



DILLON
CONSULTING

Ridge Landfill Expansion Environmental Assessment

Draft Terms of Reference



Progressive
Waste Solutions

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Supporting Document 2:	Consideration of Alternatives To

Record of Consultation (*provided under separate cover*)

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 – The Act requires that “undertakings being reviewed within its framework consider “alternative methods” of carrying out the undertaking or various ways of carrying out the preferred undertaking that are technically and economically feasible” (CEAA, 2016).

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, 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.

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 as shown on **Figure 10**).

Preferred Alternative to – The expansion of the Ridge Landfill with opportunities for Resource Recovery.

Progressive Waste Solutions Canada Inc. – (“PWS”) is the proponent for this undertaking. PWS was formerly BFI Canada Inc. PWS and Waste Connections Inc. merged in an all-stock transaction as of June 1, 2016. The company will continue to be branded as Progressive Waste Solutions for its operations in Canada.

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 Progressive Waste Solutions Canada Inc. is the limited partner.

South Landfill – This refers to the waste cells located south of the Old Landfill. Development of the South Landfill is expected to begin in 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 with resource recovery opportunities (also described herein as the “Project”).

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

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

PWS – Progressive Waste Solutions Canada Inc.

ToR – Terms of Reference

Executive Summary

PWS is undertaking an EA under the Act for the proposed expansion of the Ridge Landfill (“the Project”). The Ridge Landfill is located near Blenheim, Ontario in the Municipality of Chatham-Kent. The Landfill is currently approved to receive waste from the industrial, commercial and institutional (“IC&I”) sectors in Ontario, and residential waste from the Municipality of Chatham-Kent and the surrounding Counties of Essex, Lambton, Middlesex and Elgin.

The Ridge Landfill has been in operation since 1966 and was expanded in 1999. The existing Landfill Site Area is 262 hectares (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 April 2015, it is estimated that the existing Waste Fill Area at the Ridge Landfill site will provide waste disposal capacity until approximately 2022 at the current fill rate.

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 proposed Project would see the Landfill Site Area increase from 262 ha to up to approximately 340 ha, allowing for an additional 26 million tonnes (30.6 million m³) of capacity. The annual waste fill rate would remain the same at 1.3 million tonnes annually.

The Act requires that the EA be undertaken in two parts; the first of which requires the preparation of the “ToR”. It will be prepared pursuant to clause 6(2)(c) and subsection 6.1(3) of the Act. This is often referred to as a “focussing” which will be described more fully later in the ToR. The ToR outlines the framework for what will be studied in the second part of the requirement of the Act; namely, the EA. The ToR requires approval by the “MOECC”.

The ToR outlines the work that will be completed during the second phase of the Project; the EA. The ToR will also describe the Undertaking, the work done to develop and evaluate alternative methods of carrying out the Undertaking which will include assessing potential effects on the broad environment defined in the Act of these alternative methods and how they will be mitigated, if necessary.

Before it is finalized, a draft ToR will be made available for review by the public and government agencies. The comments received during this period will be reviewed and incorporated where applicable in the final ToR. The final ToR will then be submitted to the MOECC for review and approval. The public will be notified when the ToR is submitted to the MOECC and there will also be an opportunity for any additional comments during that period.

For the purposes of the EA, information will be collected within three study areas: the On-site Study Area, which includes the property on which the current Ridge Landfill and proposed expansion is situated; the Off-site Study Area, which encompasses the area within one kilometre of the maximum fill area; and the Haul Route Study Area, which encompasses lands immediately adjacent to Communication Road, Drury Line and Erieau Road. In some cases

broader study areas may be required to assess properly potential effects (e.g. visual impacts). These will be addressed on a case-by-case basis during preparation of the EA.

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, PWS completed an assessment of the Alternatives to the Project, presented in a supporting document and summarized in the ToR. Alternative 4 – Expand the Existing Landfill with Resource Recovery was identified as the Preferred Alternative to (the Project) and will be further considered in the EA.

The EA will evaluate the Alternative Methods of implementing the Preferred Alternative to. The Alternative Methods evaluation will include several site development options for physical expansion of the Ridge Landfill, and will also consider ways of implementing resource recovery.

PWS is committed to engaging stakeholders to ensure that interested parties have the ability to provide their input on the proposed Project. PWS met with the MOECC in December of 2015 to receive additional guidance on methods of stakeholder engagement.

During the development of the ToR, PWS provided information to stakeholders and the public to increase their understanding of the EA. PWS 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 and the broader community

of the Municipality of Chatham-Kent. The consultation activities allowed the project team to gather valuable feedback which was then used to develop this ToR.

During the EA, PWS 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 6.3.2**, below;
- distribution of updates through mail and electronic correspondence, a community newsletter and the project website;
- meetings with neighbours, elected officials, and other stakeholders;
- open houses;
- Ridge Landfill Liaison Committee meetings; and
- evaluation workshop.

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. 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.

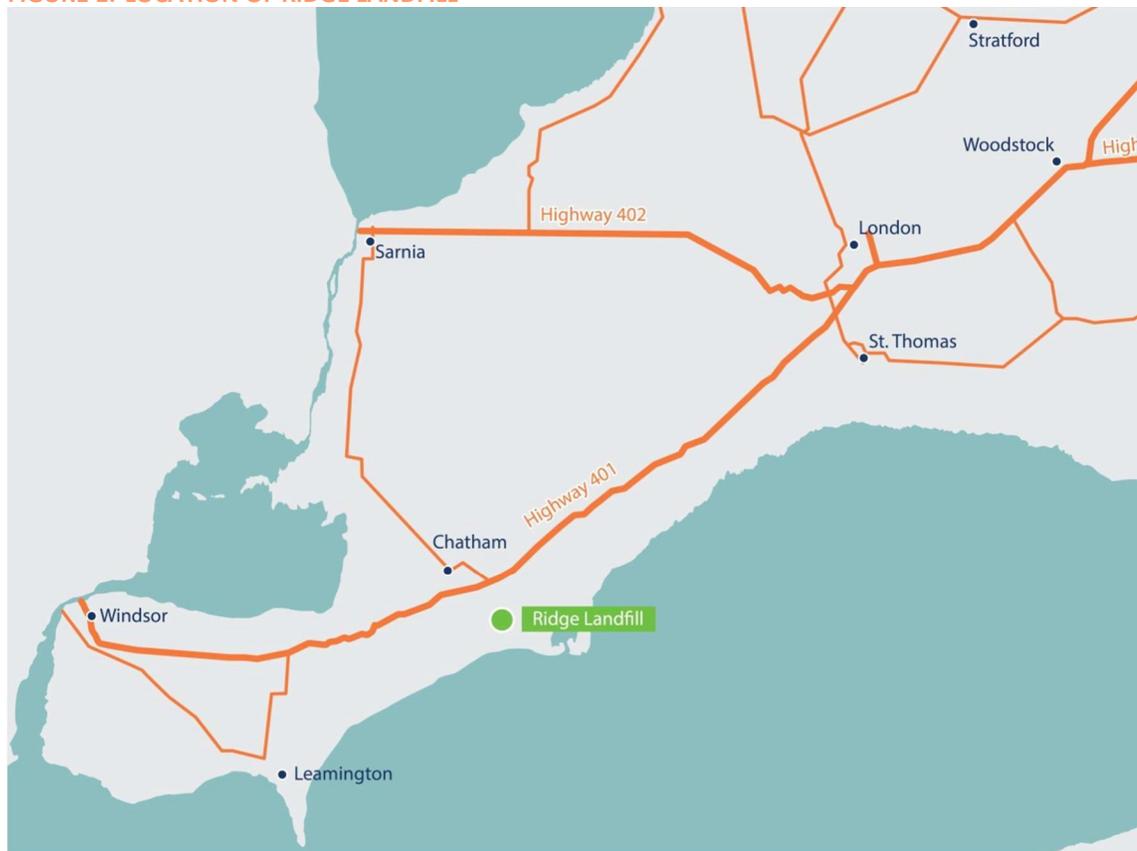
1.0

Introduction

PWS is undertaking the Project pursuant to the Act. 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 Ridge Landfill is located near Blenheim, Ontario in the Municipality of Chatham-Kent, and is operated by PWS (**Figure 1**). The site is currently approved to receive waste from the industrial, commercial and institutional (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. The Landfill Site Area is 262 hectares (ha). The Waste Fill Area, is 131 ha or half of the Landfill Site Area. As of April 2015, it is estimated that the Ridge Landfill will provide waste disposal capacity until 2022.

This ToR is the first step of 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 (interest 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”). The ToR, presently in draft, is being submitted for public and agency review and comment over a 30 day comment period. Once the comments are reviewed and incorporated as applicable, a final ToR will be submitted to the MOECC for approval. The ToR package consists of:

- Terms of Reference (this document);
- Record of Consultation; and
- Supporting documents (e.g. an assessment of the Alternatives to).

1.1 Identification of the Proponent

PWS 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, PWS has been able to provide its customers reliable and cost competitive solutions to help them achieve and exceed their waste management and sustainability goals.

PWS is the proponent of the proposed Project. Contact information for the PWS Project Manager is presented below.

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

1.2 Site History and Background

The Ridge Landfill is one of PWS’ most important landfill facilities in Canada and an important component of the waste management infrastructure in Ontario. Landfilling has 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.

