Durham Region

York Region

Durham York Energy Centre Environmental Screening Report

December 2021

Executive Summary

The Durham York Energy Centre (DYEC) is located at 1835 Energy Drive in the Municipality of Clarington, Ontario, Canada and has been in commercial operation since 2016. Jointly owned by Durham Region and York Region (Regions), the DYEC is a waste management facility that produces energy from the combustion of residential garbage that remains after maximizing waste diversion programs. The DYEC generates enough electricity from the combustion of garbage to power approximately 10,000 homes a year. It also captures residual metals for recycling and reduces the volume of waste going to landfill by 90 per cent.

The DYEC is currently permitted to process 140,000 tonnes of residential garbage (non-hazardous) per year that remains after all waste diversion efforts have been utilized (reducing, reusing, recycling, and composting) in both Durham Region and York Region. Durham Region's portion of DYEC annual processing capacity is 110,000 tonnes (approximately 80 per cent) and York Region's is 30,000 tonnes (approximately 20 per cent). In 2018, the DYEC processed 140,000 tonnes of garbage, while recovering 3,848 tonnes of metal and generating approximately 85,412 MWh of electricity for sale to the provincial grid. By using state-of-the-art pollution control systems and proven, reliable energy from waste technology, the DYEC meets the most stringent environmental standards and reduces greenhouse gas emissions compared to the landfilling option.

Since 2017, residents in the Region of Durham generated more than 110,000 tonnes of garbage for final disposal. The excess garbage is required to by-pass processing at the DYEC and must be sent directly to landfill for disposal. Since the Region of Durham has a growing population, it is expected that garbage generation will exceed 110,000 tonnes every year going forward, despite the diversion programs in place.

The DYEC is capable of processing up to 160,000 tonnes of garbage annually without requiring any modifications or additions to the existing equipment or the building. Durham Region and York Region propose to utilize the additional waste processing capacity at the DYEC to make use of the existing equipment more efficiently while reducing the need to by-pass garbage directly to landfill disposal.

Increasing the processing capacity of the DYEC to 160,000 tonnes per year requires an amendment to the facility Environmental Compliance Approval (ECA). The existing ECA permits processing a maximum of 140,000 tonnes per year. Regulations requires an Environmental Screening Process be undertaken for the project to evaluate the potential negative environmental effects of the proposed increase and to consult with the public.

The Waste Management Projects Regulation (Ontario Regulation 101/07) outlines the regulatory requirements for Environmental Assessment (EA) for waste management projects. The requirements for completing an Environmental Screening Process are described in a detailed, step-by-step guide found in Part B of the MECP document: “Guide to Environmental Assessment Requirements for Waste Management Projects” (Guide). The Regions initiated an Environmental Screening Process in July 2019 with a Notice of Commencement announcing the proposal to increase the DYEC waste processing capacity. Key steps undertaken by the Regions include:

- Completion of the Environmental Screening Checklist found in Schedule 1 of the Guide
- Identification of potential negative environmental effects
- Completion of studies and assessment of potential negative environmental effects and impact mitigation measures
- Updated Emission Summary and Dispersion modeling
- Consultation with the public, agencies, indigenous communities, and other interested parties

Potential Effects

As part of the review of potential negative environmental effects, the Environmental Assessment (EA) that was completed in 2009 prior to the initial construction of the DYEC, was reviewed. Since there is no new construction or equipment associated with the requested increase in processing capacity and the 2009 EA considered the effects of processing up to 400,000 tonnes of waste per year, many of the conclusions reached in the 2009 EA remain valid for a facility operating at a much lower capacity of 160,000 tonnes of waste per year. A discussion of the multiple technical studies completed for the 2009 EA is included in Section 4.

Also, a Compliance Monitoring Program (CMP) was prepared and submitted to the MECP to satisfy Condition 4 of the Notice of Approval during the original EA process. The CMP outlines how the proponents will comply with conditions in the Notice of Approval and other commitments made in the EA Study Document. To ensure compliance with regulatory requirements and guidelines, data generated from the facility is monitored and reviewed on a continuous basis. A discussion on the CMP completed for the 2009 EA is included in Section 3.5

The Environmental Screening Process criteria outlined in the MECP Guide, was applied to the DYEC waste processing capacity increase from 140,000 to 160,000 tonnes per year. Potential negative environmental effects were identified in the screening checklist for:

- Air and noise
- Socio-Economic (proximity to aerodrome or airport)

Air Emissions

The local air quality in the vicinity of the DYEC is considered typical of urban areas in southern Ontario. Multiple industrial activities are conducted along the Highway 401 corridor in Clarington that contribute to the local air quality including odour and noise emissions. These include other waste management operations, traffic on Highway 401, construction of the 407 East extension, electricity production and resource industries.

The increase in DYEC processing capacity to 160,000 tonnes per year will result in increased total air emissions from the facility. To determine the potential impact of the increased air emissions at the DYEC, an Air Quality Impact Assessment (AQIA) was completed assuming the worst-case operating and weather conditions. Golder

Associates Limited simulated the potential change in local air quality using an MECP-approved (CALMET/CALPUFF) modelling methodology. This modelling methodology was used to ensure consistency with the previous air quality studies undertaken for DYEC in 2011. The dispersion model and version selected for use in the assessment is the U.S. RPA CALPUFF model version 7.2.1, level 150618, and CALMET model version 6.5.0, level 150223.

The modelling concluded that the DYEC increase in capacity to 160,000 tonnes per year will comply with the MECP regulated air quality standards and will not have a significant negative effect on local ambient air quality. Testing scenarios are discussed in section 5.

Total greenhouse gas emissions from the facility will also increase as the capacity is utilized to its full processing potential at the DYEC. However, it is important to note that despite facility emissions increasing, when reviewing the entire waste management greenhouse gas emissions (GHG) life cycle the net effect of GHGs is a decrease in emissions when compared to landfilling the same quantity of waste. The net emissions of GHGs from thermal treatment of waste compared to disposal at a landfill was assessed as part of the initial EA. This assessment indicated that the total GHG emissions from thermal treatment were less than those associated with transportation related emissions and landfill methane generation when waste is landfilled. GHG emissions from DYEC are reported as part of the federal Greenhouse Gas Reporting Program and are discussed in Section 3.8.6.

Socio-Economic

Socio-economic effects include community character, aesthetic impacts, effects on local businesses or public facilities, increased demands on community services, effects on the economic base of the community, traffic effects, interference with flight paths and public health and safety. All these areas were considered when completing the Environmental Screening Checklist. Since there is no construction or change to equipment associated with the capacity increase to 160,000 tonnes per year, the conclusions of the 2009 socio-economic studies remain valid.

One potential effect as outlined in the screening criteria checklist was identified. The facility is within 8 kilometers of a helipad located at the Bowmanville Hospital. Although air ambulance service is currently suspended to the hospital, it is anticipated that a relocated helipad will be established in the future. Prior to construction, the DYEC received aeronautical clearance from Navigation Canada. Since there are no additional buildings or structures associated with the increase in capacity to 160,000 tonnes per year, the aeronautical clearance remains valid and there are no negative effects related to the proximity of the helipad.

The Regions review has concluded there are no significant net environmental effects because of increasing capacity to 160,000 tonnes per year.

Project Benefits

Increasing the DYEC processing capacity to 160,000 tonnes per year will increase the efficiency of DYEC operations by allowing for full use of the existing equipment, maximizing the use of the investment without requiring any additional construction or building modifications. There is no capital cost associated with increasing the DYEC capacity to 160,000 tonnes per year. Rather, the Regions will realize financial savings from reducing by-pass waste, resulting in overall GHG emissions being reduced due to reduction in transportation and landfilling while also increasing revenue from additional power generation and materials recovery.

The completion of this Environmental Screening Report (ESR) is anticipated by January 2022 (subject to change). The ESR is posted for a 60-day public review period and provided to the MECP for review. The final step in the Environmental Screening Process is posting a Statement of Completion.

Glossary of Terms (Abbreviations)

AAR – Acoustic Assessment Report

APC – Air Pollution Control

AQIA – Air Quality Impact Assessment

CEBP – Clarington Energy Business Park – Located south of Highway 401 and north of the CN rail line, bordered by Courtice Road to the west and Crago Road to the east, in the Municipality of Clarington, Region of Durham.

CEMS – Continuous Emissions Monitoring System

CO2eq – Carbon Dioxide Equivalent

CoPC – Chemicals of Potential Concern

DYEC – Durham York Energy Centre

EA – Environmental Assessment

ECA – Environmental Compliance Approval

ESDM – Emissions Summary and Dispersion Modelling

ESR – Environmental Screening Report

GHG – Greenhouse Gases

Golder – Golder Associates Limited

Guide – MECP Guide to Environmental Assessment Requirements for Waste Management Projects

HHV – Higher Heating Value

LCA – Lifecycle Assessment

MECP – Ministry of Environment, Conservation and Parks

MJ – Mega Joule

MNRF – Ministry of Natural Resources and Forestry

Mt - Megatonnes

NO_x – Nitrous Oxides, includes nitric oxide (NO) and nitrogen dioxide (NO_2)

OU – Odour Unit

POI – Point of Impingement or Area of Highest Concentration

Regions – Durham Region and York Region

Screening – Environmental Screening Process

Site – the Durham York Energy Centre structures and property

SO_2 – Sulphur Dioxide

TPY– tonnes per year

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1. Introduction

Durham Region and York Region (Regions) require additional waste disposal capacity for residual garbage generated by the residents of both regions. Co-owned by the Regions, the DYEC is a waste management facility that produces energy from the combustion of post-diversion residential garbage. Durham Region's portion of DYEC processing capacity is 110,000 tonnes and represents the primary method of post-diversion waste disposal. York Region's portion of processing capacity at the DYEC is 30,000 tonnes and represents one of multiple disposal facilities used by York Region.

As constructed, the Durham York Energy Centre (DYEC) has the equipment and building capacity to process an additional 20,000 tonnes of waste annually (from 140,000 to 160,000 tonnes). The Regions have chosen to pursue an amendment to the existing Environmental Compliance Approval (ECA) to allow the facility to receive and process an additional 20,000 tonnes of waste per year. After approval of the ECA amendment, the DYEC will be able to process 160,000 tonnes of waste per year.

1.1 Identification of the Proponents

The Proponents for the Environmental Screening Report (ESR) are The Regional Municipality of Durham (Durham Region) and The Regional Municipality of York (York Region), collectively referred to as the Regions. Covanta Durham York Renewable Energy Limited Partnership, as the design-build-operate-maintain contractor for the DYEC, is also identified in the ECA as a partner. Both Regions have responsibility for the final disposal of residential waste generated within their respective regional borders. The Regions also maintain source separation programs for blue box materials, organic materials including leaf and yard waste, household hazardous wastes, batteries, electronics, tires, and bulky items such as appliances and porcelain fixtures.

1.2 Overview of the DYEC

The DYEC provides a safe and environmentally sustainable method of waste disposal through thermal treatment and generates electrical power through a steam-turbine generator. The net electricity produced by the DYEC is sent to the local grid and distributed by Hydro One Inc. Additionally, the DYEC recovers ferrous and non-ferrous metals from the ash residue stream for recycling.

The DYEC includes two mass-burn thermal treatment units, each with a nominal nameplate capacity of 218 tonnes per day (Maximum Continuous Rating (MCR)). The boilers are designed to process solid waste with a High Heat Value (HHV) of 11 MJ/kg to 15 MJ/kg. Therefore, the actual waste processing rates will vary based on the waste heating value that is determined by the composition of waste being processed. The two thermal treatment units includes a combustion grate, a boiler, and an Air Pollution Control (APC) system. The two units can process waste independent from each other; either one or both can operate to process waste.

After all diversion efforts have been employed, municipal solid waste (MSW) from residential sources is received, at the DYEC within an enclosed tipping building and discharged into the waste storage pit or the tipping floor for inspection. One truck per hour is discharged on the tipping floor for a manual visual inspection. Waste is mixed or “fluffed” by a grapple crane in the pit to achieve optimal combustion through consistent mix and moisture content of wastes prior to being placed in the feed chute hoppers. Once fed into the feed chute, the waste drops onto a feed table and is charged into the furnace by a hydraulic ram feeder that slides across the feed table. The waste then travels across a Martin reverse reciprocating stoker-grate where combustion occurs. The grate runs are independently and variably controlled to thoroughly mix and agitate the waste to promote complete combustion over a range of waste characteristics and moisture content.

Natural gas is used as auxiliary fuel during start-up and shutdown and to ensure good combustion practices for meeting the DYEC ECA limits. Bottom ash is collected in hoppers and quenched in the ash discharger before being discharged onto a vibrating conveyor bound for the residue building where the bottom ash, ferrous and non-ferrous metals are separated (see Figure 2).

1.3 Study Area

The DYEC is located in the Municipality of Clarington which was selected as the preferred site during the 2009 Environmental Assessment (EA) process. Identified as the Clarington 01 site in the 2009 EA, the DYEC property consists of approximately 12.1 hectares (ha) of land located in the Clarington Energy Business Park. The land is owned by Durham Region.

Local Natural Environment

The study area is bounded by the Northshore line of Lake Ontario to the south and Highway 401/418 exchange to the north. The Site is approximately 12.1 hectares in area and is located in the Clarington Energy Business Park. The closest natural area to the Site is the locally significant Tooley Creek Coastal Wetland, 0.87 km from the Site and 2.2 km from Darlington Provincial Park. The closest hazard land to the Site is at a distance of 100 m. The haul route for the Site is 0.9 km from the coastal wetland and 1.3 km from Darlington Provincial Park, with the majority of natural areas falling farther than 2 km from the haul route.

The Site is composed of four fields with a central access road originating from Osborne Road. A total of 515 m of hedgerow is present along the boundaries of the Site and between the fields. These consist of a variety of common tree and shrub species representative of agricultural areas. The area surrounding the Site consisted of fallow and cultivated agricultural fields, which contained hedgerows with similar tree and shrub species. The Site contains no permanent watercourses and few documented species of conservation concern.

The lands northeast and west of the Site are undeveloped and are currently used for agricultural purposes. However, the land located west of the facility has been designated as the future site for the Anerobic Digestion (AD)and Mixed Waste Pre-Sort (MWPS) Facility.

The management of the natural environment features within Durham and York Regions are primarily under the jurisdiction of the Ministry of Natural Resources and five conservation authorities – Central Lake Ontario, Toronto and Region, Ganaraska Region, Lake Simcoe Region, and the Kawartha Region Conservation Authorities.

Social/Land Use

The Courtice Water Pollution Control Plant is located directly south, the East Penn Canada Battery Plant is located directly north, and Ontario Power Generation (OPG) is located directly east of the DYEC lands. Additionally, Copart Toronto is located 500 metres to the south and Darlington Nuclear Generating Station is located approximately 1.8 kilometres to the east. The nearest major intersection is Highway 401 and Courtice Road, which is approximately 1.7 kilometres from the DYEC. The construction of the Highway 407 East extension interchange with Highway 401 north of the site was completed in December 2019.

The nearest residential area to the DYEC is designated as future urban residential and is located 3.2 kilometres from the DYEC. At the time of the 2009 EA there were two residences within one kilometre of the DYEC. In 2019, only one residence remains located east of the DYEC, east of the Copart auto auction site.

Figure 1: DYEC and Surrounding Area

Google Earth Image © 2021 Terrametrics

2. Environmental Screening Process

The Environmental Screening Process (Screening) is a proponent driven, self-assessment process whereby proponents are responsible for determining if the process applies to the project. Part III of the Waste Management Projects Regulation (Ontario Regulation 101/07), enacted under the Environmental Assessment Act, identifies the waste management projects eligible to undertake a Screening. The requirements for completing a Screening are described in a detailed, step-by-step guide found in Part B of the MECP document: “Guide to Environmental Assessment Requirements for Waste Management Projects” (Guide). In accordance with the Guide, a screening criteria checklist was completed for the additional requested 20,000 tonnes per year capacity increase for the DYEC.

As part of the Screening every proponent must apply the screening criteria to a project to identify potential environmental effects. Proponents must consider potential environmental effects on groundwater and surface water, land, air, and noise, natural environment, and impact to resources as well as socio-economic, heritage and cultural effects and effects on Indigenous communities.

The proponent must also conduct the Screening with sufficient consultation. The Guide provides a 14-step process for completing an environmental screening. A copy of the Guide is available from the MECP website: https://www.ontario.ca/page/guide-environmental-assessment-requirements-waste-management-projects#section-3. The prepared screening report will be reviewed by government agencies and interested persons, including Indigenous communities. The Environmental Screening Process is outlined below:

1. Publish a Notice of Commencement of a Screening Project
2. Identify the problem or opportunity and provide a project description
3. Apply the screening criteria checklist to identify potential environmental effects
4. Describe potential environmental effects and concerns/issues to be addressed

5. Consult with interested persons to identify any issues or concerns
6. Conduct required studies and assessment of potential environmental effects
7. Develop impact management measures (including mitigation where required)
8. Consult with interested persons to identify any issues or concerns
9. Significant net effects and resolution of concerns
10. Conduct additional studies/assessment of effects and mitigation measures (where required)
11. Prepare an Environmental Screening Report
12. Publish a Notice of Completion of Environmental Screening Report
13. Elevation requests (if applicable)
14. Submission of Statement of Completion to the MECP

2.1 Purpose of the Environmental Screening Report

The purpose of the Environmental Screening Report (ESR) is to document steps 1 to 11 as described above. The ESR incorporates all questions, comments and suggestions received during the Screening up to the issuance of Notice of Completion, step 12, which marks the commencement of the 60-day mandatory review period.

2.2 Study Timeframe

Since the requested capacity increase to 160,000 tonnes per year does not require any construction or alterations to the building footprint, the ESR evaluates the potential environmental effects only during the operational phase of the DYEC.

2.3 Report Organization

The ESR documents and summarizes the Screening process. The table below indicates where each step of the process is documented in the report.

Table 1: Environmental Screening Process Index

Environmental Screening Process Requirement	Section of ESR where addressed
Notice of Commencement (Step 1)	Appendix F
Problem and Opportunity Statement and Project Description (Step 2)	Section 3
Environmental Screening Checklist (Step 3)	Section 4, Appendix A
Potential Environmental Effects (Step 4)	Section 4
Consultation with interested agencies, stakeholders, Indigenous communities (Step 5)	Appendix G
Conduct studies and assessment of potential environmental effects (Step 6)	Section 5
Develop impact management measures (Step 7)	Section 5
Additional consultation with interested agencies, stakeholders, Indigenous communities (Step 8)	Appendix G
Significant net effects discussion (Step 9)	Section 6
Additional studies and assessment of effects (Step 10)	Section 3 (Air and Noise) Section 4 (Air and Noise) Section 5 (Air)
Prepare Environmental Screening Report (Step 11)	All sections and Appendices of this report
Publish Notice of Completion of ESR, Elevation Request and Statement of Completion submission (Steps 12-14)	Section 8

3. The Problem to be Addressed

The Regional Municipality of Durham and the Regional Municipality of York the Regions are requesting to increase the permitted annual waste processing capacity of the DYEC by 20,000 tonnes per year, from 140,000 tonnes to 160,000 tonnes. This additional capacity is needed to accommodate population growth within the two Regions while continuing to maintain and increase diversion rates. In response to the ongoing COVID-19 pandemic, the Regional Municipality of Durham and Regional Municipality of York received a temporary Emergency Amendment to the ECA at the DYEC to process an additional 20,000 tonnes of garbage, for an annual total of 160,000 tonnes of garbage until December 31, 2020. With a significant number of residents remaining at home, the Regions are continuing to see increases in the amount of garbage being placed at the curb. As more businesses re-evaluate their working from home models in a fundamental way, increased curbside waste is anticipated. The proposed capacity increase will also allow the DYEC to operate more efficiently and produce more energy with no modifications or additions to existing infrastructure. If approved, the additional capacity will further reduce the reliance on alternate waste disposal facilities outside the Regions' borders.

The DYEC is subject to regulatory approvals under the Environmental Assessment Act (the EA Notice of Approval) and the Environmental Protection Act (the Environmental Compliance Approval, or ECA). The EA Notice of Approval was issued in November 2010 followed by the ECA in June 2011. Facility construction commenced after the ECA was received and the facility achieved commercial operation in late January 2016.

The DYEC is designed to accept materials with a HHV of 11.0 MJ/kg to 15.0 MJ/kg and produce a Gross Electrical Output between 712 and 1030 kWh/tonne. The DYEC is capable of processing 160,000 tonnes of waste per year with the existing equipment and is currently being underutilized despite demand for additional waste disposal capacity for residential waste within the Regions.

3.1 Problem Background

Nearly a decade ago, the EA and the ECA for the DYEC set the processing capacity to 140,000 tonnes per year. This capacity was divided between the Regions with Durham Region having 110,000 tonnes per year and York Region having 30,000 tonnes per year. Since then, population growth in Durham Region has led to garbage tonnages exceeding 110,000 tonnes per year, while York Region has relied more heavily on other energy from waste disposal facilities. As a result of increasing waste generation, some residential garbage is being by-passed to other disposal facilities including landfill. As an interim remedy to the shortage of processing capacity, an amendment to the current ECA for an additional 20,000 tonnes of processing capacity is being pursued by the Regions. As constructed, the DYEC can process up to 160,000 tonnes per year (nameplate capacity) without any modifications to infrastructure, processes, or services.

In 2018, 2019 and 2020 the Regions had to by-pass residential garbage to landfill and to other energy from waste facilities. By-passing otherwise processible residential garbage from the DYEC is not a sustainable or economical long-term solution with increasing cost risks associated with long-term landfill capacity, availability, and price. As well, by-passed garbage to landfill results in overall greater greenhouse gas (GHG) emissions being produced and does not work towards the Regions climate mitigation targets.

3.2 Current Waste Diversion Programs

3.2.1 Durham Region

Durham Region manages curbside collection of recyclables, organics, leaf and yard waste, residual and bulky garbage, metal goods, waste electrical and electronic equipment, battery, and porcelain collection in six of eight area municipalities: Town of Ajax, Township of Brock, Municipality of Clarington, City of Pickering, Township of Scugog and Township of Uxbridge. The Region only collects blue box recycling in the Town of Whitby and City of Oshawa, but partners with both local municipalities to ensure uniform collection programs Region-wide. Almost 400 multi-residential buildings and townhouses are also serviced by Durham Region's weekly waste collection programs. Onsite collection services offered in the buildings include recyclables, battery, and e-waste collection.

In addition to curbside collection services, the Region, in partnership with local municipalities, normally offers local waste reduction initiatives such as:

- Spring compost events; one in each local municipality
- Special Waste Electrical and Electronic Equipment drop-off events and household hazardous waste drop-off events
- Reuse drop-off events held from March to October, in partnership with local charities
- However, due to the ongoing COVID-19 pandemic, many events have been cancelled during 2020 and 2021

Following collection, the processing of recyclables, organics, yard waste and garbage is overseen by Durham Region. This is accomplished through a combination of blue box processing by a third party at the Durham Region's Material Recovery Facility, external contracts for composting organics and yard waste at third party facilities and energy-from-waste recovery for residual waste.

Durham Region provides a system of drop-off facilities for residential use. These facilities include various transfer stations equipped to receive, process and ship electronics, tires, household hazardous materials, metals, and blue box recyclables. Wastes that cannot be diverted are disposed as residual garbage. The Region also owns and operate a designated household hazardous waste facility and leases another for public drop-off.

Durham Region submits an annual datacall to the province through the Resource Productivity and Recovery Authority (RPRA) to receive funding from producers to assist with costs of operating the Blue Box Program. The datacall is the source of data used to confirm municipal diversion rates across the province.

RPRA Annual Waste Diversion

2016 – 1st for Urban Regional Municipalities (55%)

2017 – 1st for Urban Regional Municipalities, 3rd Overall in the Province (65%*)

2018 – 1st for Urban Regional Municipalities, 3rd (tied) Overall in the Province (64%)

2019 – 1st for Urban Regional Municipalities, 3rd Overall in the Province (66%)

2020 – 63%** Pending Verification

* RPRA modified the diversion calculation starting in 2017 to reflect energy recovery

3.2.2 York Region

York Region provides waste management services to nine cities and towns: Towns of Aurora, East Gwillimbury, Georgina, Newmarket, Richmond Hill, Whitchurch-Stouffville, Township of King and Cities of Markham and Vaughan. As the upper-tier municipality, York Region provides waste processing and disposal while the lower-tier cities and towns provide waste collection services.

The comprehensive waste reduction, reuse and recycling initiatives provided jointly by York Region and its cities and towns include curbside collection for residual waste, blue box recycling, source separated organics, leaf, and yard waste, white goods, and bulky items.

York Region provides a network of drop-off facilities for residential use. These facilities include various Household Hazardous Waste and/or recycling depots and two Community Environmental Centres to provide convenient locations for residents and small businesses to drop off a variety of diversion materials. Accepted items vary by location and include bulky recyclables, construction and demolition materials, electronics, household hazardous materials, metals, and blue box recyclables. Non-hazardous wastes that cannot be diverted are disposed as residual garbage. York Region uses three energy-from-waste disposal options for residual waste: Covanta Niagara in New York State, Emerald Energy in Brampton and the DYEC in the Municipality of Clarington.

York Region also participates in the annual datacall administered by RPRA. York Region is larger than Durham Region and is classified as a Large Urban Municipality.

RPRA Annual Waste Diversion

2016 – 1st Overall in Province (66%)

2017 – 1st for Large Urban Municipalities, 2nd Overall in Province (68%*)

2018 – 1st for Large Urban Municipalities (68*%)

2019 – 1st for Large Urban Municipalities, (66%*)

2020 – 66% Pending Verification

* RPRA modified the diversion calculation staring in 2017 to reflect energy recovery

3.3 Problem / Opportunity Statement

The ECA and EA Notice of Approval for the DYEC both limit the annual tonnes processed to 140,000 tonnes per year. As a result of these approval limits on DYEC processing capacity, the Regions are required to by-pass waste to other disposal facilities that could have otherwise been processed at the DYEC (Table 2). With growth continuing in Durham and York Regions, additional disposal capacity is needed to meet current system demands and to account for long term growth. The table below shows the DYEC by-pass tonnages from the previous three years and projections for 2026 and 2029. The tonnage projections were presented to Durham Regional Council on February 27, 2019.

Table 2: Durham By-pass Waste Tonnes

Year	Tonnes By-passed to Other EFW Facilities	Tonnes By-passed to Landfill	Tonnes By-passed to Waste Composition Study	Total Tonnes By-passed
2017	10,170	3,487	0	13,657
2018	370	6,280	3,657	10,307
2019	0	13,675	0	13,675

Year	Tonnes By-passed to Other EFW Facilities	Tonnes By-passed to Landfill	Tonnes By-passed to Waste Composition Study	Total Tonnes By-passed
2020	0	15,409	0	15,409
2026 projected	*	*	0	33,850**
2029 projected	*	*	0	45,766**

* Covanta contracts disposal of by-pass waste to landfill or other EFW facilities based on available capacity and cost for disposal
**By-pass tonnage projections assume Durham's planned Anaerobic Digestion and waste pre-sort is not operational; this project is discussed in Section 3.4.

If the annual approval limit of 140,000 tonnes per year was increased, some of the additional demand for disposal capacity could be satisfied using the existing equipment at the DYEC. The maximum annual waste tonnage that an energy-from-waste facility can process when operating at full design load varies from year to year and is influenced by several factors. This maximum annual tonnage can be calculated using the following equation:

$$T_{max} = \frac{365 \times Q \times A}{HHV}$$

Where:

T_{max} = The maximum waste tonnage that can be processed in one year if the boilers operate at 100per cent design load whenever they are operating.

Q = The design rate of fuel energy input. For the DYEC, this value is equal to 5,668,000 megajoules per day (MJ/d) with both boilers operating at full design load.

HHV = The average Higher Heating Value of the fuel. This parameter measures the average energy content per unit of fuel mass and varies over time based on waste composition. The DYEC is designed to accept fuel with HHV ranging from 11 to 15 megajoules per kilogram (MJ/kg) which is equivalent to 11,000 to 15,000 megajoules per tonne (MJ/T).

A = The number of hours that the boilers are available to process waste expressed as a percentage of total hours in a year, referred to “boiler availability”

For example, in a year in which the DYEC achieves boiler availability of 94 per cent using fuel with an average HHV of 12,000 MJ/tonne, the maximum number of tonnes that could be processed with the boilers operating at full design load would be:

$$\frac{(365\ days/year) \times (5{,}668{,}000\ MJ/day) \times 94\%}{(12{,}000\ MJ/tonne)} = 162{,}058\ tonnes/year$$

However, if the HHV increases to 14,000 MJ/tonne while boiler availability is reduced to 90 per cent, the maximum number of tonnes that could be processed in one year would be:

$$\frac{(365\ days/year) \times (5{,}668{,}000\ MJ/day) \times 90\%}{(14{,}000\ MJ/tonne)} = 132{,}996\ tonnes/year$$

During the original Environmental Assessment, the DYEC’s nominal annual processing capacity was set at 140,000 tonnes per year based on expected normal HHV values and conservative boiler availability estimates to allow for planned and unplanned facility maintenance. However, as illustrated by the examples above, it is possible for the facility to process more than 140,000 tonnes per year in years of higher boiler availability or lower average HHV. The proposed amendment to the maximum annual processing limit would provide the Regions with the flexibility to use this additional processing capacity when available. This in turn would reduce the quantity of waste requiring alternate disposal at facilities outside the Regions’ borders. On April 22, 2020 due to the COVID-19 pandemic, the DYEC was issued an emergency approval for an ECA amendment, temporarily increasing the waste processing limit from 140,000 up to 160,000 tonnes per year to accommodate the additional curbside waste generated by residents working from home. The total amount of waste attributed to the DYEC including by-pass waste for 2020 was 160,750 tonnes. This includes 145,343 tonnes shipped to and processed at the DYEC and 15,409 by-passed to landfills.

