Project File Report

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Halton Region

Halton Region Biosolids Composting Facility Municipal Class Environmental Assessment Study
March 24, 2025

Project File Report

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Executive Summary

Introduction and Background

Halton Region (the Region) owns and operates six wastewater treatment plants (WWTPs) that treat wastewater and safely return the water back to the environment. The solids by-product of the wastewater treatment process, known as "biosolids", is rich in organic matter and nutrients. Biosolids from the Region's WWTPs have been made available, where appropriate, to the agricultural community for crop production for 40 years.

As recently as 2000, Halton Region had access to sufficient agricultural land to manage all biosolids locally. Over time, population growth and changing demographics in the region have resulted in both an increase in biosolids production and a decrease in local farmland. Currently, the biosolids program exports approximately 75 percent of biosolids outside the region to either agricultural producers, reclamation facilities or an approved landfill.

The Biosolids Master Plan (BMP) completed by the Region in 2012 recommended investigation of biosolids composting to enhance the Region's land application program. Biosolids composting is a provincially regulated process by which biosolids are mixed with other organic materials to produce a compost product. Biosolids-sourced compost qualifies for a wider range of land application opportunities (compared to biosolids), allowing the Region to enhance its current land application program locally and reduce hauling distances to manage the material.

In 2020, the Halton Region Biosolids Composting Feasibility Study (Jacobs, 2020) was completed (Feasibility Study) and recommended a Halton Region-owned composting facility to process biosolids into compost, diversify outlets and reduce greenhouse gas (GHG) emissions associated with haulage. The proposed facility includes the biosolids composting process, organic materials (bulking agent), odour control system, parking areas, and office space.

Halton Region initiated this Municipal Class Environmental Assessment (MCEA) study to identify the preferred location for constructing a biosolids composting facility. The study incorporated the recommended composting technology from the Feasibility Study to help facilitate selection of the preferred site location. To help determine and adequately evaluate alternative site location options, the study included high-level conceptual design considerations, such as vehicle access, process area, odour control, and storage for bulking agents. The needs for finished compost product storage will be identified through a subsequent market assessment study.

This study was conducted in accordance with the planning and design process for municipal projects outlined in the Municipal Engineers Association's Municipal Class EA process for Schedule B municipal infrastructure projects (MEA, October 2000, as amended in 2007, 2011, 2015 & 2023).

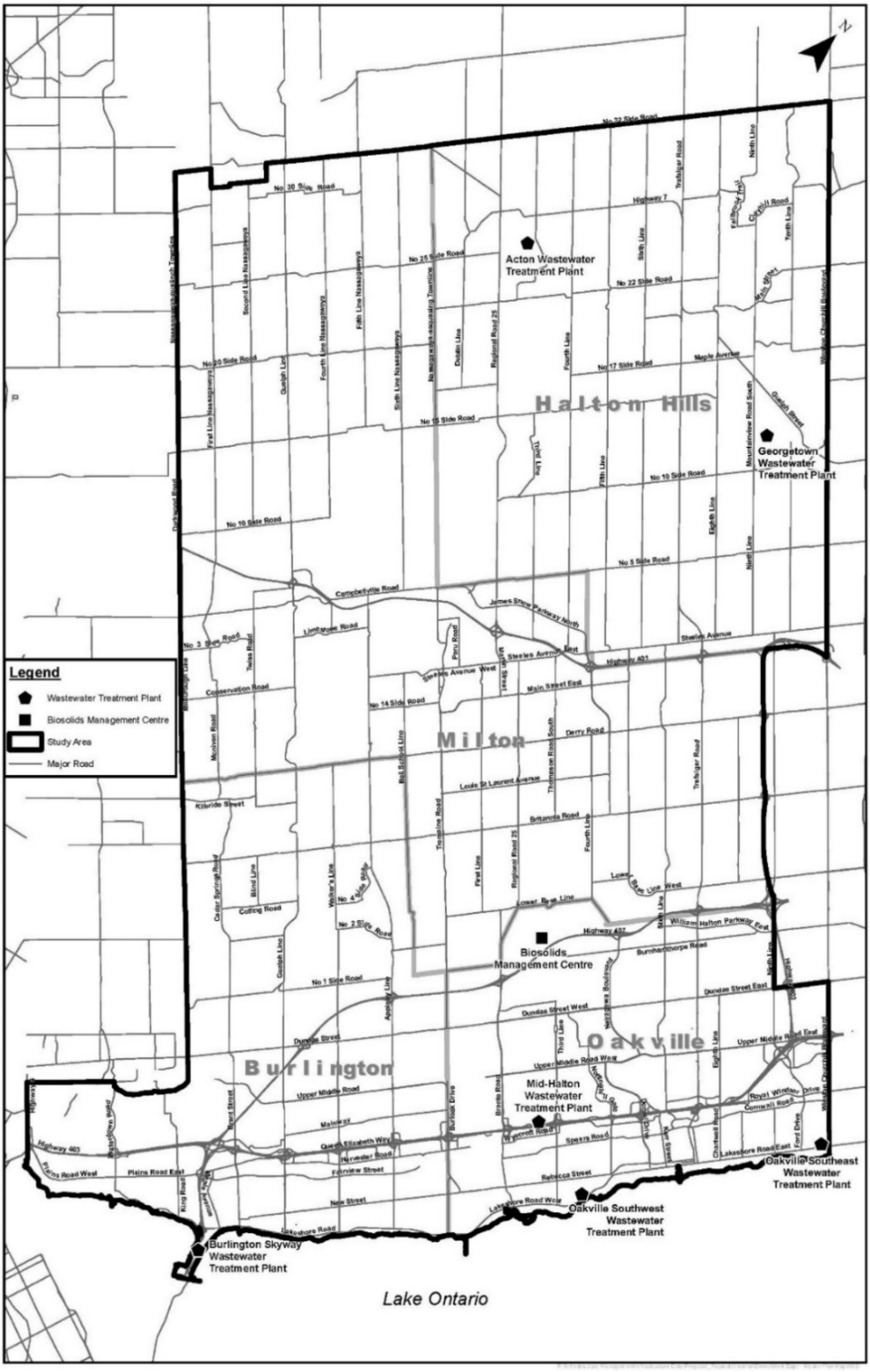
Phase 1 and Phase 2 of the MCEA process were completed for this Schedule B Class EA, as follows:

- Phase 1 – Status of existing biosolids management program, future needs, description of Regional land uses and constraints related to locating a biosolids composting facility in the region, and development of a Problem and/or Opportunity Statement.
- Phase 2 – Identification and evaluation of alternative sites considering the benefits and impacts to the existing community, technical, legal/jurisdictional, natural, social/cultural, and economic environments, as well as input from project stakeholders, to identify a preferred site.

This Project File Report (PFR) documents the Class EA study methodology, stakeholder communications and engagement program, and Phases 1 and 2 findings and recommendations.

The Study Area boundaries for the purposes of this MCEA study include the entirety of the Halton Region. Figure ES-1 presents the project Study Area, as well as locations of the Region's wastewater treatment and biosolids management facilities.

Figure ES-1. Project Study Area



Published in 2012, the Ontario Compost Quality Standards (OCQS) classified three different categories of finished compost: AA, A, and B. Category AA compost is the highest quality but cannot contain any biosolids. Category A compost has more stringent quality criteria than Category B, in which the compost feedstock cannot contain more than 25 percent (dry weight) biosolids and requires a product label. However, Category A compost is not subject to approval for transportation or use (that is, exempted from O. Reg. 347 and 267/03). On the other hand, Category B compost does not impose a maximum feedstock contribution for biosolids but requires government approvals for transportation and use (that is, subject to O. Reg. 347 and O. Reg. 267/03, per current biosolids land application program).

The OCQS sets stringent limits for metal concentrations that must be satisfied for both the feedstock and final product, as presented in Table ES-1.

Table ES-1. Maximum OCQS Feedstock and Finished Products Metals Concentrations

Metals Concentrations (mg/kg dry weight)	Feedstock Maximum Limit for Category A&B Compost	Finished Category A Compost Product	Finished Category B Compost Product
Arsenic	170	13	75
Cadmium	34	3	20
Chromium	2,800	210	1,060
Cobalt	340	34	150
Copper	1,700	400	760
Lead	1,100	150	500
Mercury	11	0.8	5
Molybdenum	94	5	20
Nickel	420	62	180
Selenium	34	2	14
Zinc	4,200	700	1,850

Notes:

mg/kg = milligram(s) per kilogram

Metals concentrations in the Region's biosolids have historically been well below the OCQS limits for feedstock. It is expected that finished Category A compost using the Region's biosolids as feedstock can meet the OCQS limits for the final product, considering the biosolids will be blended with at least 75 percent (by dry weight) bulking agents. The Region previously completed a pilot test in 2015 using the Region's dewatered biosolids, leaf and yard (L&Y) waste, and woodchips as feedstock (with biosolids less than 25 percent by dry weight) in an open windrow composting system; the pilot testing results demonstrated that the final compost product complied with all quality criteria for Category A compost (Halton Region, 2015).

Existing Conditions

The Region owns and operates six wastewater treatment plants (WWTPs). Each facility, as shown in Table ES-2, operates under an Environmental Compliance Approval (ECA) issued by the Ministry of Environment, Conservation and Parks (MECP). The WWTPs have a total treatment capacity of approximately 370,000 m^3/day and currently treat a combined total wastewater flow of approximately 245,000 m^3/day (2019 to 2021).

Table ES-2. Location of Wastewater Treatment Plants in Halton Region

Facility	Address	ECA Number	Rated Flow Capacity (m^3/day)
Acton WWTP	202 Churchill Rd S, Acton, ON	2257-ADZNND	5,200
Georgetown WWTP	275 Mountainview Rd S, Georgetown, ON	4783-BUCP6Y	22,727
Mid-Halton WWTP	2195 North Service Rd W, Oakville, ON	3636-BUCP2V	125,000
Oakville Southeast WWTP	2477 Lakeshore Rd E, Oakville, ON	4916-9RTLQM	31,800
Oakville Southwest WWTP	1385 Lakeshore Rd W, Oakville, ON	1418-7WYPG9	45,400
Burlington Skyway WWTP	1125 Lakeshore Rd, Burlington, ON	0615-AD6RT7	140,000

The Region also owns and operates the W.A. Bill Johnson Biosolids Management Centre (BMC), which collects and stores liquid biosolids before they are hauled to the final receiver (for example, farmland). The liquid biosolids can also be dewatered at the BMC to reduce the volume of biosolids that need to be hauled. The BMC, located at 4449 Regional Road 25, Oakville, ON, is an 11.2-ha facility within a 59-ha property. The facility is operated under the Amended ECA Number A680210 (January 22, 2019) to receive and store liquid biosolids from the Region's wastewater treatment plants. With a rated storage capacity of 79,600 m^3, the BMC contains ten 8,000 m^3 storage tanks, a dewatering station with an allowable throughput of 4,000 m^3/day (operation at 800 to 900 m^3/day), and an administration and maintenance building. An aerial view of the BMC is provided in Figure ES-2.

Figure ES-2. Aerial View of Halton Region Biosolids Management Centre

The purpose of the facility is to store, blend and manage the liquid biosolids from the Region's wastewater treatment plants, resulting in a consistent material for farmland application.

Storing the liquid biosolids at the BMC allows for solids to settle and the supernatant to be returned via a forcemain to the Mid-Halton WWTP for treatment. Between 2019 to 2021, approximately 89 percent of the liquid biosolids leaving the BMC were applied to agricultural land both within and outside the region, 5 percent were dewatered and applied to mine land reclamation, with the remaining 6 percent dewatered and directed to landfill, as shown in Table ES-3. Of the liquid biosolids applied to agricultural land, approximately 59 percent were applied to land outside the region, and 41 percent inside the region.

Table ES-3. Destination of Liquid Biosolids (2019-2021)

Destination	Biosolids Mass (dt)	% of Total
Field Application	2,633	89
Mine Reclamation	148	5
Landfill	178	6

Notes:

dt = dry tonne(s)

Dewatered biosolids are generated at Skyway and Mid-Halton WWTPs, where onsite dewatering equipment is available. Between 2019 and 2021, approximately 24,573 wet tonnes (wt), or 6,045 dt at 24.6 percent solids concentration, of dewatered biosolids were generated each year. Agricultural land

application is the most common destination for the dewatered biosolids (Table ES-4); however, dewatered biosolids are typically applied to farmland outside Halton Region, to contractor-approved sites in southern Ontario (including Wellington, Dufferin, Kent, Perth, Grey Haldimand, Brant, Norfolk, Oxford, Elgin, and Middlesex Counties; the spreading sites are determined based on distance, weather, soil types, and available resources by the contractor). Dewatered biosolids are also hauled to mine sites in northern Ontario for land reclamation or to the Lystek facility in Dundalk (ON) to be used as feedstock for fertilizer production. A small percentage of the dewatered biosolids was sent to Twin Creeks Landfill in Watford for disposal when other land application locations were unavailable.

Table ES-4. Destination of Dewatered Biosolids (2019-2021)

Destination	Biosolids Mass (dt)	% of Total
Field Application	7,798	43
Lystek	6,347	35
Mine Reclamation	3,446	19
Landfill	544	3

Future Biosolids Management Needs

Table ES-5 presents the projected quantity of biosolids generated by 2051, calculated based on the historical equivalent per capita biosolids generation rate and population projections from the Region's Official Plan Review (Halton Region, 2021).

Table ES-5. Historical and Projected Biosolids Generation Rates

Year	Residential Population	Liquid Biosolids (m^3)	Dewatered Biosolids (wt)	Liquid Biosolids (dt [% of total]) [a]	Dewatered Biosolids (dt [% of total]) [b]	Biosolids Generated (dt)
2021	621,000	137,969	25,121	3,035 [33%]	6,180 [67%]	9,215
2051	1,098,070	260,157	43,735	5,723 [35%] [c]	10,759 [65%] [c]	16,482

Notes:

[a] Based on average solids concentration of 2.2% for liquid biosolids (2019 to 2021)

[b] Based on average solids concentration of 24.6% for dewatered biosolids (2019 to 2021)

[c] Percent distribution of liquid and dewatered biosolids corrected to account for future normal operation of Acton WWTP

The biosolids generated and residential population in 2021 were used to calculate the historical equivalent per capita biosolids generation rate (41.1 grams per capita per day) and to estimate 2051 biosolids generated based on the projected residential population. Rather than identifying residential and employment contributions separately, the equivalent per capita biosolids generation rate accounted for contributions from employment in the region. This approach is considered reasonable as long as the ratio of employment to residential contributions does not change significantly in the future, which is the case for Halton Region to 2051, based on residential and employment projections from the Region's Official Plan Review (Halton Region, 2021).

Both the compost feedstock (biosolids) and final product must meet their maximum allowable metal concentrations as defined in the OCQS, for the compost product to be acceptable for distribution as a Category A compost.

Table ES-6 presents the metal concentrations of BMC liquid biosolids (which is a blend from all WWTPs generating liquid biosolids) and dewatered biosolids (from BMC, Skyway WWTP and Mid-Halton WWTP), compared to the maximum limits defined by OCQS for feedstock quality. The concentrations of all metals in the Region's biosolids are well below the OCQS feedstock maximum limits.

Table ES-6. Metals Concentrations (2019-2021) in Halton Region Liquid and Dewatered Biosolids Compared to Maximum OCQS Feedstock Concentrations

Metals Concentrations (mg/kg dry weight)	BMC Liquid Biosolids	BMC Dewatered Biosolids (dewatered onsite)	Skyway WWTP Dewatered Biosolids	Mid-Halton WWTP Dewatered Biosolids	OCQS Feedstock Maximum Limit for Category A&B Compost
Arsenic	10.0	6.5	9.8	5.5	170
Cadmium	5.0	5.0	4.2	2.9	34
Chromium	164	172	95.2	72.1	2,800
Cobalt	5.2	4.8	4.7	3.0	340
Copper	716	701	551	477	1,700
Lead	21.4	26.4	18.9	11.9	1,100
Mercury	0.4	0.6	0.5	0.4	11
Molybdenum	9.0	8.5	11.5	10.4	94
Nickel	35.0	35.1	21.4	21.8	420
Selenium	6.4	5.5	4.7	4.5	34
Zinc	928	887	656	716	4,200

The final compost product quality depends on the bulking materials used, which need to account for at least 75 percent of the feed stream to produce a Category A compost.

Biosolids Composting Alternatives Development and Evaluation

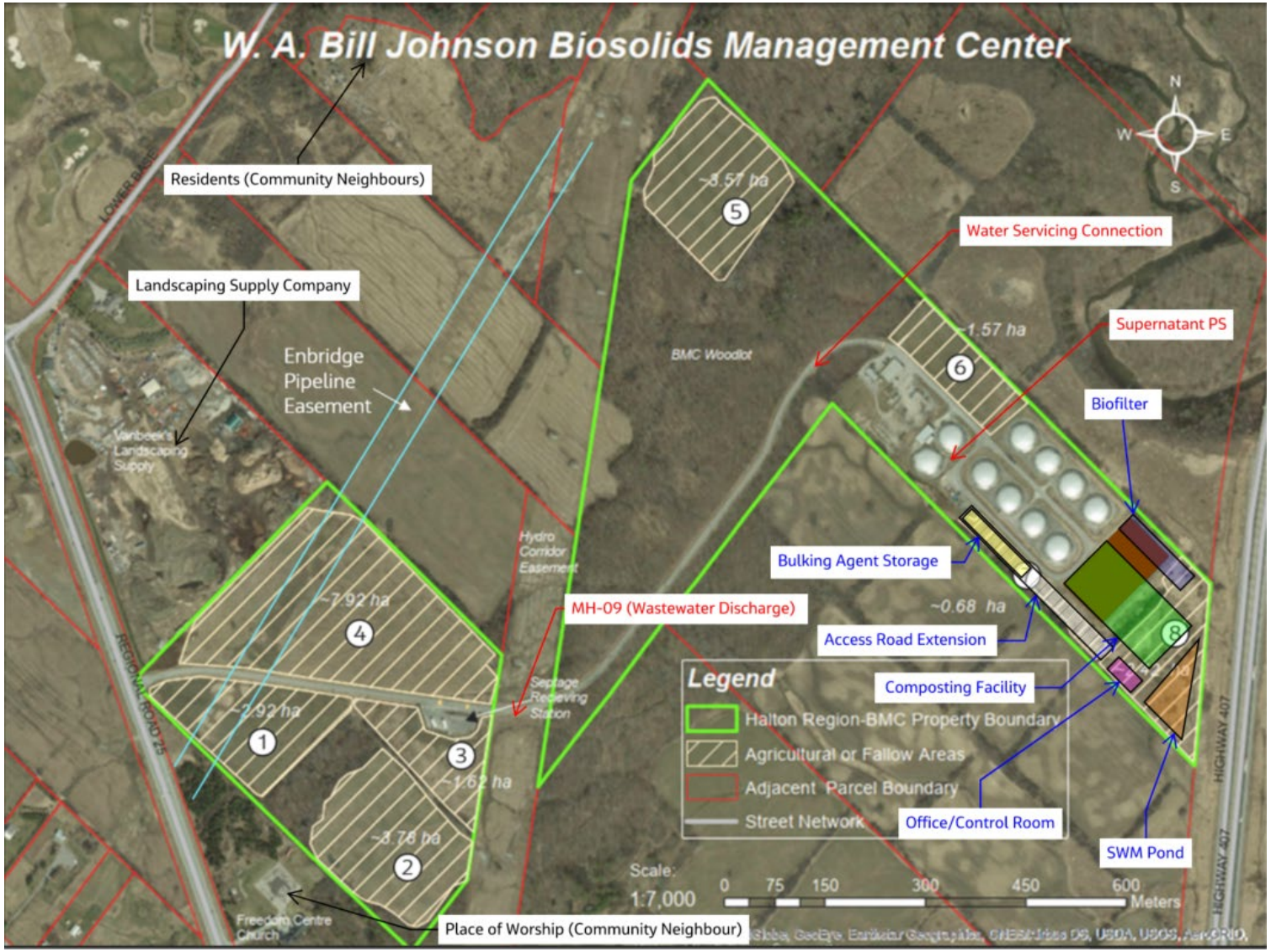
A multi-step evaluation approach was used to identify the preferred location for the proposed biosolids composting facility, as follows:

1. Develop a long list of alternative land parcels within the vicinity of the BMC.
2. Screen the long list to develop a short list of alternative land parcels that are feasible to site the proposed biosolids composting facility.
3. Develop additional details for the short list of alternative land parcels, including potential site layouts, estimated costs and operations and maintenance requirements.
4. Complete a detailed evaluation of the biosolids composting site alternatives using detailed criteria considering impacts and benefits related to the natural environment, the social/cultural environment, technical features, legal/jurisdictional requirements, and economics.

BMC Parcel 8 (Figure ES-3) was selected as the preferred location for the proposed biosolids composting facility, based on the comprehensive evaluation results. Locating the biosolids composting facility at BMC Parcel 8 has the least potential impacts with respect to the natural and social/cultural environments compared to other alternatives. Key factors associated with this site that informed the evaluation results include the following:

- The existing site consists of open field with some trees and does not fall within any special policy areas, meaning that impacts to the natural environment are expected to be minimal.
- Only standard construction techniques and mitigation measures are expected.
- BMC Parcel 8 is furthest from nearby sensitive receptors (place of worship, residences), meaning that it is expected to have the lowest odour and noise impacts. These factors also decrease the risk of a negative community perception.
- There is flexibility for future process expansion if the Region elects to remove one or more of the existing liquid biosolids storage tanks.
- Overall, the relative capital and O&M costs are similar for all shortlisted site alternatives and are non-differentiating.

Figure ES-3. Preliminary Site Layout for the Preferred Solution (BMC Parcels 7 and 8)



Consultation and Engagement

Active and ongoing consultation and engagement with the public and stakeholders including First Nations and Indigenous communities, community members and government entities was maintained as an integral part of the MCEA process. A project mailing list was established where interested members of the public could sign up to receive updates on the progress of the projects and be notified of key communication points and sessions open to the public. This essential procedure fosters a transparent and responsible planning process.

A project contact list was developed at the onset of the project which includes stakeholders from relevant government agencies, First Nations community representatives and interested members of the public who signed up to the project mailing list. The contact list was maintained and updated throughout the master planning process. Key opportunities for the public to receive information about the project and express their input were communicated through project notices distributed to the mailing list and posted on the Region's project website. A dedicated project mailbox was set up to allow for interested members of the community to ask questions and provide feedback at any phase of the project.

The following engagement activities were completed for this MCEA study:

- Project Notices
  - Notice of Commencement
  - Notice of Public Information Centre
  - Notice of Completion
- Public Information Centre
  - One PIC was held as part of the study using a virtual platform where interested parties could view project material for a 5-week period, from March 28, 2024, to May 2, 2024. Virtual consultation meets the spirit of consultation requirements set out by the MECP while allowing stakeholders and interested parties to participate without being in-person. Stakeholders were notified about the PIC via a Notice of Public Information Centre, which was distributed through emails and/or regular mail. The PIC was also advertised through Google Ads and on various Halton Region social media pages.
  - The PIC introduced the study, existing conditions, criteria, constraints, opportunities, the long and short lists of alternative locations, the evaluation framework, and the preliminary preferred location for the proposed biosolids composting facility.
  - An online survey was prepared for the PIC to facilitate the exchange of information. The survey used a multiple-choice format for project-related questions and provided users the opportunity to submit general feedback and comments outside of the survey questions.
  - Over 900 users visited the project PIC webpage and 13 users completed the survey.

The project team received feedback at key stages of the study and identified the following common themes:

- **Proximity to the public and associated noise and odour impacts.** Feedback received through engagement activities indicated that there are concerns about potential noise and odour impacts to the public resulting from the proposed biosolids composting facility.
- **Product interest from local agricultural uses.** Several survey respondents indicated interests in the composting process, the final product characteristics (quality, quantity), and impacts to the Region's current compost pickup program at the HWMS.

The feedback was incorporated into the study as follows:

- **Evaluation Framework:** Noise and odour impacts were considered during the evaluation process and these criteria received high weightings relative to other criteria, reflecting their importance in the overall decision-making process.
- **Site Alternative Development and Evaluation:** Site alternatives were selected with a goal of minimizing impacts to the public. The BMC is an active biosolids management facility, so siting the biosolids composting facility at this location would minimize impacts relative to other potential locations in the Region. Relevant guidelines for minimum separation distance between the biosolids composting facility and other private/public facilities were considered and these requirements can be met. The biosolids composting facility will include an odour control process that collects and treats odorous air before it is released. Odour dispersion modelling will be completed to inform the design of the odour treatment facility and minimize the frequency and level of odours on nearby residents and businesses, and will be subject to MECP approval.
- **Next Steps:** A subsequent study will be completed to develop a detailed implementation and phasing plan, and will also include a market assessment considering local end users' feedback on product interest and finished compost storage/distribution requirements.

Implementation Plan

The preferred solution for the Halton Region Biosolids Composting Facility Municipal Class EA is to construct the biosolids composting facility on BMC Parcel 8 (supplemented with Parcel 7).

The preliminary footprint requirement for the proposed biosolids composting facility is based on the capacity required to compost all of the Region's biosolids through 2051 (conservative). The Region will maintain the ability to land apply liquid biosolids on a seasonal basis, which provides redundancy and flexibility for the Region's overall biosolids management program.

While this footprint represents the ultimate capacity, the Region may implement the facility in multiple phases. The implementation phasing plan will be identified in a subsequent study and will depend on the following factors:

- Biosolids composting facility capital costs and funding/financing availability
- Revised growth projections
- Agricultural land availability for liquid biosolids land application
- Liquid biosolids land application program costs
- Biosolids compost product market assessment

Although the biosolids composting facility will be a greenfield facility, construction should be completed based on the following general sequence:

1. Construct the new stormwater management pond and all associated infrastructure (swales, ditches, stormwater pumping station, storm sewers).
2. Decommission and fill the existing stormwater management pond and associated infrastructure.
3. Construct the new access road and biosolids composting facility.

A detailed construction sequencing plan will be developed during the design phase.

Contents

Appendices

Tables

Figures

Acronyms and Abbreviations

Acronym	Definition
ANSI	area of natural and scientific interest
ASP	aerated static pile
BEAM	Biosolids Emissions Assessment Model
BMC	Biosolids Management Centre
Class EA	Class Environmental Assessment
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
dt	dry tonnes
ECA	Environmental Compliance Approval
EPA	Environmental Protection Agency
ESDM	Emission Summary and Dispersion Model
FEL	front-end loader
GFL	Green For Life
GGH	Greater Golden Horseshoe
ha	hectare(s)
IPCC	International Panel on Climate Change
IPZ	Intake Protection Zone
kg/y	kilograms per year
km	kilometre(s)
L&Y	leaf and yard
m	metre(s)
m^3	cubic metre(s)
MCEA	Municipal Class Environmental Assessment
MEA	Municipal Engineers Association
MECP	Ontario Ministry of the Environment, Conservation and Parks
MHSTCI	Ontario Ministry of Heritage, Sport, Tourism and Culture Industries
MNRF	Ontario Ministry of Natural Resources and Forestry
N_2O	nitrous oxide
NASM	non-agricultural source material
NEBRA	Northeast Biosolids and Residuals Association
NEP	Niagara Escarpment Plan
NMA	Nutrient Management Act
OCQS	Ontario Compost Quality Standards
OMAFA	Ontario Ministry of Agriculture, Food, and Agribusiness
OWRA	Ontario Water Resources Act

Acronym	Definition
PFR	Project File Report
PIC	public information centre
PPS	Provincial Policy Statement
Region	Halton Region
R.S.O.	Revised Statutes of Ontario
SARO	Species at Risk in Ontario
SCADA	supervisory control and data acquisition
SPA	Source Protection Area
SPP	Source Protection Plan
SPR	Source Protection Region
SSO	source separated organics
SWMS	Solid Waste Management Strategy
tonnes CO_2 eq/y	tonnes of carbon dioxide equivalent per year
TS	total solids
UV	ultraviolet
WPA	Wellhead Protection Area
wt	wet tonne
WWTP	wastewater treatment plant

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This Project File Report (PFR) documents the Class EA study methodology, stakeholder communications and engagement program, and Phases 1 and 2 findings and recommendations.

1.2 Report Structure

The PFR is structured as follows:

- **Section 1: Introduction and Background** provides an overview of the project background and approach.
- **Section 2: Ontario Environmental Assessment Process** describes how the environmental assessment process has informed the development of this Class EA.
- **Section 3: Project Context** describes the project purposes, history of biosolids management in Halton Region, and presents the regulations and policies that inform and shape the Class EA study.
- **Section 4: Methods and Approach** presents the approach to public engagement and decision-making process.
- **Section 5: Inventory of Existing Conditions** presents the existing conditions establishing a foundation for understanding Halton Region's existing and future biosolids management needs.
- **Section 6: Future Biosolids Management Needs** presents the anticipated future biosolids management needs within the planning horizon, forming the basis for the Class EA problem and opportunity statement.
- **Section 7: Problem and Opportunity Statement** defines the problems and opportunities identified through the documentation of the existing conditions and future needs in accordance with the Class EA process.
- **Section 8: Site Alternative Development and Evaluation Methodology** identifies potential sites available within the Halton Region for the proposed biosolids composting facility and describes the evaluation methodology.
- **Section 9: Biosolids Composting Alternatives Development and Evaluation** identifies the biosolids composting site alternatives to address the current and future needs developed in Section 5 and 6, the results from the detailed evaluation approach, and the preferred solution.
- **Section 10: Consultation and Engagement** details the engagement activities conducted throughout the study and how the feedback received through engagement activities informed the Class EA
- **Section 11: Implementation Plan and Mitigation Measures** presents the recommended projects, the implementation schedule, triggers, and capital cost forecast for implementing the Class EA recommendations.

1.3 Project Team

The project team consists of project managers, engineers, planners, scientists, and archaeologists. Halton Region is leading this study, supported in project delivery by the Jacobs consulting team responsible for project communications, completion of relevant studies to support the Municipal Class EA Process, and preparation of all project documentation. A Steering Committee made up of Halton Region staff supported the overall development of the Study by providing advice and guidance.

The following presents the key participants from Halton Region:

- Project Team:

  - **Christopher Pasquale**, Project Manager, Water & Wastewater Infrastructure Planning & Policy
  - **Erin Longworth**, Manager, Water & Wastewater Infrastructure Planning & Policy
  - **Dean Iamarino**, Supervisor, Wastewater Biosolids Management
- Region Steering Committee:
  - **Ciara De Jong**, Senior Policy Analyst
  - **Adrian Mohammed**, Biosolids Operations Coordinator, Plant Performance & Optimization
  - **David Miles**, Manager, Waste Management Planning & Collection
  - **Sue Colclough**, Manager, Waste Management Landfill Operations
  - **John Duong**, Manager, Wastewater Treatment
  - **Dan Di Tomasso**, Manager, Plant Capital & Engineering
  - **Stephanie Lapointe**, Senior Project Advisor, Plant Capital & Engineering
  - **Lee Anne Jones**, Director, Infrastructure Planning & Policy
  - **Mark Connell**, Director, Water & Wastewater Treatment
  - **Alli Tyldesley**, Director, Waste Management

Jacobs' project team includes the following key members:

- **Tom Mahood**, Project Manager
- **Deborah Ross**, Technical Advisor – CDM Smith
- **Emma Shen**, Technical Lead
- **Jared Philpott**, Project Engineer
- **Jasmine Biasi**, MCEA Lead

Jacobs' project team also included planning, engineering and technical staff members to support project delivery.

2. Ontario Environmental Assessment Process

This section describes the Ontario EA process.

2.1 Environmental Assessment Act

The objective of the Ontario Environmental Assessment Act Revised Statutes of Ontario (R.S.O.) 1990, c. E. 18 is to consider the possible effects of projects early in the planning process when concerns may be most easily resolved, and to select a preferred solution with the fewest identified impacts.

The *EA Act* requires the study, documentation, and examination of the environmental effects that could result from projects or activities.

The *EA Act* defines "environment" very broadly as follows:

4. Air, land, or water
5. Plant and animal life, including human life
6. Social, economic, and cultural conditions that influence the life of humans or a community
7. Any building, structure machine, or other device or thing made by humans
8. Any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities
9. Any part or combination of the foregoing, and the interrelationships between any two or more of them, in or of Ontario

In applying the requirements of the EA Act to projects, two types of EA planning and approval processes are identified:

- Individual EAs (Part II of the EA Act): Projects have terms of reference and individual EAs, which are carried out and submitted to the Ontario Ministry of the Environment, Conservation and Parks (MECP) for review and approval.
- Class EAs: Projects are approved subject to compliance with an approved Class EA process; provided that the appropriate Class EA approval process is followed, a proponent will comply with the requirements of the EA Act.

2.2 Environmental Assessment Process

The MCEA process is a decision-making framework that effectively meets the requirements of the *EA Act* and is comprised of the following five phases. These phases are illustrated in Figure 2-1.

1. Identify the problem and/or opportunity
2. Identify alternative solutions and establish a preferred solution
3. Examine alternative methods of implementing the preferred solution that will minimize negative effects and maximize positive effects
4. Prepare the project file

5. Implement the preferred solution

The MCEA schedules are defined as follows:

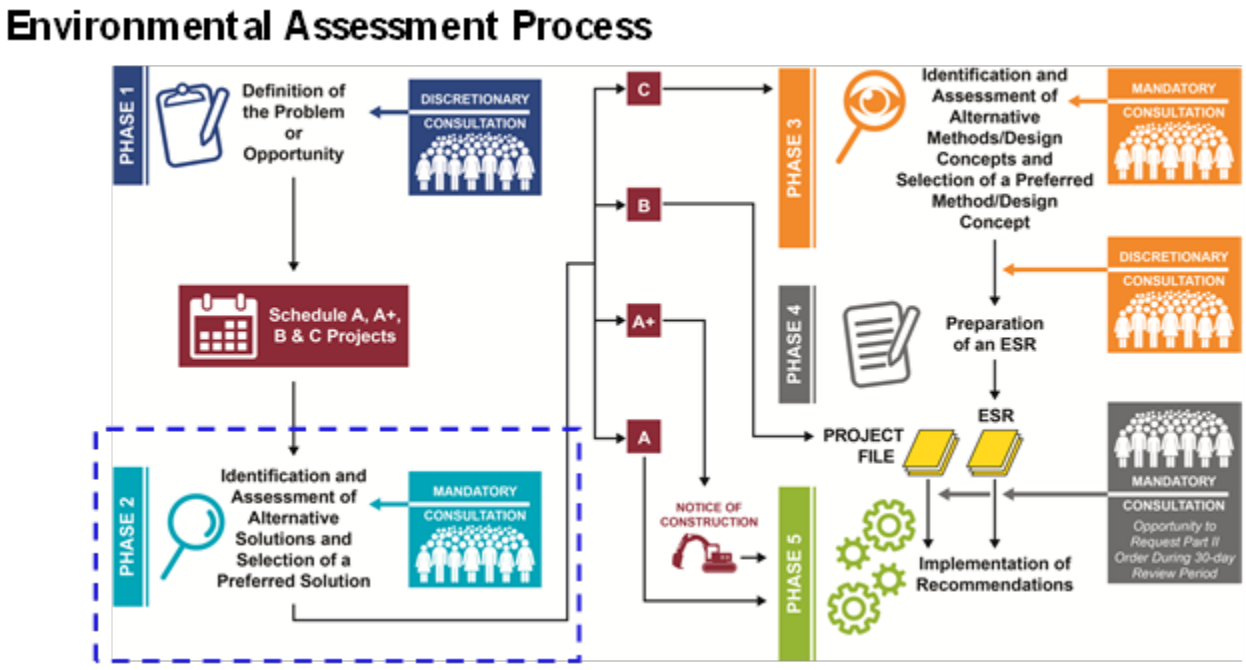
- Schedule A projects are minor operational and upgrade activities and may go ahead without further assessment once Phase 1 of the MCEA process is complete (that is, the problem is reviewed, and a solution is confirmed).
- Schedule A+ projects are pre-approved but still require public notification prior to implementation of the project. Projects categorized as Schedule A+ include activities such as municipal infrastructure plans previously approved by a municipal council (Phase 1).
- Schedule B projects must proceed through the first two phases of the process. Proponents must identify and assess alternative solutions to the problem, inventory impacts, and select a preferred solution. They must also contact relevant agencies and affected members of the public. Provided that no significant impacts are identified, and no requests are received to elevate the project to Schedule C or undertake the project as an Individual EA (Section 16 Order), the project may proceed to the next phase.
- Schedule C projects require more detailed study, public consultation, and documentation, as they may have more significant impacts. Projects categorized as Schedule C must proceed through all five phases of an assessment. An Environmental Study Report must be completed and available for a 30-day public review period prior to proceeding to implementation.

This project was completed as a Schedule B MCEA study, including Phases 1 and 2 of the Municipal Engineer's Association (MEA) MCEA Process, as shown in Figure 2-1 (MEA, October 2000, as amended in 2007, 2011, 2015 & 2023).

A Section 16 Order is the legal mechanism in which the status of an undertaking can be elevated before the project can progress. The study's planning and design process allows for concerns to be identified and resolved throughout the course of the project; however, a Part 16 Order request can be submitted to MECP on the grounds that the order may prevent, mitigate or remedy adverse impacts on the existing Aboriginal and treaty rights of the Aboriginal peoples of Canada, as recognized and affirmed in section 35 of the Constitution Act, 1982.

The *EA Act* as amended through the COVID-19 Economic Recovery Act, 2020, also provides the Minister with the authority to make two types of orders with respect to an undertaking proceeding in accordance with a MCEA. The Minister may, on their own initiative, within a time-limited period, require a proponent to undertake an individual EA, referred to as a section 16(1) order, in which case the proponent cannot proceed with the project without first seeking and obtaining approval under Part II of the Act (conduct an individual EA). The Minister may also impose conditions on an undertaking, referred to as a Section 16(3) order, where the proponent must meet the conditions outlined in the order.

Figure 2-1. Class Environmental Assessment Process



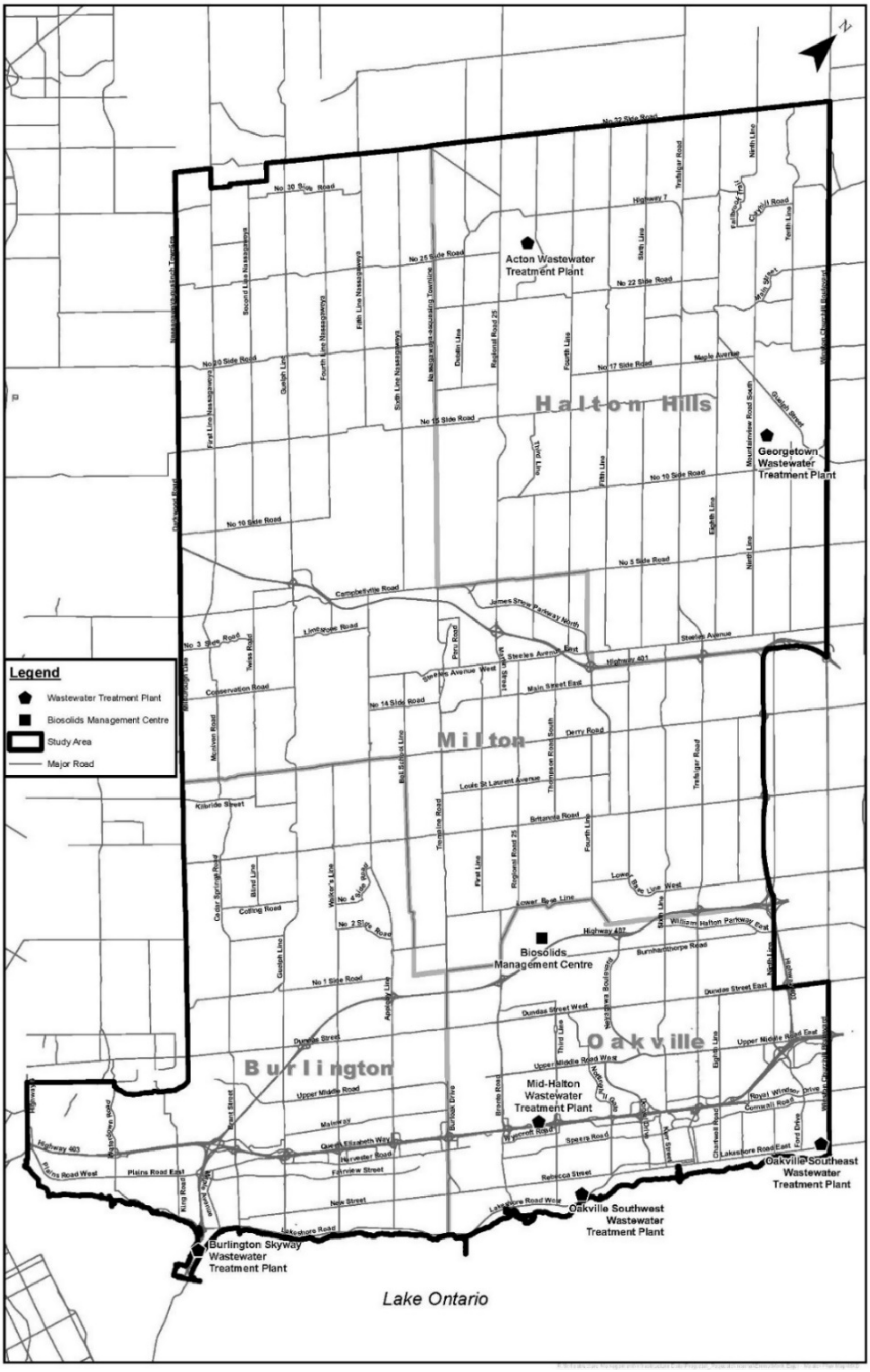
3. Project Context

This section presents an overview of the study area and relevant regulatory frameworks that informed the study.

