DILLON CONSULTING

WASTE CONNECTIONS OF CANADA

Ridge Landfill Expansion: Approved Amended Terms of Reference, Technical Work Plans, and Record of Consultation for the Terms of Reference

Appendix A

January 2020

Waste Connections of Canada

Errata Sheet

Ridge Landfill Environmental Assessment Report: Appendix A – Terms of Reference/Technical Work Plans/Consultation Record for Terms of Reference

The Draft Ridge Landfill Environmental Assessment (EA) Report and supporting documentation (appendices) were provided for review and comment to the MECP, Stakeholders, Indigenous Communities and Organizations on July 22, 2019. The final version of the Ridge Landfill Environmental Assessment was revised where appropriate, to address the comments received. All revised versions of the final environmental assessment report and supporting documentation are posted on the website for the Ridge Landfill, www.ridgelandfill.com/our-future-plans.

As there were minimal changes required from the review for this particular document, it has not been reprinted for the final version. The changes to the document as described below, have been incorporated into the on-line and DVD versions.

Revisions to Appendix A – Terms of Reference/Technical Work Plans/Consultation Record for Terms of Reference:

Errata No.	Section	Revision
1	All	Date changed – from July 2019 to January 2020
2	All	Report name changed - Draft Ridge Landfill EA to Ridge Landfill EA

Appendix A1

Approved Amended Terms of Reference

Appendix A1

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Ridge Landfill Expansion Environmental Assessment

Approved Amended Terms of Reference

May 2018

WASTE CONNECTIONS OF CANADA

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Acronyms and Definitions

Definitions

Alternatives to – The Environmental Assessment Act (the "Act") requires that Undertakings being reviewed within the framework of the *Act* consider "alternatives to" the Undertaking, or functionally different ways of addressing the problem statement (in this case, managing waste). This is also known as an "Alternative to the Undertaking".

Alternative Daily Cover – cover material other than earthen material placed on the surface of the active face of a landfill at the end of each operating day to control odours, blowing litter, scavenging, etc. (CDR, 2016)

Alternative Methods –Various ways of carrying out the preferred undertaking that are technically and economically feasible (Ministry of the Environment. (2014b, January)).

Circular Economy – An industrial economy that "aims for the elimination of waste through the superior design of materials, products, systems and business models" (Government of Ontario, 2015)

Focused EA – An EA prepared in accordance with Subsection 6.1(3) of the *Act* which may exclude one or more requirements of the *Act* from the EA.

Haul Route – refers to Communication Road, Drury Line and Erieau Road which are identified and used as the designated route for trucks entering and exiting the Ridge Landfill from Hwy 401.

Haul Route Study Area – The residences and businesses abutting the Haul Route.

Indigenous Communities – The First Nations and Métis communities identified by the Ministry of the Environment and Climate Change ("MOECC") that have potential to be interested in, or impacted by the Undertaking. These groups include the Caldwell First Nation, Walpole Island First Nation, Kettle and Stoney Point First Nation, Chiefs of Ontario, Chippewas of the Thames First Nation, Moravian of the Thames, Munsee-Delaware Nation, Oneida of the Thames, Métis Nation of Ontario and the Aamjiwnaang First Nation.

Individual EA – Individual EAs are prepared for large-scale, complex projects with the potential for significant environmental effects. They require MOECC approval. Individual EAs are broken into 8 steps: develop and submit a Terms of Reference ("ToR"), prepare an Environmental Assessment ("EA"), submit an EA, public and government review, MOECC review, public consultation on the MOECC review, the decision of the MOECC (the "Minister"), and implement the Project and monitor compliance (Government of Ontario, 2016).

Infill Area – This refers to the approved waste cell located in the southwest corner of the Old Landfill. The Infill Area has not been developed yet.

Landfill Site Area – This term encompasses the 262 ha area identified by the MOECC which includes the fill areas and associated environmental works, and facilities required for the ancillary waste management activities.

Off-Site Study Area – The area within 1 km of the maximum expanded fill area of the landfill.

Old Landfill – This refers to the waste cells located at the northeast corner of the Landfill Site Area. The Old Landfill was closed in 1999.

On-Site Study Area – The Ridge Landfill property including the Landfill Site Area, plus the proposed expansion areas.

Ridge Landfill – Property that encompasses existing Landfill Site Area and proposed expansion. The site is owned by Ridge Limited Partnership. Ridge (Chatham) Holdings G.P. Inc., is the general partner and Waste Connections of Canada Ltd. is the limited partner.

South Landfill – This refers to the waste cells located south of the Old Landfill. Development of the South Landfill began in August 2016.

Stakeholders –This refers to 'interested persons' as defined in the "Code of Practice: Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario" (Ministry of the Environment, 2014b) (January 2014).

Undertaking – The proposed expansion of the Ridge Landfill (also described herein as the "Project").

Waste Connections of Canada Inc. – (Waste Connections) is the proponent for this undertaking. Waste Connections was formerly Progressive Waste Solutions Canada Inc. Progressive Waste Solutions and Waste Connections merged in an all-stock transaction as of June 1, 2016.

Waste Fill Area – This term encompasses the 131 ha area that is presently approved for the disposal of waste. The Waste Fill Area includes the Old Landfill, South Landfill, West Landfill and Infill Area.

West Landfill – This refers to the waste cells located west of the Old Landfill. The West Landfill is currently accepting waste.

Acronyms

C&D – Construction and Demolition

EA – Environmental Assessment

EA Act or the *Act* – the Environmental Assessment Act

ECA – Environmental Compliance Approval

IC&I – Industrial, Commercial and Institutional

LTVCA – Lower Thames Valley Conservation Authority

MNRF – Ministry of Natural Resources and Forestry

MOECC – Ministry of the Environment and Climate Change

ToR – Terms of Reference

Executive Summary

Waste Connections of Canada Inc. (Waste Connections) is seeking approval under the Ontario *Environmental Assessment Act* (the *Act*) for an expansion of its Ridge Landfill to continue to provide long-term, post-diversion residual waste disposal capacity to southern and central Ontario for the IC&I sector and for its host community the Municipality of Chatham-Kent.

Waste Connections is undertaking an Environmental Assessment (EA) pursuant to the Act for the proposed expansion of the Ridge Landfill. The EA requires the preparation of a Terms of Reference (ToR) and will be prepared pursuant to clause 6(2)(c) and subsection 6.1(3) of the *Act*. This is often referred to as "focusing" which will be described more fully in this document. The ToR outlines the framework and methodology for what will be studied in the second part of the requirement of the *Act*; namely, the EA.

The following ToR outlines the purpose of the undertaking, the opportunity for Waste Connections, work completed to consider "Alternatives to" the Undertaking, and work proposed to develop and evaluate Alternative Methods of carrying out the Undertaking and assessing potential effects on the broad environment defined in the *Act*.

The Ridge Landfill is situated near the communities of Blenheim, Charing Cross and Cedar Springs and has been in operation since 1966. The landfill is an environmentally well engineered facility with an excellent environmental performance record that has become an integral part of the economic and social fabric of the Municipality of Chatham-Kent. The Ridge Landfill employs 23 people and contributes approximately $14 million annually in a combination of direct financial contributions to Chatham-Kent and purchase of local goods and services.

Waste Connections' operations in the service area have a total annual economic impact in Ontario of well over $200 million per year, including third party suppliers of various goods and services to Waste Connections and direct employment income for its over 1000 employees in the service area alone. More than 30,000 IC&I waste generators in southern and central Ontario rely each year on Waste Connections to provide turnkey service (collection, recycling, transportation and disposal) for their solid waste.

The facility was last expanded in 1999, and in 2012 the annual waste disposal rate was increased from 899,000 to 1.3 million tonnes per year. This proposed expansion would allow the Ridge to continue to operate as a critical regional waste management facility particularly as the population and economy of southern and central Ontario is projected to increase significantly. The expanded Ridge Landfill would continue to provide long-term disposal capacity to serve the growing population and economy in the province of Ontario. The Project would see the Landfill Site Area increase from 262 ha to up to 340 ha (the total area of Waste Connections-owned lands at the Ridge Landfill), with the same annual waste disposal rate of

1.3 million tonnes. Rationale for maintaining the annual waste disposal rate is provided in Section 3.2.1.

Expanding the Ridge aligns with the Ontario government's policy goals under the *Strategy for a Waste-Free Ontario* to meet its objective of minimizing the need for the development of new landfills while maintaining a strong, reliable and economical waste management system in Ontario that will support its economic development goals in the coming decades. A growing economy and population coupled with the Province's diversion goals is why Waste Connections is proposing to maintain its annual waste disposal rate of 1.3 million tonnes. With the implementation of the *Strategy for a Waste-Free Ontario* waste diversion targets of 30% by 2020, 50% by 2030 and 80% by 2050, Waste Connections modelling has identified a continuous and net deficit of landfill capacity for residual IC&I waste in southern and central Ontario during the planning period of 2022 to 2041.

Over 3.0 million tonnes of solid non-hazardous waste from Ontario is exported to the U.S. annually. The proposed expansion of the Ridge Landfill would help minimize the current risk of reliance on the export of residual IC&I waste to the U.S. The export of waste to the U.S. reflects market pricing. Should currency exchange rates change, transportation costs increase, the border be disrupted, trade tariffs imposed or a change in policy, it would have profound impact on the available permitted annual capacity within the province, specifically in southern and central Ontario. The proposed expansion also aligns with the province's Climate Change Action Plan by reducing greenhouse gas emissions associated with the long hauling of residual waste to U.S. disposal sites.

An extensive public consultation process was undertaken in concert with ToR development starting in May of 2016. A draft ToR was submitted in June 2016 and with a final ToR submitted in November 2016 and amended in February of 2017. In summer of 2017 Waste Connections voluntarily withdrew that ToR to work with the MOECC to develop this new ToR to better reflect the government's new *Strategy for a Waste-Free Ontario – Building a Circular Economy* (February 2017), which was released after the last ToR were submitted.

The main changes to the ToR that was withdrawn are noted as follows:

1. Additional detail has been provided to clarify the business opportunity that Waste Connections is fulfilling with the proposed expansion. This includes providing additional rationale for the annual waste disposal rate of 1.3 million tonnes.
2. The service area for IC&I waste was reduced from the current service area of all of Ontario to southern and central Ontario;
3. The alternatives to the undertaking as outlined in Supporting Document #2 have been refined;

4. The service area for residential waste was reduced from the current service area of Municipality of Chatham-Kent and the surrounding five Counties, to the Municipality of Chatham-Kent only, the host community of the Ridge;

5. Specific system-wide alternative methods to enhance waste diversion will not be considered in detail as part of the EA; however, Waste Connections has committed to assisting the province in meeting its diversion goals, and opportunities for Waste Connections to enhance its existing waste diversion activities, either at source, at the Ridge or elsewhere in Waste Connections' integrated system will be examined further in the environmental assessment as an activity concurrent to the evaluation of alternative methods for landfill site expansion. Waste Connections will examine and evaluate the feasibility and viability of implementing an on-site diversion program as part of the preferred landfill expansion method. This will include the consideration and assessment of a reasonable number of ways in which to divert the types of waste materials received at site. The assessment of an on-site diversion program will be carried out in accordance with best management practices, in consideration of new and emerging technologies, and in recognition of the goals and expectations set forth in the *Resource Recovery and Circular Economy Act*, 2016 and the Strategy for a Waste-Free Ontario: Building the Circular Economy. The Food and Organic Waste Policy Statement under the *Resource Recovery and Circular Economy Act*, 2016 directs proponents of new or expanded waste management systems for disposal to consider resource recovery opportunities for food and organic waste. Waste Connections will include an assessment on how additional resource recovery activities could help reduce the disposal of food and organic waste at the Ridge Landfill; and

6. The EA work plan for Air Quality has been revised to include a qualitative analysis of potential odours and operational changes in greenhouse gases associated with site development alternatives.

Waste Connections was and remains committed to engaging stakeholders to ensure that interested parties can provide their input on the Project. During the development of the final ToR, Waste Connections provided information to stakeholders and the public to increase their understanding of the EA process and proposed methodology. Waste Connections sought input from several interested parties, including the following: residents on and around the landfill site and along the haul route, government agencies, Indigenous Communities, local stakeholders, the local communities of Blenheim, Charing Cross and Cedar Springs and the broader community of the Municipality of Chatham-Kent. Comments were received from the Ministry of Environment and Climate Change, Ministry of Natural Resources, Ministry of Transportation, Walpole Island First Nation and Aamjiwnaang First Nation.

The consultation activities allowed the Project team to gather valuable feedback which was used to develop the final ToR and the benefit of that same feedback has been taken into

consideration in this ToR. As such all comments received between May, 2016 to the present have been considered.

The ToR describes existing conditions and how potential impacts will be studied within the following technical fields representing a broad definition of the environment:

Natural Environment:

- Biology
- Geology/Hydrogeology
- Surface Water

Socio-Economic Environment

- Socio-Economic
- Atmospheric
- Agriculture
- Cultural Resources and Archaeology
- Land Use
- Visual

Transportation

- Traffic
- Aviation

As this ToR is being submitted as part of a focused EA, Waste Connections completed an assessment of the Alternatives To the Project, presented in a supporting document and summarized in the ToR. Landfilling within the service area through an expansion of the Ridge is identified as the preferred alternative for Waste Connections to manage the IC&I residual waste received by the company during the planning period and as such will be further considered in the EA.

The EA will evaluate the Alternative Methods of implementing the Preferred Alternative. The Alternative Methods evaluation will include site development options for physical expansion of the Ridge Landfill.

During the EA, Waste Connections will engage in a variety of stakeholder consultation activities, including:

- notification and distribution of Project information using the Project contact list, which is described in Section 6.2.4, below;

- distribution of updates through mail and electronic correspondence, a community newsletter and the Project website;
- meetings with neighbours, elected officials, Indigenous Communities and other stakeholders;
- an EA criteria workshop;
- open houses; and,
- updates to the Ridge Landfill Liaison Committee.

In addition to approval under the *Act*, applications will be made under other provincial and federal statutes, as necessary, for approval to implement the Project. It has been confirmed that the Project will not be subject to review under the *Canadian Environmental Assessment Act, 2012* based on correspondence with the Canadian Environmental Assessment Agency in May 2016. A specific list of other approvals required for the Project will be provided in the EA.

1.0 Introduction

Waste Connections is undertaking the Project pursuant to the *Act*. Waste Connections is proposing an expansion of its Ridge Landfill in order to continue to provide long-term residual disposal capacity for the company's large IC&I customer base and as a regional and inter-regional waste management facility to serve the projected increase in population and economic growth in southern and central Ontario.

The Ridge Landfill is located at 20262 Erieau Road near Blenheim, Ontario in the Municipality of Chatham-Kent, and is operated by Waste Connections (Figure 1). The site is currently approved to receive waste from the IC&I sectors in Ontario, and residential waste from the Municipality of Chatham-Kent and the surrounding Counties of Essex, Lambton, Middlesex and Elgin.

FIGURE 1: LOCATION OF RIDGE LANDFILL

The Ridge Landfill has been in operation since 1966 and was expanded in 1999. Waste Connections owns 340 hectares (ha) of land at the Ridge Landfill. The existing Landfill Site Area, which is permitted by the ECA from the MOECC for waste management and environmental work purposes, is 262 ha. The area within which waste disposal is permitted, called the Waste Fill Area, is 131 ha or half of the Landfill Site Area. As of December 2017, it is estimated that the existing Waste Fill Area at the Ridge Landfill site will provide waste disposal capacity until approximately 2021 at the current fill rate.

This ToR is the first step in the process required by the *Act* for approval of the Project. The ToR sets out the study process to be followed in conducting the Individual EA, including a

description of how the public, stakeholders (interested parties), Indigenous Communities and agencies (to be described more fully below) will be consulted. The ToR has been prepared in accordance with the *"Code of Practice: Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario"* (Ministry of Environment, 2014b) (the "Code of Practice"). This ToR is being formally submitted to the Minister of the Environment and Climate Change. The ToR package consists of:

- Terms of Reference (this document);
- Record of Consultation; and
- Supporting documents (Purpose/Opportunity Assessment, and Alternatives to the Undertaking).

An extensive public consultation process was undertaken in concert with the ToR development starting in May of 2016. A first draft ToR was submitted in June 2016 with a final ToR submitted in November 2016 and later amended in February of 2017. In the summer of 2017, Waste Connections voluntarily withdrew the amended ToR to work with the MOECC to develop this new ToR to better reflect the government's new *Strategy for a Waste Free Ontario – Building a Circular Economy* (February 2017), which was released after the amended ToR was submitted.

The main changes to the ToR that was withdrawn are noted as follows:

1. Additional detail has been provided to clarify the business opportunity that Waste Connections is fulfilling with the proposed expansion. This includes providing additional rationale for the annual waste disposal rate of 1.3 million tonnes.
2. The service area for IC&I waste was reduced from the current service area of all of Ontario to southern and central Ontario;
3. The alternatives to the undertaking as outlined in Supporting Document #2 have been refined;
4. The service area for residential waste was reduced from the current service area of Municipality of Chatham-Kent and the surrounding five Counties, to the Municipality of Chatham-Kent only, the host community of the Ridge;
5. Specific alternative methods to enhance waste diversion will not be considered as part of the EA; however, Waste Connections has committed to assisting the province in meeting its diversion goals, and opportunities for Waste Connections to enhance its existing waste diversion activities, either at source, at the Ridge or elsewhere in Waste Connections' integrated system will be examined further in the environmental assessment.

Waste Connections was and remains committed to engaging stakeholders to ensure that interested parties can provide their input on the Project. The consultation activities allowed the Project team to gather valuable feedback and all comments received from May, 2016 to the present have been considered in this ToR.

1.1 Identification of the Proponent

Waste Connections is an environmental services company that is continually assessing its environmental footprint and how it can go beyond meeting today's regulations by identifying best management practices and technologies to reduce its impact. By combining innovative thinking with proven waste collection and processing technologies, Waste Connections has been able to provide its customers reliable and cost competitive solutions to help them achieve and exceed their waste management and sustainability goals.

Waste Connections is the proponent of the Project. Contact information for the Waste Connections Project Manager is presented below.

Proponent contact information:
Ms. Cathy Smith, Project Manager – Ridge Landfill Expansion
Waste Connections of Canada Inc.
Ridge Landfill, 20262 Erieau Road,
Blenheim, ON NOP 1A0
Phone: 519-358-2860
Email: cathy.smith@wasteconnections.com

1.2 Site History and Background

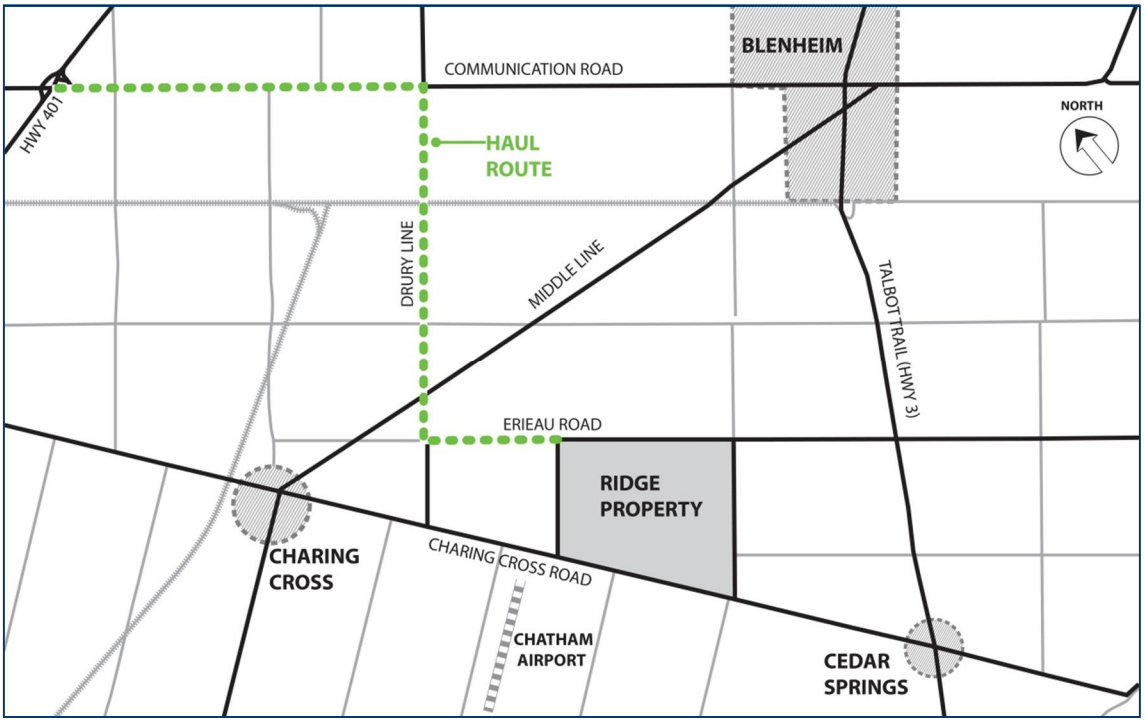
The Ridge Landfill is one of Waste Connections' most important landfill facilities in Canada and an important component of the waste management infrastructure in Ontario. Landfill operations have been undertaken at this site since 1966 and the site is a well-known business within the local community. Figure 2 provides a timeline highlighting key changes to the Ridge Landfill site over the last 50 years.

FIGURE 2: HISTORY OF THE RIDGE LANDFILL

Figure 3 shows the Ridge property owned by Waste Connections and the haul route that waste trucks use to access the site (described further in Section 4.3).

Waste Connections owns approximately 340 ha of land west of Erieau Road. This land includes the 262 ha Landfill Site Area. The Ridge Landfill consists of four waste disposal areas: the Old Landfill, the West Landfill, the South Landfill and the Infill Area. The Old Landfill reached capacity in December 1999 and landfilling operations have been conducted in the West Landfill from January 2000 to present and in the South Landfill since 2016. The Infill Area has not been developed.

FIGURE 3: RIDGE LANDFILL AND HAUL ROUTE



To ensure long-term management of the Ridge Landfill, Waste Connections has an extensive and rigorous environmental management system in place that follows stringent MOECC regulations. Operations at the landfill are continuously reviewed and updated to protect the environment and minimize potential nuisance effects such as litter, birds, dust, noise and odour.

The current approved capacity for the Ridge Landfill is 21 million cubic metres (m^3). The site is approved to accept a maximum of 1,300,000 tonnes of waste per year (the MOECC approved annual waste disposal rate). In 2016, approximately 1,191,771 tonnes of waste and 101,916 tonnes of materials which have been used as Alternative Daily Cover were received at the site. As of April 2017, the Ridge Landfill has a remaining capacity of 5.3 million m^3 and is expected to reach its current approved capacity by 2021.

2.0 The Environmental Assessment Framework

An EA under the *Act* is a planning and decision making process designed to assist proponents in making environmentally responsible decisions. The EA process includes the assessment of environmental effects, the consideration of alternatives and the development of mitigation plans to reduce any potential effects on the environment. The environment, as defined in the *Act* is to include natural, social, cultural and economic environments.

The proposed expansion of the Ridge Landfill requires the completion and approval of an Individual EA, as well as additional approvals as shown in Figure 4.

FIGURE 4: APPROVAL STEPS

The first step in the process described in the *Act* is the development of a ToR which outlines the framework for what will be studied in the future EA. The ToR requires approval by the Minister of Environment and Climate Change.

Inputs from the public, interested stakeholders, Indigenous Communities and government agencies form an important component of an EA. Consultation has been undertaken during the preparation of the ToR to obtain input into its development. Consultation undertaken and input received is documented in the Record of Consultation and summarized in Section 6 of the ToR.

The second phase in the process involves the completion of the EA based on the approved ToR.

2.1 How the Environmental Assessment will be Prepared

Subsection 6(2) (c) of the *Act* allows proponents to define how they are going to complete the EA and to clearly document this in the ToR. As per the *Act*, EAs can be completed in one of the following two ways:

- In accordance with the generic requirements identified in subsection 6.1(2) of the *Act*; or
- In accordance with subsection 6.1 (3) which allows proponents to prepare EAs with information other than the generic requirements. Following the provisions of subsection 6.1(3) of the *Act* is often referred to as a focusing as noted in the Code of Practice.

The requirements outlined in subsection 6.1(2) and 6.1 (3) of the *Act* are provided in Table 1 for reference.

TABLE 1: REQUIREMENTS OF THE ENVIRONMENTAL ASSESSMENT ACT

Subsection of the *Act*	EA Requirement
6.1 (2) (a)	A description of the purpose of the undertaking
6.1 (2) (b)	A description of and a statement of the rationale for, (i) the undertaking, (ii) the alternative methods of carrying out the undertaking, and (iii) the alternatives to the undertaking;
6.1 (2) (c)	A description of, (i) the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, (ii) the effects that will be caused or that might reasonably be expected to be caused to the environment, and (iii) the actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment, by the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking
6.1 (2) (d)	An evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking
6.1 (2) (e)	A description of any consultation about the undertaking by the proponent and the results of the consultation.
6.1 (3)	The approved terms of reference may provide that the environmental assessment consist of information other than that required by subsection (2).

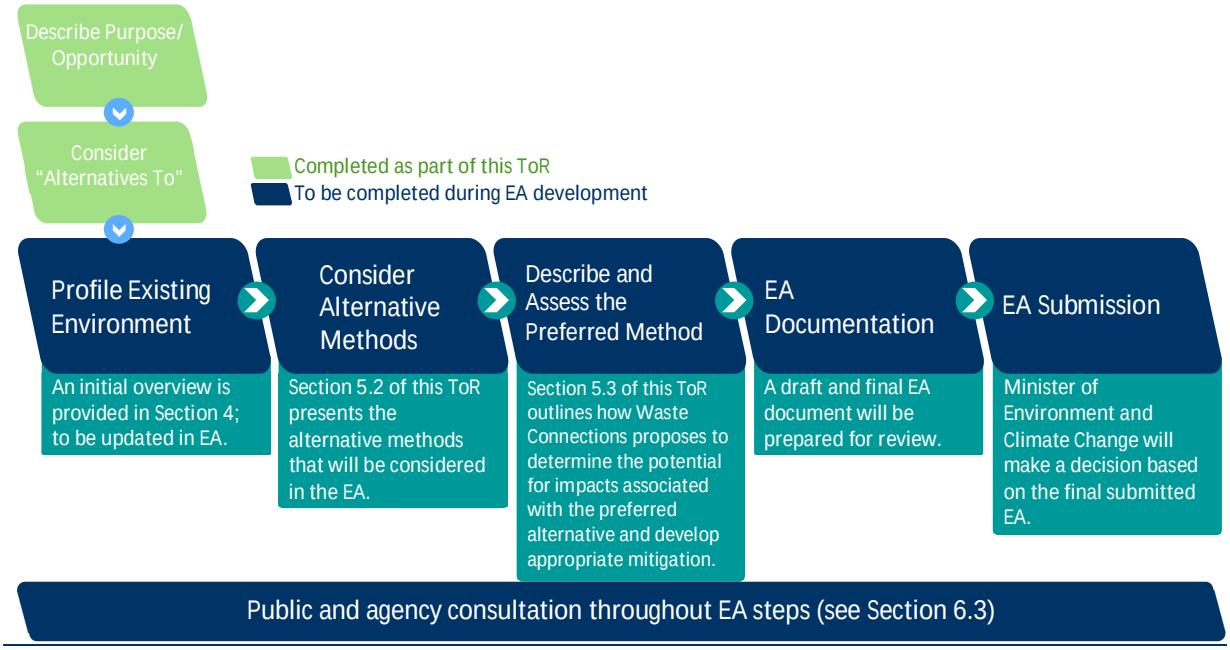
Waste Connections has prepared a ToR for a focused EA.

Based on the above, the following activities related to the purpose/opportunity for the project, and consideration of Alternatives to the Undertaking were carried out as part of the ToR development and no additional work is proposed during the EA:

- Rationale for the Undertaking (6.1 (2) (b) (i)) – Waste Connections has completed an assessment of the purpose and business opportunity for additional IC&I waste disposal capacity in southern and central Ontario. This work is summarized in the ToR and the report included as a supporting document to the ToR (Supporting Document #1). Most of this information has been included as part of the consultation with the public, interested stakeholders, Indigenous Communities and government agencies during ToR development. The final description of the proposed undertaking and rationale for the project will be confirmed during the EA.
- Description of Alternatives to the Undertaking (6.1 (2) (b) (iii)) – During the development of the ToR, Waste Connections considered functionally different ways to provide additional residual waste disposal capacity. It was concluded that landfilling within the service area through an expansion at Ridge was the preferred way for Waste Connections to provide long-term disposal capacity for the IC&I sector. The consideration of Alternatives to the Undertaking was included as part of the consultation with the public and agencies and the report documenting this analysis is a supporting document to this ToR (Supporting Document #2). No additional assessment of Alternatives to the Undertaking will be included in the EA. (Note: The "Do Nothing" alternative will be carried into the EA and considered in relation to the assessment of the preferred undertaking as a base case for assessing potential effects.)

This ToR focuses on the remainder of the EA requirements noted in Table 1 describing the Project and the work that Waste Connections will undertake in the EA to develop and evaluate Alternative Methods of carrying out the Project, assess potential effects of the Project on the environment and identify appropriate mitigation measures to minimize any potential effects. Figure 5 shows the EA steps to be undertaken. Following the preparation and approval of the ToR by the Minister, Waste Connections would proceed to prepare the EA document.

FIGURE 5: EA PROCESS



2.2 Alignment with Provincial Legislation, Plans and Strategies

The MOECC has identified issues to be considered in waste management EAs that are of specific interest to the province and have been described in provincial legislation, plans and strategies. The following outlines how Waste Connections is currently and will further align with these pieces of legislation, plans and strategies.

Climate Change: The province released its Climate Change Action Plan on June 8, 2016 as one of the mandates of the *Climate Change Mitigation and Low-carbon Economy Act*. The purpose of the *Act* is to "reduce greenhouse gas in order to respond to climate change, to protect the environment and to assist Ontarians to transition to a low-carbon economy and to enable Ontario to collaborate and coordinate its actions with similar actions in other jurisdictions…" Waste Connections is committed to minimizing the release of greenhouse gases from the Ridge Landfill with its landfill gas management system that collects landfill gas (approximately 50% methane) and flares it; Waste Connections is currently evaluating the potential for a biogas facility that would use landfill gas from the Ridge (Section 5.2). Waste Connections will include an assessment on how the preferred project may contribute to greenhouse gas emissions. Waste Connections will develop a detailed work plan outlining how greenhouse gas emissions will be considered in the environmental assessment for site development activities including woodlot removal, on-site vehicles, the waste haul route as defined in the Terms of Reference, and landfill gas management for the preferred undertaking in consultation with Ministry of the Environment and Climate Change staff. Waste Connections will also consider greenhouse gas emissions as an evaluation criterion for alternative methods. The assessment of landfill gas

utilization alternatives will reflect the objective of reducing greenhouse gases from the waste sector as stated in the Climate Change Action Plan.

The EA will also consider how changing climate has the potential to impact the Project and how adaptive measures can be incorporated into the site design. This will be explored, specifically as it relates to the potential for extreme weather events to impact waste management infrastructure through power outages, physical damage, stormwater management systems and reduced access to the site. Waste Connections will assess the potential effects of climate change on infrastructure components for the preferred undertaking and related potential risks to the environment resulting from these effects. The environmental assessment will include a consideration of climate change adaptation measures to reduce and manage such potential effects during the operation, construction, closure and post-closure phases of the undertaking. Waste Connections will use climate change assessment guidance documents that include, but are not limited to those issued by the Ministry of the Environment and Climate Change in the environmental assessment. The EA will include studies related to odour and greenhouse gas emissions when considering the preferred site development alternative. This work is summarized in Appendix A.

Waste Diversion: With the release of the *Strategy for a Waste-Free Ontario* and coming into force of the *Waste-Free Ontario Act*, Ontario has committed to creating a circular economy that encourages producers to take responsibility for end-of-life products and packaging. While the province recognizes that additional waste disposal is needed to meet demands over the next several years, the *Act* signals a shift from waste disposal to diversion from landfill. In this EA, Waste Connections will commit to assisting the province in meeting its diversion goals and will consider opportunities to enhance its existing waste diversion activities, either at source, at the Ridge or elsewhere in Waste Connections' integrated system.

Source Water Protection: Source water protection became a priority for Ontario after the Walkerton events of 2000 and is legislated by the *Clean Water Act* of 2006. The *Clean Water Act* empowers local communities to protect their drinking water supply through the development of watershed-based source protection plans. The project falls within the Thames-Sydenham and Region Source Protection Area; however, the Project does not fall within any designated vulnerable areas. Waste Connections has an environmental management system in place to protect groundwater in accordance with MOECC standards outlined in the Ontario Reasonable Use Guidelines under *Ontario Regulation 232/98* (Section 4.5.1).

Cumulative Effects Assessment: As required by Section 4.3 of the Code of Practice, proponents must consider the potential cumulative effects of their proposed Project combined with other existing and planned facilities in the Project vicinity. The EA will consider cumulative effects of the Project. This methodology is discussed in Section 5.3.

2.2.1 Provincial Land Use Planning Policy

The Province has developed a series of land use policies specific to waste management uses. The Provincial Policy Statement, 2014 (the PPS) points out the need for waste management systems of an appropriate size and type to accommodate present and future requirements, and facilitate, encourage and promote reduction, reuse and recycling objectives. The PPS dictates that waste management systems be located and designed in accordance with provincial legislation and standards, and directs planning authorities to consider the implications of development and land use patterns on waste management and diversion.

The MOECC provides guidance by way of the "D-4 Land Use On or Near Landfills and Dumps" land use guidelines. These guidelines apply to all proposals for land use on or near any landfill which contains municipal solid waste, industrial solid waste and/or sewage sludge. The guidelines direct that several factors must be considered when land use is proposed near an operating landfill site. These include, but are not limited to, water contamination by leachate, odour, litter, dust, noise, surface runoff and landfill-generated gases. These will be considered as part of the technical studies completed as part of the EA.

The MOECC guidelines dictate that no land use may take place within 30 m of the perimeter of the fill area, that this is a minimum distance, and that all landfills must include an on-site operational/maintenance buffer of no less than 30 m, and is typically between 60 and 100 m. The operational buffer will be established as part of the landfill site development alternatives. The guidelines indicate that land use should be studied within 500 m of the perimeter of the fill area (or beyond in cases where significant impacts are expected to be encountered at or beyond that distance). The impact study areas proposed for the EA are discussed in Section 4.3.

2.3 Flexibility of the Terms of Reference

Subsection 6.1(1) of the *Act* and the Code of Practice states that the EA must be prepared in accordance with the approved ToR; however, minor variations to methodologies may be necessary in some circumstances. To accommodate new circumstances, the Code of Practice states that it is important to incorporate flexibility into the ToR.

It is the intention of Waste Connections to complete the EA based on this ToR. The information presented in the ToR is preliminary and will be confirmed during the preparation of the EA in consultation with the public, interested stakeholders, Indigenous Communities and government agencies. The following are considered to be minor modifications, fitting within the intent and purpose of the ToR that may occur during the development of the EA:

- the description of the environment may be modified based on information that becomes available during the more detailed work in the EA;
- work plans for technical studies may be refined;
- the schedule for completing the EA may be adjusted;

- the description of Alternative Methods may be modified based on studies undertaken during the EA and to reflect stakeholder input;
- criteria for the evaluation of alternatives and assessment of effects and the associated study areas may be modified to reflect available data and the potential for environmental effects identified; and,
- the consultation program may be modified to reflect changes in schedule and the revision of consultation methods to best meet the needs of the community.

The list above is not intended to be exhaustive; the items are examples of changes that are considered minor in nature. These modifications could be included within the overall scope of this ToR without seeking approval for amendment of the document. It is noted that the incorporation of flexibility in the ToR is not meant to allow for a significant change of the scope of the Project, but rather to allow for minor adjustments to the EA process without having to re-start the ToR/EA process.

3.0 The Project

3.1 Purpose of the Project

Waste Connections is proposing an expansion of its Ridge Landfill in order to continue to provide long-term residual waste disposal capacity for its large customer base and to continue serving as a regional waste management facility to help manage waste volumes associated with projected increases in population and related economic growth in southern and central Ontario.

3.2 Description of the Project

The Project, that is the proposed expansion of the Ridge Landfill, can be accommodated within the Waste Connections-owned lands at the Ridge without the need to acquire new lands. The preliminary description of the Project includes:

- A capacity expansion to the Ridge Landfill of 26 million tonnes (maintaining the current annual waste disposal rate of 1.3 million tonnes for the 20-year planning period);
- No change to the designated haul route to the site from Highway 401 which currently includes Communication Road, Drury Line and Erieau Road;
- A reduction of the IC&I waste service area from all of Ontario to southern and central Ontario;
- A reduction of the residential waste service area from the Municipality of Chatham-Kent and surrounding Counties of Essex, Lambton, Middlesex and Elgin to only the Municipality of Chatham-Kent;
- Continuation of the environmental management system at the site and potential changes based on the outcome of the EA;
- Provision of a public drop-off centre at the Ridge site to divert materials that are currently not collected; and

Consideration of other potential diversion opportunities that could arise from the *Waste-Free Ontario Act.* As stated above, Waste Connections is prepared to reduce its currently approved all-Ontario service area to a more regional approach to include IC&I waste from southern and central Ontario (Figure 6) and residential waste from the Municipality of Chatham-Kent. IC&I waste generators in this area are located within an economically competitive transportation distance of the Ridge. Waste Connections is and has been Chatham-Kent's primary solid waste service provider for many years and currently provides all residential waste collection and disposal services to Chatham-Kent. Residential residual waste disposal volumes from Chatham-Kent at the Ridge are in the range of 30,000 tonnes annually, or approximately 2% of the waste disposed of at the Ridge annually.

The final description of the proposed undertaking will be confirmed in the EA once alternatives have been considered and evaluated.

RIDGE LANDFILL

FIGURE 6
IC&I SERVICE AREA OF THE RIDGE

Service Area

1:2,100,000

0 25 50 100 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: GM
MAP CHECKED BY: BV
MAP PROJECTION: NAD 1983 CSRS Ontario MNR Lambert

DILLON CONSULTING

PROJECT: 152456
STATUS: FINAL
DATE: 2017-12-11

FILE LOCATION: I:\GIS\141382 - Ridge Landfill\Mapping\Figure 1 Proposed Service Areas of the Ridge.mxd

3.3 Rationale for the Project

This section describes the opportunity for additional waste disposal capacity in southern and central Ontario and the rationale for the proposed expansion of the Ridge Landfill.

The Project is driven by two core needs:

1. The opportunity for Waste Connections to continue to service its existing and future customers; and
2. The need for additional waste disposal capacity in southern and central Ontario.

The rationale for each is further described in the following sections.

3.3.1 Opportunity for Continued Waste Connections Operations

Waste Connections operates the largest integrated IC&I waste collection, recycling, transfer and disposal business in Ontario. Its collection fleet of almost 800 vehicles (many of them running on compressed natural gas) currently service almost 50,000 waste and recycling collection containers and more than 30,000 IC&I customers in the service area. Volumes of IC&I recycling and residual waste collected by its fleet have been growing every year in the service area. It should be noted, when referring to the Waste Connections – Ridge network, that its service area, southern and central Ontario, including the GTA, is forecasted by the Ministry of Finance to grow in population by over 3.8 million people by 2041.

The Ridge has been in operation for over 50 years. For the first part of its life, the site was under the control of an individual owner. During that period, the Ridge functioned as a local disposal site for municipal and commercial waste.