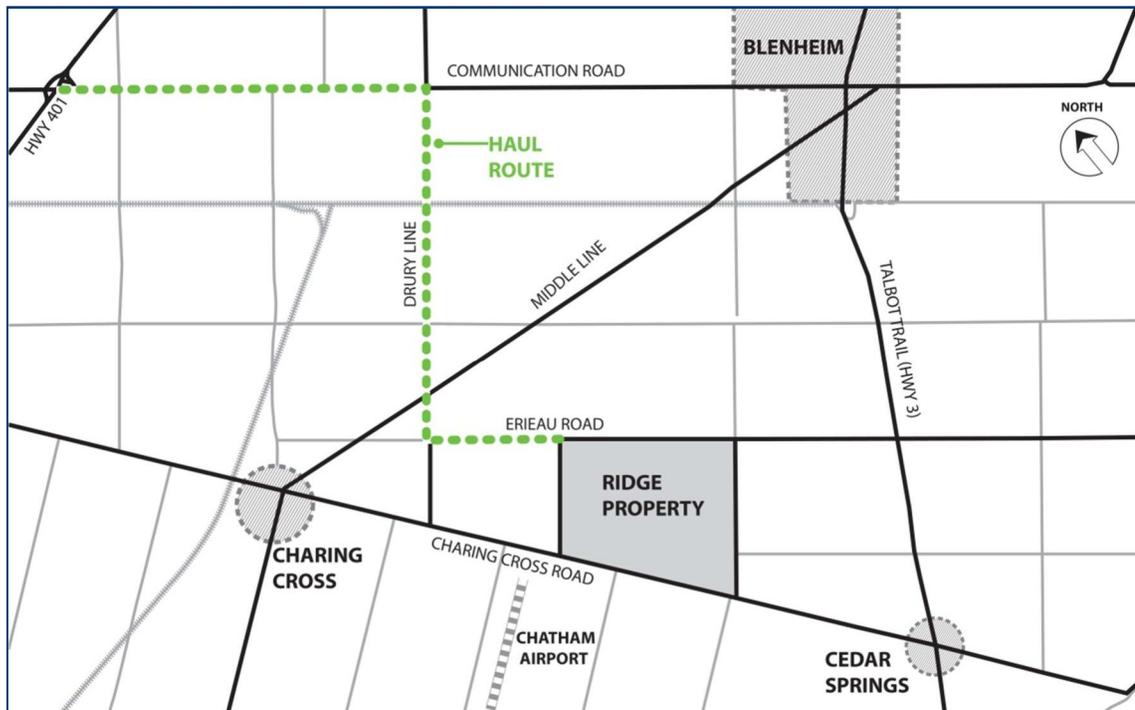
FIGURE 2: HISTORY OF THE RIDGE LANDFILL



Figure 3 shows the 340 ha property owned by PWS and the haul route that waste trucks use to access the site (described further in **Section 4.3**).

PWS 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. The South Landfill and the Infill Area have not been developed; however it is expected that work will begin to develop the South Landfill in 2016.

FIGURE 3: PWS RIDGE LANDFILL AND HAUL ROUTE



To ensure long-term management of the Ridge Landfill, PWS 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 fill rate). In 2015, approximately 1,231,335 tonnes of waste and 68,000 tonnes of materials which have been used as Alternative Daily Cover were received at the site. As of April 2015, the Ridge Landfill has a remaining capacity of 9 million m^3 and is expected to reach its current approved capacity by 2022.

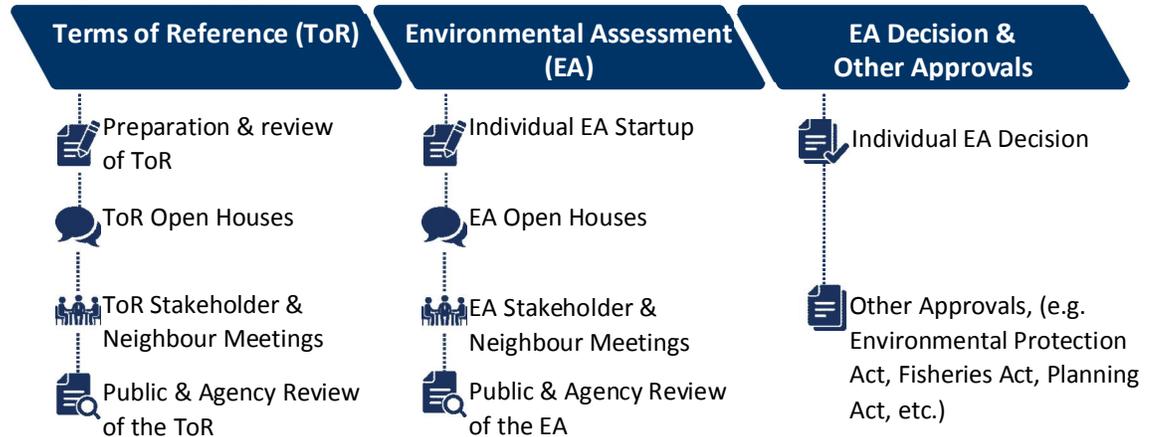
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The Environmental Assessment Framework

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 methods 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.

Public and government agency input is 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. This draft ToR has been made available for 30 days for review by the public and government agencies. Upon receiving comments, the required changes will be incorporated in the final ToR, which will be submitted to the MOECC for review and approval.

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 EA 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, <ol style="list-style-type: none"> (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, <ol style="list-style-type: none"> (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).

PWS has prepared a ToR for a focused EA. As such, the following activities were carried out as part of the ToR development and no additional work is proposed during the EA:

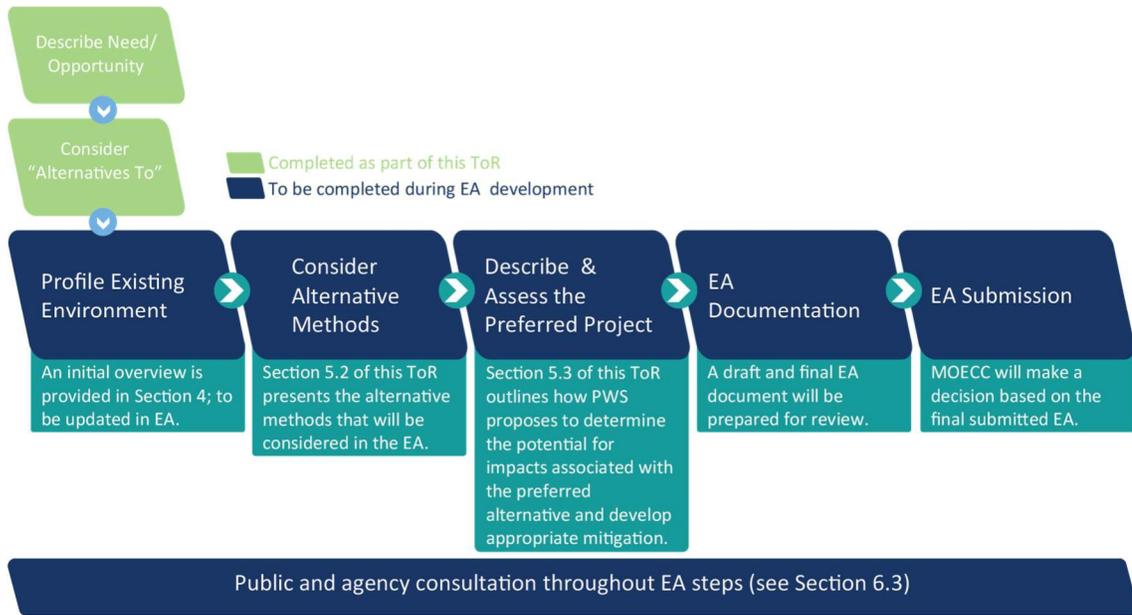
- **Rationale for the Undertaking (6.1 (2) (b) (i))** – PWS has completed an assessment of the need/opportunity for additional waste disposal capacity in southern Ontario. This work is

summarized in the ToR and the report included as a supporting document to the ToR (**Supporting Document 1**). This information has been included as part of the consultation with the public and agencies during ToR development. No additional assessment of need/opportunity for the proposed expansion will be undertaken during the EA.

- **Description of Alternatives to the Undertaking (6.1 (2) (b) (iii))** – During the development of the ToR, PWS considered functionally different ways to provide additional disposal capacity. It was concluded that the expansion of the Ridge Landfill with added resource recovery opportunities was the preferred way for PWS to provide long term disposal capacity. The consideration of “Alternatives to” was included as part of the consultation with the public and agencies and the report documenting this work is a supporting document to the ToR (**Supporting Document 2**). No additional assessment of “Alternatives to the Undertaking” will be included in the EA.

This ToR focuses on the remainder of the EA requirements noted in **Table 1** describing the Project and the work that PWS 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 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, PWS would proceed to prepare the EA document.

FIGURE 5: EA PROCESS



2.2

Addressing Relevant Provincial Legislation, Plans and Strategies

The MOECC has identified considerations for waste management EAs that are of specific interest to the province and have been described in provincial legislation, plans and strategies. PWS and the MOECC discussed these items during pre-consultation meetings for the development of this ToR. They are described in greater detail below:

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 that 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...” PWS is committed to minimizing the release of greenhouse gases from the Ridge Landfill with its landfill gas management system that collects landfill gas (mostly methane) and flares it; PWS plans to build a gas utilization plant that will clean the landfill gas to natural gas quality and send it to the local gas distribution system (**Section 4.2**). The EA will also consider how changing climate has the potential to impact the Project. This will be explored, specifically as it relates to storm events and surface water impacts (**Appendix A**).

Waste Diversion: With the release of the Draft Strategy for a Waste-Free Ontario and the passing of Bill 151 (the *Waste-Free Ontario Act*) on June 1, 2016, 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, that Act signals a shift from waste disposal to diversion from landfill. In this EA, resource recovery system alternatives will be evaluated that can position PWS to pursue the waste diversion opportunities created from the implementation of the Draft Strategy (**Section 5.2.1**). **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. Although the proposed Project does not fall within a regulated Source Water Protection Area, PWS has an environmental management program 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: 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**.