The requested processing limit amendment provides an opportunity to achieve significant environmental and social benefits using existing infrastructure, such as:

- Reduced reliance on disposal capacity outside the Regions' borders and subject to market fluctuations for price
- Reduced highway traffic and GHG emissions associated with long-haul transportation to remote disposal sites
- Reduced methane emissions from landfill disposal
- Increased energy recovery and displacement of fossil fuel electricity generation
- Reduced cost to Regional taxpayers

Through the Screening process, the Regions will review studies and where necessary, update modelling completed during the original EA or prepare new models where required to demonstrate that these benefits can be realized with no unacceptable environmental impacts. Several of the studies undertaken during the original process included consideration of impacts of a larger facility, with a processing capacity of up to 400,000 tonnes per year which remains a conservative estimate for the facility operating under the requested capacity increase to 160,000 tonnes per year. The Regions have completed a comprehensive review of all the original technical studies in 2019. The reviews confirmed the original calculations and conclusions are still valid and, in some cases, the current operation is more efficient than what was initially projected in 2009. Additionally, it was determined that the Region undertake updating the studies and modeling for noise and air emissions. Results from the updated modelling are discussed in sections below.

3.4 Long Term Waste Management Solutions

3.4.1 Durham Region

Durham Region (Region) developed an initial Long-Term Waste Management Strategy Plan (LTWMSP) in 1999 to cover the twenty years to 2020. Durham Region is one of the fastest growing regions in Canada. By 2041, Durham Region's population is expected to almost double, increasing to 1.2 million people. The Region is now undertaking the development of the next Long-Term Waste Management Plan (Waste Plan) for the next twenty years (2021 to 2040). As part of the phase one development during 2020 for the Waste Plan, the Region undertook consultation with stakeholders to get input on the guiding principles, vision and objectives that will guide the Region's waste management programs and services over the planning period. Durham Region Council approved the guiding principles, vision, and objectives at the January 27, 2021 meeting. A copy of the Waste Plan can be viewed here.

The guiding principles are as follows:

1. Emphasize rethink, reduce, and reuse principles as the first steps in reducing waste generation.
2. Deliver cost effective waste management services to a rapidly growing and diverse population.
3. Work with producers and importers of designated products and packaging to implement "Extended Producer Responsibility" and adjust Region waste programs as required.
4. Apply innovative approaches to Region waste streams to manage them as resources in a circular economy.
5. Demonstrate leadership in sustainability to address the climate crisis by reducing greenhouse gas emissions from waste management activities.

The Region's vision is, together, with our residents, we will reduce the amount of waste we create and manage the generated waste as a resource. We will build an innovative system, balancing financial needs and environmental sustainability.

To execute the vision, the following objectives were established:

1. Engage with residents to build an understanding and awareness of the 5Rs (Rethink, Reduce, Reuse, Recycle, Recover) and the Region's waste management programs and services.
2. Reduce the quantity of waste we create.

3. Increase diversion of waste from disposal and support the Circular Economy.
4. Support the Region's greenhouse gas reduction and climate change mitigation efforts.
5. Protect or improve water, land, and air quality in Durham Region.

Phase two of development, occurring during 2021, is consulting on the draft targets and actions to achieve the objectives. Delivery of a draft Waste Plan as well as the 1st five-year action plan is anticipated for Council approval in early 2022.

As part of developing the next Waste Plan, the Region is focusing on maximizing the diversion of materials from waste and recovering waste as resources to optimize its existing and planned disposal and processing infrastructure. This includes long-term efforts to manage waste within our municipal borders. To achieve this Durham Region is pursuing the construction of a Mixed Waste Pre-sort and Anaerobic Digestion (AD) facility. In June 2018, Council (Report # 2018-COW-146) approved a Mixed Waste Pre-sort and AD facility as the preferred technologies for the Region's long-term organics management strategy. In June 2019, Council approved report 2019-COW-17 that directed the Region to proceed with the Mixed Waste Pre-sort facility and AD facility utilizing wet anaerobic digestion under a design, build, operate and maintain (DBOM) service delivery approach.

On May 27, 2020, Council (Report # 2020-WR-1) received for information an update on the evaluation of siting for the project. Council was advised that the Mixed Waste Pre-sort and Anaerobic Digestion Facility Siting Report was published and that a Public Information Centre was held on February 27, 2020. As a result of the analysis of the siting options and public consultation, the South Clarington Location at 383 Courtice Road was identified as the preferred location for the AD facility. On August 20, 2020, the Region issued RFPQ-1062-2020 for Mixed Waste Pre-sort and Wet Anaerobic Digestion Processing Facility that closed on December 1, 2020.

The proposed AD facility operations will remove the organic fraction of waste that was incorrectly sorted and from multi-residential buildings which are not currently being captured by the Durham Region Green Bin program for processing in an anaerobic digestor. The AD facility will not replace the current Green Bin program. Additionally, Durham Region intends to recover recyclables such as metals, and remove non-combustible materials from the waste. This further separation will reduce the amount of waste that will be sent for disposal at the DYEC from Durham Region. However, the requested processing capacity is still needed to accommodate the projected population growth in the Region.

The procurement process continues to be ongoing, with staff returning to Council for approval at critical milestones within the process. It is anticipated that the AD facility will be operational in 2024. Once the AD facility is operational, staff will need to determine the full impact that separation of additional organics, metals and non-combustibles will have on DYEC processing capacity. It is anticipated that removing additional materials from the waste upstream of the DYEC, will delay the need for further DYEC expansion. The latest waste diversion report can be viewed here.

3.4.2 York Region

York Region's long-term waste management master plan (SM4RT Living Plan) approved in September 2013, was originally developed with a 25 to 40 year time horizon to extend from 2039 to 2054. This plan established the business case for expanding the focus of policy and programming, from beyond diversion to waste prevention. York Region was the first Ontario municipality to move in this direction; in the last five years, the province has also made this shift, along with other communities. As part of regular update cycles, York completed an update to its waste management master plan in 2020 (SM4RT Living Plan 2020 Update) setting the stage for waste management as far out as 2059 timeframe while outlining actions for the next five years aspiring to ensure nothing goes to waste. The updated plan continues to focus efforts on waste prevention and reuse – expanding and refining successful community programs such as curbside giveaway days, textile recycling, repair cafes, lending libraries and food waste reduction and initiating programs to address single use items and support community groups in developing new circular economy programming. These efforts are aimed at reaching the Region's waste reduction targets by moving the Region towards a circular economy. York's 2031 aspirational targets aim to reduce the curbside residual waste generation rate by 20 per cent and the curbside organics generation rate by 15 per cent below the 2014 baseline, focusing on the two largest curbside streams, recognizing that the Blue Box program will transition in the next five years.

The Region continues to be committed to maximizing diversion through continuous improvement of the performance of curbside programs such as green bin, yard waste and blue box and community depot services. Improving diversion in multi-residential properties is a priority over the next five years. Tracking and reporting on waste generation rates and diversion rate helps understand long term waste trends and progress towards circularity. An annual report is submitted to the MECP each year to satisfy the DYEC EA condition for diversion reporting. The latest waste diversion report can be viewed here.

Long term organics and residual waste processing capacity will be secured through new contracts to be tendered in 2021/2022

The SM4RT Living Plan 2020 Update by York examined long term capacity needs for organics processing and residual waste disposal to service the Region's growing population. Earlier work identified anaerobic digestion as a preferred technology over aerobic composting for source separated organic waste (SSO) from the Region's green bin program. The Long Term SSO Processing Plan, included in the master plan, looked at the cost/benefit analysis of a range of location and ownership options for anaerobic digestion facilities supporting York's case to issue an RFP in 2021 to provide anaerobic digestion capacity for processing the Region's SSO at privately owned facilities in a cost effective and environmentally sustainable manner for the next 25 years while accounting for greenhouse gas emissions from all phases of service delivery. The RFP was issued on June 7, 2021 and will close October 29, 2021. Transition to anaerobic digestion technology is expected to reduce the Region's greenhouse gas emissions by up to 15,000 tonnes per year relative to existing contracts.

The Residual Waste Processing Plan, also part of the master plan, included an analysis of the projected tonnage of residual waste out to 2050 and identified a strategy for ensuring sufficient capacity to meet anticipated need given a number of York Region's current residual waste contracts expire between 2020-2028. The plan recommendation endorsed by York Regional Council in 2020, to secure up to 120,000 tonnes of annual EFW processing capacity from one or more privately owned facilities from September 2023 through January 2046, will serve as an interim bridge until such time as the Region has enough tonnage along with Durham, to undertake expansion of the DYEC. Several factors led to this decision, including expected reduction in residual tonnage due to the transition of the blue box program to extended producer responsibility; the need to maintain sufficient landfill capacity as a contingency and to manage non-recyclable material not suited for EFW; and plans by Durham Region for a pre-sort facility that are expected to further increase diversion from the DYEC. York staff are working on an RFP for securing the EFW capacity, to be released ahead of existing EFW contract expiry of September 2023, making use of the fourth "R" (recovery) as it relates to energy recovery, for those materials that cannot be managed by other means, only after placing highest priority on the first three "Rs" (reduction, reuse, and recycling) in accordance with the Region's "4 Rs" waste management hierarchy.

SM4RT Living Plan recognizes and supports partnerships as key elements of transition to circular economy

The Plan recognizes that successful social and environmental change requires support from many players and outlines some of the many success stories of community champions who are leading the way in transforming their services to adopt waste prevention principles. Action areas under the plan's objectives spark change across the Region through leadership, support for community-led action and advocacy to other levels of government. An example of one action area includes establishing a program that will provide funding to support programs within York Region that align with SM4RT Living. This $100,000 Circular Economy Initiatives Fund was launched in February 2021, with the first round of projects slated to begin in August 2021. Successful projects are chosen from the pool of applicants based on established criteria to support areas of waste prevention, reduction, reuse, repair, and recycling.

With the anticipated 160,000 tonnes per year processing capacity increase at the DYEC, the Anaerobic Digestion and Mixed Waste Pre-sort facility and the successful and effective implementation of further diversion efforts by both Durham Region and York Region, the DYEC is not expected to require additional disposal capacity beyond 160,000 tonnes per year until after 2035. Note: should any of the current factors being considered change- the Regions projected long term waste processing capacity needs will change accordingly.

3.5 Screening Criteria and Potential Environmental Effects

As part of the Screening, the MECP requires the completion of an Environmental Screening Checklist. The checklist is an evaluation of potential environmental effects that could result from the project. The checklist was completed to evaluate the potential effects from increasing the annual capacity of the DYEC by 20,000 tonnes to a maximum of 160,000 tonnes per year. The draft checklist was presented at the first Public Information Centre for the project and the completed checklist is attached as **Appendix A**. The checklist identified two areas where negative potential effects could exist as a result of the change in the facility.

- Air and Noise
- Socio Economic (proximity to airport or heliport)

Prior to the construction of the DYEC, an individual EA was completed to evaluate the potential environmental effects of the facility and determine mitigating actions for those effects. The 2009 EA report and associated technical studies can be viewed on the DYEC website under the Facility Development Document section here.

Numerous Technical Study Reports, referenced in later sections of this report, were completed to evaluate potential effects on the natural environment, socio-cultural conditions of the community and air, water, noise, or vibration impacts. The 2009 EA was completed for two tonnage scenarios, the approved 140,000 tonnes per year and a proposed future expansion to 400,000 tonnes per year.

As part of the EA and ECA approval process a Compliance Monitoring Program was also established by the Regions in 2011 and approved by the MECP. The program outlines how the Regions comply with the EA Notice of Approval conditions and other commitments made in the EA study document. Annual compliance monitoring reports are submitted to the Director of the MECP Environmental Approvals Branch to satisfy condition 4 of the EA. There are several monitoring plans currently being adhered to at the DYEC. These plans include the groundwater surface water monitoring plan, soil monitoring plan, ambient air monitoring plan, emissions monitoring plan, noise monitoring plan, odour management and mitigation plan, community communications plan, waste diversion program monitoring plan, third party audit plan and spill contingency and emergency response plan. The monitoring plans can be viewed under the Environmental Monitoring section of the DYEC website here.

As part of this Screening, the 2009 Technical Study Reports were reviewed to determine if the initial studies can be applied to the 160,000 tonnes per year scenario to identify potential concerns and determine if the monitoring and mitigation measures already in place at the DYEC facility are sufficient to mitigate any additional impacts from the 20,000 tonnes per year waste processing capacity increase. The report review included a summary of the initial findings, any mitigating efforts included as part of the initial design and construction of the facility and an evaluation of anticipated changes due to the additional 20,000 tonne per year capacity. As well, the DYEC has a robust Compliance Monitoring Program prepared and submitted to the MECP to satisfy Condition 4 of the Notice of Approval during the original EA process. Results of the monitoring program are consistent with findings of the 2009 Technical Study Reports. Reports detailing the Facility’s performance as it pertains to compliance with MECP standards have been submitted to the MECP on an annual basis since operation commenced. Annual reports including 2020 can be viewed here.

The rationale for the checklist results is presented below.

3.6 Groundwater and Surface Water

Review of the following 2009 studies and reports that were undertaken during the initial Environmental Assessment continue to demonstrate, through the established monitoring program, that there are no anticipated adverse effects or additional impacts to groundwater or surface water that will result from the 20,000 tonnes per year capacity increase as outlined in the screening criteria checklist:

- Surface Water and Groundwater Technical Study Report (Jacques Whitford, 2009, Appendix C-2)
- Natural Environment Assessment (Jacques Whitford, 2009, Appendix C-7)
- Geotechnical Investigation Technical Study Report (Jacques Whitford, 2009, Appendix C-4)
- Environmental Compliance Approval Application Submission Stormwater (Golder Associates, 2011)

The following legislation, as amended, was reviewed, and it was determined that the DYEC continues to be compliant as there have been no legislative changes which would impact the groundwater and surface water monitoring program.

- Ontario Drinking Water Standards (ODWS) (2006)
- Provincial Water Quality Objectives (PWQO) (1994)
- Canadian Water Quality Guidelines (CWQG) (2011)
- Environmental Compliance Approval Application for Stormwater (Golder Associates, 2011)

3.6.1 Surface Water

The Surface Water monitoring program was developed mainly to monitor impacts from the construction phase of the DYEC to the nearby Tooley Creek, to which the surface water is ultimately conveyed.

The general slope of the site is from northeast to southwest. The grading of the Site directs runoff towards two Stormwater Management Ponds (SWM) east and west, located at the southeastern and southwestern quadrants of the Site. The Site runoff is conveyed from northeast to southwest via overland flow or through two constructed swales that direct runoff towards the two SWM ponds along the southern perimeter.

Stormwater discharges from these SWM ponds and are controlled by float-pumps in the aft bay of both ponds, to keep water levels at approximately 1 meter below the invert of the pipe outlets.

Discharge from the pond is controlled by the size of the outlet pipes. Both ponds discharge from an inverted (reverse slope) pipe into an outlet structure. In the outlet structure the water flows through a perforated riser pipe into an outlet pipe before discharging to the drainage swale. The ponds discharge during a precipitation event that causes the water levels in the ponds to rise above the top elevation of the inverted discharge pipes. To date there have been no major storm events that have resulted in uncontrolled discharge.

The Site outfall disperses flow through a grassy, overland flow route leading to the receiving swale south of the Site, and immediately north of the CN Rail ditch. This common receiving swale also conveys surface water from properties located immediately east of the DYEC located on the east side of Osborne Road. Surface water flow from this swale is conveyed under Courtice Road via corrugated steel pipe and discharges into Tooley Creek approximately 400 metre downstream and west of the Courtice Road crossing. (Golder Associates., 2013)

The Site is located within the Tooley Creek watershed which in its lower reaches supports cold water fisheries. Tooley Creek is a small meandering watercourse receiving most of its flow from agricultural and rural runoff and groundwater inputs in its northern reaches. (Jacques Whitford Ltd., 2009).

The Tooley Creek Watershed is fully contained within the Municipality of Clarington and has an area of 1040 ha. The headwaters originate in the Maple Grove Wetland Complex north of Highway 2. The definable stream length of the creek is 26 km (AECOM Canada Ltd., 2009).

The increase in capacity to 160,000 tonnes per year will not direct additional surface water into the stormwater management ponds that currently exist onsite. To process the additional 20,000 tonnes per year of waste, no additional construction is required to the facility. Also, there will be no changes to the drainage area or construction to add additional impervious surfaces. Therefore, there are no concerns with additional on-site surface water run-off into the existing stormwater ponds which discharge into the Tooley Creek wetland.

In 2011, Sigma Engineering analyzed the site design for the stormwater based on the 2009 Surface Water and Groundwater Assessment Technical Study Report, and stated the original design included a conservative assumption that the 100-year storm is contained in the stormwater pond design and that the ponds are sized to meet governing erosion and sediment control requirements. The stormwater management design is currently oversized, as it was designed to accommodate the additional runoff associated with infrastructure to process 400,000 tonnes per year. Sigma Engineering reviewed and revised the original analysis completed for the Surface Water and Groundwater Assessment Technical Study Report, to address design changes that occurred after the initial Environmental Assessment was completed in 2009. The revised report was submitted to the MECP as part of the ECA application and maintains the 100-year stormwater capacity along with erosion and sediment control requirements.

The initial EA proposed one on-site stormwater management pond, however, with the development of the Clarington Energy Business Park, stormwater plan modifications were made to the site stormwater design and a second stormwater management pond was constructed. The drainage area contributing to the stormwater ponds was reduced from 12.4 hectares to 10.1 hectares due to the construction of a new right-of-way along Energy Drive which has its own drainage system including a wider swale, providing more capacity to the onsite storage ponds. As a result of these off-site changes, the design provides a better level of stormwater management than what was proposed in the initial EA documents. Additionally, to ensure the SWM system including the ponds continue to function as designed, inspections are conducted annually along with annual spill training and weekly inspections. The most recent annual inspection, completed on November 20, 2020, encompasses visual inspection of the pond outlet structure overflow, pond inlet headwall, discharge points, collection system and general surrounding vegetation, seeps and leaks and visible pollution. There have been no complaints or reportable spills regarding the SWM system. No major issues were identified during the annual sewage inspection report, included in **Appendix B**

Based on the review of the initial EA, final design of the SWM and results on ongoing annual inspections, there will not be any significant negative effects to stormwater as a result of the 20,000 tonnes per year capacity increase.

3.6.2 Groundwater

Prior to the start of construction of the DYEC, the Regions in consultation with the MECP prepared and implemented a groundwater and surface water monitoring plan in accordance with EA Condition 20. The plan is designed to provide an understanding of both groundwater and surface water quality during the construction and operation phases of the DYEC and to ensure ongoing environmental management of the site.

Groundwater monitoring wells were established prior to facility operation at five locations on the DYEC property to evaluate water quality conditions. Monitoring wells are placed at each of the four corners of the site, as well as central to the site and represent water quality conditions of upgradient and downgradient water quality and for potential compromise of the waste storage pit. Groundwater monitoring results to date have continued to confirm the absence of any impacts to groundwater resulting from waste processing operations at the DYEC.

In 2020, the groundwater analytical results for the required parameters of analysis continue to satisfy their respective ODWS, with the exception of select salt-related parameters within one of the monitoring locations. As reported in the 2020 Annual Groundwater and Surface Water Monitoring Report, there is no indication that the elevated concentrations of chloride and sodium within the groundwater occur as a result of DYEC waste treatment operations. The elevated concentrations of chloride and sodium are interpreted to be attributed to the seasonal exfiltration of salt-impacted surface water from the East Stormwater Management Pond that is interpreted to migrate easier through the more permeable sandy silt. As the facility does not store or utilize large quantities of sodium or chloride in the waste processing, an evaluation of potential road salt application impacts within the groundwater was completed using the method proposed by Panno et al. (2005, 2006) to aid in determining the source. Based on the November 2020 groundwater quality results, the chloride/bromide (Cl/Br) ratios within the groundwater at several monitoring wells indicates that groundwater quality is alluding towards impacts from surface salt application on Energy Drive, Osbourne Road, and/or the on-site roadways/parking lots applied throughout the winter season. Concentrations of chloride and sodium within the groundwater at some of the monitoring locations have been increasing since 2014, which coincides with the construction of Energy Drive north and west of the Site, as well as on-Site roadways and parking lots.

The monitoring and mitigation plan currently in place are adequate to protect groundwater at a waste processing capacity of 160,000 tonnes per year. Groundwater monitoring results will not vary significantly as a result of the additional waste processing capacity of 160,000 tonnes per year. In addition, there will be no changes to the waste storage pit to accommodate the proposed increase, as the waste storage pit was sized to support the operations up to 250,000 tonnes per year. With no modification or construction planned for the waste storage pit, there will be no concerns with altering the integrity of the pit walls. The storage pit is a sealed concrete pit set 5.5 metres below grade which does not allow leachate from waste to come into contact with groundwater.

Several design features were incorporated into the DYEC to protect groundwater including:

- A zero-process water discharge facility.
    - Process wastewater equipment drains, sinks, and washdown is collected in various drains, sumps and trenches and is sent to the settling basin. This water cannot be discharged to the sanitary sewer and is used for internal processes. Pumped wastewater from this system is used as primary ash discharger makeup and refuse pit dust control. Intermittent and continuous blow down water, non-recoverable samples from the steam sample panel and reject water from the reverse osmosis system are also collected in the wastewater holding tank. From this tank the wastewater is pumped to the fly ash conditioning system and to the APC evaporative cooler.
- The waste storage pit is constructed using one-metre-thick concrete conforming to Canadian Standards Association A23.1 Class C-1 performance standards which applies to structurally reinforced concrete that is exposed to chlorides at a wide range of temperature conditions.
- The waste storage pit is lined on the exterior with a sodium bentonite waterproofing membrane to prevent leakage of water into or out of the pit.
- The waste storage pit was oversized during the original construction and has the capacity to store waste for up to four days when operating at a 250,000 tonnes per year waste processing rate.
- The waste storage pit construction includes PVC plastic water stops in the construction joints which form a continuous, watertight barrier that prevents the passage of fluid.
- Diesel tanks are of double-walled construction with a leak detection system and are checked daily per the DYEC Containment Protocol.

- A containment dyke surrounds the ammonia tank. Daily general inspection of the ammonia tank for leaks and annual calibrations of the ammonia alarm are safeguards that are included in the DYEC Containment Protocol.

In the unlikely event that a groundwater contamination issue was to develop at the site, the low rate of groundwater flow would limit the rate of contaminant dispersion and provide the Regions with sufficient time to undertake remediation. Borehole logs for the monitoring wells confirm that the facility is constructed on silty glacial till soils. Based on the hydraulic conductivities and the horizontal hydraulic gradients observed on the site, it is anticipated that surface water will infiltrate into the ground and travel at a low rate of approximately one metre per year or less.

Based on the review of the initial EA, groundwater impact mitigation design features of the DYEC and current groundwater monitoring results, no significant negative effects to groundwater will result from the 20,000 tonnes per year capacity increase.

3.7 Land

A review was completed of the following 2009 study that was undertaken during the initial Environmental Assessment, that shows there are no anticipated potential effects to land as outlined in the screening criteria checklist.

- The Social/Culture Assessment - Technical Study Report (Jacques Whitford, 2009, Appendix C-8)

The following social/cultural indicators were considered in the Technical Study to determine the site's compatibility with existing and proposed land uses:

- Potential for disruption to use and enjoyment of residential properties
- Potential for changes in community character
- Potential for disruption to use and enjoyment of public facilities and institutions
- Potential for disruption to use and enjoyment of cultural and recreational resources

- Compatibility with existing land use designations and proposed land use designations

At the time of the 2009 EA, the area surrounding the proposed location for the DYEC included the Courtice Water Pollution Control Plant immediately south of the site, auto auction sites immediately east and north of the site and agricultural lands west and further east of the site; on-farm residences were identified with the agricultural property use on the east and west sides of the site. An uninhabitable residence was also located northwest of the site. Further north of the site, north of Highway 401 are light industrial businesses and a few residences. The waterfront trail runs south and east of the site.

The DYEC is located on employment lands/business park as designated in both the Regional and Clarington Official Plans. The DYEC is located on a portion of land that has been designated the Clarington Energy Business Park (CEBP). The lands are zoned employment/light industrial areas which is compatible with the DYEC activity:

- Zoned: Business Park Map A2 Land Use Courtice Urban Area (June 2018)
- Clarington Zoning By-law 84-63 Sections 23C – Energy Park Light Industrial and 23D Energy Park General Industrial (2015)

The DYEC continues to be located in a designated employment/ light industrial area and the land use is consistent with the 2014 Provincial Policy Statement Part V Section (1). As no construction or alterations to the site are required for the increase in capacity to 160,000 tonnes per year, there will be no additional impacts to nearby properties.

The Technical Study concluded that the DYEC would have minimal overall net effects on residential properties, public facilities or institutions and is compatible with the development of the future Clarington Energy Business Park.

Since the 2009 Environmental Assessment Technical Studies were completed, the following changes occurred to the DYEC surrounding land use.

- The Ontario Power Generation completed construction of a training centre, the Darlington Energy Complex, located at the southeast corner of Energy Drive and Osbourne Road, directly east of the DYEC
- Manheim Oshawa Auctions is no longer located north of the DYEC
- The uninhabitable residence and the residence located west of the DYEC have been demolished
- Work has been completed on the new 418 interchange and connector highway between the 401 and 407 East extension
- East Penn Canada Battery Distribution Centre, located north of the DYEC at 1840, Energy Drive, Courtice, ON, is expected to complete construction and begin operation September 2021

Based on the review of the initial EA and current municipal zoning for the DYEC and surrounding property, no significant negative effects to land use will result from the 20,000 tonnes per year capacity increase.

3.8 Air and Noise

Review of the 2009 studies that were undertaken during the initial Environmental Assessment identified potential changes to air emissions and are outlined in the screening criteria checklist including:

- Air Quality Assessment - Technical Study Report (Jacques Whitford, 2009, Appendix C-1)
- Acoustic Assessment - Technical Study Report (Jacques Whitford, 2009, Appendix C-5)

Potential changes attributed to the larger quantities of air and combustion gases being released through the stack as the result of processing an additional 20,000 tonnes per year are possible. The following legislation, standards, and guidelines have been reviewed to determine the implications to the DYEC capacity increase, including:

- Guideline A-7: Air Pollution Control, Design and Operations Guidelines for Municipal Waste Thermal Treatment Facilities (2010)
- Ontario Regulation 419/05: Air Pollution - Local Air Quality (as amended)
- Canadian Ambient Air Quality Standards (CAAQS) (2013)
- Ontario's Ambient Air Quality Criteria (AAQC) (2012 as amended)
- Ontario Air Standards for Sulphur Dioxide (SO_2) (2018)
- MECP Publication NPC-300 Environmental Noise Guideline – Stationary and Transportation Sources (2013)
- Publication NPC-233 Information to be submitted for approval of stationary sources of sound (1995)
- Environmental Compliance Approval Application for Air and Noise (2011)

To assess the impacts of the change in emissions from the proposed capacity increase, an Air Quality Impact Assessment for a 160,000 tonnes per year scenario was prepared by Golder Associates Limited (2021) and compared to the 140,000 tonnes per year scenario as found in Attachment 3 of the 2011 Emission Summary and Dispersion Modelling Report dated March 2011.

- Air Quality Impact Assessment (Golder Associates Limited, 2021) **Appendix D**

As a result of consultation with the MECP on the screening checklist and the above noted technical memorandum, the MECP requested that an Air Quality Impact Assessment (AQIA) and an updated stand-alone Emission Summary and Dispersion Modelling (ESDM) be prepared as part of the Screening Process and ECA Application.

In a memo received by the Region dated October 22, 2019 from the MECP, the Regions were directed to address specific comments to provide clarity to the initial preliminary assessment through the preparation of a refined Air Quality Impact Assessment. In consultation with their modelling branch, the MECP requested that the model version and accompanying data being used should be updated to more recent versions, and that an ESDM report be prepared.

An Air Quality Impact Assessment (AQIA) for DYEC was undertaken by Golder in 2021 in support of the Environmental Screening Report. This assessment focused on predicting changes in the airborne concentrations of Indicator Compounds which include all contaminants identified in previous air quality reports (ie. the Emission Summary and Dispersion Modelling (ESDM) Report)(Golder, 2011), plus additional compounds for which source testing data is routinely completed (Ortech, 2021). The AQIA is discussed in Sections 4 and 5.

