



Environmental Review Report

York Energy Centre Upgrades Project

Capital Power Corporation

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Acronyms and Abbreviations

°C	degrees Celsius
AAQC	Ambient Air Quality Criteria
AAR	Acoustic Assessment Report
ACB	Air Contaminants Bench
ANSI	Area of Natural and Scientific Interest
ATEP	Advanced Turbine Efficiency Package
BAU	business as usual
CAAQS	Canadian Ambient Air Quality Standard
CEMS	Continuous Emissions Monitoring System
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
COC	contaminant of concern
C-SSPA	Countryside-Site Specific Policy Area
DAIS	Direct Air Injection System
dB	decibel
EA	Environmental Assessment
<i>EA Act</i>	<i>Environmental Assessment Act</i>
ECA	Environmental Compliance Approval
ELC	Ecological Land Classification
EPA	<i>Environmental Protection Act</i>
ERR	Environmental Review Report
ESA	Environmental Site Assessment
ESDM	Emissions Summary and Dispersion Modelling
ESP	Environmental Screening Process
GHG	Greenhouse Gas
GTA	Greater Toronto Area
ha	hectare
HVA	Highly Vulnerable Aquifer
Hz	hertz
IESO	Independent Electricity System Operator
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization



km	kilometre
kV	kilovolt
LIO	Land Information Ontario
LSRCA	Lake Simcoe Region Conservation Authority
m	metre
m ³	cubic metre
mbgs	metres below ground surface
MCM	Ministry of Citizenship and Multiculturalism
MECP	Ministry of the Environment, Conservation and Parks (formerly Ministry of the Environment)
MNRF	Ministry of Natural Resources and Forestry
MW	megawatt
MWh	megawatt hour
NOx	nitrogen oxides
O. Reg.	Ontario Regulation
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
PAHs	polycyclic aromatic hydrocarbons
PM	particulate matter
POI	Point of Impingement
POR	Point(s) of Reception
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
PTTW	Permit to Take Water
PWQO	Provincial Water Quality Objectives
SAR	Species at Risk
SE	Siemens Electric
SGRA	Significant Groundwater Recharge Area
SO ₂	sulphur dioxide
SoCC	Species of Conservation Concern
SWH	Significant Wildlife Habitat
SWM	Stormwater Management
ULN	Ultra Low NOx
VOCs	volatile organic compounds
WHPA	Wellhead Protection Area
YEC	York Energy Centre



1.0 Introduction

1.1 Project Overview

Capital Power Corporation (Capital Power), through its affiliate York Energy Centre LP, owns and operates the York Energy Centre (YEC). The YEC is a natural gas-fired, simple cycle, peaking generation power plant that generates an average gross output of 425 megawatts (MW) of electrical power. The YEC has been in operation since 2012, and since April of 2017, has been owned and operated by Capital Power.

Capital Power is proposing equipment upgrades at the YEC, referred to as the YEC Upgrades Project (the Project). The Project is contracted with Ontario's Independent Electricity System Operator (IESO) and will provide approximately 30 MW of additional electricity generating capacity compared to current operations, which is reflective of an approximate 7.0 percent (%) increase in generating capacity. The proposed modifications of the YEC include:

- installation of a turbine upgrade package that will increase operational performance and reduce emissions of nitrogen oxides (NO_x);
- installation of an inlet fogging system;
- installation of larger transformer cooling fans; and
- adjustments to control logic.

The Project will result in improved efficiency, increased generation capacity and reduced NO_x emissions at the YEC. Installation of the upgrades will not result in changes to the footprint of the existing YEC, and there will be no changes to current use or maintenance practices at the facility. Installation of the upgrades will consist of component delivery, installation, and performance testing. Limited ground disturbance will be required within the footprint of the existing facility pad, and no construction work will occur within undisturbed or naturalized areas.

This Environmental Review Report (ERR) has been prepared to meet the requirements of the Environmental Screening Process for Electricity Projects (ESP) under Ontario Regulation (O. Reg.) 50/24 (Part II.3 Projects - Designations and Exemptions) of the Ontario *Environmental Assessment Act (EA Act)*.

1.2 Purpose of the Project

The IESO has identified a significant need for new power supply in the province (IESO 2022a, 2024). At the system level, the IESO is projecting a generation capacity deficit starting in 2025. After many years of stable supply, and at times, a surplus, the projected shortfall is being driven by 1) increasing demand due to expanding electrification and increasing business investment in the province, 2) refurbishment of the Pickering Nuclear Generating Station (Government of Ontario 2024) and refurbishment schedules at the Bruce and Darlington nuclear facilities, and 3) expiring IESO contracts (IESO 2022a, 2024). While the need for new generating capacity is clear at the system wide level, the IESO has also identified several regions of the province with particularly pressing needs for new power supply. One region identified by the IESO as high priority is the Greater Toronto Area (GTA). The GTA and surrounding area need significant capacity additions, with the IESO forecast suggesting local demand will outstrip capacity by 2027.



The IESO's Resource Eligibility Interim Report, dated October 7, 2022, stated that without a limited amount of new natural gas generation in the near term, the IESO would be reliant on emergency actions such as load curtailments or blackouts (IESO 2022b). The IESO's Pathways to Decarbonization (IESO 2022c) and Resource Eligibility Interim Report indicate that a moratorium on new natural gas generation is not possible under the current demand forecast. The IESO has recommended procurement of a limited amount of natural gas-fired generation to help fuel the energy transition and maintain system reliability.

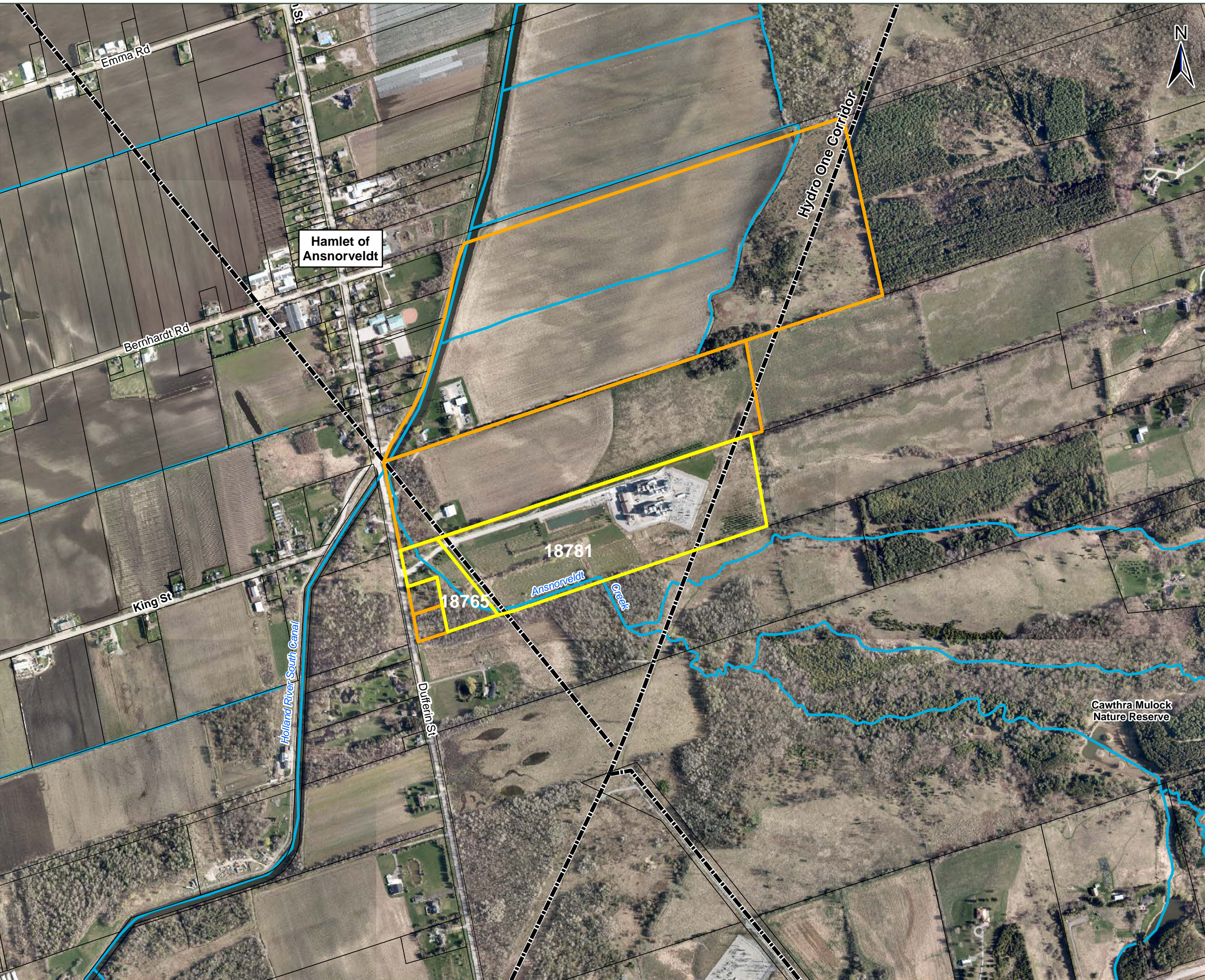
In response to the projected regional and system wide shortfalls, the IESO launched a series of programs in 2022 to secure new capacity to meet the growing needs of the province. Leveraging existing natural gas facilities by providing new or extended contracts, as well as upgrading and expanding capacity, was identified by the IESO as critical for maintaining reliability over the medium term. The IESO's Same Technology Upgrades procurement program aims to procure 300 MW of capacity through improvements to existing facilities across Ontario. Facilities proceeding under this procurement process will upgrade existing equipment to provide additional generating capacity to meet the growing provincial energy demand. The IESO has extended contracts with expiry dates prior to 2032 to 2035 to provide continued flexibility to the broader system and to meet local needs.

The IESO and Capital Power executed a contract for the YEC Upgrades Project in June 2023, and as part of the contract, the Project is expected to be operational by May 1, 2025.

1.3 Project Location

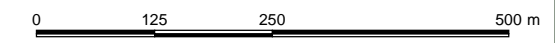
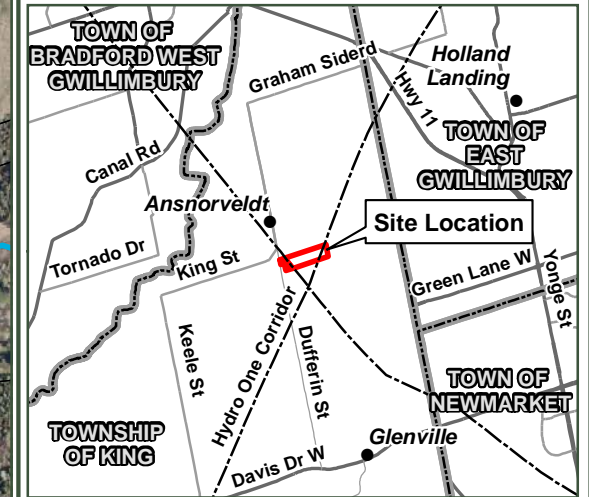
The YEC is located on two parcels, municipally known as 18781 and 18765 Dufferin Street, in the Township of King, Regional Municipality of York, just south of the Hamlet of Ansnorveldt and the Holland River, hereafter referred to as the "YEC Property". The generally rectangular property is approximately 15.3 hectares (ha) in size with approximately 80 metres (m) of frontage along Dufferin Street, and an approximate depth of 810 m. Located slightly east of the centre of the property is the main power generation facility and all of the associated infrastructure, including internal access roads and parking lots, high voltage substation and overhead transmission line for grid interconnection, natural gas supply and storage infrastructure, and stormwater management (SWM) features. The remainder of the property is predominantly mowed lawn and open field. Ansnorveldt Creek extends along the south property line, intersecting the southwest portion of the property to feed into the Holland River South Canal located generally west of the YEC. The YEC's main site entrance is located in the northwest corner of the property. **Figure 1-1** provides context related to the location of the YEC and associated site features. **Figure 1-2** provides context related to the existing YEC facility layout.





LEGEND:

- YEC Property
- Other CPC Owned Properties
- Parcel Fabric
- Watercourse/Drainage Feature
- Existing Utility Line



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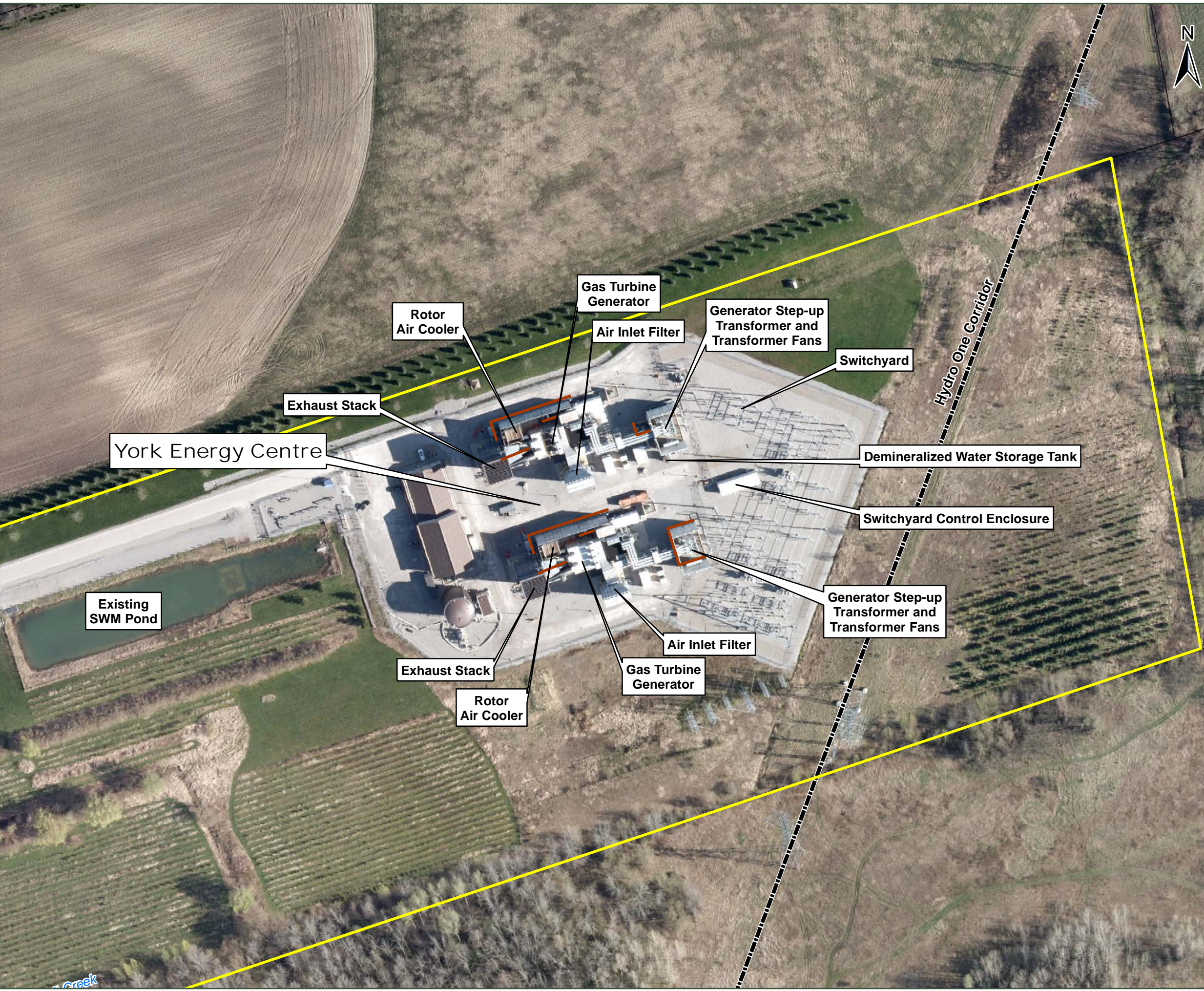
YEC UPGRADES PROJECT

