Environmental Assessment Study Report

Eastern Ontario Waste Handling Facility Future Development Environmental Assessment

GFL Environmental Inc.

Moose Creek, Ontario

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Prepared by:

HDR Corporation
100 York Blvd, Suite 300
Richmond Hill, ON L4B 1J8

Acknowledgements

This report has been prepared by:

HDR Corporation
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8

Executive Summary

This report documents the Environmental Assessment (EA) undertaken by GFL Environmental Inc. (GFL) to provide approximately 15.1 million m³ of additional landfill disposal capacity at the existing Eastern Ontario Waste Handling Facility (EOWHF) in accordance with the approved Terms of Reference (ToR) (**Appendix A** of the EA Study Report). The EOWHF Future Development EA was initiated in September 2021 following approval of the ToR by the Minister of Environment, Conservation and Parks in January 2021.

Section 1 – Introduction

The existing EOWHF is located approximately 5 kilometres (km) north-northwest of the village of Moose Creek, Ontario, and 5 km east of the Municipality of Casselman, Ontario, on the western half of Lot 16 and Lots 17 and 18, Concession 10, in the Township of North Stormont within the United Counties of Stormont, Dundas and Glengarry, near the intersection of Highway 417 and Highway 138. The lands to the east of the existing EOWHF being considered for the future development (i.e., the 'future development lands') include the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10. The existing EOWHF encompasses a site area of 189 hectares (ha), while the future development lands comprise approximately 240 ha.

The existing EOWHF landfill was approved under the Ontario *Environmental Assessment Act* (*OEAA*) in 1999 (Stages 1 to 3A) and 2019 (Stages 3B and 4) and is operated by GFL under the Ontario Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) A420018. The total capacity of the existing EOWHF landfill is approximately 11.6 million cubic metres (m³).

The purpose of the proposed undertaking is to provide approximately 15.1 million m³ of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period, with operations anticipated to begin in 2025 and closure anticipated in 2045. The undertaking will enable GFL to continue to provide disposal services for residual non-hazardous solid waste to their customers once the landfill reaches its currently approved disposal capacity and continue to provide economic support to the local community over the long term. No changes to the approved fill rates or site access routes are proposed. The project is planned to be constructed within the existing EOWHF and the future development lands.

Section 2 – Overview of the Environmental Assessment Process and Study Organization

The EA was undertaken in accordance with the requirements for an expanding waste landfill (as identified in Ontario Regulation (O.Reg.) 101/07, Section 4) under the *OEAA*, which are described in **Section 2.2** of the EA Study Report. The EA was conducted in accordance with the ToR dated September 2020, and approved by the Minister of Environment, Conservation and Parks in January 2021 (**Appendix A** of the EA Study Report). The ToR was the first step of a two-step *OEAA* approval process for the proposed undertaking, with the second step being the EA. An overview of the EA process for the EOWHF Future Development EA is provided in **Figure 2-1** of the EA Study Report.

Section 3 – Overview of the Undertaking

The purpose of the undertaking is to provide approximately 15.1 million m^3 of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period. The undertaking will enable GFL to continue to provide disposal services to their customers for residual non-hazardous solid waste once the landfill reaches its currently approved disposal capacity and continue to provide economic support to the local community over the long term. Based upon the historical and forecasted filling rate at the existing landfill, GFL estimates that the landfill will reach its approved capacity in 2025.

Since the original EA approval in 1999, the EOWHF has transformed from a small, local family-owned facility to an important multi-service regional facility serving a broad customer base across Eastern Ontario. The EOWHF provides cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario, including over 500 villages, towns, and cities. GFL has continued to expand its operations into a broad series of waste management services integrated with the EOWHF landfill including:

- providing collection services to residential/municipal and industrial, commercial and institutional (IC&I) waste generators, including collection of recyclables, source separated organics, leaf and yard material, and waste, both at the curb and directly at the EOWHF;
- processing and transfer of recyclables;
- composting of source separated organic material; and
- collection and diversion of used tires and construction and demolition (C&D) waste.

The EOWHF is a well-established business in the local community providing approximately 40 stable, long-term jobs for residents of the area. The on-going operation of the EOWHF allows GFL to provide significant financial contributions to the local economy, through donations to support the local community, by means of a host community agreement and municipal taxes. The Host Community Agreement helps

alleviate tax burdens to local residents, reduces the Township's reliance on residential tax assessment, and offsets net increases in the Township's operating costs associated with residential development.

The continued operation of the EOWHF landfill is integrated with, and critical to, the on-site composting facility by providing efficient access to dispose of non-compostable (mainly residual plastics) materials from the composting process. It also provides convenient access to drop-off programs to divert additional materials from disposal.

GFL has an on-going need to continue operation of the EOWHF landfill for the following reasons:

- GFL can continue to provide its customer base with an integrated set of services including collection, transfer, processing (recycling and composting) and disposal in a reliable and cost effective manner;
- long-term contractual obligations to municipalities across Ontario can be honoured and fulfilled;
- the Province's waste diversion programs and objectives are and will continue to be supported; and
- the environmental impacts of Greenhouse Gas (GHG) emissions will be minimized through:
    - reducing the number of waste related trucks hauling material long distances;
    - diversion of organic material and composting;
    - the on-going closure of small municipal landfill sites without gas collection systems, as they reach approved capacity; and
    - the capture of landfill (methane) gas and generation of green energy at the EOWHF.

Continued operation of the EOWHF aligns with the Province of Ontario's Strategy for a Waste Free Ontario, Climate Change Action Plan goal of reducing GHG emissions, the Made in Ontario Environment Plan to reduce litter and waste in communities, and Ontario's Food and Organic Waste Policy Statement to reduce the amount of food and organic waste going to landfill. The future development of the EOWHF is required to continue sustainable business operations and to continue providing the essential financial support for a wide range of additional services and programs, as follows:

- GFL has installed a landfill gas (LFG) collection system at the existing EOWHF to collect methane gas (a major source of GHGs), which is used for energy production. The LFG collection system is being expanded as additional cells and stages of the landfill are completed. In 2021, approximately 62.4 million m^3 of LFG was captured and destroyed at the EOWHF.
- In 2011, GFL received approval from the Ontario Power Authority as part of the Feed-in-Tariff (FIT) program to produce 4.2 megawatts (MW) of renewable energy from the collected methane.

- GFL's EOWHF composting facility keeps organic material, including food and organic waste, out of landfills which also reduces GHG emissions through the avoidance of methane generation from the decomposition of organic materials.
- GFL supports further reductions in GHG emissions by providing disposal services to smaller municipalities allowing them to close their landfills which do not have LFG control systems.
- GFL provides a network of regional transfer stations to collect material from a larger number of generators and consolidate the material for transport, which significantly reduces the number of vehicles travelling long distances to appropriate processing and disposal facilities.
- GFL is in the planning process for the development of a facility at the EOWHF to convert LFG to renewable natural gas (RNG).

There are also a number of programs and services offered by GFL at the EOWHF which contribute to community awareness of climate change and waste reduction including participation in various organizations to further develop opportunities to reduce waste. These include the following:

- GFL has partnered with Habitat for Humanity to allow individuals to drop off items for redistribution, instead of being disposed, at GFL transfer station locations and at the EOWHF public drop off area.
- GFL is an active educator and during a year provides presentations, tours and information to hundreds of individuals.
- GFL in partnership with the Ontario Centre of Innovation, The River Institute, and St. Lawrence College have funded and conducted extensive research on the beneficial use of the leachate generated from the EOWHF organics processing / composting facility.
- GFL staff is actively involved at the director level with the Compost Council of Canada and has been instrumental in working with them and the MECP as a member of the Organics Working Committee to develop the Organics Strategy as part of Waste-Free Ontario.
- GFL is an active member of the Ontario Waste Management Association (OWMA) participating in various committees on organics, recycling, and soil remediation established to help advance the waste management industry within Ontario.

As outlined in the ToR, GFL has focused the preparation of the EA and the consideration of alternatives to the undertaking to address their specific needs and circumstances. The following four alternatives to the undertaking were identified:

1. Do nothing;
2. Redirect waste to a disposal facility elsewhere;
3. Develop a thermal treatment facility at the EOWHF; and
4. Develop additional landfill disposal capacity at the EOWHF.

Based upon the screening of the alternatives to the undertaking, GFL concluded that Alternative 4, the future development and on-going operation of the EOWHF landfill, is the only reasonable option for the company, its customers, and the Province of Ontario. The other alternatives do not address GFL's business opportunity to meet long-term customer commitments or avoid business risks, and they are not supportive of the Ontario government priorities of addressing waste diversion and climate change. The "do nothing" alternative will be carried forward in the EA to provide a benchmark against which to measure the alternative methods and to assess the advantages and disadvantages of the preferred alternative.

Section 4 – Description of the Environment Potentially Affected by the Undertaking

The existing EOWHF is located within the Township of North Stormont, approximately 5 km north-northwest of the village of Moose Creek, Ontario, and 5 km east of the Municipality of Casselman, Ontario, on the western half of Lot 16 and Lots 17 and 18, Concession 10, Township of North Stormont, United Counties of Stormont, Dundas and Glengarry, near the intersection of Highway 417 and Highway 138. The municipal street address for the facility is 17125 Laflèche Road, Moose Creek, Ontario. The EOWHF encompasses a site area of 189 ha, which includes the following waste management related activities and services:

- 112 ha landfill site;
- composting facility;
- wastewater (leachate) treatment facility;
- small vehicle waste drop off;
- Landfill Gas to Energy (LFGTE) plant;
- enclosed flare and natural gas fired comfort heating equipment;
- Resource Productivity & Recovery Authority – Tires; and
- supporting facilities (office, vehicle maintenance).

The lands being considered for the future development include lands within the existing EOWHF and lands to the east comprising the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10, comprising an area of approximately 240 ha (**Figure 4-2** of the EA Study Report). These lands are owned by GFL and currently leased for agricultural use (sod farming) with a small commercial office for the sod farm administration and sales.

The study areas identified for the EA include the existing EOWHF site and the future development lands as well as potentially affected surrounding areas. The generic On-site and Off-site Study Areas identified for the EA in the approved ToR are as follows (**Figure 4-1** of the EA Study Report):

- On-site Study Area – the existing EOWHF site, and the future development area comprising the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10 east of the EOWHF; and
- Off-site Study Area – the lands in the vicinity of the future development extending approximately 1 km from the On-site Study Area.

As outlined in the approved ToR, the generic study areas identified above were refined during the EA to better suit the requirements of specific environmental components. Modifications to the study areas are outlined in **Table 4-2** of the EA Study Report.

A preliminary description of the existing environmental conditions at the EOWHF was provided in the approved ToR. The ToR contained the commitment that the existing environment will be characterized in the EA, and will address the five aspects of the environment as defined in the *OEAA*:

- natural environment;
- built environment;
- cultural environment;
- social environment; and
- economic environment.

For the purposes of this EA, the social and economic environments have been grouped into the socio-economic environment. The environmental aspects identified above were subdivided into environmental components and evaluation criteria to focus the assessment of effects as follows:

Environmental Aspect	Environmental Component	Evaluation Criteria
Natural Environment	Atmospheric Environment	• Air Quality • Noise • Odour
	Geology and Hydrogeology	• Groundwater Quality • Groundwater Quantity
	Surface Water Environment	• Surface Water Quality • Surface Water Quantity
	Ecological Environment	• Terrestrial Ecosystems • Aquatic Ecosystems
Socio-Economic Environment	Economic	• Economic Effects on / Benefits to Local Community
	Social	• Effects on Local Community • Visual Impact of Facility
Cultural Environment	Cultural Environment	• Cultural Heritage Resources • Archaeological Resources
Built Environment	Transportation	• Effects from Truck Transportation along Access Roads
	Current and Planned Future Land Use	• Effects on Current and Planned Future Land Uses

Environmental Aspect	Environmental Component	Evaluation Criteria
	Aggregate Extraction and Agricultural	• Aggregate Resources • Effects on Agricultural Land

The description of existing conditions (i.e., the existing environment potentially affected) is presented in **Section 4.3** of the EA Study Report organized by environmental aspect and environmental component.

Section 5 – Alternative Methods of Carrying Out the Undertaking

Two alternative methods for the future development to provide additional landfill disposal capacity were identified in the ToR and are described below. The preliminary conceptual designs were refined during the EA process and were presented at two public open houses as part of the consultation and engagement process during the EA.

The landfill design and operations concepts for the two alternative methods are summarized in **Section 5** of the EA Study Report and presented in the Conceptual Design Report (CDR) (**Supporting Document 2**). The landfill design and operations concept for the Preferred Alternative will be further developed during the detailed technical design stage (i.e., the ECA). During the technical approval of the Preferred Alternative, the conceptual design of the Preferred Alternative may be refined and optimized.

For both alternative methods, the design of the stages will be consistent with the existing landfill design. Visual screening will be constructed along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings. A new road entrance will be constructed from Laflèche Road, which will include a new scale facility. Both alternative methods will continue to use established operating procedures currently in place at the EOWHF and would maximize the use of existing site infrastructure.

Overview of Alternative Method 1

Alternative Method 1 (**Figure 5-1** of the EA Study Report) consists of implementing the future development through five stages: one stage adjacent to and north of the existing landfill (Stage 5); and four stages oriented east-west within the future development lands (Stages 6 through 9). Stages 6 through 8 will be identical in size, while Stages 5 and 9 will be smaller. A Stormwater Management (SWM) system will be constructed consisting of conveyance ditches around the perimeter of each stage and a retention pond located northwest of Stage 8. The existing pond located northeast of Stage 5 will be modified to attenuate peak flows if required.

Overview of Alternative Method 2

Alternative Method 2 (**Figure 5-2** of the EA Study Report) consists of implementing the future development through four stages: one stage adjacent to and north of the existing

landfill (Stage 5); and three stages oriented north-south within the future development lands (Stages 6 through 8). Stages 6 and 7 will be identical in size, while Stages 5 and 8 will be smaller. A SWM system will be constructed consisting of conveyance ditches around the perimeter of each stage and a retention pond located north of Stages 6 and 7. The existing pond located northeast of Stage 5 will be modified to attenuate peak flows if required.

Section 6 – Net Effects of the Alternative Methods

The potential effects of the future development alternative methods were assessed using the evaluation criteria, indicators, rationale and data sources from the approved ToR, provided in **Section 6.1.1**, and considering the existing conditions. The potential environmental effects from each alternative method were identified based on the currently-approved maximum predicted waste receipt level (i.e., 755,000 tonnes per year) and the design considerations presented in the CDR (**Supporting Document 2**). The key design considerations and assumptions for the effects assessment for each environmental component were documented, including the mitigation measures incorporated into the project design. Mitigation measures beyond those included in the CDR were identified when required to minimize or mitigate the potential effects associated with each alternative method. The net environmental effects were then identified taking into account the identified mitigation measures. The potential effects, mitigation measures, and net effects associated with the alternative methods were documented in a series of stand-alone Effects Assessment Reports (**Supporting Document 3**). The potential net effects are summarized below.

Natural Environment

Atmospheric Environment

Air Quality

The potential net effects of Alternative Method 1 and Alternative Method 2 on Air Quality are as follows:

Alternative Method 1	Alternative Method 2
• The ground-level concentrations of contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • NO_2 concentrations are predicted to exceed the 2025 Canadian Ambient Air Quality Standards (CAAQS) by 54%. Exceedances are at the site boundary and fall to below the standard within 55 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • SPM (dust) concentrations are predicted to	• The ground-level concentrations of contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • NO_2 concentrations are predicted to exceed the 2025 CAAQS by 47%. Exceedances are at the site boundary and fall to below the standard within 10 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by

Alternative Method 1	Alternative Method 2
exceed the O.Reg.419/05 Air Standard by 88%. Exceedances are at the site boundary and fall to below the standard within 350 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • PM_{10} concentrations are predicted to exceed the Ontario Ambient Air Quality Criteria (AAQC) by 150%. Exceedances are at the site boundary and fall to below the standard within 450 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • Concentrations at sensitive receptors (residences) do not exceed the standards.	56%. Exceedances are at the site boundary and fall to below the standard within 150 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • PM_{10} concentrations are predicted to exceed the Ontario AAQC by 84%. Exceedances are at the site boundary and fall to below the standard within 250 m of the boundary. Concentrations at sensitive receptors do not exceed the AAQC with the exception of one receptor location. • Concentrations at sensitive receptors (residences) do not exceed the standards with the exception of PM_{10}, which exceeded the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time. This sensitive receptor was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

Odour

The potential net effects of Alternative Method 1 and Alternative Method 2 on Odour are as follows:

Alternative Method 1	Alternative Method 2
• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m³. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.1% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility at the intersection of Allaire Road and Highway 138. • The highest concentration predicted at a sensitive receptor is 1.64 OU/m³, which is a 12% increase over existing conditions.	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m³. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.5% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility on Highway 138. • The highest concentration predicted at a sensitive receptor is 1.85 OU/m³, which is a 26% increase over existing conditions.

Noise

The potential net effects of Alternative Method 1 and Alternative Method 2 on Noise are as follows:

Alternative Method 1	Alternative Method 2
• All points of reception within the Off-site Study Area will experience sound levels within the MECP limits. • Predicted maximum cumulative noise impact from all landfilling operations is 55 dBA at R3,	• All points of reception within the Off-site Study Area will experience sound levels within the MECP limits. • Predicted maximum cumulative noise impact from all landfilling operations is 49 dBA at R3,

Alternative Method 1	Alternative Method 2
within the limit of 56 dBA at that location. • Predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location. • Predicted maximum impulse noise impact is 59 dBAI at R2 and R3, within the limit of 65 dBAI at those locations. • The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits.	within the limit of 56 dBA at that location. • Predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location. • Predicted maximum impulse noise impact is 56 dBAI at R2 and R3, within the limit of 65 dBAI at those locations. • The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits.

Geology and Hydrogeology

The potential net effects of Alternative Method 1 and Alternative Method 2 on Geology and Hydrogeology, including Groundwater Quality and Groundwater Quantity, are as follows:

Alternative Method 1	Alternative Method 2
• The chloride[1] concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer. • No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated. • No effects to groundwater quantity are anticipated.	• The chloride[1] concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer. • No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated. • No effects to groundwater quantity are anticipated.

Surface Water Environment

The potential net effects of Alternative Method 1 and Alternative Method 2 on the Surface Water Environment, including Surface Water Quality and Surface Water Quantity, are as follows:

Alternative Method 1	Alternative Method 2
• The surface water will meet the MECP monitoring requirements with regard to Total Suspended Solids (TSS) (on-site surface water quality control facilities will be designed to achieve 80% TSS removal). • No net effects to surface water quality at the site outlet are anticipated since the stormwater will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge. • Considering treated effluent concentrations in Moose Creek will be limited to the chronic Site-Specific Water Quality Objectives (SSWQOs) and stormwater quality will meet MECP requirements prior to release to Fraser Drain,	• The surface water will meet the MECP monitoring requirements with regard to TSS (on-site surface water quality control facilities will be designed to achieve 80% TSS removal). • No net effects to surface water quality at the site outlet are anticipated since the stormwater will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge. • Considering treated effluent concentrations in Moose Creek will be limited to the chronic SSWQOs and stormwater quality will meet MECP requirements prior to release to Fraser Drain, no net effects to off-site surface water

[1] Chloride, a non-degrading and non-adsorbing constituent of leachate, was used to represent worst case conditions for assessing effects on groundwater quality.

Alternative Method 1	Alternative Method 2
no net effects to off-site surface water quality are anticipated. • Increase in total surface water quantity volume to the site outlet but no net effects on peak flows since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions values up to a 100-year return period.	quality are anticipated. • Increase in total surface water quantity volume to the site outlet but no net effects on peak flows since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions values up to a 100-year return period.

Ecological Environment

Terrestrial Ecosystems

The potential net effects of Alternative Method 1 and Alternative Method 2 on Terrestrial Ecosystems are as follows:

Alternative Method 1	Alternative Method 2
• Natural and native vegetation cover on Stages 6 through 9 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time. • Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5. • Wildlife habitat and potential Species at Risk (SAR) habitat associated with the thicket swamp would be removed (13.2 ha). • Artificial wildlife habitat and potential SAR habitat associated with sod fields would be removed (184 ha), but similar habitat would remain in the vicinity. • Potential wildlife habitat and potential SAR habitat associated with trees and buildings on the Manderley Turf Products property would be removed.	• Natural and native vegetation cover on Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time. • Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5. • Wildlife habitat and potential SAR habitat associated with the thicket swamp would be removed (13.2 ha). • Artificial wildlife habitat and potential SAR habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity. • Potential wildlife habitat and potential SAR habitat associated with trees and buildings on the Manderley Turf Products property would be removed.

Aquatic Ecosystems

The potential net effects of Alternative Method 1 and Alternative Method 2 on Aquatic Ecosystems are as follows:

Alternative Method 1	Alternative Method 2
• Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings. • No net effects to aquatic biota are anticipated.	• Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings. • No net effects to aquatic biota are anticipated.

Socio-Economic Environment

Economic Environment

The potential net effects of Alternative Method 1 and Alternative Method 2 on the Economic Environment are as follows:

Alternative Method 1	Alternative Method 2
• Beneficial effect from extended duration of employment at site for an additional 20 years. • Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years. • Partial relocation of Manderley Turf Products. • Displacement of a small agricultural operation. • Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services. • Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations.	• Beneficial effect from extended duration of employment at site for an additional 20 years. • Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years. • Partial relocation of Manderley Turf Products. • Displacement of a small agricultural operation. • Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services. • Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations.

Social Environment

The potential net effects of Alternative Method 1 and Alternative Method 2 on the Social Environment, including the local community and visual impact, are as follows:

Alternative Method 1	Alternative Method 2
• No net effects to number of residents. • Possible decrease of one local sod production business due to the relocation of Manderley Turf Products. • No net effects on residents and their use of property. • With the visual screening in place, Alternative Method 1 is not expected to change the visual character of the landscape.	• No net effects to number of residents. • Possible decrease of one local sod production business due to the relocation of Manderley Turf Products. • No net effects on residents and their use of property. • With the visual screening in place, Alternative Method 2 is not expected to change the visual character of the landscape.

Cultural Environment

The potential net effects of Alternative Method 1 and Alternative Method 2 on the Cultural environment, including Cultural Heritage and Archaeological Resources, are as follows:

Alternative Method 1	Alternative Method 2
• No net effects on cultural heritage resources. • No net effects on archaeological resources.	• No net effects on cultural heritage resources. • No net effects on archaeological resources.

Built Environment

Transportation

The potential net effects of Alternative Method 1 and Alternative Method 2 on Transportation are as follows:

Alternative Method 1	Alternative Method 2
• No net effects on traffic operations.	• No net effects on traffic operations.

Current and Planned Future Land Use

The potential net effects of Alternative Method 1 and Alternative Method 2 on Current and Planned Future Land Use are as follows:

Alternative Method 1	Alternative Method 2
• Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use. • Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities. • No net effects on off-site recreational resources within 500 m of the future development. • MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.	• No net effects to current off-site land uses are anticipated. • Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities. • No net effects on off-site recreational resources within 500 m of the future development. • MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.

Aggregate Extraction and Agriculture

The potential net effects of Alternative Method 1 and Alternative Method 2 on Aggregate Extraction and Agriculture are as follows:

Alternative Method 1	Alternative Method 2
• No net effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated. • There will be a net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture. • Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent	• No net effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated. • There will be a net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture. • No net effects to surrounding agricultural operations are anticipated. • Possible decrease of one local sod production operation due to the relocation of Manderley Turf Products.

Alternative Method 1	Alternative Method 2
future building expansions or changes in use. • Possible decrease of one local sod production operation due to the relocation of Manderley Turf Products.	

Section 7 – Comparative Evaluation of Net Effects and Identification of the Preferred Alternative

The results of the comparative evaluation of net effects for each alternative method, and the identification of the Preferred Alternative, as detailed in **Section 7** of the EA Study Report are summarized below.

A comparison of Alternative Method 1 and Alternative Method 2 was conducted to identify a Preferred Alternative for the undertaking. The predicted net effect(s) associated with each alternative method for each indicator were identified and a preference rating was assigned (i.e., Preferred, Not Preferred, No Substantial Difference). Each alternative method was then rated at the criteria level (i.e., Preferred, Not Preferred, No Substantial Difference) based on the identified preference rating for each indicator and a rationale was provided.

Environmental Component	Evaluation Criteria	Preferred Alternative	
		Alternative Method 1	Alternative Method 2
Natural Environment			
Atmospheric Environment	Air Quality	Not Preferred	Preferred
	Odour	No Substantial Difference	No Substantial Difference
	Noise	Not Preferred	Preferred
Preferred Alternative for the Atmospheric Environment		**Not Preferred**	**Preferred**
Geology and Hydrogeology	Groundwater Quality	No Substantial Difference	No Substantial Difference
	Groundwater Quantity	No Substantial Difference	No Substantial Difference
Preferred Alternative for Geology and Hydrogeology		**No Substantial Difference**	
Surface Water Environment	Surface Water Quality	No Substantial Difference	No Substantial Difference
	Surface Water Quantity	No Substantial Difference	No Substantial Difference
Preferred Alternative for the Surface Water Environment		**No Substantial Difference**	

Environmental Component	Evaluation Criteria	Preferred Alternative	
		Alternative Method 1	Alternative Method 2
Ecological Environment	Terrestrial Ecosystems	No Substantial Difference	No Substantial Difference
	Aquatic Ecosystems	No Substantial Difference	No Substantial Difference
Preferred Alternative for the Ecological Environment		**No Substantial Difference**	
Socio-Economic Environment			
Economic	Economic Effects on / Benefits to Local Community	No Substantial Difference	No Substantial Difference
Social	Effects on Local Community	No Substantial Difference	No Substantial Difference
	Visual Impact of Facility	No Substantial Difference	No Substantial Difference
Preferred Alternative for the Socio-Economic Environment		**No Substantial Difference**	
Cultural Environment			
Cultural Environment	Cultural Heritage Resources	No Substantial Difference	No Substantial Difference
	Archaeological Resources	No Substantial Difference	No Substantial Difference
Preferred Alternative for the Cultural Environment		**No Substantial Difference**	
Built Environment			
Transportation	Effects from Truck Transportation along Access Roads	No Substantial Difference	No Substantial Difference
Preferred Alternative for Transportation		**No Substantial Difference**	
Current and Planned Future Land Use	Effects on Current and Future Land Uses	Not Preferred	Preferred
Preferred Alternative for Current and Planned Future Land Use		**Not Preferred**	**Preferred**
Aggregate Extraction and Agriculture	Aggregate Resources	No Substantial Difference	No Substantial Difference
	Effects on Agricultural Land	Not Preferred	Preferred
Preferred Alternative for Aggregate Extraction and Agriculture		**Not Preferred**	**Preferred**
Overall Preferred Alternative		**Not Preferred**	**Preferred**

Alternative Method 2 is preferred over Alternative Method 1 based on the comparative evaluation of net effects to air quality, noise, current and planned future land use, and effects on agricultural land as follows:

- Alternative Method 2 will result in lower concentrations of contaminants of concern that fall below the standards within shorter distances from the On-site Study Area boundary than Alternative Method 1. The single exceedance at a sensitive receptor identified for Alternative Method 2 is at a receptor location that has been vacated and will be demolished prior to the implementation of the future development landfill.
- Alternative Method 2 results in lower maximum off-site sound levels at the points of reception than Alternative Method 1 for landfilling operations and impulsive sounds because worst-case landfilling activities for Alternative Method 1 are closer to two receptor locations than for Alternative Method 2.
- Alternative Method 2 provides greater buffer distances between the future development landfill and the existing sensitive land uses than Alternative Method 1, and allows existing sensitive land use to continue to be in compliance with the Township of North Stormont Zoning By-law.
- Alternative Method 2 allows the adjacent agricultural operation (sensitive land use) to continue to be in compliance with the Township of North Stormont Zoning Bylaw.

Section 8 – Net Effects Assessment of the Preferred Alternative

Net Effects

A summary of the assessment of the environmental effects of the Preferred Alternative, Alternative Method 2, is presented in **Section 8** of the EA Study Report. The summary is based on the effects identified in **Section 6** of the EA Study Report.

Cumulative Effects

An assessment of cumulative effects focused on the net effects of the Preferred Alternative (Alternative Method 2) combined with the potential effects from other projects in the immediate area. The net effects for the Preferred Alternative relate to air quality, odour, noise, vegetation communities, wildlife habitat including potential SAR habitat, aquatic habitat, economics (length of employment at site and for local businesses, displacement of business activities, continued provision and procurement of products and/or services, continued financial contributions to the local community), number and type of local businesses, planned land use (development restrictions), and agricultural land (loss of agricultural land, possible decrease in one agricultural operation). The net effects take into account the existing EOWHF operations and other past and current projects as part of the existing conditions; consequently, the focus of the cumulative effects assessment is on planned and future projects.

Planned and future projects in the area include two active site plan control applications, which are located approximately 700 m from the On-site Study Area, the potential relocation of the EOWHF compost curing and storage pad areas to an area south of the existing EOWHF, and the discharge of treated effluent from the Leachate Treatment Facility (LTF) directly to Moose Creek instead of to the Fraser Drain where it is currently

discharged. The Ontario Ministry of Transportation (MTO) is currently undertaking an EA for Highway 138 from Highway 417 southward; however, the MTO indicated that there are no impacts expected to the study areas. No cumulative effects are anticipated to result from this transportation project.

No cumulative effects to air quality, odour, noise, traffic, or planned land use are anticipated to result from these projects. The treated effluent discharge to Moose Creek was considered in the surface water quality and aquatic ecosystems effects assessments. In addition, the relocation of the compost areas was included in the results of the effects assessment for the air, odour, noise, and transportation and the Stage 1 Archaeological Assessment determined that the relocation area held no archaeological potential. No changes to aquatic habitat, employment, continued provision and procurement of products and/or services, continued financial contributions to the local community, or planned land use (development restrictions) are anticipated to result from the potential compost area relocation.

The new composting pads may be located on disturbed lands used for peat harvesting. wildlife habitat and potential SAR habitat associated with the peat fields and hedgerow would be removed, but similar habitat would remain in the vicinity.

Climate Change Considerations

The effect of the Preferred Alternative on climate change and the effect of climate change on the Preferred Alternative are discussed below with consideration of the MECP guidance document Considering Climate Change in the Environmental Assessment Process (2017). On-going changes to the global climate related to increased emissions and concentrations of GHGs in the atmosphere are addressed in the conceptual design for the EOWHF future development, both in adapting to changes in climate and for the mitigation of GHG emissions. This has been addressed primarily by evaluating the impact of increased intensity of storm events, potential impacts to leachate generation associated with higher temperatures and increased intensity of rainfall events and snowmelt, assessing LFG generation rates and designing the expanded LFG management system to optimize collection efficiency to mitigate atmospheric emissions.

In 2021, Ontario's total GHG emissions were approximately 150,600,000 tonnes CO_2e with approximately 5,000,000 tonnes CO_2e generated from the solid waste sector (note that the provincial solid waste GHG emissions include emissions from municipal solid waste landfills, wood waste landfills and municipal solid waste composting and not other potential sources related to the industry)[2]. The maximum predicted total GHGs for the facility expansion would contribute approximately 9.8% of Ontario's solid waste related GHG emissions and approximately 0.3% of the total GHG emissions from Ontario.

In 2021, Canada's total GHG emissions were approximately 670,000,000 tonnes CO_2e, with approximately 21,000,000 tonnes CO_2e generated from the waste sector[3]. The

[2] https://data-donnees.ec.gc.ca/data/substances/monitor/canada-s-official-greenhouse-gas-inventory/B-Economic-Sector/EN_Annex12_GHG_Econ_Prov_Terr.xlsx

[3] https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2023.html

maximum predicted total GHGs for the facility expansion would contribute approximately 2% of Canada's waste related GHG emissions and approximately 0.01% of the total GHG emissions from the country.

The effect of the Preferred Alternative on climate change is anticipated to be minimal given the following aspects of the landfill design:

- The future development will incorporate an active LFG collection system which will limit emission of LFG to the atmosphere.
- Collected LFG will be combusted in either reciprocating engines or flares at the site's LFGTE plant or potentially utilized as RNG.
- The landfill will be progressively covered with a soil/geomembrane final cover which significantly reduces emissions as compared to a soil cover.

Climate change effects will be addressed in the detailed design of the future development by addressing MECP design criteria for ECA approval under the *Ontario Water Resources Act*, in addition to the landfill-specific requirements in O.Reg. 232/98. These will include:

- the use of the latest available local airport IDF curves, as modified for climate change, for the rainfall/snowmelt event analysis;
- the post-development peak discharge from a development site will be controlled to the equivalent pre-development level for the 2- to 100-year return period design storms;
- providing 250 m^3/ha in storage volume for stormwater quality control, in accordance with MECP guidelines for 80% Enhanced Removal at an impervious level of 85%;
- Any proposed control measure sized to provide Enhanced Protection (level 1), i.e., the removal of 80% long-term suspended solids, and meet the SWM design requirements of the MECP's Stormwater Management Planning and Design Manual (2003).

Extreme weather events resulting from climate change are not expected to have a significant long-term effect on precipitation infiltration and generation of leachate because the site will be progressively capped with a low permeability final cover. Increased infiltration will result in an increase in leachate generation of active open cells, but the effect will be reduced by moisture initially going into storage in the waste mass, as well as the progressive closure of the site. The detailed design of the leachate collection system will account for any climate-related changes.

Advantages and Disadvantages of the Preferred Alternative

A description of the advantages and disadvantages of the Preferred Alternative over the 'Do Nothing' alternative is provided in **Section 8.4** of the EA Study Report based on the net effects. The potential environmental effects remaining following the implementation of potential mitigation/management measures were used to identify and compare the advantages and disadvantages. The 'Do Nothing' alternative represents what is anticipated to occur if the project is not undertaken, and is used as a benchmark against

which the Preferred Alternative can be compared to determine the advantages and disadvantages of proceeding with the project.

Under the 'Do Nothing' alternative, GFL would not undertake the development of new long-term disposal capacity and would only be able to continue with their current business operations at the EOWHF for approximately 2 years based on current landfilling rates (i.e., until approximately 2025). Landfill operations would have to cease once the existing landfill is at capacity. GFL would be unable to continue to provide disposal services to its customers and fulfill long term contractual commitments. These customers, including a number of municipalities across Eastern Ontario, would need to find alternate ways to manage their waste. Currently, the EOWHF is the largest operating disposal facility in Eastern Ontario, and the only landfill in the region capable of managing the waste volumes being generated by municipalities who do not have their own facility.

The Preferred Alternative was determined to have the following advantages over the 'Do Nothing' alternative:

- Economic benefits for an additional 20 years such as: extended duration of employment at site and at local businesses through procurement; continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario; contribution of as much as $300 million to the local economy through the procurement of local goods and services; continued annual financial contributions to the Township of North Stormont; and direct financial contributions in the form of public donations.
- SPM (dust) concentrations are predicted to decrease by 101% at the site boundary.
- Natural and native vegetation cover on Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time.
- Improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings.

The Preferred Alternative was determined to have the following disadvantages compared to the 'Do Nothing' alternative:

- Air, Odour, and Noise effects such as: continued emissions from operations for an additional 20 years; increase in PM_{10} concentrations by 55% at the site boundary; increase in highest odour concentration of 26% at a sensitive receptor, which will only occur 1.5% of the time and is not expected to be distinguishable; and neighbouring noise-sensitive receptors will experience a minor increase in noise levels so that landfilling activity may be audible at times during lulls in background sound levels.
- Slight increase (0.1%) in Ontario's total GHG emissions.
- Effects on wildlife habitat such as: the removal of wildlife habitat, including potential SAR habitat, and ecosystem functions associated with the thicket swamp (13.2 ha) and trees and buildings on the Manderley Turf Products property; and the removal of

artificial wildlife habitat, including potential SAR habitat, associated with sod fields (182 ha), but similar habitat would remain in the vicinity.

- Partial relocation of Manderley Turf Products resulting in a possible decrease of one local sod production business, and the displacement of a small agricultural operation and net loss of 233 ha of land currently used for agriculture.
- Restriction on development within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities.

Overall, the advantages of the Preferred Alternative outweigh the disadvantages.

Section 9 – Consultation and Engagement

In accordance with the MECP's Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario (January 2014), Code of Practice: Consultation in Ontario's Environmental Assessment Process (January 2014) and as required by Section 5.1 of the *OEAA*, a consultation and engagement program involving agencies, Indigenous groups, and the public was carried out during the EA process.

A broad group of participants were consulted and engaged in the EA process. This included:

- governmental departments, ministries, and agencies with an interest in the project, typically referred to as the Government Review Team (GRT);
- local municipalities, including the host Township of North Stormont;
- Indigenous communities in the vicinity of the study areas or with an interest in the project; and
- the general public including residents, landowners, businesses and other stakeholders with an interest in the outcome of the EA.

A list of participants for the EA was prepared based on the consultation and engagement process completed during the ToR. The list of participants was updated throughout the EA process including both the addition and removal of participants as required and when requested.

The following consultation and engagement activities took place during the EA:

- Distribution of Notices (Notice of Commencement, Notice of Public Open Houses);
- Public Open Houses;
- Agency Workshop;
- Review of Draft Existing Conditions Reports by Agencies;
- Project Website;
- Consultation with Agencies and Organizations;
- Engagement with Indigenous Communities and Groups;

- Site Tours; and
- Draft EA Study Report review.

During the preparation of the ToR, the following Indigenous communities and organizations were identified as having a potential interest in the project. These Indigenous communities and organizations were contacted during the development of the ToR and throughout the EA process.

- Mohawk Council of Akwesasne
- Huron Wendat Nation Council
- Mohawks of the Bay of Quinte – Tyendinaga Mohawk Council
- Algonquins of Ontario Consultation Office
- Métis Nation of Ontario Council
- Métis Nation of Ontario Ottawa Region Métis Council

The Stage 1 Archaeological Assessment for the future development was provided to the Huron Wendat Nation Council, Mohawk Council of Akwesasne, and the Algonquins of Ontario Consultation Office on June 23, 2020 during the ToR. Feedback was provided by the Mohawk Council of Akwesasne. Only one Indigenous group, the Huron Wendat Nation Council, requested to be kept informed further of any archaeological related studies or reports during the EA Process[4].

The Indigenous communities and groups were provided the EA Notices in both English and French via hard copy mail and email.

The Draft EA Study Report was made available for review on the GFL website beginning on December 21, 2022 with comments requested by February 3, 2023. A follow-up email about the Draft EA Study Report review was sent on January 30, 2023. The Mohawk Council of Akwesasne's Aboriginal Rights and Research Office (ARRO) indicated that they had no comments and would like to remain informed about the project. No other comments were received from Indigenous communities or groups.

Additional details of the consultation and engagement activities are provided in **Section 9** of the EA Study Report.

Section 10 – Monitoring and Commitments for the Undertaking

Monitoring strategies were developed so that environmental effects can be monitored during construction, operation and maintenance of the landfill to confirm that:

- predicted net effects are not exceeded;
- unexpected negative effects are addressed; and
- implemented mitigation measures are effective.

[4] The correspondence with Indigenous groups regarding the archaeological studies is provided in the Record of Consultation for the ToR.

Mitigation commitments include the development and/or continuation of management plans, monitoring programs, in-design mitigations, ECA amendments, implementation of operational controls, construction practices, agency consultation, and contingency measures.

Monitoring commitments include the continuation of on-going monitoring programs, undertaking of surveys, installation of monitors, issues tracking, implementing monitoring programs as part of ECA amendments, implementing regular inspections, and undertaking compliance monitoring as required.

Specific monitoring details and commitments relating to each environmental component are outlined in **Section 10** of the EA Study Report. GFL will also develop a Compliance Monitoring Program to detail how GFL will report annually on their compliance with the commitments made in the EA Study Report.

Section 11 – Approvals

The proposed undertaking will require additional approvals following EA approval, which are anticipated to include:

- Approval from the MECP of the detailed design and operations (Design and Operations Report) for the future development.
- Approval of the groundwater monitoring component of ECA No. A420018.
- Amendment to ECA No. 7899-CBQP6L for the proposed SWM system including the SWM discharge outlet to Fraser Drain.
- Amendment to ECA No. 7899-CBQP6L for the proposed increase in total leachate volume to be treated and managed to achieve compliance with the Effluent Limits at the point of discharge and with the chronic SSWQOs in Moose Creek, based on an ACS and MZ assessment for Moose Creek to be carried out as part of the ECA amendment process.
- Approvals from South Nation Conservation (SNC), Fisheries and Oceans Canada (DFO), and MECP for release of treated stormwater and effluent.
- Approvals from SNC and DFO for physical alterations to the Fraser Drain (culvert crossings and stormwater outlet).
- Approval from the Township of North Stormont Drainage Superintendent.
- Depending on SAR presence during development and consultation with MECP, approvals relating to SAR may be required.
- Lift holding symbol from the future development lands in the Township of North Stormont Zoning Bylaw.
- Site plan control approval.

An amendment to the Stormont, Dundas and Glengarry (SDG) Counties Official Plan was completed in March 2022 and an amendment to the North Stormont Zoning Bylaw was completed in April 2022, to permit a waste management system and ancillary uses and to re-zone the future development lands.

Acronyms, Units and Glossary

Acronyms

Acronym	Definition
AADT	Annual Average Daily Traffic
AAQC	Ambient Air Quality Criteria
ACS	Assimilative Capacity Study
ADMGO	Air Dispersion Modelling Guideline for Ontario
AERMOD	Atmospheric Dispersion Model
AG	Agriculture Zoning
AIA	Agricultural Impact Assessment
ANSI	Area of Natural or Scientific Interest
ARRO	Mohawk Council of Akwesasne's Aboriginal Rights and Research Office
ASI	Archaeological Services Inc.
BOD	Biological Oxygen Demand
C&D	Construction and Demolition
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CCRR	Climate Change Research Report
CDR	Conceptual Design Report
CH_4	Methane
CHL	Cultural Heritage Landscape
CHR	Cultural Heritage Resource
CLC	Community Liaison Committee
CLI	Canada Land Inventory
CWQG	Canadian Environmental Quality Guidelines
DFO	Fisheries and Oceans Canada
DOC	Dissolved Organic Carbon
EA	Environmental Assessment
ECA	Environmental Compliance Approval
EHP	Effluent Holding Pond
ELC	Ecological Land Classification
EOWHF	Eastern Ontario Waste Handling Facility
ESA	*Endangered Species Act*
ESDM	Emission Summary and Dispersion Modelling
FIT	Feed-in-Tariff
GCL	Geosynthetic Clay Liner

Acronyms

Acronym	Definition
GFL	GFL Environmental Inc.
GHG	Greenhouse Gas
GRT	Government Review Team
GWP	Global Warming Potential
HDR	HDR Corporation
HELP	Hydrologic Evaluation of Landfill Performance
IAA	*Impact Assessment Act*
IAAC	Impact Assessment Agency of Canada
IC&I	Industrial, Commercial and Institutional
ID	Identification
IDF	Intensity-Duration-Frequency
IPZ	Intake Protection Zone
ISO	International Organization for Standardization
LCS	Leachate Collection System
L_{EQ}	Equivalent Sound Level
LFG	Landfill Gas
LFGTE	Landfill Gas to Energy
L_{LM}	Logarithmic Mean Impulse Sound Level
LOS	Level of Service
LTF	Leachate Treatment Facility
MCM	Ontario Ministry of Citizenship and Multiculturalism
MECP	Ontario Ministry of Environment, Conservation and Parks
MHSTCI	Ontario Ministry of Heritage, Sport, Tourism and Culture Industries
MMAH	Ontario Ministry of Municipal Affairs and Housing
MNRF	Ontario Ministry of Natural Resources and Forestry
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MTCS	Ontario Ministry of Tourism, Culture and Sport
MTO	Ontario Ministry of Transportation
MZ	Mixing Zone
OASD	Ontario Archaeological Sites Database
OEAA	*Ontario Environmental Assessment Act*
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
OWMA	Ontario Waste Management Association
PM	Particulate Matter
PM_{10}	Fine Particulate Matter <10 µm diameter

Acronyms

Acronym	Definition
POI	Point of Impingement
PWQO	Provincial Water Quality Objective
RNG	Renewable Natural Gas
RPRA	Resource Productivity and Recovery Authority
RU	Rural Zoning
SAR	Species At Risk
SCS	Soil Conservation Service
SD	Supporting Document
SDG	Stormont, Dundas and Glengarry
SMBR	Suspended Media Biological Reactor
SNC	South Nation Conservation
SPM	Suspended Particulate Matter (dust)
SRM	Specified Risk Material
SSWQO	Site-Specific Water Quality Objective
SWM	Stormwater Management
SWT	Thicket Swamp
TDS	Total Dissolved Solids
TIS	Traffic Impact Study
TMC	Turning Movement Count
TSS	Total Suspended Solids
US EPA	United States Environmental Protection Agency
USA	United States of America
WD	Waste Disposal Zoning
WHPA	Well Head Protection Area

Units

Unit	Definition
cfm	cubic feet per minute
dBA	decibels (A-weighted)
dBAI	decibels (A-weighted) for impulse noise
ha	hectare
hr	hour
km	kilometre
km/h	kilometres per hour
L/s	litres per second

Units

Unit	Definition
m	metre
m/s	metres per second
m^2	square metres
m^3	cubic metre
m^3/ha	cubic metres per hectare
m^3/hr	cubic metres per hour
m^3/s	cubic metres per second
m^3/yr	cubic metres per year
masl	metres above sea level
mbg	metres below ground surface
mg/L	milligrams per litre
mm	millimetre
mm/yr	millimetres per year
MW	megawatt
OU	odour unit
OU/m^3	odour unit per cubic metre
yr	year

Glossary

Term	Definition
Approval	Permission granted by an authorized individual or organization for an undertaking to proceed. This may be in the form of program approval, certificate of approval or provisional certificate of approval.
Bulking Material	Material such as woodchips added to high nitrogen materials like food scraps to provide a carbon source and increase the porosity of the compost.
Capacity (Disposal Volume)	The total volume of air space available for disposal of waste at a landfill site for a particular design (typically in m^3); includes both waste and daily cover materials, but excludes the final cover.
Composting	The controlled microbial decomposition of organic matter, such as food and yard wastes, in the presence of oxygen, into finished compost (humus), a soil-like material. Humus can be used in vegetable and flower gardens, hedges, etc.
Composting facility	A facility designed to compost organic matter either in the presence of oxygen (aerobic) or absence of oxygen (anaerobic).
Construction and demolition (C&D) waste	Solid waste produced in the course of residential, commercial, industrial or institutional building construction, demolition or renovation (e.g., lumber, brick, concrete, plaster, glass, stone, drywall, etc.).

Glossary

Term	Definition
Environment	As defined by the Environmental Assessment Act, environment means: • air, land or water; • plant and animal life, including human life; • the social, economic and cultural conditions that influence the life of humans or a community; • any building, structure, machine or other device or thing made by humans; • any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or • any part or combination of the foregoing and the interrelationships between any two or more of them (ecosystem approach).
Environmental Assessment (EA)	A systematic planning process that is conducted in accordance with applicable laws or regulations aimed at assessing the effects of a proposed undertaking on the environment
Environmental Compliance Approval (ECA)	A licence or permit issued by the Ministry of the Environment for the operation of a waste management site/facility.
Evaluation criteria	Evaluation criteria are considerations or factors taken into account in assessing the advantages and disadvantages of various alternatives being considered.
Feed-in-Tariff (FIT) program	The Feed-In Tariff (FIT) Program was developed for the Province of Ontario to encourage and promote greater use of renewable energy sources including on-shore wind, waterpower, renewable biomass, biogas, LFG and solar photovoltaic for electricity generating projects in Ontario, typically for projects from 10 kW up to 500 kW. A new procurement process is being developed for large renewable projects (greater than 500 kW).
Greenhouse gas (GHG)	Any of the gases whose absorption of solar radiation is responsible for the greenhouse effect, including carbon dioxide, methane, ozone, and the fluorocarbons.
Indicators	Indicators are specific characteristics of the evaluation criteria that can be measured or determined in some way, as opposed to the actual criteria, which are fairly general.
Industrial, commercial and institutional (IC&I) wastes	Wastes originating from the industrial, commercial and institutional sectors.
Landfill gas (LFG)	The gases produced from the wastes disposed in a landfill; the main constituents are typically carbon dioxide and methane, with small amounts of other organic and odour-causing compounds.
Landfill site	An approved engineered site/facility used for the final disposal of waste. Landfills are waste disposal sites where waste is spread in layers, compacted to the smallest practical volume, and typically covered by soil.
Leachate	Liquid that drains from solid waste in a landfill and which contains dissolved, suspended and/or microbial contaminants from the breakdown of this waste.
Methane gas	A colourless, odourless highly combustible gas often produced by the decomposition of decomposable waste at a landfill site. Methane is explosive in concentrations between 5% and 15% volume in air.
Mitigation	Measures taken to reduce adverse impacts on the environment.
Non-hazardous waste	Non-hazardous wastes include all solid waste that does not meet the definition of hazardous waste and includes designated wastes such as asbestos waste.
Proponent	A person who: • carries out or proposes to carry out an undertaking; or • is the owner or person having charge, management or control of an undertaking.

Glossary

Term	Definition
Receptor	The person, plant or wildlife species that may be affected due to exposure to a contaminant.
Terms of Reference (ToR)	A terms of reference is a document that sets out detailed requirements for the preparation of an Environmental Assessment.
Undertaking	Is defined in the *Ontario Environmental Assessment Act* as follows: • An enterprise or activity or a proposal, plan or program in respect of an enterprise or activity by or on behalf of Her Majesty in right of Ontario, by a public body or public bodies or by a municipality or municipalities; • A major commercial or business enterprise or activity or a proposal, plan or program in respect of a major commercial or business enterprise or activity of a person or persons other than a person or persons referred to in clause (1) that is designated by the regulations; or • An enterprise or activity or a proposal, plan or program in respect of an enterprise or activity of a person or persons, other than a person or persons referred to in clause (a), if an agreement is entered into under section 3.0.1 in respect of the enterprise, activity, proposal, plan or program ("enterprise").
Waste	Refuse from places of human or animal habitation; unwanted materials left over from a manufacturing process.

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Appendices

Supporting Documents

1 Introduction

This section of the Environmental Assessment (EA) Study Report presents background on the site, project, proponent and EA.

1.1 Background

GFL Environmental Inc. (GFL), in consultation with agencies, the Township of North Stormont, Indigenous communities, and the public, has undertaken an EA to provide additional landfill disposal capacity within, and adjacent to, their existing Eastern Ontario Waste Handling Facility (EOWHF).

The existing EOWHF is located approximately 5 kilometres (km) north-northwest of the village of Moose Creek, Ontario, and 5 km east of the Municipality of Casselman, Ontario, on the western half of Lot 16 and Lots 17 and 18, Concession 10, in the Township of North Stormont within the United Counties of Stormont, Dundas and Glengarry, near the intersection of Highway 417 and Highway 138. The regional setting of the project is shown on **Figure 1-1**. The municipal street address for the facility is 17125 Laflèche Road, Moose Creek, Ontario. The lands to the east of the existing EOWHF being considered for the future development (i.e., the 'future development lands') include the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10. The existing EOWHF and future development lands are shown on **Figure 1-2**. The existing EOWHF encompasses a site area of 189 hectares (ha), while the future development lands comprise approximately 240 ha.

The EOWHF includes the following waste management related activities and services:

- 112 ha landfill site;
- composting facility;
- waste water treatment facility;
- small vehicle waste drop off;
- landfill gas (LFG) to energy plant;
- enclosed flares and natural gas fired comfort heating equipment;
- Resource Productivity & Recovery Authority - Tires; and
- supporting facilities (office, vehicle maintenance).

Figure 1-1. Regional Setting

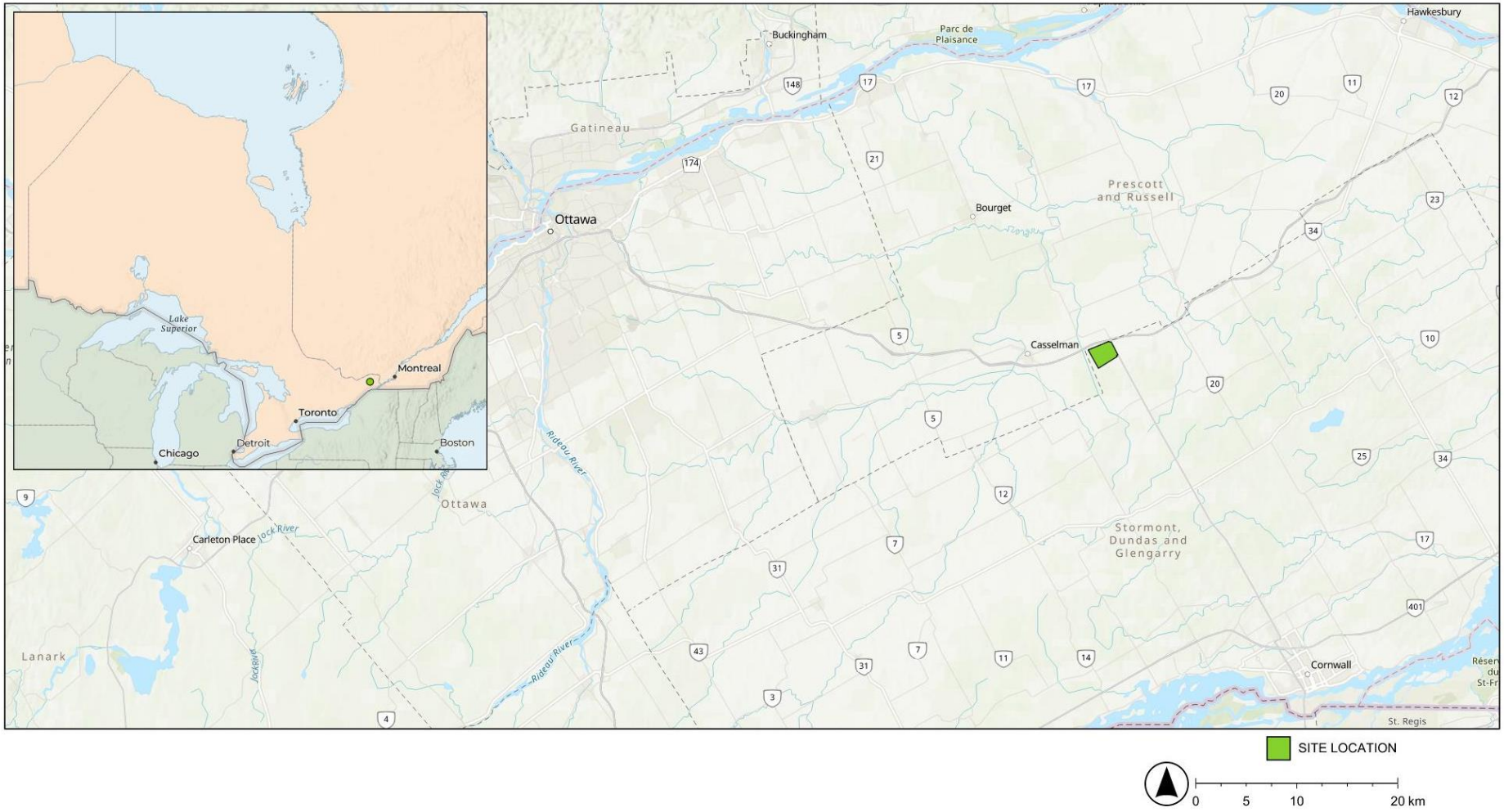


Figure 1-2. EOWHF and Future Development Lands

The existing EOWHF landfill was approved under the Ontario *Environmental Assessment Act* (*OEAA*) in 1999 (Stages 1 to 3A) and 2019 (Stages 3B and 4) and is operated by GFL under the Ontario Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) No. A420018. The landfill is one of several integrated services offered by GFL at the EOWHF, and is approved to accept solid non-hazardous municipal, industrial, commercial, and institutional wastes generated within the Province of Ontario for disposal. The total capacity of the existing EOWHF landfill is approximately 11.6 million cubic metres (m^3). The landfill has a permitted annual fill rate of 755,000 tonnes per year and an average daily fill rate of 2,500 tonnes per day. Additional waste quantities are accepted at the EOWHF composting facility. The EOWHF is permitted to receive an overall maximum of 4,000 tonnes per day of landfill and compost material. Based on the historical and forecasted filling rate, GFL estimates that the existing EOWHF landfill will reach its approved capacity in 2025.

The purpose of the proposed undertaking is to provide approximately 15.1 million m^3 of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period, with operations anticipated to begin in 2025 and closure anticipated in 2045. The undertaking will enable GFL to continue to provide disposal services for residual non-hazardous solid waste to their customers once the landfill reaches its currently approved disposal capacity and continue to provide economic support to the local community over the long term. No changes to the approved fill rates or site access routes are proposed. The project is planned to be constructed within the existing EOWHF and the future development lands.

1.2 Proponent

The proponent for the proposed undertaking is GFL Environmental Inc. GFL is a leading North American provider of diversified environmental solutions. GFL is the only major diversified environmental services company in North America offering services in solid waste management, liquid waste management and infrastructure implementation. The company's services include:

- Collection, hauling, sorting, transfer and disposal of non-hazardous solid waste (including recyclable materials and organics);
- Identification, collection, transport, processing, recycling and disposal of a broad range of hazardous and non-hazardous liquid wastes (plus sale of recycled liquid wastes and other liquid products); and
- Soil remediation services.

Through GFL's strategically located network of more than 200 facilities across Canada and several US states, the company has capabilities that can be mobilized to service their customers wherever they are located. GFL has a dedicated, professional team of more than 15,000 employees that provides local service to millions of households under municipal contracts and to thousands of industrial, commercial and institutional customers.

The EOWHF functions as a regional facility in Eastern Ontario and is integrated with a wide range of collection, transfer and transport services and facilities serving residential and commercial customers across the region. The EOWHF provides essential services

in the area, managing municipal solid waste and source separated organics and also providing drop-off facilities for residents. The EOWHF currently employs approximately 40 staff.

The GFL contact for this project is:

Mr. Greg van Loenen, Environmental Compliance Officer
GFL Environmental Inc.
17125 Laflèche Road, Moose Creek, Ontario K0C 1W0
Telephone: 613-538-2776 ext. 2223
Fax: 613-538-2779
Email: gvanloenen@gflenv.com

1.3 EOWHF Future Development EA

GFL initiated this EA to obtain approval for the future development of the EOWHF landfill, which would provide approximately 15.1 million m³ of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period. The EA has been carried out in accordance with the requirements of the *Ontario Environmental Assessment Act* (*OEAA*) and Terms of Reference (ToR) (**Appendix A**), which was approved by the Ministry of Environment, Conservation and Parks (MECP) on January 14, 2021.

The EA documents the approved study process as well as the results and recommendations. In accordance with the approved ToR, phases of the EA included the following:

1. Describing the environment potentially affected by the project in relation to the proposed evaluation criteria, indicators, and data sources.
2. Describing each of the two conceptual design alternative methods in sufficient detail for assessment.
3. Predicting the environmental effects for each alternative method using the criteria, indicators, and data sources, taking into account assumed mitigation measures.
4. Conducting a comparative evaluation of the alternative methods and identifying the Preferred Alternative based on the results of the comparative evaluation.
5. Assessing the effects of the Preferred Alternative on the environment.

A thorough and inclusive consultation and engagement program was undertaken as part of the EA. The results of the EA and updates were provided to agencies, Indigenous communities, and the public at key milestones during EA preparation.

2 Overview of the Environmental Assessment Process and Study Organization

This section of the EA Study Report provides an overview of the process used to carry out the EOWHF Future Development EA and the regulatory environment, and provides the organization of the EA Study Report.

2.1 Environmental Assessment Process

The EA was undertaken in accordance with the requirements for an expanding waste landfill (as identified in Ontario Regulation (O.Reg.) 101/07, Section 4) under the *OEAA*, which are described in **Section 2.2**. The EA was conducted in accordance with the ToR dated September 2020, and approved by the Minister of Environment, Conservation and Parks in January 2021 (**Appendix A**). The ToR was the first step of a two-step *OEAA* approval process for the proposed undertaking, with the second step being the EA.

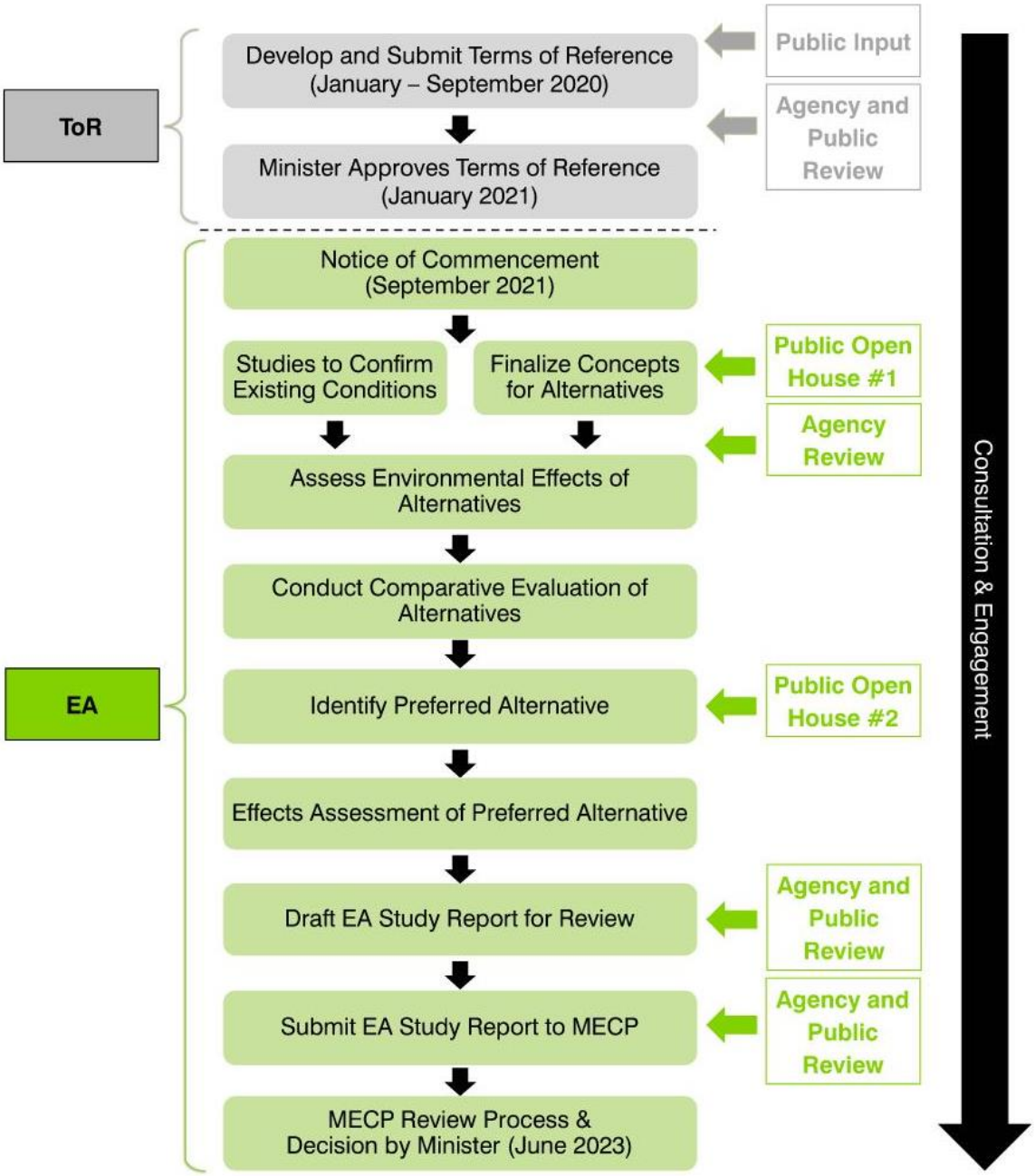
An overview of the EA process for the EOWHF Future Development EA is provided in **Figure 2-1**.

2.2 Ontario Environmental Assessment Act

The overall purpose of the *OEAA* is to promote good environmental planning through the protection, conservation and wise management of Ontario's environment. The intent is to predict the environmental effects of proposed initiatives or projects before they are carried out. In order to achieve this, the *OEAA* ensures that environmental concerns and opportunities associated with a project are considered along with alternatives and that their effects are investigated and mitigated through the planning process, prior to implementation and construction. A key component of the *OEAA*, as well as good planning, is to ensure that reasonable and meaningful consultation and engagement opportunities for members of the public, agencies, Indigenous communities, and other key stakeholders are provided throughout the process.

The *OEAA* requires a ToR to be prepared and approved by the Minister of Environment, Conservation and Parks prior to undertaking the EA. The ToR for the EA (approved January 2021) sets the framework, considerations, and commitments for how the EA will be undertaken and provides overall direction for the EA. **Appendix B** of this EA Study Report details how the EA has fulfilled the commitments made in the approved ToR.

Figure 2-1. EOWHF Landfill EA Process



The EA was prepared in accordance with the requirements set out in the approved ToR and the *OEAA*, and includes a description of the:

a) purpose of the undertaking;

b) rationale for the undertaking;

c) rationale for the alternative methods of carrying out the undertaking;

d) environment potentially affected by the undertaking;

e) effects that might reasonably be expected to be caused to the environment by the alternative methods of carrying out the undertaking;

f) actions necessary, or that may reasonably be expected to be necessary, to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment, by the alternative methods of carrying out the undertaking and the predicted net effects of each of the two alternative methods;

g) advantages and disadvantages to the environment as a result of the alternative methods of carrying out the undertaking;

h) rationale for selecting the Preferred Alternative; and

i) consultation and engagement undertaken by GFL and the results.

Further to *OEAA* requirements, GFL has utilized and complied with both of the MECP's Codes of Practice for Preparing and Reviewing Environmental Assessments in Ontario (MECP, 2014a) and Consultation in Ontario's Environmental Assessment Process (MECP, 2014b) when completing the EA. GFL has also considered the MECP's guide: Considering Climate Change in the Environmental Assessment Process (MECP, 2017c).

2.3 Undertaking by a Private Proponent

GFL is the owner and operator of the EOWHF. The EOWHF landfill has been in operation since 1999, servicing the Province of Ontario, and GFL is looking to continue to provide on-going landfill services at the EOWHF to its customers.

The proposed undertaking is designated under Regulation 101/07 of the *OEAA*. As described in the approved ToR (**Appendix A**), GFL has completed the EA in accordance with subsection 6(2)(c) and 6.1(3) of the *OEAA* which allows a proponent to focus the EA and consider alternatives to address their specific needs and circumstances. The approved ToR provided justification for the rationale for the undertaking as well as selection of the alternative to the undertaking, which allowed the EA to commence at the alternative methods stage (i.e., alternative landfill configurations). Commencing the EA at the alternative methods stage is supported by the Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (MECP, 2014a) as follows:

> *Cases may arise where proponents have previously considered alternatives during a separate planning or decision-making process. If the previous planning process had similar provisions to those of the Environmental Assessment Act then the proponent may have sought and received approval at the terms of reference stage to limit the discussion of previously examined alternatives.*

Under the requirements of the *OEAA*, the proponent must include a description of the rationale as part of the EA documentation. GFL has provided a description of the rationale for the undertaking in **Section 3** of this EA Study Report, which provides a re-statement of the rationale and provides additional detail on the benefits of the proposed undertaking. This also includes a summary of the alternatives to the undertaking for context purposes.

2.4 *Impact Assessment Act*

The *Impact Assessment Act* (*IAA*) is a piece of federal legislation that guides the EA process within Canada. It provides a framework for actions to be taken in order to protect vital terrestrial and aquatic environments throughout the EA process. A Federal EA may be required if a proponent proposes a specific undertaking listed on the *IAA* Physical Activities Regulations.

The alternative methods being considered in this EA do not appear on the list of activities subject to the *IAA* as confirmed by the Impact Assessment Agency of Canada[5].

2.5 Organization of the EA Study Report

This EA Study Report has been prepared in accordance with the following key documents:

- GFL Environmental Inc. Eastern Ontario Waste Handling Facility Future Development Environmental Assessment Terms of Reference (September 2020) as approved by the Minister of Environment, Conservation and Parks on January 14, 2021 (**Appendix A**);
- MECP Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (MECP, 2014a);
- MECP Code of Practice for Consultation in Ontario's Environmental Assessment Process (MECP, 2014b); and
- MECP Guide – Considering Climate Change in the Environmental Assessment Process (MECP, 2017c).

The EA Study Report comprises the following chapters, appendices, and technical reports/reference documents for addressing the requirements set out in the approved ToR:

EA Study Report Section	
Section 1	**Introduction** Provides an introduction to and background information regarding the EA and the proponent, GFL Environmental Inc.
Section 2	**Overview of the Environmental Assessment Process and Study Organization** Describes the process used to carry out the EA, the *OEAA* requirements, and provides an overview of the overall EA Study Report.

[5] Letter dated May 14, 2020 from Loraine Cox, A/Director Ontario Region, Impact Assessment Agency of Canada (IAAC, 2020).

EA Study Report Section	
Section 3	**Overview of the Undertaking** Identifies the purpose of and rationale for the undertaking, including the preferred alternative to the undertaking.
Section 4	**Description of the Environment Potentially Affected by the Undertaking** Provides an overview of the existing environmental conditions in both the On-site Study Area and Off-site Study Area.
Section 5	**Alternative Methods of Carrying Out the Undertaking** Identifies and describes the alternative methods of carrying out the undertaking comprising the two alternative methods for the future development.
Section 6	**Net Effects of the Alternative Methods** Identifies and describes the net effects for the alternative methods for each environmental component.
Section 7	**Comparative Evaluation of Net Effects and Identification of the Preferred Alternative** Provides the comparative evaluation of the two alternative methods and identifies the Preferred Alternative.
Section 8	**Net Effects Assessment of the Preferred Alternative** An assessment of the effects of the Preferred Alternative is presented and a description of any potential cumulative effects. Climate change considerations for the Preferred Alternative are discussed, and the advantages and disadvantages of the Preferred Alternative are identified.
Section 9	**Consultation and Engagement** Provides an overview of the consultation and engagement process and a summary of consultation and engagement activities undertaken.
Section 10	**Monitoring and Commitments for the Undertaking** Describes the commitments as well as the monitoring strategy and schedule for the preferred undertaking.
Section 11	**Approvals** Outlines the anticipated approvals required for implementing the preferred undertaking following *OEAA* approval.
Section 12	**References** Provides the references used in the EA Study Report.

Appendices	
Appendix A	Approved Terms of Reference
Appendix B	Terms of Reference Commitments Table

Supporting Documents	
Supporting Document 1	**Existing Conditions Reports**
SD 1-1	Air Quality and Odour Existing Conditions Report
SD 1-2	Noise Existing Conditions Report
SD 1-3	Geology and Hydrogeology Existing Conditions Report
SD 1-4	Surface Water Quality Existing Conditions Report
SD 1-5	Surface Water Quantity Existing Conditions Report

Supporting Documents	
SD 1-6	Ecological Environment Existing Conditions Report
SD 1-7	Socio-Economic Environment Existing Conditions Report
SD 1-8	Cultural Heritage Existing Conditions Report
SD 1-9	Stage 1 Archaeological Assessment
SD 1-10	Transportation Existing Conditions Report
SD 1-11	Land Use Existing Conditions Report
SD 1-12	Agriculture Existing Conditions Report
Supporting Document 2	**Conceptual Design Report**
Supporting Document 3	**Effects Assessment Reports**
SD 3-1	Air Quality and Odour Effects Assessment Report
SD 3-2	Noise Effects Assessment Report
SD 3-3	Geology and Hydrogeology Effects Assessment Report
SD 3-4	Surface Water Quality Effects Assessment Report
SD 3-5	Surface Water Quantity Effects Assessment Report
SD 3-6	Ecological Environment Effects Assessment Report
SD 3-7	Socio-Economic Environment Effects Assessment Report
SD 3-8	Cultural Heritage Effects Assessment Report
SD 3-9	Archaeological Resources Effects Assessment Report
SD 3-10	Transportation Effects Assessment Report
SD 3-11	Land Use Effects Assessment Report
SD 3-12	Agriculture Effects Assessment Report
Supporting Document 4	**Record of Consultation and Engagement**

The requirements set out in the approved ToR and the location where each is addressed in the EA Study Report and/or reference documents are provided in **Table 2-1**.

Table 2-1. Requirements from the Approved Terms of Reference and Where Addressed

Terms of Reference Requirement	Section / Document Where Addressed
A description of the purpose of the undertaking	• EA Study Report Section 3 • Approved ToR Section 4
A description of and a statement of the rationale for, (i) the undertaking	• EA Study Report Section 3 • Approved ToR Section 5
A description of and a statement of the rationale for, (ii) the alternative to the undertaking	• EA Study Report Section 3 • Approved ToR Section 6
A description of and a statement of the rationale for, (iii) the alternative methods of carrying out the undertaking	• EA Study Report Section 5 • Supporting Document 2 to the EA Study Report • Approved ToR Section 6

Table 2-1. Requirements from the Approved Terms of Reference and Where Addressed

Terms of Reference Requirement	Section / Document Where Addressed
A description of, (i) the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking, the alternatives for the undertaking and the alternatives to the undertaking	• EA Study Report Section 4 • Supporting Document 1 to the EA Study Report • Approved ToR Section 7
A description of, (ii) the effects that will be caused or that might reasonably be expected to be caused to the environment by the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking	• EA Study Report Sections 6 & 7 • Supporting Documents 2 & 3 to the EA Study Report
A description of, (iii) the actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment, by the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking	• EA Study Report Section 6 • Supporting Documents 2 & 3 to the EA Study Report
An evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking	• EA Study Report Section 8 • Supporting Document 3 to the EA Study Report
A description of any consultation about the undertaking by the proponent and the results of the consultation. 1996, c. 27, s. 3.	• EA Study Report Section 9

3 Overview of the Undertaking

This section of the EA Study Report describes the project, otherwise known as the undertaking, and discusses the purpose and alternatives to the project.

3.1 Description of the Undertaking

The proposed undertaking is to provide approximately 15.1 million m³ of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period, with operations anticipated to begin in 2025 and closure anticipated in 2045. The proposed undertaking will be within the existing EOWHF site and on lands to the east including the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10 (**Figure 1-2**). The existing EOWHF encompasses a site area of 189 ha, while the lands to the east of the existing EOWHF being proposed for future development include approximately 240 ha. The undertaking will enable GFL to continue to provide disposal services for residual non-hazardous solid waste to their customers once the landfill reaches its currently approved disposal capacity and continue to provide economic support to the local community over the long term. No changes to the approved fill rates or site access routes are proposed.

3.2 Purpose of the Undertaking

The purpose of the undertaking is to provide approximately 15.1 million m³ of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period. The undertaking will enable GFL to continue to provide disposal services to their customers for residual non-hazardous solid waste once the landfill reaches its currently approved disposal capacity and continue to provide economic support to the local community over the long term. Based upon the historical and forecasted filling rate at the existing landfill, GFL estimates that the landfill will reach its approved capacity in 2025.

3.3 Rationale for the Undertaking

The rationale for the undertaking is twofold: first, there is a need for the future development of the EOWHF as it is a significant component of the provincial waste management network and infrastructure in a region lacking in sufficient and secure long-term disposal capacity; and second, GFL is providing waste management services and facilities that are well positioned to continue to support Ontario's transition to becoming waste-free and achieving a circular economy, while supporting a reduction in Greenhouse Gas (GHG) production and the amount of waste going to landfill, consistent with provincial legislation.

3.3.1 Need for the Undertaking

Since the original EA approval in 1999, the EOWHF has transformed from a small, local family-owned facility to an important multi-service regional facility serving a broad customer base across Eastern Ontario. The EOWHF is a well-established business in

the local community providing approximately 40 stable, long-term jobs for residents of the area.

In 2016, GFL acquired the former Lafleche Environmental Inc. operating company to complement other waste services provided across Ontario and Canada. GFL has continued to expand its operations into a broad series of waste management services integrated with the EOWHF landfill including:

- providing collection services to residential/municipal and industrial, commercial and institutional (IC&I) waste generators, including collection of recyclables, source separated organics, leaf and yard material, and waste, both at the curb and directly at the EOWHF;
- processing and transfer of recyclables;
- composting of source separated organic material; and
- collection and diversion of used tires and construction and demolition (C&D) waste.

Many of these services are provided at the EOWHF and supported by a number of smaller GFL collection facilities located in Eastern Ontario. The distribution of these facilities and service capabilities continues to expand as GFL enters into new business contracts with municipalities and businesses across Ontario.

The EOWHF provides cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario, including over 500 villages, towns, and cities. These services include waste collection, organics composting, processing and transfer of recyclables, tire collection, and residential drop-offs. The EOWHF's customer base includes municipalities within the United Counties of Stormont, Dundas and Glengarry, United Counties of Prescott and Russell, United Counties of Leeds and Grenville, Lanark County, Renfrew County, Lennox and Addington County, Hastings County and Prince Edward County. The majority of these municipalities have long term (e.g., 15 years) waste disposal contracts at the EOWHF through their responsible authority (i.e., Township, Town, City or County). Many of these municipalities have been faced with the need to close their own landfill sites due to increased regulatory requirements and associated costs, plus the risks and costs associated with long term liabilities. GFL has partnered with these municipalities to provide the necessary waste management services at the EOWHF in a local and cost-effective manner. The EOWHF also provides landfill disposal capacity to Indigenous communities within the region.

The existing EOWHF landfill was approved in two phases. The initial 1999 approval for Phase 1 included Stages 1 to 3A with a total disposal capacity of 7.4 million m^3. Stage 3A reached its approved capacity in Fall 2019. Phase 2 of the landfill development, approved in 2019, included Stages 3B and 4 with a total capacity of 4.2 million m^3. Landfilling is currently underway within Stage 4. Phase 2 of the landfill is expected to be complete in 2025.

The EOWHF landfill has an approved annual fill rate of 755,000 tonnes. Historically, the landfill has been under-utilized receiving an annual average of less than 450,000 tonnes between 2009 to 2016. Annual waste quantities received continued to increase year over year during this same time period. GFL acquired the facility in 2016 and has optimized

the operations since then. The historical waste volumes received by GFL at the EOWHF compost facility and landfill from 2016 onward are shown in **Table 3-1**.

Table 3-1. Historical Waste Quantities (tonnes) Managed at the EOWHF from 2016 Onward

Year	Compost Facility*	Landfill
2016	117,293	734,874
2017	151,290	712,016
2018	136,888	754,889
2019	129,134	679,464
2020	130,605	735,331
2021	98,780	754,561

Note: *This quantity includes residential source separated organics, leaf and yard waste, and clean wood, pulp paper, and other compostable materials.

A detailed breakdown of the source and/or material type managed at the landfill annually from 2016 onward is provided in **Table 3-2**.

Table 3-2. Historical Material Quantities (tonnes) Managed at the EOWHF from 2016 Onward

Year	Municipal	IC&I	C&D	Cover Material	Cover Material (Contam-inated)	Other Waste Material	Total
2016	148,561	317,108	25,208	101,056	132,130	14,966	734,874
2017	187,922	322,853	35,964	27,344	132,672	6,135	712,016
2018	181,478	358,346	38,607	53,713	81,927	40,818	754,889
2019	190,838	369,109	46,137	29,386	35,467	8,527	679,464
2020	168,319	368,666	46,896	29,152	109,232	13,066	735,331
2021	144,297	417,183	49,148	44,964	88,421	10,548	754,561

The on-going operation of the EOWHF allows GFL to provide significant financial contributions to the local economy, through donations to support the local community, by means of a host community agreement and municipal taxes. The EOWHF contributes approximately 10% of North Stormont's tax base, including host community contributions. GFL entered into a 20-year agreement (i.e., the Host Community Agreement) with the Township of North Stormont in 2001 under which GFL agreed to provide the Township with an annual monetary contribution. With the expiry of the agreement in 2021, a new 20-year Host Community Agreement was negotiated between GFL and the Township of North Stormont that took effect in 2022. Under the new Agreement, GFL will continue to provide an annual financial contribution to the Township and will also make direct financial contributions in the form of public donations as follows:

- $500,000 donation to the Moose Creek Recreation Facility in 2022;

- $500,000 donation to the Moose Creek Recreation Facility in 2023;
- $130,000 for a fire rescue van for the Finch Fire Station in 2024; and
- $130,000 for a fire rescue van for the Crysler Fire Station in 2024.

The Host Community Agreement helps alleviate tax burdens to local residents, reduces the Township's reliance on residential tax assessment, and offsets net increases in the Township's operating costs associated with residential development.

GFL endeavours to maximize the use of local businesses and services across the region in support of the ongoing development and operation of the EOWHF. This includes food services, accommodations, repair and maintenance, construction, equipment rental and purchase, amongst other opportunities. GFL also sponsors many local events to increase the quality of life for the community.

GFL continually looks for opportunities to grow its service offerings and maximize waste diversion activities, and has established themselves as a leader in waste diversion activities and services to support the needs of their growing customer base, specifically with recycling and composting. In 2019, GFL acquired Canada Fibers Ltd. (Canada Fibers), a leader in the Canadian recycling industry which operates numerous material recovery facilities in Ontario and across Canada. Canada Fibers has been responsible for managing and processing more than 450,000 tonnes of blue box recyclables annually in Ontario. In addition to operating Materials Recovery Facilities (MRFs), Canada Fibers has also served their clients by undertaking the expansion and upgrade of MRFs and has several such projects underway presently. With the integration of the Canada Fibers facilities and capabilities with GFL's other services, assets and infrastructure, GFL is now positioned to create new opportunities to provide integrated collection, sorting, processing and marketing of recyclable materials.

Beyond blue box materials, GFL is responsible for diverting a number of other materials from disposal for its customers, including scrap tires. In 2020, twelve tonnes of tires were collected at the EOWHF for recycling.

Additional quantities of materials are received at the EOWHF for proper management and include Specified Risk Material (SRM), contaminated soils, asbestos, solidified industrial materials and international waste. The landfill at the EOWHF is the only one in Eastern Ontario permitted to dispose of SRM (e.g., cattle).

The EOWHF composting facility is the largest in Ontario and is among the few in Ontario able to manage an expanded stream of organic materials, including diapers, sanitary and pet waste. As processing capacity for the expanded stream of organic materials is limited in Ontario, the EOWHF composting facility plays an important role in providing processing capacity to Ontario municipalities, particularly those larger municipalities who accept this type of waste in their curbside green bin programs. A total of 44,024 tonnes of residential source-separated organics and 54,756 tonnes of leaf and yard material were received and composted at the EOWHF in 2021.

The continued operation of the EOWHF landfill is integrated with, and critical to, the on-site composting facility by providing efficient access to dispose of non-compostable (mainly residual plastics) materials from the composting process. It also provides convenient access to drop-off programs to divert additional materials from disposal.

GFL has an on-going need to continue operation of the EOWHF landfill for the following reasons:

- GFL can continue to provide its customer base with an integrated set of services including collection, transfer, processing (recycling and composting) and disposal in a reliable and cost effective manner;
- long-term contractual obligations to municipalities across Ontario can be honoured and fulfilled;
- the Province's waste diversion programs and objectives are and will continue to be supported; and
- the environmental impacts of GHG emissions will be minimized through:
    - reducing the number of waste related trucks hauling material long distances;
    - diversion of organic material and composting;
    - the on-going closure of small municipal landfill sites without gas collection systems, as they reach approved capacity; and
    - the capture of landfill (methane) gas and generation of green energy at the EOWHF.

Currently, the EOWHF is the only large privately-owned landfill operating in the Eastern Ontario region approved to receive putrescible waste, which is typically waste generated from residential or municipal sources. As shown in **Table 3-2**, the EOWHF manages a significant volume of residual waste annually from municipalities throughout Eastern Ontario. There are two large municipally owned landfills operating within the area including the City of Ottawa Trail Road Landfill and the City of Cornwall Landfill. Both of these landfill sites have service areas restricted to their specific municipal boundaries. They primarily provide disposal capacity for residential waste and lesser quantities of IC&I waste generated within their municipalities. Consequently, these landfills are typically not an option for managing the wastes received at the EOWHF. There has been a lack of approved, constructed and unrestricted disposal capacity within the region to service IC&I waste generators.

C&D wastes, contaminated soils and other waste material volumes disposed at the landfill have fluctuated from one year to the next. These annual fluctuations are in part driven by event based activity such as large single construction projects.

The EOWHF landfill manages a relatively consistent volume of IC&I and C&D waste annually. Currently, there is only one other large privately-owned landfill operating in Eastern Ontario with the ability to serve the waste management requirements of IC&I customers. The Waste Connections Navan Landfill in Ottawa is permitted to receive 234,750 tonnes of solid non-hazardous waste (excluding putrescible waste) per year. The Approved Amended Terms of Reference for the Waste Connections Ridge Landfill Expansion (Waste Connections of Canada, 2018) indicated that the Navan Landfill had less than 10 years of capacity remaining and that there is an agreement with the MECP and the community that there will be no further expansion of the site.

- There are two proposed and approved private landfills within Ottawa which have not been constructed. The Waste Management West Carleton Environmental Centre

received EA approval in September 2013. This approval included the expansion of an existing (now closed) landfill site. The approval is for a volume of 6.5 million m^3 based on receiving 400,000 tonnes annually over an approximate 10-year planning period. The Capital Region Resource Recovery Centre received EA approval in May 2017 which includes a new landfill with capacity of approximately 10.7 million m^3. This capacity was based on a 30 year planning period at a maximum of 450,000 tonnes annually.

- In January 2021, the Ontario Waste Management Association (OWMA) released their State of Waste in Ontario: Landfill Report (3rd Annual Landfill Report) (OWMA, 2021) which provides an assessment of landfill disposal capacity in Ontario. The OWMA concludes that in aggregate there are approximately 14.5 years of landfill disposal capacity remaining in Ontario with continued export at current levels to the USA.

The OWMA report outlines that seven landfills in Ontario account for over 60% of the available disposal capacity and the 15 largest sites account for 85% of the remaining capacity. The report suggests the landfill capacity in smaller landfills is being exhausted and a greater proportion of material is being directed to larger landfills. Private landfills now account for 53% of landfill capacity in Ontario, an increase from 36% in 2017. This increase reflects the trend of municipalities relying more on private sector capacity instead of developing their own. Some municipalities with landfills are also utilizing private sector capacity due to cost efficiency and/or extending the capacity life of municipal landfills. Municipalities typically manage their landfills to preserve capacity for residential waste by minimizing IC&I waste disposal through market pricing strategies.

While data is not available to quantify the volume of waste generated in Eastern Ontario being disposed in the USA annually, it is at least understood that some volume of waste from the area is being transported to upstate New York landfills for disposal, as 27% of Ontario's waste is landfilled in the USA according to the OWMA. Similar to the situation in Ontario, landfill capacity in New York and other states is continuing to diminish and consolidating into fewer regional sites. This has had the effect of increased competition to actually secure long term disposal capacity.

The need for accessible and secure local disposal capacity for residential waste, which is managed entirely within Ontario, is of particular importance during situations like the COVID-19 pandemic. On May 12, 2020, the OWMA issued a media release outlining the changes in residential and commercial waste generation experienced during the pandemic based on a study conducted with the support of 13 Ontario municipalities representing close to 8.5 million residents (P. van der Werf, 2020). The study concluded that, between March 9 and April 27, 2020, there was an overall 5.31% increase in residential waste generation over the same time period in 2019 as a result of the pandemic. This increase included a 4.32% increase in garbage, a 12.25% increase in green bin organics, and a 1.07% increase in blue box recyclables. The EOWHF is an essential service for managing residential wastes (including garbage and organics) from numerous municipalities across Eastern Ontario.

It is evident that the EOWHF is a significant component of the provincial waste management network and infrastructure, both now and in the future, serving a broad area and customer base across Eastern Ontario. The EOWHF provides both composting

and disposal capacity to customers from the Quebec border west to the Greater Toronto Area and north to Renfrew County, and is also permitted to process organics and leaf and yard waste from both Ontario and Quebec (Montreal, Gatineau, and western Quebec). With a lack of sufficient and secure long term disposal capacity available in the region, there is an on-going requirement for this facility to continue to provide this service, supporting stable operation and growth for municipalities and businesses across Eastern Ontario.

It is possible that, with the construction of the two other private landfills within Ottawa identified above, and the expected increase in waste diversion, the annual disposal rate at the EOWHF landfill may be less than 755,000 tonnes and the site life may therefore extend more than 20 years.

3.3.2 Consistency with Provincial Legislation

In June 2016, the Ontario government passed the *Waste Free Ontario Act*, which enacted two Acts: the *Resource Recovery and Circular Economy Act, 2016*, and the *Waste Diversion Transition Act, 2016*. Under the new legislation, the province is moving toward a circular economy framework by establishing a producer responsibility regime. Subsequently in 2017, the MECP released the Strategy for a Waste-Free Ontario: Building the Circular Economy (the Strategy) (MECP, 2017a). The Strategy outlines a vision for Ontario where waste is considered a resource that can be recovered, reused and reintegrated to achieve a circular economy. The ultimate goal of the Strategy is to achieve zero waste and zero GHG emissions from the waste sector. The Strategy further identifies four overall objectives which include a total of 15 actions to be taken and implemented by 2050. A number of the actions relate to the need for landfill including increased resource recovery, disposal bans, reduction of food and organic wastes, and ensuring landfills are well planned and managed to minimize their need and reduce GHG emissions.

The Province of Ontario released their Climate Change Action Plan 2016 – 2020 (MECP, 2016), which describes the actions Ontario would take during that time period to fight climate change, reduce GHG pollution and transition to a low-carbon economy. The waste sector is reported to contribute 5% of the overall GHG emissions. The Climate Change Action Plan aligned with the *Waste Free Ontario Act*, outlining increased recycling efforts and a reduction in the amount of organic material being directed to landfill in order to reduce GHGs. Another action is the capture of methane generated from landfill for use as a renewable natural gas.

In April 2018, the Province of Ontario issued the Food and Organic Waste Policy Statement pursuant to section 11 of the *Resource Recovery and Circular Economy Act, 2016*. The Food and Organic Waste Policy Statement provides further direction for increasing waste reduction and resource recovery of food and organic waste in Ontario. Policy 6.8 of the Food and Organic Waste Policy Statement directs that “proponents of new or expanded waste management systems for disposal should consider resource recovery opportunities for food and organic waste”.

In November 2018, the MECP released Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan (MECP, 2018b) which outlined various commitments to reduce litter and waste in Ontario communities. Subsequently in

March 2019, the Ministry released the Reducing Litter and Waste in Our Communities: Discussion Paper (MECP, 2019) identifying three waste management goals for Ontario:

1. Decrease the amount of waste going to landfill;
2. Increase the province's overall diversion rate; and
3. Reduce greenhouse gases from the waste sector.

Even with the introduction and implementation of these provincial initiatives, residual materials will remain which require proper management and disposal for the foreseeable future.

GFL's integrated waste management services and facilities are well positioned to continue to support Ontario's transition to becoming waste-free and achieving a circular economy, while supporting a reduction in GHG production and the amount of waste, including food and organic waste, going to landfill. GFL currently provides a range of services to maximize the diversion of materials away from disposal, which include the largest composting facility in Ontario capable of managing food and organic wastes and producing a high quality marketable end product. GFL is very active in providing organics management as a key business service to a diverse range of clients across Ontario and Canada. With the acquisition of Canada Fibers, GFL is also well positioned to respond to future market demands for increased recyclables processing.

Continued operation of the EOWHF aligns with the Province of Ontario's Strategy for a Waste Free Ontario, Climate Change Action Plan goal of reducing GHG emissions, and the Made in Ontario Environment Plan to reduce litter and waste in communities. GFL has invested in many initiatives to reduce GHG emissions and divert more materials. The future development of the EOWHF is required to continue sustainable business operations and to continue providing the essential financial support for a wide range of additional services and programs, as follows:

- GFL has installed an LFG collection system at the existing EOWHF to collect methane gas (a major source of GHGs), which is used for energy production. The LFG collection system is being expanded as additional cells and stages of the landfill are completed. This now includes all of Stages 1, 2, 3, and the initial cells of Stage 4 of the existing landfill. In 2021, approximately 62.4 million m^3 of LFG was captured and destroyed at the EOWHF.
- In 2011, GFL received approval from the Ontario Power Authority as part of the Feed-in-Tariff (FIT) program to produce 4.2 megawatts (MW) of renewable energy from the collected methane via four reciprocating engines. The plant is operating at its peak electrical production and has additional combustion capacity in place through its existing flare stacks; therefore, it has the capacity to manage additional LFG volumes collected from future landfill development.
- GFL's EOWHF composting facility keeps organic material out of landfills which also reduces GHG emissions through the avoidance of methane generation from the decomposition of organic materials. This facility is one of very few composting facilities in Ontario able to manage organic materials such as diapers and sanitary products. The facility is capable of consistently producing an 'AA' compost product.

- GFL supports further reductions in GHG emissions by providing disposal services to smaller municipalities allowing them to close their landfills which do not have LFG control systems. As an example, GFL worked with Russell Township Council to assist the municipality in the environmentally sound closure of their landfill and provided a state of the art transfer station for waste, recyclables and organics transfer. In addition, the transfer station site also includes a residential drop-off area that allows the efficient sorting of all waste streams, recyclables, metal, etc.
- GFL provides a network of regional transfer stations to collect material from a larger number of generators and consolidate the material for transport, which significantly reduces the number of vehicles travelling long distances to appropriate processing and disposal facilities. This also supports a substantial decrease in GHG emissions associated with transportation of waste.
- GFL is in the planning process for the development of a facility at the EOWHF to convert LFG to renewable natural gas (RNG). The broader economic benefits have been discussed with the United Counties of Stormont, Dundas and Glengarry (SDG) and the United Counties of Prescott-Russell which may include the development of greenhouses and a local abattoir. This proposal was endorsed by the United Counties of SDG by resolution dated January 24, 2022.

There are also a number of programs and services offered by GFL at the EOWHF which contribute to community awareness of climate change and waste reduction including participation in various organizations to further develop opportunities to reduce waste. These include the following:

- GFL has partnered with Habitat for Humanity to allow individuals to drop off items for redistribution, instead of being disposed, at GFL transfer station locations and at the EOWHF public drop off area.
- GFL is an active educator and during a year provides presentations, tours and information to hundreds of individuals. Numerous local and Ottawa schools come as part of their curriculum to the EOWHF to learn about diversion, composting, and their role in making Ontario waste free.
- GFL in partnership with the Ontario Centre of Innovation, The River Institute, and St. Lawrence College have funded and conducted extensive research on the beneficial use of the leachate generated from the EOWHF organics processing / composting facility. This research has included an assessment of the effect on plant growth rates. The study was finalized in 2018 and the results have shown excellent benefits to nutrient growth. Based on these successful results, GFL is exploring the potential to take the leachate from the composting facility and provide it as a viable, highly enriched liquid organic fertilizer and soil additive that can be marketed to the public. This will eliminate the need to treat the leachate as waste water and offer an excellent example of the circular economy in practice.
- GFL staff is actively involved at the director level with the Compost Council of Canada and has been instrumental in working with them and the MECP as a member of the Organics Working Committee to develop the Organics Strategy as part of Waste-Free Ontario.

- GFL is an active member of the OWMA participating in various committees on organics, recycling, and soil remediation established to help advance the waste management industry within Ontario.

3.4 Alternatives to the Undertaking

Alternatives to the undertaking are functionally different ways of addressing the business opportunity identified by GFL which is the provision of long-term waste disposal capacity. GFL has identified and considered specific alternatives to the proposed undertaking that address the opportunity and are within the company's business mandate and ability to implement.

Consistent with the MECP's Code of Practice for Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario (MECP, 2014a), GFL identified a range of alternatives for providing long-term disposal capacity that are appropriate and reasonable for them (a private sector company) to implement. The following four alternatives were identified:

1. Do nothing;
2. Redirect waste to a disposal facility elsewhere;
3. Develop a thermal treatment facility at the EOWHF; and
4. Develop additional landfill disposal capacity at the EOWHF.

Each of the alternatives were considered in the context of their ability to meet the needs of the Eastern Ontario region and the business opportunity identified by GFL, including financial, and in some cases technological, risks.

These alternatives were presented to the public as part of consultation and engagement during the development of the ToR. The comments received on the alternatives to the undertaking identified that the future development of the landfill east of the EOWHF (Alternative 4, above) is an acceptable alternative; however, potential effects on noise, odour and visual impacts need to be considered along Highway 138 and Highway 417. The potential effects of the preferred alternative will be identified and assessed as part of the EA.

Comments were also received regarding the use of incineration and newer technologies, taken to mean various thermal treatment technologies currently being investigated. GFL has considered development of a thermal treatment facility as an alternative (Alternative 3, above) and it is not a feasible option for the company to address the identified business opportunity. GFL does not own or operate any thermal treatment facilities and has no related business experience with this type of alternative. This alternative would pose significant risks to GFL's business.

GFL has determined that the future development and on-going operation of the EOWHF landfill is the only reasonable option for the company, its customers, and the Province of Ontario. The other alternatives do not address GFL's business opportunity to meet long-term customer commitments or avoid business risks, and they are not supportive of the Ontario government priorities of addressing waste diversion and climate change. The "do nothing" alternative will be carried forward in the EA to provide a benchmark against

which to measure the alternative methods and to assess the advantages and disadvantages of the preferred alternative.

3.5 Summary

GFL Environmental wishes to maintain its current integrated business operations at the EOWHF. This includes a range of waste management services including waste collection, processing and transfer of recyclables, composting and disposal. GFL's services support the goals and objectives of Ontario's Strategy for a Waste Free Ontario: Building the Circular Economy (MECP, 2017a), Climate Change Action Plan (MECP, 2016), and Made-in-Ontario Environment Plan (MECP, 2018b). The landfill component of the EOWHF remains an essential component to support these activities until a waste-free Ontario is achieved.

The proposed undertaking is to provide approximately 15.1 million m^3 of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period. The proposed undertaking will be within the existing EOWHF site and on lands to the east including the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10. The undertaking will enable GFL to continue to provide disposal services for residual non-hazardous solid waste to their customers once the landfill reaches its currently approved disposal capacity and continue to provide economic support to the local community over the long term.

There is a need for the future development of the EOWHF as it is a significant component of the provincial waste management network and infrastructure in a region lacking in sufficient and secure long-term disposal capacity. GFL is providing waste management services and facilities that are well positioned to continue to support Ontario's transition to becoming waste-free and achieving a circular economy, while supporting a reduction in GHG production and the amount of waste going to landfill, consistent with provincial legislation.

4 Description of the Environment Potentially Affected by the Undertaking

A preliminary description of the existing environmental conditions at the EOWHF was provided in the approved ToR. The ToR contained the commitment that the existing environment will be characterized in the EA, and will address the five aspects of the environment as defined in the *OEAA*:

- natural environment;
- built environment;
- cultural environment;
- social environment; and
- economic environment.

For the purposes of this EA, the social and economic environments have been grouped into the socio-economic environment.

This section of the EA Study Report provides an overview of the existing environment potentially affected by the EOWHF future development based on **Supporting Document 1 – Existing Conditions Reports.**

4.1 Environmental Aspects, Components and Criteria

For the purposes of the EA, the environmental aspects identified above were subdivided into environmental components and evaluation criteria, as included in the approved ToR and provided in **Table 4-1**, to focus the assessment of effects. The description of the existing environment and the assessment of effects are organized by environmental component.

Table 4-1. Environmental Aspects, Components and Evaluation Criteria

Environmental Aspect	Environmental Component	Evaluation Criteria
Natural Environment	Atmospheric Environment	• Air Quality • Noise • Odour
	Geology and Hydrogeology	• Groundwater Quality • Groundwater Quantity
	Surface Water Environment	• Surface Water Quality • Surface Water Quantity
	Ecological Environment	• Terrestrial Ecosystems • Aquatic Ecosystems
Socio-Economic Environment	Economic	• Economic Effects on / Benefits to Local Community
	Social	• Effects on Local Community • Visual Impact of Facility

Table 4-1. Environmental Aspects, Components and Evaluation Criteria

Environmental Aspect	Environmental Component	Evaluation Criteria
Cultural Environment	Cultural Environment	• Cultural Heritage Resources • Archaeological Resources
Built Environment	Transportation	• Effects from Truck Transportation along Access Roads
	Current and Planned Future Land Use	• Effects on Current and Planned Future Land Uses
	Aggregate Extraction and Agricultural	• Aggregate Resources • Effects on Agricultural Land

4.2 Study Areas

The study areas identified for the EA include the existing EOWHF site and the future development lands as well as potentially affected surrounding areas. The existing EOWHF encompasses a site area of 189 hectares, while the lands to the east of the existing EOWHF being considered for future development include approximately 240 ha. The generic On-site and Off-site Study Areas identified for the EA in the approved ToR are as follows (**Figure 4-1**):

- On-site Study Area – the existing EOWHF site, and the future development area comprising the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10 east of the EOWHF; and
- Off-site Study Area – the lands in the vicinity of the future development extending approximately 1 km from the On-site Study Area.

As outlined in the approved ToR, the generic study areas identified above were refined during the EA to better suit the requirements of specific environmental components. Modifications to the study areas are outlined in **Table 4-2**.

The generic On-site Study Area was adopted for all environmental components with the exception of the following:

- Atmospheric Environment
  - Air Quality
  - Odour
- Surface Water Environment
  - Surface Water Quantity

The generic Off-site Study Area was modified for the following environmental components:

- Atmospheric Environment
  - Air Quality
  - Odour
- Socio-Economic Environment
  - Economic Environment
- Surface Water Environment
  - Surface Water Quality
  - Surface Water Quantity
- Transportation
- Agriculture

Figure 4-1. Generic Study Areas for the EA

Table 4-2. Study Areas by Environmental Component

Environmental Component	Evaluation Criteria	Off-site Study Area	On-site Study Area
Natural Environment			
Atmospheric Environment	• Air Quality	• Modified to include an area extending approximately 4 km from the On-site Study Area (**Figure 4-2**)	• Modified to include the future composting area to the south of the existing EOWHF (**Figure 4-2**)
	• Noise	• Generic Off-site Study Area	• Generic On-site Study Area
	• Odour	• Modified to include an area extending approximately 4 km from the On-site Study Area (**Figure 4-2**)	• Modified to include the future composting area to the south of the existing EOWHF (**Figure 4-2**)
Geology and Hydrogeology	• Groundwater Quality • Groundwater Quantity	• Generic Off-site Study Area	• Generic On-site Study Area
Surface Water Environment	• Surface Water Quality	• Modified to include the Moose Creek subwatershed (**Figure 4-5**)	• Generic On-site Study Area
	• Surface Water Quantity	• Modified to include the Fraser and Upper Tayside subwatersheds (**Figure 4-7**).	• Modified to exclude the existing EOWHF (**Figure 4-7**)
Ecological Environment	• Terrestrial Ecosystems • Aquatic Ecosystems	• Generic Off-site Study Area	• Generic On-site Study Area
Socio-Economic Environment			
Economic	• Economic Effects on / Benefits to Local Community	• Modified to include the United Counties of SDG, the City of Cornwall, the Municipality of Casselman, the Township of Russell, and the Nation Municipality (**Figure 4-10**).	• Generic On-site Study Area
Social	• Effects on Local Community • Visual Impact of Facility	• Generic Off-site Study Area	• Generic On-site Study Area
Cultural Environment			
Cultural Environment	• Cultural Heritage Resources • Archaeological Resources	• Generic Off-site Study Area	• Generic On-site Study Area

Table 4-2. Study Areas by Environmental Component

Environmental Component	Evaluation Criteria	Off-site Study Area	On-site Study Area
Built Environment			
Transportation	• Effects from Truck Transportation along Access Roads	• Modified to include the intersection of Highway 417 with Highway 138, and the intersection of Highway 138 with Laflèche Road (**Figure 4-14**).	• Generic On-site Study Area
Current and Planned Future Land Use	• Effects on Current and Planned Future Land Uses	• Generic Off-site Study Area	• Generic On-site Study Area
Aggregate Extraction and Agricultural	• Aggregate Resources	• Generic Off-site Study Area	• Generic On-site Study Area
	• Effects on Agricultural Land	• Modified to extend approximately 1.5 km from the On-site Study Area (**Figure 4-16**)	• Generic On-site Study Area

4.3 Existing Conditions

The summary of existing conditions (i.e., the existing environment potentially affected) presented herein is organized by environmental aspect and environmental component. Detailed descriptions of the existing conditions are provided in the Existing Conditions Reports (**Supporting Document 1**).