2.3

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 PWS to complete the EA based on this ToR. 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 in the EA and 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 will be considered minor. These modifications will be considered minor changes that could be included within the overall scope of this ToR without seeking approval for amendment of this ToR. 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 Proposed Project

3.1 Purpose of the Project

The purpose of the proposed Project is to allow PWS to continue to service its Ontario customers with full waste management services, including waste residuals disposal, while helping address the need for continued waste disposal capacity in southern Ontario over the 20-year planning period.

3.2 Rationale for the Proposed Project

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

3.2.1 Need for Additional Disposal Capacity

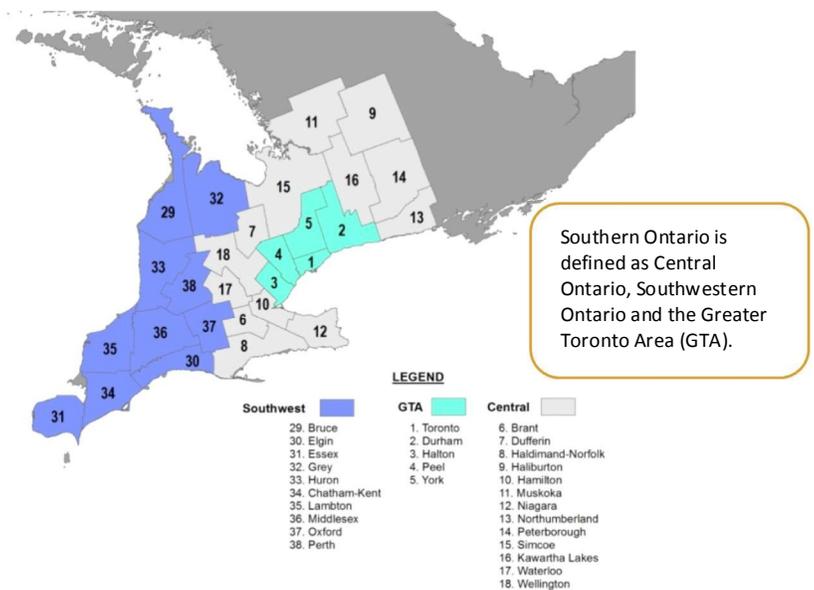
As an initial step before embarking on this EA, PWS undertook an assessment of the need and/or opportunity for additional disposal capacity. The following summarizes the assessment of future waste disposal needs over a 20 year planning period from 2022 to 2041 for southern Ontario (the primary waste service area for the Ridge Landfill). A map of southern Ontario is presented in **Figure 6**.

The full Needs/Opportunity Assessment report is a supporting document to this ToR (see **Supporting Document 1**).

Future Waste Disposal Needs in Southern Ontario

Future waste disposal need is determined on the basis of a combination of projected population and employment growth and anticipated generation and diversion rates for residential and IC&I waste. For southern Ontario, 7 to 8 million tonnes of residual waste is projected to be needed to be disposed of each year between 2022 and 2041. To be conservative, the project team considered three diversion scenarios (low, moderate and high) to

FIGURE 6: MAP OF SOUTHERN ONTARIO



acknowledge potential future changes to regulations that might increase diversion of waste on a provincial level. The moderate diversion scenario was carried forward to estimate demand.

The disposal need assumes that there will be moderate residential and IC&I diversion rates (i.e. residential waste diversion will increase from 38% in 2010 to 55% in 2041, whereas IC&I waste diversion will increase from 11% to 35%).

Available Disposal Capacity in Southern Ontario

There are 15 major landfills in southern Ontario that are permitted to take 100,000 tonnes or more of waste each year. In total, these fifteen landfills have approved capacity to receive 7.3 million tonnes of waste each year.

It is estimated that available annual capacity in these landfills will decrease from 5.4 million tonnes per year in 2010 to 4.3 million tonnes per year by 2022 and to 1.1 million tonnes per year by 2041. The estimate of available capacity was based on the amount of waste reported to be disposed (rather than the amount of waste permitted) as it represented a more conservative estimate of remaining capacity. Full details can be viewed in Needs/Opportunity Assessment, presented as **Supporting Document 1**.

Quantity of Waste Disposed of Elsewhere

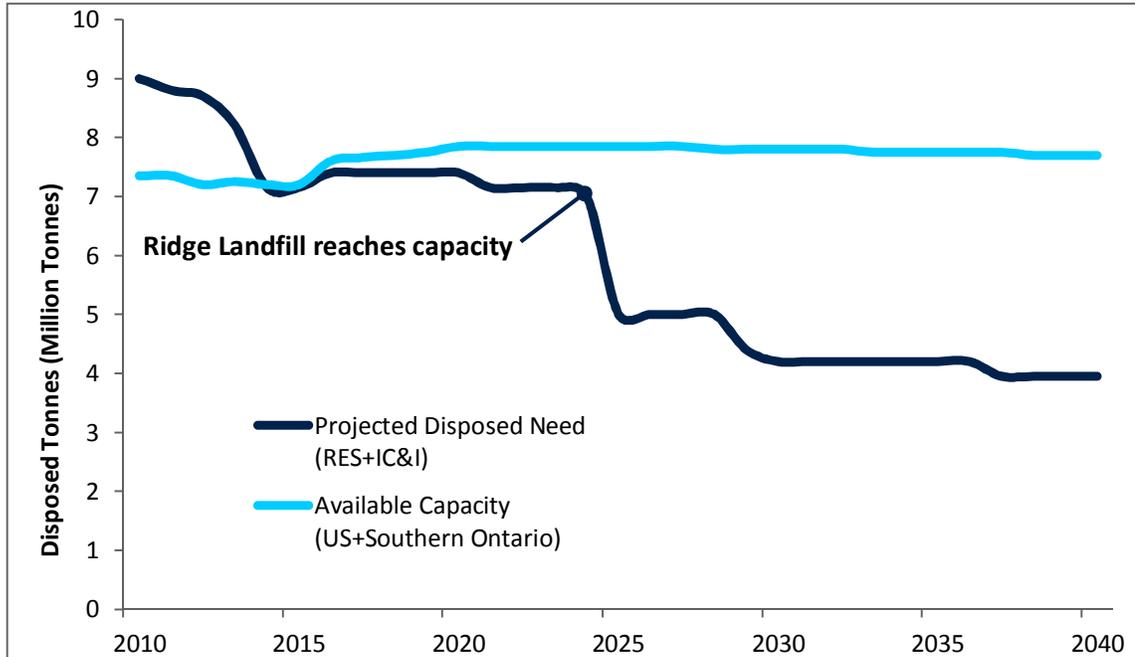
The amount of waste exported from Ontario to the United States (US) is variable but has generally decreased in the last 10 years from approximately 4 million tonnes to around 3 million tonnes per year (OWMA, 2016). It is assumed that the majority of this waste is generated in southern Ontario. This exported waste is primarily IC&I waste with some residential waste included. It goes to landfills in Michigan and New York. Projecting into the future it was assumed that the rate of export to the US would remain at approximately 3 million tonnes per year.

Projected Disposal Need for Southern Ontario

Using the information above, the waste disposal capacity need/opportunity for southern Ontario was identified. Population projections and employment data were used to estimate the potential waste generation over the 20-year planning period. By applying the moderate diversion scenario, the projected disposal need was identified (see **Figure 7**).

As shown in **Figure 7**, the projected amount of waste for disposal and the capacity to manage that waste are relatively consistent until approximately 2022 when the Ridge Landfill is currently scheduled to reach capacity. This emphasizes the important role that the Ridge Landfill currently plays in managing waste in southern Ontario and demonstrates how the proposed expansion is needed to continue to assist in meeting the province's long term disposal needs from 2022 to 2041.

FIGURE 7: PROJECTED DISPOSAL NEEDS AND AVAILABLE LANDFILL CAPACITY 2010-2040 (WITH MODERATE DIVERSION)



Although not considered as part of projected disposal needs, it should be noted that more frequent and intense storms resulting from climate change could have the potential to result in emergency peak waste volumes, such as demolition wastes or horticultural waste. Having capacity for this type of emergency situation in local landfills is also a benefit.

3.2.2 Opportunities for Increased Waste Diversion

In June 2016, the Government of Ontario passed the *Waste-Free Ontario Act*, formerly as Bill 151. The *Draft Strategy for a Waste Free Ontario (2015)* circulated with Bill 151 outlines a resource recovery and waste reduction road map for Ontario which targets greater diversion of waste from landfills through policies such as Full Producer Responsibility (FPR), disposal bans, reduce, reuse and recycle regulations under the *Environmental Protection Act, 1990*, and the development and implementation of an Organics Action Plan. Through this initiative the Province is targeting to achieve zero waste and zero greenhouse gas emissions from the waste sector by creating a circular economy. Implementation is anticipated to begin in 2017 and be carried out over a number of years.

The *Draft Strategy for a Waste-Free Ontario (2015)* acknowledges the need for additional waste disposal capacity, stating that “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 (Government of Ontario, 2015). The proposed Project supports this initiative by providing additional disposal capacity at an existing facility rather than a new one.

A continued and increased emphasis on diversion is of stated importance to the Province of Ontario and also represents a potential business opportunity for PWS. The *Waste-Free Ontario Act* represents an important change in the approach to waste management with a new philosophy toward diversion efforts. With these regulations in place, and subject to reasonable (i.e., economically viable) business opportunities for PWS, additional resource recovery facilities will be pursued at the Ridge Landfill.