ENVIRONMENTAL REVIEW REPORT

PROJECT LOCATION

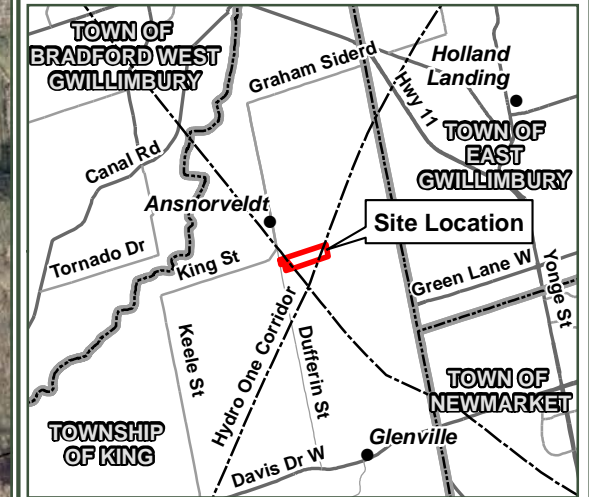
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FIGURE NO:
1-1



LEGEND:

- YEC Property
- Parcel Fabric
- Existing Utility Line
- Existing Noise Barrier



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YEC UPGRADES PROJECT

ENVIRONMENTAL REVIEW REPORT

EXISTING YEC FACILITY LAYOUT



FIGURE NO:
1-2

1.4 Regulatory Framework

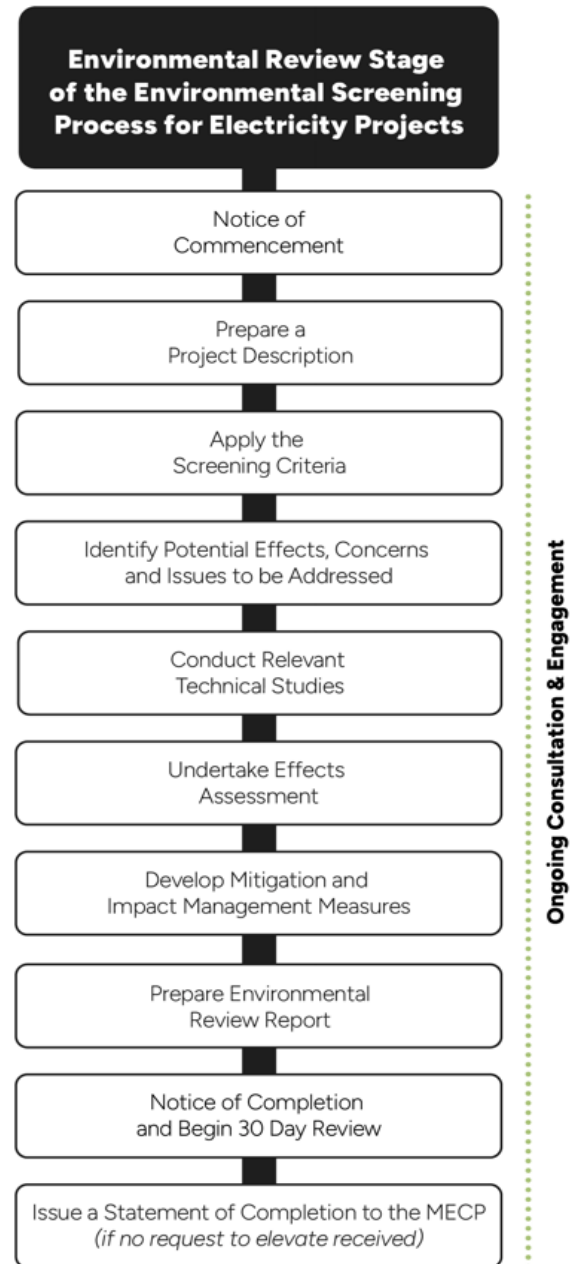
Natural gas-fired generation projects are subject to the requirements of O. Reg. 50/24 (Part II.3 Projects - Designations and Exemptions) under the *EA Act*¹. These projects are subject to the ESP and must be carried out in accordance with the provincial *Guide to Environmental Assessment Requirements for Electricity Projects (2024)* (the Guide). The ESP is a proponent-driven process overseen by the Ministry of the Environment, Conservation and Parks (MECP).

A modification to a natural gas-fired generation facility that will result in a nameplate capacity increase of 5 MW or more is defined in O. Reg. 50/24 as a “significant modification”. A significant modification is classified as a Category B project, and is subject to the full review process set out in the ESP. The Project will have a nameplate capacity of more than 5 MW and is therefore subject to the ESP.

The ESP has two tiers of assessment: the Screening Stage, which can be based primarily on existing or readily available information, and the Environmental Review Stage, where additional work programs, studies and engagement are undertaken to assess environmental effects and/or address unresolved concerns and issues. Capital Power has voluntarily undertaken the Environmental Review Stage of the ESP for this Project. This ERR documents the outcome of the Environmental Review Stage and has considered the potential environmental effects of the Project. **Figure 1-2** provides an overview of the various steps for the Environmental Review Stage of the ESP².

In addition to requirements under the *EA Act*, the Project will require an amendment to the YEC’s existing Environmental Compliance Approval (ECA) (Air & Noise). No other federal, provincial, or municipal/local permits or approvals are anticipated to be required.

Figure 1-3: Environmental Review Stage of the Environmental Screening Process for Electricity Projects



¹ At the time of Project commencement in June 2023, O. Reg. 116/01 was in effect but has since been revoked by the Government of Ontario, and the Project is now subject to O. Reg. 50/24.

² During the review period, anyone with outstanding environmental concerns could request that the Project be elevated from an Environmental Review to a Comprehensive Environmental Assessment (EA). For more information about how to submit an Elevation Request, refer to the Guide section B.4.1.1 (MECP 2024).



1.5 Nameplate Capacity Context

Nameplate capacity generally refers to the MW of instantaneous electricity generation registered with government authorities for the purposes of classifying the power output of a generation facility. O. Reg. 50/24 – Electricity Projects defines nameplate capacity as “with respect to a generation facility, the total of the design electricity generating capacities of all the generation units in the facility”. Power output levels for natural gas-fuelled generation equipment varies with atmospheric conditions including temperature, relative humidity, and elevation. The defined nameplate capacity of a facility incorporates International Organization for Standardization (ISO) standards, where the original equipment manufacturer provides facility-specific performance datasheets that factor in site-specific elevation at a defined ambient temperature and humidity level.

The maximum output of a facility is different than nameplate capacity, as it represents the largest amount of electricity that can be generated by the equipment and is typically associated with more extreme atmospheric conditions compared to nameplate capacity. This measurement is useful for predictive modelling scenarios and measuring operational compliance.

Previous YEC documentation included descriptions of the output of the facility that did not fully align with the definitions of nameplate capacity and maximum output, and therefore resulted in a lack of clarity regarding facility output:

- The 2008 ERR for the YEC describes the facility as a modern natural gas-fired simple cycle peaking generation facility capable of producing approximately 400 MW (nominal) of electrical power. The facility was further described as utilizing two natural gas-fired Siemens SGT6-PAC 5000F power plant packages with an output of 213 MW subject to ambient conditions, per unit.
- The current ECA (Air & Noise) for the YEC (last amended on July 4, 2014) documents the capacity of the YEC as having a power rating of approximately 400 MW (nominal output) subject to ambient conditions. The ECA further documents that this 400 MW nominal output is comprised of two combustion gas turbines, each having a power rating of approximately 200 MW (ranging from 171.7 MW to 216.6 MW dependent upon ambient air conditions).

These documents therefore defined the YEC capacity not based on the original equipment manufacturer datasheets, but rather based on approximate nominal output and reference to a range of power ratings depending on ambient conditions, and do not specify the maximum output of the facility. There is therefore some ambiguity in the documents related to the actual nameplate capacity and maximum output of the YEC.

For clarity moving forward, Capital Power has verified that the gross nameplate capacity of the YEC as it exists in its current state is 408 MW. This nameplate capacity was determined at conditions of 15 degrees Celsius (°C), the site-specific conditions for elevation, and 60% humidity. Similarly, the existing YEC has a maximum gross output of 457 MW and an average capacity of 425 MW at the annual average temperature of 7.5°C.



2.0 Project Description

2.1 Project Component Modifications

The proposed modifications of the YEC include three distinct turbine upgrades designed to increase operational performance and reduce emissions of nitrogen oxides (NO_x), the installation of an inlet fogging system, the installation of larger transformer cooling fans, and adjustments to control logic. These modifications are discussed further in the following sections.

2.1.1 Turbine Upgrades

To generate electricity, natural gas entering the YEC is compressed to the required specification and directed to the two existing turbines. Intake air is drawn into the two turbines via the dedicated inlet air filters, before entering the compressor section of the turbines where it is compressed, increasing pressure and generating heat. The hot, compressed air then flows into each combustor, where it is combined with the compressed natural gas. The ignited mixture of natural gas and air generate hot gas that moves through the turbine blades of each unit, forcing them to spin. The process converts chemical energy into mechanical. During this process both the compressed air and natural gas come into contact with several turbine parts, including combustion liners, transition pieces, turbine vanes, and turbine blades. These “hot-gas-path components” are exposed to hot gases discharged from combustion systems and as a result, suffer from materials degradation and damage.

The YEC began operations in 2012, and since the time of its original design and construction, there have been advancements in turbine component technology. To increase the efficiency of the existing YEC turbines used to generate power, each of the two existing gas turbines will be modified through the installation of an upgrade package offered and installed by the turbine manufacturer, Siemens Energy (SE). The upgrade package includes three distinct modifications:

- **Advanced Turbine Efficiency Package (ATEP):** this performance upgrade will improve power turbine aerodynamics, provide more efficient use of cooling and sealing air flows in the turbine section, and use improved thermal barrier coatings and manufacturing technologies for the hot-gas-path components, resulting in improved efficiency and power output of the units. The turbine upgrade will provide an increased YEC capacity of approximately 25-40 MW (dependent on ambient conditions above 0°C). In addition to the increase in output capacity, the ATEP performance upgrade will result in an improvement of the heat rate by upwards of 4%. This realised improvement will result in an increase in the thermal efficiency of each turbine unit, which in turn will result in an improved carbon dioxide emission factor (CO_{2e})/MW.
- **Ultra-Low NO_x Combustion System (ULN 3.0):** this upgrade will replace the existing ULN 2.0 system which will result in an improvement of the emissions performance of the YEC. Design changes in the combustor pilot control of the ULN 3.0 allows finer tuning of the equipment which results in lower emissions, increased stability/control at higher loads. Additionally, the material selection and design of the ULN 3.0 burners will make the combustor life equal to the rest of the upgraded turbine parts, allowing a full 1,200 equivalent starts between overhauls.



- **Direct Air Injection System (DAIS):** this modification includes one air compressor and one air receiver tank per unit. The two DAIS will be mounted on skids, connected to power, and the compressed air will be piped into the turbine building for each of the units.

The DAIS modification will not result in additional output capacity, but rather will pump compressed air into the turbine during shutdown to help equalize the temperature and prevent turbine damage from occurring.

Once installed, operation of the YEC with the upgraded turbines will become the new typical operating scenario for the facility.

2.1.2 Inlet Fogging

This upgrade will involve the installation of an inlet fogging power augmentation system to cool intake air entering each of the existing turbines. The cooling of the intake air prevents a decrease in power during times of higher ambient air temperature. This power augmentation system upgrade prevents the decrease in power output realized when the ambient temperature is warmer than 15°C. The inlet fogging system cools the air back down to 15°C which results in optimal power generation for both turbines.

This system involves the installation of a new 8,000-gallon demineralized water storage tank which will provide demineralized water to the inlet fogging nozzles in the air intake structure which cools the ambient (outside) air before it enters the turbine. The new demineralized water storage tank will be located immediately adjacent to an existing tank of the same size and will be installed on a new small ring foundation. The two demineralized water tanks, with a combined 16,000-gallon capacity, will be connected and filled with demineralized water trucked in from Capital Power's Goreway Power Station in Brampton. The inlet fogging injector pump and instrumentation will be skid mounted. New below ground piping within the existing facility pad will be required to connect the new and existing demineralized water tanks with the inlet fogging pumps and skids.

2.1.3 Transformer Cooling Fans

The existing transformer cooling fans need to be replaced with larger fans to accommodate the additional power generated from the YEC as a result of the turbine upgrades package and inlet fogging. The fans themselves aid in cooling of the transformer but will not add additional capacity.

2.1.4 Gas Turbine Control Logic Updates

As a result of the discrepancy in the descriptions of the existing YEC's generating capacity in the original ERR and ECA, as described in **Section 1.5**, a change was made to the YEC's control and operation systems to limit each turbine's gross output to 216.6 MW (433.2 MW combined) when the ambient temperature is at or below 1.7°C. This control logic programming manages the fuel input to each of the two turbines in order to limit YEC's output.

With the upgrades being installed at the YEC and the need to undergo an amendment to the existing ECA, this control logic limitation will be removed to allow the upgraded YEC equipment to operate at the designed maximum gross output (457 MW), as outlined in **Section 2.1.5** and **Table 2-1**.



2.1.5 Change to YEC Capacity as a Result of the Modifications

Following Project completion, the new gross nameplate capacity of the YEC will be 438 MW, determined using the same method as for the existing YEC as outlined in **Section 1.5**. With the upgrades, the maximum gross output of the YEC will be 463 MW. The modified YEC will have an average capacity of 456 MW at the annual average temperature of 7.5°C. The modifications therefore amount to approximately 38 MW³ of additional nameplate capacity depending on ambient temperatures, as summarized in **Table 2-1**.

Table 2-1: Changes to YEC Capacity as a Result of the Modifications

Capacity	Existing YEC	Existing YEC + Modifications	Capacity Increase	% Capacity Increase
Nameplate Capacity (gross)	408 MW	438 MW	30 MW	7.5%
Maximum Approved Output (gross)	433.2* MW	463 MW	29.8 MW	6.9%
Average Output (gross)	425 MW	456 MW	31 MW	7.3%

* As outlined in Section 2.1.4 of this report, the YEC is being limited operationally to comply with the existing ECAs, which stipulate a power rating of 216.6 MW per unit, 433.2 MW combined. The actual maximum gross output for each unit is 228.5 MW, 457 MW combined. The installed upgrades packages will result in 6 MW of additional capacity, bringing the maximum generation capacity of the upgraded YEC to 463 MW.