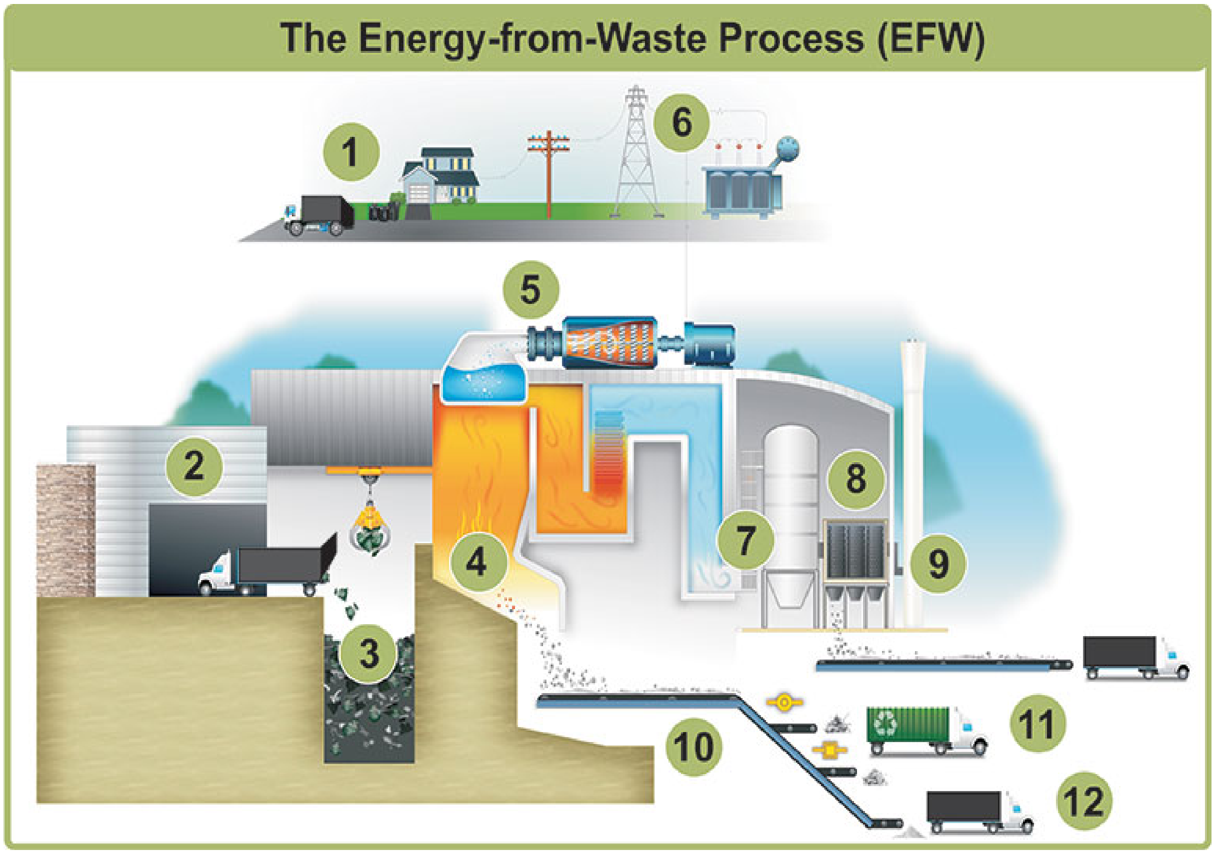
A stand-alone ESDM has been prepared by Golder Associates using an approved updated version of the modelling software as recommended by the MECP in support of the ECA Application. An ECA amendment application, including updated ESDM report, will be prepared following the completion and submission of the ESR to the MECP

3.8.1 Odour

The waste processed at the DYEC is a heterogeneous mixture of residential waste materials and may include odorous substances. Potential odour emission sources associated with the processing of the waste include:

- Truck transportation of waste onto the site
- Waste handling and storage onsite
- Thermal treatment of waste onsite

Figure 2: DYEC Process



The waste delivery trucks are fully enclosed to reduce the potential for odour emissions while transporting waste. Trucks entering the facility are monitored by the scalehouse to ensure the contents are sealed and secure, wheels are cleaned, and no signs of leakage are visible. If found to be unacceptable, the scalehouse operator will notify the client. If the truck passes inspection it is permitted to proceed to the tipping building. The tipping building is located on the northside of the facility and is equipped with multiple bays to minimize waste truck line-ups outside the tipping building during peak truck arrival periods.

The tipping building is equipped with motor operated high speed entrance bay door facing east towards the DYEC Visitors Centre parking lot and an exit door facing west towards Region owned land. The doors remain closed except when vehicles are entering or exiting the tipping building. In addition, the louvers on the north outside wall of the tipping building are closed during truck deliveries. As shown in Figure 2, unloading of waste from the trucks occurs within the enclosed tipping building to prevent potential odours from escaping to the external environment

The air from the tipping building is drawn in through inlet ducts above the waste storage pit for use as combustion air and maintains negative pressure in the tipping building which prevents the escape of dust and odour. Drawing air from the waste storage pit eliminates ambient odour problems as the temperature in the combustion chamber ranges from 1000 to 1400ºC, which is sufficient to complete the combustion of all organic vapours.

Potential odour emissions for 140,000 tonnes per year were assessed as part of the initial ECA application for Air and Noise, following the MECP Technical Bulletin Methodology for Modelling Assessments of Contaminants with 10-minute Average Standards and Guidelines under Ontario Regulation 419/05 (2008). The odour was modelled during a potential outage situation when all combustion equipment is off-line. Draft induced fans would continue to operate and draw air from the tipping building, through the system and vented out of the stack. The worst-case odour concentration was 0.11 Odour Unit (OU) per cubic metre (ou/m^3) which is well below the MECP POI limit of 1 ou/m^3 (10-minute average) at all off property receptors.

To verify the initial modelling, a one-time odour sampling was undertaken in October 2015 by Zorix Consultants Inc. in accordance with the Ontario Source Testing Code Method ON-6. As the tipping building was identified as the principal source of fugitive odours, triplicate samples were collected from the area. The air samples were analyzed by an 8-member odour panel to determine the typical odour source concentration. Dispersion of worst-case potential odours through the stack during a 2-hr outage was modelled using the (CALMET/CALPUFF) dispersion model as approved under Schedule B of the DYEC ECA. According to the model, the maximum, 10-minute odour concentration at a sensitive receptor was 0.28 OU and occurred at a former house to the west of the facility. This result was well below the compliance limit of 1.0 OU.

Based on the results of odour sampling undertaken in 2015 which verified the 2011 modelling, there is not expected to be an increase in odour due to the increase in capacity to 160,000 tonnes per year. The facility has been designed to manage waste in enclosed buildings which effectively contain odours. The tipping building and waste storage pit will continue to be maintained under negative pressure. Air drawn in from the tipping floor and waste storage pit areas will be used for combustion air, where odourous air will be drawn into the furnace and destroyed though high temperature oxidation. The truck entrance and exit doors and louvers will continue to be closed when there are no deliveries of waste to the facility. The amount of waste being stored onsite at any one time will not change with the 20,000 tonnes per year capacity increase. The processing of an additional 20,000 tonnes per year may result in up to four additional trucks per day, including waste delivery, reagent delivery and residual removal vehicles. There will be no outdoor staging of waste. Additionally, staff periodically review the conditions at the perimeter of the facility to determine if detectable odours are present at the property boundary. It is important to note that since DYEC operations commenced in 2016, all the odour investigations completed by the DYEC staff, in conjunction with the MECP, have concluded that reported odour events have not been a result of operations at the DYEC.

Based on the review of the initial EA, odour impact mitigation design features of the DYEC and recent sampling, no significant negative effects from odour will result from the 20,000 tonnes per year capacity increase.

3.8.2 Noise

Acoustic Assessment Reports were completed for the 2009 EA and for the initial ECA application and an updated Acoustic Assessment was undertaken in 2019:

- The Acoustic Assessment –Technical Study Report (Jacques Whitford, 2009, Appendix C-5)
- Acoustic Assessment Report (Golder, 2011 Durham York Energy Centre ECA Application, Air and Noise)

- Annual Noise Monitoring of the Durham York Energy Centre Operations (Valcoustics Canada Limited, 2017)
- Acoustic Assessment Report (AAR) - Durham York Energy Centre (Golder Associates Limited, 2021) **Appendix C**

Evaluations were completed for two design capacity scenarios for the DYEC. These are the initial design capacity of 140,000 tonnes per year and a maximum design capacity of 400,000 tonnes per year. The report includes consideration of:

- Existing ambient acoustical environment;
- Sound from the facility construction;
- Sound from the facility operations;
- Potential impacts of sound on wildlife in addition to human receptors; and
- Mitigation measures to limit and manage potential effects.

The noise assessment was designed to assess the potential effects of the DYEC relative to the applicable regulatory requirements. In 2009, MECP Noise Pollution Control (NPC) documents 205/232/233 were in effect. Evaluations of potential noise effects during the initial construction and operations were conducted which considered both the 140,000 tonnes per year and 400,000 tonnes per year scenarios.

The technical study concluded that the DYEC is located in a Class 2 (suburban) area with acoustical qualities representative of both Class 1 (urban) and Class 3 (rural) areas. Class 2 sound levels are characteristic of Class 1 areas during the daytime with background sound levels dominated by an urban hum. At nighttime, Class 2 areas have a low sound level dominated by natural environment and infrequent human activity noises. Nighttime sound levels in a Class 2 area can start as early as 1900 hours.

The technical study was conducted in July 2009 and the DYEC was predicted to meet all NPC-205 noise limits when operating at both the 140,000 tonnes per year and 400,000 tonnes per year scenarios. The technical study predicted noise mitigation might be required for the emergency generators and fire pumps but not for the regularly operating equipment.

In 2011, an additional acoustic assessment was completed in support of the ECA application for the DYEC. This acoustic assessment incorporated changes and refinements which were not initially known during the 2009 acoustic assessment undertaken in support of the EA. Proposed DYEC equipment assessed in this study included roof ventilation units on the main building and residue building, the closed-loop cooling water cooler, silo filling, silo dust collector, loader operations, bay doors and process louvers.

The worst-case daytime operating scenario has all sources and both boiler trains operating simultaneously. This included ten trucks entering and exiting the DYEC per hour. Standby equipment was tested in a separate hour during the day. The worst-case nighttime /evening operating scenario had all sources and both boiler trains operating simultaneously, but did not include silo filling, dust collection operations, on-site traffic, tipping hall bay doors remained closed and no standby equipment operating.

Three locations were identified as the most sensitive points of reception near the DYEC:

- Two-storey single family dwelling located approximately 480 metres from the property line west of the facility.
- Two-storey single family dwelling approximately 690 metres from the property line west of the facility.
- One-storey single family dwelling approximately 870 metres from the property line north of the facility.

Sound levels from the DYEC at these identified sensitive points of reception were predicted to be at or below the applicable sound level limits as specified in NPC-205 during the predictable worst-case hour of the DYEC normal operation and during the testing of the standby diesel generator or diesel fire pumps.

Given the nature of the activities at the facility, noise impacts are minimal. There is no grinding, shredding or other pre-processing of the waste and noise mitigation measures were installed for the emergency generator and fire water pumps. An emergency generator is located outside, west of the tipping building and is equipped with an acoustic enclosure including air intake/discharge silencers and an engine exhaust muffler. The fire water pumps are housed in a building near the southeast corner of the site and are fitted with exhaust mufflers. The DYEC operating procedures require that weekly testing of the emergency generator and fire pumps only occurs during business hours (0700 to 1900) and only for a thirty-minute duration. The equipment is not tested at the same time to further reduce noise impacts.

In 2013, MECP released new noise guidelines in the publication NPC-300 Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning. NPC-300 was designed to limit the conflicts between NPC-205/232 and land use planning requirements. NPC-300 introduces new sound level limits, a new protocol for assessing impulse sounds and a requirement to consider hypothetical, potential points of reception on vacant lands that might permit a sound-sensitive land use in the future.

The ECA for the facility required an acoustic audit after construction and during normal operations. An Acoustic Audit Report was prepared in January 2017 by Valcoustics Canada Limited (Valcoustics) based on field work completed in 2016. The Acoustic Audit provided a determination of facility sound levels during peak facility activity with both boilers operating at full thermal load. The acoustic audit also provided an assessment of the DYEC sound classification based on the surrounding site activity in 2016. Noise was assessed at three receptor locations. Audit measurements were also completed in the vicinity of these receptors. One two-storey receptor dwelling was demolished as part of the 401/418 interchange and road realignment project. However, a two-storey farmhouse, identified as POR001rev, approximately 1100 metres to the west of the DYEC property line was assessed to maintain consistency with the report. Another receptor, a two-storey family dwelling, identified as POR002, is located 690 metres east of the DYEC property line. And a third receptor, identified as POR003, is 860 metres north of the DYEC. The results of the acoustic assessment found that the DYEC facility was not audible in the vicinity of POR001rev, POR002 and POR003 in September 2016 which is consistent with previous post-operational monitoring periods.

These observations were made during the daytime period (0700 to 1900 hours). Additionally, during lulls in road traffic on Highway 401 (the dominant noise source at all locations), the DYEC was not audible.

Based on sound measurements and subjective observations, Valcoustics determined that the DYEC area should be considered a Class 1 (urban) area that is dominated by “urban hum”. The key difference between criteria for Class 1 (urban) compared to Class 2 (suburban) areas is the sound level limits applicable in the evening between 1900 and 2300 hours. Class 2 (suburban) areas have lower sound level limits after 1900 hours. Despite the determination that the DYEC area is now a Class 1 (urban) area, the 2016 audit compared the sound levels to Class 2 (suburban) limits to be consistent with the 2009 EA and the ECA application.

Off-site sound levels from the DYEC are continuous with short-term or transient activities such as truck movements or fire water pump testing not discernable off-site. The 2016 acoustic audit demonstrated that the sound levels from the facility were not audible during the September 2016 post-operational measurement period.

Valcoustics determined that the DYEC activities are within the sound level limits stated in the MECP Publication NPC-205 and concluded that the DYEC remains in compliance with NPC-205, the updated NPC-300 and the ECA. In 2016, the MECP revoked the requirement to conduct further acoustic audit measurements.

No construction or additional equipment is necessary to increase the capacity to 160,000 tonnes per year. Therefore, sound levels are not expected to increase and the DYEC, operations will continue not to be audible at off-site receptors. It is anticipated that up to four additional trucks will access the site daily. However, since truck traffic is not discernible at off-site sensitive receptors, the increased traffic is not anticipated to negatively affect sound levels. Further, waste deliveries are restricted in the ECA to 0700 to 1900 hours meaning there will be no truck traffic after 1900 hours when the sound level limits for Class 2 (suburban) areas are lowered. The DYEC is located in the Clarington Energy Business Park which is designated for employment and light industrial land use and it is unlikely that new sensitive noise receptors would be constructed with this land use designation. There are no noise impacts to the natural environment from the DYEC capacity increase.

Since DYEC operations commenced in 2016, there have been no noise complaints attributed to the operation of the facility. Based on the review of the initial EA, the acoustic assessment for ECA application and subsequent acoustic assessments, no significant negative effects from noise are anticipated from the 20,000 tonnes per year capacity increase. However, as a result of consultation with the MECP on the screening checklist, the need for an updated acoustic assessment was identified. Based on the results from the updated acoustic assessment undertaken in 2019 by Golder, noise emissions associated with Facility operations continue operate in compliance with MECP noise guideline as specified in NPC 300. Results of the 2021 Acoustic Assessment are discussed in Section 4.

3.8.3 Stack Emissions

The Environmental Screening Criteria Checklist indicates that the waste capacity increase to 160,000 tonnes per year could result in potential impacts to air. Air emissions are a primary concern of most stakeholders. In 2011, in support of the ECA, an Emissions Summary Dispersion Modelling (ESDM) report was completed to determine the potential for impacts at several receptors surrounding the facility. This was also a supporting component of a Human Health and Environmental Risk Assessment completed for the facility.

The Air Quality Assessment Technical Study (Appendix C-1 of the 2009) Environment Assessment report undertaken in 2009 during the initial EA predicted the contaminant emissions from the DYEC at both the 140,000 tonnes per year and 400,000 tonnes per year scenarios. The assessments were carried out using the approved (CALMET/CALPUFF) air quality modelling system.

The Air Quality Assessment Technical Study in support of the initial EA stated:

"The Facility emissions (for both the 140,000 tonnes per year and 400,000 tonnes per year scenarios) will meet or be below the current air contaminant emissions limits placed on municipal waste incinerators by the current version of Ministry of Environment (MOE) Guideline A-7 dated (2004). This will be verified through continuous monitoring of stack emissions and annual stack tests."

Guideline A-7 was updated in 2010 and was considered in the DYEC ECA application. Stack testing has been performed twice per year since the commencement of facility operations which have demonstrated facility compliance well within Guideline A-7 limits.

Schedule C of the Environmental Compliance Approval (Certificate #7306-8FDKNX) for the DYEC issued June 28, 2011, established the DYEC stack emission limits which are in many instances more stringent, than the most current A-7 Guideline. The table below compares Guideline A-7 limits to the DYEC prescribed In-Stack Emission Limits.

Table 3: Guideline A-7 limits compared to the DYEC prescribed In-Stacked Emission Limits

Pollutant	Units	Previous A-7 (2004)	CurrentA-7 (2010)	ECA-Schedule C
particulate matter (PM)	mg/Rm^3	17	14	9
cadmium	ug/Rm^3	14	7	7
lead	ug/Rm^3	142	60	50
mercury	ug/Rm^3	20	20	15
dioxins and furans	pg/Rm^3	80	80	60
hydrochloric acid (HCl)	mg/Rm^3	27	27	9
sulphur dioxide (SOx)	mg/Rm^3	56	56	35
nitrogen oxide (NOx)	mg/Rm^3	207	198	121
organic matter (methane)	mg/Rm^3	66	33	33
carbon monoxide (CO)	mg/Rm^3	not specified	40	40
Opacity (6 minute rolling average)	%	10	10	10

Pollutant	Units	Previous A-7 (2004)	CurrentA-7 (2010)	ECA-Schedule C
Opacity (2 hour rolling average)	%	5	5	5

Stack testing has been undertaken twice annually since 2016. Testing for all parameters have complied with Schedule-C of the ECA since 2016, with the exception of one exceedance of Dioxins and Furans, which occurred in Boiler #1 during the May 2016 stack test. In this instance the affected boiler was shut down and an Abatement Plan was established in consultation with the MECP detailing the process to investigate and prevent a future occurrence of the incident. The Plan was undertaken and there has not been a reoccurring exceedance in any subsequent stack test. Results of the stack testing can be found on the DYEC website here. After five years of stack testing, DYEC has been able to demonstrate it can meet the A-7 Guideline. Stack testing Results are further discussed in Section 4.

In support of the Environmental Screening Process, Golder Associates undertook and Air Quality Impact Assessment (AQIA) in 2021 to evaluate the potential impacts to facility emissions as a result of processing an additional 20,000 tonnes of waste for a total of 160,000 tonnes per year. The AQIA was undertaken using an updated version of the model used in previous studies for DYEC (e.g., ESDM Golder, 2011) with more recent meteorological data, as requested by the MECP. The AQIA can be found in **Appendix D.**

The results of the AQIA modelling assessment indicated that the 160,000 tonnes per year would result in a small overall change in the maximum predicted concentrations for all contaminants and the change in cumulative concentrations would be even less significant. Results of the AQIA are discussed in Sections 4 and 5.

An updated ESDM report is required to demonstrate compliance with O. Reg. 419/05 air quality limits, as documented in the Air Contaminants Benchmark List (MECP, 2018). The list contains standards and guidelines for contaminants is used to assess their contributions of a contaminant to air as part of an ESDM report to support an ECA Application

To address comments made by the MECP, via memo dated October 22, 2019, the new modelling has been completed based on the consultation with the MECP. An ECA amendment application, including updated ESDM report, will be prepared following the completion and submission of the ESR to the MECP

3.8.4 Process Upset Conditions

The Continuous Emissions Monitoring Systems (CEMS) measures parameters on a continuous basis to maximize facility performance and minimize atmospheric effects.

Two ambient air monitoring stations in the vicinity of the DYEC have been in place since 2013. These stations monitor air quality surrounding the facility. Quarterly and annual monitoring reports have been submitted to the MECP since 2013 and are posted on the DYEC website: DYEC Ambient Air Monitoring Reports. Ambient air monitoring cannot determine the source(s) in the event of an exceedance of one of the monitored parameters. However, meteorological data such a wind direction and wind speed from both stations, combined with public data posted to the MECP Air Quality Ontario website can aid in the determination of potential source(s) of a contaminant. Since the ambient air stations have been operational, there have been no incidents where DYEC operations were anticipated to have resulted in and exceedance of the Ambient Air Quality Criteria (AAQC). Ambient air monitoring results are discussed further in Section 4.

The Air Quality Assessment Technical Study Report (Jacques Whitford, 2009, Appendix C-1) undertaken in 2009 for the initial EA predicted the potential effects to ambient air. The assessment compared the maximum model-predicted concentrations to ambient air criteria for both the 140,000 tonnes per year and 400,000 tonnes per year scenarios. The assessment was conservative as it assumed the worst-case operating scenario with the highest potential to cause environmental effects. It is possible for emissions levels to be higher than those during normal operation due to various operating conditions such as start-ups, shutdowns and malfunctions of the combustion units or the APC equipment. These events are expected to occur infrequently over a short period of time. Using the methods prescribed to evaluate potential changes to air quality due to process upset conditions in the initial EA, the results predicted when cumulative environmental effects were considered by adding background levels to the maximum predicted ground level concentration for each Chemical of Potential Concern (CoPC), the predicted maximum ground level concentrations were still below the applicable criteria.

The results of the cumulative assessment in the Golder AQIA discussed above represent a very conservative scenario as they assume that the worst-case meteorological conditions during 90th percentile ambient air quality conditions occur at the same time that maximum on-site activities occur. This same level of conservatism was used in the Air Quality Assessment Technical Study Report (Jacques Whitford, 2009, Appendix C-1) undertaken in 2009 for the initial EA. The likelihood of these situations occurring concurrently is low. The results of the AQIA are discussed in more detail in Section 4 and 5.

3.8.5 Existing Operations at Elevated Throughput

As part of the facility's design, the boilers have the capacity to be operated at different steaming rates and tonnage throughput rates to allow the facility to adjust to variations in waste heat content and delivery rates. Between 2017 and the first half of 2019, the facility operated at rates greater than 33.6 tonnes of steam per hour with one or both boilers for at least one hour on a total of 387 days (234 in 2017, 124 in 2018, and 29 in the first half of 2019). The facility was capable at operating these elevated throughputs while maintaining compliance with the CEMS in stack limits. Any instances of ambient air exceedances detected during these periods were determined to be not related to plant operations.

3.8.6 Greenhouse Gas Emissions

The DYEC waste processing capacity increase to 160,000 tonnes per year will result in an increase in the total amount of greenhouse gases (GHG) generated by the facility due to the increase in the total mass of waste processed. However, this will be offset by the reduction of GHG emissions that has been associated with the transportation and disposal of waste to landfills outside the Regions (including landfill methane generation). Consequently, the DYEC waste capacity increase is anticipated to result in a net benefit to the environment in the form of an overall reduction of GHG emissions to atmosphere. Greenhouse gas emissions are a growing concern given their contribution to climate change. The net emissions of GHGs from thermal treatment of waste versus landfill disposal were assessed as part of the initial EA for the DYEC as per the document "Supplement to Annex E-5: Comparative Analysis of Thermal Treatment and Remote Landfill on a Lifecycle Basis". This initial assessment indicated that the total GHG emissions from thermal treatment were less than those associated with landfilling and transportation related emissions and landfill methane generation.

The Air Quality Technical Assessment (Jacques Whitford, 2009, Appendix C-1) undertaken for the initial EA in 2009, predicted the DYEC contribution to the total Ontario and Canadian annual GHG contributions. The Air Quality Technical Assessment carried out GHG estimate for the 140,000 and 400,000 tonnes per year facilities based on the 2010 GHG emission levels in Canada and Ontario. The study predicted that the DYEC GHG contributions would be minimal relative to the Canadian and Ontario totals. The percent contribution from DYEC at 140,000 tonnes per year predicted in the 2009 Air Quality Technical Assessment was 0.06 per cent and 0.018 per cent of the Ontario and Canadian GHG contributions, respectively. Using the 2019 DYEC actual GHG contributions and the actual 2019 Canadian and 2019 Ontario GHG contributions, the initial study prediction is comparable, with the 2019 DYEC contribution calculated at 0.1 per cent and 0.02 per cent of the Ontario and Canadian GHG totals respectively.

The DYEC reported a total CO2 equivalent emission of 159,545.40 tonnes in 2019 under Ontario Regulation 390/18: Greenhouse Gas Emissions Quantification, Reporting and Verification. The 2019 Ontario and Canadian GHG emissions contributions were reported on the Government of Canada website: Canadian and Ontario GHG contributions.

The 2019 Canadian total was reported as 730 megatonnes (Mt) of carbon dioxide equivalent (CO_2eq) and the 2019 Province of Ontario GHG total was reported as 163.2Mt of CO_2eq. The actual DYEC GHG values from 2019 for the current 140,000 tonne facility was compared as a percentage of the Provincial and Canadian total GHG contributions.

Assuming a linear projection of GHG contribution for 160,000 tonnes per year scenario, there is a 0.01 per cent difference to the Ontario GHG contribution as a result of the 20,000 tonnes per year waste capacity increase. There is no difference in the GHG contribution as a result of the additional 20,000 tonnes per year waste capacity increase.

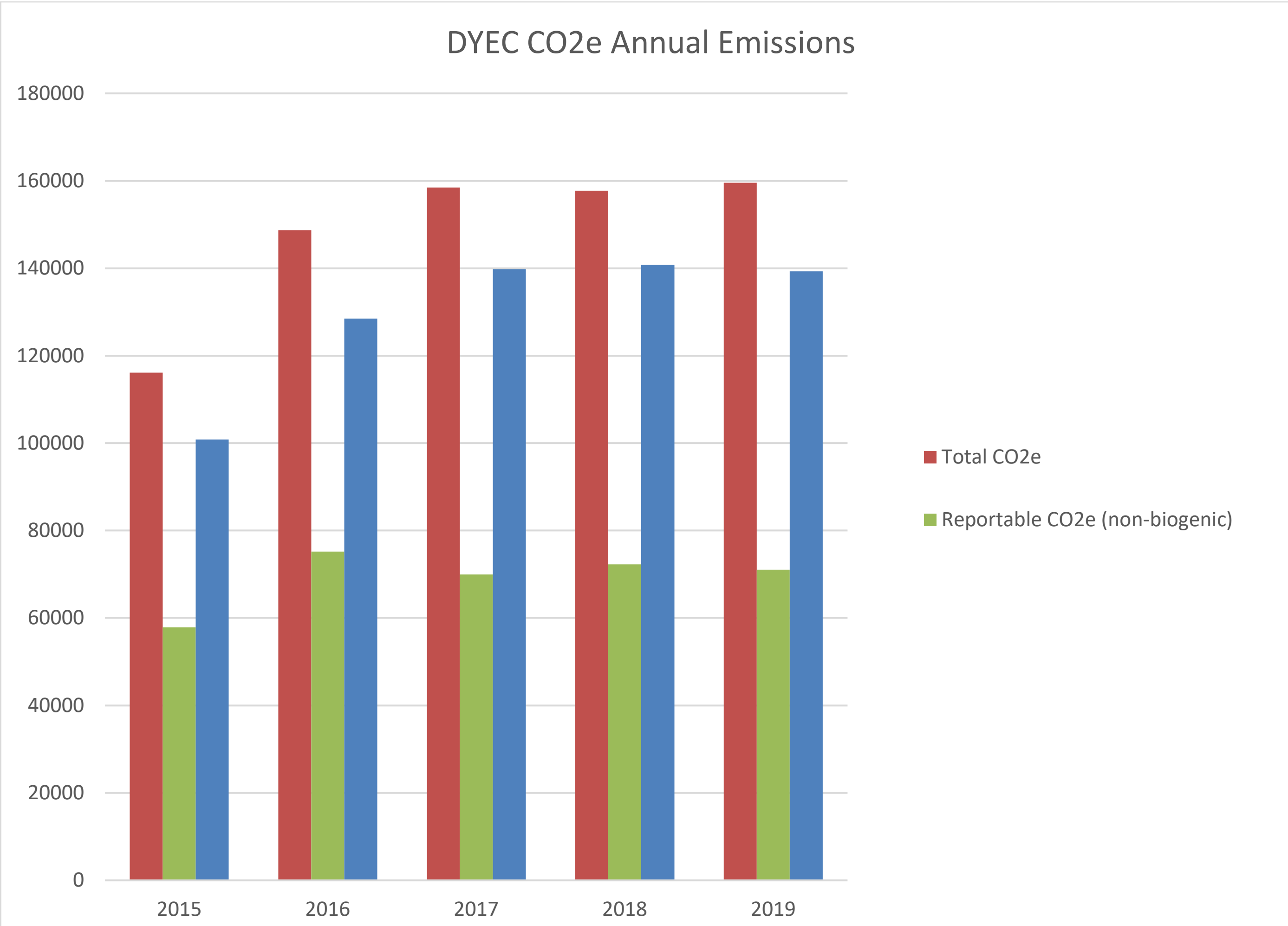
Table 4 below shows the DYEC reported GHG emissions as a percentage of the 2019 Canadian and Ontario contributions.