3.3 Description of the Proposed Project

PWS is proposing to expand the Ridge Landfill to meet the long term disposal needs of Ontario's growing population and economy, while continuing to serve its customers with full waste management services, including opportunities that will evolve to increase waste diversion to support the recently passed *Waste-Free Ontario Act*. The preliminary description of the proposed Project includes:

- A capacity expansion to the Ridge Landfill of 26 million tonnes (maintaining the current annual fill 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;
- No change to the IC&I service area (all of Ontario);
- An expansion of the residential service area to all of Ontario;
- Continuation of the environmental management system at the site and potential changes based on the outcome of the EA; and
- Provision of a public drop-off centre at the Ridge site to divert materials that are currently not collected, as well as other potential diversion initiatives that could be located at Ridge resulting from the *Waste-Free Ontario Act*.

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 PWS's current waste management system in southern 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. **Appendix A** includes the work that will be completed during the EA as needed to update and fill any gaps in information.

4.1

PWS Waste Management System in Southern Ontario

It is this approach and the growing externalities impacting the waste services industry that have shaped PWS' commitment to creating a more sustainable future. PWS 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.

PWS plays a pivotal role based on its strengths in logistics and infrastructure in the Southern 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 PWS' commitment to environmental sustainability and Ontario's effort to increase diversion efforts represented by the Province's *Waste Free Ontario Act*, PWS will continue to evaluate opportunities for additional resource recovery and recovery facilities.

4.1.1

The PWS Southern Ontario System

PWS has nine (9) districts in Southern Ontario that are responsible for local IC&I and/or residential curbside collection and the operation of Material Recovery Facilities (MRFs), Waste Transfer Stations or a combination of both. Districts work with their customers, industrial, commercial, institutional or residential, to find at-source solutions for segregation of wastes that have a beneficial end-use. Where at-source separation is not practical then 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 PWS' receiving facility for residual waste from its system of integrated collection services, materials recovery and transfer facilities, as well as 3rd party facilities used in southern Ontario. PWS' collection programs and processing facilities enable segregation of valuable recyclable materials from the waste stream. The PWS districts that send their residual waste to the Ridge have established waste segregation programs and continually source local facilities for recycling of asphalt, brick, concrete, clean fill, organics, wood, roofing, drywall, mixed C&D, blue box material, metals, and cardboard. The PWS Windsor District, for example, has recently (2015) partnered with Seaclyffe Energy in Leamington and now diverts through anaerobic digestion over 8,000 tonnes of IC&I sourced organics per year for PWS customers. PWS continues to work with its customer base to expand this and other waste diversion programs. PWS also supports corporate diversion programs, including LEED initiatives for our clients, e.g. the Toyota-Cambridge Zero Waste Program.

PWS understands that no one knows the needs of a community better than those who live and work in it and PWS' philosophy of local managerial empowerment allows our district managers to find local and sometimes unique solutions to increase waste diversion activity. One example is that while our Windsor District takes source separated organics to Seaclyffe as mentioned it also has a partnership with a local farmer who receives almost 8500 tonnes per year of greenhouse cucumber and pepper vines and growing medium and composts it for use as farm fertilizer. PWS 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. It also makes diversion programs economically viable for customers and minimizes GHG emissions that would result from longer haul distances to markets.

The location of each PWS district waste management facility relative to the Ridge Landfill is shown in **Figure 8**.

FIGURE 8: PWS EXISTING SYSTEM IN SOUTHERN ONTARIO



PWS facilities include the Bracebridge MRF that processes in the order of 27,000 tonnes of recyclable materials collected from IC&I sources, the District of Muskoka and some adjacent townships. PWS services residential curbside collection programs and public drop off depots located throughout the District and in the townships it serves. The PWS Barrie MRF receives and transfers paper for the City of Barrie and bulks source separated organics for shipment for both Barrie and the County of Simcoe. The PWS Toronto Transfer Station processes approximately 44,000 tonnes of IC&I recyclable materials per year and the PWS Toronto District is also responsible for one of two contracts with the Region of Peel for curbside collection of waste, recyclables and organics. The Hamilton Transfer Station also segregates recyclables. The Brantford operation relies on local facilities owned by others for recyclables material handling. The PWS Kitchener MRF receives and processes in the order of 77,000 tonnes of recyclables; all recyclables are sourced from the IC&I sector. PWS also operates a MRF in London. The Windsor Transfer Station receives IC&I recyclable materials and waste. Organic wastes are hauled directly from generation sources to processors and residual waste from PWS Windsor is transferred to nearby Michigan for disposal.

The PWS Chatham District serves the host community for the Ridge Landfill and provides IC&I waste and recyclables collection as well as curbside collection services for the Municipality of Chatham-Kent. Recyclables are delivered to Chatham-Kent Recycling and PWS recently

implemented an automated waste collection system which is supporting a cart limit on the amount of waste that can be set out for disposal on a weekly basis.

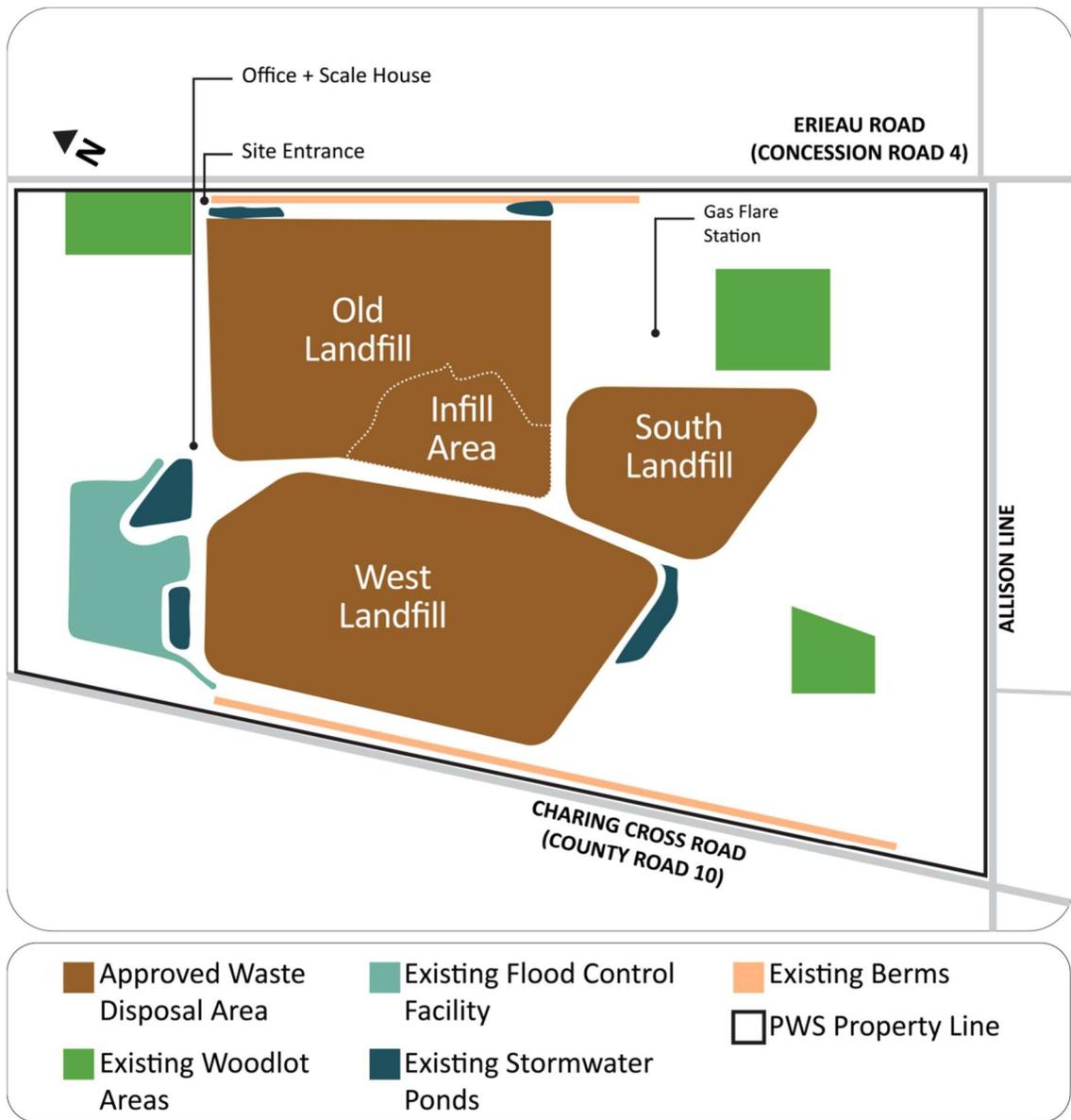
The Ridge Landfill itself receives in the order of 160,000 tonnes of material per year for beneficial end uses such as road base. Inspections of waste materials being received at the Ridge Landfill are also undertaken and where materials that are visually inspected are determined to be 'recoverable' further discussion occurs with generators with respect to at-source separation and opportunities for direct transport to recycling/organic waste recovery facilities or other beneficial end use.

4.2

The Existing Site

The Ridge Landfill has been in operation since 1966. The Landfill Site Area currently includes 262 ha of the 340 ha Ridge Landfill property. The approved waste disposal area is 131 ha, including the Old Landfill, West and South Landfills and the Infill Area. **Figure 9** highlights the key on-site features.

FIGURE 9: THE EXISTING SITE



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 Landfill includes a blanket stone drainage layer and perforated pipes at the bottom of the fill area under the waste, which will be the same for the South Landfill when it is developed. Environmental management at the site includes annual independent groundwater and surface water monitoring with reports submitted to the MOECC.