2.2 Operating Regime

The existing YEC has been in operation since 2012. It is a natural gas-fired, simple cycle, peaking generation power facility that primarily operates during intermediate and peak demand periods. In addition to normal operations, the YEC is also capable of generating power utilizing peak firing mode during times when higher system capacity is required (as requested by the IESO). Operating the units in ‘peak firing’ mode leads to increased equipment maintenance given the increased firing temperatures and wear on system components. Given the stress peak firing places on the equipment, this is only used for limited periods of time when required to meet IESO requirements.

As a peaking facility, the YEC is dispatched by the IESO only when there is high (peak) demand for electricity or as a result of sudden system disturbances. Capable of coming online in under 30 minutes, the YEC has historically been dispatched to provide grid stability and power while other baseload facilities come online. Over the past five years, the YEC has been dispatched by the IESO an average of 146 hours annually, with an average run time of just under 3 hours per dispatch request. The dispatch profile is determined by the IESO administered market and ultimately depends on electricity demand in the region. As a peaking facility, the YEC must operate for less than 1,500 hours annually.

³ The Notice of Commencement circulated May 4, 2023 stated the Project would provide approximately 50 MW of additional electricity generating capacity, depending on ambient temperature. As a result of project refinements and modifications, it has been confirmed the Project would provide approximately 30 MW of additional electricity generating capacity.



The upgrades to the YEC will not materially change how the facility is dispatched by the IESO as a peaking power plant. The YEC is expected to continue to run infrequently and below the regulated 1,500-hour annual limit for peaking facilities. Dispatch forecasting suggests that the facility may run less than 180 hours annually, while 2027 would see the largest number of operating hours at approximately 260.

2.3 Project Activities

2.3.1 Construction

The Project construction phase is applicable to the modifications involving physical replacement of equipment within the existing infrastructure (i.e., turbine upgrades, inlet fogging, and transformer cooling fans).

The Project installation activities are planned to occur during scheduled IESO YEC outages in March and April 2025. The installation activities scheduled to take place at the two existing turbines can be achieved during the two outage periods. The two existing turbines will be receiving the same upgrade treatments.

Although the installation of Project components will occur concurrently with other scheduled maintenance activities, the YEC outages are part of normal facility operations. Routine maintenance activities are outside the scope of the YEC Upgrades Project. The IESO schedules facility outages to ensure that consumers are not disrupted. Scheduled outages are routinely used as an opportunity to complete system upgrades and facility maintenance.

Construction phase activities will be limited to:

- **Component Delivery:** The turbine upgrade, inlet fogging, and transformer cooling fan components will be delivered by truck; however, delivery of the component upgrades will be incorporated into the delivery of other components and materials associated with maintenance outage activities. Therefore, within the context of the scheduled outages and associated maintenance activities, no increase in trucking/delivery requirements are anticipated for component upgrades outside of those associated with the scheduled outages.
- **Installation:** All of the installation activities associated with the Project will be completed inside the existing YEC facility pad. The number of workers and associated equipment that will be required on-site for the turbine upgrade installation process will remain unchanged compared to the requirements of the scheduled maintenance outages, when the Project work is to take place. It is not anticipated that the maintenance outage periods would require additional time to accommodate the installation of turbine upgrade components.
- **Performance Testing:** Prior to resuming operations, testing will be conducted to ensure that the installed components are functioning as expected. This performance testing will be conducted as part of the regular testing completed following the regularly scheduled maintenance outages.



Installation of the component upgrades will result in no change to the footprint of the existing YEC. There will be no changes to current use or maintenance practices at the facility. Limited ground disturbance will be required within the footprint of the existing facility pad for the installation of a small ring foundation for the demineralized water tank, and below ground piping required to connect the new and existing demineralized water tanks with the inlet fogging pumps and skids. All work will occur within the existing disturbed pad, with no construction work to occur on undisturbed or naturalized areas. Installation activities will not include any water takings or discharges, nor involve storage or handling of any materials or substances beyond those used for normal operational and maintenance procedures and subject to facility spill prevention and containment protocols.

No additional waste materials will be generated, as existing components that will be removed will continue to be of value and will remain in storage for future refurbishment.

2.3.2 Operations

There will be no substantive changes in operational staff or activities at the YEC as a result of the Project. The Project components will be fully integrated into the existing facility with no differences in current use or maintenance practices at the YEC, with the exception of a potential minor increase in frequency of delivery of demineralized water to the YEC due to the addition of inlet fogging.

2.3.3 Decommissioning

The Project components will be fully integrated into the existing facility, and therefore would be included in the final decommissioning of the YEC. No specific decommissioning considerations are required for this Project.

3.0 Assessment Methods and Scope

3.1 Assessment Methods

The ESP, including preparation of this ERR, was undertaken in accordance with the process outlined in the Guide, including the following key steps:

- Describe the Project including the basic technologies to be used.
- Describe the local environment and conditions, where the definition of “environment” is the same as that in the *EA Act*, and is broadly defined to include air, land, and water as well as natural, cultural, social, and economic components.
- Apply the screening criteria to identify the negative environmental effects that the Project has, or could potentially have, directly or indirectly on the environment at any stage in the Project life cycle in the absence of mitigation or management measures (**Appendix A**).
- Undertake an effects assessment, including a description of:
 - potential environmental effects or concerns,
 - Project design or mitigation measures to avoid or reduce the environmental effects,
 - net effects that will remain after mitigation measures have been applied, and



- the significance of net effects, which considers the value of the resource affected, magnitude of the effect, geographic extent of the effect, duration and frequency of the effect, reversibility of the effect, and ecological/social context.
- Conduct an overall assessment of the environmental advantages and disadvantages of the Project.

Upon commencement of the ESP, the MECP provided Capital Power with additional guidance that identified MECP Areas of Interest (v. August 2022) that are expected to be addressed as part of the ESP. In addition to preparing this ERR in accordance with the requirements the Guide, a concordance review was completed to confirm the specific MECP Areas of Interest have been considered (**Appendix B**).

Engagement with the public, review agencies, and Indigenous communities are also an important part of the ESP. The engagement process undertaken as part of this Project is described in **Section 4.0**.

3.2 Assessment Boundaries

Although Project construction will be limited to equipment upgrades and associated works taking place entirely within the existing facility, the potential for negative environmental effects resulting from the operation of the new equipment may extend beyond the YEC Property. Spatial boundaries for documentation of existing conditions and application of the screening criteria are described below and shown in **Figure 3-1**.

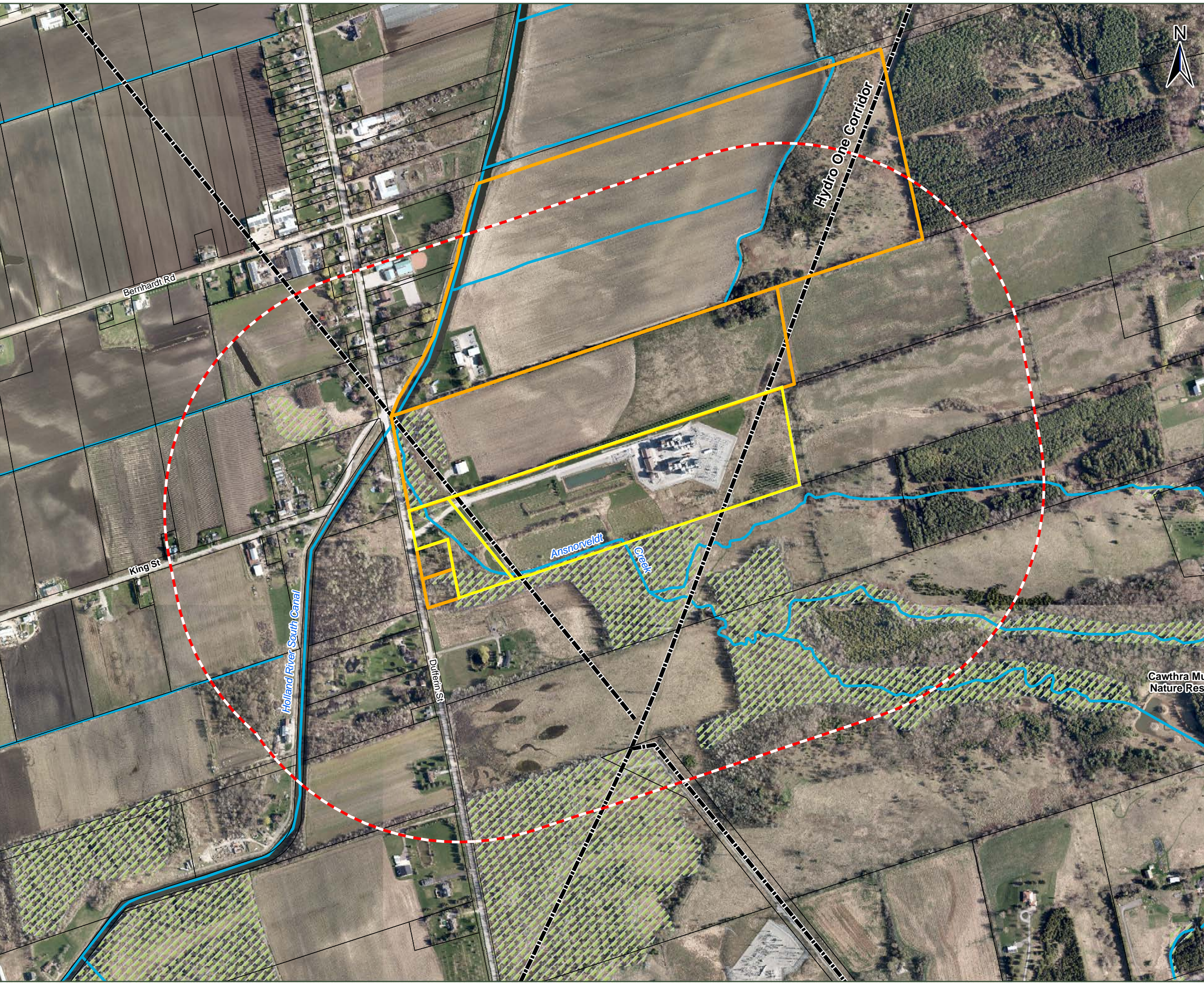
Spatial boundaries were determined via examination of geographic boundaries applied to the YEC Property:

- **YEC Property / Project Footprint** – includes 18781 and 18765 Dufferin Street, where 18781 Dufferin Street includes the existing YEC, and 18765 Dufferin Street fronts onto the roadway and includes the entrance to the existing YEC. The Project Footprint consists of the portion of the YEC Property to be used for Project construction and operation, including the main site access, parking lot, and the existing YEC facility pad.
- **Study Area** – For defining the Project Study Area, a 500-m buffer from the YEC Property boundary was selected as the most appropriate area for study as it captures representative land uses in proximity to the Project Footprint.

Environmental component-specific study area boundaries for the Project were determined based on the requirements of technical assessments and may not align with this general Study Area.

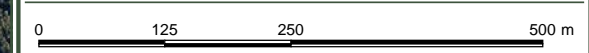
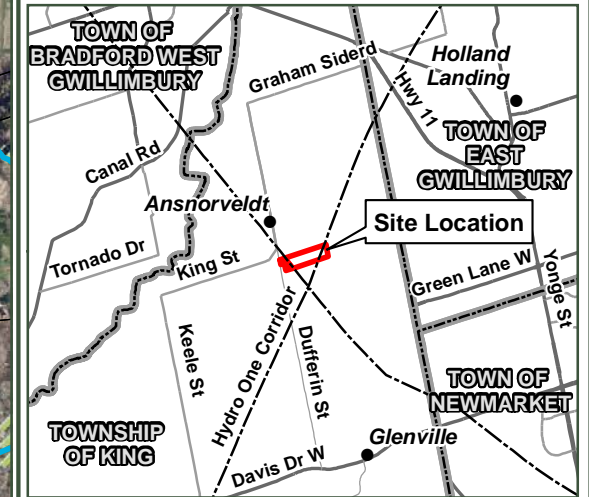
Temporal boundaries include the construction and operation phases. The construction phase is comprised of the component delivery and installation activities scheduled to occur during the scheduled maintenance outages in March and April of 2025. The IESO scheduled outages will have an approximate duration of three weeks. Once installation of the Project components is complete, YEC operations will resume. Decommissioning works are not specific to the Project; as described in **Section 2.3.3**, Project decommissioning will occur as part of the overall facility decommissioning and was therefore not considered to be a relevant temporal boundary to include in this assessment.





LEGEND:

- YEC Property/Project Footprint
- Other CPC Owned Properties
- Study Area
- Parcel Fabric
- Watercourse/Drainage Feature
- Existing Utility Line
- Ansnorveldt Provincially Significant Wetland (PSW) Complex



SCALE 1:7,500
 PAGE SIZE 11 x 17
 NAD 1983 UTM Zone 17N
 THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
 AND SHOULD NOT BE USED FOR NAVIGATION

YEC UPGRADES PROJECT

ENVIRONMENTAL REVIEW REPORT

PROJECT STUDY AREA

SLR

FIGURE NO:
3-1

3.3 Information Sources

A description of existing conditions and the completion of the screening checklist (**Appendix A**) was based on publicly available open-source data and desktop resources. Generally, the desktop study included a review of the following:

- Original ERR prepared for the YEC (Dillon Consulting 2008a).
- Current and previous versions of the ECA (Industrial Sewage) for the YEC associated application packages including the SWM Plan.
- Current and previous versions of the ECA (Air & Noise) associated application packages, including the Acoustic Assessment Report (AAR) and Emissions Summary and Dispersion Modelling (ESDM) Report.
- Stage 2 Archaeological Assessment (D.R. Poulton & Associates Inc 2009) and associated Ministry clearance letter (October 2009).
- Lake Simcoe Region Conservation Authority (LSRCA) O. Reg. 179/06 and associated available resources (e.g., LSRCA online interactive regulation mapping (LSRCA 2023)).
- Publicly available federal and provincial open data online mapping applications (e.g., Aquatic Species at Risk (SAR) online mapping (DFO 2023), Federal Contaminated Sites Inventory (Government of Canada 2023a), Land Information Ontario (Government of Ontario 2023b), Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF 2015), Ontario SAR List (MECP 2022), Oil, Gas & Salt Resources Library (OGSR 2022), Ontario Ministry of Agriculture, and Food and Rural Affairs online mapping (OMAFRA 2023)).
- Provincial, Regional and Municipal policies and associated plans and schedules (e.g., *Guide to Environmental Assessment Requirements for Electricity Projects* (MECP 2024), Provincial Policy Statement (2022), York Region Official Plan and Schedules (2012), Township of King Official Plan (2019) including maps and schedules, Township of King Zoning By-law (2022) and online mapping).
- Google Maps/Google Earth (2022, 2023) (<https://www.google.com/maps/@44.0755244,-79.5320283,15z?entry=ttu>).

The desktop review was supplemented by field study results, technical reports, facility-specific information, and other supporting information. These information sources were used to identify the known environmental features within the Study Area that may be affected by the Project **Figure 3-1**, and to identify the potential need for more detailed studies. Relevant information was collected within the context of the Project description to complete the screening for the YEC site and surrounding area.