3.1 Study Area

The Study Area boundaries for the purposes of this MCEA study include the entirety of the Halton Region. Figure 3-1 presents the project Study Area, as well as locations of the Region's wastewater treatment and biosolids management facilities.

Figure 3-1. Project Study Area



3.2 Regulatory Context and Guidelines for Biosolids Management in Ontario

Biosolids composting requires material handling equipment, hauling of dewatered biosolids and bulking materials, and a large land area. Certain regulatory requirements must be satisfied to utilize biosolids as compost feedstock, and to process, transport, and manage the resulting compost.

This section presents the regulations and guidelines that govern biosolids management, including composting, in Ontario, as well as relevant planning policies that need to be considered for siting a biosolids composting facility in Halton Region.

3.2.1 Biosolids Processing, Transportation, and Beneficial Use Under Nutrient Management Act

The Region's current biosolids management program is governed by the Ontario Environmental Protection Act's General Waste Management regulations (O. Reg. 347) and the Ontario Nutrient Management Act (NMA), general regulation 267/03. Biosolids compost would be subject to O. Reg. 347 and O. Reg. 267/03 if the biosolids compost product does not meet Category A compost requirements under the Ontario Compost Quality Standards (OCQS) (Section 3.2.3).

O. Reg. 347, issued under the Environmental Protection Act, governs the processing of biosolids at facilities other than wastewater treatment plants, the transportation of biosolids, and the utilization or disposal of biosolids outside of agricultural uses. The Region's Biosolids Management Centre (BMC), which provides seasonal storage of biosolids, operates under an Environmental Compliance Approval (ECA) issued under O. Reg. 347.

The NMA (O. Reg. 267/03) governs the land application of nutrient products on agricultural land within the province. Administered by the Ontario Ministry of Agriculture, Food, and Agribusiness (OMAFA), the NMA (O. Reg. 267/03) allows for the use of non-agricultural source materials (NASM) such as leaf and yard waste, food waste, and biosolids to be applied to farmland as a cost-effective method to enhance soil productivity and crop growth.

NASM is classified under one of three risk-based categories (Category 1, 2, and 3), each with its own unique standards that regulate the sampling, analysis, quality, and land application rates. The NASM must be applied to land in a manner that safeguards against the contamination of ground and surface water, excessive odours, and adverse impacts to neighbouring properties. Liquid and dewatered biosolids are classified as NASM Category 3, which requires a NASM Plan to be developed, including site-specific application instructions (for example, application areas, rates), sampling and analysis (for example, metals and solids) of both the receiving soil and the NASM to be applied, and contingency plans for any spills or other emergencies that may arise. NASM Plans are approved by OMAFA, while the MECP is responsible for compliance and enforcement of the NMA and handle any complaints arising from land application of NASM.

3.2.2 Ontario Compost Quality Standards

Published in 2012, the OCQS classified three different categories of finished compost: AA, A, and B. Category AA compost is the highest quality but cannot contain any biosolids. Category A compost has more stringent quality criteria than Category B, in which the compost feedstock cannot contain more than 25 percent (dry weight) biosolids and requires a product label. However, Category A compost is not subject to approval for transportation or use (that is, exempted from O. Reg. 347 and 267/03). On the other hand, Category B compost does not impose a maximum feedstock contribution for biosolids but requires government approvals for transportation and use (that is, subject to O. Reg. 347 and O. Reg. 267/03, per current biosolids land application program).

The OCQS sets stringent limits for metal concentrations that must be satisfied for both the feedstock and final product, as presented in Table 3-1.

Table 3-1. Maximum OCQS Feedstock and Finished Products Metals Concentrations

Metals Concentrations (mg/kg dry weight)	Feedstock Maximum Limit for Category A&B Compost	Finished Category A Compost Product	Finished Category B Compost Product
Arsenic	170	13	75
Cadmium	34	3	20
Chromium	2,800	210	1,060
Cobalt	340	34	150
Copper	1,700	400	760
Lead	1,100	150	500
Mercury	11	0.8	5
Molybdenum	94	5	20
Nickel	420	62	180
Selenium	34	2	14
Zinc	4,200	700	1,850

Notes:

mg/kg = milligram(s) per kilogram

Metals concentrations in the Region's biosolids have historically been well below the OCQS limits for feedstock (Section 6.2). It is expected that finished Category A compost using the Region's biosolids as feedstock can meet the OCQS limits for the final product, considering the biosolids will be blended with at least 75 percent (by dry weight) bulking agents. The Region previously completed a pilot test in 2015 using the Region's dewatered biosolids, leaf and yard (L&Y) waste, and woodchips as feedstock (with biosolids less than 25 percent by dry weight) in an open windrow composting system; the pilot testing results demonstrated that the final compost product complied with all quality criteria for Category A compost (Halton Region, 2015). Section 3.2.6.2 presents a brief summary of the pilot test.

3.2.3 Biosolids Composting Facility Operation in Ontario

The Ontario Water Resources Act (OWRA) regulates biosolids treatment and processing at wastewater treatment plants across the province and is administered by the MECP. All wastewater treatment plants with biosolids management facilities are permitted to operate by a site-specific ECA, issued by the MECP. If

the biosolids management facility does not have an effluent discharge (for example, is not situated at a wastewater treatment plant), the ECA is issued under O. Reg. 347 (such as the Region's BMC facility).

For a biosolids composting facility, the ECA will specify the maximum processing capacity (for example, quantity of biosolids to be processed), major process information, final product quality compliance limits, as well as monitoring and reporting requirements.

O. Reg. 419/05 (Air Pollution – Local Air Quality) under the EPA, governs air emissions originating from a facility. An ECA Air will be required for the biosolids composting facility, considering all potential odour emission sources. Modelling of odour dispersion from the proposed biosolids composting facility will be required to demonstrate that odour emissions from the facility (with proper odour control) can meet the MECP requirements to minimize impacts to neighbouring properties, as defined by frequency and intensity of odours. An Emission Summary and Dispersion Modelling (ESDM) report will be required to obtain the ECA Air.

3.2.4 Relevant Planning Policies in Ontario

The following sections provide a brief overview of the policies and plans that need to be considered for siting the biosolids composting facility in Halton Region, based on avoiding potential impacts to natural heritage features or guidance regarding potential project activities (for example, development, construction of new infrastructure). The relevant policies and plans are used later to review the land use features in the Halton Region in Section 5.3.8.

3.2.4.1 Provincial Policy Statement

The purpose of the Provincial Policy Statement (PPS) is to provide direction on matters of provincial interest related to land use planning and development, and to set the foundation for policy regarding the regulation of development and use of land (MMAH, 2024). The PPS came into effect October 20, 2024, under Section 3 of the *Planning Act,* and supports a comprehensive, integrated, and long-term approach to planning, recognizing the linkages among policy areas. The 2024 PPS replaced the 2020 PPS and A Place to Grow: Growth Plan for the Greater Golden Horseshoe (Growth Plan), 2019.

The primary purposes of the 2024 PPS are to enable municipalities to:

- Plan for and support development, and increase the housing supply across the province
- Align development with infrastructure to build a strong and competitive economy that is investment-ready
- Foster the long-term viability of rural areas
- Protect agricultural lands, the environment, public health and safety

Municipal official plans, such as the Halton Region Official Plan (Halton Region, 2021) are considered the most important "vehicle" for implementation of the PPS.

The 2024 PPS is generally applicable to this study, as it outlines policies that enable growth while protecting resources. This study identifies the preferred strategy for implementing a Region-owned biosolids composting facility, which will provide reliable, sustainable biosolids management through 2051. Biosolids management infrastructure is a key component of the overall servicing infrastructure required to meet population growth targets in Halton Region.

3.2.4.2 Greenbelt Plan

The Greenbelt is considered to be the cornerstone of the Growth Plan; therefore, the Greenbelt Plan identifies where development should not occur in order to protect the agricultural land base, and the ecological and hydrological features occurring on this landscape (MMAH, 2017). The Greenbelt Plan, together with the Growth Plan and Niagara Escarpment Plan (Section 3.2.5.3), build on the PPS to establish a land use planning framework to support sustainable development. Applicable Greenbelt Natural Heritage areas in the Halton Region are further described in Section 5.3.8.3.

The following sections are relevant to the siting of a biosolids composting facility in Halton Region:

- Section 1.2.2.2: Protection, maintenance and enhancement of natural heritage, hydrologic and landform features, areas and functions, including protection of habitat for flora and fauna and particularly species at risk.
- Section 1.2.2.3: Identification, conservation, use and wise management of cultural heritage resources to support the social, economic and cultural wellbeing of all communities, including Indigenous Communities and First Nations.
- Section 1.2.2.5: Support for infrastructure which achieves the social and economic aims of the Greenbelt Plan and the Growth Plan and improves integration with land use planning while seeking to minimize environmental impact.
- Section 1.2.2.6: Integrating climate change considerations into planning and managing growth that includes incorporating techniques to reduce greenhouse gas emissions and increasing the resilience of settlement areas and infrastructure within the Greenbelt.
- Section 3.2.2.3: New development or site alteration in the Natural Heritage System will have no negative impacts on key natural heritage features or key hydrologic features or their functions.
- Section 3.2.5.5: A proposal for new development or site alteration within 120 metres (m) of a key natural heritage feature within the Natural Heritage System or a key hydrologic feature anywhere within the Protected Countryside requires a natural heritage evaluation or a hydrological evaluation which identifies a vegetation protection zone.
- Section 4.1.1.2: Proposals for non-agricultural uses must demonstrate that: the type of water and sewer servicing proposed is appropriate for the type of use; there are no negative impacts on key natural heritage features or their functions; and there are no negative impacts on the biodiversity or connectivity of the Natural Heritage System.
- Section 4.2.1.2: The location and construction of infrastructure and expansions, extensions, operations and maintenance of infrastructure in the Protected Countryside will avoid key natural heritage features, key hydrologic features or key hydrologic areas unless need has been demonstrated and it has been established that there is no reasonable alternative.
- Section 4.2.2.1: Sewage and water infrastructure in the Protected Countryside will be planned, designed and constructed in accordance with the policies in subsection 3.2.6 of the Growth Plan.
- Section 4.4.1: For lands within the Protected Countryside, cultural heritage resources will be conserved in order to foster a sense of place and benefit communities.
- Section 4.5.1: For lands falling within the Protected Countryside, all existing uses are permitted.

Of note, areas within the Greenbelt Plan are still subject to policies from the 2020 PPS and 2019 Growth Plan due to Amendment 4.

3.2.4.3 Niagara Escarpment Plan

The Niagara Escarpment Plan (NEP) (MNRF, 2017) serves to provide a framework of objectives and policies to strike a balance between development, protection, and the enjoyment of the Niagara Escarpment and the resources it supports. The NEP Areas in Halton Region are further described in Section 5.3.8.2.

The following sections are relevant to the construction of a Halton Region-owned biosolids composting facility:

- Section 2.2.1: The Escarpment environment shall be protected, restored and where possible enhanced for the long-term having regard to single, multiple or successive development that have occurred or are likely to occur.
- Section 2.2.2: The site shall not be prone to natural hazards, and the development will not impact the control of these natural hazards including flooding hazards, erosion hazards, or other water-related hazards and hazard events associated with unstable soil or unstable bedrock.
- Section 2.2.6: Any development permitted should be designed and located in such a manner as to promote design and orientation that: maximizes energy efficiency and conservation and considers the mitigating effects of vegetation; maximizes opportunities for the use of renewable energy systems and alternative energy systems; and reduces greenhouse gas emissions.
- Section 2.3.5: On existing waste disposal sites in the Escarpment Natural, Escarpment Protection, Escarpment Rural Areas and Mineral Resource Extraction Area designations, the following municipal waste-related facilities may be permitted: recycling and/or compost facilities, serving the local community.
- Section 2.7.2: Development is not permitted in key natural heritage features except for infrastructure where the project has been deemed necessary to the public interest and there is no other alternative.
- Section 2.7.4: Development in other natural features not identified as key natural heritage features or key hydrologic features should be avoided. Such features should be incorporated into the planning and design of the proposed use wherever possible, and the impact of the development on the natural features and its functions shall be minimized.
- Section 2.7.12: Development, where permitted in woodlands, should protect and where possible enhance the woodland and associated wildlife habitat. All development involving the cutting of trees requires approval from the implementing authority.
- Section 2.8.1: Prime agricultural areas shall be protected for long-term agricultural use.
- Section 2.10.1: Development shall not be permitted on lands containing archaeological resources or areas of archaeological potential unless significant archaeological resources are conserved.
- Section 2.12.1: Infrastructure shall be planned in an integrated fashion, to obtain the most value out of existing infrastructure and to ensure that the most sustainable infrastructure alternatives have been identified.
- Section 2.12.3: Green infrastructure and low impact development should be considered where appropriate to complement infrastructure.
- Section 2.12.7: Municipal water and wastewater systems and private communal water and wastewater systems shall not be located in or extended into Escarpment Natural Area, Escarpment Protection Area, Escarpment Rural Area, or Mineral Resource Extraction Area designations, unless such servicing is required to address failed individual onsite sewage or water services, or to ensure the protection of public health.

3.2.4.4 Parkway Belt West Plan

The Parkway Belt West Plan Area includes lands recognized to accommodate future infrastructure for transportation, community and utilities. The Parkway Belt West Plan came into effect in 1978. The purpose of the plan is to support growth in the Greater Toronto Area, and after over 160 amendments, this plan has evolved to primarily designate and protect land required for large-scale infrastructure corridors (for example, transit, electric power facility) (MMAH, 2019). Considering more recent provincial (for example, the Greenbelt Plan) and regional (for example, Halton Regional Official Plan) plans that govern the Parkway Belt West Plan Areas and include provisions of the Parkway Belt West Plan, policies from the Parkway Belt West Plan (1978) are not included in this report.

3.2.4.5 Other Relevant Guidance Documents

3.2.4.5.1 Changes to Land Use Compatibility Guideline

The MECP proposed a new Land Use Compatibility Guideline in 2021, with the intent to guide the implementation of new facilities on existing land uses to avoid impacts. The proposed guidelines included approaches for screening potential sites, identifying land requirements for buffers (if applicable), and identifying mitigation requirements to be included in facility design. The guideline is no longer being carried forward due to significant public concerns raised during the consultation period; however, the D-Series guidelines remained in effect. This guideline recommends separation distances and other control measures for land use planning proposals to prevent or minimize adverse impacts where adjacent land use types are incompatible. While this guideline provides recommended separation distances and buffer zones from sensitive land use types for wastewater treatment plants and landfills, the Guidelines for Production of Compost in Ontario (Section 3.2.5.5.3) provide minimum separation for composting facilities that are more applicable and will be considered for this study.

3.2.4.5.2 Guideline to Address Odour Mixtures in Ontario

Ontario proposed a guideline in 2021 that describes the approach to be used for MECP-regulated facilities to anticipate, prevent, and address odour issues that have the potential to affect local residents. The consultation period for this proposal closed on August 6, 2021; as yet, the guideline has not been promulgated.

3.2.4.5.3 Guidelines for the Production of Compost in Ontario

The purpose of this guideline (published in 2016) is to protect the environment by recommending planning, design and operational practices for composting facilities, and applies to non-hazardous organic materials including sewage biosolids and de-watered domestic septage. The purpose of this Class EA study is to find an appropriate site for a proposed biosolids composting facility; therefore, applicable proper siting and design of composting facilities, as per this guideline, will seek to:

- Prevent and control offsite environmental impacts (for example, odour, water contamination, noise, dust).
- Protect public health.
- Produce compost that meets applicable standards.

Proper site selection can influence the success of any composting project by avoiding the potential for adverse effects by ensuring:

- There is adequate separation between the facility and adjacent land uses.
- Compliance with the municipal official plan and local zoning by-laws.
- Selecting a site with sufficient space.
- Watershed planning and protection of water resources is adhered to.
- Convenient access to existing or approved transportation routes.

3.2.4.5.4 Food and Organic Waste Policy Statement

The Food and Organic Waste Policy Statement supports the provincial vision of a circular economy, helping move Ontario toward the goal of zero waste and zero GHG emissions from the waste sector through waste reduction and resource recovery.

Waste reduction and resource recovery will help improve environmental outcomes, reduce GHG emissions and recover valuable nutrients, fostering a circular economy. Within this statement, a policy to support resource recovery infrastructure outlines how zero waste and zero GHG emissions from the waste sector depends on effect, efficient and economical systems to maximize resource recovery and support a low-carbon economy. Resource recovery facilities must be planned and sited in a manner that ensures long-term effectiveness. Additionally, beneficial use supporting healthy soils, promoting crop growth, and enhancing carbon storage are promoted. Owners and operators of resource recovery systems that create compost, digestate or other high-quality soil amendments are encouraged to promote the beneficial use of such materials to improve the quality of existing soils.

3.2.4.5.5 Source Protection Plans

Source Protection Plans (SPP) in Halton Region include those for Hamilton-Halton; Credit Valley, Toronto and Region, and Central Lake Ontario, and Lake Erie. These plans contain policies to protect existing and future drinking water resources in Source Protection Areas (SPA) from prescribed water quality threats (for example, establishment of a system that stores or treats wastewater). The Regional Official Plan must conform to applicable SPP and must be updated through the Official Plan review process to keep SPP policies up to date.

3.2.5 Relevant Studies and Waste Management Programs

This section discusses the studies and waste management programs that apply to this study.

3.2.5.1 Halton Region Biosolids Master Plan (2012)

Published in 2012, the BMP was completed by Halton Region to plan future management of biosolids, due to a projected increase in biosolids generation corresponding to population growth planned for the region (XCG, 2012). The BMP outlines a long-term strategy for effective biosolids management while protecting human health and the environment. Key considerations during the development of the BMP were the Region's current and future infrastructure requirements, the current biosolids management program, the commitment to organics recycling, and program diversification requirements aimed at long-term flexibility and sustainability.

The evaluation process used in developing the BMP involved a three-step process that included:

- Pre-screening and shortlisting of the management methods for evaluation
- Detailed evaluation of the shortlisted management methods

- Identification of the preferred strategy.

From the long list of management methods, a short list of viable methods was developed based on the following evaluation criteria:

- Ability to meet current and potential future regulatory requirements
- At least three known systems in full-scale operation
- Systems operating at a similar scale as potentially required for the Region
- A minimum of three years of successful operating experience at full-scale.

Ultimately, the BMP identified the following preferred biosolids management strategies:

- Continued land application to the extent that costs are controlled and reasonable, and vulnerabilities are minimized
- Investigation of composting opportunities to enhance Halton Region's land application program
- Investigation of thermal oxidation (incineration) partnership opportunities at a facility outside of Halton Region to diversify the strategy.

The BMP development coincided with the release of the updated draft OCQS, which supports the composting of a broader range of organic materials including biosolids. Inclusion of composting in the Region's biosolids management strategy satisfies two of the key strategy considerations by continuing the Region's relationship with the agricultural community while diversifying with an enhanced product that may attract new agricultural and other end users such as landscapers.

3.2.5.2 Halton Region Biosolids Composting Pilot Study (2014-2015)

At the time of the 2012 BMP, the new OCQS were still in draft form and there was uncertainty in the Ontario market for biosolids compost. Following the BMP recommendation, the Region conducted a compost pilot study in 2014-2015 to demonstrate compliance with the newly published OCQS (Halton Region, 2015).

The key features and findings from the pilot study are summarized as follows:

- The feedstock included a mix of the Region's dewatered biosolids, L&Y waste and woodchips in a ratio of 1:2:2 by volume, to meet the OCQS feedstock requirements for Category A compost (that is, maximum allowable biosolids feedstock of 25 percent by dry weight).
- The feedstock materials (dewatered biosolids, L&Y waste, woodchips) met the feedstock concentration standards for all regulated metals. The biosolids had the highest concentrations of metals but concentrations were below 50 percent of the maximum allowable limits.
- Selecting appropriate feedstock and developing a compost recipe based on sound science (with use of a compost process model) ensured a temperature of 55 °C for 15 days could be achieved using windrow composting.
- The finished compost metal concentrations for all samples were below the maximum allowable metal limits for Category A compost.
- The finished compost met the pathogen indicator standards for both Salmonella and E. coli.
- The respiration test met the Maturity Standards after approximately 65 days of curing. Therefore, under the conditions of this study, compost may require more time to cure than the minimum 21 days identified in the Maturity Standards.

- Upon utilizing a 12.7 mm screen, foreign matter >3 mm did not exceed 1 percent on a weight basis; there was no foreign matter >25 mm/500 mL. Plastic foreign matter >3 mm did not exceed 0.5 percent and there were no sharps >3 mm in the final product.
- There were no odour complaints from the public regarding the biosolids compost windrow and as such no mitigation measures were required during the study.

Results of the pilot study demonstrated that the selected feedstock recipe and resulting open windrow compost met all phases of quality criteria to comply with the OCQS Category A compost requirements. Photos of the open windrow testing pile and finished product are shown in Figure 3-2.

Figure 3-2. Halton Region Biosolids Composting Pilot Study (Left: Open Windrow Composting Pile; Right: Finished Category A Compost Product)

3.2.5.3 Halton Region Biosolids Composting Feasibility Study (2020)

Based on the positive results of the biosolids composting pilot study, the Region initiated the Halton Region Biosolids Composting Feasibility Study (Jacobs, 2020). The objectives of this study were to:

- Identify and evaluate composting alternatives to manage a portion of the Region's biosolids and confirm the technical and economic feasibility and benefits to the Region's biosolids management program associated with the preferred composting alternative.
- Develop a business case and implementation plan for the preferred composting alternative.

The study included a comprehensive evaluation and business case analysis for a range of biosolids composting scenarios, which involved technology evaluation, risk assessment, and biosolids compost market survey. The recommended strategy was to construct a Halton Region-owned biosolids composting facility using covered aerated static pile (ASP) technology, with the capacity to process all dewatered biosolids year-round and between 50 to 100 percent of liquid biosolids. It was recommended that the final composting capacity provided for liquid biosolids consider the Region's goal of maximizing liquid biosolids land application within the region, and the Halton Region-owned biosolids composting facility provides sufficient capacity to supplement the current land application program.

The recommended biosolids composting program was based on producing Category A compost per the OCQS (the highest quality allowable for biosolids compost [Section 3.2.3]), such that management of the final product will be exempt from O. Reg. 347 (for transportation) and O. Reg. 267/03 (for end use). This means that the compost feedstock will include up to 25 percent biosolids (by dry weight) and 75 percent other organic material (referred to as bulking agents). The study identified potential sources for bulking agents, such as clean woodchips (previously used in the pilot study), bulk brush, and L&Y compost 'overs'

(discarded materials from the initial screening step and less desirable portion of the finished compost); these are generated within the region (from landscapers and bulk wood waste) and are currently considered a by-product of the Region's solid waste management program. However, the availability of these materials will be subject to change depending on future solid waste management operations.

Lifecycle cost analysis of the recommended biosolids composting program showed that operating costs will be similar to those for the current land application program. However, unlike agricultural land application that is restricted to a short season, the composting operation can be supported year-round (thereby reducing the biosolids storage capacity needed), the compost product has broader end-use opportunities within local markets, and the use of compost is less dependent on weather and soil conditions, all of which would significantly improve the resiliency of the biosolids management program. The anticipated increases in fuel costs (due to the COVID-19 Global Pandemic and Federal Carbon Tax increase) would further improve the business case for biosolids composting. Moreover, the composting program will result in GHG emission reduction compared to the current program, largely due to the significant reduction in biosolids haulage distances.

The current study was initiated based on the recommendations from the Feasibility Study, to identify a preferred site location for constructing a Halton Region-owned biosolids composting facility. As part of this MCEA study, the lifecycle cost analysis was updated to reflect current market conditions.

3.2.5.4 Halton Region Solid Waste Management Programs

3.2.5.4.1 Overview

The Halton Waste Management Site (HWMS), located at 5400 Regional Road 25, Milton, ON, is a 53-ha solid waste disposal site (that is, landfill) within a 126-ha property. The facility is approved (solid waste ECA 8110-APTH2K) to accept municipal waste from the region with a total capacity of 7.96 million cubic metres (m^3). The facility currently incorporates the following operations:

- Five landfill cells to be constructed, operated, covered and monitored over the lifespan of the site
- Landfill gas collection system, which captures the landfill gas and coverts to electricity
- Container station and scale house for the disposal of domestic and commercial solid waste
- Depot for the collection of hazardous and special waste
- Depot for the collection of reuse items
- Compost pad for the receipt and composting of L&Y waste
- Brush and yard waste pad where over-sized brush material is off-loaded
- Wood pad for the receipt and processing of Container Station materials and large wood loads
- Interim Transfer Station for the receipt of Blue Box and Green Cart materials.

The HWMS also has an Administrative Building, Maintenance Building, Storage Building, and Event and Storage Pads. An aerial view of the HWMS is provided in Figure 3-3. The Region purchased 81 ha directly south of the HWMS and berm construction along the southern boundary was completed in 2021.

Figure 3-3. Aerial View of Halton Waste Management Site

In the context of the current study, the HWMS can be considered as a potential siting alternative that could be compatible with biosolids composting, because it may have land available that is already approved for waste management and may generate materials that could be used as bulking agents such as woodchips.

In May 2022, Regional Council endorsed the Halton Region 2023-2030 Solid Waste Management Strategy (SWMS) that outlines the Region's short and long-term plans for its waste management program with objectives to increase waste diversion, extend landfill life, and reduce GHG emissions (Halton Region, 2022). Components of the Region's waste management program include L&Y waste, source separated organics (SSO), and landfill operations. The following sections provide a brief description of the existing program, recommendations from the SWMS (as available), and the relevance to biosolids composting.

3.2.5.4.2 Leaf and Yard Waste

L&Y waste is currently processed at an open windrow composting facility located at the HWMS to generate Category AA compost, as shown in Figure 3-3. Between 2019 and 2021, the HWMS collected approximately 33,309 tonnes of L&Y waste per year. The L&Y compost facility is operated and managed by a third-party contractor, Miller Waste Systems. The current contract is in effect until March 31, 2025, with two additional one-year extension options. The SWMS does not address future L&Y waste management beyond 2027. The alternatives being considered include transferring the material offsite to a third party for management, or continuation of onsite processing via a third-party contractor.

The HWMS also generates woodchips that are currently used for landfill operation at the HWMS (for example, as cover materials). Between 2019 and 2021, approximately 7,370 tonnes of woodchips were generated from the following three sources:

- Clean woodchips from landscapers (2,560 tonne/year)
- Woodchips from bulk wood waste grinded onsite (3,810 tonne/year)
- Woodchips from brush piles (1,000 tonne/year).

To meet Category A compost requirements, biosolids can only represent 25 percent (by dry weight) of the total feedstock, and therefore, additional feed material is required. As presented for the biosolids composting pilot study (Section 3.2.6.2), using clean wood chips and L&Y waste as the additional feed material (bulking agent) was demonstrated to produce compost that met Category A finished compost quality requirements. Based on the projected biosolids production by 2051, up to 26,000 tonnes of new bulking agent will be required annually to process all of the Region's liquid and dewatered biosolids to generate Category A compost. The potential for using L&Y waste or woodchips as bulking agents for biosolids composting will depend on future HWMS operation strategies.

3.2.5.4.3 Source Separated Organics

Management of SSO is currently contracted out to a third-party (StormFisher Environmental), who haul the material from the HWMS to an anaerobic digestion facility in London, ON. The current contract term is in effect until March 31, 2025, with two additional one-year extension options.

The SWMS does not address future SSO processing needs, based on there being adequate capacity with privately owned facilities to continue with third-party management of the Region's SSO. The SWMS focused on efforts to reduce food waste and increase the Region's waste diversion rate.

Since there is no plan for a Halton Region-owned SSO management facility in the future, there is no opportunity for synergy with the proposed biosolids composting facility.

3.2.5.4.4 Landfilling

The landfill is located within the HWMS (as shown in Figure 3-3), designed for disposal of domestic, commercial and non-hazardous solid waste. The facility opened in November 1992 and was originally planned to have capacity for a maximum of 20 years. Through a combination of enhanced waste diversion programs, landfill operations (waste compaction and alternative-daily-cover), and most of the commercial waste generated within the region being disposed at third-party facilities outside the region, the lifespan of the landfill is extended to 2044-2048. The HWMS has identified additional opportunities to further reduce the amount of solids waste production within the region, to potentially extend the lifespan of the landfill by an additional 6 to 10 years.

In August 2022, the Region initiated the *Halton Waste Management Site Land-Use Study* to develop a proposed layout for future infrastructure needs to support the operation of the HWMS, and to improve traffic flow and customer experience. The provision for locating a biosolids composting facility at the HWMS was considered when developing the future layout.

4. Methods and Approach

This section describes the approach and methodology for the study.

4.1 Overview of Study Approach

This study was completed as a Schedule B MCEA study, following Phases 1 and 2 of the MCEA process.

The activities completed in Phases 1 and 2 include:

- **Phase 1 – Existing Conditions and Future Needs:** This phase included a review of the existing biosolids management program, development of future needs, description of Regional land uses and constraints related to locating a biosolids composting facility in the region, development of a Problem and/or Opportunity Statement.
- **Phase 2 – Identification and Evaluation of Alternative Solutions:** This phase included identification and evaluation of alternative sites considering the benefits and impacts to the existing community, technical, legal/jurisdictional, natural, cultural, and economic environments, as well as input from project stakeholders, to identify a preferred site.

This PFR documents the MCEA study methodology, stakeholder communications, and engagement program, and Phases 1 and 2 findings and recommendations.

4.2 Consultation and Engagement Plan

A Consultation and Engagement Plan was developed as part of this MCEA study. An effective Consultation and Engagement Plan is designed to build and maintain the trust of the community, establish a strategy to provide meaningful information about the project to the identified audiences, and provide engagement opportunities over the course of the MCEA Study.

Throughout the study, Halton Region was committed to communicating with and engaging the public, review agencies, municipalities, and Indigenous Communities and First Nations by providing opportunities to share information and receive input, including public notices, access to information about the project, meetings, holding a Public Information Centre (PIC), and publicly posting the Project File Report for a minimum 30-day public review period.

Project communications and engagement with Indigenous Communities and First Nations, members of the public, review agencies and other stakeholders (for example, organizations, and businesses) is an important part of the MCEA process. The main purpose of this Communications and Engagement Plan is to present the activities and methods used throughout the Study to identify a preferred location for construction of the proposed Halton Region-owned biosolids composting facility.

Specifically, the Communications and Engagement Plan presents:

- The principles guiding the Communications and Engagement Plan for this project
- The Class EA study project team
- Communication and engagement activities, methods, roles and responsibilities
- Indigenous Communities and First Nations engagement plan
- Approach to responding to comments and feedback
- Approach to documenting communications and engagement activities to be included in the Project File Report.

Consultation and engagement activities are described in Section 10.

4.3 Decision-making Process

A multi-criteria evaluation framework was used to evaluate alternatives and identify the preferred solution for this MCEA. The evaluation framework considered the following criteria categories in accordance with the MCEA process:

- **Natural Environment**
- **Social/Cultural Environment**
- **Technical Features**
- **Legal/Jurisdictional Requirements**
- **Economics**

Further details about the alternatives evaluation process and framework are presented in Section 8.

4.4 Supporting Studies

A series of technical reviews and specialty studies were completed to develop information for site alternatives, that enabled them to be compared using the multi-criteria evaluation:

- A Natural Heritage Report (Appendix A) was completed to identify environmental characteristics and natural features at and near each alternative site, including the following:
  - Ecological Land Classification
  - Species at Risk
  - Watercourses and Wetlands
- A Stage 1 Archaeological Assessment (Appendix B) was completed to identify which sites have archaeological potential and require further investigation (that is, Stage 2 Archaeological Assessment) during design.

5. Inventory of Existing Conditions

Figure 3-1 (in Section 3.1) presents a map of Halton Region showing locations of wastewater treatment plants and the BMC. A description of the region is included in this section to provide information and constraints that will be considered in identifying potential sites for the construction of a Halton Region-owned biosolids composting facility. Specifically, constraints could include land uses, topographical features, cultural heritage features, natural heritage features, and protected areas. By understanding these constraints, potential locations for the proposed facility were identified.

For a MCEA study, the Study Area is defined as the geographic location where direct or indirect effects associated with the implementation of a project may occur. For this MCEA study, the Study Area(s) include the areas where siting a biosolids composting facility was considered, and the surrounding areas that may be affected by implementation of the project. The Study Area(s) are defined in Phase 2 of the MCEA study, with the identification of potential locations for the proposed biosolids composting facility.

5.1 Population and Demographics

The Region is located within the Greater Golden Horseshoe, which is one of the fastest-growing regions in North America (MMAH, 2020b). Halton Region is comprised of the following municipalities:

- City of Burlington
- Town of Oakville
- Town of Milton
- Town of Halton Hills.

Biosolids quantity projections are based on the population projections of these municipalities from the Region's Official Plan Review, including current population and projected population growth to 2051 per municipality (Table 5-1).

Table 5-1. Current and Projected 2051 Population Growth in Halton Region

Municipality	2021 Population	Projected 2051 Population
City of Burlington	195,000	265,160
Town of Oakville	222,000	349,990
Town of Milton	137,990	350,870
Town of Halton Hills	66,010	132,050
Halton Region Total	**621,000**	**1,098,070**

5.2 Description of Halton Region Features

This section describes the features of Halton region.

5.2.1 Indigenous Communities and First Nations Land and Territories

Halton Region is on the traditional lands and within the traditional territory of the Mississaugas of the Credit First Nation, who are part of the Anishinaabe Nation, extending from the Niagara Peninsula across the Halton Region toward the City of Toronto.

There is no Indigenous or First Nations Reserve land located in the region (Government of Canada, 2022a); consideration for development on Reserve land (for example, obligations to the Government of Canada, Environmental Review Process for projects on Reserve land) will not be required when siting the proposed biosolids composting facility.

5.2.2 Land Uses

Halton Region is comprised of a variety of land uses, including agricultural and urban areas, mineral resource extraction areas, and natural heritage systems (Figure 5-1). Land uses such as parks and urban areas, and land designated as Future Strategic Employment Area was not considered for the location of the proposed biosolids composting facility.

There are several connected and protected land uses within the region (for example, Parks and Open Spaces) that are described further in Section 5.3.6.

5.2.3 Transportation Network

Halton Region contains a network of municipal and regional roads (for example, Guelph Line, Trafalgar Road) that connect to main provincial highways (for example, Queen Elizabeth Way, Highway 401), as well as the Parkway Belt West Plan Area, which includes transportation and utility corridors. The transportation network information is included in Figure 5-4 along with other special policy areas.

Access to the proposed biosolids composting facility is required for workers and hauling of biosolids, bulking agents and finished compost product. In evaluating the potential alternative sites for the proposed biosolids composting facility, access via existing roads was considered.

5.2.4 Topography

Elevation along the northern portion of Halton Region is approximately 375 metres above sea level. The land generally slopes downward toward Lake Ontario. Topographic features within the region include the Niagara Escarpment with the NEP Boundary running through the region from the northeast of Town of Halton Hills to City of Burlington, which are further described in Section 5.3.8.2 and shown on Figure 5-4.

Topography throughout the region varies from rolling hills to valleyland. Facility sites are generally located on level ground. Land with steep slopes or rolling hills are not suitable for the location of the proposed biosolids composting facility.

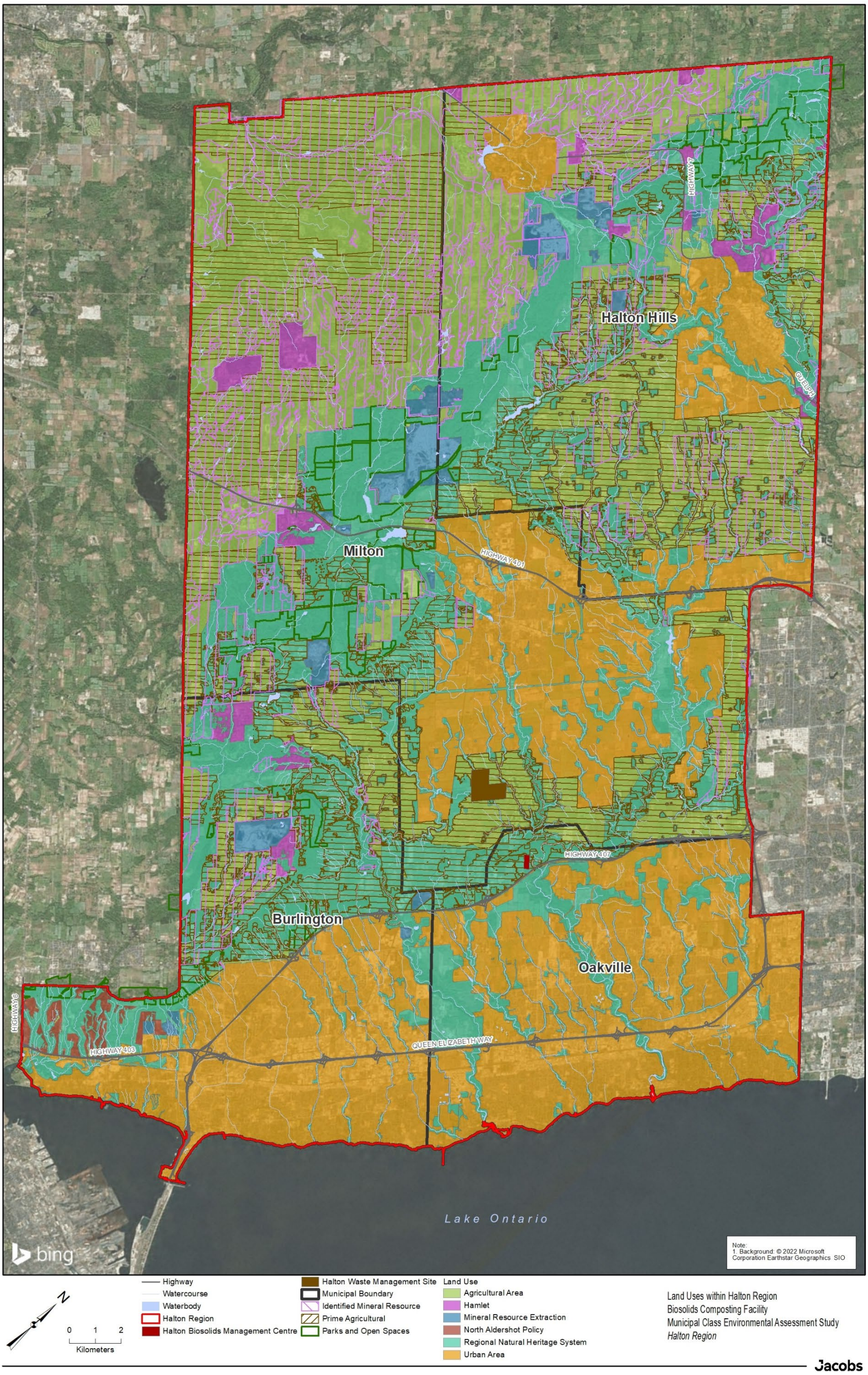
5.2.5 Archaeological and Cultural Heritage Features

Cultural heritage features include the built environment (for example, building, structure, monument, bridge) and cultural landscapes (for example, archaeological sites, spaces, views) (MMAH, 2024). The Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes: A Checklist for the Non-Specialist (MHSTCI, 2016) was completed for the Study Areas defined for the shortlisted sites. Identification, conservation, use and wise management of cultural heritage features are important, to support the social, economic and cultural wellbeing of all communities, including Indigenous Communities and First Nations (MMAH, 2017). The shortlisted sites were not found to be of cultural heritage value, which was considered as part of the alternatives evaluation in Section 8 and was ultimately a non-differentiating criterion.

Halton Region offers a variety of cultural heritage features including 19th-century farms and historical settlements, agricultural landscapes, churches, parks, bridges, museums, and cemeteries (Town of Milton, 2022) (Town of Oakville, 2022) (Town of Halton Hills, 2022) (City of Burlington, 2022).

A Stage 1 Archaeological Assessment was completed for the short list of potential sites for the proposed biosolids composting facility. Development and site alteration is not permitted on lands containing archaeological resources or areas of archaeological potential unless significant archaeological resources have been conserved (MMAH, 2020a) (MNRF, 2017). Stage 2 Archaeological Assessments were recommended for portions of land within the shortlisted sites. The assessment results were considered as part of the alternatives evaluation in Section 8.

Figure 5-1. Land Uses within Halton Region



5.2.6 Natural Heritage Features

5.2.6.1 Overview

Some of the key natural heritage features within Halton Region were presented in Figure 5-1, with additional information presented in Figure 5-2; these features are discussed in the following subsections.

Halton Region encompasses a variety of natural areas (for example, forests, wetlands) and landforms (for example, valleylands, Niagara Escarpment) providing habitat for a variety of plant, wildlife and aquatic species. Within the Natural Heritage System, new development or site alteration will demonstrate that there are no negative impacts on key natural heritage features or key hydrologic features or their functions (MMAH, 2020b; MMAH, 2017). Natural heritage, hydrologic and landform features, areas and functions, including protection of habitat for flora and fauna and particularly species at risk will be protected, maintained or enhanced (MMAH, 2017).

Natural heritage features include water, agricultural and mineral resources, wetlands, woodlands, wildlife habitat and areas of natural and scientific interest (ANSI) (MMAH, 2024). Halton Region is located within Ecoregion 6E and 7E based on the Ontario Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Areas Map (MNRF, 2022). Natural heritage features within these ecoregions are diverse and contain a variety of vegetation, wildlife and aquatic species. Over time, development has resulted in cumulative impacts to these natural areas. Natural heritage features are generally situated outside of the urban areas and include primary agricultural areas, enhancements, linkages and buffers, and the Greenbelt.