The groundwater and surface water monitoring is carried out by an independent contractor on annual basis to confirm that the leachate collection system and the natural clay liner is protecting groundwater. Over 50 years of groundwater monitoring through an extensive 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 to minimize dust;
- Use of water trucks on site access roads during dry weather to reduce dust and use of woodchips or autofluff when needed to minimize mud within the cell areas;
- Truck wheel cleaning facility to control mud;
- 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 portable 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.

PWS is also planning to develop a biogas facility to convert landfill gas into a pipeline quality natural gas. This facility would contribute to the achievement of the provincial government's goal to address climate change.

4.3 Study Areas

For the purposes of the EA, three impact study areas will include (see **Figure 10**):

- 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 but will not exceed the area shown in **Figure 10**; and
- Haul Route Study Area ("haul route") – encompasses lands immediately adjacent to Communication Road, Drury Line and Eriean Road which are identified as the designated haul route for the site.



RIDGE LANDFILL

Figure 10: RIDGE LANDFILL STUDY AREAS

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

1:25,000
 0 100 200 400 m



MAP DRAWING, INFORMATION, IMAGERY PROVIDED BY DIGITAL GLOBE/ DATA OBTAINED FROM MNRF
 MAP CREATED BY: GJM
 MAP CHECKED BY: MB
 MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 192456
 STATUS: DRAFT
 DATE: 6/20/2016

It should be noted that in at least one case a broader study area may be required to properly assess potential effects (i.e., visual effects). These will be addressed on a case-by-case basis during the preparation of the EA.

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.

4.4 Existing Environmental Conditions

This section describes the existing environmental conditions on-site and in the vicinity of 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 Mixed wood 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

Southwest, southeast and northern woodlots are located on the property. An ecological land classification study completed in 2015 identified seven natural vegetation communities within these on-site woodlots. All three woodlot areas were 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.

Three other woodlots exist to the northeast and southwest ends of the property.

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 a number of species that could occur 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 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 does not fall within a regulated source water protection area that is subject to a Source Water Protection Plan under the *Clean Water Act*. 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 property is situated in the southeastern end of the Jeanette's Creek Subwatershed. The Jeanette's Creek Subwatershed encompasses an area of approximately 380 km² 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 generated from the property and local vicinity is conveyed into tributaries of Jeanette's Creek by five municipal drains: the Duke Drain, Howard Drain, Lewis Drain, Scott Drain and Gales Drain; however there are seven drains within 1 km of the property. Approximately 900 m of the Duke Drain and 1,700 m of the Howard Drain are within the property. Flow rates in these watercourses are variable throughout the year.

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.

PWS 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 in the vicinity of 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.

PWS strives to be a good neighbor 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 & 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 and thus the archaeological potential of these lands is not yet known.

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 roadscares including sections of Eriean 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 Plan¹. The Waste Fill Area falls under the *Waste Management Area* land use designation, which allows disposal of non-hazardous waste only. With the exception of Eriean Road, the current landfill area is bounded on all sides by lands under the *Agriculture/Buffer Area* designation, which allows for agriculture, farm-related industrial and farm-related commercial uses and accessory uses.

Portions of Eriean 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.

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 as visible from 3 km away. To mitigate potential visual effects, berms are located along the southwest and northeast boundaries of the Ridge Landfill 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 proposed Project.

The visual landscape at the regional level has been altered in recent years due to the installation of wind power generation facilities in the Municipality of Chatham-Kent.

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

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 5,500 foot 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, 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.

5.0 Alternatives Assessment

As required by **Section 6.1(2)** of the *Act*, the proponent is to undertake an alternatives assessment which includes consideration of Alternatives to the proposed Project and Alternative Methods of carrying out the proposed Project. Since this is a focused EA (**Section 2.3**), the assessment of Alternatives to the proposed Project (“Alternatives to”) was completed as part of this ToR. This Alternatives To assessment work is presented in a supporting document and summarized in this section of the ToR (**Section 5.1**). No additional work on Alternatives to is proposed to be completed during the EA.

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

5.1 Screening Criteria

Screening criteria suggested in the Code of Practice were used to determine the preferred Alternative to be considered in the EA. **Table 2** documents the application of these screening criteria to the four Alternatives to. Only the preferred alternative from the screening analysis was judged to be reasonable and feasible for PWS to pursue.

TABLE 2: APPLICATION OF “ALTERNATIVES TO” SCREENING CRITERIA

Screening Criteria	Alternative 1: Do Nothing	Alternative 2: Close the Ridge Landfill and open a new landfill	Alternative 3: Expand the Ridge Landfill	Alternative 4: Expand the Ridge Landfill + Resource Recovery
Does the alternative provide a viable solution to address the need/opportunity for waste diversion and disposal capacity?	No	No	No	Yes
Is the alternative technically feasible?	Yes	Yes	Yes	Yes
Can the alternative be implemented within the defined study area (i.e., southern Ontario)?	Yes	No	Yes	Yes
Is the alternative consistent with planning objectives and provincial government priority initiatives (e.g., the emphasis for diversion of waste products by the Government of Ontario)?	No	No	No	Yes
Is the alternative able to meet the purpose of the Act? Is it capable of being approved?	Yes	Yes	Yes	Yes
Is the alternative practical, financially realistic and economically viable such that PWS can continue to provide cost effective services to its customers once the current capacity of the site has been reached?	No	No	Yes	Yes
Can the alternative be developed to minimize environmental impacts and avoid sensitive features?	Yes	Yes	Yes	Yes

5.2 “Alternatives To” Evaluation

Section 6.1(2)(b)(iii) of the Act requires consideration in an EA of Alternatives to the proposed Project or functionally different ways of satisfying the need/opportunity. The Ministry of the Environment’s Code of Practice (2014b) recognizes that private companies may not be able to implement some alternative ways of managing waste and provides guidance on focusing an EA.

Since the core waste management services of PWS are collection, waste diversion/processing, transfer stations and landfill disposal, the Alternatives to assessment included waste processing/diversion and landfill to satisfy the opportunity/need for disposal in southern Ontario.

The following four Alternatives to were identified and evaluated:

Alternative 1 – Do Nothing

This alternative involves continuing landfill operations until the existing approved capacity is reached. The “Do-Nothing” alternative would mean that the Ridge Landfill will reach capacity by 2022 and will no longer be able to provide needed waste disposal capacity in southern Ontario including the current customers of PWS.

Waste disposal is a key service of an integrated waste management services business such as PWS. To exit the waste disposal business at the Ridge Landfill would place PWS at a significant competitive disadvantage in the southern Ontario marketplace and would lead to an erosion of the value and quality of the company’s services in Ontario.

The PWS customer base includes the Municipality of Chatham-Kent and contingency capacity for surrounding counties of Essex, Lambton, Middlesex and Elgin. Closure of the Ridge Landfill would lead to local job losses and the loss of the significant local economic benefits which result from the operation of the facility.

Alternative 2 – Close Ridge Landfill and Construct a New Landfill

This alternative involves closing the Ridge Landfill when it reaches capacity and opening a new landfill at a different location. To meet the need for southern Ontario landfill capacity and the needs of the same or a similar customer base as PWS has now, a new site would need to be located in southern Ontario.

A new landfill would be an engineered landfill that includes a liner, leachate management system and a landfill gas management system. It would need to be of a size that could accommodate 1.3 million tonnes of waste annually for 20 years (the current approved fill rate for Ridge Landfill). PWS searched for other landfill siting opportunities in southern Ontario in a previous EA for the Ridge Landfill completed in the late 1990s. Since landfill siting is mainly based on environmental conditions that would not have changed since the 1990s, the conclusions of this past EA are still valid - that no new site to serve PWS’ local municipal customers was significantly more advantageous than the Ridge Landfill.

Alternative 2 would involve the same closure activities associated with Alternative 1 (the Do-Nothing alternative) resulting in the requirement for PWS to maintain and monitor two separate sites over the long term.

Alternative 3 – Expand the Existing Landfill

The current Ridge Landfill has been in operation since 1966. Over this time, PWS has established a relationship with neighbours of the Ridge Landfill. This alternative involves maintaining the Ridge Landfill and adding capacity through expansion. Expanding the landfill could include a lateral expansion, increasing the height of the Old Landfill and/or mining the Old Landfill or any combination of these alternative site development methods. Depending on the configuration of the expansion, the expanded fill area could range from approximately 40 to 90 ha.

The expansion would be contained on property owned by PWS and the required infrastructure for the expanded landfill is already in place or can be put in place cost effectively. There is an excellent management and operations team already in place at the Ridge Landfill.

PWS believes it can mitigate any reasonable concerns of its neighbours as they relate to future operations at the Ridge Landfill within the expansion of its disposal capacity. PWS has demonstrated over an extended period of time an ability to manage and mitigate any environmental issues at the site and to be a good neighbour. Monitoring of site performance after 50 years of operations demonstrates acceptable environmental performance by the landfill.

Alternative 4 – Expand the Existing Landfill with Resource Recovery

This alternative involves laterally expanding the current landfill and/or increasing the height of the Old Landfill and/or mining the Old Landfill as described in Alternative 3. In addition, this alternative includes the recovery of additional resources through enhanced diversion opportunities.

An expanded public drop-off area at the Ridge Landfill to divert additional recyclable materials (e.g., household hazardous, electronic wastes, etc.) and other recyclable materials that may be designated by the Province will be included in the assessment. Additional waste diversion opportunities that could be located at Ridge resulting from the *Waste-Free Ontario Act* and that are technically feasible and economically viable for PWS.

