

## 1. Introduction

Hydro One Networks Inc. (Hydro One) is planning to construct a new transformer station (TS) within the Municipality of Clarington, just east of the City of Oshawa, in the Regional Municipality of Durham (Durham Region). The location of the Clarington TS (herein referred to as the “Project”) is provided in **Figure 1-1**. To meet the requirements of the *Environmental Assessment Act (EA Act)*, Hydro One followed the Ontario Hydro (1992) “Class Environmental Assessment for Minor Transmission Facilities” (Class EA) process, which is approved under the *EA Act*. The Project falls within the definition of the projects covered under this Class EA. This Environmental Study Report (ESR) has been prepared in accordance with the requirements of the Class EA process.

The Clarington TS Class EA process was initiated in response to a recommendation by the Ontario Power Authority (OPA). The OPA identified the need to offset a reduction of 3,000 megawatts (MW) of electricity flow to the eastern Greater Toronto Area (GTA) which will be lost when the Pickering Nuclear Generating Station (NGS) is retired and decommissioned. The OPA recommendation to plan and develop a new 500 kilovolt (kV)/230 kV TS in the Oshawa area was based on a technical and economic comparison of potential transmission options.

The Ministry of the Environment (MOE) *Code of Practice for Preparing, Reviewing and Using Class Environmental Assessments in Ontario (Code of Practice)* provides guidance to EA proponents on projects which result from previous planning studies. The *Code of Practice* provides the opportunity to limit the scope of an EA (in respect to need and alternatives and the environmental effects of those alternatives) if the prior planning studies have met the provisions of the *EA Act*. These provisions include an examination of alternatives, regard for the environment and environmental effects, public consultation with interested persons (such as Municipalities and members of the public), ability for the public to review and inspect the planning document in its entirety and approval by a recognized decision-making body in a transparent manner (such as through a municipal council resolution).

It was concluded by Hydro One that the previous planning studies did not meet all of the above-stated *Code of Practice* criteria. Consequently, Hydro One included the rationale for the

recommendation made by the OPA (including information on the need for the Project and the alternative transmission options considered by OPA) in the Class EA process. This information was presented at public information centres and stakeholder meetings, as well as, in notification and communication materials. The comments and feedback received during Hydro One's Class EA consultation process were summarized in the draft Environmental Study Report (ESR) which was made available for a 30-day public review period. OPA staff participated in Hydro One's Class EA and consultation process and, as a result, the process complied with the full scope of the requirements laid out in the approved Class EA process.

## **1.1 Need for the Undertaking**

The OPA advised Hydro One that Ontario Power Generation's (OPG) Pickering NGS is approaching its final years of operation and will be retired between 2015 and 2020. Pickering NGS is the largest generation facility in the GTA and currently supplies the GTA (including the Regional Municipality of Durham) with more than 25 percent of its peak electricity demand. When the generating station is removed from service, its 3,000 MW of capacity must be replaced by a corresponding amount of power through Hydro One's transmission system. In October of 2011 and January of 2012, the OPA issued letters to Hydro One regarding "the need for an implementation plan to incorporate additional 500 to 230 kV auto-transformation capacity in the eastern GTA by the spring of 2015 given the risk of early retirement of Pickering NGS". Since this recommendation, Pickering NGS has received an operational extension to 2018. Consequently, the in-service date of Clarington TS is now mid-2017; the new TS will also prevent unacceptable reliability issues in the electricity supply to the eastern GTA prior to the retirement of Pickering NGS.