5.2.6.2 Woodlands and Wetlands

Halton Region owns approximately 703 ha of forest within the region, including wooded areas, wetlands and meadows (Halton Region, 2022). Woodlands are located throughout the region with more abundant areas in the northwest (MNRF, 2022). Development, including the proposed biosolids composting facility, or site alteration is not permitted in significant woodlands in Ecoregions 6E and 7E unless it can be demonstrated that there will be no negative effects (MMAH, 2024).

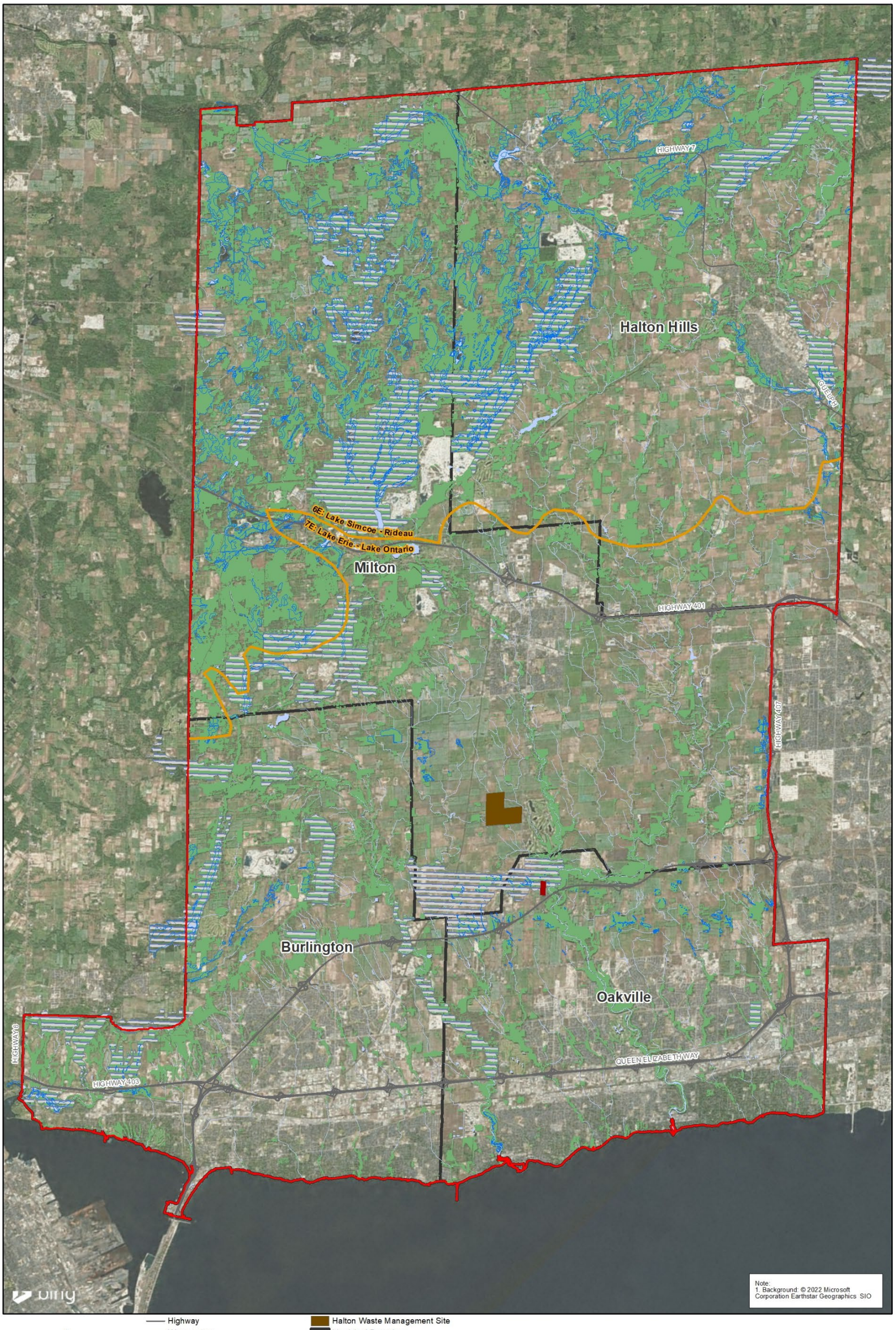
Development, where permitted in woodlands, should protect and where possible enhance the woodland and associated wildlife habitat. All development involving the cutting of trees requires approval from the implementing authority (MNRF, 2017). Wetlands are located throughout the region, including evaluated and unevaluated wetlands, and Provincially Significant Wetlands. Provincially Significant Wetlands are shown on Figure 5-2. Suitable locations for the proposed biosolids composting facility will seek to avoid construction in wetland areas, specifically Provincially Significant Wetlands. Approvals or permits may be required from the applicable Conservation Authority (for example, Conservation Halton, Grand River Conservation) if construction of the proposed biosolids composting facility is located in or adjacent to wetlands.

5.2.6.3 Wildlife and Aquatic Habitat

With Halton Region's natural areas, such as woodlands, wetlands, streams, creeks, valleys and meadows, there are diverse habitats that are home to a variety of plants, animals and aquatic species. The Cootes to Escarpment EcoPark System, the last intact ecological connection between Lake Ontario wetlands and the Niagara Escarpment, is located within the region, offering habitat for over a quarter of Canada's known plant species and more than 50 species at risk (Halton Region, 2022).

In selecting potential sites for constructing a Halton Region-owned biosolids composting facility, the aim was to avoid impacts to wildlife and aquatic habitats; however, if this was not possible, mitigation measures would be required. Development, including a proposed biosolids composting facility, or site alteration is not permitted in significant wildlife habitats unless it can be demonstrated that there will be no negative effects on the nature features or their ecological functions (MMAH, 2024) (MMAH, 2020b). Development and site alteration within the habitat of endangered and threatened species will only be permitted in accordance with provincial and federal requirements (MMAH, 2024).

Figure 5-2. Natural Heritage Features within Halton Region



5.2.6.4 Areas of Natural and Scientific Interest

Halton Region has areas of Provincially Significant Life Science ANSI (for example, Region-owned forest tracts within the NEP Area) as well as Earth Science Provincially Significant ANSI. ANSIs are shown on Figure 5-2. Development, including a proposed biosolids composting facility, or site alteration is not permitted in significant ANSIs unless it can be demonstrated that there will be no negative effects on the nature features or their ecological functions (MMAH, 2024) (MMAH, 2020b).

5.2.6.5 Agricultural Areas

Protected agricultural land is considered a natural heritage feature. The agricultural land uses within Halton Region are shown in Figure 5-1, showing that Prime Agricultural Fields, identified and designated based on the PPS and Greenbelt Plan, are located throughout the region from the northern regional border to Highway 407. Non-agricultural uses in prime agricultural areas may be permitted for limited non-residential uses as long as impacts from any new or expanding non-agricultural uses on surrounding agricultural operations and lands are mitigated to the extent feasible (MMAH, 2024). Prime agricultural areas will be protected for long-term use.

5.2.6.6 Mineral Resource Areas

Identified Mineral Resource Areas within Halton Region are shown on Figure 5-1. Mineral Resource Areas are subject to specific conditions for development to protect these areas from incompatible land uses (Halton Region, 2021).

5.2.6.7 Source Water Protection Areas

Drinking water is protected by each of Ontario's Source Protection Regions (SPR) and SPA.

The most northern area of Town of Milton and the northwest corner of Town of Halton Hills are in the Grand River SPA within the Lake Erie SPR. The Credit Valley SPA covers the northeast half of Town of Halton Hills within Central Lake Ontario SPR. The rest of the region is in the Halton Region SPA (Ontario Ministry of Environment, Conservation and Parks, 2022) within the Hamilton-Halton SPR.

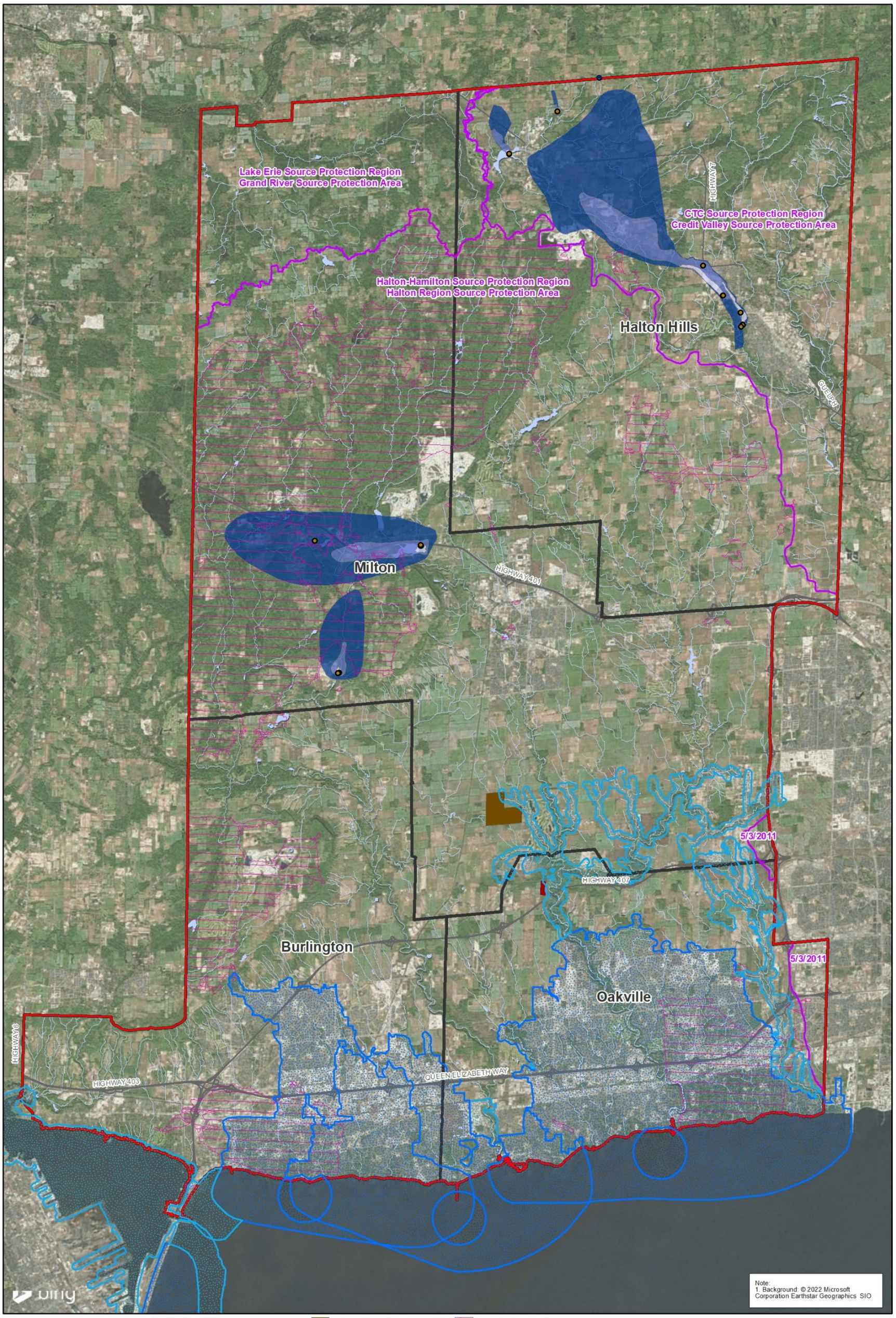
Source water protection features within the region are shown on Figure 5-3 and include the following:

- Wellhead Protection Area (WPA)
- Vulnerable scoring area
- Intake Protection Zone (IPZ)
- Event-based area; and
- Highly vulnerable aquifer.

Siting a biosolids composting facility within a vulnerable area may introduce a potential drinking water threat. A wastewater treatment plant process tank or holding tank that forms part of a wastewater treatment facility is considered a circumstance where wastewater treatment facilities and associated components are potential significant drinking water threats in select IPZs or WPAs (MECP, 2021)

Per the Regional Official Plan (Halton Region, 2021), construction of a biosolids composting facility and the storing of biosolids is prohibited within Municipal Wellhead Protection Zone 1 (Figure 5-3).

Figure 5-3. Source Water Protection Areas within Halton Region



5.2.6.8 Surface Water

Halton Region's Water Resource System is comprised of ground and surface water features, including seeps, springs, wetlands and rivers that provide water to residents. The Region owns three surface water treatment plants (Halton Region, 2022) that treat water from Lake Ontario for distribution.

Watercourses within the region include rivers, streams, Lake Ontario, and small inland lakes and waterbodies (Halton Region, 2021). Major watercourses within the region include Sixteen Mile Creek, Bronte Creek, Grindstone Creek and the Speed River (Conservation Halton, 2022a). The region is comprised of several watersheds that drain toward or into Lake Ontario. The main watersheds within the region are Bronte Creek and Sixteen Mile Creek watersheds (Conservation Halton, 2022a). The southern limits of the region end at Lake Ontario, a protected waterway under the Canadian Navigable Waterway. Siting a facility away from watercourses and/or implementing a buffer to protect ecological features will mitigate potential impacts from development or site alteration. Watercourses within a Conservation Authority Regulation Limit may be subject to additional restrictions or conditions.

There are several floodplain and shoreline hazards within the region (Conservation Halton, 2022b). Permission from Conservation Halton is required for most works in and adjacent to floodplains and hazardous lands.

5.2.7 Atmospheric Environment

Halton Region is located within Ecoregion 6E and 7E (MNRF 2022). Climate in Ecoregion 6E is characterized as mild and moist with a mean annual temperature range from 4.9 to 7.8 °C (MNRF 2018). Climate in Ecoregion 7E is one of the mildest in Canada with a mean annual temperature range of 6.3 to 9.4 °C (MNRF 2018).

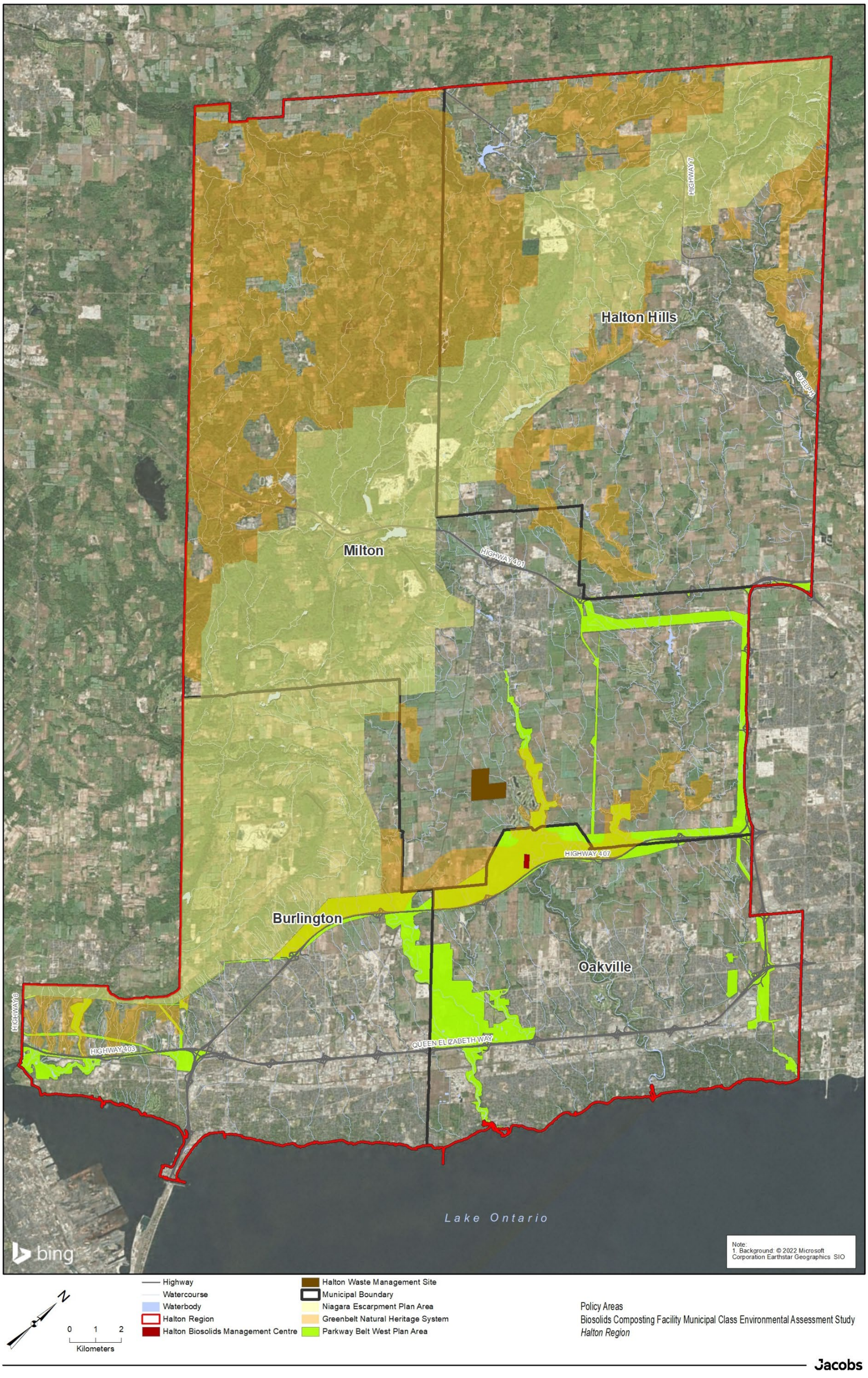
Reducing greenhouse gas emissions and increasing the resilience of settlement areas and infrastructure within the Greenbelt is important (MMAH, 2017).

5.2.8 Special Policy Areas

5.2.8.1 Introduction

Special Policy Areas within Halton Region include the NEP Area, Parkway Belt West Plan Area and Greenbelt Plan Protected Countryside Areas (Halton Region, 2021), as shown on Figure 5-4. The relevant policies were previously described in Section 3.2.5. A description of the policy areas and the constraints imposed related to siting a proposed biosolids composting facility are described in the following subsections.

Figure 5-4. Special Policy Areas within Halton Region



5.2.8.2 Niagara Escarpment Plan Areas

In 1990, the United Nations Educational, Scientific and Cultural Organization named the Niagara Escarpment a World Biosphere Reserve recognizing the land and its vicinity as a national and international significant landform (MNRF, 2017). The Niagara Escarpment runs through Halton Region (as shown in Figure 5-4), which includes the following NEP Land Uses, protected under the NEP and Niagara Escarpment Commission:

- Escarpment Natural Areas
- Escarpment Protection Areas
- Escarpment Rural Areas
- Urban Areas
- Mineral Resource Extraction Areas.

Within the region, the following NEP land use designation areas are encountered: Escarpment Natural, Mineral Resource Extraction, Escarpment Rural and Escarpment Protection Areas. According to the NEP (MNRF, 2017), municipal wastewater systems will not be in or extended into Escarpment Natural Areas, Escarpment Protection Areas, Escarpment Rural Areas, or Mineral Resource Extraction Areas; however, biosolids composting facilities serving the local community may be permitted on existing waste disposal sites.

5.2.8.3 Greenbelt

The Greenbelt runs through Halton Region covering most of Town of Halton Hills, Town of Milton and City of Burlington (Figure 5-4). Development or site alteration within the Greenbelt Natural Heritage System is not permitted unless it can be demonstrated that there are no negative effects on key natural heritage features or hydraulic features or their functions (MMAH, 2017). Potential development or site alteration within 120 m of features within the Protected Countryside require additional studies. Wastewater and water infrastructure in the Protected Countryside will be planned, designed and constructed in accordance with the policies in subsection 3.2.6 of the Growth Plan (MMAH, 2017).

5.2.8.4 Parkway Belt West Areas

The Parkway Belt West Plan Areas are located in the southern half of Halton Region, generally running through City of Burlington, Town of Milton and Town of Oakville (Figure 5-4). All development within Parkway Belt West Plan Areas is subject to the provisions of the Ontario Planning and Development Act, applicable Provincial Land Use Regulations, the Parkway Belt West Plan, the Greenbelt Plan (where applicable) and any policies outlined in the Regional Official Plan (Halton Region, 2021). Conditions for development on land designated as Parkway Belt Transportation and Utility Corridors may be subject to additional conditions and constraints (Halton Region, 2021).

5.3 Technical Environment

This section describes the technical environment as it relates to this study.

5.3.1 Wastewater Treatment in Halton Region

The Region owns and operates six WWTPs. Each facility, as shown in Table 5-2, operates under an ECA issued by the MECP. The WWTPs have a total treatment capacity of approximately 370,000 m^3/day and currently treat a combined total wastewater flow of approximately 245,000 m^3/day (2019 to 2021).

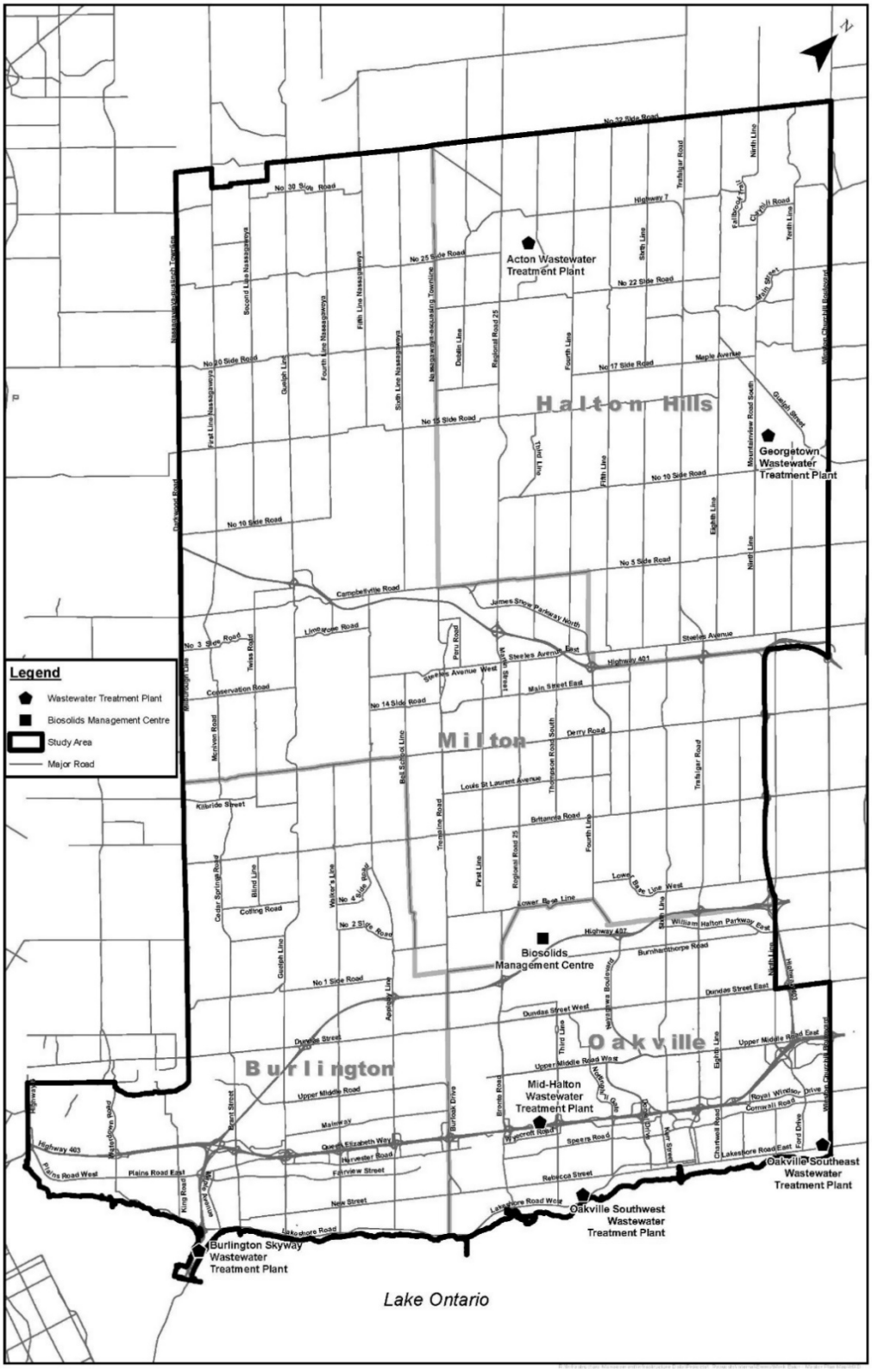
Table 5-2. Location of Wastewater Treatment Plants in Halton Region

Facility	Address	ECA Number	Rated Flow Capacity (m^3/day)
Acton WWTP	202 Churchill Rd S, Acton, ON	2257-ADZNND	5,200
Georgetown WWTP	275 Mountainview Rd S, Georgetown, ON	4783-BUCP6Y	22,727
Mid-Halton WWTP	2195 North Service Rd W, Oakville, ON	3636-BUCP2V	125,000
Oakville Southeast WWTP	2477 Lakeshore Rd E, Oakville, ON	4916-9RTLQM	31,800
Oakville Southwest WWTP	1385 Lakeshore Rd W, Oakville, ON	1418-7WYPG9	45,400
Burlington Skyway WWTP	1125 Lakeshore Rd, Burlington, ON	0615-AD6RT7	140,000

The Region also owns and operates the W.A. Bill Johnson BMC, which collects and stores liquid biosolids before they are hauled to the final receiver (for example, farmland). The liquid biosolids can also be dewatered at the BMC to reduce the volume of biosolids that need to be hauled.

The locations of the Region's WWTPs and BMC are shown in Figure 5-5.

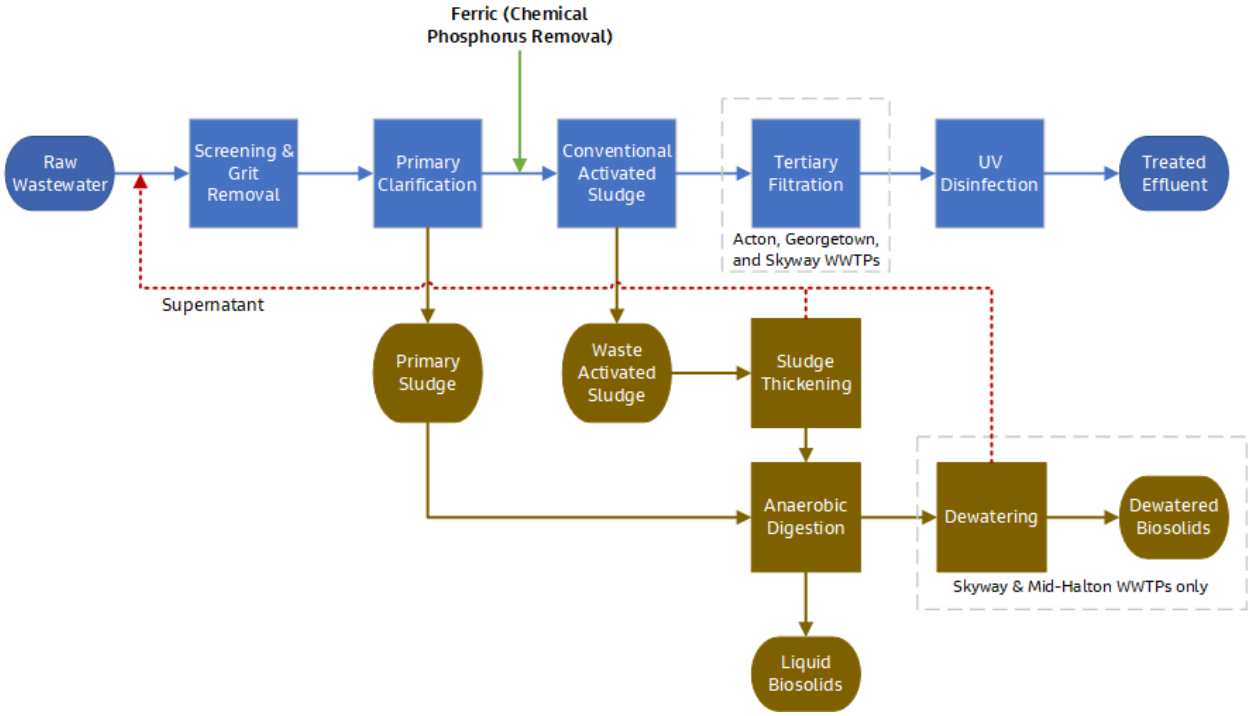
Figure 5-5. Location of Halton Region's Wastewater Treatment Plants and Biosolids Management Centre



The Region's wastewater treatment facilities are all conventional activated sludge plants with solids handling. In general, wastewater treatment consists of screening, grit removal, primary clarification, nitrifying activated sludge secondary treatment, phosphorus removal via chemical precipitation, and disinfection using ultraviolet light before the final effluent is discharged into the environment (Figure 5-6). Tertiary filtration is provided at Acton, Georgetown, and Skyway WWTPs for enhanced phosphorus removal.

The primary sludge and secondary waste activated sludge generated from the treatment process are stabilized via anaerobic digestion into liquid biosolids. A dewatering process used at the two largest plants, Skyway and Mid-Halton WWTPs, removes water to generate a dewatered biosolids, resembling a wet soil. The separated water from the dewatering process (centrate) is then returned to the beginning of the wastewater treatment train for treatment.

Figure 5-6. Process Flow Diagram for Halton Region's Wastewater Treatment Plants



5.3.2 Biosolids Management Centre

The W.A. Bill Johnson Biosolids Management Centre, located at 4449 Regional Road 25, Oakville, ON, is an 11.2-ha facility within a 59-ha property. The facility is operated under the Amended ECA Number A680210 (January 22, 2019) to receive and store liquid biosolids from the Region's wastewater treatment plants. With a rated storage capacity of 79,600 m^3, the BMC contains ten 8,000 m^3 storage tanks, a dewatering station with an allowable throughput of 4,000 m^3/day (operation at 800 to 900 m^3/day), and an administration and maintenance building. An aerial view of the BMC is provided in Figure 5-7.

Figure 5-7. Aerial View of Halton Region Biosolids Management Centre

The purpose of the facility is to store, blend and manage the liquid biosolids from the Region's wastewater treatment plants, resulting in a consistent material for farmland application. The storage tanks also allow for solids to settle and the supernatant to be removed, reducing the total volume of biosolids hauled for farmland application. The supernatant from the storage tanks and centrate from the dewatering station is pumped to the Mid-Halton WWTP for treatment via a forcemain (discharge into the Boyne Sewer); the forcemain was commissioned in late 2019. Haulage of supernatant/centrate from the BMC has generally been discontinued but may be required on a contingency basis if the manhole is unable to receive the flow.

While the Region owns and operates the BMC, a third-party contractor (currently Green for Life [GFL] Environmental Inc.) conducts daily program operations from the BMC, including managing the end use of the biosolids, transportation and determining their destination, based on the options available at the time. Agricultural land application is the preferred method of biosolids management, but when conditions are unfavourable (for example, frozen ground, high runoff risk, during times when soil compaction is a risk or within regulatory prohibition dates), liquid biosolids are storage at the BMC and dewatered biosolids are diverted to land reclamation sites near northern Ontario regions or to the Lystek fertilizer production facility in Dundalk, ON (www.lystek.com) where they are used as feedstock. Liquid biosolids are dewatered at the BMC prior to any diversion options when conditions for land application are not favourable. If none of these options are available, landfill disposal may be used on an emergency basis.

5.3.3 Historical Biosolids Generation Rates and Quality

5.3.3.1 Liquid Biosolids

Anaerobic digestion is used to convert primary sludge and waste activated sludge into liquid biosolids before they are hauled for blending and storage at the BMC. Between 2019 and 2021, the BMC received approximately 137,606 m^3 of liquid biosolids each year, primarily from the Oakville Southwest, Oakville Southeast, and Georgetown WWTPs (Table 5-3). The Acton WWTP hauled its (undigested) sludge to Skyway or Mid-Halton WWTP for stabilization during this period due to onsite construction of digester upgrades. The BMC also received a small amount of liquid biosolids from Skyway WWTP on an emergency basis when there was inadequate dewatering capacity (not included in Table 5-3).

Table 5-3. Quantity and Quality of Liquid Biosolids Transported to the BMC (2019-2021)

Facility	Average Liquid Biosolids Generated (m^3/year)	Average Total Solids Concentration (TS%)
Oakville Southwest WWTP	54,591	1.9
Oakville Southeast WWTP	46,033	1.8
Georgetown WWTP	36,880	2.8
Total	**137,504**	**2.2**

Notes:

m^3/year = cubic metre(s) per year

TS = total solids

Storing the liquid biosolids at the BMC allows for solids to settle and the supernatant to be returned via a forcemain to the Mid-Halton WWTP for treatment. Between 2019 to 2021, approximately 89 percent of the liquid biosolids leaving the BMC were applied to agricultural land both within and outside the region, 5 percent were dewatered and applied to mine land reclamation, with the remaining 6 percent dewatered and directed to landfill, as shown in Table 5-4. Of the liquid biosolids applied to agricultural land, approximately 59 percent were applied to land outside the region, and 41 percent inside the region.

Table 5-4. Destination of Liquid Biosolids (2019-2021)

Destination	Biosolids Mass (dt)	% of Total
Field Application	2,633	89
Mine Reclamation	148	5
Landfill	178	6

Notes:

dt = dry tonne(s)

5.3.3.2 Dewatered Biosolids

Dewatered biosolids are generated at Skyway and Mid-Halton WWTPs, where onsite dewatering equipment is available. Between 2019 and 2021, approximately 24,573 wet tonnes (wt), or 6,045 dt at 24.6 percent solids concentration, of dewatered biosolids were generated each year. Agricultural land application is the most common destination for the dewatered biosolids (Table 5-5); however, dewatered biosolids are typically applied to farmland outside Halton Region, to contractor-approved sites in southern Ontario (including Wellington, Dufferin, Kent, Perth, Grey Haldimand, Brant, Norfolk, Oxford, Elgin, and Middlesex Counties; the spreading sites are determined based on distance, weather, soil types, and

available resources by the contractor). Dewatered biosolids are also hauled to mine sites in northern Ontario for land reclamation or to the Lystek facility in Dundalk (ON) to be used as feedstock for fertilizer production. A small percentage of the dewatered biosolids was sent to Twin Creeks Landfill in Watford for disposal when other land application locations were unavailable.

Table 5-5. Destination of Dewatered Biosolids (2019-2021)

Destination	Biosolids Mass (dt)	% of Total
Field Application	7,798	43
Lystek	6,347	35
Mine Reclamation	3,446	19
Landfill	544	3

5.3.4 Contract, Hauling and Handling Costs

The Region uses a third-party contractor (GFL Environmental Inc.) to manage biosolids haulage, land application, and day-to-day operations of the BMC. The Region provides administrative support by liaising with farm owners, regulators and public to ensure all biosolids applications are approved, in compliance, and operating without public concern.

Table 5-6 presents the contract hauling and handling costs for liquid and dewatered biosolids management in 2021, in which the Region spent approximately $4.8 million. General labour and maintenance costs (for example, tank cleaning) were excluded as they are considered fixed costs. On an equivalent unit cost basis (per dry tonne), the handling cost for liquid biosolids is approximately 30 percent higher than for dewatered biosolids primarily due to the larger volume that requires haulage.

Table 5-6. Halton Region's Biosolids Contract Management Costs (2021)

Item	Cost	Equivalent Unit Cost (per dt)
Liquid Biosolids & Supernatant Haulage/Handling	$2,573,385	$486
Dewatered Biosolids Haulage/Handling	$2,259,671	$374
Total	**$4,833,056**	

5.3.5 Historical Biosolids Land Application Breakdown

Table 5-7 presents how the Region's biosolids were distributed between the various land application destinations between 2019 and 2021, and the average round-trip haulage distance.

Table 5-7. Historical Biosolids Land Application Breakdown (2019-2021)

Biosolids Type	Destination	Annual Average Quantity Distribution, % of liquid [a] /dewatered (dt)	Average Haulage Distance, km (round-trip)
Liquid	Farmland within the region	41	50
Liquid	Farmland outside the region	59	150
Dewatered	Farmland outside the region	43	275
Dewatered	Mine land reclamation	19	903
Dewatered	Lystek (Dundalk)	35	266

Biosolids Type	Destination	Annual Average Quantity Distribution, % of liquid [a] /dewatered (dt)	Average Haulage Distance, km (round-trip)
Dewatered	Landfill (Watford)	3	418

Notes:

[a] Percent of liquid biosolids is based on quantities hauled from the BMC.

km = kilometre(s)

5.3.6 Limitations and Challenges

The current biosolids land application program is facing increasing limitations and challenges, as follows:

- Loss of local farmland due to urban development pressures resulting in the contractor having to seek farmland and/or other outlets for biosolids application further outside the region at higher costs
- Significant weather dependence:
  - Increasing wet weather preventing land application
  - Harsh winter weather impacting haulage
  - Increasing extreme weather events (due to climate change) preventing haulage
- Increasing cost due to higher fuel prices and longer haulage distances
- Increasing GHG emissions associated with biosolids haulage distances and landfill contingency
- High dependence on third-party contractors and contracted facilities
- Potential future regulatory ban on organics disposal in Ontario landfills to promote beneficial reuse of these organics (the Region would lose its contingency outlet).

Given these considerations, the current biosolids management program poses financial and environmental risks to the Region.

6. Future Biosolids Management Needs

This section discusses future biosolids management needs.

6.1 Biosolids Quantity Projection

Table 6-1 presents the projected quantity of biosolids generated by 2051, calculated based on the historical equivalent per capita biosolids generation rate and population projections from the Region's Official Plan Review (Halton Region, 2021).

Table 6-1. Historical and Projected Biosolids Generation Rates

Year	Residential Population	Liquid Biosolids (m^3)	Dewatered Biosolids (wt)	Liquid Biosolids (dt [% of total]) [a]	Dewatered Biosolids (dt [% of total]) [b]	Biosolids Generated (dt)
2021	621,000	137,969	25,121	3,035 [33%]	6,180 [67%]	9,215
2051	1,098,070	260,157	43,735	5,723 [35%] [c]	10,759 [65%] [c]	16,482

Notes:

[a] Based on average solids concentration of 2.2% for liquid biosolids (2019 to 2021)

[b] Based on average solids concentration of 24.6% for dewatered biosolids (2019 to 2021)

[c] Percent distribution of liquid and dewatered biosolids corrected to account for future normal operation of Acton WWTP

The biosolids generated and residential population in 2021 were used to calculate the historical equivalent per capita biosolids generation rate (41.1 grams per capita per day) and to estimate 2051 biosolids generated based on the projected residential population. Rather than identifying residential and employment contributions separately, the equivalent per capita biosolids generation rate accounted for contributions from employment in the region. This approach is considered reasonable as long as the ratio of employment to residential contributions does not change significantly in the future, which is the case for Halton Region to 2051, based on residential and employment projections from the Region's Official Plan Review (Halton Region, 2021).

6.2 Biosolids Quality

Both the compost feedstock (biosolids) and final product must meet their maximum allowable metal concentrations as defined in the OCQS, for the compost product to be acceptable for distribution as a Category A compost.

Table 6-2 presents the metal concentrations of BMC liquid biosolids (which is a blend from all WWTPs generating liquid biosolids) and dewatered biosolids (from BMC, Skyway WWTP and Mid-Halton WWTP), compared to the maximum limits defined by OCQS for feedstock quality. The concentrations of all metals in the Region's biosolids are well below the OCQS feedstock maximum limits.

Table 6-2. Metals Concentrations (2019-2021) in Halton Region Liquid and Dewatered Biosolids Compared to Maximum OCQS Feedstock Concentrations

Metals Concentrations (mg/kg dry weight)	BMC Liquid Biosolids	BMC Dewatered Biosolids (dewatered onsite)	Skyway WWTP Dewatered Biosolids	Mid-Halton WWTP Dewatered Biosolids	OCQS Feedstock Maximum Limit for Category A&B Compost
Arsenic	10.0	6.5	9.8	5.5	170
Cadmium	5.0	5.0	4.2	2.9	34
Chromium	164	172	95.2	72.1	2,800
Cobalt	5.2	4.8	4.7	3.0	340
Copper	716	701	551	477	1,700
Lead	21.4	26.4	18.9	11.9	1,100
Mercury	0.4	0.6	0.5	0.4	11
Molybdenum	9.0	8.5	11.5	10.4	94
Nickel	35.0	35.1	21.4	21.8	420
Selenium	6.4	5.5	4.7	4.5	34
Zinc	928	887	656	716	4,200

The final compost product quality depends on the bulking materials used, which need to account for at least 75 percent of the feed stream to produce a Category A compost, as discussed previously in Section 3.2.3.

7. Problem and Opportunity Statement

The Region's current biosolids land application program is facing increasing challenges and risks, as follows:

- Increasing biosolids quantities due to population growth within the Halton Region.
- Loss of local farmland to urban development, resulting in the third-party biosolids haulage contractor having to seek farmland and/or other outlets for biosolids management further outside the region at higher costs.
- Significant weather dependence, including:
  - Increasing wet weather preventing land application
  - Harsh winter weather impacting haulage
  - Increasing extreme weather events (due to climate change) preventing haulage
- Increasing costs due to higher fuel prices and longer haulage distances.
- Increasing GHG emissions associated with biosolids haulage and use of landfill as a contingency management approach.
- High dependency on third-party contractors and contracted facilities.
- Potential future regulatory ban on organics disposal in Ontario landfills to promote beneficial reuse of these organics (that is, the Region would lose its contingency outlet).