In the early 1980s, the Ridge was acquired by Browning-Ferris Industries (BFI), whose primary business was providing integrated waste management services for IC&I waste. The Ridge began its transition at that time to what it is today - a site providing disposal services for residual IC&I waste collected and processed by an integrated waste management business, one that is now owned and operated by Waste Connections, while retaining its long-standing history of providing vital waste disposal services for the host municipality of Chatham-Kent.

Up until 1999, the site operated on a relatively small scale, with an annual waste disposal rate of approximately 220,000 tonnes under the site's Certificate of Approval at that time. The Ridge was filled to its then- approved annual waste disposal rate throughout the 1990s.

Following a successful EA approval in the late 1990s, the approved annual waste disposal rate of the site was increased to 899,000 tonnes per year. Annual waste receipts at the site grew steadily through the early 2000s so that the Ridge was again accepting waste at or about its approved annual waste disposal rate each year by the end of the decade. By 2010, the Ridge was hitting its annual waste disposal rate and it became evident that a further increase in

annual capacity at the site was required. In 2012, an Environmental Screening Process was completed to increase the annual waste disposal rate to 1.3 million tonnes per year.

In each year since 2013, Waste Connections has had to re-direct IC&I waste away from the Ridge in the fourth quarter of the year in order to avoid exceeding the site's annual waste disposal rate. Much of this waste is typically redirected across the border to Michigan and forms part of the over 2 million tonnes of Ontario IC&I waste disposed of in that state each year.

According to the Ontario Economic Outlook and Fiscal Review, the economy has grown faster than that of Canada's and those of all other G7 nations for the past three years. With these two factors combined, the Ridge is well positioned to maintain its annual waste disposal rate and continue to support the growing Ontario population and economy.

The Ridge is a key and essential component of the integrated IC&I waste collection, recycling, transfer and residuals disposal business developed by Waste Connections over decades in the service area. More than 30,000 IC&I waste generators in southern and central Ontario rely each year on Waste Connections to provide turnkey service (collection, recycling, transportation and disposal) for their residual waste with the Ridge providing safe and proper disposal of that waste. At 1.3 million tonnes per year, the Ridge currently disposes of approximately 25% of the IC&I waste generated in southern and central Ontario each year making the Ridge a critical component of the Ontario IC&I waste management system.

The Ridge is also a vital piece of infrastructure to the over 100,000 people living in the Municipality of Chatham-Kent, providing significant benefits to the community, including: employment opportunities, an annual royalty payment, significant financial contributions to the Ridge Landfill Trust, incentives to Chatham-Kent, and monetary incentive for Chatham-Kent to reduce the amount of waste residuals delivered to the Ridge. The Ridge Landfill employs 23 people and contributes approximately $14 million annually in a combination of direct financial contributions to Chatham-Kent and purchase of local goods and services.

The IC&I waste collection; processing and disposal business in Ontario typically operates on relatively short term contracts and is intensely competitive, to the benefit of the commercial waste generators and the Ontario economy. Indicative of the fact that Waste Connections is highly service driven is its disposal of over 25% of IC&I waste in the service area. Given that Waste Connections has already made the capital investments to build out its integrated facility network in the service area, the marginal cost in competing for customers' IC&I waste business is very low. The mechanism of price competition combined with the low marginal cost for the company to add new/replacement customers results in a highly predictable share of the IC&I waste market in southern and central Ontario.

Waste Connections is therefore quite confident that there is a sustainable market opportunity to continue to dispose of 1.3 million tonnes of residual waste at the Ridge during the 2022-

2041 planning period. This is supported by an economic analysis of the market for IC&I waste for southern and central Ontario that was completed by an independent third party (and included as Attachment C to Supporting Document 1).

3.3.2 Need for Additional Disposal Capacity in Southern and Central Ontario

Future Waste Disposal Needs in Southern and Central Ontario

Future waste generation quantities in the service area were estimated using Statistics Canada's Waste Management Industry Survey data and the Ministry of Finance's Long-Term Report on the Economy to forecast future employment growth. In order to forecast the future residual quantities of IC&I waste to be managed over the planning period, the new diversion targets from the MOECC's Strategy for a Waste-Free Ontario were applied. Under this scenario, the quantity of residual IC&I waste requiring disposal would decrease from 4.9 million tonnes in 2022 to 2.8 million tonnes in 2041 as diversion rates increase.

Available Disposal Capacity in Southern and Central Ontario

To estimate the available disposal capacity over the planning period, both existing and future proposed disposal facilities were considered.

The major disposal facilities (both public and private) in the service area that currently service the IC&I sector in southern and central Ontario were identified and their remaining site capacity estimated using 2015 data provided by the MOECC (see Table 2). It is estimated that currently approved available annual capacity for IC&I waste will decrease from approximately 3.1 million tonnes per year in 2022 to 311,000 tonnes per year in 2029 and continue at that rate to the end of the planning period. This is based on the assumption that the municipal facilities will allocate 15% of disposal capacity for IC&I waste and that private sector facilities will allocate 100% of their disposal capacity to the IC&I sector. It is acknowledged that these assumptions are very conservative given that some municipal facilities reserve their capacity to meet future residential waste disposal needs and that private facilities do in fact receive residential waste.

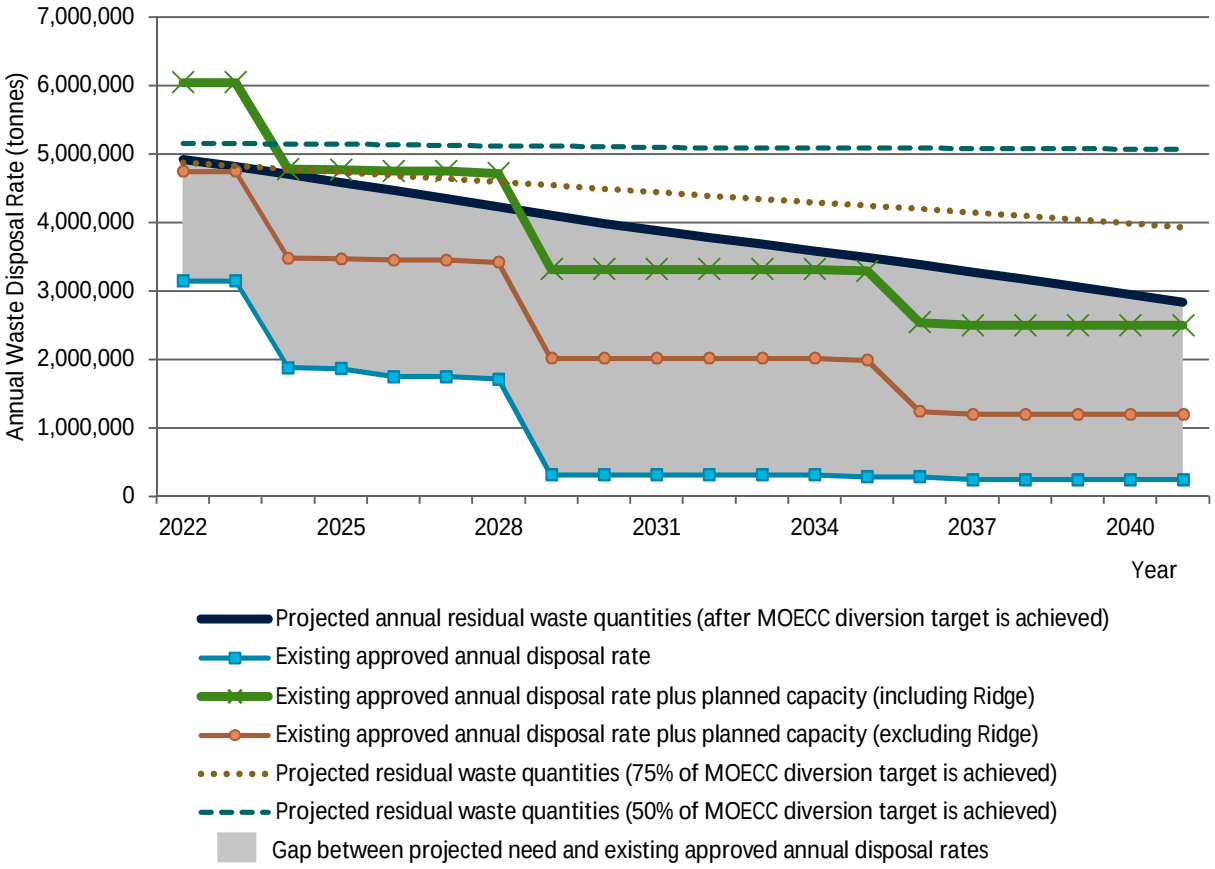
TABLE 2: DISPOSAL FACILITIES WITHIN THE SERVICE AREA

Private Sector	Municipal Sector
Emerald Energy from Waste Inc. Terrapure – Stoney Creek Landfill	Barrie Landfill (Sandy Hollow) Bensfort Road – Peterborough
Walker Environmental – South Landfill Waste Management – Twin Creeks	Durham York Energy Centre Essex-Windsor Solid Waste Authority Regional Landfill
Waste Connections – Ridge Landfill	Glanbrook – Hamilton Green Lane Landfill – Toronto
	Halton Regional Landfill
	Humberstone – Niagara Region
	Lindsay-Ops Landfill
	Mohawk Street – Brantford
	Regional Road 12 – Niagara
	Salford – Oxford County
	Stratford W12A – London
	Waterloo Landfill

In terms of proposed waste disposal facilities, there are three EAs currently in process for new or expanded landfill capacity (in addition to the Ridge Landfill expansion) that, if approved, could provide approximately 1.7 million tonnes of disposal capacity to the IC&I sector in the service area at some or all points of the planning period.

Figure 7 illustrates the projected quantities of IC&I residual waste from the service area that will need to be managed through disposal under three scenarios: 1) assuming the new MOECC Strategy for a Waste-Free Ontario targets are achieved, 2) assuming that 75% of the MOECC diversion targets are achieved and 3) assuming that 50% of the MOECC diversion targets are achieved. The residual waste quantities are compared to the remaining annual waste disposal rate in the service area, the remaining plus planned facilities excluding the Ridge and the remaining plus all planned facilities including the Ridge.

FIGURE 7 PROJECTED POST-DIVERSION IC&I RESIDUAL WASTE AND AVAILABLE PLUS PLANNED DISPOSAL RATES (2022-2041)



3.3.3 Quantity of Waste Disposed of beyond Ontario's Borders

Currently, there is a reliance on the export of several million tonnes per year of waste across an international border for disposal. Ontario has relied on this practice for many years and given past potential U.S. State actions and current North American Free Trade Agreement (NAFTA) negotiations, it is risky to expect this option to exist in perpetuity.

The export of residential waste to Michigan from the GTA was curbed in 2010 as a result of political pressure in Michigan, and the border was temporarily shut down entirely in the aftermath of September 11, 2001. There can be no assurance that the landfills in Michigan and New York State will continue to be available in the future for Ontario waste. In addition, long distance transportation of over 3 million tonnes of Ontario IC&I waste to Michigan and New York disposal facilities contributes additional greenhouse gas (GHG) emissions to the atmosphere.

3.3.4 Revisiting the Purpose and Opportunity of the Undertaking

Waste Connections will revisit the purpose and opportunity outlined in the Terms of Reference. Waste Connections will reconfirm the data and methods used to develop the rationale for the undertaking that considers the available disposal volume at existing landfill sites, anticipated capacity from proposed landfill facilities, and waste export to the United States. Waste Connections will prepare a comprehensive market analysis to quantify the industrial, commercial and institutional waste that the Ridge Landfill can reasonably expect to receive over the 20-year planning period to support the identified opportunity.

The Food and Organic Waste Policy Statement under the *Resource Recovery and Circular Economy Act*, 2016, directs both municipalities and the industrial, commercial and institutional sector to expand food and organic waste collection programs across the province and ensure that all collected food and organic waste is sent for recovery instead of disposal. Waste Connections will assess how this direction may impact the volume and composition of the disposal streams managed at the Ridge Landfill and the need for additional landfill capacity.

4.0 The Environment and Potential Effects

With the long history of the Ridge Landfill and the past EA processes undertaken, there is a significant amount of available information on the site and its surroundings. This section provides an overview of Waste Connections' current waste management system in southern and central Ontario, and the existing Ridge Landfill Site and the environmental conditions on-site and in the vicinity of the Ridge Landfill. Based on secondary source information, the overview of baseline conditions provides an understanding of the area and features that could potentially be affected by the proposed expansion. The baseline conditions information represents a starting point for the collection of further information to be undertaken during the EA. The final detailed description of existing conditions will be provided in the EA based on technical work that will be completed as noted in *Section 4.5* and in the technical work plan summaries included in *Appendix A.* The EA will consider the cumulative environmental effects of existing and planned future undertakings.

4.1 Waste Connections' Waste Management System in Southern & Central Ontario

Waste Connections' approach to the waste management business demonstrates a commitment to creating a more sustainable future. Waste Connections recognizes that the materials it manages are valuable resources that if diverted from disposal, could be beneficially reused or recycled as secondary materials for new products.

This approach forms the basis of what has become a burgeoning global circular economy whereby materials are repurposed to reduce the need for new resource extraction as well as lessen fossil fuel use and greenhouse gas emissions along the product processing and supply chain.

Waste Connections plays a pivotal role based on its strengths in logistics and infrastructure in the southern and central Ontario marketplace to collect and process these materials in an environmentally responsible manner and return them to the economy as secondary resources.

In keeping with Waste Connections' commitment to environmental sustainability and Ontario's effort to increase diversion efforts represented by the Province's *Waste-Free Ontario Act*, Waste Connections will continue to consider opportunities for additional waste diversion, including the potential to enhance its existing waste diversion activities, either at source, at the Ridge or elsewhere in Waste Connections' integrated system.

4.1.1 The Waste Connections Ontario System

Waste Connections has twenty-four (24) stand-alone operating facilities in Ontario that are responsible for local IC&I and/or residential curbside collection, the operation of Material

Recovery Facilities (MRFs) and waste transfer stations, and including two (2) landfills, the Ridge Landfill and the Navan Landfill in Ottawa. Districts work with their IC&I and residential customers to find at-source solutions for segregation of wastes that have a beneficial end-use. Where at-source separation is not practical, segregation of wastes for recovery occurs at district transfer stations or processing facilities where feasible and prior to shipment for final residual disposal.

The Ridge Landfill is Waste Connections' receiving facility for post-diversion residual waste from its system of integrated collection services, materials recovery and transfer facilities, as well as 3rd party facilities in the southern and central Ontario service area. The 3rd party facilities are owned and operated by others but also ship residual waste to the Ridge Landfill.

The Waste Connections operating facilities that send their residual waste to the Ridge Landfill have well established waste segregation programs and continually source local facilities for recycling of asphalt, brick, concrete, clean fill, organics, wood, roofing, drywall, paper fibres, comingled containers, metals, separately collected cardboard and other divertible materials. There are continuous efforts to increase both the types and amount of these materials being diverted.

Waste Connections Windsor District, for example, partnered with Seacliffe Energy in Leamington and now diverts over 11,000 tonnes of IC&I sourced organic waste materials every year to their anaerobic digestion facility. Waste Connections Windsor also diverts COCO product from greenhouse cleanouts to farms. COCO product is a plant growth by-product from greenhouses that is sought by farmers for its exceptional water retention, good drainage and aeration properties. Another unique program is the diversion of over 9,000 tonnes of ash material that is recycled into concrete by St. Mary's Cement.

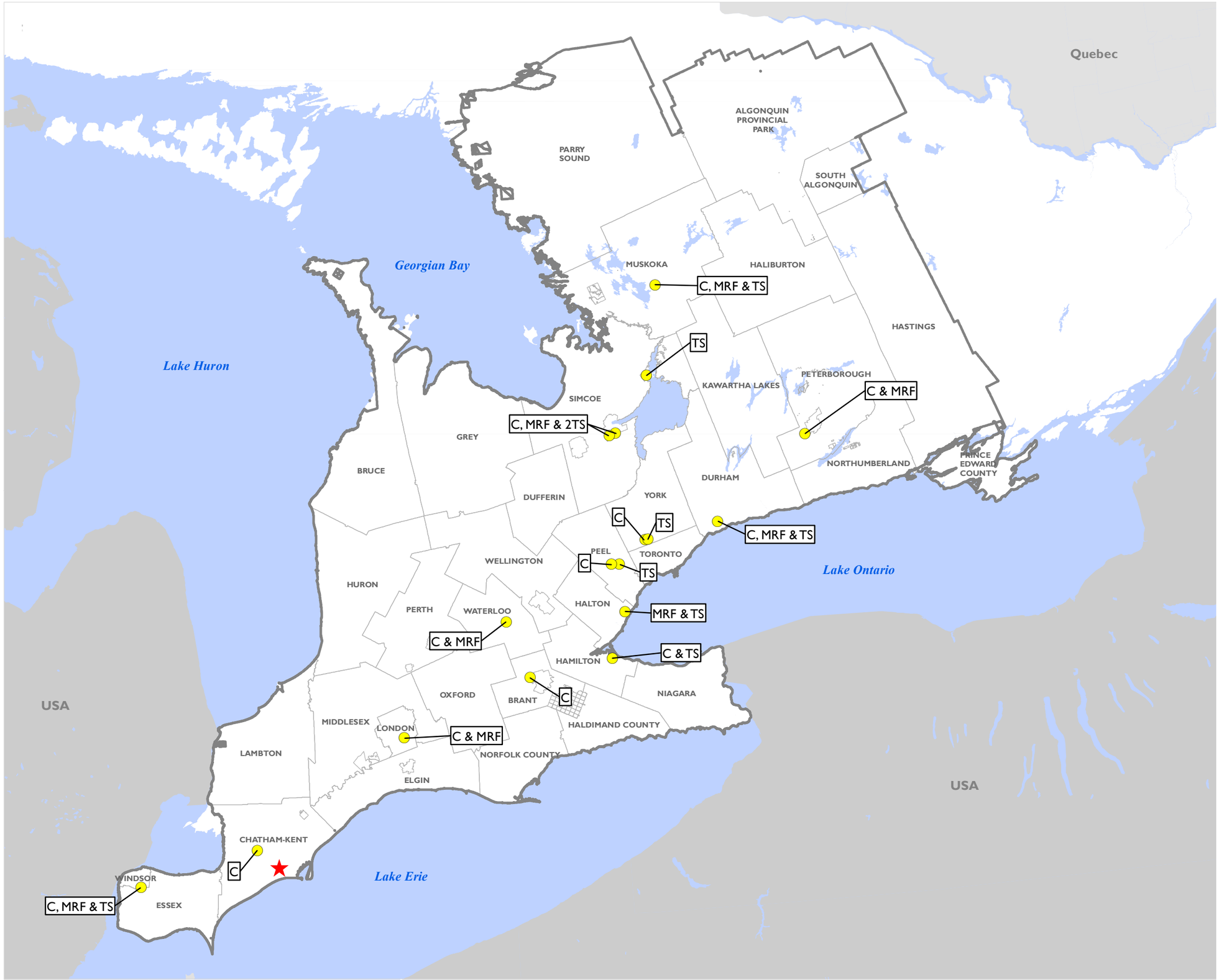
Waste Connections also re-uses in the order of 160,000 tonnes per year of materials such as autofluff, wood chips, glass and asphalt for use in the construction and maintenance of roads at both the Ridge and the Navan landfills. This displaces the use of virgin materials like aggregate and soils. At the Navan landfill in Ottawa, there is an extensive contaminated soil treatment operation in place and treated soil is used for final cover and berm construction. Recently, Waste Connections invested in TerraCycle, a company whose goal is to eliminate the idea of waste by providing a service to recycle the very difficult to recycle materials.

Based on the Statistics Canada Waste Management Industry survey (2014) it is estimated that approximately 995,000 tonnes of waste from the IC&I sector in Ontario was diverted from landfill. In the last five (5) years Waste Connections has been directly involved in the diversion of over 1,300,000 tonnes of materials from disposal in Ontario of which just over 900,000 tonnes were diverted from within the service area. Diversion efforts at Waste Connections have averaged at 262,000 tonnes per year for Ontario with just over 180,000 tonnes diverted within the service area. The company plays a significant role in IC&I waste diversion in this province.

Waste Connections also provides residential recycling and/or organics collection programs to its municipal clients which includes recycling collection for the District of Muskoka for processing at the Waste Connections Materials Recovery Facility (MRF) in Bracebridge, and the collection of recycling and organics for parts of Peel Region, the City of Barrie and the County of Simcoe using CNG powered truck fleets. Waste Connections also provides residential collection of recyclables for its Ridge host community, the Municipality of Chatham-Kent.

Waste Connections' philosophy of local managerial empowerment allows their district managers to find local solutions to increase waste diversion activity. Waste Connections strongly believes in local community partnering, local purchase of goods and services, local employment and support for local tax bases. Where possible, beneficial end use materials are marketed or managed locally. This helps make diversion programs economically viable for customers and minimizes GHG emissions that would result from longer haul distances to markets.

The location of each Waste Connections district waste management facility in the service area is shown in Figure 8.



RIDGE LANDFILL

FIGURE 8
WASTE CONNECTIONS COLLECTION, PROCESSING AND TRANSFER STATION NETWORK FOR THE RIDGE

- Waste Connection Facility
- Ridge Landfill
- Service Area

C: Collection
TS: Transfer Station
MRF: Materials Recovery Facility

1:2,000,000
0 25 50 100 km

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: GM
MAP CHECKED BY: BV
MAP PROJECTION: NAD 1983 CSRS Ontario MNR Lambert

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PROJECT: 152456
STATUS: FINAL
DATE: 2017-12-15

FILE LOCATION: I:\GIS\141382 - Ridge Landfill\Mapping\Figure 3 Waste Connections Collection, Processing and Transfer Station Network for the Ridge.mxd

4.1.2 Waste Connections' Commitment to Increased Diversion

Notwithstanding Waste Connections' comprehensive at-source, at-transfer and at-MRF waste diversion programs, there are opportunities to further support the objectives of *Strategy for a Waste-Free Ontario* and the Climate Change Action Plan and to enhance the Waste Connections diversion system.

Waste Connections is committed, as part of the Ridge Landfill Expansion EA, to consider opportunities to enhance diversion at source, at the landfill or elsewhere in its waste management system to achieve increased diversion from its IC&I customers in its southern and central Ontario waste shed. Generally future IC&I sector waste diversion opportunities would be focused on additional materials segregation at-source and at transfer stations to avoid unnecessary trucking and associated GHG emissions with bringing material to the Ridge Landfill. Future IC&I diversion is anticipated to include items that could have beneficial end uses including those materials that may be ultimately designated under the *Waste-Free Ontario Act*. The following summarizes the ongoing and enhanced diversion opportunities the Waste Connections is committed to:

- Continue to work with its customers to identify opportunities for the segregation of re-usable, recyclable and organic wastes and provide education materials to customers;
- Establish designated collection routes for segregated materials where there are sufficient materials generated at multiple generation sources;
- Proactively work to educate its customers on objectives of the Strategy and the requirements of the *Waste-Free Ontario Act*;
- Continue to inspect inbound loads at waste transfer stations and where noticeable volumes of materials that could be diverted are observed, to work with customers to help them to develop an at-source separation program;
- Remove recyclable materials received at the waste transfer stations/landfill to a dedicated pile if possible;
- Add an expanded resource recovery area (in the form of a drop-off facility) at the Ridge Landfill for Chatham-Kent customers; and
- Continue collaboration with the Ridge Landfill host community of Chatham-Kent to develop partnership opportunities to support their municipal waste diversion targets and their alignment with the objectives of the *Strategy for a Waste-Free Ontario*.

4.2 The Existing Site

The Ridge Landfill has been in operation since 1966. The entirety of the Ridge Landfill property is approximately 340 ha in area, of which approximately 262 ha is currently occupied by the Landfill Site Area. The approved waste disposal area is 131 ha, including the Old Landfill, West

and South Landfills and the Infill Area. Figure 9: The Existing Site highlights the key on-site features.

FIGURE 9: THE EXISTING SITE

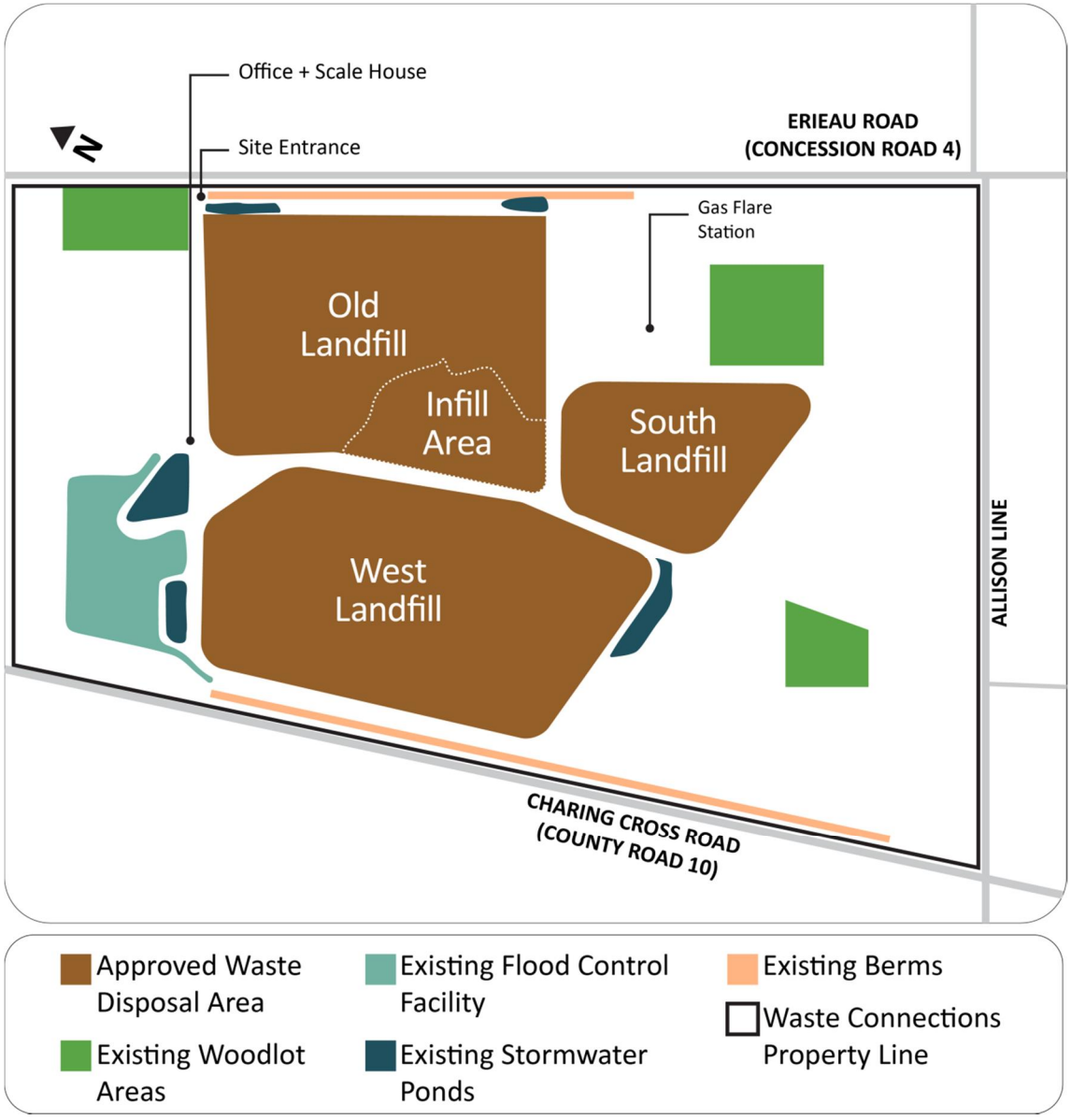
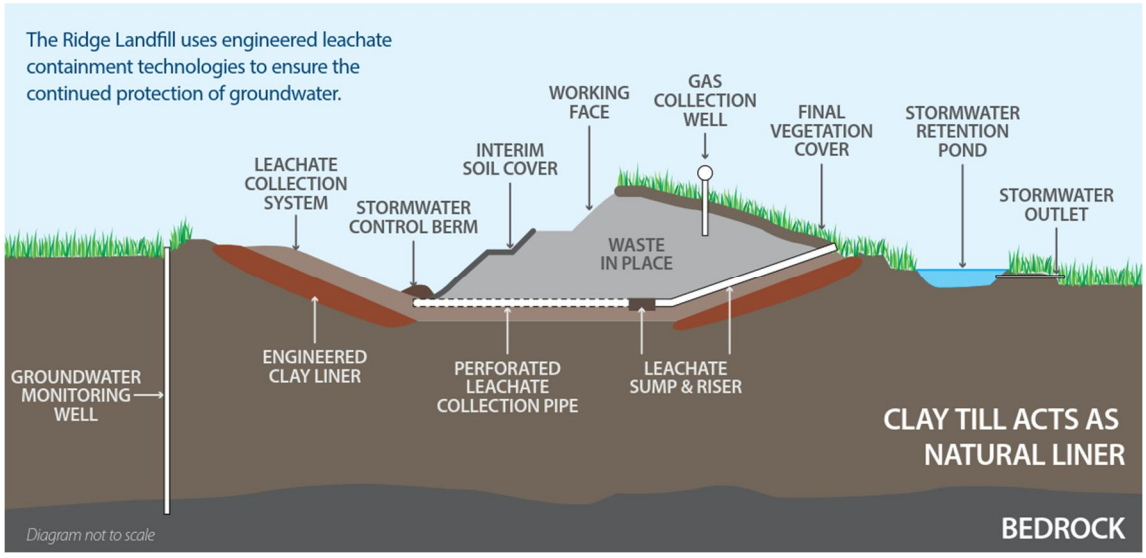


Figure 10 depicts a cross-section of the Ridge Landfill site, showing the features of its design. There is over 30 metres of clay till under the waste fill areas providing natural protection for groundwater. Leachate from the waste in the Old Landfill is collected around the perimeter of the fill area, which will be the same for the Infill Area when it is developed. The leachate collection system for the West and South Landfills include a blanket stone drainage layer and perforated pipes at the bottom of the fill area under the waste. The leachate is collected in an on-site storage tank and flows by gravity (assisted by a booster pump) to the Blenheim Waste

Water Treatment Plant where it is treated. Leachate is tested a minimum of three times per year at the pump. Environmental management at the site includes annual independent groundwater and surface water monitoring with reports submitted to the MOECC.

FIGURE 10: CROSS-SECTION OF THE RIDGE LANDFILL



The groundwater and surface water monitoring is carried out by an independent engineering consultancy twice annually to confirm that the leachate collection system and the natural clay liner is protecting groundwater. Approximately 35 years of groundwater monitoring through an extensive 48-well network at the Landfill Site Area has shown the landfill design and operations to be extremely effective in protecting groundwater.

Other environmental management activities at the site include:

- Daily covering of waste to mitigate odour, birds and litter;
- Regular maintenance of site access roads by a road grader and/or a vacuum sweeper truck;
- Use of water trucks on site access roads during dry weather to reduce dust and use of woodchips, aggregate or autofluff when needed to minimize mud within the cell areas;
- Truck wheel cleaning facility minimize mud dragout;
- Collection and flaring of landfill gas to reduce odour and greenhouse gases (methane);
- Use of permanent and temporary litter fences as well as employing staff to pick up litter from public roads, ditches and other properties adjacent to the landfill;
- Use of odour control misting units;
- Stormwater management ponds to minimize potential impacts to surface water quality;
- A flood control facility that provides surface water storage to control surface water discharges to downstream municipal drain; and

- Construction of screening berms to minimize noise and provide a visual barrier.

4.3 Study Areas

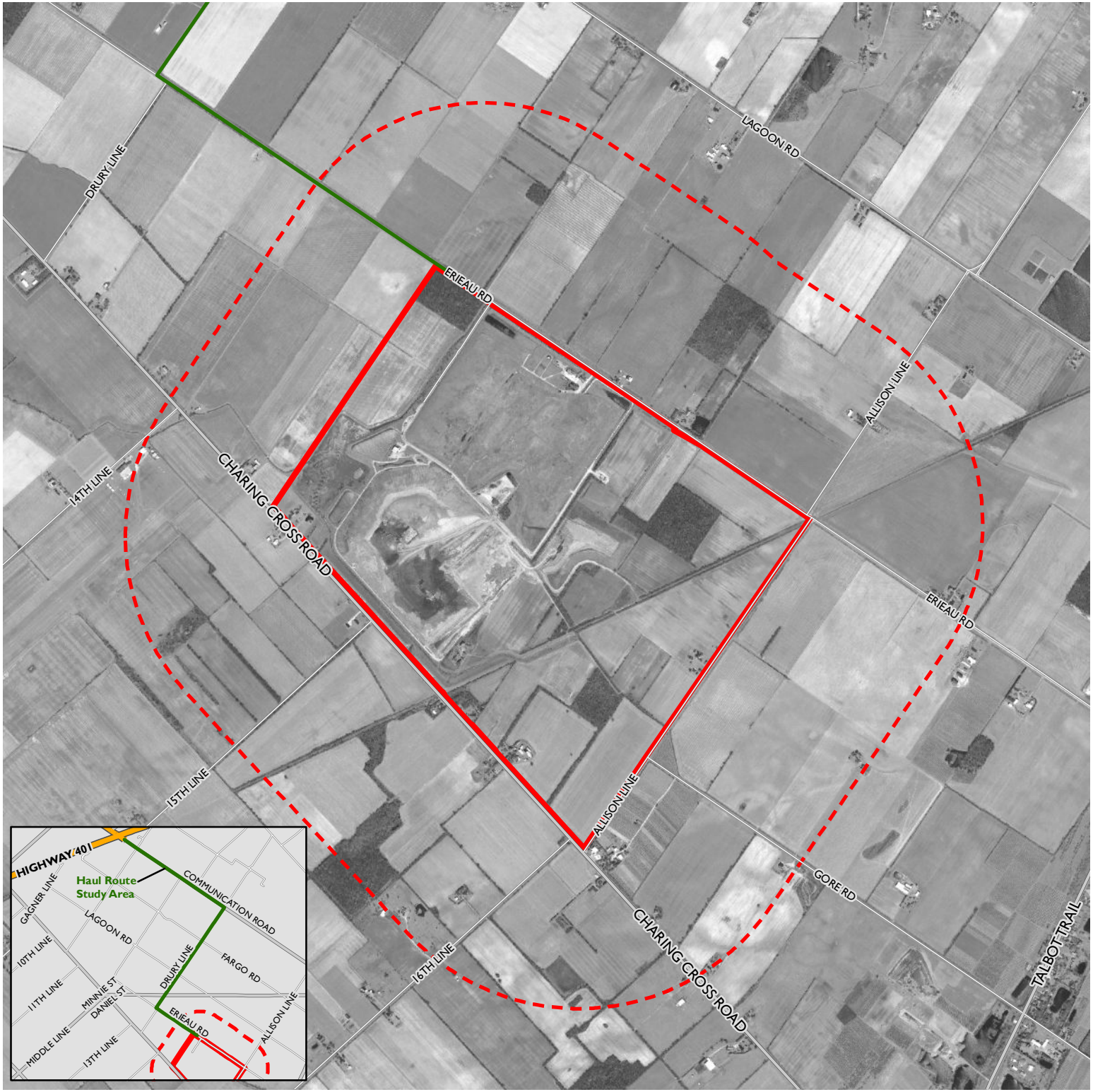
For the purposes of the EA, three impact study areas will include:

- On-Site Study Area ("on-site") – includes the property on which the current Ridge Landfill and proposed expansion is situated;
- Off-Site Study Area ("off-site") – encompasses the area within one kilometre of the proposed fill area limits. The extent of the fill area limits will be confirmed during the EA and will not exceed the area shown in Figure 11; and,
- Haul Route Study Area ("haul route") – encompasses lands immediately adjacent to Communication Road, Drury Line and Erieau Road which are identified as the designated haul routes for the site.

It should be noted that the Off-site Study Area encompasses the area within one kilometre (1 km) of the proposed fill area limits. The MOECC *Guideline D-4 Land Use on or Near Landfills and Dumps* indicates that the Ministry considers the most significant impacts to be typically within 500 m of the perimeter of a fill area. To respect this guideline and be conservative, a general 1 km off-site study area was selected for this project. The 1 km study area is deemed reasonable as any off-site effects have historically occurred within this distance of the Ridge, demonstrated by several decades of operating experience.

The 1 km study area is a starting point however, and Waste Connections acknowledges that some technical disciplines will consider potential impacts extending beyond this limit, as appropriate. The socio-economic impact assessment will assess potential effects within a regional study area that includes communities in the Municipality of Chatham-Kent.

Waste Connections will determine study areas as part of the development of detailed work plans in consultation with government agencies, Indigenous communities and interested members of the public at the beginning of the environmental assessment process, and document the rationale for study area boundary selections in the environmental assessment.



RIDGE LANDFILL

FIGURE 11: STUDY AREAS

Haul Route
On-Site Study Area
Off-Site Study Area

1:25,000

0 100 200 400 m

N
W E
S

MAP DRAWING INFORMATION:
IMAGERY PROVIDED BY DIGITAL GLOBE/
DATA OBTAINED FROM MNRF

MAP CREATED BY: GM
MAP CHECKED BY: MB
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 152456
STATUS: DRAFT
DATE: 6/20/2016

File Location: I:\GIS\141382 - Ridge Landfill\Mapping\Ridge Landfill Study Areas.mxd

4.4 Existing Environmental Conditions

This section describes the existing environmental conditions on-site and near the Ridge Landfill. The information is organized under the following headings:

- Natural environment;
- Socio-economic environment; and
- Transportation.

4.4.1 Natural Environment

The following sections describe the natural environment at and around the Ridge Landfill property including: biology, geology/hydrogeology, and surface water conditions.

4.4.1.1 Biology

The Ridge Landfill property is located within the Lake Erie-Lake Ontario ecoregion (classified as ecoregion 7E), part of the Mixedwood Plains ecozone. The ecoregion is described as having the greatest diversity of species found in Canada, despite being the most developed in terms of agricultural and suburban/urban land uses. No provincially significant wetland features or areas of natural and scientific interest (ANSI) are found on-site, or within the surrounding area.

Forest Cover

There are three woodlots located in the southwest, southeast and northern portions of the property. An ecological land classification study completed in 2015 identified seven natural vegetation communities within these on-site woodlots. All three woodlot areas primarily consist of deciduous trees. The majority of the northern woodlot is dominated by Freeman's Maple (*Acer xfreemani*), White Elm (*Ulmus americana*), Shagbark Hickory (*Carya ovata*) and Green Ash (*Fraxinus pennsylvanica*). The southeast woodlot has a similar composition, but with the inclusion of a small thicket area dominated by Gray Dogwood (*Cornus racemosa*). The southwest woodlot showed signs of impact by Emerald ash bore (*Agrilus planipennis*) and is considered less robust than the other two woodlots.

It is understood that forest cover in the Municipality is considered low (4% of total land area) and is considerably lower than Environment Canada guidelines (30%) as noted in the Chatham Kent Official Plan. Although the Municipality's Official Plan notes that agriculture remains the primary pressure on such natural heritage features, retention of mature woodlots will be carefully considered during the EA process.

Wildlife

The Ridge Landfill property is located in a primarily agricultural area with wildlife habitat limited to the woodlots noted above and hedgerows. A review of available secondary source databases and wildlife atlases identified some species that could be found in the vicinity of the

property. Based on a review of this information 15 designated species under the Endangered Species Act, 2007 have been identified as having the potential to occur within 1 km of the property.

Seven municipal drains have been identified within 1 km of the property. All watercourses within the Municipality of Chatham-Kent have been classified as warm water systems (TSRSPC, 2010). According to Aquatic Resource Area data (Ministry of Natural Resources and Forestry, 2015) all fish species found in the Howard Drain, Gales Drain, Lewis Drain and Duke Drain are considered Secure or Apparently Secure in Ontario, meaning they are not afforded protection under provincial Species at Risk legislation (i.e., Ontario's *Endangered Species Act*, 2007).