4.3.1 Existing EOWHF and Future Development Lands

4.3.1.1 Overview of the EOWHF

The existing EOWHF is located within the Township of North Stormont, approximately 5 km north-northwest of the village of Moose Creek, Ontario, and 5 km east of the Municipality of Casselman, Ontario, on the western half of Lot 16 and Lots 17 and 18, Concession 10, Township of North Stormont, United Counties of Stormont, Dundas and Glengarry, near the intersection of Highway 417 and Highway 138. The municipal street address for the facility is 17125 Laflèche Road, Moose Creek, Ontario.

The EOWHF encompasses a site area of 189 ha (**Figure 1-2**) which includes the following waste management related activities and services:

- 112 ha landfill site;
- composting facility;
- wastewater (leachate) treatment facility;
- small vehicle waste drop off;

- Landfill Gas to Energy (LFGTE) plant;
- enclosed flare and natural gas fired comfort heating equipment;
- Resource Productivity & Recovery Authority – Tires; and
- supporting facilities (office, vehicle maintenance).

The majority of the EOWHF site is zoned Waste Disposal, supporting the operation of the landfill. A minimum 50 metre (m) separation distance is maintained from the north, east and west property boundaries and 120 m from the south property boundary and the wetland area to the south. The EOWHF site is bounded by the following:

- To the North by the Fraser Drain, which outlets into Moose Creek;
- To the East by the Fraser Drain;
- To the South by Laflèche Road; and
- To the West by a private drain and road allowance.

GFL owns the land immediately east and south of the EOWHF. Land uses adjacent to the EOWHF site boundaries are as follows:

- To the North: the land to the north is owned by others and currently used for agricultural purposes (cash crops) beyond which is Highway 417;
- To the East: the land to the east is owned by GFL and is currently leased and used as a sod farm;
- To the South: the land to the south is owned by GFL and is currently leased and used for peat extraction; and
- To the West: the land to the west is owned by others and currently used for peat extraction and agricultural purposes (cash crops).

Two screening berms have been constructed at the EOWHF site. The Highway 417 berm runs parallel to the highway and screens the stormwater ponds and leachate treatment facilities as well as other on-site activities. The west boundary berm runs along the western boundary of the site, parallel to the western property boundary. Both berms are vegetated and have a top elevation approximately 4 m above the existing adjacent ground surface.

4.3.1.2 Overview of the Future Development Lands

The lands being considered for the future development include lands within the existing EOWHF and lands to the east comprising the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10, comprising an area of approximately 240 ha (**Figure 4-2**). These lands are owned by GFL and currently leased for agricultural use (sod farming) with a small commercial office for the sod farm administration and sales. An amendment to the North Stormont Zoning Bylaw was completed in April 2022 to re-zone the future development lands to Waste Disposal and remove the Area of Natural or Scientific Interest (ANSI) zoning.

The future development lands are bounded by the following:

- To the North by the Roxborough-Plantagenet Boundary Municipal Drain;
- To the East by Highway 138;
- To the South by Laflèche Road; and
- To the West by the Fraser Drain and EOWHF.

Land uses adjacent to the future development lands are as follows:

- To the North: the land to the north is owned by others and currently used for agricultural purposes (cash crops) beyond which is Highway 417;
- To the West: the land to the west is the EOWHF site, owned by GFL;
- To the South: the land to the south is owned by GFL and is currently leased and used for peat extraction; and
- To the East: the land to the east is the Highway 138 road allowance.

4.3.1.3 Environmental Compliance Approvals

The EOWHF is operated in accordance with five ECAs. **Table 4-3** provides a list of the ECAs issued for the site. The ECAs relate to landfilling operations, industrial sewage works, air discharges, and LFG capture, destruction, and electricity generation facilities. The primary ECA that relates to the day-to day operations at the EOWHF is the landfill ECA A420018.

Table 4-3. Environmental Compliance Approvals

Approval Type	Approval Number	Issuance Date	Operation /Process
ECA - Landfill	A420018	August 22, 2021	Landfill, composting facility, and waste transfer and processing station
ECA – Industrial Sewage Works	7899-CBQP6L	March 31, 2022	Leachate treatment facility and effluent testing
ECA – Air	9112-9DMTGX	December 10, 2013	Aerobic composting facility
ECA – Landfill gas	5665-8STRV7	April 26, 2012	LFG fired electricity generation generator sets
ECA – Air	8583-B9ZRZ8	March 28, 2019	Enclosed flares

4.3.1.4 Existing Infrastructure

Facility Entrance, Roads and Administration Building

A gated entrance from the North Stormont Township road allowance between Concessions 9 and 10, also known as Laflèche Road, is the main access road to the EOWHF site. The gate is locked after business hours and is monitored by security systems. Access during operating hours is controlled by an attendant at the weigh scales operating from a scale house.

Internal roads are constructed and relocated as necessary to provide access to the active landfill areas and other site facilities. The internal roads are constructed using

sand or gravel. The waste vehicle haul road is paved from the site entrance along the western boundary of the site.

There is an administrative office, scale house and two scales at the southeast corner of the EOWHF site, near the gated entrance. To the east of the administrative office is an employee parking lot and to the west is the site's maintenance shop, including offices on the second floor, and the continuation of the entrance road past the north side of the shop.

Vehicle Maintenance Building and Drop-off Area

West of the administrative office north of the entrance road is a small public drop-off area.

The public drop-off area is located northwest of the scales. There are several bins to which customers can back up, one of which is presently dedicated to metal material. Scrap metal is sent off-site for recycling.

The Recyclable Waste Transfer/Processing Facility is permitted to receive, process and transfer an annual average of 875 tonnes per day of recyclable municipal waste from residential, IC&I generators. A maximum of 265,000 tonnes of waste may be received/processed annually (ECA No. A420018). On-site storage is limited to 250 tonnes at any one time.

A roll-off bin is used to accept scrap tires. The tires are collected by Moose Creek Tire Recycling Inc. and unloaded at their facility. A dedicated bin is also provided for agricultural plastic, which is emptied periodically by an outside contractor for recycling.

Composting Facility

The aerobic composting facility is situated on an area occupying approximately 1.9 ha, located at the southwest end of the EOWHF site, immediately across from the closed Stage 1 landfill. The facility has an approved processing capacity of 240,800 tonnes per year as per ECA No. A420018. The composting facility is approved to utilize feedstocks including but not limited to non-hazardous domestic, IC&I, organic waste, or SRM. The composting facility is also approved to utilize bulking agents (as a carbon source and porosity agent) including but not limited to municipal, commercial and private leaf and yard waste, chipped virgin and/or recycled wood, straw, hay, corn by-products and 'peat-overs' (the coarse, woody fraction of peat moss).

The composting facility utilizes an aerated and agitated 12-channel arrangement that is contained within two adjacent primary enclosures for environmental control of moisture, air and odour. All material handling areas (receiving, channel loading, and active composting) with primary containment are additionally contained within a secondary structure (twin MegaDome fabric shelter buildings) for protection against the elements, confinement of materials, and supplementary control of air and odours. Air is extracted from both secondary structures such that a negative pressure is maintained, with all exhaust air ducted to an outdoor, upflow, open-bed biofilter system. Odour control for the composting facility is outlined in Amended ECA No. 9112-9DMTGX.

4.3.1.5 Waste Disposal

Service Area and Waste Characteristics

The area serviced by the EOWHF landfill is the Province of Ontario. Waste received at the EOWHF comes primarily from Eastern Ontario. The waste accepted at the site consists of solid non-hazardous municipal, IC&I wastes, including dewatered sewage sludge, construction and demolition waste, shredder and auto-fluff and contaminated soils. SRM is also approved for acceptance at the site. No hazardous waste or liquid industrial waste, as defined by O.Reg. 347, may be disposed of at the EOWHF.

Waste Quantities

The approved waste disposal volume of the EOWHF landfill (Stages 1 though 4) is 11.6 million m^3 including waste, daily cover, and intermediate cover, but excluding the final cover volume. The maximum amount of waste that may be received at the landfill annually is 755,000 tonnes, with a daily average of 2,500 tonnes. The daily maximum of compost and landfill material combined is 4,000 tonnes per day.

4.3.1.6 Stormwater Management

The EOWHF on-site Stormwater Management (SWM) system is approved under an existing ECA and includes five SWM ponds, a perimeter channel, and an outlet control structure located at the northwest corner of the EOWHF site.

The perimeter channel begins at the downstream end of two of the SWM ponds and extends to the outlet structure at the northwest corner of the EOWHF site where flows are controlled to not increase peak flows downstream. The five SWM ponds are designed for both quality control (80% Total Suspended Solids (TSS) removal or an 'Enhanced' level of protection) and quantity control (to maintain peak flows to 'natural' levels up to and including the 100-year return period and also provide extended detention to prevent downstream erosion). Each pond has a dedicated inlet structure that drains the runoff from the covered landfill areas and associated roadways.

The perimeter channel is designed to collect the controlled outflows from the SWM ponds, collect surface flows from the existing/natural portions of the site, and convey the collected flows for all return periods up to the 100-year design event to a dedicated outlet to the Fraser Drain. Peak flows are controlled at this dedicated outlet by an outlet structure containing orifices and weirs, sized to control peak flows up to the 100-year design event to their 'natural' levels.

The future development lands contain agricultural tile drains, which drain most of the area west toward the Fraser Drain. The eastern portion of the area drains east toward the Upper Tayside Municipal Drain.

4.3.1.7 Leachate Management and Treatment

Landfill leachate is currently collected from the EOWHF landfill stages and transferred via forcemain to the existing leachate aeration ponds located in the southwest portion of the EOWHF site and subsequently to the on-site Leachate Treatment Facility (LTF). The LTF and ponds operate under ECA No. 7899-CBQP6L.

The LTF includes two holding/pre-treatment aeration ponds, three suspended media biological reactors (SMBRs), a coagulation/flocculation tank, a dissolved air flotation device, and a tertiary filtration system. The aeration ponds provide primary treatment of SMBR influent through elevation of dissolved oxygen and subsequent scrubbing of ammonia. Additional benefits resulting from use of the aeration ponds includes some settling of leachate solids and lowering of biological oxygen demand (BOD) before entering the SMBRs. The SMBRs provide treatment for the remaining BOD and for nitrogen ammonia. A boiler room provides the heat to the leachate that is necessary for nitrification during cold seasons.

The treated effluent is directed to the 9,600 m^3 storage capacity effluent holding ponds (EHPs). The EHPs have a common outlet structure supplied by two discharge pipes and one discharge pump. The treated effluent is discharged to the Fraser Drain by batch when compliant with the ECA effluent limits. In 2021, batch discharge events occurred approximately once every two weeks between November to May, and less frequently during the low flow period.

If the treated effluent contained in either EHP fails to meet the batch discharge effluent limits, the contents can be transferred to the Auxiliary Wetland Treatment System for further treatment or recycled back to the LTF for further treatment.

Currently the LTF is permitted to treat 200,000 m^3 of leachate per year and in 2021 approximately 175,285 m^3 of leachate was treated. Upon full closure, it is estimated that the existing EOWHF landfill will generate approximately 130,000 m^3 to 145,000 m^3 of leachate per year. Planned upgrades are anticipated to increase the capacity of the LTF to 304,000 m^3/year so the projected volume of leachate from the future development can be managed.

4.3.1.8 Landfill Gas Management

LFG generated in the EOWHF landfill is collected with a system of vertical extraction wells, a network of buried gas conveyance piping, and a condensate drop-out location system. The LFG collection system collects and conveys the LFG to the existing LFGTE plant, which is capable of generating up to 4.2 MW of power. The LFGTE plant has a total combustion capacity of 15,040 m^3/hr (8,850 cfm) consisting of four reciprocating engines which generate electricity and have a combined capacity of 2,300 m^3/hr (1,350 cfm @ 50% CH_4), and three enclosed flares with a combined capacity of 12,750 m^3/hr (7,500 cfm).

The LFGTE plant is owned by Moose Creek Energy, which is an Ontario-based partnership between Integrated Gas Recovery Services, Inc. and Energy Ottawa Inc. Integrated Gas Recovery Services, Inc. operates the utilization facility, as well as the flaring and wellfield systems. The facility is operated under ECA No. 5665-8STRV7 and A420018.

The four reciprocating engines are being operated under a FIT contract valid until February 20, 2033. Once the FIT contract concludes it is currently anticipated that the operation of the reciprocating engines will be terminated and the combustion capacity of the LFGTE plant will be reduced. GFL is considering the potential to divert LFG to an RNG facility and, if this occurs, the existing flaring capacity at the LFGTE plant may be sufficient to manage the residual LFG. Sufficient LFG management capacity is available

at the EOWHF for the projected volume of LFG to be generated and collected. GFL will continue to monitor the generation of LFG in future years to confirm that the LFG management infrastructure is sufficient. An additional flare may be added if required. Should additional flaring be needed, an ECA amendment application will be completed as required.

4.3.1.9 General Housekeeping

A number of standard operating procedures and best management practices are followed at the EOWHF as part of daily operations. These procedures and practices address the following:

- dust;
- litter;
- odour;
- noise;
- vectors and vermin;
- fire;
- complaints;
- security;
- inspection and maintenance; and
- recordkeeping.

4.3.2 Natural Environment

A summary of the existing conditions for the Natural Environment is provided below. The Natural Environment, as defined for the EA, includes the Atmospheric Environment, Geology and Hydrogeology, the Surface Water Environment, and the Ecological Environment.

4.3.2.1 Atmospheric Environment

The Atmospheric Environment includes Air Quality, Odour, and Noise.

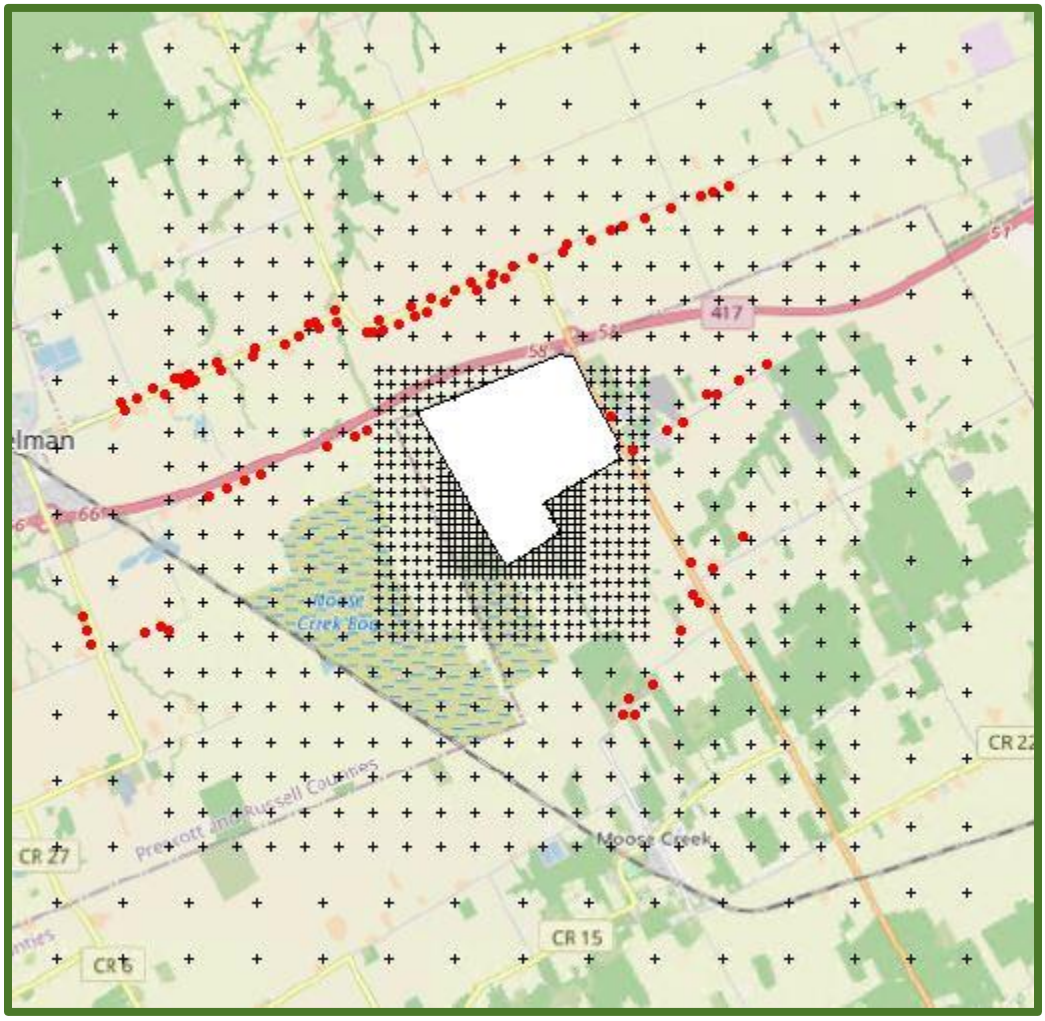
Air Quality and Odour

The existing conditions are summarized from the Air Quality and Odour Existing Conditions Report (**Supporting Document 1-1**).

The Off-site Study Area for the Air Quality and Odour assessment was increased to extend approximately 4 km from the On-site Study Area as shown on **Figure 4-2**. The area surrounding the EOWHF comprises mostly agricultural lands as well as portions of the Trans-Canada Highway (Highway 417), Highway 138, and a number of businesses including Champion Mushrooms, Calco Soils Inc., Moose Creek Tire Recycling Inc., A.L. Blair Construction Ltd., Agro Culture, Supreme Seeds, and Casselman Performance. There are a total of 81 residences within the Off-site Study Area, six (6) of which are

located within 1 km of the On-site Study Area. Air quality impacts were assessed at these residential locations, which are referred to as sensitive receptors.

Figure 4-2. Air Quality Study Areas



GFL is planning to relocate the compost curing and storage pad areas to an area south of the existing EOWHF. It is currently anticipated that the new compost pads will be constructed and operational during the life of the future development. Consequently, the new compost area was included in the On-site Study Area for the Air Quality and Odour assessment. The revised On-site Study Area is shown on **Figure 4-2**.

A dispersion modelling assessment of air emissions from the EOWHF and future development lands was completed to determine the extent of the existing impacts on air quality and odour within the surrounding area.

Air emissions result from a number of processes and activities that occur within the On-site Study Area. The list of activities included in the modelling was expanded to include sources of emissions that would not normally be considered. Including these additional sources resulted in higher emission estimates and provided a more comprehensive and

conservative assessment of air quality impacts. The on-site sources of air emissions within the On-site Study Area include:

- receiving, placing, and compacting of solid waste;
- decomposition of waste within the landfill;
- combustion of LFG in flares and in stationary engines driving electrical generators;
- organic composting facility;
- on-site haul roads, various material handling activities, and construction activities;
- mobile equipment including the waste delivery truck fleet, material handling equipment, and construction equipment; and
- agricultural activities.

Leachate from the landfill is collected, treated in aeration ponds, treated in the LTF, and stored in effluent holding ponds until discharge. These sources are expected to emit contaminants, including odour, in negligible quantities under normal aerobic conditions.

The generation of LFG is an important factor in the assessment of air quality around a landfill. The LFG generation rate at the EOWHF will increase until just after the landfill reaches its currently approved capacity, which is predicted to occur around 2025. After closure of the landfill, LFG generation will fall off slowly with time. The peak LFG generation rate will coincide with the implementation of the future development; therefore, the peak LFG generation rate (~2025) was considered as part of the existing condition.

Ontario Regulation 419/05 (MECP, 2009) sets out air standards which are upper limits on a facility's contribution to ambient air concentrations. The MECP has also established a list of guidelines and screening levels to be used as limits to evaluate a facility's contribution to ambient air concentrations for regulatory approval purposes.

The MECP has established Ambient Air Quality Criteria (AAQC) that are intended to be used to assess general (ambient) air quality resulting from all sources of a contaminant to air. An AAQC is not a regulatory value; rather, it is a concentration of a contaminant in air that is protective against adverse effects on health and/or the environment.

The Canadian Council of Ministers of the Environment (CCME) have established Canadian Ambient Air Quality Standards (CAAQS). The CAAQS are health and environmental-based air quality objectives to further protect human health and the environment and to provide the drivers for air quality improvement across the country. For nitrogen dioxide and sulphur dioxide, the existing CAAQS objectives will become more stringent as of 2025. Existing conditions were compared against both sets of CAAQS.

The cumulative air pollutant impacts in the Off-site Study Area are dependent on both the direct impact of emissions from the EOWHF, and regional background air pollutant concentrations. Regional background concentrations result from other sources of pollutant emissions in the region, as well as long-range transport from other areas.

The MECP monitors and records ambient air concentrations of key pollutants at numerous monitoring stations across the province. The two stations closest to the

EOWHF, Ottawa (Downtown) and Cornwall, were selected as most representative of the regional background concentration in the Off-site Study Area. The Ottawa (Downtown) station is at an urban location within the City of Ottawa, about 55 km west-northwest of the EOWHF. The Cornwall station is at an urban location within the City of Cornwall, about 38 km south-southeast of the EOWHF.

The MECP publishes annual reports summarizing monitored concentrations at each station. In addition, annual monitored datasets are available for selected contaminants. Reports and datasets for years up to and including 2019 were available; consequently, data from the most recent three years (2017 to 2019) were used in the modelling.

An evaluation was conducted of significant air contaminant concentrations at the Point of Impingement (POI), which is the off-site location where the highest concentration occurs. These POI concentrations were compared to applicable limits. In addition, concentrations were evaluated at sensitive receptors (i.e., residences) around the facility, and the highest concentrations at a sensitive receptor were also reported and compared to the same applicable limits.

Of the over 180 contaminants that were considered, 149 were found to be present in negligible quantities. Only four (4) contaminants were predicted to exceed AAQC, CAAQS, MECP air standards, or guidelines as described below: nitrogen dioxide (NO_2); total suspended particulate matter (SPM); fine particulate matter (PM_{10}); and odour. At sensitive receptors, cumulative concentrations of all compounds except odour were below the applicable criteria.

Nitrogen Dioxide (NO_2)

Nitrogen dioxide is a product of combustion and is emitted from the LFGTE plant (engines and flares) as well as from mobile sources (trucks, material handling equipment, construction equipment) at the EOWHF. High NO_2 concentrations are predicted at the western on-site property line due to compost material handling equipment, and at the southeast on-site property line due to the LFGTE plant. The concentration falls off quickly with distance from the property line.

Concentrations are not predicted to exceed 44% of the 1-hour or 24-hour Ontario AAQC for NO_2, and do not exceed the current (2020) or future (2025) annual CAAQS at any location; however, NO_2 concentrations may exceed the 1-hour CAAQS. Maximum NO_2 concentrations are predicted to reach 103% of the current 1-hour CAAQS (2020) at the on-site property line, but will not exceed the CAAQS at any sensitive receptor. The concentration falls off quickly with distance from the on-site property line, and falls to less than the 1-hour CAAQS within 30 m of the property line. The future 1-hour CAAQS (2025) is more stringent, and concentrations are predicted to reach 147% of the new objective at the on-site property line, but again concentrations fall off quickly with distance from the on-site property line, and do not exceed the CAAQS at any sensitive receptor. The sensitive receptor exposed to the highest NO_2 concentration is located east of the facility, along Highway 138. This receptor location is currently vacant and will be demolished.

Suspended Particulate Matter (SPM)

The air standard for SPM is based on visibility effects. The maximum concentration of SPM exceeds the MECP air standard, with a maximum 24-hour concentration that is

257% of the limit. The highest concentration occurs on the western property line adjacent to the paved haul road, and dust from on-site haul roads is the major contributor to the SPM concentration at this location. The concentration falls off quickly with distance from the property line. At sensitive receptors, the SPM concentration does not exceed 52% of the limit. The sensitive receptor exposed to the highest SPM concentration is located east of the facility, along Highway 138. This receptor location is currently vacant and will be demolished.

Fine Particulate Matter (PM_{10})

Particulate matter <10 µm diameter (PM_{10}) is emitted in exhaust from combustion sources (engines, flares), and as dust from roads, material handling, and agricultural activities. The highest concentrations occur on the western property line, adjacent to the paved haul road, and dust from on-site haul roads is the major contributor to the PM_{10} concentration at this location.

There is no monitored ambient air quality data available to describe regional background concentration of PM_{10}, so cumulative ambient air concentration cannot be quantified for comparison to AAQC. The EOWHF's contribution to ambient air concentration exceeds the interim AAQC for PM_{10}, with a maximum 24-hour concentration that is 129% of the criteria. The concentration falls off quickly with distance from the on-site property line. At sensitive receptors, the EOWHF's contribution does not exceed 41% of the AAQC. The sensitive receptor exposed to the highest PM_{10} concentration is located east of the facility, along Highway 138. This receptor location is currently vacant and will be demolished.

Odour

There are several contaminants emitted from the EOWHF that have odour-effects based air standards or guidelines; however, concentrations of these contaminants do not exceed the standards or guidelines at any location. There is no air standard or formal guideline for odour. However, a guideline value of 1 odour unit per cubic metre (OU/m^3) at a sensitive receptor is often used for assessment purposes. Similar to contaminants with odour-effects based air standards, odour is evaluated on a 10-minute average, and the 99.5th percentile concentration at a sensitive receptor is compared to the guideline.

The highest 99.5th percentile concentration at a sensitive receptor is 1.47 OU/m^3, or 147% of the guideline. The sensitive receptor exposed to the highest odour concentration is located southeast of the facility at the intersection of Sandringham Road and Highway 138. The odour concentration is predicted to exceed the guideline level of 1 OU/m^3 at a sensitive receptor about 336 times (10-minute occurrences) in the five year (43,800 hour) modelling period, or about 0.08% of the time.

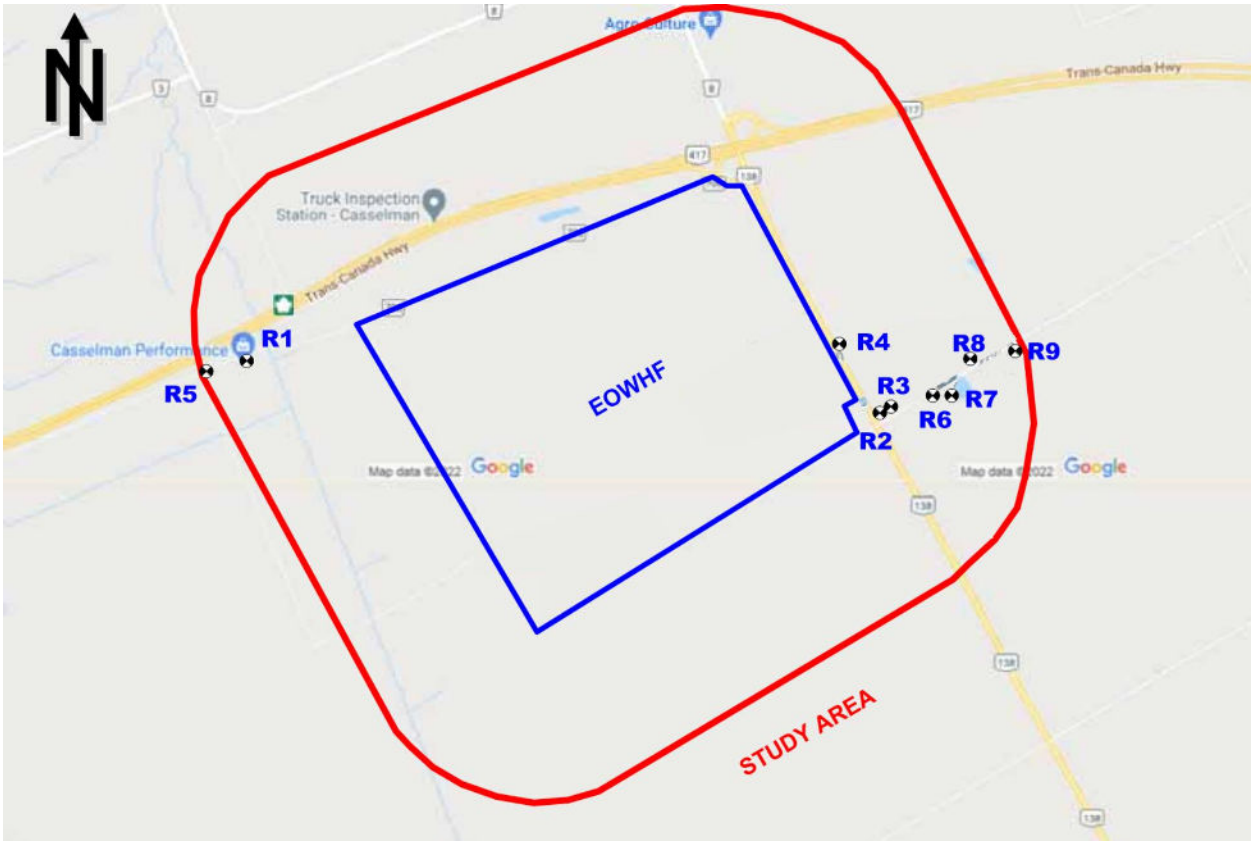
Noise

The existing conditions are summarized from the Noise Existing Conditions Report (**Supporting Document 1-2**).

The On-site and Off-site Study Areas for Noise are the generic study areas shown on **Figure 4-1**. The On-site Study Area comprises the existing EOWHF and future development lands, while the Off-site Study Area comprises the lands in the vicinity of the future development extending approximately 1 km from the On-site Study Area.

Within the Off-site Study Area, nine receptors were identified shown as R1 through R9 on **Figure 4-3**. Four of these receptors comprise the closest and most-potentially impacted points of reception, with respect to noise: R1 through R4. Assessment locations were considered at those four receptors. The other receptors are further and less exposed to the sound of the EOWHF.

Figure 4-3. Noise Receptor Locations



Waste and compostable materials are received at the EOWHF between the hours of 7:00 AM and 5:00 PM on weekdays and 8:00 AM to 2:00 PM on Saturday, with occasional extended hours to 6:00 PM on weekdays[6]. On-site landfilling equipment can operate from 6:30 AM to 6:30 on weekdays and 7:30 AM to 2:30 PM on Saturdays[7]. Some of the ancillary operations on site, including the energy from the LFGTE plant, the biofilter system associated with the composting facility, and the leachate wastewater treatment plant can operate continuously, day and night.

Potential sources of environmental noise at the facility include:

- trucks bringing waste and compostable materials to the site and taking finished compost away;

[6] These are current actual operating hours; however, the ECA allows waste receipt on weekdays from 7:00 AM to 6:00 PM and on Saturday from 7:00 AM to 5:00 PM.

[7] The ECA allows on-site equipment to operate for a half-hour before and after waste-receipt hours to carry out regular site activities such as site preparation and placement and removal of daily/interim cover. The hours provided are based on current operations.

- on-site vehicles associated with landfilling operations such as loaders, compactors, bulldozers, and onsite trucks; and
- mechanical “stationary” sources associated with the energy from the LFGTE plant, the compost facility, and the leachate wastewater treatment facility, such as engines/generators, waste gas flares, compressors, coolers, and fans.

There are two ancillary operations permitted on site, which do not receive or ship materials by heavy trucks and which are acoustically insignificant: the waste transfer and processing station; and the small vehicle waste drop off.

Within the future development lands, there are existing operations associated with Champion Mushrooms and Manderley Turf Products; however, as those operations are agricultural in nature and not subject to the MECP noise assessment guidelines, they were not considered further.

In addition to the on-site measurements of sound emissions, background sound[8] levels were monitored in the vicinity of R1 through R4, for the purposes of establishing the applicable sound level limits, in accordance with the guidelines of the MECP. An investigation of sound from off-site trucking haul routes was not included as these routes and trucking volumes have long since been established and are not planned to change as part of the future development.

Site visits were conducted in 2019 and 2021 to investigate the existing acoustic environment. In the vicinity of the receptors, the background sound was dominated by the relatively heavy volumes of traffic on Highways 417 and 138; operations at the EOWHF were not audible offsite.

Sound level limits for landfill sites are set out in the MECP publication “Noise Guidelines for Landfill Sites” (MECP, 1998). The normal landfill operations at EOWHF entail vehicles and mobile equipment, which are defined in the guideline as “conveyances” and “construction equipment,” for which the exclusion limits of 55 dBA during daytime hours (07:00 to 19:00), and 45 dBA during the evening and night (19:00 to 23:00 and 23:00 to 07:00) apply.

MECP publication NPC-300 (MECP, 2013) is the applicable guideline for establishing sound level limits for stationary sources. For non-impulsive sound, the exclusion limits depend on the character of the acoustical environment at the point of reception, categorized as Class 1, 2, 3, or 4. Because the acoustic environment at the points of reception neighbouring the EOWHF are dominated by road traffic on Highways 417 and 138 during both daytime and nighttime hours, the vicinity is best categorized as a Class 1 area. The exclusion limits applicable in a Class 1 area for stationary sound sources are 50 dBA during daytime and evening hours (07:00 to 23:00) and 45 dBA at night (23:00 to 07:00).

Under NPC-300, the limits for impulse sounds differ depending on how frequently the impulses could occur. Both sources of impulse sound at the EOWHF are associated with trucks visiting the site, which occurs only during daytime hours, in which case only the daytime limits are relevant. For infrequent impulses, occurring no more than once per

[8] Background sound is defined to include natural sounds, road traffic, and other man-made sounds but to exclude the sound of the facility under assessment.

hour, the daytime exclusion limit at a point of reception is 80 dBAI. For frequent impulses, potentially occurring 9 or more times per hour, the exclusion limit for impulse sounds is numerically the same as that for non-impulsive sound – i.e., 50 dBAI. For impulses occurring at a rate between 2 and 8 per hour, there is a stepped set of limits, which varies between the maximum and minimum limits, depending on the number of impulses that could occur per hour.

The truck that drops off and picks up the roll-off bin at the Resource Productivity and Recovery Authority (RPRA) area visits the site only once per month potentially creating a single impulse during pick up; therefore, a maximum of one impulse per hour can be expected from this activity and the applicable exclusion limit is 80 dBAI.

Similarly, dump trucks bringing waste to the tipping face only visit the facility occasionally – the majority of landfill trucks use a hydraulic ram to push the waste out of the back of the truck, which produces negligible sound. During dumping of waste, three impulses from the banging tailgate can occur. From past observations of dump trucks at multiple other sites, it is typically the case that zero to four impulses could occur from the tailgate, with a typical maximum of three to four. On that basis the applicable exclusion limit for the tailgate impulses is 65 dBAI.

Modelling was conducted on a worst-case scenario using Cadna/A software, which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures (or by topography and foliage where applicable) and is accepted by the MECP for modelling outdoor sound propagation. Modelling assumptions are provided in **Supporting Document 1-2**.

The modelling results for sound levels at each of the four receptor locations are provided in **Table 4-4** for landfill operations, stationary sources, and impulse sounds. The results show that the sound levels are well within the applicable limits at all points of reception.

Table 4-4. Sound Levels at Points of Reception

Location	Sound Levels Day / Eve / Night	Sound Level Limits[1,2] Day / Eve / Night	Within Limits?
Landfill Operations – L_{EQ} (dBA)			
R1	42 / -- / 38	55 / 49 / 45	Y / Y / Y
R2	36 / -- / 28	63 / 59 / 54	Y / Y / Y
R3	36 / -- / 30	56 / 51 / 47	Y / Y / Y
R4	35 / -- / 30	63 / 59 / 54	Y / Y / Y
Stationary Sources – L_{EQ} (dBA)			
R1	25 / 25 / 24	51 / 50 / 45	Y / Y / Y
R2	29 / 29 / 24	63 / 59 / 54	Y / Y / Y
R3	29 / 29 / 25	56 / 51 / 47	Y / Y / Y
R4	27 / 27 / 24	63 / 59 / 54	Y / Y / Y

Table 4-4. Sound Levels at Points of Reception

Location	Sound Levels RPRA Bin / Dump Truck	Sound Level Limits[2] RPRA Bin / Dump Truck	Within Limits?
Impulse Sound – L_{LM} (dBAI)			
R1	19 / 44	80 / 65	Y / Y
R2	20 / 32		Y / Y
R3	21 / 33		Y / Y
R4	20 / 34		Y / Y

1. Sound level limits for Landfill Operations from MECP publication "Noise Guidelines for Landfill Sites" (MECP, 1998).
2. Sound level limits for Stationary Sources and Impulse Sound from MECP Publication NPC-300 (MECP, 2013).

4.3.2.2 Geology and Hydrogeology

Geology and Hydrogeology includes groundwater quality and quantity. The existing conditions are summarized from the Geology and Hydrogeology Existing Conditions Report (**Supporting Document 1-3**).

The On-site and Off-site Study Areas for Geology and Hydrogeology are the generic study areas shown on **Figure 4-1**. The On-site Study Area comprises the existing EOWHF and future development lands, while the Off-site Study Area comprises the lands in the vicinity of the future development extending approximately 1 km from the On-site Study Area. Given the nature of the soils in the vicinity of the site (fine-textured soils of silt and clay) which overlie limestone bedrock, the 1 km radius is suitable to evaluate hydrogeological conditions.

Topography

Local topographic relief within the On-site Study Area and the Off-site Study Area is essentially a plain, descending in elevation toward the north. The average grade across the On-site Study Area is approximately 0.2%. There are no distinct hills or valleys within the vicinity, although there are subtle and broad higher and lower areas that may affect local drainage patterns.

Surface Water and Drainage

The On-site Study Area and Off-site Study Area are within the watersheds of Moose Creek and Scotch Creek, which are tributaries to the South Nation River that is tributary to the Ottawa River toward the north. Most of the On-site Study Area is within the Moose Creek watershed.

The On-site Study Area and Off-site Study Area contain a network of mostly linear ditches called drains. Moose Creek flows toward the north, approximately 600 m to 850 m west of the EOWHF. The Fraser Drain runs along the northern and western boundaries of the On-site Study Area and runs between the EOWHF and future development lands. The Upper Tayside Municipal Drain runs within the interior of the south-eastern part of the On-site Study Area and is tributary to the west branch of the

Scotch River. Un-named drains and shallower ditches run alongside local roads and highways.

Surface water generated within the EOWHF is managed internally with grades and complex ditching feeding to SWM ponds that release to the Fraser Drain. The future development lands include shallow ditches approximately 50 m apart that run in a south to north orientation and feed into the drains. Flows are captured along a perimeter channel directly south of the Roxborough-Plantagenet Boundary Municipal Drain and flow westerly towards the Fraser Drain, and by the Upper Tayside Municipal Drain, which runs toward the northeast and discharges to the Scotch River.

Stratigraphy

Regional

The Off-site Study Area and On-site Study Area are mapped as being almost entirely covered by overburden deposits (Ontario Geological Survey, 2010). The overburden thickness varies from a few metres to approximately 30 m (MECP, 1997), where present.

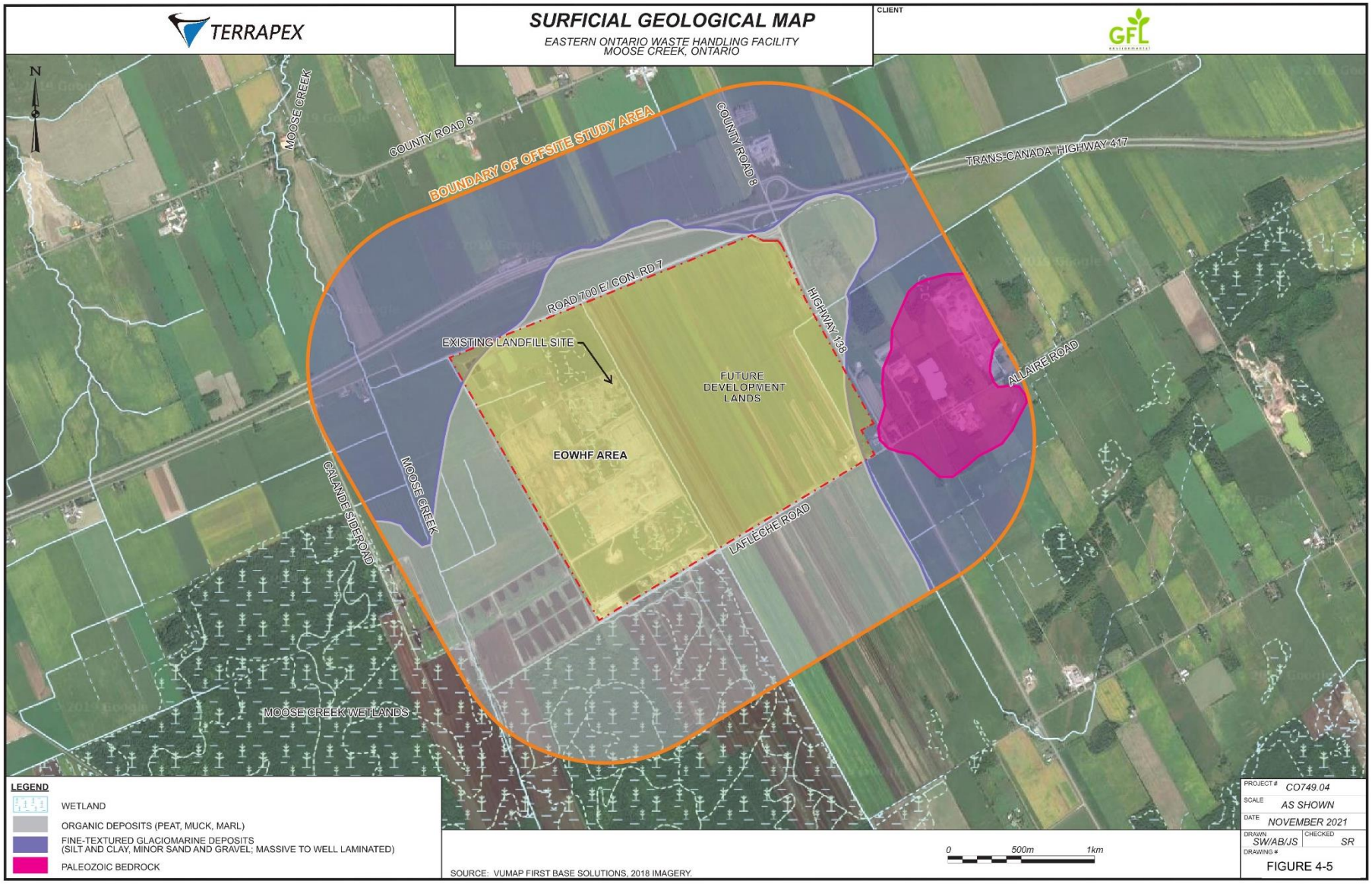
The surficial deposits in the region (**Figure 4-4**) consist of organic deposits, glaciomarine sediment, and gravelly sand or sandy till over bedrock. The materials observed in the vicinity of the EOWHF have been described as organic deposits consisting of peat, muck, and marl and fine-textured glaciomarine deposits consisting of silt and clay, and minor sand and gravel.

On-site Study Area

The EOWHF and future development lands are essentially underlain by a substantially thick package of overburden layers that rests upon bedrock. The stratigraphy, as described below was observed at boreholes within the future development lands, in increasing depth from grade. The summarized stratigraphy was consistent across the site, with minor exceptions.

- Topsoil/peat: Comprising a substantial organic component with wood chips and rootlets. Thickness ranges from 0.3 to 2.1 m, with an average of 1.3 m. The topsoil/peat was absent at two locations. Regional mapping (Ontario Geological Survey, 2010) indicates peat, muck and marl.
- Silty clay: Texture is dominantly clay with a minor component that is either silty or with some silt, sometimes with trace sand. The depth to this layer's base ranges from 4.7 to 17.8 metres below ground surface (mbg), with an average depth of 11.8 mbg. The elevation of the base ranges from 48.7 to 62.5 metres above sea level (masl), with an average of 54.8 masl. This layer is interpreted to be the Champlain Sea glaciomarine deposit. The silty clay layer rests upon the till, except along the eastern side where the till is absent. Grain size analysis indicates the following ranges: gravel = 0 to 2%, average 0.3%; sand = 1 to 8%, average 2.3%; silt = 11 to 42%, average of 22.5%; and clay = 51 to 87%, average of 74.8%.

Figure 4-4. Surficial Geology



- Sandy gravel till: Texture is dominantly sandy gravel with some silt. In the south-central portion of the future development lands, the texture is silty sandy gravel. The depth to the layer's base ranges from 4.9 to 23.7 mbg, with an average of 12.0 mbg. The thickness of the layer ranges from 0.6 to 10.6 m, with an average of 2.5 m. The till layer is absent in the east. It is thin (<1.0 m) along the southern and eastern boundaries with the exception of the midpoint south of the Upper Tayside Municipal Drain where it thickens to 4.4 m.
- Bedrock. The lithology is dominantly limestone, sometimes with shale interbeds. The top of bedrock occurs at depths ranging from 5.7 to 23.7 mbg, with an average depth of 14.4 mbg. The top of bedrock surface elevation is variable, ranging from 44.0 to 61.5 masl, with an average of 52.2 masl.

Hydrogeology

Regional

The main stratigraphic units are anticipated to function as hydrostratigraphic units that are anticipated to provide distinct hydraulic properties as follows:

- Organic. Partially saturated where shallow, saturated at depth. Variable hydraulic conductivity, with decreasing values at greater depth due to compaction. Likely to function as an unconfined aquifer.
- Glaciomarine sediments. Saturated. Very low hydraulic conductivity, with variation due to soil fractures. Likely to function as a regional aquitard due to low hydraulic conductivity and relatively significant thickness. Likely to produce a limited groundwater yield when used for domestic water supply.
- Gravelly sand or sandy till. Saturated. Moderate to relatively high hydraulic conductivity, with variation. Likely to function as a confined aquifer.
- Bedrock. Saturated. Low to relatively high hydraulic conductivity, with variation due to fracture aperture (width) and density. Likely to function as a confined aquifer where more highly fractured - usually in the upper few metres of bedrock. At some locations the bedrock exhibits sparse fracture spacing and at depth it is unweathered featuring fewer fractures and tighter fracture apertures.

Regionally, groundwater movement trends toward the north or northwest (MECP, 1997).

On-site Study Area

The hydrogeological conditions include the water table, hydraulic gradients and hydraulic conductivity.

- Water table: The water table surface elevation declines northward, from approximately 67.0 masl near to Laflèche Road to approximately 64.0 masl near to the intersection of Concession Road 7 / Road 700 and Highway 138. The depth to water table in Spring 2020 ranged from 0.5 to 1.5 mbg, with an average of 0.9 mbg. The water table in Summer 2021 ranged from 0.7 to 1.8 mbg.
- Gradients. The water table elevations indicate a horizontal hydraulic gradient with shallow groundwater generally moving northward. Similarly, the piezometric

elevations in till and in bedrock indicate a horizontal hydraulic gradient with generally northward movement. The vertical hydraulic gradient is variable between stratigraphic layers.

- Hydraulic conductivity. The silty clay layer ranged from 5×10^{-11} to 5.0×10^{-6} m/s, with values generally below 1×10^{-8} m/s. The sandy gravel till layer ranged from 1.5×10^{-7} to 3.3×10^{-6} m/s. The bedrock ranged from 7.3×10^{-6} to 1.4×10^{-5} m/s, where not fractured. In general, the upper bedrock in the future development lands appears to be approximately 10 times more permeable than the overlying sandy gravel till and the silty clay is less permeable than the sandy gravel till, possibly by factors of 10 to 1,000. The hydraulic conductivity range for the gravelly sand overlapped the hydraulic conductivity range for the bedrock, indicating there may be some locations where the sandy gravel till and bedrock exhibit similar hydraulic conductivity values.

Groundwater Resources and Use

Groundwater resources are significant for providing a number of functions. Groundwater discharge provides baseflow of local watercourses, it provides discharge to regional wetlands, and it replenishes aquifers used as a supply for drinking and for a range of agricultural, industrial and commercial purposes.

The On-site Study Area is within the larger area administered by the Raisin-South Nation Source Protection Region, which is the government agency charged with groundwater protection. Most of the On-site Study Area and a significant portion of the Off-site Study Area south of Highway 417 are classified as a Significant Groundwater Recharge Area with a score of 6. Also, most of the On-site Study Area and a significant portion of the Off-site Study Area south of Highway 417 are classified as a Highly Vulnerable Aquifer with a score of 6. The On-site Study Area has not been identified as a well head protection area (WHPA) or intake protection zone (IPZ). With respect to Source Protection Plans within the Raisin Region Source Protection Area and South Nation Source Protection Area, only WHPAs and IPZs are subject to the prohibition of specific activities or subject to Risk Management Plans. The designation of On-site and Off-site Study Areas as a Significant Groundwater Recharge Area or a Highly Vulnerable Aquifer do not lead to prohibitions of activities or Risk Management Plans.

There are no municipal piped water supplies in the On-site Study Area and the Off-site Study Area. Each property is likely serviced by a private supply well, with the possibility of some relying on bottled water. Based on a review of the MECP water well database and aerial photographic analysis, the following distribution of water supply wells determined within the study areas (the relative position with respect to the direction of groundwater movement is also provided):

- within the EOWHF: 1, upgradient of waste cells;
- within the future development lands: 0 (none);
- western part of the Off-site Study Area: 3, cross-gradient of the future development lands;
- southern part of the Off-site Study Area: 0 (none);

- southwest and western part of the Off-site Study Area: 1, upgradient of the future development lands;
- eastern part of the Off-site Study Area: 17, cross-gradient of the future development lands;
- northern part of the Off-site Study Area: 6, downgradient; and
- northern area beyond 1 km from the Off-site Study Area: 12, downgradient.

Based on the above, there are possibly 27 private supply wells in the Off-site Study Area and approximately 12 wells located further north. The MECP water well database within the Off-site Study Area indicated the majority of the wells had a supply purpose: domestic; livestock; irrigation; commercial; and/or industrial.

A search for Permits to Take Water in the provincial government database indicated one listing of No. 0431-AHNHVJ, having the purpose of pits and quarries. Its maximum allowable taking of groundwater and surface water is 1,182,816 litres per day.

Groundwater Quantity

Regional

An aquifer can be defined as a soil or bedrock horizon capable of providing a useful quantity of water, which is usually a domestic supply.

The glaciomarine sediment layer is likely to produce a limited groundwater yield. The sandy gravel layer below the glaciomarine sediment and above the bedrock can function as an aquifer where its thickness is more than a few metres and contains relatively lower fine fractions.

The limestone bedrock provides an extensive aquifer in the South Nation River basin (MECP, 1997). Relatively higher transmissivity is anticipated in the upper-most horizon of the bedrock. Wells screened in this aquifer have a sufficient quantity for domestic uses but not higher yields. In general, the basal gravelly sand and the upper horizon of bedrock, with its more intense fracturing function, is the zone where there is preferential groundwater flow on a regional basis (Colgrove, 2016).

On-site Study Area

Potential aquifers underlying the On-site Study Area include the gravelly sand till layer and the upper horizon of bedrock where relatively more fractured. Most local supply wells in the Off-site Study Area are completed in reported sandy gravel units that likely correspond to the till layer or into bedrock in the On-site Study Area. Hydraulic continuity between the sandy gravel till and shallow bedrock within the On-site Study Area and aquifers in the Off-site Study Area is not established.

The silty clay layer is generally incapable of serving as an aquifer due to its low intrinsic hydraulic conductivity.

The southern portion of the area mapped as the Ste. Rose de Prescott aquifer crosses into the Off-site Study Area. This aquifer is approximately 800 m beyond the On-site Study Area and is described as being a confined overburden unit (MECP, 1997). Selected water well records in the MECP database mapped as within this aquifer tap into

the gravelly sand till unit, which is above the bedrock and below the glaciomarine silty clay.

Groundwater Quality

Groundwater in limestone with shale and in Champlain Sea sediments is noted for often being highly mineralized. The EOWHF, future development lands, and Study Areas are all located within Champlain Sea sediments underlain by limestone, with shale in places. As a result, mineralized background groundwater conditions are expected below the EOWHF and future development lands. Groundwater quality for the future development lands and EOWHF is summarized as follows:

- Future Development Lands: Elevated hardness, dissolved organic carbon (DOC) and total dissolved solids (TDS) are expected as background conditions in bedrock. Elevated TDS in deeper silty clay is independent of landfill impacts. Elevated chloride in bedrock is localized, and likely results from the historic depositional environment.
- EOWHF: Elevated alkalinity was observed in the deeper silty clay below the northeastern section of the EOWHF Area. Elevated hardness in deeper silty clay and shallow clay were present. It was concluded that these do not appear to be related to leachate impacts.

  There are no chloride impacts evident in silty clay/clay below the EOWHF. Elevated chloride in bedrock is localized, and likely results from the historic depositional environment. Chloride, a non-degrading and non-adsorbing constituent of leachate, was used to represent worst-case conditions for assessing effects on groundwater quality.

  Elevated DOC in bedrock is expected as a background condition in bedrock. The DOC concentration of 89 milligrams per litre (mg/L) detected in Summer 2021 and 110 mg/L in Fall 2021 are considered anomalous. Corresponding DOC concentrations in Fall 2020 and Spring 2021 were both 5 mg/L. DOC concentrations in the overlying silty clay are all below 10 mg/L over the Fall 2020 to Fall 2021 monitoring rounds.

4.3.2.3 Surface Water Environment

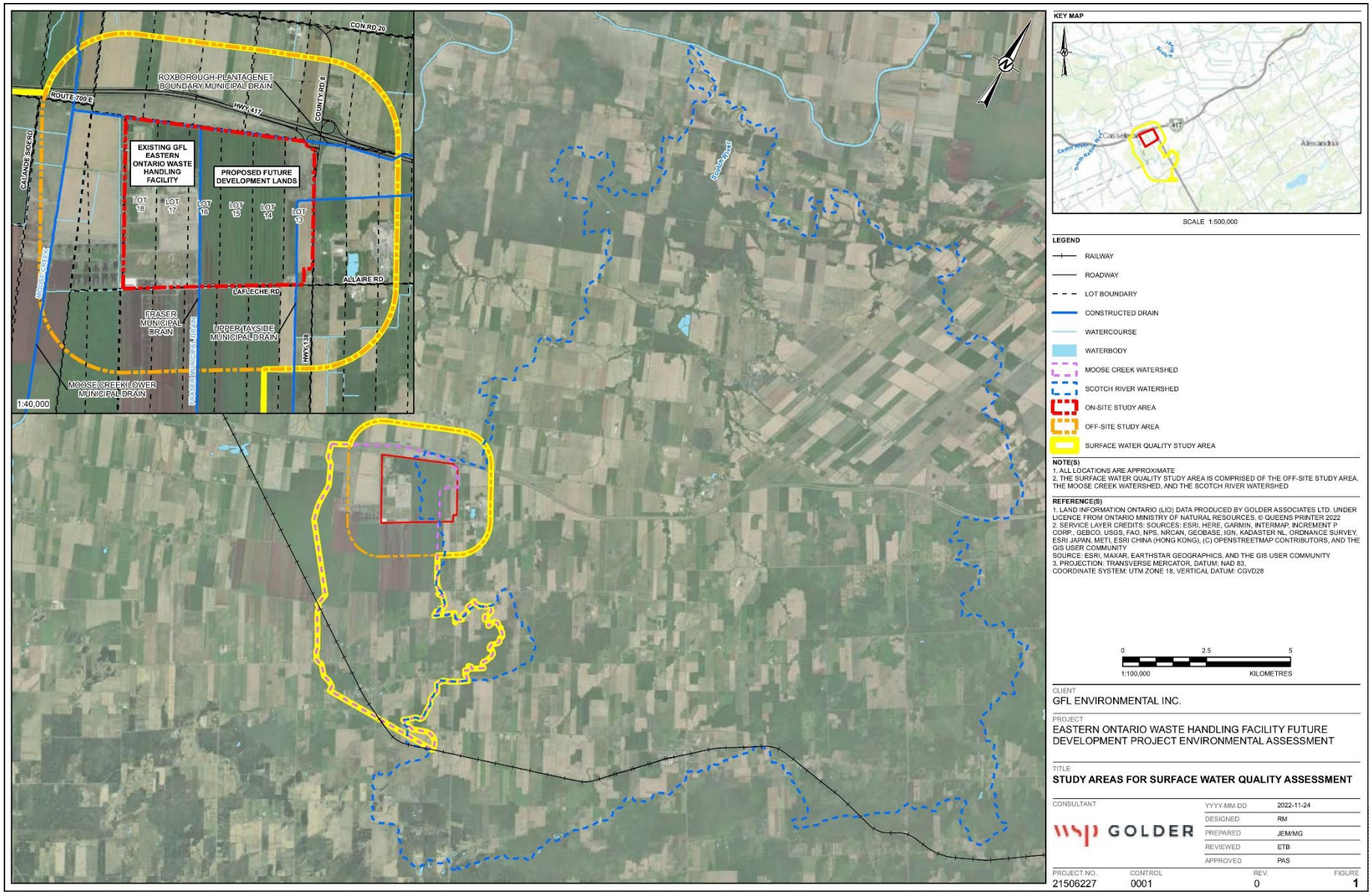
The Surface Water Environment includes surface water quality and quantity.

Surface Water Quality

The existing conditions are summarized from the Surface Water Quality Existing Conditions Report (**Supporting Document 1-4**).

The On-site Study Area for Surface Water Quality is the generic study areas shown on **Figure 4-1**. The Off-site Study Area was modified to include potentially-affected and contributing surface water areas as shown on **Figure 4-5**. The study area includes the Moose Creek subwatershed, which is part of the Lower South Nation River watershed. Although the eastern portion of the future development lands is within the Scotch River subwatershed, the watercourses that will receive discharge from the future development and have the potential to be affected are the Fraser Drain and Moose Creek, both of which are located within the Moose Creek subwatershed.

Figure 4-5. Surface Water Quality Study Areas



The EOWHF is located in a predominantly agricultural area with some rural areas to the south. The main surface watercourses providing drainage to and from the EOWHF site are the Fraser Drain and Moose Creek. The surrounding properties, used for cash cropping, sod farming, and peat extraction, are drained by agricultural drains or peat drains, which discharge to the Fraser Drain or Moose Creek at points between the EOWHF monitoring programs' upstream and downstream sampling stations.

The future development lands are located to the east of the EOWHF and are primarily used for agriculture and sod farming. A segment of the Upper Tayside Municipal Drain flows through the eastern part of Lot 13 and then crosses under Highway 138, eventually draining to the Scotch River.

EOWHF surface water management is addressed via the conditions of the ECA. In general, surface water within the site boundaries is collected and treated via a system of stormwater collection ponds, which provide total suspended solids removal and control discharge to pre-development flows.

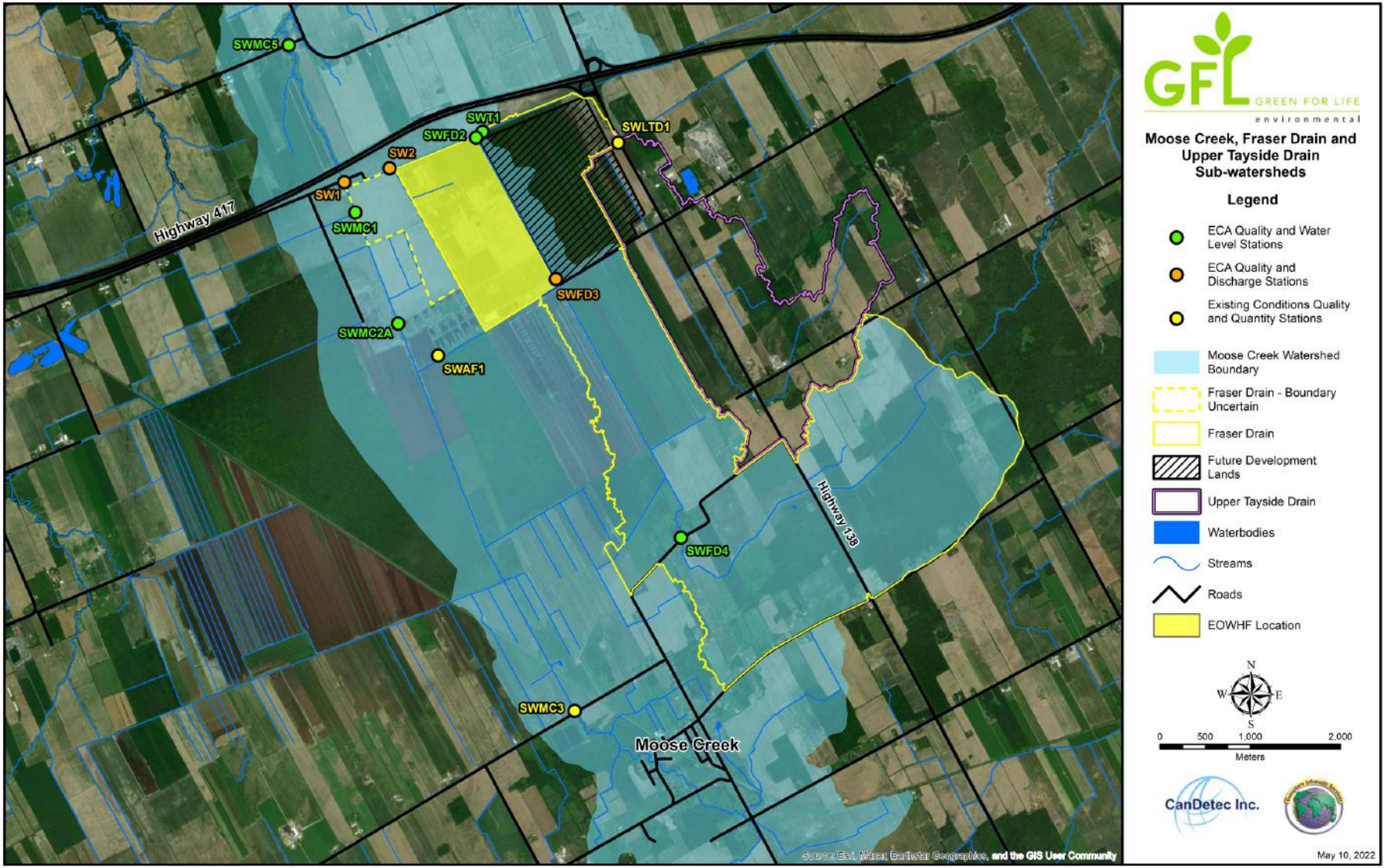
The Fraser Drain and Moose Creek are receiver watercourses for the EOWHF site's stormwater runoff and treated effluent. Both systems discharge to the Fraser Drain, the first receiver, which joins Moose Creek approximately 600 m downstream of the site. The treated effluent is a product of the EOWHF's leachate collection system (LCS) and on-site LTF.

The local water courses have been extensively modified through agricultural drain construction and maintenance and the use of field surface and subsurface drains. This has resulted in impacts on water quality in these water courses and altered hydrologic regimes which have significantly affected existing conditions compared to natural or historic conditions.

The surface water quality off-site in the Fraser Drain and Moose Creek adjacent to and downstream of the EOWHF is affected by activities around the landfill site. Several potential off-site sources for the elevated parameter concentrations include peat extraction activities, truck traffic, air-borne particulate, upstream municipal treatment lagoons, and off-site contributions via off-site drains. There are also on-going agricultural activities upstream and adjacent to the site and neighbouring watercourses, including those that discharge to the Fraser Drain upstream of the surface water monitoring stations downstream of the EOWHF. Provincial Water Quality Objective (PWQO) exceedances have been noted in upstream and adjacent sampling locations for ammonia, chromium, phenols and dissolved aluminum.

Throughout the Off-site Study Area, surface water quality is generally poor with high concentrations of total phosphorus, iron, nitrate, and un-ionized ammonia. The poor water quality is exacerbated by extreme hydrologic conditions (e.g., rapid runoff altered by agricultural drainage and the construction of straight, un-natural U-shaped channels) that result in extremely low baseflow or even dry-ditch conditions exclusive of any effects of the current landfill.The surface water monitoring locations in the vicinity of the EOWHF are shown on **Figure 4-6**. Three stations were selected for evaluation of existing or background conditions in Moose Creek including SWMC1 above the confluence of Moose Creek with Fraser Drain, SWMC2 which is located approximately 1,500 m upstream of SWMC1 and approximately 560 m downstream of the confluence of the Albert Fahey Award Drain with Moose Creek, and SWMC3 downstream of the village of Moose Creek and approximately 6.3 km upstream of SW1.

Figure 4-6. Surface Water Monitoring Locations in the Vicinity of the EOWHF



The monitoring station on the Albert Fahey Award Drain (SWAF1) drains agricultural land, peat extraction land and natural forests and wetlands and contributes to Moose Creek upstream of SWMC2 and thus is more typical of historic natural conditions from peatlands and woodlands in the Moose Creek watershed. Monitoring data indicates that the Albert Fahey Award Drain is contributing elevated concentrations to Moose Creek of boron, iron, sodium, ammonia as nitrogen, and total phosphorus. The agricultural land drainage that is more typical of the main drainage area of Moose Creek has higher concentrations of chloride, ammonia as nitrogen, and sulphate than the Albert Fahey Award Drain. Median concentrations at SWAF1 exceed the PWQO for iron and total phosphorus.

Changes in surface water quality (late May 2019 to early December 2021) at SW1 relative to upstream Moose Creek quality (SWMC2) indicate the effect of the input of Fraser Drain and the treated effluent discharge to Fraser Drain. These effects can be summarized as follows:

- boron – median increases from 0.050 to 0.750 mg/L;
- chloride – median increases from 19 to 102 mg/L;
- copper – median increases marginally from 0.002 to 0.003 mg/L;
- iron – median increases marginally from 0.480 to 0.610 mg/L;
- sodium – median increases from 14 to 118 mg/L;
- ammonia – median increases marginally from 0.120 to 0.170 mg/L;
- nitrate – median increases from 3.17 to 32.90 mg/L;
- total phosphorus – median increases from 0.050 to 0.106 mg/L; and
- sulphate – median increases from 54 to 107 mg/L.

Moose Creek is considered by the MECP to be a Policy 2 Receiver for iron, phosphorus and nitrate. The existing LTF's tertiary treatment process effectively removes iron and phosphorus from the leachate stream, resulting in concentrations well below 1 mg/L; as such, the treated effluent's impact in terms of these parameters is negligible.

The existing LTF's biological process was intended to convert nitrogen ammonia to nitrate through the nitrification process. The result is an elevated concentration of nitrate in treated effluent that is discharged to Fraser Drain, draining to Moose Creek. The interim effluent discharge operating procedure has been enacted to reduce the potential impact of nitrate on the receiving water courses, and to potentially reduce the concentrations of other parameters in the treated effluent. In general, no long-term contamination is sustained from the release of treated effluent into the Fraser Drain. No substantial increases in monitored contaminants are observed during non-leachate discharge periods relative to background conditions. The LTF receiver monitoring results indicate that electrical conductivity levels and the concentrations of parameters such as boron, chloride, nitrates, sulphate, and total dissolved solids in the Fraser Drain immediately downstream of the treated effluent discharge point were affected by the treated effluent discharge, but that the initial impact of the treated effluent discharge on parameter concentrations is of limited duration under higher flow conditions in the Fraser Drain. Under low flow and stagnant conditions in the Fraser Drain, the ability to

assimilate the treated effluent is limited or minimal resulting in surface water quality comparable to the quality of the treated effluent. Since 2020, the EOWHF has been allowed by MECP to discharge treated effluent under an interim operating procedure that does not allow discharge during the lower flow May to October period unless the flow in Moose Creek is greater than 60 litres per second (L/s) at a 5 to 1 ratio of flow in Moose Creek to treated effluent discharge rate.

The Upper Tayside Municipal Drain is on the eastern edge of the proposed landfill expansion. It has a catchment area that is predominantly agricultural for both sod farming and row crops, and several surface drains from agricultural land connect with this drain. The flow volume in the drain is low and drains east towards the Scotch River. Although associated with a different watershed than Fraser Drain and Moose Creek, the water quality in the Upper Tayside Municipal Drain appears to be very similar to that of Fraser Drain with comparable concentrations of all measured parameters. Mean concentrations at SWLTD1 for 2020 through 2021 of chlorine, iron, sodium, ammonia as nitrogen, and total phosphorus were noticeably greater but statistically not different than those of SWFD3 for all samples from 2019 through 2021. Other variables were similar or lower than SWFD3 concentrations.

Surface Water Quantity

The existing conditions are summarized from the Surface Water Quantity Existing Conditions Report (**Supporting Document 1-5**).

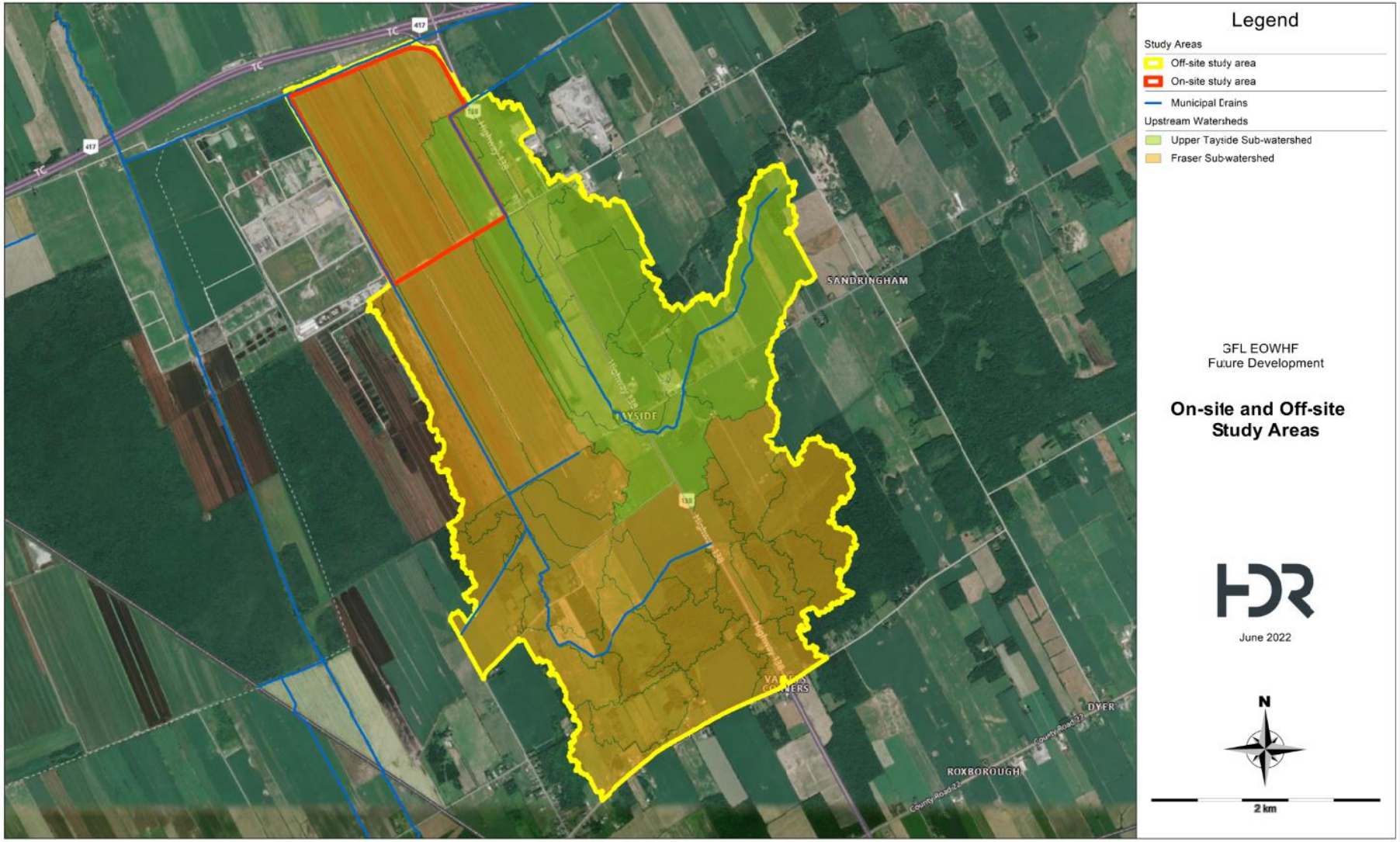
For Surface Water Quantity, the potentially-affected areas are defined based on local watershed delineation and surface water features around the future development lands. The existing SWM system in the existing EOWHF discharges at the north-west corner of the EOWHF, where Fraser Drain flows westerly and ultimately confluences with Moose Creek flowing in a northerly direction. Since the discharge point of the existing EOWHF is downstream of the future development lands, the existing EOWHF and the downstream Moose Creek watershed are not included in the study areas. The existing surface water quantity conditions for the existing EOWHF are documented in the report: Surface Water Existing Conditions Report – Part A: Water Quantity for the Eastern Ontario Waste Handling Facility Landfill Expansion Environmental Assessment (J.F. Sabourin and Associates Inc., 2017).

Accordingly, the generic On-site and Off-site Study Areas were modified for Surface Water Quantity to include the Fraser Drain subwatershed upstream of the existing EOWHF and the Upper Tayside subwatershed, as presented on **Figure 4-7**.

The future development lands currently drain to the two municipal drains:

- Fraser Drain, which runs along the western border of the site and ultimately discharges into Moose Creek; and
- Upper Tayside Municipal Drain, which crosses through the southeast corner of the site and then runs towards the northeast, ultimately discharging to the Scotch River.

Figure 4-7. Surface Water Quantity Study Areas



The Roxborough-Plantagenet Boundary Municipal Drain flows along the north border of the On-site Study Area; however, based on the available topographic information, tile drains in the future development area direct runoff primarily into a perimeter channel directly south of the Roxborough-Plantagenet Boundary Municipal Drain that flows westerly towards the Fraser Drain. The Albert Fahey Award Drain on the south side of Laflèche Road also conveys flows through a series of culverts towards the Fraser Drain.

The study areas are located within the Moose Creek and Scotch River watersheds, both of which are part of the Lower South Nation River watershed. The Moose Creek and Scotch River watersheds are situated in both the United Counties of Stormont, Dundas and Glengarry, and the United Counties of Prescott and Russell.

A PC-SWMM hydrologic model was developed and peak flows were estimated for rainfall and snowmelt with rain events with the 2- to 100-year return periods in the drains upstream and downstream of the future development lands. Model inputs are provided in **Supporting Document 1-5**. The rainfall events with a SCS Type II 24-hr distribution yielded the highest peak flows. The peak flow rates in the Fraser Drain downstream of the future development lands generated by the PC-SWMM model are provided in **Table 4-5**.

Table 4-5. Fraser Drain Peak Flow Estimates Downstream of the Future Development Lands

Return Period	Peak Flow[1] (m^3/s)
2 Year	4.20
5 Year	6.20
10 Year	7.48
25 Year	9.15
50 Year	10.18
100 Year	11.18

[1] Using a SCS Type II 24-hr rainfall distribution.

A 1-D/2-D integrated PC-SWMM hydraulic model was developed for existing conditions to generate a floodplain map within and in the vicinity of the future development lands. Based on the model results, flooding during the 100-year storm event is observed at several locations within the On-site Study Area; however, the flood depths generally did not exceed 0.5 m:

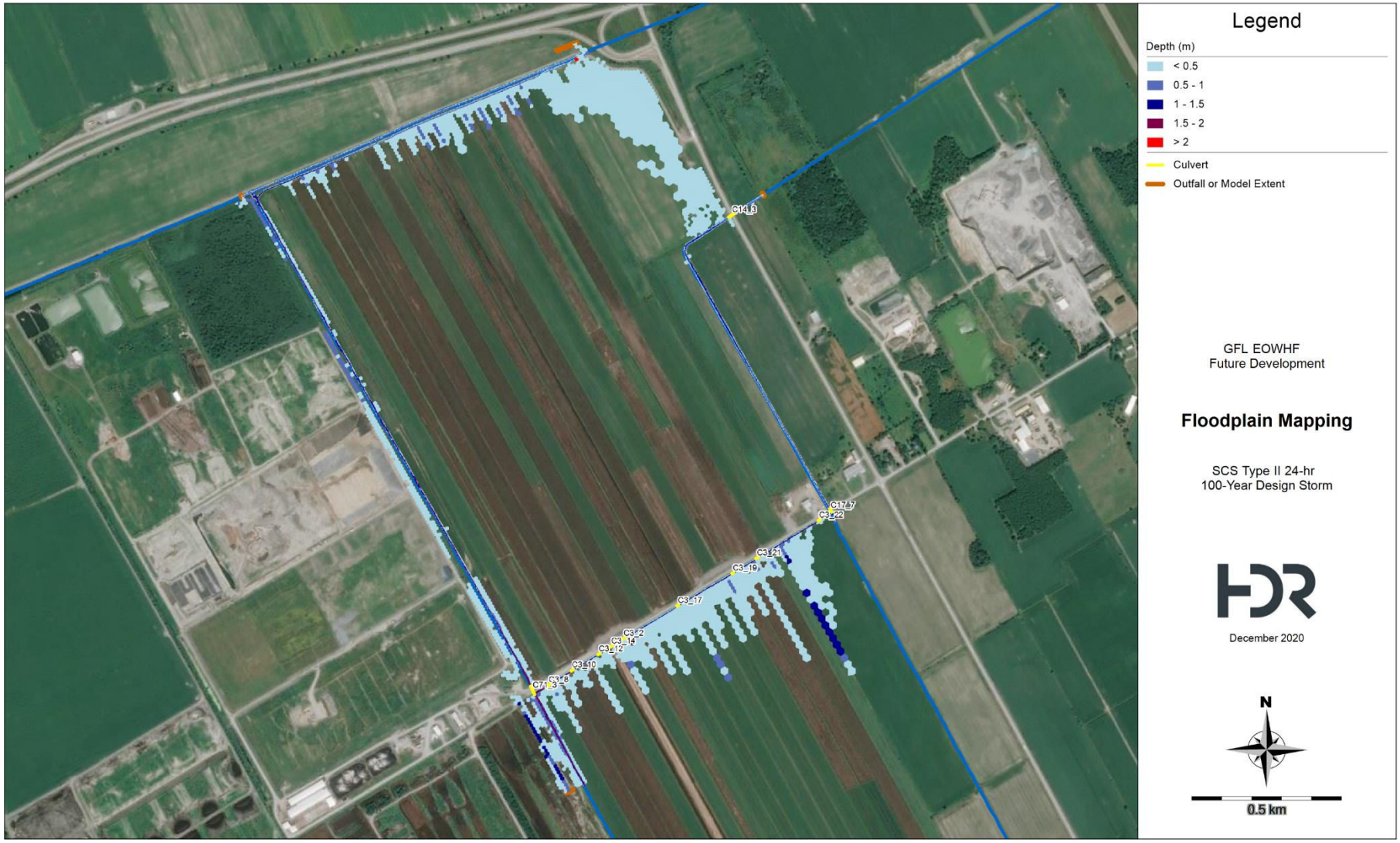
- The perimeter drain along the north border of the future development lands. The existing ditch is relatively flat, with a depth of approximately 0.5 m. An existing berm separates the flows between the perimeter channel and the existing Roxborough-Plantagenet Boundary Municipal Drain, but the berm is not overtopped during the 100-year storm.
- Upper Tayside Municipal Drain, where the flow direction changes from north to east. The existing drain is approximately 1.0 m deep, but the north bank is overtopped during the 100-year storm event. The existing topography beyond the bank slopes towards the north, so flows overtopping the Upper Tayside will flow northerly into the perimeter channel along the north border of the future development lands.

Flooding during the 100-year storm is also observed at several locations adjacent to the On-site Study Area:

- The west bank is overtopped at several locations along the Fraser Drain, and flows contribute to the perimeter drain within the existing EOWHF. The perimeter drain ultimately discharges back to the Fraser Drain downstream of the EOWHF.
- The utility area southwest of the future development lands adjacent to the Fraser Drain. Flooding is observed on both the north and south side of the access road.
- The ditch along the south side of the access road between Fraser Drain and Upper Tayside Municipal Drain is overtopped, and flooding is observed onto the adjacent site south of the future development lands.
- Localized overtopping of the north bank of the perimeter ditch at the northeast of the future development lands, west of the culvert crossing under the Highway 138 ramp, is observed, with flows travelling northerly.

The 100-year storm floodplain mapping is presented on **Figure 4-8**.

Figure 4-8. 100-Year Storm Floodplain Map



4.3.2.4 Ecological Environment

The Ecological Environment includes terrestrial and aquatic ecosystems. The existing conditions are summarized from the Ecological Environment Existing Conditions Report (**Supporting Document 1-6**).

The On-site and Off-site Study Areas for the Ecological Environment are the generic study areas shown on **Figure 4-1**. The On-site Study Area comprises the existing EOWHF and future development lands, while the Off-site Study Area comprises the lands in the vicinity of the future development extending approximately 1 km from the On-site Study Area. The future development lands are dominated by sod fields.

The Study Areas fall within the Moose Creek subwatershed of the lower South Nation watershed. A portion of Moose Creek (the watercourse) is located within the Off-site Study Area, west of the On-site Study Area. A portion of Moose Creek Wetland is also located within the Off-site Study Area, directly southwest of the On-site Study Area. Moose Creek Wetland is a locally significant wetland, a Significant Woodland, an Area of Natural and Scientific Interest (ANSI), and contains Significant Wildlife Habitat. ANSI mapping by the United Counties of SDG Official Plan Schedule B3 (United Counties of SDG, 2018) shows that this feature spans the EOWHF; however, the boundaries of the feature are outdated, and this is no longer the case. Several watercourses occur within the On-site Study Area, including the Fraser Drain, the Upper Tayside Municipal Drain, the Roxborough-Plantagenet Boundary Municipal Drain, and the Albert Fahey Award Drain.

A number of field surveys were conducted in 2019, 2020, and 2021 targeting breeding birds, bats and other mammals, turtles, anurans (i.e., frogs and toads), other reptiles, species at risk (SAR) and their habitat, and the aquatic environment.

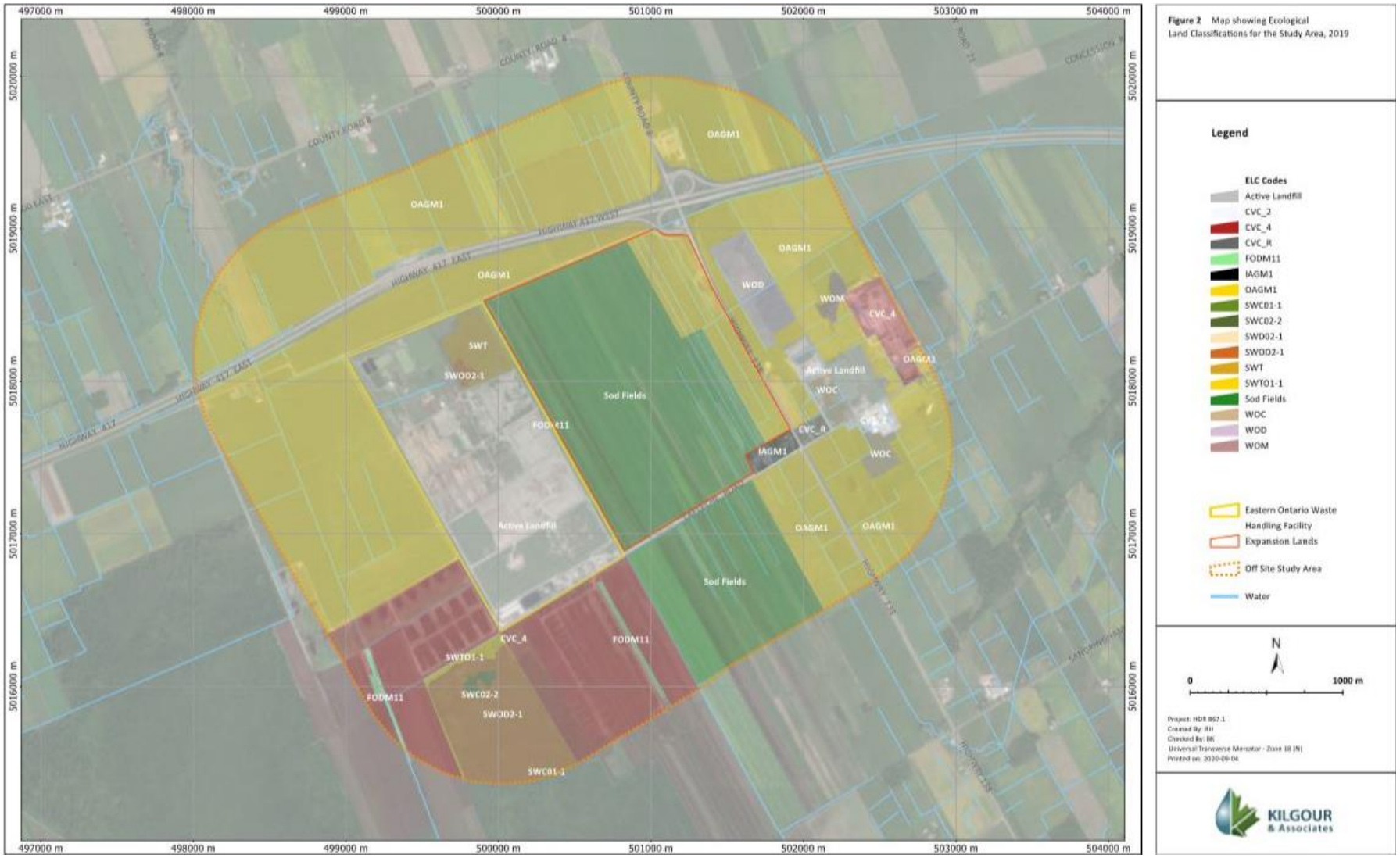
Terrestrial Ecosystems

Terrestrial Ecosystems includes vegetation communities, wildlife habitat, and vegetation and wildlife including rare, threatened or endangered species.

Vegetation Communities

Sixteen (16) distinct Ecological Land Classification (ELC) units (ecosites, vegetation types, or other) were delineated for the Study Areas as shown on **Figure 4-9**. Only four (4) of these units fall within the future development lands, highlighting the homogeneity of the land cover within the area. Seven (7) of the 16 ELC units are of anthropogenic nature (e.g., landfill, industrial, agricultural) which further illustrates how much of the land cover in the Study Areas is non-natural. Eleven (11) of these ELC units are terrestrial classifications and five (5) are wetland (swamp) classifications. The ELC designations were used in subsequent analyses to identify potential habitat that may be used by species of interest (i.e., SAR) occurring or potentially occurring in the Study Areas.

Figure 4-9. Ecological Land Classifications in the Study Areas



The northeast corner of the EOWHF site is predominantly classified as thicket swamp (SWT) and organic deciduous thicket swamp ecosite (SWTO5) consisting of a dense stand of mostly Common Buckthorn (*Rhamnus cathartica*). Sod fields (no applicable ELC code) cover the majority of the future development lands, which are heavily dominated by Kentucky Bluegrass (*Poa pratensis*) which appears to be the only grass species being used for sod operations.

Wildlife Habitat and Biota

Due to the anthropogenic nature of the future development lands and most of the surrounding area, there is no suitable habitat for most SAR known to occur or to potentially occur in the study areas. The sod fields on the future development lands did not meet the Ontario Ministry of Natural Resources and Forestry (MNRF) criteria for Significant Wildlife Habitat for Migratory Bird Staging and Migration Stopover Areas; however, these fields provide staging and stopover habitat for hundreds of Snow Geese and Canadian Geese in the spring and fall.

A total of 32 bird species were observed in the study areas and most of these species are protected under the *Migratory Birds Convention Act*.

Five species of bats were detected in the On-site Study Area via acoustic monitoring, and the results implied that bats were potentially foraging over the future development lands and/or roosting nearby. The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide roosting habitat, but much more ideal roosting habitat exists in Moose Creek Wetland in the Off-site Study Area. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat.

A total of six anuran (frog and toad) species were observed in the On-site Study Area. None of these species receive protection under the *Endangered Species Act* (*ESA*) or the *Fish and Wildlife Conservation Act*. Watercourses in the study areas and the thicket swamp in the Stage 5 area provide habitat for anurans.

Three SAR protected under the *ESA* were observed during field surveys: Bank Swallow; Barn Swallow; and Little Brown Myotis.

Category 3 habitat for Bank Swallow falls on the future development lands and significant alterations to the ecological function of this habitat would require permission from MECP. Suitable nesting and foraging habitat for Barn Swallow exists on and adjacent to the future development lands. The regulatory environment (provincial) for Barn Swallow will change on or before January 2023 such that interactions with foraging habitat will not require consultation with an agency; however, interactions with active nests of Barn Swallow will remain prohibited (like for other migratory birds) under the *Migratory Birds Convention Act*.

Little Brown Myotis was detected along the western edge of the future development lands; trees in this area may provide roosting habitat for the species, while the open sod fields may provide foraging habitat. Little Brown Myotis receives general habitat protection under the *ESA* so potential habitat areas would generally be protected with no defined limits of critical habitat at this point. If vegetation in this area needs to be cleared for the development of the future development lands, it should be done outside of the bat roosting season. Similarly, buildings occupied by at-risk bats cannot be altered while bats are present, so if the Manderley Turf Products buildings on the future development lands

need to be altered (e.g., demolished), it is best to do so outside of the bat roosting season.

Western Chorus Frog was observed in the Fraser Drain on and adjacent to the future development lands but does not receive protection under the *ESA*. This species is therefore of low concern. Candidate Significant Wildlife Habitat for Snapping Turtle was identified within the Roxborough-Plantagenet Boundary Municipal Drain north of the future development lands, though whether this habitat is protected would be determined by the local municipality. No other candidate Significant Wildlife Habitats exist on the future development lands.

Three species of snakes were observed in the Off-site Study Area: Eastern Gartersnake, Eastern Ribbonsnake, and Milksnake. These species are not protected under the *ESA*, but the latter two are protected under the *Fish and Wildlife Conservation Act*. The thicket swamp in the Stage 5 area may provide habitat for these snake species.

The wooded area within Moose Creek Wetland in the Off-site Study Area is known to contain habitat for Eastern Whip-poor-will (listed as Threatened under *ESA* and *Species At Risk Act*) and qualifies as Significant Wildlife Habitat for White-tailed Deer (deer yarding and/or deer winter congregating areas), Eastern Wood-pewee, and Wood Thrush (Significant Wildlife Habitat for Special Concern Species). These species and their habitats were not identified within the future development lands or the existing EOWHF.

The reach of the Roxborough-Plantagenet Boundary Municipal Drain north of the future development lands qualifies as Significant Wildlife Habitat for Special Concern Species (Snapping Turtle). Watercourses in the Study Areas likely provide habitat for other turtle species that are not protected under the *ESA* (i.e., Snapping Turtle and Midland Painted Turtle). Watercourses in the study areas likely act as travel corridors for these turtle species and provide foraging (e.g., fish) resources. All turtle species in the region are protected under the *Fish and Wildlife Conservation Act*.

Aquatic Ecosystems

Aquatic Ecosystems includes aquatic habitat and biota.

Aquatic Habitat and Biota

The Roxborough-Plantagenet Boundary Municipal Drain north of the future development lands and the Albert Fahey Award Drain in the Off-site Study Area go dry by mid-summer, while the Fraser Drain and the Upper Tayside Municipal Drain on the future development lands contain shallow water and support fish communities in the summer. The stretches of the Fraser and Upper Tayside Municipal Drains on the future development lands provide mostly cool-warm and warm waters for fish, respectively. Electrofishing surveys in the summer of 2019 and the spring of 2021 produced fish communities typical for the Moose Creek area. None of the species collected were outside a known range. No provincially and/or nationally listed (SAR) fish species were captured. In addition, no critical habitat for aquatic SAR or sensitive spawning habitat was identified within the Study Areas. Considering this, minor alterations to fish habitat areas in the Study Areas (e.g., addition of culvert crossings) would require review by South Nation Conservation and Fisheries and Oceans Canada, but would likely be

approved through the design and implementation of standard mitigation measures such as performing in-water works outside of the spawning period.

A field survey was conducted in the study area in 2022 to confirm the presence/absence of SAR species freshwater mussels. Shells or fragments of two species were documented including the Cylindrical Papershell (*Anodontoides ferrusacianus*) and Giant Floater (*Pyganodon grandis*). Neither of these species is listed as At Risk. The Cylindrical Papershell mussel uses Mottled Sculpin as its host for larval development suggesting that sculpin are present in the watershed. Both of those species had been historically found in the Moose Creek study area. Creek Heelsplitter (*Lasmigona compressa*) and Pink Heelsplitter (*Potamlus alatus*) have also been historically observed in the Moose Creek study area. None of the species are listed as At Risk.

4.3.3 Socio-Economic Environment

A summary of the existing conditions for the Socio-Economic Environment is provided below. The Socio-Economic Environment, as defined for the EA, includes the Economic Environment and the Social Environment. The existing conditions are summarized from the Socio-Economic Existing Conditions Report (**Supporting Document 1-7**).

4.3.3.1 Economic Environment

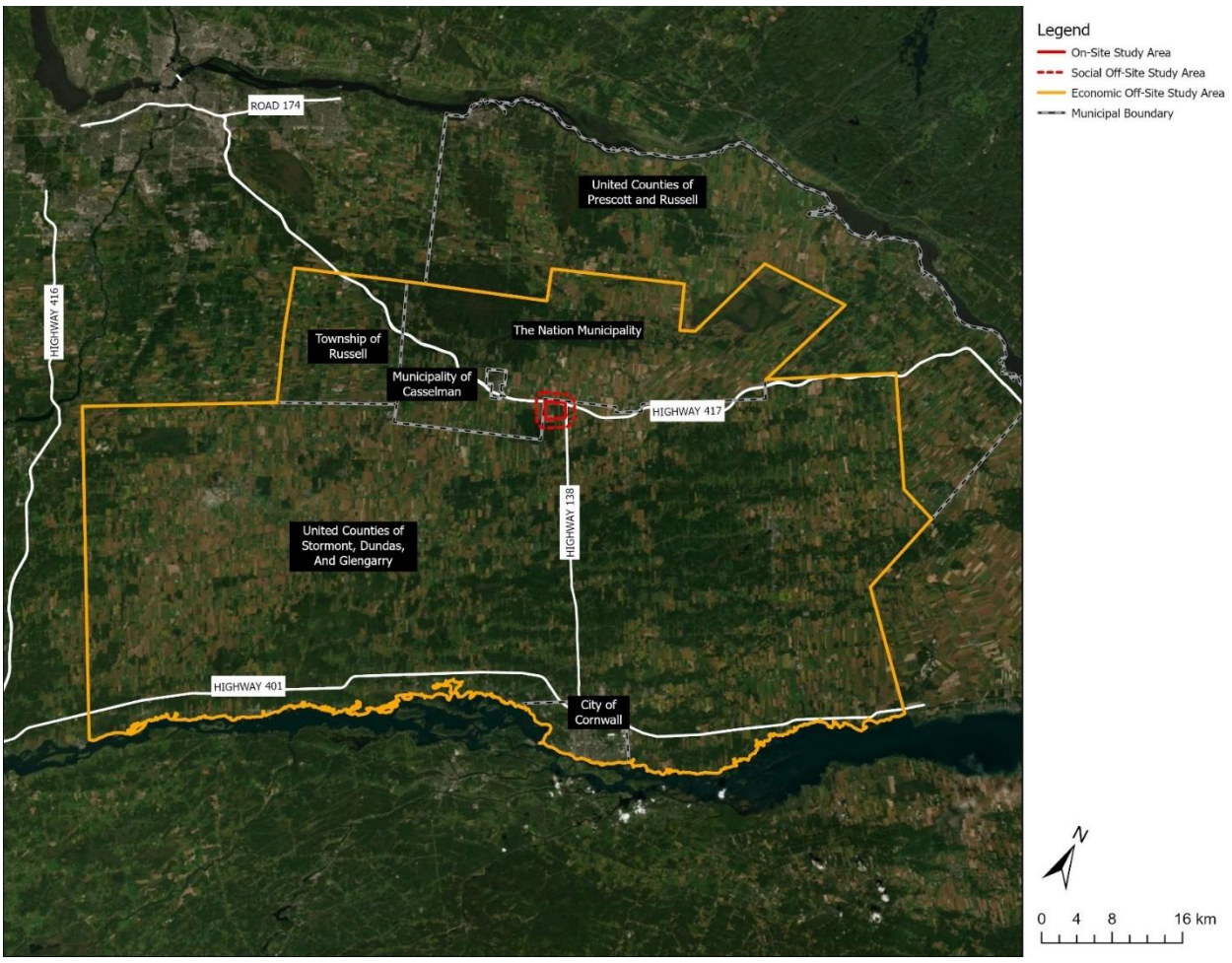
The existing conditions for the economic environment consider the following:

- labour force characteristics (e.g., local employment);
- employment at the EOWHF; and
- corporate activities including support for community initiatives, municipal support, and provision and procurement of local goods and/or services.

The description of the existing economic environment focuses primarily on the Township of North Stormont and the United Counties of Stormont, Dundas and Glengarry. The United Counties of Stormont, Dundas and Glengarry comprise six municipalities: North Stormont; South Stormont; North Dundas; South Dundas; North Glengarry; and South Glengarry; and exclude the City of Cornwall and the Mohawk Nation of Akwesasne. The EOWHF is located within the Township of North Stormont within the United Counties of Stormont, Dundas and Glengarry; both of these municipal governments would be most affected by any potential changes to the EOWHF (i.e., through municipal taxes and community support by GFL).

For the economic component of the Socio-Economic Environment, the Off-site Study Area has been modified to comprise the area within the municipal boundaries of the United Counties of Stormont, Dundas and Glengarry, the City of Cornwall, and the areas within the Municipality of Casselman, Township of Russell, and The Nation Municipality within the United Counties of Prescott and Russell as shown on **Figure 4-10**. The On-site Study Area corresponds to the generic On-site Study Area shown on **Figure 4-1**.

Figure 4-10. Economic Environment Study Areas



North Stormont has the smallest labour force, the lowest unemployment rate, and highest participation rate compared to other municipalities in the United Counties of Stormont, Dundas and Glengarry. Based on the projected place of work employment by municipality within United Counties of Stormont, Dundas and Glengarry from 2016 to 2036 (United Counties of SDG, 2018), all municipalities are expected to experience a declining number of jobs as the economy changes and people commute to other municipalities including the Cities of Cornwall and Ottawa.

The top three industry sectors in the United Counties of Stormont, Dundas and Glengarry are health care and social assistance, retail trade, and manufacturing, providing 36% of the total employment. Waste management is included within the administrative and support, waste management and remediation services industry, which comprises approximately 5% of employment within the United Counties.

GFL is a major employer in the United Counties of Stormont, Dundas and Glengarry, and is the largest employer in North Stormont, with approximately 40 full-time employees at the EOWHF and another 31 employed elsewhere. Approximately 69% of current employees are residents of the United Counties of Stormont, Dundas and Glengarry, 21% are residents of the United Counties of Prescott and Russell, and 10% are residents of the City of Cornwall. Over 30% of GFL's employees at the EOWHF have been employed full-

time for over 6 years with approximately 18% being employed over 10 years at the facility.

In addition to providing full-time, stable jobs to local residents who contribute to their local economy through the purchase of goods and services, and through payments of property taxes, GFL supports a number of community initiatives and participates in several programs and committees in the local area. The EOWHF provides significant economic contributions to the local economy through the purchase of local goods and services, community support, payment of property taxes, and financial contributions to the local municipality. Local vendors are utilized where possible, contributing up to $15 million annually to the local economy through procurement. GFL is committed to developing and maintaining good relations with the local community and, to that end, has recently entered into a second 20-year Host Community Agreement with the Township of North Stormont to provide annual financial contributions.

GFL provides cost-effective and environmentally-secure waste management services[9] to municipalities and businesses across Eastern Ontario, including over 500 villages, towns, and cities. In addition, the EOWHF also provides landfill disposal capacity to Indigenous communities within the region. GFL provides financial support to local community events (averaging approximately $10,000 annually), as well as for specific initiatives such as donating $1,000,000 towards the reconstruction of the Moose Creek Recreation Facility in North Stormont.

4.3.3.2 Social Environment

The Social Environment includes the local community and visual aesthetics. The existing conditions for the social environment consider the following:

- local population;
- local residences;
- local businesses;
- recreational and community resources;
- existing nuisance-related issues; and
- visual landscape.

For the social component of the Socio-Economic Environment, the On-site and Off-site Study Areas are the generic study areas shown on **Figure 4-1**. The Off-site Study Area includes all properties located within 1 km of the On-site Study Area. For properties that are bisected by the 1 km radius line, the entire property is included in the Off-site Study Area. The 1 km radius was deemed appropriate for this study to provide local context.

The EOWHF is located in a predominantly rural area with few neighbours and some agricultural, quarry and recycling operations. The rural area is predominantly agricultural, with cash crops of corn and soybeans being the main agricultural activity. The site is adjacent to peat and sod farming operations.

[9] These services include waste collection, organics composting, recycling, tire collection, and residential drop-offs.

The population of North Stormont is approximately half of the other municipalities in the United Counties of Stormont, Dundas and Glengarry and has remained relatively static over the last few years. In general, the municipalities in the United Counties of Stormont, Dundas and Glengarry have experienced low population growth since 2016 with the exception of North Stormont and South Stormont at 7.7% and 3.5% growth, respectively. The Township of North Stormont has a population of approximately 7,400 (2021) and had the highest rate of growth (i.e., highest positive net change) of all the surrounding municipalities in the United Counties of Stormont, Dundas and Glengarry since 2016.

There are six residences located within the Off-site Study Area (to the northwest and east), shown as yellow dots on **Figure 4-11**. The residence directly east of the On-site Study Area is within 70 m, with only Highway 138 separating the two properties, and there are no existing berms or tree cover to screen the future development from view. This residence is currently vacant and will be demolished.

The residences to the northwest, located approximately 700 m and 950 m respectively from the EOWHF, are separated from the EOWHF by a large corn field and tree cover at the edge of the existing landfill; however, the views of the existing EOWHF and future development lands are largely unobstructed from these residences.

The residences to the east are separated from the EOWHF and future development lands by Highway 138. Local businesses and tree cover obstruct the view of the On-site Study Area for the majority of these residences.

Based on an average of 2.3 people per household (Statistics Canada, 2022), approximately 14 people are predicted to be living within the Social Off-site Study Area. There are a number of properties located to the north of the EOWHF along Concession 8 that partially fall within the Social Off-site Study Area; however, the physical residences are located beyond the 1 km distance from the On-site Study Area. As of the end of 2021, no construction of additional residences is planned within the Social Off-site Study Area.