Given these considerations, the current biosolids management program poses financial and environmental risks to the Region. Recognizing these potential risks early, the Region initiated the planning process to identify a strategy to manage projected increasing biosolids quantities within the region. In 2012, the *Halton Region Biosolids Master Plan* recommended further investigation of biosolids composting to complement the Region's land application program. In 2020, the *Halton Region Biosolids Composting Feasibility Study* was completed, which recommended a Region-owned biosolids composting facility to process biosolids into compost, expand and diversify local outlets and reduce overall GHG emissions.

Halton Region initiated this Schedule B MCEA study to identify the preferred site location and provide the design concept for the proposed biosolids composting facility. The purpose of this study is to evaluate alternative site location options and conceptual design requirements (for example, vehicle access, process area, odour control, storage of bulking materials) to recommend a preferred location and plan for implementing the proposed facility. The needs for finished compost product storage will be identified through a subsequent market assessment study.

Through the MCEA study and recommendations, the Region can realize the following potential opportunities:

- Strategically locating the proposed biosolids composting facility to take advantage of existing programs and assets, such as the L&Y waste program at the HWMS, or the dewatering station at the BMC.
- Mitigating dependency of the current biosolids management program on weather (adverse weather is projected to intensify with climate change) with shorter haulage distances and expanding storage options through a more favourable regulatory framework.

- Reducing GHG emissions associated with long haulage distances and maximizing the use of compost on local land (rather than landfilling).
- Diversifying outlets, given the multiple potential markets for biosolids compost in Ontario, such as agricultural, reclamation, and horticultural.
- Increased productivity, functionality, and sustainability of Halton's soil resources, local food systems, and environment by maximizing the use of organic matter and nutrients from biosolids compost within local end-use markets.

8. Site Alternative Development and Evaluation Methodology

This section discusses development alternatives and the methods used to evaluate those.

8.1 Design Considerations for Proposed Biosolids Composting Facility

This section discusses design considerations for the proposed biosolids composting facility.

8.1.1 Design Basis

Table 8-1 presents the design basis for the proposed biosolids composting facility. The projected quantity of biosolids generated by 2051 was used to determine the capacity and space required for the biosolids composting facility, the quantity of bulking agent required, and compost production rate, as follows:

- The composting facility is sized to accommodate all liquid and dewatered biosolids generated within Halton Region (approximately 66,000 wt annually at 25 percent total solids [TS]). The liquid biosolids will be dewatered at the BMC to approximately 25 percent TS before being transferred to the composting process; there is adequate liquid biosolids dewatering capacity at the BMC within the 2051 planning period.
- The bulking agent required is determined based on feedstock composition of 25 percent biosolids (by dry weight) to satisfy Category A compost (the highest category allowed for biosolids composting) requirements established in the OCQS. The composting operation includes screening of the compost product prior to curing to allow for recycling of unused bulking materials. Preliminary estimates indicate that up to 26,000 tonnes of new bulking agent will be required annually for the projected quantity of biosolids generated by 2051, to produce 43,800 tonnes of Category A compost product.
- The estimated space required for the biosolids composting facility is 4 to 5 ha, including the composting process areas (active composting and curing), biofilter (odour control), storage area (based on 1 month for bulking agent), and allowance for offices, maintenance building, equipment storage, onsite grinding service, access road and parking. Additional space may be required for process storage, which is typically determined during the detailed design stage, and is not expected to affect site selection.
- The composting equipment sizing is based on operation of the facility 5 days per week, given the labour required for the composting operation (for example, administration, front-end loader operation, temperature monitoring in the composting piles, etc.).

Table 8-1. Design Basis for Biosolids Composting Facility

Parameter	Value	Basis
Maximum biosolids throughput capacity, wt/year	66,000	Based on quantity of biosolids generated by 2051, including all liquid biosolids (to be dewatered to 25% TS prior to composting) and all dewatered biosolids (at 25% TS) generated from the Region's WWTPs

Parameter	Value	Basis
New bulking agent required, tonne/year	26,000	Based on feedstock composition of 25% biosolids, 27% new bulking agent, and 48% recycled bulking agent (by dry weight); recycled bulking agent to be screened before curing (following primary composting stage)
Compost production rate, tonne/year	43,800	Based on maximum throughput capacity and bulking agent used (per the prior two rows)
Facility area required, ha	4 to 5	Including the composting process areas, biofilter (odour control), storage area (based on 1 month for bulking agent), and allowance for offices, maintenance building, equipment storage, onsite grinding service, access road and parking

Notes:

wt/year = wet tonne(s) per year

8.1.2 Composting Technology

As part of the 2020 Biosolids Composting Feasibility Study, three well-established composting technologies were evaluated, as presented in Table 8-2. Open windrow is another commonly used composting technology; however, it was eliminated as part of the 2012 BMP due to the high offsite odour potential, minimal control on process performance, and potential for pathogen re-growth in the final product.

Table 8-2. Overview of Biosolids Composting Technology Alternatives

Technology	Description	Example
Covered ASP	Dewatered biosolids are mechanically mixed with a bulking agent and stacked into large piles over a bed of pipes through which air is drawn down through the composting material. The level of enclosure (partial or full cover) is typically determined by the required level of odour capture and control required, as well as local environmental conditions (wind, temperature, precipitation, etc.), to be determined during the detailed design stage based on odour dispersion modelling results.	 *Spotsylvania Biosolids Composting Facility (Virginia, United States)*

Technology	Description	Example
Membrane Covered ASP (GORE®)	Dewatered biosolids are mechanically mixed with a bulking agent and stacked into long piles over a bed of pipes through which air is transferred to the composting material. A proprietary, semi-permeable membrane fibre cover (for example, GORE® cover) is used (instead of structural enclosure), which allows oxygen and carbon dioxide to pass through but keeps moisture and odours beneath the cover.	 *Moncton Biosolids Composting Facility (New Brunswick, Canada)*
In-Vessel Composting (Agitated Bay)	A mixture of dewatered biosolids and bulking agent is fed into a vessel. The compost is aerated, mechanically mixed and moved through the vessel to the discharge point. The finished compost is usually stored in a pile for additional curing prior to distribution.	 *Goldsboro Biosolids Composting Facility (North Carolina, United States)*

A multi-criteria evaluation framework was used to complete a comprehensive evaluation of the three composting technologies, considering process reliability, flexibility, operating and maintenance (O&M) complexity, odour risk, occupational and health risk, land area required, and cost (capital, O&M and life-cycle costs). The covered ASP ranked the highest and was recommended as the preferred technology.

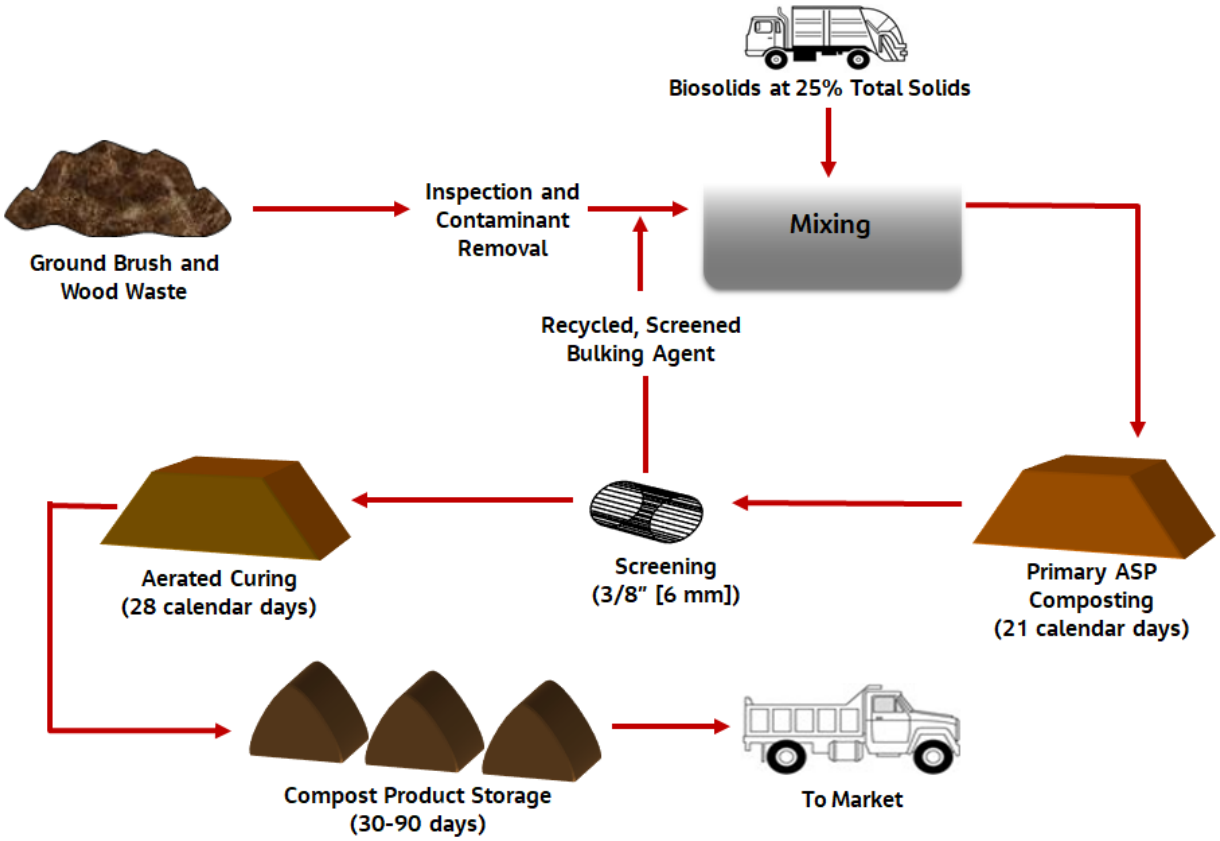
Development of composting technologies has not changed significantly since the 2020 Biosolids Composting Feasibility Study; therefore, covered ASP was used in this Class EA study to develop the biosolids composting facility concept and associated area requirement for each alternative site. Of note, among the three technologies reviewed, covered ASP requires the smallest area. The other two technologies require approximately 10 to 20 percent more land area compared to covered ASP. To be conservative, this Class EA study allows for a larger area with buffer, to leave flexibility to finalize the preferred technology selection during detailed design.

The technology selection will be re-evaluated during the detailed design stage to confirm the recommendation based on the latest technology developments at that time. However, a significant change to technology selection that would change the impact evaluation and mitigation measures cannot be made at the detailed design stage. Technology change during the design stage should be limited to proven technologies with equivalent or less impact than covered ASP.

8.1.3 Description of Covered Aerated Static Pile Biosolids Composting Process

The ASP technology is the most common biosolids composting method in North America in the last decade, especially for new construction. A general process flow diagram for a typical ASP composting facility is presented in Figure 8-1, and briefly described in the following subsections.

Figure 8-1. Process Flow Diagram for a Typical Aerated Static Pile Biosolids Composting Facility



8.1.3.1 Feedstock Receiving and Storage

The feedstock (biosolids and bulking agents) will be received and mixed within a three-sided bunker inside a Mixing Building. Typically, the Mixing Building provides capacity for approximately half of the dewatered biosolids that would be received in one day, plus the recycled bulking agents and new bulking agents. The preliminary design concept also includes one month storage capacity for bulking agents. A small storage volume can be provided for the dewatered biosolids (for example, 2 to 3 days), considering the 5-d operation of the composting facility and limited biosolids storage capacity at the Skyway and Mid-Halton WWTPs; the need for biosolids storage can be refined during the detailed design stage, and is not expected to affect site selection. Storage of liquid biosolids will not be provided at the composting facility, given the availability at the BMC.

The Mixing Building can be covered or enclosed (at additional cost). Experience has shown that this portion of the process typically contributes to less than 5 percent of the overall facility odour load and therefore, does not always require enclosing (for example, can be covered to reduce capital cost). For the concept development in this project, enclosing the mixing area operation is included for enhanced odour management, which can be refined during the detailed design stage based on results from the odour dispersion modelling.

8.1.3.2 Mixing

Mixing will be conducted in a designated area inside the Mixing Building using one or two stationary batch mixers that are charged with a front-end loader (FEL); an example is shown in Figure 8-2. The mixers are typically sized to be able to mix an operating days' worth of material within 6 hours (considering 8-hour working days). The mixers will be electric and outfitted with weigh scales and a local read-out so that the operator can meter out a set gravimetric ratio of bulking agent to dewatered biosolids. The initial mix will be discharged onto an elevating conveyor to transfer the material into a three-sided mix bunker located in the adjacent composting area, where it will be picked up and transferred to the composting system using a FEL.

Figure 8-2. Example of Stationary Batch Mixers

8.1.3.3 Composting Process and Aeration

Composting of dewatered biosolids will be conducted in an extended ASP composting system located under roof and contained by 4-metre-tall concrete walls, with process air provided through a negative aeration system; an example of covered ASP composting process with extended aeration system is shown in Figure 8-3. The walls typically do not extend to the roof, allowing for natural ventilation to occur in the composting area. This approach reduces the size of the odour control system by at least 30 percent as compared to a totally enclosed facility. This approach also reduces the odour exposure level within the composting area for the operators.

Figure 8-3. Example of Covered Aerated Static Pile System with Extended Aeration Stations

The composting zones are sized based on 1/3-m woodchip layer placed on the aeration floor, followed by 3-m of mix (biosolids and bulking agents) and a 1/3-m layer of finished unscreened compost as an insulation layer on top. Temperature probes are installed within each pile. An example of active composting piles is shown in Figure 8-4. The composting system will be designed to allow for a 21-day retention time (three weeks) for the active composting phase of operation.

Figure 8-4. Example of Active Composting Piles

Multiple aeration fans will be utilized to provide process air to the compost zones. Each aeration fan will operate in the negative aeration mode, drawing air down through the composting piles and directing it to the odour control system. Each aeration zone will be controlled by a dedicated fan that has a variable frequency drive to allow for increasing or decreasing the aeration provided in that zone based on pile temperatures. A below grade high-density polyethylene aeration pipe network will service aeration risers outfitted with stainless steel distribution grates.

Aeration will be controlled by automated temperature readings taken in each pile continuously every day. Daily adjustments in the aeration fan speed will then be made based on pile temperature measurements to meet time-temperature criteria in every pile for process to further reduce pathogens and vector attraction reduction. Simple operational controls are typically used instead of an automated supervisory control and data acquisition (SCADA) system to minimize facility complexity and maintenance needs.

8.1.3.4 Screening

Once composting is completed, the composted material will be screened in an adjacent covered screening area using a 6-mm screen to produce high-quality compost; an example is shown in Figure 8-5. Screened bulking agents (also referred to as compost 'overs') will be recycled back to the compost mixing operation. The screened compost product will be moved by FEL to the adjacent aerated curing operation.

Figure 8-5. Example of Compost Screening Operation

8.1.3.5 Aerated Curing

Curing of the screened compost will be conducted in an extended ASP composting system located under roof and contained by 4-metre-tall concrete walls, with process air provided through a positive aeration system. The curing zones are sized based on a pile height of 3 m placed directly on the aeration floor. Like the composting area, below grade piping and risers with grates will be used to provide aeration. Because most odours are released and captured for treatment in the primary composting zone, positive aeration of the curing area is planned. Aeration will be controlled by automated temperature readings taken in each pile continuously every day. Daily adjustments in the aeration fan speed will be made based on pile temperatures.

The curing system will provide 28-day retention time (four weeks) at the design capacity.

8.1.3.6 Odour Control

The highest concentration of odours are generated from the active composting phase of the operation. Previous testing at other ASP composting facilities has shown that approximately 75 percent or more of the mass odour emission can be attributed to the composting process and less than 20 percent to the curing process. By operating with continuous negative aeration in the composting process, the odorous air can be captured for treatment.

The preliminary odour control design concept for the proposed biosolids composting facility is based on a biofiltration system, which has been demonstrated to be very effective for removing compost odours.

Process air from the compost process will be drawn into a central collection duct by the individual aeration fans and directed to a booster fan. Fresh air will also be drawn into the collection duct via an intake duct with a manually controlled butterfly damper to reduce process air temperatures to less than 40 °C. The diluted process air will be directed by the booster fan up through an organic-based media biofilter for the removal of the odours. Examples of the collection duct and typical biofilters are provided in Figure 8-6.

Figure 8-6. Example of Odour Control Collection Duct (left) and Biofilters (right)

The biofilter will consist of perforated lateral pipes placed on a concrete pad with holes on the crown, on top of which a 2-metre-deep layer of woodchip media will be placed. The configuration will result in a nominal gas residence time of 60 seconds. Moisture control will be provided as needed during the spring, summer, and fall through manually controlled surface irrigation.

Once the facility size and location are selected for a composting operation, odour dispersion modelling of the site layout will be completed to determine the level of odour treatment needed to keep odours from leaving the site. Depending on the size of the operation and the land area available, odour modelling of the entire process may show that additional odour control of the curing process may be needed (for example, using negative aeration for curing to capture the air for odour control). The odour modelling is typically carried out during the detailed design stage.

8.2 Potential Location Considerations

This section discusses considerations when evaluating locations for the proposed biosolids composting facility.

8.2.1 Introduction

Construction of the proposed biosolids composting facility on an existing site with an ECA for wastewater treatment or solids management would offer potential advantages, as follows:

- There could be synergies with existing operations onsite.
- There may be opportunities to reduce hauling distances (for example, if the facility could be located at an existing wastewater treatment plant, the BMC, or the HWMS).
- With an existing ECA, site impacts were already studied, mitigation measures were identified, and the sites were approved for similar operations. Therefore, planning for an amendment to an existing ECA would be less complex than identifying and obtaining approvals for a new site within the region.

It is anticipated that the proposed biosolids composting facility will need 4 to 5 ha of land. Relevant existing Halton Region facilities were reviewed for potential suitable locations. Additional Region-owned sites near the BMC without an existing ECA were also considered and are described further in Section 9.1.

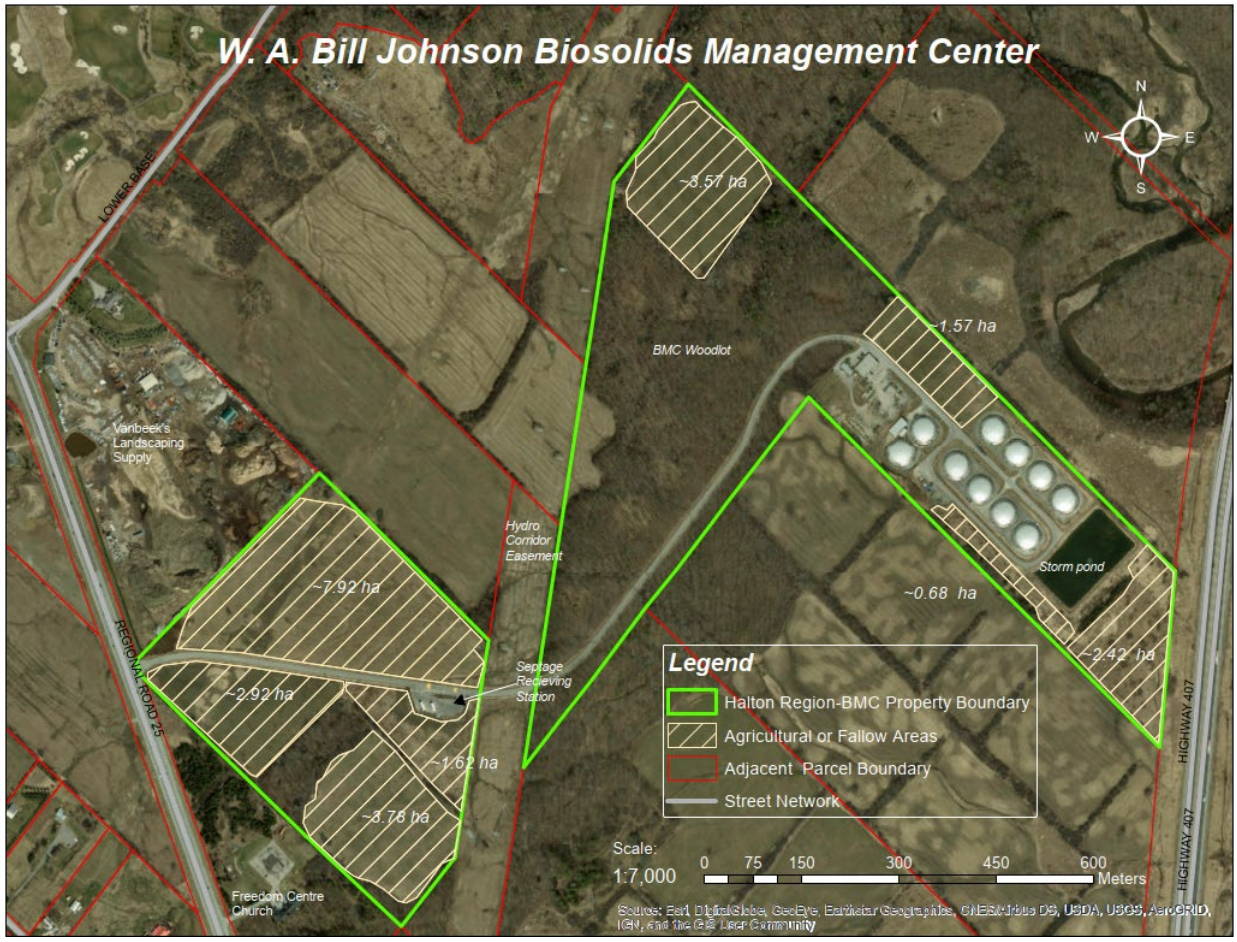
8.2.2 Wastewater Treatment Plants

Given the large footprint required (4 to 5 ha), the existing wastewater treatment plants (previously described in Section 5.4.1 are not suitable for siting the proposed biosolids composting facility, because site space is used by existing processes and buildings or reserved for future treatment process expansions. Therefore, existing wastewater treatment plant sites were not further reviewed.

8.2.3 Biosolids Management Centre

The BMC is an 11.2 ha facility located within a 59-ha property that is approved to collect and store liquid biosolids generated from the Region's wastewater treatment plants. The site boundaries and land use around the BMC are shown on Figure 8-7. Several land parcels within the BMC property boundary can be considered for siting the proposed biosolids composting facility. The information presented in Figure 8-7 was used to identify and develop the long list of siting alternatives.

Figure 8-7. Land Use Around the Biosolids Management Centre



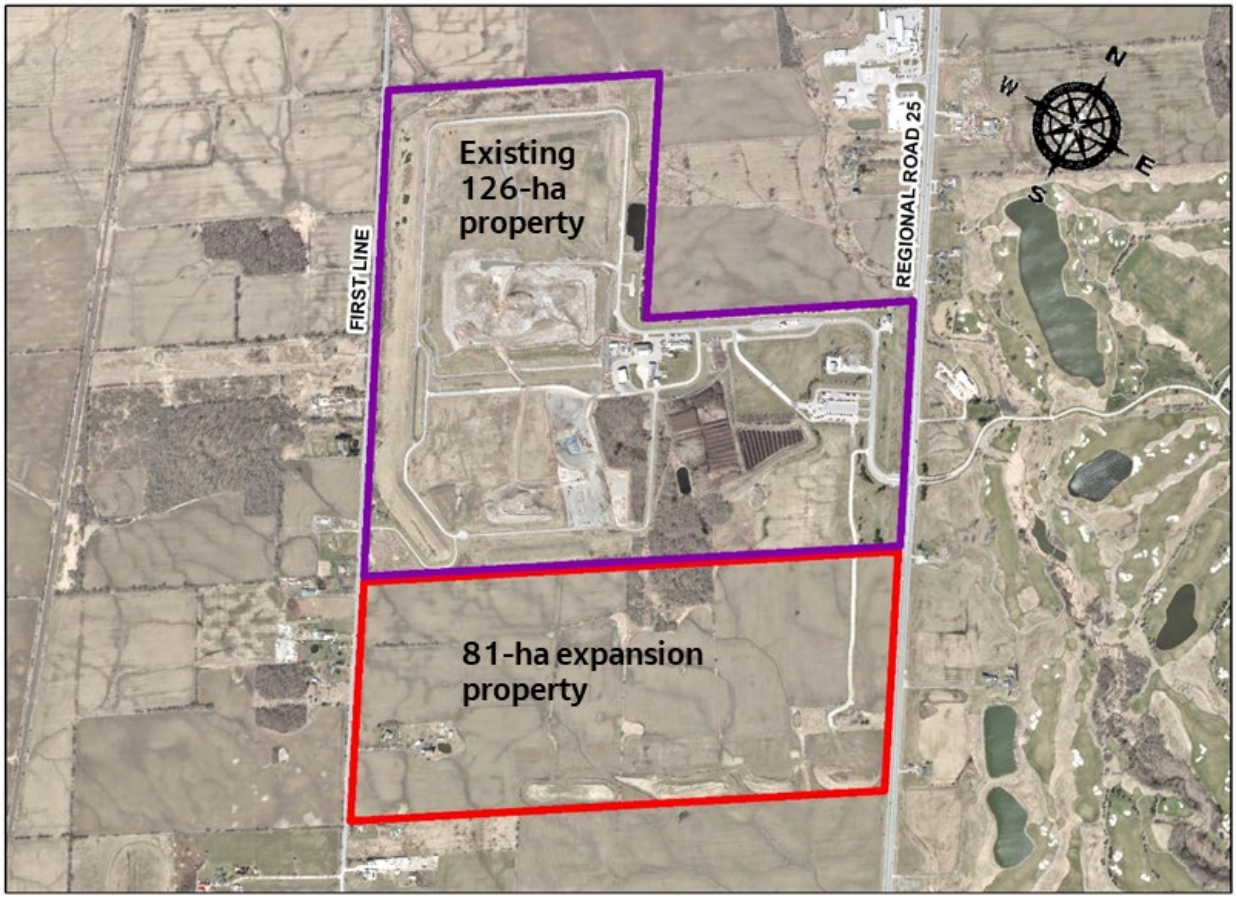
Key features characterizing the BMC and surrounding area include:

- Land use at the site is classified as Agricultural and Regional Natural Heritage System land (Halton Region, 2021).
- Transportation Network: Johnson Way connects the BMC to Regional Road 25. Highway 407 and Highway 403 are located approximately 2.2 km and 8 km southeast of the BMC, respectively.
- Topography is generally level with an average slope of approximately 2 percent from northwest to southeast.
- Woodlands are located around the BMC site and there is a woodlot located within the existing site boundaries. According to Natural Heritage Information Centre data, butternut (*Juglans cinerea*) is known to occur in the vicinity of the BMC (MNRF 2022).
- There are several evaluated wetlands located within 1 km of the BMC; however, no wetlands are located on the facility site.
- Woodland, wetlands and agricultural fields surrounding the BMC provide wildlife habitat. Known wildlife species in the vicinity of the BMC include:
  - bank swallow (*Riparia riparia*) which is listed as Threatened on the Species at Risk in Ontario List (SARO) and by Committee on the Status of Endangered Wildlife in Canada (COSEWIC)
  - bobolink (*Dolichonyx oryzivorus*) which is listed as Threatened on SARO and by COSEWIC
  - eastern meadowlark (*Sturnella magna*) which is listed as Threatened on SARO and by COSEWIC
  - eastern milksnake (*Lampropeltis Triangulum*) which is listed as Special Concern by COSEWIC
  - midland painted turtle (*Chrysemys picta marginata*) which is listed as Special Concern by COSEWIC
  - northern bobwhite (*Colinus virginianus*) which is listed as Endangered on SARO and by COSEWIC
  - snapping turtle (*Chelydra sepentinai*) which is listed as Special Concern on SARO and by COSEWIC
  - wood thrush (*Hylocichla mustelina*) which is listed as Special Concern on SARO and Threatened by COSEWIC.
- Sixteen Mile Creek is located approximately 150 m east of the BMC. Based on Fisheries and Oceans Canada's mapping, Sixteen Mile Creek provides critical habitat for silver shiner (*Notropis photogenis*) which is listed as Threatened on the SARO and federal Species at Risk Act (Government of Canada 2022b).
- The north boundary and northern portions of the west and east boundary of the BMC border an Earth Science ANSI (Trafalgar Moraine) (MNRF, 2022).
- The BMC is not located within a source water protection zone, wellhead protection area, significant groundwater recharge area or highly vulnerable aquifer (MECP 2022). The north and east boundary of the site border IPZ-3 (Conservation Halton, 2022b)
- Sixteen Mile Creek (located approximately 150 m east of the BMC) is mapped as a floodplain hazard. Portions of both BMC properties (Figure 8-7) overlap with the Conservation Halton regulation limits.
- The BMC is not located in an identified Mineral Resource Area.
- Land is not within the NEP land use designation and is not located within the Niagara Escarpment Park and Open Space System (MNRF 2022). It is located within the Greenbelt Plan Protected Countryside Area, and within Prime Agricultural Area, as designated in the PPS and Greenbelt Plan. The BMC is located in the Parkway Belt West Plan Area.

8.2.4 Halton Waste Management Site

The HWMS is a 53-ha solid waste disposal site (that is, landfill) located within a 126-ha property. The facility is approved to accept municipal waste from the region with a total capacity of 7.96 million cubic metres and includes a windrow composting operation for L&Y waste, a wood chipping operation, and a transfer station for SSO that are hauled offsite. Figure 8-8 presents the site boundaries and land use around the HWMS. In addition to the existing property, the Region purchased 81 ha directly south of the HWMS. Space may be available at the HWMS site that can be considered for siting the proposed biosolids composting facility. The information presented in Figure 8-8 was used to identify and develop the long list of siting alternatives.

Figure 8-8. Land Use Around the Halton Waste Management Site



Key features characterizing the HWMS and surrounding area include:

- Land use at the site is classified as Agricultural and Regional Natural Heritage System land (Halton Region, 2021).
- Topography is level.
- Transportation Network: Corbett Drive connects the HWMS to Regional Road 25. Highway 407 and Highway 403 are located approximately 4 km and 10 km southeast, respectively. Highway 401 is located approximately 10 km northeast; however, the route is through the heart of Town of Milton. An alternate route to Highway 401, east along Britannia Road and north along Tremaine Road, is an additional 2 km or 12 km total.

- A patch of woodland is located at the southern edge of the HWMS.
- There are no wetlands located in, at or within 1 km of the HWMS.
- Woodlands and agricultural areas within and surrounding the HWMS provide wildlife habitat. Known wildlife species in the vicinity of the HWMS include:
  - Eastern meadowlark (*Sturnella magna*) which is listed as Threatened on SARO and by COSEWIC
  - Eastern milksnake (*Lampropeltis Triangulum*) which is listed as Special Concern by COSEWIC
  - Bobolink (*Dolichonyx oryzivorus*) which is listed as Threatened on SARO and by COSEWIC
  - Midland painted turtle (*Chrysemys picta marginata*) which is listed as Special Concern by COSEWIC
  - Snapping turtle (*Chelydra sepentinai*) which is listed as Special Concern on SARO and by COSEWIC.
- There is no known critical habitat for aquatic species at risk within 1 km of the HWMS (Government of Canada 2022b).
- There are no ANSIs within 1 km of the HWMS.
- The HWMS is not located within a source water protection zone, wellhead protection area, significant groundwater recharge area or highly vulnerable aquifer (MECP 2022). The northeast corner of the site overlaps with IPZ-3.
- There is a floodplain hazard delineated along the north and west boundary of the HWMS site (Conservation Halton 2022).
- The HWMS is not located in an identified Mineral Resource Area.
- The site is located within Prime Agricultural Area, as designated in the PPS and Greenbelt Plan. Land is not within the NEP land use designation and is not located within the Niagara Escarpment Park and Open Space System (MNRF 2022). The HWMS is not located within a designated or protected Greenbelt Plan area or the Parkway Belt West Plan Area.

8.2.5 General Considerations

The primary goal of this MCEA study is to identify a preferred site for the proposed biosolids composting facility. Ideally, a relatively level or slightly sloped site is preferred. The following common site elements will be considered regardless of the site selection:

- **Site Access**: Access to the composting facility is required with an all-weather access driveway that can accommodate large trucks and amount of traffic anticipated.
- **Utilities**: Electrical service will be required for aeration and odour control, and administrative spaces. Surface water irrigation of the odour control biofilter and cleaning water supply will be required. Electricity, domestic potable water, and wastewater management will be needed for employees.
- **Condensate Management**: Wastewater (condensate) will be generated from the composting aeration system and the odour control biofilter. The condensate streams need to be collected and potentially discharged into a sanitary sewer for subsequent treatment. If the site does not have access to a sanitary sewer, underground fibreglass storage tank(s) can be used to collect condensates, and the contents can be periodically pumped into a tanker truck and hauled to one of the Region's wastewater treatment plants for treatment.
- **Stormwater Management**: The mixing, composting, screening and curing areas will be covered to prevent impact from precipitation and eliminate any contaminated rainwater runoff from these processes. Stormwater from roofs can be directed offsite without treatment. Roadways and site storage areas may require stormwater collection; this stormwater will be directed to a stormwater

infiltration basin. An erosion and sediment control plan will be required during the detailed design stage.

- **Offsite Odour Risks**: The biosolids composting facility will be designed with odour collection and treatment to minimize the offsite odour risks, with the system effectiveness confirmed by odour dispersion modelling during the detailed design stage. However, if there are sensitive receptors near the site, the infrastructure required for odour control (and associated capital and operating costs) will increase.
- **Sensitive Features**: The site of the proposed biosolids composting facility will be selected to avoid sensitive environmental, cultural and heritage features.

Construction of the proposed biosolids composting facility on an existing Region-owned site with an ECA for biosolids or waste management offers potential advantages compared to a site used for other purposes (for example, agricultural land). Potential synergies with the existing operations were considered when identifying and evaluating the alternative sites, as follows:

- **BMC**: Liquid biosolids storage and dewatering capacity is provided at the BMC, which can reduce the biosolids haulage required. The site has access to a sanitary sewer, where the storage tank supernatant and dewatering centrate are collected and pumped via a forcemain to the Mid-Halton WWTP. A stormwater management pond is also available at the site.
- **HWMS**: The HWMS could generate bulking agents required for biosolids composting, such as woodchips and compost 'overs' from the existing L&Y waste composting program onsite. Chipping and grinding equipment are also available, if additional or alternative bulking agents are needed. It should be noted that there is land allocated to the HWMS operations that does not currently have an ECA for waste management; however, it offers advantages because it is owned by the Region and adjacent to the approved HWMS site.

8.3 Compost Storage Considerations

Finished compost storage was also considered for the proposed biosolids composting facility. However, onsite compost storage requirements are dependent on a number of factors, including the target markets and seasonal demands. For example, some customers may purchase finished compost in bulk and store it at their own sites, which would reduce the storage volume required at a Region-owned facility. The BMC and HWMS Southeast Expansion Area were identified as feasible sites for a compost storage and distribution facility, however, storage requirements will be confirmed through a subsequent study. Specialty studies such as natural environment and archaeological assessment were completed for these sites as part of this study to assist the Region with future decision-making.

8.4 Detailed Evaluation Framework

This section documents the evaluation framework used to complete a comparative evaluation of the alternative sites for the proposed biosolids composting facility.

8.4.1 Multi-Criteria Evaluation Methodology

A comprehensive set of criteria was identified to evaluate the alternative sites for biosolids composting. The evaluation criteria are classified into the following categories:

- **Natural Environment,** such as regulated areas, terrestrial and aquatic environmental habitats, and GHG emissions.

- **Social/Cultural Environment,** such as land use, aesthetics, odour, noise, property requirements, archaeological, cultural and heritage impacts.
- **Technical Features,** such as those related to implementation phasing, constructability, O&M complexity, synergy with existing operations, and flexibility to accommodate potential future Region land use.
- **Legal/Jurisdictional Requirements,** including land acquisition, planning needs, and permitting requirements.
- **Economics,** including capital and O&M costs.

Each category contains a set of criteria applicable to the selection of the preferred site for the proposed biosolids composting facility. Tables 8-3 to Table 8-7 present the evaluation criteria and associated scoring indicators for each criterion. The criterion score for each site alternative was based on a scale of 1 to 5 (with 5 being the most favourable score and 1 being the least favourable score), considering the potential negative impacts or benefits of each site alternative, and mitigation measures that may be required to minimize negative impacts, where required. Definitions for scores 1, 3, and 5 are provided in Table 8-3 to Table 8-7; where intermediate scores (2 and 4) were deemed necessary, rationales were documented accordingly.

Table 8-3. Evaluation Framework for Natural Environment Criteria

Criterion	How will this Criterion be Measured?	Scoring Scale
GHG emissions	Based on the predicted GHG emissions associated with the proposed biosolids composting facility operations and materials hauling, specific to the site alternative. (Note: Regardless of site location, biosolids composting is expected to reduce GHG emissions associated with biosolids management compared to the Region's current program (haulage and land application), as previously demonstrated in the Feasibility Study (Jacobs, 2020).)	5 – Lowest GHG emissions from biosolids composting facility operation and materials hauling. Scores for other site alternatives will be assigned proportionally based on the ratio to the lowest GHG emission (for example, if the GHG emission is 20% higher than the lowest GHG emission site alternative, the score would be 20% lower than the highest score).
Terrestrial and aquatic habitats and features	Based on potential negative impacts to terrestrial and aquatic habitats at or around the site that would result from the construction and/or operation of the proposed biosolids composting facility at that site, and mitigation required to minimize impacts.	5 – Terrestrial and aquatic habitat quality or quantity may be enhanced as a result of building and/or operating the proposed biosolids composting facility (for example, increase habitat use or effectiveness). 3 – There are no predicted measurable effects on the quality or quantity of terrestrial and aquatic habitats from building and/or operating the proposed biosolids composting facility (with or without the implementation of mitigation measures). 1 – Terrestrial and aquatic habitat quality or quantity will be negatively affected as a result of building and/or operating the proposed biosolids composting facility and substantial amount of mitigation measures to protect existing habitats are required.
Groundwater quality or quantity	Based on potential effects of the proposed biosolids composting facility on groundwater quality or quantity at or around the site, including effects on wellhead protection areas (WHPA) near or around the site alternative.	5 – The construction and/or operation of the proposed biosolids composting facility will not impact groundwater resources with the implementation of routine mitigation measures. 3 – The construction and/or operation of the proposed biosolids composting facility will pose minimal risk to the quality or quantity of groundwater resources (and implementation of routine mitigation measures may be required). 1 – The construction and/or operation of the proposed biosolids composting facility site may present a threat to groundwater resources and/or substantial mitigation measures are required to protect groundwater.
Surface water quality or quantity	Based on potential effects of the proposed biosolids composting facility on surface water quality or quantity (for example, spills or other adverse events during processing, changes in natural surface water patterns) at or near the site, including effects on IPZ.	5 – The construction and/or operation of the proposed biosolids composting facility will not impact surface water resources with the implementation of routine mitigation measures. 3 – The construction and/or operation of the proposed biosolids composting facility will pose minimal risk to the quality or quantity of surface water resources (and implementation of routine mitigation measures may be required). 1 – The construction and/or operation of the proposed biosolids composting facility site may present a threat to quality or quantity of surface water resources and/or substantial mitigation measures are required to protect surface water resources.
Soil quality	Based on potential effects of the proposed biosolids composting facility on soil and soil productivity at or near the site.	5 – There will be no predicted impact and/or benefits to productivity of the soil. 3 – Soil productivity will be reduced (for example, removing productive agricultural area, thereby creating areas where soil is no longer productive). 1 – The quality and/or productivity of the soil will be significantly reduced and/or requires substantial mitigation measures to be implemented to minimize impacts.
Construction in regulated areas	For the alternative site, based on a need to construct the proposed biosolids composting facility in regulated areas or in buffer zones around regulated areas.	5 – Construction of the facility will not be in or near regulated areas. 3 – The facility construction encounters or encroaches on regulated areas, but can be constructed and operated within appropriate regulations, and reasonable mitigation measures can be implemented to avoid impacts. 1 – The site requires some portion of the facility to be constructed in a regulated area and substantial mitigation is required to comply with appropriate regulations.
Compliance with applicable planning and policy requirements	Based on the site use for the proposed biosolids composting facility to comply with relevant plans and policies for protection of the natural environment (for example, PPS, A Place to Grow: Growth Plan for the Greater Golden Horseshoe, Climate Change Action Plan).	5 – Use of the alternative site for a biosolids composting facility complies with relevant plans and policies. 3 – Use of the alternative site for a biosolids composting facility may not fully comply with relevant plans and policies; mitigation measures may be required. 1 – Use of the alternative site for a biosolids composting facility does not comply with relevant plans and policies; significant mitigation measures are required.