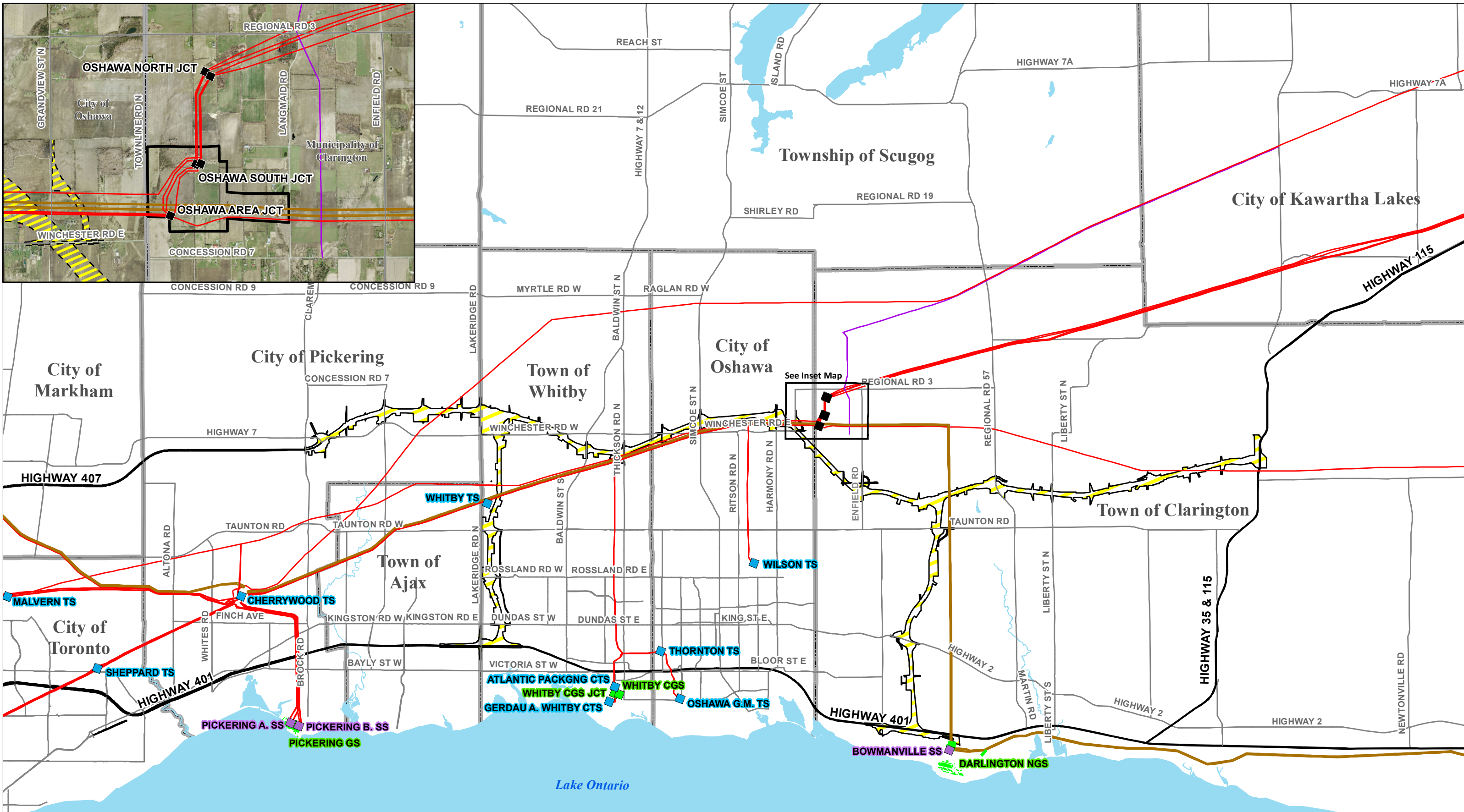
Further details are provided in **Appendix A**, including materials prepared by the OPA in support of Hydro One’s 2013/2014 Transmission Revenue Requirement Application to the Ontario Energy Board (OEB).



As has been explained throughout the Class EA process, Pickering NGS must be replaced by a corresponding amount of power from the Hydro One transmission system. A new station will ensure adequate power supply for the eastern GTA and will improve reliability in the Pickering, Ajax, Whitby, Oshawa and Clarington areas. The Project will provide power flow from the 500 kV network to the 230 kV network to offset the 3,000 MW loss from the retirement of Pickering NGS. A new 500/230 kV TS in the Clarington area also addresses the long term potential to incorporate additional generation capacity at the nearby Darlington NGS.

The need for the Project has been recognized for several decades. The Solandt Commission Report in the 1970s resulted in the acquisition of property at the intersection of the 500 kV and 230 kV transmission lines in Clarington for the purpose of a future transformer station to provide a required interconnection point for these two transmission networks. The OPA Integrated Power System Plan (IPSP; 2007) confirmed the need for an Oshawa Area TS (now referred to as the Clarington TS) “to address the potential impact associated with the retirement of the Pickering B generating station...” as well as “potential regional supply needs and the long term potential to incorporate new generation at Darlington”.