The ERR also considered the results of the engagement program, including the receipt of data, information and interpretation, and feedback from government agencies, Indigenous communities, and the public.



4.0 Engagement

4.1 Engagement Approach

The approach to engagement with interested and potentially affected parties, including adjacent property owners, Indigenous communities, regulatory review agencies, interest groups, and members of the public, was developed using Capital Power's value driven approach to stakeholder engagement and the provincial ESP requirements as outlined in the *Guide to Environmental Assessment Requirements for Electricity Projects* (MECP 2024).

The overarching objective was to notify potentially interested and affected parties of the proposed works, provide various channels for the community to provide feedback, identify concerns and possible impacts stakeholders believe the Project may pose, and address those concerns, where possible. Guidance was also sought from the Code of Practice outlined in the *Consultation in Ontario's Environmental Assessment Process* (MECP 2014).

As is the case with all projects, Capital Power's engagement approach is founded on respect, transparency, and a goal of developing enduring relationships that recognize the unique circumstances of individual communities and groups. Capital Power always strives to engage parties who live near, or have an interest in, their operations and developments. At the forefront of all initiatives, efforts are made to foster understanding and trust, and laying the foundations for mutually beneficial relationships whenever possible.

Through a variety of engagement methods as outlined in **Section 4.2**, Capital Power reached out to potentially interested parties early in the process, welcoming all questions and comments and providing open and transparent communications.

Capital Power continues to welcome all questions and comments. As the Project progresses, any additional comments directed to Capital Power will be welcomed and dialogue will be undertaken to discuss comments and resolve any Project-specific issues, where possible.

4.2 Engagement Methods

Potentially interested and affected parties were contacted using a range of communication tools. These methods included e-mail, letter correspondence (direct mailings), phone calls, notices in the local newspaper, and the Project website. These methods were used to inform interested parties of key Project information and milestones, as well as opportunities to provide feedback and engage in dialogue.



4.2.1 Project Contact List

The engagement program started with the identification of potentially interested parties. A Project Contact List was developed based on the previous mailing list used during approvals for the existing YEC, MECP's *Environmental Assessment Government Review Team Master Distribution List* (August 2022)⁴, input from MECP regarding potentially affected Indigenous communities, and the requirements of the Guide. Potentially interested parties were identified as follows:

- Indigenous communities identified by the MECP as potentially affected by the proposed Project;
- Government (regulatory) review agencies with permitting or approval authority for the Project, or with potential interest in the Project based on review of the MECP's Master Distribution List;
- Local regulatory review agencies, including staff from the Township of King, York Region, and LSRCA;
- Elected officials, including Members of Parliament and Provincial Parliament for King-Vaughn and York-Simcoe and the Township of King Councillor for Ward 6;
- Interest groups or local organizations, including the York Region Environmental Alliance, York Region Federation of Agriculture, York-Durham Woodlot Association, Township of King Chamber of Commerce, Ontario Federation of Agriculture, Ontario Nature, Ontario Heritage Trust, Ontario Greenbelt Alliance, Ontario Clean Air Alliance, King Christian School, York Simcoe Naturalists, Concerned Citizens of King Township, and the Holland Growers Marsh Association.

The Project Contact List is a "living" document and will continue to be updated throughout the Project, either through the identification of new contacts or the deletion of those that do not wish to be contacted further. A copy of the redacted Project Contact List (with personal information removed) is provided in (**Appendix C.1**).

4.2.2 Direct Mailings

A geographic area was identified for the purpose of direct mailings to potentially interested residents in proximity to the Project. The notification limits were determined via review of a series of potential buffers applied to the extent of the YEC Property. Initially, a 500 m radius was applied from the edge of the YEC Property as it captured all those surrounding properties in the immediate area. This radius was then generally expanded to include the nearest roadway or land use in each direction and the Hamlet of Ansnorveldt to the north. The extent of the notification radius was defined with the intent to include those most likely to be potentially interested in the Project. As shown in **Figure 4-1**, the direct mailing notification area was bounded as follows:

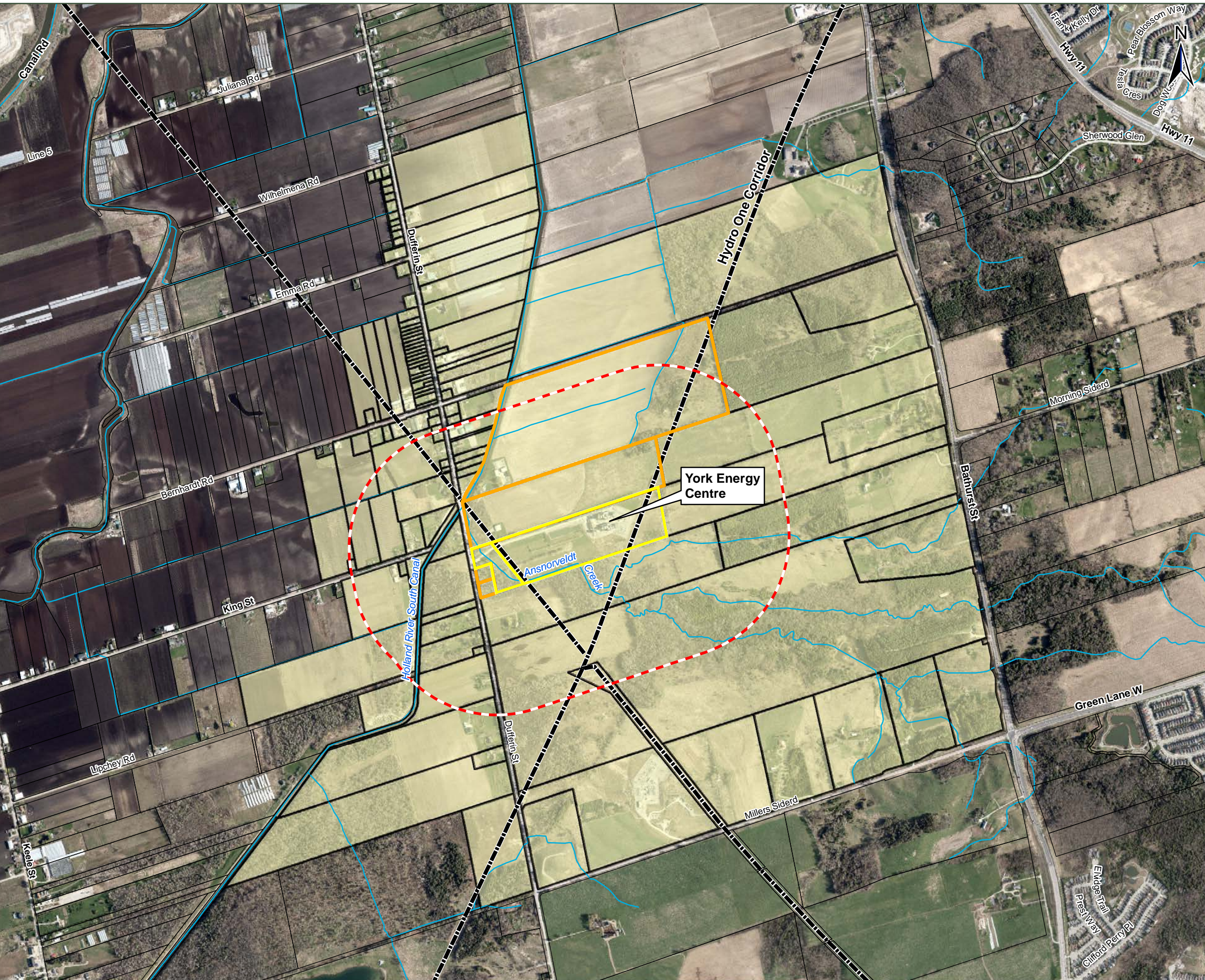
⁴ The *Environmental Assessment Government Review Team Master Distribution List* is an information source prepared and periodically updated by the Environmental Assessment Branch of the MECP. It is a list of federal, provincial, and municipal agency contacts and links to agency websites where additional information may be obtained for matters pertaining to EA submissions. The list includes a description of the type of EA projects to be circulated to each agency.



- To the north by Wilhelmena Road (the Hamlet of Ansnorveldt);
- To the east by Bathurst Street;
- To the south by Miller's Sideroad; and
- To the west by properties within 500 m of the YEC Property.

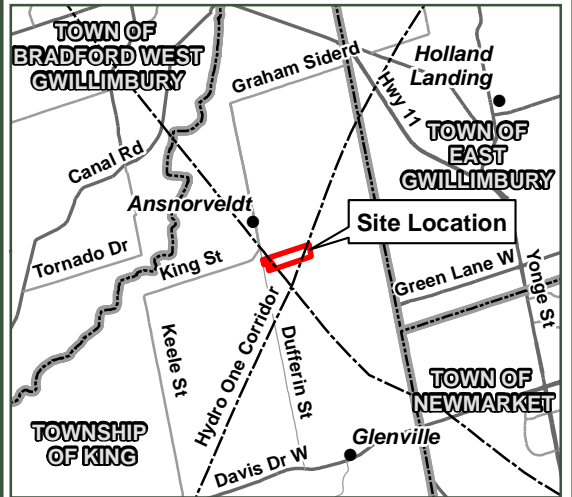
Parcel address information was obtained from publicly available sources for the approximately 60 properties within this notification area with mailing addresses. This list of addresses was used for direct mailings via Canada Post at key Project milestones.





LEGEND:

- YEC Property/Project Footprint
- Other CPC Owned Properties
- Study Area
- Notification Area
- Parcel Fabric
- Watercourse/Drainage
- Existing Utility Line



SCALE 1:15,000
 PAGE SIZE 11 x 17
 NAD 1983 UTM Zone 17N
 THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
 AND SHOULD NOT BE USED FOR NAVIGATION

YEC UPGRADES PROJECT

ENVIRONMENTAL REVIEW REPORT

PROJECT NOTIFICATION AREA

SLR FIGURE NO:
4-1

4.2.3 Project Email and Phone Number

Capital Power's contact information, including a business email address and phone number, were provided on all written notifications and correspondence to help establish a direct line of contact to the appropriate Capital Power Project team member. Current contact information is as follows:

Lawrence Nasen
Senior Specialist, Environment
Phone: 1-855-703-5005 | Fax: 780-392-5927
Email: info@capitalpower.com

4.2.4 Newspaper Publications

Notices were published at key project milestones in the local newspaper, the *King Weekly Sentinel*. The *King Weekly Sentinel* is a free, weekly community newspaper with a circulation of approximately 10,300 recipients within the Township of King and is also available in virtual format.

4.2.5 Project Webpage

A dedicated Project webpage on the Capital Power website was published in April 2023 and updated at key Project milestones to share Project information online. The webpage provides a high-level overview of the need for the Project, a description of the proposed upgrades, regulatory process, and Project contact information. The Project webpage will continue to be updated as the Project proceeds through permitting and approvals and construction. The webpage can be found at: <https://www.capitalpower.com/operations/york-energy-centre-upgrade/>.

4.2.6 Meetings

All those on the Project Contact List were invited to meet with the Project Team. Capital Power first offered to meet with all Indigenous communities as part of early engagement activities in April 2023, and again in both May and July 2023 and May 2024 (see **Section 4.6**). Follow-up invitations to meet with potentially interested parties were also provided during the Notice of Completion mailout.

4.3 Notice of Commencement

Publication of a Notice of Commencement is a requirement of the ESP. The Notice of Commencement of an Environmental Review introduced the proposed equipment upgrades and the beginning of the Environmental Review to assess the potential environmental effects of the Project. An explanation of the ESP and an invitation to submit comments was provided. The Notice also provided a map of the Project location, a brief description of the issues that were subject to detailed review as part of the ERR, and Capital Power's contact information. The Notice of Commencement directed readers to the Project webpage for more detailed information.

The Notice of Commencement of an Environmental Review was published as a half-page ad in the *King Weekly Sentinel* on May 4, 2023. The Notice of Commencement was additionally sent via email (or letter mail where no email was identified) that same day to all those on the Project Contact List.



The following week, the week of May 8, 2023, addressed letter mail containing the Notice of Commencement was delivered via Canada Post to residents within the Project notification limits (see **Figure 4-1** above). Copies of the Notice of Commencement, example email and addressed letter mail are provided in (**Appendix C.2**).

4.4 Public Engagement

To date, one comment has been received from a representative of the Ontario Clean Air Alliance. The email received on October 16, 2023, noted that the Ontario Clean Air Alliance is opposed to the Project, stating that Ontario has cleaner and lower cost electricity options such as energy efficiency and demand management, waterpower, and solar energy. It further requested information about the existing YEC and forecasted emissions and requested a copy of the ERR when available. Capital Power responded on November 9, 2023 by providing the 2017-2022 YEC emissions data as requested, and committed to providing the ERR as soon as it becomes available (**Appendix C.3**). Capital Power issued a courtesy notification letter to the Ontario Clean Air Alliance on July 16, 2024, notifying them of the upcoming Notice of Completion and availability of the ERR. The letter included an overview of the Project and summary of key ERR findings, with a specific focus on the results of the Air Quality and Greenhouse Gas Assessments.

4.5 Agency Engagement

Engagement with the MECP, the Township of King, and other government agencies began early in the Project planning phase as detailed in the Record of Engagement (**Appendix C.4**). All those listed on the Project Contact List were at minimum provided with a copy of the Notice of Commencement and the Notice of Completion. A summary of key correspondence with government agencies is provided in the sections below.

4.5.1 Ministry of the Environment, Conservation and Parks

The MECP is the provincial ministry with jurisdiction over the ESP and future ECA processes; therefore, Capital Power will continue to engage with the MECP as needed throughout the Project planning process. Key points of contact to date are summarized below and copies of key correspondence have been included in (**Appendix C.4**).

- The MECP was first contacted in November 2022 as part of the early Project planning works to confirm provincial permitting requirements and obtain the preliminary list of potentially interested Indigenous communities.

Preliminary Project information was provided and a meeting with MECP staff was held on December 16, 2022, to provide an overview of the IESO procurement process and the proposed Project and discuss approval requirements. Further correspondence through February and March 2023 included preliminary guidance from the MECP on potentially interested Indigenous communities and applicable approval processes;

- The MECP formally acknowledged the Notice of Commencement on May 25, 2023, and in their response, included the list of potentially interested Indigenous communities with an introduction to the delegation of procedural aspects of consultation with Indigenous communities, a guide for preliminary screening for SAR, and a document identifying the MECP's "Areas of Interest" (August 2022) with respect to the ESP. Guidance material was reviewed and applicable information has been considered and/or incorporated in this ERR; and



- A meeting was held with the MECP on July 28, 2023, to provide a Project update and discuss the future ECA application process.

Capital Power will continue to correspond with the MECP throughout completion of the ESP and during the future permitting and approvals phase related to the ECA (Air & Noise) amendment application.

4.5.2 Ministry of Citizenship and Multiculturalism

The Ministry of Citizenship and Multiculturalism (MCM) responded to the Notice of Commencement on June 12, 2023. MCM staff indicated that the Ministry's interest in the Project includes archaeological resources, built heritage resources, and cultural heritage landscapes. Guidance was provided related to MCM standards and requirements for the evaluation of these resources.