Table 8-4. Evaluation Framework for Social/Cultural Criteria

Criterion	How will this Criterion be Measured?	Scoring Scale
Community health and safety	Based on potential for the use of the alternative site for a biosolids composting facility to create a potential risk to community health and safety (for example, due to increased truck traffic).	5 – The construction and/or operating of a biosolids composting facility at the alternative site would have negligible increased health and safety risk to the community. 3 – The construction and/or operating of a biosolids composting facility at the alternative site would increase health and safety risk to the community; however, risks can be managed with routine mitigation. 1 – The construction and/or operating of a biosolids composting facility at the alternative site would increase health and safety risk to the community that cannot be fully mitigated.
Noise	Based on potential for the use of the alternative site for a biosolids composting facility to increase noise to receptors at or near the site.	5 – The construction and/or operation of a biosolids composting facility at the alternative site will not increase noise levels for receptors at or near the site. 3 – The construction and/or operation of a biosolids composting facility at the alternative site will slightly increase noise levels for receptors at or near the site; routine mitigation measures such as construction within normal work hours, may be required. 1 – The construction and/or operation of a biosolids composting facility at the alternative site will cause a persistent noise increase to receptors at or near the site.
Odour	Based on potential for the use of the alternative site for a biosolids composting facility to increase odours to receptors at or near the site. (Note: Regardless of siting, odorous air generated from the process will be captured and treated. Site-wide odour dispersion modelling will be completed during the design phase to determine the level of odour treatment needed to keep odours from leaving the site.)	5 – The construction and/or operation of a biosolids composting facility at the alternative site will not increase odour levels for receptors at or near the site. 3 – The construction and/or operation of a biosolids composting facility at the alternative site will increase potential odour frequency or concentration for receptors at or near the site. 1 – The construction and/or operation of a biosolids composting facility at the alternative site will cause an increase in frequency or intensity of nuisance odours to receptors at or near the site.
Air quality	Based on potential for the proposed biosolids composting facility construction or operation to impact air quality (for example, air contaminants, dust) for receptors at or near the alternative site.	5 – The construction and/or operation of a biosolids composting facility at the alternative site will not negatively affect air quality and/or there will be no air quality risks to receptors at or near the site. 3 – The construction and/or operation of a biosolids composting facility at the alternative site will pose minimal risk to air quality to receptors at or near the site; routine mitigation measures such as construction and road dust suppression may be required. 1 – The construction and/or operation of a biosolids composting facility at the alternative site will present a threat to air quality to receptors at or near the site, and mitigation measures are required to protect receptors from exposure.
Level of social acceptance	Based on anticipated community support (for example, considering impacts to community such as aesthetics) and/or garner positive perception for the proposed biosolids composting facility at the site alternative.	5 – The alternative site has the potential to receive a high level of support and endorsement from the public. 3 – The alternative site has the potential to receive a moderate level of support and endorsement from the public. 1 – The alternative site has the potential to receive little to no support and endorsement from the public.
Traffic	Based on the increase in trucks for construction and/or operation to cause impacts to traffic. (Note: Regardless of siting, biosolids composting is expected to reduce overall traffic impacts compared to the Region's current program (haulage and land application) because it eliminates haulage of biosolids over long distances outside the region, as previously demonstrated in the Feasibility Study (Jacobs, 2020).)	5 – The alternative site will result in the least impacts to local traffic. 3 – The alternative site will result in moderate impacts to local traffic. 1 – The alternative site will result in the highest impacts to local traffic (for example, increase the need for hauling).
Archaeological resources	Based on the potential archaeological resources identified at the alternative site.	5 – The site has no known archaeological resources and/or low potential to contain archaeological resources. 3 – The site has some known archaeological resources and/or contains moderate potential for archaeological resources. 1 – The site has a substantial amount of known archaeological resources and/or contains high potential for archaeological resources.

Criterion	How will this Criterion be Measured?	Scoring Scale
Cultural heritage resources	Based on the existing cultural heritage resources (for example, traditional use sites, historic buildings and artifacts, heritage trails) at or around the alternative site.	5 – The site has no known cultural heritage resources/no cultural heritage resources will be impacted during construction and/or operation of the proposed biosolids composting facility. 3 – The site contains or is in proximity to known cultural heritage resources; however, construction and/or operation of the proposed biosolids composting facility will not impact existing resources. 1 – The site contains cultural heritage resources/cultural heritage resources will be impacted during construction and/or operation of the proposed biosolids composting facility.

Table 8-5. Evaluation Framework for Technical Criteria

Criterion	How will this Criterion be Measured?	Scoring Scale
O&M complexity	The complexity of O&M requirements at the site (for example, need to manage operations at different sites)	5 – The alternative involves all operations at one location to minimize O&M complexity (for example, single parcel at BMC or HWMS). 3 – The alternative involves operations at different locations within a site (for example, combination of parcels within BMC) or different locations within close proximity (for example, hybrid alternative at BMC and HWMS), which can introduce additional O&M complexity. 1 – The alternative involves operations at multiple locations that result in the highest O&M complexity (for example, generic new location, with liquid biosolids dewatering at BMC then hauled to the new site for composting, as well as bulking agents hauled from the HWMS to the new site).
Construction complexity	The ability for the proposed biosolids composting facility to be constructed (for example, ease of construction, construction techniques, servicing requirements such as roads and utilities)	5 – The site does not require any complex construction techniques and routine construction methods can be implemented with ease including connecting to existing services (for example, water, power). 3 – The proposed biosolids composting facility can be constructed at the site with routine methods and may require a few new connections for services. 1 – Construction of the proposed biosolids composting facility requires complex construction techniques and methods, and requires new connections to all required services.
Compatibility with existing facilities and operations	The ability for the site to be compatible with existing process operations and its ability to integrate within an existing site (for example, synergies with existing operations at BMC and/or HWMS)	5 – The site is very compatible and compliments current operations; it can be integrated into current site operations with minimal impacts. 3 – The site is somewhat compatible and complimentary to current processes; it can be integrated; but will have some impacts. 1 – The site is not compatible or complimentary to current processes.
Flexibility to accommodate potential future Region land use	The ability for the site to accommodate future Region land use (for example, capacity expansion for biosolids management, landfill, L&Y and SSO management)	5 – The site can be easily designed with provisions to accommodate potential future land use (for example, space available to allow for future expansion of biosolids composting facility while not affecting other site operations). 3 – The site can be designed with provisions to accommodate potential future land use, with some impacts to existing operations (for example, space available to allow for future expansion of biosolids composting facility but will affect or limit future expansion of other site operations). 1 – The site has limited flexibility to accommodate potential future land use or will result in significant changes to existing operations (for example, space not available for future expansion of biosolids composting facility and/or will affect or limit future expansion of other site operations).

Table 8-6. Evaluation Framework for Legal/Jurisdictional Criteria

Criterion	How will this Criterion be Measured?	Scoring Scale
Land acquisition	The site requires the acquisition of new land.	5 – The site does not require the acquisition of new land/the site is located on land already owned or leased by the Region. 3 – Land acquisition is required for the site; however, purchase and title transfer are anticipated to be simple. Or Region-owned property currently leased by others but can be returned to the Region. 1 – Land acquisition is required for the site and purchase and title transfer are anticipated to require substantial planning and process requirements.
Permits and approvals	The ability of the alternative to be approved with minimal, if any, conditions and/or obtain permits and approvals within an appropriate amount of time.	5 – The alternative can be readily approved/requires routine permits and approvals. 3 – The alternative can be approved with minimal conditions. 1 – The alternative can be approved with substantial or onerous conditions (for example, Species at Risk Act permit).

Table 8-7. Evaluation Framework for Economic Criteria

Criterion	How will this Criterion be Measured?	Scoring Scale
Capital Cost	The relative capital costs compared to other alternative sites.	5 – The site has a low relative capital cost. 3 – The site has a moderate relative capital cost. 1 – The site has a high relative capital cost.
O&M Cost	The relative O&M costs compared to other alternative sites.	5 – The site has a low relative O&M cost. 3 – The site has a moderate relative O&M cost. 1 – The site has a high relative O&M cost.

The evaluation criteria were reviewed to identify which criteria would not differentiate the alternative sites and those criteria were eliminated from the set. The non-differentiating criteria that were removed and the associated rationales are included in Table 8-8.

Table 8-8. Non-Differentiating Criteria for Site Selection

Category	Criterion	Rationale for Not Evaluating
Natural Environment	Groundwater quality or quantity	The proposed biosolids composting facility will not be constructed in a wellhead protection area and therefore would not impact groundwater quality or quantity.
Natural Environment	Surface water quality or quantity	The proposed biosolids composting facility will include a stormwater pond and therefore would not impact surface water quality or quantity.
Natural Environment	Soil quality	The proposed biosolids composting facility will not affect soil quality. Application of biosolids compost would improve soil quality but this is not relevant for siting the facility.
Natural Environment	Compliance with applicable planning and policy requirements	The proposed biosolids composting facility will be compliant with applicable planning and policy requirements.
Social/Cultural	Community health and safety	The potential risks to community health and safety are mainly related to local traffic, offsite odour and noise impacts – these impacts are evaluated separately.
Social/Cultural	Air quality	The biosolids composting operation will not generate air emissions that require approval, therefore will not impact air quality.

Each remaining criterion was assigned a weighting through a workshop with the Region's stakeholders. Weightings were normalized such that the total evaluation score for each alternative was provided as a value out of 100.

The evaluation criteria and associated weights are presented in Table 8-9, and a summary of category weights is presented in Table 8-10.

Table 8-9. Summary of Evaluation Criteria and Weights

Number	Category	Criterion	Criterion Weight
1	Natural Environment	GHG emissions	8.3
2	Natural Environment	Terrestrial and aquatic habitats	6.7
3	Natural Environment	Construction in regulated areas	6.7
4	Social/Cultural Environment	Noise	6.7
5	Social/Cultural Environment	Odour	8.3
6	Social/Cultural Environment	Level of social acceptance	6.7
7	Social/Cultural Environment	Traffic	5.0
8	Social/Cultural Environment	Archaeological resources	6.7
9	Social/Cultural Environment	Cultural heritage resources	6.7
10	Technical	O&M complexity	6.7
11	Technical	Construction complexity	5.0
12	Technical	Compatibility with existing facilities and operations	6.7
13	Technical	Flexibility to accommodate potential future Region land use	3.3
14	Legal/Jurisdictional	Land acquisition	5.0
15	Legal/Jurisdictional	Permits and approvals	5.0
16	Economic	Capital cost	3.3
17	Economic	Lifecycle O&M cost	3.3
Total			**100**

Table 8-10. Summary of Category Weights

Category	Category Weight
Natural Environment	21.7
Social/Cultural Environment	40.0
Technical	21.7
Legal/Jurisdictional	10.0
Economic	6.7
Total	100

8.4.2 Cost Estimate Methodology

Conceptual level costs were developed for this study to assist with decision-making and were found to be non-differentiating. There are also uncertainties associated with the current construction market and therefore, cost estimates need to be refined during the design phase.

Conceptual level capital costs were developed, including composting equipment, structures, and other facility components associated with the work, installation, and ancillary costs associated with construction. Cost estimates developed in this report are approximately +50 percent/-30 percent accurate (AACE

International Class 4), including the following mark-ups and adjustment factors, unless otherwise specified:

- 12 percent contractor overhead
- 15 percent contractor profit, mobilization, demobilization, insurance, and bonding
- 20 percent contingency
- 14 percent design and engineering fees

Conceptual level O&M costs were developed based on the following operational requirements:

- Haulage of liquid biosolids to the BMC
- Haulage of dewatered biosolids from the Skyway and Mid-Halton WWTPs to the BMC
- Dewatering of liquid biosolids at the BMC (electricity and polymer use)
- Haulage of bulking agents to the BMC
- O&M requirements associated with the proposed biosolids composting facility, including:
  - Electricity, for example, mixing, aeration, odour control, and building (such as ventilation and lighting)
  - Diesel, for example, front-end loaders and screens
  - Bulking agents (assumed to be provided from an external source)
  - Biofilter media replacement (for odour control)
  - Labour and equipment maintenance
  - Compost product sales (revenue)

Haulage of compost product to the final destinations was not included in the O&M cost estimates since the final destinations will depend on the end-use market (undetermined at this stage) and would be the same for all site alternatives (not affecting site selection).

A 25-year lifecycle duration is selected for the lifecycle cost estimates associated with each site alternative, based on the planning period between 2027 and 2051.

The lifecycle cost estimates included capital and annual O&M costs. The lifecycle O&M costs were developed using the annual biosolids projections between years 2027 and 2051, based on linear growth between the current population and the 2051 projected population. Unit rates were escalated using an inflation rate of 2 percent. Table 8-11 summarizes the basis for lifecycle cost estimates for this study.

Table 8-11. Lifecycle Cost Basis

Parameter	Value	Basis
Lifecycle duration	25 years	Planning period 2027 to 2051
Inflation rate	2%	Similar Jacobs projects in Ontario and Region input; general inflation rate to be applied on annual O&M costs for utilities, chemicals, labour, and maintenance
Interest rate	5%	Similar Jacobs projects in Ontario and Region input

8.4.3 Greenhouse Gas Emission Methodology

The following GHG emission sources and sinks were considered for the biosolids composting operation:

- Liquid biosolids dewatering at the BMC
- Biosolids composting and land application of compost product

Biosolids and bulking agent haulage were excluded from the GHG estimation because it is expected that biosolids haulage would be similar for each alternative and bulking agent haulage would be similar for

each alternative, regardless of the composting facility location within the BMC. Haulage of the compost product (from storage to final destination) was excluded in the GHG estimation because the end user markets and destinations would be similar regardless of the site location.

Table 8-12 presents the relevant Scope 1/2/3 emission sources and sinks that were included in this study. Scope 1/2/3 emissions are defined as follows by the International Panel on Climate Change (IPCC) (IPCC, 2006):

- Scope 1: Direct GHG emissions associated with treatment processes (that is, nitrous oxide [N_2O] and methane) and from fossil fuel consumption (that is, diesel).
- Scope 2: Indirect GHG emissions due to electricity, heat or steam usage.
- Scope 3: Indirect GHG emissions caused by the production of purchased materials and use of end products.

The latest Biosolids Emissions Assessment Model (BEAM) update (referred to as BEAM2022) was used to estimate the GHG emissions associated with each site alternative. The BEAM tool was originally developed by the Canadian Council of Ministers of the Environment in 2009. The latest update was completed by Northeast Biosolids and Residuals Association (NEBRA), Northern Tilth, and Northwest Biosolids in 2022 (NEBRA, Northern Tilth, and Northwest Biosolids, 2022).

Table 8-12. Greenhouse Gas Emission Sources and Sinks (Offsets) from Biosolids Composting

Greenhouse Gas Source (Sink)	Scope 1	Scope 2	Scope 3
Liquid Biosolids Dewatering at the BMC	▪ None	▪ Electricity	▪ Polymer
Biosolids Composting and Land Application of Compost Product	▪ Diesel ▪ N_2O emission (from compost piles)	▪ Electricity	▪ Fertilizer offset from compost application (credit) ▪ Carbon sequestration from compost application (credit)

9. Biosolids Composting Alternatives Development and Evaluation

This section discusses the development of biosolids composting alternatives and their evaluation.

9.1 Long List of Alternative Land Parcels

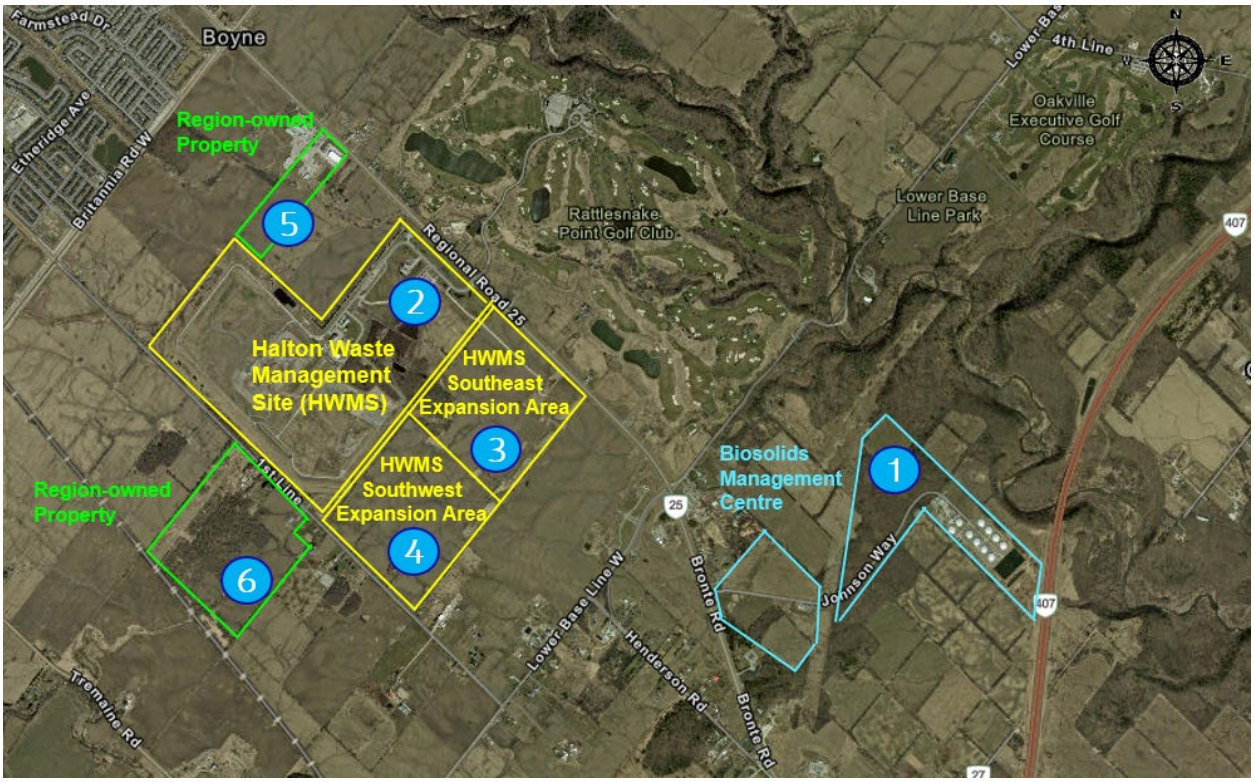
This section discusses the long list of land parcel alternatives.

9.1.1 Overview

The proposed biosolids composting facility will be preferably sited on Region-owned property within 5 km of the BMC to minimize the distance biosolids need to be hauled from the BMC.

The BMC and the HWMS offer operational synergies such as biosolids dewatering equipment at the BMC, and L&Y waste and woodchips (potential sources of bulking agents) processing at the HWMS. Additionally, they both have ECAs to operate as biosolids or waste management sites, and they are located less than 3 km from each other, allowing for short haulage distances between the two sites. Figure 9-1 presents an aerial view of the BMC (property boundary shown in light-blue, Location 1) and HWMS (property boundary shown in yellow, Location 2), as well as other Region-owned properties within the vicinity of the two sites (Locations 3 to 6).

Figure 9-1. Aerial View of Region-owned Properties in the Vicinity of the Halton Waste Management Site and Biosolids Management Centre.



The HWMS Southeast Expansion Area (Location 3 in Figure 9-1) and Southwest Expansion Area (Location 4 in Figure 9-1) are lands purchased specifically to extend the future HWMS operations and storage areas.

Two other properties (shown in green in Figure 9-1) can also be considered as potential land parcels for the biosolids composting facility. The strip of land contiguous with the HWMS on the northeast (Location 5 in Figure 9-1) has a portion of land that is leased for a Town of Milton works yard. The land to the southwest, which is on the south side of First Line (Location 6 in Figure 9-1), includes some residences on land leased to occupants from the Region.

The six Region-owned properties were reviewed in consultation with the Region, considering existing operations, site constraints, expansion plans, and planned future land uses. In addition, given the large size of the HWMS and the HWMS Expansion Areas, and the existing land uses at the BMC, meetings were held with BMC staff, HWMS staff, and the Region's core project team to identify feasible parcels within these areas, which are described in the following subsections.

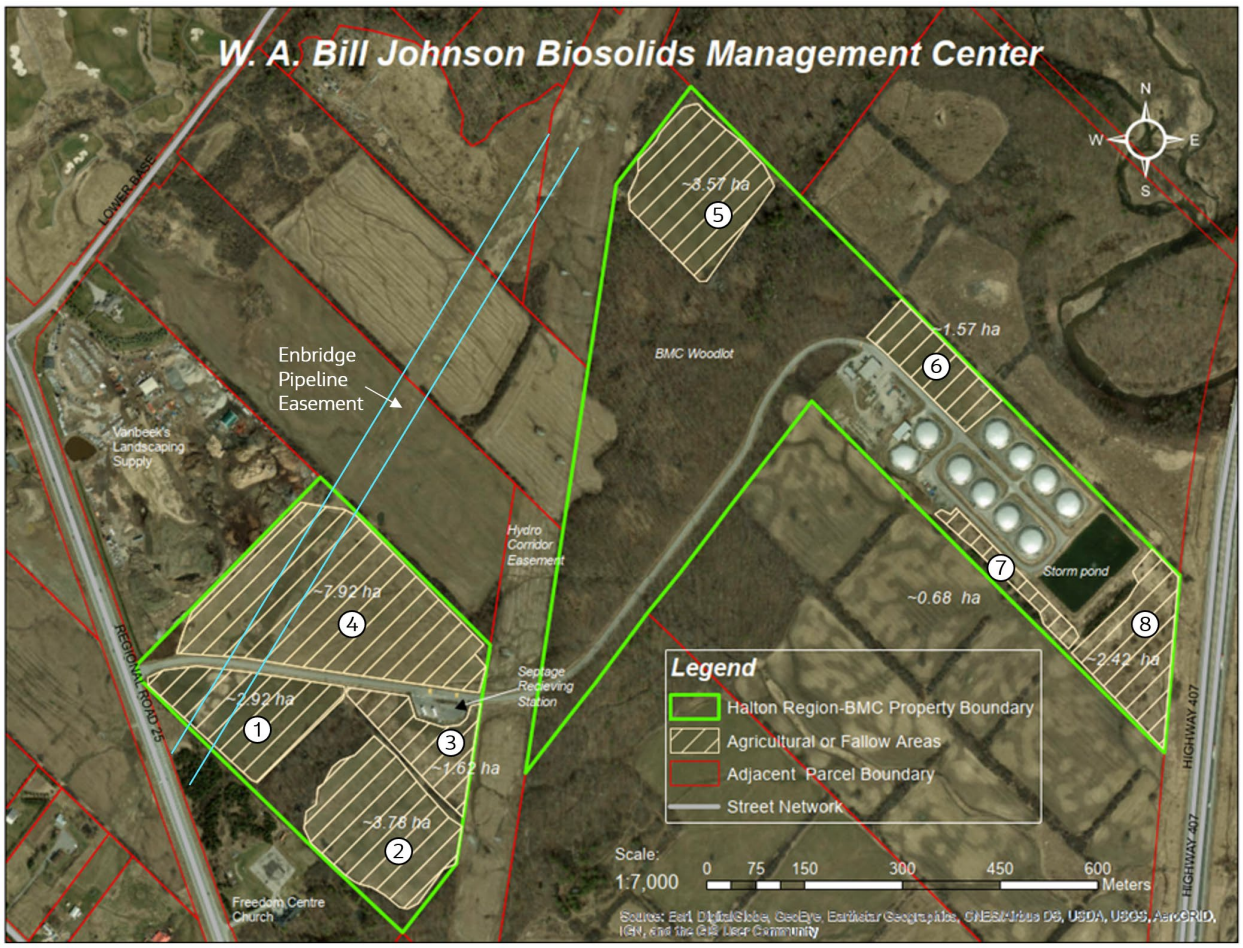
A generic new site within Halton Region (not on Region-owned property) is included in this report, to be carried forward for comparative evaluation with the shortlisted site alternatives identified at the BMC and HWMS, as part of the Class EA evaluation process.

The following sections present a review of the available land parcels on Region-owned properties to identify those that can be considered alone or in combination (that is, more than one parcel) to provide a site for the proposed biosolids composting facility.

9.1.2 Available Land Parcels at the Biosolids Management Centre

Several unused land parcels are available within the BMC property boundary and were considered for siting the proposed biosolids composting facility, as presented in Figure 9-2 (striped and numbered polygons), with their approximate areas in hectares. Of note, only Site 6 and Site 7 are currently within the existing ECA approved area; the remaining land parcels are not included in the existing ECA.

Figure 9-2. Unused Land Parcels at the Biosolids Management Centre (provided by Halton Region)

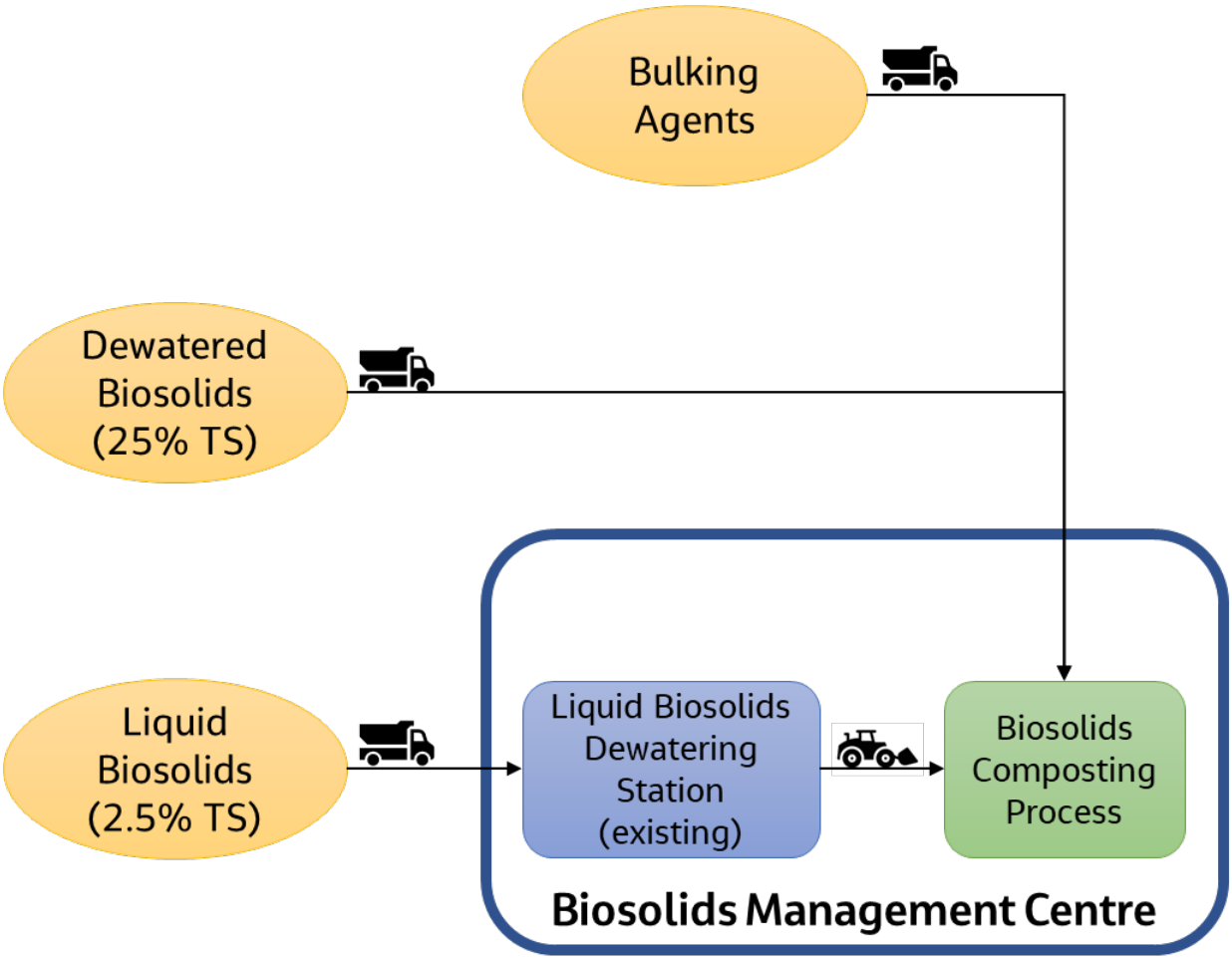


The following potential synergies were identified for siting the proposed biosolids composting facility at the BMC:

- Onsite liquid biosolids storage and dewatering capacity, minimizing the haulage required for dewatered biosolids to the composting process. The dewatering station has capacity for the projected quantity of liquid biosolids to 2051.
- Existing administration building and parking, albeit these supporting facilities may need to be expanded or reconfigured to accommodate the biosolids composting operation.
- The site is served by a robust road network, with Highway 407 to the East, and the Johnson Way local road connecting the BMC to Regional Road 25.
- The site has access to utilities, including potable water, electricity, and sanitary sewer, and has a stormwater management pond.

Figure 9-3 presents a simplified process flow diagram for a biosolids composting facility at the BMC.

Figure 9-3. Simplified Process Flow Diagram for Biosolids Composting at the Biosolids Management Centre



The estimated land area required for the biosolids composting facility is 4 to 5 ha, including the composting process areas (active composting and curing), biofilter (odour control), bulking agent storage area, and allowance for offices, maintenance building, equipment storage, access road and parking. None of the BMC parcels alone provide adequate usable space to accommodate all the processes and building components for composting. While Parcel 4's total footprint is greater than 5 ha, its usable footprint is less than the 4 to 5 ha required for the biosolids composting facility due to the pipeline easement that crosses the parcel. However, the smaller parcels can be combined to make up a site that accommodates the various biosolids composting facility components. Therefore, the long list of site parcels at the BMC was assessed individually to verify their suitability. Feasible parcels were combined in the next study steps to develop site alternatives that can provide 4 to 5 ha within the BMC property. The BMC internal road network is designed primarily for biosolids haulage trucks and not for commercial traffic, therefore, only parcels near the front entrance are suitable for compost distribution.

Table 9-1 presents the advantages and disadvantages associated with each of the land parcels, and rationale for shortlisting the feasible parcels within the BMC property.

Table 9-1. Long List Analysis of Land Parcels at the Biosolids Management Centre

Parcel	Size (ha)	Advantages	Disadvantages	Recommendation
1	2.92	▪ Easy access to Regional Road 25; Johnson Way local road north of the site	▪ Parcel is smaller than 5 ha and needs to be combined with other parcel(s) to provide the required footprint ▪ Two places of worship, with history of outdoor events being hosted, are located on the south boundary of the parcel within 200 m. This is less than the minimum of 250 m recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts ▪ An Enbridge pipeline that was recently installed (light-blue lines in Figure 9-2) crosses the northwest portion of this site, further limiting the available area (easement required)	▪ Shortlisted for facilities with no odour potential only (office). Would need to be combined with composting operations on other parcels, as it does not provide sufficient footprint for composting operations on its own.
2	3.78	▪ Close to the front entrance	▪ Internal road network extension required ▪ Parcel is smaller than 5 ha and needs to be combined with other parcel(s) to provide the required footprint ▪ Two places of worship are located on the south boundary of the parcel within 200 m, which is less than the minimum of 250 m recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts ▪ The hydro corridor easement (east boundary) and clearance from the right-of-way (ROW) need to be considered	▪ Shortlisted for facilities with no odour potential only (office). Would need to be combined with composting operations on other parcels, as it does not provide sufficient footprint for composting operations on its own.
3	1.62	▪ Easy access to Regional Road 25; Johnson Way local road north of the site	▪ Parcel is smaller than 5 ha and needs to be combined with other parcels (s) to provide the required footprint ▪ A septage receiving station is located north of this area. The Region has plans for its expansion and, therefore, would need to use this site ▪ The hydro corridor easement (east boundary) and clearance from the ROW need to be considered	▪ Eliminate (reserved for future site use).
4	7.92	▪ Area is large enough to accommodate the required footprint for the biosolids composting facility, with the feedstock receiving station to be placed over 300 m from the two places of worship located south of the BMC property ▪ Easy access to Regional Road 25; Johnson Way local road north of the site ▪ Proximity to sanitary sewer	▪ An Enbridge pipeline that was recently installed (light-blue lines in Figure 9-2) crosses the northwest portion of this area. Clearance from the ROW needs to be considered, but sufficient area is available within the site parcel ▪ This area is bound to the northwest by a landscaping company (Vanbeek's), which sometimes imports manure; therefore, there is the potential for odour complaints to be mistakenly directed at the biosolids composting facility ▪ The hydro corridor easement (east boundary) and clearance from the ROW need to be considered	▪ Shortlisted for the biosolids composting facility. Would need to be combined with composting operations on other parcels, as it does not provide sufficient footprint for composting operations on its own.
5	3.57	▪ Close proximity to existing BMC operations (for example, biosolids dewatering, relatively close to sanitary sewer)	▪ Parcel is smaller than 5 ha and needs to be combined with other parcel(s) to provide the required footprint ▪ Internal road network needs to be expanded to reach this area ▪ The hydro corridor easement (west boundary) and clearance from the ROW need to be considered ▪ History of odour complaints (with respect to the former biosolids storage lagoon at Parcel 6) from residents along Lower Base Line which borders the north of the woodlot ▪ Amendment 49 of the Halton Regional Official Plan expanded the urban boundaries and created new Community Areas north of the BMC (particularly at the intersection between Fourth Line and Lower Base Line). The nearest resident is approximately 400 m away from this parcel, which is greater than the minimum of 250 m recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts	▪ Shortlisted for the biosolids composting facility. Would need to be combined with composting operations on other parcels, as it does not provide sufficient footprint for composting operations on its own.

Parcel	Size (ha)	Advantages	Disadvantages	Recommendation
6	1.57	▪ Easy access to internal road network ▪ Within the existing ECA approved area	▪ This area was formerly a lagoon that stored biosolids from the City of Toronto. Parcel is smaller than 5 ha and needs to be combined with other parcels(s) to provide the required footprint. The parcel does not provide sufficient footprint for composting operations. ▪ Amendment 49 of the Halton Regional Official Plan expanded the urban boundaries and created new Community Areas north of the BMC (particularly at the intersection between Fourth Line and Lower Base Line). The nearest resident is approximately 800 m away from this parcel, which is greater than the minimum of 250 m recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts	▪ Shortlisted for the biosolids composting facility. Would need to be combined with composting operations on other parcels, as it does not provide sufficient footprint for composting operations on its own.
7	0.68	▪ The area can be used to implement a road to connect Parcel 8 to the existing BMC internal road network ▪ Within the existing ECA approved area	▪ Parcel is smaller than 5 ha and needs to be combined with other parcel(s) to provide the required footprint	▪ Shortlisted for a new internal road.
8	2.42	▪ This is the most private and out of the way area, with no neighbours, apart from Highway 407. Has low potential of offsite odour complaints ▪ Close proximity to existing BMC operations (for example, biosolids dewatering, access to stormwater pond)	▪ Parcel is smaller than 5 ha and needs to be combined with other parcels(s) to provide the required footprint. Reduction of the stormwater management (SWM) pond size may be required to provide adequate footprint ▪ Internal road network needs to be expanded to reach this area, through Parcel 7	▪ Shortlisted for biosolids composting facility. Would need to be combined with composting operations on other parcels, as it does not provide sufficient footprint for composting operations on its own.

Notes:

ha = hectare(s)

9.1.3 Available Land Parcels at/around the Halton Waste Management Site

Figure 9-4 presents the site boundaries of the existing HWMS and the southeast and southwest Expansion Areas. Figure 9-5 and Figure 9-6 present the northeast and southwest Region-owned properties adjacent to the HWMS.

Figure 9-4. Land Parcels at Halton Waste Management Site and Expansion Areas

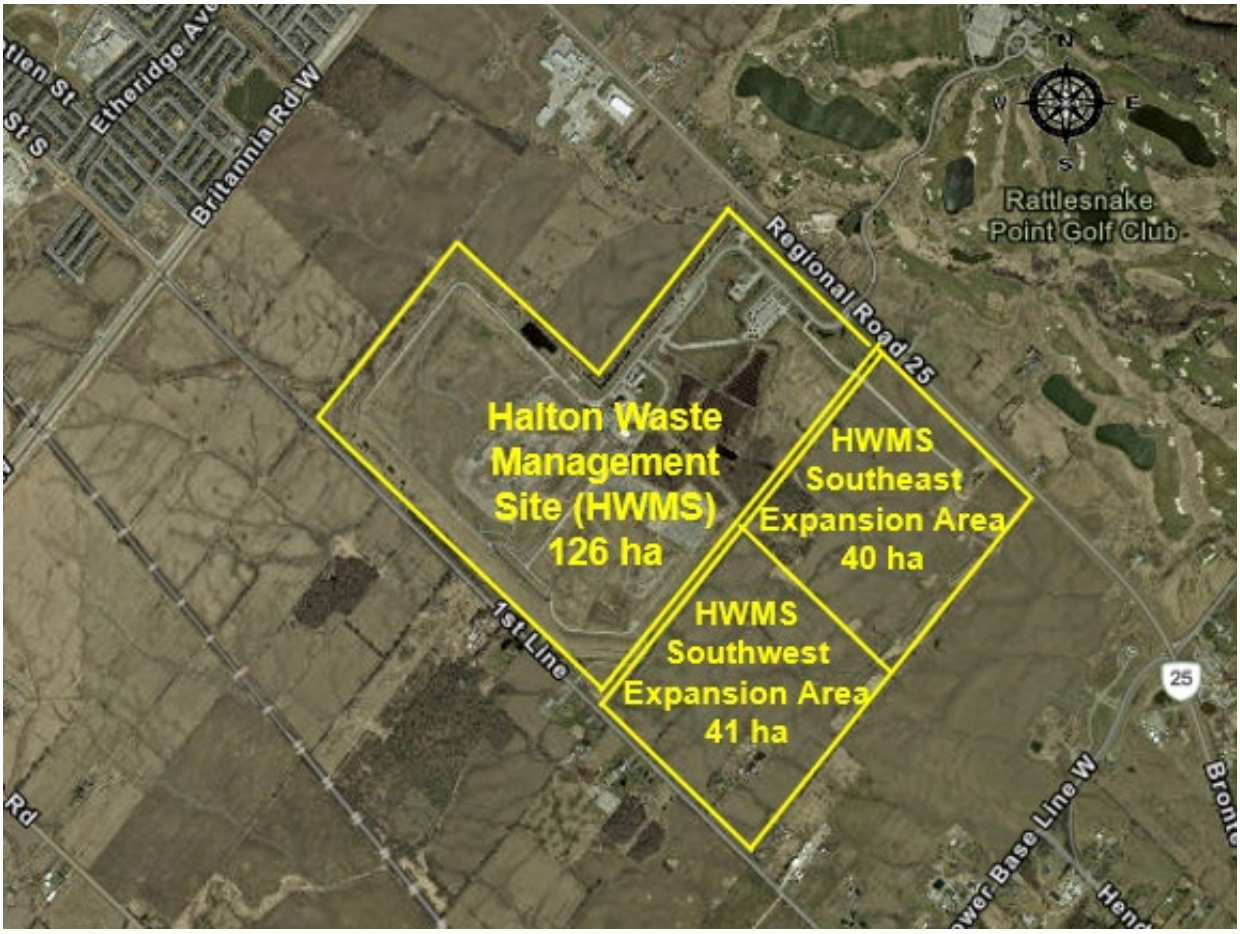


Figure 9-5. Region-owned Property Northeast of the Halton Waste Management Site (provided by Halton Region)

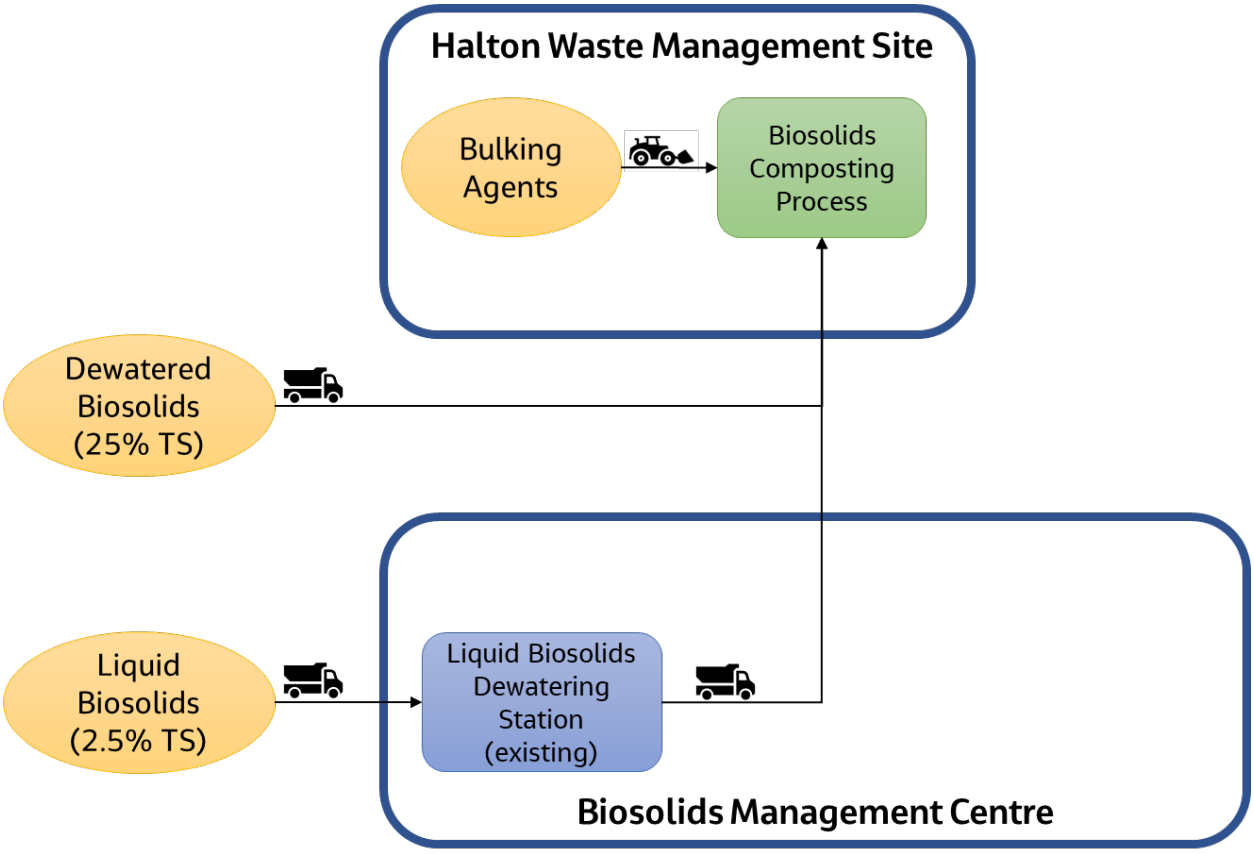
Figure 9-6. Region-owned Property Southwest of the Halton Waste Management Site (provided by Halton Region)

The following potential synergies were identified for siting the biosolids composting facility within or near the HWMS:

- Potential access to bulking agent production (for example, woodchips and L&Y waste compost 'overs') and onsite chipping and grinding operation (if available and alternative bulking agents are required).
- The site is serviced by a robust road network, with Highway 407 and 403 to the east, and Corbett Drive local road connecting the HWMS to Regional Road 25.
- The site has access to utilities.
- There is high circulation of commercial users, which is compatible with the commercial trucks that would be used for final product distribution.