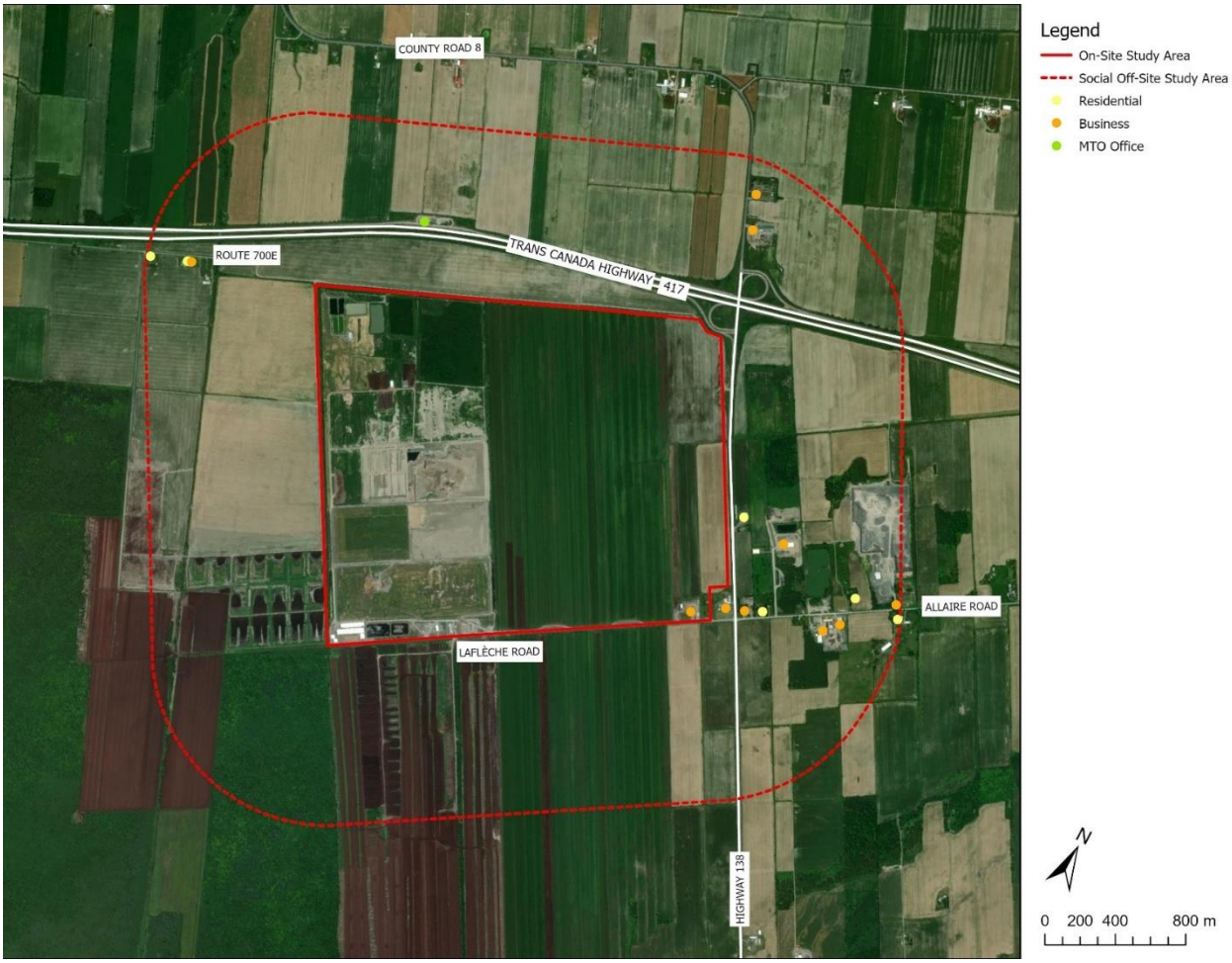
One business is located within the On-site Study Area, and 13 businesses are located within the social Off-site Study Area, shown as orange dots on **Figure 4-11**. The majority of these businesses are located east and northeast of the On-site Study Area. There are no recreational resources (e.g., parks, walking trails), schools, churches or other community resources located in the On-site or Social Off-site Study Areas or in the vicinity of the EOWHF.

GFL employs a variety of proactive measures to minimize nuisance-related issues associated with noise, dust, odour, litter, and vectors and vermin on the surrounding environment as described in Section 5.3.8.6. The success of these measures is evident in the low number of complaints received annually regarding the facility operation. There has been a decline in the numbers of complaints about odours from the start of 2015 through 2021: in 2015 there was only one odour complaint; in 2016, there were six odour complaints; in 2017 there were six odour complaints and one bird complaint; in 2018 there were four odour complaints; in 2019 and 2020 there were no complaints received, and in 2021 there was one odour complaint and one litter complaint.

The operational landfill itself is not obtrusive and is barely visible from the roads surrounding the facility. The buildings and structures (e.g., the wastewater treatment

facility and compost screening facility) on the north side of the facility are more evident from the north (e.g., from Highway 417). The future development lands are unobstructed from along Route 700E, Highway 138, and Laflèche Road.

Figure 4-11. Socio-Economic Receptor Locations



4.3.4 Cultural Environment

A summary of the existing conditions for the Cultural Environment is provided below. The Cultural Environment, as defined for the EA, includes Cultural Heritage Resources and Archaeological Resources.

4.3.4.1 Cultural Heritage Resources

A Cultural Heritage existing conditions study was undertaken for the EA. The study consisted of data collection, background historical research, review of secondary source material, and field review. A total of three potential cultural heritage landscapes were identified within the Off-site Study Area. Direct and indirect impacts to these resources are not anticipated. The Cultural Heritage Existing Conditions Report is included as **Supporting Document 1-8**.

The On-site and Off-site Study Areas for Cultural Heritage Resources are the generic study areas shown on **Figure 4-1**. The On-site Study Area comprises the existing

EOWHF and future development lands, while the Off-site Study Area comprises the lands in the vicinity of the future development extending approximately 1 km from the On-site Study Area.

The study area is located in the Township of Roxborough, County of Stormont; the Township of Cambridge, County of Russell; and the Township of Plantagenet, County of Prescott. The study area is within the land covered by the Crawford Purchases of 1783, and is part of the current Algonquins of Ontario land claim. A historic Agreement-in-Principle was signed in 2016 by the Algonquins of Ontario and the Governments of Ontario and Canada representing a major step towards continued negotiations of a modern-day treaty and outlined the main elements of a potential settlement.

The results of background historical research and a review of secondary source material, including historical mapping, revealed a study area with a rural land use history dating back to the late-nineteenth century. The 1862 *Map of the Counties of Stormont, Dundas, Glengarry, Prescott and Russell* shows no historical features within the study area.). The 1879 *Illustrated Atlas of Stormont, Dundas and Glengarry Counties* labels most of the area within the On-site Study Area as Government Land, and a number of structures are shown within the east end of the Off-site Study Area, along present day Allaire Road. No structures are illustrated on the 1881 mapping of Plantagenet Township.

The 1927 topographic map illustrates the study area within a rural agricultural context, with residential structures along the roadways to the north and east. This agricultural context continues throughout the twentieth century and minimal change are evident into the late-twentieth century. Residences and farmscapes within the study area are visible on mid-twentieth century aerial photography and late-twentieth century topographic mapping.

A review of existing heritage inventories, consultation with the Township of North Stormont, the Ontario Heritage Trust, and the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), review of previously identified cultural heritage resources, and a field review of the study areas resulted in the identification of three potential cultural heritage resources[10] within and/or adjacent to the Off-site Study Area as summarized in **Table 4-6** and shown on **Figure 4-12**.

Table 4-6. Summary of Potential Cultural Heritage Resources

CHR #	Location/Name	Heritage Recognition	Description
CHR 1	Address unknown, located on the south side of Concession Road 7 between 37 and 49 Concession Road 7	Identified during 2016 assessment (CHL 1)	Farmscape
CHR 2	17423 Allaire Road	Identified during field review	Residence, former farmscape
CHR 3	1790 County Road 8	Identified during field review	Farmscape

[10] For the purpose of this EA, the term 'cultural heritage resource' (CHR) is used to describe both cultural heritage landscapes and built heritage resources.

Figure 4-12. Cultural Heritage Resource Locations

The identified cultural heritage landscapes are historically and contextually associated with land use patterns in the Township of North Stormont and more specifically representative of the early settlement of the community.

4.3.4.2 Archaeological Resources

A Stage 1 Archaeological Assessment (under Project Information Form number P383-0205-2020) was undertaken in 2022 for the EA. The Stage 1 Archaeological Assessment consisted of a review of geographic, land use, and historical information for the property and the relevant surrounding area. The purpose of the assessment was to identify areas of archaeological potential and further archaeological assessment (e.g., Stage 2-4) as necessary. The Stage 1 Archaeological Assessment is included as **Supporting Document 1-9**.

The On-site and Off-site Study Areas for Archaeological Resources are the generic study areas shown on **Figure 4-1**. The On-site Study Area comprises the existing EOWHF and future development lands, while the Off-site Study Area comprises the lands in the vicinity of the future development extending approximately 1 km from the On-site Study Area. For the purposes of the Stage 1 Archaeological Assessment, lands to the south of the existing EOWHF were included in the assessment; however, these lands are not part of the EOWHF future development and are therefore not described herein.

A Stage 1 Archaeological Assessment was completed in 1999 for the entire 189 ha EOWHF site as part of the original EA for the landfill (Wright, 1999) and determined that there is no archaeological potential within the boundaries of the existing EOWHF, including the northeastern corner of the site where Stage 5 of the EOWHF future

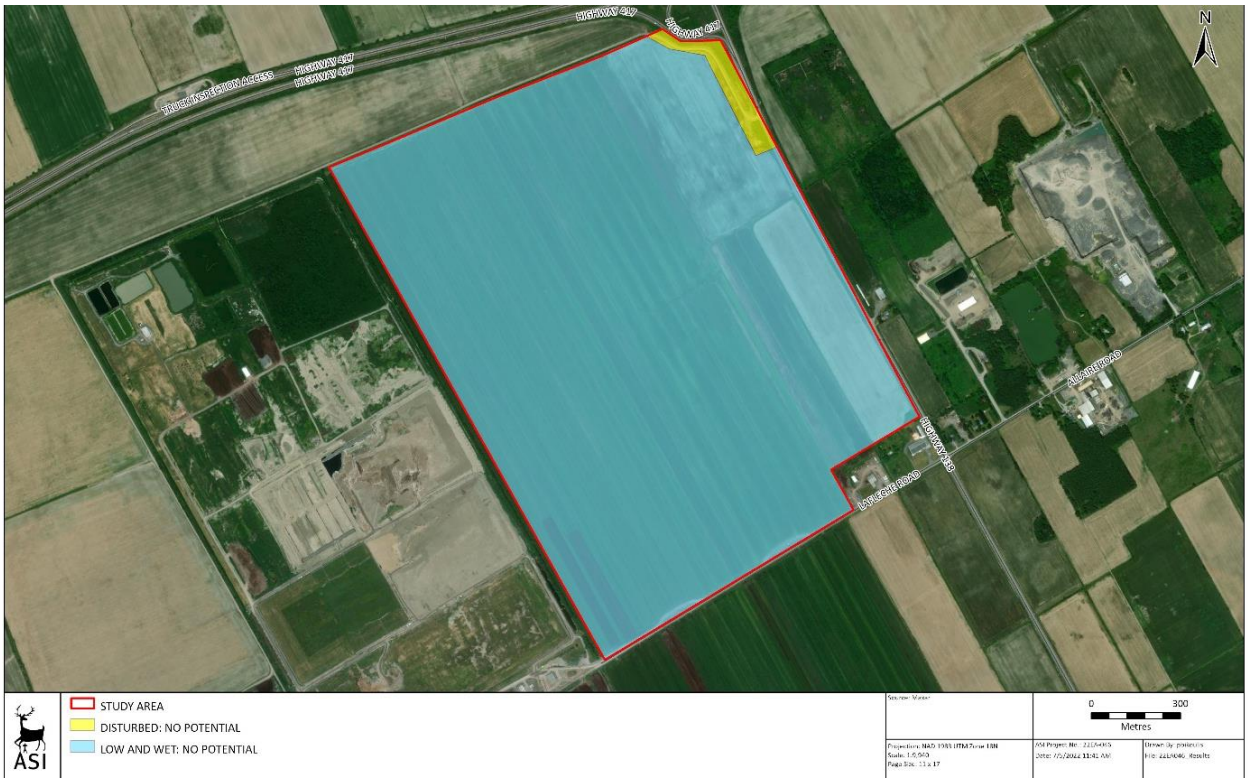
development will be located, and recommended no further study. Consequently, the EOWHF site was not re-assessed in the 2022 Stage 1 Archaeological Assessment. Nothing of archaeological significance has been found on or around the EOWHF as the site has been developed.

The On-site and Off-site Study Areas were once part of the Moose Creek wetland within the Moose Creek watershed. Historically, the future development lands are located in the Township of Roxborough, County of Dundas, in Lots 13-16, Concession 10, and are within a historical peat bog which was drained for agricultural use in the twentieth century Part of the future development lands are covered by the existing commercial peat harvesting operation, which is noted as a network of access roads and mounds of excavated organic material. A property inspection also confirmed that the area is generally low-lying and very flat in nature, which is consistent with reclaimed and drained swamps.

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD) maintained by the MHSTCI (now MTCS). According to the OASD, no previously registered archaeological sites are located within 1 km of the On-site Study Area (i.e., within the Off-site Study Area) (MHSTCI, 2019).

The Stage 1 Archaeological Assessment concluded that the On-site Study Area does not retain archaeological potential on account of deep and extensive land disturbance and permanently low and wet conditions and these lands do not require further archaeological assessment as shown on **Figure 4-13**.

Figure 4-13. Results of the Stage 1 Archaeological Assessment



Should the proposed work extend beyond the current On-site Study Area, further Stage 1 Archaeological Assessment should be conducted to determine the archaeological potential of the surrounding lands.

Since the potential always exists to miss important information in an archaeological survey; if any artifacts of Indigenous interest or human remains are encountered during the development of the subject property, the following contact should be notified:

Algonquins of Ontario Consultation Office
31 Riverside Drive, Suite 101
Pembroke, Ontario K8A 8R6
Tel: 613-735-3759
Fax: 613:735-6307
Email: algonquins@tanakiwin.com

4.3.5 Built Environment

A summary of the existing conditions for the Built Environment is provided below. The Built Environment, as defined for the EA, includes Transportation, Current and Planned Future Land Use, and Aggregate Extraction and Agricultural.

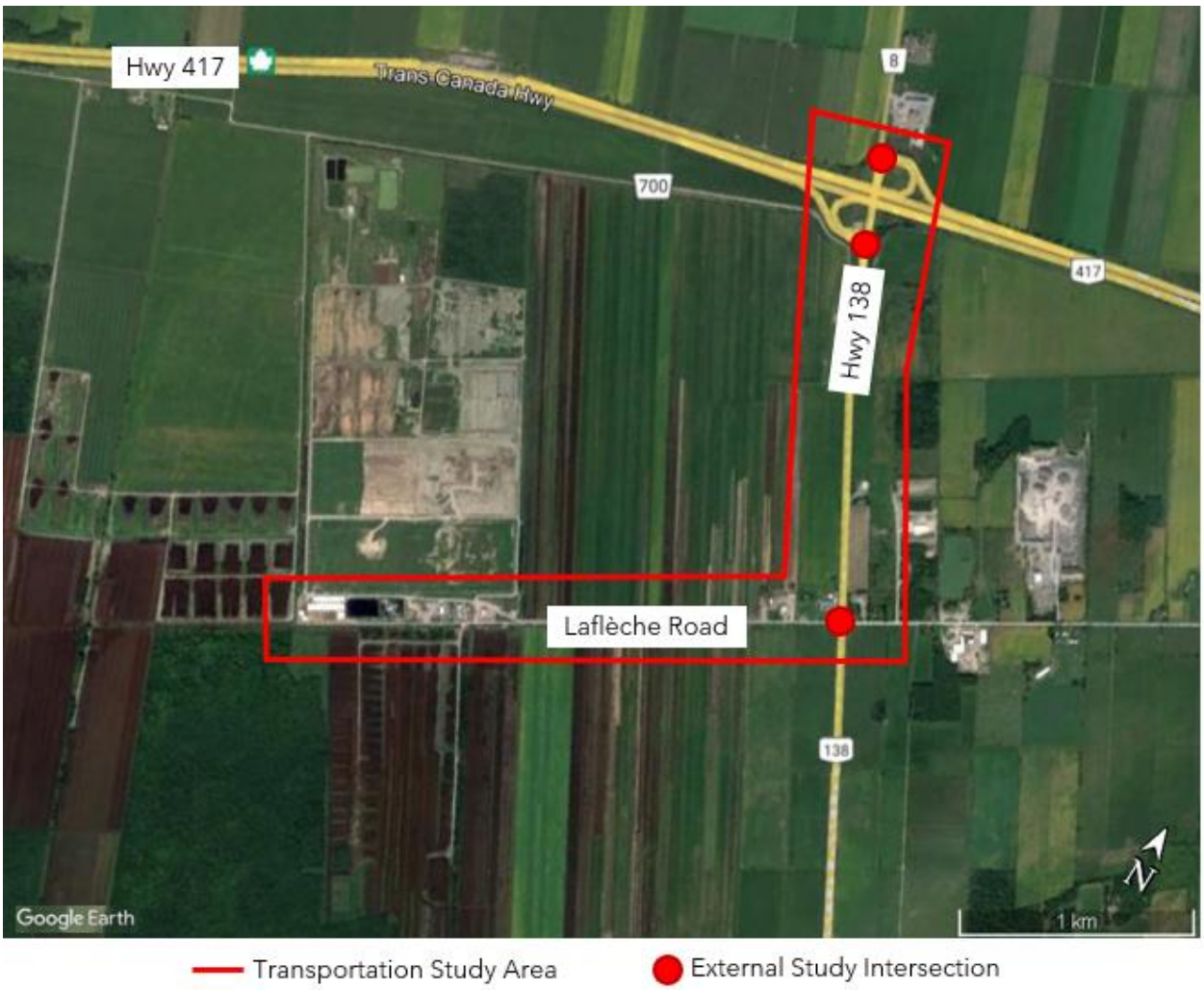
4.3.5.1 Transportation

The existing conditions are summarized from the Transportation Existing Conditions Report (**Supporting Document 1-10**).

The EOWHF is located on Laflèche Road, a private road, which is accessed from Highway 138. Highway 138 intersects with Highway 417 approximately 2 km north of Laflèche Road. The existing EOWHF and future development lands are bounded by Concession Road 7 to the north, property lines to the east and west, and Laflèche Road to the south. The surrounding area is predominantly rural and undeveloped. There is also no transit service directly serving the area in the vicinity of the site.

The generic Off-site Study Area has been modified for Transportation to include the intersection of Highway 417 with Highway 138, and the intersection of Highway 138 with Laflèche Road as shown on **Figure 4-14**. Three intersections were included in the Off-site Study Area including the off-ramps at the Highway 417/138 interchange. The On-site Study Area corresponds to the generic On-site Study Area shown on **Figure 4-1**.

Figure 4-14. Transportation Off-site Study Area



Laflèche Road is an east-west local road under the jurisdiction of the United Counties of Stormont, Dundas, and Glengarry and has an assumed un-posted speed limit of 50 km/h. It has a two lane cross section with gravel shoulders. No sidewalk or bicycle lanes are provided and there are no posted parking restrictions.

Highway 138 is a north-south rural highway under the jurisdiction of the Ontario Ministry of Transportation (MTO) with a posted speed limit of 80 km/h. It is designated as a King's Highway and has a two lane cross section plus gravel shoulders and rumble strips at the edge of pavement as well as along the centreline. Right-turn taper is provided at Laflèche Road in the northbound and southbound directions. No sidewalk or bicycle lanes are provided and there are no posted parking restrictions.

Highway 417 is an east-west controlled-access divided highway under the jurisdiction of the MTO with a posted speed limit of 100 km/h. It is designated as a King's Highway and has a four lane cross section plus gravel shoulders. Off-ramps to Highway 138 are stop-controlled with the exception of the east-to-south and the north-to-west ramps, which are free-flow. Parking is not permitted.

The current ECA, issued by the MECP limits the EOWHF landfill to a maximum of 755,000 tonnes annually, equivalent to an average of 2,500 tonnes per day[11]. The annual limit for receipt of compost at the EOWHF is limited to 240,800 tonnes (120,800 tonnes of feedstock and 120,000 tonnes of bulking agent), equivalent to an average of 797 tonnes per day[12]. The combined average of both landfill and compost material is therefore 3,297 tonnes per day, with a maximum of 4,000 tonnes per day.

The current haul route to the EOWHF is via Highway 417, Highway 138, and Laflèche Road. Weigh scale data and turning movement counts were collected to determine trip generation characteristics. Traffic not passing through the weigh scale typically comprises employee traffic, or traffic associated with the peat extraction operation on the south side of Laflèche Road. Larger trucks generally travel to/from Ottawa or to/from the south via Highway 138. Any traffic travelling east-west across Highway 138 is associated with other businesses on the east side of Highway 138 (along Allaire Road). Smaller personal vehicles and pick-up trucks likely serve the surrounding local communities.

The following intersections were considered:

- Highway 138 at Highway 417 westbound off-ramp;
- Highway 138 at Highway 417 eastbound off-ramp;
- Highway 138 at Laflèche Road; and
- Laflèche Road at GFL Driveway.

Level of service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between ‘A’ and ‘F’, with ‘F’ being the longest delay. The volume to capacity (v/c) ratio is a measure of the degree of capacity utilized at an intersection.

Under existing conditions all movements at all study intersections are operating well with level of service (LOS) ‘A’ or ‘B’ and with volume to capacity ratios of 0.10 or lower indicating that the intersection is operating well with residual capacity. There are no operational concerns at any study intersections.

A review of publicly available segment collision rates along Highway 138 in the vicinity of the study area does not indicate safety concerns when comparing the collisions rates with the provincial average – the adjacent section of Highway 138 has an average collision rate that is nearly half of the provincial average.

4.3.5.2 Current and Planned Future Land Use

The existing conditions are summarized from the Land Use Existing Conditions Report (**Supporting Document 1-11**).

The On-site and Off-site Study Areas for Land Use are the generic study areas shown on **Figure 4-1**. Land uses were examined within 1 km and 500 m of the On-site Study Area as per MECP Guideline D-4 Land Use On or Near Landfills and Dumps (MECP, 1994) as

[11] The average of 2,500 tonnes per day is obtained by taking 755,000 tonnes and dividing by 302 working days per year.

[12] The average of 797 tonnes per day is obtained by taking 240,800 tonnes and dividing by 302 working days per year.

the 500 m boundary is relevant to land use compatibility regulations regarding sensitive land uses. For the purposes of the EA, the 500 m was measured from the On-site Study Area rather than from the future development landfill configuration. The 1 km Off-site Study Area was used to illustrate the broader land use pattern and potential sensitive land uses in proximity to the future development. The Off-site Study Area includes lands in both the North Stormont Township, United Counties of Stormont Dundas and Glengarry, and the Nation Municipality, County of Prescott-Russell.

Land Use

The existing land uses within the study areas are shown on **Figure 4-15**. The existing EOWHF site has been categorized as a heavy industrial land use. Current heavy industrial land use activities include landfill cells, the LFGTE plant, a composting facility, a wastewater treatment facility, SWM ponds, waste reclamation activities for small vehicles and tires, and an administrative office.

The future development lands are currently used for agricultural (crops/products) and associated agricultural business activities. The active agricultural uses include sod farming and corn production. These lands are owned by GFL and the existing sod farming and office use will be relocated as part of the future development plans.

The existing land uses within 1 km of the On-site Study Area consist mostly of agricultural (crop/product) with some extraction (aggregate/peat), vacant/natural, heavy industrial, agricultural (livestock), and residential and commercial land uses.

MECP Guideline D-4 (MECP, 1994) states that the most significant environmental and aesthetic effects of a landfill are felt within 500 m of the perimeter of a landfill area. Sensitive land uses for operating landfills include:

a) a permanent structure used in animal husbandry; or

b) agricultural land used for pasturing livestock; or

c) a permanent structure where:

i. a person sleeps; or

ii. a person is present on a full time basis;

but not including food or motor vehicle service facilities adjacent to a highway, utility operations, scrap yards, heavy industrial uses, gravel pits, quarries, mining or forestry activities; or

d) cemeteries.

Four sensitive land uses were identified in ‘permanent structures’ that are within 500 m of the perimeter of the expanded landfill:

1. An agricultural use operated by Champion Mushrooms. The building is located at 1454 Highway 138. Several full-time employees work at the indoor mushroom growing facility.
2. A commercial administrative office operated by Calco Soils that is located at 17305 Allaire Road and supports two full-time employees. The office is an ancillary use to Calco’s nearby peat and topsoil extraction and processing facilities.

Figure 4-15. Existing Land Uses within the Study Areas

3. A residential dwelling is located at 1397 Highway 138. GFL purchased the property and the residential use was discontinued in Summer 2022.
4. A residential dwelling is located at 17319 Allaire Road.

No public recreation facilities or activities were identified within the Off-site Study Area.

Official Plan and Zoning By-Law

The planned future land uses of the On-site and Off-site Study Areas are described by the United Counties of SDG Official Plan (United Counties of SDG, 2021) and the United Counties of Prescott-Russell Official Plan (United Counties of Prescott-Russell, 2018). Each Counties' Official Plan provides a policy framework for comprehensive and context-specific, long-term planning to integrate land use policies and decision-making.

The existing EOWHF and future development lands are located within the United Counties of SDG. The existing EOWHF and the portion of the future development lands located on Lot 17 and the western portion of Lot 16, Concession 10 are designated "Rural District". The United Counties of SDG Official Plan states that waste management systems are permitted in the "Rural District" land use designation.

Lots 14, 15 and the eastern portion of Lot 16, Concession 10 of the future development lands were designated "Agricultural Resource Lands". The "Agricultural Resource Lands" designation does not permit a waste management system and an Official Plan Amendment was submitted to the United Counties of SDG to redesignate these future development lands. These lands were redesignated as a Special Land Use District permitting a waste management system and ancillary uses in the Agricultural Resources Lands in Official Plan Amendment No. 9, which was adopted by the United Counties of SDG on April 22, 2022.

The existing EOWHF and the portion of the future development lands located on Lot 17 and the western portion of Lot 16, Concession 10 are defined as a "Waste Disposal Site" in the North Stormont Zoning By-law and zoned as "Waste Disposal" (WD), "Waste Disposal Exception Zone" (WD-2), with the exception of the area north of Stage 4, which is zoned as "Rural" (RU) and "Areas of Natural and Scientific Interest" (ANSI). A "Waste Disposal Site" is a permitted use in the WD and WD-2 zones but not within the RU and ANSI zones.

The future development lands are zoned "Agriculture" (AG) with a small parcel along Highway 138 zoned "Highway Commercial Exception Zone" (CH-7). A Waste Disposal Site is not permitted in the AG or CH-7 zones.

A Zoning By-law Amendment was submitted to the Township of North Stormont to rezone the RU, ANSI, AG, and CH-7 lands. The lands were rezoned as Waste Disposal – Special Exception zones in the Township of North Stormont By-law No. 24-2022, which was approved by Council on April 5, 2022.

Active Development Applications and Future Development Potential

The Township of North Stormont confirmed that there are no active development applications within 1 km of the future development lands. The Nation Municipality confirmed that there are two active site plan control applications within 1 km of the future

development lands, which are located approximately 700 m from the On-site Study Area on County Road 8 north of Highway 417, and include a mini storage development and a biosolids transfer station. Both applications are industrial in nature and would be compatible with the expanded landfill.

The future development potential of lands within 1 km of the On-site Study Area was identified using the United Counties of SDG Official Plan, Prescott-Russell Official Plan, North Stormont Zoning Bylaw, and The Nation Municipality Zoning Bylaw. The municipal policies restrict land uses due to the potential effects of a landfill which are experienced within 50 m, 200 m, or 500 m of landfill, depending on the planning authority. The Guideline D-4 restricts land uses within 30 m of the expanded landfill (MECP, 1994). Based on these municipal and provincial policies, it is understood that future development in the Off-site Study Area is restricted in the following ways:

- All future development is prohibited within 30 m of the expanded landfill;
- All future development is prohibited within 50 m of the expanded landfill in The Nation Municipality;
- Sensitive land uses are prohibited within 200 m of the expanded landfill within the Township of North Stormont; and
- All future development is restricted within 500 m of the expanded landfill in the SDG Counties and Prescott-Russell Counties, subject to additional studies and approvals. Additionally, proposals for future development will need to show that they will not impact future expansion of the landfill.

4.3.5.3 Aggregate Extraction and Agriculture

The existing conditions are summarized from the Land Use Existing Conditions Report (**Supporting Document 1-11**) and the Agriculture Existing Conditions Report (**Supporting Document 1-12**).

Aggregate Resources

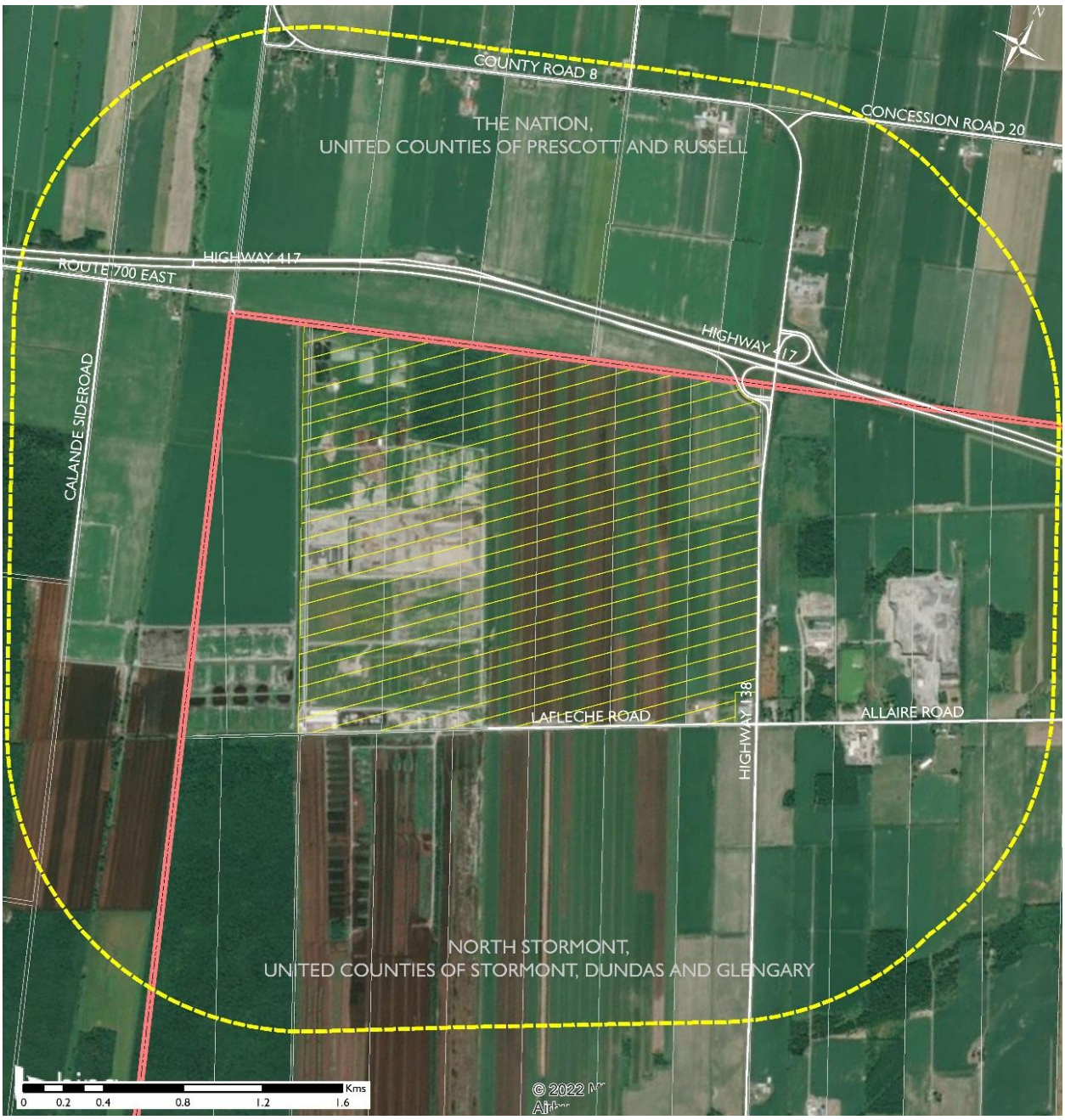
The On-site and Off-site Study Areas for Aggregate Resources are the generic study areas shown on **Figure 4-1**. No aggregate resource sites exist within the On-site Study Area. Two aggregate resource sites exist within the Off-site Study Area, totalling 163 ha of land, as follows:

- Peat harvesting on the lands southwest of the existing EOWHF undertaken by Calco Soils, located 50 m south of the On-site Study Area.
- Aggregate extraction at the Martin Quarry operated by A.L. Blair Construction Ltd. at 17423 Allaire Road, located 800 m east of the On-site Study Area. The Martin Quarry is a licensed quarry that is extracting aggregate materials.

Agriculture

The On-site and Off-site Study Areas for Agriculture are shown on **Figure 4-16**. The Off-site Study Area was extended to include the lands in the vicinity of the future development extending approximately 1.5 km from the On-site Study Area.

Figure 4-16. Study Areas for Agriculture



The land use and zoning in the study areas are described in Section 4.3.5.2.

The On-site and Off-site Study Areas comprise a relatively simple mix of topography. The eastern portion of the Study Area includes very gently rolling lands, created through a process of landforming fields. The fields between the existing EOWHF and the Highway 138 consist of long narrow fields (roughly 55 m wide), with ditches between each field. The ditches are shallow to the south and are deeper to the northern portions of the On-site Study Area. The fields between the ditches have been contoured with a slightly higher centre portion (0.5 to 1 m) that would extend higher than the edge of the fields near the ditches. This will allow for rapid surface water drainage to the nearby ditches.

The topography in the Off-site Study Area is similar to the eastern portions of the On-site Study Area, with contoured (landformed) fields south of Laflèche Road. Relatively level to very gently sloping lands were noted in all directions. The highest point of topography is located within the existing EOWHF area.

The land use survey identified that the On-site Study Area comprises approximately 45.1% built-up areas, 43.8% sod, and 11.1% common field crop. The Off-site Study Area comprises land use of approximately 45.9% common field crop, 15.8% peat extraction, 10.9% forage/pasture, 9.6% woodlands, 9.0% sod, 2.5% built up, 2.3% grains, 2.2% quarry lands, 1.5% scrubland, 0.2% pond, and 0.1% open field.

One agriculture-related building was observed within the On-site Study Area, located just west of the Highway 138, along the north side of Laflèche Road, which is part of the Manderley Sod Farm. The building is used for equipment storage and maintenance for the production of sod at this location. There are no buildings within the On-site Study Area that are used for housing of or production of livestock. A total of 16 agricultural facility sites (active, remnant, vestige) were identified in the Off-site Study Area.

There is no tile drainage registered to the On-site Study Area, and no capital investment related to irrigation systems identified within the Study Areas. The land tenure of the lands within the Study Areas indicate that the lands are considered locally owned.

The soil capability (Canada Land Inventory (CLI)) from the detailed soil survey of the proposed future development lands indicated that approximately 30.6% of the area is considered CLI Class 1-3 lands (Prime Agricultural Lands). The remaining portion (approximately 69.4%) is considered as Not Rated.

A review of the online Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Agricultural System Portal indicated that there were no farmers markets, pick your own operations, nurseries, specialty farms (crop or livestock), frozen food manufacturing, refrigerated warehousing/storage, livestock assets or abattoirs in the Study Areas. The closest transportation network (major roadway) is Highway 417 which is located immediately north of the existing EOWHF and the proposed future development area. Highway 138 runs immediately east of the proposed future development and has direct access to Highway 417.

5 Alternative Methods of Carrying Out the Undertaking

This section of the EA Study Report describes the two alternative methods of carrying out the undertaking.

5.1 Overview

The alternative methods for carrying out the proposed undertaking (i.e., future development options) were identified as part of the approved ToR. Two alternative methods for the future development to provide additional landfill disposal capacity were identified in the ToR. Studies completed for the EOWHF have indicated that, based on the underlying soils, the design alternatives are limited to varying lateral configurations with a consistent height. The preliminary conceptual designs were refined during the EA process and were presented at two public open houses as part of the consultation and engagement process during the EA.

For both alternative methods, the design of the stages will be consistent with the existing landfill design. Visual screening will be constructed along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings. A new road entrance will be constructed from Laflèche Road, which will include a new scale facility. Both alternative methods will continue to use established operating procedures currently in place at the EOWHF and would maximize the use of existing site infrastructure.

5.1.1 Alternative Method 1

Alternative Method 1 (**Figure 5-1**) consists of implementing the future development through five stages: one stage adjacent to and north of the existing landfill (Stage 5[13]); and four stages oriented east-west within the future development lands (Stages 6 through 9). Stages 6 through 8 will be identical in size, while Stages 5 and 9 will be smaller. An SWM system will be constructed consisting of conveyance ditches around the perimeter of each stage and a retention pond located northwest of Stage 8. The existing pond located northeast of Stage 5 will be modified to attenuate peak flows if required.

[13] The current EOWHF comprises Stages 1 through 4.

Figure 5-1. Alternative Method 1

HDR
300 - 100 York Boulevard
Richmond Hill, ON L4B 1J8
Canada

ISSUE	DATE	DESCRIPTION
I	2022-08-25	ISSUED FOR CDR
H	2022-06-02	ISSUED FOR REVIEW
G	2022-05-13	ISSUED FOR REVIEW
F	2022-03-04	ISSUED FOR REVIEW
E	2021-11-17	ISSUED FOR REVIEW
D	2021-08-09	ISSUED FOR REVIEW
C	2021-06-29	ISSUED FOR REVIEW
B	2021-06-15	ISSUED FOR REVIEW
A	2021-03-24	DRAFT FOR DISCUSSION

DESIGN	AJC
DRAWN	AJC
CHECKED	MS
APPROVED	LF
PROJECT NUMBER	10287067

GFL EASTERN ONTARIO WASTE HANDLING FACILITY FUTURE DEVELOPMENT

PROPOSED TOP OF FINAL CONTOURS ALTERNATIVE METHOD 1 PLAN

5.1.2 Alternative Method 2

Alternative Method 2 (**Figure 5-2**) consists of implementing the future development through four stages: one stage adjacent to and north of the existing landfill (Stage 5); and three stages oriented north-south within the future development lands (Stages 6 through 8). Stages 6 and 7 will be identical in size, while Stages 5 and 8 will be smaller. A SWM system will be constructed consisting of conveyance ditches around the perimeter of each stage and a retention pond located north of Stages 6 and 7. The existing pond located northeast of Stage 5 will be modified to attenuate peak flows if required.

5.2 Conceptual Design of the Future Development Alternative Methods

The conceptual designs of the landfill expansion alternative methods were developed in greater detail as part of the EA (**Supporting Document 2 – Conceptual Design Report** (CDR)) to confirm feasibility, constructability and approvability under the *Environmental Protection Act*. These more detailed conceptual designs were used to support the net effects assessment and comparative evaluation.

The conceptual designs for both alternative methods were prepared with consideration of the requirements in O.Reg. 232/98 and are consistent with the guidance presented in the MECP's Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Sites, Ontario Ministry of the Environment (MECP, 2012). O.Reg. 232/98 requires that the Ontario Landfill Standards be applied to new or expanding landfills with a total disposal capacity greater than 40,000 m³. O.Reg. 232/98 allows for a site-specific design in addition to the generic design elements. The proposed conceptual designs for the two alternative methods are site-specific designs that meet or exceed the requirements of O.Reg. 232/98. The concepts presented in the CDR for both alternative methods are a minimum requirement and different methods may be applicable to achieve the same or better objective/purpose for the design.

The approved ToR set out a framework for the development of the conceptual design for the two alternative methods. During the development of the conceptual designs for both alternative methods, refinements were made including the addition of a stage to Alternative Method 1.

The CDR (**Supporting Document 2**) presents conceptual design and operations information for the two alternative methods. This report provides information on the main aspects of the landfill design and operations proposed for the two alternative methods including:

- figures of the two alternative methods including landfill base and top of waste contours;
- landfill development sequence and operations;
- leachate management, including leachate generation and leachate treatment;
- LFG management;

Figure 5-2. Alternative Method 2

ISSUE	DATE	DESCRIPTION
I	2022-08-25	ISSUED FOR CDR
H	2022-06-02	ISSUED FOR REVIEW
G	2022-05-13	ISSUED FOR REVIEW
F	2022-03-04	ISSUED FOR REVIEW
E	2021-11-17	ISSUED FOR REVIEW
D	2021-08-09	ISSUED FOR REVIEW
C	2021-06-29	ISSUED FOR REVIEW
B	2021-06-15	ISSUED FOR REVIEW
A	2021-03-24	DRAFT FOR DISCUSSION

DESIGN	AJC
DRAWN	AJC
CHECKED	MS
APPROVED	LF
PROJECT NUMBER	10267067

HDR
300 - 100 York Boulevard
Richmond Hill, ON L4B 1J8
Canada

GFL EASTERN ONTARIO
WASTE HANDLING FACILITY
FUTURE DEVELOPMENT

PROPOSED TOP OF FINAL CONTOURS
ALTERNATIVE METHOD 2 PLAN

- SWM including drainage pathways; and
- typical details of the key features associated with the future development.

The conceptual designs for the two alternative methods have differences relating primarily to the geometry of the landfill stages, with the same design concepts to be applied to the base liner, leachate collection, and cover systems for both alternative methods. The designs presented in the CDR for the two alternative methods will be further developed and optimized during the technical design stage for the Preferred Alternative in support of the application to amend the existing ECA for the landfill.

5.3 Alternative Method 1

This section describes the landfill design and cell geometry, buffer area, site development, leachate generation and management, LFG management, SWM, ancillary facilities and infrastructure, and landfill operations for Alternative Method 1.

5.3.1 Landfill Design and Geometry

Alternative Method 1 consists of implementing the future development through five stages: one stage adjacent to and north of the existing landfill (Stage 5[14]); and four stages oriented east-west within the future development lands (Stages 6 through 9). Stages 6 through 8 will be identical in size, while Stages 5 and 9 will be smaller. Stage 9 is located north of Stage 8 and to the east of the stormwater pond. The layout for Alternative Method 1 is shown on **Figure 5-1**. The design of these stages will be consistent with the existing landfill design including:

- Base excavation into native soils (e.g., into natural low permeability barrier).
- Construction of perimeter berms around each stage utilizing either existing low-permeability soils, or compacted soils overlain by a geosynthetic clay liner (GCL) keyed into native soils at the inside toe of the berm.
- Leachate collection system (LCS) consisting of granular layers and a piping network with collected leachate conveyed to leachate aeration ponds located in the southern portion of the existing landfill and then to the LTF located north of the existing landfill. The capacity of the LTF will be expanded to accept leachate generated from the existing landfill as well as from the future development.
- Final contours reflecting a 4H to 1V slope at the perimeter of the stage transitioning to an approximately 3% slope on the top of the stage.
- Low permeability final cover consisting of a soil/geomembrane composite.
- LFG collection system consisting of vertical extraction wells and lateral and header piping within the waste. Collected LFG will be conveyed to the existing LFGTE plant located south of Stage 1 and which includes internal combustion reciprocating engines which generate electricity as well as enclosed LFG flares. LFG condensate will be re-introduced into the waste or conveyed to the LTF.

[14] The current EOWHF comprises Stages 1 through 4.

- SWM system consisting of conveyance ditches around the perimeter of each stage and a retention pond located northwest portion of Stage 8. The existing pond located northeast of Stage 5 will be modified to attenuate peak flows if required.

Other key design features include:

- Visual screening to be constructed along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings.
- New road entrance from Laflèche Road, including new scale facility with three 26 m long scales.
- Soil storage pads adjacent to the new scale facility and to the north of Stage 9.
- Internal road network permitting access to the new stages.

The geometry of Alternative Method 1 is shown in plan view on **Figure 5-1** and in cross-section on **Figure 5-3** and **Figure 5-4**. The maximum elevation of the top of final cover will range as follows:

- Stage 5: 78.5 masl.
- Stages 6 through 8: 81.0 masl.
- Stage 9: 77.5 masl.

The proposed design is a natural containment landfill that utilizes the existing in situ low permeability silty clay as a hydraulic barrier layer with performance criteria equivalent to or exceeding a generic composite liner system. This will be overlain by an LCS, which consists of a leachate collection blanket of coarse stones (incorporating a leachate piping network) overlain by a protective layer of finer granular material acting as a filter, consistent with the design criteria set out in O.Reg. 232/98, Schedule 1.

The conceptual cell base grade elevations have been based on the interpreted contours for the bottom of the desiccated zone within the silty clay while also maintaining sufficient slope to facilitate leachate drainage to the LCS and reduce the head of leachate on the base of the cells. The depth of the conceptual base grade will vary between about 63.5 to 65.5 masl, which can be several metres below existing grade. The conceptual design of Alternative Method 1 considers the presence of shallow bedrock in the southeastern portion of the future development lands, which is close to the eastern limit of Stage 6.

The base in each of Stages 6 through 9 will be excavated to form an east-west oriented central ridge with an approximately 0.6% slope away from the central ridge towards both the south and north perimeters of the stage. The base will be excavated to form a series of smaller ridges and valleys such that a steeper slope (e.g., about 4%) will exist toward LCS piping within each valley.

The maximum width of the new stages (Stages 6 through 8) will be 400 m, which is consistent with the maximum stage width developed in the existing landfill. A compacted earthen berm with 4H to 1V slopes will be constructed around the perimeter of each stage utilizing either existing low-permeability soils, or compacted soils overlain by a GCL keyed into native soils at the inside toe of the berm. The berm will be approximately 33 m in width and constructed to an elevation of between 64.5 to 68.5 masl.

Figure 5-3. Cross-Sections for Stage 5

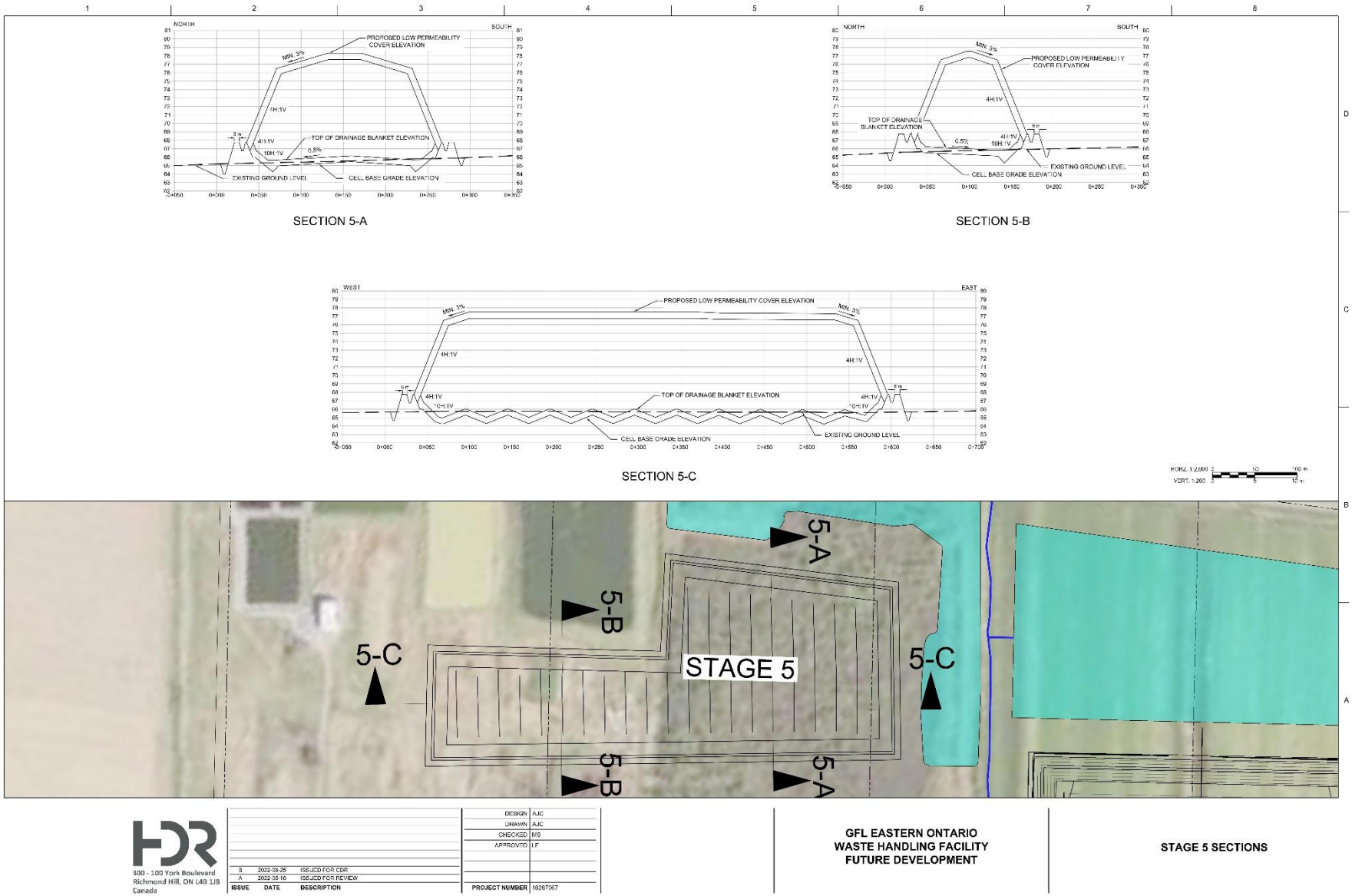
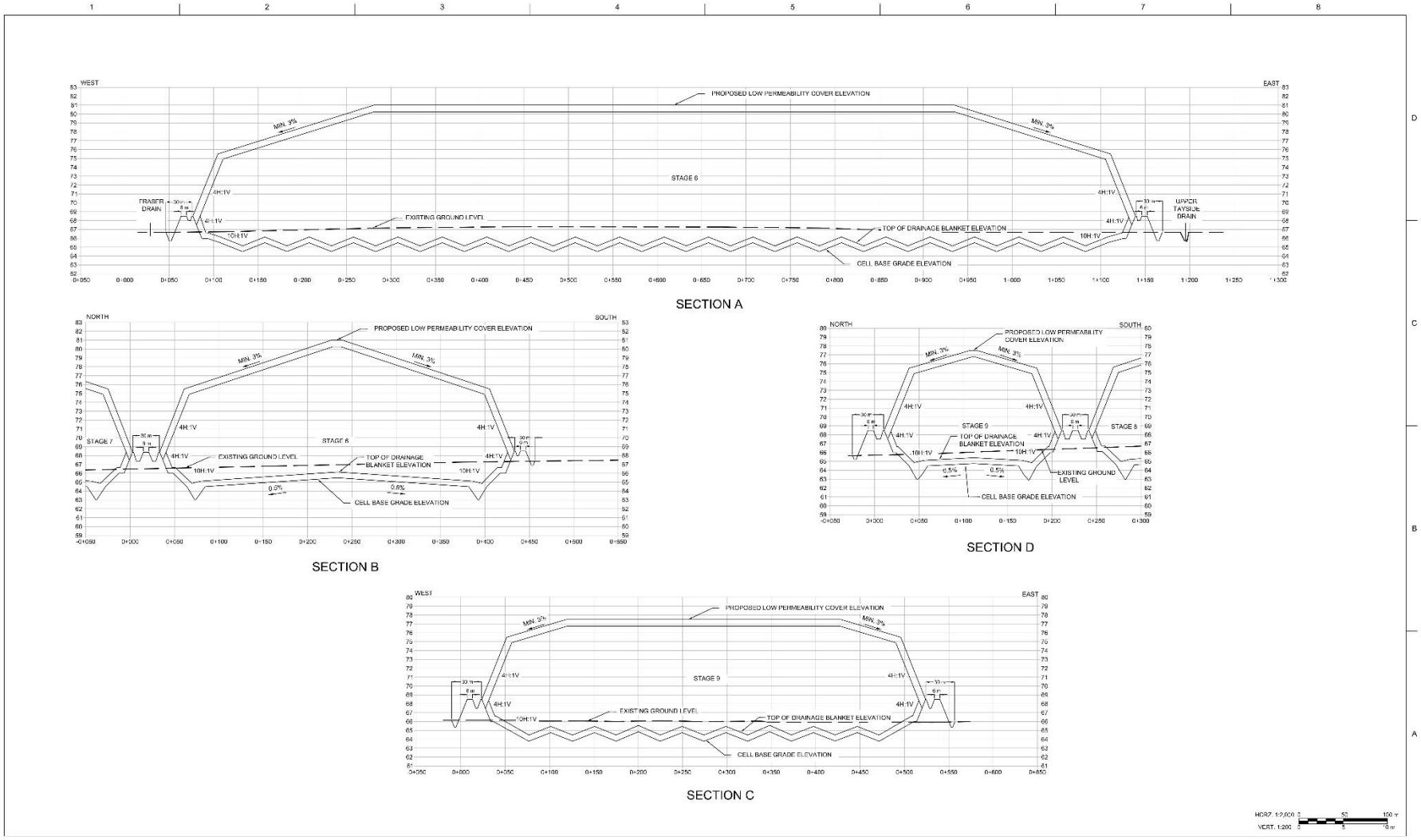


Figure 5-4. Cross-Sections for Stages 6 through 9 – Alternative Method 1



B	2022-09-25	ISSUED FOR CDR	
A	2022-03-04	ISSUED FOR REVIEW	
ISSUE	DATE	DESCRIPTION	PROJECT NUMBER 1028787

DESIGN	AJC
DRAWN	AJC
CHECKED	MS
APPROVED	LF

HDR
300 - 100 York Boulevard
Richmond Hill, ON L4B 1J8
Canada

GFL EASTERN ONTARIO WASTE HANDLING FACILITY FUTURE DEVELOPMENT

ALTERNATIVE METHOD 1 SECTIONS

5.3.2 Buffer Area

Alternative Method 1 will provide the following minimum buffer widths between the limits of waste placement and property boundaries:

- North limit Stage 5 to north property boundary: 158 m.
- North limit of Stage 9 to north property boundary: 145 m.
- East limit of Stages 7 through 9 to east property boundary: 242 m.
- South limit of Stage 6 to south property boundary: 100 m.

5.3.3 Site Development

The proposed site development for Alternative Method 1 is described in the sub-sections below. It includes the landfilling sequence as well as operational considerations during landfill construction.

5.3.3.1 Phasing

This alternative method consists of five stages with 34 cells as shown in **Table 5-1**. The areas and volumes of the Stages and Cells shown in **Table 5-1** are approximate and will be confirmed through detailed design. However, the total landfill volume of Alternative Method 1 will remain at 15,100,000 m^3.

Table 5-1. Proposed Phasing and Cell Capacity – Alternative Method 1

Cell	Area (m^2)	Volume (m^3)
Stage 5 (CELLS 1 and 2)	102,948	755,000
Stage 6 (CELLS 1 and 2)	92,400	898,172
Stage 6 (CELLS 3 and 4)	80,065	899,764
Stage 6 (CELLS 5 and 6)	80,065	899,764
Stage 6 (CELLS 7 and 8)	80,065	899,764
Stage 6 (CELLS 9 and 10)	92,381	898,172
Stage 7 (CELLS 1 and 2)	92,400	898,172
Stage 7 (CELLS 3 and 4)	80,065	899,764
Stage 7 (CELLS 5 and 6)	80,065	899,764
Stage 7 (CELLS 7 and 8)	80,065	899,764
Stage 7 (CELLS 9 and 10)	92,381	898,172
Stage 8 (CELLS 1 and 2)	92,400	898,172
Stage 8 (CELLS 3 and 4)	80,065	899,764
Stage 8 (CELLS 5 and 6)	80,065	899,764
Stage 8 (CELLS 7 and 8)	80,065	899,764
Stage 8 (CELLS 9 and 10)	92,381	898,172
Stage 9 (CELLS 1 and 2)	100,020	858,095
TOTAL	**1,477,896**	**15,100,000**

5.3.3.2 Site Development Schedule

For the purposes of the EA, it was assumed that landfilling would commence in Stage 5 with filling progressing from east to west and, upon completion of Stage 5, filling would progress to each of Stages 6 through 9 moving from west to east within each stage. The planned landfilling sequence may be modified by GFL prior to or during implementation of the future development.

The landfill future development will be filled over a period of 20 years. GFL anticipates that, as the landfill is developed, a maximum of up to two cells will be active in any given year (e.g., landfilling will occur within an area of between 8 to 10 ha), and that similar area would be inactive (e.g., some waste placed, with a soil intermediate cover). The maximum combined area of active landfill and intermediate covered landfill in any given year will be up to approximately 17.4 ha, with the remaining site area closed with final cover after the waste fill reaches the final contours.

5.3.3.3 Construction Activities

Prior to commencing landfilling operations, the area will be excavated and prepared to accept waste. The preparation of cells for landfilling will include the following activities:

- Construction of temporary ditching to limit stormwater entry into excavations and to allow for dry working conditions during construction;
- Construction of necessary drainage features in accordance with the SWM design and tie in temporary ditching;
- Excavation to the cell base grades using methods to minimize disturbance and excess moisture on the silty clay;
- Construction of the LCS within the excavated landfill cell area;
- Construction of temporary separation berms at the LCS edge that will divert surface water away from the waste placement operations within the open landfill cell; and
- Construction of berms around the perimeter of the stage.

Prior to commencement of landfilling in Stage 6 (e.g., the first landfill stage planned to be developed within the future development lands), the new site access will be constructed as shown on **Figure 5-1**.

Landfill development will be transitioned from cell to cell in the following order:

- Construction of the next landfill cell according to the activities listed above;
- Construction and installation of the LCS piping and granular drainage blanket in the new cell, connecting leachate collection and header piping between the current and new cell, and removal of portions of the temporary berms between the cells to facilitate LCS piping connections; and
- Removal of the remaining interior berms to recover airspace.

Once two cells have reached the limits of their final waste contours, and their respective landfill LFG collection system has been installed, the final cover will be constructed. Final cover will be placed as soon as possible to limit the uncovered areas to minimize fugitive

LFG emissions and minimize infiltration of precipitation, which in turn will reduce leachate generation.

5.3.4 Leachate Generation and Management

The design concept for the future development involves effective leachate management to minimize the build-up of leachate on the base of the landfill and to effectively remove and treat the leachate to enable the effluent to be discharged to off-site surface water receivers. Estimates of the volume of leachate and the rate at which it is generated at the site were developed in order to determine the design parameter for the collection and treatment infrastructure.

5.3.4.1 Leachate Generation

A leachate generation assessment was undertaken in order to evaluate leachate production at varying stages of development throughout the life of the future development. The evaluation was carried out using the Hydrologic Evaluation of Landfill Performance (HELP) model (Version 4.0).

Leachate generation was estimated on a per hectare basis for four different conditions that will exist during the life of the future development, as follows:

- Open cell conditions (i.e., all precipitation is considered leachate), representing leachate generation at the construction of a new cell and initial placement of waste;
- Two intermediate cover scenarios; and
- Final cover conditions, representing leachate generation in an area where waste has been placed to final waste grades and the composite soil/geomembrane final cover has been constructed.

The future development will occur over a 20-year period and operations in the future development area will be similar to Stage 4 at the existing landfill. This reflects that, in a given year:

- four cells (approximately 17.4 ha) would be active;
- two of the four active cells would be in an open cell condition (e.g., active landfilling);
- two of the four cells will be in an intermediate cover condition; however, stormwater runoff is not released from the intermediate covered cells, so these cells were assumed to be equivalent to the open cell condition for the purpose of estimating leachate generation; and
- the remainder of developed area under final cover conditions.

On this basis, the maximum leachate generation for Alternative Method 1 is estimated to occur in approximately Year 19 when 17.4 ha are active (entire area modelled as an open cell condition), and 130.4 ha is in a final covered condition, corresponding to between 131,000 m^3 and 141,000 m^3 of leachate.

Projections of potential precipitation and temperature changes for different parts of Ontario are presented in a 2015 report prepared by the Ontario Ministry of Natural Resources and Forestry (MNRF, 2015a). Under the highest scenario, average annual

precipitation in the Ottawa River Basin could increase by 56 millimetres per year (mm/yr) over the period from 2011 to 2040, with a maximum projected increase of 128 mm/yr over the same period. This range represents an increase of approximately 6% to 14% over the annual average precipitation used in the HELP model. A conservative assumption is that maximum leachate generation could increase by the same amount to a range of 131,000 m³/yr to 141,000 m³/yr.

5.3.4.2 Leachate Treatment Facility Capacity

The existing LTF at the EOWHF has the capacity to treat 833 m³/day for a total annual volume of 304,000 m³. The approved ECA No. 7899-CBQP6L allows for 833 m³/day of leachate treatment up to a total of 200,000 m³/year.

The effluent requirements before discharge are shown in **Table 5-2** as per Table 1, Section 7: “Effluent Limits” in ECA No. 7899-CBQP6L.

Table 5-2. Approved Effluent Discharge Limits

Parameters	Units	Effluent Limits
$CBOD_5$	mg/L	10.0
Total Suspended Solids	mg/L	10.0
Total Phosphorus	mg/L	0.3
Total Ammonia Nitrogen	mg/L	1.0
Dissolved Oxygen (Minimum Level)	mg/L	4.0
Iron	mg/L	1.0
Copper	mg/L	0.2
Zinc	mg/L	0.2
Phenols	mg/L	0.005
pH	—	6.0-8.5

5.3.4.3 Leachate Management and Treatment

Leachate collected in the future development landfill LCS will be conveyed via a newly constructed forcemain to the existing leachate aeration ponds located in the southern portion of the existing landfill and subsequently to the on-site LTF and managed as per current practices. The LTF includes two holding/pre-treatment ponds, three suspended media biological reactors (SMBRs), a coagulation/flocculation tank, a dissolved air flotation device, and a tertiary filtration system. Currently the LTF is permitted to treat 200,000 m³ of leachate per year and in 2021 approximately 175,285 m³ of leachate was treated. Upon full closure of the existing landfill, it is estimated that the existing landfill will generate approximately 130,000 m³ to 145,000 m³ of leachate per year (**Supporting Document 2**). The maximum annual leachate generation is estimated to be 286,000 m³, which will occur during a single year (Year 19) of the future development (i.e., the leachate generation volume will be less for every other year of operation) and will decline in subsequent years after closure. After closure and capping of the future development, the leachate generation rate will decrease to approximately 203,321 m³ (145,000 m³ from the existing landfill and 62,231 m³ from the future development). The appropriate design safety factor will be determined as part of the ECA application for the LTF upgrade in

order to avoid development of an unnecessarily oversized facility and any resulting operational challenges or inefficiencies.

Planned upgrades are anticipated to increase the capacity of the LTF to 304,000 m^3/year so the projected volume of leachate from the future development can be managed. Based on leachate generation projections and planned upgrades to the LTF, it is anticipated that the upgraded LTF will have the capacity to treat all leachate from the existing landfill and the future development.

Condition 36.3 of ECA No. A420018 includes an approved contingency for leachate management at the existing landfill comprising the removal of leachate for treatment at an off-site wastewater treatment facility. This contingency will be maintained for the future development.

5.3.5 Landfill Gas Management

Management of LFG generated by decomposition of the landfilled waste in the future development area will involve active collection through an LFG collection system. The collected gas will then be combusted by flaring or used as fuel in reciprocating engines generating electrical power at the existing LFGTE plant at the EOWHF.

5.3.5.1 Landfill Gas Collection and Destruction System

System Description and Capacity

The LFG collection system is the portion of the system which collects and conveys the LFG to the LFGTE plant. LFG generated in the future development area will be collected with a system of vertical extraction wells, a network of buried gas conveyance piping, and a condensate drop-out location system similar to the existing landfill. Collected LFG will be conveyed to the existing LFGTE plant located in the southeast portion of the existing landfill, near the entrance to the existing site.

The LFGTE plant has a total combustion capacity of 15,040 cubic metres per hour (m^3/hr) (8,850 cubic feet per minute (cfm)) consisting of four Jenbacher internal combustion reciprocating engines capable of generating up to 4.2 MW of electricity with a combined capacity of 2,300 m^3/hr (1,350 cfm @ 50% CH_4), and three enclosed flares with a combined capacity of 12,750 m^3/hr (7,500 cfm). ECA No. 5665-8STRV7 allows for an LFGTE plant that consists of eight engines.

The LFG collection system is connected to a central mechanical system that provides the vacuum necessary to extract the LFG from the wellfield and transfer it under low pressure to the Jenbacher engines for combustion. Under normal operating conditions, LFG collected at the site is directed to the engines, which run at maximum capacity for optimal energy generation. Any excess LFG is sent to the flares for destruction. The flares are designed to manage any and all excess LFG resulting from some or all of the engines being offline for maintenance.

Landfill Gas Collection Efficiency

It has been assumed that the LFG collection system for the future development would achieve a 75% collection efficiency which is considered typical for Municipal Solid Waste

(MSW) landfills (US EPA, 2018). Historical LFG generation estimates and actual LFG collection data for the existing EOWHF landfill suggests an average collection efficiency in the order of 84% over the past four years; however, by utilizing the 75% collection efficiency assumption, the assessment of effects is expected to be the worst case for air emissions when the landfill is operating. The final cover design for the landfill expansion will incorporate a geomembrane which is expected to enhance LFG collection as it will limit fugitive emissions through the cover. It will also reduce the infiltration of precipitation into the waste thereby slowing down the waste decomposition and LFG generation process. Overall, the LFG collection system should then operate with increased efficiency, possibly up to 95%, resulting in greater LFG capture and reduced fugitive emissions.

5.3.5.2 Landfill Gas Generation Projections

Modelling of LFG generation for the future development was performed using the LFG Emissions Model (LandGEM) (US EPA, 2005) tool to estimate LFG generation rates.

LandGEM calculates annual LFG production rates using annual landfilling rates and data on the biodegradation of the waste organic fraction, as represented by the following parameters:

- Year-by-year landfilled waste tonnage;
- Methane generation potential (L_o) expressed as m^3 of methane per tonne of waste (m^3-CH_4/tonne);
- Methane generation rate (k) expressed as a kinetic rate ($year^{-1}$); and
- Methane concentration in LFG.

A description of how LFG generation was estimated using the LandGEM model is provided in Appendix C of the CDR (**Supporting Document 2**). LFG generation rates were calculated separately for MSW, IC&I, and SRM waste (which have comparable methane generation characteristics) and for C&D waste. The contributions of both groups of waste were then combined, resulting in total LFG generation for all landfilled waste.

LFG generation from the future development is expected to peak one year after closure in 2046 at approximately 8,680 m^3/hr, or 5,110 cfm. LFG generation is expected to decline approximately 5% per year after closure reaching a value of approximately 1,750 m^3/hr (1,030 cfm) in 2078.

Assuming the LFG collection system for the future development would achieve a 75% collection efficiency, the potential LFG recovery is expected to peak one year after closure in 2046 at approximately 6,510 m^3/hr (3,830 cfm). Potential LFG recovery is expected to decline approximately 5% per year after closure reaching a value of approximately 1,315 m^3/hr (775 cfm) in 2078.

LFG production from the existing site is estimated to peak one year after its closure in 2026 at 9,000 m^3/hr (5,300 cfm) and then decline, as LFG generation from the future development area begins to increase. The combined generation from the existing site and the future development would peak one year after closure of the future development in 2046 at 14,300 m^3/hr (8,400 cfm). A collection efficiency range of 75% to 95%

corresponds to collection and management of between approximately 6,300 to 8,000 cfm of LFG.

The current combustion capacity of the LFGTE plant exceeds the future peak LFG generation; however, it is noted that the four reciprocating engines are being operated under a FIT contract valid until February 20, 2033. If contractually obligated electricity production is not required, then the continued operation of the reciprocating engines is unlikely.

GFL is considering the potential to divert LFG to an RNG facility in the future. An RNG facility would be able to utilize all of the LFG generated, not just a portion as is the case with the LFGTE plant. All LFG will be flared in the event that the LFGTE plant is no longer operating and an RNG facility not developed.

Sufficient LFG management capacity is available at the EOWHF for the projected volume of LFG to be generated and collected. Based on the potential LFG collection efficiency of up to 95%, the LFG management system for the expansion will be designed to provide adequate capacity. GFL will continue to monitor the generation of LFG in future years to confirm that the LFG management infrastructure is sufficient. An additional flare may be added if required. Should additional flaring be needed, an ECA amendment application will be completed as required.

5.3.6 Stormwater Management

The EOWHF landfill future development lands are located in the Fraser Drain and Upper Tayside Municipal Drain subwatersheds, which ultimately drain into Moose Creek and Scotch River, respectively. The Fraser Drain flows along the west boundary, and the Upper Tayside Municipal Drain flows along a portion of the east boundary of the future development, respectively. Under existing conditions, shallow ditches in the future development lands direct runoff primarily into a perimeter ditch that runs along the northern boundary of the site and discharges into the Fraser Drain, where the Fraser Drain changes flow direction from north to west. The shallow ditches also direct a small portion of the runoff to the Upper Tayside Municipal Drain.

The future development area will increase the impervious surface area, peak flows, and volume of surface runoff. To prevent an increase in risk of flooding and negative impacts to water quality, a proposed conceptual SWM design has been developed that will mitigate potential negative impacts to the existing surface water drainage system.

Relevant SWM criteria as identified by the MECP in O.Reg. 232/98 and its related guidance document “Landfill Standards” (MECP, 2012) include:

- Water quality enhancement features (e.g., sedimentation ponds) of non-contaminated stormwater should be designed to temporarily treat/store the runoff volume generated from a 4-hour, 25 millimetre (mm) storm event and will be sized to provide “Enhanced” (Level 1) protection (i.e., 80% long-term suspended solids removal) and meet the SWM design requirements of the MECP Stormwater Management Planning and Design Manual (MECP, 2003).
- Surface water quantity control (i.e., peak flow reduction) measures of non-contaminated stormwater to be designed to temporarily store the runoff volume generated from storm events up to the higher of the 24-hour, 100-year design storm

or the prevailing Regional Storm event, and release at or below the existing condition peak flows, such that there is no appreciable change in the potential for flooding and/or erosion in the watercourses receiving surface water discharges.

The following design storms were used to assess the design of the SWM system:

- Environment Canada's rain gauge station: Ottawa CDA RCS Station (6105978); and
- Quantity control design storms: SCS Type II 24-hour Storm for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year return periods.

In order to satisfy quantity and quality requirements, the proposed SWM system includes a new wet pond in the northwest corner of the future development area and oversized drainage ditches around the east and west perimeter of the site. The proposed wet pond will discharge into the Fraser Drain just upstream of where the Fraser Drain changes flow direction from north to west. As noted in Section 5.1.1, the existing SWM pond located northeast of Stage 5 will be modified to attenuate peak flows if required.

Based on the available topographic information, the bottom elevation of the Fraser Drain is at approximately 63.7 masl, and the 100-year flow depth is approximately 1.5 m. All the runoff from the future development is proposed to be directed to the Fraser Drain, and accordingly will not generate negative water quality or quantity impacts to the Upper Tayside Municipal Drain.

The proposed SWM system for Alternative Method 1 is shown on **Figure 5-1** and the estimated required storage volumes in the proposed facilities are summarized in **Table 5-3**.

Table 5-3. Estimated Required Stormwater Volumes – Alternative Method 1

SWM Facility ID	Quality Control	Quantity Control	Required Volumes (m^3)		
			Permanent Pool[1]	Extended Detention[1]	Active Storage[2]
Wet Pond	80% Long-Term TSS removal	100-year storm	39,500	8,600	64,300
Perimeter ditch	Not Applicable	100-year storm	Not Applicable	Not Applicable	Not Applicable

[1] As per (MECP, 2003) Table 3.2 for 'Enhanced' Protection.
[2] Based on a controlled peak release rate of 5.7 m^3/s, excluding permanent pool and extended detention storage.

5.3.7 Ancillary Facilities and Infrastructure

The construction of Stages 6 through 9 will require the development of a new network of perimeter roads, entrance roadway, and weigh scale facility with three scale decks as shown on **Figure 5-1**. The road access will be at the southern limit of the future development lands, off of Laflèche Road. There will be a 12 m wide entrance prior to the scale and 12 m wide exit. Access to the cells will be through three 26 m x 4 m scales with 3 m long ramps. A 6 m roadway will be built around the perimeters of Stages 6 through 9, with two access bridges over the Fraser Drain to the existing EOWHF lands at the south of Stage 6 and north of Stage 8. The access bridges will be designed to allow

the passage of landfill equipment as well as to convey infrastructure (e.g., leachate pipeline and gas mains) as required.

5.3.8 Landfill Operations

Landfill operations including operating hours, equipment, waste placement, daily and intermediate cover and nuisance control measures for Alternative Method 1 are described below.

5.3.8.1 Operating Hours

The hours of operation for receiving waste at the existing EOWHF are:

- Monday to Friday 7:00 AM to 6:00 PM; and
- Saturday 7:00 AM to 5:00 PM.

Receiving hours for specified risk material are Monday to Friday from 7:00 AM to 3:00 PM.

The hours of operation for on-site equipment extend beyond the above receiving hours in order to carry out regular site activities such as site preparation and placement and removal of daily/interim cover:

- Monday to Friday 6:30 AM to 6:30 PM; and
- Saturday 6:30 AM to 5:30 PM.

The site is closed on Sunday and all statutory holidays. It is anticipated that these hours of operation will continue for the future development. The hours of operation may be reduced if waste quantities are consistently low over an extended period.

5.3.8.2 Site Equipment

The type and number of landfill equipment used at the existing landfill will continue to be used for the future development. The type and number of equipment may be revised based on day-to-day operational requirements as well as when equipment is taken out of service for maintenance or repairs. The equipment roster is anticipated to consist of:

- 2 bulldozers for levelling, compacting, and grading waste;
- 2 landfill compactors for levelling, compacting, and grading waste;
- 2 loaders for loading, snow removal, and waste processing;
- 2 articulating dump trucks for general site maintenance and hauling daily cover;
- 1 excavator for excavating, soil movement, and waste processing;
- 1 water truck for dust control; and
- 1 roll-off truck for moving and emptying 20-40 yd waste bins.

Other equipment (e.g., pick-up trucks, maintenance vehicles, mowers, tractors, and roll-off trucks) may be used for tasks such as landscaping and maintenance and may be provided by outside third parties.

5.3.8.3 Site Traffic

The EOWHF will continue to operate within its approved limits of 755,000 tonnes annually and an average daily rate of 2,500 tonnes per day. There are no operational changes anticipated for the future development and it will operate consistent with current conditions with the same daily and annual tonnage limits. There is no proposed change to the effective catchment area for the facility, the origin-destination patterns of vehicles travelling to or from the facility, or the maximum daily trips generated. Consequently, operations are expected to remain unchanged in terms of the origin and destinations of trucks as well as haul routes.

The current haul route to the EOWHF is via Highway 417, Highway 138 and Laflèche Road. Approximately 90% of the vehicles entering the weigh scale are large industrial trucks including dump trucks, walking floor trucks, rear loaders and front loaders, and roll-offs. Automobiles and service/pick-up trucks represent the remainder. The larger trucks generally travel to/from Ottawa or to/from the south via Highway 138. The smaller personal vehicles and pick-up trucks likely serve the surrounding local communities.

Future traffic volumes for the EOWHF were projected based on actual site data[15] under the assumption that 100% of the daily tonnage limits would be met for landfill waste on weekdays and on Saturdays (**Supporting Document 3-10**). This represents a very conservative estimate of future site trip generation, particularly for Saturday. This data was used to project future traffic volumes for the facility under the following assumptions:

- The maximum daily limit of 4,000 tonnes of total waste (landfill and compost material) is received.
- The 4,000 tonnes received includes receipt of 900 tonnes of compost materials (e.g., maximum allowable 400 tonnes of feedstock (biosolids, non-hazardous organic waste and/or non-hazardous liquid organic waste) and 500 tonnes of bulking agents (e.g., leaf and yard waste and/or wood waste) but no SRM). On this basis 3,100 tonnes of landfill waste would be received for both weekdays and weekends.
- The ratio of compost to landfill trips over the peak hour is equal to that over the full day. According to the weigh scale data, compost trips account for 27.2% and 76.2% during the weekday and Saturday, respectively.
- Employee traffic volumes remain unchanged.
- Traffic associated with the existing land uses south of Laflèche Road will not change.
- The origins/destinations of site traffic do not change.
- Haul routes do not change.
- The hourly, daily, and seasonal patterns remain stable.
- The breakdown of vehicle types and average vehicle loads remain stable.

[15] Due to COVID-19, it was not possible to conduct existing 2020 turning movement counts (TMCs) along Highway 138; therefore, the site traffic volumes observed in the 2016 TMCs were used to create a 2020 baseline by applying general background growth rates from Annual Average Daily Traffic (AADT) and Winter Average Daily Traffic data from the Ontario Ministry of Transportation (MTO). The 2020 baseline was then validated using the traffic data from weigh scale tickets.

The resulting trip generation is summarized in **Table 5-4**.

Table 5-4. Projected Maximum Vehicular Peak Hour Site Trip Generation vs. Observed Site Operations

Component	Observed Site Operations (April 2020)			Projected (3,100 tonnes/day)		
	AM	PM	Saturday	AM	PM	Saturday
Daily Tonnage	1,717		106	3,100		
Two-Way Landfill Trips	27	28	4	50	53	105

It is projected that the site may theoretically generate up to 50, 53, and 105 two-way trips during the weekday AM and PM, and Saturday midday peak hours, respectively. The nature of the site (waste disposal) means that there are no active transportation or transit trips anticipated. Thus, the vehicular site trip generation represents all trips generated by the facility.

Under existing, future background, and future total conditions there is, and will continue to be, residual capacity in the off-site road network even under the conservative assumption that the maximum daily tonnage is received. No off-site road network improvements are required to accommodate the extension of the facility's operating life.

5.3.8.4 Waste Placement

Once a landfill cell is prepared, waste will initially be placed in a thin layer over the entire base, starting in the outer perimeter and pushed out over the LCS, to prevent damage to the LCS from subsequent equipment traffic or frost. This initial layer will act as a travelling surface for equipment and waste haul vehicles.

Waste haul vehicles will access the working face via a well-maintained granular surface access road. Upon arriving at the active face, a spotter will screen the load and direct the haul vehicle to the active face. The length of the active face will be confined to an area that is as small as possible while maintaining efficient and timely waste disposal service and providing sufficient space between haul vehicles to safely unload.

Landfilling will be carried out using the 'area' method, where waste is spread over the underlying waste lifts and compacted by repeated passes of the compaction equipment over the layered waste. Additional layers of waste are placed and compacted using a bulldozer and compactor until a total average depth of about 5 m of waste has been placed. For stability, the working face will be sloped locally at a ratio of 4H :1V and in accordance with the temporary interior waste slope geometry approved for the existing landfill.

5.3.8.5 Daily and Intermediate Cover

Soil will be imported from off-site for use as daily cover although alternative covers may be used as per the landfill's ECA and subject to the conditions described in Section 35 of ECA No. A420018. Alternative cover may be used as follows:

- Geosynthetic Materials – Enviro Cover system (plastic cover material).

- Waste materials considered to be solid non-hazardous waste – contaminated soils and dewatered and digested sewage and pulp mill stabilized sludges.
- Spray applied materials – including polymer-based foams and recycled cellulose material.
- Waste materials considered to be solid non-hazardous waste – auto fluff, shredder fluff, dredged materials, grill ash, tire shreds, processed organic shingles, wood chips, compost, and foundry sand.
- Non-hazardous waste fines material from the waste disposal site located at 197 Putman Industrial Road in Belleville, Ontario.

The working face will be graded and compacted at the end of each working day with daily cover consisting of soil or approved alternative cover. Soil daily cover will be placed approximately 0.15 m deep. Areas that have not had waste placed for more than six months will be covered with at least 0.3 m of interim cover.

5.3.8.6 Nuisance Control Measures

GFL employs a variety of proactive measures to minimize nuisance effects related to dust, noise, odour, litter, and vectors and vermin on the surrounding environment. These established measures, detailed below, are expected to continue at the EOWHF and future development until landfill closure.

Dust

Dust is common in landfilling operations, particularly during dry conditions and during construction. The main sources of dust on-site at the landfill are access roads, particularly traffic on unpaved roads, and equipment movement around landfill working areas. Dust control measures may include the following:

- The use of gravel as the surface material of unpaved roads, which includes the areas from the scales to the working area. Low-silt concrete or wood waste materials may also be used.
- The application of water or dust suppressants on roads during dry periods as necessary.
- Regular maintenance of roads as part of normal site operations.
- Speed limits of 19 km/h imposed to reduce the agitation of dust and particulates from the road.
- Operating on the working face of the landfill below the grade level of the surrounding lands on windy days, where possible.

The distance from Highway 138 to the proposed future development site entrance is approximately 500 m, which is anticipated to minimize the amount of mud tracked from the site onto public highways. GFL may also consider use of wheel wash equipment to minimize mud tracking, which has not been required to-date.

Noise

The future development will operate according to the MECP's Noise Guidelines for Landfill Sites (MECP, 1998). Throughout the landfilling of Stages 5 through 9, standard noise control practices will be followed such as:

- Minimizing equipment noise by carrying out regular manufacturer-specified maintenance.
- Confining construction activities under normal conditions to regular operating hours, weather permitting.
- Developing the stages such that the landfill mound acts as a barrier to minimize noise impact between equipment and hauling routes and the site perimeter, where possible.
- Constructing and maintaining screening buffers for Stages 5 through 9 along the northern, eastern, and southern portions of the site perimeter.
- Maintaining the existing screening berms along the northern and western portions of the existing EOWHF site perimeter for Stage 5.
- Planting trees to enhance noise screening.

Litter

Litter control for the future development is anticipated to include the following:

- The working face of the landfill will be kept to a minimum width to reduce litter generation, and lightweight waste material will be covered with other waste or soil, as soon as possible.
- Waste trucks will be required to properly cover their waste loads to contain waste and will only be permitted to remove tarps in a dedicated tarp removal area provided close to the working face. Trucks with loads not properly secured will be refused entry to the landfill and these occurrences will be recorded.
- Portable litter control fences will be placed around, and immediately downwind, of the working area to capture wind-blown litter. These modular litter fence units are skid-mounted, can be moved by landfill equipment as-needed, and can be joined together to create varying lengths of fencing as needed. Typical dimensions of the fencing are 7 m long and 3 m high.
- Perimeter fencing in strategic areas around the site can also act as litter fencing.
- Litter pickup will be conducted as required with extra staff collecting litter following exceptionally windy days and snowmelt when snow cover is no longer preventing litter from being visible. Special attention will be given to the spaces between portable and permanent fences, and litter control fences will be cleaned regularly.
- Litter will be collected on off-site adjacent properties on an as-needed basis.

Vectors and Vermin

Vectors and vermin (e.g., birds, rodents, insects) may be attracted to the landfill as the site can provide food or habitat. Control measures already in effect at the EOWHF will be maintained throughout the development of Stages 5 through 9. These control measures can include:

- Minimizing the size of the working face to the degree possible subject to the waste placement requirements.
- Use of daily and intermediate cover materials.
- Encouraging the growth of tall grass and vegetated banks (including around SWM ponds) to discourage birds from loafing.
- Placing SRM immediately into the landfill upon receipt and covering SRM with sufficient cover material in accordance with Canadian Food Inspection Agency requirements.
- Using bird-scaring pyrotechnics (e.g., bangers) to discourage gulls from gathering overhead and from congregating on tipping faces and loafing areas.
- Using falconry contractors with trained birds of prey to frighten gulls away from the landfill.
- Daily observations of seagull numbers.
- Obtaining damage or danger permits from the Canadian Wildlife Service on an annual basis.

Odour

The main potential sources of odour during the active phases of each stage will be the waste at the working face, LFG, the leaf and yard waste area, and the composting facility. The application of cover soils at the end of the working day controls odour.

GFL carries out a consistent landfill surface scan program to identify and repair leaks in the landfill cover to maximize LFG capture. Any leaks in the cover detected as a result of these regular inspections will be repaired to reduce emission of LFG. The LFG collection system will be installed once cells are filled prior to capping, and will be connected to the existing LFGTE plant while the excess gas will be diverted to the on-site flare. The LFG collection system will be progressively expanded each year as site development occurs. The low permeability final cover will be constructed progressively and will also serve to minimize the emission of LFG-related odours.

GFL will continue to strive to keep odours to a minimum through continued utilization of the following additional measures:

- Continued operation of the LFGTE plant.
- Negative air pressure in the composting facility.
- Exterior biofilter system for the compost facility.
- Daily cover used on tipping face.

- Odour control misting systems.
- Avoidance of processing of leaf and yard waste material when southerly winds are occurring.
- Installation of a full-scale weather station to gauge wind direction and velocity.
- Monitoring of weather conditions that may increase potential for odours with certain activities.

5.3.8.7 Contingency Measures

A number of contingency measures are in place at the existing EOWHF in the event that monitoring demonstrates unacceptable levels of contaminants in groundwater or surface water, treated effluent fails to meet discharge limits, and if potentially harmful methane concentrations accumulate within on-site structures. These contingency measures will continue to be maintained as part of the future development.

5.4 Alternative Method 2

This section describes the landfill design and cell geometry, buffer area, site development, leachate generation and management, LFG management, SWM, ancillary facilities and infrastructure, and landfill operations for Alternative Method 2.

5.4.1 Landfill Design and Geometry

Alternative Method 2 consists of implementing the future development through four stages: one stage adjacent to and north of the existing landfill (Stage 5); and three stages oriented north-south within the future development lands (Stages 6 through 8). Stages 6 and 7 will be identical in size, while Stages 5 and 8 will be smaller. Stage 8 is located east of Stage 7. The layout for Alternative Method 2 is shown on **Figure 5-2**. The design of these stages will be consistent with the existing landfill design including:

- Base excavation into native soils (e.g., into natural low permeability barrier).
- Construction of perimeter berms around each stage utilizing either existing low-permeability soils, or compacted soils overlain by a GCL keyed into native soils at the inside toe of the berm.
- LCS consisting of granular layers and a piping network with collected leachate conveyed to leachate aeration ponds located in the southeast portion of the existing landfill and then to the LTF located north of the existing landfill. The capacity of the LTF will be expanded to accept leachate generated from the existing landfill as well as from the future development.
- Final contours reflecting a 4H to 1V slope at the perimeter of the stage transitioning to an approximately 3% slope on the top of the stage.
- Low permeability final cover consisting of a soil/geomembrane composite.
- LFG collection system consisting of vertical extraction wells and lateral and header piping within the waste. Collected LFG will be conveyed to the existing LFG plant located south of Stage 1 and which includes internal combustion reciprocating

engines which generate electricity as well as enclosed LFG flares. LFG condensate will be re-introduced into the waste or conveyed to the LTF.

- SWM system consisting of conveyance ditches around the perimeter of each stage and a retention pond located north of Stages 6 and 7. The existing pond located northeast of Stage 5 will be modified to attenuate peak flows if required.

Other key design features include:

- Visual screening to be constructed along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings.
- New road entrance from Laflèche Road, including new scale facility with three 26 m long scales.
- Soil storage pad adjacent to the new scale facility and to the north of Stage 8.
- Internal road network permitting access to the new stages.

The geometry of Alternative Method 2 is shown in plan view on **Figure 5-2** and in cross-section on **Figure 5-3** and **Figure 5-5**. The maximum elevation of the top of final cover will range as follows:

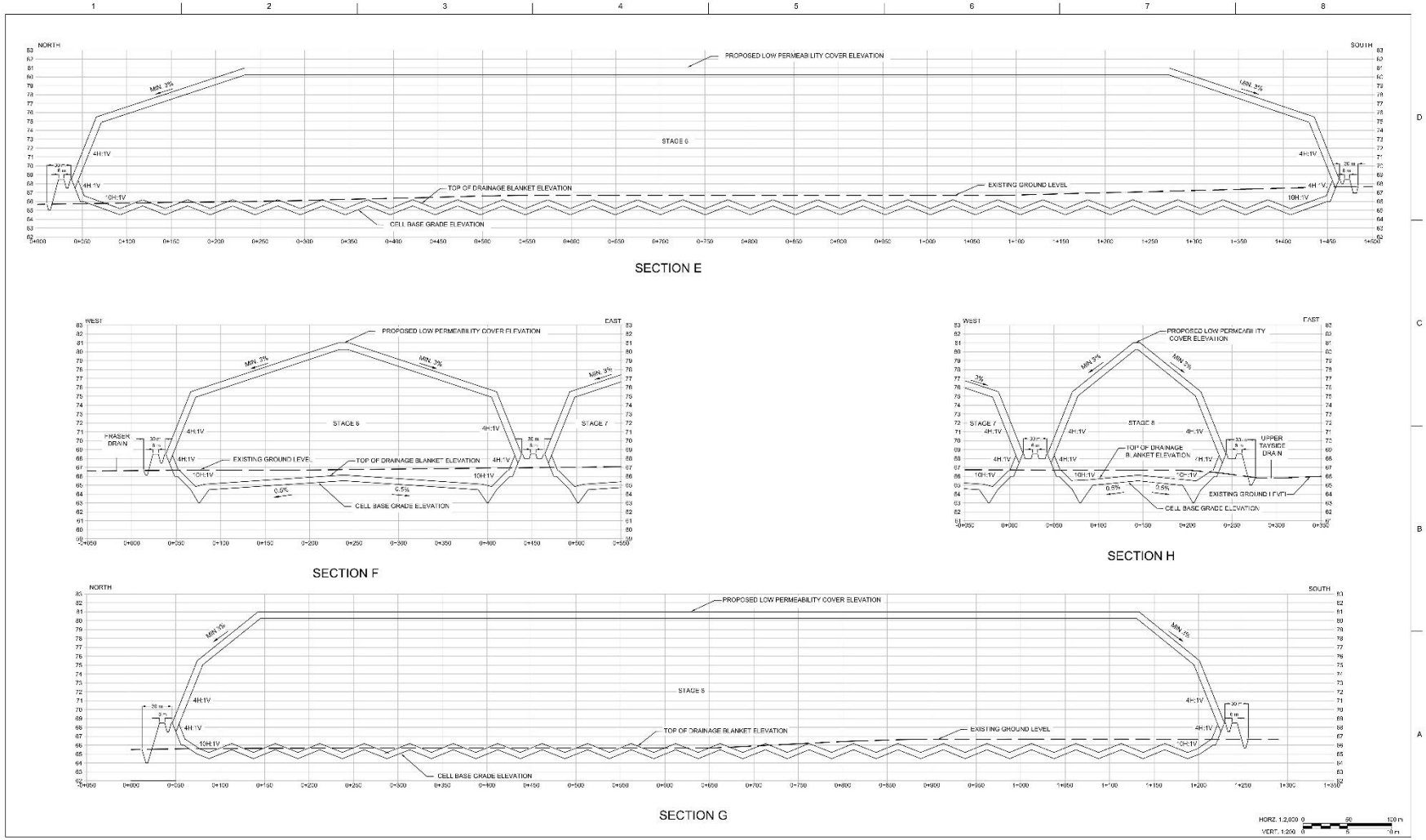
- Stage 5: 78.5 masl.
- Stages 6 through 8: 81.0 masl.

The proposed design is a natural containment landfill that utilizes the existing in situ low permeability silty clay as a hydraulic barrier layer with performance criteria equivalent to or exceeding a generic composite liner system. This will be overlain by an LCS, which consists of a leachate collection blanket consisting of coarse stones (incorporating a leachate piping network) overlain by a protective layer of finer granular material acting as a filter, consistent with the design criteria set out in O.Reg. 232/98, Schedule 1.

The conceptual cell base grade elevations have been based on the interpreted contours for the bottom of the desiccated zone within the silty clay while also maintaining sufficient slope to facilitate leachate drainage to the LCS and reduce the head of leachate on the base of the cells. The depth of the conceptual base grade will vary between about 63.5 to 65.5 masl, which can be several metres below existing grade. The conceptual design of Alternative Method 2 considers the presence of shallow bedrock in the southeastern portion of the future development lands and avoids this area.

The base in each of Stages 6 through 8 will be excavated to form a north-south oriented central ridge with an approximately 0.6% slope away from the central ridge towards both the east and west perimeters of the stage. The base will be excavated to form a series of smaller ridges and valleys such that a steeper slope (e.g., about 4%) will exist toward LCS piping within each valley.

Figure 5-5. Cross-Sections for Stages 6 through 8 – Alternative Method 2



DESIGN	AJC		
DRAWN	AJC		
CHECKED	MS		
APPROVED	LF		
B	2022-08-25	ISSUED FOR CDR	
A	2022-03-04	ISSUED FOR REVIEW	
ISSUE	DATE	DESCRIPTION	
PROJECT NUMBER	1028067		

300 - 100 York Boulevard
Richmond Hill, ON L4B 1J8
Canada

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The maximum width of the new stages (Stages 6 through 7) will be 400 m, which is consistent with the maximum stage width developed in the existing landfill. A compacted earthen berm with 4H to 1V slopes will be constructed around the perimeter of each stage utilizing either existing low-permeability soils, or compacted soils overlain by a GCL keyed into native soils at the inside toe of the berm. The berm will be approximately 33 m in width and constructed to an elevation of between 64.5 to 68.5 masl.

5.4.2 Buffer Area

Alternative Method 2 will provide the following minimum buffer widths between the limits of waste placement and property boundaries:

- North limit Stage 5 to north property boundary: 158 m.
- North limit of Stages 6, 7, and 8 to north property boundary: 210 m.
- East limit of Stage 8 to east property boundary: 241 m.
- South limit of Stage 6 to south property boundary: 100 m.

5.4.3 Site Development

The proposed site development for Alternative Method 2 is described in the sub-sections below. It includes the landfilling sequence as well as operational considerations during landfill construction.

5.4.3.1 Phasing

This alternative method consists of four stages with 36 cells as shown in **Table 5-5**. The areas and volumes of the Stages and Cells shown in **Table 5-5** are approximate and will be confirmed through detailed design. However, the total landfill volume of Alternative Method 2 will remain at 15,100,000 m³.

Table 5-5. Proposed Phasing and Cell Capacity – Alternative Method 2

Cell	Area (m^2)	Volume (m^3)
Stage 5 (CELLS 1 and 2)	102,948	755,000
Stage 6 (CELLS 1 and 2)	92,804	896,456
Stage 6 (CELLS 3 and 4)	80,926	896,621
Stage 6 (CELLS 5 and 6)	80,926	896,621
Stage 6 (CELLS 7 and 8)	60,750	665,468
Stage 6 (CELLS 9 and 10)	80,926	896,621
Stage 6 (CELLS 11 and 12)	80,926	896,621
Stage 6 (CELLS 13 and 14)	92,804	896,456
Stage 7 (CELLS 1 and 2)	92,804	896,456
Stage 7 (CELLS 3 and 4)	80,926	896,621
Stage 7 (CELLS 5 and 6)	80,926	896,621
Stage 7 (CELLS 7 and 8)	60,750	665,468

Table 5-5. Proposed Phasing and Cell Capacity – Alternative Method 2

Cell	Area (m^2)	Volume (m^3)
Stage 7 (CELLS 9 and 10)	80,926	896,621
Stage 7 (CELLS 11 and 12)	80,926	896,621
Stage 7 (CELLS 13 and 14)	92,804	896,456
Stage 8 (CELLS 1 and 2)	87,743	830,052
Stage 8 (CELLS 3 and 4)	87,743	830,052
Stage 8 (CELLS 5 and 6)	64,917	595,168
TOTAL	**1,483,475**	**15,100,000**

5.4.3.2 Site Development Schedule

For the purposes of the EA, it was assumed that landfilling would commence in Stage 5 with filling progressing from east to west and, upon completion of Stage 5, filling would progress to each of Stages 6 through 8 moving from south to north within each stage. The planned landfilling sequence may be modified by GFL prior to or during implementation of the future development.

The landfill future development will be filled over a period of 20 years. GFL anticipates that, as the landfill is developed, a maximum of up to two cells will be active in any given year (e.g., landfilling will occur within an area of between 8 to 10 ha), and that similar area would be inactive (e.g., some waste placed, with a soil intermediate cover). The maximum combined area of active landfill and intermediate covered landfill in any given year will be up to approximately 17.4 ha, with the remaining site area closed with final cover after the waste fill reaches the final contours.

5.4.3.3 Construction Activities

The activities involved in preparation of cells for landfilling in Alternative Method 2 will be the same as for Alternative Method 1, as described in Section 5.3.3.3.

5.4.4 Leachate Generation and Management

The design concept for the future development involves effective leachate management to minimize the build-up of leachate on the base of the landfill and to effectively remove and treat the leachate to enable the effluent to be discharged to off-site surface water receivers. Estimates of the volume of leachate and the rate at which it is generated at the site were developed in order to determine the design parameter for the collection and treatment infrastructure.

5.4.4.1 Leachate Generation

A leachate generation assessment was undertaken as described in Section 5.3.4.1. The maximum leachate generation for Alternative Method 2 is estimated to occur in approximately Year 19 when 17.4 ha are active (entire area modelled as an open cell condition), and 130.9 ha is in a final covered condition, corresponding to 123,752 m^3 of

leachate. Accounting for the increase in annual average precipitation, the maximum leachate generation could increase by the same amount to a range of 131,000 m^3/yr to 141,000 m^3/yr (**Supporting Document 2**), approximately the same as for Alternative Method 1.

5.4.4.2 Leachate Treatment Facility Capacity

The LTF capacity and effluent requirements are described in Section 5.3.4.2.

5.4.4.3 Leachate Management and Treatment

Leachate collected in the future development landfill LCS will be conveyed via a newly constructed forcemain to the existing leachate aeration ponds located in the southwest portion of the existing landfill and subsequently to the on-site LTF and managed as per current practices. The LTF is described in Section 5.3.4.3. Based on leachate generation projections and planned upgrades to the LTF, it is anticipated that the upgraded LTF will have the capacity to treat all leachate from the existing landfill and the future development.

Condition 36.3 of ECA No. A420018 includes an approved contingency for leachate management at the existing landfill comprising the removal of leachate for treatment at an off-site wastewater treatment facility. This contingency will be maintained for the future development.

5.4.5 Landfill Gas Management

Management of LFG generated by decomposition of the landfilled waste in the future development area will involve active collection through an LFG collection system. The collected gas will then be combusted by flaring or used as fuel in reciprocating engines generating electrical power at the existing LFGTE plant at the EOWHF.

5.4.5.1 Landfill Gas Collection and Destruction System

The LFG collection system and efficiency is described in Section 5.3.5.1.

5.4.5.2 Landfill Gas Generation Projections

Modelling of LFG generation for the future development was undertaken as described in Section 5.3.5.2. LFG generation and management for Alternative Method 2 will be the same as for Alternative Method 1 as described in Section 5.3.5.2.

5.4.6 Stormwater Management

The proposed general components of the SWM system for Alternative Method 2 are the same as for Alternative Method 1 as described in Section 5.3.6. The SWM system will consist of a proposed wet pond in the northwest corner of the site and oversized drainage ditches. The wet pond for Alternative Method 2 has a longer length to width ratio along the north perimeter of the future development lands than Alternative Method 1. Additionally, the length of the oversized drainage ditches that will be located around the perimeter and between the proposed landfill stages is greater compared to Alternative Method 1.

The contributing drainage area and percent imperviousness for Alternative Method 2 is similar to Alternative Method 1. Accordingly, the estimated permanent pool, extended detention, and quantity control volumes are also similar. An orifice plate will be provided in the outlet structure for extended detention. The actual pond location and footprint size, and the storage volume within the perimeter ditches will be confirmed during detailed design.

The proposed SWM system for Alternative Method 2 is shown on **Figure 5-2** and the estimated required storage volumes in the proposed facilities are summarized in **Table 5-6**.

Table 5-6. Estimated Required Stormwater Volumes – Alternative Method 2

SWM Facility ID	Quality Control	Quantity Control	Required Volumes (m^3)		
			Permanent Pool[1]	Extended Detention[1]	Active Storage[2]
Wet Pond	80% Long-Term TSS removal	100-year storm	39,700	8,600	64,300
Perimeter ditch	Not Applicable	100-year storm	Not Applicable	Not Applicable	Not Applicable

[1] As per (MECP, 2003) Table 3.2 for 'Enhanced' Protection.
[2] Based on a controlled peak release rate of 5.7 m^3/s, excluding permanent pool and extended detention storage.

5.4.7 Ancillary Facilities and Infrastructure

The construction of Stages 6 through 8 will require the development of a new network of perimeter roads, entrance roadway, and weigh scale facility with three scale decks as shown on **Figure 5-2**. The road access will be at the southern limit of the future development lands, off of Laflèche Road. There will be a 12 m wide entrance prior to the scale and 12 m wide exit. Access to the cells will be through three 26 m x 4 m scales with 3 m long ramps. A 6 m roadway will be built around the perimeters of Stages 6 through 8, with two access bridges over the Fraser Drain to the existing EOWHF lands at the south and north ends of Stage 6. The access bridges will be designed to allow the passage of landfill equipment as well as to convey infrastructure (e.g., leachate pipeline and gas mains) as required.

5.4.8 Landfill Operations

Landfill operations including operating hours, equipment, waste placement, daily and intermediate cover and nuisance control measures for Alternative Method 2 are the same as for Alternative Method 1 described in Section 5.3.8.

5.5 Climate Change Considerations

The effects of climate change on the landfill design and operations, and the effects of the landfill design on climate change are addressed in the sections below.

5.5.1 Effects of Climate Change on Landfill Design

Climate change has resulted in extreme weather events including increasingly severe rainfall and wind events, temperature extremes, and reduced snow cover. The potential impacts of these events are expected to influence mainly the design of the SWM system as well as routine site operations. These events are not expected to have a significant influence on the design of the LFG or leachate management systems, although they may influence the rate of generation of leachate and LFG.

5.5.1.1 Stormwater Management Design

Extreme weather events caused by climate change are relevant to the design of SWM systems in the diversion/control of runoff, as well as erosion and sedimentation control. O.Reg. 232/98 requires that the SWM systems be designed relative to specific storm events, including:

- external diversion elements, and a continuous overland flow route or drainage system, sized to convey peak flow from the higher of the 100-year design storm or prevailing Regional Storm.
- internal conveyance elements sized to convey peak flow from a 25-year design storm;
- water quality enhancement elements (e.g., sedimentation ponds) sized to temporarily store runoff volume from a 4-hour, 25 mm storm event; and
- surface water quantity controls sized to temporarily store runoff volume from the higher of the 24-hour, 100-year design storm or prevailing Regional Storm, and release at or below existing condition peak flows.

The design of the SWM system is based on the use of local rainfall intensity-duration-frequency (IDF) curves developed using historical rainfall data. Prediction of extreme rainfall events requires the assumption that historic meteorological conditions can be used to predict future conditions; with changing climatic conditions, the validity of this assumption is reduced.

Climate change effects will be addressed in the detailed design of the future development by addressing MECP design criteria for ECA approval under the *Ontario Water Resources Act*, in addition to the landfill-specific requirements in O.Reg. 232/98. These will include:

- the use of the latest available local airport IDF curves, as modified for climate change, for the rainfall/snowmelt event analysis;
- the post-development peak discharge from a development site will be controlled to the equivalent pre-development level for the 2- to 100-year return period design storms;
- providing 250 m^3/ha in storage volume for stormwater quality control, in accordance with MECP guidelines for 80% Enhanced Removal at an impervious level of 85%;
- Any proposed control measure sized to provide Enhanced Protection (level 1), i.e., the removal of 80% long-term suspended solids, and meet the SWM design

requirements of the MECP's Stormwater Management Planning and Design Manual (MECP, 2003).