4.4.1.2 Geology/Hydrogeology

The property lies within the St. Clair Clay Plain physiographic region. There is little topographic relief in the area of the property, and the ground surface slopes slightly to the northwest. Surface drainage is poor and drains are man-made.

The property is located on a flat silt and clay till plain. The till plain is widespread in the west towards Windsor but narrows near the site area, extending from Charing Cross south to Lake Erie. The till plain consists of slightly stony, clayey silt Port Stanley Till. In some locations this is reported to be underlain by the denser stony and silty Catfish Creek Till. Some shallow surficial deposits of lacustrine silts and clays may occur locally. The till sequence generally exceeds 30 m in thickness, and the top 3-5 m is fractured. Occasional discontinuous sand and gravel lenses have been encountered at various depths within the till below 20 m.

Below the till and directly overlying bedrock is a thin (less than 3 m thick) zone of sand and gravel. Bedrock in the area is at an average depth of approximately 46 m. The bedrock is generally well-fractured and consists of black shale of the Kettle Point Foundation and/or shaley limestone of the Hamilton Group. Pockets of natural gas have been encountered in the bedrock.

The basal overburden sands and gravels, as well as the upper layer of fractured bedrock (Kettle Point Shale) constitute the main regional aquifer in the area. Water well records for the Off-Site Study Area indicate that there are five wells located in the surficial sands and gravels, as well as the weathered upper zone of the regional till unit.

The flat till and clay plain make this area a preferred geological location for the landfill, as the clay acts as a natural liner between the groundwater and the waste layer.

Source Water Protection Areas

The Ridge Landfill property falls within the Thames-Sydenham and Region Source Protection Area; however not within any designated vulnerable areas. The Ridge Landfill has an existing environmental management system that protects groundwater resources in accordance with

the Ministry standards outlined in the Ontario Reasonable Use Guidelines under *Ontario Regulation 232/98.*

4.4.1.3 Surface Water

The Ridge Landfill site is situated in the southeastern end of the Jeanette's Creek Subwatershed. The Jeanette's Creek Subwatershed encompasses an area of approximately 380 km^2 and outlets into the Thames River 3 km upstream of Lake St. Clair.

Local topography is considered flat to depressed, with average slopes of less than one percent. Internal drainage within the on-site study area is considered poor resulting in high runoff characteristics.

Surface runoff from the existing site and proposed landfill expansion area is primarily received by the Duke Drain, Howard Drain, and Scott Drain (tributary of the Howard Drain). Flow rates in these watercourses are variable throughout the year. Within the 1 km study area there are two other drains, the Lewis Drain and Gales Drain, which do not receive flows from the site. A third drain within the 1 km study area, the McDowell Drain, also does not receive direct flows from the site but is part of the Howard Drain watershed area.

There are 5 existing ponds on the property that collect stormwater and a flood control facility that does not come into contact with waste.

4.4.2 Socio-Economic Environment

The following sections describe the baseline socio-economic environment in the vicinity of the Ridge Landfill property, including: agriculture, cultural and archaeological resources, socio-economic and land use aspects.

4.4.2.1 Socio-economic

The Municipality of Chatham-Kent constitutes the regional socio-demographic setting for the proposed Ridge Landfill expansion. Blenheim is considered a primary urban centre with a population of 4,563 as of 2011. Charing Cross is a secondary urban centre with a 2011 population of 319 and Cedar Springs is identified as a hamlet with a 2011 population of 283 (Statistics Canada Census Profile, 2011).

There are three rented properties within the Ridge Landfill and 28 residences within 1 km.

The defining features of the community include its farming landscape interspersed by small residential clusters.

Waste Connections currently employs 60 people who live in the community, 23 of whom are directly involved with the landfill operation.

There are no businesses located on-site other than the landfill operation. Businesses operating near the site include a fruit stand operation at County Road 10 (Charing Cross Road) and Allison

Line, a small equipment dealer, and the Chatham-Kent Municipal Airport. Along the haul route businesses include Platinum Produce, a septic system installer, a Ministry of Transportation Ontario (MTO) maintenance yard, the Ontario Provincial Police facility, RM Classic Cars and other businesses in proximity to Highway 401.

Waste Connections strives to be a good neighbour and a responsible partner in the community. The host community derives significant economic benefit from the Ridge Landfill and this will continue with the proposed expansion. The Ridge Landfill contributes over $4 million annually to the local community through direct and indirect benefits such as an annual royalty payment to the Municipality of Chatham-Kent, and financial contributions to the Ridge Landfill Trust.

Atmospheric

The ambient noise environment in a rural area is primarily defined by the sounds of nature and to a lesser extent, road traffic noise. Dust is also related to the rural context and typically is a result of farming operations or dust generated by passing traffic.

Odours within the existing environment are generated predominantly by the existing Ridge Landfill, agricultural operations, and the Blenheim Sewage Treatment Plant located on Lagoon Road approximately 1.5 km east of the site boundary.

4.4.2.2 Agriculture

The property is located in an area that is primarily agricultural with mostly Class 2 soils as indicated by Canadian Land Inventory (CLI) mapping. The types of crops grown in this area include soybean, corn, grain, and pasture/hay. Specialty crops in the vicinity of the site include an apple and pear orchard at the southwest property boundary. Land is farmed on-site by tenant farmers along the western boundary of the Ridge Landfill property. There is also a small apple orchard on-site.

4.4.2.3 Archaeology and Cultural Heritage

As part of the expansion work that was undertaken for the Ridge Landfill in 1997, portions of the Ridge property were studied for archaeological and cultural heritage potential. No archaeological resources were found within the area studied (i.e. the Waste Fill Area). Lands southeast of the former rail line which will be included in the proposed expanded landfill footprint were not studied in 1997.

The 1997 work noted that the area generally included rural agricultural lands and associated roadscapes that reflected the area's original nineteenth century survey patterns. Three cultural landscapes were identified on or adjacent to the Ridge Landfill property as defined at that time: an active agricultural landscape backed by the current landfill operation to the east, the abandoned Chesapeake & Ohio Railway corridor, and the roadscape of County Road 10 (Charing Cross Road) which marks the western edge of the landfill.

The haul route was found to be comprised of three historic roadscapes including sections of Erieau Road, Drury Line and Communication Road.

Several built heritage features were identified during the 1997 work, all of which were determined to exhibit low heritage significance.

4.4.2.4 Land Use

The Ridge Landfill property is located in the community of Harwich Township in the Chatham-Kent Official Plan[1]. The Municipality's Official Plan includes land use policies specific to the ongoing operation, potential expansion and closure of the Ridge Landfill. The Waste Fill Area falls under the *Waste Management Area* land use designation, which allows disposal of non-hazardous waste only. The current landfill site area is bounded on three sides by lands under the *Agriculture/Buffer Area* designation, which allows for agriculture, farm-related industrial and farm-related commercial uses and accessory uses. A small portion of the Ridge Landfill site property is designated *Agricultural*.

Portions of Erieau Road, Drury Line and Communication Road between Allison Line and Highway 401 fall under the *Waste Management Truck Route* Official Plan land use designation, also known as *Ridge Landfill Truck Route* in Official Plan schedules.

Official Plan policies indicate that in order to seek expansion of a landfill on lands under the above designations, the operator must demonstrate, in a manner satisfactory to the Municipality, that the design capacity of the existing landfill site will be reached within 10 years. This information was presented to the Municipality of Chatham-Kent. Furthermore, any expansion of an existing waste management use or establishment of a new use can only take place on lands zoned to permit those uses.

Portions of the site (the three woodlots) are regulated under the *Open Space Zone* OS1-105 designation, which permits open space, private recreational uses, forestry and fisheries, conservation, and preservation of wildlife and fisheries.

The surrounding area is designated *Agricultural*, which permits typical agricultural and farming uses.

4.4.2.5 Visual

The Ridge Landfill site, while part of the landscape, is an anomalous form that is different from the surrounding topography. Visual impact assessment work completed in 1997 identified that at least a portion of the Ridge Landfill was visible from 3 km away. To mitigate potential visual effects, berms are located along the southwest and northeast boundaries of the Ridge Landfill

[1] Official Plan Schedule A4 – Community of Harwich Township Land Use Schedule December 2015. See The Corporation of the Municipality of Chatham-Kent, 2016.

property. It is anticipated that new berms would be installed along the southeast boundary and in the southeast corner of the Ridge Landfill property to address visual mitigation concerns from the Project.

The visual landscape at the regional level has been altered in recent years due to the installation of wind power generation facilities around the Ridge Landfill and more broadly across the Municipality of Chatham-Kent.

4.4.3 Transportation

The following sections describe the baseline conditions for aviation and roadway traffic in the vicinity of the Ridge Landfill.

4.4.3.1 Traffic

Waste haul vehicles arrive at the site from Highway 401 by following three main roads, collectively referred to as the haul route, described as follows:

- traffic heads southeast along County Road 11 (Communication Road), a two-lane paved road with a posted speed limit of 90 km/h; then,
- southwest along Drury Line, a two-lane paved road with a posted speed limit of 60 km/h; then,
- southeast along Erieau Road, a two-lane paved road with a posted speed of 60 km/h that provides direct access to the landfill site entrance.

The haul route configuration will not change as a result of the current EA process.

Currently, approximately 200 trucks use this haul route to access the site each day. In addition to these large trucks, smaller trucks and personal vehicles also access the site. While the daily and annual fill rate for the site is not expected to change, it is anticipated that there could be an increase in truck traffic during construction, or to accommodate materials being brought to the landfill for waste segregation activities. For clarity, traffic related specifically to waste disposal will remain the same.

4.4.3.2 Aviation

The centre point of the Chatham-Kent Municipal Airport ("the Airport"; identifier CYCK) is located approximately 3 km west of the centre point of the Ridge Landfill property. The east end of the runway is approximately 1 km from the Ridge Landfill property boundary and approximately 1.5 km from the Waste Fill Area. The aircraft approach/departure path to the Airport runway passes about 300 m to the northwest of the existing Ridge Landfill.

The Airport is owned by the Municipality and is managed and operated by a private contractor (Z3 Aviation). With a single lighted 1,675 m paved runway oriented in a northeast/southwest

direction (runway designation 06/24), the Airport is available for year-round operations and is capable of servicing corporate, regional and commercial aircraft.

The lands around the Airport are zoned for obstruction clearances and bird hazard protection under the federal *Aeronautics Act, 1985*. Since the Ridge Landfill was present before the zoning designation was enacted, it was granted exemption from federal airport zoning regulations. Under the exemption, operators of the landfill must control any bird hazards to aircraft that result from the operation of the landfill, including any expansion of activities. This exemption would need to be extended as part of the EA to accommodate the proposed expansion.

4.5 Technical Studies during the EA

Several technical studies will be conducted during the EA to confirm existing environmental conditions, support the evaluation of site development alternative methods and to identify and mitigate potential effects.

The planned studies to be conducted during the EA process are noted in Table 3 with further details included in the technical work plan summaries provided in Appendix A. These studies will inform the final description of the environment which will be provided in the EA. It is noted that additional studies may be required.

TABLE 3: TECHNICAL STUDIES TO BE COMPLETED DURING THE EA

TECHNICAL DISCIPLINE	DESCRIPTION OF STUDIES TO BE COMPLETED DURING THE EA
Natural Environment	
Biology	Field work will be completed to establish baseline conditions for terrestrial and aquatic habitats, wetlands, botanical surveys, bats, amphibians, breeding birds, wildlife habitat, tree identification, snapping turtles and fish.
Hydrogeology	Field investigation will be conducted, including testing for hydraulic conductivity, water levels, groundwater quality and an isotopic assessment, to determine whether the site can be developed without causing an adverse effect to off-site groundwater. New monitoring wells will be installed to provide adequate coverage of the site. The contaminating lifespan of the expanded landfill (as defined by O. Reg. 232/98) will also be determined as part of this work.
Surface Water	A desktop review of background data and field investigations will be completed to establish baseline surface water conditions such as flow, quality and water levels.
Socio-Economic Environment	
Socio-economic	Information on current land use, feedback from stakeholders, and information related to potential nuisance effects (i.e. noise, dust, visual, and odour) will be collected to characterize existing conditions.
Atmospheric - Air Quality	A baseline air quality study, indicator compound analysis will be conducted to establish baseline conditions.
Atmospheric - Noise	A baseline noise study will be completed at existing noise receptors to establish baseline conditions.
Agriculture	Field work, windshield surveys and farm interviews will be completed to

TECHNICAL DISCIPLINE	DESCRIPTION OF STUDIES TO BE COMPLETED DURING THE EA
	confirm agricultural activity.
Archaeology and Cultural Heritage	Desktop and field investigations will be completed to establish the presence of archaeological or cultural heritage features.
Visual	Viewshed analysis will be undertaken to establish baseline conditions. This will include photography in both leaf-on (spring) and leaf-off (fall) conditions.
Transportation	
Transportation	An inventory of the haul route road network, turning movement counts at intersections, and collection of traffic volume information will be completed to establish baseline conditions.
Aviation - Operations	A review of airport diagrams, published aircraft procedures, Chatham airport zoning regulations, bird populations and flight patterns will establish baseline conditions.
Aviation - Bird Hazards	Bird counts, movements, distribution, behavior, and flight orientation in and around the Ridge Landfill will be studied to establish baseline conditions.
Design and Operations	
Design and Operations	A conceptual design and operations plan will be prepared for the preferred site development alternative. This will address key components such as the regulatory approval requirements, waste characteristics and quantities to be accepted, landfill capacity and soil balance, landfill development sequencing, leachate management, landfill gas management, environmental controls to manage potential impacts, and site closure and post closure requirements.

5.0 Alternatives Assessment

As discussed in Section 3.2 of this ToR, Waste Connections completed an assessment of projected quantities of residual IC&I waste requiring disposal (assumes the MOECC's diversion targets in the *Strategy for a Waste-Free Ontario* are achieved) compared to the estimated available annual waste disposal rates in the service area assuming the approval of all new and expanded IC&I disposal facilities. This assessment confirms that with the Province meeting its diversion targets and all proposed facilities (including the Ridge) are approved and operational, there is an opportunity for the Ridge Landfill to continue to provide disposal capacity for IC&I waste for the service area over the 20-year planning period. To fulfill this opportunity, Waste Connections must address the impending exhaustion of the currently approved capacity of the Ridge, which is projected to occur by the end of 2021. As such, the purpose of this undertaking is to expand the Ridge Landfill such that Waste Connections can continue to provide long-term residual waste disposal capacity for its large customer and to continue serving as a regional waste management facility to help manage waste volumes associated with projected increases in population and related economic growth in southern and central Ontario.

This section provides a summary of the evaluation of alternative ways of addressing the identified opportunity to determine which alternative(s) to carry forward into the environmental assessment (the Alternatives to). An evaluation is presented in Supporting Document 2.

This section of the ToR also presents the approach Waste Connections proposes to use during the EA to identify and evaluate Alternative Methods of carrying out the Project (see Section 5.2) and the impact assessment for the preferred expansion Alternative Method (see Section 5.3).

5.1 "Alternatives To" Evaluation

The MOECC *Code of Practice for Preparing and Reviewing Environmental Assessment Terms of Reference* (2014) provides guidance for consideration of a reasonable range of alternatives. The Code of Practice recognizes that private companies may not be able to implement some alternative ways of managing waste and also provides guidance on focusing a Terms of Reference. Waste Connections has prepared a focused Terms of Reference under Section 6(2)(c) of the *Environmental Assessment Act*.

As noted in Supporting Document 2, Waste Connections identified the following alternatives as a reasonable list of alternative ways to address the above-described purpose/opportunity:

1. Do nothing (i.e., benchmark or baseline condition for comparison);
2. Export Waste Out of the Service Area;

3. Thermal Treatment;
4. Increased Waste Diversion; and
5. Landfilling Within the Service Area.

These alternatives are described in further detail below.

5.1.1 Assessment of "Alternatives To"

Alternative 1 – Do Nothing

This alternative involves continuing landfill operations until the Ridge reaches capacity by the end of 2021 and then closing the Ridge and implementing an appropriate closure plan. Waste disposal is a key component of Waste Connections' efficient integrated waste management services business. The Do Nothing alternative is not acceptable to Waste Connections from a business perspective as exiting the waste disposal business at the Ridge would place Waste Connections at a significant competitive disadvantage in the southern and central Ontario marketplace. This alternative would effectively remove 25% of the province's IC&I disposal capacity in the service area and require Waste Connections find alternative ways to address the need to safely dispose of residual waste generated by its customers.

Waste Connections does not intend to proceed with the "Do Nothing" or status quo alternative; however, the Do Nothing alternative will be carried forward into the EA as a baseline against which advantages or disadvantages of the preferred site development alternative can be compared.

Alternative 2 – Export Waste Out of the Service Area

This alternative considers Waste Connections' options to dispose of the 1.3 million tonnes of waste that goes to the Ridge annually at other Waste Connections owned facilities outside of the Ridge service area. There are three other Waste Connections disposal facilities that were considered. None of these were identified as reasonable to address the business opportunity proposed in this ToR as follows:

- Navan Landfill – This landfill, located in Ottawa is not a feasible location to accept additional waste from the Ridge service area as it has less than 10 years of capacity at its approved waste disposal rate of just 234-750 tonnes per year, and there is an agreement with MOECC and the community that there will be no further expansion of the site. The site is also not permitted to accept waste from the Greater Toronto Area or putrescible waste.
- Lachenaie Landfill – This landfill is located in Quebec where provincial regulation does not permit disposal of residual waste generated from out of province.

- Brent Run Landfill in Michigan – Waste Connections owns no additional land to laterally expand this landfill and it requires transporting 1.3 million tonnes of waste annually across an international border. The extra travel to this site from the transfer stations that currently use the Ridge would result in an estimated additional 5,500 tonnes CO_2e[2] of transportation-related emissions.

Given the above, this alternative is not considered to be a feasible way for Waste Connections to continue to provide residual disposal capacity to its IC&I customers in the southern and central Ontario service area.

Alternative 3 – Thermal Treatment

Thermal treatment technologies involve applying heat to waste through complex industrial processes to significantly reduce volume and generate energy. Thermal treatment typically does not eliminate the need for landfill disposal; however the residual waste ash volume is significantly reduced. Some key thermal treatment technologies include: direct combustion or incineration, gasification, pyrolysis and plasma arc gasification. Not all of these technologies have to date been proven reliable and siting thermal facilities can be controversial.

It is noted that Waste Connections does not own or operate any thermal treatment facilities and has a corporate philosophy to not build a thermal treatment facility as it runs contrary to the waste diversion infrastructure that Waste Connections has built. Due to high capital and operating costs, Waste Connections also believes that thermal treatment will not provide a cost competitive way to provide residual disposal services to its IC&I customers.

Alternative 4 – Increased Waste Diversion

Waste Connections proactively assists its generator customers to divert IC&I waste at source and further works to divert recyclable materials once waste is collected.

Increased waste diversion is an important component of Waste Connections' efficient integrated system. It will assist the province in meeting the targets set out in the Strategy; however, this additional diversion will not reduce the need for the 1.3 million tonnes of capacity per year during the 20 year planning period.

Alternative 5 – Landfilling Within the Service Area

Waste Connections does not have the ability to expropriate land to site a new landfill; therefore its ability to develop landfill capacity is inherently constrained to properties owned by the company. New landfill capacity could be developed by expanding an existing landfill site(s) or constructing a new site on a Waste Connections property. The Ridge is the largest

[2] Based on the difference between the distance from each Transfer Station to the Ridge and each Transfer Station to the Brent Run Landfill.

Waste Connections property in the service area at 340 ha. The remaining properties range from less than 1 ha to approximately 20 ha. A new landfill to accommodate 26 million tonnes of residual waste over the planning period would require sufficient land to accommodate the waste fill area, stormwater management ponds, on-site roads and storage areas, and an office, scale house and drop off areas. It is anticipated that the footprint to accommodate these facilities at a new site would be approximately 200 ha. The Ridge landfill is the only Waste Connections property large enough to accommodate the projected waste opportunity; and has the advantage of being an existing landfill with the required land and support infrastructure already in place.

Landfilling within the service area through an expansion of the Ridge is Waste Connections' preferred alternative to address the business purpose/opportunity identified.

5.1.2 "Alternatives To" Conclusion

Overall it is concluded that Export of Waste Out of the Service Area, Thermal Treatment and Increased Waste Diversion are not reasonable or feasible alternatives to be considered for Waste Connections' stated business opportunity. These alternatives will not be carried forward in the EA. As noted, Waste Connections remains committed to considering opportunities to enhance diversion at source, at the landfill or elsewhere in its waste management system to achieve increased diversion from its IC&I customers in its southern and central Ontario service area and will explore these opportunities as part of the EA.

The "Do-Nothing" alternative will be carried forward into the EA and considered in relation to the assessment of the preferred undertaking as a base case for assessing potential effects.

Landfilling within the service area through an expansion of the Ridge is considered the preferred way for Waste Connections to manage residual waste received by the company during the planning period used in this environmental assessment and to fulfill its desire to continue to provide an efficient and integrated waste management system to its IC&I customers and to its host municipality of Chatham-Kent. Landfilling within the service area through an expansion of the Ridge Landfill will be carried forward into the EA. The EA will consider the advantages and disadvantages of alternative methods of expanding the landfill. The potential effects of the expansion compared to the Do-Nothing alternative will also be addressed in the EA.

5.2 Alternative Methods Evaluation

In addition to consideration of "Alternatives To", proponents must also consider a reasonable range of alternative methods for carrying out the Project. Section 6.1(2)(b)(ii) of the *Act* requires consideration of "Alternative Methods" of carrying out the Project; i.e., different ways that the preferred "Alternative to" could be implemented. Once defined, the Alternative

Methods are then evaluated based on several criteria, including their potential to have effects on the natural, social, cultural and economic environments.

The EA will document the evaluation of Alternative Methods of implementing the Preferred Alternative To by considering landfill site development Alternative Methods (Section 5.2.1).

The following presents the steps in the overall approach to the evaluation of Alternative Methods in the EA:

Step 1 - Characterize Baseline Conditions: Information on the existing environment will be gathered in sufficient detail to characterize baseline conditions. This will include gathering information from secondary sources data as well as primary field work where required. This will include the characterization of existing conditions on-site, off-site and along the proposed haul route. This work will supplement the description of existing conditions included in Section 4, where needed.

Step 2 - Develop Alternative Methods: Landfill site development Alternative Methods will be developed. Each will include a description and rationale. The Alternative Methods will be described conceptually and in sufficient detail to allow for a comparative evaluation during the EA.

Step 3 - Predict Potential Environmental Effects for Each Alternative Method: For each alternative method the potential for environmental effects will be identified, based on the broad definition of environment within the *Act*. This exercise involves the consideration of potential effects based on a set of evaluation criteria. Preliminary draft evaluation criteria are included for the evaluation of landfill site development Alternative Methods in Section 5.3. For each criterion, indicators will be identified to specify how potential effects will be measured. The evaluation criteria and indicators will be confirmed and finalized during the EA. Public input on the criteria and indicators will be solicited through a workshop early in the EA and incorporated where appropriate into the final criteria. Mitigation measures to minimize potential effects will be considered in this step. As such, the potential environmental effects will represent net effects – or potential effects once mitigation measures are implemented.

Step 4 - Comparatively Evaluate the Alternative Methods to Identify a Preferred Method: Alternative Methods will be compared against each other based on the evaluation criteria to determine a preferred method. Alternatives will be qualitatively compared based on their advantages and disadvantages for each of the criteria. Making trade-offs is a key part of a comparative evaluation process. During the EA it will be determined whether evaluation criteria weighting will be applied. Through consultation, the Project team will seek input from the public, interested stakeholders, Indigenous Communities and government agencies on the importance of criteria. Based on the results of this evaluation, a preferred site development alternative will be identified. This work will be documented in a clear,

transparent, reproducible fashion such that the decision making process and rationale for the preferred methods is easy to understand.

Step 5 – Impact Assessment of the Preferred Method: The preferred landfill site development alternative method will be carried forward for a more detailed assessment of potential effects and the development of mitigation and monitoring measures as part of the EA.

A number of technical disciplines will be involved in the evaluation of Alternative Methods and the impact assessment of the preferred method. Further information on the technical work to be carried out in the EA is included in Appendix A.

5.2.1 Alternative Methods – Landfill Site Development Alternatives

5.2.1.1 Identification of Landfill Site Development Alternative Methods

Waste Connections has identified an opportunity for additional waste disposal capacity. Landfill site development Alternative Methods to expand the landfill capacity could include a combination of vertical expansion of the Old Landfill, landfill mining of the Old Landfill, and/or lateral fill area expansion. In all cases, site development Alternative Methods will achieve a target capacity of 26 million tonnes over the 20-year planning period; be no higher than 241.3 metres above sea level (masl); and be located within the Ridge Landfill property.

The following briefly describes the different ways to expand the landfill capacity at the site. It is noted that individually these approaches do not provide the capacity required for the 20-year expansion of the landfill. As such, during the EA, the list of expansion approaches below will be combined to create specific site development alternatives for consideration.

Vertical Expansion of the Old and South Landfills–There is opportunity to increase the height of the Old Landfill area, as well as the top of the South Landfill, and still meet the maximum height restriction for the Airport.

It should be noted that vertical expansion of the Old and South Landfills would not be sufficient on its own to accommodate the needed additional capacity at the Ridge. Vertical expansion would need to be combined with lateral waste cell expansion to provide the additional waste capacity.

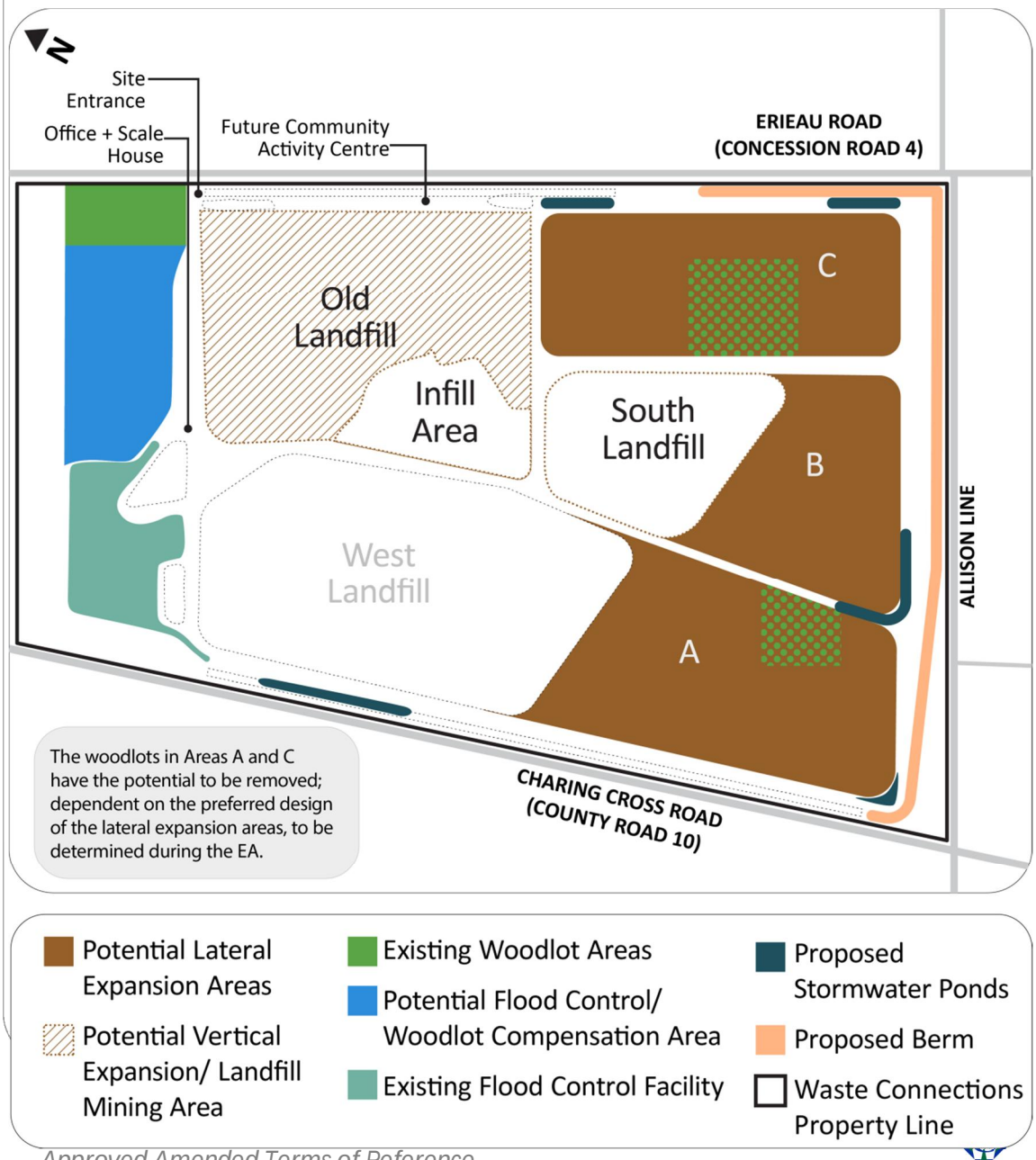
Landfill Mining of the Old Landfill - Landfill mining involves excavating waste, sorting or screening it and diverting recyclables and cover material to provide additional space in an existing landfill to accommodate additional waste.

This is a potentially viable opportunity for older landfill sites where there is a significant amount of waste that was landfilled prior to diversion programs being in place.

It should be noted that landfill mining would not be sufficient on its own to accommodate the needed additional capacity at the Ridge. Landfill mining would need to be combined with vertical or lateral waste cell expansion to provide the additional waste capacity.

Lateral Fill Area Expansion - Lateral expansion of the landfill would require the construction of new cell areas. Three distinct locations have been identified on the Waste Connections property where new waste cells could be developed as shown on Figure 12; these are named Fill Areas "A", "B" and "C". Fill Area A consists of expanding the West Landfill further to the south. Fill Area B involves a lateral expansion of the South Landfill to the south. Fill Area C consists of developing a proposed separate landform east of the South Landfill.

FIGURE 12: RIDGE LANDFILL EXPANSION FILL AREAS



The proposed expansion will be developed in phases over time. As such, the EA will consider the potential for impacts during construction, operation and post-closure of the proposed landfill expansion.

New waste cells would include a leachate collection system and landfill gas management system that meets *Ontario Regulation 232/98*. The leachate collection system and landfill gas management system would be connected to the existing systems on-site.

Waste Connections is currently evaluating the potential for a biogas facility that would use landfill gas from the Ridge. This facility would not likely be located on the landfill site and may or may not be owned by Waste Connections. It is being considered independently of the expansion of the landfill to proactively address the landfill gas currently being generated at the Ridge Landfill. Waste Connections will incorporate an assessment of landfill gas treatment or utilization alternatives for the expansion into the EA.

A review of the existing leachate management system, including the Blenheim Waste Water Treatment Plant and associated piping, will be undertaken to confirm sufficient capacity for leachate management from an expanded landfill. As part of this review, Waste Connections will assess other reasonable long term leachate treatment alternatives.

5.2.1.2 Comparative Evaluation of Landfill Site Development Alternatives

Table 1 in Appendix B outlines the preliminary draft evaluation criteria for the comparison of alternative methods for landfill site development, leachate management, and landfill gas management. These criteria and indicators will be further developed in consultation with agency stakeholders, Indigenous communities, and members of the public during the environmental assessment process.

5.3 Impact Assessment of the Preferred Alternative Method

The EA will determine the potential effects from all phases of the Project (construction, operation, closure and post-closure) on the natural, cultural, social, economic and built environments within the study areas developed in consultation with government agencies, Indigenous communities, and interested members of the public. Potential effects can be short-term or long-term, direct or indirect and positive or negative. The EA will also identify ways to reduce or mitigate potential negative effects on the environment and consider the effects of the undertaking on climate change. This work will involve the following steps, which will be finalized subject to consultation activities:

Step 1 – Develop Facility Characteristics: The facility characteristics of the preferred alternative method will be determined. Characteristics could include: modifying site contours; moving existing features such as drains or existing landfill facilities; constructing

new landfill cells; modifying leachate, stormwater, and landfill gas management systems; and ongoing operation of the landfill. Closure and post-closure characteristics will also be developed. Facility design will also consider potential extreme weather effects on landfill infrastructure components and the goals to reduce phosphorus loading to Lake Erie as set forth in the Canada-Ontario Lake Erie Action Plan.

Step 2 –Assessment of Potential Effects and Development of Mitigation Measures: The proposed impact assessment criteria, outlined in Table 4 to predict the potential effects of the project and associated activities on the environment are preliminary, and will be further developed in consultation with government agencies, Indigenous communities and interested members of the public. The impact assessment criteria will also consider the potential effects of greenhouse gases from waste hauling activities and site activities from all phases of the project, including post-closure and proposed mitigation measures.

Step 3 – Cumulative Effects Assessment: Cumulative effects of other existing and potential future developments will be considered by undertaking the following steps:

1. Summarize potential future impacts from the proposed expanded Ridge Landfill (e.g., noise, odour, traffic related effects, etc.)
2. Identify other existing or proposed projects/activities that may be constructed and/or operated in the planning period within the project study areas. Such projects will be determined through discussion with the local municipality (Planning Department) as well as through input from project stakeholders.
3. The identified projects will be characterized based on the potential for effects including the timing, nature, and spatial extent of potential effects. Characterization will be done using available secondary source information.
4. Identify where there is potential for impacts from the Ridge Landfill expansion to overlap time/space with the effects of other projects/activities.
5. For identified cumulative effects, describe the nature and extent of these possible effects and as appropriate, propose mitigation, impact management and/or monitoring strategies to address them.
6. Document results in the EA Report.

A summary of the technical work to be undertaken as part of the EA impact assessment is included in Appendix A. These work plans are preliminary and will be finalized based on input from interested government agencies, Indigenous communities, and the public. Waste Connections will consult with the Ministry of the Environment and Climate Change prior to the finalization of air quality, hydrogeology, and surface water quality work plans to ensure that the proposed studies will adequately characterize the existing environment as well as allow for the accurate prediction of impacts during the entire lifecycle of the proposed landfill. Waste

Connections will consult with the Ministry of Transportation on the preparation of a traffic impact study that considers the impacts of the existing waste haul route, as defined in the Terms of Reference, on the Highway 401/Highway 40 interchange.

A "do-nothing" scenario will be used as a baseline by which to measure the potential for impacts on the environment. Measures to reduce or mitigate potential effects will be identified and documented in the EA. Mitigation measures will be developed in consultation with Project stakeholders. Typical mitigation measures could include: minimizing the amount of vegetation removed to the extent possible; controlling dust during construction and operation; using best management practices for erosion and sediment control; and sequencing of facility development. Mitigation measures will be incorporated into an overall mitigation and monitoring plan which Waste Connections will be required to implement if the EA is approved. The mitigation and monitoring plan will also include auditing of the mitigation measures to ensure they are working as planned. Contingency measures will be developed in the event that mitigation measures are not functioning properly.

TABLE 4: PROPOSED IMPACT ASSESSMENT CRITERIA

Criteria Group	Criteria
NATURAL ENVIRONMENT	
Biology	
On-site	• Potential for loss of woodlot and associated habitat. • Potential for disturbance of aquatic habitat due to potential realignment of municipal drains.
Off-site	• Potential for nuisance disruption by litter, noise, dust or odour.
Geology/Hydrogeology	
On-site and Off-site	• Potential impacts to: - groundwater quality. - groundwater movement. - groundwater quantity. - domestic water wells.
Surface Water	
On-site and Off-site	• Potential impacts to surface water flow conditions. • Potential impacts to flow within the municipal drains. • Potential impacts to surface water quality.
SOCIO-ECONOMIC *Socio-economic*	
On-site	• Loss of agricultural products and employment.

Criteria Group	Criteria
Off-site	• Potential for displacement of on-site residences. • Potential impacts to property value. • Potential visual impacts. • Potential nuisance effects to residences and businesses from odour, noise, litter and dust.
Haul Route	• Potential nuisance effects to businesses and residences from dust and noise.
Regional Economy	
Off-Site and Haul Route	• Potential benefits to the regional economy.
Agriculture	
On-site Off-site	• Potential for loss of farm land. • Potential for nuisance effects of dust, noise, odour, litter.
Haul Route	• Potential for change in traffic safety and operations.
Cultural	
Off-site	• Potential disturbance of cultural heritage resources.
Archaeology	
On-site	• Potential disturbance of as-yet undiscovered archaeological resources.
Land Use	
On-site	• Potential for changes to land use designations. • Potential for additional approvals or permits (e.g., airport zoning)
TRANSPORTATION	
Aviation Safety	
Off-site	• Potential for increased bird hazards to aircraft.
Transportation	
Haul Route	• Potential for increase in traffic and delay to users. • Potential for safety concerns.

6.0 Consultation

Consultation is an important part of the EA process. It is a two-way exchange of information between the proponent and those who may be interested in, or potentially affected by the Project. The consultation guidance found in the MOECC's *Codes of Practice* will be followed over the course of the Project.

Waste Connections is committed to engaging stakeholders and Indigenous communities to ensure that they have the ability to provide their input on the Project. Waste Connections has adopted the following principles to help guide the design of consultation and communication activities for the Project ToR and EA:

- Make it timely – Consultation activities will be conducted so as to ensure members of the public, interested stakeholders, Indigenous Communities and government agencies have the opportunity to provide feedback and participate in the development of the EA.
- Make it inclusive – Ensure a broad range of stakeholders and the general public can access Project information, participate, and interact with the Project team. Consultation and communications material will be designed to be easy to understand and a variety of communication and consultation methods will be used.
- Make it community-focused – Consultation activities will be held in proximity to the Ridge Landfill to make it easy for the Project neighbours to participate. Project information will also be available online for ease of community use and engagement.
- Make it productive – Continuous measuring and monitoring of events and input will ensure that the positions of stakeholders are being considered and contributing to the EA in line with the consultation objectives.
- Make it transparent –The consultation process will be open and transparent so that the many different perspectives of stakeholders and the general public can be received and the way in which that input is considered can be seen as reflected in all documentation as appropriate.

The following sections describe the consultation completed for the ToR preparation, the feedback received as a result of this consultation, and the planned consultation for the EA process.

The objectives of the consultation activities for the ToR development and the EA are:

- To generate and maintain awareness of the Project;
- To gain insight into how the community wishes to be consulted; and
- To listen to, and address stakeholder input and concerns about the Project.

A list of stakeholders was created to ensure all the interested parties and the people potentially affected by the Project were informed. In a dedicated effort to keep everyone informed and updated, contacts from the last Ridge Landfill EA project (1997) and the last environmental screening process (2012) to increase the maximum annual fill rate were also included. The stakeholders included:

- Landowners within 1 km of the site and along the haul route;
- Ridge Landfill Liaison Committee;
- Ridge Landfill Community Trust;
- Chatham-Kent elected officials;
- Provincial and federal representatives elected officials;
- Chatham-Kent municipal staff;
- Adjacent municipalities;
- Provincial and federal regulatory agencies;
- Participants from past EA processes;
- Indigenous Communities; and
- Other stakeholders (e.g., agricultural organizations, local conservation authority, businesses and business organizations, school boards, etc.).

A complete list of stakeholders is presented in the Record of Consultation.

6.1 Consultation Completed for the Terms of Reference

The Code of Practice guides the proponent to "make the planning process a cooperative venture with potentially affected and other interested persons".