This alternative would have similar benefits and potential for effects on neighbours of the Ridge Landfill and the environment as Alternative 3. Should additional resource recovery occur at the Ridge Landfill there is the potential for additional traffic to the site and associated nuisance effects as well as potential nuisance effects from on-site processing activities (e.g., noise, dust, and odour).

5.3 "Alternatives To" Conclusion

Alternative 4 – Expand the Existing Landfill with Resource Recovery was identified as the Preferred Alternative and will be further considered in the EA – After applying the screening

criteria it was the only Alternative To that met all screening criteria. This Alternative is a viable approach to providing additional disposal capacity to assist Ontario and PWS to meet the disposal needs for their customers and residual waste generators in southern Ontario. It will also provide PWS the flexibility to respond to potential waste diversion opportunities at the Ridge.

Hence, Alternative 4 is the preferred alternative as it supports disposal of residual waste, and waste diversion from disposal. Implementation of this alternative will provide continued residual waste disposal capacity in southern Ontario for an additional 20 years. This alternative is practical, financially realistic and economically viable and enables PWS to meet the demands of its current customer base and to consider further waste diversion opportunities.

5.4 Alternative Methods Evaluation

Section 6.1(2)(b)(ii) of the Act requires consideration of “Alternative Methods” of carrying out the proposed 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 resource recovery system Alternative Methods (**Section 5.2.1**), and landfill site development Alternative Methods (**Section 5.2.2**).

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 of secondary source data as well as primary field work where required. For landfill site development Alternative Methods this will include the characterization of existing conditions on-site, off-site and along the haul route. For resource recovery system Alternative Methods this will include characterizing the existing PWS system. This work will supplement the description of existing conditions included in **Section 4**, where needed.

Step 2 - Develop Alternative Methods: Resource recovery system and 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. Proposed evaluation criteria are

included for the evaluation of resource recovery system and landfill site development Alternative Methods in **Sections 5.2.1** and **5.2.2**, respectively. 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 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 after mitigation.

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 tradeoffs 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 public input on the importance of criteria. Based on the results of this evaluation, a preferred alternative method will be identified. This work will be documented in a clear and traceable fashion such that the decision making process and rationale for the preferred method is easy to understand.

Step 5 – Impact Assessment of the Preferred Method (i.e., Landfill Site Development Alternative Criteria): 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**.

5.4.1 Alternative Methods – Resource Recovery System Alternatives

5.4.1.1 Identification of Resource Recovery System Alternatives

The following describes in more detail an approach to how the proposed Alternative Methods for waste diversion will be evaluated as part of the EA process. As set out in **Section 5.2.1** each alternative will be evaluated with consideration to socio-economic, design and operations, and a range of transportation impact criteria. Only those criteria that enable differentiation between the Alternative Methods will be applied.

All three (3) proposed alternatives can involve collaboration with the Ridge Landfill host community of Chatham-Kent to develop partnership opportunities through collection, processing and expanded public drop off opportunities to support their municipal waste diversion targets.

Alternative 1 – PWS Existing Resource Recovery System

The existing system as described in **Section 4.1** would continue to provide near-source resource recovery for PWS' residential and IC&I customers in Southern Ontario. Future resource recovery opportunities would continue to be developed near source, that is, ongoing encouragement of at-source separation by customers, segregation at transfer/processing facilities and this alternative would support any further mandated material segregation e.g. designated materials that may arise from Bill 151 and similar legislative and regulatory initiatives throughout the expanded life of the landfill. Initiatives such as Bill 151 will also ensure 3rd party users of the Ridge Landfill are diverting as much as possible before shipping their residual waste to the site for disposal. Appropriate processing facilities and markets for materials as applicable would be utilized to support those programs and would be sourced as locally as possible. No centralized processing infrastructure e.g. composting and/or construction and demolition recovery facilities would be constructed, i.e., at the Ridge Landfill.

This alternative would include an expanded public drop-off area at the Ridge Landfill site to divert additional recyclable materials that could include materials such as household hazardous waste, electronic wastes and other recyclable materials as designated by the Province, likely in the regulations to follow Bill 151. This alternative would involve collaboration with the Ridge Landfill's host community of Chatham-Kent and site neighbours in order to develop synergies in programming and infrastructure development, and to avoid duplication in the provision of service. Chatham-Kent currently operates eight (8) transfer stations that receive large item waste, regular waste, recyclables, appliances, scrap metal, electronics and the like.

Alternative 2 – Centralized Processing at the Ridge Landfill Site for Southern Ontario

This system alternative would complement the existing PWS resource recovery network. Any additional designated materials prescribed as an outcome of Bill 151 that could be managed locally (e.g. that would accumulate in smaller tonnage volumes over time) would be managed as such. This alternative however considers centralized infrastructure for those materials that could generate significant tonnage for waste diversion purposes like organic waste and/or construction and demolition waste. This would involve long-haul transport from the Southern Ontario network to the Ridge Landfill. This alternative would complement an outcome of Bill 151 that supports mandated diversion in the IC&I sector and could also possibly support mandated programs municipally where PWS has municipal contracts.

This alternative would also include the expanded public drop-off area at the Ridge Landfill as described in Alternative 1.

Alternative 3 – Centralized Processing at the Ridge Landfill for Local Markets

This system alternative would also complement the existing PWS resource recovery network. Any additional designated materials prescribed as an outcome of Bill 151 that could be managed locally (e.g., that would accumulate in smaller tonnage volumes over time) would be managed as such. This alternative also however considers centralized infrastructure for those materials that could generate significant tonnage for waste diversion purposes like organic waste and/or construction and demolition waste but for more local markets transported to the Ridge site. Partnering opportunities with Chatham-Kent and adjacent municipalities that do not currently have infrastructure in place; Lambton, Middlesex, Elgin Counties and Essex Region would be the local area serviced. This could also include IC&I source waste for diversion. This alternative could compliment an outcome of Bill 151 that supports mandated diversion in the municipal and/or the IC&I sector.

This alternative would also include the expanded public drop-off area at the Ridge Landfill.

5.4.1.2

Comparative Evaluation of Resource Recovery System Alternatives

Table 3 outlines the proposed qualitative evaluation criteria to compare the resource recovery system Alternative Methods. These criteria would be used to evaluate the system Alternative Methods in the EA to select a preferred alternative method.

TABLE 3: PROPOSED EVALUATION CRITERIA FOR RESOURCE RECOVERY SYSTEM ALTERNATIVES

Criteria Group	Criteria
Socio-economic	<ul style="list-style-type: none"> Economic benefits to the local economy.
Transportation	<ul style="list-style-type: none"> Potential for traffic safety and operations impacts along the haul routes to waste processing facilities. Potential for increased greenhouse gas emissions along the haul routes to waste processing facilities. Haulage costs to waste processing facilities.
Design and Operations	<ul style="list-style-type: none"> System flexibility

5.4.2

Alternative Methods – Landfill Site Development Alternatives

5.4.2.1

Identification of Landfill Site Development Alternative Methods

PWS has identified a need/opportunity for an additional 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 combined, these represent a greater total capacity than what is needed to accommodate a 20 year expansion of the landfill. The specific site development alternatives for consideration will be determined during the EA.

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.

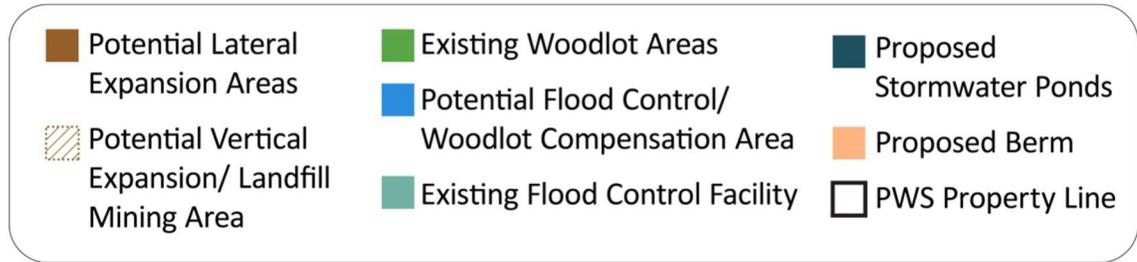
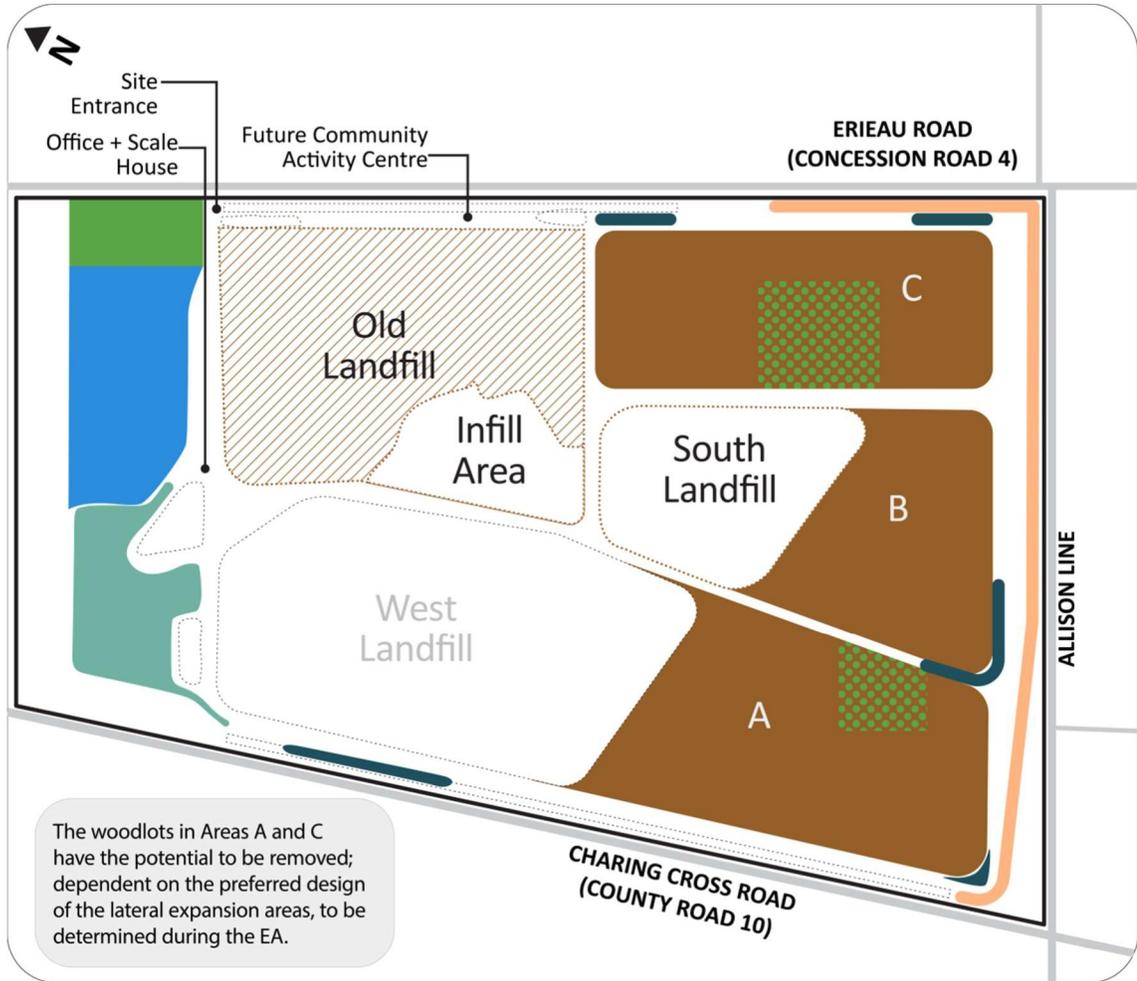
Landfill Mining of the Old Landfill - Landfill mining involves excavating waste, sorting or screening it and diverting recyclables and cover material to provide additional space in an existing landfill for more waste.