Table 4: Projected Annual GHG contribution from DYEC

	GHG Contribution 2019 (tonnes CO_2 eq)	DYEC (Tonnes Processible)	GHG Contribution (tonnes CO_2 eq)	% Contribution to Ontario GHG Emissions	% Contribution to Canadian GHG Emissions
Ontario	163,000,000	140,000	159,545	0.10%	0.02%
Canada	730,000,000	160,000	182,337	0.11%	0.02%

DYEC submits an annual Greenhouse Gas Report as required by Environment and Climate Change Canada under the Greenhouse Gas Reporting Program. The information is collected under section 46 of the Canadian Environmental Protection Act and reports are submitted annually in June. Facilities that emit 10,000 tonnes or more of GHGs in carbon dioxide equivalent units per year are required to submit a report. A summary of the DYEC CO_2e Annual Emissions from 2015-2019 as reported under the Greenhouse Gas Reporting Program is charted below.

Figure 3: A summary of the DYEC CO2e Annual Emissions from 2015-2019



An additional 20,000 tonnes per year of waste processed at the DYEC from the Regions, will remove or shorten the distance travelled by as much as 416 long haul trucks transporting waste for landfill disposal. In 2020, approximately 15,000 tonnes of waste were by-passed from DYEC, (15,000 tonnes/ 36 tonnes per long haul truck equals 416). DYEC by-passed waste has been shipped as far as Twin Creeks Landfill, over 300 kilometres from the DYEC. With an average transport truck fuel efficiency of 39.5 litres per 100 kilometres and an average of 2.62 kilograms of carbon dioxide (CO_2) generated from the combustion of 1 litre of diesel fuel, this prevents approximately 98,592 litres of diesel fuel being burned annually, avoiding the generation of approximately 258 tonnes of CO_2 as well as other transportation related emissions (Fuel Efficiency Benchmarking in Canada's Trucking Industry, 2019). https://www.nrcan.gc.ca/energy/efficiency/transportation/commercial-vehicles/reports/7607

Methane (CH4) is generated from the landfilling of waste and according to the Intergovernmental Panel on Climate Change (IPCC), methane has twenty-five times the global warming potential of CO_2 over a 100-year time horizon. It is accepted that 1 kilogram of methane produces approximately 25 kilograms of CO_2. Government of Canada Climate Change Potentials. If the 20,000 tonnes per year were landfilled without methane gas capture systems in place, approximately 890 tonnes of methane would be generated equivalent to over 22,000 tonnes of CO_2. Alternatively, 356 tonnes of methane would be generated equivalent to 8,800 tonnes of CO_2.

While modern landfills capture and either flare or use the methane to produce electricity, landfill gas capture systems are not capable of intercepting all produced methane. The "Supplement to Annex E-5: Comparative Analysis of Thermal Treatment and Remote Landfill on a Lifecycle Basis" assumed a 60 per cent recovery from landfill using gas capture. With this assumption approximately 534 tonnes of methane would be captured. To clarify, collection efficiency is difficult to measure directly. With improvements in technology, the typical values of the estimated collection efficiency on average are approximately 70 per cent. Based on current research recovery rate ranges from 60-70 percentile (Department of Earth and Environmental Engineering Columbia University 2019)

https://gwcouncil.org/wp-content/uploads/2019/06/Methane-Emissions-from-Landfills-Haokai-Zhao.pdf

3.9 Natural Environment

A review was completed of the following 2009 study that was undertaken during the initial Environmental Assessment to confirm: (a) the potential aquatic and terrestrial impacts associated with the development of a Proposed Thermal Treatment Facility (the Facility) on the Facility Site (the Site), Clarington 01; (b) potential mitigation required; and, (c) potential net effects and impact management measures.

- The Natural Environment Assessment - Technical Study Report (Jacques Whitford, 2009, Appendix C-7)

The 2009 Natural Environment Assessment was undertaken assuming a disturbed area or “footprint” equal to a design capacity of 400,000 tonnes per year and listed the following study conclusions:

- No rare or threatened species were present on the site. This determination will not change with an increase in waste capacity to 160,000 tonnes per year.
- No significant natural areas were present. This determination will not change with an increase in waste capacity to 160,000 tonnes per year.
- Tooley Creek Coastal Wetland was identified as the closest Natural Area. The DYEC and haul routes are located at a minimum 0.87 km from any natural area and these areas should not be directly impacted by the development of the facility. Given there will not be any new construction or site alterations for the waste capacity increase, Tooley Creek will not be impacted.
- No permanent watercourses were found onsite and no significant net effects on aquatic species were anticipated. This assessment continues to be valid for the increased capacity to 160,000 tonnes per year.
- No significant ecosystems or vegetation were present on site. Native shrubs and trees were incorporated into the landscape plan for the facility to mitigate any potential minor impact. There will not be any changes to the current native shrubs and trees for the increase to 160,000 tonnes per year.

- No significant avian species were present, and no net effects were anticipated. A follow up Site Reconnaissance Study was undertaken in 2011 and observed ten species of birds onsite. All the observed species were common and widespread in Ontario and neither were listed under the federal Species at Risk Act or the provincial Endangered Species Act. These same bird species were noted in the Natural Environment Technical Study Report (2009).

As a result of the above findings, there were no negative effects to the natural environment anticipated with the original facility construction with the implementation of mitigation measures. No additional construction, structures or landscape alternations are required for the capacity increase to 160,000 tonnes per year at the Durham York Energy Centre. No significant forested areas or permanent watercourses exist on the Site. The flat, open terrain and lack of cover offer few opportunities for specialized habitat or species. No species of conservation concern were documented during the 2007 field surveys. Subsequent supplementary field surveys in 2009 targeted seasonally sensitive species and features that might not have been present or evident during previous field visits. All plants and animals identified were common and widespread in Ontario.

Ministry of Natural Resources and Forestry Meadowlark Clarington Energy Business Park and Energy from Waste Facility Development Plan Monitoring Reports for Eastern Meadowlark.

The Regional Municipality of Durham completed the development of a 12.1 ha parcel immediately north of the CN rail line on the west side of Osborne Road for an Energy from Waste (EFW) facility. To service the EFW site within the Energy Park lands the Region has constructed new roads with associated services including water and sanitary and storm sewers for all the lands west of Osborne Road. The work involved the realignment of Courtice Road, realignment of Darlington Park Road, and the new construction of Energy Drive, truck access road to the EFW facility, stormwater conveyance channel and waterfront trail.

Eastern Meadowlark and their habitat were identified at the Clarington Energy Business Park and EFW sites and the works that were completed to construct these facilities contravened the protection and recovery of Eastern Meadowlark and its habitat pursuant to Section10(1)(a) of the Endangered Species Act, 2007. In a letter dated April 16, 2013, the Ministry of Natural Resources and Forestry (MNRF) informed the Regional Municipality of Durham (the Region) that they were eligible to submit a Development Plan under Section 23.2 of Ontario Regulation 242/08 of the Endangered Species Act, 2007. In accordance with the direction provided by the MNRF, a Development Plan was prepared and submitted to address activities for both the CEBP and EFW facility (Durham Region 2013).

In accordance with the CEBP and EFW facility Development Plan (Durham Region 2013):

> *The Region of Durham or its agent agrees to maintain an ongoing logbook of actions in an annual report which will be submitted to the MNR by January 31st of each monitoring year for 5 years, beginning January 31, 2014 up to and including January 31, 2018. To be included are the details of information collected from the annual monitoring of Eastern Meadowlark, associated bird species, and habitat creation and maintenance activities (vegetation monitoring).*

Following the construction of the DYEC, a specialized firm, LGL Limited, was retained by the Regions to monitor and make recommendations to improve grassland habitats for select avian species of concern, notably the Eastern Meadowlark.

As part of the Region's commitment to carrying out restoration and monitoring in accordance with the requirements of the Development Plan under Section 23.2 of Ontario Regulation 242/08 of the Endangered Species Act, 2007, adaptive management was undertaken in 2014 to combat the presence of non-native and invasive herbaceous broadleaf species within the Restoration Area. However, additional management efforts were necessary in 2015 which included the use of herbicide to aid in reducing populations of herbaceous, broadleaf species which negatively impacted the establishment of preferred, sown grasses. Habitat conditions in 2015 were observed as grass dominated meadow with an approximate grass cover of 60% to 70%, which included more than three grass species, as well as grasses that grew to heights greater than 50 cm. Consequently, no adaptive management was recommended for the 2016 growing season.

Vegetation monitoring in 2016 and in 2017 continued to conclude that the community within the Restoration Area was dominated by preferred grass species (70 per cent), thus community attributes continued to satisfy Ontario Regulation 242/08 (ESA 2007). Mowing and biomass removal was conducted in September 2017 based on wildlife observations made in 2017. Mowing in 2017 resulted in improved vegetation conditions and mitigated the establishment of woody species in 2018. The grass dominated habitat in 2018 continues to meet conditions set out for Eastern Meadowlark in the ESA 2007.

Despite site conditions and restoration efforts considered favourable for the Eastern Meadowlarks, none were identified within the restoration area during the 2018 breeding bird surveys. However, Bobolink, a species which has been identified as endangered, with relatively distinct grassland habitat requirements was noted in the restoration area during the 2018 breeding bird surveys. Bobolinks were recorded during two of three surveys, indicating probable breeding status within the restoration area. The presence of this species during 2016, 2017 and 2018 suggests that restoration goals have been achieved and that functional grassland bird habitat has been created. It is expected that the established vegetation composition will increase the likelihood of Eastern Meadowlark using habitats within the Restoration Area in the future. Monitoring conducted by our consultant in 2018 was the 5th and final year of monitoring as per Development Plan (#AU-DP-004-13). LGL did not recommend any additional vegetation restoration or maintenance under Region contract as they reported that grassland creation objectives have been met. The established restoration area will not be impacted by the capacity increase.

3.10 Resources

Review of the following studies that were undertaken during the initial Environmental Assessment show there are no negative effects to Resources as outlined in the screening criteria checklist:

- Facility Energy and Life-Cycle Assessment - Technical Study Report (Jacques Whitford, 2009 Appendix C -3)

  The study was prepared to identify the potential energy benefits and Life Cycle Analysis (LCA) parameters (GHG emissions, Air emissions, Water emissions) associated with the Proposed Thermal Treatment Facility (the Facility). The Report forms part of the supporting documentation and materials for the "Description of the Undertaking", completed as part of the EA Study. The Report addresses the broader implications of the proposed Facility, in regard to the environmental burden of the Facility at a global or macro-environmental scale.

- Environmental Compliance Approval Application Design and Operations Report (Golder Associates, 2011)

The DYEC is in a designated employment and light industrial area and this land use continues to be consistent with the Provincial Policy Statement as revised in 2014 Part V Section (1).

Positive effects on Resources were identified through the study review. Approval for additional waste processing capacity is in keeping with the recent MECP discussion paper: "Reducing Litter and Waste in Our Communities" (2019) This paper lists the following points, which directly support increasing waste processing capacity at DYEC:

- Ontario needs to find innovative ways to reduce waste sent to landfill.
- Thermal treatment in the form of energy from waste is a potential opportunity to recover the value of resources in waste.

- Sending waste to landfill is economically inefficient and unsustainable. It puts a strain on our environment by taking up valuable land resources that could be used more productively.
- By reducing and diverting waste from landfill we can make our economy more productive through job creation.
- Reducing our reliance on landfills is an important part of meeting the greenhouse gas emission target outlined in the Made-in-Ontario Environment Plan.
- Sending waste to landfill also impacts local communities. Municipalities, often in rural areas, are hosting landfills that accept waste from locations far beyond their communities, often with limited say in their approvals.
- Residents, businesses, institutions, and governments alike are moving towards viewing waste as a resource that has value and can be integrated back into the economy.
- Moving Ontario to where we produce less waste, maximize the resources from waste through reuse, recycling, or other means such as thermal treatment, and ultimately send less of our waste to landfill.

Based on the review of the initial EA and MECP policy direction, no significant negative effects to resources will result from the 20,000 tonnes per year capacity increase.

3.11 Socio-Economic

Review of the following studies that were prepared in 2009 during the initial Environmental Assessment were undertaken.

- Economic Assessment - Technical Study Report (Jacques Whitford, 2009 Appendix C-11)
- Socio-Cultural Assessment - Technical Study Report (Jacques Whitford, 2009 Appendix C-8)
- Traffic Assessment - Technical Study Report (Jacques Whitford, 2009 Appendix C-10)

- Visual Assessment - Technical Study Report (Jacques Whitford, 2009 Appendix C-6)
- Record of Consultation from initial EA

One potential effect as outlined in the screening criteria checklist was identified. The DYEC is within 8 kilometers of a helipad located at the Bowmanville Hospital. Although air ambulance service is currently suspended to the hospital, it is anticipated that a relocated helipad will be established in the future. The DYEC already has aeronautical clearance from Navigation Canada as constructed. With no new construction or increase in stack height, there are no negative effects related to the proximity of a helipad in the Bowmanville area.

3.11.1 Economic Assessment

The Economic Assessment – Technical Study Report was completed in 2009 to support the Environmental Assessment for the DYEC. The report was prepared to assess the potential economic related effects associated with the development of the DYEC, potential mitigation required and net effects. Evaluations were completed for the 140,000 tonnes per year and 400,000 tonnes per year design scenarios. Since the increase in capacity to 160,000 tonnes per year does not require any new construction, the economic effects during construction do not need to be re-evaluated in this summary.

The objectives of the economic assessment are to summarize the existing economic conditions and assess the economic effects of the project during construction, operations and post closure based on the following socio-economic measures:

- Employment levels;
- Aggregate wages and salaries;
- Effects on property value;
- Municipal revenues and expenditures;
- Effects on existing businesses; and
- Business opportunities.

Employment Levels/Aggregate Wages and Salaries

The economic conditions in Durham Region have changed since the original assessment was completed in 2009. The economic downturn in 2009 and loss of manufacturing throughout Ontario impacted Durham and York Region manufacturing industry as well. In Durham Region the health sciences, retail, education, and energy sectors continue to be primary employers.

In June 2019, Ontario Power Generation (OPG) announced the construction of a new consolidated headquarters building to be located in the Clarington Energy Business Park, northeast of the DYEC. The OPG office consolidation will increase the energy sector employment in the Region.

In October 2019, East Penn Canada Power Battery Sales Ltd requested amendments to Energy Park Prestige Exception (MO2-1) Zone regulations to permit a warehousing facility and office space. The facility is located north of the DYEC was constructed during 2020/2021 and is scheduled to begin operation fall of 2021.

The continued operation of the DYEC and increase in capacity to 160,000 tonnes per year will have minimal effect on the overall employment conditions, wages, and salaries in the Region. No new employment is anticipated to support this capacity increase.

Effects on Property Value and Existing Businesses

Industrial property values are anticipated to increase with the district heating potential and road infrastructure provided as part of the DYEC construction. All property in the Durham Energy Business Park is zoned for light industrial usage however it is expected that agricultural uses will continue until industrial activities expand further in the area. Residential and agricultural property values are not expected to be adversely affected by the DYEC capacity increase.

Potential disruption to the use and enjoyment of businesses and agricultural farms due to odour, noise, dust, traffic, and visual aesthetics were evaluated as part of the technical study. Mitigation measures were put in place during the initial facility construction to minimize off-property impacts. Odour control measures include off-loading waste in an enclosed building under negative pressure and all operations take place indoors. Dust impacts are also mitigated by paved surfaces and indoor off-loading of waste. Visual impacts of the DYEC are mitigated by the neutral colour choices for the exterior, extensive landscaping, and unobtrusive exterior lighting. Several architectural enhancements were identified and incorporated during the DYEC's initial construction to minimize any potential negative effects. The emissions stack is the most significant visual impact of the facility and its impact will continue to be minimized as the Highway 407 East construction is completed and as additional multi-level buildings are constructed in the Clarington Energy Business Park. Noise assessments completed since the facility has been operational indicate all noise levels are well below MECP regulated limits.

Municipal Revenues and Expenditures

The DYEC has an overall positive impact on municipal revenues. Based on the host community agreement with the Municipality of Clarington, payment in lieu of taxes are approximately $650,000 per year. There was also significant investment in developing the infrastructure of the Clarington Energy Business Park during the DYEC construction. The Municipality of Clarington will benefit further as industry continues to move into the Clarington Energy Business Park.

Changes to demands on local services have been minimal since most DYEC employees were already living in the Region of Durham.

The capacity increase to 160,000 tonnes per year from the current 140,000 tonnes per year waste processing will result in cost savings for the Region of Durham. Reduced Covanta operating fees for waste tonnages greater than 140,000 tonnes per year, increased revenue for electricity and metals recovery and preventing the need to by-pass waste to other disposal options will result in up to $1.3 million in annual savings in 2020 rising to $2.1 million by 2023. DYEC capacity growth along with other Regional programs and initiatives in waste management is critical to ensure that sufficient infrastructure and waste processing capacity exists to support Regional population growth projections.

Business Opportunities

The potential for district heating within the Clarington Energy Business Park and the enhanced road infrastructure, provide an incentive for businesses to locate in the area. OPG has recently announced the construction of a consolidated headquarters building that will be adjacent to the Darlington Energy Complex as well, East Penn Canada Power Battery Sales Ltd is has constructed office and warehousing operations in the area.

Overall, the DYEC has had a net positive impact on the economics of the local municipality and minimal impact at the Regional level.

Based on the review of the initial EA and recent announcements of investment in the Clarington Energy Business Park, no significant negative effects to the local economy will result from the 20,000 tonnes per year capacity increase.

3.11.2 Socio-Cultural Assessment

The Social-Cultural Assessment Technical Study Report that was completed in 2009, assessed the effects of the facility on the people and community within the areas surrounding the DYEC site for both the 140,000 tonnes per year and 400,000 tonnes per year scenarios. Since the site is primarily surrounded by industrial and agricultural land uses and the nearest residential development is approximately three kilometres away, the impact of the DYEC on local community character is considered minor. The Durham Regional Police Service unit is located approximately 4.5 kilometers northeast of the DYEC, and the Courtice Water Pollution Control Plant is located to the immediate southwest of the DYEC. These facilities are the only two public facilities located in the vicinity of the Facility. Neither of the public facilities are considered sensitive community uses. New development will be constructed after any changes and under MECP proposed Land Use Compatibility Guidelines (LUC's) the developer will be responsible for completing compatibility studies. All waste management at DYEC is conducted in enclosed building areas which minimizes the odour, dust, and visual impacts of the site activities. The DYEC operations are not considered to have a negative effect on the local community character or the use of public facilities. The site is designated employment/ light industrial land use in both the Durham Region and Clarington Official Plans. The DYEC is located on a portion of land that has been designated the Clarington Energy Business Park.

The Social-Cultural Assessment also considered the effect of the DYEC on the enjoyment of cultural and recreational resources. Four recreational uses are located within the study area including the Waterfront Trail, the Darlington Sports Fields, the Lake Ontario waterfront, and Darlington Provincial Park. Negative effects on the use of these recreational areas have been and will continue to be minimal given the indoor operations of the facility. There are minor visual impacts of the facility since it is visible within a one-kilometre radius. During construction, a $9 million cash allowance was included to incorporate visually pleasing design features to minimize the negative visual effect of the DYEC.

Changes to Land Use

Since the 2009 Environmental Assessment Technical Studies were completed, the following changes have occurred to the DYEC surrounding land use.

- The Darlington Energy Complex was completed, located at the southeast corner of Energy Drive and Osbourne Road, directly east of the DYEC;
- Manheim Oshawa Auctions is no longer located north of the DYEC;
- Two former residences located near the DYEC have been demolished;
- Work has been completed on the new 418 interchange and connector highway between Highway 401 and the 407 East extension, as well as the 401 interchange for Courtice Road.
- East Penn Canada Battery Distribution Centre is scheduled to commence operation in fall of 2021

The Social-Cultural Assessment reached the following conclusions based on the review of 2009 Technical Studies completed for Air Quality, Visual Impacts, Traffic Impacts, the Acoustic Assessment, litter and vermin evaluations, and the design proposal submitted by Covanta. There are little to no differences between the potential effects at the 140,000 tonnes per year scenario versus the 400,000 tonnes per year scenario. Therefore, the conclusions presented below are considered valid for both scenarios and apply to the 160,000 tonnes per year scenario:

- Considering no residential receptors are located within 500 metres, the DYEC is anticipated to have minimal overall net effects regarding the "Potential for Disruption to use and enjoyment of residential properties".
- Considering the significant distance from the DYEC to the nearest existing and planned communities and the characteristics of the current landscape, the DYEC is anticipated to have minimal to no overall net effects regarding the "Potential for changes in Community Character". The DYEC will be one contributor to the transition of the immediate area to commercial/light industrial land use in accordance with the planned development of the Clarington Energy Business Park.
- Considering that there are only two Public Facilities or Institutions within one kilometre, the DYEC is anticipated to have minimal overall net effects regarding the "Potential for Disruption to Use and Enjoyment of Public Facilities or Institutions".
- Considering the limited number and type of recreational land uses in close proximity, the DYEC is anticipated to have minimal overall net effects regarding the "Potential for Disruption to Use and Enjoyment of Cultural and Recreational Resources".
- Considering the existing and proposed land use designations, the DYEC is anticipated to have minimal overall net effects regarding the "Compatibility with Existing Land Use Designations and Proposed Land Use Changes".

The DYEC is and will continue to be compatible with the existing landscape character and zoning of the Clarington Energy Business Park. The increased processing capacity, if approved, will occur within the existing structure onsite, no changes to land, or new construction will be undertaken for the project therefore no impacts are anticipated.

The Durham-York Energy from Waste Facility Business Case (May 15, 2008), prepared for the Region of Durham by Deloitte and Touche LLP, noted that the inclusion of district heating and site works associated with the development of the DYEC within the Clarington Energy Business Park would result in a positive effect for enterprises looking to locate their businesses in Clarington. This would essentially increase the compatibility of the DYEC with the current and future land uses in the vicinity which are likely to include commercial and light industrial uses that could benefit from the availability of district heating and potentially district cooling provided. The Region is currently conducting pre-feasibility studies related to further developing a district energy system within the Energy Park.

Based on the review of the initial EA and recent announcements of investment in the Clarington Energy Business Park, no significant negative effects to the local social and cultural environment will result from the 20,000 tonnes per year capacity increase.

3.11.3 Traffic Assessment

The Traffic Assessment Technical Study from the 2009 EA was reviewed. For the purpose of this traffic assessment, a ten-year horizon period was selected to assess future traffic conditions. The DYEC was expected to be operational by 2013, thus a 2023 horizon year reflects an appropriate assessment horizon (10 years from beginning of operations).

The purpose of the study was to identify and address potential traffic effects that could result from the construction of the DYEC including:

- Assess existing traffic conditions at the study area intersections;
- Forecast future traffic demands as a result of the DYEC construction;

- Forecast future planned roadway network improvements and background travel demands, specifically generated by the future Clarington Energy Business Park; and,
- Identify operational concerns and recommend required mitigation measures to address potential deficiencies and meet the future traffic demand generated by the DYEC.

Three waste capacity scenarios for the DYEC were reviewed (140,000, 250,000, and 400,000 tonnes per year) and analyzed in terms of traffic operations and effects on adjacent roads.

The initial traffic assessment was based on the morning and evening road peak hours on a weekday, as this is generally the simultaneous peak for both commuter and site traffic. Traffic effects were based on the observed and forecast traffic volumes for both the weekday morning and evening peak hours. A traffic assessment study of this nature is usually based on the forecasted traffic effects associated with the usual or typical traffic conditions that are to be experienced on a day-to-day basis at the DYEC during the morning and evening peak hours.

A ten-year horizon period was selected to assess future traffic conditions. The study assumed up to 34 trucks per day at a design capacity of 140,000 tonnes per year; 51 daily truck trips at 250,000 tonnes per year; and 77 daily truck trips at 400,000 tonnes per year. The study assumed 18 trucks (inbound and outbound combined) and 22 cars during the peak hour operating at 140,000 tonnes per year. At 250,000 tonnes per year, peak hour traffic is anticipated to be 26 trucks and 22 cars, and at 400,000 tonnes per year, peak hour traffic is anticipated to be 40 trucks and 22 cars. In all three scenarios, no traffic control measures were required on the adjacent road network to accommodate traffic during operations of the DYEC. Traffic operations at the study area intersection were assessed with HCS software for unsignalized intersections. The signal warrant analysis did not require traffic signals at any of the intersections and traffic queues were not expected to extend to the Darlington Park Road and Courtice Road intersection. Overall, the studied intersections were found to operate acceptably in the morning and evening peak periods beyond the 2023 horizon year. The alternate truck access road to the DYEC removed truck traffic from Energy Drive, which increases safety along this corridor.

As a result of changes to the development of the road network, the Traffic Assessment was updated in 2011. Changes included the DYEC truck access road no longer being Osbourne Road and instead is Courtice Road and an updated road network for the intersections of Courtice Road and Energy Drive as well as Energy Drive and Darlington Park Road. The updated 2011 Traffic Assessment noted only marginal changes in traffic volumes as a result of the changes to the road network. As the Highway 401 and 418 interchange was not finalized, the study did not include an assessment of traffic operations at the then proposed interchange.

A 20,000 tonne per year capacity increase at DYEC will result in approximately four additional trucks per day including waste delivery, residuals removal and reagent delivery trucks accessing the facility. As a result of conservative assumptions made in the Traffic Assessment Study for the initial EA regarding the number of vehicles required to enter the facility on a daily basis, the total number of vehicles, including the additional trips required for the 20,000 tonnes per year increase, is anticipated to remain below the initial study numbers. Currently, approximately 24 trucks and 21 cars enter the facility daily, where the initial EA Cars include staff operating the facility and Regional staff occupying the Visitors Centre. There are no concerns related to increase in vehicle traffic to the site as a result of processing an additional 20,000 tonnes per year. The site is capable of queuing eighteen tractor trailers within the security gates and additional ten tractor trailers on the private roadway located outside the security gates. Currently, there are never more than three tractor trailers queuing at one time. With sufficient roadway space on-site, trucks have never queued off-site. Operationally, the arrival of staff and deliveries to the facility frequently occurs outside of normal peak periods. Since the construction of the DYEC, OPG has announced an intention to develop an office campus northeast of the DYEC, for approximately 2,000 staff. The impacts of the proposed OPG offices on the local network are outside of the scope of this assessment.

Based on the review of the initial EA and the actual truck traffic associated with the operational DYEC, no significant negative effects to local traffic will result from the 20,000 tonnes per year capacity increase.

3.11.4 Visual Assessment

The 2009 Visual Assessment Technical Study Report (Jacques Whitford, 2009, Appendix C-6) outlines the scope of the visual assessment that has been completed for use in the initial Environmental Assessment and includes an assessment of the following:

- The sensitivity of the landscape and the identified receptors to the potential change in the visual aesthetics that could result from the development of the DYEC;
- The magnitude of the potential effects on the landscape and the identified receptors resulting from the development of the DYEC; and,
- The anticipated overall level of effect on each identified receptor.

The initial phase of the visual impact assessment is a baseline study which describes the existing environment potentially affected within approximately one kilometre of the DYEC and within five kilometres of the DYEC.

The visual impact assessment focuses on:

- Visibility of the DYEC structures;
- Effects on receptors; and,
- Local community viewshed analysis.

The visual effects associated with the DYEC and specific facility structures that were considered during operation include the buildings and stack(s). Both the initial design capacity of 140,000 tonnes per year and potential future expansion to 400,000 tonnes per year were assessed. The 400,000 tonnes per year scenario would result in the addition of several facility buildings and an additional stack. This larger operation would be contained within the same facility footprint and the additional structures would remain adjacent to the existing structures. Overall, the visual differences between the 400,000 tonnes per year facility compared to the existing 140,000 tonnes per year facility would be minimal.

In response to a request from the Municipality of Clarington at the time of the study, potential visual effects associated with the DYEC were also assessed with regards to the planned future build-out of the Clarington Energy Business Park. These future facilities and infrastructure include the proposed Ontario Power Generation Building and Visitors Centre (identified to be situated on 61 acres of currently vacant land, northeast of the DYEC), Energy Drive (an east-west thoroughfare traversing the Clarington Energy Business Park), and the then proposed Highway 407 East extension interchange ramps to connect with Highway 401. The cumulative effects of a 400,000 tonne per year facility, in addition to other planned and future building and construction projects surrounding the DYEC, would result in a decrease in visual impacts as the character of the area changes.

Negative visual effects are minimal based on the DYEC location in the Clarington Energy Business Park between the Courtice Water Pollution Control Plant to the south and commercial properties to the north. The completion of the Darlington Energy Complex and construction of the 407 East interchange ramps will further reduce the overall visual impact of the DYEC. With no new construction, the capacity increase to 160,000 tonnes per year will not alter the site visually from existing conditions, therefore no further visual assessments are required.

The Host Community Agreement included investment by the Region of Durham in infrastructure including roadways to support the Clarington Energy Business Park and surrounding area to serve existing and future businesses and residents.

Based on the review of the initial EA and recent announcements of investment in the Clarington Energy Business Park, no significant negative visual effects will result from the 20,000 tonnes per year capacity increase.

