

May 17, 2023

Revision 0

Submission in Support of Exemption Application for Windsor NextStar Transformer Station

- Exemption Applicant: Hydro One Networks Inc.
- Facility: Load at Windsor NextStar Transformer Station
- Ontario Resource and Transmission Assessment Criteria (ORTAC)
- Exemption: ORTAC 7.1 (load security criteria); ORTAC 7.2 (load restoration criteria)

Hydro One Networks Inc. (HONI) is developing the Windsor NextStar Transformer Station (TS) in the city of Windsor near Lauzon TS to supply the upcoming NextStar Electric Vehicle Battery Manufacturing Plant. The above Market Rules exemptions are needed to incorporate load at this location. The exemptions request is based on the findings of the System Impact Assessment (SIA) report for this project, CAA ID: 2022-726, dated March 27, 2023.

Project Description

The Windsor NextStar TS is a Dual Element Spot Network (DESN) Transformer Station in a Bermondsey configuration to be built and commissioned in the city of Windsor about 1 kilometre from Lauzon TS and will be supplied from 230kV circuits H53Z and H54Z. The approximate location is shown in Figure 1 below. A summary of the project is provided below:

- Build Windsor NextStar Transformer Station (DESN):
 - A new 230/27.6-27.6 kV DESN, connecting 150 MW of peak load planned to be in-service by in Q2/Q3, 2024
 - Approximate 700m double circuit line tap connecting the transformer station to the 230kV circuits H53Z and H54Z.
 - One of the transformers of this new DESN will be in-service by January 2024 supplying a load of about 44 MW from January 2024 to April 2024, and about 68 MW until full DESN is in-service in June 2024