5.5.1.2 Landfill Gas Management System Design

The rate of generation of methane is highly dependent upon the moisture in the waste mass, and the overall methane generation capacity depends on the type and composition of waste in the landfill.

Extreme weather events caused by climate change may influence the amount of moisture within the waste and therefore the rate at which methane is generated. If climate change results in a lowering of moisture content, the generation rate will be reduced; conversely if the moisture content increases the generation rate will be increased.

The proposed landfill design includes a low permeability soil/geomembrane final cover that will be constructed progressively as the site is developed, and as the final covered area increases, the effect of variations in rain events on moisture content of the waste will be diminished. GFL will monitor the LFG generation rate throughout the life of the site and will confirm that adequate LFG destruction capability (e.g., use of reciprocating engines and flaring) is maintained. The existing gas management system has sufficient capacity to manage up to 8,850 scfm, which is greater than the estimated gas generation rate.

5.5.1.3 Leachate Collection System Design

Extreme weather events resulting from climate change are not expected to have a significant long-term effect on precipitation infiltration and generation of leachate because the site will be progressively capped with a low permeability final cover. Increased infiltration will result in an increase in leachate generation of active open cells, but the effect will be reduced by moisture initially going into storage in the waste mass, as well as the progressive closure of the site. The detailed design of the LCS will account for any climate-related changes.

5.5.2 Effects of Climate Change on Landfill Operations

Extreme rainfall and wind events can influence landfill operations although these influences can be mitigated by adapting operating practices as follows:

- Higher rainfall may lead to a more rapid degradation of internal site roadways (e.g., road surface softening or erosion) necessitating a higher level of effort in road maintenance (e.g., reconstruction, resurfacing).
- Higher rainfall may increase the level of effort required for SWM along internal site roadways and the landfill working face (e.g., temporary ditching, pumping).
- High wind events may increase nuisance effects of dust and litter, necessitating increased efforts in dust control as well as litter collection.

5.5.3 Effects of the Design on Climate Change

The greatest potential influence of the landfill on climate change relates to the generation and emission of LFG, which is comprised primarily of methane and carbon dioxide, both of which are GHGs. This effect is anticipated to be minimal given the following aspects of the landfill design:

- The future development will incorporate an active LFG collection system which will limit emission of LFG to the atmosphere.
- Collected LFG will be combusted in either reciprocating engines or flares at the site's LFGTE plant or potentially utilized as RNG.
- The landfill will be progressively covered with a soil/geomembrane final cover which significantly reduces emissions as compared to a soil cover.

6 Net Effects of the Alternative Methods

The potential effects of the future development alternative methods, Alternative Methods 1 and 2 detailed above, were assessed in accordance with the requirements of the *OEAA* and approved ToR. This section of the EA Study Report provides a summary of the net effects assessments of the alternative methods for the EOWHF future development. Detailed net effects assessments for the environmental components are provided in **Supporting Document 3 – Effects Assessment Reports**.

6.1 Assessment Methods

The environmental effects of each alternative method were assessed using the evaluation criteria, indicators, rationale and data sources from the approved ToR, provided in **Section 6.1.1**, and considering the existing conditions from the existing conditions reports (**Supporting Document 1**). The effects assessment was carried out as follows:

- the potential environmental effects for each alternative method were predicted, mitigation measures and monitoring programs were identified, and the net environmental effects were determined (**Section 6.2**);
- the Preferred Alternative was identified based on a comparative evaluation of the net environmental effects of each alternative method (**Section 7**); and
- an effects assessment on the Preferred Alternative was conducted, including the identification of mitigation measures and monitoring programs (**Section 8**).

The potential environmental effects from each alternative method were identified based on the currently-approved maximum predicted waste receipt level (i.e., 755,000 tonnes per year) and the design considerations presented in the CDR (**Supporting Document 2**). The key design considerations and assumptions for the effects assessment for each environmental component were documented, including the mitigation measures incorporated into the project design. Mitigation measures beyond those included in the CDR were identified when required to minimize or mitigate the potential effects associated with each alternative method. The net environmental effects were then identified taking into account the identified mitigation measures.

6.1.1 Evaluation Criteria and Indicators

The evaluation criteria, rationale, indicators and data sources used for the net effects assessment are provided in **Table 6-1**.

Table 6-1. Evaluation Criteria, Indicators and Data Sources for the Net Effects Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Natural Environment			
Atmospheric Environment			
Air Quality	Waste disposal site and associated operations can emit contaminants that can degrade air quality. Construction and operation activities at a waste disposal site can also lead to increased levels of particulates (dust) in the air.	• Predicted maximum off-site point of impingement air concentrations of emitted contaminants of concern • Number of off-site receptors potentially affected (residential properties, public facilities, businesses/farms, institutions)	• Approved meteorological data • Applicable MECP guidelines, technical standards, and models • Aerial photographic mapping and field reconnaissance • Previously completed Emission Summary and Dispersion Modelling Reports • Off-site receptors confirmed on recent mapping • Available background ambient air data • Proposed facility characteristics • Landfill design and operation data • Published terrain data • Published air emission factors
Odour	Waste disposal site and associated operations can emit contaminants that generate odorous emissions.	• Predicted maximum off-site odour concentrations (OU/m^3) • Number of off-site receptors potentially affected (residential properties, public facilities, businesses/farms, institutions)	• Approved meteorological data • Applicable MECP guidelines, technical standards, and models • Aerial photographic mapping and field reconnaissance • Previously completed Emission Summary and Dispersion Modelling Reports • Off-site receptors confirmed on recent mapping • Proposed facility characteristics • Landfill design and operation data • Published terrain data • Published air emission factors
Noise	Activities related to operation of the landfill can result in an increase in noise levels associated with the waste disposal facility.	• Predicted site-related noise levels (measured in dBA or dBAI) • Number of off-site receptors potentially affected (residential properties, public facilities, businesses/farms, institutions)	• Annual site specific noise monitoring data • Manufacturer provided noise specifications • Applicable MECP guidelines, technical standards, and models • Aerial mapping and field reconnaissance to confirm off-site receptors

Table 6-1. Evaluation Criteria, Indicators and Data Sources for the Net Effects Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
			• Land use zoning plans • Proposed facility characteristics • Landfill design and operations data
Geology and Hydrogeology			
Groundwater Quality	Contaminants associated with waste disposal sites have the potential to enter the groundwater and impact off-site groundwater.	• Predicted effects to groundwater quality at property boundaries and off-site	• Hydrogeological and geotechnical studies • Determination of water well users in the area • Annual site monitoring reports • Leachate generation assessment • Provincial Water Quality Monitoring Network • Proposed facility characteristics • Landfill design and operations data
Groundwater Quantity	Physical works may disrupt natural groundwater flows.	• Predicted groundwater flow characteristics	• Hydrogeological and geotechnical studies • Water well records • Determination of water well users in the area • Annual site monitoring reports • Proposed facility characteristics • Landfill design and operations data
Surface Water Environment			
Surface Water Quality	Effluent from the waste disposal site has the potential to run off into surface water through stormwater discharge or from the leachate collection and treatment system. Sediment associated with the potential erosion of surficial soils at waste disposal sites create suspended solids in the surface water runoff draining to surface water receptors.	• Predicted effects on surface water quality on-site and off-site	• Surface Water Quality and quantity monitoring data including nutrients, TSS and other pollutants associated with waste disposal sites • Topographic maps and air photos • On-site SWM system design for the future development • On-going site monitoring reports • Integration of SWM with restoration of agricultural drains • Landfill leachate treatment alternatives • Landfill design and operations data
Surface Water Quantity	Construction of physical works may disrupt natural surface drainage patterns and may	• Change in drainage areas • Predicted occurrence and degree of off-site impacts	• On-site SWM system design for expanded landfill • Annual monitoring reports

Table 6-1. Evaluation Criteria, Indicators and Data Sources for the Net Effects Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
	alter runoff and peak flows. The presence of the expanded landfill may also affect base flow to surface water.		• Published flow information from MECP, Environment Canada, and local conservation authorities • Engineer's Report for municipal drains • Site reconnaissance • Proposed facility characteristics • Landfill design and operations data
Ecological Environment			
Terrestrial Ecosystems	Continued or expanded operation of the waste disposal facility may disturb the functioning of natural terrestrial habitats and vegetation, including rare, threatened or endangered species.	• Predicted impact on vegetation communities • Predicted impact on wildlife habitat • Predicted impact on vegetation and wildlife including rare, threatened or endangered species	• Vegetation, breeding birds, amphibian calling, and species at risk habitat survey data from previous studies and recent field studies • Aerial imagery • MNRF Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement • MNRF Significant Wildlife Habitat Technical Guide • Significant Wildlife Habitat Schedule Criteria for Ecoregion 6E • Proposed facility characteristics • Landfill design and operations data • Annual monitoring report data
Aquatic Ecosystems	Continued or expanded operation of the waste disposal facility may disturb the functioning of natural aquatic habitats and species, including rare, threatened or endangered species.	• Predicted impact on aquatic habitat including fish habitat • Predicted impact on aquatic biota including rare, threatened or endangered species	• Fish and fish habitat survey data from previous studies and field studies • MNRF review letters of previous existing conditions reports • Surface water quantity and quality effects assessments • Annual monitoring report data • Proposed facility characteristics • Landfill design and operations data

Table 6-1. Evaluation Criteria, Indicators and Data Sources for the Net Effects Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Socio-Economic Environment			
Economic			
Economic effects on/benefits to local community	The continued operation of the landfill could have economic effects on and/or provide economic benefits to the local community, which may include an increase or decrease in employment.	• Employment at site (number and duration) • Local business employment • Displacement of business activities • Opportunities for the provision and procurement of products and/or services • Financial contributions to the local community	• Census and municipal data for the Township of North Stormont, United Counties of Stormont, Dundas and Glengarry, the City of Cornwall, and The Nation Municipality and Municipality of Casselman in the United Counties of Prescott-Russell • Proposed facility characteristics • Landfill design and operations data
Social			
Effects on local community	Waste disposal facilities can potentially affect local residents and businesses in the vicinity of the site.	• Number of residents • Number and type of local businesses • Predicted changes to use of property	• Mapping and field reconnaissance • Census information and municipal data • Proposed facility characteristics • Landfill design and operations data
Visual Impact of Facility	The contours of the waste disposal facility may affect the visual character of a landscape.	• Predicted changes in perceptions of landscapes and views.	• Site grading plans • Aerial mapping and field reconnaissance • Proposed facility characteristics • Existing landfill design and operations data • Regional topographic mapping
Cultural Environment			
Cultural Heritage Resources	Activities related to construction and operation of the landfill may result in direct or indirect impacts to identified cultural heritage resources.	• Proximity of known and potential cultural heritage resources to the landfill site (known/potential cultural heritage resources will be assessed for potential direct or indirect impacts)	• Published data sources • Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) - Built Heritage and Cultural Heritage Landscapes Checklist • MHSTCI - Ontario Heritage Tool Kit • Cultural Heritage assessment • Commemorative statements • Proposed facility characteristics • Landfill design and operations data

Table 6-1. Evaluation Criteria, Indicators and Data Sources for the Net Effects Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Archaeological Resources	Archaeological resources are non-renewable cultural resources that can be destroyed by the construction and operation of a waste disposal facility.	• Predicted impacts to archaeological resources on-site and in vicinity	• Existing Stage 1 Archaeological Assessment for the EOWHF site • MHSTCI Correspondence • Stage 1 Archaeological Assessment for the future development lands
Built Environment			
Transportation			
Effects from Truck Transportation along Access Roads	Truck traffic associated with continued operations of the landfill may adversely affect residents, businesses, institutions and movement of farm vehicles in the site vicinity.	• Disturbance to traffic operations	• Existing information and traffic data • Proposed facility characteristics • Landfill design and operations data
Current and Planned Future Land Use			
Effects on Current and Future Land Uses	The continued operation of the landfill may not be fully compatible with certain current and/or planned future land uses in the off-site study area. Waste disposal facilities can potentially affect the use and enjoyment of recreational resources in the vicinity of the site.	• Current land use • Planned land use • Type(s) and proximity of off-site recreational resources within 500 m of a landfill footprint potentially affected • Type(s) and proximity of off-site sensitive land uses (e.g., dwellings, churches, parks) within 500 m of a landfill footprint potentially affected	• United Counties of Stormont, Dundas and Glengarry Official Plan • Township of North Stormont Zoning By-law • Aerial photographic mapping and field reconnaissance • Published data on public recreational facilities/activities • Provincial Policy Statement • Proposed facility characteristics • Landfill design and operations data
Aggregate Extraction and Agriculture			
Aggregate Resources	Aggregate resources may be present in the area of the expanded landfill.	• Presence of known or identified aggregate resources and the predicted impact of impairment of their use due to the proposed footprint, construction and operation on-site	• Aggregate resources inventory mapping • Ontario geological survey • Proposed facility characteristics • Landfill design and operations data

Table 6-1. Evaluation Criteria, Indicators and Data Sources for the Net Effects Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Effects on Agricultural Land	Adjacent agricultural land may be affected by the development of the facility.	• Predicted loss of agricultural land use • Predicted impacts on surrounding agricultural operations • Type(s) and proximity of agricultural operations (e.g., organic, cash crop, livestock)	• Provincial Policy Statement • United Counties of Stormont, Dundas and Glengarry Official Plan • Township of North Stormont Official Plan and Zoning By-law • Aerial mapping and field reconnaissance • Canadian Lands Inventory mapping • Proposed facility characteristics • Landfill design and operations data • Agriculture Existing Conditions Report

6.1.2 Key Design Considerations and Assumptions

The effects assessment for each environmental component incorporated key design considerations and assumptions. These considerations and assumptions are outlined in the net effects tables in **Section 6.2**.

6.2 Net Effects Assessment

The results of the net effects assessment of Alternative Methods 1 and 2 are described in the following sections. Detailed net effects assessments for the environmental components are provided in the Effects Assessment Reports (**Supporting Document 3**).

6.2.1 Natural Environment

A summary of the net effects assessment for the Natural Environment, including the Atmospheric Environment, Geology and Hydrogeology, the Surface Water Environment, and the Ecological Environment is provided below.

6.2.1.1 Atmospheric Environment

The Atmospheric Environment includes Air Quality, Odour and Noise.

Air Quality and Odour

The Air Quality net effects assessment incorporated information from the Air Quality and Odour Existing Conditions Report (**Supporting Document 1-1**), the results of the Emission Summary and Dispersion Modelling (ESDM), and the relevant project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Air Quality and Odour Effects Assessment Report (**Supporting Document 3-1**).

The ESDM report (**Appendix A of Supporting Document 3-1**) was prepared in accordance with the MECP Procedure for Preparing an Emission Inventory and Dispersion Modelling Report (MECP, 2018a) to assess the potential impacts of each alternative method. Additional emission sources and contaminants that are not normally considered in an ESDM report were included to provide a more comprehensive analysis including fugitive dust from roadways and material handling, and tailpipe emissions from on-site vehicles. The ESDM report includes a detailed inventory of modelled emission sources and the modelled ground-level concentrations.

The study areas and receptors for the Air Quality and Odour effects assessment are shown on **Figure 4-2** and the existing conditions are described in Section 4.3.2.1. Fence line receptors and a multi-tier receptor grid were applied in accordance with the Air Dispersion Modelling Guideline for Ontario (ADMGO) (MECP, 2017b). A total of 81 receptors were identified within the Off-site Study Area, including six (6) residences within 1 km of the On-site Study Area. The US EPA's atmospheric dispersion model (AERMOD Version 19191), an approved model under O.Reg. 419/05, was used to predict the worst-case ground-level concentrations within the Off-site Study Area.

Air emissions result from a number of processes and activities within the study areas. These include:

- odour and dust emitted from receiving, placing, and compacting of solid waste;
- LFG consisting of volatile contaminants and odour, generated from decomposition of waste within the landfill;
- combustion gases and particulate matter from combustion of LFG in flares and in stationary engines driving electrical generators;
- odour from an organic composting facility;
- dust from on-site haul roads, various material handling activities, and construction activities;
- tailpipe emissions from mobile equipment including the waste delivery truck fleet, material handling equipment, and construction equipment; and
- dust from agricultural activities.

Leachate from the landfill is collected, treated in aeration ponds, treated in the LTF, and stored in effluent holding ponds until discharge. These sources are expected to emit contaminants, including odour, in negligible quantities under normal aerobic conditions and have been considered negligible for this assessment.

The cumulative air contaminant impacts in the Off-site Study Area are dependent on both the direct impact of emissions from the EOWHF, and regional background air pollutant concentrations. Regional background concentrations result from other sources of pollutant emissions in the region, as well as long-range transport from other areas. Monitored concentration data was used to estimate the cumulative air contaminant impacts in the Off-site Study Area.

The existing conditions for Air Quality and Odour are described in Section 4.3.2.1. For the existing conditions, the maximum predicted contaminant concentrations were compared to provincial and federal ambient air quality criteria, air standards, guidelines, and screening levels. For nitrogen dioxide and sulphur dioxide, the existing CAAQS objectives will become more stringent as of 2025, and the predicted concentrations were compared against both sets of CAAQS. Of the over 180 contaminants identified, four (4) were predicted to exceed criteria, standards, or guidelines:

- Concentrations of total SPM and PM_{10} (dust) were predicted to exceed ambient air criteria and standards on the facility boundary, adjacent to facility haul roads, and concentrations of NO_2, emitted from combustion sources, exceeded the CAAQS at the facility boundary. In both cases, concentrations fell below the criteria or standards a short distance beyond the boundary, and concentrations did not exceed criteria or standards at any sensitive receptors (residences).
- Odour was predicted to exceed the provincial guideline of 1 odour unit at a sensitive receptor. The highest odour impact at a sensitive receptor reached 1.47 odour units at a residence to the southeast of the EOWHF at the intersection of Sandringham Road and Highway 138.

Based on the design concepts of the CDR, there are many design considerations affecting air quality and odour that do not differ between Alternative Methods 1 and 2 as follows:

- The rate that solid waste is received/landfilled (755,000 tonnes/year), the total amount of waste landfilled (15.1 million m^3), and the expanded landfill life (20 years) will not differ between alternative methods. This means that the LFG generation rate will not differ between alternative methods at any given point in time.
- Current practices for LFG capture and combustion will continue for both alternative methods.
- Current odour and dust mitigation practices (e.g., daily cover, watering, etc.) will continue for both alternative methods.
- Existing infrastructure (LFG combustion facility, access roads, service buildings) will be unchanged for both alternative methods.
- Composting processes and volumes at the facility will be unchanged for both alternative methods.

The key difference between the two alternative methods is the configuration of the landfill stages.

- Alternative Method 1 consists of implementing the future development through five stages: one stage adjacent to and north of the existing landfill (Stage 5); and four stages oriented east-west within the future development lands (Stages 6 through 9). Stages 6 through 8 will be identical in size, while Stages 5 and 9 will be smaller. Landfilling will progress sequentially from Stage 5 through Stage 9.
- Alternative Method 2 consists of implementing the future development through four stages: one stage adjacent to and north of the existing landfill (Stage 5); and three stages oriented north-south within the future development lands (Stages 6 through 8). Stages 6 and 7 will be identical in size, while Stages 5 and 8 will be smaller. Landfilling will progress sequentially from Stage 5 through Stage 8.

The consequence of this difference in configuration is that, at any point in time, the locations of air and odour emissions from the active landfilling activities, landfill cell construction activities, and on-site haul roads will differ between the alternative methods. While total LFG emission rate will not differ between the alternative methods, the locations of LFG emissions will differ.

Stormwater control systems will also differ between alternative methods, but these systems have negligible effects on air quality and odour.

For both alternative methods, it is planned that final landfilling activities will occur in the northeast area of the future development; however, the closest sensitive receptor to the facility is near the southeast corner. Consequently, to capture the maximum impacts to the sensitive receptors, two scenarios were considered for each alternative method: Scenarios A and B.

Scenario A involves active landfilling and cell construction in the southeast corner of the future development, so that these sources are assessed while closest to the sensitive receptor. Due to the difference in configuration and sequential progression through the

stages, the year that these activities occur in this area differ between the alternative methods.

Scenario B involves active landfilling and cell construction in the northeast corner of the future development and represents operation near closure when LFG emissions are at their maximum. For both alternative methods this aligns with the final activity year.

The scenarios for each alternative method are summarized in **Table 6-2**. Emission rates and resulting concentrations of contaminants of concern in the Off-site Study Area were quantified for each of the four scenarios. Cumulative impacts were determined based on the sum of the EOWHF contribution and the background concentration, as identified through regional ambient air monitoring of contaminants of concern for which regional air monitoring data is available.

Table 6-2. Air Quality and Odour Modelling Scenarios

Alternative Method 1		Alternative Method 2	
Scenario A	**Scenario B**	**Scenario A**	**Scenario B**
Southeast area	Northeast area	Southeast area	Northeast area
Stage 6 (Cells 9 and 10)	Stage 9 (Cells 1 and 2)	Stage 8 (Cells 1 and 2)	Stage 8 (Cells 5 and 6)
2032 activity year	2045 activity year	2043 activity year	2045 activity year

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-3**.

OFF-SITE POINT OF IMPINGEMENT AIR CONCENTRATIONS OF EMITTED CONTAMINANTS OF CONCERN

Similar to existing conditions, Alternative Method 1 is predicated to result in the exceedance of air quality criteria, air standards, or guidelines for four (4) contaminants of concern: NO_2; SPM; PM_{10}; and odour.

Nitrogen Dioxide (NO_2)

Nitrogen dioxide is a product of combustion and is emitted from the LFGTE plant (engines and flares) as well as from mobile sources (trucks, material handling equipment, construction equipment) at the EOWHF. High NO_2 concentrations are predicted at the western boundary of the On-site Study Area due to compost material handling equipment. Near end of life (i.e., Scenario B) for Alternative Method 1, high NO_2 concentrations are predicted at the northern on-site property line due to landfilling/construction activities in the final cells. The concentration falls off quickly with distance from the property line.

The maximum NO_2 concentration is predicted to exceed the current (2020) 1-hour CAAQS at the boundary of the On-site Study Area by 8% but will not exceed the CAAQS at any sensitive receptor. The concentration falls off quickly with distance from the On-site Study Area boundary. The future (2025) 1-hour CAAQS is more stringent, and the concentration is predicted to exceed the new objective by 54%. Again, the maximum concentration is at the boundary of the On-site Study Area, but the concentration falls off

quickly with distance from the On-site Study Area boundary and does not exceed the CAAQS at any sensitive receptor. The sensitive receptor exposed to the highest NO_2 concentration in both scenarios is located east of the future development, along Highway 138. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

The 1-hour CAAQS for NO_2, is defined with the statistical form of "the 3-year average of the annual 98th percentile of the daily-maximum 1-hour average concentrations". Due to this statistical form, the frequency that the CAAQS is exceeded cannot be reported.

Suspended Particulate Matter (SPM)

The maximum concentration of SPM for Alternative Method 1 exceeds the MECP air standard with a maximum 24-hour concentration that is 188% of the standard (Scenario A). The air standard for SPM is based on visibility effects. The highest concentration occurs on the property boundary along Laflèche Road, adjacent to the paved on-site haul road. Dust from on-site haul roads is the primary contributor to the SPM concentration at this location. The concentration falls off quickly with distance from the On-site Study Area boundary.

The SPM does not exceed the air standard at any sensitive receptor. At sensitive receptors, the SPM concentration for Alternative Method 1 reaches 71% of the standard (Scenario B). The sensitive receptor exposed to the highest SPM concentration is located east of the future development, along Highway 138. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

Fine Particulate Matter (PM_{10})

Fine particulate matter (PM_{10}) is emitted in exhaust from combustion sources (engines, flares), and as dust from roads, and material handling activities. The highest concentrations occur on the south and eastern property boundaries, adjacent to the paved haul road. Dust from on-site haul roads is the major contributor to the PM_{10} concentration at these locations.

The EOWHF's contribution to ambient air concentration exceeds the interim AAQC for PM_{10}, with a maximum 24-hour concentration that is 250% of this criterion for Alternative Method 1 (Scenario A). The concentration falls off quickly with distance from the On-site Study Area boundary. For Alternative Method 1, the EOWHF's contribution does not exceed the AAQC at any sensitive receptors. At sensitive receptors, the PM_{10} concentration for Alternative Method 1 reaches 85% of the standard (Scenario B). The sensitive receptor exposed to the highest PM_{10} concentration is located east of the future development, along Highway 138. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

There is no monitored ambient air quality data available to describe regional background concentration of PM_{10}, so cumulative ambient air concentration could not be quantified for comparison to AAQC. Background concentrations will not be negligible and will be at least as high as that of $PM_{2.5}$ (a subset of PM_{10}), so cumulative concentrations may approach the AAQC at sensitive receptors.

Odour

There are several contaminants emitted from the EOWHF that have odour-effects based air standards or guidelines; however, concentrations of these contaminants will not exceed the standards or guidelines at any location.

There is no air standard or formal guideline for odour; however, a guideline value of 1 OU/m^3 at a sensitive receptor is often used for assessment purposes. Similar to contaminants with odour-effects based air standards, odour is evaluated on a 10-minute average, and the 99.5th percentile concentration at a sensitive receptor is compared to the guideline.

Modelling predicted that the highest 99.5th percentile concentration at a sensitive receptor is 1.64 OU/m^3 for Alternative Method 1 (Scenario A). The sensitive receptor exposed to the highest odour concentration is located east of the facility at the intersection of Allaire Road and Highway 138.

It is notable that odour is not linear, and a difference of less than a factor of 2 is not expected to be distinguishable by most people. As such, there is no significant difference between the predicted value of 1.64 OU/m^3 and the existing condition of 1.47 OU/m^3. In addition, the maximum odour values tend to occur during calm meteorological periods with low winds, which generally occur during the nighttime hours.

No additional mitigation measures are expected to be necessary under normal operating conditions. Existing dust management practices are expected to be sufficient to mitigate potential particulate matter based exceedances. Exceedances of the relevant standards are expected to be limited to the area immediately adjacent to the facility property line. Current odour management practices will continue for the future development.

NUMBER OF OFF-SITE RECEPTORS POTENTIALLY AFFECTED

AERMOD dispersion modelling was used to predict the ground-level POI concentrations of contaminants of concern at receptors within the Off-site Study Area. A total of 81 receptors were identified within the Off-site Study Area, including six (6) residences within 1 km of the On-site Study Area.

Of the over 180 contaminants of concern that were modelled, only four (4) exceeded standards, guidelines, or screening levels: NO_2; SPM; PM_{10}; and odour. Only odour exceeded the guideline at any sensitive receptor location.

Scenario A presents the worst-case condition for Alternative Method 1 with regard to odour. This scenario resulted in six (6) sensitive receptors within the Off-site Study Area experiencing maximum concentrations above 1 OU/m^3, with the most frequently impacted sensitive receptor being exposed to a concentration above 1 OU/m^3 approximately 1.1% of the time. The highest concentration predicted at a sensitive receptor is 1.64 OU/m^3, which is an 12% increase over existing conditions. This would be considered an imperceptible increase, since odour is not linear, and a difference of less than a factor of 2 is not expected to be distinguishable by most people.

No additional mitigation measures are expected to be necessary under normal operating conditions, and no substantial difference is expected in the number of off-site receptors potentially affected by the future development as a result of Alternative Method 1.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-4**.

OFF-SITE POINT OF IMPINGEMENT AIR CONCENTRATIONS OF EMITTED CONTAMINANTS OF CONCERN

Similar to existing conditions, Alternative Method 2 is predicated to result in the exceedance of air quality criteria, air standards, or guidelines for four (4) contaminants of concern: NO_2; SPM; PM_{10}; and odour.

Nitrogen Dioxide (NO_2)

High NO_2 concentrations are predicted at the western boundary of the On-site Study Area due to compost material handling equipment. Near end of life (i.e., Scenario B) for Alternative Method 2, high NO_2 concentrations are predicted at the northern on-site property line due to landfilling/construction activities in the final cells. The concentration falls off quickly with distance from the property line.

The maximum NO_2 concentration is predicted to exceed the current (2020) 1-hour CAAQS at the boundary of the On-site Study Area by 3% but will not exceed the CAAQS at any sensitive receptor. The concentration falls off quickly with distance from the On-site Study Area boundary. The future (2025) 1-hour CAAQS is more stringent, and the concentration is predicted to exceed the new objective by 47%. Again, the maximum concentration is at the boundary of the On-site Study Area, but the concentration falls off quickly with distance from the On-site Study Area boundary and does not exceed the CAAQS at any sensitive receptor. The sensitive receptor exposed to the highest NO_2 concentration in both scenarios is located east of the future development, along Highway 138. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

The 1-hour CAAQS for NO_2, is defined with the statistical form of “the 3-year average of the annual 98th percentile of the daily-maximum 1-hour average concentrations”. Due to this statistical form, the frequency that the CAAQS is exceeded cannot be reported.

Suspended Particulate Matter (SPM)

The maximum concentration of SPM for Alternative Method 2 exceeds the MECP air standard with a maximum 24-hour concentration that is 156% of the standard (Scenario B). The air standard for SPM is based on visibility effects. The highest concentration occurs on the property boundary along Laflèche Road, adjacent to the paved on-site haul road. Dust from on-site haul roads is the primary contributor to the SPM concentration at this location. The concentration falls off quickly with distance from the On-site Study Area boundary.

The SPM does not exceed the air standard at any sensitive receptor. At sensitive receptors, the SPM concentration for Alternative Method 2 reaches 99% of the standard (Scenario B). The sensitive receptor exposed to the highest SPM concentration is located east of the future development, along Highway 138. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

Fine Particulate Matter (PM_{10})

The highest concentrations of PM_{10} occur on the south and eastern property boundaries, adjacent to the paved haul road. Dust from on-site haul roads is the major contributor to the PM_{10} concentration at these locations.

The EOWHF's contribution to ambient air concentration exceeds the interim AAQC for PM_{10}, with a maximum 24-hour concentration that is 184% of this criterion for Alternative Method 2 (Scenario A). The concentration falls off quickly with distance from the On-site Study Area boundary. For Alternative Method 2, the PM_{10} concentration reaches 135% of the AAQC at a sensitive receptor (Scenario B). The sensitive receptor exposed to the highest PM_{10} concentration is located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard infrequently, only 1 hour in the 43,800 hour modelling period, or 0.002% of the time. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

There is no monitored ambient air quality data available to describe regional background concentration of PM_{10}, so cumulative ambient air concentration could not be quantified for comparison to AAQC. Background concentrations will not be negligible and will be at least as high as that of $PM_{2.5}$ (a subset of PM_{10}), so cumulative concentrations may approach or exceed the AAQC at sensitive receptors.

Odour

There are several contaminants emitted from the EOWHF that have odour-effects based air standards or guidelines; however, concentrations of these contaminants will not exceed the standards or guidelines at any location.

Modelling predicted that the highest 99.5th percentile concentration at a sensitive receptor is 1.85 OU/m^3 for Alternative Method 2 (Scenario A). The sensitive receptor exposed to the highest odour concentration is located east of the facility on Highway 138.

It is notable that odour is not linear, and a difference of less than a factor of 2 is not expected to be distinguishable by most people. As such, there is no significant difference between the predicted value of 1.85 OU/m^3 and the existing condition of 1.47 OU/m^3. In addition, the maximum odour values tend to occur during calm meteorological periods with low winds, which generally occur during the nighttime hours.

No additional mitigation measures are expected to be necessary under normal operating conditions. Existing dust management practices are expected to be sufficient to mitigate potential particulate matter based exceedances. Exceedances of the relevant standards are expected to be limited to the area immediately adjacent to the facility property line. Current odour management practices will continue for the future development.

NUMBER OF OFF-SITE RECEPTORS POTENTIALLY AFFECTED

Of the over 180 contaminants of concern that were modelled, only four (4) exceeded standards, guidelines, or screening levels: NO_2; SPM; PM_{10}; and odour. Only PM_{10} and odour exceeded the guideline at any sensitive receptor location; however, the PM_{10} exceedance was noted at a receptor location that has been vacated and will be demolished prior to the implementation of the future development landfill. The

concentration at this receptor was predicted to exceed the standard infrequently, only 1 hour in the 43,800 hour modelling period, or 0.002% of the time.

Scenario A presents the worst-case condition for Alternative Method 2 with regard to odour. This scenario resulted in six (6) sensitive receptors within the Off-site Study Area experiencing maximum concentrations above 1 OU/m^3, with the most frequently impacted sensitive receptor being exposed to a concentration above 1 OU/m^3 approximately 1.5% of the time. The highest concentration predicted at a sensitive receptor is 1.85 OU/m^3, which is a 26% increase over existing conditions. This would be considered an imperceptible increase, since odour is not linear, and a difference of less than a factor of 2 is not expected to be distinguishable by most people.

No additional mitigation measures are expected to be necessary under normal operating conditions, and no substantial difference is expected in the number of off-site receptors potentially affected by the future development as a result of Alternative Method 2.

Table 6-3. Air Quality and Odour Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Air Quality	Predicted maximum off-site point of impingement air concentrations of emitted contaminants of concern	• Key design considerations are related to the orientation and fill progression of Stages 6 to 9.
		• Solid waste received/landfilled at 755,000 tonnes/year.
		• 15.1 million m^3 of solid waste landfilled over 20-year life.
		• Current practices for LFG emission mitigation and use (daily and interim cover, impermeable cover, capture systems and combustion) will continue.
		• Current dust mitigation practices (e.g., paving, watering, etc.) will continue.
		• Existing infrastructure (LFG combustion facility, access roads, service buildings) will be unchanged.
		• Composting processes and volumes at the facility will be unchanged
		• Landfill working face and construction emissions assessed at two (2) separate locations and future activity years to identify worst-case effects:
		  • Scenario A assessed active landfilling and cell construction in the southeast corner (Stage 6, Cells 9 and 10).
		  • Scenario B assessed active landfilling and cell construction near end of life in the northeast corner (Stage 9, Cells 1 and 2).
		• The facility's existing Fugitive Dust Management Plan is expected to be effectively implemented for all current and future operations in order to manage and mitigate the potential fugitive dust emissions from the site's transportation and operational sources.
			• The off-site ground-level concentrations of over 180 contaminants of concern were estimated within the study area and compared against provincial and federal ambient air quality criteria, standards, guidelines and screening levels and the results indicate that all were within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}.
			• NO_2 concentrations are predicted to exceed the 2025 CAAQS by 54%. Exceedances are at the site boundary and fall to below the standard within 55 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard.
			• SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 88%. Exceedances are at the site boundary and fall to below the standard within 350 m of the boundary. High concentrations are mainly associated with road dust from on-site haul roads. Concentrations at sensitive receptors (residences) do not exceed the standard.
			• PM_{10} concentrations are predicted to exceed the Ontario AAQC by 150%. Exceedances are at the site
				No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility.	• NO_2 concentrations are predicted to exceed the 2025 CAAQS by 54%. Exceedances are at the site boundary and fall to below the standard within 55 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard.
					• SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 88%. Exceedances are at the site boundary and fall to below the standard within 350 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard.
					• PM_{10} concentrations are predicted to exceed the Ontario AAQC by 150%. Exceedances are at the site boundary and fall to below the

Table 6-3. Air Quality and Odour Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
			boundary and fall to below the standard within 450 m of the boundary. High concentrations are mainly associated with road dust from on-site haul roads. Concentrations at sensitive receptors (residences) do not exceed the AAQC.		standard within 450 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard.
	Number of off-site receptors potentially affected	• AERMOD dispersion modelling was used to predict the ground-level concentrations of contaminants at receptors within the Off-site Study Area. • A total of 81 individual receptors (residential and commercial properties) were identified within the model to represent the nearest and most potentially-affected receptors. • The EOWHF's existing Fugitive Dust Management Plan is expected to be effectively implemented for all current and future operations in order to manage and mitigate the potential fugitive dust emissions from the site's transportation and operational sources.	• The off-site ground-level concentrations of over 180 contaminants of concern were estimated within the Off-site Study Area and compared against provincial and federal ambient air quality criteria, standards, guidelines and screening levels and the results indicate that all were within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) do not exceed the standards.	No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility.	• The ground-level concentrations of contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) do not exceed the standards.
Odour	Predicted maximum off-site odour concentrations	• Key design considerations are related to the orientation and fill progression of Stages 6 to 9. • Solid waste received/landfilled at 755,000 tonnes/year. • 15.1 million m^3 of solid waste landfilled over 20-year life. • Current practices for LFG emission mitigation and use (daily and interim cover, impermeable cover, capture systems and combustion) will continue. • Existing infrastructure (LFG combustion	• The off-site ground-level concentrations of odour were estimated and compared against a guideline of 1 OU/m^3 that is commonly applied in Ontario. • Scenario A presents the worst-case condition for Alternative Method 1 with regard to odour. • The highest concentration predicted at a sensitive receptor is 1.64 OU/m^3, which	No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility.	• Scenario A presents the worst-case condition for Alternative Method 1 with regard to odour. • The highest concentration predicted at a sensitive receptor is 1.64 OU/m^3, which is a 12% increase

Table 6-3. Air Quality and Odour Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

		facility, access roads, service buildings) will be unchanged.
		• Composting processes and volumes at the facility will be unchanged.
		• Landfill working face and construction emissions assessed at two (2) separate locations and future activity years to identify worst-case effects:
		  • Scenario A assessed active landfilling and cell construction in the southeast corner (Stage 6, Cells 9 and 10).
		  • Scenario B assessed active landfilling and cell construction near end of life in the northeast corner (Stage 9, Cells 1 and 2).
			is a 12% increase over existing conditions.
			• The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.1% of the time.
					over existing conditions.
					• The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.1% of the time.

	Number of off-site receptors potentially affected	• AERMOD dispersion modelling was used to predict the ground-level concentrations of contaminants at the receptors identified within the Off-site Study Area. • A total of 81 individual receptors (residential and commercial properties) were identified within the model to represent the nearest and most potentially-affected receptor. • The EOWHF's existing odour management practices are expected to be effectively implemented for all current and future operations in order to manage and mitigate the potential odorous emissions from the future development.	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m³. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.1% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility at the intersection of Allaire Road and Highway 138. • The highest concentration predicted at a sensitive receptor is 1.64 OU/m³, which is a 12% increase over existing conditions.	• No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility. • Since odour is not linear, a difference of less than a factor of 2 is not expected to be distinguishable by most people. • The maximum odour values tend to occur during calm meteorological	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m³. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.1% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility at the

Table 6-3. Air Quality and Odour Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
				periods with low winds, which generally occur during the nighttime hours.	intersection of Allaire Road and Highway 138. • The highest concentration predicted at a sensitive receptor is 1.64 OU/m^3, which is a 12% increase over existing conditions.

Table 6-4. Air and OdourQuality Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Air Quality	Predicted maximum off-site point of impingement air concentrations of emitted contaminants of concern	• Key design considerations are related to the orientation and fill progression of Stages 6 to 8. • Solid waste received/landfilled at 755,000 tonnes/year. • 15.1 million m^3 of solid waste landfilled over 20-year life. • Current practices for LFG emission mitigation and use (daily and interim cover, impermeable cover, capture systems and combustion) will continue. • Current dust mitigation practices (e.g., paving, watering, etc.) will continue. • Existing infrastructure (LFG combustion facility, access roads, service buildings) will be unchanged. • Composting processes and volumes at the facility will be unchanged	• The off-site ground-level concentrations of over 180 contaminants of concern were estimated within the study area and compared against provincial and federal ambient air quality criteria, standards, guidelines and screening levels and the results indicate that all were within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • NO_2 concentrations are predicted to exceed the 2025 CAAQS by 47%. Exceedances are at the site boundary and fall to below the standard within 10 m of the boundary. Concentrations at sensitive	No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility.	• NO_2 concentrations are predicted to exceed the 2025 CAAQS by 47%. Exceedances are at the site boundary and fall to below the standard within 10 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • SPM (dust) concentrations are predicted to exceed the O.Reg.419/05

Table 6-4. Air and OdourQuality Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

		• Landfill working face and construction emissions assessed at two (2) separate locations and future activity years to identify worst-case effects:
		  • Scenario A assessed active landfilling and cell construction in the southeast corner (Stage 8, Cells 1 and 2).
		  • Scenario B assessed active landfilling and cell construction near end of life in the northeast corner (Stage 8, Cells 5 and 6).
		• The facility's existing Fugitive Dust Management Plan is expected to be effectively implemented for all current and future operations in order to manage and mitigate the potential fugitive dust emissions from the site's transportation and operational sources.
			receptors (residences) do not exceed the standard.
			• SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 56%. Exceedances are at the site boundary and fall to below the standard within 150 m of the boundary. High concentrations are mainly associated with road dust from on-site haul roads. Concentrations at sensitive receptors (residences) do not exceed the standard.
			• PM_{10} concentrations are predicted to exceed the Ontario AAQC by 84%. Exceedances are at the site boundary and fall to below the standard within 250 m of the boundary. High concentrations are mainly associated with road dust from on-site haul roads. Concentrations exceed the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard infrequently, only 1 hour in the 43,800 hour modelling period, or 0.002% of the time. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the
					Air Standard by 56%. Exceedances are at the site boundary and fall to below the standard within 150 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard.
					• PM_{10} concentrations are predicted to exceed the Ontario AAQC by 84%. Exceedances are at the site boundary and fall to below the standard within 250 m of the boundary. Concentrations exceed the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time. This sensitive receptor location was vacated in Summer 2022 and

Table 6-4. Air and OdourQuality Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
			implementation of the future development landfill. Concentrations at other sensitive receptors do not exceed the AAQC.		will be demolished prior to the implementation of the future development landfill. Concentrations at other sensitive receptors do not exceed the AAQC.
	Number of off-site receptors potentially affected	• AERMOD dispersion modelling was used to predict the ground-level concentrations of contaminants at receptors within the Off-site Study Area. • A total of 81 individual receptors (residential and commercial properties) were identified within the model to represent the nearest and most potentially-affected receptors. • The EOWHF's existing Fugitive Dust Management Plan is expected to be effectively implemented for all current and future operations in order to manage and mitigate the potential fugitive dust emissions from the site's transportation and operational sources.	• The off-site ground-level concentrations of over 180 contaminants of concern were estimated within the study area and compared against provincial and federal ambient air quality criteria, standards, guidelines and screening levels and the results indicate that all were within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) do not exceed the standards with the exception of PM_{10}, which exceeded the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.	No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility.	• The ground-level concentrations of contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) do not exceed the standards with the exception of PM_{10}, which exceeded the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time.

Table 6-4. Air and OdourQuality Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
					This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

Odour	Predicted maximum off-site odour concentrations	• Key design considerations are related to the orientation and fill progression of Stages 6 to 8.
		• Solid waste received/landfilled at 755,000 tonnes/year.
		• 15.1 million m^3 of solid waste landfilled over 20-year life.
		• Current practices for LFG emission mitigation and use (daily and interim cover, impermeable cover, capture systems and combustion) will continue.
		• Existing infrastructure (LFG combustion facility, access roads, service buildings) will be unchanged.
		• Composting processes and volumes at the facility will be unchanged.
		• Landfill working face and construction emissions assessed at two (2) separate locations and future activity years to identify worst-case effects:
		  • Scenario A assessed active landfilling and cell construction in the southeast corner (Stage 8, Cells 1 and 2).
		  • Scenario B assessed active landfilling and cell construction near end of life in the northeast corner (Stage 8, Cells 5 and 6).
			• The off-site ground-level concentrations of odour were estimated and compared against a guideline of 1 OU/m^3 that is commonly applied in Ontario.
			• Scenario A presents the worst-case condition for Alternative Method 2 with regard to odour.
			• The highest concentration predicted at a sensitive receptor is 1.85 OU/m^3, which is a 26% increase over existing conditions.
			• The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m^3 approximately 1.5% of the time.
				No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility.	• Scenario A presents the worst-case condition for Alternative Method 2 with regard to odour.
					• The highest concentration predicted at a sensitive receptor is 1.85 OU/m^3, which is a 26% increase over existing conditions.
					• The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m^3 approximately 1.5% of the time.

Table 6-4. Air and OdourQuality Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
	Number of off-site receptors potentially affected	• AERMOD dispersion modelling was used to predict the ground-level concentrations of contaminants at the receptors identified within the off-site study area. • A total of 81 individual receptors (residential and commercial properties) were identified within the model to represent the nearest and most potentially-affected receptor. • The EOWHF's existing odour management practices are expected to be effectively implemented for all current and future operations in order to manage and mitigate the potential odorous emissions from the future development.	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m^3. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m^3 approximately 1.5% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility on Highway 138. • The highest concentration predicted at a sensitive receptor is 1.85 OU/m^3, which is a 26% increase over existing conditions.	• No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility. • Since odour is not linear, a difference of less than a factor of 2 is not expected to be distinguishable by most people. • The maximum odour values tend to occur during calm meteorological periods with low winds, which generally occur during the nighttime hours.	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m^3. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m^3 approximately 1.5% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility on Highway 138. • The highest concentration predicted at a sensitive receptor is 1.85 OU/m^3, which is a 26% increase over existing conditions.

Noise

The Noise net effects assessment incorporated information from the Noise Existing Conditions Report (**Supporting Document 1-2**), the results of sound level propagation modelling, and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Noise Effects Assessment Report (**Supporting Document 3-2**).

The MECP has set out separate noise guidelines for landfill sites versus “stationary” noise sources of sound (MECP, 1998; MECP, 2013). The activities at a landfill site comprise “construction and rehabilitation” and “landfilling operations”. Construction and rehabilitation include “grading, construction of internal and external roads, construction of earth berms and tree removal, as well as those due to rehabilitation activities such as removal of berms, demolition of buildings and landscaping”. Landfilling operations include vehicles bringing waste to the facility, and mobile equipment for moving and handling landfill waste and soil. Stationary sources include mechanical equipment, fixed sound sources, and vehicles operating on or visiting the site, other than those bringing landfill waste or taking away finished compost.

The majority of operations at the EOWHF produce sound that is steady or slowly varying in nature, which is defined in the MECP guidelines as “non-impulsive” sound. However, the monthly pick-up of waste bins by a roll-off truck at the RPRA tire drop-off area, and tail-gate impacts during occasional tipping of waste by a dump-truck in the active landfill area, produce impulse sound, which is defined as a single pressure pulse or a single burst of pressure pulses. Under MECP noise assessment guidelines, non-impulsive sounds and impulse sounds are assessed separately, using two distinct measurement/evaluation methods.

The study areas for the Noise effects assessment are the generic study areas shown on **Figure 4-1** and the existing conditions are described in Section 4.3.2.1. The noise receptor locations are shown on **Figure 4-3**. One of the neighbouring residential points of reception, identified as “R4” on **Figure 4-3** was purchased by GFL and vacated in Summer 2022. This location will be demolished prior to the implementation of the future development landfill. Consequently, location R4 was not considered to be a point of reception with regard to noise from the future development.

Within the Off-site Study Area, eight (8) points of reception were identified (excluding R4 as noted above), shown as R1 through R3 and R5 through R9 on **Figure 4-3**. Three of these locations comprise the closest and most-potentially impacted points of reception, with respect to noise – R1 through R3; consequently, the assessment focuses on these three locations. The other points of reception are further from the On-site Study Area and will be less exposed to the resulting noise.

The MECP noise guideline for landfill sites makes a general recommendation that sound from off-site haul routes be considered for proposed new landfill sites; however, the off-site haul routes for the EOWHF are long established and will not change as a result of the future development. Accordingly, sound from off-site haul routes was not considered in the effects assessment.

The sound level limits applicable at each point of reception neighbouring the EOWHF were established as part of the Noise Existing Conditions Report (**Supporting Document 1-2**) by comparing the background sound to the exclusion limits and are summarized in **Table 6-5** and **Table 6-6**, below.

Table 6-5. Applicable Limits for Non-Impulsive Sound, L_{EQ} [dBA] (Day/Evening/Night)

Point of Reception	Minimum Monitored Background Sound Level	Applicable Limits for Landfilling Operations (MECP, 1998)	Applicable Limits for Stationary Sources (MECP, 2013)
R1	51 / 49 / 44	55 / 49 / 45	51 / 50 / 45
R2	63 / 59 / 54	63 / 59 / 54	63 / 59 / 54
R3	56 / 51 / 47	56 / 51 / 47	56 / 51 / 47

Table 6-6. Applicable Limits for Impulsive Sound, L_{LM} [dBAI]

Point of Reception	Minimum Monitored Daytime Background Sound Level	Impulses from Roll-off Trucks (max 1/hr) (MECP, 2013)	Impulses from Tailgates (max 4/hr) (MECP, 2013)
R1	51	80	65
R2	63		
R3	56		

Operations at the future development were assumed to be consistent with existing conditions. Waste and compostable materials will be received at the future development between the hours of 7:00 AM and 5:00 PM on weekdays and 8:00 AM to 2:00 PM on Saturday, with occasional extended hours to 6:00 PM on weekdays and 5:00 PM on Saturdays. On-site landfilling equipment can operate from 6:30 AM to 6:30 PM on weekdays and 7:30 AM to 2:30 PM on Saturdays[16]. Some of the ancillary operations on site, including the energy from the LFGTE plant, the biofilter system associated with the composting facility, and the leachate wastewater treatment plant can operate continuously, day and night. The following equipment and operations were assumed to be active during a predictable worst case daytime hour:

- A maximum of 33 visits by landfill trucks;
- Three rock trucks;
- Two landfill compactors;
- Two bulldozers;
- Two loaders;
- Two excavators;

[16] The ECA allows on-site equipment to operate for a half-hour before and after waste-receipt hours to carry out regular site activities such as site preparation and placement and removal of daily/interim cover. The hours provided are based on current operations.

- One water truck (occasional and acoustically insignificant, not modelled);
- Two landfill gas flares and associated equipment;
- Four landfill gas electrical generators and associated equipment;
- Leachate wastewater treatment facility;
- A maximum of 12 visits by trucks to the compost facility;
- Composting operations;
- RPRA bin drop-off/pickup, non-impulsive sound;
- Impulse sounds from RPRA bin pickup (maximum 1 per hour);
- Impulse sounds from dump truck tail gates (maximum 4 per hour).

The future development will accept landfill trucks during daytime hours only, although the on-site mobile landfill equipment can begin operations at 6:30 AM on weekdays. In that respect, the only night-time operation of the landfill will be the on-site mobile equipment in the half hour between 6:30 AM and 7:00 AM. The impulse sounds are associated with trucking activities, and therefore will occur daytime hours only.

Similarly, the compost trucks travelling between the front gate and the compost area, will visit the site during daytime hours only, at a maximum of 12 trucks in a busy hour.

A review of the past annual off-site noise monitoring data along with field reconnaissance determined that the sound of the EOWHF was not audible off-site over the background traffic sound. Therefore, computational acoustical modelling was used to determine the off-site sound levels of the existing facility. The sound levels from the EOWHF were found to be within the limits identified in **Table 6-5** and **Table 6-6** under all existing operating conditions.

The computational acoustical model was developed using Cadna/A software (version 2022, build 189.5221), which is a digital implementation of the International Organization for Standardization (ISO) Standard 9613-2 (ISO, 1996) and which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures (or by topography and foliage where applicable) and is accepted by the MECP for modelling outdoor sound propagation.

To assess the effects of the future development, the acoustical model was used to determine which operating locations and configurations of the landfilling operations will represent the "predictable worst case" noise impact scenarios at the closest off-site points of reception.

The higher grades representing the completed state of the stages/cells were assumed in the modelling, as they produced slightly greater exposure of the points of reception to the landfilling equipment and operations. The location and configuration of the stationary noise sources would be the same for all stages of the landfilling operations for both alternative methods.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-7**.

PREDICTED SITE-RELATED NOISE LEVELS

Because the closest points of reception are situated to the northwest of the EOWHF (R1) and to the southeast (R2 and R3), the site configurations with the greatest off-site sound levels for Alternative Method 1 were found to be:

- the end of Stage 5 (with respect to R1 to the northwest); and
- the end of Stage 7 (with respect to R2/R3 to the southeast).

The results of the modelling indicated the following:

- The predicted maximum cumulative noise impact from all landfilling operations is 55 dBA at R3, within the limit of 56 dBA at that location.
- The predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location.
- The predicted maximum impulse noise impact is 59 dBAI at R2 and R3, within the limit of 65 dBAI at those locations.

The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits. Landfilling activity may be audible at times, during lulls in background sound levels.

The current noise control practices outlined in Section 5.3.8.6 will be continued. As the potential effects are below the applicable sound level limits, no additional mitigation measures are required.

NUMBER OF OFF-SITE RECEPTORS POTENTIALLY AFFECTED

All points of reception within the Off-site Study Area will experience sound levels within the MECP limits. The current noise control practices outlined in Section 5.3.8.6 will be continued. As the potential effects are below the applicable sound level limits, no additional mitigation measures are required.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-8**.

PREDICTED SITE-RELATED NOISE LEVELS

Because the closest points of reception are situated to the northwest of the EOWHF (R1) and to the southeast (R2 and R3), the site configurations with the greatest off-site sound levels for Alternative Method 2 were found to be:

- the end of Stage 5 (with respect to R1 to the northwest); and
- the start of Stage 8 (with respect to R2/R3 to the southeast).

The results of the modelling indicated the following:

- The predicted maximum cumulative noise impact from all landfilling operations is 49 dBA at R3, within the limit of 56 dBA at that location.
- The predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location.

- The predicted maximum impulse noise impact is 56 dBAI at R2 and R3, within the limit of 65 dBAI at those locations.

The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits. Landfilling activity may be audible at times, during lulls in background sound levels.

The current noise control practices outlined in Section 5.3.8.6 will be continued. As the potential effects are below the applicable sound level limits, no additional mitigation measures are required.

NUMBER OF OFF-SITE RECEPTORS POTENTIALLY AFFECTED

All points of reception within the Off-site Study Area will experience sound levels within the MECP limits. The current noise control practices outlined in Section 5.3.8.6 will be continued. As the potential effects are below the applicable sound level limits, no additional mitigation measures are required.

Table 6-7. Noise Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Noise	Predicted site-related noise levels	• Other than relocation of landfilling operations to the future development lands, the existing equipment and operations comprising the sources of noise emissions will remain unchanged.
		• Study Areas are influenced by the following noise sources:
		  • 33 visits/hr by landfill trucks
		  • Three rock trucks
		  • Two landfill compactors
		  • Two bulldozers
		  • Two loaders
		  • Two excavators
		  • Two LFG flares and associated equipment
		  • Four LFG electrical generators and associated equipment
		  • Leachate wastewater treatment facility
		  • 12 visits/hr by trucks to the compost facility
		  • Composting operations
		  • RPRA bin drop-off/pickup, non-impulsive & impulsive sound (max 1/hr)
		  • Impulse sounds from tail gates (max 4/hr)
		• Measured sound emission levels of actual equipment at EOWHF were used for the predictive analysis.
		• The worst-case locations for landfilling activities were assessed.
		• Final (near closure) landfill topography as the worst-case elevations was assessed.
		• Equipment is maintained to prevent atypical noise emissions.
			• Predicted maximum cumulative noise impact from all landfilling operations is 55 dBA at R3, within the limit of 56 dBA at that location.
			• Predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location.
			• Predicted maximum impulse noise impact is 59 dBAI at R2 and R3, within the limit of 65 dBAI at those locations.
				The potential effects are below the allowable limit; therefore, no additional mitigation measures are required. Current noise control practices will be continued.	The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits. Landfilling activity may be audible at times, during lulls in background sound levels.

	Number of off-site receptors potentially affected	Eight noise-sensitive points of reception are located within the Off-site Study Area.	All points of reception within the Off-site Study Area will experience sound levels within the MECP limits.	No additional mitigation required. Continue current noise control practices and annual noise monitoring program.	Noise levels at all points of reception within Off-site Study Area will be within the MECP regulatory sound level limits.

Table 6-8. Noise Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Noise	Predicted site-related noise levels	• Other than relocation of landfilling operations to the future development area, the existing equipment and operations comprising the sources of noise emissions will remain unchanged.
		• Study Areas are influenced by the following noise sources:
		  • 33 visits/hr by landfill trucks
		  • Three rock trucks
		  • Two landfill compactors
		  • Two bulldozers
		  • Two loaders
		  • Two excavators
		  • Two landfill gas flares and associated equipment
		  • Four landfill gas electrical generators and associated equipment
		  • Leachate wastewater treatment facility
		  • 12 visits/hr by trucks to the compost facility
		  • Composting operations
		  • RPRA bin drop-off/pickup, non-impulsive & impulsive sound (max 1/hr)
		  • Impulse sounds from tail gates (max 4/hr)
		• Measured sound emission levels of actual equipment at EOWHF were used for the predictive analysis.
		• The worst-case locations for landfilling activities were assessed.
		• Final (near closure) landfill topography as the worst-case elevations was assessed.
		• Equipment is maintained to prevent atypical noise emissions.
			• Predicted maximum cumulative noise impact from all landfilling operations is 49 dBA at R3, within the limit of 56 dBA at that location.
			• Predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location.
			• Predicted maximum impulse noise impact is 56 dBAI at R2 and R3, within the limit of 65 dBAI at those locations.
				The potential effects are below the allowable limit; therefore, no additional mitigation measures are required. Current noise control practices will be continued.	The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits. Landfilling activity may be audible at times, during lulls in background sound levels.

	Number of off-site receptors potentially affected	Eight noise-sensitive points of reception are located within the Off-site Study Area.	All points of reception within the Off-site Study Area will experience sound levels within the MECP limits.	No additional mitigation required. Continue current noise control practices and annual noise monitoring program.	Noise levels at all points of reception within Off-site Study Area will be within the MECP regulatory sound level limits.

6.2.1.2 Geology and Hydrogeology

The net effects assessment for Geology and Hydrogeology includes groundwater quality and quantity. The Geology and Hydrogeology net effects assessment incorporated information from the Geology and Hydrogeology Existing Conditions Report (**Supporting Document 1-3**), conceptual site modelling, and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Geology and Hydrogeology Effects Assessment Report (**Supporting Document 3-3**).

The study areas for the Geology and Hydrogeology effects assessment are the generic study areas shown on **Figure 4-1** and the existing conditions are described in Section 4.3.2.2. The groundwater assessment followed the relevant aspects of O.Reg. 232/98 Landfilling Sites that apply specifically to groundwater. O.Reg. 232/98 provides for determination of water quality assessment criteria through application of a formula to determine the maximum allowable concentration at a compliance boundary.

The potential impact of the proposed landfill expansion on the quality of groundwater in the underlying aquifer was evaluated using software developed by Gaea Technologies (Pollute, version 8, 2021), specifically designed for evaluating contaminant impact between engineered systems and hydrogeology. Based on a review of existing conditions and the alternative methods, the most appropriate model to evaluate the effects of the proposed landfill expansion is the simple clayey aquitard, assuming the following:

- Uniform geologic layering and groundwater flow throughout the On-site Study Area. Since spatial variability exists, mass transport was evaluated using various lengths and thicknesses in the direction of groundwater flow along north-south cross-sections.
- As defined in O.Reg. 232/98, the LCS was assumed to remain fully functional for a service life of 100 years.
- The base of the landfill (top of the silty clay aquitard) will be at an elevation of 64.0 masl.
- Following closure, the static height of leachate will be 1.5 m (65.5 masl) above the base of the landfill while the LCS is operational, a value consistent with existing observations at the EOWHF.
- Following closure, the infiltration rate for each closed stage will be 0.042 m/yr of precipitation. Th resulting volume of leachate will be continuously collected.
- Following the passage of the 100 service life of the LCS as defined by O.Reg. 232/98, the LCS was considered to fail. Upon failure of the LCS, leachate mounding will occur. For modelling purposes, the average height of the mounding was anticipated to be 73 masl (4 m above the top of the peripheral berm, which is set at approximately 69 masl). This value is similar to that used in previous EAs conducted at various stages of historical EOWHF landfill development.
- Vertical hydraulic gradients were calculated between the static height of leachate and the bedrock piezometric surface using a reference distance between the middle of

the leachate column and the middle of the wetted screened interval (while the LCS was operational these values are effectively zero and transport is driven by diffusion with effectively no seepage of groundwater into the closed stage).

- Although a background concentration of chloride is present in the aquifer, it was not considered in the model to eliminate the upward diffusive gradient from the aquifer and better represent a worst-case scenario.
- For Stage 5 (the same in both alternative methods) located immediately down-gradient of the existing landfill, the modeling considered the flow path from the up-gradient end of the existing landfill extending to the down-gradient limit of the proposed Stage 5 cell. The mass of waste per unit area was assumed equivalent to the highest value observed in Alternative Methods 1 and 2, with an underlying silty clay thickness of 10 m. Other boundary conditions were assumed to be as noted above.

The model output provides a concentration profile in depth over time at the down-gradient extent of the model. It is understood that this occurs up-gradient of the compliance boundary (property line); however, the modelled concentrations entering the aquifer at the down-gradient limit of the model are conservatively protective as decreases in chloride concentrations beyond this point are not anticipated and the plug of groundwater would reach the compliance boundary at some future time. Chloride, a non-degrading and non-adsorbing constituent of leachate, was used to represent worst case conditions for assessing effects on groundwater quality.

Various scenarios were evaluated for the effects assessment given the varying conditions across the EOWHF and future development lands. Calculations, model inputs and outputs, and modelled groundwater flow paths over interpreted clay thicknesses and bedrock groundwater piezometric contours are provided in Appendix A of **Supporting Document 3-3**.

The contaminating lifespan considered the amount of time, under the given conditions, when the concentration of chloride in leachate at depth 0 m was less than the maximum allowable concentration, and was modelled to be less than or equal to 500 years for either Alternative Method 1 or Alternative Method 2.

Groundwater Quality

The Groundwater Quality existing conditions are described in Section 4.3.2.2. Groundwater quality for the EOWHF and future development lands was determined to be as follows:

- Future development lands: Elevated hardness, DOC, and TDS are expected in bedrock. Elevated TDS in deeper silty clay is independent of landfill impacts. Elevated chloride in bedrock is localized, and likely results from the historic Champlain Sea.
- EOWHF: Elevated alkalinity was observed in shallow and deeper silty clay below the northeastern section of the EOWHF. Elevated hardness in deeper silty clay and shallow clay were present and do not appear to be related to leachate impacts.

- No chloride impacts are evident in silty clay/clay below the EOWHF. Elevated chloride in bedrock is localized, and likely results from the historic depositional environment.
- Elevated concentrations of alkalinity, hardness, TDS, chloride, and DOC at the southeastern limit of the EOWHF in bedrock appear unrelated to the EOWHF, as these elevated parameters are not evident in the overlying silty clay or shallow wells. These elevated parameters observed in bedrock are reflective that groundwater in the regional limestone aquifer is often highly mineralized, including to a saline condition.

The water quality assessment criteria were determined through application of the maximum allowable concentration formula provided in O.Reg. 232/98. To evaluate the impacts that the proposed landfill expansion may have on groundwater quality, chloride was used to represent worst-case conditions. Chloride is a conservative parameter that does not adsorb or degrade and is therefore the best indicator of the maximum extents of the influence of leachate contaminated groundwater. The background concentration of chloride was determined to be 104 mg/L based on concentrations measured in the bedrock aquifer monitoring wells. The aesthetic objective for chloride in groundwater is 250 mg/L. Consequently, the maximum allowable concentration was calculated to be 177 mg/L.

Once leachate contaminated water migrates to the bedrock aquifer mixing zone, the primary transport mechanism would be advection and diffusion towards the north property boundary, through the bedrock.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-9**.

For Alternative Method 1, one cross-section was developed for Stage 5 within the EOWHF site, and four cross-sections were developed for the future development lands as follows:

- Stage 5: 1,750 m section with 10 m of underlying silty clay.
- Stages 6 through 9:
  - 1,550 m section with 9.4 m of underlying silty clay (Alt 1-1);
  - 1,377 m section with 8.5 m of underlying silty clay (Alt 1-2);
  - 1,310 m section with 6.4 m of underlying silty clay (Alt 1-3); and
  - 504 m section with 5.9 m of underlying silty clay (Alt 1-4).

These cross-sections and modelling inputs and outputs for Alternative Method 1 are provided in Appendix A of **Supporting Document 3-3**.

Following the end of the LCS service life, the chloride concentration in leachate in the future development area was calculated to increase to a maximum of 165 mg/L in Year 650 (Alt 1-3), and the corresponding maximum concentration in the aquifer would be 160 mg/L (Alt 1-3). Since the chloride concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer, there will be no adverse

effect to groundwater quality and water well users in the Off-site Study Area. Consequently, no mitigation measures are required.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-10**.

For Alternative Method 2, one cross-section was developed for Stage 5 within the EOWHF site, and five cross-sections were developed for the future development lands as follows:

- Stage 5: 1,750 m section with 10 m of underlying silty clay.
- Stages 6 through 8:
  - 1,538 m section with 9.5 m of underlying silty clay (Alt 2-1);
  - 1,379 m section with 8.7 m of underlying silty clay (Alt 2-2);
  - 1,107 m section with 8.2 m of underlying silty clay (Alt 2-3);
  - 377 m section with 5.5 m of underlying silty clay (Alt 2-4); and
  - 493 m section with 5.8 m of underlying silty clay (Alt 2-5).

These cross-sections and modelling inputs and outputs for Alternative Method 2 are provided in Appendix A of **Supporting Document 3-3**.

Following the end of the LCS service life, the chloride concentration in leachate in the future development area was calculated to increase to a maximum of 166 mg/L in Year 1000 (Alt 2-1) and Year 930 (Alt 2-2). The maximum concentration in the aquifer would be 133 mg/L in Year 520 (Alt 2-5). Since the chloride concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer, there will be no adverse effect to groundwater quality and water well users in the Off-site Study Area. Consequently, no mitigation measures are required.

Groundwater Quantity

The Groundwater Quantity existing conditions are described in Section 4.3.2.2. The hydrogeological conditions include the water table, hydraulic gradients and hydraulic conductivity.

- Water table. The water table surface elevation declines northward, from approximately 67 masl near to Laflèche Road to approximately 64 masl near to the intersection of Concession Road 7/Road 700 and Highway 138. The depth to the water table in 2020-2021 ranged from 0.5 to 1.8 mbg.
- Gradients. The water table elevations indicate a horizontal hydraulic gradient with shallow groundwater generally moving northward and piezometric elevations in till and in bedrock indicate a horizontal hydraulic gradient with generally northward movement. The vertical hydraulic gradient is variable between stratigraphic layers, with bedrock monitoring wells generally demonstrating an upward gradient towards the overlying silty clay.
- Hydraulic conductivity. In general, the upper bedrock within the future development lands appears to be approximately 10 times more permeable than the overlying

sandy gravel till, which is more permeable than the overlying silty clay, potentially by factors of 10 to 1,000. The hydraulic conductivity range for the sandy gravel till overlapped the hydraulic conductivity range for the bedrock, indicating there may be some locations where the sandy gravel till and bedrock exhibit similar hydraulic conductivity values.

There are no municipal piped water supplies in the On-site Study Area and the Off-site Study Area. Each property is likely serviced by a private supply well, with the possibility of some relying on bottled water. Twenty-eight (28) water wells were identified within the On-site and Off-site Study Areas.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-9**.

The silty clay underlying the proposed landfill is a low-hydraulic conductivity layer (aquitard) overlying the bedrock below. The vertical gradients between the bedrock and the silty clay aquitard are generally upwards; therefore, no effects to groundwater quantity are anticipated and no mitigation measures are required.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-10**.

The silty clay underlying the proposed landfill is a low-hydraulic conductivity layer (aquitard) overlying the bedrock below. The vertical gradients between the bedrock and the silty clay aquitard are generally upwards; therefore, no effects to groundwater quantity are anticipated and no mitigation measures are required.

Table 6-9. Geology and Hydrogeology Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Groundwater Quality	Predicted effects to groundwater quality at property boundaries and off-site	• Cross-sections and modelling inputs and outputs for Alternative Method 1 are provided in Appendix A of **Supporting Document 3-3**.
		• The LCS is assumed to remain fully functional for a service life of 100 years.
		• The infiltration rate for each closed stage will be 0.042 m/yr of precipitation, and the resulting leachate will be collected continuously.
		• One cross-section was developed for Stage 5 within the EOWHF site, and four cross-sections were developed for the future development lands as follows:
		  • Stage 5: 1,750 m section with 10 m of underlying silty clay.
		  • Stages 6 through 9:
		  • 1,550 m section with 9.4 m of underlying silty clay (Alt 1-1);
		  • 1,377 m section with 8.5 m of underlying silty clay (Alt 1-2);
		  • 1,310 m section with 6.4 m of underlying silty clay (Alt 1-3); and
		  • 504 m section with 5.9 m of underlying silty clay (Alt 1-4).
			• Following the end of the LCS service life, the chloride concentration in leachate in the future development area was calculated to increase to a maximum of 165 mg/L in Year 650 (Alt 1-3)
			• The corresponding maximum concentration in the aquifer would be 160 mg/L (Alt 1-3).
				None required	• The chloride[1] concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer.
					• No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated.

Groundwater Quantity	Predicted groundwater flow characteristics	• Silty clay underlying the proposed landfill is a low-hydraulic conductivity layer (aquitard) overlying the bedrock below.	The vertical gradients between the bedrock and the silty clay aquitard are generally upwards; therefore, no effects to groundwater quantity are anticipated.	None required.	No effects to groundwater quantity are anticipated.

1. Chloride, a non-degrading and non-adsorbing constituent of leachate, was used to represent worst case conditions for assessing effects on groundwater quality.

Table 6-10. Geology and Hydrogeology Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Groundwater Quality	Predicted effects to groundwater quality at property boundaries and off-site	• Cross-sections and modelling inputs and outputs for Alternative Method 2 are provided in Appendix A of **Supporting Document 3-3**.
		• The LCS is assumed to remain fully functional for a service life of 100 years.
		• The infiltration rate for each closed stage will be 0.042 m/yr of precipitation, and the resulting leachate will be collected continuously.
		• One cross-section was developed for Stage 5 within the EOWHF site, and five cross-sections were developed for the future development lands as follows:
		  • Stage 5: 1,750 m section with 10 m of underlying silty clay.
		  • Stages 6 through 8:
		  • 1,538 m section with 9.5 m of underlying silty clay (Alt 2-1);
		  • 1,379 m section with 8.7 m of underlying silty clay (Alt 2-2);
		  • 1,107 m section with 8.2 m of underlying silty clay (Alt 2-3);
		  • 377 m section with 5.5 m of underlying silty clay (Alt 2-4); and
		  • 493 m section with 5.8 m of underlying silty clay (Alt 2-5).
			• Following the end of the LCS service life, the chloride concentration in leachate in the future development area was calculated to increase to a maximum of 166 mg/L in Year 1000 (Alt 2-1) and Year 930 (Alt 2-2).
			• The maximum concentration in the aquifer would be 133 mg/L in Year 520 (Alt 2-5).
				None required.	• The chloride[1] concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer.
					• No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated.

Groundwater Quantity	Predicted groundwater flow characteristics	Silty clay underlying the proposed landfill is a low-hydraulic conductivity layer (aquitard) overlying the bedrock below.	The vertical gradients between the bedrock and the silty clay aquitard are generally upwards; therefore, no effects to groundwater quantity are anticipated	None required.	No effects to groundwater quantity are anticipated.

1. Chloride, a non-degrading and non-adsorbing constituent of leachate, was used to represent worst case conditions for assessing effects on groundwater quality.

6.2.1.3 Surface Water Environment

The net effects assessment for the Surface Water Environment includes surface water quality and quantity.

Surface Water Quality

The Surface Water Quality net effects assessment incorporated information from the Surface Water Quality Existing Conditions Report (**Supporting Document 1-4**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment for off-site surface water quality is provided in the Surface Water Quality Effects Assessment Report (**Supporting Document 3-4**) and for on-site surface water quality in the Surface Water Quantity Effects Assessment Report (**Supporting Document 3-5**).

The study areas for Surface Water Quality are shown on **Figure 4-5** and a description of the existing conditions is provided in Section 4.3.2.3.

The future development will increase the impervious surface area, peak flows, and volume of surface runoff. To prevent an increase in risk of negative impacts to water quality, a proposed conceptual SWM design was developed to mitigate potential negative impacts to the existing surface water drainage system.

In order to satisfy quality requirements, the proposed SWM systems for both alternative methods include a new wet pond in the northwest corner of the future development lands and oversized drainage ditches on the site. The proposed wet pond will discharge into the Fraser Drain just upstream of where the Fraser Drain changes flow direction from north to west. Based on the available topographic information, the bottom elevation of the Fraser Drain is at approximately 63.7 m, and the 100-year flow depth is approximately 1.5 m. All the runoff from the future development lands will be directed to the Fraser Drain, and accordingly will not generate negative water quality impacts to the Upper Tayside Municipal Drain.

For stormwater quality control, the wet ponds have been designed to provide an “Enhanced” protection level (i.e., 80% long-term TSS removal). Under proposed conditions, the site imperviousness is 74%, which corresponds to a volumetric water quality criterion of 240 m^3/ha, including 40 m^3/ha for extended detention. An orifice plate will be provided in the outlet structure for extended detention.

The on-site Surface Water Quality net effects assessment for Alternative Methods 1 and 2 was conducted with consideration of the following:

- Final landfill topography as the worst-case scenario since the cell slopes are steepest after the completion of filling, and therefore the concentration time is shortest.
- The imperviousness of the landfill cells, including the localized perimeter ditches around each stage, were modelled as 95%, since all cells will be closed, capped, and covered, and will not allow for significant infiltration.

- A Manning's number of 0.3 and an impervious depression storage of 5.0 mm was assumed to account for the vegetated cover of the cells.
- For future climate conditions, an additional precipitation scenario was considered with a 14% increase in precipitation volumes in addition to the 24-hour, 100-year design storm volume to account for the increased severity of storm events. This adjustment is based on the MNRF Climate Change Research Report CCRR-44 (MNRF, 2015a). Additional details are included in **Supporting Document 3-5**.

EOWHF SWM is addressed via a number of the conditions in ECA No. 7899-CBQP6L. In general, surface water within the EOWHF is collected and treated via a system of SWM ponds, which provide TSS removal and control discharge to pre-development flows.

The Fraser Drain and Moose Creek are receiver watercourses for the EOWHF site's stormwater runoff and treated effluent. Both systems currently discharge to the Fraser Drain, the first receiver, which joins Moose Creek approximately 600 m downstream of the site. The treated effluent is a product of the EOWHF's LCS beneath the landfill stages and the on-site LTF.

The Albert Fahey Award Drain is most representative of natural or existing conditions for off-site surface water quality in the area of the EOWHF. The sampling location is in an area that drains peatlands and woodlands. Water quality from this location contributes to recent increases in parameter concentrations downstream in Moose Creek.

Upstream of the confluence with Moose Creek, Fraser Drain water quality shows increases in background parameter concentrations that are speculated to be caused by low flow conditions. In Moose Creek, background conditions have remained fairly stable.

In Moose Creek downstream of the current treated effluent discharge location, median parameter concentrations have increased; however, this is not solely related to treated effluent discharge, as there is deteriorating water quality in upstream and/or background monitoring locations.

Potential effects on surface water quality are often assessed by comparison of the quality to the generic PWQO; where PWQO are not available for specific parameters of interest, generic surface water quality objective values are obtained from other jurisdictions such as the federal Canadian Water Quality Guidelines (CWQG) or other provinces. These generic objectives are intentionally conservative values intended to be protective of the surface water environment under a very broad range of conditions. Since 2007, the leachate generated at the EOWHF is treated in the on-site LTF before being discharged to the Fraser Drain that leads to Moose Creek; the treated effluent quality is required to comply with the Effluent Limits for certain parameters set out in the EOWHF's ECA and has demonstrated through monitoring to comply with the ECA. In recent years, and in view of the elevated concentrations of some parameters in the effluent following treatment, MECP requested these additional parameters be considered for both the treated effluent and in the receiving water courses, some of which do not have PWQO and so have borrowed generic objectives from other jurisdictions. The treated effluent has been shown to exceed the generic values for some of the additional parameters, although ongoing toxicity testing programs on the surface water do not indicate adverse effects. As is often done in various industrial sectors where there are issues with their industry-specific wastewater (landfill leachate in the case of the EOWHF) meeting the

conservative generic water quality objectives, Site-Specific Water Quality Objectives (SSWQOs) are derived for use in assessing site compliance.

SSWQOs are scientifically defensible and meet the same intended level of protection as generic water quality guidelines in Canada. The SSWQOs are toxicologically-based benchmarks that are protective of the aquatic environment, and are developed using established science-based procedures that are the same as those used to derive the generic CWQG. SSWQOs are customized to the conditions that are applicable to a region or site; they represent substance concentrations that are not predicted to impair ecological health, either through disruption of ecological functions or adversely affecting populations of valued organisms. The customization of SSWQOs to site-specific conditions reflects an application of the process of refinement developed by the CCME. Therefore, GFL has developed SSWQOs for their treated effluent, intended to be applied for both the existing landfill site and the expanded landfill site.

The off-site surface water quality net effects assessment for Alternative Methods 1 and 2 was conducted with consideration of the following:

- Site run-off will always be controlled and treated, regardless of whether it came in contact with waste or not (either through the LTF or SWM ponds).
- MECP have agreed (conference call April 5, 2023) to the use of acute SSWQOs to represent maximum effluent limits in this assessment, specific effluent limits for the site are still to be established and approved by MECP, and will be defined as part of an Assimilative Capacity Study and Mixing Zone Assessment (ACS/MZ) being conducted under separate cover in support of a future ECA amendment application. As such, all references to compliance with acute SSWQOs should be interpreted as temporary effluent limits for the purposes of this assessment, and are subject to change.
- Effluent limits for treated leachate discharged from the LTF will be determined for both SSWQOs and effluent limit parameters via an ACS/MZ at the ECA approval stage, following a methodology appropriate for the conditions at the EOWHF approved by the MECP. The acute and chronic SSWQOs, approved by the MECP, have been used in this effects assessment for proof of concept.
- For the purposes of this assessment, it has been assumed that the effluent limits acceptable to the MECP are equal to the acute SSWQOs for parameters where historical effluent quality exceeds the acute SSWQOs; for parameters where the treated effluent is below the acute SSWQOs, the 95th percentile of the treated effluent quality will be used.
- The LTF will be upgraded to meet the effluent limits and design objectives acceptable to the MECP.
- The approved SSWQOs are provided in Table 1 in Appendix A of **Supporting Document 3-4**.
- As part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek. Consequently, this effects assessment assumed that treated effluent will be conveyed via a pipe for direct discharge to Moose Creek rather than being discharged into the Fraser Drain, at a

location situated approximately 25 m upstream of the confluence between Fraser Drain and Moose Creek. As such, the point of compliance for surface water quality associated with treated effluent discharge is Moose Creek.

- Treated effluent will only be discharged when the conditions in Moose Creek, the receiving waterbody, and the effluent are favourable to meet the chronic SSWQOs (e.g., flow rate, discharge rate, pH, temperature, conductivity, and hardness).
- Treated effluent will continue to be released during batch events.
- The current ECA for the LTF (ECA No. 7899-CBQP6L) allows for the treatment of 833 m^3/day, up to a maximum of 200,000 m^3/year. The landfill expansion alternative methods are estimated to generate approximately 304,000 m^3/year of leachate at the peak prior to landfill closure in Year 19. Planned upgrades are anticipated to increase the capacity of the LTF to 304,000 m^3/year so the projected volume of leachate from the future development can be managed.
- The effluent discharge must either be assimilated into Moose Creek in compliance with the chronic SSWQOs or temporarily stored for later discharge in the event that insufficient assimilation capacity is available in Moose Creek.

For both Alternative Methods 1 and 2, mass balance modelling was undertaken as presented in Appendix A of **Supporting Document 3-4**. The modelling considered daily treated effluent generation rates of 833 m^3 corresponding to the maximum development year (Year 19) of the future development across 40 years of synthesized historical flow records for Moose Creek and monthly 75th percentile receiving environment and 95th percentile treated effluent water quality conditions (or the acute SSWQOs in the case of nitrate and chloride). Chronic SSWQOs for six regulated parameters (nitrate, chloride, boron, ammonia, phenols, and sulphate) were used to define regulatory criteria within Moose Creek, after complete mixing of effluent with creek flows had occurred.

The 95th percentile treated effluent concentrations were compared to acute SSWQOs for the six parameters prior to discharge and mixing within Moose Creek. The 95th percentile concentrations for both chloride and nitrate did not meet the acute SSWQO for any months of the year and were lowered to the acute SSWQO value. This adjustment assumes that there will be upgrades to the LTF to achieve the acute SSWQOs for nitrate and chloride in treated effluent prior to its discharge, if required, combined with an appropriate mixing zone in Moose Creek.

Chronic SSWQOs were used to determine variable permissible daily discharge rates and the estimated daily treated effluent temporary storage requirements according to treated effluent quality, and flows and quality in Moose Creek. Nitrate and ammonia are the most significant of the six regulated parameters in preventing discharges from the LTF, while parameters that limit daily permissible treated effluent discharge rates to Moose Creek below the maximum 50 L/s include chloride, nitrate and ammonia and, to a lesser degree, boron and sulphate. The estimated storage volume requirements and percentage of time requirements are provided in Appendix A of **Supporting Document 3-4**.

Fundamentally, the management of treated effluent associated with the future development is feasible from the perspective of meeting acute SSWQOs within the effluent and chronic SSWQOs within Moose Creek.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-11**.

PREDICTED EFFECTS ON SURFACE WATER QUALITY ON-SITE

The SWM system for Alternative Method 1 consists of one wet pond and an oversized perimeter ditch along the north, east, and west perimeter of the site. Smaller, localized ditches around each stage convey runoff to the oversized perimeter ditch.

The proposed SWM system was evaluated using the PC-SWMM model. The proposed wet pond will have a total volume of 208,060 m^3 and will provide an active storage volume of 166,820 m^3 for extended detention and water quantity control, which includes a permanent pool volume of 41,240 m^3 and an extended detention storage volume of 30,840 m^3 for water quality control. The permanent pool will facilitate the removal of 80% of long-term suspended solids. To account for higher runoff volumes attributed to climate change, an additional berm is to be constructed around the pond perimeter to provide a minimum 0.3 m freeboard. The height of the berm will be confirmed during detailed design based on the design of the pond outlet structure.

There will be an increase in runoff volume and suspended solids to the site outlet; however, on-site SWM facilities will be designed to achieve 80% TSS removal. The wet ponds will require maintenance to permit proper water quality control (i.e., sediment removal). The surface water will meet the MECP monitoring requirements with regard to TSS. No net effects to surface water quality at the site outlet are anticipated since the water will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge.

PREDICTED EFFECTS ON SURFACE WATER QUALITY OFF-SITE

In consideration of existing Surface Water Quality and the results of the mass balance modelling, additional treated effluent that meets the acute SSWQOs and treated effluent discharge that meets the chronic SSWQOs within the receiver are not expected to have adverse impacts to the receiving watercourse (Moose Creek). It is not anticipated that additional mitigation measures will be required for the alternative methods above and beyond implementing the proposed run-off and leachate management controls, subject to agreement from MECP. The surface water and treated effluent monitoring program currently in place should remain, possibly with some additions/enhancements associated with the operational practices.

ECA amendments will be required for the proposed increase in total leachate volume to be treated and managed to achieve compliance with effluent limits acceptable to the MECP for treated effluent and the proposed SWM discharge outlet to the Fraser Drain.

No net effects to off-site Surface Water Quality are anticipated.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-12**.

PREDICTED EFFECTS ON SURFACE WATER QUALITY ON-SITE

The SWM system for Alternative Method 2 consists of one wet pond and oversized ditches running in a northerly direction along the outer perimeter of the site and between

the stages. Smaller, localized ditches around each stage convey runoff to the oversized perimeter ditch.

The proposed SWM system was evaluated using the PC-SWMM model. The proposed wet pond will have a total volume of 191,720 m^3 and will provide an active storage volume of 151,220 m^3 for extended detention and water quantity control, which includes a permanent pool volume of 40,500 m^3 and an extended detention storage volume of 25,160 m^3 for water quality control. The permanent pool will facilitate the removal of 80% of long-term suspended solids. To account for higher runoff volumes attributed to climate change, an additional berm is to be constructed around the pond perimeter to provide a minimum 0.3 m freeboard. The height of the berm will be confirmed during detailed design based on the design of the pond outlet structure.

There will be an increase in runoff volume and suspended solids to the site outlet; however, on-site SWM facilities will be designed to achieve 80% TSS removal. The wet ponds will require maintenance to permit proper water quality control (i.e., sediment removal). The surface water will meet the MECP monitoring requirements with regard to TSS. No net effects to surface water quality at the site outlet are anticipated since the water will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge.

PREDICTED EFFECTS ON SURFACE WATER QUALITY OFF-SITE

In consideration of existing Surface Water Quality and the results of the mass balance modelling, additional treated effluent that meets the acute SSWQOs and treated effluent discharge that meets the chronic SSWQOs within the receiver are not expected to have adverse impacts to the receiving watercourse (Moose Creek). It is not anticipated that additional mitigation measures will be required for the alternative methods above and beyond implementing the proposed run-off and leachate management controls, subject to agreement from MECP. The surface water and treated effluent monitoring program currently in place should remain, possibly with some additions/enhancements associated with the operational practices.

ECA amendments will be required for the proposed increase in total leachate volume to be treated and managed to achieve compliance with effluent limits acceptable to the MECP for treated effluent and the proposed SWM discharge outlet to the Fraser Drain.

No net effects to off-site surface water quality are anticipated.

Table 6-11. Surface Water Quality Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Surface Water Quality	Predicted effects on surface water quality on-site	• The SWM wet pond will have a permanent pool storage volume of 41,230 m³ and extended detention storage volume of 30,840 m³ for water quality control. • On-site surface water quality control facilities will be designed to achieve 80% TSS removal in stormwater runoff prior to discharge.	Increase in runoff volume and suspended solids to the site outlet.	Wet ponds need maintenance to permit proper quality control (i.e., sediment removal). Operational and maintenance requirements for the proposed wet ponds will be specified in the amended ECA that will be issued for the project.	• The surface water will meet the MECP monitoring requirements with regard to TSS (on-site surface water quality control facilities will be designed to achieve 80% TSS removal). • No net effects to surface water quality at the site outlet are anticipated since the stormwater will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge.
	Predicted effects on surface water quality off-site	• Off-site Study Area is influenced by discharge from the LTF and SWM ponds • Additional SWM ponds will be added for the future development to provide stormwater quantity and quality control prior to discharge to the Fraser Drain. • Leachate management system operations are to be modified appropriately for the future development. • Upgrades are planned to the LTF to achieve effluent limits acceptable to the MECP for treated effluent. • Treated effluent will be discharged directly to Moose Creek.	• No adverse effects on off-site surface water quality during treated effluent discharge are anticipated. • Considering that treated effluent concentrations are expected to remain the same during controlled discharge, the future development	• Complete ECA amendment (ECA No. 7899-CBQP6L) for the proposed increase in total leachate volume to be treated and managed to achieve compliance with effluent limits acceptable to the MECP for treated effluent. • Complete ECA amendment (ECA No. 7899-CBQP6L) for the proposed SWM discharge outlet to Fraser Drain. • An ACS and MZ assessment will be undertaken for Moose Creek as part of amended ECA approvals.	Considering treated effluent concentrations in Moose Creek will be limited to the chronic SSWQOs and stormwater quality will meet MECP requirements prior to release to Fraser Drain, no net effects to off-site surface water quality are anticipated.

Table 6-11. Surface Water Quality Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		• Discharge of treated effluent will be managed to meet chronic SSWQOs in Moose Creek (compliance location), combined with a mixing zone if required. • Stormwater quality will meet MECP requirements prior to release to the Fraser Drain.	is not expected to result in substantial changes to off-site surface water quality.	• A detailed leachate management plan will be prepared as part of the ECA amendment application to address the design of the effluent discharge system, operation of temporary storage ponds and effluent assimilation in Moose Creek. • Implement proposed run-off and leachate management controls. • Continue existing monitoring program, possibly with some additions/enhancements. • Discharge from the proposed SWM pond and LTF will follow the requirements of the amended ECA that will be issued for the project.	

Table 6-12. Surface Water Quality Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Surface Water Quality	Predicted effects on surface water quality on-site	• The SWM wet pond will have a permanent pool storage volume of 40,500 m³ and extended detention storage volume of 25,160 m³ for water quality control. • On-site surface water quality control facilities will be designed to achieve 80% TSS removal in stormwater runoff prior to discharge.	Increase in runoff volume and suspended solids to the site outlet.	Wet ponds need maintenance to permit proper quality control (i.e., sediment removal). Operational and maintenance requirements for the proposed wet ponds will be specified in the amended ECA that will be issued for the project.	• The surface water will meet the MECP monitoring requirements with regard to TSS (on-site surface water quality control facilities will be designed to achieve 80% TSS removal). • No net effects to surface water quality at the site outlet are anticipated since the stormwater will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge.
	Predicted effects on surface water quality off-site	• Off-site Study Area is influenced by discharge from the LTF and SWM ponds • Additional SWM ponds will be added for the future development to provide stormwater quantity and quality control prior to discharge to the Fraser Drain. • Leachate management system operations are to be modified appropriately for the future development. • Upgrades are planned to the LTF to achieve effluent limits acceptable to the MECP for treated effluent. • Treated effluent will be discharged directly to Moose Creek.	• No adverse effects on off-site surface water quality during treated effluent discharge are anticipated. • Considering that treated effluent concentrations are expected to remain the same during controlled discharge, the future development	• Complete ECA amendment (ECA No. 7899-CBQP6L) for the proposed increase in total leachate volume to be treated and managed to achieve effluent limits acceptable to the MECP for treated effluent. • Complete ECA amendment (ECA No. 7899-CBQP6L) for the proposed SWM discharge outlet to Fraser Drain. • An ACS and MZ assessment will be undertaken for Moose Creek as part of amended ECA approvals. • A detailed leachate management	Considering treated effluent concentrations in Moose Creek will be limited to the chronic SSWQOs and stormwater quality will meet MECP requirements prior to release to Fraser Drain, no net effects to off-site surface water quality are anticipated.

Table 6-12. Surface Water Quality Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		• Discharge of treated effluent will be managed to meet chronic SSWQOs in Moose Creek (compliance location), combined with a mixing zone if required. • Stormwater quality will meet MECP requirements prior to release to the Fraser Drain.	is not expected to result in substantial changes to off-site surface water quality.	plan will be prepared as part of the ECA amendment application to address the design of the effluent discharge system, operation of temporary storage ponds and effluent assimilation in Moose Creek. • Implement proposed run-off and leachate management controls. • Continue existing monitoring program, possibly with some additions/enhancements. • Discharge from the proposed SWM pond and LTF will follow the requirements of the amended ECA that will be issued for the project.	

Surface Water Quantity

The Surface Water Quantity net effects assessment incorporated information from the Surface Water Quantity Existing Conditions Report (**Supporting Document 1-5**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Surface Water Quantity Effects Assessment Report (**Supporting Document 3-5**).

The study areas for Surface Water Quantity are shown on **Figure 4-7** and a description of the existing conditions is provided in Section 4.3.2.3. Hydraulic modelling predicted that flooding would occur during the 100-year storm event within the future development lands along the north perimeter channel, as well as across the northeast area of the future development lands, where flows overtopped the Upper Tayside Municipal Drain and spilled towards the perimeter channel (**Figure 4-8**). Flooding outside of the future development lands would occur at multiple locations along Fraser Drain, the utility area south-west of the future development lands, and along the ditch on the south side of Laflèche Road between the Fraser and Upper Tayside Municipal drains.

The future development will increase the impervious surface area, peak flows, and volume of surface runoff. To prevent an increase in risk of flooding, a conceptual SWM design was developed that would mitigate potential negative impacts to the existing surface water drainage system. Relevant SWM criteria as identified by the MECP in O.Reg. 232/98 and its related guidance document (MECP, 2012) include:

- Water quality enhancement features (e.g., sedimentation ponds) of non-contaminated stormwater should be designed to temporarily treat/store the runoff volume generated from a 4-hour, 25 mm storm event and will be sized to provide “Enhanced” (Level 1) protection (i.e., 80% long-term suspended solids removal) and meet the SWM design requirements of the MECP Stormwater Management Planning and Design Manual (MECP, 2003).
- Surface water quantity control (i.e., peak flow reduction) measures of non-contaminated stormwater to be designed to temporarily store the runoff volume generated from storm events up to the higher of the 24-hour, 100-year design storm or the prevailing Regional Storm event, and release at or below the existing condition peak flows, such that there is no appreciable change in the potential for flooding and/or erosion in the watercourses receiving surface water discharges.

The following design storms were used to assess the design of the SWM system:

- Environment Canada’s rain gauge station: Ottawa CDA RCS Station (6105978).
- Quantity control design storms: SCS Type II 24-hour rainfall distribution for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year return periods.

To satisfy the quantity requirements, the proposed SWM systems for both alternative methods include a new wet pond in the northwest corner of the future development lands and oversized drainage ditches on the site. The proposed wet pond will discharge into the Fraser Drain just upstream of where the Fraser Drain changes flow direction from north to west. Based on the available topographic information, the bottom elevation of

the Fraser Drain is at approximately 63.7 m, and the 100-year flow depth is approximately 1.5 m. All the runoff from the future development site is proposed to be directed to the Fraser Drain, and accordingly will not generate negative water quantity impacts to the Upper Tayside Municipal Drain.

For stormwater quantity control, the wet pond is designed to temporarily store the runoff volume generated by storm events up to the 24-hour, 100-year design storm and maintain peak flow discharge below existing conditions levels. The storage volume and conveyance capacity of the perimeter ditches will be confirmed during detailed design. Stage-storage tables for the ponds in Alternative Methods 1 and 2 are included in Appendix A of **Supporting Document 3-5**.

There is no difference in the design of Stage 5 within the existing EOWHF site for Alternative Methods 1 and 2. Further analysis will be conducted during detailed design to confirm that sufficient storage can be provided in the perimeter ditches and/or appropriate changes are made to the existing northeast pond, such that there is no increase in peak flows to the Fraser Drain.

The net effect analysis for Alternative Methods 1 and 2 was conducted in consideration of the following:

- The imperviousness of the landfill cells, including the localized perimeter ditches around each stage, were modelled as 95%, since all cells will be closed, capped, and covered, and will not allow for significant infiltration.
- A Manning's number of 0.3 and an impervious depression storage of 5.0 mm was assumed to account for the vegetated cover of the cells.
- For future climate conditions, an additional precipitation scenario was considered with a 14% increase in precipitation volumes in addition to the 24-hour, 100-year design storm volume to account for the increased severity of storm events. This adjustment is based on the MNRF Climate Change Research Report CCRR-44 (MNRF, 2015a). Additional details are included in **Supporting Document 3-5**.

To assess the surface water quantity effects, the PC-SWMM model developed for the existing conditions assessment was advanced to evaluate peak flows and the required storage for the proposed alternative methods to maintain peak discharge flows at or below existing conditions.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-13**.

The SWM system for Alternative Method 1 consists of one wet pond and an oversized perimeter ditch along the north, east, and west perimeter of the site. Smaller, localized ditches around each stage convey runoff to the oversized perimeter ditch.

The proposed SWM system was evaluated using the PC-SWMM model. The proposed wet pond will provide an active storage volume of 166,820 m^3 for extended detention and water quantity control, and a total pond volume of 208,060 m^3. To account for higher runoff volumes attributed to climate change, an additional berm is to be constructed around the pond perimeter to provide a minimum 0.3 m freeboard. The height of the berm will be confirmed during detailed design based on the design of the pond outlet structure.

The active storage volume will attenuate discharge flows from the future development lands under ultimate conditions to levels lower than the pre-development discharge peak flows for storm events up to a 100-year return period, including consideration for climate change. The pond outlet structure will be designed in the detailed design stage to achieve the target peak flow rates.

CHANGE IN DRAINAGE AREAS

The total area that will be draining to the Fraser Drain from the future development is 215 ha. The drainage area to the Fraser Drain downstream of the future development lands will be increased by 33.1 ha due to the catchment area being diverted from the Upper Tayside Municipal Drain to the Fraser Drain. All cells will be closed, capped, and covered which will allow minimal infiltration – this will increase the global imperviousness of the site. Further hydrologic and hydraulic analysis will be conducted during detailed design to confirm that sufficient storage will be provided in the perimeter ditches and the northeast pond.

There is a potential for an increase in runoff volume and the peak flow rate to the site outlet. The detailed design of on-site surface water quantity control storage and conveyance will be appropriately sized to meet the site operational practice. Although there will be an increase in total surface water quantity volume, no net effects are anticipated since peak flows to the site outlet are controlled with the SWM ponds to within the predevelopment conditions values up to a 100-year return period. No additional mitigation is required.

PREDICTED OCCURRENCE AND DEGREE OF OFF-SITE IMPACTS

The proposed wet pond will provide an active storage volume of 166,820 m^3 for extended detention and water quantity control, and the perimeter channel will be capable of conveying a 100-year storm event. There is potential for an increase in runoff volume and the peak flow rate to the site outlet. The detailed design of on-site surface water quantity control storage and conveyance will be appropriately sized to meet the site operational practice. Although there will be an increase in total surface water quantity volume, no net effects are anticipated since peak flows to the site outlet are controlled with the SWM ponds to within the predevelopment conditions values up to a 100-year return period. No additional mitigation is required.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-14**.

The SWM system for Alternative Method 2 consists of one wet pond and oversized ditches running in a northerly direction along the outer perimeter of the site and between the stages. Smaller, localized ditches around each stage convey runoff to the oversized perimeter ditch.

The proposed SWM system was evaluated using the PC-SWMM model. The proposed wet pond will provide an active storage volume of 151,220 m^3 for extended detention and water quantity control, and a total pond volume of 191,720 m^3. To account for higher runoff volumes attributed to climate change, an additional berm is to be constructed around the pond perimeter to provide a minimum 0.3 m freeboard. The height of the

berm will be confirmed during detailed design based on the design of the pond outlet structure.

The active storage volume will attenuate discharge flows from the future development lands under ultimate conditions to levels lower than the pre-development discharge peak flows for storm events up to a 100-year return period, including consideration for climate change. The pond outlet structure will be designed in the detailed design stage to achieve the target peak flow rates.

CHANGE IN DRAINAGE AREAS

The total area that will be draining to the Fraser Drain from the future development is 215 ha. The drainage area to the Fraser Drain downstream of the future development lands will be increased by 33.1 ha due to the catchment area being diverted from the Upper Tayside Municipal Drain to the Fraser Drain. All cells will be closed, capped, and covered which will allow minimal infiltration – this will increase the global imperviousness of the site. Further hydrologic and hydraulic analysis will be conducted during detailed design to confirm that sufficient storage will be provided in the perimeter ditches and the northeast pond.

There is a potential for an increase in runoff volume and the peak flow rate to the site outlet. The detailed design of on-site surface water quantity control storage and conveyance will be appropriately sized to meet the site operational practice. Although there will be an increase in total surface water quantity volume, no net effects are anticipated since peak flows to the site outlet are controlled with the SWM ponds to within the predevelopment conditions values up to a 100-year return period. No additional mitigation is required.

PREDICTED OCCURRENCE AND DEGREE OF OFF-SITE IMPACTS

The proposed wet pond will provide an active storage volume of 151,220 m^3 for extended detention and water quantity control, and the perimeter channel will be capable of conveying a 100-year storm event. There is potential for an increase in runoff volume and the peak flow rate to the site outlet. The detailed design of on-site surface water quantity control storage and conveyance will be appropriately sized to meet the site operational practice. Although there will be an increase in total surface water quantity volume, no net effects are anticipated since peak flows to the site outlet are controlled with the SWM ponds to within the predevelopment conditions values up to a 100-year return period. No additional mitigation is required.

Table 6-13. Surface Water Quantity Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Surface Water Quantity	Change in drainage areas	• Total area that will be draining to the Fraser Drain from the future development is 215 ha. • The drainage area to the Fraser Drain downstream of the future development lands will be increased by 33.1 ha due to the catchment area being diverted from the Upper Tayside Municipal Drain to the Fraser Drain. • All cells will be closed, capped, and covered which will allow minimal infiltration, increasing the global imperviousness of the site. • Sufficient storage will be provided in the perimeter ditches and the northeast pond (to be confirmed during detailed design). • On-site surface water quantity control storage and conveyance will be appropriately designed to meet the site operational practice.	Increase in runoff volume and peak flow rate to the site outlet.	None required.	Increase in total surface water quantity volume, but no net effects since peak flows to the site outlet will be controlled with the SWM ponds within the pre-development conditions values up to a 100-year return period.
	Predicted occurrence and degree of off-site impacts	• Proposed wet pond will provide an active storage volume of 166,820 m³ for extended detention and water quantity control. • Perimeter channel will be capable of conveying a 100-year storm event. • On-site surface water quantity control storage and conveyance will be appropriately sized to meet the site operational practice.	Increase in runoff volume and peak flow rate to the site outlet.	• Stormwater management facilities will be designed in accordance with MECP's Stormwater Management Planning and Design Manual (2003) and O. Reg 232/98. The design of the pond will be submitted to MECP for review and approval prior to incorporation into the amended ECA that will be issued for the project. • Discharge from the proposed SWM pond and LTF will follow the requirements of the amended ECA that will be issued for the project.	Increase in total surface water quantity volume, but no net effects since peak flows to the site outlet will be controlled with the SWM ponds within the pre-development conditions values up to a 100-year return period.

Table 6-14. Surface Water Quantity Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Surface Water Quantity	Change in drainage areas	• Total area that will be draining to the Fraser Drain from the future development is 215 ha. • The drainage area to the Fraser Drain downstream of the future development lands will be increased by 33.1 ha due to the catchment area being diverted from the Upper Tayside Municipal Drain to the Fraser Drain. • All cells will be closed, capped, and covered which will allow minimal infiltration, increasing the global imperviousness of the site. • Sufficient storage will be provided in the perimeter ditches and the northeast pond (to be confirmed during detailed design). • On-site surface water quantity control storage and conveyance will be appropriately designed to meet the site operational practice.	Increase in runoff volume and peak flow rate to the site outlet.	None required.	Increase in total surface water quantity volume, but no net effects since peak flows to the site outlet will be controlled with the SWM ponds within the pre-development conditions values up to a 100-year return period.
	Predicted occurrence and degree of off-site impacts	• Proposed wet pond will provide an active storage volume of 151,220 m^3 for extended detention and water quantity control. • Perimeter channel will be capable of conveying a 100-year storm event. • On-site surface water quantity control storage and conveyance will be appropriately sized to meet the site operational practice.	Increase in runoff volume and peak flow rate to the site outlet.	• Stormwater management facilities will be designed in accordance with MECP's Stormwater Management Planning and Design Manual (2003) and O. Reg 232/98. The design of the pond will be submitted to MECP for review and approval prior to incorporation into the amended ECA that will be issued for the project. • Discharge from the proposed SWM pond and LTF will follow the requirements of the amended ECA that will be issued for the project.	Increase in total surface water quantity volume, but no net effects since peak flows to the site outlet will be controlled with the SWM ponds within the pre-development conditions values up to a 100-year return period.

6.2.1.4 Ecological Environment

The net effects assessment for the Ecological Environment includes terrestrial and aquatic ecosystems. The Ecological Environment net effects assessment incorporated information from the Ecological Environment Existing Conditions Report (**Supporting Document 1-6**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Ecological Environment Effects Assessment Report (**Supporting Document 3-6**).

The study areas for the Ecological Environment are the generic study areas shown on **Figure 4-1** and a description of the existing conditions is provided in Section 4.3.2.4. The On-site Study Area is mostly non-natural (i.e., of anthropogenic nature) and is therefore not suitable habitat for most SAR known to occur or to potentially occur in the area.