3.12 Cultural Heritage

Review of the following 2009 studies that were undertaken during the initial Environmental Assessment show there are no effects to Heritage and Culture as outlined in the screening criteria checklist:

- Stage 2 Archeological Assessment and Built Heritage - Technical Study Report (Jacques Whitford, 2009, Appendix C-9)

The Stage 2 Archaeological Assessment and Built Heritage Technical Study Report was prepared to assess the potential archaeological and heritage resource related impacts associated with the development of the DYEC, potential mitigation required and net effects. The assumed 400,000 tonnes per year building footprint was used to carry out the investigation. Since the capacity increase to 160,000 tonnes per year does not require any construction, the 400,000 tonnes per year building footprint evaluation continues to address all potential concerns associated with a capacity increase.

A Stage 2, below-grade survey was completed based on the determination that there was an elevated potential for the presence of archaeological resources. A Stage 1 Archaeological Assessment was completed for the construction of the Courtice Water Pollution Control Plant located south of the DYEC. The Stage 1 assessment indicated no historic period archaeological resources in or near the site of the DYEC. The walking survey completed during the Stage 2 assessment revealed only a few small, non-diagnostic and modern artifacts as well no pre-historic artifacts or significant features were noted. Shovel test pits were completed in less accessible areas of the DYEC facility location. These investigations also indicated no artifacts, anthropogenically altered soils or other items of archaeological significance.

The Stage 2 Archaeological Assessment Technical Study Report concluded that, based on the results of the 2008 and 2009 field assessments and previous studies in and around the Site, it is not likely to contain significant, intact archaeological or built heritage resources. The Project is cleared of archaeological conditions.

The 2009 report recommended that, should human remains be identified during operations, all work in the vicinity of the discovery will be suspended immediately. Notification would be made to the Ontario Provincial Police, or local police, who would conduct a site investigation and contact the district coroner. Notification was also required to the Ministry of Culture and the Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Small Business and Consumer Services. Additionally, should any cultural heritage values (archaeological or historical materials or features) be identified, all work in the vicinity of the discovery would be suspended and the Ministry of Culture archaeologist contacted. This condition provided for the potential for deeply buried or enigmatic local site areas that are not typically identified in archaeological field assessments.

The Ministry of Culture issued a letter dated February 3, 2012, included in **Appendix E,** accepting the Stage 2 Archaeological Assessment - Technical Study Report dated May 25, 2009 and two addendums to the report that detail additional shovel testing completed after the original study. The technical study is listed in the Provincial register of archaeological reports and no archaeological sites were documented. The Ministry of Culture agreed with the recommendation of no further concerns for alterations to archaeological sites for the study area.

The DYEC capacity increase to 160,000 tonnes per year does not require any new construction or changes to the existing building footprint. The capacity increase will not disturb any soils or expand the site beyond the previously assessed boundaries. No additional archaeological assessment is required.

Based on the review of the initial EA, Ministry of Culture and Tourism correspondence, and no required construction and no new built cultural heritage resources in the area, no significant negative effects to heritage or culture will result from the 20,000 tonnes per year capacity increase.

3.13 Indigenous Communities

Consultation and engagement with Indigenous communities will continue to determine if any concerns related to the increase in capacity at the DYEC exist as part of our Duty to Consult with First Nations and Métis communities where decisions or actions that may adversely impact asserted or established Aboriginal or treaty rights. A summary of the consultation efforts is included as part of the Record of Consultation in **Appendix G.**

Review of the following 2009 studies that were undertaken for the initial Environmental Assessment for any assumptions, estimates and updates are provided with known/current information where applicable:

- Review of the Record of Consultation to determine the concerns of Indigenous Communities during the initial EA. This review indicated several common themes of concern relating largely to the protection of the natural environment, and the emissions from the facility. The review of the studies completed above, and the air emissions study undertaken as part of the study as listed below review the potential impacts to the environments of concern which include:
    - Groundwater and Surface Water Technical Study Report
    - Archaeological Assessment and Built Heritage Technical Study Report
    - Natural Environment Technical Study Report
    - Air Quality Impact Assessment by Golder Associates.

As described above, a review of groundwater and surface water, and the natural environment shows no additional negative environmental effects are likely to occur as a result of the waste capacity increase to 160,000 tonnes per year and effective mitigation and monitoring plans are in place.

Current mitigation measures in place for the 140,000 tonnes per year facility are sufficient to manage an additional 20,000 tonnes of capacity with no additional impacts to the natural environment or groundwater and surface water.

The updated air modelling by Golder Associates simulating a 160,000 tonne per year facility indicated that the predicted concentrations of all Indicator Compounds showing a decrease for the 160,000 tonne per year operating scenario compared to the 140,000 tonnes per year operating scenario.

Based on the results of two separate Stage 2 archaeological assessments conducted in 2009 during the original development of the facility, the likelihood of significant, intact archaeological resources on the site is low. No archaeological evidence or items of historical significance were found on the site during construction. The Archaeological Assessment Technical Study Report was provided to the Ministry of Tourism, Culture and Sport and no archaeological sites were documented. Given construction is not required as part of this capacity increase, further archaeological assessments are not planned as part of the project.

With no construction required for the capacity increase to 160,000 tonnes per year and a review of previous and current emissions assessments showing no significant impacts to land and resources, there are no impacts to Indigenous communities. The Regions will continue to consult on any project updates with potentially impacted communities.

Based on the review of the initial EA, the historical consultation with Indigenous communities prior to DYEC construction and no new construction associated with the capacity increase, no significant negative effects result from the 20,000 tonnes per year capacity increase.

3.14 Other

Increasing the waste capacity of the DYEC to 160,000 tonnes per year will result in additional ash generation. As illustrated in the table below, an additional 20,000 tonnes of waste per year is estimated to result in an additional 14 per cent ash generation. This ash will continue to be shipped to a landfill for use as daily cover. It is expected that an additional one (1) truck trip per day will be necessary to dispose of the additional ash.

Table 5 Anticipated Increase in Ash Generation

Waste Processed	140,000 tonnes	160,000 tonnes	Increase in Ash Generation (tonnes)	Ash % Increase
Fly Ash Generated (tonnes)	14,004	16,005	2,001	13.3%
Bottom Ash Generated (tonnes)	27,134	31,010	3,876	1.3%

The DYEC conducts an Ash Sampling and Testing Protocol that is approved by the MECP under ECA condition 7(7)(d). The sampling protocol objectives are to ensure the bottom ash contains less than 10 per cent by weight combustible material and that conditioned fly ash is not leachate toxic.

4. Environmental Effects Assessment and Impact Management Plan

4.1 Environmental Effects Assessment

As described in Section 3, the Environmental Screening Checklist was completed to identify potential negative effects from the DYEC capacity increase to 160,000 tonnes per year. Additional studies were undertaken where necessary for areas identified with a potential negative environmental effect.

4.2 Impact Management and Monitoring

The DYEC currently conducts air emissions monitoring to ensure the operations do not result in a negative environmental effect. The CEMS monitors operational and regulatory parameters on a continuous real-time basis to provide initial indication of facility performance. CEMS monitoring provides immediate detection of facility conditions which enable the operator to implement immediate measures to mitigate any potential negative impacts to air quality. Source testing is conducted annually over a period of three to five days and provides the current stack emissions data for a full suite of parameters (dioxins and furans, particulate, metals, acid gases and volatile organic compounds). Ambient air monitoring provides an indication of air quality in the vicinity of the facility. Although the ambient air data is not used to identify a single emissions source, it can be used as a tool to determine changes to air quality near the DYEC. All three air monitoring methods: CEMS, stack tests and ambient air monitoring, are used to monitor air quality near the DYEC so potential impacts can be mitigated or managed quickly and effectively. Results of these testing and monitoring programs are provided to the MECP and posted on the DYEC website for public information.

4.2.1 CEMS

The DYEC uses CEMS to monitor operational and compliance parameters. CEMS continuously analyzes and measures air emissions and provides a permanent record of current emission levels. The results of continuously monitored parameters can be seen on the DYEC website (Emissions Data) and are updated on a 1-minute, 10-minute and hourly basis.

Table 6 shows the average readings for CEMS parameters in 2020 compared to the ECA-Schedule C limits. The DYEC annual average CEMS results from 2020 demonstrate the facility operates within compliance of the ECA limits.

Table 6: 2020 Average CEMS readings

Parameter (units)	ECA Limit	Boiler #1	Boiler #2
Opacity -6-minute rolling average (%)	5	0	0
Opacity - 2 hour rolling average (%)	10	0	0
Hydrochloric Acid (mg/Rm^3)	9	4	5
Sulphur Dioxide (mg/Rm^3)	35	1	1
Nitrogen Oxides (mg/Rm^3)	121	110	111
Carbon Monoxide (mg/Rm^3)	40	10	11
Oxygen (%)	Minimum 6	8	8
Furnace Temperature (ºC)	Minimum 1000	1218	1302
Baghouse Inlet Temperature (ºC)	>120 <185	142	143

The CEMS performance in 2020 was excellent with the average monthly CEMS availability for all parameters ranging from 95 to 100 per cent.

The 2020 annual Relative Accuracy Test Audit (RATA) on the CEMS was performed in July of 2020. The CEMS met the performance parameters detailed in Schedule F of the ECA. Therefore, the data recorded by the DYEC CEMS was used to assess against the in-stack emissions limits detailed in Schedule C of the ECA for hydrochloric acid, sulphur dioxide, nitrogen oxides and carbon monoxide.

4.2.2 Air Pollution Control

The DYEC uses air pollution control technology which assists to assist with meeting stringent air emissions regulatory limits. All air pollution control processes are integrated with the facility Distributed Control System (DCS). The DCS includes alarms to inform control room operators if a system is not achieving a specific setpoint. The following air pollution control systems are utilized to ensure compliance with emissions limits:

- The NO_x reduction process consists of two systems that are integrated through the DCS:
    - The Very Low NO_x (VLN TM) system
    - Selective Non-Catalytic Reduction (SNCR) system
- Combustion processes including carbon monoxide are optimized using the Martin Infrared Combustion Control (MICC) System
- Dioxin and Furan mitigation is accomplished using:
    - Furnace temperature is maintained at a minimum 1000º C, 1 second residence for dioxin and furan mitigation
    - Activated powdered carbon injection
- Mercury is mitigated through the use of powder activated carbon.
- Acid gases, including hydrogen chloride hydrogen fluoride, and sulphur dioxide, are mitigated using dry hydrated lime injection with fly ash recirculation
- A fabric filter bag house comprised of over 3000 individual bags (1,560 bags per baghouse/boiler) is used for particulate matter and heavy metals (lead and cadmium) control

4.3 Air Emissions

The ECA for the DYEC establishes air requirements for the site. Emission limits in the ECA are established for the stack that are based on Guideline A-7 and Ontario Regulation 419/05 Air Pollution - Local Air Quality. Under the ECA there are specific stack emission limits that are not to be exceeded.

Stack emissions and ambient air emissions are monitored with the monitoring results provided to the MECP and posted to the DYEC website.

Stack emissions are monitored by Continuous Emissions Monitoring and annual stack tests. Key combustion parameters are monitored continuously when the boilers are in operation and the emission levels are available to the public in real time on the DYEC website and on an external display board on the building. The CEMS system is equipped with alarms to notify the operators when there is a potential deviation above a performance requirement in the ECA. The ECA also requires the boilers to be shut down if the performance requirements are exceeded for a continuous three-hour period.

The ECA requires an annual source test on the DYEC. Prior to completing the source test, the MECP must review and accept the testing plan and has the option to attend the source test to observe the sample collection and operating conditions. Results of the annual source test are provided to the MECP for review and are posted on the DYEC website.

The ECA also required the Regions to establish an ambient air monitoring program to assess ambient air both upwind and downwind of the DYEC. Ambient air measurements are compared to Ontario Ambient Air Quality Criteria (AAQC) or Canadian Ambient Air Quality Standards (CAAQS). Readings represent impacts of multiple sources in an area.

4.3.1 Stack Emissions

Table 7 shows the results of the spring and fall 2020 source test results compared to the in-stack contaminant concentration limits set in DYEC's ECA, as well as those outlined in Ontario's A-7 Guideline and the European Union (EU). The Regions proposed the prescribed ECA limits and included them as part of the DYEC Request for Proposal to demonstrate commitment to meet or exceed current regulatory standards. The MECP adopted those limits and included them in the ECA. The DYEC ECA limits either met or exceeded the legislative emission limits in Ontario. An additional level of safety is built in with the more stringent ECA limits. As illustrated in Table 7, the results of the 2020 source tests demonstrate that the DYEC normally operates well below the stringent ECA and A-7 limits.

Table 7: Comparative In-Stack Contaminant Concentration Limits Table

Parameter (units)	European Union (EU) Limits	Ontario A-7 Guideline	ECA Limits	Boiler #1 Source Test Results		Boiler #2 Source Test Results	
				Spring 2020	Fall 2020	Spring 2020	Fall 2020
Particulate Matter (mg/Rm^3)	9	14	9	1.14	2.6	1.04	2.0
Cadmium (µg/Rm^3)	N/A	7	7	0.056	0.075	0.11	0.056
Lead (µg/Rm^3)	N/A	60	50	0.55	0.37	0.61	0.34
Mercury (µg/Rm^3)	46	20	15	0.13	0.34	0.10	0.045
Dioxins and Furans (pg/Rm^3)	92	80	60	1.82	28.7	2.53	7.26
Hydrochloric Acid (mg/Rm^3)	9	27	9 – (24 hr avg.)	4.5	3.8	5.10	3.20
Sulphur Dioxide (mg/Rm^3)	46	56	35– (24 hr avg.)	0	0.1	0	0.1
Nitrogen Oxides (mg/Rm^3)	183	198	121– (24 hr avg.)	109	110	109	110
Organic matter - methane (ppmdv)	N/A	50	50	0.2	0.5	1.7	1.1
Carbon Monoxide (mg/Rm^3)	N/A	40	40 – (4 hr avg.)	15.2	11.4	11.4	14.1

In 2019, Golder Associates Limited (Golder) simulated the potential change in local air quality levels from the DYEC increasing its annual waste capacity by 20,000 tonnes per year to a maximum of 160,000 tonnes per year. The results of the Golder preliminary assessment were compared to the assessment for 140,000 tonnes per year completed in 2011, in support of the DYEC ECA application. A Technical Memorandum prepared by Golder, was superseded by the Air Quality Impact Assessment (AQIA) attached in **Appendix D.**

As a result of consultation with the MECP during the development of the screening report, an updated ESDM report be prepared for the facility using updated background and meteorological data in support of the ECA Application. Air quality emission calculations and modelling have to be completed and documented in accordance with MECP procedures (Guideline A-10: Procedure for Preparing an Emission Summary and Dispersion Modelling (ESDM) Report | Ontario.ca) to assess compliance with Ontario Regulation 419/05 air quality limits.

An AQIA was undertaken by Golder (2021), and the results determined the waste capacity increase of 20,000 tonnes per year is not expected to significantly impact local air quality.

Emission rates for the 160,000 tonnes and 140,000 tonnes per year (TPY) scenarios were calculated using the in-stack emission limits and recent source testing data in conjunction with the respective flow rates for each scenario.

The following scenarios were considered in this assessment:

- **Scenario 1A**: Current Maximum Operating Conditions - Main Stack operating at 140,000 TPY
- **Scenario 1B**: Current Maximum Operating Conditions, plus ancillary sources - Main Stack operating at 140,000 TPY with simultaneous silo filling and diesel-fired EPG testing

- **Scenario 2A**: Future Maximum Operating Conditions - Main Stack operating at 160,000 TPY
- **Scenario 2B**: Future Maximum Operating Conditions plus ancillary sources - Main Stack operating at 160,000 TPY with simultaneous silo filling and diesel EPG testing.

Modelling was completed using the CALPUFF modelling system, with meteorological data generated using observation data from surface stations and large-scale mesoscale meteorological data from the Weather Research and Forecasting (WRF) model. The model predicted concentrations of approximately 90 contaminants over a receptor grid extending 40km x 40km, centred on DYEC. Input data were reviewed and approved by Ontario Ministry of Environment, Conservation and Parks (MECP) in advance of modelling.

To provide a cumulative assessment, the predicted concentrations of each indicator compound that result from the operation of DYEC and were calculated using the CALPUFF model were added to existing background air quality concentrations. Background air quality concentrations were obtained from local air quality monitoring data completed primarily at The Region of Durham's Courtice and Rundle monitoring stations. The cumulative concentrations were compared to relevant Canadian Ambient Air Quality Standards (CAAQS) and Ontario Ambient Air Quality Criteria (AAQC).

Overall, the results of the assessment indicate that the Project would result in a small overall decrease in the maximum predicted concentrations for all contaminants because of the increase stack outlet gas temperature and flowrate. Predicted cumulative concentrations of all contaminants are below the relevant air quality criteria for all Indicator Compounds, with the exception of benzo(a)pyrene during maximum operations and nitrogen dioxides during emergency diesel generator testing.

The background concentration of benzo(a)pyrene is greater than the Project Criteria before any contribution from DYEC is included due to transportation emissions from the nearby Highway 401. Emissions from DYEC contribute less than 1% to the total ambient benzo(a)pyrene concentration for all assessed scenarios. The concentrations of benzo(a)pyrene are virtually the same before and after the operations of DYEC suggesting that the facility is not a significant source of benzo(a)pyrene.

Standby generator testing occurs for up to one hour, once per month. This assessment assumes that testing occurs while DYEC is operating at maximum capacity (i.e., 140,000 or 160,000 TPY) and during meteorological conditions that result in the worst-case dispersion and is therefore very conservative. Additionally, while the maximum predicted concentration of NO_2 is greater than the CAAQS of 79 µg/m³, it is much less than the Ontario AAQC of 400 µg/m³. There is also no significant difference in the predicted concentration of NO_2 between the current and future operating scenarios.

In summary, the increase in annual throughput of DYEC by 20,000 TPY is not expected to significantly impact local air quality.

4.3.2 Greenhouse Gas

Section 3 determined that the actual GHG emissions from the DYEC at 140,000 tonnes per year was comparable with what was predicted in the 2009 EA studies in terms of the effect on the Canadian and Ontario GHG emission totals. There were no significant changes to the annual Canadian and Ontario GHG totals when waste capacity was projected to 160,000 tonnes per year using the DYEC 2019 actual totals.

Using the model and assumptions from the initial EA "Supplement to Annex E-5: Comparative Analysis of Thermal Treatment and Remote Landfill on a Lifecycle Basis" (LCA) the emissions from processing an additional 20,000 tonnes per year were estimated and compared between the remote landfill and energy from waste disposal options. As detailed in the table below, the DYEC results in a net improvement of air emissions compared to landfill on a life-cycle basis. It shows lower emissions data compared to the actual 2019 operational data since the 2007 calculation is a net calculation accounting for displacement and energy offset credits. In addition, the 2019 operational data includes biogenic carbon calculations of the incoming waste stream which accurately depicts the actual anthropogenic carbon being emitted vs fixable carbon which is put back into the atmosphere. This also results in lower emissions of acid gases and smog precursors.

Table 8: Emissions to Air for the Management of 20,000 tonnes per year of Residual Waste by Remote Landfill and Energy from Waste (DYEC)

	20,000 tonnes per year of Residual Waste				
	Landfill		**EFW by DYEC**		**Variance**
Energy Consumption	**(GJ/yr)**	**(GJ/tonne)**	**(GJ/yr)**	**(GJ/tonne)**	
	4640	19	-230480	-922	-225840(GJyr)/-903(GJt)
Emissions to Air GHG's	**(TPY)**	**(kg/tonne)**	**(TPY)**	**(kg/tonne)**	
CO2e	4720	19	2640	11	2080(tyr)/8(kgt)
Acid gases	**(TPY)**	**(kg/tonne)**	**(TPY)**	**(kg/tonne)**	
NOx	4	0.02	2.4	0.001	1.6(tyr)/0.019(kgt)
SOx	-2.3	-0.01	-47.6	-0.2	
HCl	0.16	0.0008	0.96	0.004	2080(tyr)/0.8(kgt)
Smog precursors	**(TPY)**	**(kg/tonne)**	**(TPY)**	**(kg/tonne)**	
NOx	4	0.02	2.4	0.001	1.6(tyr)/0.019(kgt)
PM	0.72	0.003	-5.5	-0.02	-6.22(tyr)/-0.023(kgt)
VOCs	0.72	0	-5	-0.02	-5.72(tyr)/-0.02(kgt)
Heavy Metals	**(kg/yr)**	**(g/tonne)**	**(kg/yr)**	**(g/tonne)**	
Pb	0	0	0.7	0.002	0.7(kgyr)/0.002(gt)
Hg	0	0	0.7	0.002	0.7(kgyr)/0.002(gt)
Cd	0	0	0.06	0	0.06(kgyr)/0(gt)
Dioxins	**g/yr**	**(µg/tonne)**	**g/yr**	**(µg/tonne)**	
	0.000002	0.000008	0.001	0.004	0.000998(gyr)/0.003992(µg)

Table 8A: Energy Consumption and Emissions to Air Comparison of Remote Landfill and Energy from Waste

	Base Case – Remote Landfill		System 2a – Thermal Treatment of Mixed Solid Waste & Recovery of Energy followed by Recovery of Materials from Ash/Char	
ENERGY CONSUMPTION				
	(GJ/year)	(GJ/tonne)	(GJ/year)	(GJ/tonne)
Energy Consumption	58,000	232	-2,881,000	-11,524
EMISSIONS TO AIR				
Greenhouse Gases	(tonnes/year)	(kg/tonne)	(tonnes/year)	(kg/tonne)
Net carbon dioxide equivalent, eCO_2	59,000	236	33,000	132

Table 8B: DYEC 2019 Operational Data – Reported Emissions

2019 DYEC Operational Data- 140,000 TPY Processing Capability					
	CO_2 Emissions		CH_4 Emissions	N_2O Emissions	CO_2 Equivalent Emissions
	Non-Biomass	Biomass			
	tonnes		tonnes	tonnes	tonnes
Total Emissions	67,555.65	88,475.22	54.19	7.24	159,545.40

Table 8C shows the increase in energy and GHG emissions if there is an increase of 20,000 tonnes per year processing capacity. In this scenario, modelled GHG emissions were calculated comparing the impact on emissions to the DYEC and landfill respectively. This scenario still indicates a lower GHG emissions rating compared to that of traditional landfill situations. In addition, it is interesting to note that energy consumption for the EFW by DYEC shows negative values due to the fact that this facility is a net energy producer and thus does not require energy draw from the grid.

Table 8C: Increase in Energy and Emissions from 20,000 tonnes of waste

	20,000 tonnes				
	Landfill		EFW by DYEC		Variance
Energy Consumption	**(GJ/yr)**	**(GJ/tonne)**	**(GJ/yr)**	**(GJ/tonne)**	
	4640	19	-230480	-922	-225840(GJyr)/-903(GJt)
Emissions to Air GHG's	**(tonnes/yr)**	**(kg/tonne)**	**(tonnes/yr)**	**(kg/tonne)**	
CO2e	4720	19	2640	11	2080(tyr)/8(kg)

4.3.3 Noise

In November 2019, Golder completed an additional acoustic assessment of the DYEC to determine the impact of processing an additional 20,000 tonnes per year and to support the ECA amendment application. All relevant sound levels for sources were obtained from Golder's onsite sound measurements using an NTI sound level meter/real-time analyzer, which were used as inputs to a predictive acoustical model to quantify outdoor noise emissions associated with the Facility.

The acoustic assessment report documents the operations at the DYEC and has been prepared in accordance with MECP noise guidelines, NPC 233 "Information to be Submitted for Approval of Stationary Sources of Sound" (NPC 233) and NPC 300

"Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning" (NPC 30).

Significant noise sources associated with the Facility operations include HVAC units, roof ventilation units, closed-loop cooling water cooler, transformer, silo filing using truck mounted blower, silo vent dust collector, main exhaust stack, on-site truck traffic, front end loader traffic, air cooled condensers, various building openings (louvers, bay doors etc.), an emergency diesel generator and two emergency diesel fire pumps. Testing of the Facility's emergency diesel generator and emergency fire pumps is limited to daytime hours only (i.e., 07:00 to 19:00 hours)

Three (3) locations have been identified as being representative of the most sensitive Point(s) of Reception (POR(s)) in the vicinity of the Facility.

Golder predicted sound levels from the Facility at the identified PORs are below the applicable sound level limits during the predictable worst-case hour of the Facility during normal operation and during the periodic testing of the emergency diesel generator and emergency diesel fire pumps. Therefore, the Facility can operate in compliance with MECP noise guideline as specified in NPC 300

Site operations were not expected to be a significant source of vibration as defined by the MECP in NPC 207, and therefore a vibration assessment was not carried out.

The predictive analysis was carried out using Cadna/A V 2019 MR 1 Geometrical spreading, attenuation from barriers, ground effect and air absorption were included in the analysis as determined from ISO 9613 (part 2), which is the current MECP accepted standard used for outdoor sound propagation predictions.

DYEC operations were modelled to determine the predictive worst-case sound levels at the identified PORs. Sound levels were predicted at each POR location for both Plane of Window (POW) and Outdoor POR's. Outdoor POR sound levels (at a height of 1.5 m) were predicted by calculating sound levels using a 2 m by 2 m grid resolution within the

POR property boundaries and within 30 m of the POW POR as per NPC 300. Sample calculation are provided in Appendix G of the Acoustic Assessment Report (Golder, 2021).

Based on the result of the assessment, the noise emissions associated with Facility operations are below the applicable sound level limits at the identified PORs. With only four additional trucks per day and no additional equipment required to be operated to manage a waste capacity increase of 20,000 tonnes per year, noise impacts from DYEC operations are negligible. Therefore, the Facility is expected to operate in compliance with MECP noise guidelines as specified in NPC 300. The Acoustic Assessment Report is attached as **Appendix C.**

4.3.4 Proximity to Aerodrome/Airport

Bowmanville Hospital is located at 47 Liberty Street South in Bowmanville and maintains a helipad for air ambulance service. Although air ambulance service is currently suspended to the hospital, it is anticipated to resume with a re-located helipad in the near future.

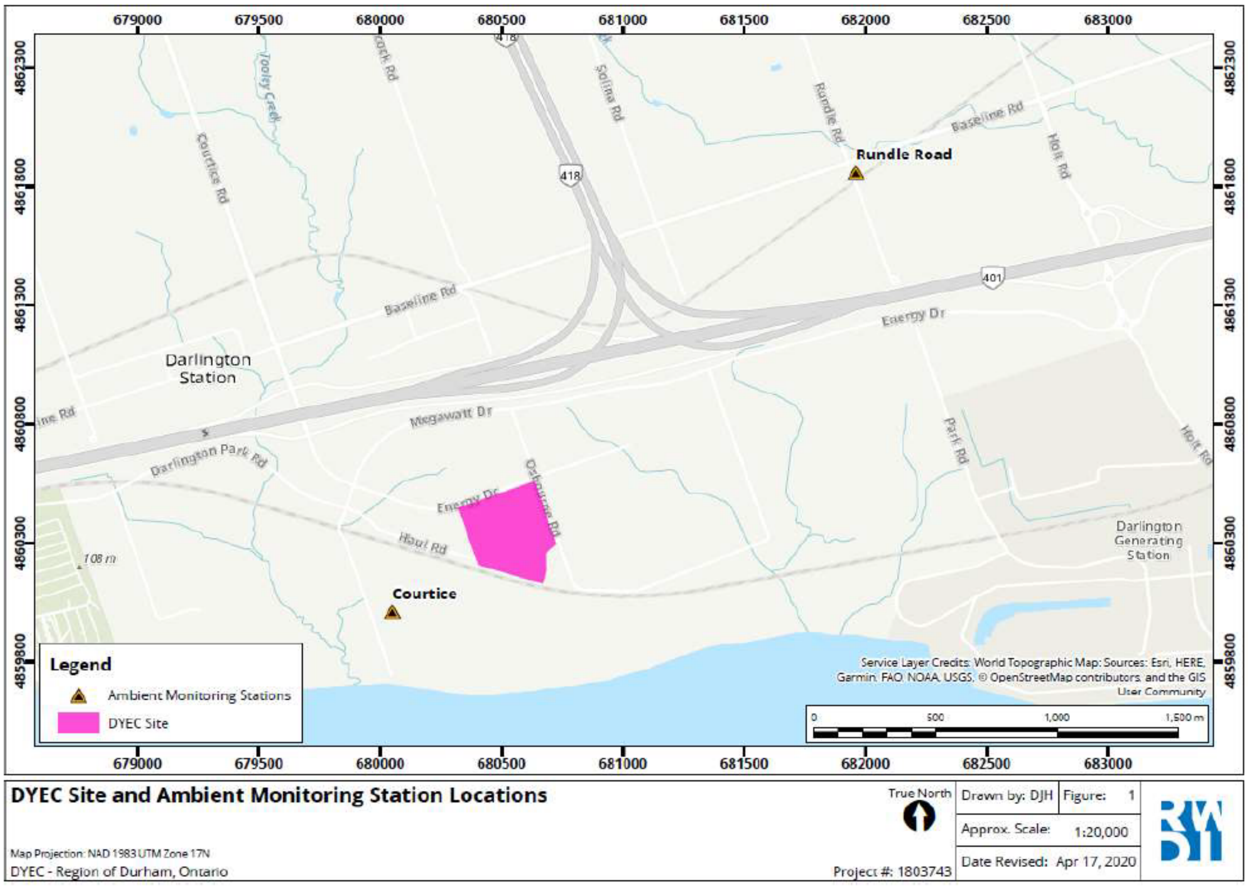
The DYEC received aeronautical clearance from Navigation Canada as constructed. Since there is no new construction, building or stack alterations required for the increase in capacity to 160,000 tonnes per year, there is no negative impact due to the proximity of the helipad at Bowmanville Hospital. Therefore, nautical clearance remains valid and does not require updating.