During the development of the ToR, Waste Connections provided information to the public to increase the understanding of the EA and sought input from stakeholders. The consultation activities undertaken allowed the Project team to gather valuable feedback which was then used to develop this ToR.

This section summarizes consultation undertaken during the ToR development. Additional details regarding the consultation completed during the ToR are presented in the Record of Consultation.

6.1.1 Indigenous Communities Engagement

Indigenous Communities have constitutionally protected rights and offer a unique environmental understanding based on indigenous relationships with the land. It is the objective of Waste Connections to develop meaningful opportunities to engage with

Indigenous Communities throughout the EA process by providing information as well as receiving input and being responsive to any concerns that may arise. Indigenous Communities that may have a territorial interest in the Ridge Landfill were identified in collaboration with the MOECC and through the previous environmental screening process in 2012. The Indigenous Communities contacted as part of the ToR development were as follows:

- Caldwell First Nation;
- Chiefs of Ontario;
- Chippewas of the Thames First Nation;
- Kettle-Stoney Point First Nation;
- Moravian of the Thames First Nation;
- Munsee-Delaware Nation;
- Oneida Nation of the Thames;
- Walpole Island First Nation;
- Métis Nation of Ontario; and
- Aamjiwnaang First Nation.

During the ToR development, meetings were held with the Walpole Island First Nation and the Caldwell First Nation. Waste Connections commits to continuing to engage and consult with the communities listed above, during the development of the EA. For a record of all correspondence, meetings, and engagement with Indigenous Communities during the ToR development, see the Record of Consultation.

6.1.2 Agency Engagement

Relevant government review agencies were added to the contact list and received notification of the Project. Meetings with various regulatory agencies during the ToR allowed for a deeper exploration of questions and issues that may arise throughout the EA. Targeted meetings were held with those anticipated to have an interest in the Project including the Ministry of Natural Resources and Forestry, Ministry of the Environment and Climate Change, Lower Thames Valley Conservation Authority, the Municipality of Chatham-Kent and the Chatham-Kent Airport. Input received through these meetings was documented through meeting minutes and included in the Record of Consultation.

6.1.3 Public Engagement

Public consultation is a critical part of a project as it aids in developing a clearer understanding of community issues and priorities. Waste Connections has a history of positive relations with the local communities of Charing Cross, Cedar Springs, Blenheim and the broader community of Chatham-Kent. To maintain this strong relationship, Waste Connections put considerable

effort into developing a public consultation program that was inclusive and flexible to meet the needs of the community. This included a personalized approach to notification regarding the Project.

Consultation with the public during ToR development occurred through a variety of touch points, including the following:

Project Website:
http://www.ridgelandfill.com/our-future-

- Notice of Commencement of the ToR was published in local newspapers (Blenheim News Tribune, Chatham Voice, Chatham Daily News and Chatham This Week);
- Personalized notification of the Project was undertaken for all those on the Project contact list. This included on-site residents, landowners within 1 km of the property and those along the haul route, as well as municipal staff, agencies and other stakeholders. Effort was made to ensure that neighbours and haul route residents/businesses received information about the Project concurrent with the placement of notices in the newspapers;
- Ongoing communication with municipal, provincial and federal officials was undertaken to ensure they were aware of the Project in a timely fashion to allow for discussion with their constituents;
- A "Future Plans" section was added to the landfill website to provide easy access to information about the Project as well as an on-line contact form to provide comments;
- The Ridge community newsletter was distributed to landowners around the site, along the haul route and within the communities of Blenheim, Charing Cross and Cedar Springs providing information about the Project as well as information about the Ridge Landfill;
- Meetings were held with on-site residents, other adjacent residents, the Ridge Landfill Liaison Committee and Waste Connections staff to provide information about the proposed expansion, introduce the Project Manager as the contact for further information and invite attendance at the public Open Houses;
- Meetings were held with interested groups such as the Kent Federation of Agriculture, Blenheim Business Improvement Association and the Chatham-Kent Chamber of Commerce;
- The final ToR was made available for a 30 day public and agency review in draft and final form in 2016 to provide an opportunity for members of the community to provide feedback on the Project;
- Two public Open Houses were held during the ToR development. The first was held on May 3, 2016 and was intended to introduce attendees to the Project, and the rationale

for the proposed expansion including the need for additional disposal capacity. The second took place on June 28, 2016 (following the release of the draft ToR) and provided more information about the EA and the work that would be undertaken to make decisions on the expansion and determine potential effects and mitigation;

- The December 2017 ToR will be made available for public and agency review during a 30-day comment period from January 5, 2018 to February 4, 2018 to provide an opportunity for members of the community to provide feedback to the MOECC on the project. The submission of this ToR will also be published in local newspapers (Blenheim News Tribune, Chatham Voice, Chatham Daily News and Chatham This Week), and circulated to the project contact list in the same manner as before.

6.1.4 Consultation on the Previous EA Terms of Reference

The draft ToR and supporting documentation were made available to the public and agencies for a 30-day review period from June 28, 2016 to July 28, 2016. A notice identifying the opportunity to review the draft ToR and associated documents was published along with the notice of the second Open House. Review agencies also received an email with a downloadable link to the documents. The draft ToR was available for review at the following locations:

- Ministry of the Environment and Climate Change, Environmental Assessment and Approvals Branch
- Ministry of the Environment and Climate Change, Windsor Area Office
- Chatham Branch, Chatham-Kent Public Library
- Blenheim Branch, Chatham-Kent Public Library
- Municipality of Chatham-Kent Civic Centre
- Online at the Ridge Landfill Website: www.ridgelandfill.com

During the review periods for the final ToR, meetings were held with the MOECC to clarify comments received.

The final Terms of Reference was submitted to MOECC for in November 2016 with a formal public and agency review period extending from November 18, 2016 to December 18, 2016. Comments were received from MOECC, Ministry of Natural Resources, Ministry of Transportation, Walpole First Nations, Aamjiwnaang First Nation and two members of the public. Subsequent to the completion of the review period, Waste Connections made revisions and submitted an amended ToR in February 2017.

6.1.5 New EA Terms of Reference Submission

In the summer of 2017, Waste Connections voluntarily withdrew the amended ToR to work with the MOECC to develop this new ToR to better reflect the government's new Strategy for a

Waste Free Ontario – Building a Circular Economy (February 2017). A number of comments were received from MOECC during this period including requests to clarify the purpose/opportunity and service area for the project, and to confirm Waste Connections commitment to diversion.

This new ToR and supporting documentation were submitted to the Ministry of the Environment and Climate Change on December 22, 2017. The formal public and agency review of the ToR was initiated on January 5, 2018 and concluded on February 4, 2018. The distribution approach and review locations were the same as those used during the final ToR. Comments received during this period will be considered along with those received during the final ToR comment period, as part of the EA.

Waste Connections continues to consult with Indigenous Communities, agencies and the public while awaiting the Minister's decision on this ToR.

6.2 Consultation Planned for the EA

6.2.1 EA Consultation Objectives

The Ministry of Environment's Code of Practice (2014a) provides guidance on consultation activities to be undertaken as part of the EA for the Project. The consultation activities that are proposed for the EA were developed in accordance with the requirements of the Code of Practice, but also create additional opportunities for interested parties to provide feedback. It is important to Waste Connections to maintain the strong relationships that have been built in the local community, and maintain momentum from consultation completed during the ToR development.

The consultation activities to be undertaken during the EA are a continuation of the consultation activities undertaken during the ToR. The objectives of the consultation activities for the EA are consistent with the consultation objectives of the ToR, which are presented in Section 6.

6.2.2 Identification of Interested Persons and Government Agencies

The Project has potential to be of interest to many in the community, and as such, consultation activities are designed to reach a wide audience. Project stakeholders include government agencies, elected officials, municipal staff members, adjacent landowners/tenants; Indigenous Communities and others. These stakeholders are being tracked in a contact list created specifically for consultation purposes. As a living document, the Project contact list will be continuously updated to include new participants as the Project unfolds.

6.2.3 EA Consultation Process Overview

During the EA, Waste Connections will implement a consultation program that provides interested stakeholders with multiple opportunities through which they can learn about the Project, provide input and express their comments or concerns. Through on-going effort during the EA, the consultation program will:

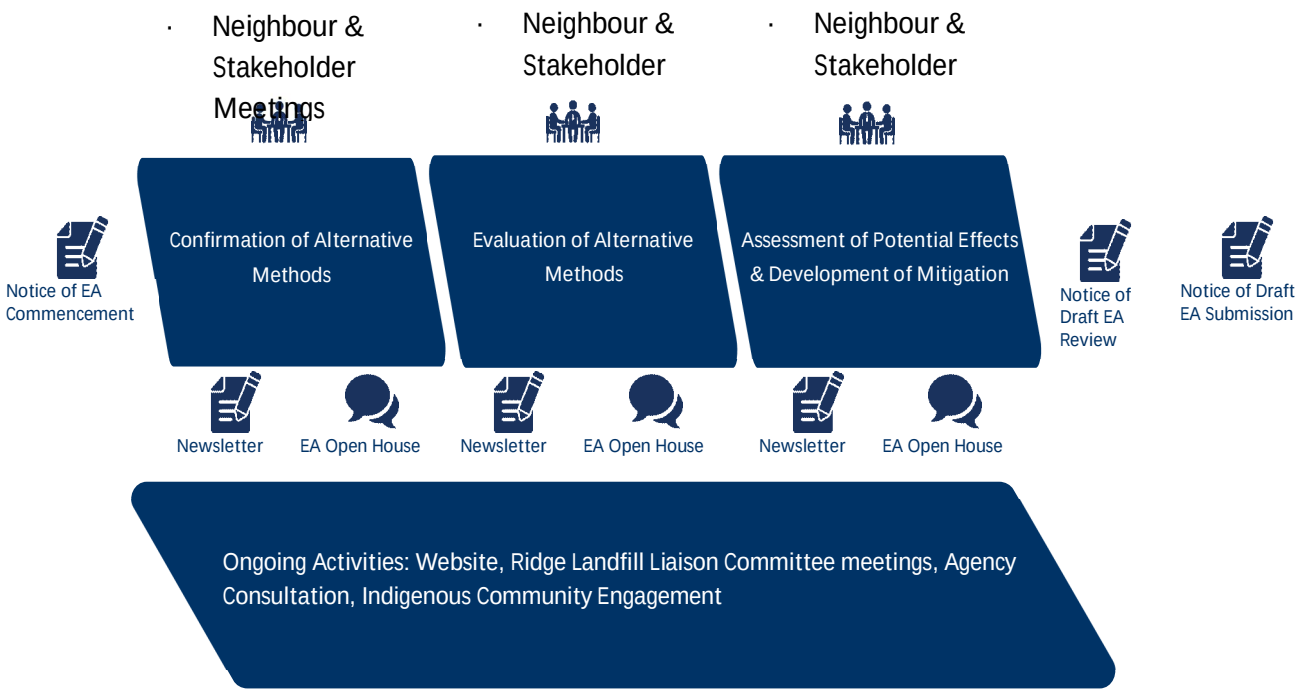
- Maintain and nurture existing relationships, cultivate new Project contacts, and encourage open communication (see contact list in the Record of Consultation);
- Notify stakeholders, review agencies and the public in a timely manner regarding opportunities to provide input at key decision points;
- Continue to develop Waste Connections' understanding of the community issues and concerns;
- Identify issues that could arise from the Project and where possible, address and resolve these issues; and
- Provide the MOECC with information regarding how issues and concerns were addressed through the process as input to the Minister's decision on the EA.

Figure 13 illustrates the consultation and communication that will occur at each of three key milestones:

1. Confirmation of Alternative Methods – Neighbourhood and stakeholder meetings, an evaluation criteria workshop, an open house and newsletter will provide opportunities for the community to learn about and provide input on the alternative methods and the evaluation approach and criteria;
2. Evaluation of Alternative Methods - Neighbourhood and Stakeholder meetings, an open house and newsletter will provide opportunities for the community to learn about and provide input on the evaluation of alternative methods; and,
3. Assessment of Potential Effects and Development of Mitigation Measures for Preferred Alternative Method - Neighbourhood and Stakeholder meetings, an open house and newsletter will provide the community opportunities to learn about and provide input on the preferred site development alternative including measures to mitigate potential effects.

It is noted that the consultation program may change as the EA unfolds contingent upon whether additional opportunities to obtain input arise, and/or based on feedback from stakeholders, government agencies, Indigenous Communities and the public.

FIGURE 13: EA KEY MILESTONES AND ASSOCIATED CONSULTATION PLAN



6.2.4 Notification and Communication

The Code of Practice (Ministry of Environment, 2014a) identifies two mandatory notification points during an EA: the *Notice of Commencement of the EA* and the *Notice of Submission of the EA*. Other public outreach activities include notification of public events. This section provides an overview of the various methods that will be used to communicate information to Project stakeholders during the EA.

6.2.4.1 Notification

Notifications help keep the public informed of a Project and aware of their opportunities to provide input. Proponents are required to publish a notice in the local newspaper(s) and give a copy of the notice to local and adjacent municipalities, potentially affected Indigenous Communities, and to all those who have previously expressed interest in the Project (Section 6.1).

The following six notification points are anticipated for the Project (it is anticipated that some notices may be combined):

1. Notice of EA Commencement;
2. Notice of EA Open House #1 (Site Development Alternative Methods);

3. Notice of EA Open House #2 (Evaluation of Alternative Methods – preliminary results);
4. Notice of EA Open House #3 (Assessment of potential effects and proposed mitigation measures for the preferred Alternative Method);
5. Notice of the Draft EA Document for public and agency review; and
6. Notice of Submission of the final EA document to the MOECC for formal public and government agency review.

All notifications will be published in local newspapers. Notifications for events will be published approximately two weeks before the planned event. In addition to the newspaper placement, notices will be distributed to all stakeholders on the Project contact list and posted on the landfill website.

6.2.4.2 Media

Local media representatives were included on the Project contact list during the ToR and will receive all Project notifications during the EA consultation phase. Waste Connections will also liaise with media contacts at key points during the EA to provide information about the Project that will assist them in reporting. Waste Connections will continue to monitor all media, including social media for potential issues of concern related to the Project.

6.2.4.3 Landfill Website

At each key milestone in the EA development, the landfill website will be updated to share messages associated with the current Project phase. The website will act as a resource point for the public to gather information, including notification of upcoming public events, and an avenue for people to provide input or ask questions through an on-line comment form. To encourage online participation, printed notification materials will include the website address.

The information that will be available on the website may include:

- Information about the Ridge Landfill and Waste Connections' activities in the Chatham-Kent community;
- Information about the Project including:
  - The EA process;
  - Materials from consultation events;
  - Documentation of work completed during the EA (e.g. the draft and submitted ToR);
- How to get involved in the Project, including information about upcoming events.

6.2.4.4 Community Newsletter

The newsletter will continue to be used as a communication tool during the EA phase. Newsletters will be distributed to neighbours of the Ridge Landfill site and others on the

Project contact list at key points in the process. Copies of the newsletters will also be posted on the landfill web site.

6.2.5 Consultation Activities

The primary objectives of the EA consultation program are to create transparent lines of communication, provide accessible information to interested persons, and provide avenues for people to provide input on the proposed Ridge Landfill expansion. Waste Connections plans to use multiple tools and techniques to achieve these objectives. Table 5 provides a summary of the consultation activities Waste Connections will undertake to obtain input from the community during the EA development.

TABLE 5: CONSULTATION ACTIVITIES

CONSULTATION ACTIVITY	DESCRIPTION
Neighbour Meetings	Waste Connections will continue to proactively meet with Ridge Landfill neighbours on an informal basis to explain the Project and answer questions. Neighbours have been provided with a contact for the Project and will be encouraged to reach out if they have something they would like to discuss.
Evaluation Workshop	A workshop is proposed early in the EA process to discuss the evaluation criteria and evaluation process. The workshop will be an opportunity for participants to better understand the evaluation process and to provide the team with a local perspective on evaluation criteria and importance of criteria.
Open Houses	All open houses will be set up as a drop-in to allow people to review the information at their own pace. Staff will be available to discuss issues and respond to questions. Comment forms will be available to record public input. • The first EA Open House will provide information and seek input on Alternative Methods and the criteria used to evaluate them. • A second EA Open House will describe the preliminary evaluation results and seek feedback on the preliminary preferred Alternative Method. • A third EA Open House will present the preferred alternative method and potential effects and seek input on plans to mitigate potential negative impacts associated with the Project.
Stakeholder Meetings	Meetings will be held with representatives from Chatham-Kent and interested groups on an as needed or as-requested basis throughout the EA process.
Agency Consultation	Meetings will be held with agencies as required. Potential agency meetings during the EA are likely to include the MOECC, the MNRF, the Ministry of Tourism, Culture and Sport (MTCS), the Municipality of Chatham-Kent, Chatham-Kent Municipal Airport, Transport Canada, and the LTVCA.

CONSULTATION ACTIVITY	DESCRIPTION
Indigenous Community Engagement	Waste Connections will continue to consult with Indigenous Communities and organizations throughout the EA process. Letters will be sent to inform them about key points in the Project and Waste Connections will proactively work to set up meetings with the Indigenous Communities to discuss Project details where desired.
Ridge Landfill Liaison Committee Meetings	The existing Ridge Landfill Liaison Committee was developed to discuss on-going landfill operation. It is not intended that they become focused on the EA; however, their familiarity with the site means that this committee is in a unique position to comment on the proposed expansion. It is anticipated that updates on the EA process will be provided at each of the Ridge Landfill Liaison Committee meetings and input sought from the committee where appropriate.
Elected Official Meetings	Chatham-Kent Councillors will be updated frequently on the Project so that they have the information they need to liaise with their constituents. Waste Connections intends to brief key elected officials immediately preceding public events.
EA Review	The draft EA document will be made available for a minimum 45-day public and agency review prior to formal submission of the document to MOECC. This draft review will provide an opportunity for those who are interested to provide comments on the EA. These comments will be reviewed and the EA revised as appropriate. Once the final EA is submitted to the MOECC, the formal public and government review period begins providing another 30-day period where people can provide comments on the EA.

6.2.6 Issue Resolution

Documenting and addressing issues is an important component of a transparent EA process. Waste Connections is committed to considering all issues raised. Issues or concerns raised during the EA will be documented in a comprehensive table which will also document the response to the issue and how it was addressed in the EA. If issues are raised that cannot be addressed in the EA, this will be noted along with the rationale.

7.0 Commitments and Monitoring

The EA report will include a comprehensive list of commitments made by Waste Connections by way of interactive consultation throughout the EA process. Commitments made during the ToR will also be documented in the EA including commentary on how they were addressed in the EA process. Waste Connections will develop a tracking table of commitments made during the Terms of Reference that will be carried forward into the environmental assessment. The table will outline the commitments made during the Terms of Reference and in what section they are addressed in the environmental assessment. The main body of the environmental assessment report will include a summary of issues and concerns raised during consultation which will be described in greater detail in the Record of Consultation. These commitments may include, but are not limited to the following:

- Mitigation measures for potential impacts;
- Monitoring of mitigation measures based on performance objectives;
- Ongoing consultation with landfill neighbours, stakeholders, agencies and Indigenous communities;
- Continuation of property value protection program with amendments based on the outcome of the EA;
- Continuation of commitments including, but not limited to, the haul route compensation and the Ridge Landfill Trust;
- Continuation of Ridge Landfill Community Host Agreement, with amendments based on the outcome of the EA;
- Additional works and studies to be carried out during detailed design;
- Contingency planning;
- Documentation of all correspondence and input received; and
- Minimum of a 45 day review and comment period for public, Indigenous communities and agencies for the draft EA document.

The EA will include a monitoring framework for all phases of the Project including both compliance monitoring and effects monitoring, as set out in the Code of Practice. The results of the monitoring will be documented and reported to the MOECC. A comparison of actual effects with the potential effects predicted during preparation of the EA will determine whether additional mitigation measures are needed. Any additional mitigation will be prepared in consultation with the MOECC.

8.0 Other Approvals

In addition to approval under the *Act*, applications will be made under a number of provincial and federal statutes, as necessary, for approval to implement the Project. Approvals to be sought may include, but are not limited to:

- Approvals to construct and operate an expanded landfill site under the *Environmental Protection Act*;
- Municipality of Chatham-Kent Official Plan and zoning amendments under the provincial *Planning Act*; and
- Approvals to take or discharge water under the *Ontario Water Resources Act*.

It has been confirmed that the Project is not subject to review under the *Canadian Environmental Assessment Act, 2012* based on correspondence with the Canadian Environmental Assessment Agency in May 2016.

A specific list of other approvals required for the Project will be provided in the EA.

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Appendix A

Technical Work Plan Summaries

Technical Work Plan Summaries

The following summarizes the technical work plans for each of the disciplines that will be involved in the EA. The information has been organized based on the three key steps: data collection and field work, evaluation of alternative methods, and impact assessment and mitigation of the preferred alternative method. For each discipline, information is provided based on their anticipated involvement in each of these steps. The objective of the technical studies is to complete the required investigations and analysis of data to support the *Environmental Assessment Act* and the *Environmental Protection Act* approvals required for the expansion of the landfill site.

Agricultural Assessment

Data Collection and Field Work

Field work will include walking the fields in the on-site study area to record crop types and see if any abandonment has occurred. On-site tenants will be interviewed to determine if there is any intended future abandonment for reasons other than what might occur in association with the proposed expansion. This will include tenants currently farming property boundaries of the site and the apple orchard on Erieau Road. Further, it will be determined if there is any intended change in cropping activity.

Windshield surveys and air photo analysis will be undertaken within the off-site area as well as along the haul route to determine if there are any landfill-related nuisance impacts (e.g. litter, noise and odour).

Special attention will be paid to the privately-owned orchard and market garden farm to determine potential negative effects, if any. Analysis of this farm will also be included in the Social and Air Quality disciplines.

The Agricultural Assessment will be documented and will include the update of agricultural activity for the on-site, off-site and haul route boundaries. Changes in cropping trends will be included if there appears to be a change in crops compared to what was found in the 1997 EA.

Evaluation of Site Development Alternative Methods

The review of the site development alternative methods will include an analysis of how agriculture activity on-site will be impacted. Some alternative methods may present the opportunity to conserve more property for agricultural use than others.

Impact Assessment and Mitigation

We will describe the agricultural conditions that exist on-site, their significance and the extent of loss or disruption associated with the preferred alternative. Opportunities to prevent or minimize loss of this resource as well as ways to minimize disruption will be documented.

Should it be required, an agricultural soils contingency plan will be developed to determine how existing agricultural soils can be used most effectively. This would include investigating the need for landfill cap material; using soils to amend surrounding fields in the offsite area, or using stripped soils as part of a soil mix operation in the local area.

Air Quality Assessment

Data Collection

Indicator compounds will be selected for the air quality assessments. Changes in the concentrations of these compounds will be assessed (qualitatively and/or quantitatively) and the anticipated magnitude of these changes will be used as indicators of impacts to air quality. The compounds for the air quality emissions assessment may include:

- total suspended particulate matter,
- particulate matter with an aerodynamic diameter <2.5 microns (PM2.5) and <10 microns (PM10)
- nitrogen oxides,
- odour,
- chloroform
- vinyl chloride; and
- hydrogen sulphide

Total suspended particulate matter emissions are attributable to activities such as material handling, vehicle traffic/road dust and wind erosion. PM2.5 and PM10 emissions are also associated with these activities as well as from fuel combustion equipment such as diesel trucks and off-road vehicles (tailpipe emissions), and landfill gas flares. Oxides of nitrogen (NOx) is selected as the indicator compound for gaseous products of fuel combustion associated primarily with gasoline or diesel fuel vehicles and landfill gas flares. Hydrogen sulphide is selected as an indicator of sulphur-based odour compounds that can be generated through anaerobic decomposition of certain wastes. Vinyl chloride and Chloroform (as indicators of other Volatile Organic Compounds) may be generated in the waste decomposition process and is present in landfill gas emissions. Characterization of baseline air quality within the study area through the use of air quality data from the closest Environment Canada NAPS

or MOECC air quality monitoring stations, as well as historical site-specific monitoring. Data will be collected for the indicator compounds identified for the Project.

Impact Assessment and Mitigation

Once a preferred site development alternative method is selected, a quantitative assessment of air emissions will be conducted. This assessment will include:

- Estimation of emissions of indicator compounds from significant on-site sources (e.g. landfill working face, on-site roads, flare system, mobile equipment for the landfill);
- Incorporation of the emission estimates into a dispersion model to predict the potential change, if any, in air quality;
- Combination of the predicted changes, if any, in air quality with baseline conditions to estimate cumulative air quality impacts; and
- Comparison of the cumulative air quality impacts to relevant air quality criteria.

Using the data above, analysis of the magnitude of the potential changes in air quality (i.e., changes in concentrations of indicator compounds) will be completed as part of the overall evaluation of the preferred alternative. Opportunities to mitigate air quality impacts will be recommended if required.

Archaeology and Cultural Heritage Resource Assessments

Data Collection and Field Work

Archaeological data collection will be limited to work in the on-site study area. The Cultural Heritage Resource Assessment data collection will confirm existing conditions within the off-site and haul route study areas. Two reports will be prepared, described as follows:

- Stage 1 Archaeological Assessment - will be prepared in accordance with the "Standards and Guidelines for Consultant Archaeologists" as administered by the Ministry of Tourism, Culture and Sport ("MTCS"). The report will involve the following tasks:
    - Reviewing pertinent provincial and federal government files and compiling the results of a literature search;
    - Evaluating the archaeological potential of the Ridge Landfill site, based on characteristics that indicate where archaeological resources are most likely to be found; and
    - Conducting a property inspection to review the site and layout and to confirm and photo-document archaeological site potential.

- Cultural Heritage Resource Assessment - focuses on conducting and analyzing background research including the work completed in 1997 and conducting field surveys for the off-site and haul route study areas.

Evaluation of Site Development Alternative Methods

The information collected for the Stage 1 Archaeological Assessment will be used to compare the alternative methods of site development.

Impact Assessment and Mitigation

If areas of high archaeological potential will be impacted by the preferred alternative methods of site development a Stage 2 Archaeological Assessment will be undertaken. Mitigation will also be proposed, if necessary. The impact assessment report for archaeology will be submitted to the MTCS for review and acceptance into the provincial Registrar. If the preferred alternative has the potential to impact cultural heritage resources, measures to minimize potential impacts will be recommended.

Aviation Assessment

Data Collection and Field Work

The scope of the work will be focussed on assessing the potential impacts of the Project on aviation operations at the Chatham-Kent Municipal Airport. The data collection will include:

- Detailed review of airport diagrams and published procedures information for the Airport, including aircraft restrictions diagrams;
- Discussions with the Airport management, including such topics as bird hazard considerations, relationships with the landfill operator, operating procedures, as well as possible future Airport development plans;
- Discussions with aviation operators at the Airport;
- Discussions with Transport Canada and Nav Canada with respect to the Chatham Airport Zoning Regulations that are established under the federal *Aeronautics Act, 1985*,; and
- Updates on bird populations and flight patterns, current control procedures, planned future mitigations, including any recent or future environmental studies that are planned to be undertaken.

Impact Assessment

The Aviation Assessment will assess the potential effects to Airport operations based on the bird hazard assessment and control plan for the Project.

Biology Assessment

Data Collection and Field Work

As part of the 1997 EA, a detailed analysis of biological existing conditions was undertaken. Most of the stages and tasks identified in 1997 are still valid, and moving forward, should form the genesis of the Biology Assessment component of the Project. The work to confirm existing conditions as part of the EA will include the following data collection tasks:

- Terrestrial – on-site data collection tasks will include investigations of the following:
    - Ecological Land Classification including swamp/wetland studies;
    - Significant tree species;
    - Grassland bird species;
    - Snapping turtle investigations;
    - Incidental wildlife and wildlife habitat observations
    - Breeding bird surveys;
    - Amphibian surveys;
    - Botanical surveys;
    - Bat studies (species at risk bat activity monitoring, bat maternity roost surveys, bat habitat assessment, and acoustic bat data collection); and
    - Whip-poor-will surveys.
- Aquatic - As fish inventories were last conducted in the Howard and Duke Drain on May 31, 1996, and no fisheries information is available for the Gales/Scott drain, updates are required. In this regard, collection and inventory of fish species within these drains are required by the use of electrofishing, seining or other collection methods.

The field work and secondary source data will update flora/faunal inventories for the entire Ridge Landfill. This will include the significance of each species, and whether it is listed within the *Endangered Species Act, 2007*. Secondary source data only will be used to update the characterization of the terrestrial and aquatic environment off-site.

Evaluation of Site Development Alternative Methods

The evaluation of alternatives will include analysis of how terrestrial and aquatic systems will be impacted by the Project. In cases where removal may need to occur, there may be opportunities to relocate/re-establish these communities elsewhere on the Ridge Landfill site. Alternatives will be compared based on the potential for impact on terrestrial and aquatic environments on-site.

Impact Assessment and Mitigation

We will describe the biological conditions which exist on-site, their significance and whether opportunities are present to avoid loss of habitat associated with the preferred alternative. Opportunities to prevent or minimize loss of this resource as well as ways to minimize disruption on-site and off-site will be documented.

In cases where listed species are present, proposed contingency and monitoring plans will be developed for each species where possible.

Bird Hazard Assessment

Data Collection and Field Work

As the Ridge Landfill is located in close proximity to the Chatham-Kent Municipal Airport, a Bird Hazard Assessment will be prepared. Data collection associated with this assessment includes:

- Document number, movement, distribution and behaviour of birds within and near the Ridge Landfill;
- Investigate the path, altitude, pattern and direction of flight originating from, and passing by, the Ridge Landfill;
- Confirm the flight lines of birds between the Ridge Landfill and their communal night roosting sites;
- Document the numbers of birds flying over the Chatham-Kent Municipal Airport, including approximate direction and altitude of flight; and
- Update previous assessments with data from field investigation.

Surveys will include:

- Counts of morning gull flights to the Ridge Landfill;
- Mid-day counts at the Ridge Landfill;
- Counts of evening gull flights;
- General surveys of the area;
- Observations of gull flightlines to and from the night roost; and
- Observations of crow flightlines to and from their communal roosts in the winter.

Impact Assessment and Mitigation

Based on the data collected, we will confirm whether the bird species attracted to the site in any significant numbers has changed from previous conditions and assess the effectiveness of

the current bird control program. We will also assess the potential for bird hazard impacts as they relate to the Project.

Design and Operations Plan

A conceptual design and operations plan will be prepared for the preferred alternative method of site development to reflect current operations and approvals as well as the proposed expansion of the Ridge Landfill. The plan will provide a detailed description of the Ridge Landfill site design and operations in order to satisfy approval requirements.

Following *Ontario Regulation 232/98 (O.Reg 232/98)* and the *Landfill Standards* published by the MOECC in January 2012, the following key components will be addressed:

- Regulatory and approval requirements;
- Potential for extreme weather events to impact waste management infrastructure, power outages, physical damage, and reduced access to the site;
- Estimated waste characteristics and quantities to be accepted;
- Site development plans and details, including limits and contours;
- Landfill capacity and soil balance;
- Landfill development sequencing;
- Leachate management, including an assessment of the capacity of the existing Blenheim Waste Water Treatment Plant;
- Landfill gas management;
- Design and operation assumptions for the Ridge Landfill site;
- Stormwater management and on-site traffic management;
- Environmental controls to manage potential impacts from the Ridge Landfill site;
- Monitoring, inspection, maintenance and reporting programs;
- Trigger mechanisms for the implementation of remedial measures, as part of a contingency plan; and
- Site closure and post-closure description.

Hydrogeological Assessment

The purpose of the hydrogeological assessment is to determine whether the site can be developed without causing an adverse effect to off-site groundwater. The objective of the hydrogeological assessment is to complete the required investigations and analysis of

hydrogeological data to support the *Environmental Assessment Act* and the *Environmental Protection Act* approvals required for the expansion of the landfill site.

The hydrogeological discipline is significantly involved in the design of landfill, particularly in the design of the leachate management system. The assessment will address the requirements of O. Reg. 232/98 *Landfilling Sites* - in particular, section 8 of the regulation (*"Hydrogeological Assessment"*). The assessment will characterize the hydrogeologic setting of the existing landfill site, and predict the potential impacts that could be expected from the landfill expansion.

The detailed assessment of the site required by O.Reg. 232/98 will identify potential effects on the environment from landfill development, and how these potential effects will be mitigated.

Contaminating Lifespan

Ontario Regulation 232/98 defines "contaminating life span of a landfill" as:

(a) in respect of a landfilling site, the period of time during which the site will produce contaminants at concentrations that could have an unacceptable impact if they were to be discharged from the site, and

(b) in respect of a landfilling site and a contaminant or group of contaminants, the period of time during which the site will produce the contaminant or a contaminant in the group at concentrations that could have an unacceptable impact if they were to be discharged from the site.

The three factors that influence the contaminating life span are:

a) The transport pathway (contaminant fate and transport) which will vary from landfill to landfill. The greater the attenuation potential along the transport pathway, the shorter the contaminating life span. At Ridge, the low permeability clay means that it will take many years (in the order of thousands of years) for water to move from the landfill to the underlying bedrock aquifer. Therefore, site development alternatives will not materially affect the influence of the transport pathway on contaminating life span.
b) The mass of waste per unit area (referred to as "waste loading" in O.Reg. 232/98). The thicker the waste, the more mass of contaminants (and with other factors being equal) the longer the contaminating lifespan.
c) The leachate generation rate and initial leachate concentrations. The greater the leachate generation rate, the more contaminants are leached from the waste mound which results in shorter contaminating life spans.

<u>Qualitative Assessment of Contaminating Life Span for Site Development Alternatives</u>

To quantitatively predict contaminating life spathe "contaminating lifespan" of the expanded landfill, as defined by O.Reg. 232/98, will also be determined. The contaminating lifespan will be determined as part of the assessment of potential impacts for the landfill expansion and will

depend on factors such as tonnes of waste per hectare and leachate generation rate. Groundwater use in the vicinity of the site will also be characterized.

Data Collection and Field Work

Data collection and field investigations on-site will include:

- Six leachate monitoring wells will be installed to be base of fill in the Old Landfill. Relative elevations of the wells will be measured and water level measurements will be taken to help determine leachate levels. Leachate samples will be collected for laboratory analysis of metals, inorganics and volatile organic compounds (VOCs);
- Six new monitoring well "nests", consisting of a monitoring well installed in each hydrostratigraphic unit (Layer 1, Layer 2 and Layer 3) will be constructed, along the perimeter of the Ridge Landfill expansion area; and
- Testing and monitoring will be completed as follows:
  - The hydraulic conductivity of the clay till will be assessed using two different methods: in-situ hydraulic conductivity tests and triaxial permeability tests. Hydraulic conductivity data is used to calculate the rate of groundwater movement;
  - An isotopic assessment will be completed at two monitoring well nests where porewater from soil cores and groundwater samples from the monitoring wells will be analyzed for deuterium and oxygen-18. This analysis will be used to confirm rate of groundwater movement. It is noted that similar testing at the site has demonstrated that pore water in deep clay samples is thousands of years old;
  - Water levels will be manually monitored in the new monitoring wells periodically after installation. In addition, water level dataloggers will be installed in each new well and in two existing monitoring well nests. Water levels are used to determine groundwater flow directions; and
  - All new monitoring wells will be developed and purged and then water samples will be taken and submitted for laboratory analyses to determine baseline groundwater quality.

Impact Assessment and Mitigation

A predictive impact assessment of the preferred alternative method of site development will be completed using contaminant transport computer modelling to assess compliance with the MOECC Reasonable Use Guideline. Compliance with the Reasonable Use Guideline indicates that off-site adverse effects will not occur. The engineered features of the landfill such as the leachate collection system will be included in the model, as will an assessment of the service life of the engineered features and an overall assessment of the contaminating lifespan of the site.

The existing monitoring program and contingency plans will be reviewed and modified as appropriate. The existing triggering mechanism for the contingency plans will also be reviewed and modified as necessary.

Noise Assessment

Data Collection and Field Work

The following tasks will be completed to determine the potential noise impact associated with the Project:

- The existing and potential future noise receptors in the vicinity of the Ridge Landfill will be confirmed for use in the acoustic assessment;
- A baseline ambient noise study to establish receptor noise environments along the Haul Route as well as in the vicinity of the Project; and
- The predicted receptor levels will be compared against applicable noise criteria set by the MOECC.

Impact Assessment and Mitigation

For the preferred site development alternative, a quantitative analysis consisting of predictive acoustic modelling will be completed. A reasonable worst-case operating scenario at the site will be determined and the associated noise sources will be modelled using CADNA/A. The noise propagation software will take into account site layout, topography, and ground and atmospheric absorption to predict receptor noise impact associated with the Ridge Landfill.

A stand-alone noise impact study will be prepared which will include all the assumptions and considerations used in the assessment as well as modelling results and findings of the study. The report will be prepared in accordance with the following MOECC noise guideline publications:

- NPC-300 , “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning” (2013); and
- NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound" (1995) and (2003).

If required, the report will also include a noise mitigation section that will provide the details of the proposed noise mitigation plan for the Ridge Landfill.

For the construction phase of the Project, the activities will be reviewed against the following MOECC publications:

- NPC-115 (Construction Equipment);

- NPC-118 (Motorized Conveyances); and
- NPC-207 (Impulsive Vibration in Residential Buildings).

If required, qualitative assessments will be prepared for the construction phase of the Project.

Socio-Economic Assessment

Data Collection and Field Work

Data collection to provide information for the Socio-economic Assessment will include the following:

- Review of current land use;
- Collection of information concerning use and enjoyment of residential property and potential effects to business;
- Collection of information from other disciplines related to potential noise, dust, visual and odour effects;
- Review of feedback received through public consultation activities; and
- Review of secondary source information such as Statistics Canada data/reports, provincial and municipal policy, GIS mapping, aerial photographs, government publications, and existing literature.

Information will be collected on-site, off-site and along the haul route.

Evaluation of Site Development Alternative Methods

The evaluation of site development alternatives will consider the potential for displacement of residents on site as well as the disruption of residents or businesses off-site.

Impact Assessment and Mitigation

The Socio-economic Assessment report will use standardized criteria and indicators to assess potential socio-economic effects resulting from the preferred site development alternative. The assessment of social and economic effects will rely on the input of other disciplines including air, noise, dust and visual. The potential for positive effects on the community will also be considered.

The Socio-economic Assessment will include an investigation of potential avoidance, mitigation and monitoring measures. This may include the development of contingency and/or impact management plans to address potential effects.

Surface Water Assessment

Data Collection and Field Work

The study area for the Surface Water Assessment will focus on the on-site Duke Drain, Howard Drain, and Scott Drain (tributary to Howard Drain) but will also extend to the limits of the watershed boundary of the Howard, Scott, Duke and McDowell Drains (for the purpose of hydrologic analyses). This will enable a more comprehensive characterization of baseline conditions at a watershed scale to assist in the assessment of potential surface water impacts.

A desktop review of background data will be completed to enable an understanding and synthesis of recently completed studies and relevant supporting information. Field Investigations to characterize existing conditions will focus on understanding existing flow conditions in the on-site drains under both high and low flow conditions.

Detailed surface water investigations will be undertaken to assess water quality and water quantity considerations as well as habitat conditions (in cooperation with the biology discipline), in accordance with the criteria outlined in the Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Site (January 2012) document.

The investigations will include the following (note: only the first three bullets below apply to the McDowell Drain):

- Confirmation of overland flow routes, drainage boundaries and outlet locations;
- Inventory of existing hydraulic structures (i.e., location, size, material);
- Measurements of typical stream channel geometry (i.e., bottom width, side slopes, depth);
- Climate and stream flow monitoring (initiated in the fall of 2015) to collect:
    - Rainfall data and ambient temperature data;
    - Water temperature and water levels data; and
    - Stream flow gauging measurements;
- Surface water quality sampling of indicator parameters such as temperature, suspended sediments, inorganics, major ions, bacteria, trace organics and nutrients; and
- A benthic community inventory, including taxonomic sorting and identification of macro-invertebrates, which will follow the *Ontario Benthos Biomonitoring Network: Protocol Manual* (January 2007).