### **Enfield TS**


It is important to note that the Project shares the same property as a smaller station known as Enfield TS. The Enfield TS is required to meet the anticipated electricity load growth in the Oshawa and Clarington areas and improve reliability of electricity supply to area customers. The Class EA process for the Enfield TS project was completed in 2008. Construction of the station has been postponed because electricity demand in the area has grown slower than originally forecasted due to the recession. Enfield TS is not part of this Class EA process.





  
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 Fig1-1\_Map12-02\_ClaringtonTS\_ProjectLocation  
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<ul style="list-style-type: none"> <li>■ Junctions</li> <li>■ Transformer Stations</li> <li>■ Generating Stations</li> <li>■ Switching Stations</li> </ul>	<p><b>Transmission Lines</b></p> <ul style="list-style-type: none"> <li>— 44 kV</li> <li>— 230 kV</li> <li>— 500 kV</li> </ul>	<ul style="list-style-type: none"> <li>— Highways</li> <li>— Roads</li> <li>▨ Future Highway 407</li> <li>▭ Project Area (see inset map)</li> </ul>	<ul style="list-style-type: none"> <li>— Watercourses</li> <li>■ Water</li> <li>▭ Municipal Boundary</li> </ul>
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**Clarington TS - Project Location**  
**Figure 1-1**


  
 1:150,000
 
 0      5      10 km



## **1.2 Purpose of the Undertaking**

The purpose of the Project is to implement the recommendations of the OPA. The Project involves a new 500/230 kV TS which will ensure continued safe and reliable supply of power to the GTA including Durham Region, when Pickering NGS is required.

The Project will transform power flow from Hydro One's 500 kV network to the 230 kV network in order to offset the loss of 3,000 MW of supply that will occur with the retirement of the Pickering NGS. The OPA originally recommended planning the Clarington TS for an in-service date of spring 2015 to address the earliest possible retirement date of the Pickering NGS. The Clarington TS is now planned to be in-service by late 2017 based on the operating extension of Pickering NGS to 2018.

The subject 500/230 kV TS includes new switching facilities that provide improved load restoration capabilities to the Pickering, Ajax, Whitby, Oshawa and Clarington areas. Existing supply facilities serving these areas are not capable of meeting existing load restoration requirements specified within the Ontario Resources and Transmission Assessment Criteria (ORTAC) document issued by the Independent Electricity System Operator (IESO). The subject 500/230 kV TS would enable meeting the requirements specified in ORTAC (IESO, 2007).

## **1.3 Alternatives to the Undertaking**

Consideration was given to the expansion of existing transmission stations, addition of new stations at existing generation sites and at new locations. Generation was not an option because of the large capacity which will be lost when Pickering NGS is retired, and the extensive lead times to plan, approve, design and construct new facilities of similar capacity.

It is the conclusion of the OPA that the Project is the only feasible option to address the retirement of Pickering NGS. This was summarized in the OPA IPSP II (2011) Planning and Consultation Overview document. As noted, this was restated in the Hydro One 2013/2014

Transmission Revenue Requirement Application to the OEB. The screening conducted by OPA to support this conclusion considered technical and economic factors.

The OPA considered the expansion of Cherrywood TS and expansion of Parkway TS. These two stations represent the nearest existing sites at which 500 to 230 kV electrical transformation occurs. Through the course of the Class EA process, OPA was also requested to consider six other potential options (see **Appendix A** and **Section 4.6** of the ESR). In the case of Parkway TS and Cherrywood TS, input was also provided from the Independent Electricity System operator (IESO). The IESO confirmed that the Cherrywood option would not meet Provincial Transmission System adequacy and security criteria set out in the ORTAC. Secondly, station expansion would not meet the regional supply reliability needs of the Pickering, Ajax, Whitby, Oshawa and Clarington areas. Subsequently, from an EA perspective the expansion of Cherrywood TS does not constitute a reasonable alternative.