Figure 9-7 presents the simplified process flow diagram for a biosolids composting facility at or near the HWMS.

Figure 9-7. Simplified Process Flow Diagram for Biosolids Composting at the Halton Waste Management Site



Based on discussions with the Region staff, the following aspects were considered about each of the long-listed land parcels within and around the HWMS:

- The existing 126-ha HWMS site is required for existing and future HWMS operations and therefore, does not have space for the proposed biosolids composting facility.

- The 41-ha southwest Expansion Area and 40-ha southeast Expansion Area have adequate space for the proposed biosolids composting facility but are reserved for potential future solid waste management facilities.
- The other land parcels (properties shown in Figure **9-5** and Figure 9-6) have adequate space to be considered feasible for the long list.

Advantages and disadvantages of the two land parcels with adequate space were further considered, as presented in Table 9-2, to identify which parcels should be shortlisted for further investigation.

Table 9-2. Long List Analysis of Land Parcels at/around the Halton Waste Management Site

Site	Size (ha)	Advantages	Disadvantages	Recommendation
HWMS southeast and southwest Expansion Areas (Figure 9-4)	81	▪ There is already high circulation of commercial users at the HWMS, and opportunity to plan extension of the HWMS road network into this area to be compatible with biosolids composting storage/distribution needs.	▪ The Region has reserved the land in this area for potential future solid waste management facilities.	▪ Eliminate; area is required for potential future solid waste management facilities expansion
Northeast property (Figure 9-5)	~ 7	▪ There is already high circulation of commercial users at HWMS, and opportunity to plan extension of HWMS road network into this area to be compatible with biosolids composting facility needs.	▪ Haulage of dewatered biosolids from BMC to area is required. ▪ The nearest resident is approximately 100 m away, which is less than the minimum 250 m recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts. Therefore, there is a potential for odour complaints. ▪ The area is required for the future Town of Milton Operations Facility expansion. ▪ The site is adjacent to a small creek (north boundary) – mitigation measures need to be considered.	▪ Eliminate; area is required for future Town of Milton Operations Facility expansion

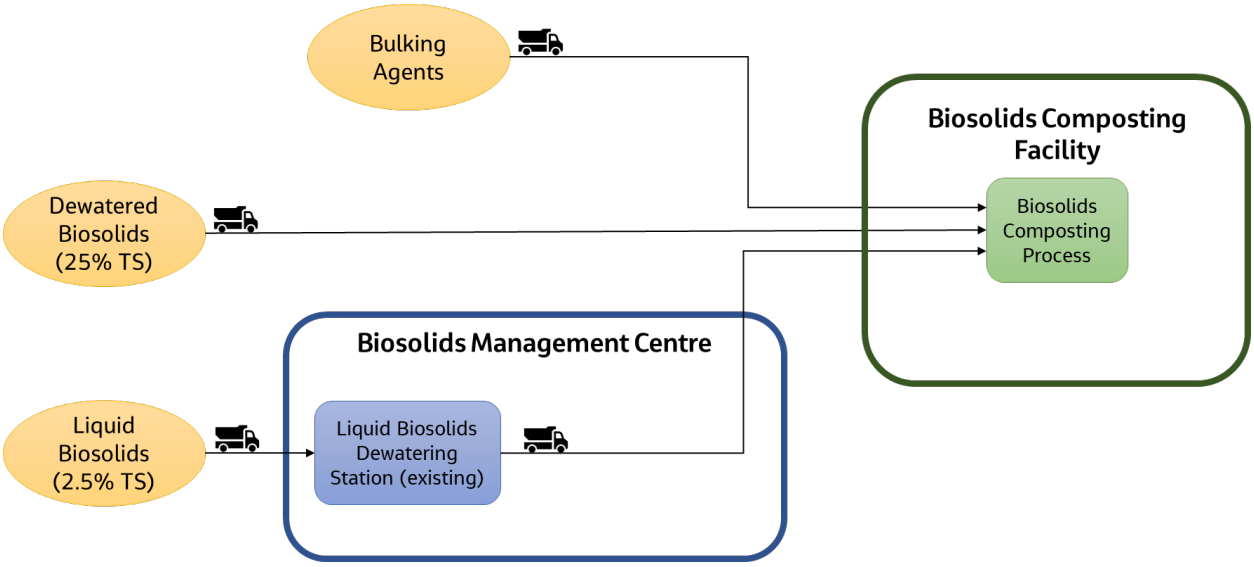
Site	Size (ha)	Advantages	Disadvantages	Recommendation
Southwest property (Figure 9-6)	~ 15	▪ The parcel is close to the HWMS.	▪ Haulage of dewatered biosolids from BMC to site is required. ▪ Would require trucks from the BMC to travel through the HWMS and cross First Line for access, as First Line is not suitable for large trucks. ▪ Would increase consumer (residential and commercial) traffic along First Line. ▪ The nearest resident is approximately 500 m away from the proposed composting operations location, which is greater than the minimum 250 m recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts. However, there is an open area that could be used for future composting operations expansion, which is 100 m away from the nearest resident. Therefore, there is a potential for odour complaints in the future. ▪ The site does not have water and wastewater services, and there is no water or wastewater infrastructure planned along First Line in the 2031 planning horizon.	▪ Eliminate; property has access constraints

9.1.4 New Location Alternative

Figure 9-8 presents the simplified process flow diagram for siting the biosolids composting facility at a new site within Halton Region (not on Region-owned property). Compared with the other alternatives, a new location is expected to result in longer haulage distances (because both the bulking agents and

dewatered biosolids need to be hauled to the new site). The Region would need to purchase new property for this alternative.

Figure 9-8. Simplified Process Flow Diagram for Biosolids Composting Facility at a New Location/New Site



This alternative is included as a generic new site at a new location. Details will only be developed further if evaluation of the shortlisted sites identifies a new location as being more favourable than any of the alternatives shortlisted on Region-owned properties. General assumptions for this generic new location include:

- Located in a rural area to minimize impacts to communities
- Preferably near the BMC to minimize the haulage distance of biosolids from the BMC
- Available area larger than 4-5 ha (for example, additional 20 percent to provide buffer from adjacent land uses, although the actual buffer requirement will depend on the surrounding land uses and features)
- Currently not owned by Region (conservative).

9.1.5 Identification of Site Alternatives for Biosolids Composting

The following parcels were identified as feasible to site components of the proposed biosolids composting facility (including composting, curing, bulking agent storage, and odour control):

- **BMC**
  - Parcel 1**:** For facilities with no odour potential (that is, bulking agent storage, office).
  - Parcel 2: For facilities with no odour potential (that is, bulking agent storage, office).
  - Parcel 4: For biosolids composting facility.
  - Parcel 5: For biosolids composting facility.
  - Parcel 6: For biosolids composting facility.
  - Parcel 7: For a new internal road and bulking agent storage.
  - Parcel 8: For biosolids composting facility.
- **Generic new site at a new location in the vicinity of the BMC.**

None of the BMC parcels alone provide adequate usable space to accommodate all the processes and building components for composting. Therefore, three alternative concepts were developed considering the characteristics of the site parcels (for example, available area, distance between each other, sensitive features, etc.) and overall composting facility components, to identify those that could be most appropriately combined. For example, it is preferred to locate all active composting operations (and the associated odour control facility) in one parcel to minimize complexity, with the bulking agent storage area located in a separate parcel a short distance from the composting location. Three site alternatives were identified for the BMC based on input from Region's team as follows, in addition to a generic new site that is not on Region-owned property:

- **Alternative 1:** Combination of BMC Parcels 1 and 4
- **Alternative 2:** Combination of BMC Parcels 5 and 6.
- **Alternative 3:** Combination of BMC Parcels 7 and 8.
- **Alternative 4:** New site at a new location within the vicinity of the BMC.

Details developed for these site alternatives are presented in Sections 9.2.1 to 9.2.3. Details for Alternative 4 are presented in Section 9.1.4.

For the site alternative based on a generic new site, the property would be selected to minimize risk of environmental and community impacts and will require land acquisition. It will be within non-protected/restrictive areas, most likely on agricultural land.

9.2 Development of Information on Shortlisted Site Alternatives for Biosolids Composting

The following sections present information on the design and operating requirements, impacts (from the technical review and specialty studies, and GHG emissions), and relative capital and O&M costs associated with each of the shortlisted site alternatives for the proposed biosolids composting facility.

Several factors were considered when developing concepts, layouts and costs for each site alternative for biosolids composting, including the following:

- Site access
- Traffic management
- Operational complexity
- Utilities (that is, water service, wastewater management)
- Condensate management
- SWM
- Odour
- Sensitive features

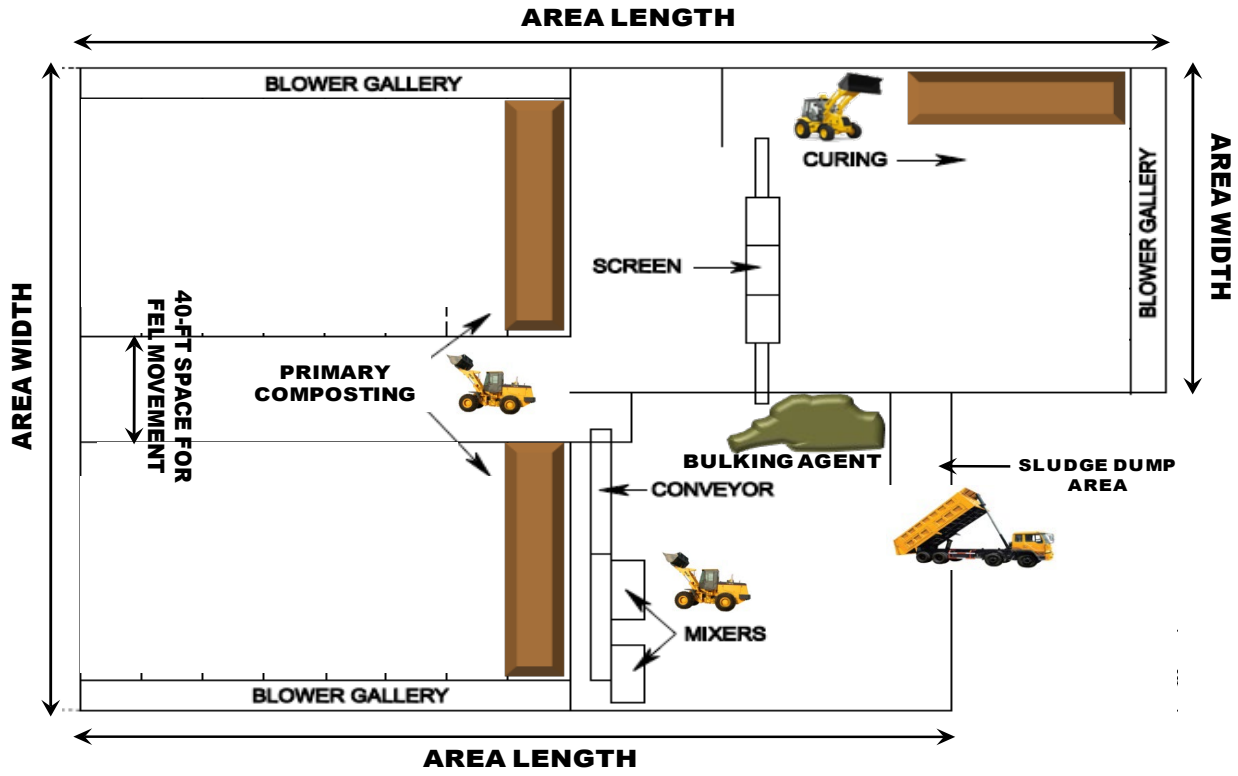
Concepts for each site alternative include the following facilities/components:

- Biosolids composting facility, including biosolids receiving/mixing, primary composting and curing
- Biofilter for odour control
- Bulking agent storage facility
- Office space/control room
- Stormwater management pond to manage onsite stormwater

Biosolids composting facility layouts were developed based on an "ideal" biosolids composting facility where sufficient footprint was available to accommodate all stages of the operation, as presented in Figure 9-9. Space (footprint) required was developed based on providing capacity to process 100 percent

of biosolids generated in 2051 (approximately 66,000 wt/y). Of note, the Region will still maintain the existing liquid biosolids land application program (including the liquid biosolids storage capacity at the BMC). Sizing the biosolids composting facility to accommodate all Region biosolids supplements the existing program, providing significant flexibility and redundancy. This flexibility mitigates risks related to the uncertainties associated with population projections and growth rates. There is also flexibility to phase construction based on the projected growth rates. The implementation plan will be developed through a subsequent study.

Figure 9-9. Ideal Facility Layout for Aerated Static Pile Composting Process



Conceptual layouts were developed within the parcels considering access, workflow, operational complexity, and other factors. The layout was customized specifically to suit the parcel shape for alternatives that do not have the footprint required to accommodate the "ideal facility layout".

The following subsections present concepts and features for the shortlisted biosolids composting sites.

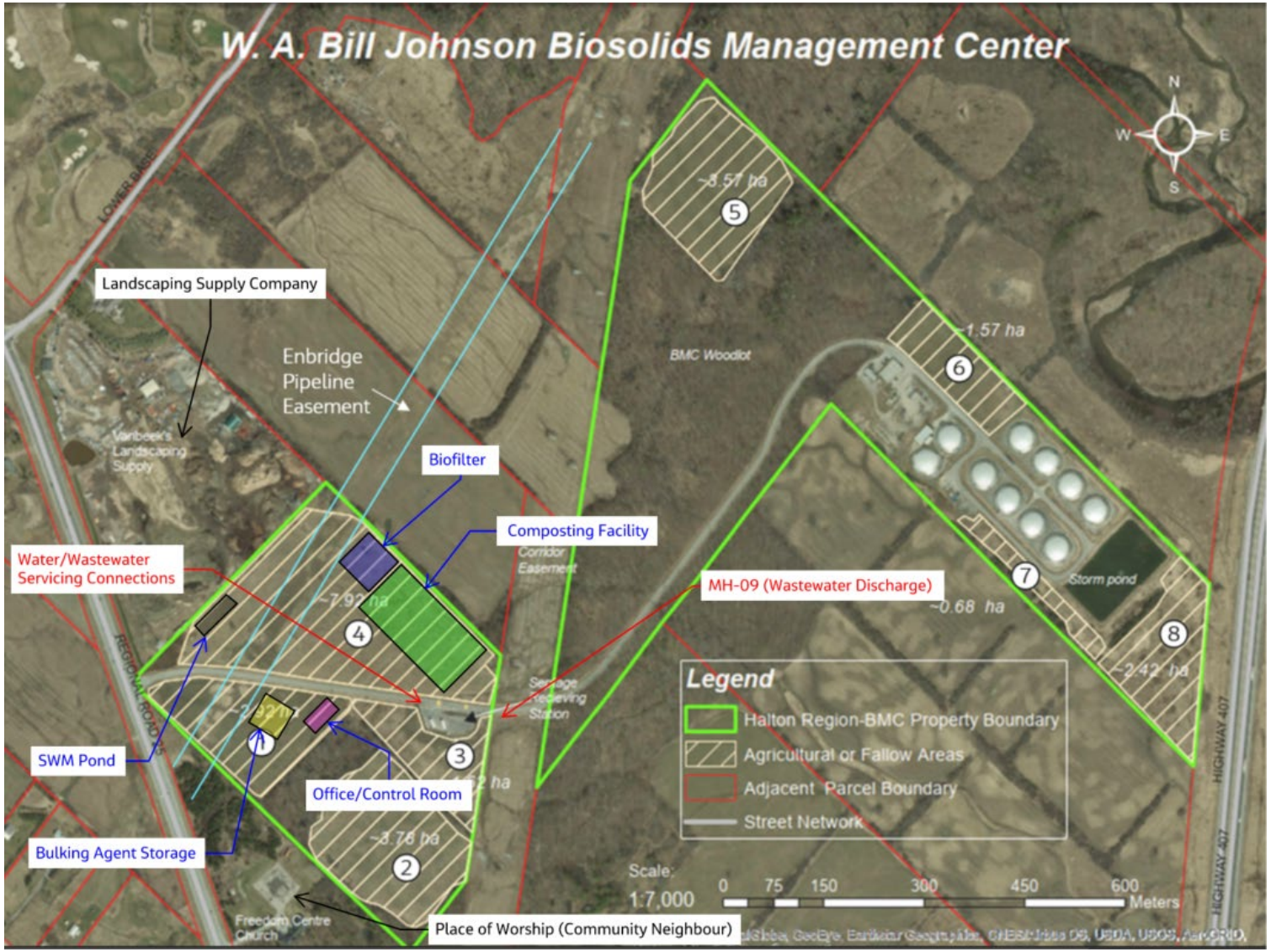
9.2.1 Alternative 1: BMC Parcel 4

Alternative 1 is to locate the biosolids composting facility at BMC Parcel 4 (supplemented with Parcel 1).

Parcel 4 does not have sufficient usable footprint to accommodate all process and building components due to the pipeline easement that crosses the parcel, so only the biosolids composting facility, the odour control biofilter and the SWM pond would be located at Parcel 4. The facilities would be located east of the utility easement that passes through the parcel. The bulking agent storage facility and the office space/control room (with no odour potential) will be located on Parcel 1, which is separated from Parcel 4 by the BMC's main access road.

Figure 9-10 presents a preliminary site layout with nearby features highlighted.

Figure 9-10. Preliminary Site Layout for Biosolids Composting Alternative 1 (BMC Parcels 1 and 4)



9.2.1.1 Technical Considerations

Parcels 1 and 4 are owned by the Region, so no land acquisition is required. There are no existing facilities on Parcels 1 and 4, allowing the biosolids composting facility and associated buildings to be implemented without any interruption to existing operations. However, access road traffic would temporarily increase during construction due to general construction activities, material delivery, etc., which could interfere with biosolids trucking operations into and out of the BMC. Parcel 4 is the furthest parcel from existing BMC operations, so would require the longest distance for hauling dewatered biosolids within the BMC.

Facility implementation can be phased based on future growth projections, with potential to add capacity as required. However, there is limited space available for expansion beyond the capacity projected in 2051 due to the utility easement that passes through Parcel 4. Additional biosolids composting capacity beyond 2051 would require another site.

Construction would be somewhat complex because of the utility pipeline easement in Parcel 4. The easement contains the following infrastructure:

- 750 mm diameter Enbridge pipeline
- 250 mm diameter Sarnia Products pipeline
- 300 mm diameter Sarnia Products pipeline

Construction activities would need to avoid the easement and special construction methods may be required, such as shoring, to support excavations and protect the pipeline instead of using a standard sloped excavation. Consultation with Enbridge and Imperial Oil would be required to determine the exact requirements.

Water and wastewater servicing is available for Parcels 1 and 4 on Johnson Way. Water would be provided from the 200 mm diameter watermain located in the road, which currently services the BMC. Wastewater from the composting process and from the office area would be diverted to SAN MH09, which is part of the Boyne trunk sewer system, that ultimately flows to the Mid-Halton WWTP. Available reserve capacity at the Mid-Halton WWTP needs to be confirmed during design; however, it is anticipated that the flow impact (estimated to be 25 m^3/d in 2051) is insignificant. The location of SAN MH09 is presented in Figure 9-10.

A new ECA (or amendment to the existing BMC ECA) would be required for this alternative. Portions of Parcel 1 and Parcel 4 are located within the area regulated by Conservation Halton (CH) under Ontario Regulation 162/06 and therefore, a permit from CH would be required. The site is also regulated by the Greenbelt Plan and the Parkway Belt West Plan special policies; however, additional mitigation measures related to these policies are not anticipated.

The topography of Parcels 1 and 4 is generally flat and grading required is expected to be minimal. It is assumed that geotechnical conditions will not require special construction techniques (that is, piling for foundational support). This would be verified during the detailed design phase.

9.2.1.2 Operational Requirements

Dewatered biosolids from the Mid Halton and Skyway WWTPs would be transported directly to Parcel 4 for composting. Liquid biosolids would be dewatered at the BMC dewatering facility and transported to the composting facility, by truck via Johnson Way given that this road is already used for liquid biosolids and dewatered biosolids transportation. New roads are not required for this alternative. The Region may consider purchasing a truck for internal use at the BMC if Parcel 4 is selected as the preferred location for the biosolids composting facility.

Operational requirements were developed for comparative purposes based on composting 100 percent of the Region's biosolids. However, the Region will maintain the ability to land apply liquid biosolids as required on a seasonal basis, which provides redundancy and flexibility for the Region's overall biosolids management program. Operational requirements for Alternative 1 include the following:

- **Dewatering at the BMC:** All liquid biosolids would be dewatered at the BMC rather than hauled offsite for land application. Dewatering has the following operational requirements:
  - **Electricity:** Dewatering electricity consumption is estimated to be 424,000 kWh/y by 2051.
  - **Polymer:** Polymer usage is estimated to be 71,500 kilograms per year by 2051.
- **Biosolids Composting:** The proposed biosolids composting facility would have the following operational requirements**:**
  - **FEL Diesel Consumption:** FELs will be used to transfer biosolids, bulking agents, and compost products within the facility and are estimated to consume 606,500 litres per year of diesel by 2051. It is estimated that up to 7 FELs will be required in 2051.
  - **Electricity:** The biosolids composting facility electricity consumption is estimated to be 4,441,000 kWh/y by 2051, mainly associated with aeration and odour control equipment.
  - **Biofilter Media Replacement:** Biofilter media requires periodic replacement, estimated to be 3,800 m^3 of biofilter media replacement per year in 2051.
  - **Bulking Agent:** The composting process is estimated to require 26,000 tonnes per year of bulking agent (for example, wood chips) by 2051.
  - **Labour:** 10 full-time equivalent staff would be required for biosolids composting facility operation in 2051. No overlap is assumed with current Region staff.
    - 1 manager
    - 2 general operations staff (process/equipment maintenance)
    - 7 loader operators (one per FEL)
- **Haulage:** Liquid biosolids will continue to be hauled to the BMC but would be dewatered onsite rather than hauled offsite for land application. In addition, dewatered biosolids would be hauled from the Skyway WWTP and Mid Halton WWTP to the BMC. Bulking agents would be hauled to the BMC from an external source, such as the HWMS. Overall, there would be a net decrease in haulage trucks in and out of the site. Figure 9-11 presents a comparison of existing BMC truck traffic components versus BMC truck traffic components following biosolids composting facility implementation, and Table 9-3 presents a traffic impact analysis based on 2051 biosolids generation rate projections. This analysis assumes that compost would be hauled offsite by a 4-5 axle truck with approximately 90 m^3 of volume, similar to trucks that haul bulking agent and other solid materials in the Region. Of note, if finished compost was stored onsite, it may be picked up directly by customers using smaller vehicles. Therefore, the final traffic impact will vary depending on storage/distribution of the finished compost product.

Figure 9-11. BMC Traffic Comparison - Existing Conditions vs Future Traffic with Biosolids Composting Implemented

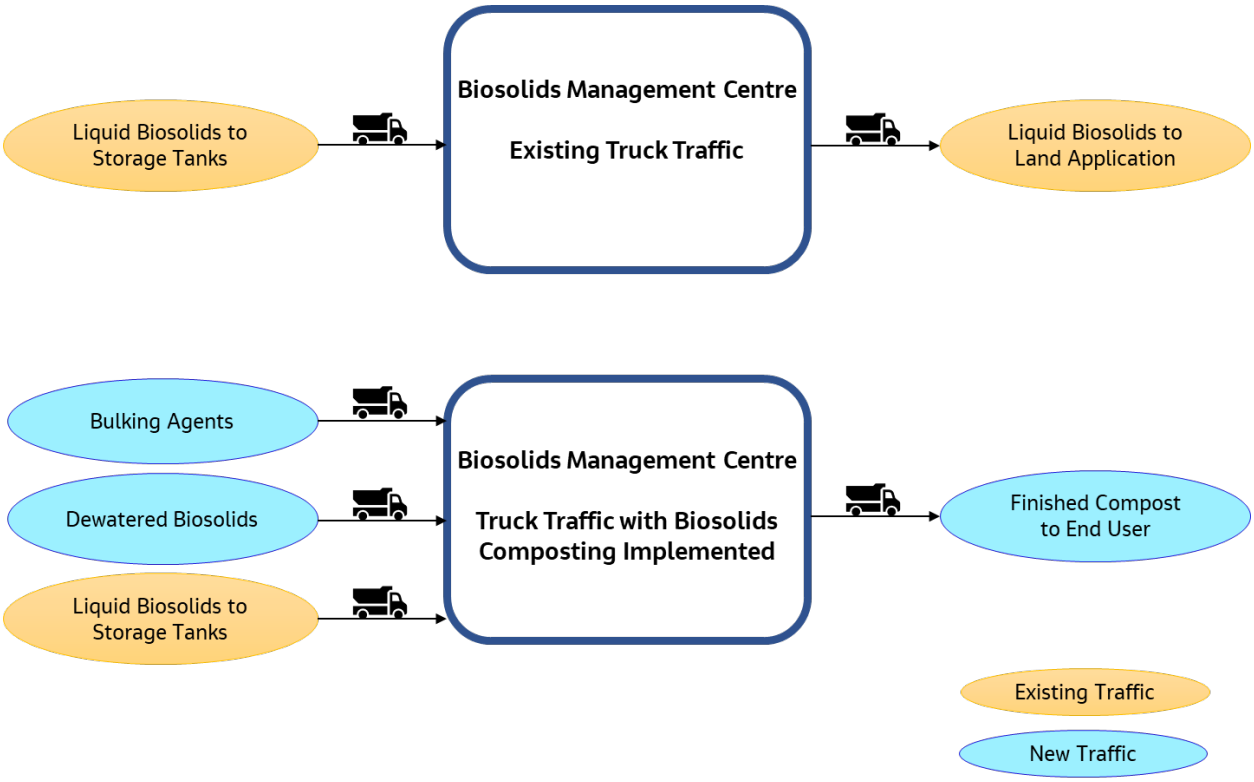


Table 9-3. Traffic Impact Analysis for Biosolids Composting Alternative 1 (2051)

Component	Value
Liquid Biosolids Transportation (reduction), Trucks/d	(14)
Bulking Agent Transportation, Trucks/d	4
Dewatered Biosolids Transportation, Trucks/d	5
Finished Compost Transportation, Trucks/d [a]	4
Net Traffic Impact, Trucks/d	(1)

Notes:

[a] Assumes that finished compost is hauled offsite for storage.

Of note, there are current traffic safety concerns related to the intersection of Regional Road 25 and Johnson Way. However, this risk would not increase with the biosolids composting facility location at Parcel 4, as there would be a net decrease in traffic.

Table 9-4 provides a summary of operational requirements for Alternative 1.

Table 9-4. Operational Requirements for Biosolids Composting Alternative 1 (2051)

Alternative 1 Operational Requirements	Component	Value
Dewatering	Electricity Consumption, kWh/y	424,000
	Polymer Consumption, kilograms per year	71,500
Biosolids Composting	FEL Diesel Consumption, litres per year	606,500
	Electricity Consumption, kWh/y	4,441,000
	Biofilter Media Replacement, m^3/year	3,800
	Bulking Agent Consumption, tonnes per year	26,000
	Labour, Full-time Equivalent Staff	10
	Haulage, Trucks/d (net reduction)	(1)

9.2.1.3 Impacts During Construction and Operations

The following potential construction-related impacts are associated with the proposed biosolids composting facility at BMC Parcel 4 (with a portion of Parcel 1 for bulking agent storage and office/control room):

- **Natural Features:** Parcel 1 and Parcel 4 generally consist of open fields, which are low quality terrestrial habitat. Impacts to habitats are expected to be minimal.
- **Archaeological and Cultural Heritage Resources:** A Stage 1 Archaeological Assessment was completed for this site and did not identify any known archaeological resources. A Stage 2 Archaeological Assessment will be required during detailed design based on the areas identified to have archaeological potential.
- **Traffic:** There would be temporary traffic increases during construction due to trucks and personal vehicles from construction personnel. Construction hours would be limited to daytime shifts on weekdays. Traffic impacts from operations were discussed in Section 9.2.1.2.
- **Noise:** The closest sensitive receptor is a place of worship located approximately 300 m from the proposed composting facility. During construction, noise impacts will be mitigated by restricting work to normal working hours. During operations, there will be intermittent noise from truck traffic, truck unloading (biosolids and wood chips), front-end loaders (moving the materials), and air blowers. It should be noted that the site is located 200 m from Regional Road 25, which is expected to generate significantly more background noise than the biosolids composting facility itself. Given the distance to the place of worship, there is a moderate risk of noise impacts.
- **Odour:** The closest sensitive receptor is the place of worship located approximately 300 m from the composting facility, which is further than the minimum distance of 250 m (can be up to 1,000 m based on site-specific conditions) recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts. Odour impacts will be mitigated by collecting and treating odorous air before it is released. Odour dispersion modelling will be completed to inform the design of the odour treatment facility, with goals to minimize the frequency and intensity of odours experienced by nearby sensitive receptors; the Emission Summary and Dispersion Modelling report will be subject to MECP approval for the ECA Air and Noise application. Given the distance to the receptor and because odour control will be integral to the facility, there is a low risk of odour impacts. There is a risk that odours

from the adjacent landscaping materials operation (that is, mulch, compost, manure) will be attributed to the biosolids composting facility.

9.2.1.4 GHG Emissions

GHG emissions in 2051 were estimated for this alternative based on the following components:

- Liquid biosolids dewatering at the BMC
- Biosolids composting and land application of compost product

Table 9-5 presents a summary of GHG emissions associated with Alternative 1. Overall, the biosolids composting facility is expected to provide a net GHG emission benefit to the Region. GHG emissions are similar between all site alternatives for this study.

Table 9-5. GHG Emissions for Biosolids Composting Alternative 1 (2051)

Emission Scope	GHG Emissions, tonnes CO_2 eq/y	Notes
Scope 1	2,150	Emissions from fuel consumption (that is, for FELs) and N_2O from biosolids compost piles
Scope 2	80	Emission from electricity consumption
Scope 3	(3,490)	Emission from dewatering polymer; benefits from carbon sequestration and fertilizer offsets
Total	(1,260)	Not applicable

Notes:
tonnes CO_2 eq/y = tonnes of carbon dioxide equivalent per year

9.2.1.5 Relative Cost

The capital cost for this alternative is primarily for the biosolids composting facility. There are some site-specific requirements (that is, special construction methods for easement protection), however, these site-specific costs are expected to be non-differentiating relative to the facility costs. Overall, the relative capital cost is similar for all shortlisted site alternatives and is non-differentiating.

O&M costs are expected to be the same for each site alternative and are non-differentiating.

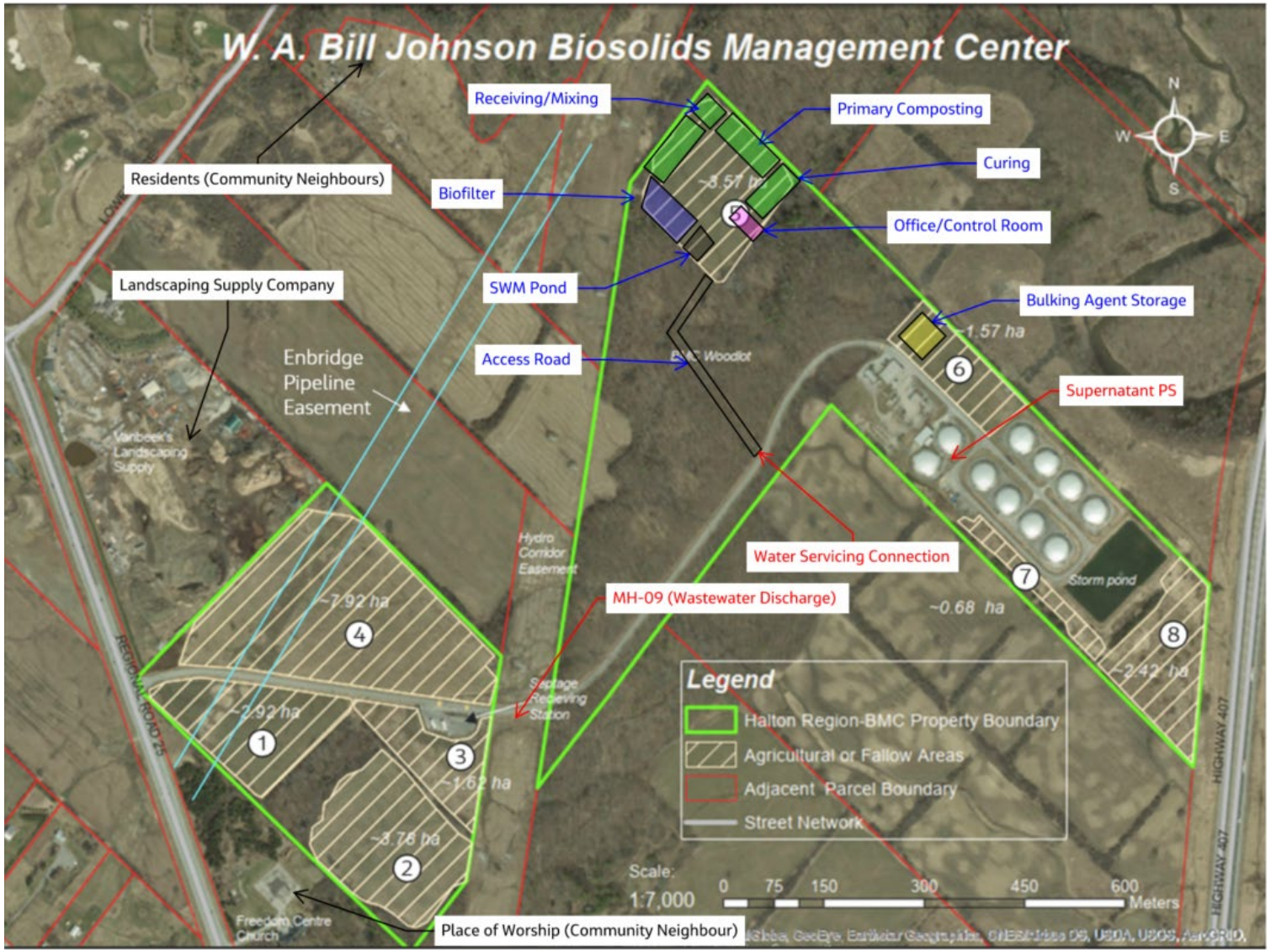
9.2.2 Alternative 2: BMC Parcel 5

Alternative 2 is to locate the biosolids composting facility at BMC Parcel 5 (supplemented with Parcel 6).

Parcel 5 does not have sufficient footprint to accommodate all process and building components, so the bulking agent storage facility will be located at Parcel 6 (formerly a lagoon that stored biosolids from the City of Toronto). A new access road would be constructed through the BMC Woodlot to provide access from Johnson Way.

Figure 9-12 presents a preliminary site layout with nearby features highlighted.

Figure 9-12. Preliminary Site Layout for Biosolids Composting Alternative 2 (BMC Parcels 5 and 6)



9.2.2.1 Technical Considerations

Parcels 5 and 6 are owned by the Region, so no land acquisition is required. There are no existing facilities on Parcels 5 and 6, allowing the biosolids composting facility and associated buildings to be implemented without any interruption to existing operations. However, access road traffic would temporarily increase during construction due to general construction activities, material delivery, etc., which could interfere with biosolids trucking operations into and out of the BMC. Parcel 5 is not directly adjacent to existing BMC operations, so would require dewatered liquid biosolids haulage within the BMC.

Implementation can be phased based on future growth projections, with potential to add capacity as required. However, space in Parcel 5 is limited for expansion beyond the capacity projected in 2051. Any additional biosolids composting capacity required beyond 2051 would require additional land within the woodlot. Substantial disruption of the woodlot may not be permitted, to protect the natural environment.

Construction would be somewhat complex because of the mitigation measures required for road construction in the BMC Woodlot, given the nearby wetland and the need for tree removal.

Water and wastewater servicing is available for Parcel 5 on Johnson Way. Water would be provided from the 75 mm diameter watermain located in the road (presented in Figure 9-12), which currently services the BMC. A new watermain extension would be constructed along the new access road between Johnson Way and Parcel 5. Water supply availability and system pressures would need to be confirmed during design if this alternative is selected as the preferred location.

Wastewater from the composting process and from the office area would be diverted to the supernatant pumping station, located east of Storage Tank #10. A new sanitary sewer would be constructed along the access road between Johnson Way and Parcel 5, which would discharge into the pumping station wet well. Flows would be pumped into the 150 mm diameter forcemain that runs parallel with Johnson Way and discharges to SAN MH09, which is part of the Boyne trunk sewer system that ultimately flows to the Mid-Halton WWTP. Available reserve capacity at the Mid-Halton WWTP should be confirmed during design, however, it is anticipated that the flow impact (estimated to be 25 m^3/d in 2051) is insignificant. The pumping station location is presented in Figure 9-12.

A new ECA (or amended ECA) would be required for this alternative. Portions of Parcel 5 and Parcel 6 are located within the area regulated by CH under Ontario Regulation 162/06 and therefore, a permit from CH would be required. Additional permits will likely be required by the MECP if species at risk habitats are identified within the woodlot. The site is also regulated by the Greenbelt Plan and the Parkway Belt West Plan special policies; however, it is unlikely that additional mitigation measures will be required related to these policies.

The topography of Parcels 5 and 6 is generally flat and grading is expected to be minimal. It is assumed that geotechnical conditions will not require special construction techniques (that is, piling for foundational support). This would be verified during the detailed design phase.

9.2.2.2 Operational Requirements

Operational requirements for Alternative 2 (BMC Parcel 5) are the same as for Alternative 1 (BMC Parcel 4), as presented in Section 9.2.1.2, therefore are not repeated.

9.2.2.3 Impacts During Construction and Operations

The following potential construction-related impacts are associated with the proposed biosolids composting facility at BMC Parcel 5 (with bulking agent storage at Parcel 6):

- **Natural Features:** Parcel 5 generally consists of open field, which is low quality terrestrial habitat. However, the BMC Woodlot is high-quality terrestrial habitat for a number of species and also contains a number of wetlands. Moderate mitigation measures would be required to reduce impacts to terrestrial and aquatic habitats in the BMC Woodlot. Parcel 6 was previously used to store biosolids from the City of Toronto and therefore, there is a low risk of natural feature impacts from the bulking agent storage facility.
- **Archaeological and Cultural Heritage Resources:** A Stage 1 Archaeological Assessment was completed for this site and did not identify any known archaeological resources. A Stage 2 Archaeological Assessment will be required during detailed design based on the areas identified to have archaeological potential.
- **Traffic:** There would be temporary traffic increases during construction due to trucks and personal vehicles from construction personnel. Construction hours would be limited to daytime shifts on weekdays. Traffic impacts from operations were discussed in Section 9.2.2.2.
- **Noise:** The closest sensitive receptors are private residences approximately 400 m from the proposed composting facility. There is a place of worship located approximately 800 m from the composting facility. During construction, noise impacts will be mitigated by restricting work to normal working hours. During operations, there will be intermittent noise from truck traffic, truck unloading (biosolids and wood chips), front-end loaders (moving the materials), and air blowers. Given the distance from each facility to the receptors, there is a low risk of noise impacts.
- **Odour:** The closest sensitive receptors are private residences approximately 400 m away from the composting facility and there is a place of worship located approximately 800 m from the composting facility, which are further than the minimum distance of 250 m (can be up to 1,000 m based on site-specific conditions) recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts. Odour impacts will be mitigated by collecting and treating odorous air before it is released. Odour dispersion modelling will be completed to design the odour treatment facility to minimize frequency and level of odours experienced by nearby sensitive receptors, and will be subject to MECP approval. Given the distance to the receptors and because odour control will be integral to the facility, there is a very low risk of odour impacts.

9.2.2.4 GHG Emissions

The GHG emissions for Alternative 2 (BMC Parcel 5) are the same as Alternative 1 (BMC Parcel 4), as the GHG emissions for the biosolids composting operation are not affected by location.

9.2.2.5 Relative Cost

The capital cost for this alternative is primarily for the biosolids composting facility. There are some site-specific requirements (that is, new access road), however, these site-specific costs are expected to be non-differentiating relative to the facility costs. Overall, the relative capital cost is similar for all shortlisted site alternatives and is non-differentiating.

O&M costs are expected to be the same for each site alternative and are non-differentiating.