To identify the potential effects of the future development on the Ecological Environment, interactions with terrestrial and aquatic ecosystems were examined. Direct effects on ecosystems can include the removal of vegetation or wildlife habitat. Indirect effects on ecosystems can include the introduction of habitat disturbances or changes to surface water.

Terrestrial Ecosystems

The conceptual designs for the two alternative methods provide the same landfill disposal capacity and differ primarily in their geometry and overall footprint. Alternative Method 2 has a footprint that is 5,579 m² larger than that of Alternative Method 1.

For both alternative methods, land preparation, prior to landfill construction would proceed in stages (Stages 5 through 8/9). The development of each stage would involve shallow excavation to approximately 3 m depth and installation of an LCS to form the base of each stage. Both alternative methods include two pads where approved cover material would be placed when brought to the site; this stockpiled material would be used as an approved cover material.

The future development lands are mostly devoid of natural vegetation, and thus both alternative methods would require limited vegetation clearing. Both methods would require the removal of:

- 13.2 ha of organic deciduous thicket swamp (unevaluated wetland) within the Stage 5 area;
- vegetation within the direct development footprint (i.e., not areas outside of the footprint that may be altered during site preparation, construction, and/or operation), with the exception of the entire removal of the thicket swamp in the Stage 5 area.
- sparse tree cover on the Manderley Turf Products property in the southeastern corner of the future development lands;
- the deciduous treed hedgerow along the western edge of the future development lands (i.e., along the Fraser Drain) where crossings would be constructed over the Fraser Drain; and

- the sod fields and agricultural fields within the future development lands.

A visual screening buffer will be constructed around the periphery of the future development lands which will consist of some combination of planted trees or other vegetation and/or a soil berm. Tree cover in Stages 6 through 8/9 is expected to be similar or greater than existing conditions once plantings associated with the visual screening buffer are mature. Construction of the visual screening buffer would require the removal of buildings at the Manderley Turf Products property in the southeastern corner of the future development lands.

No impact to the Moose Creek Wetland is anticipated as both alternative methods are located approximately 1 km from this feature.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-17**.

PREDICTED IMPACT ON VEGETATION COMMUNITIES

Vegetation removal throughout most of the project footprint would be necessary to accommodate site preparation, construction, and operation. The future development lands are mostly devoid of natural vegetation, so Alternative Method 1 would require limited removal of natural vegetation as shown in **Table 6-15**.The natural vegetation removal would be mostly confined to the Stage 5 area (13.2 ha of organic deciduous thicket swamp). Trees that interact with the two crossings over the Fraser Drain would need to be removed (naturalized deciduous hedgerow), along with trees associated with the Manderley Turf Products property. The remaining vegetation removal is mostly associated with non-natural sod fields.

Table 6-15. Vegetation Removal – Alternative Method 1

Ecological Land Classification	Existing Conditions	Vegetation Removal for Alternative Method 1		
	Area (ha)	Area Loss (ha)	Area Remaining (ha)	% Loss
Sod Fields	194.6	184.1	10.5	94.6
Annual Row Crops Ecosite (OAGM1)	38.8	14.1	24.7	36.3
Organic Deciduous Thicket Swamp (SWTO5)	13.2	13.2	0.0	100.0
Agricultural Properties (IAGM1)	3.4	2.2	1.2	64.7
Naturalized Deciduous Hedgerow (FODM11)	2.9	0.1	2.8	3.4
Total	**252.9**	**213.7**	**39.2**	**84.5**

The removal of 13.2 ha of thicket swamp in the Stage 5 area combined with tree removal could result in a loss of ecosystem functions such as biodiversity (e.g., native species), wildlife habitat, landscape aesthetics, flood attenuation, water quality improvement, pollutant removal, erosion control, carbon sequestration and storage, regulation of relative humidity, wind-shielding, shading, reduction of urban heat island effects, and filtration of dust, noise, and light pollution. The removal of the sod fields could remove non-natural wildlife habitat.

Vegetation removal will be limited to areas necessary for construction. Vegetation removal will also be phased, if feasible, to minimize the amount of exposed soil at a given time. Impacts to retained trees will be minimized by:

- erecting construction fence beyond the critical root zone (10x the trunk diameter) to prevent interaction with retained trees and their roots;
- pruning branches to avoid conflict with construction equipment; and
- refraining from attaching signs and other materials to trees.

The natural and native vegetation cover in Stages 6 through 9 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time. The ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5.

No impacts to vegetation communities of Moose Creek Wetland are anticipated.

PREDICTED IMPACT ON WILDLIFE HABITAT

The reach of the Roxborough-Plantagenet Boundary Municipal Drain north of the future development lands qualifies as Significant Wildlife Habitat for Special Concern Species (Snapping Turtle); however, development would not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain.

Watercourses in the study areas likely provide habitat for other turtle species and anurans that are not protected under the ESA, act as travel corridors, and provide turtle foraging (e.g., fish) resources. Construction adjacent to watercourses could interact with anurans and migrating and/or foraging turtles, with risk of these species being harmed or harassed.

The thicket swamp in the Stage 5 area may provide habitat for snake species and anurans not protected under the ESA. Removing the thicket swamp would remove 13.2 ha of potential habitat for these snakes and anurans, as well as for birds and bats.

The sod fields on the future development lands are not Significant Wildlife Habitat; however, they provide staging and stopover habitat for hundreds of Snow Geese and Canadian Geese in the spring and fall. Removing the sod fields would remove 184 ha of staging and stopover habitat for geese and potential foraging habitat for bats, but remaining sod fields in the vicinity would still provide such habitat.

The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide bat roosting habitat, but more ideal roosting habitat exists in Moose Creek Wetland in the Off-site Study Area. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat. Removing trees and buildings associated with the Manderley Turf Products property would remove potential roosting and nesting habitat for bats and birds, respectively.

The future development, including the waste and the SWM pond, could artificially attract wildlife. The stormwater pond would likely provide suitable foraging habitat for bats, birds, and some species of anurans, and could provide overwintering habitat for turtles. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality.

During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. This fence will be inspected regularly, particularly during the active wildlife season to confirm continued functionality. The visual screening buffer may also help deter turtles from accessing the future development.

Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[17] to prevent impacts to birds and bats.

The following standard mitigation measures will also be followed during construction:

- Wildlife will not be harmed, fed, or harassed.
- Waste will be covered daily to limit wildlife attraction to the landfill.
- Vehicles and equipment will be driven slowly and with an awareness for wildlife along access routes.
- Stockpiles and equipment (e.g., pipes) will be managed on the site to prevent wildlife from being attracted to artificial habitat.
- Work areas will be checked for wildlife before commencing work.
- Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development.
- Wildlife artificially attracted to the future development will be managed using current EOWHF practices (e.g., use of raptors to deter gulls) and thus are expected to align with standard and accepted approaches.
- Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).

In conclusion, the wildlife habitat associated with the thicket swamp would be removed (13.2 ha), the artificial wildlife habitat associated with sod fields would be removed (184 ha), but similar habitat would remain in the vicinity, and the potential wildlife habitat associated with trees and buildings on the Manderley Turf Products property would be removed. No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.

PREDICTED IMPACT ON VEGETATION AND WILDLIFE

No regionally rare floral or faunal species were observed within the study areas. Midland Painted Turtle, a provincially significant species, was observed in the Off-site Study Area and has a high potential to interact with the future development. Construction adjacent to

[17] Combining the regional breeding bird window (April 15 through August 31 (Environment and Climate Change Canada, 2018)) with the bat roosting season (April through September (MECP, 2021)).

watercourses could interact with migrating and/or foraging turtles, with risk of these species being harmed or harassed.

Only SAR listed as Threatened or Endangered receive individual and habitat protection under the ESA. SAR listed under the ESA that were observed in the On-site Study Area are: Bank Swallow (Threatened); Barn Swallow (Threatened); and Little Brown Myotis (Endangered).

A Bank Swallow nesting colony was observed directly southwest of the future development lands. The bank where Bank Swallow nests were observed (Category 1 habitat) and 50 m within the face of the bank (Category 2 habitat) would not be directly altered by the future development. Stage 6 of the future development slightly overlaps with protected foraging (Category 3) habitat for Bank Swallow. The Category 3 area is highly disturbed, comprising peat extraction lands, roads, sod fields, and an active landfill. The development within the Stage 6 area is not anticipated to alter the ecological function of this habitat given that open foraging space would be retained, and Category 3 habitat has a high tolerance to alteration (MNRF, 2015b).

Barn Swallow was not observed nesting on the future development lands but is known to nest in the broader area. The Barn Swallow nest observed in the Off-site Study Area is more than 200 m from the future development lands (i.e., Category 3/foraging habitat does not occur on the future development lands). The future development would remove the buildings on the Manderley Turf Products property, which would remove potential nesting habitat for Barn Swallow.

Little Brown Myotis likely forages over the future development lands and is assumed to roost in the vicinity where habitat is highly suitable (i.e., Moose Creek Wetland). The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide bat roosting habitat, but more ideal roosting habitat exists in Moose Creek Wetland in the Off-site Study Area. Foraging habitat within the future development lands would be removed, but similar habitat exists within the vicinity.

SAR listed under the ESA that were observed in the Off-site Study Area are: Snapping Turtle (Special Concern); Eastern Ribbonsnake (Special Concern); Eastern Whip-poor-will (Threatened); Eastern Wood-pewee (Special Concern); and Wood Thrush (Special Concern).

The Snapping Turtle observation was associated with the Roxborough-Plantagenet Boundary Municipal Drain; however, development would not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain.

Eastern Ribbonsnake was observed along an access road south of the EOWHF and the thicket swamp in the Stage 5 area may provide habitat; therefore, removing the thicket swamp would remove potential habitat for Eastern Ribbonsnake.

Observations of Eastern Whip-poor-will, Eastern Wood-pewee, and Wood Thrush were associated with Moose Creek Wetland, and no impacts to the Moose Creek Wetland are anticipated.

The new SWM pond could increase foraging habitat for Little Brown Myotis, Bank Swallow, and Barn Swallow (if nesting/roosting in the vicinity), and could provide overwintering habitat for Snapping Turtle and Midland Painted Turtle. This constructed

habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality.

Mitigation measures to prevent impacts to wildlife habitat have the potential to also minimize impacts to SAR. Mitigation measures will include:

- During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. This fence will be inspected regularly, particularly during the active wildlife season to confirm continued functionality. The visual screening buffer may also help deter turtles from accessing the future development.
- GFL will consult with the MECP to confirm that no additional mitigation, avoidance, or compensation measures are required to eliminate potential impacts to Bank Swallow and its habitat.
- Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[17] to prevent impacts to birds and bats.
- Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development.
- Site workers will be familiar with SAR that have potential to interact with the project. Observations of and interactions with SAR will be reported to GFL for further direction.
- Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for SAR and other wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).

In conclusion, the potential SAR habitat associated with the thicket swamp would be removed (13.2 ha), the potential SAR habitat associated with sod fields would be removed (184 ha), but similar habitat would remain in the vicinity, and the potential SAR habitat associated with trees and buildings on the Manderley Turf Products property would be removed. No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-18**.

PREDICTED IMPACT ON VEGETATION COMMUNITIES

Vegetation removal throughout most of the project footprint would be necessary to accommodate site preparation, construction, and operation. The future development lands are mostly devoid of natural vegetation, so Alternative Method 2 would require limited removal of natural vegetation as shown in **Table 6-18**.The natural vegetation removal would be mostly confined to the Stage 5 area (13.2 ha of organic deciduous thicket swamp). Trees that interact with the two crossings over the Fraser Drain would need to be removed (naturalized deciduous hedgerow), along with trees associated with

the Manderley Turf Products property. The remaining vegetation removal is mostly associated with non-natural sod fields.

Table 6-16. Vegetation Removal – Alternative Method 2

Ecological Land Classification	Existing Conditions	Vegetation Removal for Alternative Method 2		
	Area (ha)	Area Loss (ha)	Area Remaining (ha)	% Loss
Sod Fields	194.6	182.0	12.6	93.5
Annual Row Crops Ecosite (OAGM1)	38.8	13.2	25.5	34.0
Organic Deciduous Thicket Swamp (SWTO5)	13.2	13.2	0.0	100.0
Agricultural Properties (IAGM1)	3.4	0.9	2.5	26.1
Naturalized Deciduous Hedgerow (FODM11)	2.9	0.1	2.8	3.4
Total	**252.9**	**209.4**	**43.5**	**82.8**

The removal of 13.2 ha of thicket swamp in the Stage 5 area combined with tree removal could result in a loss of ecosystem functions such as biodiversity (e.g., native species), wildlife habitat, landscape aesthetics, flood attenuation, water quality improvement, pollutant removal, erosion control, carbon sequestration and storage, regulation of relative humidity, wind-shielding, shading, reduction of urban heat island effects, and filtration of dust, noise, and light pollution. The removal of the sod fields could remove non-natural wildlife habitat.

Vegetation removal will be limited to areas necessary for construction. Vegetation removal will also be phased, if feasible, to minimize the amount of exposed soil at a given time. Impacts to retained trees will be minimized by:

- erecting construction fence beyond the critical root zone (10x the trunk diameter) to prevent interaction with retained trees and their roots;
- pruning branches to avoid conflict with construction equipment; and
- refraining from attaching signs and other materials to trees.

The natural and native vegetation cover in Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time. The ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5.

No impacts to vegetation communities of Moose Creek Wetland are anticipated.

PREDICTED IMPACT ON WILDLIFE HABITAT

The reach of the Roxborough-Plantagenet Boundary Municipal Drain north of the future development lands qualifies as Significant Wildlife Habitat for Special Concern Species (Snapping Turtle); however, development would not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain.

Watercourses in the study areas likely provide habitat for other turtle species and anurans that are not protected under the ESA, act as travel corridors, and provide turtle foraging (e.g., fish) resources. Construction adjacent to watercourses could interact with anurans and migrating and/or foraging turtles, with risk of these species being harmed or harassed.

The thicket swamp in the Stage 5 area may provide habitat for snake species and anurans not protected under the ESA. Removing the thicket swamp would remove 13.2 ha of potential habitat for these snakes and anurans, as well as for birds and bats.

The sod fields on the future development lands are not Significant Wildlife Habitat; however, they provide staging and stopover habitat for hundreds of Snow Geese and Canadian Geese in the spring and fall. Removing the sod fields would remove 182 ha of staging and stopover habitat for geese and potential foraging habitat for bats, but remaining sod fields in the vicinity would still provide such habitat.

The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide bat roosting habitat, but more ideal roosting habitat exists in Moose Creek Wetland in the Off-site Study Area. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat. Removing trees and buildings associated with the Manderley Turf Products property would remove potential roosting and nesting habitat for bats and birds, respectively.

The future development, including the waste and the SWM pond, could artificially attract wildlife. The stormwater pond would likely provide suitable foraging habitat for bats, birds, and some species of anurans, and could provide overwintering habitat for turtles. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality.

During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. This fence will be inspected regularly, particularly during the active wildlife season to confirm continued functionality. The visual screening buffer may also help deter turtles from accessing the future development.

Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[17] to prevent impacts to birds and bats.

The following standard mitigation measures will also be followed during construction:

- Wildlife will not be harmed, fed, or harassed.
- Waste will be covered daily to limit wildlife attraction to the landfill.
- Vehicles and equipment will be driven slowly and with an awareness for wildlife along access routes.
- Stockpiles and equipment (e.g., pipes) will be managed on the site to prevent wildlife from being attracted to artificial habitat.
- Work areas will be checked for wildlife before commencing work.

- Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development.
- Wildlife artificially attracted to the future development will be managed using current EOWHF practices (e.g., use of raptors to deter gulls) and thus are expected to align with standard and accepted approaches.
- Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).

In conclusion, the wildlife habitat associated with the thicket swamp would be removed (13.2 ha), the artificial wildlife habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity, and the potential wildlife habitat associated with trees and buildings on the Manderley Turf Products property would be removed. No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.

PREDICTED IMPACT ON VEGETATION AND WILDLIFE

No regionally rare floral or faunal species were observed within the study areas. Midland Painted Turtle, a provincially significant species, was observed in the Off-site Study Area and has a high potential to interact with the future development. Construction adjacent to watercourses could interact with migrating and/or foraging turtles, with risk of these species being harmed or harassed.

Only SAR listed as Threatened or Endangered receive individual and habitat protection under the ESA. SAR listed under the ESA that were observed in the On-site Study Area are: Bank Swallow (Threatened); Barn Swallow (Threatened); and Little Brown Myotis (Endangered).

A Bank Swallow nesting colony was observed directly southwest of the future development lands. The bank where Bank Swallow nests were observed (Category 1 habitat) and 50 m within the face of the bank (Category 2 habitat) would not be directly altered by the future development. Stage 6 of the future development slightly overlaps with protected foraging (Category 3) habitat for Bank Swallow. The Category 3 area is highly disturbed, comprising peat extraction lands, roads, sod fields, and an active landfill. The development within the Stage 6 area is not anticipated to alter the ecological function of this habitat given that open foraging space would be retained, and Category 3 habitat has a high tolerance to alteration (MNRF, 2015b).

Barn Swallow was not observed nesting on the future development lands but is known to nest in the broader area. The Barn Swallow nest observed in the Off-site Study Area is more than 200 m from the future development lands (i.e., Category 3/foraging habitat does not occur on the future development lands). The future development would remove the buildings on the Manderley Turf Products property, which would remove potential nesting habitat for Barn Swallow.

Little Brown Myotis likely forages over the future development lands and is assumed to roost in the vicinity where habitat is highly suitable (i.e., Moose Creek Wetland). The

thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide bat roosting habitat, but more ideal roosting habitat exists in Moose Creek Wetland in the Off-site Study Area. Foraging habitat within the future development lands would be removed, but similar habitat exists within the vicinity.

SAR listed under the ESA that were observed in the Off-site Study Area are: Snapping Turtle (Special Concern); Eastern Ribbonsnake (Special Concern); Eastern Whip-poor-will (Threatened); Eastern Wood-pewee (Special Concern); and Wood Thrush (Special Concern).

The Snapping Turtle observation was associated with the Roxborough-Plantagenet Boundary Municipal Drain; however, development would not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain.

Eastern Ribbonsnake was observed along an access road south of the EOWHF and the thicket swamp in the Stage 5 area may provide habitat; therefore, removing the thicket swamp would remove potential habitat for Eastern Ribbonsnake.

Observations of Eastern Whip-poor-will, Eastern Wood-pewee, and Wood Thrush were associated with Moose Creek Wetland, and no impacts to the Moose Creek Wetland are anticipated.

The new SWM pond could increase foraging habitat for Little Brown Myotis, Bank Swallow, and Barn Swallow (if nesting/roosting in the vicinity), and could provide overwintering habitat for Snapping Turtle and Midland Painted Turtle. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality.

Mitigation measures to prevent impacts to wildlife habitat have the potential to also minimize impacts to SAR. Mitigation measures will include:

- During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. This fence will be inspected regularly, particularly during the active wildlife season to confirm continued functionality. The visual screening buffer may also help deter turtles from accessing the future development.
- GFL will consult with the MECP to confirm that no additional mitigation, avoidance, or compensation measures are required to eliminate potential impacts to Bank Swallow and its habitat.
- Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[17] to prevent impacts to birds and bats.
- Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development.
- Site workers will be familiar with SAR that have potential to interact with the project. Observations of and interactions with SAR will be reported to GFL for further direction.

- Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for SAR and other wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).

In conclusion, the potential SAR habitat associated with the thicket swamp would be removed (13.2 ha), the potential SAR habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity, and the potential SAR habitat associated with trees and buildings on the Manderley Turf Products property would be removed. No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.

Table 6-17. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Terrestrial Ecosystems	Predicted impact on vegetation communities	• Vegetation removal throughout most of the project footprint would be necessary to accommodate site preparation, construction, and operation.
		• Future development lands are mostly devoid of natural vegetation, so Alternative Method 1 would require limited removal of natural vegetation.
		• Natural vegetation removal would be mostly confined to the Stage 5 area (13.2 ha of organic deciduous thicket swamp). Trees that interact with the two crossings over the Fraser Drain would need to be removed (naturalized deciduous hedgerow), along with trees associated with the Manderley Turf Products property. The remaining vegetation removal is mostly associated with non-natural sod fields.
		• No impacts to vegetation communities of Moose Creek Wetland are anticipated.
			• Removal of 13.2 ha of thicket swamp in the Stage 5 area combined with tree removal could result in a loss of ecosystem functions such as biodiversity (e.g., native species), wildlife habitat, landscape aesthetics, flood attenuation, water quality improvement, pollutant removal, erosion control, carbon sequestration and storage, regulation of relative humidity, wind-shielding, shading, reduction of urban heat island effects, and filtration of dust, noise, and light pollution.
			• Removal of the sod fields could remove non-natural wildlife habitat.
				• Vegetation removal will be limited to areas necessary for construction.
				• Vegetation removal will be phased, if feasible, to minimize the amount of exposed soil at a given time.
				• Impacts to retained trees will be minimized by:
				  • Erecting construction fence beyond the critical root zone (10x the trunk diameter) to prevent interaction with retained trees and their roots.
				  • Pruning branches to avoid conflict with construction equipment.
				  • Refraining from attaching signs and other materials to trees.
					• Natural and native vegetation cover on Stages 6 through 9 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time.
					• Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5.

	Predicted impact on wildlife habitat	• Watercourses in the study areas likely provide habitat for other turtle species and anurans that are not protected under the ESA, act as travel corridors, and provide turtle foraging (e.g., fish) resources. • The thicket swamp in the Stage 5 area may provide habitat for snake species and anurans not protected under the ESA. • The sod fields on the future development lands are not Significant Wildlife Habitat; however, they provide	• Construction adjacent to watercourses could interact with anurans and migrating and/or foraging turtles, with risk of these species being harmed or harassed. • Removing the thicket swamp would remove 13.2 ha of potential habitat for snakes and anurans, as well as for birds and bats. • Removing the sod fields would remove 184 ha of staging and	• During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. • The silt fencing will be inspected regularly, particularly during the active wildlife season to confirm continued	• Wildlife habitat associated with the thicket swamp would be removed (13.2 ha). • Artificial wildlife habitat associated with sod fields would be removed (184 ha), but similar habitat would remain in the vicinity.

Table 6-17. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		staging and stopover habitat for hundreds of Snow Geese and Canadian Geese in the spring and fall. • The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide bat roosting habitat, but more ideal roosting habitat exists in Moose Creek Wetland in the Off-site Study Area. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat. • The future development will not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland are anticipated.	stopover habitat for geese and potential foraging habitat for bats, but remaining sod fields in the vicinity would still provide such habitat. • Removing trees and buildings associated with the Manderley Turf Products property would remove potential roosting and nesting habitat for bats and birds, respectively. • The future development, including the waste and the SWM pond, could artificially attract wildlife. The stormwater pond would likely provide suitable foraging habitat for bats, birds, and some species of anurans, and could provide overwintering habitat for turtles. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.	functionality. • The visual screening buffer may also help deter turtles from accessing the future development. • Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[1] to prevent impacts to birds and bats. • Wildlife will not be harmed, fed, or harassed. • Waste will be covered daily to limit wildlife attraction to the landfill. • Vehicles and equipment will be driven slowly and with an awareness for wildlife along access routes. • Stockpiles and equipment (e.g., pipes) will be managed on the site to prevent wildlife from being attracted to artificial habitat. • Work areas will be checked for wildlife before commencing work. • Established controls for noise, dust, waste management, and other disturbances at the landfill	• Potential wildlife habitat associated with trees and buildings on the Manderley Turf Products property would be removed.

Table 6-17. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
				that are currently in use at the EOWHF will be used for the future development. • Wildlife artificially attracted to the future development will be managed using current EOWHF practices (e.g., use of raptors to deter gulls) and thus are expected to align with standard and accepted approaches. • Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).	
	Predicted impact on vegetation and wildlife including rare, threatened or endangered species	• No regionally rare floral or faunal species were observed within the study areas. • Midland Painted Turtle, a provincially significant species, was observed in the Off-site Study Area and has a high potential to interact with the future development. • SAR listed under the ESA that were observed in the On-site Study Area are: Bank Swallow (Threatened); Barn Swallow (Threatened); and Little Brown Myotis (Endangered). • A Bank Swallow nesting colony was	• Construction adjacent to watercourses could interact with migrating and/or foraging turtles (Snapping Turtle and/or Midland Painted Turtle), with risk of these species being harmed or harassed. • Stage 6 of the future development slightly overlaps with protected foraging (Category 3) habitat for Bank Swallow. The Category 3 area is highly disturbed. Development within the	• During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. • The silt fencing will be inspected regularly, particularly during the active wildlife season to confirm continued functionality.	• Potential SAR habitat associated with the thicket swamp would be removed (13.2 ha). • Potential SAR habitat associated with sod fields would be removed (184 ha), but similar habitat would remain in the vicinity. • Potential SAR

Table 6-17. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		observed directly southwest of the future development lands. Category 1 and Category 2 habitat would not be directly altered by the future development. • Barn Swallow is known to nest in the general area. Category 3 habitat does not occur on the future development lands. • Little Brown Myotis likely forages over the future development lands, but similar habitat exists within the vicinity. • The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide roosting habitat for Little Brown Myotis, but more ideal roosting habitat exists in Moose Creek Wetland. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat. • SAR listed under the ESA that were observed in the Off-site Study Area are: Snapping Turtle (Special Concern); Eastern Ribbonsnake (Special Concern); Eastern Whip-poor-will (Threatened); Eastern Wood-pewee (Special Concern); and Wood Thrush (Special Concern). • Snapping Turtle was observed in association with the Roxborough-Plantagenet Boundary Municipal Drain. • The thicket swamp in the Stage 5 area may provide habitat for Eastern Ribbonsnake. • Observations of Eastern Whip-poor-will, Eastern Wood-pewee, and Wood	Stage 6 area is not anticipated to alter the ecological function of this habitat given that open foraging space would be retained, and Category 3 habitat has a high tolerance to alteration. • Removing the thicket swamp would remove 13.2 ha of potential habitat for Eastern Ribbonsnake and Little Brown Myotis. • The future development would remove the buildings on the Manderley Turf Products property, which would remove potential nesting habitat for Barn Swallow and roosting habitat for Little Brown Myotis. • Removing the sod fields would remove 184 ha of potential foraging habitat for Little Brown Myotis, but remaining sod fields in the vicinity would still provide such habitat. • The new SWM pond could increase foraging habitat for Little Brown Myotis, Bank Swallow, and Barn Swallow (if nesting/roosting in the vicinity), and could provide overwintering habitat for Snapping Turtle and Midland Painted Turtle. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment	• The visual screening buffer may also help deter turtles from accessing the future development. • GFL will consult with the MECP to confirm that no additional mitigation, avoidance, or compensation measures are required to eliminate potential impacts to Bank Swallow and its habitat. • Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[1] to prevent impacts to birds and bats. • Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development. • Site workers will be familiar with SAR that have potential to interact with the project. • Observations of and interactions with SAR will be reported to GFL for	habitat associated with trees and buildings on the Manderley Turf Products property would be removed.

Table 6-17. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		Thrush were associated with Moose Creek Wetland. • The future development will not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland are anticipated.	functionality. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.	further direction. • Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for SAR and other wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).	

[1] Combining the regional breeding bird window (April 15 through August 31) with the bat roosting season (April through September).

Table 6-18. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Terrestrial Ecosystems	Predicted impact on vegetation communities	• Vegetation removal throughout most of the project footprint would be necessary to accommodate site preparation, construction, and operation.
		• Future development lands are mostly devoid of natural vegetation, so Alternative Method 2 would require limited removal of natural vegetation.
		• Natural vegetation removal would be mostly confined to the Stage 5 area (13.2 ha of organic deciduous thicket swamp). Trees that interact with the two crossings over the Fraser Drain would need to be removed (naturalized deciduous hedgerow), along with trees associated with the Manderley Turf Products property. The remaining vegetation removal is mostly associated with non-natural sod fields.
		• No impacts to vegetation communities of Moose Creek Wetland are anticipated.
			• Removal of 13.2 ha of thicket swamp in the Stage 5 area combined with tree removal could result in a loss of ecosystem functions such as biodiversity (e.g., native species), wildlife habitat, landscape aesthetics, flood attenuation, water quality improvement, pollutant removal, erosion control, carbon sequestration and storage, regulation of relative humidity, wind-shielding, shading, reduction of urban heat island effects, and filtration of dust, noise, and light pollution.
			• Removal of the sod fields could remove non-natural wildlife habitat.
				• Vegetation removal will be limited to areas necessary for construction.
				• Vegetation removal will be phased, if feasible, to minimize the amount of exposed soil at a given time.
				• Impacts to retained trees will be minimized by:
				  • Erecting construction fence beyond the critical root zone (10x the trunk diameter) to prevent interaction with retained trees and their roots.
				  • Pruning branches to avoid conflict with construction equipment.
				  • Refraining from attaching signs and other materials to trees.
					• Natural and native vegetation cover on Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time.
					• Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5.

	Predicted impact on wildlife habitat	• Watercourses in the study areas likely provide habitat for other turtle species and anurans that are not protected under the ESA, act as travel corridors, and provide turtle foraging (e.g., fish) resources. • The thicket swamp in the Stage 5 area may provide habitat for snake species and anurans not protected under the ESA. • The sod fields on the future development lands are not Significant Wildlife Habitat; however, they provide staging and stopover habitat for	• Construction adjacent to watercourses could interact with anurans and migrating and/or foraging turtles, with risk of these species being harmed or harassed. • Removing the thicket swamp would remove 13.2 ha of potential habitat for snakes and anurans, as well as for birds and bats. • Removing the sod fields would remove 182 ha of staging and stopover habitat for geese and	• During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. • The silt fencing will be inspected regularly, particularly during the active wildlife season to confirm continued functionality.	• Wildlife habitat associated with the thicket swamp would be removed (13.2 ha). • Artificial wildlife habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity. • Potential wildlife

Table 6-18. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		hundreds of Snow Geese and Canadian Geese in the spring and fall. • The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide bat roosting habitat, but more ideal roosting habitat exists in Moose Creek Wetland in the Off-site Study Area. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat. • The future development will not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland are anticipated.	potential foraging habitat for bats, but remaining sod fields in the vicinity would still provide such habitat. • Removing trees and buildings associated with the Manderley Turf Products property would remove potential roosting and nesting habitat for bats and birds, respectively. • The future development, including the waste and the SWM pond, could artificially attract wildlife. The stormwater pond would likely provide suitable foraging habitat for bats, birds, and some species of anurans, and could provide overwintering habitat for turtles. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.	• The visual screening buffer may also help deter turtles from accessing the future development. • Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[1] to prevent impacts to birds and bats. • Wildlife will not be harmed, fed, or harassed. • Waste will be covered daily to limit wildlife attraction to the landfill. • Vehicles and equipment will be driven slowly and with an awareness for wildlife along access routes. • Stockpiles and equipment (e.g., pipes) will be managed on the site to prevent wildlife from being attracted to artificial habitat. • Work areas will be checked for wildlife before commencing work. • Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at	habitat associated with trees and buildings on the Manderley Turf Products property would be removed.

Table 6-18. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
				the EOWHF will be used for the future development. • Wildlife artificially attracted to the future development will be managed using current EOWHF practices (e.g., use of raptors to deter gulls) and thus are expected to align with standard and accepted approaches. • Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).	
	Predicted impact on vegetation and wildlife including rare, threatened or endangered species	• No regionally rare floral or faunal species were observed within the study areas. • Midland Painted Turtle, a provincially significant species, was observed in the Off-site Study Area and has a high potential to interact with the future development. • SAR listed under the ESA that were observed in the On-site Study Area are: Bank Swallow (Threatened); Barn Swallow (Threatened); and Little Brown Myotis (Endangered). • A Bank Swallow nesting colony was observed directly southwest of the	• Construction adjacent to watercourses could interact with migrating and/or foraging turtles (Snapping Turtle and/or Midland Painted Turtle), with risk of these species being harmed or harassed. • Stage 6 of the future development slightly overlaps with protected foraging (Category 3) habitat for Bank Swallow. The Category 3 area is highly disturbed. Development within the Stage 6 area is not anticipated	• During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. • The silt fencing will be inspected regularly, particularly during the active wildlife season to confirm continued functionality. • The visual screening buffer	• Potential SAR habitat associated with the thicket swamp would be removed (13.2 ha). • Potential SAR habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity. • Potential SAR habitat associated

Table 6-18. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		future development lands. Category 1 and Category 2 habitat would not be directly altered by the future development. • Barn Swallow is known to nest in the general area. Category 3 habitat does not occur on the future development lands. • Little Brown Myotis likely forages over the future development lands, but similar habitat exists within the vicinity. • The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide roosting habitat for Little Brown Myotis, but more ideal roosting habitat exists in Moose Creek Wetland. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat. • SAR listed under the ESA that were observed in the Off-site Study Area are: Snapping Turtle (Special Concern); Eastern Ribbonsnake (Special Concern); Eastern Whip-poor-will (Threatened); Eastern Wood-pewee (Special Concern); and Wood Thrush (Special Concern). • Snapping Turtle was observed in association with the Roxborough-Plantagenet Boundary Municipal Drain. • The thicket swamp in the Stage 5 area may provide habitat for Eastern Ribbonsnake. • Observations of Eastern Whip-poor-will, Eastern Wood-pewee, and Wood Thrush were associated with Moose	to alter the ecological function of this habitat given that open foraging space would be retained, and Category 3 habitat has a high tolerance to alteration. • Removing the thicket swamp would remove 13.2 ha of potential habitat for Eastern Ribbonsnake and Little Brown Myotis. • The future development would remove the buildings on the Manderley Turf Products property, which would remove potential nesting habitat for Barn Swallow and roosting habitat for Little Brown Myotis. • Removing the sod fields would remove 182 ha of potential foraging habitat for Little Brown Myotis, but remaining sod fields in the vicinity would still provide such habitat. • The new SWM pond could increase foraging habitat for Little Brown Myotis, Bank Swallow, and Barn Swallow (if nesting/roosting in the vicinity), and could provide overwintering habitat for Snapping Turtle and Midland Painted Turtle. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality.	may also help deter turtles from accessing the future development. • GFL will consult with the MECP to confirm that no additional mitigation, avoidance, or compensation measures are required to eliminate potential impacts to Bank Swallow and its habitat. • Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[1] to prevent impacts to birds and bats. • Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development. • Site workers will be familiar with SAR that have potential to interact with the project. • Observations of and interactions with SAR will be reported to GFL for further direction.	with trees and buildings on the Manderley Turf Products property would be removed.

Table 6-18. Terrestrial Ecosystems Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		Creek Wetland. • The future development will not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland are anticipated.	• No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.	• Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for SAR and other wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).	

[1] Combining the regional breeding bird window (April 15 through August 31) with the bat roosting season (April through September).

Aquatic Ecosystems

For both alternative methods, an LCS would be installed to collect and transport leachate to the leachate aeration ponds and then to the LTF. Treated effluent is currently discharged to the Fraser Drain from the northwestern portion of the existing EOWHF; however, as part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek. The capacity of the LTF will be expanded to accept leachate generated from the existing landfill as well as the future development. The estimated maximum annual leachate generation for Alternative Methods 1 and 2 is 123,542 m^3 and 123,752 m^3, respectively. The alternative methods and the expanded LTF would operate under provincial approvals.

For both alternative methods, stormwater from closed stages will be directed to a SWM pond in the northern portion of the future development lands for quality and quantity control prior to discharging to the Fraser Drain. The stormwater pond for Alternative Method 2 is 200 m^3 larger than that for Alternative Method 1. The outlet channel into the Fraser Drain will be located on the west side of the pond for both alternative methods. It is assumed that the construction of the outlet channel would require working below the normal high-water mark.

The alternative methods both incorporate two crossings over the Fraser Drain to connect The future development lands to the existing EOWHF. These crossings have the same design for each alternative method and include the installation of culverts.

The future development was designed with setbacks from the various watercourses that are expected to improve aquatic and riparian habitats relative to existing conditions since they will increase the unused area between development and the watercourses and increase natural vegetation cover. The setbacks are the same for each alternative method as follows:

- Northern development limit from Roxborough-Plantagenet Boundary Municipal Drain: ≥ 13 m setback for visual screening buffer.
- Eastern development limit from Upper Tayside Municipal Drain: ≥ 9 m setback for visual screening buffer to ≥ 15 m setback for eastern drainage ditches.
- Western development limit from Fraser Drain: ≥ 8 m setback for western drainage ditches to 30 m setback for SWM pond.

Surface water features on the future development lands either go dry (Roxborough-Plantagenet Boundary Municipal Drain) or are very shallow by mid-summer (Fraser Drain and Upper Tayside Municipal Drain). Only the Fraser Drain and Upper Tayside Municipal Drain provided habitat for fish communities in the summer. The stretches of the Fraser Drain and Upper Tayside Municipal Drain on the future development lands provide mostly cool-warm and warm waters for fish, respectively. Captured fish species, which are typical for the region, are considered primarily to be warm- and cool-water species except for Northern Pearl Dace (captured in the Upper Tayside Municipal Drain), which also prefers cold water streams.

Northern Pike was historically documented in Moose Creek but has not been detected in this watercourse since 1996 and is not known to occur in other watercourses in the study areas. Northern Pike spawning surveys confirmed that most reaches of watercourses

associated with the study areas provide sub-optimal spawning habitat for Northern Pike, with a general absence of flooded vegetation.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-19**.

PREDICTED IMPACT ON AQUATIC HABITAT INCLUDING FISH HABITAT

Treated effluent is currently discharged to the Fraser Drain via pulse events from the northwestern portion of the existing EOWHF; however, as part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek. It is assumed that the LTF would be designed to effectively treat the predicted leachate load following MECP requirements. Based on temperature balance models, thermal contributions of treated effluent from the LTF currently do not pose significant risk to fish species in the Fraser Drain or Moose Creek. Concentrations for regulated effluent parameters (ammonia, boron, chloride, nitrate, phenols) will align with SSWQOs, which will provide satisfactory protection to aquatic biota including fish (**Supporting Document 3-4**). Leachate would be managed and treated under permissions from MECP (as well as South Nation Conservation (SNC) and Fisheries and Oceans Canada (DFO) as may be required), and as such, effluent can be anticipated to have no net deleterious effect on fish habitat in terms of water quality, water quantity, and thermal contributions. Discharge from the LTF will follow requirements of an ECA to be issued for the project by MECP.

The proposed SWM pond would outlet into the Fraser Drain, which is a fish-bearing watercourse. No net off-site effects are predicted related to suspended solids or flow volumes (**Supporting Document 3-5**). Stormwater would be managed and treated under permissions from MECP (as well as SNC and DFO as may be required), and as such, stormwater discharge can be anticipated to have no net deleterious effect on fish habitat in terms of water quality or water quantity. Discharged water from the SWM pond will follow requirements of an ECA to be issued for the project by MECP.

The culvert crossings over the Fraser Drain and the SWM pond outlet to the Fraser Drain would be designed and constructed following requirements of SNC and DFO, and are therefore anticipated to have no net deleterious effect on fish habitat. GFL will consult with MECP, SNC, and DFO to determine information, design, and permit requirements for alterations to watercourses, including mitigation and/or compensation measures. All requirements of a permit from SNC to alter the Fraser Drain shall be followed, along with any DFO requirements. A Request for Review of the proposed alterations to the Fraser Drain will be submitted to DFO for consideration of potential impacts, and to determine whether they would require a *Fisheries Act* Authorization.

To further minimize impacts to aquatic habitat and water quality in the Fraser Drain and other surface water features in the study areas, the construction of the road crossings and the SWM pond outlet channel will incorporate the following mitigation measures:

- In-water work areas will be isolated during construction and may require fish to be relocated from work areas.
- In-water works will be planned such that they respect fish-protection timing windows.

- Riparian vegetation will be maintained to the extent possible between areas of on-land activity and the high-water mark of the drain. Use methods to avoid soil compaction, such as swamp mats or pads.
- Following construction of the crossings and installation of the culverts, fish passage will be maintained. The changing of flows or water levels and obstructing or interfering with the movement and migration of fish will be avoided. Culvert size and position will be based on existing hydrologic conditions.
- The stormwater pond will be discharged in such a way or with design options to avoid channel erosion.
- Consideration will be given to the incorporation of an outlet control structure that could stop discharge into the Fraser Drain if water quality issues are encountered on site.

The proposed setbacks from watercourses on the future development lands are expected to improve aquatic and riparian habitats of these features relative to existing conditions. Current land uses extend to the banks of the watercourses, and the proposed setbacks would increase the buffer between the watercourses and operations on the future development lands.

The planted visual screening buffer along the peripheries of the future development lands is anticipated to enhance aquatic and riparian habitat through an increase in natural vegetation cover (e.g., soil stabilization/erosion control, shading, allochthonous inputs, habitat structure, etc.). Shading can be anticipated to reduce solar insolation and provide channel cooling.

Site preparation and construction could increase erosion and sedimentation, with potential for sediment to be released into surface water features. The potential for sediment to be released into surface water features during site preparation and construction will be mitigated using standard erosion and sediment control measures.

The proposed SWM pond would increase fish habitat on the future development lands. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality. Maintenance works associated with the new SWM pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for minimizing impacts to fish (e.g., removal and relocation of fish under appropriate permits).

PREDICTED IMPACT ON AQUATIC BIOTA

None of the fish species known to occur in the study areas or collected via electrofishing are outside of a known range. No provincially and/or nationally listed (SAR) fish species were observed and no critical habitat for aquatic SAR or sensitive spawning habitat was identified within the study areas.

Mitigation measures to minimize impacts to water quality and fish habitat identified above would also minimize potential impacts to downstream watercourses that support more complex fish communities and other aquatic biota.

No potential effects to aquatic biota are anticipated.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-20**.

PREDICTED IMPACT ON AQUATIC HABITAT INCLUDING FISH HABITAT

Treated effluent is currently discharged to the Fraser Drain via pulse events from the northwestern portion of the existing EOWHF; however, as part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek. It is assumed that the LTF would be designed to effectively treat the predicted leachate load following MECP requirements. Based on temperature balance models, thermal contributions of treated effluent currently do not pose significant risk to fish species in the Fraser Drain or Moose Creek. Concentrations for regulated effluent parameters (ammonia, boron, chloride, nitrate, phenols) will align with SSWQOs, which will provide satisfactory protection to aquatic biota including fish (**Supporting Document 3-4**). Leachate would be managed and treated under permissions from MECP (as well as SNC and DFO as may be required), and as such, effluent can be anticipated to have no net deleterious effect on fish habitat in terms of water quality, water quantity, and thermal contributions. Discharge from the LTF will follow requirements of an ECA to be issued for the project by MECP.

The proposed SWM pond would outlet into the Fraser Drain, which is a fish-bearing watercourse. No net off-site effects are predicted related to suspended solids or flow volumes (**Supporting Document 3-5**). Stormwater would be managed and treated under permissions from MECP (as well as SNC and DFO as may be required), and as such, stormwater discharge can be anticipated to have no net deleterious effect on fish habitat in terms of water quality or water quantity. Discharged water from the SWM pond will follow requirements of an ECA to be issued for the project by MECP.

The culvert crossings over the Fraser Drain and the SWM pond outlet to the Fraser Drain would be designed and constructed following requirements of SNC and DFO, and are therefore anticipated to have no net deleterious effect on fish habitat. GFL will consult with MECP, SNC, and DFO to determine information, design, and permit requirements for alterations to watercourses, including mitigation and/or compensation measures. All requirements of a permit from SNC to alter the Fraser Drain shall be followed, along with any DFO requirements. A Request for Review of the proposed alterations to the Fraser Drain will be submitted to DFO for consideration of potential impacts, and to determine whether they would require a *Fisheries Act* Authorization.

To further minimize impacts to aquatic habitat and water quality in the Fraser Drain and other surface water features in the study areas, the construction of the road crossings and the SWM pond outlet channel will incorporate the following mitigation measures:

- In-water work areas will be isolated during construction and may require fish to be relocated from work areas.
- In-water works will be planned such that they respect fish-protection timing windows.
- Riparian vegetation will be maintained to the extent possible between areas of on-land activity and the high-water mark of the drain. Use methods to avoid soil compaction, such as swamp mats or pads.

- Following construction of the crossings and installation of the culverts, fish passage will be maintained. The changing of flows or water levels and obstructing or interfering with the movement and migration of fish will be avoided. Culvert size and position will be based on existing hydrologic conditions.
- The SWM pond will be discharged in such a way or with design options to avoid channel erosion.
- Consideration will be given to the incorporation of an outlet control structure that could stop discharge into the Fraser Drain if water quality issues are encountered on site.

The proposed setbacks from watercourses on the future development lands are expected to improve aquatic and riparian habitats of these features relative to existing conditions. Current land uses extend to the banks of the watercourses, and the proposed setbacks would increase the buffer between the watercourses and operations on the future development lands.

The planted visual screening buffer along the peripheries of the future development lands is anticipated to enhance aquatic and riparian habitat through an increase in natural vegetation cover (e.g., soil stabilization/erosion control, shading, allochthonous inputs, habitat structure, etc.). Shading can be anticipated to reduce solar insolation and provide channel cooling.

Site preparation and construction could increase erosion and sedimentation, with potential for sediment to be released into surface water features. The potential for sediment to be released into surface water features during site preparation and construction will be mitigated using standard erosion and sediment control measures.

The proposed SWM pond would increase fish habitat on the future development lands. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality. Maintenance works associated with the new SWM pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for minimizing impacts to fish and wildlife.

PREDICTED IMPACT ON AQUATIC BIOTA

None of the fish species known to occur in the study areas or collected via electrofishing are outside of a known range. No provincially and/or nationally listed (SAR) fish species were observed and no critical habitat for aquatic SAR or sensitive spawning habitat was identified within the study areas.

Mitigation measures to minimize impacts to water quality and fish habitat identified above would also minimize potential impacts to downstream watercourses that support more complex fish communities and other aquatic biota.

No potential effects to aquatic biota are anticipated.

Table 6-19. Aquatic Ecosystems Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Aquatic Ecosystems	Predicted impact on aquatic habitat including fish habitat	• The capacity of the LTF will be expanded to accept and treat leachate generated from the existing landfill and the future development following MECP requirements.
		• Estimated maximum leachate generation for Alternative Method 1 is 123,542 m^3.
		• Treated effluent is currently discharged to the Fraser Drain via pulse events from the northwestern portion of the existing EOWHF; however, as part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek.
		• Temperature balance models show that thermal contributions of treated effluent currently do not pose significant risk to fish species in the Fraser Drain or Moose Creek.
		• The proposed SWM pond would outlet into the Fraser Drain, which is a fish-bearing watercourse. It is assumed that the construction of the outlet channel would require working below the normal high-water mark.
		• The proposed development incorporates two culvert crossings over the Fraser Drain.
		• Proposed setbacks from watercourses on the future development lands are:
		  • Northern development limit from Roxborough-Plantagenet Boundary Municipal Drain: ≥ 13 m
			• Concentrations for regulated effluent parameters (ammonia, boron, chloride, nitrate, phenols) will align with SSWQOs, which will provide satisfactory protection to aquatic biota including fish (**Supporting Document 3-4**).
			• No net off-site effects are predicted related to suspended solids or flow volumes (**Supporting Document 3-5**).
			• Stormwater and leachate would be managed and treated under permissions from MECP (as well as SNC and DFO as may be required), and as such, effluent can be anticipated to have no net deleterious effect on fish habitat in terms of water quality, water quantity, and thermal contributions.
			• The culvert crossings over the Fraser Drain and the SWM pond outlet to the Fraser Drain would be designed and constructed following requirements of SNC and DFO are therefore anticipated to have no net deleterious effect on fish habitat.
			• Proposed setbacks from watercourses on the future development lands are expected to improve aquatic and riparian habitats of these features relative to existing conditions. Current land uses extend to the banks of
				• Discharges from the SWM pond and LTF will follow requirements of an ECA to be issued for the project by MECP.
				• GFL will consult with MECP, SNC, and DFO to determine information, design, and permit requirements for alterations to watercourses, including mitigation and/or compensation measures.
				• All requirements of a permit from SNC to alter the Fraser Drain shall be followed, along with any DFO requirements.
				• A Request for Review of the proposed alterations to the Fraser Drain will be submitted to DFO for consideration of potential impacts, and to determine whether they would require a *Fisheries Act* Authorization.
				• To further minimize impacts to aquatic habitat and water quality in the Fraser Drain and other surface water features in the study areas, the construction of road crossings and the SWM pond outlet channel into the drain will incorporate the following mitigation measures:
				  • In-water work areas will be isolated during construction and may require fish to be
					Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings.

Table 6-19. Aquatic Ecosystems Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		setback for visual screening buffer. • Eastern development limit from Upper Tayside Municipal Drain: ≥ 9 m setback for visual screening buffer to ≥ 15 m setback for eastern drainage ditches. • Western development limit from Fraser Drain: ≥ 8 m setback for western drainage ditches to 30 m setback for SWM pond. • Surface water features on the future development lands either go dry or are very shallow by mid-summer. Only the Fraser Drain and Upper Tayside Municipal Drain provided habitat for fish communities in the summer. • The Fraser Drain and Upper Tayside Municipal Drain on the future development lands provide mostly cool-warm and warm waters for fish, respectively. Captured fish species, which are typical for the region, are considered primarily to be warm- and cool-water species except for Northern Pearl Dace which also prefers cold water streams. • Northern Pike was historically documented in Moose Creek but has not been detected in this watercourse since 1996 and is not known to occur in other watercourses in the study areas. Northern Pike spawning surveys confirmed that most reaches of watercourses associated with the study areas provide sub-optimal spawning habitat for Northern Pike,	the watercourses, and the proposed setbacks would increase the buffer between the watercourses and operations on the future development lands. • The planted visual screening buffer along the peripheries of the future development lands is anticipated to enhance aquatic and riparian habitat through an increase in natural vegetation cover (e.g., soil stabilization/ erosion control, shading, allochthonous inputs, habitat structure, etc.). Shading can be anticipated to reduce solar insolation and provide channel cooling. • Site preparation and construction could increase erosion and sedimentation, with potential for sediment to be released into surface water features. • The proposed SWM pond would increase fish habitat on the future development lands. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality.	relocated from work areas. • In-water works will be planned such that they respect fish-protection timing windows. • Riparian vegetation will be maintained to the extent possible between areas of on-land activity and the high-water mark of the drain. Use methods to avoid soil compaction, such as swamp mats or pads. • Following construction of the crossings and installation of the culverts, fish passage will be maintained. The changing of flows or water levels and obstructing or interfering with the movement and migration of fish will be avoided. Culvert size and position will be based on existing hydrologic conditions. • The SWM pond will be discharged in such a way or with design options to avoid channel erosion. • Consideration will be given to the incorporation of an outlet control structure that could stop discharge into the Fraser Drain if water quality issues are encountered on site. • The potential for sediment to	

Table 6-19. Aquatic Ecosystems Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		with a general absence of flooded vegetation.		be released into surface water features during site preparation and construction will be mitigated using standard erosion and sediment control measures. • Maintenance works associated with the new SWM pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for minimizing impacts to fish (e.g., removal and relocation of fish under appropriate permits).	
	Predicted impact on aquatic biota including rare, threatened or endangered species	• None of the fish species known to occur in the study areas or collected via electrofishing are outside of a known range. • No provincially and/or nationally listed (SAR) fish species were observed and no critical habitat for aquatic SAR or sensitive spawning habitat was identified within the study areas.	No potential effects are anticipated.	Mitigation measures to minimize impacts to water quality and fish habitat identified above would also minimize potential impacts to downstream watercourses that support more complex fish communities and other aquatic biota.	No net effects are anticipated.

Table 6-20. Aquatic Ecosystems Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Aquatic Ecosystems	Predicted impact on aquatic habitat including fish habitat	• The capacity of the LTF will be expanded to accept and treat leachate generated from the existing landfill and the future development following MECP requirements.
		• Estimated maximum leachate generation for Alternative Method 2 is 123,752 m^3.
		• Treated effluent is currently discharged to the Fraser Drain via pulse events from the northwestern portion of the existing EOWHF; however, as part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek.
		• Temperature balance models show that thermal contributions of treated effluent currently do not pose significant risk to fish species in the Fraser Drain or Moose Creek.
		• The proposed SWM pond would outlet into the Fraser Drain, which is a fish-bearing watercourse. It is assumed that the construction of the outlet channel would require working below the normal high-water mark.
		• The proposed development incorporates two culvert crossings over the Fraser Drain.
		• Proposed setbacks from watercourses on the future development lands are:
		  • Northern development limit from Roxborough-Plantagenet Boundary Municipal Drain: ≥ 13 m setback for visual screening
			• Concentrations for regulated effluent parameters (ammonia, boron, chloride, nitrate, phenols) will align with SSWQOs, which will provide satisfactory protection to aquatic biota including fish (**Supporting Document 3-4**).
			• No net off-site effects are predicted related to suspended solids or flow volumes (**Supporting Document 3-5**).
			• Stormwater and leachate would be managed and treated under permissions from MECP (as well as SNC and DFO as may be required), and as such, effluent can be anticipated to have no net deleterious effect on fish habitat in terms of water quality, water quantity, and thermal contributions.
			• The culvert crossings over the Fraser Drain and the SWM pond outlet to the Fraser Drain would be designed and constructed following requirements of SNC and DFO are therefore anticipated to have no net deleterious effect on fish habitat.
			• Proposed setbacks from watercourses on the future development lands are expected to improve aquatic and riparian habitats of these features relative to existing conditions. Current land uses extend to the banks of the watercourses, and the
				• Discharges from the SWM pond and LTF will follow requirements of an ECA to be issued for the project by MECP.
				• GFL will consult with MECP, SNC, and DFO to determine information, design, and permit requirements for alterations to watercourses, including mitigation and/or compensation measures.
				• All requirements of a permit from SNC to alter the Fraser Drain shall be followed, along with any DFO requirements.
				• A Request for Review of the proposed alterations to the Fraser Drain will be submitted to DFO for consideration of potential impacts, and to determine whether they would require a *Fisheries Act* Authorization.
				• To further minimize impacts to aquatic habitat and water quality in the Fraser Drain and other surface water features in the study areas, the construction of road crossings and the SWM pond outlet channel into the drain will incorporate the following mitigation measures:
				  • In-water work areas will be isolated during construction and may require fish to be relocated from work areas.
					Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings.

Table 6-20. Aquatic Ecosystems Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		buffer. • Eastern development limit from Upper Tayside Municipal Drain: ≥ 9 m setback for visual screening buffer to ≥ 15 m setback for eastern drainage ditches. • Western development limit from Fraser Drain: ≥ 8 m setback for western drainage ditches to 30 m setback for SWM pond. • Surface water features on the future development lands either go dry or are very shallow by mid-summer. Only the Fraser Drain and Upper Tayside Municipal Drain provided habitat for fish communities in the summer. • The Fraser Drain and Upper Tayside Municipal Drain on the future development lands provide mostly cool-warm and warm waters for fish, respectively. Captured fish species, which are typical for the region, are considered primarily to be warm- and cool-water species except for Northern Pearl Dace which also prefers cold water streams. • Northern Pike was historically documented in Moose Creek but has not been detected in this watercourse since 1996 and is not known to occur in other watercourses in the study areas. Northern Pike spawning surveys confirmed that most reaches of watercourses associated with the study areas provide sub-optimal spawning habitat for Northern Pike,	proposed setbacks would increase the buffer between the watercourses and operations on the future development lands. • The planted visual screening buffer along the peripheries of the future development lands is anticipated to enhance aquatic and riparian habitat through an increase in natural vegetation cover (e.g., soil stabilization/ erosion control, shading, allochthonous inputs, habitat structure, etc.). Shading can be anticipated to reduce solar insolation and provide channel cooling. • Site preparation and construction could increase erosion and sedimentation, with potential for sediment to be released into surface water features. • The proposed SWM pond would increase fish habitat on the future development lands. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality.	• In-water works will be planned such that they respect fish-protection timing windows. • Riparian vegetation will be maintained to the extent possible between areas of on-land activity and the high-water mark of the drain. Use methods to avoid soil compaction, such as swamp mats or pads. • Following construction of the crossings and installation of the culverts, fish passage will be maintained. The changing of flows or water levels and obstructing or interfering with the movement and migration of fish will be avoided. Culvert size and position will be based on existing hydrologic conditions. • The SWM pond will be discharged in such a way or with design options to avoid channel erosion. • Consideration will be given to the incorporation of an outlet control structure that could stop discharge into the Fraser Drain if water quality issues are encountered on site. • The potential for sediment to	

Table 6-20. Aquatic Ecosystems Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		with a general absence of flooded vegetation.		be released into surface water features during site preparation and construction will be mitigated using standard erosion and sediment control measures. • Maintenance works associated with the new SWM pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for minimizing impacts to fish (e.g., removal and relocation of fish under appropriate permits).	
	Predicted impact on aquatic biota including rare, threatened or endangered species	• None of the fish species known to occur in the study areas or collected via electrofishing are outside of a known range. • No provincially and/or nationally listed (SAR) fish species were observed and no critical habitat for aquatic SAR or sensitive spawning habitat was identified within the study areas.	No potential effects are anticipated.	Mitigation measures to minimize impacts to water quality and fish habitat identified above would also minimize potential impacts to downstream watercourses that support more complex fish communities and other aquatic biota.	No net effects are anticipated.

6.2.2 Socio-Economic Environment

The net effects assessment for the Socio-Economic Environment includes the economic environment and the social environment. The Socio-Economic Environment net effects assessment incorporated information from the Socio-Economic Environment Existing Conditions Report (**Supporting Document 1-7**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Socio-Economic Environment Effects Assessment Report (**Supporting Document 3-7**).

6.2.2.1 Economic Environment

The study areas for the Economic Environment are shown on **Figure 4-10**, and the existing conditions are described in Section 4.3.3.1. The Economic Off-site Study Area includes the area within the municipal boundaries of the United Counties of Stormont, Dundas and Glengarry, the City of Cornwall, and the areas within the Municipality of Casselman, Township of Russell, and The Nation Municipality within the United Counties of Prescott and Russell.

Economic Effects on/Benefits to Local Community

Economic effects on or benefits to the local community resulting from a project can occur through employment opportunities (new or continued), displacement of business activities, opportunities for the provision and procurement of products and services, and financial contributions to the local community.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-21**.

EMPLOYMENT AT SITE (NUMBER AND DURATION)

Alternative Method 1 can help sustain a healthy labour force participation rate within North Stormont and surrounding municipalities by continuing to provide job opportunities, both direct and indirect, as the future development will extend the life of the EOWHF's landfill. GFL employs staff from several municipalities surrounding the EOWHF and aims to provide stable long-term employment. Over a third of the EOWHF employees have been employed at the facility for more than 6 years.

Alternative Method 1 is not anticipated to result in any changes to the number of employment positions at the EOWHF; however, the facility is expected to operate for an additional 20 years thereby extending the duration of employment at the site and through procurement from local businesses.

LOCAL BUSINESS EMPLOYMENT

GFL endeavours to utilize local businesses and services in support of its operation to the extent possible. GFL relies on a variety of vendors to maintain its operations at the EOWHF, which contributes to indirect employment at local businesses. Details regarding the procurement of products and/or services is described further below.

Alternative Method 1 is anticipated to have a beneficial effect on local business employment from extended duration of employment at local businesses through procurement for an additional 20 years.

DISPLACEMENT OF BUSINESS ACTIVITIES

The local business located within the On-site Study Area, Manderley Turf Products, leases the majority of the future development lands for the production of sod and turf products and a portion of their operations would be displaced by the future development. The partial displacement of Manderley Turf Products' operations will be phased over time as the stages are developed, and will be mitigated through the continued provision of lands for sod production by agreement. Another portion of the future development lands are leased by the former property owner for a small agricultural operation. Although this agricultural operation will also be displaced, a lease is in place that details the exit arrangements.

OPPORTUNITIES FOR THE PROVISION AND PROCUREMENT OF PRODUCTS AND/OR SERVICES

GFL provides cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario, including over 500 villages, towns, and cities, and produces renewable energy from LFG through its LFGTE plant. Alternative Method 1 will result in the beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario and energy via the LFGTE plant for an additional 20 years.

GFL contributes up to approximately $15 million annually to the local economy through the procurement of local goods and services including utilities, stone and sand aggregate materials, machinery and parts, labour, and consulting and lab services. GFL procures products and services from the following local businesses within 1 km of the EOWHF (i.e., within the Social Off-site Study Area): Calco Soils; GFL Environmental Inc. Soil Remediation Facility; Moose Creek Tire Recycling; and AL Blair Construction Ltd. Alternative Method 1 will result in a beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services over the 20-year life of the future development.

FINANCIAL CONTRIBUTIONS TO THE LOCAL COMMUNITY

GFL supports a number of community initiatives and participates in several programs and committees in the local area and supports the Township of North Stormont through a host community agreement and payment of municipal taxes.

A new 20-year Host Community Agreement was negotiated between GFL and the Township of North Stormont to take effect in 2022. Under the new Agreement, GFL will continue to provide an annual financial contribution to the Township and will also make direct financial contributions in the form of public donations as follows:

- $25,000 donation to the Iroquois Cenotaph project in 2022;
- $500,000 donation to the Moose Creek Recreation Facility in 2022;
- $500,000 donation to the Moose Creek Recreation Facility in 2023;

- $130,000 for a fire rescue van for the Finch Fire Station in 2024; and
- $130,000 for a fire rescue van for the Crysler Fire Station in 2024.

Alternative Method 1 will allow GFL to continue annual financial contributions to the Township of North Stormont and to the local community through public donations.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-22**.

EMPLOYMENT AT SITE (NUMBER AND DURATION)

Alternative Method 2 can help sustain a healthy labour force participation rate within North Stormont and surrounding municipalities by continuing to provide job opportunities, both direct and indirect, as the future development will extend the life of the EOWHF's landfill. GFL employs staff from several municipalities surrounding the EOWHF and aims to provide stable long-term employment. Over a third of the EOWHF employees have been employed at the facility for more than 6 years.

Alternative Method 2 is not anticipated to result in any changes to the number of employment positions at the EOWHF; however, the facility is expected to operate for an additional 20 years thereby extending the duration of employment at the site and through procurement from local businesses.

LOCAL BUSINESS EMPLOYMENT

GFL endeavours to utilize local businesses and services in support of its operation to the extent possible. GFL relies on a variety of vendors to maintain its operations at the EOWHF, which contributes to indirect employment at local businesses. Details regarding the procurement of products and/or services is described further below.

Alternative Method 2 is anticipated to have a beneficial effect on local business employment from extended duration of employment at local businesses through procurement for an additional 20 years.

DISPLACEMENT OF BUSINESS ACTIVITIES

The local business located within the On-site Study Area, Manderley Turf Products, leases the majority of the future development lands for the production of sod and turf products and a portion of their operations would be displaced by the future development. The partial displacement of Manderley Turf Products' operations will be phased over time as the stages are developed, and will be mitigated through the continued provision of lands for sod production by agreement. Another portion of the future development lands are leased by the former property owner for a small agricultural operation. Although this agricultural operation will also be displaced, a lease is in place that details the exit arrangements.

OPPORTUNITIES FOR THE PROVISION AND PROCUREMENT OF PRODUCTS AND/OR SERVICES

GFL provides cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario, including over 500 villages, towns, and cities, and produces renewable energy from LFG through its LFGTE plant.

Alternative Method 2 will result in the beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario and energy via the LFGTE plant for an additional 20 years.

GFL contributes up to approximately $15 million annually to the local economy through the procurement of local goods and services including utilities, stone and sand aggregate materials, machinery and parts, labour, and consulting and lab services. GFL procures products and services from the following local businesses within 1 km of the EOWHF (i.e., within the Social Off-site Study Area): Calco Soils; GFL Environmental Inc. Soil Remediation Facility; Moose Creek Tire Recycling; and AL Blair Construction Ltd. Alternative Method 2 will result in a beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services over the 20-year life of the future development.

FINANCIAL CONTRIBUTIONS TO THE LOCAL COMMUNITY

GFL supports a number of community initiatives and participates in several programs and committees in the local area and supports the Township of North Stormont through a host community agreement and payment of municipal taxes.

A new 20-year Host Community Agreement was negotiated between GFL and the Township of North Stormont to take effect in 2022. Under the new Agreement, GFL will continue to provide an annual financial contribution to the Township and will also make direct financial contributions in the form of public donations as follows:

- $25,000 donation to the Iroquois Cenotaph project in 2022;
- $500,000 donation to the Moose Creek Recreation Facility in 2022;
- $500,000 donation to the Moose Creek Recreation Facility in 2023;
- $130,000 for a fire rescue van for the Finch Fire Station in 2024; and
- $130,000 for a fire rescue van for the Crysler Fire Station in 2024.

Alternative Method 2 will allow GFL to continue annual financial contributions to the Township of North Stormont and to the local community through public donations.

Table 6-21. Economic Environment Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Economic					
Economic effects on/benefits to local community	Employment at site (number and duration)	• No anticipated changes to the number of employment positions at the EOWHF as a result of the future development. • The site is expected to operate for an additional 20 years.	Beneficial effect from extended duration of employment at site for an additional 20 years.	None required	Beneficial effect from extended duration of employment at site for an additional 20 years.
	Local business employment	• GFL relies on a variety of vendors to maintain its operations at the EOWHF, which contributes to indirect employment at local businesses. • The site is expected to operate for an additional 20 years.	Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years.	None required	Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years.
	Displacement of business activities	• The future development lands are currently leased for agricultural operations and sod and turf production. • A lease is in place with the agricultural operator detailing the exit arrangements.	The future development would partially displace the operations of one local business (Manderley Turf Products) who lease land from GFL and a small agricultural operation.	• The displacement will be phased as the stages are developed. • GFL will continue to provide lands to Manderley Turf Products by agreement.	• Partial relocation of Manderley Turf Products. • Displacement of a small agricultural operation.
	Opportunities for the provision and procurement of products and/or services	• GFL provides cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario, including over 500 villages, towns, and cities. • GFL contributes up to approximately $15 million annually to the local economy through the procurement of local goods and services. • The site is expected to operate for an additional 20 years.	• Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario and energy via the LFGTE plant for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services.	None required	• Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario and energy via the LFGTE plant for an additional 20 years. • Beneficial effect from

Table 6-21. Economic Environment Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
					as much as $300 million contributed to the local economy through the procurement of local goods and services.
	Financial contributions to the local community	• GFL supports a number of community initiatives and participates in several programs and committees in the local area. • A new 20-year Host Community Agreement was negotiated between GFL and the Township of North Stormont to take effect in 2022.	• Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations.	None required	• Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations.

Table 6-22. Economic Environment Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Economic					
Economic effects on/benefits to local community	Employment at site (number and duration)	• No anticipated changes to the number of employment positions at the EOWHF as a result of the future development. • The site is expected to operate for an additional 20 years.	Beneficial effect from extended duration of employment at site for an additional 20 years.	None required	Beneficial effect from extended duration of employment at site for an additional 20 years.
	Local business employment	• GFL relies on a variety of vendors to maintain its operations at the EOWHF, which contributes to indirect employment at local businesses. • The site is expected to operate for an additional 20 years.	Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years.	None required	Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years.
	Displacement of business activities	• The future development lands are currently leased for agricultural operations and sod and turf production. • A lease is in place with the agricultural operator detailing the exit arrangements.	The future development would partially displace the operations of one local business (Manderley Turf Products) who lease land from GFL and a small agricultural operation.	• The displacement will be phased as the stages are developed. • GFL will continue to provide lands to Manderley Turf Products by agreement.	• Partial relocation of Manderley Turf Products. • Displacement of a small agricultural operation.
	Opportunities for the provision and procurement of products and/or services	• GFL provides cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario, including over 500 villages, towns, and cities. • GFL contributes up to approximately $15 million annually to the local economy through the procurement of local goods and services. • The site is expected to operate for an additional 20 years.	• Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario and energy via the LFGTE plant for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods	None required	• Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario and energy via the LFGTE plant for an additional 20 years.

Table 6-22. Economic Environment Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
			and services.		• Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services.
	Financial contributions to the local community	• GFL supports a number of community initiatives and participates in several programs and committees in the local area. • A new 20-year Host Community Agreement was negotiated between GFL and the Township of North Stormont to take effect in 2022.	• Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations.	None required	• Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations.

6.2.2.2 Social Environment

The study areas for the Social Environment are the generic study areas shown on **Figure 4-1** and existing conditions are described in Section 4.3.3.2. Socio-Economic receptor locations are provided on **Figure 4-11**.

A project can have an effect on the local community through effects on residents or businesses, or predicted changes to use of property, and/or a visual impact through changes in perceptions of landscapes and views.

Effects on Local Community

Waste disposal facilities can potentially affect local residents and businesses in the vicinity of the site. Population can increase or decrease as a result of changes to employment. Residents and their use of property can be affected through disturbance from noise, dust, odour, litter, and vectors and vermin. GFL employs a variety of proactive measures to minimize nuisance effects related to these disturbances as outlined in Section 5.3.8.6.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-23**.

NUMBER OF RESIDENTS

There are six existing residences within the Social Off-site Study Area; however, GFL has acquired the residence located directly east of the EOWHF future development lands (1397 Highway 138, shown as a yellow dot on **Figure 4-11**), which was vacated in Summer 2022 and will be demolished. No new residential developments are planned within the Social Off-site Study Area.

Alternative Method 1 is not anticipated to result in any changes to the number of employment positions at the EOWHF; consequently, no changes to population are anticipated within the Social Off-site Study Area as a result of employment for the EOWHF future development.

NUMBER AND TYPE OF LOCAL BUSINESSES

The operations of one local business, Manderley Turf Products, will be displaced by the future development; however, this displacement will be phased over time as the stages are developed, and will be mitigated through the continued provision of lands for sod production. At this time, the location of these additional lands has not been identified. Manderley Turf Products owns lands on the south side of Laflèche Road that are used for sod production, so it is assumed that the future development will result in the partial displacement of one local business and its business type (sod production) from the On-site Study Area.

The effect of the future development on the local economy through procurement of products and/or services from local businesses is described in Section 6.2.2.1. Alternative Method 1 will allow for the continued procurement of products and services for an additional 20 years.

PREDICTED CHANGES TO USE OF PROPERTY

As previously noted, residents and their use of property can be affected through disturbance from noise, dust, odour, litter, and vectors and vermin.

Noise

From 2015 through 2021, no complaints were received related to noise. The site's operating hours will remain unchanged and no additional large equipment will be required for either alternative method. The measures to minimize nuisance effects from noise will continue for the future development.

The Noise Effects Assessment Report (**Supporting Document 3-2**) indicated that there will be a minor increase in noise as a result of the future development; however, the noise level will be below the MECP's sound level limits at the closest residences. Consequently, noise from Alternative Method 1 is not anticipated to have an effect on residents and their use of property.

Dust

From 2015 through 2021, no complaints were received related to dust. The measures to minimize nuisance effects from dust will continue for the future development.

The construction and operation of Alternative Method 1 will generate releases of fugitive dust, mainly associated with road dust from on-site haul roads. The modelling results in the Air Quality and Odour Effects Assessment Report (**Supporting Document 3-1**) indicated that the concentration of SPM (i.e., dust) exceeded the relevant standard by 88% at the site boundary, but fell below the standard within 350 m. Concentrations at the sensitive receptors (i.e., residences) are not expected to exceed the relevant standard. Consequently, dust from Alternative Method 1 is not anticipated to have an effect on residents and their use of property.

Odour

There are a number of existing potential sources of odour in and around the Social Off-site Study Area which have the potential to generate odour emissions under adverse circumstances. From 2015 through 2021, there were 18 complaints received related to odour. All of the odour complaints except for one were made prior to 2019.

The Air Quality and Odour Effects Assessment Report (**Supporting Document 3-1**) concluded that Alternative Method 1 could result in a small increase in off-site odour concentrations relative to existing conditions (maximum 1.64 OU/m^3 vs. 1.47 OU/m^3, a 12% increase, at the most impacted receptor), which is predicted to occur 1.1% of the time (474 10-minute exceedances over 5 years). Odour is non-linear and is based on a logarithmic scale; therefore, anything less than a factor of 2 is generally not noticeable, and a 12% increase would be imperceptible. In addition, the maximum odour values tend to occur during calm meteorological periods with low winds, which typically occur during nighttime hours.

GFL employs a variety of proactive measures to minimize nuisance effects related to odour, which are expected to continue as part of the future development to mitigate the potential odorous emissions from on-site operations. GFL will continue to provide prompt

attention to nuisance complaints to mitigate any adverse effects to the surrounding community.

Although Alternative Method 1 could result in a minor increase in odour concentrations at off-site receptors, the increase would be imperceptible and unlikely to result in a change in use of property.

Litter

The measures to minimize nuisance effects from litter are expected to continue throughout the operation of the future development. The working face of the landfill will continue to be minimized to reduce litter generation, and daily waste cover and litter fencing will be used.

From 2015 through 2021, only one complaint was received related to litter. GFL will continue to provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.

It is anticipated that Alternative Method 1 will have no effect on residents and their use of property from litter.

Vectors and Vermin

The existing control measures for vectors and vermin are expected to continue throughout the operation of the future development. The working face of the landfill will continue to be minimized to reduce the presence of vectors and vermin.

From 2015 through 2021, only one complaint was received related to birds. GFL will continue to provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.

It is anticipated that Alternative Method 1 will have no effect on residents and their use of property from vectors and vermin.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-24**.

NUMBER OF RESIDENTS

There are six existing residences within the Social Off-site Study Area; however, GFL has acquired the residence located directly east of the EOWHF future development lands (1397 Highway 138), which was vacated in Summer 2022 and will be demolished. No new residential developments are planned within the Social Off-site Study Area.

Alternative Method 2 is not anticipated to result in any changes to the number of employment positions at the EOWHF; consequently, no changes to population are anticipated within the Social Off-site Study Area as a result of employment for the EOWHF future development.

NUMBER AND TYPE OF LOCAL BUSINESSES

The operations of one local business, Manderley Turf Products, will be displaced by the future development; however, this displacement will be phased over time as the stages are developed, and will be mitigated through the continued provision of lands for sod

production. At this time, the location of these additional lands has not been identified. Manderley Turf Products owns lands on the south side of Laflèche Road that are used for sod production, so it is assumed that the future development will result in the partial displacement of one local business and its business type (sod production) from the On-site Study Area.

The effect of the future development on the local economy through procurement of products and/or services from local businesses is described in Section 6.2.2.1. Alternative Method 2 will allow for the continued procurement of products and services for an additional 20 years.

PREDICTED CHANGES TO USE OF PROPERTY

As previously noted, residents and their use of property can be affected through disturbance from noise, dust, odour, litter, and vectors and vermin.

Noise

From 2015 through 2021, no complaints were received related to noise. The site's operating hours will remain unchanged and no additional large equipment will be required for either alternative method. The measures to minimize nuisance effects from noise will continue for the future development.

The Noise Effects Assessment Report (**Supporting Document 3-2**) indicated that there will be a minor increase in noise as a result of the future development; however, the noise level will be below the MECP's sound level limits at the closest residences. Consequently, noise from Alternative Method 2 is not anticipated to have an effect on residents and their use of property.

Dust

From 2015 through 2021, no complaints were received related to dust. The measures to minimize nuisance effects from dust will continue for the future development.

The construction and operation of Alternative Method 2 will generate releases of fugitive dust, mainly associated with road dust from on-site haul roads. The modelling results in the Air Quality and Odour Effects Assessment Report (**Supporting Document 3-1**) indicated that the concentration of SPM (i.e., dust) exceeded the relevant standard by 56% at the site boundary, but fell below the standard within 150 m. Concentrations at the sensitive receptors (i.e., residences) are not expected to exceed the relevant standard. Consequently, dust from Alternative Method 2 is not anticipated to have an effect on residents and their use of property.

Odour

There are a number of existing potential sources of odour in and around the Social Off-site Study Area which have the potential to generate odour emissions under adverse circumstances. From 2015 through 2021, there were 18 complaints received related to odour. All of the odour complaints except for one were made prior to 2019.

The Air Quality and Odour Effects Assessment Report (**Supporting Document 3-1**) concluded that Alternative Method 2 could result in a small increase in off-site odour concentrations relative to existing conditions (maximum 1.85 OU/m^3 vs. 1.47 OU/m^3, a

26% increase, at the most impacted receptor), which is predicted to occur 1.5% of the time (638 10-minute exceedances over 5 years). Odour is non-linear and is based on a logarithmic scale; therefore, anything less than a factor of 2 is generally not noticeable, and a 26% increase would be imperceptible. In addition, the maximum odour values tend to occur during calm meteorological periods with low winds, which typically occur during nighttime hours.

GFL employs a variety of proactive measures to minimize nuisance effects related to odour, which are expected to continue as part of the future development to mitigate the potential odorous emissions from on-site operations. GFL will continue to provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.

Although Alternative Method 2 could result in a minor increase in odour concentrations at off-site receptors, the increase would be imperceptible and unlikely to result in a change in use of property.

Litter

The measures to minimize nuisance effects from litter are expected to continue throughout the operation of the future development. The working face of the landfill will continue to be minimized to reduce litter generation, and daily waste cover and litter fencing will be used.

From 2015 through 2021, only one complaint was received related to litter. GFL will continue to provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.

It is anticipated that Alternative Method 2 will have no effect on residents and their use of property from litter.

Vectors and Vermin

The existing control measures for vectors and vermin are expected to continue throughout the operation of the future development. The working face of the landfill will continue to be minimized to reduce the presence of vectors and vermin.

From 2015 through 2021, only one complaint was received related to birds. GFL will continue to provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.

It is anticipated that Alternative Method 2 will have no effect on residents and their use of property from vectors and vermin.

Visual Impact of Facility

Residents and their use of property can be affected through changes to the visual landscape. The contours of the waste disposal facility may affect the visual character of the landscape.

The EOWHF is situated on land that is relatively flat, surrounded by agricultural lands. The existing EOWHF landfill has a low profile, which makes it difficult to see, particularly

from the south, east, and west viewpoints. The overall height of the existing landfill is approximately 15 m, or 80 masl.

There are currently no tree plantings or berms along Highway 417 or Highway 138 to obstruct the views of the future development lands; therefore, the views of the future development could potentially be obtrusive particularly from the eastern properties and Highway 138. Residences along Allaire Road are surrounded by woodlots and tree plantings which obstruct the view of the future development lands.

As part of the characterization of existing conditions, photos were taken of the EOWHF and future development lands from various locations within the Social Off-site Study Area. For each photo location, a visual representation of the future development was created from the appropriate perspective based on the conceptual design, which was then incorporated into the photo taken from that location. The future development was rendered as it would be at closure, with all stages fully developed and final cover in place, as this represents the maximum visual impact. For visual screening purposes, it was assumed that the visual screening would be provided solely by vegetation (i.e., trees) to simplify the modelling.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-23**.

PREDICTED CHANGES IN PERCEPTIONS OF LANDSCAPES AND VIEWS

Alternative Method 1 comprises five stages with the following maximum elevations:

- Stage 5 – 78.5 masl;
- Stages 6 through 8 – 81 masl; and
- Stage 9 – 77.5 masl.

The visual modelling determined that views of Alternative Method 1 would be almost if not completely obstructed from the closest residences that are expected to exist at the time of construction; therefore, it would not affect residents and their use of property from changes to the visual landscape. Alternative Method 1 will result in a change to the landscape; however, it will be of similar height to the existing EOWHF landfill and visual screening will be provided to obstruct the view from transient locations (i.e., roadways) in the form of earthen berms and/or vegetation plantings. The visual screening should be at least 2.4 m (8 feet) high on the northern, eastern, and southern perimeters, and at least 4.5 m (16 feet) high in the northeastern corner of the perimeter to mitigate visual impacts. With the visual screening in place, Alternative Method 1 is not expected to change the visual character of the landscape.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-24**.

PREDICTED CHANGES IN PERCEPTIONS OF LANDSCAPES AND VIEWS

Alternative Method 2 comprises four stages with the following maximum elevations:

- Stage 5 – 78.5 masl; and
- Stages 6 through 8 – 81 masl.

The visual modelling determined that views of Alternative Method 2 would be almost if not completely obstructed from the closest residences that are expected to exist at the time of construction; therefore, it would not affect residents and their use of property from changes to the visual landscape. Alternative Method 2 will result in a change to the landscape; however, it will be of similar height to the existing EOWHF landfill and visual screening will be provided to obstruct the view from transient locations (i.e., roadways) in the form of earthen berms and/or vegetation plantings. The visual screening should be at least 2.4 m (8 feet) high on the northern, eastern, and southern perimeters, and at least 4.5 m (16 feet) high in the northeastern corner of the perimeter to mitigate visual impacts. With the visual screening in place, Alternative Method 2 is not expected to change the visual character of the landscape.

Table 6-23. Social Environment Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Social					
Effects on local community	Number of residents	• There are six existing residences within the Social Off-site Study Area; however, GFL has acquired the residence located directly east of the EOWHF future development lands (1397 Highway 138), which was vacated in Summer 2022 and will be demolished. • No new residential developments are planned within the Social Off-site Study Area.	No potential effect to number of residents.	None required.	No net effects to number of residents.
	Number and type of local businesses	• There are 14 businesses located within the Study Areas; one within the On-site Study Area, and 13 within the Social Off-site Study Area. • The future development lands are currently leased for agricultural operations and sod and turf production.	• The future development would partially displace the operations of one local business (Manderley Turf Products). • A small agricultural operation would be displaced; however, agricultural businesses would continue in the area.	GFL will continue to provide lands to Manderley Turf Products by agreement.	Possible decrease of one local sod production business due to the relocation of Manderley Turf Products.
	Predicted changes to use of property	• Residents and their use of property can be affected through disturbance from noise, dust, odour, litter, vectors and vermin, and changes to the visual landscape. • GFL employs a variety of proactive measures to minimize nuisance effects related to noise, dust, odour, litter, and vectors and vermin as outlined in Section 5.3.8.6. • The site's operating hours will remain unchanged and no additional large equipment will be required. • GFL will continue to provide prompt attention to nuisance complaints to mitigate any adverse effects to the	• No potential effect on residents and their use of property from noise. Noise level will be below the MECP's sound level limits at the closest residences. • No potential effect on residents and their use of property from dust. Concentrations at the sensitive receptors (i.e., residences) are not expected to exceed the relevant standard. • Alternative Method 1 could result in a minor increase in off-site odour concentrations; however, the increase from existing conditions would be imperceptible and unlikely to result in	GFL will continue to implement the odour control measures outlined in Section 5.3.8.6, and provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.	No net effects on residents and their use of property.

Table 6-23. Social Environment Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		surrounding community. • The future development will be of similar height to the existing EOWHF landfill.	a change in use of property. • No potential effect on residents and their use of property from litter or vectors and vermin. • Alternative Method 1 would be almost if not completely obstructed by existing vegetation from the closest residences that are expected to exist at the time of construction; therefore, it would not affect residents and their use of property from changes to the visual landscape.		
Visual Impact of Facility	Predicted changes in perceptions of landscapes and views	• The future development will be of similar height to the existing EOWHF landfill (approximately 15 m in height or 80 masl). • Visual screening will be constructed along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings.	• Views of Alternative Method 1 would be almost if not completely obstructed from the closest residences that are expected to exist at the time of construction; therefore, it would not affect residents and their use of property from changes to the visual landscape. • Alternative Method 1 will result in a change to the landscape; however, it will be of similar height to the existing EOWHF landfill and visual screening will be provided to obstruct the view from transient locations (i.e., roadways) in the form of earthen berms and/or vegetation plantings.	The visual screening should be at least 2.4 m (8 feet) high on the northern, eastern, and southern perimeters, and at least 4.5 m (16 feet) high in the northeastern corner of the perimeter to mitigate visual impacts.	With the visual screening in place, Alternative Method 1 is not expected to change the visual character of the landscape.

Table 6-24. Social Environment Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Social					
Effects on local community	Number of residents	• There are six existing residences within the Social Off-site Study Area; however, GFL has acquired the residence located directly east of the EOWHF future development lands (1397 Highway 138), which was vacated in Summer 2022 and will be demolished. • No new residential developments are planned within the Social Off-site Study Area.	No potential effect to number of residents.	None required	No net effects to number of residents.
	Number and type of local businesses	• There are 14 businesses located within the Study Areas; one within the On-site Study Area, and 13 within the Social Off-site Study Area. • The future development lands are currently leased for agricultural operations and sod and turf production.	• The future development would partially displace the operations of one local business (Manderley Turf Products). • A small agricultural operation would be displaced; however, agricultural businesses would continue in the area.	GFL will continue to provide lands to Manderley Turf Products by agreement.	Possible decrease of one local sod production business due to the relocation of Manderley Turf Products.
	Predicted changes to use of property	• Residents and their use of property can be affected through disturbance from noise, dust, odour, litter, vectors and vermin, and changes to the visual landscape. • GFL employs a variety of proactive measures to minimize nuisance effects related to noise, dust, odour, litter, and vectors and vermin as outlined in Section 5.3.8.6. • The site's operating hours will remain unchanged and no additional large equipment will be required. • GFL will continue to provide prompt attention to nuisance complaints to mitigate any adverse effects to the	• No potential effect on residents and their use of property from noise. Noise level will be below the MECP's sound level limits at the closest residences. • No potential effect on residents and their use of property from dust. Concentrations at the sensitive receptors (i.e., residences) are not expected to exceed the relevant standard. • Alternative Method 2 could result in a minor increase in off-site odour concentrations; however, the increase from existing conditions would be imperceptible and unlikely to result in	GFL will continue to implement the odour control measures outlined in Section 5.3.8.6, and provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.	No net effects on residents and their use of property.

Table 6-24. Social Environment Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		surrounding community. • The future development will be of similar height to the existing EOWHF landfill.	a change in use of property. • No potential effect on residents and their use of property from litter or vectors and vermin. • Alternative Method 2 would be almost if not completely obstructed from the closest residences that are expected to exist at the time of construction; therefore, it would not affect residents and their use of property from changes to the visual landscape.		
Visual Impact of Facility	Predicted changes in perceptions of landscapes and views	• The future development will be of similar height to the existing EOWHF landfill (approximately 15 m in height or 80 masl). • Visual screening will be constructed along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings.	• Views of Alternative Method 2 would be almost if not completely obstructed by existing vegetation from the closest residences that are expected to exist at the time of construction; therefore, it would not affect residents and their use of property from changes to the visual landscape. • Alternative Method 2 will result in a change to the landscape; however, it will be of similar height to the existing EOWHF landfill and visual screening will be provided to obstruct the view from transient locations (i.e., roadways) in the form of earthen berms and/or vegetation plantings.	• The visual screening should be at least 2.4 m (8 feet) high on the northern, eastern, and southern perimeters, and at least 4.5 m (16 feet) high in the northeastern corner of the perimeter to mitigate visual impacts.	• With the visual screening in place, Alternative Method 2 is not expected to change the visual character of the landscape.

6.2.3 Cultural Environment

The net effects assessment for the Cultural Environment includes Cultural Heritage Resources and Archaeological Resources.

6.2.3.1 Cultural Heritage Resources

The Cultural Heritage Resources net effects assessment incorporated information from the Cultural Heritage Existing Conditions Report (**Supporting Document 1-8**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Cultural Heritage Effects Assessment Report (**Supporting Document 3-8**).

Proximity of Known and Potential Cultural Heritage Resources to the Landfill Site

The study areas for Cultural Heritage Resources are the generic study areas shown on **Figure 4-1** and existing conditions are described in Section 4.3.4.1. Three cultural heritage resources with potential for cultural heritage value or interest were identified within the Off-site Study Area (**Figure 4-12**) and no cultural heritage resources were identified within the On-site Study Area.

The construction and operation of Alternative Methods 1 and 2 will take place within the On-site Study Area. Construction and operation of the future development will be planned and undertaken to avoid impacts to identified cultural heritage resources. Both alternative methods will continue to use established operating procedures currently in place at the EOWHF.

To assess the potential effects of the EOWHF landfill expansion, identified cultural heritage resources are considered against a range of possible impacts based on the Ontario Heritage Tool Kit Info Sheet #5: Heritage Impact Assessments and Conservation Plans (MHSTCI, 2006). These include both direct impacts (e.g., destruction and alteration) and indirect impacts (e.g., shadows, isolation, view obstruction, change in land use, land disturbances, and construction-related vibration). Potential vibration impacts are defined as having potential to affect an identified cultural heritage resource where work is taking place within 50 m of features on the property.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-25**.

No direct impacts to identified cultural heritage resources are anticipated as the resources are located within the Off-site Study Area. No cultural heritage resources were identified within the On-site Study Area.

No indirect adverse impacts on identified cultural heritage resources are anticipated, as there will be no changes to the landfill height or operational changes. The future development and associated construction activities will not result in vibration impacts to identified cultural heritage resources as they are located more than 50 m from the future development lands. Given the distance between identified cultural heritage resources

and the On-site Study Area, the presence of an existing landfill site, as well as the proposed visual screening around the site, no adverse impacts to the setting or character of identified cultural heritage resources are anticipated.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-26**.

No direct impacts to identified cultural heritage resources are anticipated as the resources are located within the Off-site Study Area. No cultural heritage resources were identified within the On-site Study Area.

No indirect adverse impacts on identified cultural heritage resources are anticipated, as there will be no changes to the landfill height or operational changes. The future development and associated construction activities will not result in vibration impacts to identified cultural heritage resources as they are located more than 50 m from the future development lands. Given the distance between identified cultural heritage resources and the On-site Study Area, the presence of an existing landfill site, as well as the proposed visual screening around the site, no adverse impacts to the setting or character of identified cultural heritage resources are anticipated.

6.2.3.2 Archaeological Resources

The Archaeological Resources net effects assessment incorporated information from the Stage 1 Archaeological Assessment (**Supporting Document 1-9**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Archaeological Resources Effects Assessment Report (**Supporting Document 3-9**).

Archaeological Resources On-site and in Vicinity

The study areas for Archaeological Resources are the generic study areas shown on **Figure 4-1** and existing conditions are described in Section 4.3.4.2. The construction and operation of the future development will take place within the existing On-site Study Area. A Stage 1 Archaeological Assessment was completed for the entire 189 ha EOWHF landfill site including the Stage 5 area as part of the original EA for the landfill in 1999. The Stage 1 Archaeological Assessment determined that there is no archaeological potential within the boundaries of the existing EOWHF site. A recent Stage 1 Archaeological Assessment completed in 2020 for the future development lands[18] (**Supporting Document 1-9**) determined that the area has no previously registered archaeological sites and that it has no archaeological potential due to deep and extensive land disturbance and permanently low and wet conditions.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry

[18] Lands to the south of the existing EOWHF were included in the study area for the Stage 1 Archaeological Assessment; however, these lands are not part of the future development and are therefore not included in this assessment.

out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (atarchaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-25**.

The Stage 1 Archaeological Assessments for the EOWHF site and future development lands determined that there is no archaeological potential within the On-site Study Area. Consequently, no effects on archaeological resources are anticipated.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-26**.

The Stage 1 Archaeological Assessments for the EOWHF site and future development lands determined that there is no archaeological potential within the On-site Study Area. Consequently, no effects on archaeological resources are anticipated.

Table 6-25. Cultural Environment Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Cultural heritage resources	Proximity of known and potential cultural heritage resources to the landfill site	• Three cultural heritage resources are located within the Off-site Study Area. • No cultural heritage resources are identified within the On-site Study Area. • Construction and staging will be suitably planned and undertaken to avoid impacts to identified cultural heritage resources. • There are no operational changes anticipated for the expanded landfill, and therefore no changes in general operational practices, on-site equipment, traffic volume or waste haul routes are expected as a result of Alternative Method 1. • No changes to the landfill height are expected. • The planned construction activities within the On-site Study Area will result in five phased landfill envelopes consistent with existing landfill design, SWM system, new access road from Laflèche Road and internal road network, new scale facility, soil storage pads, and visual screening along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings.	• No direct impacts to identified cultural heritage resources are anticipated. • No indirect adverse impacts on identified cultural heritage resources are anticipated, as there will be no changes to the landfill height and operational changes. • The future development and associated construction activities will not result in vibration impacts to identified cultural heritage resources as they are located more than 50 m from the future development lands. • Given the distance between identified cultural heritage resources and the On-site Study Area, the presence of an existing landfill site, as well as the proposed visual screening around the site, no adverse impacts to the setting or character of identified cultural heritage resources are anticipated.	None required.	No net effects on cultural heritage resources.
Archaeological resources	Predicted impacts to archaeological	• The Stage 1 Archaeological Assessment for the future development lands determined	No potential for the disturbance of unassessed or documented archaeological	Should previously undocumented archaeological resources be discovered, they may be a new	No net effects on archaeological resources.

Table 6-25. Cultural Environment Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
	resources on-site and in vicinity	that there is no archaeological potential. • Previous Stage 1 Archaeological Assessment for the EOWHF site determined that there is no archaeological potential including the proposed Stage 5 area.	resources.	archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*. The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (atarchaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.	

Table 6-26. Cultural Environment Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Cultural heritage resources	Proximity of known and potential cultural heritage resources to the landfill site	• Three cultural heritage resources are located within the Off-site Study Area. • No cultural heritage resources are identified within the On-site Study Area. • Construction and staging will be suitably planned and undertaken to avoid impacts to identified cultural heritage resources. • There are no operational changes anticipated for the expanded landfill, and therefore no changes in general operational practices, on-site equipment, traffic volume or waste haul routes are expected as a result of Alternative Method 2. • No changes to the landfill height are expected. • The planned construction activities within the On-site Study Area will result in four phased landfill envelopes consistent with existing landfill design, SWM system, new access road from Laflèche Road and internal road network, new scale facility, soil storage pads, and visual screening along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings.	• No direct impacts to identified cultural heritage resources are anticipated. • No indirect adverse impacts on identified cultural heritage resources are anticipated, as there will be no changes to the landfill height and operational changes. • The future development and associated construction activities will not result in vibration impacts to identified cultural heritage resources as they are located more than 50 m from the future development lands. • Given the distance between identified cultural heritage resources and the On-site Study Area, the presence of an existing landfill site, as well as the proposed visual screening around the site, no adverse impacts to the setting or character of identified cultural heritage resources are anticipated.	None required.	No net effects on cultural heritage resources.
Archaeological resources	Predicted impacts to archaeological	• The Stage 1 Archaeological Assessment for the future development lands determined	No potential for the disturbance of unassessed or documented archaeological	Should previously undocumented archaeological resources be discovered, they may be a new	No net effects on archaeological resources.

Table 6-26. Cultural Environment Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
	resources on-site and in vicinity	that there is no archaeological potential. • Previous Stage 1 Archaeological Assessment for the EOWHF site determined that there is no archaeological potential including the proposed Stage 5 area.	resources.	archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*. The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (atarchaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.	

6.2.4 Built Environment

The net effects assessment for the Built Environment includes Transportation, Current and Planned Future Land Use, and Aggregate Extraction and Agricultural.

6.2.4.1 Transportation

The net effects assessment for Transportation includes the effects from truck transportation along the access roads to the EOWHF and future development lands. The Transportation net effects assessment incorporated information from the Transportation Existing Conditions Report (**Supporting Document 1-10**), the results of the Transportation Impact Study (Appendix A of **Supporting Document 3-10**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Transportation Effects Assessment Report (**Supporting Document 3-10**).

The On-site Study Area for Transportation corresponds to the generic On-site Study Area shown on **Figure 4-1**. The Off-site Study Area for Transportation is shown on **Figure 4-14**, and includes the three main off-site intersections along the access roads from Highway 417 to the EOWHF site and the off-ramps at Highway 417. The Transportation existing conditions are described in Section 4.3.5.1.

The potential effects of the future development on Transportation were assessed based on guidelines from the MTO (MTO, 2014). The assessment considered traffic at 5-year (2025) and 15-year (2035) horizons. Future background traffic volumes for the years 2025 and 2035 were based on existing traffic volumes plus general background traffic growth. Total traffic volumes were derived by removing existing site traffic volumes from the background traffic volumes and then adding forecast site traffic volumes assuming the daily tonnage limits were reached.

Intersection operations were assessed for the site driveways and study intersections using the software program Synchro 9, Traffic Signal Coordination Software Version 10, which employs methodology from the Highway Capacity Manual (HCM2000) published by the Transportation Research Board National Research Council. The LOS and volume to capacity ratio were calculated for the study intersections. LOS is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between ‘A’ and ‘F’, with ‘F’ being the longest delay. The volume-to-capacity (v/c) ratio is a measure of the degree of capacity used at an intersection.

Effects from Truck Transportation along Access Roads

The EOWHF is located on Laflèche Road, a private road, which is accessed from Highway 138. Highway 138 intersects with Highway 417 approximately 2 km north of Laflèche Road. The current haul route to the EOWHF is via Highway 417, Highway 138 and Laflèche Road. No changes to waste haul routes are anticipated as a result of the future development. There are no signalized intersections within the study area.

The following intersections were considered in the effects assessment:

- Highway 138 at Highway 417 westbound off-ramp;
- Highway 138 at Highway 417 eastbound off-ramp;
- Highway 138 at Laflèche Road; and
- Laflèche Road at GFL driveway.

The following time periods were considered in the effects assessment:

- Weekday AM peak hour (between 7:00 AM and 9:00 AM);
- Weekday PM peak hour (between 4:00 PM and 6:00 PM); and
- Saturday midday peak hour (between 10:00 AM and 1:00 PM).

The facility is expected to receive comparable levels of waste and compost as it currently does on a typical day. On average, the facility accepts 3,297 tonnes per day of waste and compost, however, the facility may accept up to 4,000 tonnes per day when required. The traffic analysis was prepared under the assumption that 100% of the daily tonnage limits would be met for both compost and waste, on weekdays and on Saturdays. The theoretical maximum number of peak hour trips was calculated by dividing the tonnage received during the traffic counts into the daily maximum of 4,000 tonnes, and multiplying that factor by the observed trip generation.

The following assumptions were made for the purposes of the Transportation effects assessment:

- No changes to waste haul routes are anticipated.
- Site traffic generation is expected to increase nominally considering the site has accepted between 90% and 99.9% of the annual tonnage limit (755,000 tonnes) over the past three years (2019 through 2021).
- The future development is not anticipated to generate additional measurable traffic related to construction due to on-site soil suitability for use as the base liner and cover material. Additional soil requirements for cover are included in the projected vehicle trips.
- Employee traffic volumes will remain unchanged and do not occur during peak hours.
- The proportion of inbound and outbound traffic volumes will remain steady, along with the proportion of trucks to light vehicles.
- No changes to typical on-site times (less than 30 minutes) and weigh scale times (less than 3 minutes) are anticipated.
- Hourly, daily, and seasonal patterns will remain stable.
- The breakdown of vehicle types and average vehicle loads will remain stable.
- GFL will continue to support the minimization of environmental impacts associated with GHG emissions through reducing the number of waste-related trucks hauling material long distances.

- No planned road network improvements or background developments were identified within the study areas.
- A conservative 2% compound annual growth rate was applied to all turning movement volumes, with the exception of turning movements in to and out of Laflèche Road and Allaire Road since these are local roadways.

Under 2025 background conditions, all movements at all study intersections will operate well with LOS 'C' or better and with v/c ratios of 0.10 or lower indicating that the intersection will operate with residual capacity. LOS 'C' is typically considered acceptable and does not indicate the need for mitigation or monitoring. All 95th percentile queues will be less than one standard vehicle length (7 m). There are no operational concerns at any study intersections under 2025 background conditions.

Under 2035 background conditions all movements at all study intersections will operate well with LOS 'C' or better and with v/c ratios of 0.12 or lower indicating that the intersections will operate with residual capacity. All 95th percentile queues will be less than one standard vehicle length (7 m). There are no operational concerns at any study intersections under 2035 background conditions.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-27**.

DISTURBANCE TO TRAFFIC OPERATIONS

Traffic volumes for Alternative Method 1 were calculated based on the theoretical maximum daily tonnage limit of 4,000 tonnes per day combined landfill and compost material. Based on the theoretical maximum, up to 25 and 27 additional two-way trips are projected to enter the facility during the weekday AM, and PM peak hours, respectively. Relative to existing conditions, this is a 68%, and 69% increase. Saturday trip generation may increase from 15 two-way trips per hour to a theoretical maximum of 113 trips per hour. The weekday projections represent the higher end of traffic anticipated for the facility, while the Saturday projections represent the highest theoretical level of trip generation. As previously mentioned, the average daily facility traffic associated with the landfill is not anticipated to change from observed 2020 conditions. These projections are theoretical maximums and demonstrate that the facility will have minimal impacts on traffic operations even on atypical, high demand days. The forecast maximum hourly one-way trip generation on a weekday is 58 vehicles occurring during the weekday PM peak hour, with 58 outbound trips, or one vehicle every 62 seconds on average. The maximum hourly one-way trip generation for the Saturday is 68 outbound trips, or one vehicle every 52 seconds.

Under 2025 total conditions, all movements at all study intersections will operate well with LOS 'C' or better and with v/c ratios of 0.26 or lower indicating that the intersections will operate with residual capacity. All 95th percentile queues will be less than one standard vehicle length (7 m). There are no operational concerns at any study intersections under 2025 total conditions even with the consideration of potential future uses.

Under 2035 total conditions all movements at all study intersections will operate well with LOS 'C' or better and with v/c ratios of 0.26 or lower indicating that the intersections will

operate with residual capacity. Most of the 95th percentile queues will be less than one standard vehicle length (7 m), with the exception of the eastbound approach to Highway 138/Laflèche Road during the Saturday which will have a 95th percentile queue of 7.7 m, which is approximately one standard vehicle length. There are no operational concerns at any study intersections under 2035 total conditions.

Traffic operations are acceptable under existing, future background, and future total conditions during both horizon years, according to the Synchro analysis, and no road network improvements are necessary, even with the potential future uses considered. Any future need for road improvements would be triggered by future background traffic conditions and not by site traffic.

The accident rates for the segment of Highway 138 within the Off-site Study Area were compared to the provincial average, and it was determined that this segment of Highway 138 has an accident rate that is nearly half that of the provincial average, suggesting that this segment is not collision-prone and that there is no significant safety concern.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-28**.

DISTURBANCE TO TRAFFIC OPERATIONS

Traffic volumes for Alternative Method 1 were calculated based on the theoretical maximum daily tonnage limit of 4,000 tonnes per day combined landfill and compost material. Based on the theoretical maximum, up to 25 and 27 additional two-way trips are projected to enter the facility during the weekday AM, and PM peak hours, respectively. Relative to existing conditions, this is a 68%, and 69% increase. Saturday trip generation may increase from 15 two-way trips per hour to a theoretical maximum of 113 trips per hour. The weekday projections represent the higher end of traffic anticipated for the facility, while the Saturday projections represent the highest theoretical level of trip generation. As previously mentioned, the average daily facility traffic associated with the landfill is not anticipated to change from observed 2020 conditions. These projections are theoretical maximums and demonstrate that the facility will have minimal impacts on traffic operations even on atypical, high demand days. The forecast maximum hourly one-way trip generation on a weekday is 58 vehicles occurring during the weekday PM peak hour, with 58 outbound trips, or one vehicle every 62 seconds on average. The maximum hourly one-way trip generation for the Saturday is 68 outbound trips, or one vehicle every 52 seconds.

Under 2025 total conditions, all movements at all study intersections will operate well with LOS ‘C’ or better and with v/c ratios of 0.26 or lower indicating that the intersections will operate with residual capacity. All 95th percentile queues will be less than one standard vehicle length (7 m). There are no operational concerns at any study intersections under 2025 total conditions even with the consideration of potential future uses.