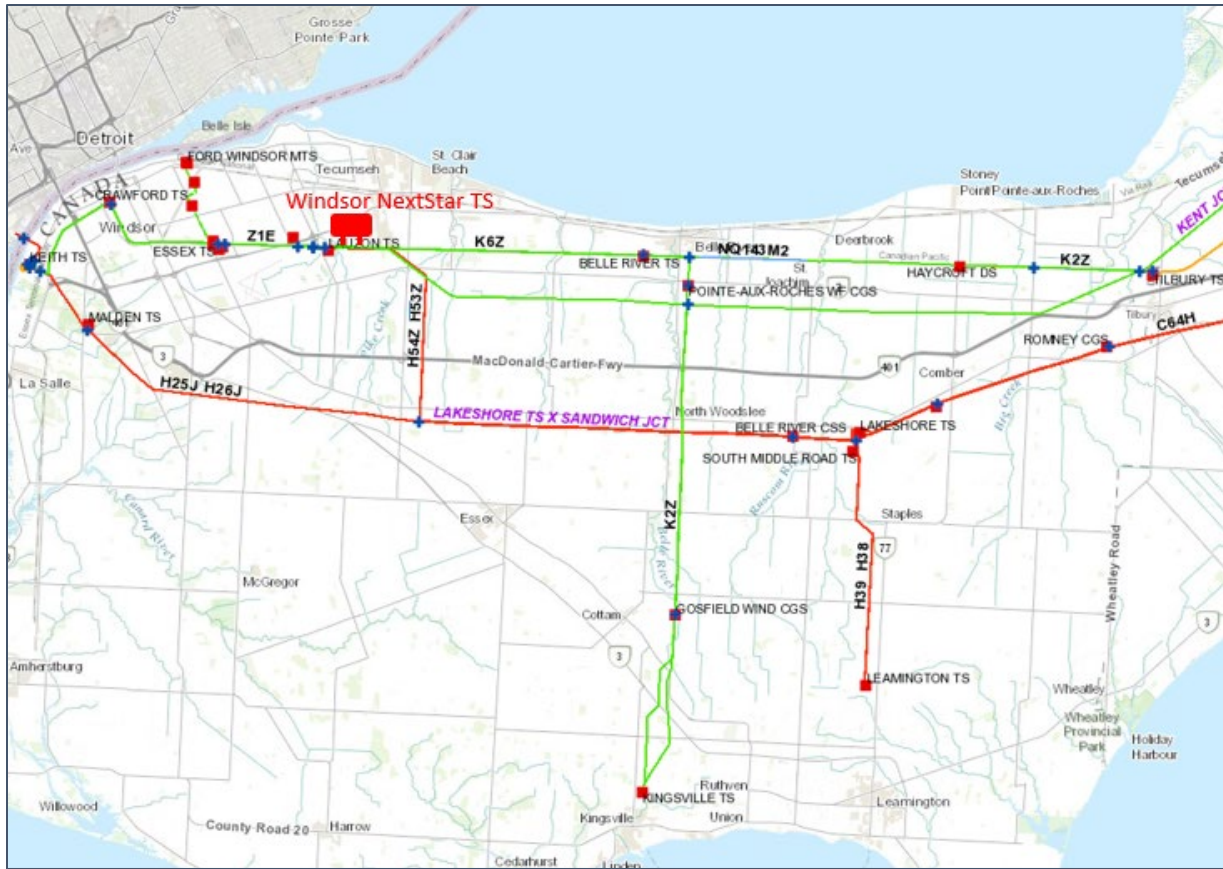


Figure 1: Map of Windsor – Essex Region with Windsor NextStar Transformer Station

Description of the Relevant IESO Requirements

This exemption application refers to two requirements outlined in the Ontario Resource and Transmission Assessment Criteria ([ORTAC](#)).

Section 7.1: Load Security Criteria

The transmission system must be planned to satisfy demand levels up to the extreme weather, median-economic forecast for an extended period with any one transmission element out of service. The transmission system must exhibit acceptable performance, as described below, following the design criteria contingencies defined in sections 2.7.1 and 2.7.2. For the purposes of this section, an element is comprised of a single zone of protection.

With any one element out of service, not more than 150MW of load may be interrupted by configuration and by planned load curtailment, or load rejection, excluding voluntary demand management.

With any two elements out of service, planned load curtailment or load rejection exceeding 150MW is permissible only to account for local generation outages. Not more than 600MW of load may be interrupted by configuration and by planned load curtailment, or load rejection, excluding voluntary demand management.

Section 7.2: Load Restoration Criteria

The IESO has established load restoration criteria for high voltage supply to a transmission customer. The load restoration criteria below are established so that satisfying the restoration times below will lead to an acceptable set of facilities consistent with the amount of load affected.

- All loads must be restored within approximately 8 hours.
- When the amount of load interrupted is greater than 150MW, the amount of load in excess of 150MW must be restored within approximately 4 hours.
- When the amount of load interrupted is greater than 250MW, the amount of load in excess of 250MW must be restored within 30 minutes.

Exemption Requirements

Exemptions are sought for the following violations of the Ontario Resource and Transmission Assessment Criteria (ORTAC):

a) Requirement #2 in the SIA report CAA ID 2022-726

Requirement #2 in the SIA report CAA ID 2022-726 required Hydro One Networks Inc. to obtain an exemption from satisfying section 7.1 load security criteria in ORTAC, for the loads supplied by Windsor NextStar TS under the following system conditions:

- 1- Following the loss of L28C or L29C or W44LC or W45LS OR S47C, over 150 MW of load would have to be rejected, as identified in finding #1a of the report.
- 2- Following the loss of J5D under peak load conditions and maximum import level from Michigan with Brighton Beach CGS out-of-service, over 150 MW of load would have to be rejected, as identified in finding #2b of the report.
- 3- During outage of L28C or L29C with Brighton Beach CGS in-service under peak load conditions and with no transfers on J5D, load would have to be curtailed to avoid ORTAC transfer capability violation, as identified in finding #3 of the report.
- 4- During outage of L28C or L29C with Brighton Beach CGS in-service under peak load conditions and with no transfers on J5D, over 150 MW of load would have to be rejected, as identified in finding #4a of the report.
- 5- Following the loss of Brighton Beach CGS during outage of L28C or L29C under peak load conditions and maximum import level from Michigan, over 150 MW of load would have to be rejected, as identified in finding #5 of the report.
- 6- With all elements in service and the Brighton Beach CGS out of service, under peak load conditions and with no transfers on J5D following the loss of C42H, C43H, C64H or C65H, over 150 MW of load would have to be rejected, as identified in finding #7a of the report.

b) Requirement #3 in the SIA report CAA ID 2022-726

Requirement #3 in the SIA report CAA ID 2022-726 required Hydro One Networks Inc. to obtain an exemption from satisfying section 7.2 load restoration criteria in ORTAC, for the loads supplied by Windsor NextStar TS under the following system conditions:

- 1- Following the completion of the Chatham SS x Lakeshore TS line project, more than 250 MW of load may be interrupted for some system conditions as identified in finding #6 of the report, following the loss of any of the following circuits L28C, L29C, W44LC, W45LS, S47C, or J5D: or for the loss of any of the following double circuits L29C and L24L, W44LC and S47C, or W44LC and W45LS.
- 2- Before the completion of the Chatham SS x Lakeshore TS line project, more than 250 MW of load may be interrupted for some system conditions as identified in finding #10 of the report, following the loss of any of the following single circuits C42H, C43H, C64H and C65H: or for the loss of double circuits C42H and C64H, or C43H and C65H.