4.3.5 Ambient Air

As part of the DYEC's environmental monitoring programs, two ambient air monitoring stations were established in 2013 to monitor ambient air quality in the vicinity of the DYEC in accordance with an Ambient Air Monitoring and Reporting Plan approved by the MECP. The two stations were sited with input from the MECP and are located at predominately upwind (Courtice) and downwind (Rundle Road) locations to the DYEC. The MECP ambient air station location approval can be found on the DYEC website at

MECP Approval of Ambient Air Station Monitoring Locations. The Figure below shows the location of the two monitoring station locations relevant to DYEC.

Figure 4: DYEC Ambient Air Monitoring Station Locations



A summary table of the ambient air monitoring program is listed in Table 9 below:

Table 9: Ambient Air Monitoring Program Summary

Monitoring Stations/ Frequency	**Courtice Road (upwind)**	**Rundle Road (downwind)**
Continuously	NO_x, SO_2, $PM_{2.5}$	NO_x, SO_2, $PM_{2.5}$
Non-continuous (every 6 days)	metals	metals
Non-continuous (every 12 days)	Polycyclic aromatic hydrocarbons (PAHs)	Polycyclic aromatic hydrocarbons (PAHs)
Non-continuous (every 24 days)	Dioxins and furans	Dioxins and furans

As required by the approved Ambient Air Monitoring and Reporting Plan, quarterly and annual reports are produced for the MECP, in accordance with the MECP Operation Manual for Air Quality Monitoring in Ontario (2018) and posted to the DYEC website: DYEC Ambient Air Monitoring Reports .

The monitored contaminant concentrations are compared to air quality criteria and standards set by the MECP and by Environment Canada. The MECP developed Ambient Air Quality Criteria (AAQCs) which are the maximum desirable concentrations in the outdoor air, based on effects to the environment and health (MECP, 2012). Not all contaminants have an applicable regulatory limit; therefore, other criteria were used for comparison. These included Human Health Risk Assessment (HHRA) criteria. New AAQC's for SO_2 were implemented in 2020, including a 10-minute rolling average AAQC of 67 parts per billion (ppb), a 1-hour rolling average AAQC of 40ppb and an annual AAQC of 4 ppb. There is no longer a 24-hour rolling average AAQC for SO_2.

In May of 2013 the federal government published the Canadian Ambient Air Quality Standards (CAAQS) as non-binding objectives under the Canadian Environmental Protection Act. The CAAQS were developed under the direction of the Canadian Council of Ministers of the Environment (CCME) as outdoor air quality targets that “set the bar” for air quality actions across Canada. In 2020, new CAAQS’ were implemented which are listed in Table 10.

Table 10: PM2.5, SO2 and NO2 CAAQS' by Implementation Year

Parameter	Averaging Time	Year Applied 2015	Year Applied 2020	Year Applied 2025	Statistical Form
Fine Particulate Matter ($PM_{2.5}$)	24-hour	28 μg/m³	27 μg/m³	-	The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
	Annual	10 μg/m³	8.8 μg/m³	-	The 3-year average of the annual average of all 1-hour concentrations
Sulphur Dioxide (SO_2)	1-hour	-	70 ppb	65 ppb	The 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentrations
	Annual	-	5 ppb	4 ppb	The average over a single calendar year of all 1-hour average concentrations
Nitrogen Dioxide (NO_2)	1-hour	-	60 ppb	42 ppb	The 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations
	Annual	-	17 ppb	12 ppb	The average over a single calendar year of all 1-hour average concentrations

The Courtice and Rundle Road Monitoring Stations observed no exceedances of Total Suspended Particulate (TSP), metals, Dioxins and Furans, PM2.5 or NO_2 over their applicable AAQC, HHRA or CAAQS during 2020.

The 2020 Ambient Air Annual Report presents a summary of the continuous sampling statistics at each station for 2020 compared to Ontario AAQC, Ontario Regulation 419/05 and HHRA values as provided in Table 11.

Table 11: 2020 Summary of Statistics for Continuous Sampling Parameter Levels at Courtice and Rundle Road Stations Compared to AAQC/HHRA's

Station	Parameter	Max 1-hr Mean	1-hr AAQC/ HHRA	Events > 1-hr AAQC / HHRA	Max 24-hr Running Mean	24-hr AAQC / HHRA	Events > 24-hr AAQC / HHRA	Annual Arithmetic Mean	Annual AAQC / HHRA	Events > Annual AAQC / HRRA
Courtice Monitoring Station	$PM_{2.5}$ (µg/m³)	45.2			28.6			5.9		
	NO_x (ppb)	98.8			38.3			5.6		
	NO (ppb)	59.7			15.6			1.1		
	NO_2 (ppb)	40.1	200	0	25.6	100	0	4.6	17	0
	SO_2 (ppb)	72.2	40	19	21.4	100	0	1.4	4	0
Rundle Road Monitoring Station	$PM_{2.5}$ (µg/m³)	59.3			23.1			5.2		
	NO_x (ppb)	66.9			22.1			4.6		
	NO (ppb)	33.9			5.0			0.8		
	NO_2 (ppb)	35.3	200	0	17.2	100	0	3.9	17	0
	SO_2 (ppb)	69.2	40	5	6.7	100	0	0.4	4	0

Table 12 below, from the 2020 Ambient Air Annual Report presents a summary of the continuous sampling statistics at each ambient air monitoring station for 2020 compared to applicable CAAQS'.

Table 12: 2018-2020 Summary of Statistics for Continuous Sampling Parameter Levels at Courtice and Rundle Road Stations Compared to CAAQS'

Station	Parameter	2018-2020[1] 1-Hour Mean	1-Hour CAAQS	Events > 1-Hour CAAQS	2018-2020[1] 24-Hour Mean	24-Hour CAAQS	Events > 24-Hour CAAQS	2018-2020[1] Annual Mean	Annual CAAQS	Events > Annual CAAQS
Courtice Monitoring Station	$PM_{2.5}$ (µg/m^3)				18.1 [4]	27	0	6.2 [5]	8.8	0
	Sulphur Dioxide (SO_2)	58.5 [2]	70	0				1.4 [6]	5	0
	Nitrogen Dioxide (NO_2)	36.4 [3]	60	0				4.6 [6]	17	0
Rundle Road Monitoring Station	$PM_{2.5}$ (µg/m^3)				17.4 [4]	27	0	5.7 [5]	8.8	0
	Sulphur Dioxide (SO_2)	31.6 [2]	70	0				0.4 [6]	5	0
	Nitrogen Dioxide (NO_2)	26.9 [3]	60	0				3.9 [6]	17	0

Notes: [1] 2017-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b)
[2] The 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentrations
[3] The 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations
[4] The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
[5] The 3-year average of the annual average of all 1-hour concentrations
[6] The average over a single calendar year of all 1-hour average concentrations

The Courtice Monitoring Station observed nineteen (19) exceedances over the maximum hourly mean AAQC for SO_2 (40 ppb) during 2020. There were also twenty-four (24) exceedances of the rolling 10-minute average AAQC (67 ppb) at the Courtice Station in 2020. The elevated SO_2 events at the Courtice Monitoring Station occurred from when the wind is from the East to South directions. The events were possibly a result of emissions from industrial sources along the lakeshore. It is unlikely that any significant contribution of measured SO_2 came from the DYEC. Additionally, based on the in-stack concentration levels measured by the CEMS during the time of the exceedance events, there were no unusual levels in SO_2 emissions recorded.

The Rundle Monitoring Station observed five (5) exceedances over the maximum hourly mean AAQC for SO_2 (40 ppb) during 2020. There were also nine (9) exceedances of the rolling 10-minute average AAQC (67 ppb) at the Rundle Station in 2020. The elevated SO_2 events at the Rundle Road Monitoring Station occurred when the wind was travelling from East to South directions. The events were possibly a result of emissions from industrial sources along the lake shore. It is unlikely that any significant contribution of measured SO_2 came from the DYEC. Additionally, based on the in-stack concentration levels measured by the CEMS during the time of the exceedance events, there were no unusual levels in SO_2 emissions recorded.

At the beginning of 2020, the 1-hour AAQC limit was reduced from 250 to 40 ppb. In previous years, the Courtice and Rundle Road Monitoring Stations recorded no SO_2 exceedances.

A summary of the 2020 TSP/metals discrete sampling statistics at Courtice and Rundle Road Stations are presented in Table 13. All results were compared to the applicable twenty-four (24) hour criteria/standards/HHRA.

Table 13: 2020 Summary of Statistics for Discrete Sampling of TSP and Metal Parameter Levels at Courtice and Rundle Road Stations

Parameter	Units	AAQC	HHRA	Courtice Monitoring Station				Rundle Road Monitoring Station			
				Geometric Mean	Arithmetic Mean	Maximum 24-hour	No. of Elevated Readings	Geometric Mean	Arithmetic Mean	Maximum 24-hour	No. of Elevated Readings
Particulate (TSP)	µg/m³	120	120	18.8	22.4	69.7	0	21.1	24.4	102.3	0
Total Mercury (Hg)	µg/m³	2	2	8.16E-06	1.05E-05	4.00E-05	0	6.97E-06	9.82E-06	4.40E-05	0
Aluminum (Al)	µg/m³	4.8	-	1.01E-01	1.36E-01	5.00E-01	0	1.12E-01	1.52E-01	1.19E+00	0
Antimony (Sb)	µg/m³	25	25	6.40E-04	7.83E-04	4.06E-03	0	5.00E-04	6.05E-04	1.53E-03	0
Arsenic (As)	µg/m³	0.3	0.3	9.69E-04	1.02E-03	3.28E-03	0	1.09E-03	1.35E-03	1.11E-02	0
Barium (Ba)	µg/m³	10	10	4.94E-03	5.79E-03	1.55E-02	0	5.10E-03	6.17E-03	1.97E-02	0
Beryllium (Be)	µg/m³	0.01	0.001	3.02E-05	3.02E-05	3.26E-05	0	3.01E-05	3.02E-05	3.37E-05	0
Bismuth (Bi)	µg/m³	-	-	5.43E-04	5.43E-04	5.86E-04	0	5.43E-04	5.43E-04	6.07E-04	0
Boron (B)	µg/m³	120	-	1.21E-02	1.21E-02	1.30E-02	0	1.21E-02	1.21E-02	1.35E-02	0
Cadmium (Cd)	µg/m³	0.025	0.025	6.35E-04	6.98E-04	5.45E-03	0	6.23E-04	6.57E-04	3.55E-03	0
Chromium (Cr)	µg/m³	0.5	-	1.91E-03	2.10E-03	4.64E-03	0	1.95E-03	2.17E-03	5.08E-03	0
Cobalt (Co)	µg/m³	0.1	0.1	6.03E-04	6.04E-04	6.51E-04	0	6.11E-04	6.15E-04	1.27E-03	0
Copper (Cu)	µg/m³	50	-	1.26E-02	1.53E-02	4.70E-02	0	2.17E-02	2.72E-02	7.30E-02	0
Iron (Fe)	µg/m³	4	-	3.01E-01	3.66E-01	1.26E+00	0	2.99E-01	3.76E-01	2.00E+00	0
Lead (Pb)	µg/m³	0.5	0.5	1.91E-03	2.24E-03	7.81E-03	0	1.62E-03	1.99E-03	5.93E-03	0
Magnesium (Mg)	µg/m³	-	-	1.69E-01	2.11E-01	8.98E-01	0	1.72E-01	2.12E-01	9.86E-01	0
Manganese (Mn)	µg/m³	0.4	-	8.13E-03	9.96E-03	3.69E-02	0	8.39E-03	1.04E-02	3.68E-02	0
Molybdenum (Mo)	µg/m³	120	-	5.82E-04	7.28E-04	3.01E-03	0	9.47E-04	1.14E-03	2.90E-03	0
Nickel (Ni)	µg/m³	0.2	-	1.07E-03	1.14E-03	2.95E-03	0	1.08E-03	1.17E-03	3.02E-03	0
Phosphorus (P)	µg/m³	-	-	2.52E-01	2.74E-01	1.36E+00	0	2.49E-01	2.63E-01	6.77E-01	0

Parameter	Units	AAQC	HHRA	Courtice Monitoring Station				Rundle Road Monitoring Station			
				Geometric Mean	Arithmetic Mean	Maximum 24-hour	No. of Elevated Readings	Geometric Mean	Arithmetic Mean	Maximum 24-hour	No. of Elevated Readings
Selenium (Se)	μg/m^3	10	10	3.02E-03	3.02E-03	3.26E-03	0	3.01E-03	3.02E-03	3.37E-03	0
Silver (Ag)	μg/m^3	1	1	3.02E-04	3.02E-04	3.26E-04	0	3.01E-04	3.02E-04	3.37E-04	0
Strontium (Sr)	μg/m^3	120	-	3.71E-03	4.90E-03	2.08E-02	0	4.26E-03	5.46E-03	4.07E-02	0
Thallium (Tl)	μg/m^3	-	-	2.72E-05	2.72E-05	2.93E-05	-	2.71E-05	2.72E-05	3.03E-05	-
Tin (Sn)	μg/m^3	10	10	6.82E-04	7.85E-04	2.47E-03	0	6.39E-04	8.23E-04	2.97E-03	0
Titanium (Ti)	μg/m^3	120	-	5.61E-03	7.17E-03	3.10E-02	0	6.10E-03	8.18E-03	7.13E-02	0
Uranium (Ur)	μg/m^3	0.3	-	3.06E-05	3.08E-05	6.97E-05	0	3.10E-05	3.22E-05	1.43E-04	0
Vanadium (V)	μg/m^3	2	1	1.51E-03	1.51E-03	1.63E-03	0	1.51E-03	1.51E-03	1.69E-03	0
Zinc (Zn)	μg/m^3	120	-	2.81E-02	3.30E-02	9.38E-02	0	1.97E-02	2.55E-02	1.05E-01	0
Zirconium (Zr)	μg/m^3	20	-	6.21E-04	6.50E-04	3.33E-03	0	6.12E-04	6.18E-04	1.43E-03	0

A summary of the 2020 PAH discrete sampling statistics at Courtice and Rundle Road Stations is presented in Table 14. All results were compared to the applicable twenty-four (24) hour criteria/standards/HHRA.

Table 14 2020 Summary of Statistics for Discrete Sampling of PAH Parameter Levels at Courtice and Rundle Road Stations

Parameter	Units	AAQC	HHRA	Courtice Monitoring Station			Rundle Road Monitoring Station		
				Arithmetic Mean	Maximum 24-hour	No. of Elevated Readings	Arithmetic Mean	Maximum 24-hour	No. of Elevated Readings
1-Methylnaphthalene	ng/m³	12000	-	4.70E+00	1.69E+01	0	6.53E+00	2.70E+01	0
2-Methylnaphthalene	ng/m³	10000	-	7.31E+00	2.88E+01	0	1.07E+01	4.85E+01	0
Acenaphthene	ng/m³	-	-	2.89E+00	1.43E+01	-	5.16E+00	2.69E+01	-
Acenaphthylene	ng/m³	3500	-	2.12E-01	1.62E+00	-	2.08E-01	8.55E-01	0
Anthracene	ng/m³	200	-	1.37E-01	5.13E-01	0	4.22E-01	2.12E+00	0
Benzo(a)Anthracene	ng/m³	-	-	2.22E-02	9.46E-02	-	2.99E-02	1.59E-01	-
Benzo(a)fluorene	ng/m³	-	-	4.08E-02	1.26E-01	-	5.89E-02	2.32E-01	-
Benzo(a)Pyrene	ng/m³	0.05 [1] 5 [2] 1.1 [3]	1	2.93E-02	9.24E-02	4	3.81E-02	1.82E-01	5
Benzo(b)Fluoranthene	ng/m³	-	-	6.35E-02	2.82E-01	-	7.59E-02	2.36E-01	-
Benzo(b)fluorene	ng/m³	-	-	2.82E-02	9.94E-02	-	3.85E-02	1.25E-01	-
Benzo(e)Pyrene	ng/m³	-	-	4.14E-02	1.97E-01	-	4.51E-02	1.74E-01	-
Benzo(g,h,i)Perylene	ng/m³	-	-	4.27E-02	2.00E-01	-	4.96E-02	1.81E-01	-
Benzo(k)Fluoranthene	ng/m³	-	-	5.20E-02	2.15E-01	-	6.48E-02	2.22E-01	-
Biphenyl	ng/m³	-	-	2.34E+00	8.65E+00	-	3.71E+00	1.93E+01	-
Chrysene	ng/m³	-	-	9.67E-02	4.10E-01	-	1.24E-01	3.40E-01	-
Dibenzo(a,h)Anthracene	ng/m³	-	-	7.14E-03	4.61E-02	-	9.54E-03	1.16E-01	-
Fluoranthene	ng/m³	-	-	6.59E-01	2.07E+00	-	1.50E+00	6.18E+00	-
Fluorene	ng/m³	-	-	2.16E+00	9.85E+00	-	3.82E+00	1.65E+01	-

Parameter	Units	AAQC	HHRA	Courtice Monitoring Station			Rundle Road Monitoring Station		
				Arithmetic Mean	Maximum 24-hour	No. of Elevated Readings	Arithmetic Mean	Maximum 24-hour	No. of Elevated Readings
Indeno(1,2,3-cd)Pyrene	ng/m^3	-	-	4.58E-02	1.94E-01	-	5.33E-02	1.71E-01	-
Naphthalene	ng/m^3	22500	22500	2.60E+01	6.71E+01	0	3.03E+01	1.05E+02	0
o-Terphenyl	ng/m^3	-	-	1.25E-02	3.44E-02	-	1.36E-02	3.98E-02	-
Perylene	ng/m^3	-	-	3.47E-03	1.84E-02	-	4.70E-03	3.05E-02	-
Phenanthrene	ng/m^3	-	-	3.42E+00	1.58E+01	-	7.15E+00	3.06E+01	-
Pyrene	ng/m^3	-	-	3.53E-01	1.05E+00	-	7.57E-01	3.60E+00	-
Tetralin	ng/m^3	-	-	3.24E+00	1.27E+01	-	4.21E+00	1.68E+01	-
Total PAH [4]	ng/m^3	-	-	5.38E+01	1.70E+02	-	7.51E+01	2.74E+02	-

Notes: [1] Ontario Ambient Air Quality Criteria. The Standard for benzo(a)Pyrene (B(a)P) is for B(a)P as a surrogate for PAHs,
[2] O.Reg. 419/05 Schedule 6 Upper Risk Thresholds,
[3] O.Reg. 419/05 24 Hour Guideline,
[4] The reported total PAH is the sum of all analysed PAH species

The Courtice Monitoring Station observed four (4) exceedances over the daily AAQC for Benzo(a)pyrene (0.05 ng/m^3) during 2020.

The Rundle Road Monitoring Station observed five (5) exceedances over the daily AAQC for Benzo(a)pyrene (0.05 ng/m^3) during 2020.

Table 15 presents a summary of the 2020 Dioxin and Furan discrete sampling statistics at Courtice and Rundle Road Stations. All results were compared to the applicable twenty-four (24) hour criteria/standards.

Table15: 2020 Summary of Statistics for Discrete Sampling of Dioxin and Furan Parameter Levels at Courtice and Rundle Road Stations

Parameter	Units	AAQC	HHRA	Courtice Monitoring Station			Rundle Road Monitoring Station		
				Arithmetic Mean	Maximum 24-hour	Number of Elevated Readings	Arithmetic Mean	Maximum 24-hour	Number of Elevated Readings
2,3,7,8-TCDD	pg/m^3	-	-	1.21E-03	2.79E-03	-	1.48E-03	6.04E-03	-
1,2,3,7,8-PeCDD	pg/m^3	-	-	2.07E-03	1.20E-02	-	1.86E-03	6.49E-03	-
1,2,3,4,7,8-HxCDD	pg/m^3	-	-	1.50E-04	5.36E-04	-	4.46E-04	3.16E-03	-
1,2,3,6,7,8-HxCDD	pg/m^3	-	-	4.22E-04	2.32E-03	-	4.45E-04	2.85E-03	-
1,2,3,7,8,9-HxCDD	pg/m^3	-	-	3.23E-04	1.28E-03	-	5.28E-04	3.01E-03	-
1,2,3,4,6,7,8-HpCDD	pg/m^3	-	-	6.86E-04	3.82E-03	-	5.53E-04	2.06E-03	-
OCDD	pg/m^3	-	-	8.86E-05	3.12E-04	-	9.69E-05	4.89E-04	-
2,3,7,8-TCDF	pg/m^3	-	-	1.24E-04	2.51E-04	-	1.31E-04	4.59E-04	-
1,2,3,7,8-PeCDF	pg/m^3	-	-	3.42E-05	6.62E-05	-	5.01E-05	1.52E-04	-
2,3,4,7,8-PeCDF	pg/m^3	-	-	4.69E-04	1.26E-03	-	5.86E-04	2.18E-03	-
1,2,3,4,7,8-HxCDF	pg/m^3	-	-	1.36E-04	4.29E-04	-	2.00E-04	8.54E-04	-
1,2,3,6,7,8-HxCDF	pg/m^3	-	-	1.53E-04	4.47E-04	-	1.97E-04	8.07E-04	-
2,3,4,6,7,8-HxCDF	pg/m^3	-	-	2.57E-04	8.17E-04	-	2.99E-04	2.17E-03	-
1,2,3,7,8,9-HxCDF	pg/m^3	-	-	1.98E-04	5.23E-04	-	2.60E-04	1.03E-03	-
1,2,3,4,6,7,8-HpCDF	pg/m^3	-	-	7.25E-05	1.70E-04	-	7.61E-05	2.06E-04	-
1,2,3,4,7,8,9-HpCDF	pg/m^3	-	-	2.05E-05	5.39E-05	-	2.61E-05	1.58E-04	-
OCDF	pg/m^3	-	-	5.17E-06	1.28E-05	-	4.57E-06	1.66E-05	-
Total Toxic Equivalency	pg/m^3	0.1 [1] 1 [2]	-	6.42E-03	2.54E-02	0	7.24E-03	3.04E-02	0

Notes: [1] O.Reg. 419/05 Schedule 3 Standard phased in after July 1st, 2016
[2] O.Reg. 419/05 Schedule 6 Upper Risk Thresholds

A summary of the Criteria Air Contaminant (CAC) concentration statistics for Courtice and Rundle Road Stations from 2013-2020 are presented in Tables 16-18 comparing the annual Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2) and Particulate Matter less than 2.5 microns (PM2.5) data.

All continuously monitored NO_2 levels were below the applicable hourly, 24-hour and annual average criteria from 2013 to 2020 for both the Courtice and Rundle Road Monitoring Stations. It should be noted that NOx and NO do not have any applicable AAQC's/CAAQS'. As of 2020, there are two new CAAQS' for NO_2 which define limits on the annual average concentration and on the 3-year average of the annual 98th percentile of the daily maximum 1-hour mean concentrations. A summary of annual NOx, NO and NO_2 data for both stations is presented in Table 16 for 2013-2020.

The 2020 Ambient Air Annual Report (RWDI, 2020) noted the following observations:

- The maximum measured hourly average NO_2 concentrations at the two stations have generally shown the Courtice Station having higher maximums than Rundle Road apart from 2014 and 2019; 2017 showed similar levels.
- The maximum measured 24-hour average NO_2 concentrations at the two stations have remained relatively constant and have generally shown similar levels between both stations year to year.
- Measured annual average NO_2 concentrations at the Courtice Station have been slightly higher than the Rundle Road Station apart from 2013 and 2015 where they showed similar levels. Measured annual average NO_2 concentrations at both stations were relatively constant for all the years presented.
- Measured maximum 1-hour and 24-hour average NO_2 concentrations have not come close to exceeding the applicable AAQC over the 2013-2020 period.

In 2020, there were more frequent SO_2 concentrations elevated above the AAQC's than in previous years due to the new limits imposed at the start of 2020. A summary of annual SO_2 data for both stations is presented in Table 17 for 2013-2020. The 2020 Ambient Air Annual Report (RWDI, 2020) noted the following observations:

- In previous years the measured maximum 1-hour, 24-hour average and annual average SO_2 concentrations did not come close to exceeding their applicable AAQC.
- In 2020, the maximum 1-hour mean AAQC was changed from 250 to 40 ppb (an 84 per cent reduction). There were nineteen (19) exceedances of the new criteria at the Courtice station and five (5) exceedances at the Rundle station.
- There were also twenty-four (24) and nine (9) exceedances of the rolling 10-minute average AAQC (67 ppb) at the Courtice and Rundle stations respectively.
- The maximum measured hourly average SO_2 concentrations at the two stations have generally shown the Courtice Station consistently having higher maximums than Rundle Road and both stations trending the same over the entire timeseries.
- The maximum measured 24-hour average SO_2 concentrations at the two stations have generally shown the Courtice Station consistently having higher maximums than Rundle Road with the exception of 2015 where maximums were generally the same. Measured 24-hour average SO_2 concentrations at both stations were relatively constant for all the years presented.
- Measured annual average SO_2 concentrations at the Courtice Station have been slightly higher than the Rundle Road Station apart from 2015 where they showed similar levels. Measured annual average SO_2 concentrations at both stations were relatively constant for all the years presented.

All continuously monitored PM2.5 levels were below the applicable CAAQS' from 2013 to 2020 for both the Courtice and Rundle Road Monitoring Stations. A summary of annual PM2.5 data for both stations is presented in Table 18 for 2013-2020. The 2020 Ambient Air Annual Report (RWDI, 2020) noted the following observations:

- The 3-year averaged annual $PM_{2.5}$ concentrations measured at the two stations have generally shown a declining trend in overall averages and the Rundle Road Station has had a slightly higher average as compared to the Courtice Station, with the exception of 2017-2019 where both stations were similar and 2018-2020 where Courtice is slightly higher.
- The 3-Year averages of annual 98th percentile 24-Hour $PM_{2.5}$ mean concentrations measured at the two stations have generally shown a declining trend in overall averages and the Rundle Road Station has had a slightly higher average as compared to the Courtice Station, with the exception of 2017-2019 where both stations were similar and 2018-2020 where Courtice is slightly higher.

Table 16: 2013-2020 Comparison of Measured NOX, NO and NO2 Statistics for Courtice and Rundle Road Monitoring Stations

Contaminant	Statistic	Courtice Station								Rundle Road Station							
		2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020	2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020
NO_x (ppb)	Annual Arithmetic Mean	9.6	10.8	9.1	8.8	9.0	8.0	7.1	5.6	8	7.8	8.2	7.1	7.2	6.7	5.1	4.6
	Maximum 1-hour Mean	151.3	122.2	148.5	97.1	146.9	86.8	98.7	95.1	68.5	70	102	71.3	89.3	73.6	275.7	66.3
	Maximum 24-hour Mean	49.6	52.1	42.6	44.7	45.0	35.6	38.6	38.3	34.9	38.6	31.9	28.3	35.5	32.3	27.9	22.1
NO (ppb)	Annual Arithmetic Mean						2.1	1.5	1.1						1.9	1	0.8
	Maximum 1-hour Mean	111.1	79.1	88.5	69.5	128.9	68.5	62.6	57.3	40.7	38.2	90.9	42.8	88.5	54.3	218.6	31.7
	Maximum 24-hour Mean	22.9	21.7	22.3	21.9	25.1	17.2	19.5	15.6	10.6	11.2	15.9	9.2	7.9	11.9	14.7	5
NO_2 (ppb)	Annual Arithmetic Mean	6.4	8	6.8	6.4	6.4	6.1	5.8	4.6	6.5	6.1	6.6	5.4	5.5	4.9	4.3	3.9
	Annual CAAQS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17.0
	Events > Annual CAAQS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	Maximum 1-hour Mean	48	52.7	62.3	62.4	42.8	70.6	41.3	39	39.3	62.2	42.6	36.2	42.9	38.3	57.2	35.2
	1-hour AAQC	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
	Events > 1-hour AAQC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	98^{th} Percentile (Daily Maximum 1-hr Mean) [2]						37.4	36.6	35.1						30.2	26.9	23.5
	3-Year Average of the Annual 98th Percentile of the Daily Maximum 1-hour Mean Concentrations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	36.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	26.9
	1-Hour CAAQS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	60.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	60.0
	Events > 1-Hour CAAQS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	Maximum Running 24-hour Mean	26.8	31.7	25.9	23.1	26.4	21.0	23.2	25.6	24.7	28	22.6	21.5	30.5	20.5	19.8	17.2
	24-hour AAQC	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	Events > 24-hour AAQC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes: [1] 2013-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b).