Under 2035 total conditions all movements at all study intersections will operate well with LOS ‘C’ or better and with v/c ratios of 0.26 or lower indicating that the intersections will operate with residual capacity. Most of the 95th percentile queues will be less than one standard vehicle length (7 m), with the exception of the eastbound approach to Highway

138/Laflèche Road during the Saturday which will have a 95th percentile queue of 7.7 m, which is approximately one standard vehicle length. There are no operational concerns at any study intersections under 2035 total conditions.

Traffic operations are acceptable under existing, future background, and future total conditions during both horizon years, according to the Synchro analysis, and no road network improvements are necessary, even with the potential future uses considered. Any future need for road improvements would be triggered by future background traffic conditions and not by site traffic.

The accident rates for the segment of Highway 138 within the Off-site Study Area were compared to the provincial average, and it was determined that this segment of Highway 138 has an accident rate that is nearly half that of the provincial average, suggesting that this segment is not collision-prone and that there is no significant safety concern.

Table 6-27. Transportation Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Effects from truck transportation along access roads	Disturbance to traffic operations	• No changes to waste haul routes are anticipated. • Transportation effects were assessed based on a theoretical daily maximum tonnage received (4,000 tonnes per day landfill and compost material). • The future development is not anticipated to generate additional measurable traffic related to construction due to on-site soil suitability for use as the base liner and cover material. Additional soil requirements for cover are included in the projected vehicle trips. • Employee traffic volumes will remain unchanged and do not occur during peak hours. • The proportion of inbound and outbound traffic volumes will remain steady, along with the proportion of trucks to light vehicles. • No changes to typical on-site times (less than 30 minutes) and weigh scale times (less than 3 minutes) are anticipated. • Hourly, daily, and seasonal patterns will remain stable. • The breakdown of vehicle types and average vehicle loads will remain stable. • GFL will continue to support the minimization of environmental impacts associated with GHG emissions through reducing the number of waste-related trucks hauling material long distances. • No planned road network improvements or background developments were identified within the study areas. • A conservative 2% compound annual growth rate was applied to all turning movement volumes, with the exception of turning movements in to and out of Laflèche Road and Allaire Road since these are local roadways.	• Based on the theoretical maximum, up to 25 and 27 additional two-way trips are projected to enter the facility during the weekday AM, and PM peak hours, respectively, which is a 68%, and 69% increase over existing conditions. • Saturday trip generation may increase from 15 two-way trips per hour to a theoretical maximum of 113 trips per hour. The average daily facility traffic associated with the landfill is not anticipated to change from observed 2020 conditions.	None required.	There are no net effects on traffic operations: • Under existing, future background, and future total conditions, during both horizon years (2025 and 2035), there is and will continue to be residual capacity in the road network, even under the conservative assumption that the maximum daily tonnage is received. There are no operational concerns at any study intersections as a result of the EOWHF expanded landfill and future development lands. • No road network improvements are necessary. • There are no significant safety concerns based on a review of Highway 138 accident rates.

Table 6-28. Transportation Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Effects from truck transportation along access roads	Disturbance to traffic operations	• No changes to waste haul routes are anticipated. • Transportation effects were assessed based on a theoretical daily maximum tonnage received (4,000 tonnes per day landfill and compost material). • The future development is not anticipated to generate additional measurable traffic related to construction due to on-site soil suitability for use as the base liner and cover material. Additional soil requirements for cover are included in the projected vehicle trips. • Employee traffic volumes will remain unchanged and do not occur during peak hours. • The proportion of inbound and outbound traffic volumes will remain steady, along with the proportion of trucks to light vehicles. • No changes to typical on-site times (less than 30 minutes) and weigh scale times (less than 3 minutes) are anticipated. • Hourly, daily, and seasonal patterns will remain stable. • The breakdown of vehicle types and average vehicle loads will remain stable. • GFL will continue to support the minimization of environmental impacts associated with GHG emissions through reducing the number of waste-related trucks hauling material long distances. • No planned road network improvements or background developments were identified within the study areas. • A conservative 2% compound annual growth rate was applied to all turning movement volumes, with the exception of turning movements in to and out of Laflèche Road and Allaire Road since these are local roadways.	• Based on the theoretical maximum, up to 25 and 27 additional two-way trips are projected to enter the facility during the weekday AM, and PM peak hours, respectively, which is a 68%, and 69% increase over existing conditions. • Saturday trip generation may increase from 15 two-way trips per hour to a theoretical maximum of 113 trips per hour. The average daily facility traffic associated with the landfill is not anticipated to change from observed 2020 conditions.	• None required.	There are no net effects on traffic operations: • Under existing, future background, and future total conditions, during both horizon years (2025 and 2035), there is and will continue to be residual capacity in the road network, even under the conservative assumption that the maximum daily tonnage is received. There are no operational concerns at any study intersections as a result of the EOWHF expanded landfill and future development lands. • No road network improvements are necessary. • There are no significant safety concerns based on a review of Highway 138 accident rates.

6.2.4.2 Current and Planned Future Land Use

The net effects assessment for Current and Planned Future Land Use includes the effects on current and planned future land uses. The Land Use net effects assessment incorporated information from the Land Use Existing Conditions Report (**Supporting Document 1-11**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Land Use Effects Assessment Report (**Supporting Document 3-11**).

Effects on Current and Future Land Uses

The study areas for Land Use are the generic study areas shown on **Figure 4-1** and the existing conditions are described in Section 4.3.5.2. The effects assessment focused on land uses within 500 m of the On-site Study Area, as recommended by the MECP Guideline D-4 Land Use On or Near Landfills and Dumps (MECP, 1994). The Guideline D-4 states that the most significant effects of a landfill are typically experienced within 500 m of the perimeter of a fill area, so sensitive land uses were assessed within this area. The wider 1 km Off-site Study Area boundary was used to assess potential effects on the broader land use pattern.

The policies of the SDG Counties Official Plan, Prescott-Russell Official Plan, North Stormont Zoning Bylaw, and the Nation Municipality Zoning Bylaw as well as the Guideline D-4 were used to identify the potential effects of the future development on the current and planned future land uses in the Off-site Study Area. The presence of recreational resources and sensitive land uses in the Off-site Study Area were assessed to determine the potential effects of the future development on these specific uses.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-29**.

CURRENT LAND USE

No impacts to current land uses within the On-site Study Area are anticipated because Alternative Method 1 is consistent with the Official Plan and Zoning By-law.

Most of the existing surrounding land uses are compatible and would not be sensitive to the future development. The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area. Sensitive land uses are prohibited within 200 m of the future development landfill in the Township of North Stormont.

Alternative Method 1 proposes the following buffer distances between the future development landfill and the existing sensitive land uses located within 500 m of the On-site Study Area:

- 1454 Highway 138 (Champion Mushrooms): 165 m.
- 17305 Allaire Road (Calco Soils): 310 m.
- 1397 Highway 138 (Residential Dwelling): 308 m.

- 17319 Allaire Road (Residential Dwelling): 414 m.

The sensitive land use located at 1454 Highway 138 (Champion Mushrooms) is adjacent to the On-site Study Area and would become legal non-conforming under the Township of North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use. The residential dwelling at 1397 Highway 138 was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

PLANNED LAND USE

Development in the Off-site Study Area may be restricted in the future by municipal and provincial policy based on distance from the future development landfill or future development lands. The municipal policies restrict land uses due to the potential effects of a landfill which are experienced within 50 m, 200 m, or 500 m of landfill, depending on the planning authority. The MECP Guideline D-4 restricts land uses within 30 m of the future development landfill (MECP, 1994). Based on these municipal and provincial policies, it is understood that development in the Off-site Study Area would be restricted as follows:

- All development would be prohibited within 30 m of the future development landfill.
- All development would be prohibited within 50 m of the future development landfill in The Nation Municipality.
- Sensitive land uses would be prohibited within 200 m of the future development landfill within the Township of North Stormont.
- All development would be restricted within 500 m of the future development landfill in the SDG Counties and Prescott-Russell Counties subject to additional studies and approvals. Measures to mitigate landfill effects would need to be included in the development proposal and, if mitigation measures are satisfactory, development may be approved. Additionally, development proposals will need to show that they will not impact future expansion of the landfill.

Alternative Method 1 provides the following setbacks on the future development lands between the landfill stages and the property boundary:

- North setback: 145 m.
- East setback: 242 m.
- South setback: 100 m.

Alternative Method 1 satisfies the Guideline D-4 requirement that a 30 m buffer be maintained around the perimeter of a landfill area and provides the required 50 m buffer from The Nation Municipality Zoning Bylaw.

The setbacks would prohibit the development of sensitive land uses within 200 m of the landfill to the north and south. Since the phasing of the stages for Alternative Method 1 proceeds from south to north, the effects will occur in the early phases of the future development. This restriction falls within the 500 m development restriction of the SDG Counties and Prescott-Russell Counties.

The visual screening around the periphery of the site consisting of earthen berms and/or vegetation plantings may aid in mitigating landfill effects regarding the 500 m development restriction of the SDG Counties and Prescott-Russell Counties.

The Township of North Stormont confirmed that there are no active development applications within 1 km of the future development lands. The Nation Municipality confirmed that there are two active site plan control applications, which are located approximately 700 m from the On-site Study Area. Both applications are industrial in nature and would be compatible with the future development landfill.

TYPE(S) AND PROXIMITY OF OFF-SITE RECREATIONAL RESOURCES WITHIN 500 M

No recreational resources are located within the Off-site Study Area; consequently, there are no potential effects on off-site recreational resources within 500 m of the future development.

TYPE(S) AND PROXIMITY OF OFF-SITE SENSITIVE LAND USES WITHIN 500 M

Most of the existing surrounding land uses are compatible and would not be sensitive to the future development. The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area. Sensitive land uses are prohibited within 200 m of the future development landfill in the Township of North Stormont. MECP Guideline D-4 (MECP, 1994) states that the most significant environmental and aesthetic effects of a landfill are felt within 500 m of the perimeter of a landfill area.

Alternative Method 1 proposes the previously-identified buffer distances between the future development landfill and the existing sensitive land uses located within 500 m of the On-site Study Area.

The sensitive land use located at 1454 Highway 138 (Champion Mushrooms) is adjacent to the On-site Study Area and would become legal non-conforming under the Township of North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use. Since the phasing of the stages for Alternative Method 1 proceeds from south to north within the future development lands, the effects to sensitive land uses will occur in the early phases of the future development.

MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-30**.

CURRENT LAND USE

No impacts to current land uses within the On-site Study Area are anticipated because Alternative Method 2 is consistent with the Official Plan and Zoning By-law.

Most of the existing surrounding land uses are compatible and would not be sensitive to the future development. The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area. Sensitive land uses are prohibited within 200 m of the future development landfill in the Township of North Stormont.

Alternative Method 2 proposes the following buffer distances between the future development landfill and the existing sensitive land uses located within 500 m of the On-site Study Area:

- 1454 Highway 138 (Champion Mushrooms): 279 m.
- 17305 Allaire Road (Calco Soils): 411 m.
- 1397 Highway 138 (Residential Dwelling): 308 m.
- 17319 Allaire Road (Residential Dwelling): 493 m.

Alternative Method 2 provides the 200 m buffer between the expanded landfill and all four existing sensitive land use allowing them to continue to be in compliance with the North Stormont Zoning Bylaw. The residential dwelling at 1397 Highway 138 was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.

PLANNED LAND USE

Development in the Off-site Study Area may be restricted in the future by municipal and provincial policy based on distance from the future development landfill or future development lands. The municipal policies restrict land uses due to the potential effects of a landfill which are experienced within 50 m, 200 m, or 500 m of landfill, depending on the planning authority. The MECP Guideline D-4 restricts land uses within 30 m of the future development landfill (MECP, 1994). Based on these municipal and provincial policies, it is understood that development in the Off-site Study Area would be restricted as follows:

- All development would be prohibited within 30 m of the future development landfill.
- All development would be prohibited within 50 m of the future development landfill in The Nation Municipality.
- Sensitive land uses would be prohibited within 200 m of the future development landfill within the Township of North Stormont.
- All development would be restricted within 500 m of the future development landfill in the SDG Counties and Prescott-Russell Counties subject to additional studies and approvals. Measures to mitigate landfill effects would need to be included in the development proposal and, if mitigation measures are satisfactory, development may be approved. Additionally, development proposals will need to show that they will not impact future expansion of the landfill.

Alternative Method 2 provides the following setbacks on the future development lands between the landfill stages and the property boundary:

- North setback: 210 m.
- East setback: 241 m.
- South setback: 100 m.

Alternative Method 2 satisfies the Guideline D-4 requirement that a 30 m buffer be maintained around the perimeter of a landfill area and provides the required 50 m buffer from The Nation Municipality Zoning Bylaw.

The setbacks would prohibit the development of sensitive land uses within 200 m of the landfill to the south. Since the phasing of the stages for Alternative Method 2 proceeds from east to west, the effects will occur in the later phases of the future development. This restriction falls within the 500 m development restriction of the SDG Counties and Prescott-Russell Counties.

The visual screening around the periphery of the site consisting of earthen berms and/or vegetation plantings may aid in mitigating landfill effects regarding the 500 m development restriction of the SDG Counties and Prescott-Russell Counties.

The Township of North Stormont confirmed that there are no active development applications within 1 km of the future development lands. The Nation Municipality confirmed that there are two active site plan control applications, which are located approximately 700 m from the On-site Study Area. Both applications are industrial in nature and would be compatible with the future development landfill.

TYPE(S) AND PROXIMITY OF OFF-SITE RECREATIONAL RESOURCES WITHIN 500 M

No recreational resources are located within the Off-site Study Area; consequently, there are no potential effects on off-site recreational resources within 500 m of the future development.

TYPE(S) AND PROXIMITY OF OFF-SITE SENSITIVE LAND USES WITHIN 500 M

Most of the existing surrounding land uses are compatible and would not be sensitive to the future development. The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area. Sensitive land uses are prohibited within 200 m of the future development landfill in the Township of North Stormont. MECP Guideline D-4 (MECP, 1994) states that the most significant environmental and aesthetic effects of a landfill are felt within 500 m of the perimeter of a landfill area.

Alternative Method 2 proposes the previously-identified buffer distances between the future development landfill and the existing sensitive land uses located within 500 m of the On-site Study Area.

Alternative Method 2 provides the 200 m buffer between the expanded landfill and all four existing sensitive land use allowing them to continue to be in compliance with the North Stormont Zoning Bylaw. Since the phasing of the stages for Alternative Method 2 proceeds from east to west within the future development lands, the effects to sensitive land uses will occur in the later phases of the future development.

MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.

Table 6-29. Land Use Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Effects on current and planned future land uses	Current land use	• Most of the existing surrounding land uses are compatible and would not be sensitive to the future development.
		• The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area.
		• Sensitive land uses are prohibited within 200 m of the expanded landfill in the Township of North Stormont.
		• Alternative Method 1 proposes the following buffer distances between the future development landfill and the existing sensitive land uses:
		  • 1454 Highway 138 (Champion Mushrooms): 165 m.
		  • 17305 Allaire Road (Calco Soils): 310 m.
		  • 1397 Highway 138 (Residential Dwelling): 308 m.
		  • 17319 Allaire Road (Residential Dwelling): 414 m.
		• The residential dwelling at 1397 Highway 138 was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.
			• Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use.
			• No effects to current land uses within the On-site Study Area are anticipated because Alternative Method 1 is consistent with the Official Plan and Zoning By-law.
				None required.	Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use.

	Planned land use	• Development in the Off-site Study Area may be restricted by municipal and provincial policies based on distance from expanded landfill.
		• Alternative Method 1 provides the following setbacks on the future development lands between the landfill stages and the property boundary:
		  • North setback: 145 m.
		  • East setback: 242 m.
		  • South setback: 100 m.
		• Visual screening around the periphery of the site consisting of earthen berms and/or
			• Development may be restricted within 500 m of the expanded landfill in all municipalities.
			• Development would be prohibited within 30 m of the future development landfill in all municipalities.
			• Development would be prohibited within 50 m of the future development landfill in The Nation Municipality
			• Development of sensitive
				None required.	Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities.

Table 6-29. Land Use Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		vegetation plantings. • Phasing of landfill stages from south to north.	land uses would be prohibited within 200 m of the expanded landfill in the Township of North Stormont. • No effect on existing development applications (700 m from On-site Study Area).		
	Type(s) and proximity of off-site recreational resources within 500 m of a landfill footprint potentially affected	No recreational resources are located within the Off-site Study Area.	No potential effects on off-site recreational resources within 500 m of the future development.	None required.	No net effects on off-site recreational resources within 500 m of the future development.

	Type(s) and proximity of off-site sensitive land uses (e.g., dwellings, churches, parks) within 500 m of a landfill footprint potentially affected	• Most of the existing surrounding land uses are compatible and would not be sensitive to the future development.
		• The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area.
		• Sensitive land uses are prohibited within 200 m of the expanded landfill in the Township of North Stormont.
		• Alternative Method 1 proposes the following buffer distances between the future development landfill and the existing sensitive land uses:
		  • 1454 Highway 138 (Champion Mushrooms): 165 m.
		  • 17305 Allaire Road (Calco Soils): 310 m.
		  • 1397 Highway 138 (Residential Dwelling): 308 m.
		  • 17319 Allaire Road (Residential Dwelling): 414 m.
		• The residential dwelling at 1397 Highway 138 was vacated in Summer 2022 and will
			• Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use.
			• MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.
				None required.	• Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use.
					• MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.

Table 6-29. Land Use Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		be demolished prior to the implementation of the future development landfill. • Phasing of landfill stages from south to north.			

Table 6-30. Land Use Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

Effects on current and planned future land uses	Current land use	• Most of the existing surrounding land uses are compatible and would not be sensitive to the future development.
		• The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area.
		• Sensitive land uses are prohibited within 200 m of the expanded landfill in the Township of North Stormont.
		• Alternative Method 2 proposes the following buffer distances between the future development landfill and the existing sensitive land uses:
		  • 1454 Highway 138 (Champion Mushrooms): 279 m.
		  • 17305 Allaire Road (Calco Soils): 411 m.
		  • 1397 Highway 138 (Residential Dwelling): 308 m.
		  • 17319 Allaire Road (Residential Dwelling): 493 m.
		• The residential dwelling at 1397 Highway 138 was vacated in Summer 2022 and will be demolished prior to the implementation of
			• Alternative Method 2 provides the 200 m buffer between the expanded landfill and all four existing sensitive land use allowing them to continue to be in compliance with the North Stormont Zoning Bylaw; consequently, no potential effects to current off-site land uses are anticipated.
			• No effects to current land uses within the On-site Study Area are anticipated because Alternative Method 2 is consistent with the Official Plan and Zoning By-law.
				None required.	No net effects to current off-site land uses are anticipated.

Table 6-30. Land Use Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		the future development landfill.			

	Planned land use	• Development in the Off-site Study Area may be restricted by municipal and provincial policies based on distance from expanded landfill.
		• Alternative Method 2 provides the following setbacks on the future development lands between the landfill stages and the property boundary:
		  • North setback: 210 m.
		  • East setback: 241 m.
		  • South setback: 100 m.
		• Visual screening around the periphery of the site consisting of earthen berms and/or vegetation plantings.
		• Phasing of landfill stages from east to west.
			• Development may be restricted within 500 m of the expanded landfill in all municipalities.
			• Development would be prohibited within 30 m of the future development landfill in all municipalities.
			• Development would be prohibited within 50 m of the future development landfill in The Nation Municipality
			• Development of sensitive land uses would be prohibited within 200 m of the expanded landfill in the Township of North Stormont.
			• No effect on existing development applications (700 m from On-site Study Area).
				None required.	Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities.

	Type(s) and proximity of off-site recreational resources within 500 m of a landfill footprint potentially affected	No recreational resources are located within the Off-site Study Area.	No potential effects on off-site recreational resources within 500 m of the future development.	None required.	No net effects on off-site recreational resources within 500 m of the future development.
	Type(s) and proximity of off-site sensitive land uses (e.g., dwellings, churches, parks) within 500 m of a landfill footprint potentially affected	• Most of the existing surrounding land uses are compatible and would not be sensitive to the future development. • The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area. • Sensitive land uses are prohibited within 200 m of the expanded landfill in the Township of	• Alternative Method 2 provides the 200 m buffer between the expanded landfill and all four existing sensitive land use allowing them to continue to be in compliance with the North Stormont Zoning Bylaw.	None required.	MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.

Table 6-30. Land Use Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

		North Stormont.
		• Alternative Method 2 proposes the following buffer distances between the future development landfill and the existing sensitive land uses:
		  • 1454 Highway 138 (Champion Mushrooms): 279 m.
		  • 17305 Allaire Road (Calco Soils): 411 m.
		  • 1397 Highway 138 (Residential Dwelling): 308 m.
		  • 17319 Allaire Road (Residential Dwelling): 493 m.
		• The residential dwelling at 1397 Highway 138 was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.
		• Phasing of landfill stages from east to west.
			• MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.		

6.2.4.3 Aggregate Extraction and Agriculture

The net effects assessment for Aggregate Extraction and Agriculture includes the effects of the project on aggregate resources and agricultural land.

Aggregate Resources

The Aggregate Resources net effects assessment incorporated information from the Land Use Existing Conditions Report (**Supporting Document 1-11**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Land Use Effects Assessment Report (**Supporting Document 3-11**).

The study areas for Aggregate Resources are the generic study areas shown on **Figure 4-1** and the existing conditions are described in Section 4.3.5.3. The potential effects of the future development on aggregate resources were identified by examining the presence of known or identified aggregate resources in the On-site or Off-site Study Areas and predicting potential impacts to their use.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-31**.

PRESENCE OF KNOWN OR IDENTIFIED AGGREGATE RESOURCES

The Provincial Policy Statement (MMAH, 2020) indicates that aggregate resources shall be protected for the long-term. No aggregate resource sites exist within the On-site Study Area. Two aggregate resource sites exist within the Off-site Study Area as follows:

- Peat harvesting on the GFL-owned lands southwest of the existing EOWHF, operated by Calco Soils, located 50 m south of the On-site Study Area. The use conforms with the Official Plan and Zoning Bylaw. Peat harvesting is not considered a “sensitive land use” as per MECP Guideline D-4 (MECP, 1994).
- Aggregate extraction at the Martin Quarry operated by A.L. Blair Construction Ltd. At 17423 Allaire Road, located 800 m east of the On-site Study Area. The Martin Quarry is a licensed quarry that is extracting aggregate materials. This quarry use conforms to the Extractive Resource Lands designation policies. Pits and quarries are not considered a “sensitive land use” as per MECP Guideline D-4 (MECP, 1994).

No potential effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated as a result of Alternative Method 1.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-32**.

PRESENCE OF KNOWN OR IDENTIFIED AGGREGATE RESOURCES

The Provincial Policy Statement (MMAH, 2020)indicates that aggregate resources shall be protected for the long-term. No aggregate resource sites exist within the On-site Study Area. Two aggregate resource sites exist within the Off-site Study Area as follows:

- Peat harvesting on the GFL-owned lands southwest of the existing EOWHF, operated by Calco Soils, located 50 m south of the On-site Study Area. The use conforms with the Official Plan and Zoning Bylaw. Peat harvesting is not considered a “sensitive land use” as per MECP Guideline D-4 (MECP, 1994).
- Aggregate extraction at the Martin Quarry operated by A.L. Blair Construction Ltd. At 17423 Allaire Road, located 800 m east of the On-site Study Area. The Martin Quarry is a licensed quarry that is extracting aggregate materials. This quarry use conforms to the Extractive Resource Lands designation policies. Pits and quarries are not considered a “sensitive land use” as per MECP Guideline D-4 (MECP, 1994).

No potential effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated as a result of Alternative Method 2.

Effects on Agricultural Land

The Agriculture net effects assessment incorporated information from the Agriculture Existing Conditions Report (**Supporting Document 1-12**), and the project details in the CDR (**Supporting Document 2**) in order to assess the net environmental effects of the two alternative methods. The detailed net effects assessment is provided in the Agriculture Effects Assessment Report (**Supporting Document 3-12**).

The study areas for Agriculture are shown on **Figure 4-16** and the existing conditions are described in Section 4.3.5.3. The Off-site Study Area was extended to include the lands in the vicinity of the future development extending approximately 1.5 km from the On-site Study Area.

To identify the potential effects of the future development on Agriculture, the requirements for the future development were examined against the current agricultural uses and conditions within the On-site and Off-site Study Areas. Potential effects on Agriculture can include direct and indirect impacts. Direct impacts on-site relate to the loss of lands that are designated and/or zoned as agriculture and are used for agricultural purposes. All on-site impacts are considered to be direct impacts. Direct impacts off-site may relate to changes in surface water, ground water, air quality, and traffic patterns. Indirect impacts off-site may relate to disturbance or nuisance effects (noise, odours, dust, litter, and vectors and vermin).

Municipalities will typically use a 500 m radius as a guideline for assessing the impact of a landfill site, consistent with the MECP Guideline D-4 “Land Use On or Near Landfills and Dumps” (MECP, 1994). The OMAFRA Draft Agricultural Impact Assessment Guidance Document (OMAFRA, 2018) uses a 1.5 km radius for assessing potential effects. The potential effects on Agriculture were determined by examining the existing agricultural conditions/ characteristics and identifying potential direct and indirect impacts that may result from the future development.

With respect to Agriculture, the key design considerations relate to the potential nuisance controls (dust, odour, noise, litter, and vectors and vermin). Changes to surface water quality and quantity, traffic, effects on current and future land uses, and air quality in the Off-site Study Area can also affect Agriculture. The On-site Study Area lands will be removed from agricultural use.

Alternative Method 1

The net effects assessment for Alternative Method 1 is presented in **Table 6-31**.

PREDICTED LOSS OF AGRICULTURAL LAND USE

The future development will require an area of approximately 240 ha. The construction and operation of Alternative Method 1 will take place on the existing EOWHF site (Stage 5) and the future development lands to the east (Stages 6 through 9) resulting in the loss of approximately 233 ha of lands used for agricultural purposes in the On-site Study Area (i.e., the future development lands).

PREDICTED IMPACTS ON SURROUNDING AGRICULTURAL OPERATIONS

The construction and operation of Alternative Method 1 will take place within the existing On-site Study Area, and there will be no physical disturbance to surrounding agricultural resources as a result of construction. Alternative Method 1 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate, dust, litter, and vectors and vermin, and will maximize the use of existing site infrastructure. No changes to waste and compost volumes beyond currently-approved levels or changes to waste haul routes are anticipated as a result of the future development; therefore, no additional dust is anticipated on surrounding agricultural lands due to traffic.

The Air Quality and Odour Draft Effects Assessment (**Supporting Document 3-1**) predicted exceedances of NO_2, SPM (dust), and PM_{10} at the site boundary, which fall below the relevant standards within 55 m, 350 m, and 450 m from the site boundary, respectively. Concentrations at sensitive receptors (residences) do not exceed the standards. Odour was predicted to increase by 12% over existing conditions, which was determined to be imperceptible. It is assumed that current odour and dust mitigation practices will continue. Consequently, no additional effects to agricultural operations are anticipated as a result of changes to air quality and odour from Alternative Method 1.

The Noise Effects Assessment (**Supporting Document 3-2**) predicted that noise levels from the future development would be below the MECP noise limits. Other than relocation of landfilling operations to the future development lands, the existing equipment and operations comprising the sources of noise emissions will remain unchanged, and current noise control practices will be continued. Consequently, no additional effects to agricultural operations are anticipated as a result of changes to noise from Alternative Method 1.

The Surface Water Quantity Effects Assessment (**Supporting Document 3-5**) concluded that the surface water will meet the MECP monitoring requirements with regard to TSS, and that there will be an increase in total surface water quantity volume to the site outlet but no net effects on peak flows since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions values up to a 100-year return period. Consequently, no additional effects to agricultural operations are anticipated as a result of changes to on-site surface water quality or quantity from Alternative Method 1.

The Land Use Effects Assessment (**Supporting Document 3-11**) concluded that Champion Mushrooms, located at 1454 Highway 138, would become legal

non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use, since Alternative Method 1 does not provide the required 200 m buffer between the future development landfill and the agricultural operation (i.e., sensitive land use). Consequently, this agricultural operation will be affected by Alternative Method 1 as future changes would be prohibited.

TYPE(S) AND PROXIMITY OF AGRICULTURAL OPERATIONS (E.G., ORGANIC, CASH CROP, LIVESTOCK)

Alternative Method 1 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate, dust, litter, and vectors and vermin, and will maximize the use of existing site infrastructure.

A sod farm (Manderley Turf Products) is located on the future development lands within the On-site Study Area, and a variety of agricultural operations were observed in the Off-site Study Area including a mushroom farm, retired facilities, dairy, and poultry operations. The majority of the buildings for these operations are located between 1 km and 1.5 km from the On-site Study Area.

The Socio-Economic Environment Effects Assessment (**Supporting Document 3-7**) concluded that the operations of one local business, Manderley Turf Products, will be displaced by the future development; however, this displacement will be phased over time as the stages are developed, and will be mitigated through the continued provision of lands for sod production by agreement. At this time, the location of these additional lands has not been identified. Manderley Turf Products owns lands on the south side of Laflèche Road that are used for sod production, so it is assumed that the future development will result in the partial displacement of one local business and its business type (sod production) from the On-site Study Area. In addition, a small agricultural operation would be displaced; however, a lease is in place that details the exit arrangements and agricultural businesses would continue in the Off-site Study Area.

Alternative Method 2

The net effects assessment for Alternative Method 2 is presented in **Table 6-32**.

PREDICTED LOSS OF AGRICULTURAL LAND USE

The future development will require an area of approximately 240 ha. The construction and operation of Alternative Method 2 will take place on the existing EOWHF site (Stage 5) and the future development lands to the east (Stages 6 through 8) resulting in the loss of approximately 233 ha of lands used for agricultural purposes in the On-site Study Area (i.e., the future development lands).

PREDICTED IMPACTS ON SURROUNDING AGRICULTURAL OPERATIONS

The construction and operation of Alternative Method 2 will take place within the existing On-site Study Area, and there will be no physical disturbance to surrounding agricultural resources as a result of construction. Alternative Method 2 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate, dust, litter, and vectors and vermin, and will maximize the use of existing site infrastructure. No changes to waste and compost volumes beyond currently-approved levels or changes to waste haul routes are anticipated as a result of the future

development; therefore, no additional dust is anticipated on surrounding agricultural lands due to traffic.

The Air Quality and Odour Draft Effects Assessment (**Supporting Document 3-1**) predicted exceedances of NO_2, SPM (dust), and PM_{10} at the site boundary, which fall below the relevant standards within 10 m, 150 m, and 250 m from the site boundary, respectively. Concentrations at sensitive receptors (residences) do not exceed the standards with the exception of PM_{10} at one receptor that will be vacated prior to construction. Odour was predicted to increase by 26% over existing conditions, which was determined to be imperceptible. It is assumed that current odour and dust mitigation practices will continue. Consequently, no additional effects to agricultural operations are anticipated as a result of changes to air quality and odour from Alternative Method 2.

The Noise Effects Assessment (**Supporting Document 3-2**) predicted that noise levels from the future development would be below the MECP noise limits. Other than relocation of landfilling operations to the future development lands, the existing equipment and operations comprising the sources of noise emissions will remain unchanged, and current noise control practices will be continued. Consequently, no additional effects to agricultural operations are anticipated as a result of changes to noise from Alternative Method 2.

The Surface Water Quantity Effects Assessment (**Supporting Document 3-5**) concluded that the surface water will meet the MECP monitoring requirements with regard to TSS, and that there will be an increase in total surface water quantity volume to the site outlet but no net effects on peak flows since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions values up to a 100-year return period. Consequently, no additional effects to agricultural operations are anticipated as a result of changes to on-site surface water quality or quantity from Alternative Method 2.

The Land Use Effects Assessment (**Supporting Document 3-11**) concluded that Alternative Method 2 provides the required 200 m buffer between the future development landfill and the closest agricultural operation (i.e., sensitive land use). Consequently, no additional effects to agricultural operations are anticipated as a result of changes to land use from Alternative Method 2.

TYPE(S) AND PROXIMITY OF AGRICULTURAL OPERATIONS (E.G., ORGANIC, CASH CROP, LIVESTOCK)

A sod farm (Manderley Turf Products) is located on the future development lands within the On-site Study Area, and a variety of agricultural operations were observed in the Off-site Study Area including a mushroom farm, retired facilities, dairy, and poultry operations. The majority of the buildings for these operations are located between 1 km and 1.5 km from the On-site Study Area.

The Socio-Economic Environment Effects Assessment (**Supporting Document 3-7**) concluded that the operations of one local business, Manderley Turf Products, will be displaced by the future development; however, this displacement will be phased over time as the stages are developed, and will be mitigated through the continued provision of lands for sod production by agreement. At this time, the location of these additional lands has not been identified. Manderley Turf Products owns lands on the south side of Laflèche Road that are used for sod production, so it is assumed that the future

development will result in the partial displacement of one local business and its business type (sod production) from the On-site Study Area. In addition, a small agricultural operation would be displaced; however, a lease is in place that details the exit arrangements and agricultural businesses would continue in the Off-site Study Area.

Alternative Method 2 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate, dust, litter, and vectors and vermin, and will maximize the use of existing site infrastructure.

Table 6-31. Aggregate Extraction and Agricultural Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Aggregate resources	Presence of known or identified aggregate resources and the predicted impact of impairment of their use due to the proposed footprint, construction and operation on-site	• Provincial Policy Statement indicates that aggregate resources shall be protected for the long-term. • No aggregate resource sites exist within the On-site Study Area. • Two aggregate resource sites exist within the Off-site Study Area that are not considered to be a "sensitive land use" as per MECP Guideline D-4.	No potential effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated.	None required.	No net effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated.
Effects on agricultural land	Predicted loss of agricultural land use	The future development will comprise an area of 240 ha.	There will be a direct net loss of 240 ha (233 ha of agricultural lands).	None required.	There will be a net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture.
	Predicted impacts on surrounding agricultural operations	• Construction and operation of Alternative Method 1 will take place within the existing On-site Study Area. • No changes to waste and compost volumes beyond currently-approved levels are anticipated. • No changes to waste haul routes are anticipated. • Alternative Method 1 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate and nuisance effects. • No changes to existing equipment and operational methods. • Current noise control practices will be continued. • Noise levels from the future development would be below the MECP noise limits. • Changes in odour will be imperceptible. • Peak flows to the site outlet will be controlled with the SWM ponds. • Surface water will meet the MECP monitoring requirements with regard to TSS. • One agricultural operation is located within 200 m of the future development landfill for Alternative Method 1.	Champion Mushrooms, located at 1454 Highway 138, would become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use, since Alternative Method 1 does not provide the required 200 m buffer between the future development landfill and the agricultural operation.	None required.	Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use.
	Type(s) and proximity	• A sod farm is located on the future development lands	• The future	GFL will	Possible decrease of

Table 6-31. Aggregate Extraction and Agricultural Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
	of agricultural operations (e.g., organic, cash crop, livestock)	within the On-site Study Area • A variety of agricultural operations were observed in the Off-site Study Area including a mushroom farm, retired facilities, dairy, and poultry operations, The majority of the buildings for these operations are located between 1 km and 1.5 km from the On-site Study Area. • Alternative Method 1 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate, dust, litter, and vectors and vermin, and will maximize the use of existing site infrastructure.	development would partially displace the operations of one local business (Manderley Turf Products). • A small agricultural operation would be displaced from the On-site Study Area; however, agricultural businesses would continue in the area.	continue to provide lands to Manderley Turf Products by agreement.	one local sod production operation due to the relocation of Manderley Turf Products.

Table 6-32. Aggregate Extraction and Agricultural Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Aggregate resources	Presence of known or identified aggregate resources and the predicted impact of impairment of their use due to the proposed footprint, construction and operation on-site	• Provincial Policy Statement indicates that aggregate resources shall be protected for the long-term. • No aggregate resource sites exist within the On-site Study Area. • Two aggregate resource sites exist within the Off-site Study Area that are not considered to be a "sensitive land use" as per MECP Guideline D-4.	No potential effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated.	None required.	No net effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated.
Effects on agricultural land	Predicted loss of agricultural land use	The future development will comprise an area of 240 ha.	There will be a direct net loss of 240 ha (233 ha of agricultural lands).	None required.	There will be a net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture.

Table 6-32. Aggregate Extraction and Agricultural Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
	Predicted impacts on surrounding agricultural operations	• Construction and operation of Alternative Method 2 will take place within the existing On-site Study Area. • No changes to waste and compost volumes beyond currently-approved levels are anticipated. • No changes to waste haul routes are anticipated. • Alternative Method 2 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate and nuisance effects. • No changes to existing equipment and operational methods. • Current noise control practices will be continued. • Noise levels from the future development would be below the MECP noise limits. • Changes in odour will be imperceptible. • Peak flows to the site outlet will be controlled with the SWM ponds. • Surface water will meet the MECP monitoring requirements with regard to TSS. • No agricultural operations are located within 200 m of the future development landfill for Alternative Method 2.	No potential effects to surrounding agricultural operations are anticipated.	None required.	No net effects to surrounding agricultural operations are anticipated.
	Type(s) and proximity of agricultural operations (e.g., organic, cash crop, livestock)	• A sod farm is located on the future development lands within the On-site Study Area • A variety of agricultural operations were observed in the Off-site Study Area including a mushroom farm, retired facilities, dairy, and poultry operations, The majority of the buildings for these operations are located between 1 km and 1.5 km from the On-site Study Area. • Alternative Method 2 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate, dust, litter, and vectors and vermin, and will maximize the use of existing site infrastructure.	• The future development would partially displace the operations of one local business (Manderley Turf Products). • A small agricultural operation would be displaced from the On-site Study Area; however, agricultural businesses would continue in the area.	GFL will continue to provide lands to Manderley Turf Products by agreement.	Possible decrease of one local sod production operation due to the relocation of Manderley Turf Products.

7 Comparative Evaluation of Net Effects and Identification of the Preferred Alternative

This section of the EA Study Report provides a comparative evaluation of the net effects of each alternative method and the identification of the Preferred Alternative.

7.1 Comparative Evaluation

The two alternative methods were comparatively assessed and evaluated using the net environmental effects identified in **Section 6** to compare the two alternative methods at the criteria and indicator level for each environmental component. The following two step methodology was applied to the comparative evaluation:

1. The predicted net effect(s) associated with each alternative method for each indicator were identified and a preference rating was assigned (i.e., Preferred, Not Preferred, No Substantial Difference); and
2. Each alternative method was rated at the criteria level (i.e., Preferred, Not Preferred, No Substantial Difference) based on the identified preference rating for each indicator and a rationale was provided.

The net effects for each indicator are provided in **Table 7-1** for both alternative methods and the Preferred Alternative is identified for each environmental component.

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	Alternative Method 2
Natural Environment			
Atmospheric Environment			
Air Quality	Predicted maximum off-site point of impingement air concentrations of emitted contaminants of concern	• NO_2 concentrations are predicted to exceed the 2025 CAAQS by 54%. Exceedances are at the site boundary and fall to below the standard within 55 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 88%. Exceedances are at the site boundary and fall to below the standard within 350 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • PM_{10} concentrations are predicted to exceed the Ontario AAQC by 150%. Exceedances are at the site boundary and fall to below the standard within 450 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. **Not Preferred**	• NO_2 concentrations are predicted to exceed the 2025 CAAQS by 47%. Exceedances are at the site boundary and fall to below the standard within 10 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 56%. Exceedances are at the site boundary and fall to below the standard within 150 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • PM_{10} concentrations are predicted to exceed the Ontario AAQC by 84%. Exceedances are at the site boundary and fall to below the standard within 250 m of the boundary. Concentrations exceed the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill. Concentrations at other sensitive receptors do not exceed the AAQC. **Preferred**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	**Alternative Method 2**
	Number of off-site receptors potentially affected	• The ground-level concentrations of contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) do not exceed the standards. **No Substantial Difference**	• The ground-level concentrations of contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) do not exceed the standards with the exception of PM_{10}, which exceeded the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time. This sensitive receptor was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill. **No Substantial Difference**
	Criteria Rating and Rationale	***Alternative Method 2 is preferred over Alternative Method 1 for Air Quality.*** Alternative Method 2 will result in lower concentrations of contaminants of concern that fall below the standards within shorter distances from the On-site Study Area boundary than Alternative Method 1. The single exceedance at a sensitive receptor identified for Alternative Method 2 is at a receptor location that has been vacated and will be demolished prior to the implementation of the future development landfill.	
Odour	Predicted maximum off-site odour concentrations	• Scenario A presents the worst-case condition for Alternative Method 1 with regard to odour. • The highest concentration predicted at a sensitive receptor is 1.64 OU/m³, which is a 12% increase over existing conditions. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.1% of the time. **No Substantial Difference**	• Scenario A presents the worst-case condition for Alternative Method 2 with regard to odour. • The highest concentration predicted at a sensitive receptor is 1.85 OU/m³, which is a 26% increase over existing conditions. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.5% of the time. **No Substantial Difference**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	**Alternative Method 2**
	Number of off-site receptors potentially affected	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m³. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.1% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility at the intersection of Allaire Road and Highway 138. • The highest concentration predicted at a sensitive receptor is 1.64 OU/m³, which is a 12% increase over existing conditions. **No Substantial Difference**	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m³. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.5% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility on Highway 138. • The highest concentration predicted at a sensitive receptor is 1.85 OU/m³, which is a 26% increase over existing conditions. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Odour.*** There is no substantial difference between Alternative Methods 1 and 2 as the same number of off-site receptors would be affected at a similar frequency, and the difference in the increase over existing conditions would not be perceptible for either alternative method as odour is non-linear, and a difference of less than a factor of 2 would not be distinguishable to most people.	

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	**Alternative Method 2**
Noise	Predicted site-related noise levels	• Predicted maximum cumulative noise impact from all landfilling operations is 55 dBA at R3, within the limit of 56 dBA at that location. • Predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location. • Predicted maximum impulse noise impact is 59 dBAI at R2 and R3, within the limit of 65 dBAI at those locations. • The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits. **Not Preferred**	• Predicted maximum cumulative noise impact from all landfilling operations is 49 dBA at R3, within the limit of 56 dBA at that location. • Predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location. • Predicted maximum impulse noise impact is 56 dBAI at R2 and R3, within the limit of 65 dBAI at those locations. • The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits. **Preferred**
	Number of off-site receptors potentially affected	• All points of reception within the Off-site Study Area will experience sound levels within the MECP limits. **No Substantial Difference**	• All points of reception within the Off-site Study Area will experience sound levels within the MECP limits. **No Substantial Difference**
	Criteria Rating and Rationale	***Alternative Method 2 is preferred over Alternative Method 1 for Noise.*** Alternative Method 2 results in lower maximum off-site sound levels at the points of reception than Alternative Method 1 for landfilling operations and impulsive sounds because worst-case landfilling activities for Alternative Method 1 are closer to two receptor locations than for Alternative Method 2. There is no substantial difference in the off-site sound levels from stationary sources or the number of potentially-affected off-site noise-sensitive points of reception.	
Overall Rating and Rationale for the Atmospheric Environment		***Alternative Method 2 is the Preferred Alternative from an Atmospheric Environment perspective.*** Alternative Method 2 will result in lower concentrations of contaminants of concern that fall below the standards within shorter distances from the On-site Study Area boundary, and lower maximum off-site sound levels at the points of reception from landfilling and impulsive sounds.	

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	Alternative Method 2
Geology and Hydrogeology			
Groundwater Quality	Predicted effects to groundwater quality at property boundaries and off-site	• The chloride concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer. • No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated. **No Substantial Difference**	• The chloride concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer. • No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Groundwater Quality.*** There is no substantial difference between Alternative Methods 1 and 2 as chloride concentrations at the property boundaries will be below the maximum allowable concentration in the aquifer and no adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated for either alternative method.	
Groundwater Quantity	Predicted groundwater flow characteristics	• No effects to groundwater quantity are anticipated. **No Substantial Difference**	• No effects to groundwater quantity are anticipated. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Groundwater Quantity.*** There is no substantial difference between Alternative Methods 1 and 2 as no effects to groundwater quantity are anticipated for either alternative method.	
Overall Rating and Rationale for Geology and Hydrogeology		***No Preferred Alternative is identified from a Geology and Hydrogeology perspective.*** There is no substantial difference between the two alternative methods for the groundwater quality and quantity evaluation criteria.	

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	Alternative Method 2
Surface Water Environment			
Surface Water Quality	Predicted effects on surface water quality on-site	• The surface water will meet the MECP monitoring requirements with regard to TSS (on-site surface water quality control facilities will be designed to achieve 80% TSS removal). • No net effects to surface water quality at the site outlet are anticipated since the stormwater will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge. **No Substantial Difference**	• The surface water will meet the MECP monitoring requirements with regard to TSS (on-site surface water quality control facilities will be designed to achieve 80% TSS removal). • No net effects to surface water quality at the site outlet are anticipated since the stormwater will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge. **No Substantial Difference**
	Predicted effects on surface water quality off-site	Considering treated effluent concentrations in Moose Creek will be limited to the chronic SSWQOs and stormwater quality will meet MECP requirements prior to release to Fraser Drain, no net effects to off-site surface water quality are anticipated. **No Substantial Difference**	Considering treated effluent concentrations in Moose Creek will be limited to the chronic SSWQOs and stormwater quality will meet MECP requirements prior to release to Fraser Drain, no net effects to off-site surface water quality are anticipated. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Surface Water Quality.*** There is no substantial difference between Alternative Methods 1 and 2 as surface water will meet the MECP monitoring requirements with regard to TSS and no net effects to surface water quality at the site outlet are anticipated for either alternative method.	
Surface Water Quantity	Change in drainage areas	• Increase in total surface water quantity volume to the site outlet but no net effects on peak flows since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions values up to a 100-year return period. **No Substantial Difference**	• Increase in total surface water quantity volume to the site outlet but no net effects on peak flows since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions values up to a 100-year return period. **No Substantial Difference**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	**Alternative Method 2**
	Predicted occurrence and degree of off-site impacts	• Increase in total surface water quantity volume to the site outlet but no net effects on peak flows since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions values up to a 100-year return period. **No Substantial Difference**	• Increase in total surface water quantity volume to the site outlet but no net effects on peak flows since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions values up to a 100-year return period. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Surface Water Quantity.*** There is no substantial difference between Alternative Methods 1 and 2 as no net effects on peak flows are anticipated for either alternative method since peak flows to the site outlet will be controlled with the SWM ponds within pre-development conditions.	
Overall Rating and Rationale for the Surface Water Environment		***No Preferred Alternative is identified from a Surface Water Environment perspective.*** There is no substantial difference between the two alternative methods for the surface water quality and quantity evaluation criteria.	
Ecological Environment			
Terrestrial Ecosystems	Predicted impact on vegetation communities	• Natural and native vegetation cover on Stages 6 through 9 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time. • Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5. **No Substantial Difference**	• Natural and native vegetation cover on Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time. • Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5. **No Substantial Difference**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	**Alternative Method 2**
	Predicted impact on wildlife habitat	• Wildlife habitat associated with the thicket swamp would be removed (13.2 ha). • Artificial wildlife habitat associated with sod fields would be removed (184 ha), but similar habitat would remain in the vicinity. • Potential wildlife habitat associated with trees and buildings on the Manderley Turf Products property would be removed. **No Substantial Difference**	• Wildlife habitat associated with the thicket swamp would be removed (13.2 ha). • Artificial wildlife habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity. • Potential wildlife habitat associated with trees and buildings on the Manderley Turf Products property would be removed. **No Substantial Difference**
	Predicted impact on vegetation and wildlife including rare, threatened or endangered species	• Potential SAR habitat associated with the thicket swamp would be removed (13.2 ha). • Potential SAR habitat associated with sod fields would be removed (184 ha), but similar habitat would remain in the vicinity. • Potential SAR habitat associated with trees and buildings on the Manderley Turf Products property would be removed. **No Substantial Difference**	• Potential SAR habitat associated with the thicket swamp would be removed (13.2 ha). • Potential SAR habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity. • Potential SAR habitat associated with trees and buildings on the Manderley Turf Products property would be removed. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Terrestrial Ecosystems.*** There is no substantial difference between Alternative Methods 1 and 2 as natural and native vegetation cover will be similar or greater than existing conditions, and a similar area of wildlife habitat, potential SAR habitat, and ecosystem functions associated with the thicket swamp, sod fields, and Manderley Turf Products would be removed.	
Aquatic Ecosystems	Predicted impact on aquatic habitat including fish habitat	• Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings. **No Substantial Difference**	• Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings. **No Substantial Difference**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	Alternative Method 2
	Predicted impact on aquatic biota including rare, threatened or endangered species	• No net effects are anticipated. **No Substantial Difference**	• No net effects are anticipated. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Aquatic Ecosystems.*** There is no substantial difference between Alternative Methods 1 and 2 as both alternative methods are anticipated to have the beneficial effect of improvement to aquatic habitat associated with the future development lands, and neither alternative method is anticipated to have an effect on aquatic biota.	
Overall Rating and Rationale for the Ecological Environment		***No Preferred Alternative is identified from an Ecological Environment perspective.*** There is no substantial difference between the two alternative methods for the terrestrial ecosystems and aquatic ecosystems evaluation criteria.	
Socio-Economic Environment			
Economic			
Economic Effects on / Benefits to Local Community	Employment at site (number and duration)	• Beneficial effect from extended duration of employment at site for an additional 20 years. **No Substantial Difference**	• Beneficial effect from extended duration of employment at site for an additional 20 years. **No Substantial Difference**
	Local business employment	• Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years. **No Substantial Difference**	• Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years. **No Substantial Difference**
	Displacement of business activities	• Partial relocation of Manderley Turf Products. • Displacement of a small agricultural operation. **No Substantial Difference**	• Partial relocation of Manderley Turf Products. • Displacement of a small agricultural operation. **No Substantial Difference**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	**Alternative Method 2**
	Opportunities for the provision and procurement of products and/or services	• Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services. **No Substantial Difference**	• Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services. **No Substantial Difference**
	Financial contributions to the local community	• Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations. **No Substantial Difference**	• Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified regarding Economic Benefits to the Local Community.*** There is no substantial difference between Alternative Methods 1 and 2 as both alternative methods will have beneficial effects from an additional 20 years of employment at the EOWHF and local businesses, continued provision of waste management services to municipalities and businesses across Eastern Ontario, and as much as $300 million contributed to the local economy through the procurement of local goods and services. Both alternative methods will also result in the partial relocation of Manderley Turf Products and the displacement of a small agricultural operation.	
Social			
Effects on Local Community	Number of residents	No net effects to number of residents. **No Substantial Difference**	No net effects to number of residents. **No Substantial Difference**
	Number and type of local businesses	Possible decrease of one local sod production business due to the relocation of Manderley Turf Products. **No Substantial Difference**	Possible decrease of one local sod production business due to the relocation of Manderley Turf Products. **No Substantial Difference**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	**Alternative Method 2**
	Predicted changes to use of property	No net effects on residents and their use of property. **No Substantial Difference**	No net effects on residents and their use of property. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified regarding Effects on the Local Community.*** There is no substantial difference between Alternative Methods 1 and 2 as neither alternative method will result in effects to number of residents or changes to use of property, and both will result in the possible decrease of one local sod production business due to the relocation of Manderley Turf Products.	
Visual Impact of Facility	Predicted changes in perceptions of landscapes and views	With the visual screening in place, Alternative Method 1 is not expected to change the visual character of the landscape. **No Substantial Difference**	With the visual screening in place, Alternative Method 2 is not expected to change the visual character of the landscape. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified regarding the Visual Impact of the Facility.*** There is no substantial difference between Alternative Methods 1 and 2 as neither alternative method is expected to change the visual character of the landscape with the visual screening in place.	
Overall Rating and Rationale for the Socio-Economic Environment		***No Preferred Alternative is identified from a Socio-Economic Environment perspective.*** There is no substantial difference between the two alternative methods regarding the economic and social evaluation criteria.	
Cultural Environment			
Cultural Heritage Resources	Proximity of known and potential cultural heritage resources to the landfill site	No net effects on cultural heritage resources. **No Substantial Difference**	No net effects on cultural heritage resources. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Cultural Heritage Resources.*** There is no substantial difference between Alternative Methods 1 and 2 as neither alternative method will result in net effects on cultural heritage resources.	
Archaeological Resources	Archaeological resources on-site and in vicinity and predicted impacts on them	No net effects on archaeological resources. **No Substantial Difference**	No net effects on archaeological resources. **No Substantial Difference**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	**Alternative Method 2**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Archaeological Resources.*** There is no substantial difference between Alternative Methods 1 and 2 as neither alternative method will result in net effects on archaeological resources.	
Overall Rating and Rationale for the Cultural Environment		***No Preferred Alternative is identified from a Cultural Environment perspective.*** There is no substantial difference between the two alternative methods regarding the cultural heritage resources and archaeological resources evaluation criteria.	
Built Environment			
Transportation			
Effects from Truck Transportation along Access Roads	Disturbance to traffic operations	No net effects on traffic operations. **No Substantial Difference**	No net effects on traffic operations. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for the Effects from Truck Transportation along Access Roads.*** There is no substantial difference between Alternative Methods 1 and 2 as neither alternative method will have a net effect on traffic operations.	
Overall Rating and Rationale for Transportation		***No Preferred Alternative is identified from a Transportation perspective.*** There is no substantial difference between the two alternative methods regarding the transportation evaluation criteria.	

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	Alternative Method 2
Current and Planned Future Land Uses			
Effects on Current and Future Land Uses	Current land use	Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use. **Not Preferred**	No net effects to current off-site land uses are anticipated. **Preferred**
	Planned land use	Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities. **No Substantial Difference**	Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities. **No Substantial Difference**
	Type(s) and proximity of off-site recreational resources within 500 m of a landfill footprint potentially affected	No net effects on off-site recreational resources within 500 m of the future development. **No Substantial Difference**	No net effects on off-site recreational resources within 500 m of the future development. **No Substantial Difference**
	Type(s) and proximity of off-site sensitive land uses (e.g., dwellings, churches, parks) within 500 m of a landfill footprint potentially affected	• Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use. • MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses. **Not Preferred**	MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses. **Preferred**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	Alternative Method 2
	Criteria Rating and Rationale	***Alternative Method 2 is preferred over Alternative Method 1 for Effects on Current and Future Land Uses.*** Alternative Method 2 provides greater buffer distances between the future development landfill and the existing sensitive land uses than Alternative Method 1, and allows existing sensitive land use to continue to be in compliance with the Township of North Stormont Zoning Bylaw. There is no substantial difference regarding effects on planned land use and type(s) and proximity of off-site recreational resources within 500 m of the landfill footprint, as development will be restricted within 500 m of the future development landfill and no net effects on off-site recreational resources are anticipated.	
Overall Rating and Rationale for Current and Planned Future Land Uses		***Alternative Method 2 is the Preferred Alternative from a Current and Planned Future Land Use perspective.*** Alternative Method 2 provides greater buffer distances between the future development landfill and the existing sensitive land uses and allows existing sensitive land use to continue to be in compliance with the Township of North Stormont Zoning Bylaw.	
Aggregate Extraction and Agriculture			
Aggregate Resources	Presence of known or identified aggregate resources and the predicted impact of impairment of their use due to the proposed footprint, construction and operation on-site	No net effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated. **No Substantial Difference**	No net effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated. **No Substantial Difference**
	Criteria Rating and Rationale	***There is no Preferred Alternative identified for Aggregate Resources.*** There is no substantial difference between Alternative Methods 1 and 2 as neither alternative method will have a net effect on land use approvals for continuation or expansion of aggregate resource land.	
Effects on Agricultural Land	Predicted loss of agricultural land use	There will be a net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture. **No Substantial Difference**	There will be a net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture. **No Substantial Difference**

Table 7-1. Comparative Evaluation of the Alternative Methods

Evaluation Criteria	Indicators	Net Effects of Alternative Methods	
		Alternative Method 1	Alternative Method 2
	Predicted impacts on surrounding agricultural operations	Alternative Method 1 does not provide the 200 m buffer between the future development landfill and the existing sensitive land use at 1454 Highway 138 (Champion Mushrooms). This would cause the sensitive land use to become legal non-conforming under the North Stormont Zoning Bylaw, which would prevent future building expansions or changes in use. **Not Preferred**	No net effects to surrounding agricultural operations are anticipated. **Preferred**
	Type(s) and proximity of agricultural operations (e.g., organic, cash crop, livestock)	Possible decrease of one local sod production operation due to the relocation of Manderley Turf Products. **No Substantial Difference**	Possible decrease of one local sod production operation due to the relocation of Manderley Turf Products. **No Substantial Difference**
	Criteria Rating and Rationale	***Alternative Method 2 is preferred over Alternative Method 1 for Effects on Agricultural Land.*** Alternative Method 2 allows the adjacent agricultural operation (sensitive land use) to continue to be in compliance with the Township of North Stormont Zoning Bylaw. There is no substantial difference regarding the predicted loss of agricultural land use or type(s) and proximity of agricultural operations as both alternative methods will result in a net loss of 240 ha of land, of which approximately 233 ha is currently used for agriculture, and the possible decrease of one local sod production operation due to the relocation of Manderley Turf Products.	
Overall Rating and Rationale for Aggregate Extraction and Agriculture		***Alternative Method 2 is the Preferred Alternative from an Aggregate Resources and Agriculture perspective.*** Alternative Method 2 allows the adjacent agricultural operation (sensitive land use) to continue to be in compliance with the Township of North Stormont Zoning Bylaw, i.e., no net effects to surrounding agricultural operations are anticipated.	

Alternative Method 2 is preferred over Alternative Method 1 based on the comparative evaluation of net effects to Air Quality, Noise, Current and Planned Future Land Uses, and Effects on Agricultural Land as follows:

- Alternative Method 2 will result in lower concentrations of contaminants of concern that fall below the standards within shorter distances from the On-site Study Area boundary than Alternative Method 1. The single exceedance at a sensitive receptor identified for Alternative Method 2 is at a receptor location that has been vacated and will be demolished prior to the implementation of the future development landfill.
- Alternative Method 2 results in lower maximum off-site sound levels at the points of reception than Alternative Method 1 for landfilling operations and impulsive sounds because worst-case landfilling activities for Alternative Method 1 are closer to two receptor locations than for Alternative Method 2.
- Alternative Method 2 provides greater buffer distances between the future development landfill and the existing sensitive land uses than Alternative Method 1, and allows existing sensitive land use to continue to be in compliance with the Township of North Stormont Zoning By-law.
- Alternative Method 2 allows the adjacent agricultural operation (sensitive land use) to continue to be in compliance with the Township of North Stormont Zoning Bylaw.

7.2 Identification of the Preferred Alternative

As shown in **Table 7-1**, Alternative Method 2 is identified as the Preferred Alternative for four of the evaluation criteria, while the remainder of the assessments determined that there is no substantial difference in the net effects between Alternative Methods 1 and 2. The results are summarized in **Table 7-2**.

Table 7-2. Identification of the Preferred Alternative Summary

Environmental Component	Evaluation Criteria	Preferred Alternative	
		Alternative Method 1	Alternative Method 2
Natural Environment			
Atmospheric Environment	Air Quality	**Not Preferred**	**Preferred**
	Odour	**No Substantial Difference**	**No Substantial Difference**
	Noise	**Not Preferred**	**Preferred**
Preferred Alternative for the Atmospheric Environment		**Not Preferred**	**Preferred**
Geology and Hydrogeology	Groundwater Quality	**No Substantial Difference**	**No Substantial Difference**
	Groundwater Quantity	**No Substantial Difference**	**No Substantial Difference**
Preferred Alternative for Geology and Hydrogeology		**No Substantial Difference**	
Surface Water Environment	Surface Water Quality	**No Substantial Difference**	**No Substantial Difference**
	Surface Water Quantity	**No Substantial Difference**	**No Substantial Difference**

Table 7-2. Identification of the Preferred Alternative Summary

Environmental Component	Evaluation Criteria	Preferred Alternative	
		Alternative Method 1	Alternative Method 2
Preferred Alternative for the Surface Water Environment		**No Substantial Difference**	
Ecological Environment	Terrestrial Ecosystems	**No Substantial Difference**	**No Substantial Difference**
	Aquatic Ecosystems	**No Substantial Difference**	**No Substantial Difference**
Preferred Alternative for the Ecological Environment		**No Substantial Difference**	
Socio-Economic Environment			
Economic	Economic Effects on / Benefits to Local Community	**No Substantial Difference**	**No Substantial Difference**
Social	Effects on Local Community	**No Substantial Difference**	**No Substantial Difference**
	Visual Impact of Facility	**No Substantial Difference**	**No Substantial Difference**
Preferred Alternative for the Socio-Economic Environment		**No Substantial Difference**	
Cultural Environment			
Cultural Environment	Cultural Heritage Resources	**No Substantial Difference**	**No Substantial Difference**
	Archaeological Resources	**No Substantial Difference**	**No Substantial Difference**
Preferred Alternative for the Cultural Environment		**No Substantial Difference**	
Built Environment			
Transportation	Effects from Truck Transportation along Access Roads	**No Substantial Difference**	**No Substantial Difference**
Preferred Alternative for Transportation		**No Substantial Difference**	
Current and Planned Future Land Use	Effects on Current and Future Land Uses	**Not Preferred**	**Preferred**
Preferred Alternative for Current and Planned Future Land Use		**Not Preferred**	**Preferred**
Aggregate Extraction and Agriculture	Aggregate Resources	**No Substantial Difference**	**No Substantial Difference**
	Effects on Agricultural Land	**Not Preferred**	**Preferred**
Preferred Alternative for Aggregate Extraction and Agriculture		**Not Preferred**	**Preferred**
Overall Preferred Alternative		**Not Preferred**	**Preferred**

Alternative Method 2 is preferred over Alternative Method 1 based on the comparative evaluation of net effects to Air Quality, Noise, Current and Planned Future Land Uses, and Effects on Agricultural Land. A description of the Preferred Alternative is provided in **Section 7.3**. The net effects assessment, cumulative effects, climate change considerations, and advantages and disadvantages of the Preferred Alternative are presented in **Section 8**.

7.3 Description of the Preferred Alternative

The Preferred Alternative is Alternative Method 2 as described in **Section 5.4**. Alternative Method 2 consists of implementing the future development through four stages: one stage adjacent to and north of the existing landfill (Stage 5); and three stages oriented north-south within the future development lands (Stages 6 through 8). Stages 6 and 7 will be identical in size, while Stages 5 and 8 will be smaller. Stage 8 is located east of Stage 7. Final contours will reflect a 4H to 1V slope at the perimeter of the stage transitioning to an approximately 3% slope on the top of the stage. The layout for Alternative Method 2 is shown on **Figure 5-2**.

The design of the stages will be consistent with the existing landfill design. The base will be excavated into native soils, perimeter berms will be constructed around each stage, an LCS will convey collected leachate to the leachate aeration ponds located in the southeast portion of the existing landfill and then to the LTF located north of the existing landfill, an LFG collection system will be constructed to convey collected LFG to the existing LFG plant located south of Stage 1, and the SWM system will consist of conveyance ditches around the perimeter of each stage and a retention pond located north of Stages 6 and 7. The existing pond located northeast of Stage 5 will be modified to attenuate peak flows if required.

Visual screening will be constructed along the north and east perimeters and a portion of the south perimeter. A new road entrance from Laflèche Road will include a new scale facility with three 26 m long scales. A soil storage pad will be located adjacent to the new scale facility and to the north of Stage 8.

The geometry of Alternative Method 2 is shown in plan view on **Figure 5-2** and in cross-section on **Figure 5-3** and **Figure 5-5**. The maximum elevation of the top of final cover will be 78.5 masl for Stage 5 and 81.0 masl for Stages 6 through 8. Minimum buffer widths between the limits of waste placement and property boundaries will be as follows:

- North limit Stage 5 to north property boundary: 158 m.
- North limit of Stages 6, 7, and 8 to north property boundary: 210 m.
- East limit of Stage 8 to east property boundary: 241 m.
- South limit of Stage 6 to south property boundary: 100 m.

Additional details on the design of the Preferred Alternative including site development, leachate generation and management, LFG management, SWM, ancillary facilities and infrastructure, and operations are provided in **Section 5.4**.

8 Net Effects Assessment of the Preferred Alternative

This section of the EA Study Report includes a summary of the net effects assessment for the Preferred Alternative (Alternative Method 2), an assessment of cumulative effects, climate change considerations, and advantages and disadvantages of the Preferred Alternative.

8.1 Net Effects Assessment Summary for the Preferred Alternative

A summary of the assessment of the environmental effects of the Preferred Alternative, Alternative Method 2, is presented in **Table 8-1**. This information is summarized from **Section 6.2**.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Natural Environment					
Atmospheric Environment					

Air Quality	Predicted maximum off-site point of impingement air concentrations of emitted contaminants of concern	• Key design considerations are related to the orientation and fill progression of Stages 6 to 8.
		• Solid waste received/landfilled at 755,000 tonnes/year.
		• 15.1 million m^3 of solid waste landfilled over 20-year life.
		• Current practices for LFG emission mitigation and use (daily and interim cover, impermeable cover, capture systems and combustion) will continue.
		• Current dust mitigation practices (e.g., paving, watering, etc.) will continue.
		• Existing infrastructure (LFG combustion facility, access roads, service buildings) will be unchanged.
		• Composting processes and volumes at the facility will be unchanged
		• Landfill working face and construction emissions assessed at two (2) separate locations and future activity years to identify worst-case effects:
		  • Scenario A assessed active landfilling and cell construction in the southeast corner (Stage 8, Cells 1 and 2).
		  • Scenario B assessed active landfilling and cell construction near end of life in the northeast corner (Stage 8, Cells 5 and 6).
		• The facility's existing Fugitive Dust
			• The off-site ground-level concentrations of over 180 contaminants of concern were estimated within the study area and compared against provincial and federal ambient air quality criteria, standards, guidelines and screening levels and the results indicate that all were within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}.
			• NO_2 concentrations are predicted to exceed the 2025 CAAQS by 47%. Exceedances are at the site boundary and fall to below the standard within 10 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard.
			• SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 56%. Exceedances are at the site boundary and fall to below the standard within 150 m of the boundary. High concentrations are mainly associated with road dust
				No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility.	• NO_2 concentrations are predicted to exceed the 2025 CAAQS by 47%. Exceedances are at the site boundary and fall to below the standard within 10 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard.
					• SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 56%. Exceedances are at the site boundary and fall to below the standard within 150 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard.
					• PM_{10} concentrations are predicted to exceed the Ontario AAQC by 84%. Exceedances are at the site boundary and fall to below the

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		Management Plan is expected to be effectively implemented for all current and future operations in order to manage and mitigate the potential fugitive dust emissions from the site's transportation and operational sources.	from on-site haul roads. Concentrations at sensitive receptors (residences) do not exceed the standard. • PM_{10} concentrations are predicted to exceed the Ontario AAQC by 84%. Exceedances are at the site boundary and fall to below the standard within 250 m of the boundary. High concentrations are mainly associated with road dust from on-site haul roads. Concentrations exceed the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard infrequently, only 1 hour in the 43,800 hour modelling period, or 0.002% of the time. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill. Concentrations at other sensitive receptors do not exceed the AAQC.		standard within 250 m of the boundary. Concentrations exceed the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill. Concentrations at other sensitive receptors do not exceed the AAQC.
	Number of off-site receptors potentially	• AERMOD dispersion modelling was used to predict the ground-level	• The off-site ground-level concentrations of over 180	No additional mitigation measures are expected to be necessary beyond those	• The ground-level concentrations of

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
	affected	concentrations of contaminants at receptors within the Off-site Study Area. • A total of 81 individual receptors (residential and commercial properties) were identified within the model to represent the nearest and most potentially-affected receptors. • The EOWHF's existing Fugitive Dust Management Plan is expected to be effectively implemented for all current and future operations in order to manage and mitigate the potential fugitive dust emissions from the site's transportation and operational sources.	contaminants of concern were estimated within the study area and compared against provincial and federal ambient air quality criteria, standards, guidelines and screening levels and the results indicate that all were within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) do not exceed the standards with the exception of PM_{10}, which exceeded the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.	currently applied at the existing facility.	contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) do not exceed the standards with the exception of PM_{10}, which exceeded the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time. This sensitive receptor location was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.
Odour	Predicted maximum off-site odour concentrations	• Key design considerations are related to the orientation and fill progression of Stages 6 to 8. • Solid waste received/landfilled at 755,000 tonnes/year.	• The off-site ground-level concentrations of odour were estimated and compared against a guideline of 1 OU/m^3 that is	No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility.	• Scenario A presents the worst-case condition for Alternative Method 2 with regard to odour.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

		• 15.1 million m³ of solid waste landfilled over 20-year life.
		• Current practices for LFG emission mitigation and use (daily and interim cover, impermeable cover, capture systems and combustion) will continue.
		• Existing infrastructure (LFG combustion facility, access roads, service buildings) will be unchanged.
		• Composting processes and volumes at the facility will be unchanged.
		• Landfill working face and construction emissions assessed at two (2) separate locations and future activity years to identify worst-case effects:
		  • Scenario A assessed active landfilling and cell construction in the southeast corner (Stage 8, Cells 1 and 2).
		  • Scenario B assessed active landfilling and cell construction near end of life in the northeast corner (Stage 8, Cells 5 and 6).
			commonly applied in Ontario.
			• Scenario A presents the worst-case condition for Alternative Method 2 with regard to odour.
			• The highest concentration predicted at a sensitive receptor is 1.85 OU/m³, which is a 26% increase over existing conditions.
			• The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.5% of the time.
					• The highest concentration predicted at a sensitive receptor is 1.85 OU/m³, which is a 26% increase over existing conditions.
					• The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.5% of the time.

	Number of off-site receptors potentially affected	• AERMOD dispersion modelling was used to predict the ground-level concentrations of contaminants at the receptors identified within the off-site study area. • A total of 81 individual receptors (residential and commercial properties) were identified within the model to represent the nearest and most potentially-affected receptor. • The EOWHF's existing odour management practices are expected	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m³. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.5% of the time.	• No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility. • Since odour is not linear, a difference of less than a factor of 2 is not expected to be distinguishable by most people. • The maximum odour values tend to occur	• Six (6) sensitive receptors within the Off-site Study Area are predicted to experience maximum concentrations above 1 OU/m³. • The most frequently impacted sensitive receptor will be exposed to a concentration above

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		to be effectively implemented for all current and future operations in order to manage and mitigate the potential odorous emissions from the future development.	• The sensitive receptor exposed to the highest odour concentration is located east of the facility on Highway 138. • The highest concentration predicted at a sensitive receptor is 1.85 OU/m³, which is a 26% increase over existing conditions.	during calm meteorological periods with low winds, which generally occur during the nighttime hours.	1 OU/m³ approximately 1.5% of the time. • The sensitive receptor exposed to the highest odour concentration is located east of the facility on Highway 138. • The highest concentration predicted at a sensitive receptor is 1.85 OU/m³, which is a 26% increase over existing conditions.

Noise	Predicted site-related noise levels	• Other than relocation of landfilling operations to the future development area, the existing equipment and operations comprising the sources of noise emissions will remain unchanged.
		• Study Areas are influenced by the following noise sources:
		  • 33 visits/hr by landfill trucks
		  • Three rock trucks
		  • Two landfill compactors
		  • Two bulldozers
		  • Two loaders
		  • Two excavators
		  • Two landfill gas flares and associated equipment
		  • Four landfill gas electrical generators and associated equipment
		  • Leachate wastewater treatment
			• Predicted maximum cumulative noise impact from all landfilling operations is 49 dBA at R3, within the limit of 56 dBA at that location.
			• Predicted maximum cumulative noise impact from all stationary sources is 30 dBA at R1, within the limit of 51 dBA at that location.
			• Predicted maximum impulse noise impact is 56 dBAI at R2 and R3, within the limit of 65 dBAI at those locations.
				The potential effects are below the allowable limit; therefore, no additional mitigation measures are required. Current noise control practices will be continued.	The neighbouring noise-sensitive points of reception will experience a minor increase in noise levels relative to existing conditions resulting from landfilling activities; however, the noise levels will be below the MECP noise limits. Landfilling activity may be audible at times, during lulls in background sound levels.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		facility • 12 visits/hr by trucks to the compost facility • Composting operations • RPRA bin drop-off/pickup, non-impulsive & impulsive sound (max 1/hr) • Impulse sounds from tail gates (max 4/hr) • Measured sound emission levels of actual equipment at EOWHF were used for the predictive analysis. • The worst-case locations for landfilling activities were assessed. • Final (near closure) landfill topography as the worst-case elevations was assessed. • Equipment is maintained to prevent atypical noise emissions.			
	Number of off-site receptors potentially affected	Eight noise-sensitive points of reception are located within the Off-site Study Area.	All points of reception within the Off-site Study Area will experience sound levels within the MECP limits.	No additional mitigation required. Continue current noise control practices and annual noise monitoring program.	Noise levels at all points of reception within Off-site Study Area will be within the MECP regulatory sound level limits.
Geology and Hydrogeology					
Groundwater Quality	Predicted effects to groundwater quality at property boundaries	• Cross-sections and modelling inputs and outputs for Alternative Method 2 are provided in Appendix A of **Supporting Document 3-3**. • The LCS is assumed to remain fully functional for a service life of 100	• Following the end of the LCS service life, the chloride concentration in leachate was calculated to increase to a maximum of 166 mg/L in Year 1000 (Alt	None required.	• The chloride[19] concentrations at the property boundaries will be below the maximum allowable concentration the

[19] Chloride, a non-degrading and non-adsorbing constituent of leachate, was used to represent worst case conditions for assessing effects on groundwater quality.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

	and off-site	years.
		• The infiltration rate for each closed stage will be 0.042 m/yr of precipitation, and the resulting leachate will be collected continuously.
		• One cross-section was developed for Stage 5 within the EOWHF site, and five cross-sections were developed for the future development lands as follows:
		  • Stage 5: 1,750 m section with 10 m of underlying silty clay.
		  • Stages 6 through 8:
		  • 1,538 m section with 9.5 m of underlying silty clay (Alt 2-1);
		  • 1,379 m section with 8.7 m of underlying silty clay (Alt 2-2);
		  • 1,107 m section with 8.2 m of underlying silty clay (Alt 2-3);
		  • 377 m section with 5.5 m of underlying silty clay (Alt 2-4); and
		  • 493 m section with 5.8 m of underlying silty clay (Alt 2-5).
			2-1) and Year 930 (Alt 2-2).
			• The maximum concentration in the aquifer would be 133 mg/L in Year 520 (Alt 25).
					aquifer.
					• No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated.

Groundwater Quantity	Predicted groundwater flow characteristics	Silty clay underlying the proposed landfill is a low-hydraulic conductivity layer (aquitard) overlying the bedrock below.	The vertical gradients between the bedrock and the silty clay aquitard are generally upwards; therefore, no effects to groundwater quantity are anticipated	None required.	No effects to groundwater quantity are anticipated.
Surface Water Environment					
Surface Water Quality	Predicted effects on surface water quality on-site	• The SWM wet pond will have a permanent pool storage volume of 40,500 m^3 and extended detention storage volume of 25,160 m^3.	Increase in runoff volume and suspended solids to the site outlet.	Wet ponds need maintenance for proper quality control (i.e., sediment removal).	• The surface water will meet the MECP monitoring requirements with

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		• On-site surface water quality control facilities will be designed to achieve 80% TSS removal.		Operational and maintenance requirements for the proposed wet ponds will be specified in the amended ECA that will be issued for the project.	regard to TSS (on-site surface water quality control facilities will be designed to achieve 80% TSS removal). • No net effects to surface water quality at the site outlet are anticipated since the water will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge.
	Predicted effects on surface water quality off-site	• Off-site Study Area is influenced by discharge from the LTF and SWM ponds • Additional SWM ponds will be added for the future development to provide stormwater quantity and quality control prior to discharge to the Fraser Drain. • Leachate management system operations are to be modified appropriately for the future development. • Upgrades are planned to the LTF to achieve effluent limits acceptable to the MECP for treated effluent. • Treated effluent will be discharged directly to Moose Creek. • Discharge of treated effluent will be managed to meet chronic SSWQOs in Moose Creek (compliance location), combined with a mixing zone if required.	• No adverse effects on off-site surface water quality during treated effluent discharge are anticipated. • Considering that treated effluent concentrations are expected to remain the same during controlled discharge, the future development is not expected to result in substantial changes to off-site surface water quality.	• Complete ECA amendment (ECA No. 7899-CBQP6L) for the proposed increase in total leachate volume to be treated and managed to achieve compliance effluent limits acceptable to the MECP for treated effluent. • Complete ECA amendment (ECA No. 7899-CBQP6L) for the proposed SWM discharge outlet to Fraser Drain. • An ACS and MZ assessment will be undertaken for Moose Creek as part of amended ECA approvals. • A detailed leachate management plan will be	• Considering treated effluent concentrations in Moose Creek will be limited to the chronic SSWQOs and stormwater quality will meet MECP requirements prior to release to Fraser Drain, no net effects to off-site surface water quality are anticipated.

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Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		• Stormwater quality will meet MECP requirements prior to release to the Fraser Drain.		prepared as part of the ECA amendment application to address the design of the effluent discharge system, operation of temporary storage ponds and effluent assimilation in Moose Creek. • Implement proposed run-off and leachate management controls. • Continue existing monitoring program, possibly with some additions/enhancements. • Discharge from the proposed SWM pond and LTF will follow the requirements of the amended ECA that will be issued for the project.	
Surface Water Quantity	Change in drainage areas	• Total area that will be draining to the Fraser Drain from the future development is 215 ha. • The drainage area to the Fraser Drain downstream of the future development lands will be increased by 33.1 ha due to the catchment area being diverted from the Upper Tayside Municipal Drain to the Fraser Drain. • All cells will be closed, capped, and covered which will allow minimal infiltration, increasing the global imperviousness of the site. • Sufficient storage will be provided in	Increase in runoff volume and peak flow rate to the site outlet.	None required.	Increase in total surface water quantity volume, but no net effects since peak flows to the site outlet will be controlled with the ponds within the pre-development conditions values up to a 100-year return period.

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Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		the perimeter ditches and the northeast pond (to be confirmed during detailed design). • On-site surface water quantity control storage and conveyance will be appropriately designed to meet the site operational practice.			
	Predicted occurrence and degree of off-site impacts	• Proposed wet pond will provide an active storage volume of 151,220 m^3 for extended detention and water quantity control. • Perimeter channel will be capable of conveying a 100-year storm event. • On-site surface water quantity control storage and conveyance will be appropriately sized to meet the site operational practice.	Increase in runoff volume and peak flow rate to the site outlet.	• Stormwater management facilities will be designed in accordance with MECP's Stormwater Management Planning and Design Manual (2003) and O. Reg 232/98. The design of the pond will be submitted to MECP for review and approval prior to incorporation into the amended ECA that will be issued for the project. • Discharge from the proposed SWM pond and LTF will follow the requirements of the amended ECA that will be issued for the project.	Increase in total surface water quantity volume, but no net effects since peak flows to the site outlet will be controlled with the ponds within the pre-development conditions values up to a 100-year return period.
Ecological Environment					
Terrestrial Ecosystems	Predicted impact on vegetation communities	• Vegetation removal throughout most of the project footprint would be necessary to accommodate site preparation, construction, and operation. • Future development lands are mostly devoid of natural vegetation, so Alternative Method 2 would require limited removal of natural	• Removal of 13.2 ha of thicket swamp in the Stage 5 area combined with tree removal could result in a loss of ecosystem functions such as biodiversity (e.g., native species), wildlife habitat, landscape aesthetics, flood	• Vegetation removal will be limited to areas necessary for construction. • Vegetation removal will be phased, if feasible, to minimize the amount of exposed soil at a given time. • Impacts to retained trees	• Natural and native vegetation cover on Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		vegetation. • Natural vegetation removal would be mostly confined to the Stage 5 area (13.2 ha of organic deciduous thicket swamp). Trees that interact with the two crossings over the Fraser Drain would need to be removed (naturalized deciduous hedgerow), along with trees associated with the Manderley Turf Products property. The remaining vegetation removal is mostly associated with non-natural sod fields. • No impacts to vegetation communities of Moose Creek Wetland are anticipated.	attenuation, water quality improvement, pollutant removal, erosion control, carbon sequestration and storage, regulation of relative humidity, wind-shielding, shading, reduction of urban heat island effects, and filtration of dust, noise, and light pollution. • Removal of the sod fields could remove non-natural wildlife habitat.	will be minimized by: • Erecting construction fence beyond the critical root zone (10x the trunk diameter) to prevent interaction with retained trees and their roots. • Pruning branches to avoid conflict with construction equipment. • Refraining from attaching signs and other materials to trees.	natural vegetation in these areas would be replaced over time. • Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5.
	Predicted impact on wildlife habitat	• Watercourses in the study areas likely provide habitat for other turtle species and anurans that are not protected under the ESA, act as travel corridors, and provide turtle foraging (e.g., fish) resources. • The thicket swamp in the Stage 5 area may provide habitat for snake species and anurans not protected under the ESA. • The sod fields on the future development lands are not Significant Wildlife Habitat; however, they provide staging and stopover habitat for hundreds of Snow Geese and Canadian Geese in the spring and fall. • The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide bat roosting habitat, but more ideal roosting	• Construction adjacent to watercourses could interact with anurans and migrating and/or foraging turtles, with risk of these species being harmed or harassed. • Removing the thicket swamp would remove 13.2 ha of potential habitat for snakes and anurans, as well as for birds and bats. • Removing the sod fields would remove 182 ha of staging and stopover habitat for geese and potential foraging habitat for bats, but remaining sod fields in the vicinity would still provide such habitat. • Removing trees and buildings associated with	• During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. • The silt fencing will be inspected regularly, particularly during the active wildlife season to confirm continued functionality. • The visual screening buffer may also help deter turtles from accessing the future development. • Vegetation removal and alterations to buildings will not take place during	• Wildlife habitat associated with the thicket swamp would be removed (13.2 ha). • Artificial wildlife habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity. • Potential wildlife habitat associated with trees and buildings on the Manderley Turf Products property would be removed.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		habitat exists in Moose Creek Wetland in the Off-site Study Area. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat. • The future development will not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland are anticipated.	the Manderley Turf Products property would remove potential roosting and nesting habitat for bats and birds, respectively. • The future development, including the waste and the SWM pond, could artificially attract wildlife. The stormwater pond would likely provide suitable foraging habitat for bats, birds, and some species of anurans, and could provide overwintering habitat for turtles. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.	sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[1] to prevent impacts to birds and bats. • Wildlife will not be harmed, fed, or harassed. • Waste will be covered daily to limit wildlife attraction to the landfill. • Vehicles and equipment will be driven slowly and with an awareness for wildlife along access routes. • Stockpiles and equipment (e.g., pipes) will be managed on the site to prevent wildlife from being attracted to artificial habitat. • Work areas will be checked for wildlife before commencing work. • Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development. • Wildlife artificially attracted to the future development	

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Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
				will be managed using current EOWHF practices (e.g., use of raptors to deter gulls) and thus are expected to align with standard and accepted approaches. • Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).	
	Predicted impact on vegetation and wildlife including rare, threatened or endangered species	• No regionally rare floral or faunal species were observed within the study areas. • Midland Painted Turtle, a provincially significant species, was observed in the Off-site Study Area and has a high potential to interact with the future development. • SAR listed under the ESA that were observed in the On-site Study Area are: Bank Swallow (Threatened); Barn Swallow (Threatened); and Little Brown Myotis (Endangered). • A Bank Swallow nesting colony was observed directly southwest of the future development lands. Category 1 and Category 2 habitat would not be directly altered by the future	• Construction adjacent to watercourses could interact with migrating and/or foraging turtles (Snapping Turtle and/or Midland Painted Turtle), with risk of these species being harmed or harassed. • Stage 6 of the future development slightly overlaps with protected foraging (Category 3) habitat for Bank Swallow. The Category 3 area is highly disturbed. Development within the Stage 6 area is not anticipated to alter the	• During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife. • The silt fencing will be inspected regularly, particularly during the active wildlife season to confirm continued functionality. • The visual screening buffer may also help deter turtles from accessing the future development.	• Potential SAR habitat associated with the thicket swamp would be removed (13.2 ha). • Potential SAR habitat associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity. • Potential SAR habitat associated with trees and buildings on the Manderley Turf Products property would be removed.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		development. • Barn Swallow is known to nest in the general area. Category 3 habitat does not occur on the future development lands. • Little Brown Myotis likely forages over the future development lands, but similar habitat exists within the vicinity. • The thicket swamp in the Stage 5 area and trees along the Fraser Drain may provide roosting habitat for Little Brown Myotis, but more ideal roosting habitat exists in Moose Creek Wetland. Buildings and trees associated with the Manderley Turf Products property may also provide roosting habitat. • SAR listed under the ESA that were observed in the Off-site Study Area are: Snapping Turtle (Special Concern); Eastern Ribbonsnake (Special Concern); Eastern Whip-poor-will (Threatened); Eastern Wood-pewee (Special Concern); and Wood Thrush (Special Concern). • Snapping Turtle was observed in association with the Roxborough-Plantagenet Boundary Municipal Drain. • The thicket swamp in the Stage 5 area may provide habitat for Eastern Ribbonsnake. • Observations of Eastern Whip-poor-will, Eastern Wood-pewee, and Wood Thrush were associated with Moose Creek Wetland.	ecological function of this habitat given that open foraging space would be retained, and Category 3 habitat has a high tolerance to alteration. • Removing the thicket swamp would remove 13.2 ha of potential habitat for Eastern Ribbonsnake and Little Brown Myotis. • The future development would remove the buildings on the Manderley Turf Products property, which would remove potential nesting habitat for Barn Swallow and roosting habitat for Little Brown Myotis. • Removing the sod fields would remove 182 ha of potential foraging habitat for Little Brown Myotis, but remaining sod fields in the vicinity would still provide such habitat. • The new SWM pond could increase foraging habitat for Little Brown Myotis, Bank Swallow, and Barn Swallow (if nesting/roosting in the vicinity), and could provide overwintering habitat for Snapping Turtle and Midland Painted Turtle. This constructed habitat would be considered	• GFL will consult with the MECP to confirm that no additional mitigation, avoidance, or compensation measures are required to eliminate potential impacts to Bank Swallow and its habitat. • Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive[1] to prevent impacts to birds and bats. • Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development. • Site workers will be familiar with SAR that have potential to interact with the project. • Observations of and interactions with SAR will be reported to GFL for further direction. • Maintenance works associated with the new	

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		• The future development will not directly interact with the Roxborough-Plantagenet Boundary Municipal Drain. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland are anticipated.	marginal given its anthropogenic nature and stormwater treatment functionality. • No impacts to Significant Wildlife Habitat associated with Moose Creek Wetland or Roxborough-Plantagenet Boundary Municipal Drain are anticipated.	stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for SAR and other wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).	
Aquatic Ecosystems	Predicted impact on aquatic habitat including fish habitat	• The capacity of the LTF will be expanded to accept and treat leachate generated from the existing landfill and the future development following MECP requirements. • Estimated maximum leachate generation for Alternative Method 2 is 123,752 m^3. • Treated effluent is currently discharged to the Fraser Drain via pulse events from the northwestern portion of the existing EOWHF; however, as part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek. • Temperature balance models show that thermal contributions of treated effluent currently do not pose significant risk to fish species in the Fraser Drain or Moose Creek. • The proposed SWM pond would outlet into the Fraser Drain, which is a fish-bearing watercourse. It is assumed that the construction of the	• Concentrations for regulated effluent parameters (ammonia, boron, chloride, nitrate, phenols) will align with SSWQOs, which will provide satisfactory protection to aquatic biota including fish (**Supporting Document 3-4**). • No net off-site effects are predicted related to suspended solids or flow volumes (**Supporting Document 3-5**). • Stormwater and leachate would be managed and treated under permissions from MECP (as well as SNC and DFO as may be required), and as such, effluent can be anticipated to have no net deleterious effect on fish habitat in terms of water quality, water quantity, and thermal	• Discharges from the SWM pond and LTF will follow requirements of an ECA to be issued for the project by MECP. • GFL will consult with MECP, SNC, and DFO to determine information, design, and permit requirements for alterations to watercourses, including mitigation and/or compensation measures. • All requirements of a permit from SNC to alter the Fraser Drain shall be followed, along with any DFO requirements. • A Request for Review of the proposed alterations to the Fraser Drain will be submitted to DFO for consideration of potential impacts, and to determine whether they would	Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings.

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Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

		outlet channel would require working below the normal high-water mark.
		• The proposed development incorporates two culvert crossings over the Fraser Drain.
		• Proposed setbacks from watercourses on the future development lands are:
		  • Northern development limit from Roxborough-Plantagenet Boundary Municipal Drain: ≥ 13 m setback for visual screening buffer.
		  • Eastern development limit from Upper Tayside Municipal Drain: ≥ 9 m setback for visual screening buffer to ≥ 15 m setback for eastern drainage ditches.
		  • Western development limit from Fraser Drain: ≥ 8 m setback for western drainage ditches to 30 m setback for SWM pond.
		• Surface water features on the future development lands either go dry or are very shallow by mid-summer. Only the Fraser Drain and Upper Tayside Municipal Drain provided habitat for fish communities in the summer.
		• The Fraser Drain and Upper Tayside Municipal Drain on the future development lands provide mostly cool-warm and warm waters for fish, respectively. Captured fish species, which are typical for the region, are considered primarily to be warm- and cool-water species except for
			contributions.
			• The culvert crossings over the Fraser Drain and the SWM pond outlet to the Fraser Drain would be designed and constructed following requirements of SNC and DFO are therefore anticipated to have no net deleterious effect on fish habitat.
			• Proposed setbacks from watercourses on the future development lands are expected to improve aquatic and riparian habitats of these features relative to existing conditions. Current land uses extend to the banks of the watercourses, and the proposed setbacks would increase the buffer between the watercourses and operations on the future development lands.
			• The planted visual screening buffer along the peripheries of the future development lands is anticipated to enhance aquatic and riparian habitat through an increase in natural vegetation cover (e.g., soil stabilization/ erosion control, shading, allochthonous inputs, habitat structure, etc.).
				require a *Fisheries Act* Authorization.
				• To further minimize impacts to aquatic habitat and water quality in the Fraser Drain and other surface water features in the study areas, the construction of road crossings and the SWM pond outlet channel into the drain will incorporate the following mitigation measures:
				  • In-water work areas will be isolated during construction and may require fish to be relocated from work areas.
				  • In-water works will be planned such that they respect fish-protection timing windows.
				  • Riparian vegetation will be maintained to the extent possible between areas of on-land activity and the high-water mark of the drain. Use methods to avoid soil compaction, such as swamp mats or pads.
				  • Following construction of the crossings and installation of the culverts, fish passage	

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		Northern Pearl Dace which also prefers cold water streams. • Northern Pike was historically documented in Moose Creek but has not been detected in this watercourse since 1996 and is not known to occur in other watercourses in the study areas. Northern Pike spawning surveys confirmed that most reaches of watercourses associated with the study areas provide sub-optimal spawning habitat for Northern Pike, with a general absence of flooded vegetation.	Shading can be anticipated to reduce solar insolation and provide channel cooling. • Site preparation and construction could increase erosion and sedimentation, with potential for sediment to be released into surface water features. • The proposed SWM pond would increase fish habitat on the future development lands. This constructed habitat would be considered marginal given its anthropogenic nature and stormwater treatment functionality.	will be maintained. The changing of flows or water levels and obstructing or interfering with the movement and migration of fish will be avoided. Culvert size and position will be based on existing hydrologic conditions. • The SWM pond will be discharged in such a way or with design options to avoid channel erosion. • Consideration will be given to the incorporation of an outlet control structure that could stop discharge into the Fraser Drain if water quality issues are encountered on site. • The potential for sediment to be released into surface water features during site preparation and construction will be mitigated using standard erosion and sediment control measures. • Maintenance works associated with the new SWM pond (e.g., sediment cleanout) will be reviewed by a qualified person to	

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Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
				confirm compliance with best management practices for minimizing impacts to fish (e.g., removal and relocation of fish under appropriate permits).	
	Predicted impact on aquatic biota including rare, threatened or endangered species	• None of the fish species known to occur in the study areas or collected via electrofishing are outside of a known range. • No provincially and/or nationally listed (SAR) fish species were observed and no critical habitat for aquatic SAR or sensitive spawning habitat was identified within the study areas.	No potential effects are anticipated.	Mitigation measures to minimize impacts to water quality and fish habitat identified above would also minimize potential impacts to downstream watercourses that support more complex fish communities and other aquatic biota.	No net effects are anticipated.
Socio-Economic Environment					
Economic					
Economic effects on/benefits to local community	Employment at site (number and duration)	• No anticipated changes to the number of employment positions at the EOWHF as a result of the future development. • The site is expected to operate for an additional 20 years.	Beneficial effect from extended duration of employment at site for an additional 20 years.	None required	Beneficial effect from extended duration of employment at site for an additional 20 years.
	Local business employment	• GFL relies on a variety of vendors to maintain its operations at the EOWHF, which contributes to indirect employment at local businesses. • The site is expected to operate for an additional 20 years.	Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years.	None required	Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years.
	Displacement of business	• The future development lands are currently leased for agricultural	The future development would partially displace the	• The displacement will be phased as the stages are	• Partial relocation of Manderley Turf

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Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
	activities	operations and sod and turf production. • A lease is in place with the agricultural operator detailing the exit arrangements.	operations of one local business (Manderley Turf Products) who lease land from GFL and a small agricultural operation.	developed. • GFL will continue to provide lands to Manderley Turf Products by agreement.	Products. • Displacement of a small agricultural operation.
	Opportunities for the provision and procurement of products and/or services	• GFL provides cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario, including over 500 villages, towns, and cities. • GFL contributes up to approximately $15 million annually to the local economy through the procurement of local goods and services. • The site is expected to operate for an additional 20 years.	• Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario and energy via the LFGTE plant for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services.	None required	• Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario and energy via the LFGTE plant for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services.
	Financial contributions to the local community	• GFL supports a number of community initiatives and participates in several programs and committees in the local area. • A new 20-year Host Community Agreement was negotiated between GFL and the Township of North Stormont to take effect in 2022.	• Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations.	None required	• Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations.

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Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Social					
Effects on local community	Number of residents	• There are six existing residences within the Social Off-site Study Area; however, GFL has acquired the residence located directly east of the EOWHF future development lands (1397 Highway 138), which was vacated in Summer 2022 and will be demolished. • No new residential developments are planned within the Social Off-site Study Area.	No potential effect to number of residents.	None required	No net effects to number of residents.
	Number and type of local businesses	• There are 14 businesses located within the Study Areas; one within the On-site Study Area, and 13 within the Social Off-site Study Area. • The future development lands are currently leased for agricultural operations and sod and turf production.	• The future development would partially displace the operations of one local business (Manderley Turf Products). • A small agricultural operation would be displaced; however, agricultural businesses would continue in the area.	GFL will continue to provide lands to Manderley Turf Products by agreement.	Possible decrease of one local sod production business due to the relocation of Manderley Turf Products.

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	Predicted changes to use of property	• Residents and their use of property can be affected through disturbance from noise, dust, odour, litter, vectors and vermin, and changes to the visual landscape. • GFL employs a variety of proactive measures to minimize nuisance effects related to noise, dust, odour, litter, and vectors and vermin as outlined in Section 5.3.8.6. • The site's operating hours will remain unchanged and no additional large equipment will be required. • GFL will continue to provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community. • The future development will be of similar height to the existing EOWHF landfill.	• No potential effect on residents and their use of property from noise. Noise level will be below the MECP's sound level limits at the closest residences. • No potential effect on residents and their use of property from dust. Concentrations at the sensitive receptors (i.e., residences) are not expected to exceed the relevant standard. • Alternative Method 2 could result in a minor increase in off-site odour concentrations; however, the increase from existing conditions would be imperceptible and unlikely to result in a change in use of property. • No potential effect on residents and their use of property from litter or vectors and vermin. • Alternative Method 2 would be almost if not completely obstructed from the closest residences that are expected to exist at the time of construction; therefore, it would not affect residents and their use of property from changes to the visual landscape.	GFL will continue to implement the odour control measures outlined in Section 5.3.8.6, and provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.	No net effects on residents and their use of property.

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Visual Impact of Facility	Predicted changes in perceptions of landscapes and views	• The future development will be of similar height to the existing EOWHF landfill (approximately 15 m in height or 80 masl). • Visual screening will be constructed along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings.	• Views of Alternative Method 2 would be almost if not completely obstructed by existing vegetation from the closest residences that are expected to exist at the time of construction; therefore, it would not affect residents and their use of property from changes to the visual landscape. • Alternative Method 2 will result in a change to the landscape; however, it will be of similar height to the existing EOWHF landfill and visual screening will be provided to obstruct the view from transient locations (i.e., roadways) in the form of earthen berms and/or vegetation plantings.	The visual screening should be at least 2.4 m (8 feet) high on the northern, eastern, and southern perimeters, and at least 4.5 m (16 feet) high in the northeastern corner of the perimeter to mitigate visual impacts.	With the visual screening in place, Alternative Method 2 is not expected to change the visual character of the landscape.
Cultural Environment					
Cultural heritage resources	Proximity of known and potential cultural heritage resources to the landfill site	• Three cultural heritage resources are located within the Off-site Study Area. • No cultural heritage resources are identified within the On-site Study Area. • Construction and staging will be suitably planned and undertaken to avoid impacts to identified cultural heritage resources. • There are no operational changes anticipated for the expanded landfill, and therefore no changes in general	• No direct impacts to identified cultural heritage resources are anticipated. • No indirect adverse impacts on identified cultural heritage resources are anticipated, as there will be no changes to the landfill height and operational changes. • The future development and associated construction activities will not result in vibration	None required.	No net effects on cultural heritage resources.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		operational practices, on-site equipment, traffic volume or waste haul routes are expected as a result of Alternative Method 2. • No changes to the landfill height are expected. • The planned construction activities within the On-site Study Area will result in four phased landfill envelopes consistent with existing landfill design, SWM system, new access road from Laflèche Road and internal road network, new scale facility, soil storage pads, and visual screening along the north and east perimeters and a portion of the south perimeter consisting of earthen berms and/or vegetation plantings.	impacts to identified cultural heritage resources as they are located more than 50 m from the future development lands. • Given the distance between identified cultural heritage resources and the On-site Study Area, the presence of an existing landfill site, as well as the proposed visual screening around the site, no adverse impacts to the setting or character of identified cultural heritage resources are anticipated.		
Archaeological resources	Predicted impacts to archaeological resources on-site and in vicinity	• The Stage 1 Archaeological Assessment for the future development lands determined that there is no archaeological potential. • Previous Stage 1 Archaeological Assessment for the EOWHF site determined that there is no archaeological potential including the proposed Stage 5 area.	No potential for the disturbance of unassessed or documented archaeological resources.	Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*. The *Funeral, Burial and*	No net effects on archaeological resources.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
				Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (atarchaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.	
Built Environment					
Transportation					
Effects from truck transportation	Disturbance to traffic operations	• No changes to waste haul routes are anticipated. • Transportation effects were	• Based on the theoretical maximum, up to 25 and 27 additional two-way trips are	None required.	There are no net effects on traffic operations: • Under existing, future

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
along access roads		assessed based on a theoretical daily maximum tonnage received (4,000 tonnes per day landfill and compost material). • The future development is not anticipated to generate additional measurable traffic related to construction due to on-site soil suitability for use as the base liner and cover material. Additional soil requirements for cover are included in the projected vehicle trips. • Employee traffic volumes will remain unchanged and do not occur during peak hours. • The proportion of inbound and outbound traffic volumes will remain steady, along with the proportion of trucks to light vehicles. • No changes to typical on-site times (less than 30 minutes) and weigh scale times (less than 3 minutes) are anticipated. • Hourly, daily, and seasonal patterns will remain stable. • The breakdown of vehicle types and average vehicle loads will remain stable. • GFL will continue to support the minimization of environmental impacts associated with GHG emissions through reducing the number of waste-related trucks hauling material long distances. • No planned road network improvements or background developments were identified within the study areas.	projected to enter the facility during the weekday AM, and PM peak hours, respectively, which is a 68%, and 69% increase over existing conditions. • Saturday trip generation may increase from 15 two-way trips per hour to a theoretical maximum of 113 trips per hour. The average daily facility traffic associated with the landfill is not anticipated to change from observed 2020 conditions.		background, and future total conditions, during both horizon years (2025 and 2035), there is and will continue to be residual capacity in the road network, even under the conservative assumption that the maximum daily tonnage is received. There are no operational concerns at any study intersections as a result of the EOWHF expanded landfill and future development lands. • No road network improvements are necessary. • There are no significant safety concerns based on a review of Highway 138 accident rates.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		• A conservative 2% compound annual growth rate was applied to all turning movement volumes, with the exception of turning movements in to and out of Laflèche Road and Allaire Road since these are local roadways.			
Current and Planned Future Land Use					

Effects on current and planned future land uses	Current land use	• Most of the existing surrounding land uses are compatible and would not be sensitive to the future development.
		• The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area.
		• Sensitive land uses are prohibited within 200 m of the expanded landfill in the Township of North Stormont.
		• Alternative Method 2 proposes the following buffer distances between the future development landfill and the existing sensitive land uses:
		  • 1454 Highway 138 (Champion Mushrooms): 279 m.
		  • 17305 Allaire Road (Calco Soils): 411 m.
		  • 1397 Highway 138 (Residential Dwelling): 308 m.
		  • 17319 Allaire Road (Residential Dwelling): 493 m.
		• The residential dwelling at 1397 Highway 138 was vacated in Summer 2022 and will be demolished prior to the implementation of the future
			• Alternative Method 2 provides the 200 m buffer between the expanded landfill and all four existing sensitive land use allowing them to continue to be in compliance with the North Stormont Zoning Bylaw; consequently, no potential effects to current off-site land uses are anticipated.
			• No effects to current land uses within the On-site Study Area are anticipated because Alternative Method 2 is consistent with the Official Plan and Zoning By-law.
				None required.	No net effects to current off-site land uses are anticipated.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		development landfill.			

	Planned land use	• Development in the Off-site Study Area may be restricted by municipal and provincial policies based on distance from expanded landfill.
		• Alternative Method 2 provides the following setbacks on the future development lands between the landfill stages and the property boundary:
		  • North setback: 210 m.
		  • East setback: 241 m.
		  • South setback: 100 m.
		• Visual screening around the periphery of the site consisting of earthen berms and/or vegetation plantings.
		• Phasing of landfill stages from east to west.
			• Development may be restricted within 500 m of the expanded landfill in all municipalities.
			• Development would be prohibited within 30 m of the future development landfill in all municipalities.
			• Development would be prohibited within 50 m of the future development landfill in The Nation Municipality
			• Development of sensitive land uses would be prohibited within 200 m of the expanded landfill in the Township of North Stormont.
			• No effect on existing development applications (700 m from On-site Study Area).
				None required.	Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities.