Surface water quality investigations will be conducted in the Duke Drain, Howard Drain, and Scott Drain, which transect the landfill site and, accordingly, represent the most appropriate watercourses to assess potential effects related to the proposed landfill expansion. This methodology is consistent with the annual monitoring program under the current approval.

Impact Assessment and Mitigation

The potential for the preferred site development alternative to have an impact on surface water quality will be assessed based on the established baseline water quality conditions.

The assessment of surface water flow conditions will involve a combination of technical analyses to determine baseline conditions and potential impacts for each of the indicators (e.g., upstream/downstream flood levels, hydrograph timing/duration, changes in baseflow, and stream-bank erosion potential). Tasks that will be completed as part of the flow condition assessment include:

- Hydrologic Modelling;
- Water Balance Assessment; and
- Hydraulic Analyses and Flood Hazard Delineation.

Consideration for the potential of climate change on the operation of the proposed landfill expansion will be made.

The Surface Water Assessment will identify mitigation measures as well as potential contingency plans to address future extreme weather events.

Transportation Analysis

Data Collection and Field Work

The following data collection tasks will be undertaken as part of the transportation analysis:

- Review available background documentation;
- Prepare inventory of existing geometric conditions for the haul route road network;
- Collect existing intersection turning movement counts at study area intersections;
- Collect daily traffic volumes on the haul route and boundary roads (e.g. Charing Cross Road, Allison Line); and
- Identify junction controls at study area intersections and existing auxiliary lanes.

From the data collected we will generate a profile of existing transportation conditions, assess the performance of road network under existing conditions and verify traffic operations assumptions.

To confirm the future environment, we will:

- Identify any area developments that would contribute traffic to study area roads;
- Identify reasonable general background growth rate for study area roads;

- Identify any planned changes to the study area road network;
- Forecast background traffic conditions on study area roads without expanded development of the Ridge Landfill site; and
- Assess performance of road network under future background (or without expanded site development) conditions.

Impact Assessment and Mitigation

Analysis will be undertaken to assess the ability of the existing roads to accommodate the traffic generated by the Project and continued operation of the Ridge Landfill. The analysis will assess the potential impact on traffic operation and safety requirements on off-site adjacent roadways and haul routes as follows:

- Identify and Quantify Site Conditions;
  - Identify a trip generation rate for subject site operations and development;
  - Forecast site trips;
  - Develop trip distribution for site trips and assign trips to future road network; and
  - Forecast post-development traffic volumes (add site traffic and future background traffic forecasts) at study area intersections.
- Assessment of Effects and Development of Mitigation;
  - Assess performance (level of service and safety) of haul route road network with expanded site operations (off-site);
  - Identify any mitigation measures required to insure network performance; and
  - Confirm feasibility of design elements for required modifications to road network.

Conceptual/functional design drawings for roadway modifications to mitigate potential impacts will be prepared as necessary.

Visual Impact Assessment

Data Collection and Field Work

Data collection to support a Visual Impact Assessment will include a review of available background information. Digital base information and on-site physical data will be collected. Baseline visual conditions will be confirmed.

Impact Assessment and Mitigation

The Visual Impact Assessment of the preferred method of site development will include the following tasks:

- Visibility mapping will be prepared to identify areas of concern and new visual impacts;
- Visualizations (e.g., sections, renderings) will be prepared to illustrate potential visual impacts from areas of concern;
- New potential areas of impact will be assessed, and potential mitigation measures identified; and
- Landscape Plans/visualization will be developed to provide screening to minimize visual impact from the proposed expansion.

A conceptual Mitigation Measures Plan will be developed to recommend optimal mitigation measures, should such measures be required.

Appendix B

Draft Alternative Method Evaluation Criteria

TABLE 1: PRELIMINARY DRAFT EVALUATION CRITERIA FOR ALTERNATIVE METHODS OF LANDFILL SITE DEVELOPMENT

Criteria Group	Criteria	Indicators	Data Sources
Natural Environment			
Biology	• Potential for loss/disruption of terrestrial systems on-site.	• Area and type of terrestrial systems (i.e., significant woodlands, hedgerows) to be removed. • Area and type of terrestrial systems (i.e., significant woodlands, hedgerows) potentially disrupted.	• Field work and results from other disciplines (e.g., Design and Operations, Surface Water, Hydrogeology). • Aerial photography & GIS mapping. • ELC mapping. • Official Plan mapping. • Communication with agencies (e.g. MNRF) and knowledgeable citizens.
	• Potential for loss/disruption of aquatic systems on-site.	• Amount and type of aquatic systems (i.e., ponds, drains) that would be displaced.	• Field work and results from other disciplines (e.g., Design and Operations, Surface Water, Hydrogeology). • Communication with MNRF.
Geology/Hydrogeology	• Potential impacts to groundwater quality.	• Ability to meet Reasonable Use Guidelines.	• Geologic/hydrogeologic setting. • Past monitoring reports.
Surface Water	• Potential impacts to surface water quantity.	• Ability to release pre-development flows downstream	• Field work and results from other disciplines (e.g., Design and Operations). • Aerial photography & GIS mapping. • Past monitoring reports

TABLE 1: PRELIMINARY DRAFT EVALUATION CRITERIA FOR ALTERNATIVE METHODS OF LANDFILL SITE DEVELOPMENT

Socio-Economic Environment			
Socio-economic	• Potential for displacement of residents on-site.	• Number of occupied households on-site forced to relocate.	• GIS mapping. • Personal communication.
	• Potential for disruption of residents and/or businesses off-site.	• Number of occupied households in proximity to new landfill footprint.	• GIS mapping. • Survey input from local residents/businesses. • Results from other disciplines (e.g., Design and Operations).
	• Potential for disruption of residents and/or businesses along the haul route for soil import or export.	• Number of trucks for soil import/export.	• Results from other disciplines (e.g., Design and Operations).
	• Potential for odour disruption as a result of landfill mining.	• Number of occupied households in proximity to landfill mining footprint.	• Results from other disciplines (e.g., Design and Operations). • Results of preliminary investigations on landfill mining
Agriculture	• Potential for loss/disruption of agriculture on-site.	• Area of on-site crop production lost.	• GIS mapping. • Personal communication.
Archaeology & Cultural Heritage	• Potential for impact to as-yet undiscovered archaeological or cultural heritage resources on-site.	• Potential for undocumented archaeological features within new landfill footprint on-site.	• Stage 1 archaeological assessment. • Results from other disciplines (e.g., Design and Operations).

TABLE 1: PRELIMINARY DRAFT EVALUATION CRITERIA FOR ALTERNATIVE METHODS OF LANDFILL SITE DEVELOPMENT

Land Use	• Intensity of waste management use.	• Size of landfill footprint.	• Results from other disciplines (e.g., Design and Operations).
Transportation			
Traffic	• Potential for traffic safety and operations impacts along the haul route for soil import or export.	• Number of trucks for soil import/export.	• Results from other disciplines (e.g., Design and Operations).
Design and Operations			
Design and Operations	• Potential for providing necessary service.	• Ability of site development alternative method to provide waste disposal capacity over the planning period.	• Site development alternative characteristics.
	• Potential for on-site worker safety concerns. • Cost of facility.	• Inclusion of landfill mining or not within the alternative. • Approximate relative cost of site development alternative.	• Site development alternative characteristics. • Cost estimate.

DILLON CONSULTING

Ridge Landfill Expansion Environmental Assessment

Supporting Document #1

Purpose/Opportunity Assessment

Ridge Landfill Expansion Terms of Reference

December 2017

WASTE CONNECTIONS OF CANADA

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1.0 Introduction

The Ridge Landfill (the Ridge) has been serving Ontario since 1966. The site is located near Blenheim, Ontario and is owned and operated by Waste Connections of Canada Inc. (Waste Connections). An Environmental Assessment (EA) was completed in 1997 by the previous owner (BFI Canada Inc.) to expand the Ridge to provide additional waste disposal capacity over a 20-year period. The EA was approved in 1998 and the fill area was expanded in 2000. An Environmental Screening Process was completed in 2012 to allow an increase to the annual tonnage received at the Ridge from 899,000 to 1,300,000 tonnes (to meet the demand for Industrial, Commercial and Institutional (IC&I) waste disposal services from Waste Connections' customers), but the approved site capacity remained the same. As discussed herein, the Ridge is an integral part of the IC&I waste management infrastructure for southern and central Ontario.

The Ridge currently has a service area consisting of all Ontario for IC&I waste. The Ridge service area for residential waste includes five municipal jurisdictions: the Municipality of Chatham-Kent (Chatham-Kent) as well as the Counties of Essex, Lambton, Middlesex and Elgin.

While the Ridge is approved to receive IC&I waste from anywhere in Ontario, almost all (approximately 98%) of the 1.3 million tonnes of residual waste disposed of annually at the site comes from IC&I generators in southern and central Ontario. The remaining 2% is residential waste from the landfill's host municipality of Chatham-Kent. Given that the Ridge is accepting waste at its maximum permitted annual fill rate, the site is expected to reach its approved capacity in 2021.

The purpose of this Supporting Document #1 (SD #1) is to illustrate the opportunity for Waste Connections to continue operating the Ridge Landfill beyond 2021. If the Ridge were able to expand, it would be able to support the increased demand from a growing population and economy. If the Ridge were not able to expand, it would create a problem for Waste Connections' customers, both public and private.

Waste Connections, in this proposed expansion of the Ridge, is prepared to reduce the service area to a more regional approach to include IC&I waste from central and southern Ontario (***Figure 1***) and residential waste from the Chatham-Kent (herein referred to as the "service area"). IC&I waste generators in this area are located within an economically competitive transportation distance of the Ridge. Waste Connections is and has been Chatham-Kent's primary solid waste service provider for many years. Waste Connections currently provides all residential waste collection and disposal services to Chatham-Kent. Residential residual waste disposal volumes from Chatham-Kent at the Ridge are in the range of 30,000 tonnes annually.

RIDGE LANDFILL

FIGURE 1
IC&I SERVICE AREA OF THE RIDGE

Service Area

1:2,100,000

0 25 50 100 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: GM
MAP CHECKED BY: BV
MAP PROJECTION: NAD 1983 CSRS Ontario MNR Lambert

DILLON CONSULTING

PROJECT: 152456
STATUS: FINAL
DATE: 2017-12-11

FILE LOCATION: I:\GIS\141382 - Ridge Landfill\Mapping\Figure 1 Proposed Service Areas of the Ridge.mxd

This purpose/opportunity assessment was completed in four steps:

- ***Step 1*** (***Section 1.0***) – Analyse and describe Waste Connections' waste management business and operations tied to the Ridge.
- ***Step 2 (Section 2.0)*** – Project future potential quantities of IC&I waste to be generated, diverted and disposed respectively over a 20-year planning period in southern and central Ontario – the service area for the Ridge post 2021. The base projections in this SD #1 assume that diversion of IC&I waste will significantly increase to meet the Ministry of Environment and Climate Change (MOECC's) ambitious new diversion targets for the province (30% by 2020, 50% by 2030 and 80% by 2050) as proposed in the *Strategy for a Waste-Free Ontario* (2017).
- ***Step 3*** (***Section 3.0***) – Estimate remaining approved disposal capacity at the existing major disposal facilities in the service area that currently service the IC&I waste sector based on their approved annual waste disposal rates. Then estimate the additional disposal capacity for major IC&I disposal facilities (existing and potential new) in the service area that are currently in various stages of seeking approval under the Ontario EA Act.
- ***Step 4*** (***Section 4.0***) – Identify and outline the opportunity for the Ridge and Waste Connections to continue to provide residual waste disposal capacity for IC&I waste generators over the 20-year planning period (2022 – 2041) and illustrate the problem that would be created if the Ridge capacity is not expanded post 2021.

In June 2016, the Ontario government passed Bill 151, *Waste-Free Ontario Act.* As noted above, in March 2017 the MOECC released the final *Strategy for a Waste-Free Ontario* which outlines actions to be implemented from 2017 to 2025. The *Waste-Free Ontario Act* seeks to change the way in which products are created and managed at end of life. Key elements include an increased focus on reducing the quantity of organic waste disposed, the banning of some materials from disposal (e.g., food waste, recyclables), amending the 3Rs Regulations (3Rs stands for Reduce, Reuse, Recycle) to increase resource recovery across all sectors, and ensuring landfills are planned and managed in terms of need and greenhouse gas (GHG) emissions. As noted above, the analysis in this SD #1 has assumed that the diversion goals in the *Strategy for a Waste-Free Ontario* are in fact met.

Currently, there is a reliance on the export of several million tonnes per year of waste across an international border for disposal. Ontario has relied on this practice for many years and given past potential United States (U.S.) state actions and current North American Free Trade Agreement (NAFTA) negotiations, it might be risky to expect this option to exist in perpetuity. Ontario has already been forced in 2010 to curb the export of residential waste to Michigan from the Greater Toronto Area (GTA) as a result of political pressure in Michigan and the border was temporarily shut down entirely in the aftermath of the September 11, 2001 U.S. terrorist attacks. There can be no assurance that the landfills in Michigan and New York State will continue to be available in the future for Ontario waste. In addition, long distance transportation of over 3 million tonnes of Ontario IC&I waste to Michigan and New York State disposal facilities each year does not align with the Climate Change Action Plan contributing additional GHG emissions to the atmosphere.

1.1 Waste Connections' Waste Collection, Recycling, Transfer and Disposal Business in Southern and Central Ontario

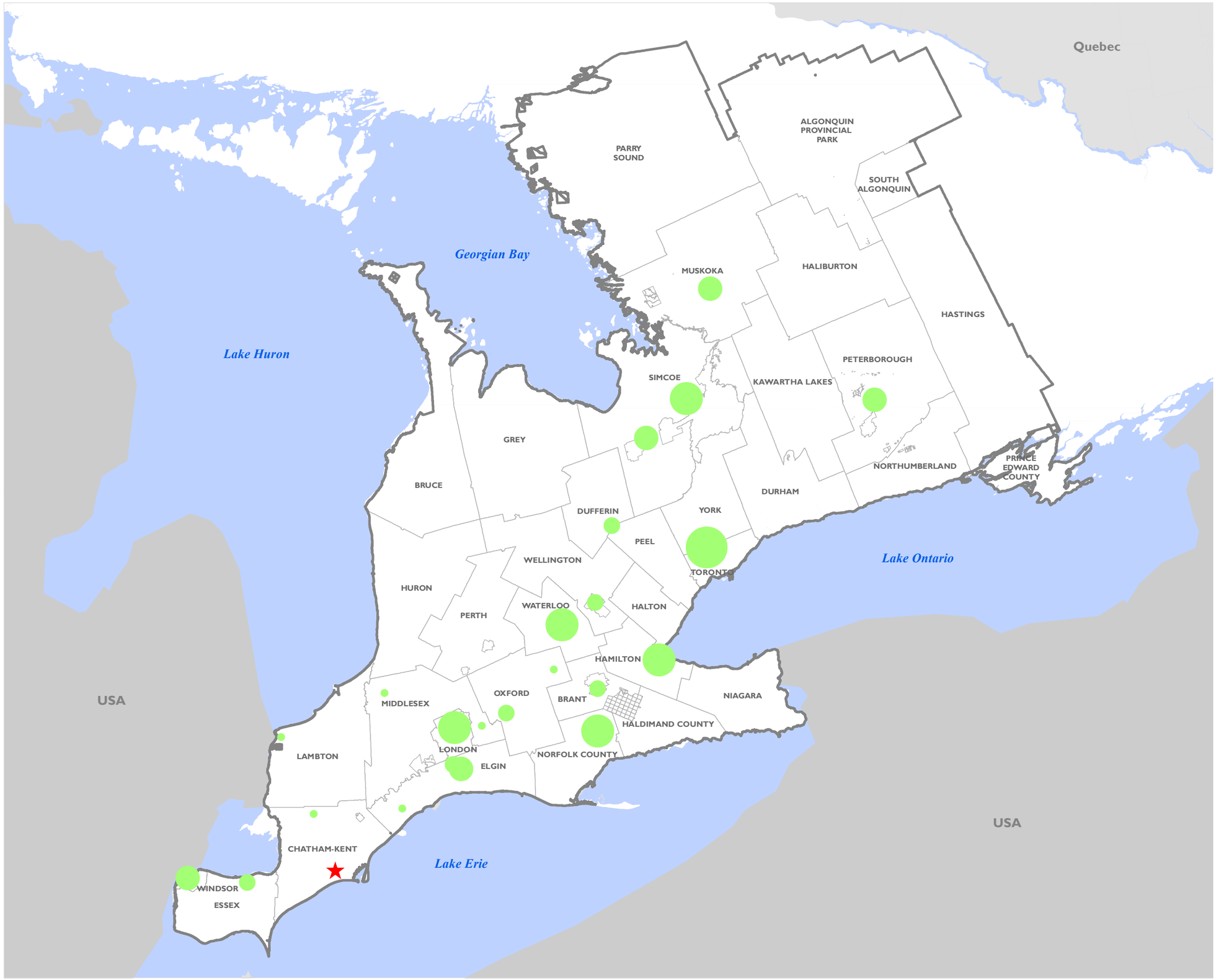
Waste Connections operates the largest integrated IC&I waste collection, recycling, transfer and disposal business in Ontario. Our collection fleet of almost 800 vehicles (many of them running on compressed natural gas) currently service almost 50,000 waste and recycling collection containers and more than 30,000 IC&I customers in the service area. Volumes of IC&I recycling and residual waste collected by our fleet have been growing every year in the service area.

Figure 2 depicts the typical distribution within the service area of IC&I waste delivered to the Ridge in a given year. It is noted that the waste centroids are generally consolidated along the Highway 400/401/Golden Horseshoe corridors, which would be expected given the concentration of population and associated commercial enterprises along those corridors.

Figure 3 depicts the Waste Connections collection, processing and transfer station network serviced by the Ridge in the service area. As depicted, Waste Connections currently owns and operates 17 collection, processing and transfer facilities servicing IC&I generators in the service area. Detailed discussion on Waste Connections' existing waste diversion programs can be found in **Attachment A** of **Supporting Document #2** (SD #2) to this Terms of Reference (ToR).

It should be noted, when referring to the Waste Connections – Ridge network, that its core service area, Central and Southwest Ontario region, including the GTA, is forecast by the Ministry of Finance to grow in population by over 3.8 million people by 2041. According to the Ontario Economic Outlook and Fiscal Review, the Ontario economy has grown faster than that of Canada and those of all other G7 nations for the past three years. With these two factors combined, the Ridge is well positioned to maintain its annual waste intake rate of 1.3 million tonnes and continue to support the growing Ontario population and economy.

Figure 4 depicts the locations of the current major disposal facilities (both municipal and private sites) within the service area that are permitted to manage IC&I waste. The major competitors to the Ridge are private sector disposal sites including the Walker South Landfill, Waste Management (WM) Twin Creeks, Terrapure Stoney Creek and the Emerald Energy from Waste (EfW) facility. It is noted that the Emerald EfW facility in Brampton specializes in a somewhat different and sometimes higher disposal fee market where customers require assured destruction of special waste streams such as international waste from Toronto Pearson International Airport rather than regular IC&I waste streams, which are the core business of the other private sector disposal sites. In addition, municipally-owned landfills are typically reserved or focused on residential waste from their own municipal jurisdiction.



RIDGE LANDFILL

FIGURE 2
CURRENT WASTE GENERATION CENTROIDS FOR THE RIDGE

Relative Quantity of Waste Received at Ridge Landfill

Ridge Landfill

Service Area

1:2,000,000

0 25 50 100 km

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: GM
MAP CHECKED BY: BV
MAP PROJECTION: NAD 1983 CSRS Ontario MNR Lambert

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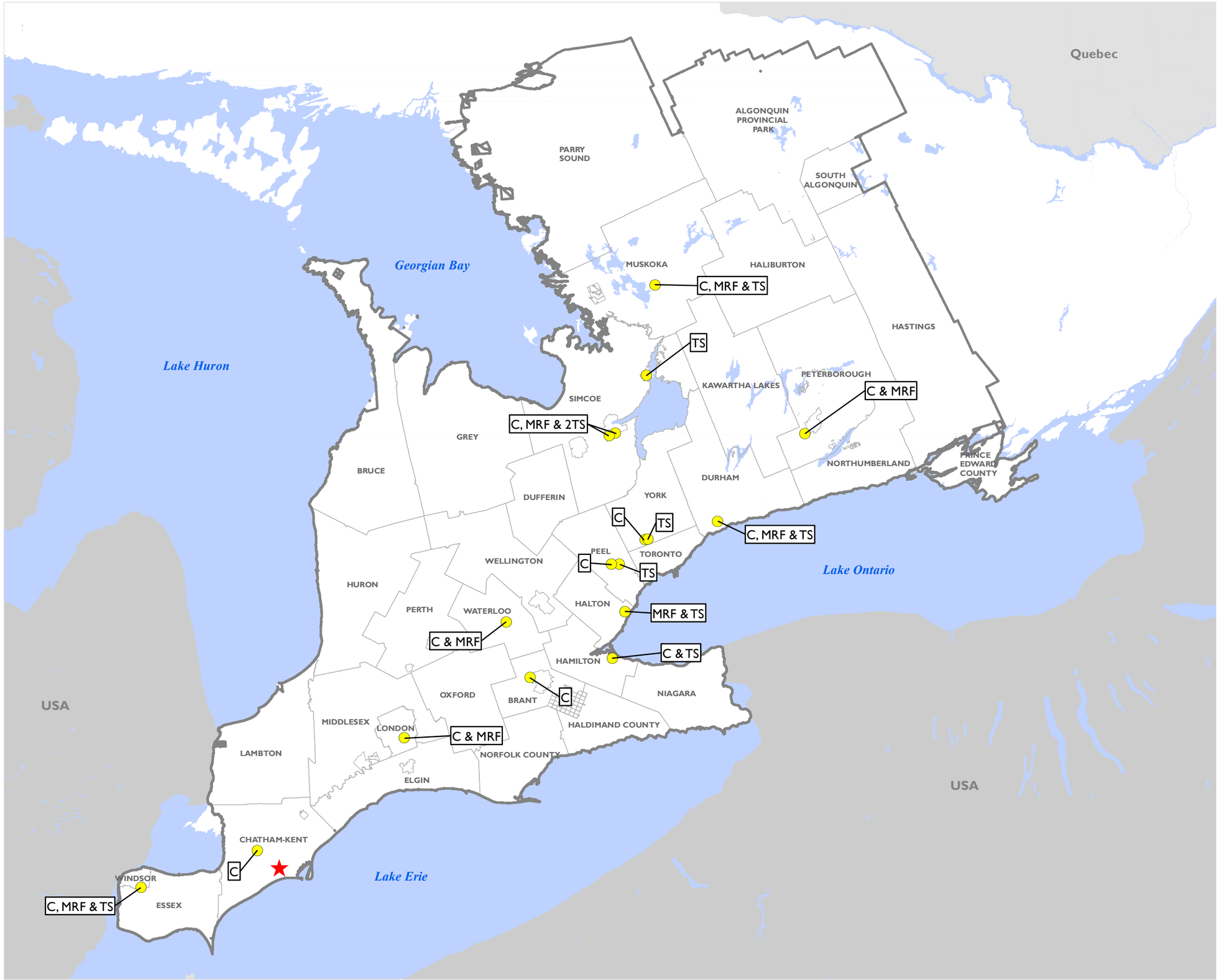
PROJECT: 152456
STATUS: FINAL
DATE: 2017-12-15

FILE LOCATION: I:\GIS\141382 - Ridge Landfill\Mapping\Figure 2 Current Waste Generation Centroids for the Ridge.mxd



RIDGE LANDFILL

FIGURE 3
WASTE CONNECTIONS COLLECTION, PROCESSING AND TRANSFER STATION NETWORK FOR THE RIDGE

- Waste Connection Facility
- Ridge Landfill
- Service Area

C: Collection
TS: Transfer Station
MRF: Materials Recovery Facility

1:2,000,000

0 25 50 100 km

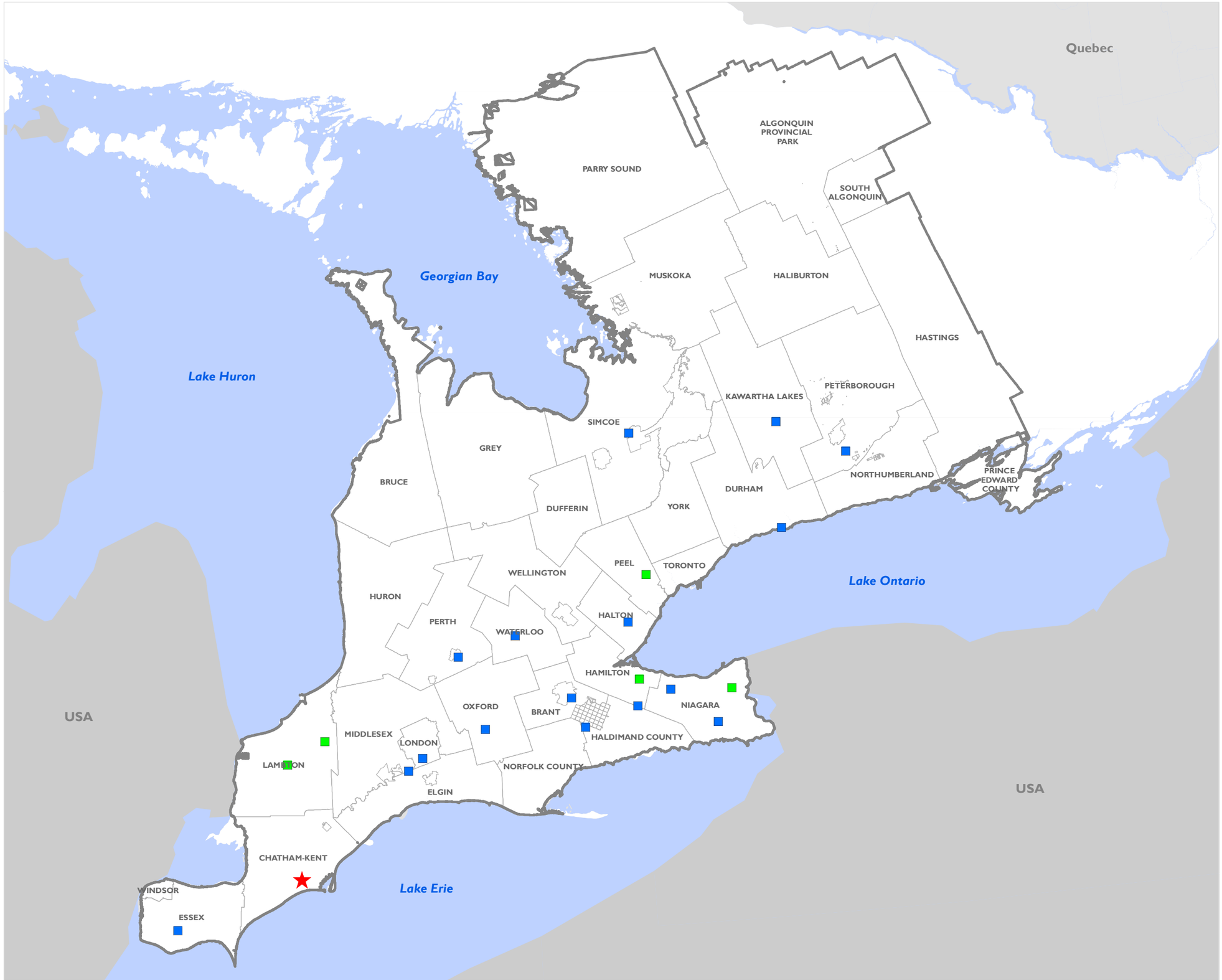
MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: GM
MAP CHECKED BY: BV
MAP PROJECTION: NAD 1983 CSRS Ontario MNR Lambert

DILLON CONSULTING

PROJECT: 152456
STATUS: FINAL
DATE: 2017-12-15

FILE LOCATION: I:\GIS\141382 - Ridge Landfill\Mapping\Figure 3 Waste Connections Collection, Processing and Transfer Station Network for the Ridge.mxd



RIDGE LANDFILL

FIGURE 4
MAJOR DISPOSAL FACILITIES
WITHIN THE RIDGE SERVICE AREA

- Ridge Landfill
- Private Sector Site
- Municipal Sector Site
- Service Area

1:2,000,000

0 25 50 100 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: GM
MAP CHECKED BY: BV
MAP PROJECTION: NAD 1983 CSRS Ontario MNR Lambert

DILLON CONSULTING

PROJECT: 152456
STATUS: FINAL
DATE: 2017-12-15

FILE LOCATION: I:\GIS\141382 - Ridge Landfill\Mapping\Figure 4 Major Disposal Facilities Within the Ridge Service Area.mxd

While Waste Connections currently utilizes third party transfer stations for efficiency reasons (i.e., proximity to collection points) for some IC&I waste collected in the service area, the MOECC approved throughput capacity of our transfer stations in the service area is approximately 2,000,000 tonnes per year. Waste Connections is thus able to receive and transfer significantly more than the approved annual waste disposal rate of the Ridge through its own processing/transfer station network alone.

These processing/transfer stations are also utilized to support Waste Connections' waste diversion efforts. In the last five (5) years Waste Connections has been directly involved in the diversion of over 1,300,000 tonnes of materials from disposal in Ontario, of which just over 900,000 tonnes were diverted from within the service area (see SD #2, Attachment A). This tonnage is collected and bulked at Waste Connections' transfer stations and taken to processing facilities, or in the event that processing facilities are located in close proximity to a collection area, these materials are taken direct from the customer to the processor. Waste Connections also re-purposes in the order of 160,000 tonnes per year of auto fluff, wood chips, glass and asphalt for beneficial reuse in road and pad construction/maintenance applications at both the Ridge and the Navan landfills.

All waste received at these transfer stations is taken to the Ridge Landfill. In addition to waste transferred to the Ridge, Waste Connections collects some additional 396,000 tonnes per year in the service area. This waste goes to third-party transfer stations or other landfills that are closer and so more efficient to use in some collection areas.

As Waste Connections' business and the Ontario economy continued to expand, the Ridge was increasingly being forced to turn away waste on account of the annual waste disposal rate in its approval. As a result, an Environmental Screening Process was completed in 2012 to increase the annual waste disposal rate at the Ridge from 899,000 to 1.3 million tonnes per year. Since receiving approval, the Ridge has essentially been operating at this increased rate ever since. Even with an annual waste disposal rate of 1.3 million tonnes, Waste Connections typically finds itself having to reduce intake at the site towards the end of the year and redirect waste to other disposal facilities to ensure that the approved annual waste disposal rate is not exceeded. For example, in 2017, some 375,000 tonnes of Ontario IC&I waste will be disposed of at the Brent Run Landfill in Michigan.

The Ridge is a key and essential component of the integrated IC&I waste collection, recycling, transfer and residuals disposal business developed by Waste Connections over decades in the service area. More than 30,000 IC&I waste generators in southern and central Ontario rely each year on Waste Connections to provide turnkey service (collection, recycling, transportation and disposal) for their residual waste with the Ridge providing safe and proper disposal of that waste. Waste Connections is also committed to increasing waste diversion efforts consistent with the *Strategy for a Waste-Free Ontario* as discussed in SD #2, Attachment A.

At 1.3 million tonnes per year, the Ridge currently disposes of approximately 25% of the IC&I waste generated in southern and central Ontario each year. This makes the Ridge a critical component of the Ontario IC&I waste management system and a vital piece of infrastructure to the over 100,000 people living in Chatham-Kent.

Waste Connections' operations in the service area have a total annual economic impact in Ontario of well over $200 million per year, including third party suppliers of various goods and services to Waste Connections and direct employment income for its over 1000 employees in the service area alone.

The Ridge has also provided and continues to provide significant benefits to its host municipality of Chatham-Kent. These include:

- An annual royalty payment to Chatham-Kent. In 2016, this amounted to $2.6 million; since 2000 Waste Connections has contributed over $22.1 million to the municipality pursuant to its host community agreement.
- Significant financial contributions to the Ridge Landfill Trust based on the volume of waste the Ridge receives each year. In 2016, this was approximately $1.1 million. These monies are allocated by a group of community leaders to projects and organizations that benefit the local community. In the past, the Trust has provided funding for the building of a Community Centre Park with the splash pad for children, the development of a new senior's centre and a youth drop in centre in downtown Blenheim. The Trust has also supported a handi-bus for seniors' mobility and the development and operation of a baseball field in Charing Cross, among other programs.
- Waste Connections provides a significant incentive for the Chatham-Kent to reduce the amount of waste residuals delivered to the Ridge. The greater the tonnage diverted the more the municipality receives in additional funding. On average, Chatham-Kent receives over $1.2 million per year in waste reduction incentives.
- In total, these benefits to the Chatham-Kent currently amount to almost $5 million per year.
- The Ridge also generates direct and indirect benefits; salaries, goods and services, services purchased, local roads maintenance etc., which accounts for a minimum $9 million per year.

2.0 IC&I Waste Forecasts

The second step in the purpose/opportunity assessment involved predicting the amount of IC&I residual waste that would be generated in the service area over the 20-year planning period assuming the diversion targets in the *Strategy for a Waste Free Ontario* are in fact met. By extension, this work determined what the annual waste disposal rates would need to be from 2022 to 2041.

2.1 Quantities of Provincial Waste Generation, Diversion and Disposal

Current estimates of the quantity of waste generated, diverted and sent to disposal by the IC&I sector in Ontario were based on Statistics Canada's *Waste Management Industry Survey* which presents data every two years up to the most recent data set in 2014. ***Table 1*** below provides the total and per-capita amounts of waste generated, disposed, and diverted from disposal in Ontario between 2006 and 2014, broken down between the residential and non-residential sectors (the non-residential (IC&I) sector is highlighted in **red**). IC&I waste diverted increased slightly and waste residuals disposed decreased slightly, however total waste generated stayed relatively the same.

TABLE 1: WASTE QUANTITY ESTIMATES IN ONTARIO, 2006-2014 (STATISTICS CANADA)[1]

Ontario	2006	2008	2010	2012	2014
Total Waste Generated (tonnes)	**12,107,315**	**12,413,389**	**11,996,462**	**12,038,044**	**12,209,956**
Total waste generation per capita (kg)	956	960	907	898	892
Total Waste Disposed (tonnes)	**9,710,459**	**9,631,559**	**9,247,415**	**9,208,839**	**9,165,299**
Waste disposal per capita (kg)	767	745	699	687	670
Non-residential waste disposed (tonnes)	**6,298,818**	**6,400,160**	**6,043,151**	**5,820,338**	**5,674,507**
Residential waste disposed (tonnes)	3,411,642	3,231,399	3,204,263	3,388,501	3,490,792
Total Waste Diverted (tonnes)	**2,396,856**	**2,781,830**	**2,749,047**	**2,829,205**	**3,044,657**
Waste diverted per capita (kg)	189	215	208	211	222
Non-residential waste diverted (tonnes)	**885,389**	**932,001**	**752,990**	**882,434**	**993,582**
Non-residential diversion rate	**12%**	**13%**	**11%**	**13%**	**15%**
Residential waste diverted (tonnes)	1,511,467	1,849,828	1,996,057	1,946,771	2,051,075
Residential diversion rate	31%	36%	38%	37%	37%
Total Diversion Rate	**20%**	**22%**	**23%**	**24%**	**25%**

[1] Statistics Canada Website, Pollution and Waste CANSIM Tables 153-0041 and 153-0042. Accessed August 2017.

Waste Generation

Per-employee waste generation rates from the Statistics Canada work were applied to employment projectiop11ns to predict future IC&I waste generation rates prior to estimating diversion rates over the planning period (1,029 kg in 2010).

Waste Diversion

Statistics Canada data shows that IC&I diversion rates have increased from 12% in 2006 to 15% in 2014. The projections in this SD #1used the Statistics Canada diversion rates for IC&I as a starting point, increasing the diversion rates in line with the MOECC 2017 Strategy for a Waste-Free Ontario provincial diversion targets.

Waste Disposal

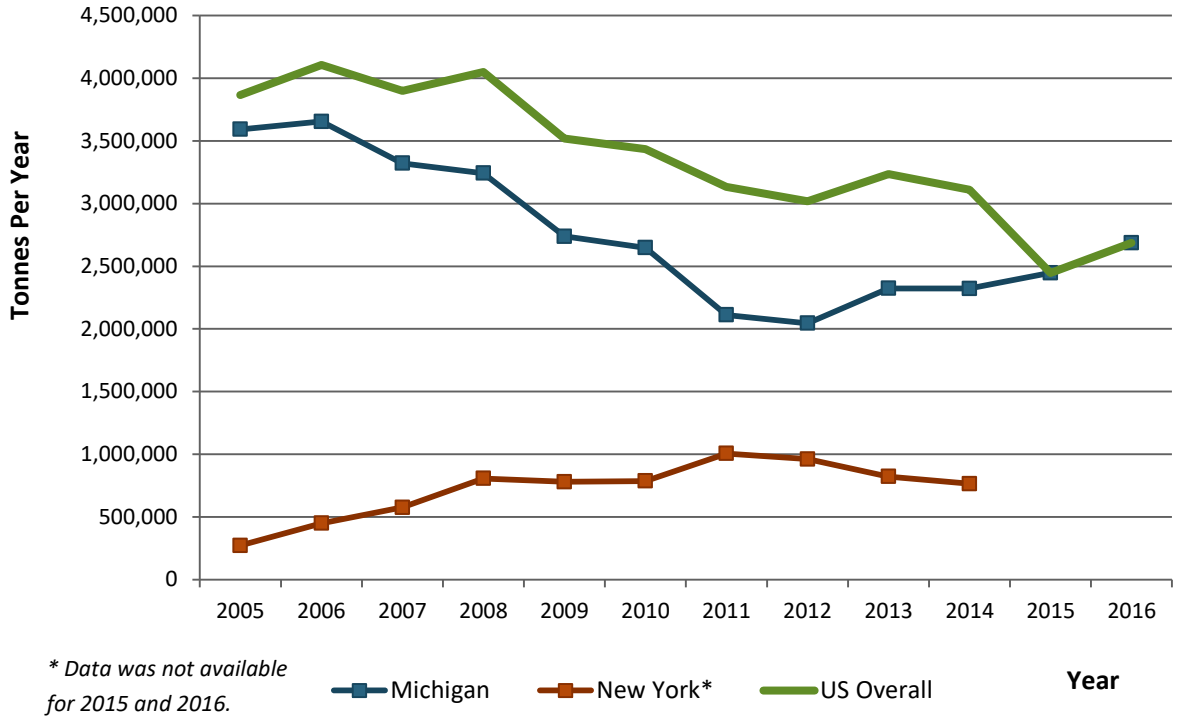
As discussed above, Ontario IC&I waste from the service area is currently sent primarily to three private sector landfills in Ontario as well as exported to the U.S. Smaller amounts of IC&I waste are also disposed at municipal sites, although these amounts are minor when compared to the amounts of residential waste disposed at these municipal sites. While there has been an understanding between Ontario and Michigan since 2010 to halt the export of residential waste from the GTA to that state, IC&I waste was not included. Over 3 million tonnes of Ontario IC&I waste continues to be sent for disposal to Michigan and New York State each year.