On the basis of previous reports, MCM noted that the YEC Property had been subject to previous archaeological assessment; however, portions of the Study Area (outside of the Project Footprint) had not previously been cleared.

The MCM recommended that the MCM's *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* be completed to determine whether there may be potential effects to cultural heritage resources. This checklist was completed (**Appendix D.1**) and is supported by the Cultural Heritage Report completed for another Capital Power project on the adjacent property. The MCM provided written comments on the Cultural Heritage Report by way of letter on February 12, 2024, confirming that no direct or indirect adverse impacts on cultural heritage resources are anticipated.

4.5.3 Township of King

The Notice of Commencement was issued to Township of King staff on May 3, 2023, prior to formal issuance to the rest of the Project Contact List. On July 7, 2023, the Township of King's Director of Growth Management Services asked via email if the Project required municipal Council support. Capital Power responded on July 10, 2023, noting that there was no requirement for municipal Council support for this Project under the IESO process. Rather, the Project will make the existing YEC facility more efficient through improvements to the existing machinery, and the facility footprint will not be increased. Capital Power further noted that the YEC will continue to be dispatched by the IESO according to system need and no changes are expected to the facility's operational characteristics.

4.6 Indigenous Community Engagement

The MECP provided a preliminary list of Indigenous communities that the MECP recommended be engaged during early Project planning via email on March 24, 2023. Following the Notice of Commencement, on May 25, 2023, the MECP provided the formal Project-specific list of Indigenous communities identified by the Crown as potentially affected by the Project and delegated the procedural aspects of rights-based consultation to Capital Power. The list included:

- Alderville First Nation;
- Beausoleil First Nation;
- Chippewas of Georgina Island First Nation;



- Chippewas of Rama First Nation;
- Curve Lake First Nation;
- Mississaugas of Scugog Island First Nation;
- Hiawatha First Nation; and
- Huron-Wendat Nation (as it relates to archaeology).⁵

Capital Power also identified the Métis Nation of Ontario as a potentially interested Indigenous group and they were added to the Project Contact List (**Appendix C.5**).

Communications with all Indigenous communities both before and during the ESP for the ERR included the following touchpoints to date (correspondence is provided in **Appendix C.5**):

- April 5, 2023 – Letters introducing the proposed Project were sent prior to notifications being issued to the broader public. The letters introduced Capital Power, the need for new power supply in the province as determined by the IESO, outlined the proposed facility upgrades, and extended an invitation to meet with the Project Team to learn more about the Project;
- May 4, 2023 – Notice of Commencement of an Environmental Review;
- July 28, 2023 – Project update email and invitation to engage, with a request to notify Capital Power of any interest by August 28, 2023;
- May 17, 2024⁶ – Project update and follow-up invitation to engage, with a request to notify Capital Power of any interest by June 3, 2024; and
- July 18, 2024 – Notice of Completion of an Environmental Review Report.

A summary of the additional community-specific notification and engagement activities is provided below.

4.6.1 Alderville First Nation

In addition to the Capital Power touchpoints listed above, Capital Power followed-up via phone call on May 8, 2023, to confirm Alderville First Nation's receipt of the introductory letter and Notice of Commencement. Voicemail messages were left with the Executive Assistant to Chief and Council. A phone message was also left with the consultation office on August 22, 2023.

In response to the May 17, 2024 Project update, Alderville First Nation confirmed receipt on May 23, 2024, and on June 13, 2024, formally provided information about their Traditional Territory and Treaty Rights, their Consultation Protocol, and the potential presence of burial or archaeological sites in the area (related to a separate Capital Power project). They requested a File Fee, submission of their "Notice of Request to Consult", and to be involved in any Stage 2-4 archaeological investigations (for a separate Capital Power project). Alderville First Nation noted that a meeting may be requested, and that they wish to be kept apprised throughout all Project phases.

⁵ The Huron-Wendat Nation was not included in the preliminary list of Indigenous communities that the MECP recommended be engaged during early Project planning but was included in the subsequent formal list received May 25, 2023.

⁶ The Project update and follow-up invitation to engage was issued to the Huron-Wendat Nation on May 21, 2024.



In response to the June 13, 2024 communication, Capital Power reached out on June 19, 2024 to the Consultation Coordinator with two separate phone calls, however, both calls went unanswered and were directed to a voicemail inbox that was full. As such, Capital Power could not leave a voice message. Subsequently, an email response to the Consultation Coordinator was provided on June 27, 2024 detailing the Project status. Further phone call attempts to reach the Consultation Coordinator were made including a call to the main office, however, these calls also went unanswered. Capital Power was able to leave a voice message on Consultation Coordinators voice mail, and on July 4, 2024 the Consultation Coordinator confirmed the voice messages were received via email and informed Capital Power to submit the notice of request along with the filing fee. Additionally, the archaeological reports and MCM clearance letters were requested for review. The same day, Capital Power provided the requested archaeological reports and confirmed they would follow up with the notice of request. Alderville First Nation is currently reviewing the information provided and it is anticipated that they may request a meeting in the future

Any additional comments received from Alderville First Nation will be addressed as the Project proceeds.

4.6.2 Beausoleil First Nation

Beausoleil First Nation confirmed receipt of the introductory letter and Notice of Commencement via telephone discussion on May 8, 2023, and indicated that they did not have an interest in the Project at that time. On August 22, 2023, Capital Power spoke with a representative of Beausoleil First Nation who asked for the Project materials to be resent via email, and on August 23, 2023, requested further details regarding the environmental assessment and the other Indigenous communities being consulted. That same day, Capital Power responded via email with further information, including confirmation that the work would be limited to equipment upgrades within the existing YEC facility, an archeological assessment was not required, and the list of other Indigenous communities being engaged.

No additional correspondence has since been received. However, any additional comments received from Beausoleil First Nation will be addressed as the Project proceeds.

4.6.3 Chippewas of Georgina Island First Nation

On May 8, 2023, Capital Power left a voicemail message with the Chippewas of Georgina Island First Nation to confirm their receipt of the introductory letter and Notice of Commencement. A response was received via phone call on May 10, 2023, confirming they had been in conversation with their 'energy champion' and the need for additional power generation was understood. The Chippewas of Georgina Island First Nation confirmed their interest in the Project and requested to be kept informed, specifically with regard to any archeological studies. Capital Power followed-up that same day with details of the previously completed archaeological assessments and confirmed that the Chippewas of Georgina Island First Nation would be kept informed.

Capital Power followed-up by phone call on August 24, 2023, and left a message asking to be contacted if there was further interest in the Project. Chippewas of Georgina Island First Nation confirmed receipt of the Project update on May 21, 2024. No further response has been received to date.

Any additional comments received from the Chippewas of Georgina Island First Nation will be addressed as the Project proceeds.



4.6.4 Chippewas of Rama First Nation

On May 8, 2023, Capital Power contacted the Chippewas of Rama First Nation by telephone to confirm receipt of the introductory letter and Notice of Commencement. The Chippewas of Rama First Nation representative confirmed receipt of the Project materials, asked about archaeology and the potential for wildlife habitat loss, and requested to be kept informed as the Project proceeds. Capital Power confirmed that the Project would not result in the loss of wildlife habitat, and followed-up by email on May 9, 2023, confirming further archeological assessment was not required. A follow-up discussion on August 22, 2023, confirmed that the Chippewas of Rama First Nation had no further questions or comments; however, they requested to continue receiving Project updates.

After receipt of the May 17, 2024 Project update email, the Chippewas of Rama First Nation requested additional Project information on May 21, 2024, asked if Capital Power had any Indigenous partners, and suggested that based on the project location, the Chippewa Tri-Council would be best suited for consultation. Capital Power provided a link to the Project website later the same day and followed up with further technical details on June 7, 2024.

Any additional comments received from Chippewas of Rama Island First Nation will be addressed as the Project proceeds.

4.6.5 Curve Lake First Nation

In addition to the Capital Power touchpoints listed above, Capital Power followed-up via phone call on May 8, 2023, to confirm Curve Lake First Nation's receipt of the introductory letter and Notice of Commencement. A voicemail message was left with the Lands Department, and another follow-up message was left on August 24, 2023. After receiving an automatic bounce-back email notification following issuance of the May 17, 2024 Project update, alternate contact information was obtained and the update was resent on June 12, 2024. Curve Lake replied to confirm receipt of the information that same day.

Any additional comments received from Curve Lake First Nation will be addressed as the Project proceeds.

4.6.6 Hiawatha First Nation

Hiawatha First Nation confirmed receipt of the Project introductory letter and Notice of Commencement on May 8, 2023, and requested to be kept informed on the results of technical studies being completed, specifically archaeology, SAR, and cumulative impacts. Capital Power responded via email on May 9, 2023, noting that further archeological assessment was not required and that other study results would be shared when available.

In an email response received by Capital Power on May 17, 2024, Hiawatha First Nation confirmed their interest in the Project and asked to meet to discuss the Project. Capital Power responded that same day and confirmed their availability to meet, and a meeting has been scheduled for July 16, 2024 to discuss potential economic opportunities with the Project.

Any additional comments received from Hiawatha First Nation will be addressed as the Project proceeds.



4.6.7 Huron-Wendat Nation

The Huron-Wendat Nation was not included in the preliminary list of Indigenous communities that the MECP recommended be engaged during early Project planning. As a result, Capital Power first contacted the Huron-Wendat Nation regarding the Notice of Commencement for this Project on May 4, 2023. No response was received to Capital Power's follow-up communications until May 22, 2024, when the Huron-Wendat Nation introduced their new consultation contact and inquired regarding any archaeological studies or fieldwork required for the Project. Capital Power responded that same day, confirming that no archaeological studies or fieldwork is required.

Any additional comments received from Huron-Wendat Nation will be addressed as the Project proceeds.

4.6.8 Mississaugas of Scugog Island First Nation

On May 8, 2023, Capital Power left a voicemail message with the Mississaugas of Scugog Island First Nation to confirm their receipt of the introductory letter and Notice of Commencement. Capital Power followed-up by phone call on August 22, 2023, and left a message asking to be contacted if there was further interest in the Project.

No response has been received to date from the Mississaugas of Scugog Island First Nation to Capital Power's communications. However, Capital Power is committed to engaging with the Mississaugas of Scugog Island First Nation, if requested, and any comments received will be addressed as the Project proceeds.

4.6.9 Métis Nation of Ontario

On August 28, 2023, the Métis Nation of Ontario acknowledged receipt of the July 28, 2023, Project update, and confirmed there were no questions at that time. No additional correspondence has since been received. Any comments received from Métis Nation of Ontario will be addressed as the Project proceeds.

4.7 Summary of Key Outcomes

Given the technical nature of the Project and limited potential for environmental effects, minimal input and feedback has been received to-date. Throughout the engagement program, Capital Power has provided additional information about the Project in response to requests from the Township of King, Indigenous communities and Ontario Clean Air Alliance. A copy of relevant correspondence and communications is included in the Record of Engagement as **(Appendix C)**.

As the Project progresses through future permitting, if further comments or questions are received from those having an interest in the Project, dialogue will be undertaken to address comments and resolve any remaining issues, where possible.



4.8 Notice of Completion

The Notice of Completion of an Environmental Review Report explained that this ERR has been filed for public review and comment for a period of 30-calendar days (**Appendix C.2**). The Notice of Completion indicated where the ERR can be reviewed online and in hard copy. The Notice of Completion formally requested written comments within the 30-day comment period, starting on July 18, 2024 and ending on August 19, 2024. As per the ESP requirements, the notice also included results of the screening and details regarding the request to elevate process.

The Notice of Completion was sent to the Project Contact List on July 18, 2024, and directly mailed to each property within the notification area (see **Figure 4-1**). The notice was also published in the *King Weekly Sentinel* on July 18, 2024, and made available on the Project website.

5.0 Existing Conditions

The YEC is a natural gas-fired, simple cycle, peaking generation power facility that primarily operates during intermediate and peak demand periods. The existing YEC was first proposed in 2008 by the York Energy Centre LP, a limited partnership owned by Pristine Power Inc. (Pristine) and Harbert Power LLC, to address the growing need for power generation in northern York Region. Pristine was purchased by Veresen Inc. (formerly Fort Chicago Energy Partners L.P.) in late 2010 and Capital Power acquired its share in the YEC from Veresen Inc. in April 2017. The facility is now owned and operated by Capital Power.

The existing YEC consists of two combustion gas turbines and one standby diesel generator and is equipped with emission control/reduction technologies including Ultra Low NOx combustors for the gas turbines. The YEC uses a Continuous Emissions Monitoring System (CEMS) to monitor emissions for compliance with regulatory limits. Electricity generated at the YEC is dispatched to the provincial power grid via the YEC substation located immediately east of the YEC facility, which interconnects with Hydro One's 230 kilovolt (kV) transmission corridor that bisects the eastern portion of the property **Figure 1-1**.

The YEC operates in accordance with the facility's existing ECA (Air & Noise) issued by the Ministry of the Environment, Conservation and Parks (MECP). The original YEC ECA was issued in March 2010 and has subsequently been amended, with the current version of ECA 7348-83GSVK issued in July 2014.

The original YEC was subject to ESP requirements pursuant to O. Reg. 116/01 under the Ontario *EA Act* and an ERR was prepared (Dillon 2008a). Construction began in 2010 and the facility was operational by 2012. The YEC is contracted with the IESO until 2032.

The existing facility was sited on the YEC Property to maintain a development setback from nearby natural features such as the Ansnorveldt Creek (a tributary to the Holland River South Canal) and the Ansnorveldt Provincially Significant Wetland (PSW) Complex located to the south (Dillon 2008a). Existing conditions at the YEC Property and in the Study Area are presented in **Table 5-1** and **Figure 5-1**.