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. At the Ridge Landfill, there is a potential opportunity to mine the Old Landfill for material to be diverted and to create additional capacity. The mined Old Landfill would have a lower base and would be re-designed with leachate control similar to the existing West and South Landfills (i.e., an underdrain leachate collection system and a side-slope liner).

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 PWS property where new waste cells could be developed as shown on **Figure 11**; 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 11: RIDGE LANDFILL EXPANSION FILL AREAS



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.

5.4.2.2

Comparative Evaluation of Landfill Site Development Alternatives

Table 4 outlines the proposed evaluation criteria to compare the Alternative Methods of landfill site development. These criteria would be used to evaluate the landfill site development Alternative Methods in the EA to select a preferred alternative method. It should be noted that only criteria that allow for differentiation between site development alternatives are listed in **Table 4**.

TABLE 4: PROPOSED EVALUATION CRITERIA FOR ALTERNATIVE METHODS OF LANDFILL SITE DEVELOPMENT

Criteria Group	Criteria
NATURAL ENVIRONMENT	
Biology	<ul style="list-style-type: none"> • Potential for loss/disruption of terrestrial systems on-site. • Potential for loss/disruption of aquatic systems on-site.
SOCIO-ECONOMIC	
Socio-economic	<ul style="list-style-type: none"> • Potential for displacement of residents on-site. • Potential for disruption of residents and/or businesses off-site (e.g. noise, dust, odour, etc.). • Potential for disruption (e.g. traffic, noise, odour, dust, etc.) of residents and/or businesses along the haul route for soil import or export. • Potential for odour disruption as a result of landfill mining.
Agriculture	<ul style="list-style-type: none"> • Potential for loss/disruption of agriculture on-site.
Archaeology	<ul style="list-style-type: none"> • Potential for impact to as-yet undiscovered archaeological resources on-site.
Land Use	<ul style="list-style-type: none"> • Intensity of waste management use.
TRANSPORTATION	
Traffic	<ul style="list-style-type: none"> • Potential for traffic safety and operations impacts along the haul route for soil import or export.
DESIGN AND OPERATIONS	
Design and Operations	<ul style="list-style-type: none"> • Potential for providing necessary service • Potential for on-site worker safety concerns. • Cost of facility.

5.5

Impact Assessment of the Preferred Alternative Method of Site Development

The EA will determine the potential effects of the Project on the natural, socio-economic and transportation environments within the study areas defined in **Section 4**. 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 these environments and will consider our changing climate. This work will involve the following steps:

Step 1 – Develop Design and Operation Facility Characteristics : The design and operations facility characteristics of the preferred alternative method will be determined.

Characteristics could include: site preparation work such as clearing vegetation; moving existing features such as drains or existing landfill facilities; construction of new landfill cells; and ongoing operation of the landfill. Facility design will also consider potential for adaptation to changing climate.

Step 2 –Assessment of Potential Effects & Development of Mitigation Measures : Proposed impact assessment criteria, included in **Table 5**, will be used in the EA to predict the potential effects of the preferred alternative method and associated activities on the environment. The impact assessment criteria will also consider the potential effects of greenhouse gases and proposed mitigation measures. Cumulative effects of other existing and potential future developments will also be considered.

A summary of the technical work to be undertaken as part of the EA impact assessment is included in **Appendix A**.

A “do-nothing” scenario will be used as a baseline by which to measure the potential for impact 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 PWS 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 5: PROPOSED IMPACT ASSESSMENT CRITERIA

Criteria Group	Criteria
NATURAL ENVIRONMENT	
<i>Biology</i>	
On-site	<ul style="list-style-type: none"> • Potential for loss of woodlot and associated habitat. • Potential for disturbance of aquatic habitat due to potential realignment of municipal drains.
Off-site	<ul style="list-style-type: none"> • Potential for nuisance disruption by litter, noise, dust or odour.
<i>Geology/Hydrogeology</i>	
Off-site	<ul style="list-style-type: none"> • Potential impacts to groundwater quality. • Potential impacts to groundwater movement.

Criteria Group	Criteria
	<ul style="list-style-type: none"> • Potential impacts to groundwater quantity. • Potential impacts to domestic water wells.
<i>Surface Water</i>	
Off-site	<ul style="list-style-type: none"> • Potential impacts to surface water flow conditions. • Potential impacts to flow within the municipal drains. • Potential impacts to surface water quality.
SOCIO-ECONOMIC	
<i>Socio-economic</i>	
On-site	<ul style="list-style-type: none"> • Loss of agricultural products and employment. • Potential for displacement of on-site residences.
Off-site	<ul style="list-style-type: none"> • Potential impacts to property value. • Potential visual impacts. • Potential nuisance effects to residences and businesses from odour, noise, litter and dust.
Haul Route	<ul style="list-style-type: none"> • Potential nuisance effects to businesses and residences from dust and noise. •
<i>Regional Economy</i>	
Off-Site & Haul Route	<ul style="list-style-type: none"> • Potential benefits to the regional economy.
<i>Agriculture</i>	
On-site	<ul style="list-style-type: none"> • Potential for loss of farm land.
Off-site	<ul style="list-style-type: none"> • Potential for nuisance effects of dust, noise, odour, litter.
Haul Route	<ul style="list-style-type: none"> • Potential for change in traffic safety and operations.
<i>Cultural</i>	
Off-site	<ul style="list-style-type: none"> • Potential disturbance of cultural heritage resources.
<i>Archaeology</i>	
On-site	<ul style="list-style-type: none"> • Potential disturbance of as-yet undiscovered archaeological resources.
<i>Land Use</i>	
On-site	<ul style="list-style-type: none"> • Potential for changes to land use designations. • Potential for additional approvals or permits (e.g., airport zoning)

Criteria Group	Criteria
TRANSPORTATION	
<i>Aviation Safety</i>	
Off-site	<ul style="list-style-type: none"> • Potential for increased bird hazards to aircraft.
<i>Transportation</i>	
Haul Route	<ul style="list-style-type: none"> • Potential for increase in traffic and delay to users. • Potential for safety concerns.

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 affected by the proposed Project. The consultation guidance found in the MOECC's *Codes of Practice* will be followed over the course of the Project.

PWS is committed to engaging stakeholders to ensure that local neighbours and stakeholders have the ability to provide their input on the proposed Project. PWS 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 stakeholders and the general public 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. .

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 proposed 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, 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, PWS 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 PWS 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:

- Caldwell First Nation;
- Chiefs of Ontario;
- Chippewas of the Thames 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.

Meetings will be held with Walpole Island First Nation and Caldwell First Nation following the issuance of this draft ToR.

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 proposed 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. PWS 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, PWS 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-plans>

- 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 launched on the landfill website to provide easy to access information about the Project as well as an on-line 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 PWS 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;
- Two public Open Houses were held during the ToR development. The first on May 3, 2016 introduced attendees to the Project, the rationale for the proposed expansion including the need for additional disposal capacity. The second on June 28, 2016 (to take place following the issuance of the draft ToR) 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; and
- The draft version of the ToR has been made available for public and agency review during a 30 day comment period to provide an opportunity for members of the community to provide feedback on the proposed Project before the ToR is finalized.