Expansion of Parkway TS was also determined to be inadequate from a supply and reliability standpoint. An additional four-circuit 230 kV transmission line would be required in an area where existing transmission corridors are fully developed, and a new or expanded transmission line Right-of-Way (RoW) would be difficult because of surrounding residential, transportation and commercial development. Studies undertaken by the IESO indicated that the improvements in supply capability generated by the expansion of Parkway TS would be significantly inferior to those which would result from the proposed Clarington TS.

As described in **Section 4.6.2** of the ESR, an opportunity to put forward additional alternatives was provided during the Class EA process. The resulting suggestions included the use of existing generation sites (Pickering, Darlington and Wesleyville), existing TS sites (Whitby TS and surrounding lands) and new sites (Seaton lands near Cherrywood TS and the Rundle Road/Taunton Road areas).

The key factors in each of the suggested alternatives mentioned above were technical and economic feasibility (or lack thereof). Most of the sites suggested during the Class EA process do not have existing adjacent 230 and 500 kV supply and therefore would have

required new high voltage transmission RoW through areas of residential and/or commercial development. New RoW would substantially increase the footprint of the Project and would affect a significant number of residents and/or businesses in contradiction to the 2005 Provincial Policy Statement (PPS). The costs of a new transmission station plus new RoW would be substantially more expensive than the Clarington TS alternative and these costs would subsequently be funded by all ratepayers in the province of Ontario.

As indicated in **Section 4.6.2**, all options put forward during the Class EA process were rejected as neither being technically or economically feasible and therefore, were not considered further.

The null hypothesis (i.e., the “do nothing” scenario) was rejected as being unacceptable due to the consequences to regional power supply and reliability that would result from the retirement of Pickering NGS.

The Clarington TS location possesses a number of important characteristics including:

- The site was selected and purchased for future transmission facilities based on the Report from the Solandt Commission which was released in the 1970s; Displacement of homes, businesses, or expropriation of additional lands, is not necessary.
- The site contains existing 500 kV and 230 kV transmission lines, and subsequently no new transmission RoW are required.
- The site meets size and technical requirements for the Project and is cost-effective.
- The site is a permitted use under the Oak Ridges Moraine Conservation Plan (ORMCP), Greenbelt Plan, Durham Region Official Plan and Municipality of Clarington Official Plan.
- No significant environmental effects are predicted. The station site is located on soils that are categorized as non-vulnerable (Newmarket Till) and is approximately 50-100 m above the unconfined deep local aquifer (primary water well zone).