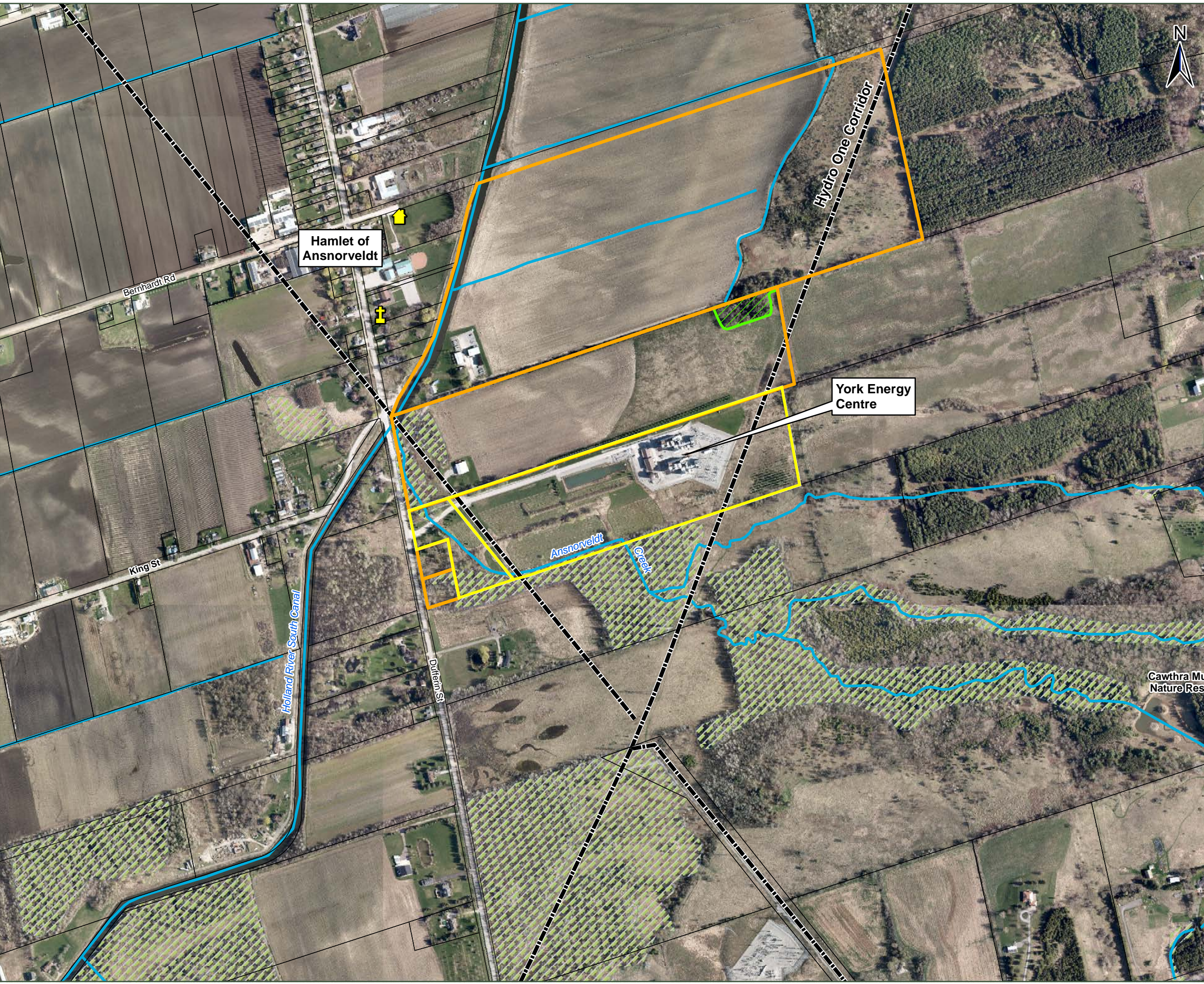
Table 5-1: Existing Conditions

Environmental Criterion		Existing Conditions
Surface and Groundwater	Surface Water	Ansnorveldt Creek is a permanent tributary to the Holland River South Canal and provides permanent warmwater fish habitat for several fish species (OMAFRA 2023 and DFO 2023). The Creek enters the YEC Property from the south, meandering westward for approximately 200 m along the south portion of the property and then turns north to drain into the canal (SLR 2024a). The existing YEC was sited to maintain a development setback from Ansnorveldt Creek and the surrounding natural features. The YEC has an existing SWM system that consists of an onsite extended retention wet pond, storm sewers, catch basins, and manholes (ECA No. 3551-9FJS2H). The YEC is subject to the conditions of the facility's ECA for Industrial Sewage Works, including ongoing monitoring requirements.
	Groundwater	Three existing groundwater monitoring wells are present on the YEC Property, and Capital Power maintains a well monitoring program in accordance with the current ECA for the YEC (ECA No. 3551-9FJS2H). The surficial soils at the YEC Property generally consist of silty clay fill material up to 4.5 meters below ground surface (mbgs), underlain by silty clay soil interbedded with coarse grained materials which reached depths of approximately 7 to 14 mbgs. Groundwater levels are generally shallow and found within the upper 2 m of the ground surface. Local horizontal groundwater flow direction to the west is inferred, which is consistent with the local topography and the proximity of the Holland River South Canal. The YEC Property is listed as located in a Significant Groundwater Recharge Area (SGRA), but site-specific soils were determined to have a low hydraulic conductivity on average; therefore, the potential for groundwater recharge is minimal. Shallow groundwater quality was determined to satisfy the MECP Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the <i>Environmental Protection Act</i> Table 1 Full Depth Background Site Condition Standard for All Types of Property Uses (MOE 2011).
Land Use	Land Use	Land uses within approximately 500 m of the existing YEC include residences along Dufferin Street. Commercial and institutional land uses include the Ansnorveldt Public Library, Holland Marsh Christian Reformed Church, and several small businesses including King Firewood and Lonelm Construction Company (YorkMaps 2023 and Google Maps 2024). Other land uses include agriculture, the Cawthra Mulock Nature Reserve south of the YEC Property, and two Hydro One transmission corridors bisecting the YEC Property.
	Provincial Plans and Policies	Provincial Policy Statement (PPS) (2020): The Project complies with the PPS, including but not limited to policies associated with infrastructure and public utilities. Greenbelt Plan (2017): The Greenbelt Plan indicates the YEC Property is within the "Protected Countryside" and policy 4.2.1.1 permits new or expanded infrastructure within the Protected Countryside provided it has been approved under the <i>EA Act</i> , <i>Planning Act</i> , or similar environmental approval. The Ontario Municipal Board's 2017 Decision regarding the existing YEC noted that it conforms with the permissions and requirements set forth in Section 4.2.1 of the Greenbelt Plan. Lake Simcoe Protection Plan (2009): The site falls within the Lake Simcoe Watershed and is subject to the policies of the Protection Plan which are integrated into the Township of King's Official Plan.
	Municipal Plans and Policies	York Region Official Plan (2022): The YEC Property includes portions designated as agricultural area, Protected Countryside, Provincial Natural Heritage System, and to the south, PSW. The YEC Property is located within an SGRA and Recharge Management Area. Recharge Management Areas are areas that include Wellhead Protection Area (WHPA)-Q1 and WHPA-Q2, where the aquifers in the area are susceptible to impacts where activities take water without returning it to the same source and where these activities that reduce recharge may be a threat to water quantity. Township of King Official Plan (2019): The YEC Property is designated as Countryside Site Specific Policy Area (C-SSPA)-3 which exempts it from the <i>Planning Act</i> as per O. Reg. 305/10 pursuant to s. 62.0.1 of the Act and permits the use of electricity generation onsite. Township of King Zoning By-Law: The YEC Property is zoned as Agricultural to the north and Greenbelt Natural Heritage to the south. The existing YEC facility falls within the Agricultural zoning. The Greenbelt Natural Heritage zoning is associated with Ansnorveldt Creek and the associated PSW.
	Hazard Lands	Approximately two-thirds of the YEC Property and a portion of the existing facility is located within the mapped LSRCA regulated area (LSRCA 2023). The regulated area is associated with the floodplain of the Holland River South Canal and the Ansnorveldt PSW Complex (LSRCA 2023).
	Contaminated Lands	There are no known contaminated areas on the YEC Property and no areas undergoing remediation. A Phase I and Phase II Environmental Site Assessment (ESA) was conducted by Dillon Consulting on the YEC Property in 2008 prior to construction of the YEC. The Phase II ESA evaluated soil samples taken throughout the YEC Property and found that concentrations of volatile organic compounds, Benzene, Toluene, Ethylbenzene, Xylene/Petroleum Hydrocarbons, and inorganics and metals in the upper 3 m of soil generally fell below the MECP (previously MOE) standards. The minor detections above the MOE standards were not found to pose a risk to the site's use. Minor detections of metals in surface water samples above Provincial Water Quality Objectives (PWQO) were also identified but did not pose a risk to the site use (Dillon 2008).
Air and Noise	Air and Noise	The YEC is subject to an ECA (Air & Noise) (ECA No. 7348-83GSVK, amended July 2014). The YEC is an existing natural gas-fired, simple cycle, electricity generation facility with two combustion gas turbines, and one standby diesel generator set (to provide power during emergency situations, exhausting to the atmosphere through a stack). The two combustion gas turbines are equipped with ultra low-NOx combustors. A CEMS is also present at the site to provide regulatory monitoring of the stack emissions. There are several noise receptors within the Study Area, with the closest residential receptor located southwest of the existing facility. The area surrounding the YEC Property is defined by MECP publication NPC-300 as Class 3 rural which is defined as an "area with an acoustical environment that is dominated by natural sounds having little to no road traffic".



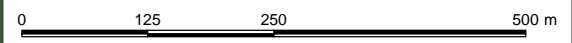
Environmental Criterion		Existing Conditions
Natural Environment	Rare, Threatened or Endangered Species	SLR completed an ecological field program within and near the YEC Property for another Capital Power project in 2022/2023 to assess the presence of Species of Conservation Concern (SoCC). Barn Swallow, a SoCC, were observed flying over the site, but no evidence of nesting was observed within the YEC Property or adjacent Capital Power-owned properties. A Pileated Woodpecker, a species with protected habitat, was observed on the YEC Property. Potential Pileated Woodpecker habitat is present on the YEC Property; however, it is located adjacent to Ansnorveldt Creek, outside of the existing YEC facility footprint. Amphibian calling from several species was concentrated on the YEC Property along Dufferin Street and the south property line, adjacent to the Ansnorveldt PSW Complex. No SoCC amphibians were heard calling. No SAR or SAR habitat was identified within the YEC Property (SLR 2024a and MECP 2023b).
	Protected Natural Areas and Wetlands	No locally important or valued ecosystems/vegetation were identified during field studies (SLR 2024a). The YEC Property does not contain Significant Woodland. No Earth or Life Science Areas of Natural and Scientific Interest (ANSI) are identified on or within the vicinity of the YEC Property (SLR 2024a). The YEC Property does not have any identified Environmentally Sensitive / Significant Areas.
	Wildlife and Wildlife Habitat	The 2022/2023 field program included evening and early morning targeted wildlife surveys within and near the YEC Property for another Capital Power project. Targeted wildlife surveys observed a total of 50 bird species, and based on incidental observations, no significant wildlife habitat was identified on the YEC Property (SLR 2024a).
	Fish and Fish Habitat	Ansnorveldt Creek provides permanent warmwater fish habitat for several fish species (OMAFRA 2023 and DFO 2023). Historical data obtained from the MNRF and LSRCA identify the presence of Creek Chub (<i>Semotilus atromaculatus</i>), Rock Bass (<i>Ambloplites Ariommus</i>), Brown bullhead (<i>Ameiurus nebulosus</i>), Northern Pike (<i>Esox lucius</i>), Johnny Darter (<i>Etheostoma nigrum</i>), Brook Stickleback (<i>Culaea inconstans</i>), Largemouth Bass (<i>Micropterus salmoides</i>), Yellow Perch (<i>Perca flavescens</i>), and Goldfish (<i>Carassius auratus</i>) within the West Holland River Watershed (Dillon 2008a).
	Migratory Birds	The 2022/2023 field program included evening and early morning migratory breeding bird surveys at the YEC Property. A total of 35 bird species were identified during the 2022 surveys and eight additional species were observed during the 2023 surveys (SLR 2024a). A Killdeer (<i>Charadrius vociferus</i>) nest with eggs was confirmed in the gravel areas of the YEC facility within the perimeter fence in 2022. Fledged young of Killdeer, American Robin (<i>Turdus migratorius</i>), European Starling (<i>Sturnus vulgaris</i>), and Mourning Dove (<i>Zenaida macroura</i>) were observed in 2023.
	Valued Ecosystems or Vegetation	Ecological Land Classification (ELC) mapping was prepared and verified during the 2022/2023 ecological field program at the YEC Property. No locally important or valued ecosystems or vegetation were identified. SLR grouped ELC units into generalized habitat characterizations. These wildlife units include manicured lawn within the main facility area; cultural meadow surrounding the YEC facility; fresh moist poplar deciduous forest fronting Dufferin Street, cultural thicket between the YEC and Dufferin Street, and Ansnorveldt Creek, an ephemeral drainage channel, extending along the south property line, then northwest through the southwest corner of the YEC Property. No valued ecosystems or vegetation was observed within the YEC Property.
Resources	Agriculture	The York Region Official Plan (2022) Map 1A designates the YEC Property as Agricultural Area; however, the existing YEC Property does not contain active agricultural land. Active agricultural lands are present within the Study Area.
	Minerals, Aggregates or Petroleum	There are no identified pits or quarries within the Study Area (Government of Ontario 2023). There are no primary or secondary aggregate, mineral, or petroleum resources within or near Study Area (Schedule L, Township of King Official Plan 2019; Map 8, York Region Official Plan 2021). There are no identified petroleum wells within or adjacent to the Study Area (OGSR Library 2023).
	Forest Resources	The YEC Property is not located within a forest resource area (MNRF 2023).
	Game and Fisheries	The Project is located on private land and is not accessible for public hunting and/or fishing.
Socio-Economic	Local Community Character and Services	The YEC Property is generally designated Agricultural and Rural according to the Township of King Official Plan, Schedule A (2020). Ansnorveldt Hamlet is located to the north.
	Employment and Economy	King Township is the largest geographical municipality in York Region, with the smallest population (King 2024). Land uses within the Study Area are primarily agricultural and residential and some commercial land use is present (Township of King Official Plan, Schedule E5 2020).
	Transportation Network and Traffic	The YEC Property fronts onto Dufferin Street, a Municipal Rural Collector Road with a 26 m right-of-way (Township of King Official Plan, Schedule F 2020).
Heritage and Culture	Built Heritage	A Cultural Heritage Report for another Capital Power project on the adjacent property was completed by qualified persons in accordance with the <i>MCM Standards and Guidelines for Conservation of Provincial Heritage Properties: Standards & Guidelines</i> (2010) and the <i>Ontario Heritage Tool Kit</i> (Ministry of Culture, 2006). One potential Built Heritage Resource (BHR), a one-and-a-half storey residence was identified within the Study Area (ASI 2023a).
	Archaeological Resources and Cultural Heritage Landscapes	A Stage 2 Archaeological Assessment was completed prior to construction of the existing YEC by D.R. Poulton & Associates (2009). Subsequently, the portion of the property where the YEC facility is sited was cleared of archaeological concern by the MCM (formerly Ministry of Tourism and Culture) with the clearance letter issued on October 8, 2009.
	Aesthetically Pleasing Landscapes and Views	The YEC Property contains a mix of natural areas and landscaped areas that provide vegetation screening for the facility.
Indigenous Communities	First Nations and Indigenous Communities	The MECP has identified the Alderville First Nation, Beausoleil First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat Nation, and the Mississaugas of Scugog Island First Nation as having a potential interest in the Project (see Section 4.6).





LEGEND:

- YEC Property/Project Footprint
- Other CPC Owned Properties
- Parcel Fabric
- Watercourse/Drainage Feature
- Existing Utility Line
- Ansnorveldt Provincially Significant Wetland (PSW) Complex
- + Church
- + Library
- Woodlot



SCALE 1:7,500
 PAGE SIZE 11 x 17
 NAD 1983 UTM Zone 17N
 THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
 AND SHOULD NOT BE USED FOR NAVIGATION

YEC UPGRADES PROJECT

ENVIRONMENTAL REVIEW REPORT

EXISTING CONDITIONS



FIGURE NO:
5-1

6.0 Effects Assessment

6.1 Screening of Potential Effects

Application of the screening criteria provided in the *Guide to Environmental Assessment Requirements for Electricity Projects (2024)* consisted of answering a series of “yes” or “no” questions to reflect the potential interactions of the Project as described in the Project Description (**Section 2.0**) with the environment. The Guide explicitly states that net effects (i.e., effects that remain after implementation of mitigation measures) are not to be considered when conducting the screening exercise. Where the screening exercise identifies a potential environmental effect, the process requires that an answer of “yes” be applied to the screening question, even if it is likely to be successfully mitigated.