6.2

Summary of Issues and Concerns

The Record of Consultation includes all issues raised by the public and agencies and other stakeholders during consultation to date. The following summarizes comments raised by the public and other stakeholders:

- Requests for support and funding from the Ridge Landfill Trust;
- Concerns that the landfill might begin to accept residential waste from the City of Toronto thus increasing the potential traffic and nuisance effects associated with the landfill;
- Sentiment that the community has been host to the landfill for a long time and that the land should be returned to agricultural production;
- Support for the use of landfill gas as a resource;
- Concerns about odour attributed to the landfill;
- Interest in compensation and property value protection;
- Sentiment that the landfill negatively impacts people’s enjoyment of their property;
- Concern about potential impacts to groundwater;
- Concerns about truck traffic and potential influence on local travel; and
- Support for increased diversion of waste.

Issues raised during agency consultation to date have included the following:

- MOECC noted that the proposal should clearly address current provincial initiatives (e.g., climate change, source water protection, cumulative impacts and Indigenous Community engagement);
- MOECC also noted that ways to increase diversion should be considered in the EA;
- LTVCA noted stormwater management as a key component that they will review;
- The Municipality of Chatham-Kent noted that the Project will require *Planning Act* approval to amend the Official Plan and Zoning by-law. It was suggested that if changes to the woodlots are proposed that *Endangered Species Act* permits should be in place prior to the Official Plan amendment;
- MNRF will provide technical advice and recommendations regarding the woodlots and species;
- The Chatham-Kent Airport indicated no concerns with the proposed Project as long as changes comply with current height restrictions and a preference to keep woodlot compensation areas that may attract wildlife and birds as far away from the airport as possible; and

- The Canadian Environmental Assessment Agency expressed that the Project would not be subject to the *Canadian Environmental Assessment Act*.

6.3 Consultation Planned for the EA

6.3.1 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 proposed Project. The consultation activities that are proposed during 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 PWS 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**.

6.3.2 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 proposed Project unfolds.

6.3.3 EA Consultation Process Overview

During the EA, PWS will implement a consultation program that provides interested stakeholders with multiple opportunities through which they can learn about the proposed 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 PWS' 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 12 illustrates the consultation and communication that will occur at each of three key milestones:

1. Confirmation of Alternative methods (i.e., site development Alternative Methods and resource recovery Alternative Methods);
2. Evaluation of Alternative methods; and
3. Assessment of Potential Effects and Development of Mitigation.

It is noted that the consultation program may change as the EA unfolds depending if additional opportunities to obtain input arise, and/or based on feedback from stakeholders, agencies and the public.

FIGURE 12: EA KEY MILESTONES AND ASSOCIATED CONSULTATION PLAN



6.3.4 Notification & 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.

6.3.4.1 Notification

Notifications help keep the public informed of a proposed 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);
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 notification 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.

6.3.4.2 **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. PWS will also liaise with media contacts at key points during the EA to provide information about the project that will assist them in reporting.

6.3.4.3 **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 can include:

- Information about the Ridge Landfill and PWS' 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 will be available on the website);
- How to get involved in the Project, including information about upcoming events.

6.3.4.4

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.

6.3.5

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. PWS plans to use multiple tools and techniques to achieve these objectives. **Table 6** provides a summary of the consultation activities PWS will undertake to obtain input from the community during the EA development.

TABLE 6: CONSULTATION ACTIVITIES

CONSULTATION ACTIVITY	DESCRIPTION
Neighbour Meetings	PWS will continue to proactively meet with Ridge Landfill neighbours on an informal basis to explain the proposed 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.
Open Houses	All open houses will be set up as a drop-in format 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. <ul style="list-style-type: none"> ● 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. This Open House will seek input on the preliminary evaluation. ● A third EA Open House will present the preferred alternative and the assessment of potential effects and an outline of the plans to mitigate potential negative impacts associated with the Project.

CONSULTATION ACTIVITY	DESCRIPTION
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 Ministry of Natural Resources and Forestry (MNR), the Ministry of Tourism, Culture and Sport (MTCS), the Municipality of Chatham-Kent, Chatham-Kent Municipal Airport, Transport Canada, and the Lower Thames Valley Conservation Authority (LTVCA).
Indigenous Community Engagement	PWS 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 proposed Project and PWS 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 proposed Project so that they have the information they need to liaise with their constituents. PWS intends to brief key elected officials immediately preceding public events.
EA Review	<p>The draft EA document will be made available for a minimum 30-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.</p> <p>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.</p>

6.3.6 Issue Resolution

Documenting and addressing issues is an important component of a transparent EA process. PWS 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.

Commitments and Monitoring

The EA report will include a comprehensive list of commitments made by PWS by way of interactive consultation throughout the EA process. These commitments may include, but are not limited to:

- Mitigation measures for potential impacts;
- Monitoring of mitigation measures based on performance objectives;
- Ongoing consultation with landfill neighbours and stakeholders;
- 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; and
- Contingency planning.

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.

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 proposed 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*;
- Airport zoning exemptions under the Transport Canada Airport Zoning Regulations; 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.

Agricultural Assessment

Data Collection & Field Work

Field work will include walking the fields in the on-site study area to 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 any litter has reached these fields.

The Agricultural Assessment will be documented and will include the update of agricultural activity for the on-site, off-site and haul route study areas. 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 analysis of how agriculture on-site will be impacted by development of the Ridge Landfill. In most cases removal will occur, but opportunities may be present to relocate/re-establish agricultural activity on-site or off-site in fields that are currently fallow or have been abandoned (if any). Alternatives will be compared from an agricultural perspective based on the potential for impacts.

Impact Assessment & 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 on-site agricultural soils can be used most effectively. This would include investigating the need for landfill cap material; berm construction, other site construction activities like planting adjacent to a new stormwater management pond(s), soils that could be sold as amendment (e.g., off-site use of stripped soils as part of a soil mix operation in the local area or for other beneficial use.

Air Quality Assessment

Data Collection and Field Work

In order to characterize the changes in air emissions, the following data collection tasks will be completed:

- Indicator compounds will be selected for the air quality assessments. Changes in 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. Indicator compounds such as total suspended solids and nitrogen oxides will be used for the air emissions assessment.
- 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. Data will be collected for the indicator compounds identified for the project.

Evaluation of Site Development Alternative Methods

Site Development alternatives, which include landfill mining may have the potential for odour impacts. As such, samples will be taken from test pits at the Old Landfill and air and odour emissions will be modelled to estimate the potential impact of landfill mining. This work will inform the evaluation of alternative methods with respect to socio-economic criteria.

Impact Assessment & 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 the significant 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 Alternatives

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

Impact Assessment & 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 NavCanada 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 & Mitigation

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;
 - Botanical surveys;
 - Bat studies (species at risk bat activity monitoring, bat maternity roost surveys, bat habitat assessment, and acoustic bat data collection);
 - Amphibian surveys;
 - Breeding bird surveys;
 - Incidental wildlife and wildlife habitat observations;
 - Significant tree species;
 - Grassland bird species; and
 - Snapping turtle investigation.

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 environment off-site.

- 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. Secondary source data only will be used to update the characterization of the aquatic environment off-site.

Evaluation of Alternative Methods of Site Development

The evaluation of these alternatives will include analysis of how terrestrial and aquatic systems will be impacted by the Project. In cases where removal is expected 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 & 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 & 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 Report

The Design and Operations Report 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 report will provide a detailed description of the Ridge Landfill site design and operations in order to satisfy the approval requirements.

The report will follow *Ontario Regulation 232/98* and the *Landfill Standards* published by the MOECC in January 2012. The report will address the following key components:

- Regulatory and approval requirements;
- 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;
- Landfill gas management;
- Design and operation assumptions for the Ridge Landfill site;
- 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

Data Collection and Field Work

The Hydrogeological Assessment will be completed following the requirements of section 8 of *Ontario Regulation 232/98*. Data collection and field investigations on-site will include:

- 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.
- 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.
 - 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.
 - 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.

- 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.

Impact Assessment & 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 Policy*. 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.

An expanded monitoring program will be developed that includes new landfill areas and will incorporate the proposed new monitoring well nests located in the southern expansion area of the Ridge Landfill. It will also review the existing contingency measures and modify these plans 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

For determining the potential noise impact associated with the Project, the following tasks will be completed:

- The existing and potential future noise receptors in the vicinity of the Ridge Landfill will be confirmed for use in the acoustic assessment.
- The Ridge Landfill is located in a rural setting with background noise levels in the low to mid 40's dBA. As such, a baseline ambient noise measurement study is not deemed necessary for this study. The predicted receptor noise levels will be compared against applicable noise criteria set by the MOECC.

Impact Assessment & 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, ground and atmospheric absorption to predicted 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. 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.

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. The regional area (i.e., the area within which the majority of Ridge Landfill employees reside and local contributions by PWS are made) will also be considered.

Evaluation of Site Development Alternatives

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

Impact Assessment & Mitigation

The Socio-economic Assessment report will use 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.

Economic impacts and influences which may apply to areas beyond the 1 km off-site study area and/or the immediate proximity of the haul route will be considered as part of the regional study area. Since the landfill is located in the Municipality of Chatham-Kent, the municipal boundary may be considered within the regional study area in some instances. The Socio-economic Assessment will include investigating 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

For the purposes of the Surface Water Assessment, the study area will focus on the on-site Howard and Duke Drains but will also extend to the limits of the watershed boundary of the Howard, Scott, Duke and

McDowell Drains. 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. Investigations will include:

- 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.
- Surface water quality sampling of indicator parameters such as temperature, suspended sediments, and nutrients.

Impact Assessment & Mitigation

The potential for the preferred site development alternative to impact 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 & 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 & 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.
- Landscape Plans/visualization will be developed to provide screening to minimize visual impact from the proposed expansion.