It is estimated that Ontario waste exports accounted for 16.5% of all waste sent to landfill in Michigan in 2014[2]. In 2014, Ontario exported approximately 2.4 million tonnes of waste to 11 landfills in Michigan; this represents approximately 26% of the waste sent to landfill in the province. In comparison, Ontario exported approximately one million tonnes of waste to disposal facilities in New York in the same year (approximately 9% of the waste sent to disposal in Ontario)[3]. In other words, a quantity equal to over one third of the waste disposed in Ontario that year was exported for disposal to those two states.

Figure 5 shows the consolidated quantities of waste exported from Ontario to Michigan and New York State for disposal between 2005 and 2016. It is noted that data from New York State has not been released for 2015 and 2016 at the time of this report.

[2] Department of Environmental Quality, Michigan website. Annual Reports of Solid Waste Landfilled in Michigan (FY 2016). Accessed on November 2017.
[3] Information received via email through Ontario Waste Management Association from the Department of Environmental Conservation, New York State.

FIGURE 5: WASTE EXPORTED FROM ONTARIO TO MICHIGAN AND NEW YORK (2005 - 2016*)



2.2 Waste Generation, Diversion and Disposal Projections for Planning Period

For the IC&I waste generation projections in this analysis, recent employment data (2010 to 2014) for Ontario was obtained from Statistics Canada. Projected annual growth rates for employment were taken from the Ontario Ministry of Finance report titled *Ontario's Long-Term Report on the Economy*[4]. With respect to the service area for the Ridge (i.e., southern and central Ontario), the population projection data identified that almost 83% of Ontario's population will live in this area by the end of the planning period. This allocation was also applied to the employment data, with the result that over the planning period employment will grow from 81% to 83% of the Ontario total in the service area.

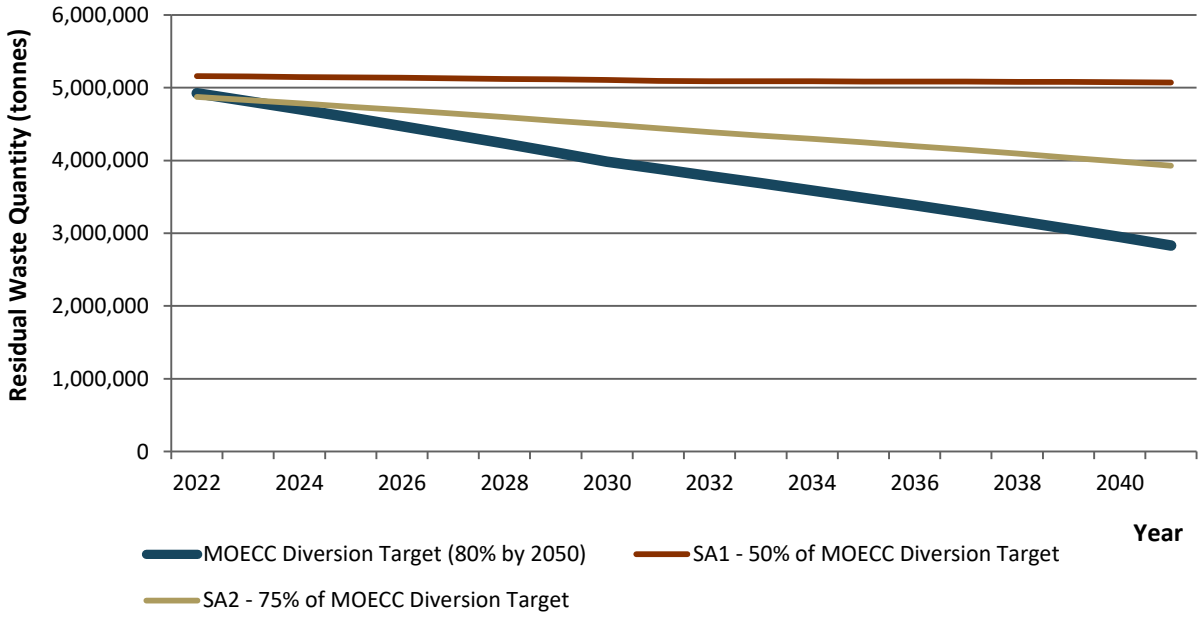
In order to forecast the residual IC&I waste disposal requirement/opportunity in the service area, the new Waste-Free Ontario Strategy diversion targets of 30% by 2020, 50% by 2030 and 80% by 2050 for both residential and IC&I waste were used as a base case. The population and employment projections were completed initially for all of Ontario in order to estimate the necessary diversion rates for the residential and IC&I sectors to achieve the province-wide diversion targets. The diversion rates were then applied to the employment projections to estimate the quantity of IC&I residual waste remaining in

[4] Employment data was obtained from the Ministry of Finance's report *Ontario's Long-Term Report on the Economy (2014-2035)*, 2014.

the service area. Under this scenario, the quantity of residual IC&I waste requiring disposal would decrease from 4.9 million tonnes in 2022 to 2.8 million tonnes in 2041 as diversion rates increase.

In order to provide a complete picture given the many unknowns associated with implementation of the 2017 MOECC Waste-Free Strategy, a sensitivity analysis (SA) was also completed to estimate the IC&I residual waste remaining under two other scenarios: SA 1) the IC&I sector achieves 50% of the MOECC's diversion targets (i.e., 40% by 2050) and SA 2) the IC&I sector achieves 75% of the MOECC's diversion targets (i.e., 60% by 2050). ***Figure 6*** shows the projected amount of residual IC&I waste requiring disposal under the three scenarios during the 20 year planning period with supporting data provided in ***Attachment A***. The base case scenario was carried forward in the analysis.

FIGURE 6: RESIDUAL IC&I WASTE REMAINING FOR DISPOSAL IN THE SERVICE AREA (2022-2041)



3.0 Major IC&I Disposal Facilities

3.1 Existing Waste Disposal Facilities

The disposal facilities in the service area that service the IC&I sector in southern and central Ontario were identified and their combined remaining site capacity estimated. The information on approved annual fill rates, last reporting year (2014, 2015) and remaining capacity in the last reporting year was obtained from the MOECC in December 2017[5]. Using this information, the number of years of capacity remaining, based on the approved annual fill rates, was estimated. ***Attachment B*** contains the data provided by the MOECC and the approach taken to estimate the number of years of remaining capacity for the existing waste disposal facilities. The disposal facilities that are estimated to have capacity available during the 20-year planning period and are included in the analysis are shown in ***Table 2***.

TABLE 2: DISPOSAL FACILITIES WITHIN THE SERVICE AREA

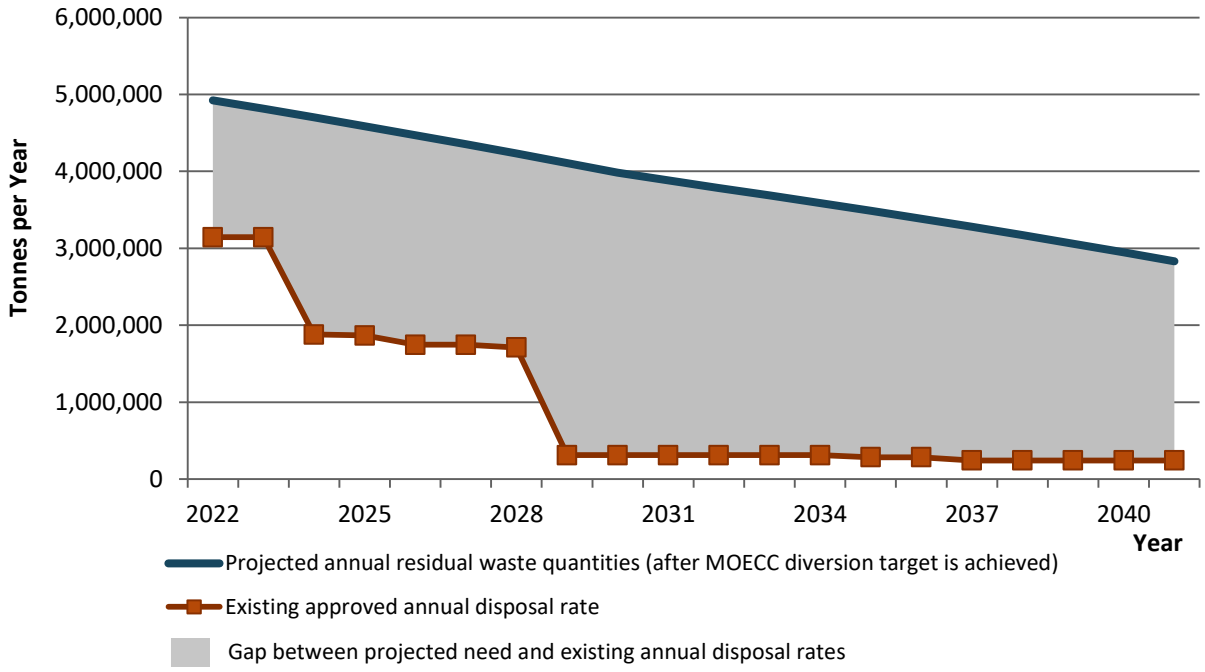
Private Sector	Municipal Sector
Emerald Energy from Waste Inc.	Barrie Landfill (Sandy Hollow)
Terrapure – Stoney Creek Landfill	Bensfort Road – Peterborough
Walker Environmental – South Landfill	Durham York Energy Centre
Waste Management – Twin Creeks	Essex-Windsor Solid Waste Authority Regional Landfill
Waste Connections – Ridge Landfill	Glanbrook – Hamilton
	Green Lane Landfill – Toronto
	Halton Regional Landfill
	Humberstone – Niagara Region
	Lindsay-Ops Landfill
	Mohawk Street – Brantford
	Regional Road 12 – Niagara
	Salford – Oxford County
	Stratford
	W12A – London
	Waterloo Landfill

Municipal disposal facilities typically reserve capacity to meet future residential waste disposal needs and discourage IC&I sector waste through disincentives such as higher tipping fees. Several of the large municipal landfill sites were contacted to ask what proportion of IC&I waste was landfilled at their sites. Using a weighted average based on reported fill rates, an average percentage of IC&I waste landfilled at municipal sites was estimated to be 15%. This percentage was applied to the approved fill rates for all

[5] C. Lee (personal communication, December 6, 2017; attached as "DisposalFacilities-SouthCentral.xlsx").

municipal sites and included in the available capacity during the planning period. It was assumed that all private sector disposal sites would reserve 100% of their capacity for IC&I waste to be conservative although it is known that some of these sites do in fact receive residential waste. ***Figure 7*** illustrates the currently approved annual disposal rates for existing facilities (combined) that receive IC&I waste in the service area along with the projected residual waste quantities that will be generated by the IC&I sector from 2022 to 2041. It is noted that the residual waste quantities assume that the IC&I sector has fully achieved the MOECC's diversion targets as outlined in the *Strategy for a Waste-Free Ontario*.

FIGURE 7: PROJECTED POST-DIVERSION RESIDUAL WASTE DISPOSAL NEED AND EXISTING APPROVED ANNUAL DISPOSAL RATES (2022-2041)



Using approved annual waste disposal rates to project future available waste disposal rates, it is estimated that the currently approved available disposal rate for IC&I waste will decrease from approximately 3.1 million tonnes per year in 2022 to under 311,000 tonnes per year in 2029 and continue at that rate to the end of the planning period.

3.2 Proposed Waste Disposal Facilities (New and Expanded)

There are three EAs currently in process for new or expanded landfill capacity that can receive IC&I waste (in addition to the Ridge Landfill expansion) in the service area as listed in ***Table 3*** below.

TABLE 3: PROPOSED ANNUAL DISPOSAL RATE AND SITE LIFE IN SOUTHERN AND CENTRAL ONTARIO

Name of Facility	Type	Tonnes per Year (if approved)	Assumed Start Year	Assumed End Year
Walker Environmental – Southwestern Landfill	Greenfield site	850,000	2022	2042
Terrapure – Stoney Creek	Expansion	750,000	2022	2035
W12A – City of London	Expansion	650,000*	2026	2040

*The 5-year average of IC&I waste landfilled at W12A was 16% which equates to approximately 105,000 tonnes of the total approved annual waste disposal rate.

4.0 IC&I Waste Disposal Purpose/Opportunity

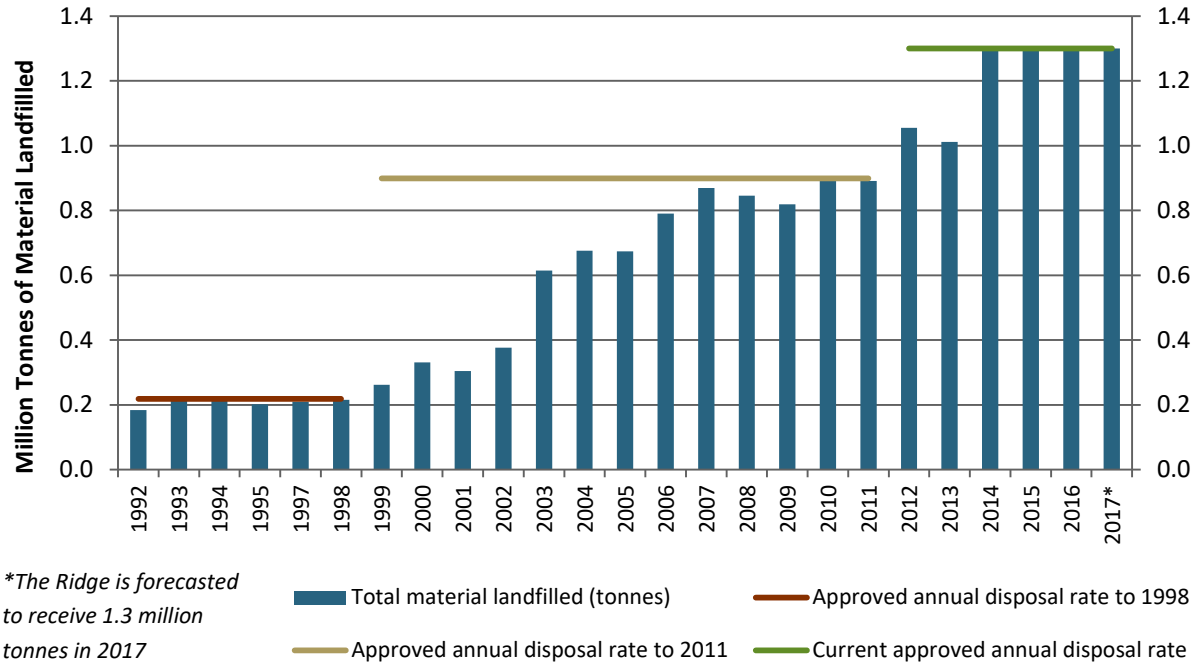
4.1 Rationale for Maintaining Approved Fill Rate

The Ridge has been in operation for over 50 years. For the first part of its life, the site was under the control of an individual owner. During that period, the Ridge functioned as a local disposal site for municipal and commercial waste.

In the early 1980s, the Ridge was acquired by Browning-Ferris Industries (BFI), whose primary business was providing integrated waste management services for IC&I waste. The Ridge began its transition at that time to what it is today - a site providing disposal services for residual IC&I waste collected and processed by an integrated waste management business, one that is now owned and operated by Waste Connections while retaining its long-standing history of providing vital waste disposal services for the host municipality of Chatham-Kent.

Figure 8 below sets out the history of annual waste receipts at the Ridge from 1992 to present. Up until 1999, the site operated on a relatively small scale, with annual waste limits of approximately 220,000 tonnes under the site's Certificate of Approval at that time. The Ridge was filled to its then-approved annual waste disposal rate throughout the 1990s.

FIGURE 8: HISTORICAL QUANTITIES LANDFILLED AT THE RIDGE (1992 – 2017*)



Following a successful EA approval in the late 1990s, the approved annual waste disposal rate of the site was increased to 899,000 tonnes per year. Annual waste receipts at the site grew steadily through the early 2000s so that the Ridge was again accepting waste at or about its approved annual waste disposal

rate each year by the end of the decade. By 2010, the Ridge was hitting its annual waste disposal rate and it became evident that a further increase in annual waste disposal rate at the site was required. In 2012, an Environmental Screening Process was completed to increase the annual waste disposal rate at the Ridge to 1.3 million tonnes per year. As ***Figure 8*** shows, in each year since 2013, the Ridge has effectively operated at its current approved annual disposal rate. The site is anticipated to again hit its annual waste disposal rate in 2017 for the fourth year in a row since receiving approval to operate at that fill rate.

In each year since 2013, Waste Connections has had to re-direct IC&I waste away from the Ridge in the fourth quarter of the year in order to avoid exceeding the site's annual waste disposal rate limit. Much of this waste is typically redirected across the border to Michigan and forms part of the over 2 million tonnes of Ontario IC&I waste disposed of in that state each year. As noted elsewhere in this SD #1, there is no assurance that the export of Ontario waste to the U.S. will continue as it does today during the 20-year planning period. The analysis in ***Section 4.0*** of this SD #1 demonstrates that even if the province achieves the new diversion targets set out in the MOECC's *Strategy for a Waste-Free Ontario,* the Ridge expansion will be required in order to manage the projected volume of residual IC&I wastes generated in the Ridge's service area during the 2022-2041 planning period examined in this EA.

Figure 8 shows that the Ridge has a consistent history of receiving all of the waste it is permitted to accept on an annual basis. On each of the two occasions in the last 20 years when its approved annual capacity has been increased after the EA Act Approval and completion of the Environmental Screening Process, annual waste receipts at the Ridge have quickly increased to the newly approved limits which demonstrates the competitive nature of the Ridge. As noted above and discussed further below, in recent years the company in fact has had to redirect waste that could otherwise have been disposed of at the Ridge in order to maintain compliance with the site's permitted annual capacity limits. With a growing population and economy, this will only continue.

Much of this waste is redirected across the US border to the Waste Connections facility, Brent Run Landfill in Michigan. In 2017, for example, some 375,000 tonnes of Ontario IC&I waste will be disposed of at the Brent Run Landfill. This waste could have been disposed of at the Ridge if it weren't for the current annual waste disposal rate restrictions at that site.

As discussed elsewhere in this SD#1, the Ridge disposes of a significant proportion (over 25%) of the IC&I waste generated annually in southern and central Ontario. The company has established a large and complex integrated collection, processing, transfer and disposal business in this area comprising some 18 separate facilities (including the Ridge) and over 50,000 containers.

The IC&I waste collection, processing and disposal business in Ontario typically operates on relatively short term contracts and is intensely competitive, to the benefit of the IC&I waste generators and the Ontario economy. Waste Connections employs a dedicated team of sales and marketing specialists, whose job it is to identify and secure new customers and retain existing ones. Service provider decisions by IC&I waste generator customers are typically and primarily price and service driven. Indicative of the fact that Waste Connections is highly service driven is its disposal of over 25% of waste in the service

area. Given that Waste Connections has already made the capital investments to build out its integrated facility network in the service area, the marginal cost in competing for customers' IC&I waste business is very low. If a service contract is lost, the company's sales force is generally easily able to replace that contract with a new customer using simple price competition. In this way, Waste Connections is able to maintain its market share in the service area. The mechanism of price competition, combined with the low marginal cost for the company to add new/replacement customers, results in a highly predictable share of the IC&I waste market in southern and central Ontario.

Waste Connections is therefore quite confident that there is a sustainable market opportunity to continue to dispose of 1.3 million tonnes of residual waste at the Ridge during the 2022-2041 planning period. The company has repeatedly over many years demonstrated its ability to maintain market share using its sales and marketing expertise and the extensive integrated network of facilities, equipment and personnel in the southern and central Ontario service area. In addition, there is a "flex" of some 375,000 tonnes of Ontario IC&I waste currently crossing the border to the Brent Run Landfill that could be repatriated to the Ridge as the success of commercial waste diversion initiatives ramps up over time in accordance with the *Strategy for a Waste-Free Ontario*.

While Waste Connections maintains this position they have also undertaken a third party, independent economic analysis to refute or support the position. This *Economic Analysis of the Market for IC&I Waste in Central and Southwestern Ontario* is provided in **Attachment C.**

4.2 Opportunity for the Ridge Landfill

Figure 9 illustrates the projected quantities of IC&I residual waste from the service area that will need to be managed through disposal under three scenarios: 1) assuming the new MOECC *Strategy for a Waste-Free Ontario* targets are achieved, 2) assuming that 75% of the MOECC diversion targets are achieved and 3) assuming that 50% of the MOECC diversion targets are achieved. The residual waste quantities are compared to the remaining annual waste disposal rate in the service area, the remaining plus planned facilities (as listed in ***Table 3***) excluding the Ridge and the remaining plus all planned facilities including the Ridge. With the addition of all proposed expanded or new facilities and MOECC's diversion targets are achieved, the estimated annual waste disposal rate rises to approximately 6 million tonnes in 2022, decreasing to 2.5 million tonnes in 2036 until the end of the planning period. Supporting data for ***Figure 9*** is provided in ***Attachment D***.

FIGURE 9: PROJECTED POST-DIVERSION IC&I RESIDUAL WASTE AND AVAILABLE PLUS PLANNED DISPOSAL RATES (2022-2041)

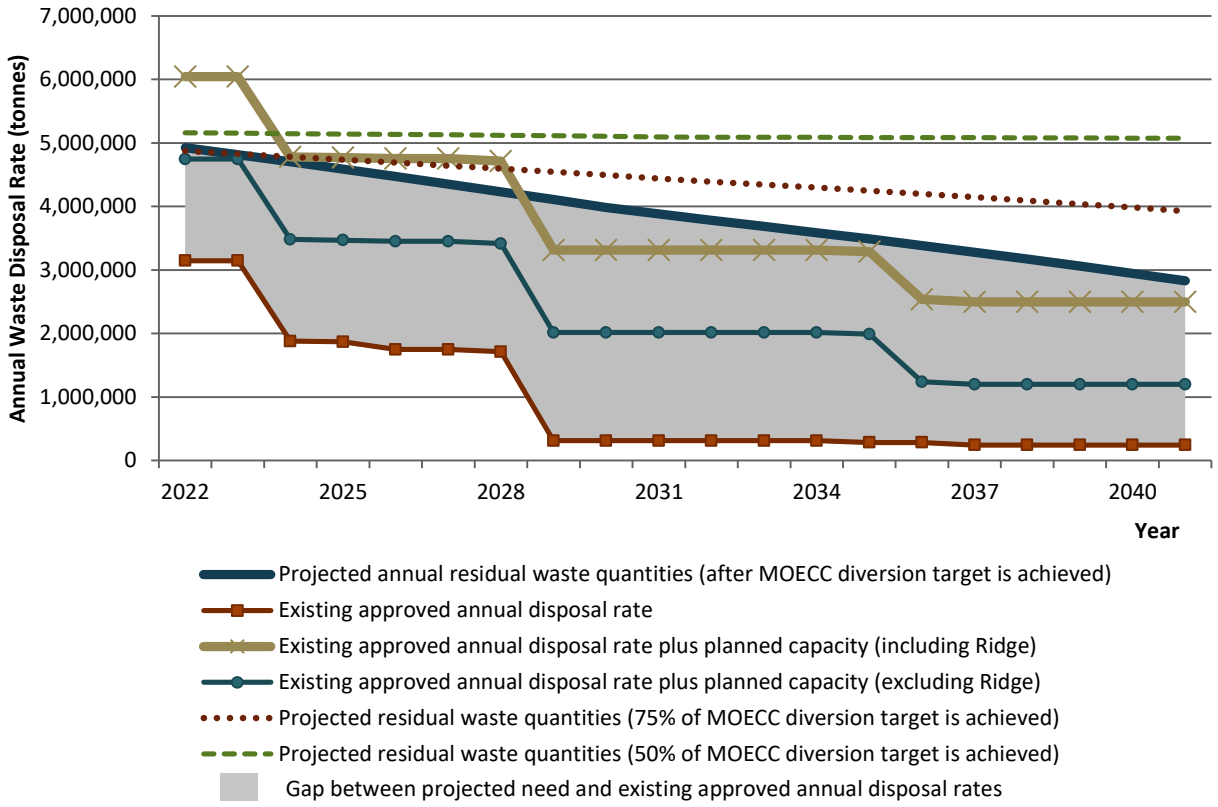


Figure 9 illustrates that with the Province meeting its diversion targets and all proposed facilities (including the Ridge) are approved and operational, there is an opportunity for the Ridge Landfill to continue to provide disposal capacity for IC&I waste for the service area over the 20-year planning period. It is noted that there is a surplus of capacity for the first two years of the 20-year planning period but that after 2024, the need closely matches the combined existing and proposed capacities in the service area. The need will only increase if the province is not successful in achieving the new diversion targets in the Strategy for a *Waste-Free Ontario*.

As outlined in ***Section 1.0*** of this SD #1, the Ridge is the endpoint of a large and complex network of almost 800 Waste Connections collection trucks, over 50,000 waste collection containers and 17 collection, processing and/or transfer facilities owned and operated by Waste Connections servicing over 30,000 customers and approximately 25% of the IC&I residual waste disposal market in southern and central Ontario. As noted, this is the largest integrated IC&I waste management business in southern and central Ontario.

Waste Connections (and its predecessors) has made very significant investments (in excess of a billion dollars) over many years in developing this integrated business. From a Waste Connections company-specific perspective, there is a clear opportunity as well as a desire, given the company's fiduciary

responsibilities to its stakeholders including its employees and shareholders, to continue to utilize these significant investments after 2021 to continue to service the IC&I waste market in southern and central Ontario. The company's assets and business, including the Ridge, have been carefully developed over decades and are, we submit, critical pieces of infrastructure for the Ontario economy.

Conversely, should the Ridge no longer be available to Waste Connections and its many thousands of IC&I waste customers in the service area, the company would be at a competitive disadvantage to Waste Management, the other company that operates an integrated commercial waste collection, recycling, transfer and disposal business in the service area, as Waste Management would be the sole company able to offer this integrated service. Collection and disposal prices would likely rise for those generators Waste Connections is able to maintain as Waste Connections would no longer be able to provide the same integrated collection, recycling and disposal service. In addition, the elimination of a facility (the Ridge) that supplies roughly 25% of Ontario IC&I waste disposal needs would also likely significantly lessen competition in the Ontario disposal market, with adverse disposal price consequences for Ontario generators and the Ontario economy.

The Ridge is also an existing operating site with a long history of excellent environmental performance and does not carry the risks and social controversy associated with attempting to establish a greenfield landfill.

Based on the analysis in this SD #1 it is demonstrated that there is a business opportunity for the Ridge landfill to continue to provide an annual waste disposal rate of 1.3 million tonnes for the management of residual IC&I waste during the planning period for this EA.

5.0 Residential Waste

Waste Connections is committed to continue to provide residential recycling and residual waste collection and disposal services to the host municipality of Chatham-Kent. Historical waste quantity data is provided in ***Table 4***.

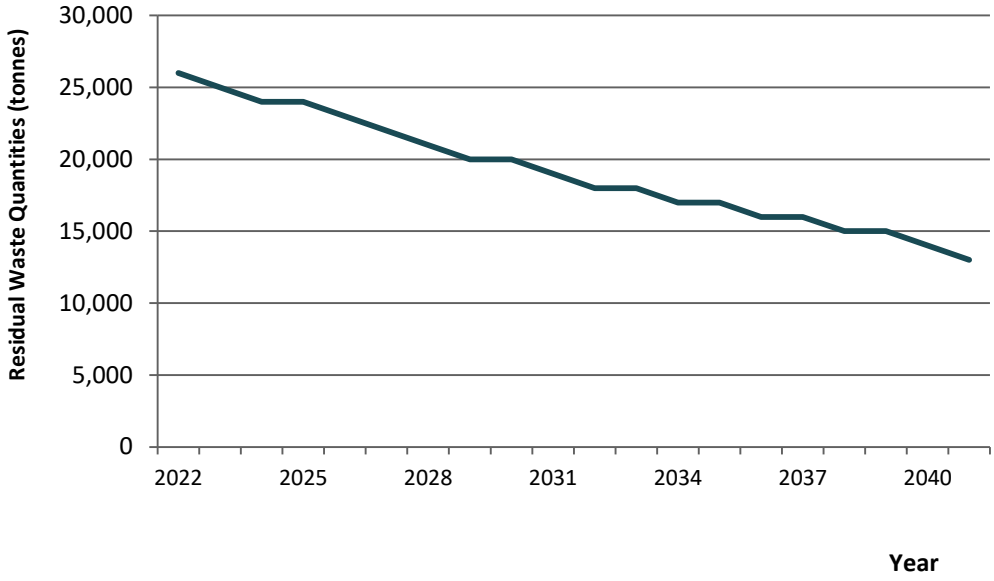
TABLE 4: HISTORICAL QUANTITIES OF RESIDENTIAL WASTE IN CHATHAM-KENT

Year	Reported Population	Total Residential Waste Generated (tonnes)	Total Residential Waste Diverted (tonnes)	Total Residential Waste Disposed (tonnes)	Total Residential Waste Diversion Rate (%)	Total Residential Waste Disposal Rate (%)
2015	103,671	45,241	16,046	29,195	35.5%	64.5%
2014	103,671	45,703	15,064	30,639	33.0%	67.0%
2013	103,671	47,389	16,640	30,749	35.1%	64.9%
2012	103,671	48,531	16,059	32,472	33.1%	66.9%
2011	108,192	48,981	15,728	33,253	32.1%	67.9%
2010	108,192	47,701	15,072	32,629	31.6%	68.4%
2009	108,192	50,736	16,502	34,234	32.5%	67.5%
2008	108,192	55,567	19,491	36,075	35.1%	64.9%
2007	109,554	54,124	15,597	38,527	28.8%	71.2%
2006	108,492	52,446	15,352	37,094	29.3%	70.7%

Source: RPRA Datacall.

Projections were completed to estimate the quantity of residual waste that would be generated by Chatham-Kent during the planning period. Using Ministry of Finance's population projections, Statistics Canada per capita waste disposal rate and MOECC's new diversion targets, the Ridge can expect to receive between 26,000 tonnes of residual waste in 2021 down to 13,000 tonnes of residual waste in 2041 from Chatham-Kent. This is illustrated in ***Figure 10*** with supporting data provided in ***Attachment E***.

FIGURE 10: RESIDUAL WASTE PROJECTION ESTIMATES FOR CHATHAM-KENT (2022 – 2041)



Attachment A

Data to Support IC&I Residual Waste Projections in Service Area

Waste Connections of Canada

Table A-1: Ontario-Wide Waste Projections Using MOECC Diversion Targets

(used to determine diversion rates to apply to service area of southern and central Ontario IC&I and Chatham-Kent)

Year No.	Year	Population and Employment		TOTAL WASTE GENERATED (tonnes)		DIVERSION RATE (%)			TOTAL WASTE DIVERTED (tonnes)		TOTAL RESIDUAL WASTE REQUIRING DISPOSAL (tonnes)		
		IC&I	Residential	IC&I	Residential	IC&I	Residential	Weighted Average	IC&I	Residential	IC&I	Residential	Total
	2010	**6,602,000**	**13,144,000**	**6,796,000**	**5,200,000**	**11%**	**38%**	**23%**	**753,000**	**1,996,000**	**6,043,000**	**3,204,000**	**9,247,000**
	2010 Average per Capita (kg)			**1,029**	**396**				**114**	**152**	**915**	**244**	
	2011	6,683,000	13,264,000	6,879,000	5,247,000	12%	39%	24%	817,000	2,035,000	6,062,000	3,212,000	9,274,000
	2012	6,769,000	13,401,000	6,968,000	5,302,000	13%	39%	24%	882,000	2,078,000	6,086,000	3,224,000	9,310,000
	2013	6,847,000	13,538,000	7,048,000	5,356,000	13%	40%	25%	948,000	2,120,000	6,100,000	3,236,000	9,336,000
	2014	6,885,000	13,661,000	7,087,000	5,405,000	14%	40%	25%	1,010,000	2,161,000	6,077,000	3,244,000	9,321,000
	2015	6,981,000	13,798,000	7,186,000	5,459,000	15%	40%	26%	1,081,000	2,205,000	6,105,000	3,254,000	9,359,000
	2016	7,079,000	13,949,000	7,287,000	5,518,000	16%	41%	27%	1,154,000	2,251,000	6,133,000	3,267,000	9,400,000
	2017	7,178,000	14,100,000	7,389,000	5,578,000	17%	41%	27%	1,228,000	2,298,000	6,161,000	3,280,000	9,441,000
	2018	7,250,000	14,233,000	7,463,000	5,631,000	17%	42%	28%	1,300,000	2,342,000	6,163,000	3,289,000	9,452,000
	2019	7,323,000	14,366,000	7,538,000	5,683,000	18%	42%	28%	1,373,000	2,387,000	6,165,000	3,296,000	9,461,000
	2020	7,396,000	14,499,000	7,613,000	5,736,000	**19%**	44%	**30%**	1,446,000	2,524,000	6,167,000	3,212,000	9,379,000
	2021	7,470,000	14,703,000	7,690,000	5,817,000	21%	46%	32%	1,638,000	2,653,000	6,052,000	3,164,000	9,216,000
1	2022	7,545,000	14,863,000	7,767,000	5,880,000	24%	47%	34%	1,833,000	2,775,000	5,934,000	3,105,000	9,039,000
2	2023	7,605,000	15,023,000	7,828,000	5,943,000	26%	49%	36%	2,027,000	2,900,000	5,801,000	3,043,000	8,844,000
3	2024	7,666,000	15,183,000	7,891,000	6,007,000	28%	50%	38%	2,225,000	3,028,000	5,666,000	2,979,000	8,645,000
4	2025	7,727,000	15,343,000	7,954,000	6,070,000	31%	52%	40%	2,426,000	3,156,000	5,528,000	2,914,000	8,442,000
5	2026	7,789,000	15,503,000	8,018,000	6,133,000	33%	54%	42%	2,630,000	3,287,000	5,388,000	2,846,000	8,234,000
6	2027	7,851,000	15,662,000	8,082,000	6,196,000	35%	55%	44%	2,837,000	3,420,000	5,245,000	2,776,000	8,021,000
7	2028	7,914,000	15,821,000	8,147,000	6,259,000	37%	57%	46%	3,047,000	3,555,000	5,100,000	2,704,000	7,804,000
8	2029	7,977,000	15,980,000	8,211,000	6,322,000	40%	58%	48%	3,260,000	3,692,000	4,951,000	2,630,000	7,581,000
9	2030	8,041,000	16,139,000	8,277,000	6,385,000	**42%**	**60%**	**50%**	3,476,000	3,831,000	4,801,000	2,554,000	7,355,000
10	2031	8,105,000	16,296,000	8,343,000	6,447,000	44%	61%	51%	3,663,000	3,933,000	4,680,000	2,514,000	7,194,000
11	2032	8,170,000	16,448,000	8,410,000	6,507,000	46%	62%	53%	3,852,000	4,034,000	4,558,000	2,473,000	7,031,000
12	2033	8,252,000	16,600,000	8,494,000	6,567,000	48%	63%	54%	4,052,000	4,137,000	4,442,000	2,430,000	6,872,000
13	2034	8,335,000	16,752,000	8,580,000	6,627,000	50%	64%	56%	4,256,000	4,241,000	4,324,000	2,386,000	6,710,000
14	2035	8,418,000	16,904,000	8,665,000	6,688,000	52%	65%	57%	4,462,000	4,347,000	4,203,000	2,341,000	6,544,000
15	2036	8,502,000	17,054,000	8,752,000	6,747,000	53%	66%	59%	4,674,000	4,453,000	4,078,000	2,294,000	6,372,000
16	2037	8,587,000	17,199,000	8,839,000	6,804,000	55%	67%	60%	4,888,000	4,559,000	3,951,000	2,245,000	6,196,000
17	2038	8,673,000	17,344,000	8,928,000	6,862,000	57%	68%	62%	5,107,000	4,666,000	3,821,000	2,196,000	6,017,000
18	2039	8,760,000	17,489,000	9,017,000	6,919,000	59%	69%	63%	5,329,000	4,774,000	3,688,000	2,145,000	5,833,000
19	2040	8,848,000	17,634,000	9,108,000	6,976,000	61%	70%	65%	5,556,000	4,883,000	3,552,000	2,093,000	5,645,000
20	2041	8,936,000	17,780,000	9,199,000	7,034,000	63%	71%	66%	5,786,000	4,994,000	3,413,000	2,040,000	5,453,000
	2042	9,025,000	17,953,000	9,290,000	7,103,000	65%	72%	68%	6,020,000	5,114,000	3,270,000	1,989,000	5,259,000
	2043	9,115,000	18,127,000	9,383,000	7,171,000	67%	73%	69%	6,258,000	5,235,000	3,125,000	1,936,000	5,061,000
	2044	9,206,000	18,303,000	9,477,000	7,241,000	69%	74%	71%	6,501,000	5,358,000	2,976,000	1,883,000	4,859,000
	2045	9,298,000	18,481,000	9,571,000	7,311,000	71%	75%	72%	6,748,000	5,483,000	2,823,000	1,828,000	4,651,000
	2046	9,391,000	18,661,000	9,667,000	7,383,000	72%	76%	74%	6,999,000	5,611,000	2,668,000	1,772,000	4,440,000
	2047	9,485,000	18,842,000	9,764,000	7,454,000	74%	77%	75%	7,255,000	5,740,000	2,509,000	1,714,000	4,223,000
	2048	9,580,000	19,025,000	9,862,000	7,527,000	76%	78%	77%	7,515,000	5,871,000	2,347,000	1,656,000	4,003,000
	2049	9,676,000	19,210,000	9,960,000	7,600,000	78%	79%	78%	7,779,000	6,004,000	2,181,000	1,596,000	3,777,000
	2050	9,773,000	19,397,000	10,060,000	7,674,000	**80%**	**80%**	**80%**	8,048,000	6,139,000	2,012,000	1,535,000	3,547,000

NOTES:

Generated #'s *: Based on 2010 Statistics Canada Waste Management Survey data.*

Diverted #'s *: The Strategy for a Waste-Free Ontario (Feb. 2017) sets overall diversion goals of 30% by 2020, 50% by 2030 and 80% by 2050*
Statistics Canada diversion rates to 2014

Disposal #'s *: Generated minus Diverted*

Table A-2: Projection Estimates for Primary Service Area (2010 to 2041)

Year No.	Year	Employment	TOTAL WASTE GENERATED (tonnes)	DIVERSION RATE (%)	TOTAL WASTE DIVERTED (tonnes)	TOTAL RESIDUAL WASTE REQUIRING DISPOSAL (tonnes)
	2010	**5,480,000**	**5,641,000**	**11%**	**625,000**	**5,016,000**
2010 Average per Capita (kg)			**1,029**		**114**	**915**
	2011	5,547,000	5,710,000	12%	678,000	5,032,000
	2012	5,618,000	5,783,000	13%	732,000	5,051,000
	2013	5,683,000	5,850,000	13%	787,000	5,063,000
	2014	5,715,000	5,883,000	14%	838,000	5,045,000
	2015	5,795,000	5,965,000	15%	897,000	5,068,000
	2016	5,876,000	6,048,000	16%	958,000	5,090,000
	2017	5,958,000	6,133,000	17%	1,020,000	5,113,000
	2018	6,018,000	6,195,000	17%	1,079,000	5,116,000
	2019	6,078,000	6,256,000	18%	1,139,000	5,117,000
	2020	6,139,000	6,319,000	19%	1,201,000	5,118,000
	2021	6,200,000	6,382,000	21%	1,359,000	5,023,000
1	2022	6,262,000	6,446,000	24%	1,521,000	4,925,000
2	2023	6,312,000	6,497,000	26%	1,683,000	4,814,000
3	2024	6,362,000	6,549,000	28%	1,847,000	4,702,000
4	2025	6,413,000	6,601,000	31%	2,013,000	4,588,000
5	2026	6,464,000	6,654,000	33%	2,183,000	4,471,000
6	2027	6,516,000	6,707,000	35%	2,354,000	4,353,000
7	2028	6,568,000	6,761,000	37%	2,529,000	4,232,000
8	2029	6,621,000	6,815,000	40%	2,706,000	4,109,000
9	2030	6,674,000	6,870,000	42%	2,885,000	3,985,000
10	2031	6,727,000	6,924,000	44%	3,040,000	3,884,000
11	2032	6,781,000	6,980,000	46%	3,197,000	3,783,000
12	2033	6,849,000	7,050,000	48%	3,363,000	3,687,000
13	2034	6,917,000	7,120,000	50%	3,532,000	3,588,000
14	2035	6,986,000	7,191,000	52%	3,703,000	3,488,000
15	2036	7,056,000	7,263,000	53%	3,878,000	3,385,000
16	2037	7,127,000	7,336,000	55%	4,057,000	3,279,000
17	2038	7,198,000	7,409,000	57%	4,238,000	3,171,000
18	2039	7,270,000	7,483,000	59%	4,422,000	3,061,000
19	2040	7,343,000	7,558,000	61%	4,610,000	2,948,000
20	2041	7,416,000	7,634,000	63%	4,802,000	2,832,000