	Type(s) and proximity of off-site recreational resources within 500 m of a landfill footprint potentially affected	No recreational resources are located within the Off-site Study Area.	No potential effects on off-site recreational resources within 500 m of the future development.	None required.	No net effects on off-site recreational resources within 500 m of the future development.
	Type(s) and proximity of	• Most of the existing surrounding land uses are compatible and would not	• Alternative Method 2 provides the 200 m buffer	None required.	MECP Guideline D-4 will apply and must be

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects

	off-site sensitive land uses (e.g., dwellings, churches, parks) within 500 m of a landfill footprint potentially affected	be sensitive to the future development.
		• The future development triggers municipal and provincial policies that restrict sensitive land uses in the Off-site Study Area.
		• Sensitive land uses are prohibited within 200 m of the expanded landfill in the Township of North Stormont.
		• Alternative Method 2 proposes the following buffer distances between the future development landfill and the existing sensitive land uses:
		  • 1454 Highway 138 (Champion Mushrooms): 279 m.
		  • 17305 Allaire Road (Calco Soils): 411 m.
		  • 1397 Highway 138 (Residential Dwelling): 308 m.
		  • 17319 Allaire Road (Residential Dwelling): 493 m.
		• The residential dwelling at 1397 Highway 138 was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.
		• Phasing of landfill stages from east to west.
			between the expanded landfill and all four existing sensitive land use allowing them to continue to be in compliance with the North Stormont Zoning Bylaw.
			• MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.
					reviewed if any changes are proposed to the existing sensitive land uses.

Aggregate Extraction and Agriculture					
Aggregate resources	Presence of known or identified aggregate resources and the predicted	• Provincial Policy Statement indicates that aggregate resources shall be protected for the long-term. • No aggregate resource sites exist within the On-site Study Area. • Two aggregate resource sites exist	No potential effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated.	None required.	No net effects on land use approvals for continuation or expansion of aggregate resource land uses are anticipated.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
	impact of impairment of their use due to the proposed footprint, construction and operation on-site	within the Off-site Study Area that are not considered to be a "sensitive land use" as per MECP Guideline D-4.			
Effects on agricultural land	Predicted loss of agricultural land use	The future development will comprise an area of 240 ha.	There will be a direct net loss of 240 ha (233 ha of agricultural lands).	None required.	There will be a net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture.
	Predicted impacts on surrounding agricultural operations	• Construction and operation of Alternative Method 2 will take place within the existing On-site Study Area. • No changes to waste and compost volumes beyond currently-approved levels are anticipated. • No changes to waste haul routes are anticipated. • Alternative Method 2 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate and nuisance effects. • No changes to existing equipment and operational methods. • Current noise control practices will be continued. • Noise levels from the future development would be below the MECP noise limits. • Changes in odour will be	No potential effects to surrounding agricultural operations are anticipated.	None required.	No net effects to surrounding agricultural operations are anticipated.

Table 8-1. Net Effects Assessment for the Preferred Alternative – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
		imperceptible. • Peak flows to the site outlet will be controlled with the SWM ponds. • Surface water will meet the MECP monitoring requirements with regard to TSS. • No agricultural operations are located within 200 m of the future development landfill for Alternative Method 2.			
	Type(s) and proximity of agricultural operations (e.g., organic, cash crop, livestock)	• A sod farm is located on the future development lands within the On-site Study Area • A variety of agricultural operations were observed in the Off-site Study Area including a mushroom farm, retired facilities, dairy, and poultry operations, The majority of the buildings for these operations are located between 1 km and 1.5 km from the On-site Study Area. • Alternative Method 2 will continue to use established operating procedures currently in place at the EOWHF for the management of leachate, dust, litter, and vectors and vermin, and will maximize the use of existing site infrastructure.	• The future development would partially displace the operations of one local business (Manderley Turf Products). • A small agricultural operation would be displaced from the On-site Study Area; however, agricultural businesses would continue in the area.	GFL will continue to provide lands to Manderley Turf Products by agreement.	Possible decrease of one local sod production operation due to the relocation of Manderley Turf Products.

[1] Combining the regional breeding bird window (April 15 through August 31) with the bat roosting season (April through September).

8.2 Cumulative Effects on the Environment

Cumulative effects are defined as those effects that are likely to result from the project in combination with other past, present and reasonably foreseeable projects or activities. The cumulative effects assessment focused on the net effects of the Preferred Alternative (Alternative Method 2), presented in **Section 8.1**, combined with the potential effects from other projects in the immediate area.

The net effects for the Preferred Alternative, outlined in **Table 8-1**, relate to air quality, odour, noise, vegetation communities, wildlife habitat including potential SAR habitat, aquatic habitat, economics (length of employment at site and for local businesses, displacement of business activities, continued provision and procurement of products and/or services, continued financial contributions to the local community), number and type of local businesses, planned land use (development restrictions), and agricultural land (loss of agricultural land, possible decrease in one agricultural operation). The net effects take into account the existing EOWHF operations and other past and current projects as part of the existing conditions; consequently, the focus of the cumulative effects assessment is on planned and future projects.

8.2.1 Identification of Planned and Future Projects

The Township of North Stormont confirmed that there are no active development applications within 1 km of the EOWHF and future development lands. The Nation Municipality confirmed that there are two active site plan control applications, which are located approximately 700 m from the On-site Study Area on County Road 8 north of Highway 417, and include a mini storage development and a biosolids transfer station.

No transportation network developments were identified for inclusion in the EA by the MTO, the United Counties of Prescott and Russell, or the United Counties of Stormont, Dundas, and Glengarry. No planned road network improvements are identified within the study areas. The MTO is currently undertaking an EA for Highway 138 from Highway 417 southward.

GFL may relocate the EOWHF compost curing and storage pad areas to an area south of the existing EOWHF. This relocation is not part of the EOWHF Future Development Project. It is currently anticipated that the new compost pads will be constructed and operational during the life of the future development.

Treated effluent from the LTF is currently discharged to the Fraser Drain from the northwestern portion of the existing EOWHF; however, as part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek. This discharge is not part of the EOWHF Future Development Project.

GFL is early in discussions regarding the potential development of an RNG facility at the EOWHF to convert LFG to RNG. Given that this future of this project is speculative, it has not been included in the assessment of cumulative effects.

8.2.2 Assessment of Cumulative Effects

The two active site plan control applications, located approximately 700 m from the On-site Study Area on County Road 8 north of Highway 417 in The Nation Municipality, include a mini storage development and a biosolids transfer station. Both applications are industrial in nature and would be compatible with the expanded landfill. Biosolids transfer stations are generally required under their ECAs to implement nuisance controls during operations and maintenance such that vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance. No cumulative effects to air quality, odour, or noise are anticipated to result from these facilities.

The EOWHF and future development lands are located in a rural agricultural area. Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities. Both development applications noted above are beyond the 500 m restriction zone, and are industrial in nature and would therefore be compatible with the future development landfill. No cumulative effects to planned land use are anticipated to result from these facilities.

The MTO is currently undertaking an EA for Highway 138 from Highway 417 southward; however, the MTO indicated that there are no impacts expected to the study areas. No cumulative effects are anticipated to result from this transportation project.

GFL may relocate the EOWHF compost curing and storage pad areas to an area south of the existing EOWHF. The relocation will not result in any changes to traffic volumes, patterns, or vehicle access for these relocated uses. The relocation of the compost areas was included in the results of the effects assessment for the air, odour, noise, and transportation. The Stage 1 Archaeological Assessment determined that the relocation area held no archaeological potential (**Supporting Document 1-9**).

The new composting pads may be located on disturbed lands used for peat harvesting. This will result in the removal of a small area of naturalized deciduous hedgerow (vegetation community) and a larger area that has been stripped of natural vegetation in the process of peat harvesting. The peat extraction areas are dominated by exposed peat and only remnant patches of vegetation and weeds were observed. Peat mounds and cut banks on the peat lands have the potential to be nesting habitat for Bank Swallow and the peat fields also could provide suitable foraging habitat for Little Brown Myotis. A colony of approximately 10 Bank Swallows was observed nesting in a vertical bank of peat south of the Albert Fahey Award Drain in 2019 (**Supporting Document 1-6**); consequently, the composting pads would be located within Category 3 habitat. Wildlife habitat and potential SAR habitat associated with the peat fields and hedgerow would be removed, but similar habitat would remain in the vicinity.

The composting pads will not result in the displacement of a portion of peat operations south of the EOWHF, since they would be built in areas where all of the peat has already been removed. No changes to aquatic habitat, employment, continued provision and procurement of products and/or services, continued financial contributions to the local community, or planned land use (development restrictions) are anticipated.

As part of existing operations at the EOWHF, GFL is considering the discharge of treated effluent from the LTF directly to Moose Creek. This discharge is considered in the Surface Water Quality and Aquatic Ecosystems effects assessments.

8.3 Climate Change Considerations

Climate change considerations for the alternative methods are discussed in Section 5.5, including the effects of climate change on the conceptual design and landfill operations, and the effects of the design on climate change. The effect of the Preferred Alternative on climate change and the effect of climate change on the Preferred Alternative are discussed below with consideration of the MECP guidance document Considering climate change in the environmental assessment process (MECP, 2017c).

On-going changes to the global climate related to increased emissions and concentrations of GHGs in the atmosphere are addressed in the conceptual design for the EOWHF future development, both in adapting to changes in climate and for the mitigation of GHG emissions. This has been addressed primarily by evaluating the impact of increased intensity of storm events, potential impacts to leachate generation associated with higher temperatures and increased intensity of rainfall events and snowmelt, assessing LFG generation rates and designing the expanded LFG management system to optimize collection efficiency to mitigate atmospheric emissions.

8.3.1 Effect of the Preferred Alternative on Climate Change

The facility's impact on climate change is mainly linked to the fugitive emissions of LFG as it is mostly methane and carbon dioxide, as well as to the carbon dioxide emissions from the combustion of the LFG. To a much lesser extent, there are also GHG emissions from the use of fuel on-site for equipment, vehicles, and stationary combustion sources. This includes emissions from diesel-fired equipment used for landfilling activities and for compost handling, from tailpipe emissions from diesel-fired truck use on on-site roads, and from natural gas use for comforting heating equipment. It was assumed that the LFG collection system for the future development would achieve a 75% collection efficiency which is considered typical for MSW landfills (US EPA, 2018). Historical LFG generation estimates and actual LFG collection data for the existing EOWHF landfill suggests an average collection efficiency in the order of 84% over the past four years; however, by utilizing the 75% collection efficiency assumption, the assessment of effects is expected to be the worst case for air emissions when the landfill is operating. The final cover design for the landfill expansion will incorporate a geomembrane which is expected to enhance LFG collection as it will limit fugitive emissions through the cover. It will also reduce the infiltration of precipitation into the waste thereby slowing down the waste decomposition and LFG generation process. Overall, the LFG collection system should then operate with increased efficiency, possibly up to 95%, resulting in greater LFG capture and reduced fugitive emissions.

Table 8-2 provides the estimated annual emission rate of GHGs from the facility for LFG fugitive and combustion emissions using global warming potential (GWP) for carbon

dioxide and methane emissions to estimate the equivalent carbon emissions for the maximum LFG generation year[20].

Table 8-3 presents a comparison of methane emissions from LFG collection at 75% collection efficiency and 95% collection efficiency during the maximum LFG generation year.

Table 8-4 summarizes the expected annual GHG emissions for each source and total GHG emissions for each scenario of the Preferred Alternative. Note that this is not meant to be an extensive inventory of GHG emissions but an overview of main GHG emitting sources to provide context to the net effects of the future development project.

Table 8-5 presents an estimate of total GHG emissions, LFG releases and non-LFG releases, for the maximum LFG generation year. The non-LFG GHG releases contribute <3% of the total GHG releases in both scenarios. From a climate change perspective, there is no preference between Alternative Methods 1 and 2 as the increase in total GHG emissions is predicted to be very similar.

In 2021, Ontario's total GHG emissions were approximately 150,600,000 tonnes CO_2e with approximately 5,000,000 tonnes CO_2e generated from the solid waste sector[21]. The provincial solid waste GHG emissions include emissions from municipal solid waste landfills, wood waste landfills, and municipal solid waste composting and not other potential sources related to the industry[21]. The maximum predicted total GHGs resulting from the future development would contribute approximately 9.8% of Ontario's solid waste related GHG emissions and approximately 0.3% of the total GHG emissions from Ontario.

By comparison, the EA recently completed for the Waste Connections of Canada Ridge Landfill in Chatham, Ontario indicated that the landfill emitted approximately 391,000 tonnes CO_2e in 2020 and the emissions were projected to increase to approximately 762,000 tonnes CO_2e in 2042. The Ridge Landfill, which is one of the largest in Ontario, would account for over 15% of the landfill related GHG emissions in the province.

In 2021, Canada's total GHG emissions were approximately 670,000,000 tonnes CO_2e, with approximately 21,000,000 tonnes CO_2e generated from the waste sector[22]. The maximum predicted total GHGs for the facility expansion would contribute approximately 2% of Canada's waste related GHG emissions and approximately 0.01% of the total GHG emissions from the country.

[20] https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/quantification-guidance/global-warming-potentials.html

[21] https://data-donnees.ec.gc.ca/data/substances/monitor/canada-s-official-greenhouse-gas-inventory/B-Economic-Sector/EN_Annex12_GHG_Econ_Prov_Terr.xlsx

[22] https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2023.html

Table 8-2. Green House Gas Releases from LFG (Maximum Projected Emissions)

GHG Species	GWP (kg CO_2e / kg X)	Existing Conditions		Existing Conditions + Future Development		Change (%)
		Annual Emissions (Tonne / year)	Annual Emissions (Tonne CO_2e/ year)	Annual Emissions (Tonne / year)	Annual Emissions (Tonne CO_2e/ year)	
Carbon Dioxide (CO_2)	1	126,109	126,109	198,314	198,314	57%
Methane (CH_4)	28	6,429	180,005	10,110	283,068	57%
Nitrous Oxide (N_2O)	265	Negligible	Negligible	Negligible	Negligible	–
Total CO_2e		–	306,114	–	481,382	57%

Table 8-3. Comparison of LFG Collection Efficiency for Existing Conditions + Future Development (Maximum Projected Emissions)

Maximum LFG Generated (m^3/year)	LFG Collection Efficiency (%)	LFG Collected (m^3/year)	Methane Concentration in LFG (%)	Methane Collected (m^3/year)	Methane Combusted (Tonne/ year)	Methane Combusted (Tonne CO_2e/ year)	Mass of CO_2 Created from Methane Combustion (Tonne/year)	GHG Reduction by Combustion (Tonne CO_2e/ year)
123,100,000	75%	92,325,000	50%	46,162,500	30,329	849,205	86,324	762,881
123,100,000	95%	116,945,000	50%	58,472,500	38,416	1,075,660	109,344	966,317

Table 8-4. Non-LFG Green House Gas Releases

Emission Source	Annual GHG Emissions (Tonne CO_2e/year)	
	Alternative 2 Scenario A	Alternative 2 Scenario B
Landfilling Activities – Diesel Emissions	2,917	2,917
Compost Handling – Diesel Emissions	3,916	3,916
Truck Traffic – Diesel Emissions	150	233
Comfort Heating – Natural Gas Emissions	791	791
All Sources – Total Emissions	**7,775**	**7,857**

Table 8-5. Estimate of Total GHG Emissions for Existing Conditions + Expansion (Maximum Projected Emissions)

GHG Releases	Maximum Projected Annual GHG Emissions (Tonne CO_2e/year)	
	Alternative 2 Scenario A	Alternative 2 Scenario B
LFG GHG Releases	481,382	
Non-LFG GHG Releases	7,775	7,857
Total GHG Releases	**489,157**	**489,239**
Percent of Non-LFG GHGs (%)	2%	2%

The LFGTE plant has a total combustion capacity of 15,040 m^3/hr (8,850 cfm) consisting of four Jenbacher internal combustion reciprocating engines capable of generating up to 4.2 MW of electricity with a combined capacity of 2,300 m^3/hr (1,350 cfm @ 50% CH_4), and three enclosed flares with a combined capacity of 12,750 m^3/hr (7,500 cfm). ECA No. 5665-8STRV7 allows for an LFGTE plant that consists of eight engines.

The LFG collection system is connected to a central mechanical system that provides the vacuum necessary to extract the LFG from the wellfield and transfer it under low pressure to the Jenbacher engines for combustion. Under normal operating conditions, LFG collected at the site is directed to the engines, which run at maximum capacity for optimal energy generation. Any excess LFG is sent to the flares for destruction. The flares are designed to manage any and all excess LFG resulting from some or all of the engines being offline for maintenance.

LFG generation from the future development is expected to peak one year after closure in 2046 at approximately 8,680 m^3/hr, or 5,110 cfm. LFG generation is expected to decline approximately 5% per year after closure reaching a value of approximately 1,750 m^3/hr (1,030 cfm) in 2078.

Assuming the LFG collection system for the future development would achieve a 75% collection efficiency, the potential LFG recovery is expected to peak one year after closure in 2046 at approximately 6,510 m^3/hr (3,830 cfm). Potential LFG recovery is expected to decline approximately 5% per year after closure reaching a value of approximately 1,315 m^3/hr (775 cfm) in 2078.

LFG production from the existing site is estimated to peak one year after its closure in 2026 at 9,000 m³/hr (5,300 cfm) and then decline, as LFG generation from the future development area begins to increase. The combined generation from the existing site and the future development would peak one year after closure of the future development in 2046 at 14,300 m³/hr (8,400 cfm). A collection efficiency range of 75% to 95% corresponds to collection and management of between approximately 6,300 to 8,000 cfm of LFG.

The current combustion capacity of the LFGTE plant exceeds the future peak LFG generation; however, it is noted that the four reciprocating engines are being operated under a FIT contract valid until February 20, 2033. If contractually obligated electricity production is not required, then the continued operation of the reciprocating engines is unlikely.

GFL is considering the potential to divert LFG to an RNG facility in the future. An RNG facility would be able to utilize all of the LFG generated, not just a portion as is the case with the LFGTE plant. All LFG will be flared in the event that the LFGTE plant is no longer operating and an RNG facility not developed. Operational techniques include utilizing full flare capacity as well as reducing vacuum on the well field to ensure uniform removal of LFG from the landfill during a shutdown. GHG emissions from either the operation of the reciprocating engines or an RNG facility will be effectively equal as the gas/methane will be combusted under both scenarios.

Sufficient LFG management capacity is available at the EOWHF for the projected volume of LFG to be generated and collected. Based on the potential LFG collection efficiency of up to 95%, the LFG management system for the expansion will be designed to provide adequate capacity. GFL will continue to monitor the generation of LFG in future years to confirm that the LFG management infrastructure is sufficient. An additional flare may be added if required. Should additional flaring be needed, an ECA amendment application will be completed as required.

The effect of the Preferred Alternative on climate change is anticipated to be minimal given the following aspects of the landfill design:

- The future development will incorporate an active LFG collection system which will limit emission of LFG to the atmosphere. The LFG management system for the expansion will be designed to provide adequate capacity based on a potential LFG collection efficiency of up to 95%.
- Collected LFG will be combusted in either reciprocating engines or flares at the site's LFGTE plant or potentially utilized as RNG.
- The landfill will be progressively covered with a soil/geomembrane final cover which significantly reduces emissions as compared to a soil cover.

8.3.2 Effect of Climate Change on the Preferred Alternative

Increased severity of storm events; more intense rainfall events, and reduced snow cover over the long term are the most likely and relevant results of climate change on the design of the Preferred Alternative. The potential impacts are largely limited to the design of the SWM infrastructure requiring an increased volume for detention and sedimentation

ponds, as well as additional erosion protection as more intense storm events result in higher flow velocities in ditches and swales and at discharge points.

The changes in extreme weather events due to climate change are of particular relevance in the design and water management infrastructure. Surface water design elements for the expansion need to address the requirement to divert or control surface water coming onto the site; control runoff discharging from the site; and to control erosion, sedimentation and flooding.

The future development area will increase the impervious surface area, peak flows, and volume of surface runoff. To prevent an increase in risk of flooding and negative impacts to water quality, a proposed conceptual SWM design has been developed that will mitigate potential negative impacts to the existing surface water drainage system.

O.Reg. 232/98 requires that the SWM systems be designed relative to specific storm events, including:

- external diversion elements, and a continuous overland flow route or drainage system, sized to convey peak flow from the higher of the 100-year design storm or prevailing Regional Storm.
- internal conveyance elements sized to convey peak flow from a 25-year design storm;
- water quality enhancement elements (e.g., sedimentation ponds) sized to temporarily store runoff volume from a 4-hour, 25 mm storm event; and
- surface water quantity controls sized to temporarily store runoff volume from the higher of the 24-hour, 100-year design storm or prevailing Regional Storm, and release at or below existing condition peak flows.

The following design storms were used to assess the design of the SWM system:

- Environment Canada's rain gauge station: Ottawa CDA RCS Station (6105978); and
- Quantity control design storms: SCS Type II 24-hour Storm for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year return periods.

For stormwater quality control, the wet ponds were designed to provide an "Enhanced" protection level (i.e., 80% long-term TSS removal). Under proposed conditions, the site imperviousness is 74%, which corresponds to a volumetric water quality criterion of 240 m^3/ha, including 40 m^3/ha for extended detention. An orifice plate will be provided in the outlet structure for extended detention.

The proposed SWM system for the Preferred Alternative is shown on **Figure 5-2** and the estimated required storage volumes in the proposed facilities are summarized in **Table 5-6**. In order to satisfy quantity and quality requirements, the proposed SWM system includes a new wet pond in the northwest corner of the future development area and oversized drainage ditches around the east and west perimeter of the site. The proposed wet pond will discharge into the Fraser Drain just upstream of where the Fraser Drain changes flow direction from north to west.

The design of the SWM system is based on the use of local rainfall intensity-duration-frequency (IDF) curves developed using historical rainfall data. Prediction of extreme rainfall events requires the assumption that historic meteorological conditions can be

used to predict future conditions; with changing climatic conditions, the validity of this assumption is reduced.

According to the Canadian Climate Normals Ottawa CDA data from Environment Canada for the 1971 – 2000 period, the average annual precipitation is 914.2 mm. The MNRF's 2015 Climate Change Research Report CCRR-44 Climate change projects for Ontario: An updated synthesis for policymakers and planners (MNRF, 2015a) was referenced for climate change considerations. In accordance with the CCRR-44, the maximum increase in annual precipitation from baseline conditions (1971 – 2000) for the 2011-2040 projected period under the representative concentration pathway 8.5 is 128 mm. This corresponds to a 14.0% increase in annual precipitation. Accordingly, climate change was taken into consideration in hydrologic simulations by including a scenario with a 14% increase in total precipitation for the 100-year event to confirm that the SWM ponds will have sufficient capacity. The proposed SWM ponds will be designed for the anticipated runoff increase.

The proposed SWM system was evaluated using the PC-SWMM model. The proposed wet pond includes a permanent pool volume of 40,500 m^3 for water quality control and provides an active storage volume of 151,220 m^3 for extended detention and water quantity control, for a total pond volume of 191,720 m^3. To account for higher runoff volumes attributed to climate change, an additional berm is to be constructed around the pond perimeter to provide a minimum 0.3 m freeboard. The actual pond location and footprint size, the storage volume within the perimeter ditches, and the height of the berm will be confirmed during detailed design.

The permanent pool facilitates the removal of 80% of long-term suspended solids. For quantity control, the active storage volume will attenuate discharge flows from the future development lands under ultimate conditions to levels lower than the pre-development discharge peak flows for storm events up to a 100-year return period, including consideration of climate change. The pond outlet structure will be designed in the detailed design stage to achieve the target peak flow rates.

Climate change effects will be addressed in the detailed design of the future development by addressing MECP design criteria for ECA approval under the *Ontario Water Resources Act*, in addition to the landfill-specific requirements in O.Reg. 232/98. These will include:

- the use of the latest available local airport IDF curves, as modified for climate change, for the rainfall/snowmelt event analysis;
- the post-development peak discharge from a development site will be controlled to the equivalent pre-development level for the 2- to 100-year return period design storms;
- providing 250 m^3/ha in storage volume for stormwater quality control, in accordance with MECP guidelines for 80% Enhanced Removal at an impervious level of 85%;
- Any proposed control measure sized to provide Enhanced Protection (level 1), i.e., the removal of 80% long-term suspended solids, and meet the SWM design requirements of the MECP's Stormwater Management Planning and Design Manual (MECP, 2003).

Extreme weather events resulting from climate change are not expected to have a significant long-term effect on precipitation infiltration and generation of leachate because the site will be progressively capped with a low permeability final cover. Increased infiltration will result in an increase in leachate generation of active open cells, but the effect will be reduced by moisture initially going into storage in the waste mass, as well as the progressive closure of the site. The detailed design of the LCS will account for any climate-related changes.

8.4 Advantages and Disadvantages of the Preferred Alternative

The potential environmental effects remaining following the implementation of potential mitigation/management measures (i.e., net effects, provided in **Section 8.1**) were used to identify and compare the advantages and disadvantages of the Preferred Alternative over the 'Do Nothing' alternative. The 'Do Nothing' alternative represents what is anticipated to occur if the project is not undertaken, and is used as a benchmark against which the Preferred Alternative can be compared to determine the advantages and disadvantages of proceeding with the project.

Under the 'Do Nothing' alternative, GFL would not undertake the development of new long-term disposal capacity and would only be able to continue with their current business operations at the EOWHF for approximately 2 years based on current landfilling rates (i.e., until approximately 2025). Landfill operations would have to cease once the existing landfill is at capacity. GFL would be unable to continue to provide disposal services to its customers and fulfill long term contractual commitments. These customers, including a number of municipalities across Eastern Ontario, would need to find alternate ways to manage their waste. Currently, the EOWHF is the largest operating disposal facility in Eastern Ontario, and the only landfill in the region capable of managing the waste volumes being generated by municipalities who do not have their own facility.

This alternative does not support GFL's integrated waste management programs, nor does it support the existing waste diversion infrastructure at the EOWHF. The on-site composting facility and electronics recycling service is in part financially viable due to its ability to utilize and share infrastructure with the landfill. With the closure of the landfill, it will be uneconomical for GFL to maintain the operation of the composting facility and the public drop-off facilities for waste diversion and disposal. These diversion facilities service municipalities and businesses across Eastern Ontario.

The closure of the EOWHF in approximately 2 years would result in a relatively large number of job losses within the local community, a significant loss of revenue for the Township of North Stormont, and broader negative economic impacts across the region.

This alternative is not a viable option for GFL's on-going business, its customers and the Province of Ontario and does not contribute to the Ontario government's priorities for waste diversion and climate change.

The advantages and disadvantages of the Preferred Alternative compared to the 'Do Nothing' alternative are provided in **Table 8-6** based on the net effects of the Preferred Alternative.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
Natural Environment					
Atmospheric Environment	Air Quality	• The ground-level concentrations of contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • NO_2 concentrations are predicted to exceed the 2025 CAAQS by 47%. Exceedances are at the site boundary and fall to below the standard within 10 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 56%. Exceedances are at the site boundary and fall to below the standard within 150 m of the boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • PM_{10} concentrations are predicted to exceed the Ontario AAQC by 84%. Exceedances are at the	• The ground-level concentrations of contaminants of concern within the Off-site Study Area were all within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • NO_2 concentrations are predicted to exceed the 2025 CAAQS by 47%. Exceedances are at the site boundary and fall off quickly with distance from the site boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • SPM (dust) concentrations are predicted to exceed the O.Reg.419/05 Air Standard by 157%. Exceedances are at the site boundary and fall off quickly with distance from the site boundary. Concentrations at sensitive receptors (residences) do not exceed the standard. • PM_{10} concentrations are predicted to exceed the Ontario AAQC by 29%. Exceedances are at the site boundary and off quickly with distance from the site boundary.	• The ground-level concentrations of contaminants of concern within the Off-site Study Area will continue to be within the relevant standards with the exceptions of: NO_2; SPM; and PM_{10}. • Concentrations at sensitive receptors (residences) will still not exceed the standards with the exception of PM_{10} (the PM_{10} exceedance occurs at a sensitive receptor location that was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill). • NO_2 concentrations at the site boundary are predicted to remain the same, exceeding the 2025 CAAQS by 47% but falling to below the standard within 10 m of the boundary. • SPM (dust) concentrations are predicted to decrease by 101% at the site boundary, exceeding the O.Reg.419/05 Air Standard by 56% instead of 157%, and falling to below the standard within 150 m of the boundary.	• Air emissions from operations will continue for an additional 20 years. • PM_{10} concentrations are predicted to increase by 55% at the site boundary, exceeding the Ontario AAQC by 84% instead of 29%. Exceedances are at the site boundary fall to below the standard within 250 m of the boundary. • PM_{10} concentrations exceeded the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
		site boundary and fall to below the standard within 250 m of the boundary. • PM_{10} concentrations exceeded the AAQC by 35% at only one sensitive receptor, located east of the future development, along Highway 138. The concentration at this receptor was predicted to exceed the standard 0.002% of the time. • Concentrations at sensitive receptors (residences) do not exceed the standards with the exception of PM_{10}. The PM_{10} exceedance occurred at a sensitive receptor location that was vacated in Summer 2022 and will be demolished prior to the implementation of the future development landfill.	• Concentrations at sensitive receptors (residences) do not exceed the standards.		
	Odour	• The highest concentration predicted at a sensitive receptor is 1.85 OU/m^3, which is a 26% increase over existing conditions (not expected to be distinguishable). • The most frequently impacted sensitive receptor will be exposed	• The highest concentration at a sensitive receptor is 1.47 OU/m^3, or 147% of the guideline level of 1 OU/m^3. • The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m^3 about 0.08% of the time.	• No additional off-site receptors will be affected by odour.	• Odour emissions from operations will continue for an additional 20 years. • The highest concentration predicted at a sensitive receptor is expected to increase 26% from 1.47 OU/m^3 to 1.85 OU/m^3, which is not expected to be distinguishable.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
		to a concentration above 1 OU/m³ approximately 1.5% of the time. • No additional off-site receptors will be affected.			• The most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.5% of the time instead of 0.08% of the time.
	Noise	• Noise levels at all points of reception within Off-site Study Area will be within the MECP regulatory sound level limits. • Neighbouring noise-sensitive receptors will experience a minor increase in noise levels. Landfilling activity may be audible at times, during lulls in background sound levels.	• Noise levels at all points of reception within Off-site Study Area will be within the MECP regulatory sound level limits.	• Noise levels at all points of reception within Off-site Study Area will continue to be within the MECP regulatory sound level limits.	• Noise emissions associated with operations will continue for an additional 20 years. • Neighbouring noise-sensitive receptors will experience a minor increase in noise levels. Landfilling activity may be audible at times, during lulls in background sound levels.
Geology and Hydrogeology	Groundwater Quality	• The chloride concentrations at the property boundaries will be below the maximum allowable concentration the aquifer. • No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated.	• No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated.	• The chloride concentrations at the property boundaries will continue to be below the maximum allowable concentration the aquifer. • No adverse effects to groundwater quality and water well users in the Off-site Study Area are anticipated.	• None.
	Groundwater Quantity	• No effects to groundwater quantity are anticipated.	• No effects to groundwater quantity are anticipated.	• No effects to groundwater quantity are anticipated.	• None.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
Surface Water Environment	Surface Water Quality	• The surface water will meet the MECP monitoring requirements with regard to TSS. • No net effects to surface water quality at the site outlet are anticipated since the water will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge. • No net effects to off-site surface water quality since treated effluent concentrations in Moose Creek will be limited to the chronic SSWQOs and stormwater quality will meet MECP requirements prior to release to Fraser Drain.	• Surface water quality will meet MECP requirements and criteria specified in ECA (Industrial Sewage Works) prior to release off-site. • No net effects to off-site surface water quality, as effluent contaminant concentrations will be limited to the effluent discharge limits currently in place. • No net effects resulting from increased TSS due to sufficient detention time provided by SWM ponds.	• The surface water will continue to meet the MECP monitoring requirements with regard to TSS. • No net effects to surface water quality at the site outlet are anticipated since the water will be treated in the wet pond via sufficient extended detention and settling in the permanent pool prior to discharge. • No net effects to off-site surface water quality are anticipated since treated effluent concentrations in Moose Creek will be limited to the chronic SSWQOs and stormwater quality will meet MECP requirements prior to release to Fraser Drain.	• None.
	Surface Water Quantity	• No net effects, as peak flows to the site outlet will be controlled with the SWM ponds within the pre-development conditions values up to a 100-year return period.	• No net effects, as peak flows to the site outlet will be controlled with the ponds within the pre-development conditions values up to a 100-year return period.	• No net effects to surface water quantity are anticipated, as peak flows to the site outlet will be controlled with the SWM ponds within the pre-development conditions values up to a 100-year return period.	• None.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
Ecological Environment	Terrestrial Ecosystems	• Natural and native vegetation cover on Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time. • Artificial wildlife habitat, including potential SAR habitat, associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity. • Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5. • Wildlife habitat, including potential SAR habitat, associated with the thicket swamp (13.2 ha) and trees and buildings on the Manderley Turf Products property would be removed.	• No additional effects on wildlife habitat, ecosystem functions, wildlife, SAR, or SAR habitat.	• Natural and native vegetation cover on Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time.	• Ecosystem functions associated with the thicket swamp will be lost during the construction of Stage 5. • Wildlife habitat, including potential SAR habitat, associated with the thicket swamp (13.2 ha) and trees and buildings on the Manderley Turf Products property would be removed. • Artificial wildlife habitat, including potential SAR habitat, associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity.
	Aquatic Ecosystems	• Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks	• No additional effects on aquatic habitat and biota.	• Beneficial effect of improvement to aquatic habitat associated with the future development lands due to proposed setbacks	• None.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
		from watercourses combined with riparian/buffer plantings. • No net effects to aquatic biota.		from watercourses combined with riparian/buffer plantings. • No net effects to aquatic biota.	
Socio-Economic Environment					
Economic	Economic Effects on / Benefits to Local Community	• Beneficial effect from extended duration of employment at site for an additional 20 years. • Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years. • Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services. • Beneficial effect of continued annual financial contributions to the Township of North	• Beneficial effect from continued employment for 2 years of remaining operations followed by loss of employment. • Beneficial effect from continued employment at local businesses through procurement for 2 years of remaining operations and then potential loss of employment. • Beneficial effect of provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario for 2 years of remaining operations and then loss of services. • Beneficial effect from as much as $30 million contributed to the local economy through the procurement of local goods and services over 2 years of remaining operations. • Beneficial effect of annual	• Beneficial effect from extended duration of employment at site for an additional 20 years. • Beneficial effect from extended duration of employment at local businesses through procurement for an additional 20 years. • Beneficial effect of continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario for an additional 20 years. • Beneficial effect from as much as $300 million contributed to the local economy through the procurement of local goods and services. • Beneficial effect of continued annual financial contributions to the Township of North Stormont for an additional 20 years.	• Partial relocation of Manderley Turf Products. • Displacement of a small agricultural operation.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
		Stormont for an additional 20 years. • Beneficial effect of continued direct financial contributions in the form of public donations. • Partial relocation of Manderley Turf Products. • Displacement of a small agricultural operation.	financial contributions to the Township of North Stormont for 2 years of remaining operations and then loss of annual financial contributions. • Beneficial effect of direct financial contributions in the form of public donations over 2 years of remaining operations and then no further public donations.	• Beneficial effect of continued direct financial contributions in the form of public donations.	
Social	Effects on Local Community	• No net effects to number of residents. • No net effects on residents and their use of property. • Possible decrease of one local sod production business due to the relocation of Manderley Turf Products.	• No effects to number of residents. • No effects on residents and their use of property.	• No net effects to number of residents are anticipated. • No net effects on residents and their use of property are anticipated.	• Possible decrease of one local sod production business due to the relocation of Manderley Turf Products.
	Visual Impact of Facility	• With the visual screening in place, no expected change to the visual character of the landscape.	• No changes to the visual character of the landscape.	• With the visual screening in place, no expected change to the visual character of the landscape.	• None.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
Cultural Environment					
Cultural Environment	Cultural Heritage Resources	• No net effects on cultural heritage resources.	• No effects on cultural heritage resources.	• No net effects on cultural heritage resources.	• None.
	Archaeological Resources	• No net effects on archaeological resources.	• No effects on archaeological resources.	• No net effects on archaeological resources.	• None.
Built Environment					
Transportation	Effects from Truck Transportation along Access Roads	• No net effects on traffic operations.	• No effects on traffic operations.	• No net effects on traffic operations.	• None.
Current and Planned Future Land Use	Effects on Current and Future Land Uses	• No net effects to current off-site land uses are anticipated. • No net effects on off-site recreational resources within 500 m of the future development. • Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities. • MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.	• No effects on current and planned land use, off-site recreational resources, or off-site sensitive land uses.	• No net effects to current off-site land uses are anticipated. • No net effects on off-site recreational resources within 500 m of the future development.	• Development will be restricted within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities. • MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.

Table 8-6. Advantages and Disadvantages of the Preferred Alternative

Environmental Component	Evaluation Criteria	Net Effects of the Preferred Alternative	Effects of the 'Do Nothing' Alternative	Advantages of the Preferred Alternative over the 'Do Nothing' Alternative	Disadvantages of the Preferred Alternative over the 'Do Nothing' Alternative
Aggregate Extraction and Agricultural	Aggregate Resources	• No net effects aggregate resources are anticipated.	• No effects aggregate resources.	• No net effects aggregate resources are anticipated.	• None.
	Effects on Agricultural Land	• No net effects to surrounding agricultural operations are anticipated. • Net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture. • Possible decrease of one local sod production operation due to the relocation of Manderley Turf Products.	• No effects on agricultural land.	• No net effects to surrounding agricultural operations are anticipated.	• Net loss of 240 ha of land of which approximately 233 ha is currently used for agriculture. • Possible decrease of one local sod production operation due to the relocation of Manderley Turf Products.
Climate Change					
Climate Change Considerations	Effect of the Preferred Alternative on Climate Change	• The maximum predicted total GHGs resulting from the future development would contribute approximately 9.8% of Ontario's solid waste related GHG emissions and approximately 0.3% of the total GHG emissions from Ontario.	• The facility would contribute approximately 3% of Ontario's solid waste related GHG emissions and approximately 0.2% of the total GHG emissions from Ontario.	• None.	• Slight increase in Ontario's total GHG emissions (0.1%).

The Preferred Alternative was determined to have the following advantages over the 'Do Nothing' alternative:

- Extended duration of employment at site and at local businesses through procurement for an additional 20 years.
- Continued provision of cost-effective and environmentally-secure waste management services to municipalities and businesses across Eastern Ontario for an additional 20 years.
- Contribution of as much as $300 million to the local economy through the procurement of local goods and services.
- Continued annual financial contributions to the Township of North Stormont and direct financial contributions in the form of public donations for an additional 20 years.
- SPM (dust) concentrations are predicted to decrease by 101% at the site boundary.
- Natural and native vegetation cover on Stages 6 through 8 is expected to be similar or greater than existing conditions once plantings are mature, and the existing functions of natural vegetation in these areas would be replaced over time.
- Improvement to aquatic habitat associated with the future development lands due to proposed setbacks from watercourses combined with riparian/buffer plantings.

The Preferred Alternative was determined to have the following disadvantages compared to the 'Do Nothing' alternative:

- Air, odour, and noise emissions from operations will continue for an additional 20 years.
- PM_{10} concentrations are predicted to increase by 55% at the site boundary. PM_{10} concentrations will exceeded the AAQC by 35% at only one sensitive receptor, which is vacant and will be demolished.
- The highest odour concentration predicted at a sensitive receptor is expected to increase 26% from 1.47 OU/m³ to 1.85 OU/m³, which is not expected to be distinguishable, and the most frequently impacted sensitive receptor will be exposed to a concentration above 1 OU/m³ approximately 1.5% of the time instead of 1% of the time.
- Slight increase (0.1%) in Ontario's total GHG emissions.
- Neighbouring noise-sensitive receptors will experience a minor increase in noise levels. Landfilling activity may be audible at times, during lulls in background sound levels.
- Wildlife habitat, including potential SAR habitat, and ecosystem functions associated with the thicket swamp (13.2 ha) and trees and buildings on the Manderley Turf Products property would be removed.
- Artificial wildlife habitat, including potential SAR habitat, associated with sod fields would be removed (182 ha), but similar habitat would remain in the vicinity.

- Partial relocation of Manderley Turf Products resulting in a possible decrease of one local sod production business.
- Displacement of a small agricultural operation and a net loss of 233 ha of land currently used for agriculture.
- Restriction on development within 500 m of the future development landfill, except in cases where mitigation measures minimize potential landfill effects to the satisfaction of local planning authorities. MECP Guideline D-4 will apply and must be reviewed if any changes are proposed to the existing sensitive land uses.

The Preferred Alternative was determined to be comparable to the 'Do Nothing' alternative with regard to:

- ground-level concentrations of contaminants of concern within the Off-site Study Area, with the exception of SPM and PM_{10}, and at sensitive receptors (residences);
- off-site receptors will be affected by odour.
- noise levels at all points of reception within Off-site Study Area.
- groundwater quality and groundwater quantity;
- surface water quality and quantity; and
- no net effects to aquatic biota, number of residents, residents and their use of property, visual character of the landscape, cultural heritage resources, archaeological resources, traffic operations, current off-site land uses and recreational resources within 500 m of the future development, aggregate resources, and surrounding agricultural operations.

Overall, the advantages of the Preferred Alternative outweigh the disadvantages.

9 Consultation and Engagement

This section of the EA Study Report provides a summary of the consultation and engagement program undertaken as part of the EA. This includes a description of how the consultation and engagement program influenced or resulted in changes to the proposed project. The detailed information related to the consultation and engagement program is included in **Supporting Document 4 – Record of Consultation and Engagement**.

9.1 Overview of the Consultation and Engagement Process for the EA

In accordance with the MECP's Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario (MECP, 2014a), Code of Practice: Consultation in Ontario's Environmental Assessment Process (MECP, 2014b) and as required by Section 5.1 of the *OEAA*, a consultation and engagement program involving agencies, Indigenous groups, and the public was carried out during the EA process.

The approved ToR included a consultation and engagement program to be undertaken for the EA (**Appendix A**). The EA consultation and engagement program was developed based on the following principles:

- transparency, accountability and accessibility;
- identification of stakeholder and Indigenous community concerns early in the process and addressing these concerns in the EA;
- multiple points of consultation and engagement throughout the EA using a variety of techniques (in-person, digital, print); and
- documentation of issues, concerns and responses in the EA.

The consultation and engagement program outlined the components and activities to be undertaken during the EA. A commitment was also made to continue to engage Indigenous communities and organizations with a potential interest in the project. The following subsections describe how each of these activities was implemented during the course of the EA.

By following the consultation and engagement program and consulting with interested people, GFL was able to provide opportunities for input before decisions were finalized and respond by making changes as appropriate. The input and comments received through the EA consultation process will be incorporated into the EA Study Report.

9.2 Participants in the EA Process

A broad group of participants were consulted and engaged in the EA process. This included:

- governmental departments, ministries, and agencies with an interest in the project, typically referred to as the Government Review Team (GRT);

- local municipalities, including the host Township of North Stormont;
- Indigenous communities in the vicinity of the study areas or with an interest in the project; and
- the general public including residents, landowners, businesses and other stakeholders with an interest in the outcome of the EA.

A list of participants for the EA was prepared based on the consultation and engagement process completed during the ToR. The list of participants was updated throughout the EA process including both the addition and removal of participants as required and when requested. A copy of the complete participants list is included in Appendix A of **Supporting Document 4**.

A list of the GRT members including federal, provincial, and municipal agencies consulted during the EA process is provided below:

Government Review Team (GRT)

- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Tourism, Culture and Sport
- Ministry of Mines
- Ministry of Economic Development, Job Creation and Trade
- Ministry of Transportation
- Ministry of Municipal Affairs and Housing
- Environment and Climate Change Canada
- Transport Canada
- Ministry of Education
- Ministry of Energy
- Ministry of Solicitor General
- Ministry of Natural Resources and Forestry
- Ontario Provincial Police
- Impact Assessment Agency of Canada[23]
- Ministry of Environment, Conservation and Parks (MECP)
- Indigenous Services Canada and Crown Indigenous Relations and Northern Affairs Canada[23]

Municipal agencies and organizations

- The Nation Municipality
- Eastern Ontario Health Unit
- Township of East Hawkesbury
- South Nation Conservation Authority
- United Counties of Prescott-Russell
- Township of North Stormont
- Municipality of Casselman
- Russell Township
- Raisin Region Conservation Authority[23]
- Upper Canada District School Board

[23] Agency removed from the contact list during the EA Process.

- United Counties of Stormont, Dundas and Glengarry
- Champlain Township
- Catholic District School Board of Eastern Ontario
- Community Liaison Committee

During the preparation of the ToR, the following Indigenous communities and organizations were identified as having a potential interest in the project. These Indigenous communities and organizations were contacted during the development of the ToR and throughout the EA process.

Indigenous communities and groups

- Mohawk Council of Akwesasne[24]
- Huron Wendat Nation Council[24]
- Mohawks of the Bay of Quinte – Tyendinaga Mohawk Council
- Algonquins of Ontario Consultation Office[24]
- Métis Nation of Ontario Council
- Métis Nation of Ontario Ottawa Region Métis Council

Local residents within the vicinity of the EOWHF and neighbouring property owners were contacted as part of the Notice of Commencement of the EA. Additional members of the public were added to the list of participants during the course of the EA upon request. Members of the Community Liaison Committee were also included in the list of participants.

9.3 Consultation and Engagement Activities

The following consultation activities took place with the above parties during the EA:

- Distribution of Notices (Notice of Commencement, Notice of Public Open Houses);
- Public Open Houses;
- Agency Workshop;
- Review of Draft Existing Conditions Reports by Agencies;
- Project Website;
- Consultation with Agencies and Organizations;
- Engagement with Indigenous Communities and Groups;
- Site Tours; and
- Review of the Draft EA Study Report.

[24] Identified by the MECP in the letter of delegation of Indigenous consultation dated February 5, 2020.

9.3.1 Notices

The GRT, Indigenous communities and members of the public, including neighbouring property owners, were notified of the EA by a Notice of Commencement. All participants were sent a copy by mail of the Notice in both English and French languages. The Notice of Commencement also contained notification of Public Open House #1. The Notice was distributed via hard copy mail on September 22, 2021 and by email on September 23, 2021.

The Notice of Commencement was published in English and French in the Cornwall Standard Freeholder newspaper on September 23 and 30, 2021 and in Le Reflet-The News newspaper on September 22, 2021.

Both the English and French versions of the Notice of Commencement were posted on the project website (https://gflenv.com/moose-creek-landfill-expansion) on September 22, 2021.

All stakeholders were notified of Public Open House #2 through the distribution of the Notice of Public Open House #2. This Notice was distributed via hard copy mail on July 4-5, 2022 and by email on July 6, 2023, and was published in English and French in both the Cornwall Standard Freeholder and in the Le Reflet-The News on July 6 and July 13, 2023.

All stakeholders were notified of the review period for the Draft EA Study Report through the distribution of the Notice of Draft EA Study Report Review. This Notice was distributed via hard copy mail on December 19, 2022 and by email on December 21, 2022, and was published in English and French in both the Cornwall Standard Freeholder and in the Le Reflet-The News on December 21 and December 28, 2023.

The Notices were also posted to the project website. Copies of each of the Notices are included in Appendix B of **Supporting Document 4**.

9.3.2 Public Open Houses

GFL hosted two Public Open Houses during the EA on October 7, 2021 and July 20, 2022.

9.3.2.1 Public Open House #1

Public Open House #1 was held on October 7, 2021 from 16:00 to 20:00 at the Moose Creek Recreational Arena at 9 Munroe Street in Moose Creek, Ontario. GFL introduced and provided an overview of the project, presented the EA process, provided information on the proposed alternatives being considered, the EA evaluation process and criteria, and the consultation process, and obtained public input. Based on the completed sign-in sheet the open house was attended by 27 people in addition to GFL and consulting staff.

Notification of the open house was provided in advance to agencies, Indigenous communities and organizations, and the public of as part of the Notice of Commencement (Section 9.3.1). In addition to the Notice, GFL representatives conducted in-person visits to four neighbouring properties on October 6, 2021 to inform them of the upcoming Public Open House #1.

The open house was organized in an information session format with poster boards displayed around the periphery of the room. GFL staff and consultants were available to discuss the information panels, receive comments, and answer questions. Members of the public were asked to sign-in as they arrived and were then given a comment form which included questions regarding the information presented.

All presentation material at the open house was available in both French and English. Bilingual staff members were also present at the open house. Presentation materials were posted to the project website following the open house.

Completed comment forms were requested by October 22, 2021. Five comment forms were received at the open house and two additional comment forms were received prior to this date. The comments received are included in **Table 9-1**. Verbal comments received at the open house were addressed by staff as they were received.

Table 9-1. Summary of Comments Received from Public Open House #1 Comment Forms

1. My **interest** in the project is: (please check all that apply)			
5	residential property	3	air quality (dust, noise, odour)
1	business	0	ecology
0	member of interest group	3	groundwater, surface water
0	agency representative	0	land use / visual
2	other: agriculture, proximity	1	transportation

2. Please provide any **general comments** about the information presented at this Public Open House.
A total of 6 responses were received to this question. General comments submitted through the comment forms were generally positive regarding the information presented at the Open House. General comments included the following: • support for natural gas in the community; • request for compost area for community use on residential properties; • appreciation for French language materials and representation; • foul odours, particularly in the evening; • foul odours as they relate to real estate value; • the impact on potable well water; and • site access routes.

3. After reviewing the information presented at this Public Open House, do you have any additional comments, concerns or recommendations regarding the **current operations at the EOWHF**? (Yes/No)
A total of 4 responses were received to this question (1 yes, 3 no). The written response received was related to: • foul odours, particularly in the evening; • foul odours as they relate to real estate value; • the impact on potable well water; and • site access routes

4. Do you have any specific comments, concerns or recommendations regarding the **Alternatives** as presented? (Yes/No)

A total of 5 responses were received to this question (3 yes, 2 no). The written responses received noted support of Alternative 2, expressed concern that the Zone of Influence encroaches on privately-owned property, and questioned if Route 700 E will be used for site access.

5. Do you have any specific comments, concerns, or recommendations regarding the **Evaluation Criteria** to be used in the assessment of the Alternatives as presented? (Yes/No)
A total of 4 responses were received to this question (2 yes, 2 no). The written responses received requested additional surface water and groundwater analysis and asked if individual meetings would be held with neighbours of the site.

6. Do you have any specific comments, concerns, or recommendations regarding the summary of **Existing Conditions** as presented? (Yes/No)
A total of 5 responses were received to this question (2 yes, 3 no). The written responses received were related to: • foul odours, particularly in the evening; • foul odours as they relate to real estate value; • the impact on potable well water; and • site access routes

7. Do you have any specific comments or questions about the **Environmental Assessment Process** or **consultation and engagement activities**? (Yes/No)
A total of 5 responses were received to this question (2 yes, 3 no). The written responses received asked if individual meetings would be held with neighbours of the site and expressed concern that the Zone of Influence would impact land-use on privately-owned property.

8. Are there any other issues that you feel GFL should consider in the **Environmental Assessment**? (Yes/No)
A total of 4 responses were received to this question (1 yes, 3 no). The written response received asked if individual meetings would be held with neighbours of the site.

As outlined in the consultation and engagement program included in the approved ToR (Appendix A), a Public Open House #1 Summary Report was prepared following the event and was posted to the project website. The Summary Report included a description of all aspects of the open house, a summary of results as well as comments received and responses, as appropriate. A copy of the Public Open House #1 Summary Report is included as Appendix C of **Supporting Document 4**.

9.3.2.2 Public Open House #2

The GRT, Indigenous communities and members of the public, including neighbouring property owners, were notified of Public Open House #2 by a Notice of Public Open House. All participants were sent a copy by mail of the Notice in both English and French languages. The Notice was distributed via hard copy mail on July 4 and 5, 2022 and by email on July 6, 2022.

The Notice of Public Open House was published in English and French in the Cornwall Standard Freeholder and Le Reflet-The News newspapers on July 6 and 13, 2022.

Both the English and French versions of the Notice of Commencement were posted on the project website (https://gflenv.com/moose-creek-landfill-expansion) on July 6, 2022.

A copy of the Notice of Public Open House #2 is included in Appendix B of **Supporting Document 4**.

In addition to the Notice described above, GFL representatives conducted in-person visits to four neighbouring properties on July 19, 2022 to inform them of the upcoming Public Open House #2.

Public Open House #2 was held on July 20, 2022 from 16:00 to 20:00 at the Moose Creek Recreational Arena at 9 Munroe Street in Moose Creek, Ontario. GFL provided an update on the project and the assessment of alternative methods and presented the results of the comparative evaluation that was conducted to identify the preferred alternative for the project. Based on the completed sign-in sheet the open house was attended by 12 people in addition to GFL and consulting staff.

The open house was organized in an information session format with poster boards displayed around the periphery of the room. GFL staff and consultants were available to discuss the information panels, receive comments, and answer questions. Members of the public were asked to sign-in as they arrived and were then given a comment form which included questions regarding the information presented.

All presentation material at the open house was available in both French and English. Bilingual staff members were also present at the open house. Presentation materials were posted to the project website following the open house.

Completed comment forms were requested by August 5, 2022. Three comment forms were received at the open house and two additional comment forms were received prior to this date. The comments received are included in **Table 9-2**. Verbal comments received at the open house were addressed by staff as they were received.

Table 9-2. Summary of Comments Received from Public Open House #2 Comment Forms

1. My **interest** in the project is: (please check all that apply)			
1	residential property	1	air quality (dust, noise, odour)
1	business	1	ecology
1	member of interest group	2	groundwater, surface water
0	agency representative	1	land use / visual
1	other: municipal	0	transportation

2. Please provide any **general comments** about the information presented at this Public Open House.
A total of 3 responses were received to this question. General comments submitted through the comment forms were generally positive regarding the information presented at the Open House. General comments included the following: • appreciation for layout, quality of presentation, and staff responsiveness • support for Alternative Method 2 • ensure all affected property owners are contacted

3. After reviewing the information presented at this Public Open House, do you have any specific comments or questions about the **conceptual design of the Alternative Methods for the project**? (Yes/No)

A total of 3 responses were received to this question (1 yes, 2 no). The written response received was related to the visual perspective of Alternative Method 2 for drivers on Highways 417 and 138.

4. Do you have any specific comments, questions, or recommendations about the **assessment of Alternative Methods**? (Yes/No)
A total of 3 responses were received to this question (1 yes, 2 no). The written response suggested planting evergreen trees at the boundaries of the future development to screen the landfill from public view.

5. Do you have any specific comments, questions, or recommendations about the **results of the comparative evaluation of Alternative Methods**? (Yes/No)
A total of 3 responses were received to this question (1 yes, 2 no). The written response received suggested there could be future, unforeseen variables as part of the future development.

6. Do you have any specific comments, questions, or concerns about the **Preferred Alternative** identified? (Yes/No)
A total of 3 responses were received to this question (2 yes, 1 no). The written responses received indicated support for Alternative Method 2 as the preferred alternative.

As outlined in the consultation and engagement program included in the approved ToR (Appendix A), a Public Open House #2 Summary Report was prepared following the event and was posted to the project website. The Summary Report included a description of all aspects of the open house, a summary of results as well as comments received and responses, as appropriate. A copy of the Public Open House #2 Summary Report is included as Appendix C of **Supporting Document 4**.

9.3.3 Review of Draft Existing Conditions Reports

The approved ToR included a preliminary description of the existing environmental conditions within the area surrounding the EOWHF landfill, with the commitment that the description would be expanded upon in the EA. Draft existing conditions reports were prepared to address the environmental components as listed in Section 2.5.

The Draft Existing Conditions Reports were provided to agencies on March 24, 2022 via email (links to the documents were provided) along with a notification of the upcoming Workshop. Invitations to the Workshop were provided to the Agencies on March 28, 2022 via email.

A one-hour virtual Agency Workshop was held on April 6, 2022 at 10:00 a.m. to facilitate the review of the Draft Existing Conditions Reports. The purpose of the workshop was to provide background on the EOWHF, introduce the project, present the alternatives being considered, provide an overview of the EA process, discuss the requested review of the Draft Existing Conditions Reports, and provide an overview of the next steps. Attendees included representatives from the: Ministry of Tourism, Culture, and Sport; Ministry of Transportation; Ontario Provincial Police; MECP Eastern Regional Office; MECP Cornwall Area Office; MECP Ottawa District Office; and MECP Environmental Assessment and Permissions Division. A copy of the presentation was provided to attendees via email following the Workshop and attendees were encouraged to forward

the presentation to others as needed. A copy of the Workshop presentation is provided in Appendix E of **Supporting Document 4**.

Comments on the Draft Existing Conditions Reports were requested by April 25, 2022. One agency requested an extension to the review deadline, and an extension was provided to May 9, 2022.

Comments on the draft existing conditions reports were received from[25]:

- Ministry of Northern Development, Mines, Natural Resources and Forestry;
- MHSTCI; and
- MECP.

Comments received on the Draft Existing Conditions Reports are provided in the Comment Response Tables in Appendix H of **Supporting Document 4**.

9.3.4 Project Website

A project-specific website (http://gflenv.com/moose-creek-eowhf) was launched during the ToR and maintained during the EA process. The website was established to provide clear and accurate information to stakeholders and also to provide opportunities for feedback. The website includes up-to-date information about the EA activities and includes access to notices, open house materials and study reports.

9.3.5 Telephone Number and Contact

A project telephone number (613-538-2776 ext. 2223) and GFL staff contact person was established to receive comments and questions from the public. This service allowed interested parties to submit enquiries for information, submit comments and request a call-back.

9.3.6 Other Activities

9.3.6.1 Site Tour(s)

GFL conducted four site tours at the EOWHF between October 2021 and June 2022. Details of the site tours are provided in **Table 9-3**.

Table 9-3. Site Tours

Date	Participants	Topics of Discussion
October 8, 2021	Casselman Environmental Committee members	• Landfill operations, equipment, and technology • Waste processing at the EOWHF • Upcoming Committee presentation to Casselman citizens • Proposed landfill expansion
November 24, 2021	The United Counties of Stormont, Dundas, and Glengarry mayors and councillors	• Proposed landfill expansion • Other potential development opportunities that could result

[25] Ministry names as of the time of review.

Date	Participants	Topics of Discussion
December 21, 2021	The United Counties of Stormont, Dundas, and Glengarry mayors, councillors, MPs and MPPs	• Proposed landfill expansion • Other potential development opportunities that could result
June 10, 2022	The United Counties of Stormont, Dundas, and Glengarry majors, councillors, MPs, MPPs, and senators	• Proposed landfill expansion • Other potential development opportunities that could result

9.3.6.2 Community Liaison Committee

GFL has developed a positive working relationship with the Township of North Stormont and has created a Community Liaison Committee (CLC). The formation of the CLC was a requirement of GFL's ECA; however, these meetings provide opportunities for GFL to meet with the local community to discuss the EOWHF and proactively discuss any complaints and/or matters of concern to the local community.

Membership consists of:

- Two (2) representatives from GFL;
- One (1) representative from the Township of North Stormont;
- One representative from the Municipality of Casselman (as of July 2020);
- One (1) local non-voting representative from the MECP; and
- Two (2) local community representatives who reside in North Stormont Township or in The Nation Municipality.

Between August 2021 (just prior to the publication of the Notice of Commencement of EA) and July 2022, three meetings were held with the CLC regarding the proposed future development as summarized in **Supporting Document 4**.

9.3.6.3 General Inquiries

During the course of the EA, EOWHF neighbours and members of the community contacted GFL staff regarding the status of the project and to make general inquiries. No specific comments or concerns about the project were identified.

9.3.6.4 Record of Consultation and Engagement

A Record of Consultation and Engagement has been prepared as part of EA and is included as **Supporting Document 4**. The Record of Consultation and Engagement includes more detailed information for each of the consultation and engagement activities undertaken during the EA and discussed above. This includes information about and received at the open houses, notices, and copies of comments, questions, issues and concerns from agencies, Indigenous communities and members of the public and how those questions, issues and concerns were addressed.

9.3.7 Draft EA Study Report Review

The Draft EA Study Report was made available to the GRT, agencies, Indigenous communities, and the public for review and comment starting on December 21, 2022.

Notice of the availability of the Draft EA Study Report and the review period was provided by newspaper notice, mail, email and on the project website.

The Draft EA Study Report was provided in electronic format and was available for download on the project website on December 21, 2022. The Notice of Draft EA Study Report Review was published in two newspapers on December 21 and December 28, 2022 – the Cornwall Standard Freeholder and Le Reflet-The News. Any comments were requested to be provided to GFL by February 3, 2023. A copy of the Notice of Draft EA Study Report Review, newspaper publications, and notice emails are included in **Supporting Document 4** (Record of Consultation).

All comments received within the 30-day review and comment period for the Draft EA Study Report were tabulated and a response prepared by GFL. The resulting changes to the Draft EA Study Report have been identified in the detailed comment response table in **Supporting Document 4**.

9.3.7.1 Review by GRT and Agencies

The GRT and agencies were notified of the Draft EA Study Report review by email on December 21, 2022 with a copy of the Notice of Draft EA Study Report Review in English and French. A link to the project website was provided for reviewers to access the Draft EA Study Report and supporting documents. A reminder email regarding the review period was sent to the GRT and agencies on January 30, 2023. Comments on the Draft EA Study Report were received from:

- Ministry of Citizenship and Multiculturalism (MCM);
- MECP;
- Ministry of the Solicitor General;
- Ministry of Mines;
- Township of North Stormont; and
- South Nation Conservation.

The comments received from the GRT and agencies were focused on: LFG generation and management; GHG emissions; leachate generation, storage and management; surface water quality; mitigation and monitoring commitments; project permitting; consultation; and other updates to the EA Study Report. Responses to the comments were prepared by the project team. Follow up comments were received from the MECP and additional responses were provided. A copy of the comments received and responses provided are included in **Supporting Document 4**. Revisions were made to the EA Study Report, as appropriate, based on the comments received, and changes made to the EA Study Report are identified as part of the responses.

9.3.7.2 Review by Indigenous Communities and Groups

Indigenous communities and groups were notified of the Draft EA Study Report review by mail (Xpresspost) on December 19, 2022 and by email on December 21, 2022 with a copy of the Notice of Draft EA Study Report Review in English and French. A link to the project website was provided for reviewers to access the Draft EA Study Report and supporting documents. A reminder email regarding the review period was sent to the

Indigenous communities and groups on January 30, 2023. One email regarding the Draft EA Study Report was received from the Mohawk Council of Akwesasne's Aboriginal Rights and Research Office (ARRO) on February 2, 2023 indicating that they had no comments, concerns, or recommendations, and would like to continue to be informed about the project. A copy of the comments received is included in **Supporting Document 4**.

9.3.7.3 Review by the Public

The public was notified of the Draft EA Study Report review by the newspaper publications of the Notice of Draft EA Study Report review in English and French on December 21 and 28, 2022, as noted above, and by email on December 21, 2022. A link to the project website was provided for reviewers to access the Draft EA Study Report and supporting documents. No public comments were received on the Draft EA Study Report.

9.4 Indigenous Community and Group Engagement

During the ToR, GFL committed to continue engagement with potentially affected Indigenous groups and communities during the EA process. The Indigenous communities and groups engaged during the EA process are listed below as per Section 9.2 above. As previously noted, the MECP identified three Indigenous groups in their February 5, 2020 letter to GFL delegating Indigenous consultation (these communities are marked with an asterisk "*" below), and GFL added three other Indigenous groups to the list of participants.

- Mohawk Council of Akwesasne*
- Huron Wendat Nation Council*
- Mohawks of the Bay of Quinte – Tyendinaga Mohawk Council
- Algonquins of Ontario Consultation Office*
- Métis Nation of Ontario Council
- Métis Nation of Ontario Ottawa Region Métis Council

The Stage 1 Archaeological Assessment for the future development was provided to the Huron Wendat Nation Council, Mohawk Council of Akwesasne, and the Algonquins of Ontario Consultation Office on June 23, 2020 during the ToR. Feedback was provided by the Mohawk Council of Akwesasne. Only one Indigenous group, the Huron Wendat Nation Council, requested to be kept informed further of any archaeological related studies or reports during the EA Process[26].

All of the Indigenous communities and groups were provided Notices in both English and French via hard copy mail (Xpresspost) and email. These Notices included the Notice of Commencement of EA in September 2021, the Notice of Public Open House 2 in July 2022, and the Notice of Draft EA Study Report Review in December 2022.

The Draft EA Study Report was made available for review on the GFL website beginning on December 21, 2022. In the Notice of Draft EA Study Report Review, questions and comments on the Draft EA Study Report were requested to be received from the

[26] The correspondence with Indigenous groups regarding the archaeological studies is provided in the Record of Consultation for the ToR.

communities by February 3, 2023. A follow-up email about the Draft EA Study Report review was sent on January 30, 2023 in which recipients were reminded that questions and comments could be submitted until February 3, 2023.

One email regarding the Draft EA Study Report was received from the Mohawk Council of Akwesasne's Aboriginal Rights and Research Office (ARRO) on February 2, 2023. ARRO indicated that they had "no comments, concerns or recommendations at this time" and they "would like to remain informed as the project is within traditional Haudenosaunee territory". No other communications were received from Indigenous communities or groups.

9.5 Commitments for On-going Consultation and Engagement

The final EA Study Report has been formally submitted to the MECP and circulated to agencies, Indigenous communities, and the public for review and comment. The Notice of Submission for the final EA Study Report has been posted to the project website and published in the Cornwall Standard Freeholder and Le Reflet-The News newspapers in both English and French. A printed copy of the EA Study Report has been made available for public viewing at the locations identified in the Notice.

GRT members and agencies, Indigenous communities, and the public have been notified of the final EA Study Report review by email or mail including a copy of the Notice and an accompanying letter as appropriate. The EA Study Report and supporting documents have also been made available from the project website https://gflenv.com/moose-creek-landfill-expansion.

10 Monitoring and Commitments for the Undertaking

This section of the EA Study Report presents a summary of the monitoring and commitments identified for the undertaking. A list of commitments made in the approved ToR and how and where the commitments are addressed in the EA Study Report is provided in **Appendix B**.

Monitoring strategies were developed so that environmental effects can be monitored during construction, operation and maintenance of the landfill to confirm that:

- predicted net effects are not exceeded;
- unexpected negative effects are addressed; and
- implemented mitigation measures are effective.

A Compliance Monitoring Program will be developed to demonstrate compliance with the commitments made in the EA Study Report. Compliance monitoring is an assessment of whether an undertaking has been designed, constructed, and/or operated in accordance with the commitments in the EA Study Report and the conditions of approval. Under the Compliance Monitoring Program, the results of compliance monitoring will be reported to the MECP and will include details of the implementation of mitigation measures and completion of commitments.

Table 10-1 summarizes the environmental effects, mitigation commitments, commitments for monitoring, and proposed compliance monitoring for the Preferred Alternative.

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
Natural Environment				
Atmospheric Environment	Air Quality	• No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility (e.g., Fugitive Dust Management Plan, LFG management).	• On-going seasonal dustfall monitoring as per the existing ECA requirements.	• Annually during construction and operation as part of the current monitoring program.
	Odour	• No additional mitigation measures are expected to be necessary beyond those currently applied at the existing facility (e.g., Odour Management Plan).	• Maintain log of any odour-related complaints and follow up actions. • Continue to report on public complaints and responses regarding odour on an annual basis. • A surface landfill gas emission survey of the completed areas with final cover is conducted at least two times a year (summer and winter), to provide an indication of the performance of the final cover and the existing LFG collection and control system, and to identify areas of the site which require upgraded or additional gas collection and control facilities. • Vacuum, temperature, gas composition and flow rate shall be monitored within the collection system and at the blower/flare Station. • As each phase of the landfill is constructed, LFG monitors will be progressively installed within the landfill buffer approximately every 200 metres around the landfill perimeter and will be conducted monthly during the winter and once in the summer.	• Annually during construction and operation as part of the current monitoring program.
	Noise	• No additional mitigation required. Continue current noise control practices and annual noise monitoring program.	• Continue with existing annual noise monitoring program. • Track all noise complaints and follow up as appropriate.	• Annually during construction and operation as part of the current monitoring program.

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
Geology and Hydrogeology	Groundwater Quality	• No additional mitigation measures required beyond the in-design mitigation measures.	• Groundwater monitoring wells located east of the existing EOWHF will be sampled triennially (i.e., three times per year) in conjunction with the existing EOWHF monitoring well network. • The analytical schedule for all monitoring wells will follow the existing commitments outlined in ECA No. A420018 for the existing EOWHF.	• Triennially in August and November (parameter "List A" as defined in ECA No. A420018) and in May (parameter "List B" as defined in ECA No. A420018).
	Groundwater Quantity	• No additional mitigation measures required beyond the in-design mitigation measures.	• The monitoring schedule for all monitoring wells will follow the existing commitments outlined in ECA No. A420018 for the existing EOWHF.	• Triennially in May, August and November.
Surface Water Environment	Surface Water Quality	• New SWM pond will reduce 80% of long term TSS removal in stormwater runoff prior to discharge. • Wet ponds need maintenance for proper quality control (i.e., sediment removal). Operational and maintenance requirements for the proposed wet ponds will be specified in the amended ECA that will be issued for the project. • Complete ECA amendment (ECA No. 7899-CBQP6L) for the proposed increase in total leachate volume to be treated and managed to achieve compliance with the effluent limits acceptable to the MECP for treated effluent. The supporting documentation will include a Surface Water Impact Assessment for the future development landfill. • Complete ECA amendment (ECA No. 7899-CBQP6L) for the proposed SWM system including SWM discharge outlet to Fraser Drain. • Pre-submission consultation with the MECP Surface Water Specialist will be undertaken	• Continue site surface water monitoring program as per ECA No. 7899-CBQP6L (with modifications to sampling locations to reflect the SWM facilities proposed for the expanded landfill) for stormwater and the receiving surface water environment. • As part of the ECA amendment (ECA No. 7899-CBQP6L), implement a monitoring program associated with treated effluent discharge.	• SWM ponds will be monitored in accordance with the requirements outlined in the amended ECA that will be issued for the project. • Five times annually during current surface water monitoring program, or revised as specified in the amended ECA that will be issued for the project. • Annually report on status of commitments during construction and operations, based on the results of the on-going monitoring programs.

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
		prior to the ECA amendment application. • An ACS and MZ assessment will be undertaken for Moose Creek as part of amended ECA approvals. In addition to SSWQO parameters, the ACS and MZ assessment will consider phosphorous in accordance with SNC Total Phosphorus Management Program, $CBOD_5$, TSS, dissolved oxygen, iron, copper, zinc, and pH. • A detailed leachate management plan will be prepared as part of the ECA amendment application to address the design of the effluent discharge system, operation of temporary storage ponds and effluent assimilation in Moose Creek. • Implement proposed run-off and leachate management controls, including any required upgrades to the LTF and additional on-site effluent temporary storage capacity, to meet the effluent limits and other regulated parameter limits acceptable to the MECP at the point of discharge and the chronic SSWQOs or applicable regulatory criteria (for regulated non-SSWQO parameters) within the Moose Creek surface water receiver. • Discharge from the proposed SWM pond and LTF will follow the requirements of the amended ECA that will be issued for the project.		
	Surface Water Quantity	• No additional mitigation measures required beyond the in-design mitigation measures (e.g., construction of new SWM pond to control volume and peak flows to the future development site outlet, and providing sufficient storage in the perimeter ditches and the existing northeast pond to control volume and peak flows to the existing site outlet).	• Inspection for erosion and sediment accumulation in SWM pond as part of landfill monitoring programs. • Annual inspection of stormwater works and maintenance to address sedimentation and excessive vegetation growth.	• Annually during current site inspection program.

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
		• Stormwater management facilities will be designed in accordance with MECP's Stormwater Management Planning and Design Manual (2003) and O. Reg 232/98. The design of the pond will be submitted to MECP for review and approval prior to incorporation into the amended ECA that will be issued for the project. • Discharge from the proposed SWM pond and LTF will follow the requirements of the amended ECA that will be issued for the project. • As appropriate, additional studies to support the use of additional storage ponds for treated effluent will be prepared as part of the ECA amendment applications.		

Ecological Environment	Terrestrial Ecosystems	• Vegetation removal will be limited to areas necessary for construction.
		• Vegetation removal will be phased, if feasible, to minimize the amount of exposed soil at a given time.
		• Impacts to retained trees will be minimized by:
		  • Erecting construction fence beyond the critical root zone (10x the trunk diameter) to prevent interaction with retained trees and their roots.
		  • Pruning branches to avoid conflict with construction equipment.
		  • Refraining from attaching signs and other materials to trees.
		• During construction, temporary silt fencing will be used for erosion and sediment control, which could act as wildlife exclusion fence to prevent interaction with turtles and other small wildlife.
		• The silt fencing will be inspected regularly,
			• Monitor and tend to plantings as specified in a landscape plan, if applicable.
			• If vegetation removal must occur during the breeding season (April 1 to September 30), areas to be cleared will first be inspected by a qualified person to confirm the absence of nesting/roosting activity.
			• Will follow standard wildlife monitoring including regular silt fencing inspections, checking work areas for wildlife before commencing work, and reporting observations and interactions with SAR.
			• Exclusion fence will be inspected weekly during the turtle active season to confirm continued functionality and turtle harm prevention.
				• No compliance monitoring required.

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
		particularly during the active wildlife season to confirm continued functionality. • The visual screening buffer may also help deter turtles from accessing the future development. • Vegetation removal and alterations to buildings will not take place during sensitive times of the year for wildlife (i.e., breeding and roosting season). No vegetation removal or alterations to buildings will occur between April 1 and September 30 inclusive to prevent impacts to birds and bats. • GFL will consult with the MECP to confirm that no additional mitigation, avoidance, or compensation measures are required to eliminate potential impacts to Bank Swallow and its habitat. • Wildlife will not be harmed, fed, or harassed. • Site workers will be familiar with SAR that have potential to interact with the project. • Observations of and interactions with SAR will be reported to GFL for further direction. • Waste will be covered daily to limit wildlife attraction to the landfill. • Vehicles and equipment will be driven slowly and with an awareness for wildlife along access routes. • Stockpiles and equipment (e.g., pipes) will be managed on the site to prevent wildlife from being attracted to artificial habitat. • Work areas will be checked for wildlife before commencing work. • Established controls for noise, dust, waste management, and other disturbances at the landfill that are currently in use at the EOWHF will be used for the future development. • Wildlife artificially attracted to the future development will be managed using current		

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
		EOWHF practices (e.g., use of raptors to deter gulls) and thus are expected to align with standard and accepted approaches. • Maintenance works associated with the new stormwater pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for wildlife (e.g., removal and relocation of turtles and fish under appropriate permits).		
	Aquatic Ecosystems	• Discharges from the SWM pond and LTF will follow requirements of an ECA to be issued for the project by MECP. • GFL will consult with MECP, SNC, and DFO to determine information, design, and permit requirements for alterations to watercourses, including mitigation and/or compensation measures. • All requirements of a permit from SNC to alter the Fraser Drain shall be followed, along with any DFO requirements. • A Request for Review of the proposed alterations to the Fraser Drain will be submitted to DFO for consideration of potential impacts, and to determine whether they would require a *Fisheries Act* Authorization. • To further minimize impacts to aquatic habitat and water quality in the Fraser Drain and other surface water features in the study areas, the construction of road crossings and the SWM pond outlet channel into the drain will incorporate the following mitigation measures: • In-water work areas will be isolated during construction and may require fish to be relocated from work areas.	• No monitoring required. Surface Water Quality monitoring as described above.	• Annually during construction and operation. • As specified in permissions from MECP, SNC, DFO.

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
		• In-water works will be planned such that they respect fish-protection timing windows. • Riparian vegetation will be maintained to the extent possible between areas of on-land activity and the high-water mark of the drain. Use methods to avoid soil compaction, such as swamp mats or pads. • Following construction of the crossings and installation of the culverts, fish passage will be maintained. The changing of flows or water levels and obstructing or interfering with the movement and migration of fish will be avoided. Culvert size and position will be based on existing hydrologic conditions. • The SWM pond will be discharged in such a way or with design options to avoid channel erosion. • Consideration will be given to the incorporation of an outlet control structure that could stop discharge into the Fraser Drain if water quality issues are encountered on site. • The potential for sediment to be released into surface water features during site preparation and construction will be mitigated using standard erosion and sediment control measures. • Maintenance works associated with the new SWM pond (e.g., sediment cleanout) will be reviewed by a qualified person to confirm compliance with best management practices for minimizing impacts to fish (e.g., removal and relocation of fish under appropriate permits). • Mitigation measures to minimize impacts to		

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
		water quality and fish habitat identified above would also minimize potential impacts to downstream watercourses that support more complex fish communities and other aquatic biota.		
Socio-Economic Environment				
Economic	Economic Effects on / Benefits to Local Community	• The displacement of business activities on the future development lands will be phased as the stages are developed. • GFL will continue to provide lands to Manderley Turf Products by agreement.	• No monitoring required.	• No compliance monitoring required.
Social	Effects on Local Community	• GFL will continue to provide lands to Manderley Turf Products by agreement. • GFL will continue to implement odour control measures and provide prompt attention to nuisance complaints to mitigate any adverse effects to the surrounding community.	• No monitoring required. Air quality, odour and noise monitoring are described above.	• No compliance monitoring required. Air quality, odour and noise compliance monitoring are described above.
	Visual Impact of Facility	• The visual screening should be at least 2.4 m (8 feet) high on the northern, eastern, and southern perimeters, and at least 4.5 m (16 feet) high in the northeastern corner of the perimeter to mitigate visual impacts.	• No monitoring required.	• No compliance monitoring required.
Cultural Environment				
Cultural Environment	Cultural Heritage Resources	• No mitigation measures required.	• No monitoring required.	• No compliance monitoring required.
	Archaeological Resources	• Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site	• No monitoring required.	• No compliance monitoring required.

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
		immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*. The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (atarchaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.		
Built Environment				
Transportation	Effects from Truck Transportation along Access Roads	• No additional mitigation measures required beyond the in-design mitigation measures.	• No monitoring required.	• No compliance monitoring required.
Current and Planned Future Land Use	Effects on Current and Planned Future Land Uses	• No mitigation measures required.	• No monitoring required.	• No compliance monitoring required.
Aggregate Resources and	• Aggregate Resources	• GFL will continue to provide lands to Manderley Turf Products by agreement.	• No monitoring required.	• No compliance monitoring required.

Table 10-1. Environmental Effects and Compliance Monitoring Commitments

Environmental Component	Evaluation Criteria	Commitment for Mitigation	Commitment for Monitoring	EA Compliance Monitoring
Agriculture	• Effects on Agricultural Land			

11 Approvals

This section of the EA Study Report outlines the additional approvals expected to be required following EA approval of the proposed undertaking.

It is anticipated that the following approvals may be required:

- Approval from the MECP of the detailed design and operations (Design and Operations Report) for the future development.
- Approval of the groundwater monitoring component of ECA No. A420018.
- Amendment to ECA No. 7899-CBQP6L for the proposed SWM system including the SWM discharge outlet to Fraser Drain.
- Amendment to ECA No. 7899-CBQP6L for the proposed increase in total leachate volume to be treated and managed to achieve compliance with the effluent limits acceptable to the MECP at the point of discharge and with the chronic SSWQOs in Moose Creek, based on an ACS and MZ assessment for Moose Creek to be carried out as part of the ECA amendment process.
- Approvals from SNC, DFO, and MECP for release of treated stormwater and effluent.
- Approvals from SNC and DFO for physical alterations to the Fraser Drain (culvert crossings and stormwater outlet).
- Approval from the Township of North Stormont Drainage Superintendent.
- Depending on SAR presence during development and consultation with MECP, approvals relating to SAR may be required.
- Lift holding symbol from the future development lands in the Township of North Stormont Zoning Bylaw.
- Site plan control approval.

An amendment to the SDG Counties Official Plan was completed on March 22nd, 2022, to permit a waste management system and ancillary uses in the Agricultural Resource Lands designation which currently applies to the future development lands.

An amendment to the North Stormont Zoning Bylaw was completed on April 5, 2022 to re-zone the future development lands to Waste Disposal (WD) Zone as well as to remove the Area of Natural or Scientific Interest (ANSI) Zoning Overlay. The Zoning bylaw amendment placed a holding symbol on the lands, requiring that Site Plan Control approval and EA approval be granted prior to expansion of a waste management system.

The Stage 1 Archaeological Assessment (ASI, 2022) was reviewed for compliance with the MHSTCI *Standards and Guidelines for Consultant Archaeologists* (MTCS, 2011) and was confirmed by the MHSTCI as having been entered into the Ontario Public Register of Archaeology Reports on June 20, 2022.

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Appendix A. Approved Terms of Reference

Terms of Reference

Eastern Ontario Waste Handling Facility
Future Development Environmental Assessment

GFL Environmental Inc.

Moose Creek, Ontario

September 11, 2020

Prepared by:

HDR Corporation
100 York Blvd, Suite 300
Richmond Hill, ON L4B 1J8

Executive Summary

GFL Environmental Inc. (GFL) is proposing to undertake an Environmental Assessment (EA) for additional landfill disposal capacity as part of the future development of its Eastern Ontario Waste Handling Facility (EOWHF). The existing EOWHF is located on the western half of Lot 16 and Lots 17 and 18, Concession 10, Township of North Stormont, United Counties of Stormont, Dundas and Glengarry, near the intersection of Highway 417 and Highway 138. The municipal street address for the facility is 17125 Lafleche Road, Moose Creek, Ontario. The lands to the east of the existing EOWHF being considered for the future development include the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10.

The existing EOWHF landfill was previously approved under the *Environmental Assessment Act* (*EAA*) in 1999 and is operated by GFL under the Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) A420018. The landfill is one of several integrated services offered by the company at the EOWHF. The landfill is approved to accept solid non-hazardous municipal, industrial, commercial, and institutional wastes generated within the Province of Ontario for disposal. The landfill has a permitted annual fill rate of 755,000 tonnes per year and an average daily fill rate of 2,500 tonnes per day. The permitted maximum daily fill rate is 4,000 tonnes per day. Additional waste quantities are accepted at the EOWHF composting operation.

GFL has prepared these Terms of Reference (ToR) in accordance with subsection 6(2)(c) of the *EAA* which allows GFL to set out in detail the requirements for preparation of the Environmental Assessment (EA). GFL plans to proceed under subsection 6(2)(c) and 6.1(3) of the *EAA*, which allows proponents to focus the EA and consideration of alternatives to address their specific needs and circumstances. The ToR was prepared following consultation with Indigenous communities and stakeholders as required by Section 6(3) of the *EAA*. The proposed undertaking is designated under Regulation 101/07 of the *EAA*.

The purpose of the proposed undertaking is to provide approximately 15.1 million cubic metres (m^3) of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period. The undertaking will enable GFL to continue to provide disposal services for residual non-hazardous solid waste to their customers once the landfill reaches its currently approved disposal capacity, and continue to provide economic support to the local community over the long term. No changes to the approved fill rates or site access routes are proposed. The proposed undertaking will occur on land currently owned by GFL including an area in the northeast corner of the existing EOWHF. The project will continue to support the minimization of environmental impacts associated with greenhouse gas (GHG) emissions through reducing the number of waste related trucks hauling material long distances,

diversion of organic material and composting, and the capture of methane gas and generation of green energy at the EOWHF.

The rationale for the undertaking is twofold: first, there is a need for the future development of the EOWHF as it is a significant component of the provincial waste management network and infrastructure in a region lacking in sufficient and secure long-term disposal capacity; and second, GFL is providing waste management services and facilities that are well positioned to continue to support Ontario's transition to becoming waste-free and achieving a circular economy, while supporting a reduction in GHG production and the amount of waste going to landfill, consistent with provincial legislation.

The proposed future development of additional landfill disposal capacity at the EOWHF may be achieved through alternative landfill configurations. Two alternative methods for developing additional landfill disposal capacity at the EOWHF have been identified. The two conceptual design alternatives will be further refined, as appropriate, during the EA. Alternative methods for treating landfill leachate and managing landfill gas will be identified and assessed, as appropriate, during the EA.

The alternatives will be assessed using criteria related to the natural, built, cultural, social, and economic environments within the on-site study area and the off-site study area (within approximately 1 km of the on-site study area). The off-site study area may be refined during the EA to suit the requirements of a specific environmental component or based on the spatial extent of predicted effects.

GFL is committed to carrying out meaningful consultation and engagement on the future development with a broad range of stakeholders. The ToR outlines a consultation and engagement program to be implemented during the preparation of the EA to engage the public, Indigenous communities, government agencies, and other interested parties in the EA process. Consultation materials will be prepared in both English and French languages.

The EA will contain a list of commitments made by GFL during the ToR process and indicate how such commitments have been addressed in the EA. A list of commitments made by GFL during the preparation of the EA will also be included in the EA along with a framework for monitoring when and how all commitments will be fulfilled. In addition, a strategy and schedule for compliance and effects monitoring will be developed and included in the EA.

In addition to the approval under the *EAA*, certain other approvals may be required under provincial legislation. A complete list of the specific approvals required for the proposed undertaking will be provided in the EA. The proposed undertaking is not identified as a designated project under the *Impact Assessment Act*, and this has been confirmed with the Impact Assessment Agency of Canada.

Résumé exécutif

GFL Environmental Inc. (GFL) compte entreprendre une étude d'impact pour accroître la capacité d'enfouissement dans le cadre du projet d'agrandissement de son centre de traitement des déchets de l'Est de *l'Ontario (EOWHF). L'EOWHF* actuel est situé sur la portion ouest du lot 16 et des lots 17 et 18, de la concession 10, du canton de North Stormont, dans les comtés de Stormont, Dundas et Glengarry, à l'intersection des autoroutes 417 et 138. Cette installation est située au 17125, chemin Laflèche, à Moose Creek, Ontario. Les terres à l'Est de *l'EOWHF* actuel envisagées pour le projet d'agrandissement comprennent la portion Est du lot 16, les lots 14 et 15 et la majeure partie du lot 13 de la concession 10.

Le site actuel de l'*EOWHF* a déjà été autorisé en 1999 en vertu de la Loi sur les évaluations environnementales (*EAA*) et est exploité par GFL en vertu du certificat d'autorisation environnementale (*ECA*) A420018 du ministère de l'Environnement, de la Conservation et des Parcs (*MECP*). Le site d'enfouissement est l'un des nombreux services intégrés offerts par l'entreprise à *l'EOWHF*. Le site d'enfouissement est autorisé à recevoir et à disposer les déchets solides non dangereux municipaux, industriels, commerciaux et institutionnels générés dans la province de l'Ontario. Le site a une capacité annuelle autorisée de 755 000 tonnes et une capacité moyenne de 2 500 tonnes par jour. La capacité quotidienne maximale autorisée est de 4 000 tonnes par jour. L'opération de compostage du *l'EOWHF* peuvent également recevoir d'autres quantités de matières.

GFL a élaboré un cadre de références (*ToR*) conformément au paragraphe 6 (2) (c) de la Loi sur les évaluations environnementales (*EAA*), permettant à GFL d'établir de façon détaillée les critères relatifs à la préparation de l'étude d'impacts. GFL prévoit réaliser l'étude en vertu des paragraphes 6 (2) (c) et 6.1 (3) de l'*EAA* qui encadre l'étude d'impacts et permet aux promoteurs d'envisager d'autres scénarios pouvant répondre à leurs besoins et préoccupations. Le cadre de références (*ToR*) a été élaboré à la suite de consultations avec les communautés autochtones et diverses parties prenantes, comme l'exige le paragraphe 6 (3) de l'*EAA*. Le présent projet est assujetti au règlement 101/07 de l'*EAA*.

L'objectif du présent projet est d'offrir d'environ 15,1 millions de mètres cubes (m^3) supplémentaires de capacité de disposition à *l'EOWHF* actuel durant une période de 20 ans. Ce projet permettra à GFL de continuer d'offrir des services de disposition de déchets solides non dangereux à ses clients une fois que le site actuel atteindra sa capacité de disposition autorisée et de soutenir pendant plusieurs années le développement économique de la communauté environnante. Aucune modification de la capacité de disposition autorisée ou des voies d'accès au site n'est proposée. Le projet proposé est prévu sur des terrains appartenant déjà à GFL incluant une zone dans le secteur nord-est de *l'EOWHF* actuel. Le projet sera élaboré avec le souci de minimiser les impacts environnementaux associés aux émissions de gaz à effet de serre (GES) par la réduction du nombre de camions liés au transport des déchets sur de longues distances, en détournant les matières organiques vers le

compostage, et en captant le méthane généré par les matières enfouies pour la production d'énergie verte sur le site de *l'EOWHF*.

Ce projet est nécessaire pour deux grandes raisons. Premièrement, il est essentiel pour assurer le maintien de *l'EOWHF* qui constitue une des installations les plus importantes du réseau de gestion des déchets de la province et qui est située dans une région dépourvue à l'égard de sa capacité de disposer, de façon sécuritaire et à long terme, de ses matières résiduelles. Deuxièmement, GFL offre des services et des installations de gestion des matières résiduelles pouvant appuyer la transition de l'Ontario vers le *Zéro déchets* et pour une économie circulaire, tout en contribuant, en lien avec la règlementation provinciale, à réduire les GES et l'enfouissement des déchets.

Le projet d'accroître la capacité d'enfouissement de *l'EOWHF* peut être réalisé par divers scénarios de disposition. Deux scénarios sont envisagés pour augmenter la capacité de disposition. Les deux scénarios seront développés, le cas échéant, durant l'étude d'impacts. Diverses méthodes de traitement du lixiviat et de gestion du biogaz seront présentées et évaluées, le cas échéant, pendant l'étude d'impacts.

Les scénarios envisagés seront évalués à l'aide de critères liés aux milieux naturel, bâti, culturel, social et économique à l'intérieur de la zone d'étude du projet, de même qu'en périphérie de la zone d'étude (dans un rayon d'environ 1 km autour du projet). La zone d'étude en périphérie du projet pourrait être redéfinie durant l'étude d'impacts afin de respecter les spécificités de certaine composante environnementale ou pour tenir compte de l'étendue des impacts possibles.

GFL s'engage à mener des consultations et à échanger sur son projet d'agrandissement auprès d'un large éventail de parties prenantes. Le cadre de références (*ToR*) comprend la mise en œuvre d'une démarche de consultation visant à favoriser la participation des citoyens, des communautés autochtones, des organismes gouvernementaux et de toutes autres parties intéressées au processus d'étude d'impacts. Tous les documents de consultation seront préparés en anglais et en français.

L'étude d'impacts va inclure les engagements pris par GFL durant la préparation du cadre de références (*ToR*) de même que la manière qu'ils seront traités dans l'étude d'impacts. Une liste des engagements pris par GFL sera également intégrée à l'étude d'impacts de même qu'une démarche de suivi de la mise en œuvre de chacun des engagements. De plus, une stratégie et un calendrier de conformité et de surveillance des impacts seront élaborés et inclus dans l'étude d'impacts.

En plus de l'autorisation en vertu de la Loi sur les évaluations environnementales (*EEA*) d'autres autorisations pourraient être requises par la règlementation provinciale. Une liste complète des autorisations nécessaires pour la réalisation du projet sera fournie dans l'étude d'impacts. Le présent projet n'est pas identifié comme un projet désigné en vertu de la *Loi sur l'évaluation d'impact* et cela a été confirmé par l'Agence d'évaluation des impacts du Canada.

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1. Introduction and Background

GFL Environmental Inc. (GFL), is proposing to undertake an Environmental Assessment (EA) for additional landfill disposal capacity as part of the future development of its Eastern Ontario Waste Handling Facility (EOWHF).

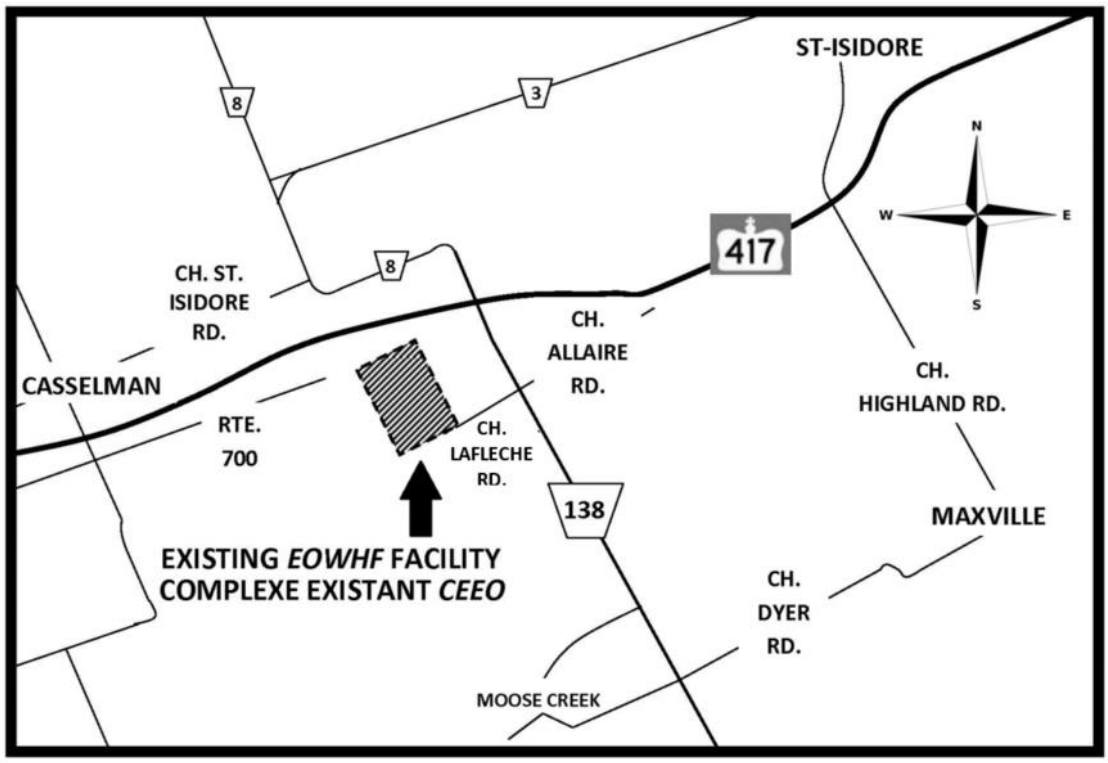
The existing EOWHF is located on the western half of Lot 16 and Lots 17 and 18, Concession 10, Township of North Stormont, United Counties of Stormont, Dundas and Glengarry, near the intersection of Highway 417 and Highway 138. The municipal street address for the facility is 17125 Lafleche Road, Moose Creek, Ontario. The lands to the east of the existing EOWHF being considered for future development include the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10.

The approved existing EOWHF encompasses a site area of 189 hectares which includes the following waste management related activities and services:

- 112 hectare landfill site;
- composting facility;
- waste transfer and processing station;
- waste water treatment facility;
- small vehicle waste drop off;
- landfill gas (LFG) utilization facility;
- enclosed flare and natural gas fired comfort heating equipment;
- Resource Productivity & Recovery Authority (RPRA) – Tires;
- Ontario Tire Stewardship (OTS) drop off; and
- supporting facilities (office, vehicle maintenance building).

The location of the EOWHF is shown on **Figure 1**.

Figure 1. Location of the EOWHF



The existing EOWHF landfill was initially approved under the Ontario *Environmental Assessment Act* (*EAA*) in 1999 and is operated by GFL under the Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) A420018. The landfill is one of several integrated services offered by the company at the EOWHF, and is approved to accept solid non-hazardous municipal, industrial, commercial, and institutional wastes generated within the Province of Ontario for disposal. The landfill has a permitted annual fill rate of 755,000 tonnes per year and an average daily fill rate of 2,500 tonnes per day. The permitted maximum daily fill rate is 4,000 tonnes per day. Additional waste quantities are accepted at the EOWHF composting facility.

The development of the EOWHF landfill was proposed to occur in two phases through four stages. The total capacity of the landfill was designed to be 11.6 million m³ when fully developed. The two landfill development phases and associated stages are:

- **Phase 1** – approved in 1999, including Stages 1 to 3A, with a total capacity of 7.4 million m³.
- **Phase 2** – approved in 2019, including Stages 3B and 4, providing 4.2 million m³ of landfill disposal capacity.

Based upon the historical and forecasted filling rate at the existing landfill, GFL estimates that the landfill will reach its approved capacity by approximately late 2025.

Since the EOWHF approval in 1999, GFL and its predecessor[1] have developed a positive relationship with the surrounding community. GFL actively communicates with its neighbours to address potential issues and received complaints, and also participates in Community Liaison Committee meetings. To date, there have been few complaints or issues expressed by the community related to the operation of the EOWHF with the exception of comments related to potential odour emissions.

The operations at the EOWHF are also integrated with the company's network of waste transfer facilities in Eastern Ontario. GFL owns and operates three regional transfer stations located in the Eastern Ontario communities of Russell, Beckwith and Belleville. These facilities provide convenient waste management services to the residential and non-residential sectors and facilitate GFL's collection activities for surrounding municipalities.

2. Proponent

GFL is the proponent for the proposed undertaking. GFL is the fourth-largest North American provider of diversified environmental solutions, and is the only major diversified environmental services company in North America offering services in solid waste management, liquid waste management, and infrastructure implementation. The company's services include:

- Collection, hauling, sorting, transfer and disposal of non-hazardous solid waste (including recyclable materials and organics);
- Identification, collection, transport, processing, recycling and disposal of a broad range of hazardous and non-hazardous liquid wastes (plus sale of recycled liquid wastes and other liquid products); and
- Soil remediation services, as well as site excavation, demolition, soil retention, foundations installation and specialty infrastructure project services.

Through GFL's strategically located network of more than 310 facilities across Canada and in 23 states in the United States of America (USA), the company has capabilities that can be mobilized to service their customers wherever they are located. GFL has a dedicated, professional team of more than 11,500 employees that provides local service to more than 4 million households under municipal contracts and to more than 135,000 industrial, commercial and institutional customers.

In early 2016, GFL purchased Lafleche Environmental Inc., the former owner and operator of the EOWHF. Since the original approval in 1999, the EOWHF has transformed from a small, local family-owned facility to an important multi-service

[1] In early 2016, GFL purchased Lafleche Environmental Inc., the former owner and operator of the EOWHF.

regional facility serving a broad customer base across Eastern Ontario. The EOWHF now functions as a regional facility in Eastern Ontario and is integrated with a wide range of collection, transfer, and transport services and facilities serving residential and commercial customers across the region. Operations at the EOWHF include public drop off of materials, diversion of recyclable materials including tires and electronics, a composting facility for source separated organics, energy generation and waste disposal. The EOWHF employs approximately 40 people.

The GFL contact for this project is:

Mr. Greg van Loenen, Environmental Compliance Officer
GFL Environmental Inc.
17125 Lafleche Road, Moose Creek, Ontario K0C 1W0
Telephone: 613-538-2776 ext. 223
Fax: 613-538-2779
Email: gvanloenen@gflenv.com

3. Preparation of the Environmental Assessment

The following sections describe how the Terms of Reference (ToR) was prepared, the flexibility of the ToR and the preparation of the EA.

3.1 Preparation of the Terms of Reference

GFL has complied with the MECP's Code of Practice for *Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (January 2014) when preparing this ToR. The consultation program has been undertaken in accordance with the MECP's Code of Practice, *Consultation in Ontario's Environmental Assessment Process* (January 2014). In addition, the requirements of the MECP's *Guide to Environmental Assessment Requirements for Waste Management Projects in Ontario* (March 2007) has also been addressed.

The Notice of Commencement for the ToR was published on January 15, 2020.

GFL has prepared this ToR in accordance with subsection 6(2)(c) of the *EAA*, which allows GFL to set out in detail the requirements for preparation of the EA. GFL plans to proceed under subsection 6(2)(c) and 6.1(3) of the *EAA*, which allows proponents to focus the EA and consideration of alternatives to address their specific needs and circumstances. The ToR was prepared following consultation with Indigenous communities and stakeholders as required by Section 6(3) of the *EAA*. The proposed undertaking is designated under Regulation 101/07 of the *EAA*.

GFL has completed an assessment of the rationale and need for the future development of the EOWHF. The EOWHF is a significant component of the provincial waste management network and infrastructure in a region lacking in

sufficient and secure long-term disposal capacity. GFL is providing waste management services and facilities that are well positioned to continue to support Ontario's transition to becoming waste-free and achieving a circular economy, while supporting a reduction in greenhouse gas (GHG) production and the amount of waste going to landfill, consistent with provincial legislation.

The EOWHF includes the largest composting facility in the province for source separated green bin organic materials and provides disposal capacity for residual wastes from an extensive number of municipalities, businesses and Indigenous communities across Eastern Ontario. Additional long-term disposal capacity will allow the continuous and on-going operation of the EOWHF, thereby enabling GFL to provide essential and secure long-term, financially-stable waste diversion, composting, and disposal services to existing and new customers. The company has invested extensively in supporting infrastructure at the EOWHF including a landfill gas-to-energy plant and an on-site leachate treatment facility, both of which have a long service life. GFL owns additional lands adjacent to the existing EOWHF to support this future development, and will continue to utilize the existing local road network without modification.

The EOWHF is a major employer and financial contributor to the local community and broader region. The development of additional disposal capacity will allow GFL to continue to provide this type of economic support to the local community and region over the long term.

GFL has determined that there is a sustainable business opportunity and need for the EOWHF to continue to provide disposal capacity over the long term. Additional details are provided in **Section 5**. Information on the rationale and need for the future development was included in consultation and engagement with the public, interested stakeholders, Indigenous Communities, and government agencies during the development of the ToR. The final description of the proposed undertaking and rationale for the project will be confirmed during the EA.

As noted, GFL intends to proceed under subsections 6(2)(c) and 6.1(3) of the *EAA*, which allow the proponent to focus the EA. Specifically, GFL intends to exclude the 'alternatives to' assessment during the EA studies because an evaluation of waste management alternatives was carried out separately in previous studies. The assessment of the 'alternatives to', including consideration of the do nothing scenario, have been further reassessed during the preparation of this ToR as presented in **Section 6.1**.

This ToR identifies a preferred 'Alternative To' and identifies the 'alternative methods' that will be examined during the preparation of the EA. This approach is consistent with the MECP *Code of Practice: Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (January 2014), which describes how a Proponent can proceed under subsection 6(2)(c) and 6.1(3) if the Proponent is

further along in the defined planning process and additional detail is known regarding its proposal.

Two previous EAs have been completed for the EOWHF. The original EA, approved in 1998, was for the development of Stages 1 to 3A of a landfill concept plan, which also included Stages 3B and 4. The second EA, approved in 2019, considered and assessed alternatives focused on the development of the remaining landfill stages within the original concept plan, which would provide additional disposal capacity for approximately 5 to 10 years. With the acquisition of the site by GFL, the need to meet the long-term (20 years) waste disposal requirements of customers in the Eastern Ontario region, securing the business commitments and opportunity available to GFL, was identified. During the development of the ToR, GFL considered functionally different ways to provide additional residual waste disposal capacity. It was concluded that developing new landfill disposal capacity on other GFL-owned lands adjacent to the EOWHF was the preferred alternative. GFL owns approximately 240 hectares of land located immediately east of the EOWHF. This alternative will continue to support the integrated facilities at the EOWHF including management of residuals from the compost facility operation, enhancing the on-going operation of the landfill gas-to-energy facility, utilizing the existing leachate treatment facility, and receiving post-diversion residual wastes providing cost effective disposal services to generators across Ontario integrated with their local collection. GFL has virtually no ability to securely provide long-term disposal capacity by redirecting waste to other disposal facilities. The company does not own or operate any thermal treatment facilities and has no related business experience with this type of alternative.

The consideration of ‘alternatives to’ the undertaking was included as part of consultation and engagement with the public and agencies and is documented in **Section 6.1** and in the Record of Consultation and Engagement (**Supporting Document 1**). No additional assessment of ‘alternatives to’ the undertaking will be included in the EA. The ‘Do Nothing’ alternative will be carried into the EA and considered against the preferred undertaking for assessing potential effects.