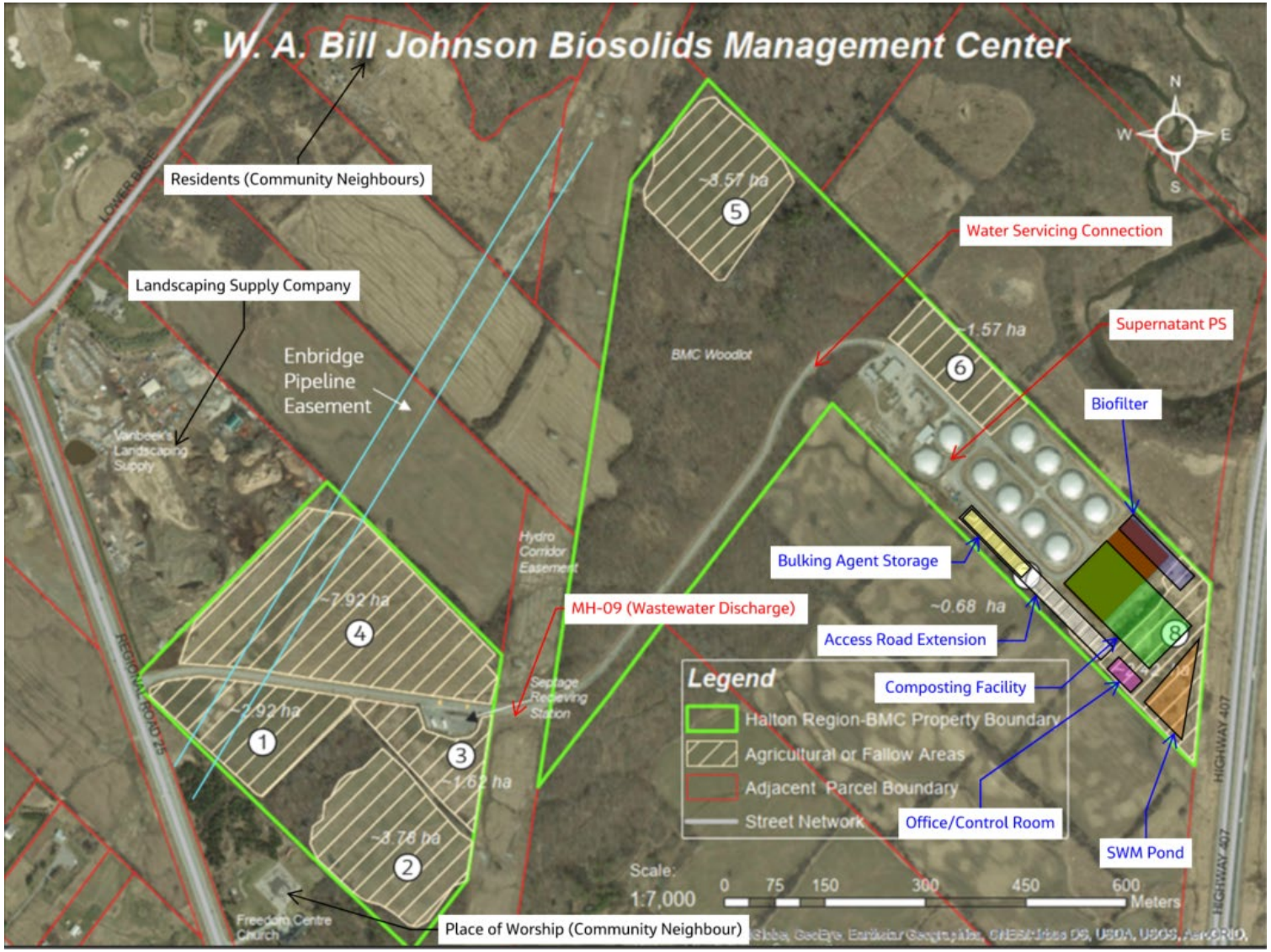
9.2.3 Alternative 3: BMC Parcel 8

Alternative 3 is to locate the biosolids composting facility at BMC Parcel 8 (supplemented by Parcel 7).

Parcel 8 has sufficient footprint to accommodate all process and building components, however, the existing BMC stormwater management pond must be relocated to the east end of Parcel 8 to accommodate the ideal biosolids composting facility layout. A new access road would be constructed in Parcel 7 to connect Parcel 8 to the existing BMC road network.

Figure 9-13 presents a preliminary site layout with nearby features highlighted.

Figure 9-13. Preliminary Site Layout for Biosolids Composting Alternative 3 (BMC Parcels 7 and 8)



9.2.3.1 Technical Considerations

Parcels 7 and 8 are owned by the Region, so no land acquisition is required. The composting facility would be located within the existing SWM pond footprint, so a new SWM pond would need to be constructed at the east end of Parcel 8. Construction would be staged to minimize any disruption of the stormwater management function. The following construction sequence is recommended to minimize any interruptions to current operations:

1. Construct a new SWM pond and all associated infrastructure (swales, ditches, stormwater pumping station, storm sewers).
2. Decommission and fill the existing SWM pond and associated infrastructure.
3. Construct the new access road and biosolids composting facility.

Access road traffic would temporarily increase during construction due to general construction activities, material delivery, etc., which could interfere with biosolids trucking operations to and from the BMC. Parcel 8 is directly adjacent to existing BMC operations, so would require dewatered liquid biosolids haulage via the new internal access road on Parcel 7.

Implementation can be phased based on future growth projections, with potential to add capacity as required. There is limited space available for expansion beyond the capacity projected in 2051 within Parcel 8. However, the Region could decommission a portion of the liquid biosolids storage tanks as required and use this footprint to expand composting operations, or purchase adjacent lands.

Construction would be somewhat complex because of the sequencing required to maintain existing stormwater management operations. However, only standard construction methods are anticipated.

Water and wastewater servicing is available for Parcel 8 on Johnson Way. Water would be provided from the 75 mm diameter watermain located in the road, which currently services the BMC. A new watermain extension would be constructed along the access road through Parcel 7. Water supply availability and system pressures would be confirmed during design if this alternative is selected as the preferred location.

Wastewater generated during the composting process and from the office area would be diverted to the supernatant pumping station, similar to Alternative 2 (BMC Parcel 5). A new sanitary sewer would be constructed along the access road through Parcel 7, which would discharge into the pumping station wet well.

A new ECA (or ECA amendment) would be required for this alternative. A small portion of Parcel 8 is located within the area regulated by CH under Ontario Regulation 162/06 and therefore, a permit from CH would be required. The site is also regulated by the Greenbelt Plan and the Parkway Belt West Plan special policies; however, it is unlikely that additional mitigation measures will be required related to these policies.

The topography of Parcel 8 is generally flat and grading is expected to be minimal. It is assumed that geotechnical conditions will not require special construction techniques (that is, piling for foundational support). This would be verified during the detailed design phase.

9.2.3.2 Operational Requirements

Operational requirements for Alternative 3 (BMC Parcel 8) are the same as for Alternative 1 (BMC Parcel 4), as presented in Section 9.2.1.2.

9.2.3.3 Impacts during Construction and Operations

The following potential construction-related impacts are associated with the proposed biosolids composting facility at BMC Parcel 8 (with bulking agent storage and access road extension on Parcel 7):

- **Natural Features:** Parcels 7 and 8 generally consist of open field, which is low quality terrestrial habitat. Impacts to habitats are expected to be minimal.
- **Archaeological and Cultural Heritage Resources:** A Stage 1 Archaeological Assessment was completed for this site and did not identify any known archaeological resources. A Stage 2 Archaeological Assessment will be required during detailed design based on the areas identified to have archaeological potential.
- **Traffic:** There would be temporary traffic increases during construction due to trucks and personal vehicles from construction personnel. Construction hours would be limited to daytime shifts on weekdays. Traffic impacts from operations were discussed in Section 9.2.3.2.
- **Noise:** The closest sensitive receptors are private residences approximately 800 m from the composting and storage facilities. There is a place of worship located approximately 1,200 m from the composting facility. During construction, noise impacts will be mitigated by restricting work to normal working hours. During operations, there will be intermittent noise from truck traffic, truck unloading (biosolids and wood chips), front-end loaders (moving the materials), and air blowers. The site is also near Highway 407, which is a more significant noise source than the proposed composting facility would be. Given the distance to the receptors, there is a negligible risk of noise impacts.
- **Odour:** The closest sensitive receptors are private residences approximately 800 m away from the composting facility and there is a place of worship located approximately 1,200 m from the composting facility, which are further than the minimum distance of 250 m (can be up to 1,000 m based on site-specific conditions) recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts. Odour impacts will be mitigated by collecting and treating odorous air before it is released. Odour dispersion modelling will be completed to design the odour treatment facility to minimize frequency and level of odours on nearby sensitive receptors, and will be subject to MECP approval. Given the distance to the receptor and because odour control will be integral to the facility, there is a very low risk of odour impacts.

9.2.3.4 GHG Emissions

The GHG emissions for Alternative 3 (BMC Parcels 8 and 7) are the same as Alternative 1 (BMC Parcels 4 and 1), as the GHG emissions for the biosolids composting operation are not affected by location.

9.2.3.5 Relative Cost

The capital cost for this alternative is primarily for the biosolids composting facility. There are some site-specific requirements (that is, access road extension, SWM pond modifications), however, these site-specific costs are expected to be non-differentiating relative to the facility costs. Overall, the relative capital cost is similar for all shortlisted site alternatives and is non-differentiating.

O&M costs are expected to be the same for each site alternative and are non-differentiating.

9.3 Evaluation of Biosolids Composting Site Alternatives

This section presents the evaluation of alternative sites to identify the preferred location for the proposed biosolids composting facility. This evaluation was completed using the framework presented in Section 8.4. The following subsections document evaluation scores and rationales for each alternative.

9.3.1 Natural Environment

This section presents the evaluation of natural environment criteria.

9.3.1.1 GHG Emissions

Overall, the biosolids composting program is expected to provide a GHG benefit to the Region. GHG emissions are similar between all site alternatives for this study. Each alternative is estimated to provide a GHG emission offset of **1,260 tonnes CO_2 eq/y** by 2051. Table 9-6 presents the criterion definition and scoring measure for GHG emissions.

Table 9-6. Definition and Scoring Scale for GHG Emissions

Criterion	How Will This Criterion be Measured?	Scoring Scale
GHG emissions	Based on the predicted GHG emissions associated with the proposed biosolids composting facility operations and materials hauling, specific to the site alternative. (Note: Regardless of site location, biosolids composting is expected to reduce GHG emissions associated with biosolids management compared to the Region's current program (haulage and land application), as previously presented in the Feasibility Study (Jacobs, 2020).)	**5** – Lowest GHG emissions from biosolids composting facility operation and materials hauling. Scores for other site alternatives will be assigned proportionally based on the ratio to the lowest GHG emission (for example, if the GHG emission is 20% higher than the lowest GHG emission site alternative, the score would be 20% lower than the highest score).

Table 9-7 presents the evaluation score and rationale provided to each alternative site for GHG emissions.

Table 9-7. Scores and Rationales for GHG Emissions

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	5	Biosolids composting is projected to provide a GHG emission offset of approximately 1,260 tonnes CO_2 eq/year. There are minor differences in haulage distances for each alternative, however, these differences account for <1% of the total GHG emission offset. Overall, biosolids composting will provide a positive GHG emission impact for the Region.
Alternative 2: BMC Parcel 5	5	Same as Alternative 1
Alternative 3: BMC Parcel 8	5	Same as Alternative 1

Site Alternatives	Score	Rationale
Alternative 4: New Location/New Property	4	Biosolids composting is projected to provide a GHG emission offset of approximately 1,260 tonnes CO_2 eq/year. A new location will result in increased haulage distances and therefore, this alternative received a score of 4 due to uncertainty and potential risks. Overall, biosolids composting will provide a positive GHG emission impact for the Region.

9.3.1.2 Terrestrial and Aquatic Habitats and Features

A natural features study was completed to identify terrestrial and aquatic habitats in the vicinity of each alternative site, and to identify potential impacts from constructing the proposed biosolids composting facility at each site. Temporary impacts during construction and permanent impacts post-construction were considered. Table 9-8 presents the criterion definition and scoring measure for terrestrial and aquatic habitats and features.

Table 9-8. Definition and Scoring Scale for Terrestrial and Aquatic Habitats and Features

Criterion	How Will This Criterion be Measured?	Scoring Scale
Terrestrial and aquatic habitats and features	Based on potential negative impacts to terrestrial and aquatic habitats at or around the site that would result from the construction and/or operation of the proposed biosolids composting facility at that site, and mitigation required to minimize impacts.	5 – Terrestrial and aquatic habitat quality or quantity may be enhanced as a result of building and/or operating the proposed biosolids composting facility (for example, increase habitat use or effectiveness). 3 – There are no predicted measurable effects on the quality or quantity of terrestrial and aquatic habitats from building and/or operating the proposed biosolids composting facility (with or without the implementation of mitigation measures). 1 – Terrestrial and aquatic habitat quality or quantity will be negatively affected as a result of building and/or operating the proposed biosolids composting facility and substantial amount of mitigation measures to protect existing habitats are required.

Table 9-9 presents the evaluation score and rationale provided to each alternative site for terrestrial and aquatic habitat and features.

Table 9-9. Scores and Rationales for Terrestrial and Aquatic Habitats and Features

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	Parcels 1 and 4 consist of open field with some trees on canopy level in the northern region. Vegetation inspection and wildlife inspection for migratory birds may be required to prevent habitat damage. The proposed work can be completed without tree removal if work will not impact the northern region of the parcel. The parcel has no connection to woodland; therefore, the impact to natural environment by construction is predicted to be minimal. These parcels occur fully within the Regional Natural Heritage System and partially in the Greenbelt Natural Heritage System. As the area is predominantly anthropogenically disturbed meadows, natural feature presence is low and could potentially have less Greenbelt and Natural Heritage System implications.
Alternative 2: BMC Parcel 5	1	Parcel 5 mainly consists of open field. The parcel is surrounded by woodland and a Land Information Ontario identified wetland exists within 120 m of the parcel. Therefore, vegetation habitat inspection is required. The proposed work can be constructed, and no biologist inspection may be required if construction is not during the bird nesting season. The wetland observed in the adjacent land should be confirmed through field investigation if the proposed work will affect drainage. An inspection will be required before any construction because the parcel is surrounded by woodland that may be used by animals as a corridor. The parcel has high potential of being a wildlife habitat area or to be used by species temporarily (that is, corridor), therefore construction has the potential to cause larger impact to natural environment features compared to other parcels. Inspection of natural features is required prior to commencement of any construction activities to confirm natural features and identify mitigation measures required during construction. Due to the sensitivity of existing features in this parcel and policy permissions, Parcel 5 would be highly restrictive and should be avoided for future construction. This parcel occurs fully within the Regional Natural Heritage System and in the Greenbelt Natural Heritage System. As the area is surrounded by wooded lands, Greenbelt and Natural Heritage System implications could be more profound.
Alternative 3: BMC Parcel 8	3	Parcels 7 and 8 mainly consist of hay field, and do not contain any significant natural features within 120 m. Therefore, impacts to terrestrial and aquatic habitats are expected to be minimal. This area is adjacent to industrial zones as well as a highway; therefore, natural feature presence is low and could potentially have less Greenbelt and Natural Heritage System impacts.
Alternative 4: New Location/New Property	1	Agricultural land is preferred for the new location, and the site would be selected to avoid impacts to terrestrial and aquatic habitats. However, there are risks due to uncertainty of mitigation measures that could be required to minimize impacts to natural environment.

9.3.1.3 Construction in Regulated Areas

Each site was assessed to determine if construction would occur in any regulated areas and to identify any associated mitigation measures required. Relevant policies include the following:

- CH Regulated Area
- Greenbelt Plan Area
- Parkway Belt West Plan Area
- NEP Area

Table 9-10 presents the criterion definition and scoring measure for construction in regulated areas.

Table 9-10. Definition and Scoring Scale for Construction in Regulated Areas

Criterion	How Will This Criterion be Measured?	Scoring Scale
Construction in regulated areas	For the alternative site, based on a need to construct the proposed biosolids composting facility in regulated areas or in buffer zones around regulated areas.	5 – Construction of the facility will not be in or near regulated areas. 3 – The facility construction encounters or encroaches on regulated areas, but can be constructed and operated within appropriate regulations, and reasonable mitigation measures can be implemented to avoid impacts. 1 – The site requires some portion of the facility to be constructed in a regulated area and substantial mitigation is required to comply with appropriate regulations.

Table 9-11 presents the evaluation score and rationale provided to each alternative site for construction in regulated areas.

Table 9-11. Scores and Rationales for Construction in Regulated Areas

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	Portions of Parcels 1 and 4 are located within the CH regulated area. Additionally, features within the parcels form linkages with conservation regulated areas, such as woodlands and pipeline/hydro easements. Therefore, additional mitigation measures may be required that are specific to the regulated area. The site is also regulated by the Greenbelt Plan and the Parkway Belt West Plan; however, these policy areas are unlikely to require additional mitigation measures.
Alternative 2: BMC Parcel 5	2	Most of Parcel 5 and the woodland area between Parcel 5 and Parcel 6 are located within the CH regulated area. The site is also regulated by the Greenbelt Plan and the Parkway Belt West Plan. Additionally, there are features within the parcels such as the hay field, woodlands and Provincially Significant Wetlands. It is likely that extensive mitigation measures will be required that are specific to the regulated area, particularly related to the woodland area and the Provincially Significant Wetland.

Site Alternatives	Score	Rationale
Alternative 3: BMC Parcel 8	4	Parcel 7 is not located within the CH regulated area and a very small portion of Parcel 8 is location within the CH regulated area. The SWM pond footprint could potentially overlap with this area, so permitting and/or consultation would be required. The site is also regulated by the Greenbelt Plan and the Parkway Belt West Plan; however, these policy areas are unlikely to require additional mitigation measures.
Alternative 4: New Location/New Property	4	It is assumed that the site will be selected to avoid construction in regulated areas, however, there is uncertainty as a large portion of the region that the site would be located in is regulated by CH. A permit would be required from CH to proceed with construction if the site was located within the regulated area.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.1.4 Weighted Scores for Natural Environment

Table 9-12 presents a summary of the weighted scores for the natural environment criteria, which are presented as scores out of the total natural environment category score of **21.7.** Alternative 3 (BMC Parcel 8) received the highest overall score in the natural environment category.

Table 9-12. Summary of Weighted Scores for Natural Environment Criteria

Category	Alternative 1 BMC Parcel 4	Alternative 2 BMC Parcel 5	Alternative 3 BMC Parcel 8	Alternative 4 New Location
GHG emissions	8.3	8.3	8.3	6.7
Terrestrial and aquatic habitats and features	4.0	1.3	4.0	1.3
Construction in regulated areas	4.0	2.7	5.3	5.3
Total	**16.3**	**12.3**	**17.6**	**13.3**

9.3.2 Social/Cultural Environment

This section presents the evaluation for social/cultural environment criteria.

9.3.2.1 Noise

Noise impacts were assessed based on potential impacts to nearby receptors during and post-construction. Table 9-13 presents the criterion definition and scoring measure for noise.

Table 9-13. Definition and Scoring Scale for Noise

Criterion	How Will This Criterion be Measured?	Scoring Scale
Noise	Based on potential for the use of the alternative site for a biosolids composting facility to increase noise to receptors at or near the site.	**5** – The construction and/or operation of a biosolids composting facility at the alternative site will not increase noise levels for receptors at or near the site. **3** – The construction and/or operation of a biosolids composting facility at the alternative site will slightly increase noise levels for receptors at or near the site; routine mitigation measures such as construction within normal work hours, may be required. **1** – The construction and/or operation of a biosolids composting facility at the alternative site will cause a persistent noise increase to receptors at or near the site.

Table 9-14 presents the evaluation score and rationale provided to each alternative site for noise.

Table 9-14. Scores and Rationales for Noise

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	The closest sensitive receptor is a place of worship located approximately 300 m from the composting facility. During construction, noise impacts will be mitigated by restricting work to normal working hours. During operations, there will be intermittent noise from truck traffic, truck unloading (biosolids and wood chips), front-end loaders (moving the materials) and air blowers. Also, the site is located 200 m from Regional Road 25, which is expected to generate significantly more noise than the biosolids composting facility. Given the distance to the church, there is a moderate risk of noise impacts.
Alternative 2: BMC Parcel 5	4	The closest sensitive receptors are private residences approximately 400 m from the composting facility. There is a place of worship located approximately 800 m from the composting facility. During construction, noise impacts will be mitigated by restricting work to normal working hours. During operations, there will be intermittent noise from truck traffic, truck unloading (biosolids and wood chips), front-end loaders (moving the materials) and air blowers. Given the distance from each facility to the receptor there is a low risk of noise impacts.
Alternative 3: BMC Parcel 8	5	The closest sensitive receptors are private residences approximately 800 m from the composting and storage facilities. There is a place of worship located approximately 1,200 m from the composting facility. During construction, noise impacts will be mitigated by restricting work to normal working hours. During operations, there will be intermittent noise from truck traffic, truck unloading (biosolids and wood chips), front-end loaders (moving the materials) and air blowers. The site is also near Highway 407, which is a more significant noise source than the composting facility would be. Given the distance to the receptors, there is a negligible risk of noise impacts.

Site Alternatives	Score	Rationale
Alternative 4: New Location/New Property	4	The new site would be selected so that there are few to no nearby receptors. During construction, noise impacts will be mitigated by restricting work to normal working hours. During operations, there will be intermittent noise from truck traffic, truck unloading (biosolids and wood chips), front-end loaders (moving the materials) and air blowers. Given that the site would be selected to avoid receptors, there is a negligible risk of noise impacts. However, as the site is currently unknown, this alternative received a score of 4 due to uncertainty and potential risks.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.2.2 Odour

Odour impacts were assessed based on potential impacts to nearby receptors during operation. Table 9-15 presents the criterion definition and scoring measure for odour.

Table 9-15. Definition and Scoring Scale for Odour

Criterion	How Will This Criterion be Measured?	Scoring Scale
Odour	Based on potential for the use of the alternative site for a biosolids composting facility to increase odours to receptors at or near the site. (Note: Regardless of siting, odorous air generated from the process will be captured and treated. Site-wide odour dispersion modelling will be completed during the design phase to determine the level of odour treatment needed to keep odours from leaving the site.)	5 – The construction and/or operation of a biosolids composting facility at the alternative site will not increase odour levels for receptors at or near the site. 3 – The construction and/or operation of a biosolids composting facility at the alternative site will increase potential odour frequency or concentration for receptors at or near the site. 1 – The construction and/or operation of a biosolids composting facility at the alternative site will cause an increase in frequency or intensity of nuisance odours to receptors at or near the site.

Table 9-16 presents the evaluation score and rationale provided to each alternative site for odour.

Table 9-16. Scores and Rationales for Odour

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	The closest sensitive receptor is a place of worship located approximately 300 m from the composting facility, which is greater than the minimum of 250 m (can be up to 1,000 m based on site-specific conditions) recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts. Odour impacts will be mitigated by collection and treatment of odorous air before it is released. Odour dispersion modelling will be completed to design the odour treatment facility to minimize frequency and intensity of odours on nearby sensitive receptors, and will be subject to MECP approval. Given the distance to the receptor and because odour control will be integral to the facility, there is a low risk of odour impacts. There is a risk that odours from the adjacent landscape supply operation (that is, mulch, compost, manure) will be attributed to the biosolids composting facility, which could create a negative community perception.
Alternative 2: BMC Parcel 5	4	The closest sensitive receptors are private residences approximately 400 m away from the composting facility and there is a place of worship located approximately 800 m from the composting facility, which are greater than the minimum of 250 m (can be up to 1,000 m based on site-specific conditions) recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts. Odour impacts will be mitigated by collection and treatment of odorous air before it is released. Odour dispersion modelling will be completed to design the odour treatment facility to minimize frequency and level of odours on nearby sensitive receptors, and will be subject to MECP approval. Given the distance to the receptors and because odour control will be integral to the facility, there is a very low risk of odour impacts.
Alternative 3: BMC Parcel 8	5	The closest sensitive receptors are private residences approximately 800 m away from the composting facility and there is a place of worship located approximately 1,200 m from the composting facility, which are greater than the minimum of 250 m (can be up to 1,000 m based on site-specific conditions) recommended by the Guideline for the Production of Compost in Ontario to avoid potential odour impacts. Odour impacts will be mitigated by collection and treatment of odorous air before it is released. Odour dispersion modelling will be completed to design the odour treatment facility to minimize frequency and level of odours on nearby sensitive receptors, and will be subject to MECP approval. Given the distance to the receptors and because odour control will be integral to the facility, there is a very low risk of odour impacts.

Site Alternatives	Score	Rationale
Alternative 4: New Location/New Property	4	The new site would be selected so that the sensitive receptors are at a distance from the facility to minimize risk of odour impacts. In addition, potential odour impacts will be mitigated by collection and treatment of odorous air before it is released. Odour dispersion modelling will be completed to design the odour treatment facility to minimize frequency and level of odours on nearby sensitive receptors, and will be subject to MECP approval. However, as the site is currently unknown, this alternative received a score of 4 due to uncertainty and potential risks.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.2.3 Level of Social Acceptance

Level of social acceptance was assessed based on anticipated community support for a biosolids composting facility at each alternative site. Table 9-17 presents the criterion definition and scoring measure for level of social acceptance.

Table 9-17. Definition and Scoring Scale for Level of Social Acceptance

Criterion	How Will This Criterion be Measured?	Scoring Scale
Level of Social Acceptance	Based on anticipated community support (for example, considering impacts to community such as aesthetics) and/or garner positive perception for the proposed biosolids composting facility at the site alternative.	5 – The alternative site has the potential to receive a high level of support and endorsement from the public. 3 – The alternative site has the potential to receive a moderate level of support and endorsement from the public. 1 – The alternative site has the potential to receive little to no support and endorsement from the public.

Table 9-18 presents the evaluation score and rationale provided to each alternative site for level of social acceptance.

Table 9-18. Scores and Rationales for Level of Social Acceptance

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	Biosolids composting has the potential to receive community support through positive marketing of the product as a green solution (that is, recycling carbon and nutrients) for biosolids management. However, nearby land users (that is, the place of worship 300 m away and other nearby residents) may be concerned that there will be impacts related to odour and noise. The risk of negative community perception is high due to proximity of the composting facility to these neighbours. There is also a risk that odours from the adjacent landscape supply operation (that is, mulch, compost, manure) will be attributed to the biosolids composting facility, which could create a negative community perception overall.
Alternative 2: BMC Parcel 5	4	Biosolids composting has the potential to receive community support through positive marketing of the product as a green solution (that is, recycling carbon and nutrients) for biosolids management. However, nearby land users (that is, the nearby residents 400 m away and the place of worship 800 m away) may be concerned that that there will be impacts from odour and noise. The risk of negative community perception is moderate due to proximity of the composting facility to these neighbours. There is also a risk that odours from the adjacent landscape supply operation (that is, mulch, compost, manure) will be attributed to the biosolids composting facility, which could create a negative community perception overall.
Alternative 3: BMC Parcel 8	5	Biosolids composting has the potential to receive community support through positive marketing of the product as a green solution (that is, recycling carbon and nutrients) for biosolids management. The biosolids composting facility would not be visible (that is, behind the liquid storage tanks) to nearby land users, and therefore, the risk of negative community perception is low.
Alternative 4: New Location/New Property	4	Biosolids composting has the potential to receive community support through positive marketing of the product as a green solution (that is, recycling carbon and nutrients) for biosolids management. However, there may be negative perceptions from nearby neighbours. The risk level for negative community perception is uncertain, as the location is unknown.

Note: Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.2.4 Traffic

Traffic impacts were assessed based on traffic volume increases during and post-construction and based on traffic safety. Table 9-19 presents the criterion definition and scoring measure for traffic.

Table 9-19. Definition and Scoring Scale for Traffic

Criterion	How Will This Criterion be Measured?	Scoring Scale
Traffic	Based on the increase in trucks for construction and/or operation to cause impacts to traffic. (Note: Regardless of siting, biosolids composting is expected to reduce overall traffic impacts compared to the Region's current program (haulage and land application) because it eliminates haulage of biosolids over long distances outside the region, as previously demonstrated in the Feasibility Study (Jacobs, 2020).)	5 – The alternative site will result in the least impacts to local traffic. 3 – The alternative site will result in moderate impacts to local traffic. 1 – The alternative site will result in the highest impacts to local traffic (for example, increase the need for hauling).

Table 9-20 presents the evaluation score and rationale provided to each alternative site for traffic.

Table 9-20. Scores and Rationales for Traffic

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	5	The alternative would reduce truck traffic out of the BMC, as liquid biosolids would be dewatered and composted onsite and not hauled as liquid from the BMC for land application. The traffic reduction would be approximately 200 trucks/year at design capacity. It is noted that there is an existing traffic risk related to vehicles entering and leaving the BMC with no traffic light at Regional Road 25 and Johnson Way.
Alternative 2: BMC Parcel 5	5	The alternative would reduce truck traffic out of the BMC, as liquid biosolids would be dewatered and composted on site and not hauled as liquid from the BMC for land application. The traffic reduction would be approximately 200 trucks/year at design capacity. It is noted that there is an existing traffic risk related to vehicles entering and leaving the BMC with no traffic light at Regional Road 25 and Johnson Way.
Alternative 3: BMC Parcel 8	5	The alternative would reduce truck traffic out of the BMC, as liquid biosolids would be dewatered and composted onsite and not hauled as liquid from the BMC for land application. The traffic reduction would be approximately 200 trucks/year at design capacity. It is noted that there is an existing traffic risk related to vehicles entering and leaving the BMC with no traffic light at Regional Road 25 and Johnson Way.
Alternative 4: New Location/New Property	3	The alternative would reduce truck traffic out of the BMC, as liquid biosolids would be dewatered on site and not hauled as liquid from the BMC for land application. Dewatered biosolids would be hauled to the new site, however, the volume would be much lower compared to hauling liquid biosolids. The traffic reduction at the BMC would be approximately 3,000 trucks/year at design capacity. Traffic will be introduced to the new site. It is assumed that the new site will be located on a road that is compatible with the expected traffic and there would be a low traffic safety risk for users, although the traffic may contribute to road congestion along the route.

9.3.2.5 Archaeological Resources

A Stage 1 Archaeological Study was completed for each alternative site to identify potential impacts to archaeological resources. The evaluation for this criterion was based on the results of this study. Table 9-21 presents the criterion definition and scoring measure for archaeological resources.

Table 9-21. Definition and Scoring Scale for Archaeological Resources

Criterion	How Will This Criterion be Measured?	Scoring Scale
Archaeological Resources	Based on the potential archaeological resources identified at the alternative site.	5 – The site has no known archaeological resources and/or low potential to contain archaeological resources. 3 – The site has some known archaeological resources and/or contains moderate potential for archaeological resources. 1 – The site has a substantial amount of known archaeological resources and/or contains high potential for archaeological resources.

Table 9-22 presents the evaluation score and rationale provided to each alternative site for archaeological resources.

Table 9-22. Scores and Rationales for Archaeological Resources

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	A Stage 1 Archaeological Assessment was completed for this site and did not identify any known archaeological resources. A Stage 2 Archaeological Assessment will be required during detailed design based on the areas that were identified to have archaeological potential.
Alternative 2: BMC Parcel 5	3	A Stage 1 Archaeological Assessment was completed for this site and did not identify any known archaeological resources. A Stage 2 Archaeological Assessment will be required during detailed design based on the areas that were identified to have archaeological potential.
Alternative 3: BMC Parcel 8	3	A Stage 1 Archaeological Assessment was completed for this site and did not identify any known archaeological resources. A Stage 2 Archaeological Assessment will be required during detailed design based on the areas that were identified to have archaeological potential.
Alternative 4: New Location/New Property	2	It is assumed that the site would have no known archaeological resources, however, some uncertainty exists. A Stage 2 Archaeological Assessment would likely be required during design for confirmation. A score of 2 was given for this alternative due to uncertainty.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.2.6 Cultural Heritage Resources

A Cultural Heritage Screening Checklist was completed for each alternative site to identify potential impacts to cultural heritage resources. The evaluation for this criterion was based on the results of this screening. Table 9-23 presents the criterion definition and scoring measure for cultural heritage resources.

Table 9-23. Definition and Scoring Scale for Cultural Heritage Resources

Criterion	How Will This Criterion be Measured?	Scoring Scale
Cultural Heritage Resources	Based on the existing cultural heritage resources (for example, traditional use sites, historic buildings and artifacts, heritage trails)	5 – The site has no known cultural heritage resources/no cultural heritage resources will be impacted during construction and/or operation of the proposed biosolids composting facility. 3 – The site contains or is in proximity to known cultural heritage resources; however, construction and/or operation of the proposed biosolids composting facility will not impact existing resources. 1 – The site contains cultural heritage resources/cultural heritage resources will be impacted during construction and/or operation of the proposed biosolids composting facility

Table 9-24 presents the evaluation score and rationale provided to each alternative site for cultural heritage resources.

Table 9-24. Scores and Rationales for Cultural Heritage Resources

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	5	The site has no known cultural heritage resources/no cultural heritage resources will be impacted during construction and/or operation of the proposed biosolids composting facility.
Alternative 2: BMC Parcel 5	5	The site has no known cultural heritage resources/no cultural heritage resources will be impacted during construction and/or operation of the proposed biosolids composting facility.
Alternative 3: BMC Parcel 8	5	The site has no known cultural heritage resources/no cultural heritage resources will be impacted during construction and/or operation of the proposed biosolids composting facility.
Alternative 4: New Location/New Property	4	It is assumed that the site would have no known cultural heritage resources/no cultural heritage resources will be impacted during construction and/or operation of the proposed biosolids composting facility. However, some uncertainty exists, so a score of 4 was given for this alternative.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.2.7 Weighted Scores for Social/Cultural Environment

Table 9-25 presents a summary of the weighted scores for the social/cultural environment criteria, which are presented as scores out of the total social/cultural environment category score of **40.0.** Alternative 3 (BMC Parcel 8) received the highest overall score in the social/cultural environment category.

Table 9-25. Summary of Weighted Scores for Social/Cultural Environment Criteria

Category	Alternative 1 BMC Parcel 4	Alternative 2 BMC Parcel 5	Alternative 3 BMC Parcel 8	Alternative 4 New Location
Noise	4.0	5.3	6.7	5.3
Odour	5.0	6.7	8.3	6.7
Level of Social Acceptance	4.0	5.3	6.7	5.3
Traffic	5.0	5.0	5.0	3.0
Archaeological Resources	4.0	4.0	4.0	2.7
Cultural Heritage Resources	6.7	6.7	6.7	5.3
Total	28.7	33.0	37.4	28.3

9.3.3 Technical Environment

This section presents the evaluation for technical criteria.

9.3.3.1 O&M Complexity

O&M complexity was assessed based on whether operation was required across multiple sites or not. Complexity is increased when operations are at multiple sites rather than at one site. Table 9-26 presents the criterion definition and scoring measure for O&M complexity.

Table 9-26. Definition and Scoring Scale for O&M Complexity

Criterion	How Will This Criterion be Measured?	Scoring Scale
O&M complexity	The complexity of O&M requirements at the site (for example, need to manage operations at different sites)	5 – The alternative involves all operations at one location to minimize O&M complexity (for example, single parcel at BMC). 3 – The alternative involves operations at different locations within a site (for example, combination of parcels within BMC), which can introduce additional O&M complexity. 1 – The alternative involves operations at multiple locations that result in the highest O&M complexity (for example, generic new location, with liquid biosolids dewatering at BMC then hauled to the new site for composting, as well as bulking agents hauled to the new site from an external source)

Table 9-27 presents the evaluation score and rationale provided to each alternative site for O&M complexity.

Table 9-27. Scores and Rationales for O&M Complexity

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	Biosolids dewatering and composting would be located on the same site, which would require transportation within the BMC site and represents the least complex O&M. Bulking agents must be hauled to the BMC.
Alternative 2: BMC Parcel 5	3	Biosolids dewatering and composting would be located on the same site, which would require transportation within the BMC site and represents the least complex O&M. Bulking agents must be hauled to the BMC.
Alternative 3: BMC Parcel 8	3	Biosolids dewatering and composting would be located on the same site, which would require transportation within the BMC site and represents the least complex O&M. Bulking agents must be hauled to the BMC.
Alternative 4: New Location/New Property	1	This alternative represents the highest O&M complexity due to operations at multiple locations. Liquid biosolids must be dewatered at the BMC and hauled to the new site for composting. Bulking agents must be hauled to the new site.

9.3.3.2 Construction Complexity

Construction complexity was assessed based on the construction methods, phasing requirements and mitigation measures required due to site conditions, and the amount of additional infrastructure required to service the proposed biosolids composting facility. Table 9-28 presents the criterion definition and scoring measure for construction complexity.

Table 9-28. Definition and Scoring Scale for Construction Complexity

Criterion	How Will This Criterion be Measured?	Scoring Scale
Construction complexity	The ability for the proposed biosolids composting facility to be constructed (for example, ease of construction, construction techniques, servicing requirements such as roads and utilities)	5 – The site does not require any complex construction techniques and routine construction methods can be implemented with ease including connecting to existing services (for example, water, power). 3 – The proposed biosolids composting facility can be constructed at the site with routine methods and may require a few new connections for services. 1 – Construction of the proposed biosolids composting facility requires complex construction techniques and methods, and requires new connections to all required services.

Table 9-29 presents the evaluation score and rationale provided to each alternative site for construction complexity.

Table 9-29. Scores and Rationales for Construction Complexity

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	2	Construction will mainly occur on agricultural land. Special construction methods may be required to protect the pipeline easement (for example, sheet piling for foundation construction). There is an access road adjacent to the site that is suitable for truck traffic. Water and wastewater servicing connections are available adjacent to the site. The topography is relatively flat, and it is assumed that geotechnical conditions will not require special construction methods. A stormwater management pond is required. Overall, construction is expected to be moderately complex.
Alternative 2: BMC Parcel 5	1	Construction will mainly occur on agricultural land and through woodlands. A new access road is required through the BMC Woodlot to Parcel 5, which will require tree removal and additional environmental protection. Nearby wetlands will also require protection, increasing construction complexity. Water and wastewater servicing connections are available at the BMC and would require new conveyance infrastructure along the new access road. The topography is relatively flat and it is assumed that geotechnical conditions will not require special construction methods. A stormwater management pond is required. Overall, construction is expected to be complex due to the overall scope (tree removal and installations) with the potential for extensive mitigation measure requirements.
Alternative 3: BMC Parcel 8	1	Construction will mainly occur on agricultural land and will require standard construction techniques and mitigation measures. SWM pond modifications are necessary to provide space for the composting facility. Construction phasing will be highly complex due to footprint restrictions and the need to keep the SWM pond in service at all times. A water servicing connection is available at the site. A wastewater servicing connection is available via a pumping station and forcemain, however, capacity will need to be confirmed. The topography is relatively flat and grading modifications may be required to accommodate a new or modified SWM pond. It is assumed that geotechnical conditions will not require special construction methods. Overall, construction is expected to be complex due to footprint restrictions and construction phasing requirements.
Alternative 4: New Location/New Property	3	The site would be selected so that construction would not be complex and would likely only require standard construction techniques and mitigation measures. However, there is some risk of complex construction requirements as the site is unknown. A new access road network would likely be required within the site. It is assumed that decentralized water and wastewater servicing would be required for this site. It is assumed that the topography would be relatively flat and it is assumed that geotechnical conditions will not require special construction methods. A stormwater management pond is required.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.3.3 Compatibility with Existing Facilities and Operations

Compatibility with existing facilities and operations was assessed based on the ability for the biosolids composting facility to be integrated into the alternate site with minimal interruptions to operations, as well as the synergies associated with existing facilities at each site. Table 9-30 presents the criterion definition and scoring measure for compatibility with existing facilities, operations and infrastructure onsite.

Table 9-30. Definition and Scoring Scale for Compatibility with Existing Facilities and Operations

Criterion	How Will This Criterion be Measured?	Scoring Scale
Compatibility with existing facilities and operations	The ability for the site to be compatible with existing process operations and its ability to integrate within an existing site (for example, synergies with existing operations at BMC).	5 – The site is very compatible and compliments current operations; it can be integrated into current site operations with minimal impacts. 3 – The site is somewhat compatible and complimentary to current processes; it can be integrated; but will have some impacts. 1 – The site is not compatible or complimentary to current processes.

Table 9-31 presents the evaluation score and rationale provided to each alternative site for compatibility with existing facilities and operations.

Table 9-31. Scores and Rationales for Compatibility with Existing Facilities and Operations

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	The alternative has moderate compatibility with current operations. Dewatered biosolids are available onsite for composting and must be transported between the dewatering facility and composting facility using FELs or trucks via Johnson Way, which is also used to deliver liquid biosolids to the BMC for dewatering or storage. Bulking agents must be trucked to site. No new roads are required within the BMC site.
Alternative 2: BMC Parcel 5	2	The alternative has moderate to low compatibility with current operations. Dewatered biosolids are available onsite for composting and must be transported between the dewatering facility and composting facility using FELs or trucks. Bulking agent storage would be located at a different parcel, which would increase travel distances within the site. Bulking agents must be trucked to site. A new access road to Parcel 5 is also required within the BMC site.
Alternative 3: BMC Parcel 8	3	The alternative has moderate compatibility with current operations. Dewatered biosolids are available on site for composting and must be transported between the dewatering facility and composting facility using FELs or trucks via the internal road network around the storage domes. These trucks/FELs would use the same roads used by trucks delivering liquid biosolids to the BMC, which may result in operational challenges due to internal traffic. Bulking agents must be trucked to site. No new roads are required within the BMC site.

Site Alternatives	Score	Rationale
Alternative 4: New Location/New Property	2	The alternative has a low degree of compatibility with current operations. Liquid biosolids must first be hauled to the BMC for dewatering and then hauled to the new site for composting. Bulking agents must be trucked to site. A new road network is required at the site to facilitate truck access.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.3.4 Flexibility to Accommodate Potential Future Region Land Use

Flexibility to accommodate potential future Region land use was assessed based on the availability for future biosolids composting expansion (or other processes as required by the Region) within each alternative site post-biosolids composting facility construction. Table 9-32 presents the criterion definition and scoring measure for flexibility to accommodate potential future Region land use.