Table 17: 2013-2020 Comparison of Measured SO2 Statistics for Courtice and Rundle Road Monitoring Stations

Contaminant	Statistic	Courtice Station								Rundle Road Station							
		2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020	2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020
SO_2 (ppb)	Annual Arithmetic Mean	1.6	1.5	1	1.7	1.8	2.7	1.9	1.4	0	0.7	0.7	0.8	0.6	0.7	0.5	0.4
	Annual AAQC	20	20	20	20	20	20	4[3]	4	20	20	20	20	20	20	4[3]	4
	Events > Annual AAQC	N/A [2]	0	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0
	Maximum 1-hour Mean	56.3	43.3	39	57.1	95.6	96.2	58.2	67.2	24.8	34.1	28.3	30.7	61.0	66.0	34.8	59.7
	1-hour AAQC	250	250	250	250	250	250	250	40	250	250	250	250	250	250	250	40
	Events > 1-hour AAQC	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	5
	99th Percentile (Daily Maximum 1-hr Mean)						73.0	50.8	51.6						33.4	25.7	35.8
	3-Year Average of the Annual 99th Percentile of the Daily Maximum 1-hour Mean Concentrations	N/A	N/A	N/A	N/A	N/A	N/A	N/A	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	31.6
	1-Hour CAAQS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	70
	Events > 1-Hour CAAQS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	Maximum Running 24-hour Mean	13.8	15.6	8.8	13	18.7	17.0	18.6	21.4	3.9	4.2	8.3	6.2	5.2	8.1	5.6	6.7
	24-hour AAQC	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	Events > 24-hour AAQC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes: [1] 2013-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b).
[2] As per Stantec's 2017 Annual Report (Stantec, 2018), the measurement period in 2013 was less than 9 months therefore annual averages are not comparable to the AAQC
[3] MECP comments on the 2019 Q4 report called for comparison to the 2020 annual SO_2 AAQC of 4 ppb in the 2019 Annual Report

Table 18: 2013-2020 Comparison of Measured PM2.5 Statistics for Courtice and Rundle Road Monitoring Stations

Contaminant	Statistic	Courtice Station								Rundle Road Station							
		2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020	2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020
$PM_{2.5}$ (µg/m³)	Annual Arithmetic Mean	8.4	8.6	7.7	6.8	6.4	6.3	6.4	5.9	8.4	8.5	9.5	9.6	6.3	6.1	5.7	5.2
	3-Year Average of the Annual Arithmetic Mean of all 1-hour Concentrations	N/A	N/A	N/A [2]	7.7	7.0	6.5	6.4	6.2	N/A	N/A	N/A [2]	9.2	8.5	7.3	6.0	5.7
	Annual CAAQS	10	10	10	10	10	10	10	8.8	10	10	10	10	10	10	10	8.8
	Events > Annual CAAQS	N/A [3]	N/A [3]	N/A [3]	0	0	0	0	0	N/A [3]	N/A [3]	N/A [3]	0	0	0	0	0
	Maximum 1-hour Mean						64.8	68.6	45.1						68.3	49.0	45.2
	Maximum Running 24-hour Mean	27	43.2	59.6	34.7	70.6	34.6	35.7	28.6	50.6	41.3	64.7	43.1	35.8	31.4	33.6	23.1
	98th Percentile (24-hour Mean)	21.5	22.3	27.3	21.6	19.8	18.7	18.5	17	21.7	21.1	28.4	32.9	20.3	18.6	17.4	16.1
	3-Year Average of the Annual 98th Percentile of the Daily 24-hour Mean Concentrations	N/A	N/A	N/A [2]	23.7	22.9	20.0	19.0	18.1	N/A	N/A	N/A [2]	27.5	27.2	23.9	18.8	17.4
	24-hour CAAQS	30	30	28	28	28	28	28	27	30	30	28	28	28	28	28	27
	Events > 24-hour CAAQS	N/A [3]	N/A [3]	N/A [3]	0	0	0	0	0	N/A [3]	N/A [3]	N/A [3]	0	0	0	0	0

Notes: [1] 2013-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b).
[2] As per Stantec's 2017 Annual Report (Stantec, 2018), the measurement period in 2013 was less than 9 months, therefore the 3-year average for 2013-2015 is not applicable.
[3] As per Stantec's 2017 Annual Report (Stantec, 2018), the measurement period in 2013 was less than 9 months, therefore the 3-year averages for comparison to CAAQS' are not comparable.

A summary of the maximum measured daily average Total Suspended Particulates (TSP) and Metal concentrations and percentage of the applicable AAQC'/HHRC' from 2013-2014, and 2016-2020 at the Courtice and Rundle Road Monitoring Stations is presented in Tables 19 and 20, respectively. The 2013, 2014 and 2016 data should be reviewed with caution "since the measurement period in 2013 was eight months (April-December), six months (January-June) in 2014, and 11 months (February-December) in 2016, due to the non-continuous monitoring being temporarily discontinued as per the ambient monitoring plan (Stantec, 2018). There were two (2) TSP exceedances in 2017, four (4) exceedances in 2018, and one (1) exceedance in 2019. No other exceedances of TSP or Metals have occurred at the Courtice or Rundle Road Monitoring Stations from 2013 to 2020. An investigation into DYEC performance was undertaken upon each TSP exceedance.

Table 19: 2013-2020 Comparison of Measured TSP and Metals Concentrations at the Courtice Station

Contaminant	Units	AAQC	HHRA	Maximum Concentration								Percentage of Criteria							
				2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020	2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020
Particulate (TSP)	μg/m³	*120*	*120*	62.0	57.0		94.7	59.6	84.7	146.4	69.7	51.7%	47.5%		78.9%	49.7%	70.6%	122.0%	58.1%
Total Mercury (Hg)	μg/m³	*2*	*2*	3.12E-05	2.15E-05		3.62E-05	3.60E-05	4.19E-05	7.75E-05	4.00E-05	0.002%	0.001%		0.002%	0.002%	0.002%	0.004%	0.002%
Aluminum (Al)	μg/m³	*4.8*	-	3.34E-01	3.57E-01		6.78E-01	4.49E-01	8.95E-01	1.00E+00	5.00E-01	7.0%	7.4%		14.1%	9.4%	18.6%	20.8%	10.4%
Antimony (Sb)	μg/m³	*25*	*25*	2.69E-03	3.91E-03		3.67E-03	3.73E-03	7.14E-03	2.55E-03	4.06E-03	0.01%	0.02%		0.01%	0.01%	0.03%	0.01%	0.02%
Arsenic (As)	μg/m³	*0.3*	*0.3*	3.79E-03	2.35E-03		2.20E-03	4.14E-03	4.29E-03	2.76E-03	3.28E-03	1.3%	0.8%		0.7%	1.4%	1.4%	0.9%	1.1%
Barium (Ba)	μg/m³	*10*	*10*	1.58E-02	1.90E-02		3.39E-02	2.05E-02	1.89E-02	2.23E-02	1.55E-02	0.2%	0.2%		0.3%	0.2%	0.2%	0.2%	0.2%
Beryllium (Be)	μg/m³	*0.01*	*0.01*	2.69E-04	3.91E-04		3.67E-04	3.73E-04	1.56E-03	7.19E-05	3.26E-05	2.7%	3.9%		3.7%	3.7%	15.6%	0.7%	0.3%
Bismuth (Bi)	μg/m³	-	-	1.66E-03	2.35E-03		2.20E-03	2.24E-03	4.29E-03	1.42E-03	5.86E-04	-	-		-	-	-	-	-
Boron (B)	μg/m³	*120*	-	1.13E-02	5.61E-03		8.50E-03	5.39E-03	1.31E-02	1.39E-02	1.30E-02	0.009%	0.005%		0.007%	0.004%	0.011%	0.012%	0.011%
Cadmium (Cd)	μg/m³	*0.025*	*0.025*	5.59E-04	1.18E-03		7.34E-04	7.45E-04	1.90E-03	6.95E-04	5.45E-03	2.2%	4.7%		2.9%	3.0%	7.6%	2.8%	21.8%
Chromium (Cr)	μg/m³	*0.5*	-	3.82E-03	6.29E-03		7.74E-03	1.03E-02	9.50E-03	2.25E-02	4.64E-03	0.8%	1.3%		1.5%	2.1%	1.9%	4.5%	0.9%
Cobalt (Co)	μg/m³	*0.1*	*0.1*	5.59E-04	7.83E-04		7.34E-04	7.45E-04	1.43E-03	6.95E-04	6.51E-04	0.6%	0.8%		0.7%	0.7%	1.4%	0.7%	0.7%
Copper (Cu)	μg/m³	*50*	-	7.68E-02	5.95E-02		1.27E-01	9.85E-02	4.55E-02	6.10E-02	4.70E-02	0.2%	0.1%		0.3%	0.2%	0.1%	0.1%	0.1%
Iron (Fe)	μg/m³	*4*	-	9.90E-01	9.26E-01		1.58E+00	1.01E+00	2.53E+00	3.31E+00	1.26E+00	24.8%	23.2%		39.5%	25.3%	63.3%	82.8%	31.6%
Lead (Pb)	μg/m³	*0.5*	*0.5*	6.47E-03	5.50E-03	N/A	7.52E-03	1.09E-02	1.43E-02	1.39E-02	7.81E-03	0.3%	0.3%	N/A	0.4%	0.5%	0.7%	0.7%	0.4%
Magnesium (Mg)	μg/m³	-	-	5.71E-01	4.13E-01		1.14E+00	5.61E-01	1.21E+00	1.25E+00	8.98E-01	-	-		-	-	-	-	-
Manganese (Mn)	μg/m³	*0.4*	-	3.31E-02	3.08E-02		4.86E-02	5.25E-02	7.25E-02	1.20E-01	3.69E-02	8.3%	7.7%		12.2%	13.1%	18.1%	30.1%	9.2%
Molybdenum (Mo)	μg/m³	*120*	-	1.65E-03	2.36E-03		3.15E-03	4.44E-03	7.69E-03	2.20E-03	3.01E-03	0.001%	0.002%		0.003%	0.004%	0.006%	0.002%	0.003%
Nickel (Ni)	μg/m³	*0.2*	-	4.35E-03	2.78E-03		2.40E-03	3.95E-03	3.85E-03	5.35E-03	2.95E-03	2.2%	1.4%		1.2%	2.0%	1.9%	2.7%	1.5%
Phosphorus (P)	μg/m³	-	-	1.45E-01	1.05E-01		4.60E-01	9.76E-02	1.08E+00	2.02E+00	1.36E+00	-	-		-	-	-	-	-
Selenium (Se)	μg/m³	*10*	*10*	2.69E-03	3.91E-03		3.67E-03	3.73E-03	7.14E-03	3.48E-03	3.26E-03	0.03%	0.04%		0.04%	0.04%	0.07%	0.03%	0.03%
Silver (Ag)	μg/m³	*1*	*1*	1.89E-03	1.96E-03		1.83E-03	1.86E-03	3.57E-03	3.48E-04	3.26E-04	0.2%	0.2%		0.2%	0.2%	0.4%	0.0%	0.03%
Strontium (Sr)	μg/m³	*120*	-	1.10E-02	1.34E-02		1.86E-02	1.38E-02	1.73E-02	4.35E-02	2.08E-02	0.01%	0.01%		0.02%	0.01%	0.01%	0.04%	0.02%
Thallium (Tl)	μg/m³	-	-	2.69E-03	3.91E-03		3.67E-03	3.73E-03	7.14E-03	9.81E-05	2.93E-05	-	-		-	-	-	-	-
Tin (Sn)	μg/m³	*10*	*10*	4.79E-03	3.91E-03		3.67E-03	3.73E-03	7.14E-03	2.52E-03	2.47E-03	0.05%	0.04%		0.04%	0.04%	0.07%	0.03%	0.02%
Titanium (Ti)	μg/m³	*120*	-	1.73E-02	2.26E-02		2.82E-02	2.08E-02	3.19E-02	4.31E-02	3.10E-02	0.01%	0.02%		0.02%	0.02%	0.03%	0.04%	0.03%
Uranium (Ur)	μg/m³	*0.3*	-	1.24E-04	1.76E-04		1.65E-04	1.68E-04	3.57E-03	1.11E-04	6.97E-05	0.04%	0.06%		0.06%	0.06%	1.19%	0.04%	0.02%
Vanadium (V)	μg/m³	*2*	*1*	6.50E-02	1.14E-01		9.54E-02	2.46E-01	3.57E-03	2.02E-02	1.63E-03	3.3%	5.7%		4.8%	12.3%	0.2%	1.0%	0.1%
Zinc (Zn)	μg/m³	*120*	-	1.39E-03	1.96E-03		1.83E-03	1.86E-03	1.86E-01	1.66E-01	9.38E-02	0.001%	0.002%		0.002%	0.002%	0.155%	0.138%	0.1%
Zirconium (Zr)	μg/m³	*20*	-	1.92E-03	1.96E-03		1.83E-03	1.86E-03	1.64E-03	2.35E-03	3.33E-03	0.010%	0.010%		0.009%	0.009%	0.008%	0.012%	0.017%

Notes: [1] 2013-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b).

Table 20: 2013-2020 Comparison of Measured TSP and Metals Concentrations at the Rundle Road Station

Contaminant	Units	AAQC	HHRA	Maximum Concentration 2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020
Particulate (TSP)	$\mu g/m^3$	*120*	*120*	78.0	59.0		97.1	232	203.6	81.7	102.3
Total Mercury (Hg)	$\mu g/m^3$	*2*	*2*	5.14E-05	2.94E-05		2.50E-05	4.80E-05	9.83E-05	6.10E-05	4.40E-05
Aluminum (Al)	$\mu g/m^3$	*4.8*	-	4.54E-01	2.90E-01		7.86E-01	1.08E+00	1.42E+00	6.64E-01	1.19E+00
Antimony (Sb)	$\mu g/m^3$	*25*	*25*	2.86E-03	3.41E-03		3.57E-03	3.69E-03	2.64E-02	4.81E-03	1.53E-03
Arsenic (As)	$\mu g/m^3$	*0.3*	*0.3*	1.76E-03	2.05E-03		4.72E-03	2.21E-03	2.06E-02	4.79E-03	1.11E-02
Barium (Ba)	$\mu g/m^3$	*10*	*10*	1.61E-02	1.18E-02		2.37E-02	3.20E-02	2.58E-02	2.67E-02	1.97E-02
Beryllium (Be)	$\mu g/m^3$	*0.01*	*0.01*	2.86E-04	3.41E-04		3.57E-04	3.69E-04	1.81E-03	3.27E-05	3.37E-05
Bismuth (Bi)	$\mu g/m^3$	-	-	1.76E-03	2.05E-03		2.14E-03	2.21E-03	2.63E-03	1.46E-03	6.07E-04
Boron (B)	$\mu g/m^3$	*120*	-	1.45E-02	4.43E-03		7.45E-03	6.12E-03	1.33E-02	1.31E-02	1.35E-02
Cadmium (Cd)	$\mu g/m^3$	*0.025*	*0.025*	8.99E-04	6.83E-04		7.13E-04	7.38E-04	4.73E-03	6.54E-04	3.55E-03
Chromium (Cr)	$\mu g/m^3$	*0.5*	-	1.78E-02	4.75E-03		7.93E-03	1.75E-02	8.20E-03	8.54E-03	5.08E-03
Cobalt (Co)	$\mu g/m^3$	*0.1*	*0.1*	5.95E-04	6.83E-04		2.78E-03	7.38E-04	8.77E-04	6.54E-04	1.27E-03
Copper (Cu)	$\mu g/m^3$	*50*	-	2.36E-01	1.93E-01		1.16E-01	2.29E-01	6.15E-02	8.54E-02	7.30E-02
Iron (Fe)	$\mu g/m^3$	*4*	-	1.31E+00	9.30E-01		1.83E+00	2.26E+00	2.97E+00	1.25E+00	2.00E+00
Lead (Pb)	$\mu g/m^3$	*0.5*	*0.5*	6.80E-03	7.34E-03		7.25E-03	1.30E-02	3.96E-01	5.81E-03	5.93E-03
Magnesium (Mg)	$\mu g/m^3$	-	-	6.76E-01	2.97E-01	N/A	1.10E+00	1.76E+00	2.10E+00	9.90E-01	9.86E-01
Manganese (Mn)	$\mu g/m^3$	*0.4*	-	1.02E-01	2.60E-02		6.56E-02	7.74E-02	1.13E-01	5.56E-02	3.68E-02
Molybdenum (Mo)	$\mu g/m^3$	*120*	-	3.79E-03	2.76E-03		6.24E-03	3.13E-02	6.26E-03	2.20E-03	2.90E-03
Nickel (Ni)	$\mu g/m^3$	*0.2*	-	4.67E-03	4.58E-03		1.94E-02	3.62E-03	3.26E-03	2.42E-03	3.02E-03
Phosphorus (P)	$\mu g/m^3$	-	-	1.59E-01	1.85E-01		1.03E-01	1.45E-01	1.75E+00	2.15E+00	6.77E-01
Selenium (Se)	$\mu g/m^3$	*10*	*10*	2.86E-03	3.41E-03		3.57E-03	3.69E-03	4.39E-03	3.27E-03	3.37E-03
Silver (Ag)	$\mu g/m^3$	*1*	*1*	2.33E-03	1.71E-03		1.78E-03	1.85E-03	1.06E-02	3.27E-04	3.37E-04
Strontium (Sr)	$\mu g/m^3$	*120*	-	1.95E-02	1.09E-02		2.11E-02	7.54E-02	5.82E-02	3.13E-02	4.07E-02
Thallium (Tl)	$\mu g/m^3$	-	-	2.86E-03	3.41E-03		3.57E-03	3.69E-03	4.39E-03	6.36E-05	3.03E-05
Tin (Sn)	$\mu g/m^3$	*10*	*10*	2.86E-03	3.41E-03		4.12E-02	3.69E-03	3.09E-02	4.30E-03	2.97E-03
Titanium (Ti)	$\mu g/m^3$	*120*	-	2.40E-02	1.71E-02		3.50E-02	6.46E-02	5.57E-02	2.52E-02	7.13E-02
Uranium (Ur)	$\mu g/m^3$	*0.3*	-	1.32E-04	1.54E-04		1.60E-04	1.66E-04	1.97E-04	3.27E-05	1.43E-04
Vanadium (V)	$\mu g/m^3$	*2*	*1*	7.43E-02	1.24E-01		6.66E-02	2.95E-01	1.88E-02	3.46E-02	1.69E-03
Zinc (Zn)	$\mu g/m^3$	*120*	-	1.48E-03	1.71E-03		1.78E-03	1.85E-03	1.12E-01	5.87E-02	1.05E-01
Zirconium (Zr)	$\mu g/m^3$	*20*	-	3.22E-03	1.71E-03		3.14E-03	3.43E-03	2.19E-03	6.54E-04	1.43E-03

Contaminant	Percentage of Criteria 2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020
Particulate (TSP)	65.0%	49.2%		80.9%	193.3%	169.7%	68.1%	85.2%
Total Mercury (Hg)	0.003%	0.001%		0.001%	0.002%	0.005%	0.003%	0.002%
Aluminum (Al)	9.5%	6.0%		16.4%	22.5%	29.6%	13.8%	24.8%
Antimony (Sb)	0.01%	0.01%		0.01%	0.01%	0.11%	0.02%	0.006%
Arsenic (As)	0.6%	0.7%		1.6%	0.7%	6.9%	1.6%	3.7%
Barium (Ba)	0.2%	0.1%		0.2%	0.3%	0.3%	0.3%	0.2%
Beryllium (Be)	2.9%	3.4%		3.6%	3.7%	18.1%	0.3%	0.3%
Bismuth (Bi)	-	-		-	-	-	-	-
Boron (B)	0.012%	0.004%		0.006%	0.005%	0.011%	0.011%	0.01%
Cadmium (Cd)	3.6%	2.7%		2.9%	3.0%	18.9%	2.6%	14.2%
Chromium (Cr)	3.6%	1.0%		1.6%	3.5%	1.6%	1.7%	1.0%
Cobalt (Co)	0.6%	0.7%		2.8%	0.7%	0.9%	0.7%	1.3%
Copper (Cu)	0.5%	0.4%		0.2%	0.5%	0.1%	0.2%	0.1%
Iron (Fe)	32.8%	23.3%		45.8%	56.5%	74.1%	31.2%	50.1%
Lead (Pb)	0.3%	0.4%		0.4%	0.7%	19.8%	0.3%	0.3%
Magnesium (Mg)	-	-	N/A	-	-	-	-	-
Manganese (Mn)	25.5%	6.5%		16.4%	19.4%	28.1%	13.9%	9.2%
Molybdenum (Mo)	0.003%	0.002%		0.005%	0.026%	0.005%	0.002%	0.002%
Nickel (Ni)	2.3%	2.3%		9.7%	1.8%	1.6%	1.2%	1.5%
Phosphorus (P)	-	-		-	-	-	-	-
Selenium (Se)	0.03%	0.03%		0.04%	0.04%	0.04%	0.03%	0.03%
Silver (Ag)	0.2%	0.2%		0.2%	0.2%	1.1%	0.0%	0.03%
Strontium (Sr)	0.02%	0.01%		0.02%	0.06%	0.05%	0.03%	0.03%
Thallium (Tl)	-	-		-	-	-	-	-
Tin (Sn)	0.03%	0.03%		0.41%	0.04%	0.31%	0.04%	0.03%
Titanium (Ti)	0.02%	0.01%		0.03%	0.05%	0.05%	0.02%	0.06%
Uranium (Ur)	0.04%	0.05%		0.05%	0.06%	0.07%	0.01%	0.05%
Vanadium (V)	3.7%	6.2%		3.3%	14.8%	0.9%	1.7%	0.1%
Zinc (Zn)	0.001%	0.001%		0.001%	0.002%	0.093%	0.049%	0.087%
Zirconium (Zr)	0.016%	0.009%		0.016%	0.017%	0.011%	0.003%	0.01%

Notes: [1] 2013-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b)

A summary of the maximum measured daily average Polycyclic Aromatic Hydrocarbons (PAH) concentrations and percentage of the applicable AAQC from 2013-2014, and 2016-2020 for both Courtice and Rundle Road Monitoring Stations is presented in Table 21 and 22 respectively. The 2013, 2014 and 2016 data should be reviewed with caution "since the measurement periods are not the same in each year, the data are not directly comparable" (Stantec, 2018).

The maximum measured PAH concentrations, with the exception of Benzo(a)Pyrene, were all well below applicable AAQC from 2013-2020.

Table 21: 2013-2020 Comparison of Measured PAH Concentrations at the Courtice Station

Contaminant	Units	*MECP Criteria*	*HHRA*	Maximum Concentration								Percentage of Criteria							
				2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020	2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020
1-Methylnaphthalene	ng/m³	*12000*	-	27.2	8.2		24.0	19.7	21.8	14.6	16.9	0.2%	0.1%		0.2%	0.2%	0.2%	0.1%	0.1%
2-Methylnaphthalene	ng/m³	*10000*	-	54.3	13.9		50.4	33.5	39.9	23.5	28.8	0.5%	0.1%		0.5%	0.3%	0.4%	0.2%	0.3%
Acenaphthene	ng/m³	-	-	38.7	11.8		29.6	17.0	20.2	10.1	14.3	-	-		-	-	-	-	-
Acenaphthylene	ng/m³	*3500*	-	1.1	0.4		0.3	0.8	0.6	0.5	1.6	0.03%	0.01%		0.01%	0.02%	0.02%	0.01%	0.05%
Anthracene	ng/m³	*200*	-	13.1	1.1		0.5	0.6	0.8	0.4	0.5	6.6%	0.6%		0.3%	0.3%	0.4%	0.2%	0.3%
Benzo(a)Anthracene	ng/m³	-	-	0.2	0.2		0.1	0.1	0.1	0.1	0.1	-	-		-	-	-	-	-
Benzo(a)fluorene	ng/m³	-	-	0.3	0.3		0.2	0.2	0.2	0.1	0.1	-	-		-	-	-	-	-
Benzo(a)Pyrene	ng/m³	*0.05[2] 5[3] 1.1[4]*	*1*	0.1	0.1		0.1	0.1	0.2	0.1	0.1	129.6%	264%		207%	176%	361%	197%	185%
Benzo(b)Fluoranthene	ng/m³	-	-	0.4	0.6		2.5	0.1	0.3	0.1	0.3	-	-		-	-	-	-	-
Benzo(b)fluorene	ng/m³	-	-	0.3	0.3		0.2	0.2	0.2	0.1	0.1	-	-		-	-	-	-	-
Benzo(e)Pyrene	ng/m³	-	-	0.3	0.3		0.2	0.2	0.2	0.1	0.2	-	-		-	-	-	-	-
Benzo(g,h,i)Perylene	ng/m³	-	-	0.4	0.3		2.5	0.1	0.1	0.1	0.2	-	-		-	-	-	-	-
Benzo(k)Fluoranthene	ng/m³	-	-	0.4	0.3	N/A	2.5	0.1	0.1	0.1	0.2	-	-	N/A	-	-	-	-	-
Biphenyl	ng/m³	-	-	14.9	4.5		11.1	9.7	10.1	5.0	8.6	-	-		-	-	-	-	-
Chrysene	ng/m³	-	-	0.2	0.5		0.2	0.1	0.3	0.2	0.4	-	-		-	-	-	-	-
Dibenzo(a,h)Anthracene	ng/m³	-	-	0.3	0.5		2.8	0.1	0.1	0.03	0.0	-	-		-	-	-	-	-
Fluoranthene	ng/m³	-	-	4.5	4.0		3.2	2.6	3.3	1.2	2.1	-	-		-	-	-	-	-
Fluorene	ng/m³	-	-	-	-		-	-	-	2.9	9.8	-	-		-	-	-	-	-
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	0.4	0.5		2.8	0.1	0.1	0.1	0.2	-	-		-	-	-	-	-
Naphthalene	ng/m³	*22500*	*22500*	143.0	38.7		60.9	92.2	77.8	48.1	67.1	0.6%	0.2%		0.3%	0.4%	0.3%	0.2%	0.3%
o-Terphenyl	ng/m³	-	-	0.3	0.3		0.2	0.2	0.2	0.02	0.0	-	-		-	-	-	-	-
Perylene	ng/m³	-	-	0.3	0.3		0.2	0.2	0.2	0.02	0.0	-	-		-	-	-	-	-
Phenanthrene	ng/m³	-	-	33.9	14.2		23.1	16.4	21.6	8.7	15.8	-	-		-	-	-	-	-
Pyrene	ng/m³	-	-	1.7	2.5		1.3	1.2	1.4	0.6	1.0	-	-		-	-	-	-	-
Tetralin	ng/m³	-	-	5.8	25.3		3.8	4.9	4.6	7.8	12.7	-	-		-	-	-	-	-
Total PAH[5]	ng/m³	-	-	327.0	95.0		208.7	200.0	203.6	117.9	170.2	-	-		-	-	-	-	-

Notes:
[1] 2013-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b)
[2] Ontario AAQC. The Standard for benzo(a)Pyrene (B(a)P) is for B(a)P as a surrogate for PAHs
[3] O.Reg. 419/05 Schedule 6 Upper Risk Thresholds
[4] O.Reg. 419/05 24 Hour Guideline
[5] The reported total PAH is the sum of all analysed PAH species

Table 22: 2013-2020 Comparison of Measured PAH Concentrations at the Rundle Road Station

Contaminant	Units	MECP Criteria	HHRA	Maximum Concentration								Percentage of Criteria							
				2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020	2013 [1]	2014 [1]	2015 [1]	2016 [1]	2017 [1]	2018[1]	2019	2020
1-Methylnaphthalene	ng/m³	12000	-	26.6	10.8		238.2	29.4	26.6	16.1	27.0	0.2%	0.1%		2.0%	0.2%	0.2%	0.1%	0.2%
2-Methylnaphthalene	ng/m³	10000	-	45.4	18.7		502.5	69.2	54.1	29.4	48.5	0.5%	0.2%		5.0%	0.7%	0.5%	0.3%	0.5%
Acenaphthene	ng/m³	-	-	18.9	8.1		303.2	44.1	40.4	18.0	26.9	-	-		-	-	-	-	-
Acenaphthylene	ng/m³	3500	-	1.6	2.0		3.3	1.2	0.6	0.6	0.6	0.1%	0.1%		0.1%		0.02%	0.02%	0.02%
Anthracene	ng/m³	200	-	1.5	0.7		7.5	3.1	2.6	1.9	2.1	0.8%	0.4%		3.8%		1.3%	0.9%	1.1%
Benzo(a)Anthracene	ng/m³	-	-	0.5	0.2		0.2	0.1	0.1	0.1	0.1	-	-		-	-			-
Benzo(a)fluorene	ng/m³	-	-	0.6	0.3		0.4	0.4	0.3	0.1	0.2	-	-						-
Benzo(a)Pyrene	ng/m³	0.05[2] 5[3] 1.1[4]	1	0.4	0.3		0.2	0.2	0.1	0.1	0.1	826%	576%		415%	316%	278%	221%	258.7%
Benzo(b)Fluoranthene	ng/m³	-	-	1.0	0.7		0.5	0.4	0.1	0.2	0.2	-	-		-	-	-	-	-
Benzo(b)fluorene	ng/m³	-	-	0.5	0.3		0.2	0.3	0.3	0.1	0.1	-	-		-	-	-	-	-
Benzo(e)Pyrene	ng/m³	-	-	0.5	0.3		0.2	0.3	0.3	0.1	0.1	-	-		-	-	-	-	-
Benzo(g,h,i)Perylene	ng/m³	-	-	0.6	0.3		0.1	0.1	0.1	0.1	0.1	-	-		-	-	-	-	-
Benzo(k)Fluoranthene	ng/m³	-	-	0.3	0.2	N/A	0.1	0.1	0.1	0.1	0.2	-	-	N/A	-	-	-	-	-
Biphenyl	ng/m³	-	-	7.4	5.8		125.9	14.2	13.2	5.5	19.3	-	-		-	-	-	-	-
Chrysene	ng/m³	-	-	0.9	0.7		0.4	0.1	0.2	0.2	0.3	-	-		-	-	-	-	-
Dibenzo(a,h)Anthracene	ng/m³	-	-	0.2	0.2		0.1	0.1	0.1	0.03	0.1	-	-		-	-	-	-	-
Fluoranthene	ng/m³	-	-	7.7	3.5		14.7	13.9	13.5	4.7	6.2	-	-		-	-	-	-	-
Fluorene	ng/m³	-	-	-	-		-	-	-	6.9	16.5	-	-		-	-	-	-	-
Indeno(1,2,3-cd)Pyrene	ng/m³	-	-	0.5	0.3		0.2	0.1	0.1	0.1	0.1	-	-		-	-	-	-	-
Naphthalene	ng/m³	22500	22500	94.1	92.6		294.6	85.4	74.2	53.7	104.7	0.4%	0.4%		1.3%	0.4%	0.3%	0.2%	0.5%
o-Terphenyl	ng/m³	-	-	0.5	0.3		0.2	0.3	0.3	0.02	0.0	-	-		-	-	-	-	-
Perylene	ng/m³	-	-	0.5	0.3		0.2	0.3	0.3	0.02	0.0	-	-		-	-	-	-	-
Phenanthrene	ng/m³	-	-	29.4	13.0		209.7	69.8	58.1	24.0	30.6	-	-		-	-	-	-	-
Pyrene	ng/m³	-	-	3.2	1.9		6.6	5.6	5.4	2.0	3.6	-	-		-	-	-	-	-
Tetralin	ng/m³	-	-	5.1	4.0		4.4	3.8	7.7	36.0	16.8	-	-		-	-	-	-	-
Total PAH[5]	ng/m³	-	-	165.0	153.9		1710.2	309.0	292.1	160.3	274.2	-	-		-	-	-	-	-

Notes: [1] 2013-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b)
[2] Ontario AAQC. The Standard for benzo(a)Pyrene (B(a)P) is for B(a)P as a surrogate for PAHs
[3] O.Reg. 419/05 Schedule 6 Upper Risk Thresholds
[4] O.Reg. 419/05 24 Hour Guideline
[5] The reported total PAH is the sum of all analysed PAH species

The maximum measured ambient toxic equivalent Dioxins and Furans (D&F) concentrations from 2013 – 2020 and their specific measurement period for both Courtice and Rundle Road Monitoring Stations is presented in Table 23. The 2013-2016 data should be reviewed with caution "as the measurement periods were different and cover different periods of each year (with different meteorological conditions). Only the 2017 measurements encompassed a full year as previous years sampling were dependent on the start-up date of the DYEC" (Stantec, 2018).