As further described in the screening checklist (**Appendix A**), the following environmental components have been identified as being potentially affected by the Project during the operations phase and therefore, have been included in the environmental effects assessment of the ERR in subsequent sections:

- Air Quality;
- Greenhouse Gas (GHG) Emissions; and
- Noise.

As the Project activities are limited to equipment installations and replacements within an existing facility, and the construction phase installation activities will occur during scheduled IESO outages, combined with the existing disturbed nature of the YEC Property, no other potential effects were identified during the screening (**Appendix A**).

The ESP can be based primarily on existing or readily obtainable information. However, a key aspect of the Environmental Review stage of the ESP is the identification of potential environmental effects and/or public concerns that require further assessment and resolution. As noted in the Guide, for potential effects and/or concerns, the assessment and impact management measures may be more complex and the concerns and issues more difficult to resolve. The air quality, GHG emissions, and noise criteria were identified early in Project planning as warranting further analyses and discussion based on actual and anticipated input from agencies, the public, and Indigenous communities. Therefore, more detailed assessments of these potential environmental effects have been undertaken and additional technical studies were prepared and appended to this ERR.

6.2 Air Quality

6.2.1 Potential Effects

An air quality assessment of the Project was undertaken to evaluate air emissions associated with Project operations to confirm compliance with applicable regulatory limits (**Appendix D.2**). The evaluation considered Project-specific emissions, as well as the broader cumulative context of the overall airshed.

The combustion of natural gas associated with the generation of electricity from a gas turbine generation facility results in emissions of contaminants of concern (COCs), including:

- Nitrogen oxides (NO_x) (in the form of Nitrogen Dioxide or NO₂);



- Carbon monoxide (CO);
- PM, where total particulate matter and fine particulate matter are assessed for the Project, with fine particulate matter defined as particulate sizes 2.5 microns in diameter and less (PM_{2.5}), and 10 microns in diameter and less (PM₁₀); and
- Sulphur dioxide (SO₂).

Volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and to a lesser extent, metals, can be detected in the exhaust stream, as a result of the combustion process. However, modelling results of these compounds predict they will be released in trace amounts and therefore these compounds were not included in the combined effects analysis for this project. The results of the analysis of these compounds are reported in (**Appendix D.2**).

Ontario's EPA is the primary provincial legislative framework for regulation of air emissions, with requirements outlined specifically in the Air Quality Regulation, O. Reg. 419/05. The MECP administers the EPA and is the key regulatory authority for establishing applicable emission limits, reviewing applications for approvals under the EPA, and for compliance. Following completion of the ESP, the Project will require an amendment to the YEC's ECA (Air & Noise) issued under the EPA.

The two aspects to air emission compliance under O. Reg. 419/05 include:

- Emission limits at the source (i.e., exhaust stack) outlined in Guideline A-5; and
- Criteria for emission levels at points of impingement (POI) as outlined in the Air Contaminant Benchmark List.

Emission Rates

Guideline A-5 specifies emissions limits for natural gas fired turbines at the source (i.e., exhaust stack) for NO_x, CO and SO₂ under normal operating conditions. The emission rates for the Project were calculated using specified equations from the guideline to confirm that emissions from the exhaust stack will meet these provincial requirements.

The results of the calculations demonstrated that, following implementation of the Project, the YEC will continue to be compliant with the Guideline A-5 emission limits. The existing facility emission rates compared to the emission rates expected after the upgrades have been completed is presented in **Table 6-1**. Included in the SE turbine upgrades package is the implementation of a more advanced, ultra low NO_x combustion system which would decrease the rate of NO_x emissions during operation. With the implementation of the newer technology, it is anticipated that the NO_x emission rate will be reduced by 37%. The analysis predicts a 5% increase in the CO emission rate from 19 lb/hr to 20 lb/hr. There is no change expected in the SO₂ and PM emission rate.



Table 6-1: Net Change in Air Emission Rates

Contaminant	Air Emission Rates (lb/hr)		
	Existing Facility	Project	Net Change
NO _x	155	98	-57
CO	19	20	1
SO ₂	13	13	0
PM	8	8	0

Dispersion Modelling

Dispersion modelling was completed using AERMOD version 22112 following the steps outlined in Guideline A-11 (Air Dispersion Modelling Guideline for Ontario, 2017). AERMOD combines stack parameter input data, emission rates calculated in accordance with Guideline A-5, terrain, and meteorological data to model a Gaussian plume to simulate the dispersion of COCs into the atmosphere.

The dispersion model was used to predict concentrations of selected COCs at identified POIs. POIs are maximum concentrations located at and beyond the property line of a Project Site. Two types of POI were included in the model: a general POI grid or nested grid covering the surrounding area, and six sensitive receptors. Sensitive receptors were chosen to represent locations where extended human occupancy is experienced, such as residences and schools. Details regarding the receptors assessed are provided in (**Appendix D.2**).

The MECP’s Air Contaminant Benchmark List (ACB List) identifies the standards and guidelines to be used for the purposes of POI assessments prepared as part of the ECA process. The applicable criteria from the ACB List were used to compare to the Project-specific dispersion modelling results at receptors to confirm Projects compliance with O. Reg 419/05 for use in the future ECA (Air & Noise) amendment process.

Five operating scenarios were modelled for the selected COCs. The scenarios chosen are intended to represent the normal operating conditions and worst-case emissions expected under different operating and environmental conditions. Scenarios assumed all equipment will run 24 hours per day, 7 days per week which is a highly conservative assumption since the YEC has historically been dispatched by the IESO at approximately half capacity to provide grid stability and power while other baseload facilities come online. As such, over the past five years, the YEC has been dispatched by the IESO an average of 146 hours annually, where the average run time has been just under three hours per dispatch request. The upgrades to the YEC will not change how the facility is dispatched by the IESO as a peaking power plant.

From a compliance perspective, emissions of identified COCs at POIs are predicted to remain below their respective O. Reg. 419/05 limits for the selected operating scenarios. Details for all scenarios are provided in (**Appendix D.2**) and results are summarized below for the normal operating scenario and worst-case start-up scenario **Table 6-2** and **Table 6-3**.



Table 6-2: COC Concentrations at POI Compared to Scenario A Criteria for Normal Operation Scenario

Contaminant	CAS #	Total Emission Rate (g/s)	Maximum POI Concentration (μm^3)	Averaging Period (hours)	MECP POI Limit (μm^3)	Limiting Effect	Percentage of MECP POI Limit (%)
Nitrogen Oxides	10102-44-0	24.75	4.963	24	200	Health	2.48
			30.162	1	400	Health	7.54
Carbon Monoxide	630-08-0	5.02	7.308	0.5	6000	Health	0.12
Sulphur Dioxide	7446-09-5	3.37	1.940	1	100	Health & Vegetation	1.94
			0.002	annual	10	Health & Vegetation	0.02
Particulate Matter	N/A	2.27	0.457	24	120	Particulate	0.38

Note: Air Dispersion Model Used – AERMOD; ACB list particulars, Source Benchmark – Standard; Reg. Schedule # B1

Table 6-3: COC Concentrations at POI Compared to Scenario E Criteria for Cold Start or Start-up Condition

Contaminant	CAS #	Total Emission Rate (g/s)	Maximum POI Concentration (μm^3)	Averaging Period (hours)	MECP POI Limit (μm^3)	Limiting Effect	Percentage of MECP POI Limit (%)
Nitrogen Oxides	10102-44-0	28.00	8.773	24	200	Health	4.39
			47.563	1	400	Health	11.89
Carbon Monoxide	630-08-0	183.41	374.116	0.5	6000	Health	6.24
Sulphur Dioxide	7446-09-5	1.03	0.909	1	100	Health & Vegetation	0.91
			0.001	annual	10	Health & Vegetation	0.01
Particulate Matter	N/A	2.15	0.670	24	120	Particulate	0.56

Note: Air Dispersion Model Used – AERMOD; ACB list particulars, Source Benchmark – Standard; Reg. Schedule # B1



Combined Effects Analysis

In addition to meeting the applicable provincial regulatory compliance limits that will be required for MECP approval, a combined effects analysis was conducted to consider the existing ambient air quality conditions in the local region for the normal operating scenario. Predicted results from dispersion modelling were added with the local, historical, ambient air quality data. The criteria used to evaluate the results of the dispersion modelling in the context of the regional air quality regime were the Provincial Ambient Air Quality Criteria (AAQC) and Federal Canadian Ambient Air Quality Standards (CAAQS):

- The Ambient Air Quality Criteria (AAQC) standards are provincially based, non-regulatory, ambient air quality values that are set based on either human health or environmental effects at concentrations of a contaminant in air below which adverse effects are not likely to occur. The MECP first sets AAQCs (non-regulatory) and uses them to establish air quality standards (regulatory) based on health and environmental effects. AAQCs are used to assess air quality from all sources whereas air standards are used to assess the performance of regulated facilities under the local air quality regulation (MECP 2020);
- The CAAQS are non-regulatory, ambient air quality values based on factors including health and environmental effects, current air quality levels in other jurisdictions, projected trends, and elements of achievability. CAAQS are intended to be used as indicators to help manage regional air quality and drive the improvement of air quality across Canada. CAAQS are established to work with regional air quality management systems (AQMS) to control and monitor air quality at the regional level but not intended to be directly applied to individual facilities (CCME 2020) or the compliance of individual facilities. As a conservative measure, the individual facility emissions were combined with the existing facility emissions and the ambient background and, similar the Provincial AAQCs, compared to the CAAQS.

Since the IESO will continue to dispatch the YEC as a peaking power plant, it is expected to continue to run infrequently and below the regulated 1,500-hour annual limit for peaking facilities. Dispatch forecasting suggests that the unit may run less than 180 hours annually, while 2027 would see the largest number of operating hours at approximately 260. Due to these expected operating conditions the air quality assessment is considered conservative since the modelled scenarios assume both turbines will run 24 hours per day, 7 days per week.

Results of the combined effects analysis are provided in **(Appendix D.2)** and are summarized below in **Table 6-4** and **Table 6-5**.



Table 6-4: Combined Concentration Results for Scenario A (Normal Operating Scenario) Compared to AAQC

COC	Averaging Period	90th Percentile of Ambient Background Concentration ($\mu\text{g}/\text{m}^3$)	Highest Concentration (Project at Sensitive Receptor ($\mu\text{g}/\text{m}^3$))	Combined Maximum at Sensitive Receptor ($\mu\text{g}/\text{m}^3$)	AAQC Limits ($\mu\text{g}/\text{m}^3$)	Sensitive Receptor Percentage of Limit
NO _x	1-Hour	25.12	14.053	39.17	400	9.79
	24-Hour	24.04	1.783	25.83	200	12.91
CO	1-Hour	421.40	2.840	424.24	36,200	1.17
	8-Hour	403.34	1.587	404.93	15,700	2.58
SO ₂	10-min	2.27	1.868	4.14	67 ppb (178.2 $\mu\text{g}/\text{m}^3$)	2.32
	1-Hour	1.38	1.132	2.51	40 ppb (106.4 $\mu\text{g}/\text{m}^3$)	2.36
	annual	0.80	0.002	0.81	4 ppb (10.6 $\mu\text{g}/\text{m}^3$)	7.50
PM ₁₀	24-Hour	21.37	0.164	21.54	50	43.08
PM _{2.5}	24-Hour	11.54	0.164	11.71	27	43.36
	annual	8.55	0.001	8.55	8.8	97.12

Note:

[1] The AAQC limits for SO₂ and NO₂ are in the unit of Part Per Billion (ppb). The (ppb) unit converted to ($\mu\text{g}/\text{m}^3$) by using following factors:

SO₂: ($\mu\text{g}/\text{m}^3$) = (ppb) * 2.66

NO₂: ($\mu\text{g}/\text{m}^3$) = (ppb) * 1.88



Table 6-5: Combined Concentration Results for Scenario A (Normal Operating Scenario) Compared to CAAQS

COC	Averaging Period	90 th Percentile of Ambient Background Concentration (µg/m ³)	Highest Concentration at Sensitive Receptor (µg/m ³) *	Cumulative Concentration at Sensitive Receptor (µg/m ³)	CAAQS Targets (ppb)	Sensitive Receptor Percentage of Targets (%)
NO ₂	1-Hour	22.15	1.183	23.33	42 (78.9 µg/m ³)	29.55
	annual	11.01	0.014	11.09	12 (22.5 µg/m ³)	48.86
PM _{2.5}	24-Hour	11.54	0.063	11.60	27	42.97
	annual	8.55	0.001	8.56	8.8	97.17
SO ₂	1-Hour	1.38	0.253	1.63	65 (172.9 µg/m ³)	0.94
	Annual	0.79	0.002	0.80	4 (10.6 µg/m ³)	7.44

Note:

[1] The CAAQS limits for SO₂ and NO₂ are in the unit of Part Per Billion (ppb). The (ppb) unit converted to (µg/m³) by using following factors:

SO₂: (µg/m³) = (ppb) * 2.66

NO₂: (µg/m³) = (ppb) * 1.88

***CAAQS Statistical Form:**

The 1-hour NO₂ CAAQS is based on the 3-year average of the annual 98th percentile of the NO₂ daily maximum 1-hour average concentrations.

The annual NO₂ CAAQS is based on the average over a single calendar year of all the 1-hour average NO₂ concentrations.

The 24-hr PM_{2.5} CAAQS is based on the 3-year average of the annual 98th percentile of the 24-hr average concentrations.

The annual PM_{2.5} CAAQS is based on the average of the three highest annual average values over the study period.

The 1-hour SO₂ CAAQS is based on the 3-year average of the annual 99th percentile of the SO₂ daily maximum 1-hour average concentrations.

The annual SO₂ CAAQS is based on the average over a single calendar year of all the 1-hour average SO₂ concentrations.

Modelling results for the combined assessment predict that despite high background concentrations for one COC (PM_{2.5}), concentration at sensitive receptors will be below its respective AAQC and CAAQS thresholds for the Normal Operating Scenario. In the case of annual PM_{2.5}, the predicted combined concentrations are 97% of the 8.8 (µg/m³) threshold recognized in both the AAQC and CAAQS. However, the total emissions from the Project contribute less than 1% to the combined concentration with the high background concentrations contributing to the air quality condition. It should be noted that the high concentration of ambient PM_{2.5} is due to the smoke that migrated from the wildfires in Ontario and Quebec in June and August of 2023.



As noted above, these modelling predictions are based on conservative operating scenarios, however, even with the conservative considerations in the assessment, the Project, in combination with local background conditions, is anticipated to be within the AAQCs and CAAQS.

6.2.2 Mitigation

Mitigation for air quality during operations has been included in the Project design, as the SE turbine upgrade package includes a more advanced Ultra Low NO_x combustion system than currently installed at the facility. No further mitigation measures are proposed for Project operations because emissions are predicted to meet the applicable air quality limits.