Plan to Achieve Compliance

The need for exemption is the result of the weakness of the existing transmission system. This transmission system is unable to adequately support the substantially increased load growth in the region while meeting ORTAC. The exemption requirements will be eliminated with sufficient strengthening of the existing transmission network.

The IESO has responsibility for making decisions and plans relating to improvements to the transmission system. In this regard, the IESO has requested Hydro One to develop the following project to reinforce the transmission system:

- Establishment of a 230 kV 2-circuit Chatham SS x Lakeshore TS line (planned in-service Q4, 2025).
- Establishment of a 230 kV 2-circuit Chatham SS x Lambton TS line (planned in-service Q4, 2028).

With the incorporation of these projects, compliance with ORTAC is expected to be met. Hydro One is in construction phase of the Chatham SS x Lakeshore TS transmission line to implement this project. For the Chatham SS x Lambton TS line, Hydro One is in the planning phase and has submitted an SIA application (CAA ID: 2021-699) to the IESO and has commenced Environmental Assessment for the new line.

Operation Over the Period When the Exemption Would be in Effect:

The request for this exemption is due to the urgent need for Hydro One's customer to connect load at Windsor NextStar TS prior to planned transmission reinforcements.

The noted exemption requirements have been discussed with NextStar JV, the customer for Windsor NextStar TS. NextStar JV was also provided with a copy of the SIA report.

The impact of the exemption on customers is expected to be marginal since the contingency events which result in the noted violations are indeed rare events.

Over the five-year period (July 2017 to June 2022) circuit L28C had four forced outages out of which three were momentary and one sustained; the corresponding numbers for circuit L29C are three and two respectively. During the same period circuit W44LC had two momentary and one sustained outage while W45LS had only one momentary outage. Also, the circuit S47C had one sustained outage during the period.

The circuits C42H, C43H, C64H and C65H only came into being with incorporation of Lakeshore TS in 2022. These circuits were previously known as C23Z, C24Z, C21J and C22J respectively, prior to re-termination at Lakeshore TS. Since then, only C43H had one sustained outage while others have none. For the same five-year period, circuit J3E had one momentary and four sustained outages while J4E, three momentary and four sustained outages. Circuit J5D had ten forced outages over the July 2017 to June 2022 period, of which one was momentary while nine sustained. For half of these outages, all loads would be restored within a minute by automatic auto reclosure at the circuit terminals.

Hence on the average, in a five-year period, the L28C contingency may occur once, the L29C outage twice, the W44LC once, the S47C once, and the J3E and J4E outages four times.

Over the five-year period, there were no simultaneous double circuit outages for L29C/L24L, W44LC/S47C and W44LC/W45LS. Since 2022, there has been no simultaneous forced outage of circuits C42H and C64H, or C43H and C65H.

The time it takes to restore load generally depends on the nature of the contingency. If the contingency is due to a lightning strike, the affected circuit(s) would be returned to service in a matter of seconds with automatic reclosure operation at circuit terminals. The rejected load would then be restored. It is expected that all rejected load would be restored within 30 minutes.

For a more permanent contingency, it would take longer to return the affected circuit(s) to service, but generally, the circuit(s) would be put back to service and all load rejected load would be restored within 8 hours. The requirement to restore 312 MW of load (i.e. load in excess of 250 MW) in 30 minutes may be challenging depending on the nature of the contingency.

Estimate of any Cost Imposed on the IESO or other Market

Participants with Exemption Granted

Granting the requested exemption will not:

- Impact the ability of the IESO to ensure non-discriminatory access to the IESO-controlled grid.
- Increase costs of market participants.
- Increase costs of the IESO.

Consideration of Exemption Criteria in Market Manual 2.2, Section 1.5.2

- Hydro One assessment indicates that granting the exemption will not give the Hydro One undue preference in the IESO-administered markets.
- The ORTAC criteria to which the exemption application relates were in force prior to the construction of Windsor NextStar TS.
- Hydro One has the capability to operate Windsor NextStar TS consistent with the terms of the proposed exemption.