NOTES:

Generated #'s *: Based on 2010 Statistics Canada Waste Management Survey data.*

Diverted #'s *: The Strategy for a Waste-Free Ontario (Feb. 2017) sets overall diversion goals of 30% by 2020, 50% by 2030 and 80% by 2050. Statistics Canada diversion rates to 2014*

Disposal #'s *: Generated minus Diverted*

Table A-3: Projection Estimates for Primary Service Area (2010 to 2041)
Sensitivity Analysis #1: Achieving 50% of MOECC's Diversion Target (40% by 2050)

Year No.	Year	IC&I Employment	TOTAL WASTE GENERATED (tonnes)	DIVERSION RATE (%)	TOTAL WASTE DIVERTED (tonnes)	TOTAL RESIDUAL WASTE REQUIRING DISPOSAL (tonnes)
	2010	**5,480,000**	**5,641,000**	**11%**	**625,000**	**5,016,000**
2010 Average per Capita (kg)			**1,029**		**114**	**915**
	2011	5,547,000	5,710,000	12%	678,000	5,032,000
	2012	5,618,000	5,783,000	13%	732,000	5,051,000
	2013	5,683,000	5,850,000	13%	787,000	5,063,000
	2014	5,715,000	5,883,000	14%	838,000	5,045,000
	2015	5,795,000	5,965,000	15%	893,000	5,072,000
	2016	5,876,000	6,048,000	16%	948,000	5,100,000
	2017	5,958,000	6,133,000	16%	1,005,000	5,128,000
	2018	6,018,000	6,195,000	17%	1,060,000	5,135,000
	2019	6,078,000	6,256,000	18%	1,115,000	5,141,000
	2020	6,139,000	6,319,000	19%	1,172,000	5,147,000
	2021	6,200,000	6,382,000	19%	1,229,000	5,153,000
1	2022	6,262,000	6,446,000	20%	1,287,000	5,159,000
2	2023	6,312,000	6,497,000	21%	1,344,000	5,153,000
3	2024	6,362,000	6,549,000	21%	1,402,000	5,147,000
4	2025	6,413,000	6,601,000	22%	1,460,000	5,141,000
5	2026	6,464,000	6,654,000	23%	1,519,000	5,135,000
6	2027	6,516,000	6,707,000	24%	1,579,000	5,128,000
7	2028	6,568,000	6,761,000	24%	1,640,000	5,121,000
8	2029	6,621,000	6,815,000	25%	1,702,000	5,113,000
9	2030	6,674,000	6,870,000	26%	1,765,000	5,105,000
10	2031	6,727,000	6,924,000	26%	1,829,000	5,095,000
11	2032	6,781,000	6,980,000	27%	1,893,000	5,087,000
12	2033	6,849,000	7,050,000	28%	1,963,000	5,087,000
13	2034	6,917,000	7,120,000	29%	2,033,000	5,087,000
14	2035	6,986,000	7,191,000	29%	2,105,000	5,086,000
15	2036	7,056,000	7,263,000	30%	2,178,000	5,085,000
16	2037	7,127,000	7,336,000	31%	2,252,000	5,084,000
17	2038	7,198,000	7,409,000	31%	2,328,000	5,081,000
18	2039	7,270,000	7,483,000	32%	2,404,000	5,079,000
19	2040	7,343,000	7,558,000	33%	2,483,000	5,075,000
20	2041	7,416,000	7,634,000	34%	2,562,000	5,072,000

NOTES:
Generated #'s *: Based on 2010 Statistics Canada Waste Management Survey data.*
Diverted #'s *: Based on achieving 50% of the diversion targets set out in The Strategy for a Waste-Free Ontario. Statistics Canada diversion rates to 2014*
Disposal #'s *: Generated minus Diverted*

Table A-4: Projection Estimates for Primary Service Area (2010 to 2041)
Sensitivity Analysis #2: Achieving 75% of MOECC's Diversion Target (60% by 2050)

Year No.	Year	IC&I Employment	TOTAL WASTE GENERATED (tonnes)	DIVERSION RATE (%)	TOTAL WASTE DIVERTED (tonnes)	TOTAL RESIDUAL WASTE REQUIRING DISPOSAL (tonnes)
	2010	**5,480,000**	**5,641,000**	**11%**	**625,000**	**5,016,000**
2010 Average per Capita (kg)			**1,029**		**114**	**915**
	2011	5,547,000	5,710,000	12%	678,000	5,032,000
	2012	5,618,000	5,783,000	13%	732,000	5,051,000
	2013	5,683,000	5,850,000	13%	787,000	5,063,000
	2014	5,715,000	5,883,000	14%	838,000	5,045,000
	2015	5,795,000	5,965,000	16%	926,000	5,039,000
	2016	5,876,000	6,048,000	17%	1,015,000	5,033,000
	2017	5,958,000	6,133,000	18%	1,108,000	5,025,000
	2018	6,018,000	6,195,000	19%	1,198,000	4,997,000
	2019	6,078,000	6,256,000	21%	1,289,000	4,967,000
	2020	6,139,000	6,319,000	22%	1,382,000	4,937,000
	2021	6,200,000	6,382,000	23%	1,477,000	4,905,000
1	2022	6,262,000	6,446,000	24%	1,574,000	4,872,000
2	2023	6,312,000	6,497,000	26%	1,669,000	4,828,000
3	2024	6,362,000	6,549,000	27%	1,765,000	4,784,000
4	2025	6,413,000	6,601,000	28%	1,863,000	4,738,000
5	2026	6,464,000	6,654,000	29%	1,963,000	4,691,000
6	2027	6,516,000	6,707,000	31%	2,064,000	4,643,000
7	2028	6,568,000	6,761,000	32%	2,166,000	4,595,000
8	2029	6,621,000	6,815,000	33%	2,270,000	4,545,000
9	2030	6,674,000	6,870,000	35%	2,376,000	4,494,000
10	2031	6,727,000	6,924,000	36%	2,482,000	4,442,000
11	2032	6,781,000	6,980,000	37%	2,591,000	4,389,000
12	2033	6,849,000	7,050,000	38%	2,707,000	4,343,000
13	2034	6,917,000	7,120,000	40%	2,824,000	4,296,000
14	2035	6,986,000	7,191,000	41%	2,944,000	4,247,000
15	2036	7,056,000	7,263,000	42%	3,066,000	4,197,000
16	2037	7,127,000	7,336,000	43%	3,190,000	4,146,000
17	2038	7,198,000	7,409,000	45%	3,315,000	4,094,000
18	2039	7,270,000	7,483,000	46%	3,444,000	4,039,000
19	2040	7,343,000	7,558,000	47%	3,574,000	3,984,000
20	2041	7,416,000	7,634,000	49%	3,707,000	3,927,000

NOTES:
Generated #'s *: Based on 2010 Statistics Canada Waste Management Survey data.*
Diverted #'s *: Based on achieving 75% of the diversion targets set out in The Strategy for a Waste-Free Ontari Statistics Canada diversion rates to 2014*
Disposal #'s *: Generated minus Diverted*

Attachment B

Data to Support Remaining Capacities of Existing Disposal Sites

Waste Connections of Canada

Table B-1: Data Provided by MOECC in December 2017

CLIENT_NAME	SITE_NAME	SITE_MUNICIPALITY	TOTAL_APPROVED_CAPACITY (CUBIC METERS)	APPROVED_ FILL_RATE	ERC_DATE_LAST_DETERMINED	ERC_ESTIMATED_VOLUME (CUBIC METERS)
Waste Management of Canada	Twin Creeks Landfill Site	Warwick	26,508,000	1400000 Tonnes Per Year	2014-07-07	21,805,237
Waste Connections of Canada	Ridge Landfill	Chatham-Kent	21,000,000	1300000 Tonnes Per Year	2015-12-31	8,979,525
The Corporation of the City of Brantford	Mohawk Street - Brantford	Brantford	19,000,000		2016-04-01	8,484,975
Niagara Waste Systems Limited	Niagara Waste Systems Limited Walker South Landfill	Niagara Falls	17,700,000	1100000 Tonnes Per Year	2015-12-31	12,432,121
City of Toronto	Green Lane - St. Thomas	Southwold	16,750,000	1100000 Tonnes Per Year	2015-03-01	11,147,064
The Regional Municipality of Waterloo	Waterloo Landfill Site	Waterloo	14,772,120	1350 Tonnes Per Day	2014-12-31	6,626,855
Corporation of the City of London	W12A - London	London	13,800,000	600000 Tonnes Per Year	2015-03-24	3,467,000
City of Hamilton	Glanbrook - Hamilton	Hamilton	13,258,000	1814 Tonnes Per Week	2014-12-31	6,262,935
Essex - Windsor Solid Waste Authority	EWSWA Regional Landfill - Essex	Essex	12,800,000	275000 Tonnes Per Year	2014-12-31	7,600,000
Regional Municipality of Halton	Halton Waste Management Site	Milton	7,960,000	900 Tonnes Per Day	2015-01-01	4,891,146
Terrapure	Stoney Creek Landfill	Hamilton	6,320,000	750000 Tonnes Per Year	2015-01-01	1,200,000
The County of Oxford	Salford Landfill; Oxford County Waste Management Facility	South-West Oxford	5,905,200		2014-12-31	3,124,868
City of Stratford	Stratford - Stratford	Perth	5,282,900		2015-05-01	1,802,956
Waste Management of Canada	Petrolia Landfill	Petrolia	4,749,000	365000 Tonnes Per Year	2014-06-04	528,879
The Corporation of the City of Peterborough	Bensfort Road - Peterborough	Otonabee-South Monaghan	4,445,000	85000 Tonnes Per Year	2015-01-05	1,350,402
The Corporation of the City of Barrie	Sandy Hollow Landfill	Barrie	3,924,746		2014-12-22	1,135,476
City of Kawartha Lakes	Lindsay-Ops - Kawartha Lakes	Kawartha Lakes	2,340,000	58200 Tonnes Per Year	2015-04-29	917,063
Walker Environmental Group Inc. (Formerly IMS Inc)	Atlas Landfill	Welland	2,207,000	5000 Tonnes Per Day	2016-03-30	547,385
The Regional Municipality of Niagara	Niagara Road 12 - Niagara Region	West Lincoln	1,851,000		2016-02-23	1,059,118
Regional Municipality of Niagara	Humberstone - Niagara Region	Welland	2,400,000	700 Tonnes Per Day		2,400,000

Table B-2: Estimated Capacity Remaining Based on Approved Waste Disposal Rates in Last Reporting Year

% IC&I landfilled at municipal sites (weighted average) 15.0%

Waste Disposal Facility	Estimated Remaining Capacity in Reporting Year (m^3)	Reporting Year	Approved Annual Waste Disposal Rate (tonnes / year)	Assumed Density (tonnes / m^3)*	Estimated Year of Closure	Estimated Years of Capacity Remaining	Comments	Municipal Approved Capacity for ICI Waste
Durham York Energy Centre	-	-	140,000	N/A	-	-	Assumed to be operational throughout planning period	21,000
Emerald Energy from Waste inc.	-	-	182,500	N/A	-	-	Assumed to be operational throughout planning period	
Halton Regional Landfill	4,891,146	2014	234,000	0.7	**2029**	15		35,100
Waterloo Landfill	6,626,855	2014	421,200	0.7	**2025**	11	ICI accounts for 48% of annual airspace consumed.	63,200
Niagara - South Landfill	12,432,121	2015	1,100,000	0.7	**2023**	8		
Terrapure Stoney Creek Landfill	1,200,000	2014	750,000	0.7	2015	1		
Glanbrook - Hamilton	6,262,935	2014	94,328	0.8	**2067**	53		14,100
Humberstone - Niagara Region	2,400,000	2018	182,000	0.8	**2029**	*11*	Received expansion approval in 2016. Assumed start in expansion area will be in 2018.	27,300
Mohawk Street - Brantford	8,484,975	2015	176,059	0.7	**2049**	34		26,400
Tom Howe- Haldiman	205,000	2011	130,000	0.7	2012	1	Source for remaining capacity taken from MOECC large landfill database.	
Salford - Oxford County	3,124,868	2014	116,000	0.75	**2034**	20		17,400
W12A - London	3,467,000	2014	600,000	0.8	2019	5	W12A 5-year average of ICI waste landfilled is 16%.	
Green Lane Landfill	11,147,064	2014	1,100,000	0.9	**2023**	9	Proporation of ICI received in 2016 was 8%.	165,000
Twin Creeks - Lambton	21,805,237	2014	1,400,000	0.85	**2028**	13	Assumed 750,000 tpy from 2014 through 2017 and 1.4 million from 2018 on.	
Petrolia - Lambton	528,879	2014	365,000	0.7	2015	1		
Ridge Landfill	6,534,758	2016	1,300,000	0.9	**2021**	5		

Table B-2: Estimated Capacity Remaining Based on Approved Waste Disposal Rates in Last Reporting Year

% IC&I landfilled at municipal sites (weighted average) 15.0%

Waste Disposal Facility	Estimated Remaining Capacity in Reporting Year (m^3)	Reporting Year	Approved Annual Waste Disposal Rate (tonnes / year)	Assumed Density (tonnes / m^3)*	Estimated Year of Closure	Estimated Years of Capacity Remaining	Comments	Municipal Approved Capacity for ICI Waste
Barrie Landfill (Sandy Hollow)	1,135,476	2014	81,000	0.7	**2024**	10		12,200
Bensfort Road - Peterborough	1,350,402	2014	85,000	0.7	**2025**	11		12,800
Stratford	1,802,956	2014	60,000	0.7	**2035**	21	No data available on Approved Annual Fill Rate so assumption made.	9,000
Lindsay-Ops	917,063	2014	58,200	0.7	**2025**	11		8,700
Niagara - Regional Road 12	1,059,118	2015	60,000	0.7	**2027**	12	No data available on Approved Annual Fill Rate so assumption made.	9,000
EWSWA Regional Landfill	7,600,000	2014	275,000	0.8	**2036**	22		41,300

**Densities taken from publically available sources, directly from contacted operators or a default conservative density was used when site-specific data was not available.*

Attachment C

Economic Analysis of the Market for IC&I Waste in Central and Southwestern Ontario

AN ECONOMIC ANALYSIS OF THE MARKET FOR IC&I WASTE IN CENTRAL AND SOUTHWESTERN ONTARIO

By:
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December 14, 2017

***Professor Emeritus of Economics, University of Toronto**

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TABLES

1. INTRODUCTION

Waste Connections is proposing to maintain the current annual fill rate of 1.3 million tonnes over a 20-year planning period for Ridge Landfill (the Ridge). This study examines the supply and demand for IC&I waste for the market in Central and South Western Ontario and also examines the economic impact on the Ontario economy of maintaining this annual fill rate of 1.3 million tonnes. This study relies on the results of a previous study of the Ridge: *BFI Ridge Landfill Expansion EA Impact Assessment -Appendix Q -The Waste Management Opportunity* dated December 1996. It should be noted that any forecast over the next 20 or 25 years is bound to be speculative.

2. DEMAND FOR WASTE DISPOSAL SERVICES FOR NEXT 20 OR 25 YEARS

Waste generation is a by-product of economic activity, and as the Ontario economy grows faster than Canada's and those of all other G7 nations for the past three years according to the 2017 Ontario Outlook and Fiscal Review, so will Ontario's waste generation. Before taking into account diversion, I assume waste volumes will grow in line with the Ontario's economy, and for simplicity, I assume that the growth in real GDP in Central and Southwestern Ontario will be equal to the growth in real GDP for the entire Ontario economy. The waste generated for the IC&I sector for Southern and Central Ontario was 5.641 million tonnes in 2010.[1] In Table 1, I start with the actual waste generated in 2010 and assume that the waste generated will increase to 2016 at the same rate of increase as the actual rate of increase of real GDP in the Ontario economy from 2010 to 2016 of 11.6%. For 2016, I assume a diversion rate of 15%. The Ministry of Finance of the Ontario Government forecasts an annual real GDP growth of 2.1 percent between 2016 and 2040. I use this estimate of future growth to project the volume of waste generated for 2030 and 2040.

TABLE 1: FORECAST OF WASTE GENERATED IN THE IC&I SECTOR OF CENTRAL AND SOUTHWESTERN ONTARIO (MILLIONS OF TONNES)

YEAR	WASTE	DIVERSION RATE SCENARIO 1	DIVERSION RATE SCENARIO 2	RESIDUAL WASTE SCENARIO 1	RESIDUAL WASTE SCENARIO 2
2010	5.641				
2016	6.295			5.351	5.351
2030	8.421	25%	50%	6.316	4.211
2040	10.366	32.5%	65%	6.997	3.628

The most difficult variable to estimate for the next 25 years is the diversion rate for the IC&I sector. The diversion rate for the IC&I sector is about 15% for 2014. Given the proprietary nature of data for the IC&I sector, it is difficult for Statistics Canada to obtain reliable estimates of diversion rates in the IC&I sector. Statistics Canada estimates for 2014, a 37% residential diversion rate and a 15% non-residual diversion rates; for a total diversion rate of 25%. The

[1]This number is derived from Statistics Canada, *2010 Waste Management Industry Survey: Business and Government Sectors*.

Strategy for a Waste-Free Ontario diversion targets are 50% for 2030 and 80% for 2050. From these targets, I would estimate a *Waste-Free Ontario* target of 65% (½ x (50% +80%) for 2040. I consider two diversion rate scenarios.

2.1 Scenario 1 - Achievement of 50% of Strategy for a Waste-Free Ontario Targets

In this Scenario, I assume a target diversion rate of 25% (50%x 50%) for 2030 and 32.5% (50%x 65%) for 2040. Given the much higher actual diversion rates for the residential sector over the IC&I sector, it will be more difficult for the IC&I sector to reach the Strategy for a Waste Free Ontario goals. Based on the performance of various past programs aimed at the sector, Appendix Q of the 1996 EA study noted various government programs and forces which would lead to an increase in diversion rates. On page 14 of Appendix Q it is stated that "…[b]oth these factors leading to reductions in the IC&I waste being produced were identified and discussed in detail in the GTA Reports. Therefore for the purposes of this study, a 40% diversion rate is believed to be a reasonable estimate for planning purposes. As with the disposable opportunity analysis, the 40% diversion rate is estimated for the year 2011". The actual diversion rate for the IC&I sector for 2011 was 12%. In 1996, Appendix Q overestimated the future diversion rates and by extension underestimated the future disposal rates at the time. The results of Appendix Q would have changed dramatically if a lower (12%) diversion rate were used instead of a 40% diversion rate.

With the diversion rate of 25% for 2030 (which is more than double the actual diversion rate in 2012), the total residual IC&I waste market is 6.316 million tonnes for 2030 and with a diversion rate of 32.5% for 2040, the total residual IC&I waste market is 6.997 million tonnes. Given the 2016 residual IC&I waste landfill disposal rate to handle 5.351 million tonnes a year (see Table 1), under Scenario 1, there is an excess demand for disposal capacity in the IC&I sector. It should be noted that the 5.351 figure is a status quo figure. It assumes no reduction and no additions to available landfill capacities.

2.2 Scenario 2 - 100% Achievement of Strategy for a Waste- Free Ontario Targets

In this scenario, I assume a target diversion rate of 50% for 2030 and 65% for 2040. This scenario assumes that the Strategy for a Waste Free Ontario targets are fully achieved. In this scenario, there will be a demand for residual IC&I waste landfill services of 4.211 million tonnes per year in 2030 and 3.628 million tonnes per year in 2040. With the addition of all proposed expanded or new facilities and MOECC's diversion targets are achieved, the estimated annual waste disposal rate rises to approximately 6 million tonnes in 2022, decreasing to 2.5 million tonnes in 2036 until the end of the planning period.[1]

Taking into account the estimated changes in supply of landfill facilities, also under Scenario 2 there is still an excess demand for disposal facilities. In Scenario 2, there is still an excess demand for disposal facilities even with 100% achievement in *Waste-Free Ontario* diversion

[1] *Data as of 2015 was obtained from MOECC received through email to Waste Connections in December 2017. It should be noted that there are three landfills in the service area that are undergoing an EA process (W12A London, Southwestern Landfill - Walker, Terrapure Stoney Creek). My estimates were based on the MOECC 2015 data plus the 3 expansions/new sites underway.*

targets.

3. DEMAND FOR DISPOSAL SERVICES AT THE RIDGE

The previous section provided the macro analysis, which showed that over the next 20 or 25 years there will be a situation where total demand for waste disposal services will exceed the total supply of landfill services to dispose of the available waste. This section examines the microeconomic situation of whether the Ridge is sufficiently competitive to be able to supply its ask of 1.3 million tonnes per year. I believe that there is overwhelming evidence that the Ridge will be able to successfully compete in the IC&I waste market of Central and Southwestern Ontario and fulfill and maintain its annual waste disposal rate of 1.3 million tonnes.

3.1 Results of Appendix Q in the 1996 Study

The question of the ability of the Ridge to compete in the waste market by fulfilling and maintaining all of its permitted annual waste disposal rate was first addressed in the 1996 study. This comprehensive study completed a "least cost" approach and estimated "the tonnage of waste that should be attracted to the Ridge site based solely on the estimated costs to existing and potential IC&I customers from Southern Ontario of hauling and disposing of their waste at Ridge, versus hauling and disposing of their waste at Ridge's competitors." On page 31 of the report it is concluded that ...[b]ased on least cost analysis alone, it appears approximately 1,215,000 tonnes of IC&I waste will be the maximum reasonable amount available for disposal at the Ridge Landfill site."

In my opinion, the data shows that the relative cost of hauling and disposing of waste at the Ridge versus the cost of hauling and disposing of waste at Ridge's competitor is approximately the same today and it was when the 1996 study was completed. [2] As such, in my opinion, the data shows that the 'least cost approach' in Appendix Q is valid today. Of the 16 sites listed in Appendix Q, 7 are now closed leaving 9 sites from the Appendix Q's list. Currently the Ridge competes successfully with the disposal sites in its market area, and does so at an intake of 1.3 million tonnes annually.

When Appendix Q was written the Ridge operated on a relatively small scale of approximately 220,000 tonnes. Today the Ridge has an annual waste disposal rate of 1.3 million tonnes and almost 98% of these 1.3 million tonnes of residual waste disposed of annually comes from the IC&I sector. The relevant market for the Ridge is residual waste from the IC&I sector. Today there are only five landfill sites with an annual fill rate of 100,000 tonnes or more that compete in the market for IC&I waste and these landfill sites are Walker Environmental-South Landfill, Terrapure-Stoney Creek Landfill, Waste Management-Petrolia, Waste Management-Twin

[2] *I assume in my analysis that the relative costs of operating the landfill site at the Ridge versus operating the landfill sites at the competitors of the Ridge has not changed since 1996. Given the substantial increase in capacity at the Ridge that has taken place since 1996 and given the economies of scale in operating landfill sites, then it is likely that the competitiveness of the Ridge may have increased since 1996. This increase in competitiveness will only apply with respect to competitors who have not experienced a similar increase in annual capacity.*

Creeks and the Ridge. All five sites existed when Appendix Q was written. Of the five sites, two are estimated to be near or at currently approved capacity; Terrapure-Stoney Creek and Petrolia.

From the original sites that competed with the Ridge in 1996, there are now only two private sector sites other than the Ridge permitted to accept putrescible waste from the IC&I sector; Walker South Landfill and Twin Creeks operated by Waste Management.[3]

These two major competitors to the Ridge existed in 1996 when Appendix Q was written. The prime cost of hauling waste is the cost of trucks/transportation, the cost of labour and the cost of fuel. Since the competitors of today existed in 1996, then the basic geographical distances from the collection from these waste sites to the disposal at the major landfills has not significantly changed. The major change is the price of fuel. Statistics Canada shows a price of gasoline of 56.1 cents a litre in Toronto in 1996.[4] Today the price of fuel is about 105 cents a litre in Toronto. After adjusting for inflation the real price of fuel has increased by about 27.5%. Counteracting this increase in the price of fuel, has been an increase in fuel efficiency for motor vehicles. It is difficult to get fuel efficiency data for the type of trucks used in the waste disposal industry however the U.S. Department of Transportation estimated that fuel efficiency of light trucks increased by 26.4% from 1996 to 2014. [5] With fuel efficiency increasing by approximately the same rate as the increase in the price of gasoline, the real fuel cost per kilometre of hauling waste is approximately the same today as it was in 1996. This analysis indicates that the main results of the least cost analysis in Appendix Q are as valid today as it was in 1996.

The main results of this comprehensive analysis are valid today. As such, the maximum reasonable amount of 1.215 million tonnes will simply have to be adjusted by the growth in the size of the market that has taken place since 2011.[6] The growth of the market from 2011 to 2030 (the mid-point of the planning period) will take this 1.215 million tonnes figures well over the 1.3 million tonnes figure that Waste Connections is proposing for the Ridge.

The 1996 study showed that the Ridge was in a favorable geographical location to successfully compete with the competitors of the Ridge. The 1996 study supports the proposition that the Ridge will in the planning period be able to fulfill and maintain all of its proposed intake waste disposal rate of 1.3 million tonnes per year.

3.2 Implications of Current Data

In 2012 the permitted annual waste disposal rate of the Ridge was increased to 1.3 million tonnes. In 2014, 2015 and 2016 the Ridge was successful in accepting 1.3 million tonnes in each year and is on target to do the same in 2017. During my research it was revealed that in the fourth quarter of each year since 2014, Waste Connections has had to re-direct IC&I waste away from the Ridge in order to avoid exceeding the site's annual waste fill limits. The 1996 study by its very nature had to be speculative in forecasting the future. That study was done for a business

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[3] *It is estimated that about 15% of waste received by public sector sites is from the IC&I sector.*
[4] *See Statistics Canada, CANSIM TABLE #326-0009.*
[5] *See US Department of Transportation, Highway Statistics*
[6] *It should be noted that this 1.215 million tonnes figure was estimated assuming a diversion rate of 40%.*

that did not exist at the time. To a large extent we know what happened in that future. The actual historical data shows that the Ridge was a very successful competitor and could have supplied even more than the 1.3 million tonnes annual waste disposal rate.

In 2017 about 375,000 tonnes of Ontario's IC&I waste will be disposed of at the Brent Run facility in Michigan operated by Waste Connections. This waste could and would likely have been disposed of at the Ridge but for the current annual waste disposal rate restrictions at that site. In addition to Brent Run there are approximately 2.625 million tonnes of Ontario waste being disposed of at other US landfills annually (for a total of about 3 million tonnes annually). This waste should/would also be disposed of in Ontario if sufficient capacity existed. It also should be noted that it has become more costly to get across the Canada-US border. In addition, the actual experience for the last four years shows that there is an excess demand for waste disposal at the Ridge and that but for the current annual waste disposal rate restrictions, the Ridge could have disposed of IC&I waste significantly above the current annual waste disposal rate of 1.3 million tonnes.

If the commercial waste diversion initiatives of the *Strategy for a Waste-Free Ontario* becomes more successful over time then there is the possibility of the repatriation of some or all of the approximate 3 million tonnes of Ontario IC&I waste currently going to the US. This fact alone almost guarantees that the Ridge will be able to fulfill and maintain all of the 1.3 million tonnes annual waste disposal rate.

The geographical advantage and management efficiency at the Ridge shows that the Ridge has been a successful competitor and will continue to be a successful competitor over the planning period and will be able to supply all of its 1.3 million tonnes of the annual waste disposal rate.

4. ECONOMIC BENEFITS OF MAINTAINING THE RIDGE AT ITS CURRENT PERMITTED WASTE DISPOSAL RATE

Waste Connections employs 1400 people in Ontario and currently spends about $84 million dollars in labour expenses and about $154 million in other vendor expenses annually. Additionally, Waste Connections reinvests substantial amounts of capital into its business on an annual basis to purchase trucks and other investment equipment to construct and expand facilities it owns and operates in the Province. The Ridge is an important landfill site for Waste Connections representing about 25% of the market in Central and Southwestern Ontario with over 200 trucks per day are inbound to the Ridge site. These trucks use local restaurants, purchase fuel locally, employ Ontarians and the facility contributes significantly in taxes and royalties to local governments and communities.

If the Ridge's annual waste disposal rate is maintained at the current level of 1.3 million tonnes, the Ridge's contribution to the Ontario economy will continue. If the Ridge's annual waste disposal rate is maintained Waste Connections has plans to build a gas plant and become a reliable source of renewable gas for decades to come. The gas plant also plays an important role in meeting the objectives of the Province's *Climate Change Action Plan* in the generation of renewable natural gas at the Ridge. The gas plant will cost about $40 million dollars to build. If the Ridge's capacity is eliminated, this gas plant could possibly be built but it would have to be

built on a smaller scale. With economies of scale in the operation of gas plants, a smaller scale plant will have higher per unit costs. Elimination of the Ridge's annual capacity will change the economics of building a gas plant and as such, decrease the likelihood that this gas plant will be built.

Waste Connections has experience in building and operating gas plants. Waste Connections invested over $40 million at the Lachenaie landfill site in Quebec, creating Canada's largest biogas-to-vehicle-fuel-quality project. That site produces enough renewable natural gas to fuel 1,500 trucks over 20 years, offsetting nearly 100,000 tonnes CO2e annually. The site has a similar annual waste disposal rate as the Ridge receiving over 1.2 million tonnes of waste, including food waste, from MSW and IC&I sources. To capture the methane produced from this waste Lachenaie invests over $2 million per year, and has achieved an impressive landfill gas capture efficiency rate above 93%. Lachenaie's 50 or more employees also oversee a variety of yard waste recovery operations while having a positive effect on the local economy. If the Ridge's capacity is maintained and if the gas plant is built, there should be additional positive economic effects on the local Southwestern and Central Ontario.

A gas plant at the Ridge will pay an additional $85,000 a year in local taxes. Currently the Ridge pays just under $350,000 in local taxes. The Ridge paid an annual royalty payment to Chatham-Kent of $2.6 million in 2016 in addition to significant contributions that are made to the Ridge Landfill Trust, which in 2016 were approximately $1.1 million dollars. Waste Connections also provides incentives to Chatham-Kent to reduce the amount of waste residuals delivered to the Ridge with payments averaging over $1.2 million per year. In total, the Ridge contributes over $5 million a year to the local government.

In addition to the above payments, The Ridge also generates direct and indirect benefits to the local community; salaries, goods and services, purchased services, local roads maintenance etc., which amounts to $9 million per year. Furthermore, the expansion of the Ridge capacity and the building of a gas plant will help stimulate the local economy and provide additional environmental benefits to Ontario by recapturing of gas that is currently flared off.

The Ridge services 25% of the disposal capacity of the Southwestern and Central Ontario market. If the Ridge is closed then competition in this market will be significantly reduced. The only other fully integrated provider is Waste Management and if Waste Connections no longer accepted waste at the Ridge, Waste Management will become a monopolist in this market.[7] Monopoly almost always results in higher prices and eliminating the competition from the Ridge will increase the costs of waste disposal in the IC&I sector in Central and Southwestern Ontario. Increasing the cost of doing business will result in a reduction in economic activity in the IC&I sector throughout Central and Southwestern Ontario.

[7] *Even if competition from Walker South Landfill is considered the elimination of the Ridge will leave only two competitors for IC&I waste resulting in a duopoly. Reduction in the number of competitors from 3 to 2 also represents a substantial reduction in competition.*

5. CONCLUSIONS

The data shows that if all of the *Strategy for a Waste Free Ontario* diversion rates for the Ontario IC&I sector are achieved then the Ridge will still be able to successfully supply all of its annual waste disposal rate (i.e., 1.3 million tonnes). If any of the assumptions used in this report turn out to be incorrect, I believe the main conclusions of this report will still hold. Due to the fact that currently around 375,000 tonnes of waste go annually from Ontario to the Brent Run facility in Michigan, as well as about 2.625 million tonnes of Ontario waste being disposed annually at other US landfills (for a total of about 3 million tonnes annually), this provides robustness to the conclusion. For example, if the government is even more successful in diverting IC&I waste, the Ridge will still be able to fulfill and maintain its annual waste disposal rate of 1.3 million tonnes by the diversion to the Ridge, of waste that now goes to the US. This would result in a reduction of trucks to the US further reducing GHG emissions.

If the annual waste disposal rate of the Ridge is renewed the Ridge will continue to be a positive influence on the Ontario economy and if the gas plant is built at the Ridge, this landfill site will have an even more stimulating impact on the Ontario economy.

Attachment D

Data to Support Remaining and Planned Capacities over the Planning Period

Table D-1: Data to Support Remaining and Planned Annual Disposal Rates over the Planning Period

Year	Projected Post-Diversion Residual Waste Quantities* (tonnes)	Existing Approved Annual Waste Disposal Rate (tonnes)	Proposed Annual Waste Disposal Rate for Planned Facilities** (tonnes)	Existing Approved Plus Planned Annual Waste Disposal Rates (excluding Ridge) (tonnes)	Existing Approved Plus Planned Annual Waste Disposal Rates (including Ridge) (tonnes)
2022	4,925,000	3,145,000	2,900,000	4,745,000	6,045,000
2023	4,814,000	3,145,000	2,900,000	4,745,000	6,045,000
2024	4,702,000	1,880,000	2,900,000	3,480,000	4,780,000
2025	4,588,000	1,867,800	2,900,000	3,467,800	4,767,800
2026	4,471,000	1,748,000	3,004,000	3,452,000	4,752,000
2027	4,353,000	1,748,000	3,004,000	3,452,000	4,752,000
2028	4,232,000	1,711,700	3,004,000	3,415,700	4,715,700
2029	4,109,000	311,700	3,004,000	2,015,700	3,315,700
2030	3,985,000	311,700	3,004,000	2,015,700	3,315,700
2031	3,884,000	311,700	3,004,000	2,015,700	3,315,700
2032	3,783,000	311,700	3,004,000	2,015,700	3,315,700
2033	3,687,000	311,700	3,004,000	2,015,700	3,315,700
2034	3,588,000	311,700	3,004,000	2,015,700	3,315,700
2035	3,488,000	285,300	3,004,000	1,989,300	3,289,300
2036	3,385,000	285,300	2,254,000	1,239,300	2,539,300
2037	3,279,000	244,000	2,254,000	1,198,000	2,498,000
2038	3,171,000	244,000	2,254,000	1,198,000	2,498,000
2039	3,061,000	244,000	2,254,000	1,198,000	2,498,000
2040	2,948,000	244,000	2,254,000	1,198,000	2,498,000
2041	2,832,000	244,000	2,254,000	1,198,000	2,498,000

Notes:

* Assumes that the diversion targets set out in the MOECC's Strategy for a Waste-Free Ontario are achieved.

**Includes Walker Environmental - Southwestern Landfill, Ridge Landfill, Terrapure - Stoney Creek and W12A Landfill

Attachment E

Residential Residual Waste Quantity Projections for Chatham-Kent

WASTE CONNECTIONS OF CANADA

Table E-1: Residential Residual Waste Projections with MOECC Diversion Targets for Chatham-Kent

Year No.	Year	Population	TOTAL WASTE GENERATED (tonnes)	DIVERSION RATE (%)	TOTAL WASTE DIVERTED (tonnes)	TOTAL RESIDUAL WASTE REQUIRING DISPOSAL (tonnes)
	2010	**108,000**	**52,000**	**38%**	**20,000**	**32,000**
2010 Average per Capita (kg)			**481**		**185**	**296**
	2011	107,000	52,000	39%	20,000	32,000
	2012	107,000	52,000	39%	20,000	32,000
	2013	106,000	51,000	40%	20,000	31,000
	2014	105,000	51,000	40%	20,000	31,000
	2015	104,000	50,000	40%	20,000	30,000
	2016	104,000	50,000	41%	20,000	30,000
	2017	104,000	50,000	41%	21,000	29,000
	2018	104,000	50,000	42%	21,000	29,000
	2019	104,000	50,000	42%	21,000	29,000
	2020	104,000	50,000	44%	22,000	28,000
	2021	102,000	49,000	46%	22,000	27,000
1	2022	102,000	49,000	47%	23,000	26,000
2	2023	102,000	49,000	49%	24,000	25,000
3	2024	102,000	49,000	50%	25,000	24,000
4	2025	102,000	49,000	52%	25,000	24,000
5	2026	101,000	49,000	54%	26,000	23,000
6	2027	101,000	49,000	55%	27,000	22,000
7	2028	101,000	49,000	57%	28,000	21,000
8	2029	101,000	49,000	58%	29,000	20,000
9	2030	101,000	49,000	60%	29,000	20,000
10	2031	99,000	48,000	61%	29,000	19,000
11	2032	99,000	48,000	62%	30,000	18,000
12	2033	99,000	48,000	63%	30,000	18,000
13	2034	99,000	48,000	64%	31,000	17,000
14	2035	99,000	48,000	65%	31,000	17,000
15	2036	98,000	47,000	66%	31,000	16,000
16	2037	98,000	47,000	67%	31,000	16,000
17	2038	98,000	47,000	68%	32,000	15,000
18	2039	98,000	47,000	69%	32,000	15,000
19	2040	98,000	47,000	70%	33,000	14,000
20	2041	96,000	46,000	71%	33,000	13,000

NOTES:

***Generated #'s** : Based on 2010 Statistics Canada Waste Management Survey data.*

***Diverted #'s** : Waste Free Ontario Act Strategy (Feb. 2017) sets overall diversion goals of 30% by 2020, 50% by 2030 and 80% by 2050. RPRA residential diversion rates from 2009*

***Disposal #'s** : Generated minus Diverted*

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DILLON CONSULTING

Ridge Landfill Expansion Environmental Assessment

Supporting Document #2

Alternatives to the Undertaking

Ridge Landfill Expansion Terms of Reference

December 2017

WASTE CONNECTIONS OF CANADA

Table of Contents

Attachments

1.0 Introduction and Background

Waste Connections of Canada (Waste Connections) is undertaking an Environmental Assessment (EA) pursuant to the *Environmental Assessment Act* with respect to the approaching exhaustion of the approved capacity at the Ridge Landfill (the Ridge). The Ridge, located near Blenheim, has been serving Ontario industrial, commercial and institutional (IC&I) waste generators since 1966 and is currently permitted to receive 1,300,000 million tonnes of waste per annum. The Ridge currently disposes of approximately 25% of all of the IC&I residual waste generated in southern and central Ontario each year. At the current waste disposal rate, the site is expected to reach its approved capacity in 2021.