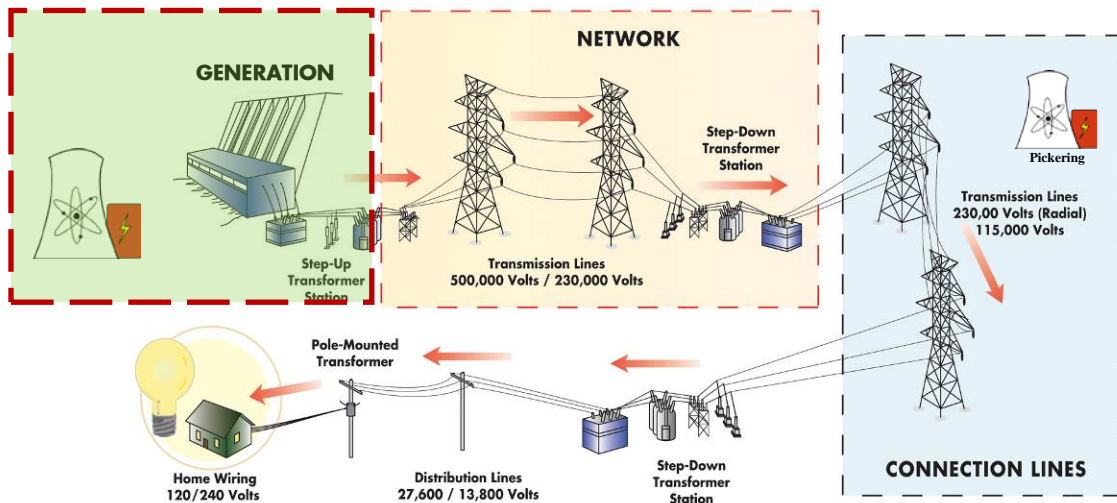
## 1.4 Description of the Undertaking

### 1.4.1 Introduction to Power Generation and Transmission

The role of a TS within the electric power system is illustrated in **Figure 1-2**. Electricity is produced at nuclear, fossil fuel and hydroelectric generating stations, at wind generation facilities or other industrial facilities throughout the Province of Ontario (Ontario). Hydro One’s transmission network transmits electricity throughout Ontario at high voltages (e.g., 500 kV, 230 kV and 115 kV) for maximum efficiency. There are approximately 300 transmission stations (which include TSs, switching stations and regulating stations) strategically located around Ontario to step down voltages consistent with the needs of energy customers.

Hydro One’s transmission network supplies large industrial customers and local distribution companies (LDCs). The LDCs directly supply customers (i.e., residential, farm and commercial properties) through their distribution infrastructure which consists of distribution stations and distribution lines with pole-mounted and pad-mounted transformers.

**Figure 1-2: Role of Transmission Facilities in the Power System**



#### *1.4.2 The Project*

The Project involves a new 500/230 kV TS and the associated line work. It is to be located on Hydro One property, in the Regional Municipality of Durham, in the Municipality of Clarington, bordering the east side of the City of Oshawa, northeast of Concession Road 7 and Townline Road North.

The station will transform electricity voltages from 500 kV to 230 kV by connecting to two of four existing 500 kV circuits and to all five of the existing 230 kV circuits located on or adjacent to the proposed Clarington TS site. The station will consist of two 500/230 kV transformers, a 500 kV switchyard, a 230 kV switchyard, two relay buildings, one electrical panel building, the associated buswork and equipment. The station will be serviced by a 44 kV distribution circuit supplied from Wilson TS.

The previously approved Enfield TS (230 kV/44 kV), as noted in **Section 1.1**, will also be constructed within the same property when it is required by local demand. Also, space has been reserved for two additional 500/230 kV transformers and associated facilities to be installed on the same property at a later date to accommodate for future demand.

The existing 230 kV wood pole lines located on the property will be relocated within the property on and replaced with new 230 kV steel structures. Associated tapping structures will be erected to connect the existing 230 kV lines and the station. A temporary bypass line will be installed to facilitate the construction of the new line structures. All necessary line work would be undertaken within the Hydro One property.

An access road will be installed off Townline Road North on the western edge of the property. The road is the municipal boundary between the Municipality of Clarington and the City of Oshawa.

The station transformers will be equipped with spill containment systems designed to prevent the loss of transformer insulating oil from entering the surrounding environment. The only source of station discharge will be runoff from precipitation. The containment and

drainage systems are subject to an Environmental Compliance Approval (ECA) under the *Environmental Protection Act (EPA)*. The approval covers not only the proposed facilities but also the Emergency Response Plan (ERP). Hydro One prepares an ERP for all its transmission stations as a condition of approval under the ECA. Hydro One has obtained several hundred of these approvals, demonstrating that effects can be readily managed through conventional controls.

Noise levels will meet *EPA* requirements. An ECA for Noise will be obtained from the MOE prior to the installation of the transformers.