Table 9-32. Definition and Scoring Scale for Flexibility to Accommodate Potential Future Region Land Use

Criterion	How Will This Criterion be Measured?	Scoring Scale
Flexibility to accommodate potential future Region land use	The ability for the site to accommodate future Region land use (for example, capacity expansion for biosolids management).	5 – The site can be easily designed with provisions to accommodate potential future land use (for example, space available to allow for future expansion of biosolids composting facility while not affecting other site operations). 3 – The site can be designed with provisions to accommodate potential future land use, with some impacts to existing operations (for example, space available to allow for future expansion of biosolids composting facility but will affect or limit future expansion of other site operations). 1 – The site has limited flexibility to accommodate potential future land use or will result in significant changes to existing operations (for example, space not available for future expansion of biosolids composting facility and/or will affect or limit future expansion of other site operations).

Table 9-33 presents the evaluation score and rationale provided to each alternative site for flexibility to accommodate potential future Region land use.

Table 9-33. Scores and Rationales for Flexibility to Accommodate Potential Future Region Land Use

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	2	The composting facility would be located on Parcel 4. This parcel has little to no additional space for future expansion of the biosolids composting facility due to site constraints caused by the Enbridge pipeline easement. Parcels 1-3 are adjacent and were not shortlisted for biosolids composting but could be used for facilities with low/no odour potential (that is, offices). The alternative is not expected to limit future BMC operations. Future expansion of liquid biosolids storage capacity is not expected.
Alternative 2: BMC Parcel 5	2	The composting facility would be located on Parcel 5, which has limited space for future expansion. The alternative is not expected to limit future BMC operations. Future expansion of liquid biosolids storage capacity is not expected.
Alternative 3: BMC Parcel 8	3	The composting facility would be located on Parcel 8. While there is no space for expansion within Parcel 8, there is potential for removal of the liquid biosolids storage tanks to create space for expansion, or purchasing adjacent land parcels. The alternative is not expected to limit future BMC operations. Future expansion of liquid biosolids storage capacity is not expected.
Alternative 4: New Location/New Property	4	The site would be selected so that it has space available for future expansion. The alternative would not be expected to impact BMC operations. However, there is some uncertainty as the site location is unknown.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.3.5 Weighted Scores for Technical Environment

Table 9-34 presents a summary of the weighted scores for the technical criteria, which are presented as scores out of the total technical category score of **21.7.** Alternative 1 (BMC Parcel 4) received the highest overall score in the technical category.

Table 9-34. Summary of Weighted Scores for Technical Criteria

Category	Alternative 1 BMC Parcel 4	Alternative 2 BMC Parcel 5	Alternative 3 BMC Parcel 8	Alternative 4 New Location
O&M complexity	4.0	4.0	4.0	1.3
Construction complexity	2.0	1.0	1.0	3.0
Compatibility with existing facilities and operations	4.0	2.7	4.0	2.7
Flexibility to accommodate potential future Region land use	1.3	1.3	2.0	2.7
Total	**11.3**	**9.0**	**11.0**	**9.7**

9.3.4 Legal/Jurisdictional Environment

This section presents the evaluation for legal/jurisdictional criteria.

9.3.4.1 Land Acquisition

The land acquisition criterion was assessed based on whether the Region would be required to purchase land at an alternative site and if so, the degree of complexity associated with land acquisition. Table 9-35 presents the criterion definition and scoring measure for land acquisition.

Table 9-35. Definition and Scoring Scale for Land Acquisition

Criterion	How Will This Criterion be Measured?	Scoring Scale
Land acquisition	The site requires the acquisition of new land.	5 – The site does not require the acquisition of new land/the site is located on land already owned or leased by the Region. 3 – Land acquisition is required for the site; however, purchase and title transfer are anticipated to be simple. Or Region-owned property currently leased by others but can be returned to the Region. 1 – Land acquisition is required for the site and purchase and title transfer are anticipated to require substantial planning and process requirements.

Table 9-36 presents the evaluation score and rationale provided to each alternative site for land acquisition.

Table 9-36. Scores and Rationales for Land Acquisition

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	5	The alternative is located on a Region-owned property and land acquisition is not required
Alternative 2: BMC Parcel 5	5	The alternative is located on a Region-owned property and land acquisition is not required
Alternative 3: BMC Parcel 8	5	The alternative is located on a Region-owned property and land acquisition is not required
Alternative 4: New Location/New Property	1	Land acquisition is required for this alternative. The location is undetermined, and the search, consultation, approval and acquisition of a new site would have a significant impact on the implementation schedule.

9.3.4.2 Permits and Approvals

The permits and approvals criterion was assessed based on the degree of complexity associated with obtaining the necessary permits and approvals for each alternative site. Table 9-37 presents the criterion definition and scoring measure for permits and approvals.

Table 9-37. Definition and Scoring Scale for Permits and Approvals

Criterion	How Will This Criterion be Measured?	Scoring Scale
Permits and approvals	The ability of the alternative to be approved with minimal, if any, conditions and/or obtain permits and approvals within an appropriate amount of time.	5 – The alternative can be readily approved/requires routine permits and approvals. 3 – The alternative can be approved with minimal conditions. 1 – The alternative can be approved with substantial or onerous conditions (for example, Species at Risk Act permit).

Table 9-38 presents the evaluation score and rationale provided to each alternative site for permits and approvals.

Table 9-38. Scores and Rationales for Permits and Approvals

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	A new ECA (or ECA amendment) would be required for the BMC site. The alternative site is located within many special policy areas, is regulated by CH but is not expected to encounter species at risk. A permit for construction would be required from CH. Given the current land use (agricultural), additional permits related to species at risk (SAR) (that is, timing windows) are not expected to be required. The permit for construction may have some conditions but they are not expected to be substantial or onerous. Permits are expected to be received within a reasonable amount of time.
Alternative 2: BMC Parcel 5	1	A new ECA (or ECA amendment) would be required for the BMC site. The alternative site is located within many special policy areas, is regulated by CH and is likely to encounter SAR in the woodland area. A permit for construction would be required from CH and additional permits related to SAR (that is, timing windows) are expected to be required, which will be confirmed through field studies. Permitting is likely to have substantial or onerous conditions based on the likelihood for requirements related to SAR protection. Permits may require an extended period of time for approval.
Alternative 3: BMC Parcel 8	3	A new ECA (or ECA amendment) would be required for the BMC site. The alternative site is located within many special policy areas, is regulated by CH but is not expected to encounter species at risk. A permit for construction would be required from CH. Given the current land use (agricultural), additional permits related to SAR (that is, timing windows) are not expected to be required. The permit for construction may have some conditions but they are not expected to be substantial or onerous. Permits are expected to be received within a reasonable amount of time.

Site Alternatives	Score	Rationale
Alternative 4: New Location/New Property	2	A new ECA would be required for the site. The alternative site is likely to be in special policy areas and could potentially be regulated by CH. Therefore, a permit for construction from CH may be required. Given the likely land use type (agricultural), additional permits related to SAR (that is, timing windows) are not expected to be required. However, there is some risk, given that the site location is unknown. The permit for construction may have some conditions but they are not expected to be substantial or onerous. Permits are expected to be received within a reasonable amount of time.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

9.3.4.3 Weighted Scores for Legal/Jurisdictional Environment

Table 9-39 presents a summary of the weighted scores for the legal/jurisdictional criteria, which are presented as scores out of the total legal/jurisdictional category score of **10.0.** Alternative 1 (BMC Parcel 4) and Alternative 3 (BMC Parcel 8) received the highest overall scores in the legal/jurisdictional category.

Table 9-39. Summary of Weighted Scores for Legal/Jurisdictional Criteria

Category	Alternative 1 BMC Parcel 4	Alternative 2 BMC Parcel 5	Alternative 3 BMC Parcel 8	Alternative 4 New Location
Land acquisition	5.0	5.0	5.0	1.0
Permits and approvals	3.0	1.0	3.0	2.0
Total	8.0	6.0	8.0	3.0

9.3.5 Economic

Economic criteria were assessed based on the relative magnitude of costs between alternatives. Capital costs and lifecycle O&M costs were developed for each alternative using the methodology presented in Section 8.4.2, but were found to be non-differentiating. Table 9-40 presents the criteria definitions and scoring measures for the economic criteria.

Table 9-40. Definition and Scoring Scale for Economic Criteria

Criterion	How Will This Criterion be Measured?	Scoring Scale
Capital Cost	The relative capital costs compared to other alternative sites.	5 – The site has a low relative capital cost. 3 – The site has a moderate relative capital cost. 1 – The site has a high relative capital cost.
Lifecycle O&M Cost	The relative lifecycle O&M costs compared to other alternative sites.	5 – The site has a low relative O&M cost. 3 – The site has a moderate relative O&M cost. 1 – The site has a high relative O&M cost.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

Table 9-41 and Table 9-42 present the scoring and rationales for capital cost and lifecycle cost, respectively.

Table 9-41. Scores and Rationales for Capital Cost

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	The capital cost for this alternative is expected to be similar to other alternatives, with some site-specific requirements (that is, easement protection) that will result in small cost differences.
Alternative 2: BMC Parcel 5	3	The capital cost for this alternative is expected to be similar to other alternatives, with some site-specific requirements (that is, access road) that will result in small cost differences.
Alternative 3: BMC Parcel 8	3	The capital cost for this alternative is expected to be similar to other alternatives, with some site-specific requirements (that is, SWM pond modifications) that will result in small cost differences.
Alternative 4: New Location/New Property	2	The capital cost for this alternative is expected to be similar to other alternatives. However, there is uncertainty associated with site-specific requirements and land acquisition costs that resulted in a score of 2 for this alternative.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

Table 9-42. Scores and Rationales for Lifecycle O&M Cost

Site Alternatives	Score	Rationale
Alternative 1: BMC Parcel 4	3	The O&M costs for this alternative are expected to be similar to other alternatives, with minor differences due to haulage distance.
Alternative 2: BMC Parcel 5	3	The O&M costs for this alternative are expected to be similar to other alternatives, with minor differences due to haulage distance.
Alternative 3: BMC Parcel 8	3	The O&M costs for this alternative are expected to be similar to other alternatives, with minor differences due to haulage distance.
Alternative 4: New Location/New Property	2	The O&M costs for this alternative are expected to be similar to other alternatives. However, there is uncertainty associated with haulage distance requirements that resulted in a score of 2 for this alternative.

Note:

Intermediate scores (2/4) were assigned if appropriate, based on input from the Region and rationales are documented.

Table 9-43 presents a summary of the weighted scores for the economic criteria, which are presented as scores out of the total economic category score of **6.7**. Alternative 1 (BMC Parcel 4), Alternative 2 (BMC Parcel 5) and Alternative 3 (BMC Parcel 8) received the highest overall scores in the economic category.

Table 9-43. Summary of Weighted Scores for Economic Criteria

Category	Alternative 1 BMC Parcel 4	Alternative 2 BMC Parcel 5	Alternative 3 BMC Parcel 8	Alternative 4 New Location
Capital Cost	2.0	2.0	2.0	1.3
Lifecycle Cost	2.0	2.0	2.0	1.3
Total	4.0	4.0	4.0	2.6

9.3.6 Summary of Evaluation Results

Table 9-44 presents a summary of the evaluation results.

Table 9-44. Evaluation Results - Biosolids Composting Alternatives

Component	Alternative 1 BMC Parcel 4	Alternative 2 BMC Parcel 5	Alternative 3 BMC Parcel 8	Alternative 4 New Location
Natural Environment	16.3	12.3	17.6	13.3
Social/Cultural Environment	28.7	33.0	37.4	28.3
Technical Environment	11.3	9.0	11.0	9.7
Legal/Jurisdictional Environment	8.0	6.0	8.0	3.0
Economic	4.0	4.0	4.0	2.6
Total	68.3	64.3	78.0	56.9
Rank	2	3	1	4

Alternative 3 (BMC Parcel 8) was selected as the preferred location for the proposed biosolids composting facility, based on the comprehensive evaluation results. Locating the biosolids composting facility at BMC Parcel 8 has the least potential impacts with respect to the natural and social/cultural environments compared to other alternatives. Key factors associated with Alternative 3 (BMC Parcel 8) that informed the evaluation results include the following:

- The existing site consists of open field with some trees and does not fall within any special policy areas, meaning that impacts to the natural environment are expected to be minimal.
- Only standard construction techniques and mitigation measures are expected.
- BMC Parcel 8 is furthest from nearby sensitive receptors (place of worship, residences), meaning that it is expected to have the lowest odour and noise impacts. These factors also decrease the risk of a negative community perception.
- There is flexibility for future process expansion if the Region elects to remove one or more of the existing liquid biosolids storage tanks.

10. Consultation and Engagement

This section discusses consultation and engagement activities.

10.1 Engagement with Indigenous Communities and First Nations

Halton Region acknowledges the Treaty Lands of the Mississaugas of the Credit First Nation as well as the Traditional Territory of the Haudenosaunee, Huron-Wendat and Anishinabek on which the Study was conducted. Engagement with Indigenous Communities and First Nations in the Class EA process is important to understand traditional knowledge of the lands throughout the past, in the present, and into the future. Indigenous Communities and First Nations were engaged about this project based on their interests and/or potential impacts related to established or asserted rights through guidance and support from Halton Region's Indigenous Relations team.

Throughout the project, Indigenous Communities and First Nations were encouraged to identify interests in the preferred location for a Halton Region-owned biosolids composting facility, and to understand how potential adverse effects of the proposed facility can be prevented or mitigated.

The following Indigenous Communities and First Nations were identified as potentially having an interest in the Study:

- Mississaugas of the Credit First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council
- Métis Nation of Ontario
- Credit River Métis Council
- Grand River Métis Council
- Huron-Wendat Nation

The Region's project team led engagement and communications activities with Indigenous Communities and First Nations. Notices were distributed at each point of consultation during the study and individual meetings were held when requested. Table 10-1 presents a summary of Indigenous Communities and First Nations engagement activities that occurred during this study.

Table 10-1. Indigenous Communities and First Nations Consultation and Engagement Summary

Point of Consultation	Date	Engaged Communities
Notice of Study Commencement	August 4, 2022	All
Introductory Meeting	September 16, 2022	Six Nations of the Grand River
Notice of Public Information Centre	March 28, 2024	All
Introductory Meeting	April 19, 2024	Mississaugas of the Credit First Nation
Stage 1 Archaeological Assessment and Natural Environment Report Review	July-September 2024	All
Notice of Completion	To Be Determined	All

The key areas of interest during these consultation and engagement activities were related to the Stage 1 Archaeological Assessment outcomes, and the potential impacts and associated mitigation measures for the project.

A Stage 2 Archaeological Assessment was recommended for the site and the Indigenous Communities and First Nations will continue to be consulted during these activities, which will occur during the design phase that will be initiated following completion of this MCEA study.

Feedback was also provided for the potential impacts and associated mitigation measures that are discussed in Section 11, primarily related to surveying activities and additional mitigation measures that could be implemented. This feedback was incorporated into this MCEA study where applicable, and the Region will continue to consult with Indigenous Communities and First Nations regarding environmental impacts and mitigation measures throughout the life of the project. The environmental management plan for this project will continue to be developed throughout the life of the project considering input from all stakeholders, Indigenous Communities and First Nations as the project scope is further defined through the planning, design and construction phases.

10.2 Project Mailing List

A project mailing list was developed at the onset of the project which includes stakeholders from relevant government agencies, Indigenous Communities and First Nations community representatives, and interested members of the public. The mailing list was maintained and updated throughout the study.

Government agencies represent the policy position of respective departments, ministries or agencies, including federal, provincial, and municipal agencies.

The following review agencies were included on the project mailing list:

- Environment and Climate Change Canada
- Ministry of Environment, Conservation and Parks
- Ministry of Northern Development
- Ministry of Mines
- MNRF
- Ministry of Heritage, Sport, Tourism and Culture (staff later transferred to the Ministry of Citizenship and Multiculturalism)
- CH
- Niagara Escarpment Commission

Municipal contacts included:

- Halton Region (internal departments)
- Regional and Municipal Council and Mayors
    - City of Burlington
    - Town of Halton Hills
    - Town of Milton
    - Town of Oakville
- Municipal Departments

Public and other project stakeholders on the project mailing list included individual members of the general public representing residents, businesses, and institutions; representatives from community and special interest groups; and local utilities. The project mailing list is presented in Appendix C.

10.3 Notice of Study Commencement

Project notices were used to raise awareness of the project and inform the community of an opportunity to provide input, as required under Phase 1 of the MCEA Process. Notices were used to provide a clear overview of the project rationale, objectives, and description of the process; to advise the community where to find project updates and an invitation to participate; and to provide contact information for the study project team.

A Notice of Study Commencement was distributed and published at the onset of the project. The notice was sent via e-mail and/or regular mail to individuals and organization representatives included on the project mailing list, posted on the project's webpage and various social media streams, and published as newspaper advertisements in the local newsprint. The Notice of Study Commencement is presented in Appendix C.

10.4 Project Webpage

A dedicated project webpage was created and maintained by Halton Region on halton.ca throughout the course of the study. The project webpage (https://www.halton.ca/For-Residents/Roads-Construction/Municipal-Class-Environmental-Assessment-Studies/Biosolids-Composting-Facility-Study) included links to project materials including notices, PIC materials, surveys, and the Project File Report. The webpage serves as the central hub for sharing information with the public and stakeholders. A project post was also created for the Region's *Opportunities to Participate* webpage, highlighting the opportunities to provide feedback on the project.

10.5 Public Information Centre

One PIC was held as part of the study using a virtual platform where interested parties could view project material for a 5-week period, from March 28, 2024, to May 2, 2024. Virtual consultation meets the spirit of consultation requirements set out by the MECP while allowing stakeholders and interested parties to participate without being in-person. Stakeholders were notified about the PIC via a Notice of Public Information Centre, which was distributed through emails and/or regular mail. The PIC was also advertised through Google Ads and on various Halton Region social media pages.

The PIC introduced the study, existing conditions, criteria, constraints, opportunities, the long and short lists of alternative locations, the evaluation framework, and the preliminary preferred location for the proposed biosolids composting facility. The PIC included the following:

- Display boards/presentation material
- Downloadable Project Information Sheet
- Survey to collect feedback and facilitate general comments

An online survey was prepared for the PIC to facilitate the exchange of information. The survey used a multiple-choice format for project-related questions and provided users the opportunity to submit general feedback and comments outside of the survey questions.

The following bullets summarize engagement statistics for the virtual PIC:

- Over 900 users visited the project PIC webpage.
- 13 users completed surveys.

The project team developed responses to survey questions in a questions-and-answers format where required. PIC consultation materials are presented in Appendix C.

10.6 Advertisements

Traditional and social media methods were used to advertise Study information. Advanced notice of Study milestones (for example, study commencement, PIC, study completion) were published in newspapers and advertised on Halton Region social media pages (Facebook, Twitter, Instagram, etc.) to encourage users to visit the Study webpage and participate in the Study.

10.7 Notice of Completion

As part of Phase 2 of the MCEA Process, a Notice of Completion was distributed to advertise/announce the completion of the Study and Project File Report and commence the 30-day public review/comment period. The notice will include provisions to request an order under section 16 of the Ontario Environmental Assessment Act. A Section 16 Order may be requested if there are outstanding concerns that a project going through a Class EA process may have potential adverse impact(s) on constitutionally protected Aboriginal and treaty rights.

If no request for a Section 16 Order is received within the review/comment period, Halton Region can proceed to implement the project based on the preferred solution.

10.8 How the Preferred Solution Incorporated Engagement Feedback

The project team received feedback at key stages of the study and identified the following common themes:

- **Proximity to the public and associated noise and odour impacts.** Feedback received through engagement activities indicated that there are concerns about potential noise and odour impacts to the public resulting from the proposed biosolids composting facility.
- **Product interest from local agricultural uses.** Several survey respondents indicated interests in the composting process, the final product characteristics (quality, quantity), and impacts to the Region's current compost pickup program at the HWMS.

The feedback was incorporated into the study as follows:

- **Evaluation Framework:** Noise and odour impacts were considered during the evaluation process and these criteria received high weightings relative to other criteria, reflecting their importance in the overall decision-making process.
- **Site Alternative Development and Evaluation:** Site alternatives were selected with a goal of minimizing impacts to the public. The BMC is an active biosolids management facility, so siting the biosolids composting facility at this location would minimize impacts relative to other potential locations in the Region. Relevant guidelines for minimum separation distance between the biosolids composting facility and other private/public facilities were considered and these requirements can be met. The biosolids composting facility will include an odour control process that collects and treats odorous air before it is released. Odour dispersion modelling will be completed to inform the design of the odour treatment facility and minimize the frequency and level of odours on nearby residents and businesses, and will be subject to MECP approval.
- **Next Steps:** A subsequent study will be completed to develop a detailed implementation and phasing plan, and will also include a market assessment considering local end users' feedback on product interest and finished compost storage/distribution requirements.

11. Implementation Plan and Mitigation Measures

This section discusses the implementation plan and mitigation measures.

11.1 Preferred Solution

The preferred solution for the Halton Region Biosolids Composting Facility Municipal Class EA is to construct the biosolids composting facility on BMC Parcel 8 (supplemented with Parcel 7). Figure 11-1 presents an overview of the preferred solution.

The preliminary footprint requirement for the proposed biosolids composting facility is based on the capacity required to compost all of the Region's biosolids through 2051 (conservative). The Region will maintain the ability to land apply liquid biosolids on a seasonal basis, which provides redundancy and flexibility for the Region's overall biosolids management program.

While this footprint represents the ultimate capacity, the Region may implement the facility in multiple phases. The implementation phasing plan will be identified in a subsequent study and will depend on the following factors:

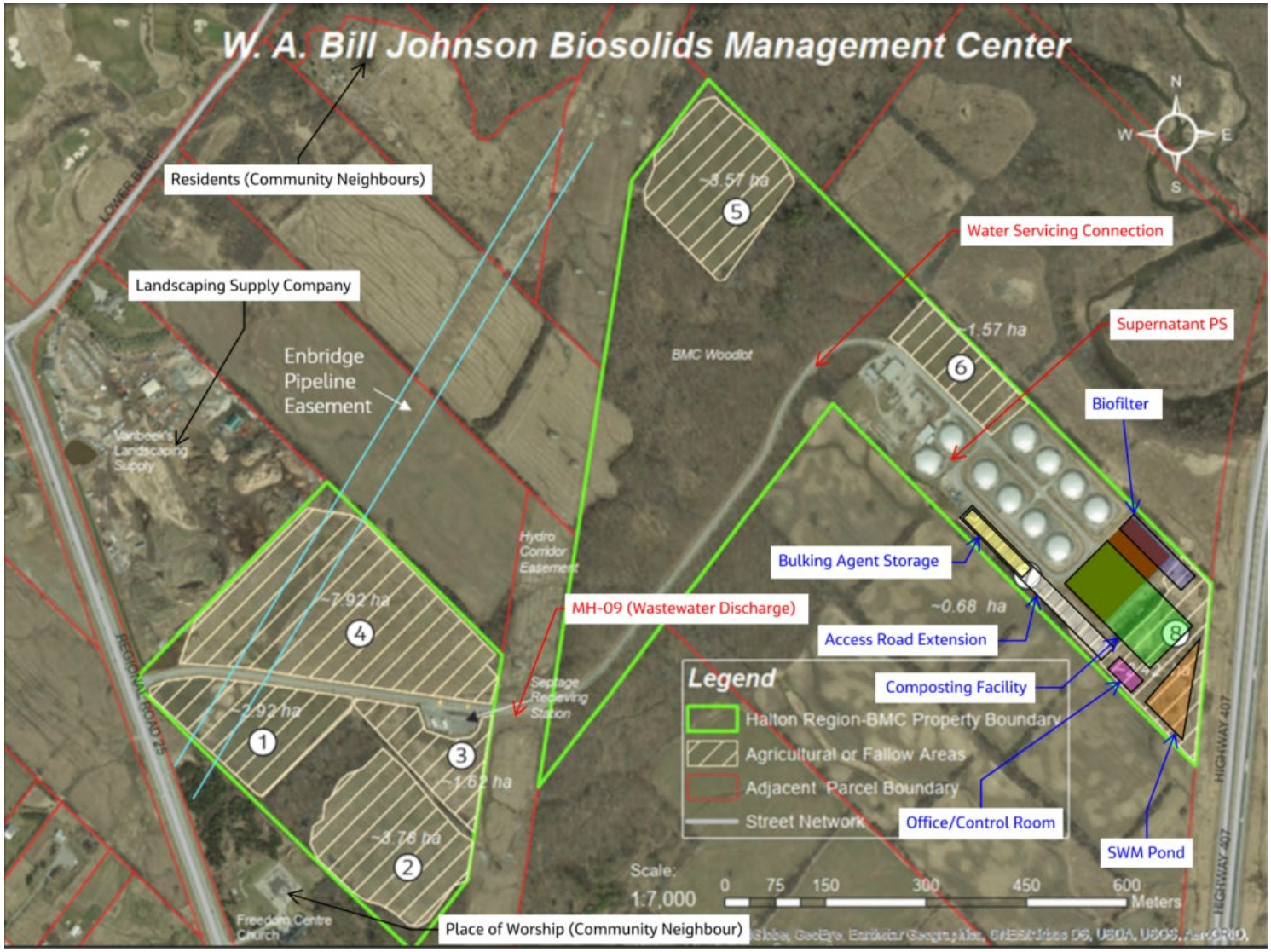
- Biosolids composting facility capital costs and funding/financing availability
- Revised growth projections
- Agricultural land availability for liquid biosolids land application
- Liquid biosolids land application program costs
- Biosolids compost product market assessment

Although the biosolids composting facility will be a greenfield facility, construction should be completed based on the following general sequence:

6. Construct the new stormwater management pond and all associated infrastructure (swales, ditches, stormwater pumping station, storm sewers).
7. Decommission and fill the existing stormwater management pond and associated infrastructure.
8. Construct the new access road and biosolids composting facility.

A detailed construction sequencing plan will be developed during the design phase.

Figure 11-1. Preliminary Site Layout for the Preferred Solution



11.2 Permits and Approvals

Table 11-1 summarizes the permits and approvals anticipated to implement the proposed biosolids composting facility.

Table 11-1. Permits and Approvals

Permitting Agency	Permit
Ministry of Environment, Conservation and Parks	ECA – Waste ECA – Air and Noise
Conservation Halton	Permit under O. Reg. 162/06 [a]
Ministry of Transportation	Controlled Area Permit
Town of Oakville	Site Plan Approval Building Permit Approval
Electrical Safety Authority	Electrical Permit
Halton Region	Services Permit (water and sewer)

Note:

[a] A small portion of BMC Parcel 8 is located within the CH regulated area. However, construction is not expected in this area. CH should be consulted during the design phase to confirm permitting requirements.

11.3 Potential Effects, Benefits, and Mitigation Measures

This section discusses potential effects, benefits, and mitigation measures in terms of the natural environment, as well as social, economic, and cultural environmental considerations.

11.3.1 Natural Environment

The purpose of the impact assessment was to identify potential direct or indirect effects of the proposed biosolids composting facility on natural features and resources within BMC Parcels 7 and 8, and 120 m adjacent land areas. Direct effects, as defined and used in this assessment, are typically associated with the physical removal or alteration of features and resources that could occur during construction (that is, tree and vegetation removal). Indirect effects include changes or effects related to hydrological, noise and disturbance-associated impacts occurring because of the activities being completed as part of the construction scope. While not physically altering or removing any habitats, indirect effects can result in disturbance to, or degradation of, natural features and functions. Indirect effects on natural features and resources could result, for example, from the erosion and movement of soil from the site into nearby forests and watercourses or the accidental introduction of invasive species.

This impact assessment was based on the information gathered from the background data review, existing site conditions, field survey results, and the evaluation of natural features and resources.

Based on the findings, recommendations were developed to avoid or minimize direct and indirect impacts to natural features and resources using mitigation measures and monitoring within the site and in adjacent land, as summarized in Table 11-2.

The following studies and mitigation measures are recommended in addition to those presented in Table 11-2:

- Vegetation removal, grading, and heavy equipment use will only occur within the project footprint where these areas have been previously demarcated and construction works are approved. Silt fencing will be erected, where appropriate.
- A site-specific Erosion and Sediment Control Plan will be developed by a qualified person and updated as required.
- Stockpiled material will be covered to prevent erosion and potential sedimentation into natural features. Staging access areas are planned to be located primarily within existing open and disturbed areas.
- Access and movement of vehicles and equipment will be controlled to limit the introduction and spread of invasive species. Vehicles and equipment will be inspected prior to entering and leaving the construction site, to verify that the equipment is clean and free of invasive species. Equipment will be inspected and used only if it is in good working order, as determined by the contractor.
- A designated and lined refuelling area with appropriate spill containment will be established a minimum of 30 m away from any watercourse. A spill response team member (from the contractor's team) will be appointed as a point of contact in the case of an accident or spill to verify the proper and timely implementation of site response controls as required.
- Absorbent materials and equipment required to control and clean up spills of deleterious substances will be available onsite. Spills and leaks of deleterious substances will be immediately contained and cleaned up in accordance with regulatory requirements and reported immediately to the Ontario Spills Action Centre at 1-800-268-6060, as well as the necessary site contacts (that is, Region project manager).

Table 11-2. Natural Features, SAR, Potential Impacts, Proposed Mitigation Measures, and Environmental Monitoring – BMC Parcels 7 and 8

Project Component	Environmental Component	Potential Impact	Mitigation Measures	Monitoring
Vegetation Communities	Vegetation removal	▪ Removal of vegetation communities may result in loss of habitat. ▪ Damage to adjacent vegetation or ELC communities may occur during construction.	▪ Limit vegetation removal to only what is required for construction. ▪ Disturbed areas will be restored and revegetated using non-invasive, native plantings and seed mix, suitable to the site conditions and surrounding lands after construction is complete. ▪ Topsoil should be stockpiled separately and used for restoration to facilitate natural regeneration of native species. Any stockpiled material exposed for longer than 30 days needs to be temporarily seeded or covered to mitigate erosion. ▪ Install and maintain construction fencing and silt fencing wherever it can prevent or reduce damage to adjacent ELC communities. ▪ Revegetate any temporarily disturbed areas using non-invasive, native plantings and seed mix, suitable to the site conditions and surrounding ELC after construction is complete. ▪ Conduct vegetation removals with consideration for potential impacts to sensitive species (for example, SAR) and features (for example, SWH) and appropriate timing windows. ▪ Tree removals and compensation will need to adhere to Halton Region tree by-law, policies and guidance. ▪ Trees not identified for removal will need to be protected from injury following Halton Region and other relevant guidance including the establishment of tree protection zones. Access routes should be adjusted to minimize impacts to trees. Additionally, root zone compaction protection measures such as wooden matting or mulch can be used to protect tree roots. Pruning, including root pruning, can also be used to retain trees near construction areas. ▪ Tree removals must also adhere to the federal Migratory Birds Convention Act, which recommends that trees and vegetation removal should be planned outside the nesting period from April 1 to August 31 (ECCC, 2020). ▪ Prepare a tree preservation plan to ensure protection of adjacent trees during construction. Demark protection area with high-visibility exclusion fencing. ▪ Contractors should adhere to the Clean Equipment Protocol for Industry (Halloran et al. 2013).	▪ Onsite inspection to confirm implementation of the mitigation measures. Corrective actions, if required, may include additional site maintenance or altering site activities to reduce impact. ▪ Monitoring will be completed as frequently as required by permits and regulatory approvals. ▪ Equipment and machinery onsite should be monitored to prevent the spread of invasive species. ▪ Any tree trimming or pruning required will be completed by a certified arborist.
	Tree removal	▪ Removal of trees may result in loss of habitat. ▪ Damage to adjacent vegetation or ELC communities may occur during construction.	▪ A certified arborist should be onsite during tree removals and management. ▪ Trees are important habitat for migratory birds. Therefore, it is prohibited to remove trees from April 1 to August 31.	▪ Onsite inspection to confirm implementation of the mitigation measures. Corrective actions, if required, may include additional site maintenance or altering site activities to reduce impact.

Project Component	Environmental Component	Potential Impact	Mitigation Measures	Monitoring
Wildlife and Wildlife Habitat	Migratory breeding birds and nests	▪ Disturbance or destruction of migratory bird nests may occur during operational vegetation maintenance activities.	▪ All works should comply with the MBCA and ESA, including timing windows for the nesting period (April 1 to August 31). ▪ Operations will occur outside of the nesting period where feasible. However, if operations or vegetation maintenance activities must occur during the general nesting period, a breeding bird and nest survey should be undertaken before required activities. Nest searches are required and should be completed by a qualified Biologist no more than 48 hours before vegetation removal. ▪ If a nest of a migratory bird is found outside this nesting period (including a ground nest), it may still receive protection. Implement appropriate buffers based on type of nests observed per the MBCA.	▪ During construction, identification by a qualified biologist of any habitats and any potential areas that are being actively used by animals as hibernating ground.
	SAR and SAR Critical Habitat	▪ Disturbance, displacement, or mortality of wildlife, including SAR or damage or destruction of wildlife habitat including SAR critical habitat may occur. ▪ (No SAR, or SAR critical habitat areas were observed during field survey.)	▪ Onsite personnel should be provided with information (for example, factsheets and training) that addresses the existence of potential wildlife including SAR and habitat areas including SAR critical habitat on site, the identification of the SAR species and habitat, and the procedures to follow if an individual is encountered or injured. ▪ Mitigation measures to reduce adverse impacts of project activities on wildlife, including SAR and habitat areas including SAR critical habitat are advised to comply with the ESA. ▪ If SAR were encountered, construction activities in the area should cease immediately, and a qualified Biologist should be contacted. The SAR must be allowed to leave the area on its own accord. Construction activities should not proceed until the SAR is safely away from the area. If the SAR does not leave the area on its own in a timely manner, a qualified Biologist with training in proper handling of SAR may be permitted to relocate the SAR safely away from the construction area. ▪ Any SAR individual that is encountered in the parcel must be reported to the MECP (SAROntario@ontario.ca) within 48 hours of the observation. ▪ Before construction, investigation of the parcel for wildlife, including SAR or habitat areas including SAR critical habitat area that may have established following the completion of previous surveys may be undertaken by a qualified Biologist, as appropriate. ▪ Wildlife and SAR surveys are required at the detailed design stage should the proposed works occur within or abut natural features.	▪ Onsite inspection to confirm implementation of the mitigation measures. Corrective actions, if required, may include additional site maintenance or altering site activities to reduce impact. ▪ Species-specific monitoring activities will be developed in accordance with the registration and permitting requirements under the ESA. ▪ Monitoring activities to reduce adverse impacts of project activities on wildlife, including SAR and habitat areas including SAR critical habitat will comply with the ESA.

Project Component	Environmental Component	Potential Impact	Mitigation Measures	Monitoring
Natural Heritage Features	Regional Natural Heritage System and Greenbelt Natural Heritage System	▪ Disturbance or destruction of areas within the Natural Heritage System during construction.	▪ The Regional Official Plan identifies the Regional Natural Heritage System. These areas of important natural features must be protected in accordance with the restrictions laid out in the Plan and enhanced wherever possible. ▪ The Greenbelt Plan identifies the Greenbelt Natural Heritage System. Development and urbanization in these areas is highly restricted to ensure ecological and hydrological functions are maintained. Development within these parcels and adjacent lands must be completed in accordance with the Greenbelt Plan (2017) and its policies.	▪ Ensure the restrictions and guidelines as laid out in the Regional Official Plan and the Greenbelt Plan are understood early in the design phase. During construction these restrictions and guidelines must be implemented and followed.
	Wetlands, woodlands, and valleylands	▪ Wetlands and valleylands were not identified and will not be impacted. ▪ Woodlands do not occur adjacent to or within the parcels.	▪ Connectivity between natural features through vegetation corridors or patches should be maintained and enhanced if and where possible to ensure plants and animals can move between different features. ▪ Staging and access area size will be minimized and should be planned to be located primarily within existing, open, and disturbed areas. ▪ Vegetation removal should be avoided whenever possible, and if feasible, vegetation removal and grading activities should be scheduled to avoid times of high runoff volumes (spring and fall) to prevent erosion and sedimentation. ▪ Multibarrier measures (that is, silt fencing) should be erected directly adjacent to proposed construction areas if slopes are steep to prevent erosion, and runoff conveyance structures (that is, tile drains and hillside erosion blankets) could also be installed if required. ▪ All work to be contained within the Project Area. At no time shall work extend into the Adjacent Lands.	▪ Ensure design and construction follows the relevant sections of the PPS, the Regional Official Plan, and the Greenbelt Plan. ▪ A qualified site inspector shall perform pre-construction and construction monitoring. ▪ Weekly monitoring shall be conducted by a construction site inspector during construction to confirm disturbances outside of the Project Area are not occurring. If disturbances are observed, activities shall be altered, and affected areas shall be restored as soon as possible.

11.3.2 Social, Economic, and Cultural Environment

Potential effects from the construction and operation of the preferred solution on the social, economic, and cultural environment are generally expected to be negligible and short-term in duration.

The following measures will be taken to mitigate potential impacts to the community from the recommendations, both during and following construction:

- **Community Health and Safety:** Development and construction activities may increase the type and volume of traffic on surrounding roadways (for example, construction vehicles and equipment) or introduce additional hazards to the environment (for example, material spill). Vehicles and equipment used during construction will follow traffic laws and multi-passenger vehicles will be used, when possible, to reduce traffic associated with construction activities.
- **Noise:** Construction noise will be temporary and short-term in nature. A negligible increase in noise at the BMC site is expected during normal operation of the facility. The proposed biosolids composting facility is not expected to result in offsite noise impacts on the surrounding community.
- **Odour:** The distance between the proposed biosolids composting facility and other private/public facilities will exceed the minimum separation per provincial guidelines. The biosolids composting facility will also include an odour control process, which will collect and treat odorous air before it is released. Odour dispersion modelling will be completed to design the odour treatment facility to minimize the frequency and level of odours on nearby residents and businesses, and will be subject to MECP approval. In general, odour impacts on the surrounding community are expected to be negligible.
- **Infrastructure and Services:**
  - **Traffic:** The alternative would reduce truck traffic out of the BMC, as liquid biosolids would be dewatered and composted onsite and not hauled as liquid from the BMC for land application. The traffic reduction would be approximately 200 trucks/year at design capacity. It is noted that there is an existing traffic risk related to vehicles entering and leaving the BMC with no traffic light at Regional Road 25 and Johnson Way. During construction, a small increase in traffic to and from the BMC site is anticipated to transport crews and equipment.
  - **Utilities:** Additional utility connections (water, wastewater) are required for the proposed biosolids composting facility. However, any disruptions from these connections are expected to occur within the BMC site only.
  - **Services:** Construction and operation of the preferred solution is not anticipated to increase demand on local or regional services (for example, emergency or health care services).
- **Viewshed:** Permanent infrastructure changes within the existing site may present a negligible change to the existing viewshed considering these changes will be made within the BMC site adjacent to the existing storage tanks. Ministry of Transportation (MTO) approval is required for upgrades that are visible from provincial roads (that is, Highway 407).
- **Cultural Heritage:** Before a development project can proceed, an archaeological assessment of all lands that are part of the project is required where land has a known archaeological site or the potential to have archaeological sites. A Stage 1 Archaeological Assessment was completed for the study area by Archaeological Research Associates Ltd. (PIF #P007-1449-2023). The Stage 1 Archaeological Assessment Report identified that BMC Parcel 8 is an area of archaeological potential and requires a Stage 2 Archaeological Assessment during the design phase. Construction within a previously disturbed site reduces the potential to uncover archaeological resources during

construction. However, ground disturbance (for example, soil handling, grading) may uncover previously unidentified artifacts. Disturbing these resources in a controlled, scientific excavation is considered an acceptable, and in some cases, the only method to collect in situ information to add to the historic record. The removal of these resources is offset by the recovery of knowledge about the site when catalogued and preserved in compliance with provincial guidelines. In the event an artifact is encountered during construction, work should be suspended, and the Ministry of Tourism, Culture and Sport should be contacted. Construction and Region personnel are not permitted to collect or disturb artifacts in accordance with the Ontario Heritage Act R.S.O. 1990 c 0.18.

The Stage 1 Archaeological Assessment Report identifies the following recommendations and mitigation measures:

- The Stage 1 assessment determined that BMC Parcel 8 is an area of archaeological potential. The assessment results are presented in Map 10 in Appendix B. It is recommended that BMC Parcel 8 be subject to a Stage 2 property assessment in accordance with Section 2.1 of the 2011 S&Gs.
- The grassed areas shown in green (Map 10 in Appendix B) in BMC Parcel 8 must be assessed using the test pit survey method. A survey interval of 5 metres will be required due to the proximity of the lands to the identified features of archaeological potential. Given the likelihood that the grassed areas shown in yellow were previously impacted, a combination of visual inspection and test pit survey should be utilized to confirm the extent of disturbance in accordance with Section 2.1.8 of the 2011 S&Gs. This will allow for the empirical evaluation of the integrity of the soils and the depth of any impacts. If disturbance cannot be confirmed, then a test pit survey interval of 5 m must be maintained.
- Each test pit must be excavated into at least the first 5 centimetres of subsoil, and the resultant pits must be examined for stratigraphy, potential features and/or evidence of fill. The soil from each test pit must be screened through mesh with an aperture of no greater than 6 millimetres and examined for archaeological materials. If archaeological materials are encountered, all positive test pits must be documented, and intensification may be required.

12. References

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