Waste Connections operates the largest integrated IC&I waste collection, recycling, transfer and disposal business in Ontario. Waste Connections currently owns and operates 18 facilities (including the Ridge) servicing IC&I generators in the service area (i.e. southern and central Ontario). This efficient integrated collection, recycling, transfer and disposal business, of which the Ridge is a key part, is a major component of the Ontario IC&I waste management system. Waste Connections' operations in the service area have a total economic impact in Ontario of over $200 million per year, including expenditures in direct employment and with third party vendors to Waste Connections. From a Waste Connections company-specific perspective, there is a clear opportunity to continue to utilize the significant investments the company has made in this integrated system after 2021 to continue to service approximately 25% of the IC&I residual waste market in southern and central Ontario and its host municipality of Chatham-Kent.

Waste Connections is proposing to undertake an EA to secure additional residual waste disposal capacity in order to continue providing integrated waste management services at the Ridge Landfill over the planning period (2022-2041). This purpose and opportunity for Waste Connections is supported by an assessment of projected annual quantities of residual IC&I waste requiring disposal (assuming the MOECC's diversion targets in the *Strategy for a Waste-Free Ontario* are achieved) compared to the estimated available annual waste disposal rates in the service area assuming all proposed new and expanded disposal facilities are approved (see Supporting Document #1, provided under separate cover).

The MOECC *Code of Practice for Preparing and Reviewing Environmental Assessment Terms of Reference* (2014) provides guidance for consideration of a reasonable range of alternatives. The Code of Practice recognizes that private companies may not be able to implement some alternative ways of managing waste and also provides guidance on focusing a Terms of Reference. Waste Connections has prepared a focused Terms of Reference under Section 6(2)(c) of the *Environmental Assessment Act*.

The purpose of this Supporting Document #2 is to describe the evaluation of alternative ways of addressing the identified opportunity to determine which alternative(s) to carry forward into the EA.

2.0 Identification of Alternatives to Address the Purpose/Opportunity

As noted in **Section 1** above and described in more detail in Supporting Document #1, there is an overall projected disposal capacity deficit for IC&I residual waste from southern and central Ontario over the planning period (2022-2041). This presents an opportunity for Waste Connections to continue to be in a position to offer an efficient integrated collection, recycling/processing and disposal service to its IC&I customers in southern and central Ontario during this planning period. To fulfill this opportunity, Waste Connections must address the impending exhaustion of the currently approved capacity of the Ridge, which is projected to occur by the end of 2021. As such, the purpose of this undertaking is to maintain and continue Waste Connections' role in providing IC&I residual waste disposal capacity in the service area of southern and central Ontario.

Waste Connections has identified the following alternatives for securing additional waste disposal capacity and thus addressing the above-described purpose/opportunity:

1. Do Nothing (i.e., benchmark or baseline condition for comparison);
2. Export Waste Out of the Service Area;
3. Thermal Treatment;
4. Increased Waste Diversion; and
5. Landfilling Within the Service Area.

The following subsections explain each of the alternatives and whether they meet the stated business opportunity.

2.1 Do Nothing

This alternative involves continuing landfill operations until the Ridge reaches capacity by the end of 2021 and then closing the Ridge and implementing an appropriate closure plan. Waste disposal is a key component of Waste Connections' efficient integrated waste management services business. The Do Nothing alternative is not acceptable to Waste Connections from a business perspective as exiting the waste disposal business at the Ridge would place Waste Connections at a significant competitive disadvantage in the southern and central Ontario marketplace, would likely drive costs up for its customers, and would materially impair the value and quality of the company's services in Ontario. Closure of the Ridge would lead to local job losses and a significant loss of revenue for the Municipality of Chatham-Kent and economic benefit for local surrounding communities. Chatham-Kent would be forced to seek an alternative waste management services provider at significant cost to the municipality and its residents. This alternative would effectively remove 25% of the IC&I disposal capacity in the service area and require Waste Connections to find an alternative way to address the need to safely dispose of residual waste generated by its customers.

Based on the above, Waste Connections does not intend to proceed with the Do Nothing or status quo alternative; however, the Do Nothing alternative will be carried forward into the EA as a benchmark or baseline against which advantages or disadvantages of the preferred alternative can be compared.

2.2 Export Waste Out of the Service Area

This alternative considers Waste Connections' options to dispose of the 1.3 million tonnes of waste that goes to the Ridge annually at other Waste Connections owned facilities outside of the Ridge service area. Other Waste Connections disposal facilities that were considered include Navan Landfill in Ottawa, Lachenaie Landfill in Quebec, and Brent Run Landfill in Michigan. The following speaks to each of these facilities.

Navan Landfill **-** Navan Landfill is located southeast of Ottawa. This site has less than 10 years of capacity based on its approved annual waste disposal rate of 234,750 tonnes. The landfill has reached its permitted annual waste disposal rate in 4 out of the last 5 years. The landfill is not permitted to receive putrescible waste or waste from the Greater Toronto Area. Expansion of the site would be required to accept the 1.3 million tonnes of waste from the Ridge service area annually over the next 20 years. It is noted that Waste Connections has reached an agreement with the MOECC and the community that there would be no further expansion of the Navan Landfill.

Given that this landfill is already receiving waste at its annual waste disposal rate, that it is not permitted to receive putrescible waste or waste from the Greater Toronto Area and that expansion will not be permitted, it is not considered feasible to transport waste from the Ridge service area to this facility. In addition, hauling 1.3 million tonnes of waste from the service area to the Navan Landfill would create an additional 8,800 tonnes CO_2e[1] of transportation-related emissions and would cost an additional $27.6 million per year[2] compared to hauling it to the Ridge.

Lachenaie Landfill **-** This landfill is located in Terrebonne, Quebec, northeast of Montreal. This landfill accepts much of the waste from the City of Montreal. It is permitted to accept 1.3 million tonnes of waste annually. The landfill has less than 10 years of remaining capacity based on its approved annual waste disposal rate. Regulation 19 to the Province of Quebec Environmental Quality Act (Regulation respecting the landfilling and incineration of residual materials) does not permit the landfilling of residual materials generated outside of Quebec (item 4(1)).

Given that this landfill is already achieving its annual waste disposal rate and is not permitted to take waste from out of province, it is not considered feasible to transport waste from the Ridge service area

[1] Based on the difference between the distance from each Transfer Station to the Ridge and each Transfer Station to the Navan Landfill.
[2] Transportation cost based on what Waste Connections is charged from a third party transportation vendor.

to this facility. In addition, hauling 1.3 million tonnes of waste from the service area to the Lachenaie Landfill would create an additional 15,300 tonnes CO_2e[3] of transportation-related emissions and would cost an additional $48.2 million per year[2] compared to hauling it to the Ridge.

Brent Run Landfill **-** Brent Run landfill is located northeast of Flint, Michigan near the community of Montrose. The landfill has approximately 17 years of capacity remaining at a current fill rate of approximately 780,000 tonnes per year. Using this site for the waste currently going to the Ridge would require Waste Connections to find another disposal location for the customers currently using Brent Run landfill or to expand the landfill to accept an additional 1.3 million tonnes of waste annually over the 20-year planning period. Waste Connections does not have sufficient land to expand this site laterally. To expand the landfill, Waste Connections would have to apply for and receive approval from Michigan State Department of Environmental Quality.

The Brent Run landfill is approximately 245 km from the Ridge Landfill and approximately 145 km from the western boundary of the service area.[4] Transporting waste to Brent Run would not be cost effective for Waste Connections. As much of the IC&I waste that goes to the Ridge comes from east of the site, continuing to Brent Run would add an additional 245 km to these trips. In addition, this travel would result in an additional 5,500 tonnes CO_2e[5] of transportation-related emissions and would cost an additional $17.3 million per year[2] compared to hauling it to the Ridge. It is also noted that transporting waste across an international border poses a potential risk should that border be closed for any reason.

Given the above, Brent Run does not have the capacity to address the business opportunity in the service area, and transport of waste to the Brent Run landfill in the U.S. would place Waste Connections at a competitive disadvantage in the Ontario market it is not considered to be feasible to transport waste from the Ridge service area to this facility.

Based on the above, exporting waste outside of the service area is not considered to be a feasible way to address the business opportunity identified in this Terms of Reference.

2.3 Thermal Treatment

Thermal treatment technologies involve applying heat to waste through complex industrial processes to significantly reduce volume and generate energy. Thermal treatment typically does not eliminate the

[3] Based on the difference between the distance from each Transfer Station to the Ridge and each Transfer Station to the Lachenaie Landfill.
[4] The distance to the western boundary of the service area is based on the distance between the landfill and Windsor, Ontario.
[5] Based on the difference between the distance from each Transfer Station to the Ridge and each Transfer Station to the Brent Run Landfill.

need for landfill disposal; however the residual waste ash volume is significantly reduced. The following summarizes some of the key thermal technologies in use or reported to be available for waste disposal:

- Direct combustion or incineration: This involves burning sorted or unsorted waste under controlled conditions. It can be coupled with energy recovery through the creation of heat, steam or electricity. Combustion technologies result in bottom and top ash residues, with the latter often classified as a hazardous waste.
- Gasification: This process converts organic materials into a gas by applying high temperatures. The process produces a synthetic gas and an inert residue. The gas can be used to generate electricity.
- Pyrolysis: This process heats solid waste in an oxygen-free environment to produce a combustible gas or liquid and a carbon char residue.
- Plasma Arc Gasification: This process uses extremely high temperatures to break down organic waste and produce a synthetic gas.

The most proven technology is direct combustion/incineration. The other technologies have not, to date been proven reliable or viable at a scale that would match that needed to accommodate the 1.3 million tonnes received annually at the Ridge. Waste Connections does not own or operate any thermal treatment facilities and has a corporate philosophy to not build a thermal treatment facility as it runs contrary to the waste diversion infrastructure that Waste Connections has built. Due to high capital and operating costs, Waste Connections also believes that thermal treatment will not provide a cost competitive way to provide disposal services to its IC&I customers. **Attachment A** provides further information on Waste Connections' consideration of thermal treatment.

Given the high capital and operating costs of thermal treatment and the fact that this is not part of Waste Connections' business, this alternative is not considered to be a feasible way for Waste Connections to realize the disposal opportunity identified in this Terms of Reference.

2.4 Increased Waste Diversion

Waste Connections proactively assists its generator customers to divert IC&I waste at source and further works to divert recyclable materials once waste is collected. **Attachment B** to this document provides an overview of Waste Connections' current diversion programs and activities.

The recent Waste-Free Ontario Act, 2016 and the subsequent MOECC document entitled *Strategy for a Waste-Free Ontario, Building a Circular Economy*, set out provincial objectives for increased diversion of waste, whether residential or IC&I, with a target of 50% diversion by 2030 and 80% diversion by 2050. Waste Connections is committed, as part of the Ridge Landfill Expansion EA, to consider opportunities to enhance diversion at source, at the landfill or elsewhere in its waste management system to achieve increased diversion from its IC&I customers in its southern and central Ontario service area. Some of the ongoing and enhanced diversion opportunities that Waste Connections is committed to implementing include:

- Continue to work with its customers to identify opportunities for the segregation of re-usable, recyclable and organic wastes and provide education materials to customers;
- Establish designated collection routes for segregated materials where there are sufficient materials generated at multiple generation sources;
- Proactively work to educate its customers on objectives of the Strategy and the requirements of the *Waste-Free Ontario Act*;
- Continue to inspect inbound loads at waste transfer stations and where noticeable volumes of materials that could be diverted are observed work with customers to help them to develop an at-source separation program;
- Remove recyclable materials received at the waste transfer stations/landfill to a dedicated pile if possible;
- Add an expanded resource recovery area (in the form of a drop-off facility) at the Ridge Landfill for Chatham-Kent customers; and
- Continue collaboration with the Ridge Landfill host community of Chatham-Kent to develop partnership opportunities to support their municipal waste diversion targets and their alignment with the objectives of the *Strategy for a Waste-Free Ontario*.

Increased waste diversion is an important component of Waste Connections' efficient, integrated system. It will assist the province in meeting the targets set out in the Strategy; however, this additional diversion will not reduce the need for the 1.3 million tonnes of capacity per year during the 20 year planning period.

2.5 Landfilling Within the Service Area

Waste Connections does not have the ability to expropriate land to site a new landfill; therefore its ability to develop landfill capacity is inherently constrained to properties owned by the company. New landfill capacity could be developed by expanding an existing landfill site(s) or constructing a new site on Waste Connection property. **Attachment C** to this Supporting Document #2 shows that the Ridge is the largest Waste Connections property in the service area at 340 ha. The remaining properties range from less than 1 ha to approximately 20 ha. A new landfill to accommodate 26 million tonnes of residual waste over the planning period would require sufficient land to accommodate the waste fill area; stormwater management ponds; on-site roads and storage areas; and an office, scale house and drop off areas. It is anticipated that the footprint to accommodate these facilities at a new site would be approximately 200 ha. The Ridge landfill is the only property large enough to accommodate the projected waste opportunity.

Expansion of the Ridge is considered reasonable for Waste Connections to pursue as it allows Waste Connections to continue to provide efficient and integrated waste management services to its customers and fully responds to the stated purpose/opportunity.

The Ridge has been operating successfully since 1966 and thus has a long and well-understood operating history. The site is located in a deep deposit of clay and silt overburden, consistent with the MOECC's Engineered Facilities policy, which expresses a MOECC preference for landfills to be sited in environments that have a high degree of natural protection for groundwater. Ground and surface water monitoring at the site has shown the site to be extremely effective in protecting ground and surface water. This is an important benefit for Waste Connections' customers as well as for the province.

Landfilling within the service area through an expansion of the Ridge is Waste Connections' preferred alternative to address the business purpose/opportunity identified in the Terms of Reference.

3.0 Conclusions

Overall it is concluded that Export of Waste Out of the Service Area, Thermal Treatment and Increased Waste Diversion are not reasonable or feasible alternatives to be considered for Waste Connections' stated business opportunity. These alternatives will not be carried forward in the EA. As noted in this Supporting Document, Waste Connections remains committed to considering opportunities to enhance diversion at source, at the landfill or elsewhere in its waste management system to achieve increased diversion from its IC&I customers in its southern and central Ontario service area and will explore these opportunities as part of the EA.

The "Do-Nothing" alternative will be carried forward into the EA and considered in relation to the assessment of the preferred undertaking as a base case for assessing potential effects.

Landfilling within the service area through an expansion of the Ridge is considered the preferred way for Waste Connections to manage residual waste received by the company during the planning period used in this environmental assessment and to fulfill its desire to continue to provide an efficient and integrated waste management system to its IC&I customers and to its host municipality of Chatham-Kent. Landfilling within the service area through an expansion of the Ridge Landfill will be carried forward into the EA. The EA will consider the advantages and disadvantages of alternative methods of expanding the landfill. The potential effects of the expansion compared to the Do-Nothing alternative will also be addressed in the EA.

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Attachment A

Thermal Treatment

WASTE CONNECTIONS OF CANADA

Types of Thermal Treatment

Thermal treatment technologies involve applying heat to waste through complex industrial processes to significantly reduce volume and generate energy. Thermal treatment typically does not eliminate the need for landfill disposal; however the residual waste ash volume is significantly reduced. The following summarizes some of the key thermal technologies in use or reported to be available for waste disposal:

- Direct combustion or incineration: This involves burning sorted or unsorted waste under controlled conditions. It can be coupled with energy recovery through the creation of heat, steam or electricity. Combustion technologies result in bottom and top ash residues, with the latter often classified as a hazardous waste.
- Gasification: This process converts organic materials into a gas by applying high temperatures. The process produces a synthetic gas and an inert residue. The gas can be used to generate electricity.
- Pyrolysis: This process heats solid waste in an oxygen-free environment to produce a combustible gas or liquid and a carbon char residue.
- Plasma Arc Gasification: This process uses extremely high temperatures to break down organic waste and produce a synthetic gas.

The most proven technology is direct combustion/incineration, which has been applied recently at the Durham York Energy Centre. The other technologies have not, to date been proven reliable or viable at the scale required and contain significant uncertainties/risks. A prominent recent example of these thermal treatment technologies not being an optimal pathway in Ontario is the now-defunct proposed Plasco facility in Ottawa.

Thermal Treatment and Provincial Policy

Thermal treatment is not fully aligned with public policy:

- A financial incentive that had been in place to help offset the costs of thermal treatment facilities was the Energy-from-Waste Standing Offer Program. However, this program was suspended effective September 2016 to save the Province in electricity system costs given that the Independent Electricity System Operator has forecasted that Ontario will have a robust supply of electricity over the coming decade to meet projected demands[6]. This policy decision was reiterated in the recently released *Long Term Energy Plan 2017.* While this policy change does not preclude the development of energy from waste facilities it removes the financial incentive for companies to implement this technology.
- Thermal treatment is not considered a step towards the goal of achieving a zero waste Ontario and zero greenhouse gas emissions from the waste sector. Achieving zero waste requires

[6] https://news.ontario.ca/mei/en/2016/09/ontario-suspends-large-renewable-energy-procurement.html

diversion, which Waste Connections has invested in; however energy from waste, according to the *Strategy for a Waste-Free Ontario: Building the Circular Economy* is not considered as a form of waste diversion.

- The *Climate Change Action Plan* is intended to facilitate a low carbon economy. The only proven thermal treatment technology, direct combustion/incineration, still results in a number of emissions including CO_2 equivalents, which does not contribute to a low carbon economy.

Thermal Treatment and Waste Connections

Waste Connections does not own or operate any thermal treatment facilities and does not currently have experience with thermal technology; as such, it is not a core competency within Waste Connection's business.

Waste Connections has a corporate philosophy that is built on sustainability. The company is proud of the efforts it has made and the successes it has had in the areas of diversion and recycling, harvesting methane gas from landfills to generate renewable power, fleet optimization to minimize the carbon footprint related to transportation and giving back to their communities.[7] Based on the company's corporate philosophy, waste diversion infrastructure has been built to service their IC&I clients. Implementing thermal treatment would run contrary to this investment Waste Connections has made in waste diversion infrastructure and abandoning this infrastructure investment would place a significant financial hardship on Waste Connections.

Capital and Operating Costs of Thermal Treatment

In terms of financial considerations, as the complexity of the thermal treatment technology increases, the capital and operating costs also increase. The median costs (in 2009$ CDN) for conventional incineration is $770/design tonne +/- 50% with operating costs of $65/tonne +/- 30% compared to plasma arc technology which has a median cost of $1,300/design tonne +/-45% and operating costs of $120/tonne +/- 55%[8].

Given the high capital and operating costs of direct combustion (the most proven thermal treatment technology for managing residual waste), the resulting net treatment costs per tonne of waste is higher compared to landfilling (typically at least twice the net cost of landfilling). In addition, the economic risk for waste incineration in case of project failure is high due to factors such as the high investment cost, complexity of the technical installations, special requirements in terms of quantity and composition and

[7] https://www.wasteconnectionscanada.com/sustainability
[8] Stantec Consulting Limited and Rambol Denmark A/S. Waste to Energy, A Technical review of Municipal Solid Waste Thermal Treatment Practices. March, 2011.

stable energy demand and prices[9]. As noted above, with the removal of the Energy-from-Waste Standing Offer Program, there is limited financial incentive to implement thermal technologies.

The following are three examples that we feel demonstrate the economic challenges of thermal treatment within the service area and support Waste Connections decision not to move in this direction:

- In 2006, the City of Toronto purchased the Green Lane Landfill at a cost of $220 million. The director of solid waste for the City of Toronto had indicated that the capital cost to build an incineration plant would be approximately $300 million. The cost per tonne to send residual waste to landfill at Green Lane was under $70 compared to the costs of incineration which could be between $120 - $150 per tonne[10].
- The Durham York Energy Centre cost approximately $255 million (gross) to construct and the gross annual operating costs are approximately $15 million (based on 2010 dollars)[11]. The incineration facility was designed to process 140,000 tonnes per year of municipal solid waste. The proposed annual waste disposal rate of the Ridge is over nine times the quantity of the Durham York Energy Centre.
- Peel Region was in the process of planning for an incineration facility that would handle 300,000 tonnes per year. Initially, the capital cost estimate was about $500 million but as the project progressed the cost estimate rose to over $600 million. In January 2016, Peel Regional Council voted in favour of cancelling the Peel Energy Recovery Centre project in part due to the escalating costs[12].

Other Considerations

There are two other considerations that influence Waste Connections assessment of the desirability of thermal treatment technologies:

- There is frequently expressed opposition to thermal treatment facilities by the public as they are seen to discourage waste diversion activities and programs.
- Thermal treatment typically requires long-term waste disposal contracts to supply a steady and reliable source of fuel. The IC&I waste collection and disposal business is quite competitive with contracts typically being short term.

[9] Haukol, J., Rand, T., and Marxen, U. 2000. Municipal Solid Waste Incineration: Requirements for a Successful Project. World Bank Technical paper. Project 462. Chapter 4.
[10] https://www.thestar.com/news/gta/2013/03/12/landfill_or_incinerator_whats_the_future_of_torontos_trash.html
[11] https://www.durhamyorkwaste.ca/FAQ/FAQ.aspx#cost
[12] https://www.thestar.com/news/gta/2016/01/05/peel-region-says-no-to-incineration.html

Conclusion

In considering the applicability of thermal treatment to Waste Connections integrated waste management system it is concluded that thermal treatment is not a disposal option that Waste Connections sees as feasible to pursue for the following reasons:

1. The suspension of Energy-from-Waste Standard Offer Program in 2016 removes the financial incentive to consider thermal treatment;
2. The proven thermal treatment technology, direct combustion or incineration, can be controversial and all others are unproven and not viable at the scale required;
3. Thermal treatment is in contradiction of a number of government policies;
4. Building an EFW facility runs contrary to waste diversion infrastructure Waste Connections has built;
5. Abandoning recent company diversion direction to pursue an unknown pathway would place Waste Connections in a fiscally precarious situation;
6. The higher capital and operating costs of thermal treatment could impact Waste Connections customer base;
7. Waste Connections has a corporate philosophy to support diversion which could be seen as contrary to building thermal treatment; and
8. Thermal treatment is not a core competency within Waste Connection's business.

Attachment B

Waste Connections Current Division System and Opportunities

WASTE CONNECTIONS OF CANADA

This attachment describes the role Waste Connections plays in diverting materials from landfill and supporting the provincial vision of a waste-free Ontario.

Waste Connections Alignment with Provincial Policy

In June 2016, the Government of Ontario passed the *Waste-Free Ontario Act* and in February 2017 released the *Strategy for a Waste Free Ontario (2017)* which outlines a resource recovery and waste reduction road map for Ontario. It targets greater diversion of waste from landfills through policies such as Full Extended Producer Responsibility (EPR), and amendment of the 3Rs Regulations. The Strategy has defined waste diversion targets and is striving for zero waste and zero greenhouse gas emissions (GHG) from the waste management sector by creating a circular economy where the production of waste is decreased as much as possible through the superior design of materials, products, systems and business models.

Since before the *Waste-Free Ontario Act,* Waste Connections has been committed to providing the customers and communities it serves with responsible and cost-effective waste diversion solutions. On an annual basis the company diverts an average of 262,000 metric tonnes of Industrial, Commercial, Institutional (IC&I) sector material away from disposal sites in Ontario; approximately 180,000 of this diverted material is in the service area (see Table B-1). These diverted tonnes create a two-fold benefit that aligns with the province's resource recovery and waste reduction road map. First, these diverted tonnes directly impact the circular economy in a positive way by reducing the amount of virgin materials that would be needed as inputs for the production of new products. Secondly, by diverting these materials away from landfill a reduction in transportation related greenhouse gas is achieved on an annual basis.

However, the *Strategy for a Waste-Free Ontario* (2017) acknowledges the need for additional waste disposal capacity, stating "while Ontario works towards its goal of zero waste there will still be a need for landfill space." The size of landfills would also be considered to ensure there is adequate capacity, reducing the need for multiple new landfills. Waste Connections is confident that a Ridge expansion aligns with this initiative in that if approved, we would provide additional disposal capacity at an existing facility rather than the establishment of a new site.

The *Waste-Free Ontario Act* represents an important change in the approach to waste management with a new philosophy toward diversion efforts. A continued and increased emphasis on diversion is of stated importance to the Province of Ontario and also represents a potential opportunity for Waste Connections to support the province in achieving its waste diversion targets, particularly with respect to those targets for the IC&I sector.

Further Alignment with Provincial Policy

Additional Waste Connections initiatives, such as our natural gas-powered truck fleet, demonstrate our commitment and alignment with other MOECC policies like the Climate Action Plan. In Ontario, and

specifically in Barrie and the Region of Peel, Waste Connections has invested significantly in large sized truck fleets that are powered by clean burning compressed natural gas (CNG) to service those communities. These vehicles represent a significant reduction in GHG emissions compared to a conventional diesel engine. The current Waste Connections CNG fleet represents 21% of its total fleet of almost 800 vehicles in Ontario. Additionally, the company is active in the replacement of its older diesel trucks with newer trucks equipped with new Diesel Particulate Filters to greatly reduce emissions when compared to older diesel engines. The use of routing technology and GPS tracking further allows the company to run more efficiently, use less fuel and ultimately reduce its carbon footprint. Another example of Waste Connections commitment to the development and use of clean fuels is its $44 million landfill gas plant built in 2015 at its Lachanaie Landfill in Quebec where landfill gas is processed to pipeline quality before injection into the TransCanada gas distribution network. A similar project is currently being investigated for the Ridge Landfill and an assessment of landfill gas treatment or utilization alternatives for the expansion will be incorporated into the EA.

The Waste Connections Ontario Diversion System

Waste Connections has twenty-four (24) stand-alone operating facilities in Ontario that are responsible for local IC&I and/or residential curbside collection; the operation of Material Recovery Facilities (MRFs) and waste transfer stations; including two (2) landfills, the Ridge Landfill and the Navan Landfill in Ottawa. Districts work with their IC&I and residential customers to find at-source solutions for segregation of wastes that have a beneficial end-use. Where at-source separation is not practical, segregation of wastes for recovery occurs at district transfer stations or processing facilities where feasible and prior to shipment for final residual disposal.

The Ridge Landfill is Waste Connections' receiving facility for post-diversion residual waste from its system of integrated collection services, materials recovery and transfer facilities, as well as 3rd party facilities in the service area of southern and central Ontario. These 3rd party facilities are owned and operated by others but who also ship post-residual waste to the Ridge Landfill.

The Waste Connections operating facilities that send their residual waste to the Ridge Landfill have well established waste segregation programs and continually source local facilities for recycling of asphalt, brick, concrete, clean fill, organics, wood, roofing, drywall, paper fibres, comingled containers, metals, separately collected cardboard and other materials. There are continuous efforts to increase both the types and amount of these materials being diverted. Waste Connections Windsor District, for example, has recently (2015) partnered with Seacliffe Energy in Leamington and now diverts over 11,000 tonnes of IC&I sourced organic waste materials every year to their anaerobic digestion facility. Waste Connections Windsor also diverts COCO product from greenhouse cleanouts to farms. COCO product is a plant growth by-product from greenhouses that is sought by farmers for its exceptional water retention, good drainage and aeration. Another unique program is the diversion of over 9,000 tonnes of ash material that is recycled into concrete by St. Mary's Cement. ***Table B-1*** shows the current breadth of waste diversion programs delivered by Waste Connections for the IC&I sector in Ontario. In addition to

the diverted materials shown in ***Table B-1,*** Waste Connections also re-uses in the order of 160,000 tonnes per year of autofluff, wood chips, glass and asphalt for use in the construction and maintenance of roads at both the Ridge and the Navan landfills. This displaces the use of virgin materials like aggregate and soils. At the Navan landfill in Ottawa, there is an extensive contaminated soil treatment operation in place and treated soil is used for final cover and buffer construction. Recently, Waste Connections invested in TerraCycle, and thus is supporting the recycling of hard to recycle materials.

Based on the Statistics Canada Waste Management Industry survey (2014) it is estimated that approximately 995,000 tonnes of waste from the IC&I sector in Ontario was diverted from landfill. In the last five (5) years Waste Connections has been directly involved in the diversion of over 1,300,000 tonnes of materials from disposal in Ontario of which just over 900,000 tonnes were diverted from within the service area of southern and central Ontario. Diversion efforts at Waste Connections have averaged 262,000 tonnes per year for Ontario with just over 180,000 tonnes diverted from the service area. It is evident that the company plays a significant role in IC&I waste diversion in this province.

While residential tonnage is not included in ***Table B-1***, Waste Connections also provides residential recycling and/or organics collection programs to its municipal clients which include recycling collection for the District of Muskoka for processing at the Waste Connections Materials Recovery Facility (MRF) in Bracebridge, and the collection of recycling and organics for parts of Peel Region using a CNG powered fleet. Waste Connections also provides residential collection of recyclables for its Ridge host community, the Municipality of Chatham-Kent.

Waste Connections understands that no one knows the needs of a community better than those who live and work in it and Waste Connections' philosophy of local managerial empowerment allows their district managers to find local solutions to increase waste diversion activity. Waste Connections strongly believes in local community partnering, local purchase of goods and services, local employment and support for local tax bases. Where possible, beneficial end use materials are marketed or managed locally. This helps make diversion programs economically viable for customers and minimizes GHG emissions that would result from longer haul distances to markets. Many districts have partnered with local farms for use of some unique waste materials like the grapes residuals, vines, as well as other organics and sawdust.

Waste Connections has numerous business arrangements in place in Ontario for the diversion and reuse of numerous waste material types. The company structure, philosophy and track record facilitate continued expansion of existing programs as well as the addition of new diversion programs for the IC&I sector. Waste Connections can and is willing to respond quickly to support initiatives mandated as part of the *Waste-Free Ontario Act*.

Waste Connections is the largest publicly traded waste management company in Canada and the third largest in North America. The company has the financial resources and desire to invest in infrastructure

that supports its business which includes waste diversion initiatives in Ontario. In 2013 an investment of $14 million was made to construct a mixed construction and demolition recycling facility in Vaughan to divert what could have been substantial IC&I tonnage from disposal. Unfortunately, at the time the facility was unsuccessful due to an absence of regulatory support/enforcement programs, however, the *Strategy for a Waste-Free Ontario: Building the Circular Economy* may enable Waste Connections to explore the re-commissioning of this facility.

Waste Connections Commitment to Increased Waste Diversion

Notwithstanding Waste Connections' comprehensive at-source, at-transfer and at-MRF waste diversion programs there are opportunities to further support the objectives of *Strategy for a Waste-Free Ontario* and the Climate Change Action Plan and to enhance the Waste Connections diversion system.

Waste Connections is committed, as part of the Ridge Landfill Expansion EA, to consider opportunities to enhance diversion at source, at the landfill or elsewhere in its waste management system to achieve increased diversion from its IC&I customers in its southern and central Ontario waste shed. Generally future IC&I sector waste diversion opportunities would be focused on additional materials segregation at-source and at transfer stations to avoid unnecessary trucking and associated GHG emissions with bringing material to the Ridge Landfill. Future IC&I diversion is anticipated to include items that could have beneficial end uses including those materials that may be ultimately designated under the *Waste-Free Ontario Act*. The following summarizes the ongoing and enhanced diversion opportunities the Waste Connections is committed to:

- Waste Connections will continue its current practice to work with its customers to identify opportunities for the segregation of re-usable, recyclable and organic wastes. Waste Connections provides educational materials as necessary to ensure segregation activities meet receiving facility or end-market standards and assesses and provides appropriate containers and container sizes at-source for the optimum capture of materials. Where there are sufficient materials generated at multiple generation sources then designated collection routes are established. This provides cost-effective collection for the customer and can serve to increase waste diversion initiatives at source and to reduce GHG emissions through reduced transportation distances.
- With the implementation of the *Strategy for a Waste-Free Ontario,* Waste Connections will proactively work to educate its customers on objectives of the Strategy and the requirements of the *Waste-Free Ontario Act*. Waste Connections has the tools necessary to support its customers in the implementation of programs for mandated segregation where applicable, e.g. organics, or for segregation of various other designated materials as they are specified. This would again include the establishment of dedicated collection routes as appropriate.
- Waste Connections will continue its current practice of routinely inspecting inbound loads from both its own collection fleet and the fleet of third party haulers to its waste transfer stations. Where noticeable volumes of materials that could be diverted are observed attempts are made to identify the customer and to work with them to develop an at-source separation program. In

the case of third party haulers, they are notified to work with their own customers. If recyclable materials received at waste transfer stations can safely be segregated from the waste stream (e.g. wood, metal) they are removed to a dedicated pile and loaded for shipment to a processing facility. These current practices will be augmented with the implementation of the *Strategy for a Waste-Free Ontario* whereby Waste Connections will proactively work with its customers and third-party haulers to support segregation of materials mandated or designated for segregation.

For Chatham-Kent and IC&I customers, Waste Connections is committed to adding an expanded resource recovery area (in the form of a drop-off facility) at the Ridge Landfill. Resources recovered could include municipal hazardous or special waste (MHSW) (including batteries and fluorescent bulbs and tubes that are designated under the *Resource Recovery and Circular Economy Act*, 2016). Other resources could also include small appliances, electrical tools, mattresses, carpets, clothing and other textiles, furniture and other bulky items that may also be designed under the *Act* and/or where local markets exist for these items. Other conventional materials could be received at an expanded recovery area including wood, cardboard, Blue Box materials etc., and as the Ridge is in a predominantly agricultural area, there may be farm-sourced resource recovery opportunities (e.g., plastic wrap) that could also be assessed.

Waste Connections is committed to continued collaboration with the Ridge Landfill host community of Chatham-Kent to develop partnership opportunities to support their municipal waste diversion targets and their alignment with the objectives of the *Strategy for a Waste-Free Ontario*. Programs will be developed in collaboration with the Municipality of Chatham-Kent to compliment and augment services already provided. Chatham-Kent currently operates eight (8) transfer stations that receive large item waste, regular waste, recyclables, appliances, scrap metal, and electronics.

Conclusion

In summary, Waste Connections has demonstrated a significant role in waste diversion, particularly for the IC&I sector, across Ontario. Waste Connections has an established network of waste management facilities as well as a strong customer base that can impact the anticipated future changes in waste diversion in Ontario. Waste Connections is committed to assisting the province in meeting its diversion goals and opportunities for Waste Connections to enhance its existing waste diversion activities, either at source, at the Ridge or elsewhere in Waste Connections' integrated system will be examined further in the environmental assessment.

Table B-1: Waste Connections Ontario - Summary of IC&I Waste Diversion Activity 2012 - 2016 (in metric tonnes)

Material Type	2012		2013		2014		2015		2016		Total Proposed Service Area	Total Ontario
	Proposed Service Area	All of Ontario	Proposed Service Area	All of Ontario	Proposed Service Area	All of Ontario	Proposed Service Area	All of Ontario	Proposed Service Area	All of Ontario		
OCC	83,043	94,957	91,900	105,399	86,700	99,693	82,568	98,278	69,591	82,025	413,802	480,352
Mixed Paper	22,767	55,794	16,994	26,022	9,600	27,119	7,820	29,028	6,701	16,456	63,882	154,419
Mixed Recycle	27,462	30,927	25,149	30,077	24,037	32,260	30,056	37,677	26,680	28,418	133,384	159,359
Metal	3,296	4,865	3,557	5,420	5,674	7,242	11,408	13,451	15,194	18,932	39,129	49,910
Wood	18,635	25,756	18,788	30,272	21,520	29,197	20,430	27,732	21,142	31,190	100,515	144,147
Source Separated Organics	16,984	47,516	13,137	13,591	6,384	6,442	7,347	8,276	11,937	12,662	55,789	88,487
Blended Organics	-	241	5,408	5,408	3,890	3,890	2,170	2,170	1,132	1,132	12,600	12,841
Farm Composting	-	-	2,084	2,084	4,808	4,808	6,959	6,959	2,440	2,440	16,291	16,291
Pomace (Grapes Residual)	129	129	203	203	148	148	200	200	108	108	788	788
Straw Manure	326	326	371	371	274	274	149	149	145	145	1,265	1,265
Diatomaceous Earth	236	236	244	244	181	181	210	210	148	148	1,019	1,019
Concrete	2,942	9,087	3,558	27,986	2,021	26,555	2,258	19,949	2,274	7,495	13,053	91,072
Brick	358	943	-	4,546	46	3,021	268	3,268	160	2,678	832	14,456
Marble	9	9	13	13	250	250	233	233	28	28	533	533
Clean Fill, Soil, Aggregate	2,037	3,507	1,038	4,082	1,157	1,276	337	452	829	1,601	5,398	10,918

Table B-1: Waste Connections Ontario - Summary of IC&I Waste Diversion Activity 2012 - 2016 (in metric tonnes)

Sand	1,826	1,826	7,204	7,204	6,691	6,691	3,282	3,282	3,585	3,585	22,588	22,588
Asphalt	95	735	64	432	10	425	53	480	69	402	291	2,474
Glass	137	13,932	240	4,116	1,394	4,846	1,360	4,766	1,304	4,844	4,435	32,504
Shingles	344	1,035	533	779	869	869	694	718	749	749	3,189	4,150
Tires	331	341	199	205	250	258	250	272	196	196	1,226	1,272
Drywall	239	643	372	643	10	183	6	154	297	605	924	2,228
Shrinkwrap	68	68	133	133	77	77	47	47	59	59	384	384
Ash	-	-	-	-	-	-	61	61	9,676	9,676	9,737	9,737
Sawdust	392	392	161	161	265	265	147	147	377	377	1,342	1,342
Ewaste	616	708	1,119	1,140	2,264	2,277	1,588	1,598	1,231	1,253	6,818	6,976
Total	**182,272**	**293,973**	**192,469**	**270,531**	**178,520**	**258,247**	**179,901**	**259,557**	**176,052**	**227,204**	**909,214**	**1,309,512**
										Average	**181,843**	**261,902**

Attachment C

Consideration of Other Waste Connections Site

WASTE CONNECTIONS OF CANADA

Table C-1 presents a list of all the Waste Connection's properties in Ontario. To assess whether any of these locations would be suitable for a landfill to accommodate 26 million tonnes, the following primary screening criterion was considered:

Site Size- A new landfill to accommodate 26 million tonnes of residual waste would require sufficient land to accommodate the waste fill area; stormwater management ponds; on-site roads and storage areas; and an office, scale house and drop off areas. It is anticipated that the footprint to accommodate these facilities at a new site would be approximately 200 ha.

Table C-1: Waste Connections Owned Properties in Ontario

Municipality	Approximate Parcel Size (in hectares)	Notes
Within the Ridge Service Area		
Vaughan	2.8	Site size insufficient
Vaughan	2.4	Site size insufficient
Brampton	1.6	Site size insufficient
Hamilton	4.7	Site size insufficient
Brant	2.3	Site size insufficient
Kitchener	1.6	Site size insufficient
Chatham - Kent	20	Site size insufficient
Chatham - Kent	340	Ridge Landfill Property
Tecumseh	5	Site size insufficient
Sarnia	2	Site size insufficient
Cavan - Millbrook - North Monaghan	1.9	Site size insufficient
Brockville	2	Site size insufficient
Barrie	5	Site size insufficient
Orillia	1.5	Site size insufficient
Bracebridge	4.7	Site size insufficient
Outside of the Ridge Service Area		
Ottawa	2.7	Site size insufficient
Ottawa	1.6	Site size insufficient
Ottawa	70	Navan Landfill Property[13]
Ottawa	14	Site size insufficient

[13] The Navan landfill in Ottawa is restricted to non-putrescible waste, and by contractual agreement with the local community, cannot be further expanded once the currently approved capacity at that site is exhausted, which is predicted to occur in approximately 2025 at current fill rates.

Municipality	Approximate Parcel Size (in hectares)	Notes
Ottawa	7.5	Site size insufficient
Oliver Paipoonge	1.4	Site size insufficient

It is clear from the data provided in **Table C-1** that Ridge is the only property large enough to manage 1.3 million tonnes annually.