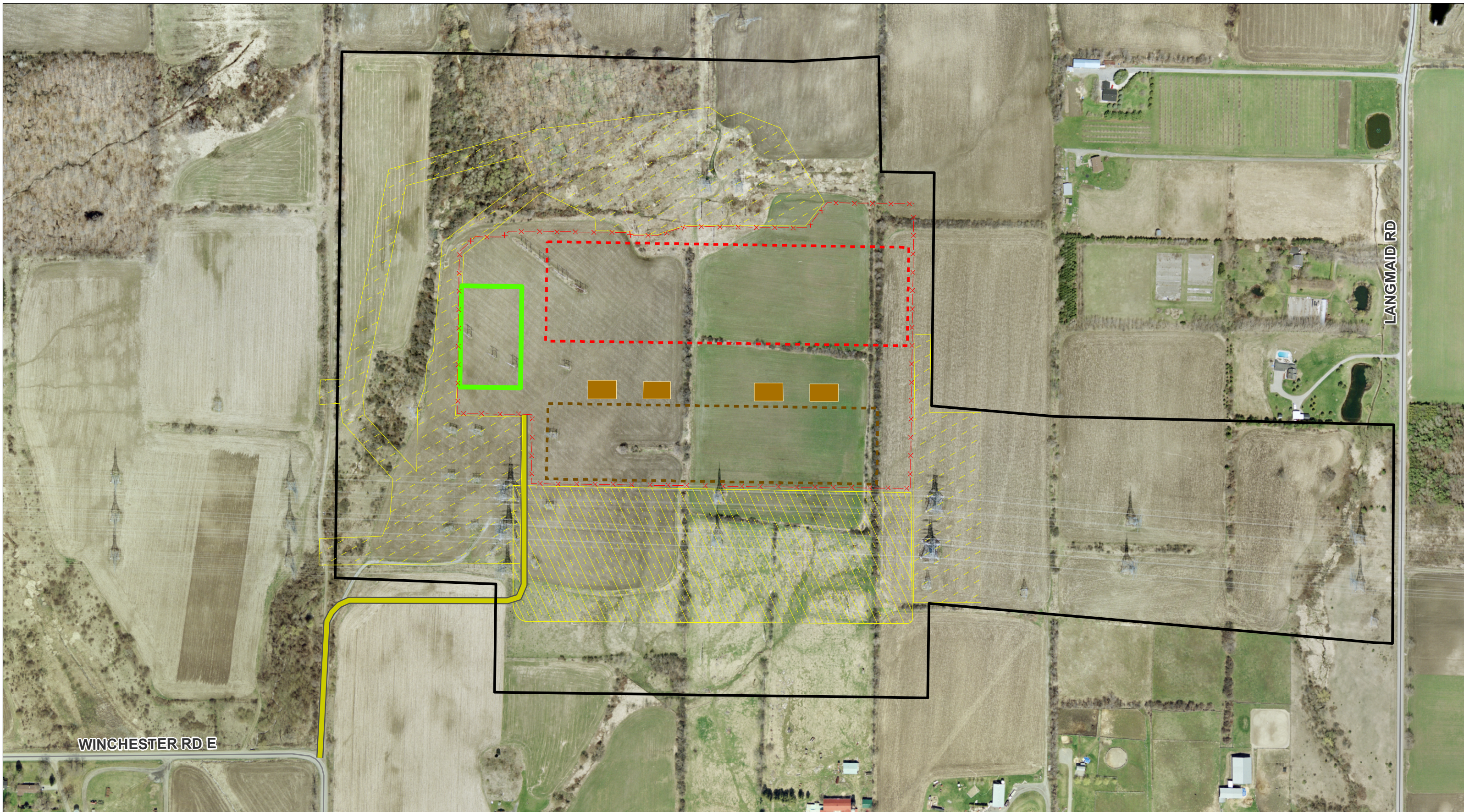
There will be no air emissions associated with the operation of the station.



A vegetative restoration and screening plan will be developed and implemented to minimize the visibility of the station. A chain-link fence will be installed around the station site for public safety and station security and site access will be gated. The station will be unmanned and operated remotely.











Construction of the station is anticipated to commence in May 2014, with a planned in-service date of late 2017.

The conceptual layout of the Project is shown in **Figure 1-3**. An example of a similar TS, Parkway TS, in the Town of Markham, in the Regional Municipality of York, is shown in **Figure 1-4**.






  
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 Fig1-3\_Map12-02\_ClaringtonTS\_ConceptualLayout  
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- |   |                      |   |              |   |                          |
|---|----------------------|---|--------------|---|--------------------------|
|  | 500kV Transformers   |  | Roads        |  | Station Fence Line       |
|  | Enfield TS (Future)  |  | Access Road  |  | 230kV Station Switchyard |
|  | 230kV Line Work Area |  | Project Area |  | 500kV Station Switchyard |
|  | 500kV Line Work Area |   |              |   |                          |


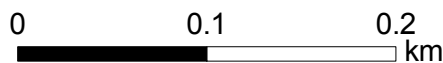
**Clarington TS - Conceptual Layout**  
**Figure 1-1**  
  
