bend East DS
15.	Customer CTS #1
16.	Customer CTS #2
17.	Customer CTS #3
18.	Customer CTS #4

Appendix C: Lists of Transmission Circuits

Sr. No.	Circuit ID	From Station	To Station	Voltage (kV)
1.	B4V/B5V	Bruce A TS	Orangeville TS	230
2.	B20P/B24P	Bruce A TS	Douglas Pt. TS/ Bruce HWP B TS	230
3.	B22D/B23D	Bruce A TS	Detweiler TS	230
4.	B27S/B28S	Bruce A TS	Owen Sound TS	230
5.	61M18	Seaforth TS	Goderich TS	115
6.	L7S	Seaforth TS	St. Mary's TS	115
7.	S1H	Owen Sound TS	Hanover TS	115
8.	D10H	Hanover TS	Detweiler TS	115

Appendix D: Lists of LDCs in the Greater Bruce-Huron Region

Sr. No.	Company	Connection Type (Transmission/Distribution)
1.	Entegrus	Distribution
2.	ERTH Power Corp.	Distribution
3.	Festival Hydro Inc.	Transmission/Distribution
4.	Hydro One Networks Inc. (Distribution)	Transmission/Distribution
5.	Wellington North Power Inc.	Distribution
6.	Westario Power Inc.	Distribution

Appendix E: Acronyms

Acronym	Description
A	Ampere
BES	Bulk Electric System
BPS	Bulk Power System
CDM	Conservation and Demand Management
CIA	Customer Impact Assessment
CGS	Customer Generating Station
CSS	Customer Switching Station
CTS	Customer Transformer Station
DESN	Dual Element Spot Network
DG	Distributed Generation
DS	Distribution Station
GS	Generating Station
HV	High Voltage
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
kV	Kilovolt
LDC	Local Distribution Company
LP	Local Plan
LTE	Long Term Emergency
LTR	Limited Time Rating
LV	Low Voltage
MTS	Municipal Transformer Station
MW	Megawatt
MVA	Mega Volt-Ampere
MVAR	Mega Volt-Ampere Reactive
NA	Needs Assessment
NERC	North American Electric Reliability Corporation
NGS	Nuclear Generating Station
NPCC	Northeast Power Coordinating Council Inc.
NUG	Non-Utility Generator
OEB	Ontario Energy Board
OPA	Ontario Power Authority
ORTAC	Ontario Resource and Transmission Assessment Criteria
PF	Power Factor
PPWG	Planning Process Working Group
RIP	Regional Infrastructure Plan
SA	Scoping Assessment
SIA	System Impact Assessment
SPS	Special Protection Scheme
SS	Switching Station
STG	Steam Turbine Generator
TS	Transformer Station