There was one (1) exceedance of the maximum measured toxic equivalent D&F concentration AAQC at the Courtice Monitoring Station in 2018, but none in 2013-2017 or 2019-2020. The maximum measured toxic equivalent D&F concentrations at the Rundle Road Station were all below the applicable AAQC from 2013-2020. An investigation into DYEC performance was undertaken upon the exceedance. The exceedance was determined not to be a result of DYEC facility operations. During the monitoring period the predominant winds were blowing from the southwest and west which places the Courtice station upwind of the Durham York Energy Centre. A toxicological review concluded no adverse effects would be expected based on the reported concentrations.

Table 23: 2013-2020 Comparison of Maximum Measured Dioxins and Furans Concentrations at the Courtice and Rundle Road Stations

Year	Sampling Period Throughout Year	Courtice Station		Rundle Road Station	
		Maximum Concentration (pg TEQ/m³)	No. of Exceedances	Maximum Concentration (pg TEQ/m³)	No. of Exceedances
2013 [1]	May - December	0.036	0	0.029	0
2014 [1]	January - June	0.038	0	0.065	0
2015 [1]	October - December	0.017	0	0.021	0
2016 [1]	February - December	0.044	0	0.026	0
2017 [1]	January – December	0.052	0	0.065	0
2018 [1]	January - December	0.109	1	0.091	0
2019	January - December	0.012	0	0.025	0
2020	January - December	0.025	0	0.030	0

Notes: [1] 2013-2018 Q2 data taken from Stantec's 2017 Annual Report (Stantec, 2018) and Stantec's 2018 Q1 (Stantec, 2018a) and Q2 Reports (Stantec, 2018b)

Golder assessed the suitability of the meteorological data collected as part of the DYEC Ambient Air Program for use in the development of the AQIA and updated ESDM model as requested by the MECP. The assessment compared data from the Courtice and Rundle Road ambient air monitoring stations to the Oshawa station, operated and maintained by Environment and Climate Change Canada. The data from the stations showed consistent annual trends and was deemed suitable for the inclusion in the CALMET modelling, considering the change in wind sensor height and disqualified data.

5. Significant Net Effects

A review of current monitoring data to complete the EA Screening Criteria checklist determined that a waste capacity increase of 20,000 tonnes per year may cause negative impacts to air quality.

To assess the potential changes the waste capacity increase will have on air quality, Golder completed a preliminary assessment, followed by and Air Quality Impact Assessment Report (Golder, 2021). For these assessments current and future operations were reviewed to document the difference in predicted air quality concentrations. Existing “background’ air quality is accounted for to determine how the project will alter the local air quality. The combined impact from the DYEC and existing background air quality was compared to Ambient Air Quality Criteria as indicators of good air quality.

The AQIA used the same modelling system as was used in the previous air quality studies for DYEC however a newer version of the modelling software and meteorological data was used to drive the model. The modeling approach was approved by the MECP. To assist in the modelling exercise, Golder used meteorological data obtained from the DYEC Ambient Air monitoring stations, in addition to several other federally maintained meteorological stations closest to the DYEC. Section 4 and 5 of the AQIA describes the modelling system and methodology used.

The dispersion modelling results were presented with and without background air quality concentrations and compared against the relevant Project Criteria. The cumulative concentrations of all contaminants (with background) are below the Project Criteria for all Indicator Compounds, with the exception of Benzo(a)pyrene, for both the current 140,000 tonnes per year and 160,000 tonnes per year scenario and nitrogen oxides over a 1 hour averaging period during testing of the standby generator.

The background concentration of benzo(a)pyrene is greater than the Project Criteria before any contribution from DYEC is included due to transportation emissions from the nearby Highway 401. Emissions from DYEC contribute less than 1% to the total ambient benzo(a)pyrene concentration for all assessed scenarios. The concentrations of benzo(a)pyrene are virtually the same before and after the operations of DYEC suggesting that the facility is not a significant source of benzo(a)pyrene.

The standby generator testing occurs for up to one hour, once per week. The assessment assumptions made were very conservative as they considered DYEC operating at maximum capacity, during the worst-case meteorological conditions. While the maximum predicted concentration is greater than the Canadian Ambient Air Quality Standards (CAAQS) (79 $\mu g/m^3$), it is much less than the Ontario Ambient Air Quality Criteria (AAQC) (400 $\mu g/m^3$).

Predicted concentrations of Nitrogen Oxides are below the AAQC for normal operations under both the current and future scenarios but exceed the 1-hour AAQC during stand-by diesel generator testing in both the current and future scenarios. Standby generator testing can occur for up to one hour, once per week. To identify the worst case 1-hour concentration, it was assumed that the generator may be tested at any time, therefore emissions were considered for every hour of the 5-year meteorological dataset. However, the CAAQS of 79 $\mu g/m^3$ is based on the three-year average of the 98th percentile of the daily maximum 1-hour concentrations, therefore, given the frequency of the generator testing, comparing the maximum predicted 1 hour concentration from the modelling is very conservative. This assessment assumes that generator testing occurs while DYEC is operating at maximum capacity and during the hour with worst case meteorological conditions, every day of the year, which is not realistic. Additionally, while the maximum predicted concentration is greater than the CAAQS of 79 $\mu g/m^3$, it is much less than the Ontario AAQC of 400 $\mu g/m^3$, which is also used as an indicator of good air quality. Maximum NO_2 concentrations during generator testing occur at the northern property boundary along Energy Drive (the fence line closest to the generator) and decrease with distance.

A comparison of the modelling results from the 140,000 tonnes per year and 160,000 tonnes per year operating scenarios determined that the change in predicted concentrations between the two scenarios is small with maximum predicted concentrations of all Indicator Parameters showing a decrease for future maximum operating scenario of 160,000 tonnes per year operating scenario.

Of the 116 combinations of Indicator Parameters and averaging periods assessed, the maximum predicted concentrations of 85 combinations changes by less than 1 per cent. All predicted concentrations vary by less than 17 per cent with all contaminants showing a decrease in predicted concentration, with the magnitude of change dependent on the averaging period. This fluctuation is anticipated to be a result of higher emission rates for the 160,000 tonnes per year combined with the increased flow rate and temperature which would improve dispersion for some meteorological conditions.

With background concentrations added to the predicted concentrations for DYEC, the resultant cumulative concentrations vary by even less, due to the high contribution of background concentrations. The maximum change was less than 1 per cent for all contaminants for which background data was available. All predicted concentrations were shown to decrease compared to the current maximum operating scenario.

Overall, the AQIA determined that the waste capacity increase of 20,000 tonnes per year is not expected to significantly impact local air quality. The results of the cumulative assessment are anticipated to represent a very conservative scenario as the worst-case meteorological conditions, during 90th percentile ambient air quality conditions and the maximum on-site activities were modelled to occur concurrently.It is anticipated that the ESDM will determine that the DYEC will continue to remain in compliance with O.Reg. 419/05 with a waste processing capacity of 160,000 tonnes per year. The ESDM will be submitted in support of the ECA Application. A review of previous studies undertaken in 2009 and updated studies for air and noise predict no significant negative net effects to the environment as a result of the waste capacity increase to 160,000 tonnes per year.

6. Project Benefits

A distinct advantage of processing 160,000 tonnes of waste per year is a result in increased operation efficiency for the DYEC. Operating each boiler at 218 tonnes per day results in the plant reaching 140,000 tonnes processed in approximately 321 days. While each boiler does have periods of downtime throughout the year to allow for cleaning and maintenance activities, these periods are typically less than 44 days per year (365 days – 321 days = 44 days). A disadvantage of operating the facility at less than full capacity, is a result in reduced efficiency of the plant's operations due to periods of operations which occur at less than full boiler load, or periods where boilers are idled as a result of reaching the annual waste capacity limit. Increasing the DYEC waste processing capacity allows for full use of the existing equipment maximizing the use of the investment without requiring any additional construction or building modifications.

Managing waste locally results in an annual net reduction of approximately 262 tonnes of CO_2 as well as other transportation related emissions. Waste that cannot be processed at the DYEC must be transported in tractor trailer to alternative disposal locations outside of the Region's borders. Managing an additional 20,000 tonnes of waste annually at the DYEC will reduce fuel consumption by 98,592 litres annually by removing 416 tractor trailers from the road. Landfill methane generation is also avoided resulting in additional greenhouse gas savings.

There is no cost associated with the increase in waste processing capacity since no additional or modified equipment is required. The Regions will realize cost savings from reduced contracted processing fees for waste tonnage in excess of 140,000 tonnes per year (110,000 tonnes for Durham Region) and additional power and materials revenue recoveries due to the additional waste tonnage processed. The 2019 preliminary financial forecast for Durham Region estimated net cost savings related to the DYEC capacity increase to 160,000 tonnes per year. Table 24 below outlines the status quo costs for Durham Region and the anticipated annual savings through 2023.

Table 24 :Estimated Durham Disposal Costs 2019 - 2023 (in millions)

	2019	2020	2021	2022	2023
Covanta Operating Fee	**13.2**	**13.5**	**13.7**	**14.0**	**14.2**
Property Taxes	0.5	0.5	0.6	0.6	0.6
Non-Covanta Operating Costs (gross costs)	0.9	0.9	0.9	1.0	1.0
Non-Covanta costs	**1.4**	**1.4**	**1.5**	**1.6**	**1.6**
Total Gross Costs	**14.6**	**14.9**	**15.2**	**15.6**	**15.8**
Revenues					
Electricity Revenues (IESO)	(7.0)	(7.1)	(7.1)	(7.2)	(7.2)
Materials Recovery Revenues	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
sub-total Revenues	**(7.5)**	**(7.6)**	**(7.6)**	**(7.7)**	**(7.7)**
Net Durham DYEC Cost	**7.1**	**7.3**	**7.6**	**7.9**	**8.1**
Covanta landfill disposal (beyond DYEC capacity)	**0.9**	**0.9**	**1.2**	**1.6**	**2.0**
Status Quo Cost of Disposal	**8.0**	**8.2**	**8.8**	**9.5**	**10.1**
With DYEC ECA Administrative Amendment:					
Reduced Covanta Operations Fee > 140,000 tonnes	0.0	(0.4)	(0.6)	(0.9)	(1.3)
Additional Revenues (IESO and material recovery)	0.0	(0.9)	(1.1)	(1.3)	(1.3)
Covanta landfill disposal (beyond 125,720 tonnes)	0.0	0.0	0.0	0.1	0.5
Sub-total Amendment Savings	**0.0**	**(1.3)**	**(1.7)**	**(2.1)**	**(2.1)**
Total Cost of Disposal	**8.0**	**6.9**	**7.1**	**7.4**	**8.0**

Footnotes:

1. Reduced Covanta fee based on deduction of landfill charge and reduced processing fee for tonnages beyond 140,000 tonnes processed (estimated at $35.45 per tonne in 2019, increasing to an estimated $38.03 per tonne by 2023). It is assumed York Region uses its full 21.4 per cent share of amended capacity.
2. Excludes materials recovery facility (MRF) residue tonnes, which are the cost responsibility of the MRF contractor.
3. Landfill fees are assumed to escalate from $70.00 per tonne in 2019 to $80.00 per tonne in 2023.
4. Power revenues escalation estimates are based on 35 per cent CPI per the IESO Power Purchase Agreement. Conservatively, revenues for ferrous and non-ferrous metals recoveries are not assumed to escalate.

The Clarington Energy Business Park is expanding with recent announcements of future construction. The potential exists to build a district heating system into the development of the Clarington Energy Business Park. Increasing the capacity to 160,000 tonnes will generate additional heat at the DYEC allowing for the potential to supply future occupants with heat at cost savings.

York Region waste is processed at three different energy-from-waste facilities, two of which are privately owned. Of the two privately owned facilities, one of them is located in Niagara Falls, New York. Increasing processing capacity at the DYEC will allow York Region to manage more waste at a facility co-owned by the Region while alleviating some of the cross-border risk associated with sending waste to New York State.

7. Next Steps

7.1 Notice of Completion

The ESR will be finalized in January 2022 (Subject to Change). In light of the current situation regarding COVID-19; hard copies will not be placed on display at public locations. An electronic version will be available on the DYEC website. Copies of the ESR will be provided to the MECP Regional EA Coordinator, government agencies and Indigenous communities that have expressed an interest in reviewing the report.

Following the completion of the ESR, a Notice of Completion will be published in local newspapers on two separate dates and posted on the DYEC website. The Notice of Completion will also be mailed to the MECP Regional EA Coordinator, adjacent landowners and tenants, Indigenous communities and to all who have expressed an interest in the DYEC capacity increase.

7.2 60 Day Public Review Period

The Notice of Completion marks the beginning of a 60-calendar day review period for the ESR. During the review period MECP, other government agencies, Indigenous communities and interested persons have the opportunity to review the completed ESR.

7.3 Opportunity for Elevation Requests

Persons who have environmental concerns regarding the project that are not addressed in the ESR can request an elevation of the Screening to an individual EA. However, MECP advises that concerns be brought to the proponent as early as possible in the Screening process so that they may be addressed by the proponent prior to the Notice of Completion. If the proponent has not been able to resolve concerns, concerned persons may write to the MECP Director, Environmental Assessment and Permissions Branch to request that the project be elevated. An elevation request must be made in accordance with the requirements outlined in Section B.3 of the Guide. Elevation requests are considered comments to a public process and will be shared with the proponent and other interested stakeholders.

7.4 Statement of Completion

The final step in the Screening process is submission of the Statement of Completion. If no elevation requests are submitted during the review period or submitted elevation requests are resolved or withdrawn, the Statement of Completion form is completed and submitted to the MECP Director, Environmental Assessment and Permissions Branch and EA Regional Coordinator and placed in the project file.

8. References

1. The Regional Municipality of Durham and The Regional Municipality of York. July 31, 2009 **Environmental Assessment Study Document and Site-Specific Technical Studies**. Prepared by Jacques Whitford. Retrieved from https://www.durhamyorkwaste.ca/en/facility-approvals/facility-development-documents.aspx#Environmental-Assessment-Appendix-C---Site-Specific-Technical-Study-Reports
2. Golder Associates Limited. **Air Quality Impact of 160,000 tonnes per year Waste at Durham York Energy Centre**. Technical Memorandum. February 19, 2019.
3. Guide to Environmental Assessment Requirements for Waste Management Projects" (Guide) https://www.ontario.ca/page/guide-environmental-assessment-requirements-waste-management-projects
4. The York Region Waste Management Master Plan (SM4RT LIVING) https://www.york.ca/wps/wcm/connect/yorkpublic/6f3f1734-1d45-4322-8903-ca7354a2db50/The+York+Region+Waste+Management+Master+Plan+2020.pdf?MOD=AJPERES&CVID=n50.7-p
5. Supplement to Annex E-5: Comparative Analysis of Thermal Treatment and Remote Landfill on a Lifecycle Basis https://www.durhamyorkwaste.ca/en/facility-approvals/resources/Documents/Annex-E-5-Supplemental_Report.pdf
6. Guideline A-7: Air Pollution Control, Design and Operations Guidelines for Municipal Waste Thermal Treatment Facilities (2010)
7. Ontario Regulation 419/05: Air Pollution - Local Air Quality (as amended)
8. Canadian Ambient Air Quality Standards (CAAQS) (2013)
9. Ontario's Ambient Air Quality Criteria (AAQC) (2012 as amended)
10. Ontario Air Standards for Sulphur Dioxide (SO2) (2018)

11. MECP Publication NPC-300 Environmental Noise Guideline – Stationary and Transportation Sources (2013)
12. Publication NPC-233 Information to be submitted for approval of stationary sources of sound (1995)
13. Environmental Compliance Approval Application for Air and Noise (2011)
14. Application for a Basic Comprehensive Certificate of Approval (Air & Noise) Attachment #3 https://www.durhamyorkwaste.ca/en/resources/Archived%20Documents/Certificate%20of%20Approval%20Applications/DYEC_Air_Noise_CofA.pdf
15. Intergovernmental Panel on Climate Change https://archive.ipcc.ch/meetings/session17/doc4.pdf
16. MECP discussion paper: "Reducing Litter and Waste in Our Communities" (2019)

    https://ero.ontario.ca/notice/013-4689
17. 2020 Storm water Pond (SWP) Inspection Checklist
18. EA Notice to Procced and Facility's ECA

    https://www.durhamyorkwaste.ca/en/facility-approvals/environmental-assessment-notice-of-approval.aspx#

Appendix A - Environmental Screening Checklist

Criterion		Yes	No	Additional Information
1.0 Surface Water and Groundwater				
1.1	Cause negative effects on surface water quality, quantities, or flow?		X	No change to surface water from existing conditions are anticipated because of the proposed increase in capacity to 160,000 tonnes.
1.2	Cause negative effects on groundwater quality, quantity, or movement?		X	No change to groundwater conditions are anticipated because of the project.
1.3	Cause significant sedimentation or soil erosion or shoreline or riverbank erosion on or offsite?		X	No sedimentation, soil erosion or shoreline or riverbank erosion are anticipated because of the project.
1.4	Cause negative effects of surface or groundwater from accidental spills or releases to the environment?		X	No increased risk of spills or accidental releases to surface or groundwater are anticipated because of this project. Total haulage distance of wastes is reduced in comparison to disposal during bypass conditions.
2.0 Land				
2.1	Cause negative effects on residential, commercial, institutional, or other sensitive land uses within 500 metres from the site boundary?		X	No negative effects are anticipated because of the change in permitted processing capacity.
2.2	Not be consistent with the Provincial Policy Statement, provincial land use or resource management plans?		X	The DYEC is in a designated employment area and the land use continues to be consistent with the Provincial Policy Statement as revised in 2014. The MECP's "Reducing Litter and Waste in Our Communities: Discussion Paper" identifies thermal treatment in the form of energy from waste as a potential opportunity to recover the value of resources in waste.
2.3	Be inconsistent with municipal land use policies, plans and zoning bylaws (including municipal setbacks)?		X	No changes to land use are proposed as part of the throughout increase.
2.4	Use lands not zoned as industrial, heavy industrial or waste disposal?		X	The Social/Culture Assessment Technical Study completed in 2009 confirmed the lands are zoned employment/light industrial areas which is compatible with the DYEC activity.
2.5	Use hazard lands or unstable lands subject to erosion?		X	No changes to land use are proposed as part of the throughout increase.
2.6	Cause negative effects related to the remediation of contaminated land?		X	Not applicable
3.0 Air and noise				
3.1	Cause negative effects on air quality due to emissions (for parameter such as temperature, thermal treatment exhaust flue gas volume, NO2, SO2, O2, opacity, HCl, TSP, or other contaminants)?	X		The potential for environmental effects on air quality exists because of stack emissions. The profile and dispersion characteristics of the stack may change because of the increase in facility throughput.
3.2	Cause negative effects from the emission of GHG (CO2, CO, and methane)?		X	Additional CO and CO2 emissions at the facility are expected with increase waste tonnage to 160,000. However, these additional carbon emissions will be less than the

Criterion		Yes	No	Additional Information
				emissions that would result if the same tonnage were transported and disposed of elsewhere, including methane generation in landfills as is currently occurring.
3.3	Cause negative effects from the emission of dust or odour?		X	Waste will continue to be off-loaded in a closed building under negative air pressure. There is minimal dust from truck traffic and odour as trucks drive around the exterior of the site. Any odour is like that from a garbage truck on a residential street. All driving surfaces are paved minimizing dust creation from all vehicles at the site.
3.4	Cause negative effects from the emission of noise?		X	No noticeable increase in noise from additional truck traffic or additional volume of waste processed.
3.5	Cause light pollution from trucks or other operational activities at the site?		X	No additional lighting will be placed on site.
4.0 Natural Environment				
4.1	Cause negative effects on rare or threatened or endangered species of flora or fauna or their habitat?		X	The 2009 Natural Environment Assessment for the original Environmental Assessment established mitigation measures to ensure that facility construction and operations do not have unacceptable adverse impacts on wildlife. These mitigation measures remain in effect and will not be impacted by the proposed increase in waste tonnage to 160,000 tonnes per year.
4.2	Cause negative effects on protected natural areas such as, ANSIs, ESAs, or other significant natural areas?		X	No changes on protected natural areas such as ANSIs ESAs or other significant natural areas are anticipated as the result of the project.
4.3	Cause negative effects on designated wetlands?		X	No negative effects are anticipated with the increase in waste tonnage to 160,000 tonnes per year.
4.4	Cause negative effects on wildlife habitat, populations, corridors, or movement?		X	No negative effects on wildlife habitat, populations, corridors, or movements are anticipated because of the project.
4.5	Cause negative effects on fish or their habitat, spawning, movement, or environmental conditions (e.g., water temp, turbidity)?		X	The 2009 Natural Environment Assessment for the original Environmental Assessment determined there were no permanent watercourses on site and no significant net effects on aquatic species were anticipated. No changes to the assessment are anticipated because of the project.
4.6	Cause negative effects on locally important or valued ecosystems or vegetation?		X	No negative impacts on locally important or valued ecosystems or vegetation are anticipated because of the project.
4.7	Increase bird hazards within the area that could impact surrounding land uses (e.g., airports)?		X	No increase to bird hazards within the area are anticipated because of the project.
5.0 Resources				
5.1	Result in practices inconsistent with waste studies and/or waste diversion targets (e.g., result in final disposal of materials subject to diversion programs)?		X	Facility operates in accordance with the EA/ECA. All tonnage received is post diversion materials. The additional requested tonnage is still subject to waste diversion requirements. Additional capacity is not expected to decrease diversion as the waste is already being generated – but is currently by-passed to another waste disposal facility.
5.2	Result in generation of energy that cannot be captured and utilized?		X	Additional tonnage will result in additional energy generation that will be sold to the provincial grid or used to provide power the DYEC.
5.3	Be located a distance from required infrastructure?		X	Facility sited at an appropriate distance from waste sources with access to supporting infrastructure. No location issues are anticipated for the project.

Criterion		Yes	No	Additional Information
5.4	Cause negative effects on the use of Canada Land Inventory Class 1-3, specialty crop or locally significant agricultural lands?		X	Site is located within an energy business park adjacent to Class 1 agricultural lands. No changes to land use are proposed to accommodate the processing increase.
5.5	Cause negative effects on existing agricultural production?		X	No impacts on existing agricultural production are anticipated as the result of the throughput increase.
6.0 Socio-Economic				
6.1	Cause negative effects on neighborhood or community character?		X	The Social Cultural Assessment Technical Study completed in 2009 concluded the facility would have minimal to no overall net effects on the community character of the area. No change to community character anticipated as the result of the processing capacity expansion.
6.2	Result in aesthetic impacts (e.g., visual and litter impacts)?		X	No changes to the facility structure or visual impacts are associated with the project. No additional litter is likely to result from the processing expansion.
6.3	Cause negative effects on local businesses, institutions, or public facilities?		X	No impacts to local businesses, institutions or public facilities are anticipated as part of the processing increase.
6.4	Cause negative effects on recreation, cottaging or tourism?		X	No impacts to recreation or tourism are anticipated as the result of a processing increase.
6.5	Cause negative effects related to increases in the demands on community services and infrastructure?		X	No changes or negative impacts related to demands on community services or infrastructure are anticipated because of the capacity increase.
6.6	Cause negative effects on the economic base of a municipality or community?		X	The Economic Assessment Technical Study Report completed in 2009 determined the facility would have a net positive impact on the economic base of the community. The proposed increase in throughput to 160,000 tonnes will have no impact on the local economic base. Increased capacity increases DYEC efficiency and electrical and metal revenue. Cost savings are anticipated as the result of reducing the need for waste bypass.
6.7	Cause negative effects on local employment and labour supply?		X	No change in local employment is anticipated with the increased tonnage.
6.8	Cause negative effects related to traffic?		X	Approximately two additional vehicles per day will visit the site because of the increase in waste tonnage. This level of traffic already occurs during periods when the facility is operating at full capacity. No negative effects are anticipated because of the throughput increase.
6.9	Be located within 8km of an aerodrome/airport reference point?	X		There is a heliport located at the Bowmanville Hospital, although air ambulance service is currently suspended to the facility, it is anticipated that a relocated facility will be established in the future. However, as no exterior changes are being made to the existing facility, and all waste handling will continue to occur indoors, no impacts are anticipated.
6.10	Interfere with flight paths due to the construction of facilities with height (stacks)?		X	No increase in stack height and no buildings are being constructed with the increased capacity.
6.11	Cause negative effects on public health and safety?		X	The Human Health and Ecological Risk Assessment completed in 2009 determined that overall, the chemical emissions from the facility would not lead to any adverse health risks to residents, farmers, or other receptors at the 140,000 tonnes per year operating scenario and minimal risk during upset conditions at the 400,000 tonne per year operating scenario. Additional modelling will be completed in the next stage of the

Criterion		Yes	No	Additional Information
				screening process to confirm that no negative impacts will result from the tonnage increase to 160,000 tonnes per year.
7.0 Heritage and Culture				
7.1	Cause negative effects on heritage buildings, structures or sites, archaeological sites or areas of archaeological importance, or cultural heritage landscapes?		X	The increased processing if approved will occur within the existing structure on site, no changes to land, or new construction will occur because of the project. No impacts to cultural, heritage or archaeological sites are anticipated.
7.2	Cause negative effects on scenic or aesthetically pleasing landscapes or views?		X	The increased processing if approved will occur within the existing structure on site, no changes to land, or new construction will occur because of the project. No impacts to visual appearance of the area are anticipated.
8.0 Aboriginal				
8.1	Cause negative effects on land, resources, traditional activities, or other interests of Aboriginal communities?		X	No impacts to land, resources, traditional activities, or other interest of Indigenous communities are anticipated as the result of the increased processing capacity to 160,000 tonnes. Consultation and engagement with Indigenous communities will occur to determine if any concerns related to the project exist.
9.0 Other				
9.1	Result in the creation of non-hazardous waste materials requiring disposal?		X	No additional waste materials are generated because of the project. The facility will continue to process collected wastes prior to their disposal, with any residuals being sent to landfill for disposal.
9.2	Result in the creation of hazardous waste materials requiring disposal?		X	There will continue to be minimal creation of hazardous waste because of the facility operations. Bottom and treated fly ash are both managed as nonhazardous wastes.
9.3	Cause any other negative environmental effects not covered by the criteria outlined above?		X	No other effects have been identified.

9. Appendices

Appendix A - Environmental Screening Checklist

Appendix B – 2020 Annual Sewage Works Inspection

Appendix C – Acoustic Assessment Report 2021

Appendix D – Air Quality Impact Assessment (AQIA) of 160,000 tonnes per year 2021

Appendix E – Letter from the Ministry of Culture dated February 3, 2012

Appendix F – Notice of Commencement

Appendix G – Consultation Summary Report