 1:4,000  km





Figure 1-4 Parkway TS



## 1.5 Approval Process and Regulatory Requirements

### 1.5.1 *Environmental Assessment Act Approval*

This ESR has been prepared in conformance with the Ontario Hydro (1992) Class EA, which was approved under the *EA Act*. The Class EA defines an environmental planning process which meets all requirements of the *EA Act*. It also includes the process for Initial and Final Notification for a proposed undertaking, an associated public consultation process, a review and comment period for the draft ESR, and the filing of a final ESR with the MOE. The Class EA process is illustrated in **Figure 1-5**. The Class EA document also defines the specific types of transmission projects that fall within the specified Class definition. The Class EA is consistent with the Category B screening process described in the MOE (2001) “Guide to Environmental Assessment Requirements for Electricity Projects” (EA Guide). As a result, projects subject to the Class EA are also consistent with Category B transmission projects that are not associated with a Category B generation project.

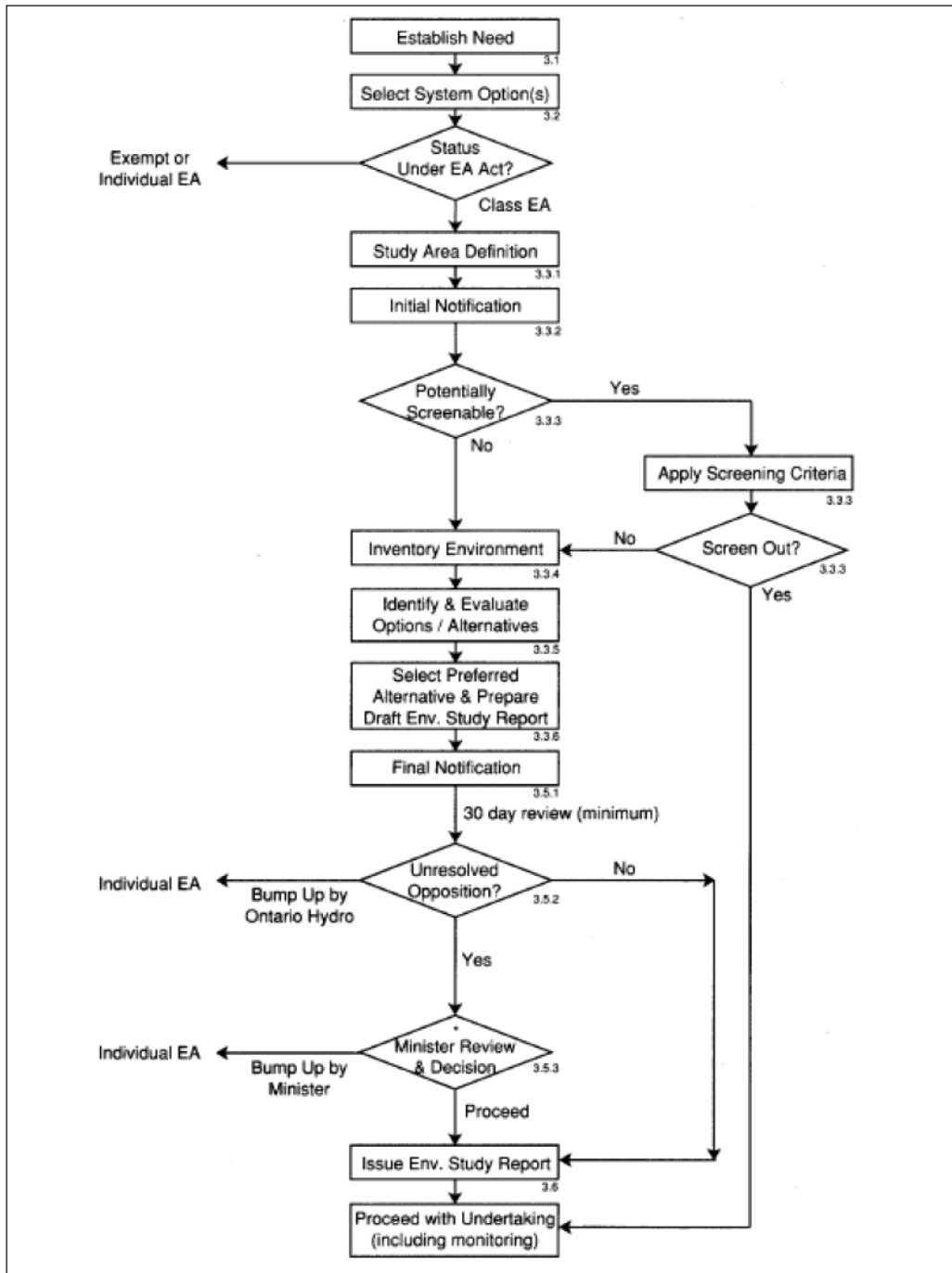
Transmission facilities covered under the Class EA include:

- 115 kV transmission lines greater than 2 km in length;
- Transmission lines greater than 115 kV and less than 500 kV (generally 230 kV) which are greater than 2 km and less than 50 km in length;
- 115 kV, 230 kV or 500 kV stations; and
- Telecommunication towers.

Transmission facilities that exceed these criteria, such as 230 kV lines longer than 50 km or a new 500 kV (or greater) line more than 2 km in length, fall outside of the Class EA definition and are automatically categorized as an Individual EA (i.e., Category C projects listed in the EA Guide).

Distribution facilities (i.e., less than 115 kV) fall outside of the *EA Act* threshold and are not subject to *EA Act* requirements (i.e., Category A projects listed in the EA Guide).

**Figure 1-5: Class EA Process**



Source: *Class Environmental Assessment for Minor Transmission Facilities, Revision 6 April 1992.*

The Class EA process can also identify whether there are substantive issues or effects which could potentially trigger a project to a higher level of assessment (referred to as a Part II Order request to elevate the project status to an Individual EA). Should an Individual EA

be required, Hydro One would decide whether to submit an Individual EA or to cancel the undertaking.

Upon completion of the draft ESR for the proposed undertaking, Hydro One will issue a Final Notification to First Nations and Métis communities; federal, provincial and municipal agencies and officials; interest groups; affected property owners and interested public. The draft ESR was made available for a review and comment period for 30 days, hereinafter referred to as “Review Period.” Hydro One will respond to and make best efforts to resolve any issues raised by concerned parties during the Review Period. Any issues and resolutions will be documented and summarized in the final ESR.

After the Review Period, the draft ESR will be finalized and filed with the MOE and the Project is considered to be acceptable and can proceed as described in the ESR.

If Hydro One cannot resolve the environmental issues and concerns raised during the Class EA process, the objector(s) may request a Part II Order to elevate the status of the Project to an Individual EA by writing to the Minister of the Environment. If Hydro One disagrees with a request then the written objection along with the Hydro One response and the draft ESR will be forwarded to the Minister of the Environment for a decision.

All information collected as part of the Class EA process would remain relevant.

#### *1.5.2 Other Permits, Licenses and Approvals*

Generally, in addition to *EA Act* approval, there are a series of permits, licenses and approvals that may be required under federal and provincial legislation for Hydro One projects. During the EA process, Hydro One contacted all applicable regulatory agencies to confirm requirements, and that approvals are obtained in a timely manner following *EA Act* approval.

Permits and approvals potentially applicable to the Project include:

- Watercourse crossing permits from the Central Lake Ontario Conservation Authority (CLOCA) for the crossing of tributaries of the Harmony Creek and/or Farewell Creek
- Approvals and permits from the Ontario Ministry of Natural Resources (MNR) related to the removal of Butternut trees
- ECA for Noise from the MOE
- ECA for Industrial Sewage from the MOE
- Building permits from the Municipality of Clarington
- Tree Cutting permit from Durham Region
- Archaeological Assessment Compliance Letters from the Ministry of Culture, Tourism and Sport (MTCS)
- Class 2 System Permit from Durham Region Health Department
- Permit/approval from Municipality of Clarington regarding water supply
- Road User Agreement for access via Townline Road North from the Municipality of Clarington and the City of Oshawa
- Transformer Haul Route approval/permit from Durham Region, Municipality of Clarington and City of Oshawa
- Permit to Take Water from the MOE

It is noted that Hydro One projects are exempt from municipal approvals as authorized under Section 62 of the *Planning Act* if approval is obtained under the *EA Act*. However, Hydro One will consult with the municipalities regarding construction planning, schedules and local traffic management.