6.2.3 Summary of Net Effects

Following implementation of the upgrades, the YEC is predicted to remain in compliance with applicable provincial standards and guidelines.

Included in the SE turbine upgrades package is the implementation of a more advanced ultra low NO_x combustion system which will decrease the rate of NO_x emissions during operation. With the implementation of the newer technology, it is anticipated that the NO_x emission rate will be reduced by 37%, with little to no change in emission rates for other COCs.

Dispersion modelling results show that all COCs are predicted to be below their respective O. Reg. 419/05 limits. The results of the combined effects analysis demonstrated that despite high background concentrations, the COC concentrations at sensitive receptors are within the AAQC and CAAQC limits.

These assessments can be considered conservative since the dispersion modelling scenarios used to assess potential impacts assume the facility is operating both turbines, 24 hours, 7 days a week, while the intended use is to continue to operate the YEC as a peaking plant with operations to be intermittent and only in response to demand cycles, as scheduled by the IESO.

No significant net adverse effects are predicted as a result of the Project.

6.3 Greenhouse Gas Emissions

6.3.1 Potential Effects

A GHG is any atmospheric gas that absorbs and re-emits infrared radiation, thereby acting as a thermal blanket for the planet and warming the lower levels of the atmosphere. GHGs are released to the atmosphere from several natural and anthropogenic (human activity) sources (IPCC 2021). GHG emissions result from the use of natural gas as fuel to power the YEC turbines to generate electricity.

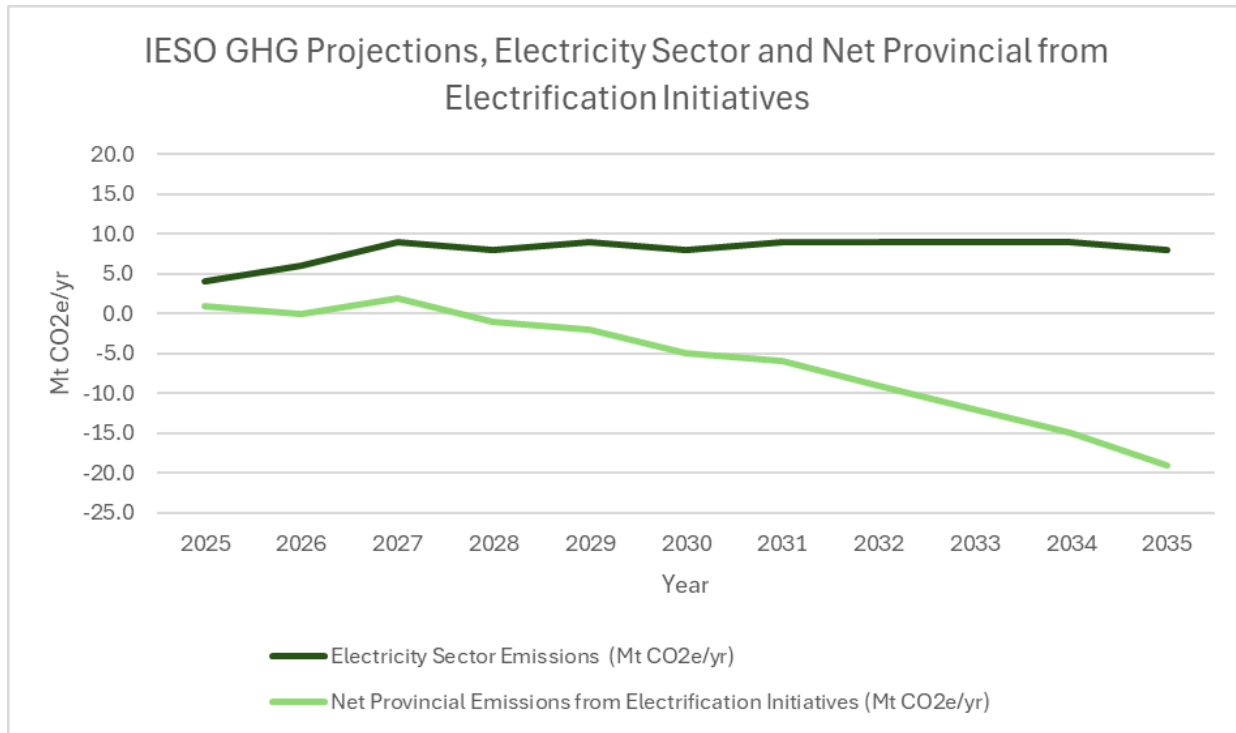
A GHG assessment was undertaken to evaluate the potential for the Project to result in changes to GHG emissions when compared to continued operation of the existing YEC (**Appendix D.3**).

To provide context to the assessment, the IESO forecast of future emissions for the Ontario electricity sector was reviewed. This forecast predicts that two major electrification initiatives will impact the broader economy emissions: 1) increased usage of electric vehicles, and 2) electrification of industrial equipment (IESO 2022a, 2024). With this increased electricity usage, GHG emissions for the province are projected by the IESO to decrease **Figure 6-1**.



Therefore, even though emissions associated with electricity generation are forecasted to increase, there will be an overall, Province-wide, decrease in GHG emissions associated with the switch to using more electricity in vehicles and industrial equipment (IESO 2022c).

Figure 6-1: Greenhouse Gas Emissions for the Ontario Electricity Sector 2025 - 2035 (IESO 2024)



Source: IESO 2024

The GHG Assessment undertaken for the Project quantified the estimated GHG emissions in carbon dioxide equivalent units (CO₂e) per year associated with the Project, incorporating a Project-specific dispatch profile developed by Capital Power based on the IESO-forecast demand. Analytical software was utilized to model a variety of complex market inputs to predict how the Project will likely be dispatched by the IESO under future market conditions. The assessment was undertaken in consideration of the MECP’s *Considering Climate Change in the Environmental Assessment Process* (Government of Ontario 2017), including use of a quantitative assessment approach for the evaluation of Project emissions.

The quantitative assessment included evaluation of the Project GHG emissions against emissions that would occur in the absence of the upgrades at the YEC. This is referred to as the Business-as-Usual (BAU) scenario which was used to determine if the operation of the Project will result in a net increase or decrease in GHG emissions. The BAU scenario assumed that the Project (upgrades) did not proceed and that the YEC continued to operate. Details are provided in **(Appendix D.3)** and results are summarized below.

The upgrades to the YEC will allow the facility to produce electricity more efficiently. The SE turbine upgrade package will result in an improvement of the heat rate by upwards of 4% over existing conditions, leading to increased thermal efficiency, meaning that 4% less fuel is used to produce the same amount of energy output.



The analysis demonstrates that as a result of the increase in the thermal efficiency of each turbine unit, the overall GHG emissions intensity (tCO₂e per megawatt hour (MWh) produced) decreases. **Table 6-5** shows the reduction in emission intensity associated with the Project.

Table 6-6: Net Change in GHG Emissions Intensity

Year	GHG Emissions Intensity (t CO ₂ e/MWh)		
	BAU	Project	Net Change
2025	0.601	0.583	-0.018
2026	0.599	0.576	-0.023
2027	0.591	0.568	-0.023
2028	0.595	0.572	-0.023
2029	0.591	0.568	-0.023
2030	0.595	0.571	-0.023
2031	0.595	0.572	-0.023
2032	0.603	0.580	-0.023
2033	0.599	0.577	-0.022
2034	0.600	0.578	-0.022
2035	0.599	0.577	-0.022

As the facility will be more efficient with the associated decrease in GHG emission intensity, the increase in power output (from increased demand) from the upgraded YEC is not predicted to result in an increase of GHG emissions but rather a reduction. The projected GHG emissions during the 2025 – 2035 period, and the yearly breakdown of net change in GHG emissions for the Project in comparison to the BAU scenario is presented in **Table 6-7**. Overall, there is an anticipated decrease in GHG emissions over the 2025-2035 period as a result of the implementation of the Project.

Table 6-7: Net Change in GHG Emissions

Year	Total GHG Emissions (t CO ₂ e/year)			
	BAU	Project	Net Change	Net Change (%)
2025	21,896	21,753	-143	-0.7
2026	22,733	22,412	-321	-1.4
2027	24,439	24,462	22	0.1
2028	12,983	12,871	-112	-0.9
2029	14,507	14,458	-49	-0.3
2030	13,285	13,210	-75	-0.6
2031	12,369	12,281	-88	-0.7
2032	10,064	9,758	-306	-3.0
2033	8,542	8,225	-317	-3.7
2034	8,640	8,320	-320	-3.7
2035	8,628	8,308	-320	-3.7



6.3.2 Mitigation

No mitigation measures for GHG emissions are proposed for the Project.

6.3.3 Summary of Net Effects

The proposed upgrades will add capacity to the grid and allow Capital Power to respond to the increased demand as projected by the IESO. With the upgrades to the YEC, GHG emissions are expected to decrease due to the improved thermal efficiency resulting in lower GHG emission intensity. Furthermore, with the predicted decrease in GHG emission intensity, the increase in power output (from increased demand) from the upgraded YEC is not predicted to result in an increase of GHG emissions but rather a reduction. Overall, there is an anticipated decrease in GHG emissions over the 2025-2035 period. No significant net adverse effects are predicted as a result of the Project.

6.4 Noise Emissions

6.4.1 Potential Effects

A noise assessment was undertaken to predict sound level emissions associated with Project operations and to assess potential noise-related effects on local receptors to confirm compliance with applicable regulatory limits (**Appendix D.4**).

Ontario's *Environmental Protection Act* (EPA) is the primary provincial legislative framework for the regulation of noise emissions from industrial facilities. This includes operational noise from natural gas generation facilities. The MECP administers Ontario's EPA and is the key regulatory authority for establishing applicable noise limits, reviewing applications for approvals under the EPA, and for compliance. Following completion of the ESP, the Project will require an amendment to the YEC's ECA (Air & Noise) issued under the EPA, and must operate within the provincially regulated noise limits.

Noise guidelines for stationary source noise (such as those from the Project) impacting surrounding noise sensitive uses are given in the MECP's NPC-300 guidelines. The modelled noise impacts were calculated using Cadna/A, a prediction software consistent with the ISO 9613-2 standard. The model took into consideration the site layout and location of the noise sources and the surrounding buildings. Details are provided in (**Appendix D.4**) and results are summarized below.

The predicted change in sound levels due to the Project are as follows:

- The manufacturer's supplied sound level change for the combined effects of turbine upgrades, inlet fogging, and gas turbine control updates are to be at most, a 2 decibel (dB) increase in the octave bands below 150 hertz (Hz) for sound levels emitted from the combustion exhaust stacks. The resulting overall A-weighted sound level will be minimally increased. This change will have negligible impact to the existing YEC sound levels.
- The proposed transformer fan sound levels are to be lower or equal to the currently installed fans on both step-up transformers. This will result in a decrease or equal sound level for each unit. To be conservative, no change in sound level is anticipated.

As shown in **Table 6-8**, the Project is anticipated to have a negligible change in noise emissions at sensitive receptors when compared to the current operations at the YEC.



Following implementation of the Project, the upgraded YEC would continue to meet the applicable MECP Publication NPC-300 sound level limits during normal operations.



Table 6-8: Combined Predicted Regular Operations Sound Levels at POR Façade

Façade Point of Reception (POR) ID	POR Description	Time of Day	YEC Sound Level at POR ^[1] (L _{eq} dBA)	Project Sound Level at POR (L _{eq} dBA)	Combined (Project + existing YEC) Sound Level at POR (L _{eq} dBA)	Most Stringent Performance Limit ^[2] (L _{eq} dBA)	Compliance with Limit (yes/no)
Regular Operations							
R1	18868 Bathurst Street	All periods	36	--	36	40	yes
R2	18660 Bathurst Street	All periods	37	--	37	40	yes
R3	18665 Dufferin Street	All periods	40	--	40	40	yes
R7	18800 Dufferin Street	All periods	36	--	36	40	yes
R9	18955 Dufferin Street	All periods	39	--	39	40	yes
<p>^[1] Sound levels for the existing YEC equipment were referenced using a combination of source data. A Noise Audit of the operating YEC was completed by Aiolos in 2012; no major upgrades or new sources of sound have been installed at the YEC Property since completion of the audit, and therefore, this data was considered representative of the current configuration of the YEC. Results were not provided in the 2012 Audit report for R3, as access was denied to the property, therefore data from the Acoustic Assessment Report from the original ECA application was used (Dillon Consulting Ltd., 2011).</p> <p>^[2] The MECP NPC-300 applicable sound level limits differ throughout the day: day (45 dBA) vs. evening and night (40 dBA). As YEC can operate during any time of the day, the most restrictive performance limit, 40 dBA, was applied to all modelling scenarios.</p>							



6.4.2 Mitigation

No mitigation measures for noise emissions are proposed for the Project.

6.4.3 Summary of Net Effects

The Project will result in a negligible increase to the existing sound level at representative local receptors. Following implementation of the Project, the upgraded YEC would continue to meet the applicable MECP Publication NPC-300 sound level limits during normal operations. No significant net adverse effects are anticipated as a result of the Project.



7.0 Summary and Conclusion

7.1 Environmental Advantages and Disadvantages

Capital Power is proposing the Project at the existing YEC to provide operational flexibility and additional generation capacity to better serve Ontario's growing electricity needs. The following sections summarize the advantages and disadvantages that have been identified for the Project.

7.1.1 Advantages

The Project makes use of technology improvements within an existing facility.

The YEC is predicted to produce power more efficiently after the upgrades have been implemented. As a result of the Project there is an expected reduction in both the GHG emissions intensity and NO_x emission rates at the YEC. The increased energy output will support the IESO in addressing the need for more power supply in the province to help fuel the province's energy transition and maintain grid reliability.

7.1.2 Disadvantages

No disadvantages to the implementation of the Project have been identified.

7.2 Summary of Commitments

Based on the results of the technical studies, effects assessment and engagement activities undertaken during the preparation of the ERR, the following mitigation commitments and future studies will be implemented for the Project:

- Applicable corporate and facility-specific management plans and procedures will be followed during implementation of the YEC Upgrades Project.
- An application for an ECA (Air & Noise) Amendment related to changes in facility components and emissions will be submitted to the MECP, with technical content deemed acceptable by the MECP and amended ECA (Air & Noise) issued prior to the undertaking of installation activities.
- Capital Power will continue to operate the YEC in compliance with regulatory requirements and facility-specific approval conditions, including continued implementation of ongoing air quality monitoring programs and annual GHG emissions reporting.

7.3 Conclusion

The IESO has identified the need for the procurement of a limited amount of natural gas-fired generation to help fuel Ontario's energy transition and to maintain a reliable and stable energy supply. The YEC Upgrades Project involves modifications to the existing YEC, which include equipment upgrades that will amount to approximately 30 MW of additional generation capacity.

Predicted changes to air and noise emissions as a result of the increased power output are below applicable criteria at identified sensitive receptor points and are subject to MECP review and approval under the ECA process. The upgrades to the YEC will also allow the facility to produce electricity more efficiently, resulting in a decrease in GHG emission intensity.



The conclusion of this Environmental Review is that implementation of the Project will not result in significant negative net environmental effects.



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