The ToR further identifies the ‘alternative methods’ that will be considered in the EA. These ‘alternative methods’ will be reviewed during the EA and modified if appropriate. Additional alternatives may be identified if warranted. Based on studies completed for the existing EOWHF design and on-going development, a limited range of laterally-oriented alternative methods or design options are available. The underlying silty clay soil provides significant attenuation capabilities and natural protection to groundwater. By increasing the peak height of the current landfill design (approximately 16 metres) the investigations have indicated that the underlying soils may become unstable. This may affect the overall landfill performance and, as a result, vertical expansion alternatives are not identified. This will be considered further in the development of the alternative methods during the EA. The alternative methods are outlined in **Section 6.2**.

3.2 Flexibility of the Terms of Reference

If approved by the Minister of Environment, Conservation and Parks, this ToR will provide the framework for preparing the EA Study Report. The ToR is not intended to present every detail of all the activities that will occur when preparing the EA. It is possible that, in carrying out the work described in this ToR, minor variations to methodologies may be necessary. These variations may include, but are not limited to:

- modifications to the local study area to suit the requirements of each environmental component;
- modifications to the alternatives, or identification of additional alternatives, considered;
- modifications to studies or additional/expanded studies due to variations in the degree of environmental impact assumed at the time of preparation of this ToR or due to content and quality of information available;
- modifications to the consultation and engagement plan; and
- any other modifications required or available through changes to Acts or Regulations.

These examples are not intended to be exhaustive; rather, they are meant to set out the types of changes that may be considered minor and that could be accommodated within the framework of the ToR. The MECP will be consulted in the event of uncertainty as to whether a proposed change should be considered minor and accommodated within the approved ToR.

The flexibility to accommodate new circumstances is also described in **Section 11**.

3.3 Preparation of the Environmental Assessment

Following approval of the ToR by the Minister of Environment, Conservation and Parks (the Minister), GFL will prepare the EA in accordance with the requirements of the approved ToR and *EAA* and submit to the Minister for review and approval. The EA will include:

- a description of the purpose of the undertaking, as described in **Section 4** of this ToR;
- a description of the undertaking based on the consideration of alternative methods, as described in **Section 6** of this ToR;
- the rationale for the undertaking, as described in **Section 5** of this ToR;
- a description of the environment potentially affected by the undertaking (the description in **Section 7** of the ToR will be expanded);

- an assessment of the alternative methods of carrying out the undertaking based on the method outlined in **Section 8** of this ToR. GFL intends to consider the alternatives described in **Section 6** including:
  - a description of the effects that will be caused or that might reasonably be expected to be caused on the environment by the undertaking or the alternative methods;
  - a description of the mitigation measures that are necessary to prevent or reduce significant adverse effects on the environment; and
  - an evaluation of the advantages and disadvantages to the environment as a result of the undertaking; and
- a description of the consultation and engagement process undertaken by GFL for the EA following the plan described in **Section 9** of this ToR.

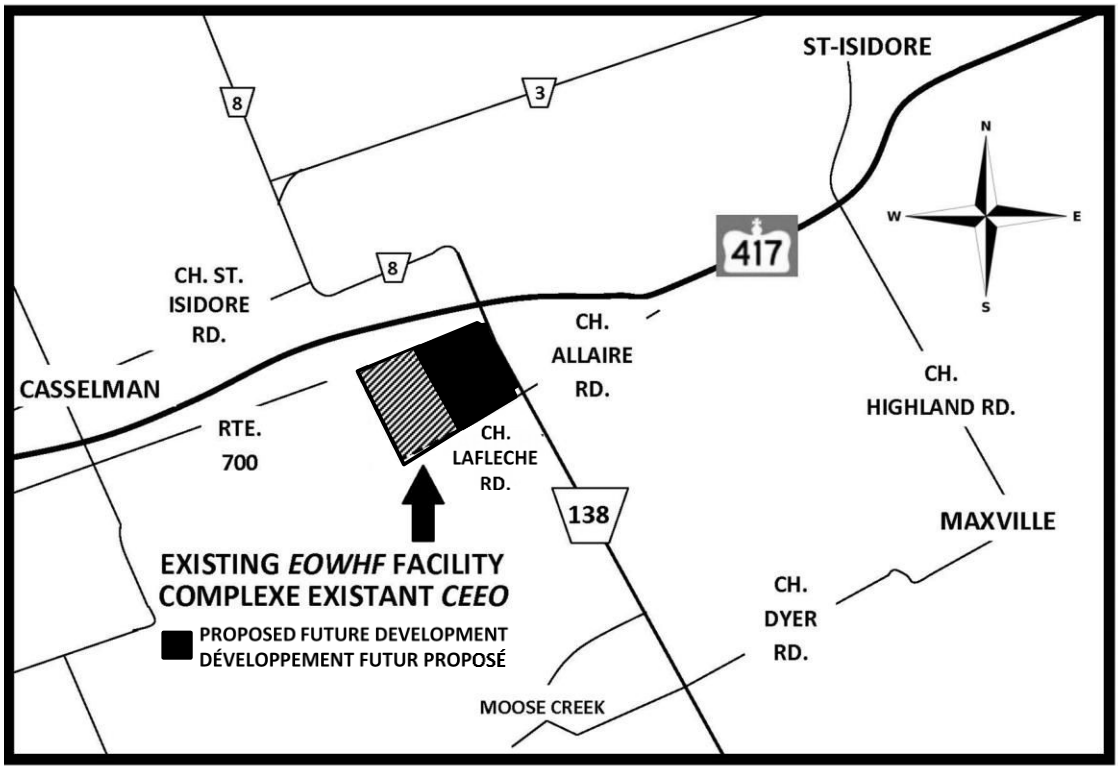
4. Purpose of the Undertaking

The purpose of the undertaking is to provide approximately 15.1 million cubic metres (m^3) of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period. The undertaking will enable GFL to continue to provide disposal services for residual non-hazardous solid waste to their customers once the landfill reaches its currently approved disposal capacity, and continue to provide economic support to the local community over the long term. No changes to the approved fill rates or site access routes are proposed.

The existing EOWHF landfill site was originally approved in 1999. The development of the EOWHF landfill was proposed to occur in two phases through four stages. The total capacity of the landfill was designed to be 11.6 million m^3 when fully developed. Phase 1 was approved in 1999, including Stages 1 to 3A, with a total capacity of 7.4 million m^3. Phase 2 was approved in 2019, including Stages 3B and 4, providing 4.2 million m^3 of landfill disposal capacity. Landfilling commenced within Stage 3B in the latter part of 2019. Based upon the historical and forecasted filling rate at the existing landfill, GFL estimates that the landfill will reach its approved capacity by late 2025. The purpose of this EA is to provide additional landfill disposal capacity once the existing approved capacity is reached.

The proposed undertaking will occur on land currently owned by GFL (**Figure 2**), including an area in the northeast corner of the existing EOWHF. The purpose of the undertaking may be refined during the EA process and will be included in the EA Study Report.

Figure 2. Location of the Proposed Undertaking



5. Rationale for and Description of the Undertaking

The rationale for and description of the undertaking are presented below. The rationale for and description of the undertaking may evolve during the preparation of the EA and will be included in the EA Study Report.

5.1 Rationale for the Undertaking

The rationale for the undertaking is twofold: first, there is a need for the future development of the EOWHF as it is a significant component of the provincial waste management network and infrastructure in a region lacking in sufficient and secure long-term disposal capacity; and second, GFL is providing waste management services and facilities that are well positioned to continue to support Ontario's transition to becoming waste-free and achieving a circular economy, while supporting a reduction in GHG production and the amount of waste going to landfill, consistent with provincial legislation.

5.1.1 Need for the Undertaking

Since the original approval in 1999, the EOWHF has transformed from a small, local family-owned facility to an important multi-service regional facility serving a broad

customer base across Eastern Ontario. The EOWHF is a well-established business in the local community providing approximately 40 stable, long-term jobs for residents of the area.

In 2016, GFL acquired the former Lafleche Environmental Inc. operating company to complement other waste services provided across Ontario and Canada. GFL has continued to expand its operations into a broad series of waste management services integrated with the EOWHF landfill including:

- providing collection services to residential/municipal and industrial, commercial and institutional (IC&I) waste generators, including collection of recyclables, source separated organics, leaf and yard material, and waste, both at the curb and directly at the EOWHF;
- processing and transfer of recyclables;
- composting of source separated organic material; and
- collection and diversion of used tires, waste electrical and electronic equipment, and construction and demolition (C&D) waste.

Many of these services are provided at the EOWHF and supported by a number of smaller GFL collection facilities located in Eastern Ontario. The distribution of these facilities and service capabilities continues to expand as GFL enters into new business contracts with municipalities and businesses across Ontario.

The on-going operation of the EOWHF allows GFL to provide significant financial contributions to the local economy, through donations to support the local community, by means of a host community agreement and municipal taxes. The EOWHF contributes approximately 9% of North Stormont's tax base[2]. GFL endeavours to maximize the use of local businesses and services across the region in support of the on-going development and operation of the EOWHF. This includes food services, accommodations, repair and maintenance, construction, equipment rental and purchase, amongst other opportunities. GFL also sponsors many local events to increase the quality of life for the community.

GFL has an on-going need to continue operation of the EOWHF landfill for the following reasons:

- the company can continue to provide its customer base with an integrated set of services including collection, transfer, processing (recycling and composting) and disposal in a reliable and cost effective manner;
- long-term contractual obligations to municipalities across Ontario can be honoured and fulfilled;

[2] Including host community payment.

- the Province's waste diversion programs and objectives are and will continue to be supported; and
- environmental impacts of GHG emissions will be minimized through:
  - reducing the number of waste related trucks hauling material long distances;
  - diversion of organic material and composting;
  - the on-going closure of small municipal landfill sites without gas collection systems, as they reach approved capacity; and
  - the capture of landfill (methane) gas and generation of green energy at the EOWHF.

GFL continually looks at opportunities to grow its service offering and maximizing waste diversion activities, and has established themselves as a leader in waste diversion activities and services to support the needs of their growing customer base, specifically with recycling and composting. In 2019, GFL acquired Canada Fibers Limited, a leader in the Canadian recycling industry which operates numerous material recovery facilities in Ontario and across Canada. Canada Fibers has been responsible for managing and processing more than 450,000 tonnes of Blue Box recyclables annually in Ontario. In addition to operating MRFs, Canada Fibers has also served their clients by undertaking the expansion and upgrade of MRFs, and has several such projects underway presently. With the integration of the Canada Fibers facilities and capabilities with GFL's other services, assets and infrastructure, GFL is now positioned to create new opportunities to provide integrated collection, sorting, processing and marketing of recyclable materials.

Beyond Blue Box materials, GFL is responsible for diverting a number of other materials from disposal for its customers. The EOWHF accepts tires, waste electronics, and C&D waste. In 2019, six tonnes of tires and 170 tonnes of waste electronics were collected at the EOWHF for recycling. Additional quantities of materials are received at the EOWHF for proper management and include Specified Risk Material (SRM), contaminated soils, asbestos, solidified industrial materials and international waste. The landfill at the EOWHF is the only one in Ontario permitted to dispose of SRM (e.g., cattle).

The EOWHF composting facility is the largest in Ontario and is among the few in Ontario able to manage an expanded stream of organic materials, including diapers, sanitary and pet waste. As processing capacity for the expanded stream of organic materials is limited in Ontario, the EOWHF composting facility plays an important role in providing processing capacity to Ontario municipalities, particularly those larger municipalities who accept this type of waste in their curbside Green Bin programs. About 77,226 tonnes of residential source separated organics and 50,271 tonnes of leaf and yard material were received from Ontario households and composted at the EOWHF in 2019.

The continued operation of the landfill is integrated with, and critical to, the on-site composting facility by providing efficient access to dispose of non-compostable (mainly residual plastics) materials from the composting process. It also provides convenient access to drop-off programs to divert additional materials from disposal.

The EOWHF provides landfill disposal capacity to over 500 villages/towns/cities across Eastern Ontario. This includes municipalities within the United Counties of Stormont, Dundas and Glengarry, United Counties of Prescott and Russell, United Counties of Leeds and Grenville, Lanark County, Renfrew County, Lennox and Addington County, Hastings County and Prince Edward County. In addition, the EOWHF also provides landfill disposal capacity to Indigenous communities within the region.

The majority of these municipalities have long term (e.g., 15 years) waste disposal contracts at the EOWHF through their responsible authority (i.e., Township, Town, City or County). Many of these municipalities have been faced with the need to close their own landfill sites due to increased regulatory requirements and associated costs, plus the risks and costs associated with long term liabilities. Faced with these economic uncertainties, GFL has partnered with these municipalities to provide this necessary service in a local and cost effective manner into the future at the EOWHF.

The existing EOWHF Landfill has been approved in two phases. The initial approval for Phase 1 included Stages 1 to 3A with a total disposal capacity of 7.4 million m^3. Stage 3A reached its approved capacity in Fall 2019. Phase 2 of the landfill development includes Stages 3B and 4 with a total capacity of 4.2 million m^3. Landfilling of Stage 3B, the first stage of Phase 2, commenced in Fall 2019, and it is anticipated that landfilling of Stage 4, the second (and last) stage, will commence in late 2020. Phase 2 of the landfill is expected to be complete in late 2025.

The EOWHF landfill has an approved annual fill rate of 755,000 tonnes. Historically, the landfill has been under-utilized receiving an annual average of less than 450,000 tonnes between 2009 and 2016. Annual waste quantities received continued to increase year over year during this same time period. GFL acquired the facility in 2016 and has optimized the operations in the subsequent years. The historical waste volumes received at the EOWHF compost facility and landfill are shown in **Table 1**.

Table 1. Historical Waste Quantities (tonnes) Managed at the EOWHF

Year	Compost Facility*	Landfill
2009	9,279	269,063
2010	31,936	257,144
2011	54,350	281,461
2012	55,623	398,384
2013	82,363	398,026
2014	98,155	526,653

Table 1. Historical Waste Quantities (tonnes) Managed at the EOWHF

Year	Compost Facility*	Landfill
2015	111,445	619,626
2016	117,293	734,874
2017	151,290	712,016
2018	136,888	754,889
2019	129,134	679,464

Note: *This quantity includes residential source separated organics, leaf and yard waste, and clean wood, pulp paper, and other compostable materials.

A detailed breakdown of the source and/or material type managed at the landfill annually is provided in **Table 2**.

Table 2. Historical Material Quantities (tonnes) Managed at the EOWHF

Year	Municipal	IC&I	C&D	Cover Material	Cover Material (Contam-inated)	Other Waste Material	Total
2009	77,168	136,714	19,051	17,041	3,286	14,826	268,085
2010	58,375	140,102	6,732	38,901	1,844	11,191	257,144
2011	100,441	135,938	14,464	22,243	12	8,364	281,461
2012	96,372	198,306	19,144	75,242	140	9,180	398,384
2013	89,245	214,770	14,806	66,591	3,106	9,508	398,026
2014	172,054	242,822	15,874	87,458	0	8,445	526,653
2015	153,740	297,987	16,753	107,946	17,075	24,127	619,626
2016	148,561	317,108	25,208	101,056	132,130	14,966	734,874
2017	187,922	322,853	35,964	27,344	132,672	6,135	712,016
2018	181,478	358,346	38,607	53,713	81,927	40,818	754,889
2019	190,838	369,109	46,137	29,386	35,467	8,527	679,464

Volumes managed at the site have increased over the past several years. The increasing volumes in the years prior to 2016 reflect not only the growth of the company, but also the transition of the EOWHF to an important regional facility. The facility began to serve an increasing number of smaller municipalities across Eastern Ontario without their own disposal capacity. In addition, there has been a lack of approved, constructed and unrestricted disposal capacity within the region to service IC&I waste generators. Following the acquisition of the EOWHF by GFL and the integration of the facility within a broader regional operation serving a larger number of customers, in recent years the EOWHF has been more effectively utilized. The facility is now operating consistent with its annual fill rate approval. This same situation is evident for the compost facility which has managed increasing organic waste volumes during this time period.

Currently, the EOWHF is the only large privately-owned landfill operating in the Eastern Ontario region approved to receive putrescible waste, which is typically waste generated from residential or municipal sources. As shown in **Table 2**, the EOWHF manages a significant volume of residual waste annually from municipalities throughout Eastern Ontario. There are two large municipally owned landfills operating within the area including the City of Ottawa Trail Road Landfill and the City of Cornwall Landfill. Both of these landfill sites have service areas restricted to their specific municipal boundaries. They primarily provide disposal capacity for residential waste and lesser quantities of IC&I waste generated within their municipalities. Consequently, these landfills are typically not an option for managing the wastes received at the EOWHF.

Construction and demolition (C&D) wastes, contaminated soils and other waste material volumes disposed at the landfill have fluctuated from one year to the next. These annual fluctuations are in part driven by event based activity such as large single construction projects.

The EOWHF landfill also manages a relatively consistent volume of IC&I and C&D waste annually. Currently, there is only one other large privately owned landfill operating in Eastern Ontario with the ability to serve the waste management requirements of IC&I customers. The Waste Connections Navan Landfill in Ottawa is permitted to receive 234,750 tonnes of solid non-hazardous waste (excluding putrescible waste) per year. The Approved Amended Terms of Reference (May 2018) for the Waste Connections Ridge Landfill Expansion indicate that the Navan Landfill has less than 10 years of capacity remaining and that there is an agreement with the MECP and the community that there will be no further expansion of the site.

There are two proposed and approved private landfills within Ottawa which have not been constructed. The Waste Management West Carleton Environmental Centre (WCEC) received EA approval in September 2013. This approval included the expansion of an existing (now closed) landfill site. The approval is for a volume of 6.5 million m^3 based on receiving 400,000 tonnes annually over an approximate 10-year planning period. The Capital Region Resource Recovery Centre received EA approval in May 2017 which includes a new landfill with capacity of approximately 10.7 million m^3. This capacity was based on a 30-year planning period at a maximum of 450,000 tonnes annually.

In December 2018, the Ontario Waste Management Association released their State of Waste in Ontario: Landfill Report (2^{nd} Annual Landfill Report) which provides an assessment of landfill disposal capacity in Ontario. The Ontario Waste Management Association (OWMA) concludes that in aggregate there are approximately 14 years of landfill disposal capacity remaining in Ontario with continued export at current levels to the USA.

The OWMA report also notes that the majority of the remaining capacity is held by large municipalities (64% of capacity) which is effectively restricted by service area. Municipalities typically manage their landfills to preserve capacity for residential waste by minimizing IC&I waste disposal through market pricing strategies. Further,

the remaining disposal capacity in Ontario is becoming concentrated in a fewer number of large regional sites. OWMA reports that the trend may be for smaller open landfills to continue to close, directing increased waste volumes to a fewer number of large regional sites in the future.

While data is not available to quantify the volume of waste generated in Eastern Ontario being disposed in the USA annually, it is at least understood that some volume of waste from the area is being transported to upstate New York landfills for disposal. Similar to the situation in Ontario, landfill capacity in New York and other states is continuing to diminish and consolidating into fewer regional sites. This has had the effect of increased competition to actually secure long term disposal capacity.

The need for accessible and secure local disposal capacity for residential waste, which is managed entirely within Ontario, is of particular importance during situations like the current COVID-19 pandemic. On May 12, 2020, the OWMA issued a media release outlining the changes in residential and commercial waste generation experienced during the pandemic based on a study conducted with the support of 13 Ontario municipalities representing close to 8.5 million residents[3]. The study concluded that, between March 9 and April 27, 2020, there was an overall 5.31% increase in residential waste generation over the same time period in 2019 as a result of the pandemic. This increase included a 4.32% increase in garbage, a 12.25% increase in green bin, and a 1.07% increase in blue box. The EOWHF is an essential service for managing residential wastes (including garbage and organics) from numerous municipalities across Eastern Ontario.

It is evident that the EOWHF is a significant component of the provincial waste management network and infrastructure, both now and in the future, serving a broad area and customer base across Eastern Ontario. The EOWHF provides both composting and disposal capacity to customers from the Quebec border west to the Greater Toronto Area and north to Renfrew County. With a lack of sufficient and secure long term disposal capacity available in the region, there is an on-going requirement for this facility to continue to provide this service, supporting stable operation and growth for municipalities and businesses across Eastern Ontario.

5.1.2 Consistency with Provincial Legislation

In June 2016, the Ontario government passed the *Waste Free Ontario Act*, which enacted two Acts: the *Resource Recovery and Circular Economy Act*, 2016, and the *Waste Diversion Transition Act*, 2016. Under the new legislation, the province is moving toward a circular economy framework by establishing a producer responsibility regime. Subsequently in 2017, the MECP released the Strategy for a Waste-Free Ontario: Building the Circular Economy (the Strategy). The Strategy

[3] P. van der Werf, R. Cook, & P. Hargreave. COVID-19 Waste Generation Report – May 12, 2020. Available at: https://www.policyintegrity.ca/blog/2020/5/11/covid-19-waste-generation-report-may-12-2020.

outlines a vision for Ontario where waste is considered a resource that can be recovered, reused and reintegrated to achieve a circular economy. The ultimate goal of the Strategy is to achieve zero waste and zero greenhouse gas (GHG) emissions from the waste sector. The Strategy further identifies four overall objectives which include a total of 15 actions to be taken and implemented by 2050. A number of the actions relate to the need for landfill including increased resource recovery, disposal bans, reduction of food and organic wastes, and ensuring landfills are well planned and managed to minimize their need and reduce GHG emissions.

The Province of Ontario released their *Climate Change Action Plan 2016 – 2020*, which describes the actions Ontario will take over the next five years to fight climate change, reduce GHG pollution and transition to a low-carbon economy. The waste sector is reported to contribute 5% of the overall GHG emissions. The Climate Change Action Plan aligns with the *Waste Free Ontario Act*, outlining increased recycling efforts and a reduction in the amount of organic material being directed to landfill in order to reduce GHGs. Another action is the capture of methane generated from landfill for use as a renewable natural gas.

In November 2018, the MECP released *Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan* which outlined various commitments to reduce litter and waste in Ontario communities. Subsequently in March 2019, the Ministry released the *Reducing Litter and Waste in Our Communities: Discussion Paper* identifying three waste management goals for Ontario:

1. Decrease the amount of waste going to landfill;
2. Increase the province's overall diversion rate; and
3. Reduce greenhouse gases from the waste sector.

Even with the introduction and implementation of these provincial initiatives, residual materials will remain which require proper management and disposal for the foreseeable future.

GFL's integrated waste management services and facilities are well positioned to continue to support Ontario's transition to becoming waste-free and achieving a circular economy, while supporting a reduction in GHG production and the amount of waste going to landfill. GFL currently provides a range of services to maximize the diversion of materials away from disposal, which include the largest composting facility in Ontario capable of managing food and organic wastes and producing a high quality marketable end product. GFL is very active in providing organics management as a key business service to a diverse range of clients across Ontario and Canada. With the acquisition of Canada Fibers, GFL is also well positioned to respond to future market demands for increased recyclables processing.

Continued operation of the EOWHF aligns with the Province of Ontario's *Strategy for a Waste Free Ontario, Climate Change Action Plan* goal of reducing GHG emissions,

and the *Made in Ontario Environment Plan* to reduce litter and waste in communities. GFL has invested in many initiatives to reduce GHG emissions and divert more materials. The future development of the EOWHF is required to continue sustainable business operations and to continue providing the essential financial support for a wide range of additional services and programs, as follows:

- GFL has installed an LFG collection system at the existing EOWHF to collect methane gas (a major source of GHGs), which is used for energy production. The LFG collection system is being expanded as additional cells and stages of the landfill are completed. This now includes all of Stages 1, 2, and 3A of the existing landfill. In 2019, approximately 45 million m^3 of LFG was captured and destroyed at the EOWHF.
- In 2011, GFL received approval from the Ontario Power Authority as part of the Feed-in-Tariff (FIT) program to produce 4.5 MW of renewable energy from the collected methane. The plant is operating at its peak electrical production and has the capacity to manage additional gas volumes collected from future landfill development.
- GFL's EOWHF composting facility keeps organic material out of landfills which also reduces GHG emissions through the avoidance of methane generation from the decomposition of organic materials. This facility is one of very few composting facilities in Ontario able to manage organic materials such as diapers and sanitary products. The facility is capable of consistently producing an 'AA' compost product.
- GFL supports further reductions in GHG emissions by providing disposal services to smaller municipalities allowing them to close their landfills which do not have gas control systems. As an example, GFL worked with Russell Township Council to assist the municipality in the environmentally sound closure of their landfill and provided a state of the art transfer station for waste, recyclables and organics transfer. In addition, the transfer station site also includes a residential drop-off area that allows the efficient sorting of all waste streams, recyclables, electronic waste, metal, etc.
- GFL provides a network of regional transfer stations to collect material from a larger number of generators and consolidate the material for transport, which significantly reduces the number of vehicles travelling long distances to appropriate processing and disposal facilities. This also supports a substantial decrease in GHG emissions associated with transportation of waste.
- GFL is in the planning process for the development of greenhouses and/or comparable facilities at the EOWHF to utilize the heat generated from the existing LFG utilization facility or the LFG as a fuel source.

There are also a number of programs and services offered by GFL at the EOWHF which contribute to community awareness of climate change and waste reduction

including participation in various organizations to further develop opportunities to reduce waste. These include the following:

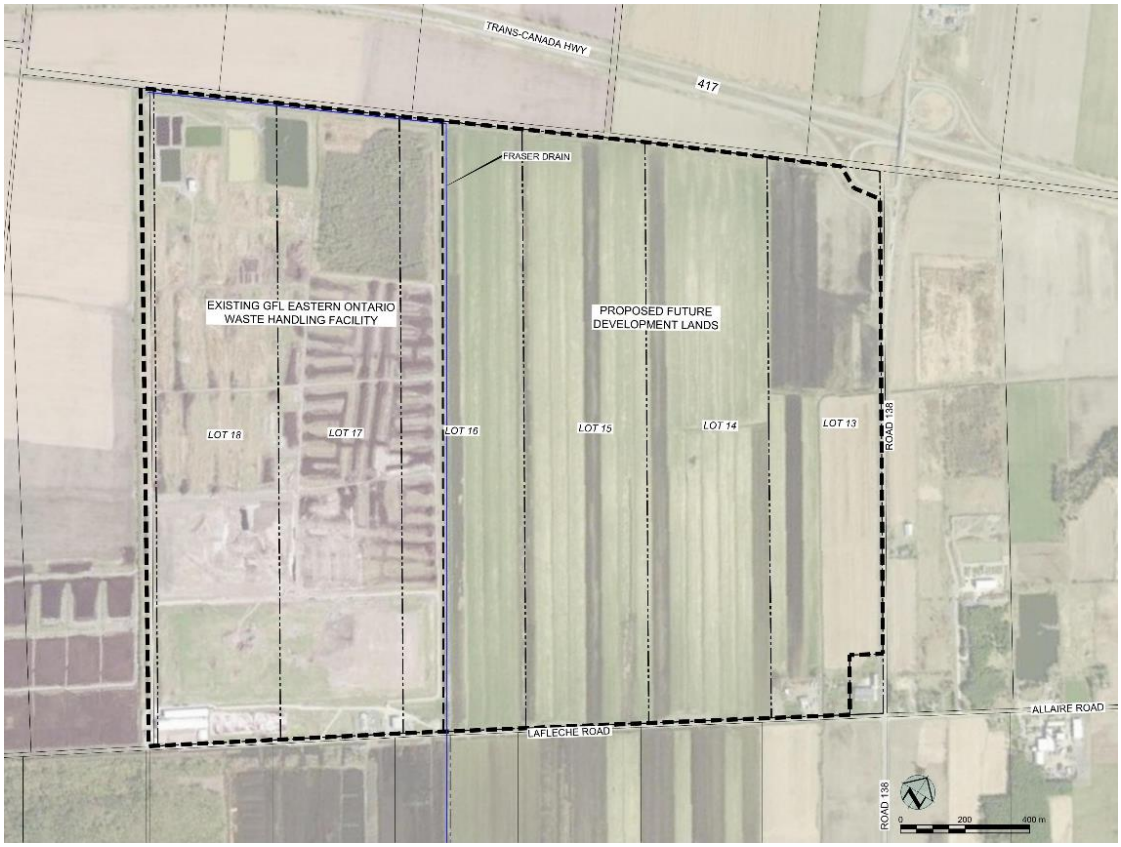
- GFL has partnered with Habitat for Humanity to allow individuals to drop off items for redistribution, instead of being disposed, at GFL transfer station locations and at the EOWHF public drop off area.
- GFL has developed a large pollinator garden on the EOWHF site. Working with the local horticultural society on the pollinator garden design, the garden was constructed in 2017 and includes over 4,300 specific plants. The pollinator garden has received praise and commendations from local, municipal and provincial agencies.
- GFL is an active educator and during a year provides presentations, tours and information to thousands of individuals. Numerous local and Ottawa schools come as part of their curriculum to the EOWHF to learn about diversion, composting, recycling and their role in making Ontario waste free.
- GFL in partnership with the Ontario Centres of Excellence, St. Lawrence Institute of Environmental Science and St. Lawrence College have funded and conducted extensive research on the beneficial use of the leachate generated from the EOWHF organics processing/composting facility. This research has included an assessment of the effect on plant growth rates. The study was finalized in 2018 and the results have shown excellent benefits to nutrient growth. Based on these successful results, GFL is exploring the potential to take the leachate from the composting facility and provide it as a viable, highly enriched liquid organic fertilizer and soil additive that can be marketed to the public. This will eliminate the need to treat the leachate as waste water and offer an excellent example of the circular economy in practice.
- GFL staff is actively involved at the director level with the Compost Council of Canada, and has been instrumental in working with them and the MECP as a member of the Organics Working Committee to develop the Organics Strategy as part of Waste-Free Ontario.
- GFL is an active member of the Ontario Waste Management Association participating in various committees on organics, recycling and soil remediation established to help advance the waste management industry within Ontario.

5.2 Description of the Undertaking

The proposed future development of the EOWHF would consist of the development of landfill capacity in an area in the northeast corner of the existing EOWHF and to the east of the existing EOHWF on lands owned by GFL (**Figure 3**). The landfill expansion is targeted to provide additional airspace capacity for approximately 20 years of operation, which represents approximately 15.1 million m^3 at GFL's current maximum annual fill rate of 755,000 tonnes per year.

The lands within the existing EOWHF being considered for future development include approximately 20 hectares in the northeast corner of the facility. The lands to the east of the existing EOWHF being considered for future development include approximately 240 hectares consisting of the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10. GFL currently owns the eastern half of Lot 16, and Lots 14 and 15, and the majority of Lot 13.

Figure 3. Proposed Future Development Lands



6. Rationale and Description of Alternatives

The *EAA* identifies two types of alternatives: 'alternatives to' an undertaking and 'alternative methods' of carrying out an undertaking. 'Alternatives to' an undertaking are the different ways of addressing a problem or opportunity, while 'alternative methods' are different ways of carrying out the same activity. The 'alternatives to' and 'alternative methods' for the EOWHF future development are discussed below.

6.1 Alternatives to the Undertaking

'Alternatives to' the undertaking are functionally different ways of addressing the business opportunity identified by GFL, which is the provision of long-term waste disposal capacity. GFL has identified and considered specific 'alternatives to' the

proposed undertaking that address the opportunity and are within the company's business mandate and ability to implement.

Consistent with the MECP Code of Practice for *Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (January 2014), GFL identified a range of 'alternatives to' for providing long-term disposal capacity that are appropriate and reasonable for them (a private sector company) to implement. The following four alternatives were identified:

1. Do nothing;
2. Redirect waste to a disposal facility elsewhere;
3. Develop a thermal treatment facility at the EOWHF; and
4. Develop additional landfill disposal capacity at the EOWHF.

Each of the 'alternatives to' were considered in the context of their ability to meet the needs of the Eastern Ontario region and the business opportunity identified by GFL. A description of each alternative to and an assessment of how each addresses the opportunity are presented below.

Alternative 1 – Do nothing

The "do nothing" alternative implies that GFL would not undertake the development of new long-term disposal capacity. GFL would only be able to continue with their current business operations at the EOWHF for approximately 5 to 6 years based on current landfilling rates (i.e., until approximately 2025). Landfill operations would have to cease once the existing landfill is at capacity. GFL would be unable to continue to provide disposal services to its customers and fulfill long term contractual commitments. These customers, including a number of municipalities across Eastern Ontario, would need to find alternate ways to manage their waste. Currently, the EOWHF is the largest operating disposal facility in Eastern Ontario, and the only landfill in the region capable of managing the waste volumes being generated by municipalities who do not have their own facility.

This alternative does not support GFL's integrated waste management programs, nor does it support the existing waste diversion infrastructure at the EOWHF. The on-site composting facility and electronics recycling service is in part financially viable due to its ability to utilize and share infrastructure with the landfill. With the closure of the landfill, it will be uneconomical for GFL to maintain the operation of the composting facility and the public drop-off facilities for waste diversion and disposal. These diversion facilities service municipalities and businesses across Eastern Ontario.

The closure of the EOWHF in approximately 5 to 6 years would result in a relatively large number of job losses within the local community, a significant loss of revenue for the Township of North Stormont, and broader negative economic impacts across the region.

This alternative is not a viable option for GFL's on-going business, its customers and the Province of Ontario. This option does nothing to contribute to the Ontario government's priorities for waste diversion and climate change. It has been included to provide a benchmark against which to measure the other alternatives and to assess the advantages and disadvantages of the preferred alternative.

Alternative 2 – Redirect waste to a disposal facility elsewhere

The EOWHF landfill is the only disposal facility owned by GFL within Ontario. This alternative consists of redirecting waste currently managed at the EOWHF (i.e., 755,000 tonnes per year) to an operating disposal facility not owned by GFL in Ontario and/or the USA. GFL owns and operates landfill sites in Quebec but they are prohibited from receiving wastes generated in Ontario.

Within Eastern Ontario, there are no large landfill facilities currently operating with the capacity to manage the wastes being disposed at the EOWHF on an annual basis. The cities of Cornwall and Ottawa are the largest municipal sites within the region and both have service areas which are restricted to their municipality. Typically, municipal landfill sites in Ontario receive only limited volumes of waste from the IC&I sectors as they look to preserve long term disposal capacity for residential generated waste. The Waste Connections Navan Landfill in Ottawa is permitted to receive 234,750 tonnes of non-putrescible waste per year and is reported to have less than 10 years of remaining capacity. These facilities are not a long term option to manage the wastes currently managed by the EOWHF.

Exporting waste to the USA is both costly and risky due to fluctuations in the value of the Canadian dollar, fuel prices, and the potential for border closures to Canadian waste due to security or health concerns. While data is not available to quantify the volume of waste generated in Eastern Ontario currently being disposed in the USA annually, it is at least understood that some volume of waste from the area is being transported to upstate New York landfills for disposal. Similar to the situation in Ontario, landfill capacity in New York is under pressure, continuing to diminish and consolidating into fewer regional sites. In addition, due to changing regulations affecting the transportation and logistics industry, there is an on-going shortage of long haul vehicles and qualified drivers available to support and sustain this approach. Also, as described in **Section 5.1.1**, the need for accessible and secure local disposal capacity for residential waste, which is managed entirely within Ontario, is of particular importance during situations like the current COVID-19 pandemic.

Based on the available options, GFL has virtually no ability to securely provide long term disposal capacity by redirecting waste to other landfill sites. Available long term landfill disposal capacity is already very limited in Eastern Ontario. Hauling waste to another disposal facility (i.e., the closest being either in New York or southwestern Ontario) significantly increases the costs GFL would need to charge its customers, for both transportation and disposal fees, results in increased GHG emissions from

increased truck volumes, causes increased concerns related to road safety, congestion and impacts on infrastructure, and makes the business less competitive putting it at a financial disadvantage. For these reasons, this is not a feasible alternative to address the regional need and business opportunity that GFL has identified.

Alternative 3 – Develop a thermal treatment facility at the EOWHF

The MECP released *Reducing Litter and Waste in Our Communities: Discussion Paper* in March 2019, which outlines the potential to use thermal treatment of waste to minimize the volume of residuals requiring management by landfill. Thermal treatment of residual waste can be undertaken through a range of technologies, some of which are well established and others which are still considered to be emerging in their application to mixed waste. Depending on the technology applied, synthetic fuels or electricity and steam are the typical outputs. Combustion residuals generated from the thermal processes will typically need to be managed by landfill.

Generally, thermal treatment for managing residual residential and IC&I wastes are categorized as incineration or emerging/alternative technology. Incineration includes the commercially proven mass burn combustion process which is the basis of the Durham York Energy Centre in Clarington, Ontario. The application of this type of technology is common across the United States and Europe. This technology approach is particularly well suited to manage a mixed residual waste stream. This facility manages approximately 140,000 tonnes per year of residential waste with a capital cost of $284 million, of which a portion was funded by the Federal Gas Tax. Annual operating costs were estimated to be in the order of $15 million offset by revenues of approximately $8.5 million from the sale of 14 MW of electricity and $550,000 from the sale of metals. The balance of the operating costs are covered by municipal taxes. The volume of waste is reduced by 85% to 90%, with the residual requiring landfill disposal.

New, emerging or alternative thermal technologies for residual waste management include gasification, pyrolysis and plasma arc amongst others. While these technologies have generally existed for a number of years, they have typically been applied to homogenous feedstocks or waste streams. To date, the application of these technologies to a mixed residential and IC&I residual waste feedstock has had very limited operating success in Canada or North America. The Plasco facility in Ottawa is a recent example where the technology application was not successful. Enerkem has developed and recently initiated the operation of a gasification facility in Edmonton producing biofuels. The success of this facility is being monitored closely for its broader application to managing a mixed residual waste stream.

GFL does not own or operate any thermal treatment facilities and has no related business experience with this type of alternative. The company is focused on maximizing waste diversion, and minimizing the volume of residual material to be landfilled, through its integrated system of collection, material recovery facilities and composting. In addition, approximately 20% to 25% of the residual material managed

at the EOWHF in recent years is unsuitable for thermal treatment (e.g., soil-like material, asbestos, special wastes, etc.).

The EOWHF has an existing landfill gas-to-energy facility. GFL, via its business partner, has a contract with the Ontario Power Authority as part of the FIT program to produce 4.5 MW of renewable energy from methane collected from the landfill and the facility is operating at its peak electrical production. The facility is designed to allow expansion and doubling of electrical production; however, the Ontario government has cancelled the FIT program and no new contracts are being issued. This would also affect the production of energy from a thermal treatment facility. Without revenues from the sale of electricity this type of facility is not financially viable.

Thermal treatment facilities are capital intensive and typically have high operating and maintenance costs; consequently, they require a relatively high per-tonne tipping fee. This type of alternative would not be cost competitive for GFL to offer to its customers. With the exception of municipalities, most customer contracts are of a short duration which creates additional financial risk in providing this type of alternative with no certainty of a long term revenue stream to cover these costs.

Given the financial and in some cases technological risks related to an approach not related to GFL's business experience, development of a thermal treatment facility is not a feasible option for the company to address the identified business opportunity.

Alternative 4 – Develop additional landfill disposal capacity at the EOWHF

This alternative consists of developing additional disposal capacity at the EOWHF through a lateral expansion of the landfill to adjacent lands owned by GFL, and on currently unused land within the northeast corner of the existing EOWHF property boundaries[4].

The development of additional disposal capacity by a vertical expansion of the existing landfill is not possible due to soil conditions within the site area. The area is underlain by a silty clay deposit which provides significant attenuation capabilities and natural protection to groundwater. Based on extensive geotechnical work completed at the EOWHF as part of the on-going design and development of the approved landfill stages, the silty clay soil is unable to safely accept the loading from an increased landfill height. The testing has shown that if the landfill height is increased, the underlying soils will become unstable, creating the risk for landfill base, berm and slope failure, and endangering human health and the environment.

The development of additional landfill disposal capacity at the EOWHF will support the integrated facilities including the management of residuals from the compost facility operation, enhancing the on-going operation of the landfill gas-to-energy

[4] There is potential to develop only very limited additional landfill capacity within the existing EOWHF property boundaries.

facility, utilizing the existing leachate treatment facility, and receiving post-diversion residual wastes providing cost effective disposal services to generators across Ontario integrated with their local collection. The on-going integration of these operations further enhances the reduction of GHG emissions.

GFL owns approximately 240 hectares of land located immediately east of the EOWHF, which is currently mainly leased to a local business and utilized for sod production. Generally this includes the land west of Highway 138, east of the eastern boundary of the existing EOWHF, north of Lafleche Road and south of Highway 417. Access to the landfill would continue to be from Lafleche Road.

GFL has successfully operated the EOWHF since 1999 and it has become an important addition to the local community by creating employment opportunities, hosting educational events and facility tours, contributing financially to the Township of North Stormont, and supporting local initiatives within the community. This alternative is the most financially and economically viable option to both GFL and its customers, utilizing land already owned by GFL and the existing supporting site infrastructure. The future development of the EOWHF on adjacent land owned by GFL is the only practical, environmentally sound and cost-effective option to address the identified business opportunity to allow GFL to operate in the long term.

Preferred Alternative to the Undertaking

GFL has determined that the future development and on-going operation of the EOWHF landfill is the only reasonable option for the company, its customers, and the Province of Ontario. The other alternatives do not address GFL's business opportunity to meet long-term customer commitments or avoid business risks, and they are not supportive of the Ontario government priorities of addressing waste diversion and climate change.

These alternatives, and the identification of the preferred 'alternative to', were presented to the public as part of consultation and engagement during the development of the ToR. The comments received on 'alternatives to' the undertaking identified that the future development of the landfill east of the EOWHF is an acceptable alternative; however, potential effects on noise, odour and visual impacts need to be considered along Highway 138 and Highway 417. The potential effects of the preferred alternative will be identified and assessed as part of the EA.

Comments were also received regarding the use of incineration and newer technologies, taken to mean various thermal treatment technologies currently being investigated. GFL has considered development of a thermal treatment facility as an alternative (Alternative 3, above) and it is not a feasible option for the company to address the identified business opportunity. GFL does not own or operate any thermal treatment facilities and has no related business experience with this type of alternative. This alternative would pose significant risks to GFL's business.

6.2 Identification of Alternative Methods

'Alternative methods' of carrying out the undertaking are different ways of implementing the proposed undertaking. The future development of additional landfill disposal capacity for the EOWHF can be achieved through alternative landfill configurations based on the area to be developed.

The lands being considered for future development include an area in the northeast corner of the existing EOWHF and lands owned by GFL to the east of the EOWHF, specifically the eastern half of Lot 16, Lots 14 and 15, and the majority of Lot 13 of Concession 10 east of the EOWHF (**Figure 3**).

Two preliminary conceptual design alternatives have been developed, which will be refined, as appropriate, during the EA. These conceptual design alternatives are outlined below. These two alternatives are consistent with the design approach that has been approved and developed over the past 20 years for the existing EOWHF. There is limited potential to adjust the design by increasing the height of the landfill. Studies completed for the EOWHF have indicated that the underlying soils may become unstable due to increased landfill height and weight. As a result, the design alternatives are limited to varying lateral configurations with a consistent height. Both alternatives provide a landfill volume of approximately 15.1 million m^3 based on the approved fill rate of 755,000 tonnes per year over a 20-year planning period. Additional alternative methods may be identified and assessed as part of the EA if necessary.

Alternative methods for treating landfill leachate and managing landfill gas will also be identified and assessed, as appropriate, during the EA.

GFL will qualitatively predict the effects for each alternative method on the environment. The assessment will be completed for each component based on the locations and conceptual designs for each alternative, including mitigation and the existing environmental conditions.

6.2.1 Alternative Method 1

Alternative Method 1, shown on **Figure 4**, contains three stages oriented east-west, similar to the existing EOWHF landfill. These stages are located on the property adjacent to the EOWHF; however, a relatively small volume of capacity may be available in the northeast corner of the existing EOWHF site.

The landfill stages will be developed with similar dimensions to the existing landfill, i.e., similar width, height/depth, spacing, and side slopes as the existing landfill. The landfill design will include leachate and landfill gas collection systems. The future development will utilize typical buffer widths of approximately 100 metres from the property boundaries, with some exceptions. The existing site access road and infrastructure, including the gas-to-energy plant and the leachate treatment plant will continue to be used for the future development.

Visual screening (not shown on **Figure 4**) will be installed around the perimeter of the development through a combination of berms and vegetation plantings.

Figure 4. Alternative Method 1

6.2.2 Alternative Method 2

Alternative Method 2, shown on **Figure 5**, contains three stages oriented north-south. These stages are located on the property adjacent to the EOWHF; however, like Alternative Method 1, a relatively small volume of capacity may be available in the northeast corner of the existing EOWHF site.

As with Alternative Method 1, the landfill stages will be developed with similar dimensions to the existing landfill, i.e., similar width, height/depth, spacing, and side slopes as the existing landfill. The landfill design will include leachate and landfill gas collection systems. The future development will utilize typical buffer widths of approximately 100 metres from the property boundaries, with some exceptions. The existing site access road and infrastructure, including the gas-to-energy plant and the leachate treatment plant will continue to be used for the future development.

Visual screening (not shown on **Figure 5**) will be installed around the perimeter of the development through a combination of berms and vegetation plantings.

Figure 5. Alternative Method 2

7. Description of Existing Environment and Potential Effects of the Undertaking

A brief description of the existing environmental conditions at the EOWHF and surrounding areas is presented in this section. This description is based on the work and studies completed for the previous EA[5] and on the additional work and studies underway to support the EA for the future development of the EOWHF. A more detailed description of the existing environmental conditions will be prepared as part of the EA. The existing conditions will be used to assess the potential effects of the alternatives on the environment. The actual determination of the anticipated potential environmental effects of the undertaking, potential mitigation/management measures, and net effects are not included in this ToR; however, these will be identified in the EA Study Report.

[5] HDR Corporation. 2018. *Environmental Assessment Study Report*. Eastern Ontario Waste Handling Facility Landfill Expansion Environmental Assessment. Moose Creek, Ontario. Prepared for GFL Environmental Inc. June 1, 2018.

During the EA, existing conditions and potential effects will be considered in the context of two study areas: on-site and off-site.

The following sections describe the study areas and the existing environmental conditions within these study areas.

7.1 Study Areas

The proposed on-site and off-site study areas for the EA are as follows (**Figure 6**):

- **On-site study area** – the existing EOWHF, and the future development area comprising the eastern half of Lot 16, Lots 14 and15, and the majority of Lot 13 of Concession 10 east of the EOWHF; and
- **Off-site study area** – the lands in the vicinity of the future development extending approximately 1 kilometre from the on-site study area.

The off-site study area may be refined during the EA to suit the requirements of a specific environmental component or based on the spatial extent of predicted effects.

7.2 Existing Conditions by Environmental Component

The *EAA* defines the environment in a broad, general sense that comprises physical, biological and human considerations. In this EA the environment has been separated broadly into natural, socio-economic, cultural, and built components. The following sections present preliminary descriptions of the existing environmental conditions by environmental component. The EA Study Report will include more detailed descriptions of existing environmental conditions. The characterization of the existing environment for the EA will incorporate the results of past studies, field reconnaissance, additional baseline studies, and information from the data sources outlined in **Appendix B**, as applicable.

7.2.1 Natural Environment

The natural environment, as defined for the EA, includes the atmospheric environment, geology and hydrogeology, the surface water environment, and the ecological environment.

Figure 6. Study Areas

7.2.1.1 Atmospheric Environment

The atmospheric environment includes air quality, odour and noise.

Air Quality

The area surrounding the EOWHF comprises mostly agricultural lands as well as portions of the Trans-Canada Highway (Highway 417), Highway 138, and a number of businesses including Manderley Sod Farms, Champion Mushrooms, Calco Soils Inc., Moose Creek Tire Recycling Inc., A.L. Blair Construction Ltd. Martin Quarry, Agro Culture, Supreme Seeds, and Casselman Performance. There are seven residences located within the off-site study area.

Sources of air emissions include on-site operations and activities from the surrounding agricultural operations, as well as traffic along Highway 417 and Highway 138. The main on-site sources of air emissions at the EOWHF include the:

- landfill operations and fugitive gas emissions, including mobile sources and vehicular traffic operating on site;
- composting facility biofilter;
- siloxane flare;
- enclosed LFG flare[6]; and
- LFG utilization facility.

The site entrance road is paved and dust control measures are implemented for on-site roads; for example, surface water is applied to on-site haul roads to minimize dust. The off-site study area is influenced by the presence of agricultural operations in the local area, resulting in elevated levels of suspended particulate matter and dustfall.

Based on previous studies, the existing air quality in the on-site and off-site study areas meets the provincial and federal air quality standards for all contaminants of concern with the exception of occasional exceedances of Nitrogen Oxides, Particulate Matter, Fine Particulate Matter ($PM_{2.5}$ and PM_{10}) and seasonal exceedances of total dustfall[7]. The exceedances of the Nitrogen Oxides and Particulate Matter (PM_{10} and $PM_{2.5}$) standards are limited to the area immediately adjacent to the existing EOWHF's southern and western property lines, and the predicted concentrations of compounds of concern drop off sharply with increasing distance from the EOWHF.

[6] A second enclosed flare will be installed in 2020.

[7] Tetra Tech. 2018. *Supporting Document 1-1 – Air Quality Existing Conditions Report*. Eastern Ontario Waste Handling Facility Landfill Expansion Environmental Assessment. Prepared for GFL Environmental Inc., Moose Creek, Ontario. May 16, 2018.

Dustfall rates in the area have exceeded the air quality standards during the summer months; however, as the EOWHF is located within a region dominated by agricultural operations, and the most affected monitoring locations are situated in close proximity to a number of confounding additional dust emission sources (i.e., peat extraction, sod farming, sand and aggregate quarrying and associated heavy truck traffic from all), elevated dustfall levels are estimated to be typical of other rural, agricultural areas of Ontario.

The results of 2019 summer (June to August) dustfall monitoring carried out under ECA A420018 demonstrated that dustfall counts were below the current provincial guideline[8] for all samples collected except for one: the upwind sampling location exceeded the guideline during August 2019. It is likely that this exceedance resulted from the large number of trucks used to bring sand and stone to the site as part of the infrastructure works associated with landfill cell construction and waste capping projects. The east access road is often the route used for these supply vehicles, and the sampling device is fastened to a hydro-pole that is positioned immediately beside this road.

GHG emissions from the EOWHF are due primarily to the generation, combustion and fugitive releases of LFG from the facility. The EOWHF currently contributes approximately 0.2% of Canada's solid waste related GHG emissions, or approximately 0.01% of the country's total GHG emissions[7].

Odour

Previous studies have shown that concentrations of odorous compounds of concern within the on-site and off-site study areas do not exceed the applicable air standards or limits. Predicted odour concentrations have been shown to meet the guideline limit of 1 OU/m^3 for all but a minimal 0.6% of the time; consequently, the EOWHF meets the relevant odour guideline approximately 99.4% of the time[9]. The infrequent occurrence of exceedances and complaints of transient odours are likely related to operational issues that can be effectively mitigated by adjusting operational practices.

In a recent study[9], the primary odour sources at the EOWHF were identified as:

- Landfill gas – 70%;
- Tipping – 9%;
- Compost fugitives – 8%;

[8] In Ontario, the current guideline for total dustfall is 7.0 g/m^2/30 days as per Ontario Regulation 419/05: Air Pollution – Local Air Quality, January 1, 2019.

[9] Tetra Tech. 2020. Technology Benchmarking Report of Methods to Reduce Odour Impacts from the Eastern Ontario waste Handling Facility. Presented to GFL Environmental Inc., North Stormont, Ontario. March 24, 2020.

- Curing – 8%;
- Leaf and yard waste storage – 4%; and
- Biofilter – 1%.

Additional potential odour sources identified in the study as negligible include:

- South leachate aeration ponds;
- Leachate treatment facility;
- Treated effluent holding ponds;
- Auxiliary wetland ponds;
- Landfill gas utilization facility (which includes the flares)[10]; and
- Finished compost storage and screening.

Between the beginning of 2014 and the end of 2016, a total of 12 odour-related complaints were logged by either the MECP or directly by the EOWHF. This is equivalent to a frequency of occurrence of less than 1.6% of the time (conservatively assuming that the reported odour persisted for a period of 24 hours for each complaint event). In 2017 through 2018, a total of 12 odour-related complaints were received by GFL, and no odour complaints were received in 2019 or to-date in 2020. The MECP has indicated that they have received a limited number of additional odour complaints since 2017 but the details have not been made available to GFL.

The complaints received by GFL were received during both normal operations and while there were no operations on-going. The odour complaints were also highly transient, lasting for only limited periods of time, making it difficult to accurately discern the originating source based on the available data. It is worth noting that the majority of complaints were related to odour impacts detected while travelling along area roads, rather than on-site at residences or businesses.

The odour complaints in 2016 through 2018 were associated with LFG impacts, which could be effectively mitigated by improving or implementing measures related to the first four elements listed above. In 2017, GFL initiated a 3-year plan to enhance the landfill gas management system at the EOWHF and substantial improvements in landfill gas odour have been achieved from past operations.

Since 2016, GFL installed additional gas wells within Stage 2 of the landfill which was completed in March 2018 with 72 wells. The installation of landfill gas wells in Stage 3A of the landfill was completed in 2020 with 54 wells. A total of 114 additional wells are pending installation within Stage 3B (currently under development) and Stage 4 (to be developed). Additional LFG management infrastructure to be installed in 2020 includes a second blower skid, a second enclosed flare (for a total of three flares), and design modifications to maximize biogas capture. In addition, routine

[10] A second enclosed flare will be installed in 2020.

landfill surface scans are conducted to detect and address fugitive emissions. These measures can be expected to effectively mitigate the fugitive release of LFG under normal operating conditions.

There are other potential sources of odour in and around the study area including agricultural activities like fertilizer applications and the nearby mushroom farm. These sources have the potential to generate significant odour emissions under adverse circumstances.

Noise

The EOWHF and surrounding areas are within a high noise environment dominated by a major 400 series highway (Highway 417) linking the Ottawa Region to Montreal. A commercial peat harvesting operation is located on the west side of the EOWHF along with an access road which allows for the passage of heavy trucks alongside the western and northern boundaries of the EOWHF.

Noise sources associated with the landfilling activities are mainly waste trucks travelling from the site entrance to the active phase and equipment used at the tipping face for shaping the mound. Equipment also operates on-site for construction at the landfill's active phase or for preparation of the next landfilling phase. Additional noise sources are associated with the LFG utilization facility, the leachate collection and treatment facility, and the composting facility and activities.

There have been no noise complaints at the EOWHF since operations began in 1999. An annual noise monitoring program has been carried out at the EOWHF since 2010, which involves a noise monitor placed in close proximity to the nearest receptor. Noise levels at the monitoring location are dominated by the road traffic noise along the Highway 417 and the noise associated with the EOWHF is inaudible over noise from Highway 417 at the closest receptor.

7.2.1.2 Geology and Hydrogeology

Geology and hydrogeology includes geology, hydrogeology, and groundwater quality and quantity.

Geology

The near surface bedrock underlying the EOWHF consists mainly of shale and limestone deposits of the Shadow Lake Formation of the Ottawa Group. The shale overlies the limestone unit. The bedrock surface generally slopes from the north to the south across the site from an elevation of approximately 55 metres above sea level in the north to 43 metres above sea level in the south, and ranging between 10.5 and 24.7 metres below ground level, which is consistent with the regional bedrock geology map of the area.

The general overburden stratigraphy in the area of the EOWHF consists of a surficial peat layer underlain by a silty clay deposit, commonly underlain by a sandy silt

glacial till layer which overlies bedrock. The typical thickness of the geological deposits is as follows:

- peat soil 2 to 3 metres thick;
- silty clay 7 to 17 metres thick;
- compact to very dense glacial till approximately 3 metres thick; and
- bedrock.

The subsurface soil conditions in the proposed future development area generally consists of a substantially thick overburden layer that rests upon bedrock. The typical thickness of the geological deposits is as follows:

- topsoil 0.3 to 2.1 metres thick;
- silty clay or clay with some silt and trace sand 4 to 16 metres thick;
- sandy gravel glacial till with some silt 0.6 to 5.7 metres thick; and
- bedrock.

Hydrogeology

The direction of shallow and deep groundwater flow is from south to north across the onsite study area. The vertical hydraulic gradient is variable between stratigraphic layers, with some upward, some downward, and some locations mixed. The clayey upper overburden layer is anticipated to provide a relatively low hydraulic conductivity, while the gravelly sand till lower overburden layer is anticipated to provide a moderate hydraulic conductivity. The bedrock displays mixed hydraulic conductivity, depending on the degree of fracturing; the bedrock at some boreholes is effectively impervious.

The existing EOWHF site is not within a source water protection zone and the EOWHF Annual Reports confirm that the site is in compliance with the MECP's *Guideline B7 – Incorporation of the Reasonable Use Concept into Groundwater Management Activities*. No issues have arisen with respect to ground water use since the site commenced operations. Mapping by the source water protection authority indicates that the future development area is classified as being a Highly Vulnerable Aquifer with a score of 6 and is within a Significant Groundwater Recharge Area with a score of 6.

The water table surface declines northward, from approximately 67.0 metres above sea level near to Lafleche Road to approximately 64.0 metres above sea level near to the intersection of Concession Road 7 and Highway 138. The depth to water table ranges from 0.5 to 1.5 metres below ground, with an average of 0.9 metres below ground.

The closest municipal water treatment plant and system is located 5 km away in the Village of Casselman and a second plant is located 5 km away in the Village of Moose Creek.

Groundwater Quality and Quantity

The bedrock aquifer groundwater within the region is of high quality. Overburden aquifer groundwater quality in the region is also of relatively high quality. A total of 416 groundwater wells were previously identified within a 5 km radius of the EOWHF, the majority of which were drilled into bedrock with depths ranging from 0.3 to 39 metres below ground and static water level depths ranged from 0.6 to 16.8 metres.

The current groundwater quality at the existing landfill, based on historical and recent groundwater monitoring data, suggests that landfill leachate generation at the EOWHF has not impacted groundwater quality at the perimeter wells. Groundwater quality, as determined through monitoring the site perimeter wells, is indicative of naturally occurring background conditions.

7.2.1.3 Surface Water Environment

The surface water environment includes surface water quality and quantity.

Surface Water Quality

The EOWHF is located in a predominantly agricultural area with some rural areas to the south. The main surface watercourses providing drainage to and from the EOWHF site are the Fraser Drain and Moose Creek. The surrounding properties used for cash cropping, sod farming, and peat extraction, are drained by agricultural drains or peat drains which discharge to the Fraser Drain or Moose Creek at points between the EOWHF monitoring programs' upstream and downstream sampling stations.

The future development lands are located to the east of the EOWHF and are primarily used for agriculture and sod farming. A segment of the Tayside-Legault Drain flows through the eastern part of Lot 13 and then crosses Highway 138, eventually draining to the Scotch River after crossing Highway 417.

EOWHF surface water management is addressed via the conditions of the Environmental Compliance Approval. In general, surface water within the site boundaries is collected and treated via a system of stormwater collection ponds which provide total suspended solids removal and pre-development flows.

The Fraser Drain and Moose Creek are receiver watercourses for the EOWHF site's stormwater runoff and for the landfill's treated leachate effluent. Both systems discharge to the Fraser Drain, the first receiver, which joins the Moose Creek just downstream of the site. The treated leachate is a product of the EOWHF's leachate collection system and the on-site leachate treatment facility.

The surface water quality off-site in the Fraser Drain and Moose Creek adjacent and downstream of the EOWHF appears to be affected by activities around the landfill site. Several potential off-site sources for the elevated parameter concentrations include peat extraction activities, truck traffic, air-borne particulate, and off-site contributions via off-site drains. There are also on-going agricultural activities upstream and adjacent to the site and neighbouring watercourses, including those that discharge to the Fraser Drain upstream of the EOWHF downstream surface water monitoring stations.

The leachate treatment facility receiver monitoring results indicate that conductivity levels and the concentrations of parameters such as boron, chloride, nitrates, sulphate, and total dissolved solids in the Fraser Drain immediately downstream of the treated effluent discharge point were affected by the treated effluent discharge, but that the initial impact of the treated effluent discharge on parameter concentrations is of limited duration under high flow conditions (i.e., greater than 50 litres/second). Under low flow and stagnant conditions in Fraser Drain, the ability to assimilate the treated effluent is limited or minimal resulting in conditions comparable to the quality of the treated effluent. This is currently being assessed through variable effluent discharge rates under flow conditions that provide adequate assimilative capacity.

Moose Creek is considered by the MECP to be a Policy 2 Receiver for iron, phosphorus and nitrates. The existing leachate treatment facility's tertiary treatment process effectively removes iron and phosphorus from the leachate stream, resulting in concentrations well below 1 mg/L so the treated effluent's impact in terms of these parameters is negligible.

The existing leachate treatment facility's current biological process was intended to convert nitrogen ammonia to nitrates through the nitrification process. The result is an elevated concentration of nitrates in treated effluent that is discharged to Fraser Drain, draining to Moose Creek. GFL has enacted a modified effluent discharge plan to reduce the potential impact of nitrates on the receiver stream.

The area around the Tayside-Legault Drain consists mainly of agricultural land. The flow volume in the drain is low and drains east towards the Scotch River. Although associated with a different water shed than Fraser Drain and Moose Creek, the water quality in the Tayside-Legault Drain appears to be very similar to that of Fraser Drain with comparable concentrations of all measured parameters.

Surface Water Quantity

The on-site and off-site study areas are located within the Moose Creek subwatershed. The surface water features around the site include the Fraser Drain along the eastern and northern sides of the property which drains into Moose Creek located to the west, and the Albert Fahey Award Drain located along the south side of the site, which also drains into Moose Creek.

The existing on-site stormwater management system is approved under an existing environmental compliance approval and includes three surface water management ponds and a perimeter channel and outlet control structure located at the northwest corner of the site, which begins at the downstream end of two of the ponds and extends to the outlet structure at the northwest corner of the site where flows are controlled to not increase peak flows downstream. The three stormwater management ponds are designed for both quality control (80% Total Suspended Solids removal or an 'Enhanced' level of protection) and quantity control (to maintain peak flows to 'natural' levels up to and including the 10-year return period and also provide extended detention to prevent downstream erosion).

The perimeter channel is designed to collect the controlled outflows from the stormwater management ponds, collect surface flows from the existing / natural portions of the site, and convey the collected flows for all return periods up to the 100-year design event to a dedicated outlet to the Fraser Drain. Peak flows are controlled at this dedicated outlet by an outlet structure containing orifices and weirs, sized to control peak flows up to the 10-year design event to their 'natural' levels.

The future development lands contain agricultural tile drains, which drain most of the area west toward the Fraser Drain. The eastern portion of the area drains east toward the Tayside-Legault Drain.

7.2.1.4 Ecological Environment

The ecological environment includes both terrestrial and aquatic ecosystems.

The on-site and off-site study areas were historically part of the locally significant Moose Creek wetland complex (non-provincially significant, now limited to off-site areas to the south) but have since been stripped of natural vegetation in the process of peat harvesting. No Provincially Significant Wetlands are located within the on-site or off-site study areas; however, a Significant Woodland is located within the Moose Creek wetland complex.

An ANSI of Regional Significance for Life Science, a significant natural heritage feature, is located within the off-site study area immediately south of the existing EOWHF site. The boundaries of the ANSI as currently mapped by the MNRF (Land Information Ontario) have not been updated to reflect existing land cover, and show that the ANSI exists in areas that now includes the EOWHF, peat fields, agricultural fields, etc. The only remaining portion of the ANSI, located within the off-site study area, is the wooded area associated with Moose Creek Wetland southwest of the on-site study area.

The majority of the EOWHF site is actively used for landfill operations or has been historically disturbed; peat and topsoil have been removed, disturbing the natural vegetation composition in all areas; as such, natural vegetation cover is isolated to areas that are not repeatedly disturbed. Natural vegetation on the site is currently limited to the small disjunct treed swamp in the northeast corner, the roadside

ditches, unused areas of the site, and the edges of the site. The majority of vegetation on site is common and disturbance tolerant, supporting common wildlife species.

The site and most of the surrounding area is largely of anthropogenic nature (i.e., agricultural, industrial) and is therefore not suitable habitat for most Species At Risk known to occur or to potentially occur in the off-site study area. Two legally protected Species At Risk were observed in the future development lands portion of the on-site study area in 2019: Barn Swallow, and Little Brown Myotis. One Species At Risk, Bank Swallow, was observed in the off-site study area. Legally protected Category 3 habitat of Bank Swallow and Barn Swallow falls within a small portion of the on-site study area at the south end, but this does not necessarily constrain development due to the opportunity to register the project with MECP and to apply for an overall benefit permit. No Significant Wildlife Habitat as defined in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E was identified in the on-site or off-site study areas.

The on-site and off-site study areas are part of a larger natural heritage feature that spans to the north as identified by MNRF at the landscape level. This natural heritage feature includes a Migratory Bird Staging and Migration Stopover Area as it pertains to Snow Geese and Canada Geese for both spring and fall. The feature also includes a Raptor Wintering Area for various species including Snowy Owls and Rough-legged Hawks. Waterfowl Stopover and Staging Areas and Raptor Wintering Areas as mapped by MNRF are considered candidate Significant Wildlife Habitats (MNRF 2015)[11]. Confirmation of a candidate Significant Wildlife Habitat requires meeting criteria defined by MNRF (2015), including confirming the presence of suitable Ecological Land Classification (ELC) habitat codes and the abundance and/or groupings of associated species. Snow Geese were observed in large numbers (500+ individuals) on sod and annual row crop fields in the study area over five days in the spring of 2019. However, the ELC criteria for significant Waterfowl Stopover and Staging Areas for Snow and Canada Geese only include aquatic habitats such as marshes, swamps, and shallow water aquatic systems such as ponds, lakes, bays, coastal inlets, and watercourses used during migration. The off-site study area contains swamps (SWD) but these are all densely treed and without open surface water, and observations of Snow Geese were not associated with these habitats. As such, the study areas do not contain significant Waterfowl Stopover and Staging Areas for Snow and Canada Geese based on MNRF's criteria. While several species of raptors have been observed at the existing EOWHF in the winter (e.g., Niblett Environmental Associates 2018)[12] and the off-site study area does contain a combination of treed and upland habitats greater than 20 hectares, these habitats do not meet the ELC habitat criteria for significant Raptor Wintering

[11] Ontario Ministry of Natural Resources and Forestry (MNRF). 2015. *Significant Wildlife Habitat EcoRegion Criteria Schedules for EcoRegion 6E*.

[12] Niblett Environmental Associates Inc. 2018. *Natural Environment Existing Conditions Report: Eastern Ontario Waste Handling Facility Landfill Expansion Environmental Assessment*.

Areas (MNRF 2015). Raptors are likely attracted to the existing EOWHF due to the presence of prey species such as gulls and small mammals that feed on the waste.

There is an overall lack of perennially wet watercourses within the on-site study area. The stretches of the Fraser Municipal and Tayside-Legault Drains located on site provide mostly cool-warm and warm waters for fish, respectively. Sections of these drains have been identified as providing habitat for fish communities in the summer. Although 10 different species were captured in the Fraser Drain and six species were captured in the Tayside-Legault Drain during 2019 surveys, no provincially and/or nationally listed (Species At Risk) fish species were captured. No critical habitat for aquatic Species At Risk or sensitive spawning habitat was identified within the study areas.

7.2.2 Socio-Economic Environment

The socio-economic environment comprises the economic and social environments.

7.2.2.1 Economic Environment

The Township of North Stormont has a population of approximately 6,873 (2016) and is experiencing minimal population growth. North Stormont has the smallest labour force, the lowest unemployment rate, and highest participation rate compared to other municipalities in the United Counties of Stormont, Dundas and Glengarry. The top three employment sectors in the United Counties of Stormont, Dundas and Glengarry are health care and social assistance, retail trade, and manufacturing.

The EOWHF is a major employer in the Township of North Stormont, providing approximately 40 stable, long-term jobs for residents in the area. Approximately 80% of the EOWHF's employees reside in the United Counties of Stormont, Dundas and Glengarry (including the City of Cornwall), and approximately 20% reside in the United Counties of Prescott and Russell. Over a quarter of the employees at the EOWHF have been employed at the facility for more than 7 years.

GFL supports a number of community initiatives and participates in a number of programs and committees in the area. The EOWHF provides significant financial contributions to the local economy, through donations to support the local community, the host community agreement and municipal taxes. GFL provides cost-effective and environmentally-secure waste management services[13] to municipalities and businesses across Eastern Ontario, and contributes approximately 9% of North Stormont's tax base[14]. GFL endeavours to utilize local businesses and services in support of its operation to the extent possible. The EOWHF supports a number of

[13] These services include waste collection, organics composting, recycling, electronic waste collection, tire collection and residential drop-offs.

[14] Including host community payment.

local vendors providing goods and services, spending approximately $10 million annually in the local community.

7.2.2.2 Social Environment

The Social Environment includes the local community and visual aesthetics.

Local Community

The EOWHF is located in a predominantly rural area with very few neighbours and some agricultural, quarry and recycling operations. The rural area is predominantly agricultural, with cash crops of corn and soybeans being the main agricultural activity. The EOWHF is adjacent to peat and sod farming operations, with agriculture to the north of Concession Road 7. The future development lands consist of sod farming and agricultural lands, which are adjacent to agricultural lands to the north of Concession Road 7 and east of Highway 138, and sod farming, agriculture, and peat extraction to the south of Lafleche Road.

There are currently no recreational resources located within the on-site and off-site study areas, and there are no sensitive land uses such as churches, parks, or schools. Seven residences are located within the off-site study area, located between 70 m and 950 m from the on-site study area. Based on an average of 2.7 people per residence, approximately 19 people could be residing within the off-site study area.

Visual Aesthetics

The EOWHF and future development lands are situated on land that is relatively flat. The land use surrounding the site consists of agriculture (corn and soybeans), peat extraction and sod farming as previously noted. Vegetation on the EOWHF site consists of hedgerows and berms, while vegetation on the future development lands consists of sod and crops. There are many small woodlots and tree plantings surrounding the EOWHF site, particularly along the north side of Highway 417 which obstructs the view of the EOWHF from the highway. There are no woodlots or plantings obstructing the view of the future development lands.

In general, the EOWHF is relatively unobtrusive and has a low profile; particularly from the south, east and west view points, it is difficult to see the landfill. From the north, the waste water treatment plant and compost screening area are more visible. The future development lands are flat and can be observed from the surrounding roadways without obstruction.

7.2.3 Cultural Environment

The cultural environment comprises archaeological and cultural heritage resources.

7.2.3.1 Archaeological Resources

The on-site and off-site areas were once part of the Moose Creek wetland. A Stage 1 Archaeological Assessment was completed for the entire 189 hectare EOWHF site as part of the original EA for the landfill in 1999. The Stage 1 Archaeological Assessment determined that there is no archaeological potential within the boundaries of the existing EOWHF site, including the northeastern corner of the site, and recommended no further study. Provincial interest in archaeology for the property was signed off in a letter dated November 2, 1999. Nothing of archaeological significance has been found on or around the EOWHF as the site has been developed.

A Stage 1 Archaeological Assessment completed in 2020 for the future development lands determined that the area has no archaeological potential due to deep and extensive land disturbance and permanently low and wet conditions. This report is being provided to the Ministry of Heritage, Sport, Tourism and Culture Industries for review and to be entered into the Ontario Public Register of Archaeology Reports.

7.2.3.2 Cultural Heritage Resources

Three cultural heritage resources were identified within the off-site study area as part of a study undertaken in 2020: one located at the western edge of the off-site study area on Concession Road 7 (also known as Route 700); one located north of Highway 417; and one located at the eastern edge of the off-site study area between Allaire Road and Highway 417.

The one resource located at the western edge of the off-site study area comprises a farmscape and a residence. The resource located north of Highway 417 is a farmstead, while the resource located at the eastern edge of the off-site study area is a residence and former farmscape. These cultural heritage resources are historically, architecturally, and contextually associated with late nineteenth to mid twentieth-century settlement patterns and agricultural industry in the area.

No cultural heritage resources were identified within the on-site area.

7.2.4 Built Environment

The built environment includes transportation, land use, aggregate extraction and agriculture.

7.2.4.1 Transportation

The EOWHF is located on Lafleche Road, a private road, which is accessed from Highway 138. Highway 138 intersects with Highway 417 approximately 2 km north of Lafleche Road. The closest airport is located approximately 50 km west of the site (Ottawa International Airport). The surrounding area is predominantly rural and undeveloped.

The current haul route to the EOWHF is via Highway 417, Highway 138 and Lafleche Road. Approximately 90% of the vehicles entering the site are large industrial trucks including dump trucks, walking floor trucks, rear loaders, front loaders, and roll-offs. Automobiles and service/pick-up trucks represent the remainder of the vehicles. The larger trucks generally travel to/from Ottawa or to/from the south via Highway 138. The smaller personal vehicles and pick-up trucks likely serve the surrounding local communities.

Under existing conditions, the intersections at Highway 417 and Highway 138, Highway 138 at Lafleche Road, and Lafleche Road at the GFL driveway entrance are operating well with residual capacity.

7.2.4.2 Land Use

The EOWHF and future development lands (i.e., the on-site study area) are located within the Township of North Stormont in the United Counties of Stormont, Dundas and Glengarry (SDG). The off-site study area is located within both the Township of North Stormont in the United Counties of SDG, and the Nation Municipality in the United Counties of Prescott and Russell. Consequently, the official plans of both Counties and the zoning by-laws of the lower tier municipalities are considered to understand the existing and future land use conditions of the study areas. In the case of the United Counties of SDG, the Official Plan is currently under appeal; therefore, the designations and policies of both the Official Plan in effect and those under appeal are considered until such time as the appeals are settled.

The on-site study area includes the existing EOWHF site and the future development area. The future development area is currently used for agriculture (sod farming) with a small commercial office for the sod farm administration and sales. The EOWHF site is designated “Rural District” in the Official Plan, while the majority of the future development area is designated “Agricultural Resource Lands” with the exception of the lands along Highway 138 (Lot 13), which are designated “Employment District”.

Waste management systems are a permitted land use in the “Rural District”, and thus the existing EOWHF and any proposed future development of landfill capacity in the available areas of the existing EOWHF are consistent with the policies of the Official Plan. Waste management systems are not permitted in the “Agricultural Resource Lands” and “Employment District” designations; consequently, an official plan amendment will be required to redesignate the lands prior to development.

Regarding zoning, the landfill cells at the EOWHF site are zoned “Waste Disposal” while the remainder of the site is zoned “Rural”. The future development lands east of the EOWHF are zoned “Agriculture”, with the exception of a small portion of lands along Highway 138 (Lot 13), which are zoned “Highway Commercial”. A waste management site is not permitted in these zones; consequently, a zoning by-law amendment will be required to rezone the future development lands prior to development.

Existing land use conditions in the off-site study area are predominantly agricultural with some extractive uses (aggregate and peat extraction), heavy industrial uses, and a small number of commercial and residential uses. The remaining lands are vacant or in a natural state. There are seven residences within the off-site study area, of which two are located within 500 metres of the on-site study area boundary. There are no other sensitive land uses such as recreation uses, churches, parks, or schools within the off-site study area.

Future land use conditions in the off-site study area are guided by the two applicable Official Plans. The south and east portions of the off-site study area are located within the United Counties of SDG. There are four land use designations within this portion of the study area, including “Employment District” along Highway 138, “Rural District”, “Extractive Resource Lands (Licensed Pit & Quarry)”, and “Agricultural Resource Lands”.

The intent of the “Employment District” is to consolidate industrial and commercial uses in proximity to transportation corridors, as well as allowing large-scale agriculture-related uses such as value-added production. The existing residential and agricultural uses on these lands therefore do not conform to the future planned uses of these lands. The other existing land uses generally conform to the official plan land use designations.

The west and north portions of the off-site study area are located within the United Counties of Prescott-Russell. There are two land use designations within this portion of the off-site study area, including a small amount of “Rural Policy Area” along County Road 8 and the remainder in the “Agricultural Resource Policy Area”. The existing commercial use and approved industrial use along County Road 8 are intended uses in the “Rural Policy Area”. The commercial use on these lands does not conform to the future planned uses of these lands. All other existing land uses generally conform to the official plan land use designations.

7.2.4.3 Aggregate Extraction and Agriculture

Based on a review of existing data sources[15], there are no known aggregate resources located within the on-site study area. There is one known aggregate resource within the off-site study area: the Martin Quarry, owned by A.L. Blair Construction Limited, located approximately 750 metres east of the on-site study area.

Lands adjacent to the EOWHF to the east, within the future development area, are used for sod farming, to the south for peat extraction, to the west for peat extraction

[15] Ontario Ministry of Natural Resources and Forestry (MNRF) “Find Pits and Quarries” website available at https://www.ontario.ca/environment-and-energy/find-pits-and-quarries, and Geographic Information System (GIS) information provided by the United Counties of Stormont, Dundas, Glengarry, Prescott-Russell.

and agricultural purposes (cash crops), and to the north for agricultural purposes (cash crops). The cash crops are currently either soybeans or corn.

Soil types in the on-site and off-site study areas have moderate to severe limitations on use for crops. Agricultural activities in the area contribute to dust and odour in the off-site study area. Some crops may also provide visual screening of the landfill.

8. Environmental Assessment Method

The following sections provide an overview of the method that will be used to develop the EA for the proposed undertaking.

The proposed method to be followed in the EA will be a qualitative comparison of the 'alternative methods' using criteria, indicators and data sources to identify the preferred alternative.

An effects assessment will be carried out on the preferred alternative using the same criteria, indicators and data sources, and additional studies as required.

8.1 Description of the Existing Environment

The existing environment within the on-site and off-site study areas (**Section 7.1**) will be characterized in the EA Study Report. The characterization of the existing environment will address the five aspects of the environment as defined in the *EAA*, specifically:

- natural environment;
- built environment;
- cultural environment;
- social environment; and
- economic environment.

For the purposes of the EA, the social and economic environments have been combined into the socio-economic environment.

The characterization of the existing environment will incorporate the results of past studies, field reconnaissance, additional baseline studies, and information from the preliminary data sources outlined in **Appendix B**, as applicable.

The potential environmental effects of the alternative methods will be qualitatively compared against the existing environmental conditions.

8.2 Description of the Alternative Methods

GFL has preliminarily identified two alternative methods for the future development of the landfill as described in **Section 6.2**. The alternative methods will be described in

further detail in the EA Study Report. Alternative methods for treating landfill leachate and managing landfill gas will also be identified and described, as appropriate, during the EA.

8.3 Prediction of Potential Environmental Effects for Each Alternative Method

The potential effects of each alternative method will be identified based upon application of the proposed evaluation criteria, indicators and data sources as outlined in **Appendix B**. The analysis of potential effects will be based on the maximum allowable waste receipt level for the EOWHF landfill. Potential effects can be positive or negative, direct or indirect, and short or long-term. Actions necessary, or that may reasonably be expected to be necessary, to prevent or mitigate the potential effects will be identified, as appropriate.

8.4 Identification of the Preferred Alternative

The alternative methods will be assessed in a qualitative comparative process to determine the preferred alternative, using the criteria and indicators provided in **Appendix B**. These evaluation criteria and indicators will be finalized during the EA.

The differences in net effects (the potential effect remaining following implementation of mitigation and/or management measures) will be used to identify and compare the advantages and disadvantages for each alternative. The comparison of alternatives will include a clear rationale for the selection of the preferred alternative.

8.5 Effects Assessment of the Preferred Alternative

Following the identification of the preferred alternative, an effects assessment will be carried out on the preferred alternative considering the same criteria, indicators and data sources, and additional studies as required, taking into account possible mitigation and/or management measures and cumulative effects. The potential effects of the preferred alternative will be compared to the 'do nothing' alternative.

The EA will also include a description of the preferred alternative's contribution to reducing GHG emissions and climate change, and the potential effect of climate change on the preferred alternative.

9. Consultation and Engagement

An overview of the consultation and engagement process conducted during the ToR is presented below and the detailed in **Supporting Document 1 – Record of Consultation and Engagement**. The proposed Consultation and Engagement Plan in support of developing the EA is presented in **Section 9.2** and the proposed plan for Indigenous engagement during the EA is presented in **Section 9.3**.

9.1 Summary of Consultation and Engagement Activities on the ToR

GFL consulted and engaged with a broad range of stakeholders including the public, agencies, and Indigenous communities during the preparation of this ToR. The following consultation activities took place during preparation of the ToR:

- Notice of Commencement of ToR and Public Open House;
- Public Open House #1;
- Project Update including a letter, comment/response table, and fact sheets on key issues;
- Draft ToR review between June 12 and July 31, 2020;
- Project website, e-mail, and telephone number;
- Engagement with Indigenous communities and groups;
- Municipal Council meetings:
  - Township of North Stormont council meetings on January 28 and April 28, 2020;
  - The Nation Municipality council meeting on May 4, 2020;
  - Municipality of Casselman council meeting on May 12, 2020;
- Community Liaison Committee meetings:
  - on January 14, 2020 prior to the Notice;
  - on July 22, 2020 during the Draft ToR review; and
- phone calls.

A detailed chronology and description of the various consultation and engagement events and activities during the ToR development is included in **Supporting Document 1 – Record of Consultation and Engagement**.

The Notice of Commencement for the ToR was developed, which included an overview of the Project, the EA process, and an invitation to Public Open House #1. The Notice of Commencement (the Notice, provided in **Supporting Document 1**) was published in both English and French in two local newspapers: the Cornwall Standard-Freeholder on January 15 and 16, 2020; and Le Reflet – The News on January 16, 2020.

The Notice, in both English and French, was also sent via regular mail to agencies, municipalities, organizations, Indigenous communities, and neighbouring property owners on January 13, 2020. Personalized letters providing a brief overview of the project and an invitation to Public Open House #1 were addressed to agencies, municipalities, organizations, and Indigenous communities, and were sent along with

the Notice via regular mail[16] on January 13, 2020. The letters were sent in either English and/or French depending on the requirements of the recipient. The list of recipients was developed in consultation with the MECP. Letters were addressed to the following Indigenous communities and organizations:

- Mohawk Council of Akwesasne;
- Algonquins of Ontario;
- Huron Wendat Nation Council;
- Mohawks of the Bay of Quinte – Tyendinaga Mohawk Council;
- Métis Nation of Ontario; and
- Métis Nation of Ontario Ottawa Métis Council.

A copy of the Notice, in both English and French, was uploaded to the project website (http://gflenv.com/moose-creek-eowhf) on January 15, 2020.

Public Open House #1 was held on January 30, 2020 at the Moose Creek Recreation Centre from 4 p.m. to 8 p.m. to introduce and provide an overview of the project, discuss the development and contents of the ToR, present the EA process, and provide information on the proposed alternatives being considered, the EA evaluation process and criteria, and the consultation process that will be followed during the development of the ToR and EA. A total of 49 people attended the Open House. Materials were available in both English and French, and a comment form was provided to solicit public input. The Open House display boards were also posted on the project website in both English and French. A detailed summary of Public Open House #1 was posted on the website and is provided in **Supporting Document 1**.

GFL provided presentations regarding the proposed project and ToR to the following municipalities and groups:

- Township of North Stormont Council on January 28 (in person) and April 28, 2020 (teleconference);
- The Nation Municipality Council on May 4, 2020 (teleconference); and
- Municipality of Casselman Council on May 12, 2020 (teleconference).

Due to the COVID-19 pandemic the latter three meetings were held via teleconference. Copies of the presentations are included in **Supporting Document 1**.

[16] The information was provided to the Indigenous communities by registered mail.

A project update was provided via a mail out on May 8, 2020, via email and hard copy mail depending on the recipient[17], which contained a project update letter, a table of comment/responses received to-date, and fact sheets regarding the key issues of LFG Management and Community Benefits. All update documents were also posted to the project website.

During the development of the draft ToR, GFL responded to comments received by telephone, email, and in writing. The company also offered to meet with anyone who requested, including conducting tours of the EOWHF; however, the opportunity for in-person meetings and site tours was limited by the COVID-19 pandemic. All comments received and responses provided by GFL are included in **Supporting Document 1**.

A Draft ToR and Record of Consultation and Engagement were prepared and made available to the public, Indigenous communities, government review team, and all other stakeholders on the project mailing list for their review and comments. Review comments on the Draft ToR were requested between June 12 and July 31, 2020. A Notice was provided in English and French to all recipients. A PDF copy of the Draft ToR was emailed to agencies and municipalities along with the Notice on June 12, 2020. A letter in English and French and a copy of the Draft ToR were sent along with the Notice to Indigenous communities via Express Post on June 10, 2020. The Notice (in both languages), the Draft ToR, and Record of Consultation and Engagement were also uploaded to the project website. Due to the COVID-19 pandemic, hard copies of the documents were not made available at public viewing locations. Copies of the materials are included in **Supporting Document 1**. All comments received and responses provided by GFL, including how the comments are addressed in the ToR, are included in **Supporting Document 1**.

9.2 Proposed Consultation and Engagement Program for the EA

GFL is committed to carrying out meaningful consultation and engagement on the future development with a broad range of stakeholders. The development of the proposed consultation and engagement program for the EA is based on the following principles:

- transparency, accountability and accessibility;
- identification of stakeholder and Indigenous community concerns early in the process and addressing these concerns in the EA;
- multiple points of consultation and engagement throughout the EA using a variety of techniques (in-person, digital, print); and
- documentation of issues, concerns and responses in the EA.

[17] The information was provided to the Indigenous communities by registered mail.

By consulting with interested people[18], GFL will provide opportunities for input before decisions are made and then respond by making changes as appropriate. The input received through the EA consultation and engagement process will be considered in the preparation of the EA and studies, and how this input is incorporated into the EA will be documented.

Consultation and engagement will be undertaken at key points in the process, as well as on an on-going basis, through the following activities as conditions permit:

- **Notice of Commencement for the EA**: by mail, email, local newspapers, and on the project website, in both English and French languages, including details on the project, the EA process and contact information, as a minimum.
- **Public Open House(s)**: to present the 'alternative methods', a description of the existing environmental conditions, the comparative evaluation criteria, the results of the assessment and comparative evaluation of the alternative methods, and the identification of the preferred alternative. The format of the Public Open Houses will be determined based on social gathering restrictions due to the pandemic.
- **Meetings/Tours**: if possible, depending on social gathering restrictions due to the pandemic;
- **Consultation and Engagement Report**: summarizing the results of the open house(s) as well as comments received via fax, email or post will be prepared, including a record of comments and responses.
- **Website**: established by GFL during the development of the ToR will be maintained during the EA to provide information, inform the public of consultation and engagement events, and provide a means for feedback.
- **Contact Person**: provided for a GFL staff member to receive enquiries from interested parties for information and submit comments.
- **Draft EA Study Report**: provided to the public, agencies, and Indigenous communities who have submitted comments on the ToR and/or wish to receive a copy. Written comments on the draft report will be requested within 45 days of its submission to the MECP. Notice of the draft report availability will be provided by newspaper notice, mail, email, and on the project website.
- **Final EA Study Report**: provided to the public, agencies and Indigenous communities who have submitted comments on the Draft EA and/or wish to receive a copy. Notice of the final report availability will be provided by newspaper notice, mail, email, and on the project website.

Consultation and engagement will be conducted in accordance with MECP requirements, and with consideration given to the potential limitations caused by the

[18] The Francophone population is included in the definition of interested persons.

COVID-19 pandemic. If requested, additional consultation and engagement activities may be undertaken. GFL is prepared to discuss individual concerns and comments directly with potentially affected persons. Additional events may be held to address specific issues of concern, as warranted.

Notification and open house related materials will continue to be provided and made available in both English and French languages. Bilingual staff will also be available at GFL to respond to any comments or concerns. The draft and final EA documentation will be prepared in English with an executive summary available in both French and English.

A Record of Consultation will be prepared as part of the EA which will include information about the EA consultation program, including copies of correspondence from and to the Proponent, information about and received at the public open houses and copies of comments, questions, issues, and concerns from stakeholders and members of the public, and how those questions, issues, and concerns were addressed.

In accordance with Section 6.1(2)(e) of the *EAA*, a description of the consultation and engagement program carried out by GFL during the EA, along with the results of the consultation and engagement, will be documented in the EA Study Report.

9.3 Indigenous Engagement during the EA

The list of potentially-affected Indigenous communities was developed in consultation with the MECP. The MECP provided formal written notification to GFL delegating procedural aspects of Indigenous consultation for this EA and required that the following communities be consulted:

- Mohawk Council of Akwesasne;
- Huron Wendat Nation Council; and
- Algonquins of Ontario Consultation Office.

Based on the previous EA conducted for the EOWHF landfill expansion[19], GFL included additional Indigenous communities in the contact list. During the EA, GFL will continue to engage with the following Indigenous communities and organizations in a manner consistent with any requests that might be received from each community:

- Mohawk Council of Akwesasne;
- Algonquins of Ontario;
- Huron Wendat Nation Council;

[19] HDR Corporation. Eastern Ontario Waste Handling Facility Landfill Expansion Environmental Assessment. Prepared for GFL Environmental Inc. June 1, 2018.

- Mohawks of the Bay of Quinte – Tyendinaga Mohawk Council;
- Métis Nation of Ontario; and
- Métis Nation of Ontario Ottawa Métis Council.

GFL is committed to working with these Indigenous communities and organizations to address any comments or concerns they may have. This includes providing any specific engagement activities, such as meetings, at the request of the community. Consultation and engagement will be conducted in accordance with MECP requirements, and with consideration given to the potential limitations caused by the COVID-19 pandemic. GFL will provide written notification to the Indigenous communities and organizations consistent with the consultation and engagement program for the EA.

10. Commitments and Monitoring

The EA will contain a list of commitments made by GFL during the ToR process and indicate how such commitments have been addressed in the EA. A list of commitments made by GFL during the preparation of the EA will also be included in the EA along with a framework for monitoring when and how all commitments will be fulfilled.

A strategy and schedule for compliance and effects monitoring will be developed and included in the EA. The monitoring plan will consider all relevant project phases: planning, detailed design, tendering, construction, establishment and post-establishment. Compliance monitoring is an assessment of whether an undertaking has been designed, constructed, implemented and/or operated in accordance with the commitments in the EA document and the conditions of approval. Effects monitoring consists of activities carried out by the proponent after the approval of the EA to determine the environmental effects of the undertaking. Monitoring requirements for effects related to the proposed undertaking are anticipated to be developed as a part of the *Environmental Protection Act* and *Ontario Water Resources Act* approval processes.

11. Flexibility to Accommodate New Circumstances

The proposed project detailed in this ToR is based upon a preliminary or conceptual design, and does not necessarily represent the final design, location, or scope of the project. The description of the project in this ToR should be viewed as a preliminary description, which is subject to change during the preparation of the EA based on the results of on-going studies and advancement of the project design, existing conditions studies and effects assessments, and consultation and engagement

including input from agencies and other regulatory authorities. Consequently, there may be changes to the feasible alternative methods for carrying out the project before the proposed undertaking is confirmed and presented in the EA Study Report.

Subsection 6.1(1) of the *EAA* states that the EA must be prepared in accordance with the approved ToR. GFL is aware that unforeseen circumstances may arise that could prevent the commitments in the ToR from being met; as such, flexibility has been incorporated into this ToR, where appropriate, to accommodate new circumstances that may arise during the progression of the EA and/or project design. It is therefore understood that certain aspects of the ToR may be adjusted without the need to re-start the provincial EA process.

For the purposes of preparing this ToR, flexibility is defined to include a minor variation or modification to the ToR itself, such as a change in consultation and engagement methods, existing conditions study methods, effects assessment methods, and to allow for refinement to things such as study areas, environmental criteria, indicators, and data sources. Therefore, the ToR has not established detailed existing conditions or a full suite of potential effects of the undertaking, for example; these will be determined during the EA and presented in the EA Study Report.

It is noted that proposed minor modifications to the ToR will be discussed with the MECP prior to proceeding with the changes.

12. Other Approvals

In addition to EA approval, certain other approvals may be required, including but not limited to:

- *Environmental Protection Act*;
  - Environmental Compliance Approvals (Waste Disposal and Air);
- *Ontario Water Resources Act*;
  - Environmental Compliance Approval (Sewage Works);
- *Drainage Act;*
- *Fisheries Act;*
- *Conservation Authorities Act*; and
- *Planning Act*.

Official Plan and Zoning By-Law amendment approvals will also be required.

The proposed undertaking is not identified as a designated project under the *Impact Assessment Act* (*IAA*), and based on correspondence received from the Impact Assessment Agency of Canada in May 2020, it has been confirmed that the future

development will not be subject to review under *IAA*. A list of the specific approvals required for the proposed undertaking will be provided in the EA.

A

Acronyms, Units, and Glossary

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Acronyms

Acronym	Definition
ANSI	Area of Natural and Scientific Interest
C&D	Construction and Demolition
COVID-19	Coronavirus Disease
EA	Environmental Assessment
EAA	*Environmental Assessment Act*
ECA	Environmental Compliance Approval
ELC	Ecological Land Classification
EOHWF	Eastern Ontario Waste Handling Facility
ESDM	Emission Summary and Dispersion Modelling
FIT	Feed-in-Tariff
GFL	GFL Environmental Inc.
GHG	Greenhouse Gas
IAA	*Impact Assessment Act*
IC&I	Industrial Commercial and Institutional
LFG	Landfill Gas
MECP	Ministry of Environment, Conservation and Parks
MHSTCI	Ministry of Heritage, Sport, Tourism and Culture Industries
MNRF	Ontario Ministry of Natural Resources and Forestry
MW	Megawatt
OTS	Ontario Tire Stewardship
OWMA	Ontario Waste Management Association
PWQMN	Provincial Water Quality Monitoring Network
RPRA	Resource Productivity & Recovery Authority
SAR	Species At Risk
SDG	Stormont, Dundas and Glengarry
SRM	Specified Risk Material
SWH	Significant Wildlife Habitat
THR	Threatened
USA	United States of America
WCEC	West Carleton Environmental Centre

Glossary

Term	Definition
Approval	Permission granted by an authorized individual or organization for an undertaking to proceed. This may be in the form of program approval, environmental compliance approval, certificate of approval or provisional certificate of approval

Glossary

Term	Definition
Capacity (Disposal Volume)	The total volume of air space available for disposal of waste at a landfill site for a particular design (typically in m^3); includes both waste and daily cover materials, but excludes the final cover
Composting	The controlled microbial decomposition of organic matter, such as food and yard wastes, in the presence of oxygen, into finished compost (humus), a soil-like material. Humus can be used in vegetable and flower gardens, hedges, etc.
Composting facility	A facility designed to compost organic matter either in the presence of oxygen (aerobic) or absence of oxygen (anaerobic).
Construction and demolition (C&D) waste	Solid waste produced in the course of residential, commercial, industrial or institutional building construction, demolition or renovation (e.g., lumber, brick, concrete, plaster, glass, stone, drywall, etc.)
Environment	As defined by the Ontario *Environmental Assessment Act*, environment means: • air, land or water; • plant and animal life, including human life; • the social, economic and cultural conditions that influence the life of humans or a community; • any building, structure, machine or other device or thing made by humans; • any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or • any part or combination of the foregoing and the interrelationships between any two or more of them (ecosystem approach).
Environmental Assessment (EA)	A systematic planning process that is conducted in accordance with applicable laws or regulations aimed at assessing the effects of a proposed undertaking on the environment
Environmental Compliance Approval (ECA)	A licence or permit issued by the Ministry of the Environment for the operation of a waste management site/facility
Evaluation criteria	Evaluation criteria are considerations or factors taken into account in assessing the advantages and disadvantages of various alternatives being considered
Feed-in-Tariff (FIT) program	The Feed-In Tariff (FIT) Program was developed for the Province of Ontario to encourage and promote greater use of renewable energy sources including on-shore wind, waterpower, renewable biomass, biogas, LFG and solar photovoltaic for electricity generating projects in Ontario, typically for projects from 10 kW up to 500 kW. A new procurement process is being developed for large renewable projects (greater than 500 kW).
Greenhouse gas (GHG)	Any of the gases whose absorption of solar radiation is responsible for the greenhouse effect, including carbon dioxide, methane, ozone, and the fluorocarbons.
Indicators	Indicators are specific characteristics of the evaluation criteria that can be measured or determined in some way, as opposed to the actual criteria, which are fairly general
Industrial, commercial and institutional (IC&I) wastes	Wastes originating from the industrial, commercial and institutional sectors
Landfill gas (LFG)	The gases produced from the wastes disposed in a landfill; the main constituents are typically carbon dioxide and methane, with small amounts of other organic and odour-causing compounds
Landfill site	An approved engineered site/facility used for the final disposal of waste. Landfills are waste disposal sites where waste is spread in layers, compacted to the smallest practical volume, and typically covered by soil.
Leachate	Liquid that drains from solid waste in a landfill and which contains dissolved, suspended and/or microbial contaminants from the breakdown of this waste.

Glossary

Term	Definition
Material Recovery Facility	A processing facility which sorts recyclable materials into various streams (e.g., glass, newspaper, aluminum, steel, etc.).
Methane gas	A colourless, odourless highly combustible gas often produced by the decomposition of decomposable waste at a landfill site. Methane is explosive in concentrations between 5% and 15% volume in air.
Mitigation	Measures taken to reduce adverse impacts on the environment.
Non-hazardous waste	Non-hazardous wastes include all solid waste that does not meet the definition of hazardous waste and includes designated wastes such as asbestos waste.
Proponent	A person who: • carries out or proposes to carry out an undertaking; or • is the owner or person having charge, management or control of an undertaking.
Receptor	The person, plant or wildlife species that may be affected due to exposure to a contaminant.
Residual waste	Waste remaining after a technological process has taken place; e.g., unrecyclable/unprocessed materials remaining after being processed at a material recovery facility or non-compostable materials such as plastic from the composting facility.
Source separated organic material	Organics separated by a household or business that include food wastes and may include leaf and yard wastes.
Specified risk material (SRM)	Tissues that, in infected cattle, typically contain the agent that causes bovine spongiform encephalopathy, predominantly concentrated in tissues such as the brain and spinal cord.
Stakeholder	Any organization, governmental entity, or individual that has a stake in or may be impacted by a given approach to environmental regulation, pollution prevention, energy conservation, etc.
Terms of Reference (ToR)	A terms of reference is a document that sets out detailed requirements for the preparation of an Environmental Assessment.
Undertaking	Is defined in the Ontario *Environmental Assessment Act* as follows: • An enterprise or activity or a proposal, plan or program in respect of an enterprise or activity by or on behalf of Her Majesty in right of Ontario, by a public body or public bodies or by a municipality or municipalities; • A major commercial or business enterprise or activity or a proposal, plan or program in respect of a major commercial or business enterprise or activity of a person or persons other than a person or persons referred to in clause (1) that is designated by the regulations; or • An enterprise or activity or a proposal, plan or program in respect of an enterprise or activity of a person or persons, other than a person or persons referred to in clause (a), if an agreement is entered into under section 3.0.1 in respect of the enterprise, activity, proposal, plan or program ("enterprise").
Waste	Refuse from places of human or animal habitation; unwanted materials left over from a manufacturing process.
Waste electrical and electronic equipment	A term encompassing all electronic waste (typically anything with a cord) designated by the MECP for end-of-life management by Ontario Electronic Stewardship.

B

Proposed Evaluation Criteria, Indicators, and Data Sources

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Table B-1. Proposed Evaluation Criteria, Indicators and Data Sources for the Environmental Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Natural Environment			
Atmospheric Environment			
Air Quality	Waste disposal site and associated operations can emit contaminants that can degrade air quality. Construction and operation activities at a waste disposal site can also lead to increased levels of particulates (dust) in the air.	• Predicted off-site point of impingement air concentrations of emitted contaminants of concern • Frequency of any exceedance of applicable standards or limits • Number of off-site receptors potentially affected (residential properties, public facilities, businesses/farms, institutions)	• Approved meteorological data • Applicable MECP guidelines, technical standards and models • Aerial photographic mapping and field reconnaissance • Previously completed Emission Summary and Dispersion Modelling Reports • Off-site receptors confirmed on recent mapping • Available background ambient air data • Proposed facility characteristics • Landfill design and operation data • Published terrain data • Published air emission factors
Odour	Waste disposal site and associated operations can emit contaminants that generate odorous emissions.	• Predicted off-site odour concentrations (µg/m³ and odour units) • Frequency of any exceedance of applicable standards or limits • Number of off-site receptors potentially affected (residential properties, public facilities, businesses/farms, institutions)	• Approved meteorological data • Applicable MECP guidelines, technical standards and models • Aerial photographic mapping and field reconnaissance • Previously completed Emission Summary and Dispersion Modelling (ESDM) Reports • Off-site receptors confirmed on recent mapping • Proposed facility characteristics • Landfill design and operation data • Published terrain data • Published air emission factors

Table B-1. Proposed Evaluation Criteria, Indicators and Data Sources for the Environmental Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Noise	Activities related to operation of the landfill can result in an increase in noise levels associated with the waste disposal facility.	• Predicted site-related noise levels (measured in dBA or dBAI). • Number of off-site receptors potentially affected (residential properties, public facilities, businesses/farms, institutions)	• Annual site specific noise monitoring data • Manufacturer provided noise specifications • Applicable MECP guidelines, technical standards and models • Aerial mapping and field reconnaissance to confirm off-site receptors • Land use zoning plans • Proposed facility characteristics • Landfill design and operations data
Geology and Hydrogeology			
Groundwater Quality	Contaminants associated with waste disposal sites have the potential to enter the groundwater and impact off-site groundwater.	• Predicted effects to groundwater quality at property boundaries and off-site	• Hydrogeological and geotechnical studies • Determination of water well users in the area • Annual site monitoring reports • Leachate generation assessment • Provincial Water Quality Monitoring Network (PWQMN) • Proposed facility characteristics • Landfill design and operations data
Groundwater Quantity	Physical works may disrupt natural groundwater flows.	• Predicted groundwater flow characteristics	• Hydrogeological and geotechnical studies • Water well records • Determination of water well users in the area • Annual site monitoring reports • Proposed facility characteristics • Landfill design and operations data

Table B-1. Proposed Evaluation Criteria, Indicators and Data Sources for the Environmental Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Surface Water Environment			
Surface Water Quality	Effluent from the waste disposal site has the potential to run off into surface water through stormwater discharge or from the leachate collection and treatment system.	• Predicted effects on surface water quality; on-site and off-site	• Surface water quality and quantity monitoring data including nutrients, total suspended solids (TSS) and other pollutants associated with waste disposal sites • Topographic maps and air photos • Landfill design and operations data • On-site stormwater management system design for expanded landfill • On-going surface water impact assessment of the existing landfill site on receiving waters • Integration of stormwater management with restoration of agricultural drains • Landfill leachate treatment alternatives • Landfill design and operations data
Surface Water Quantity	Construction of physical works may disrupt natural surface drainage patterns and may alter runoff and peak flows. The presence of the expanded landfill may also affect base flow to surface water.	• Change in drainage areas • Predicted occurrence and degree of off-site impacts	• On-site stormwater management system design for expanded landfill • Annual monitoring reports • Published flow information from MECP, Environment Canada and local conservation authorities • Engineer's Reports for municipal drains • Site reconnaissance • Proposed facility characteristics • Landfill design and operations data
Ecological Environment			
Terrestrial Ecosystems	Continued or expanded operation of the waste disposal facility may disturb the functioning of natural terrestrial habitats and vegetation, including rare, threatened or endangered species.	• Predicted impact on vegetation communities • Predicted impact on wildlife habitat • Predicted impact on vegetation and wildlife including rare, threatened or endangered species	• Vegetation, breeding bird, amphibian calling, and SAR habitat survey data from previous studies and field studies • Aerial imagery • MNRF Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement

Table B-1. Proposed Evaluation Criteria, Indicators and Data Sources for the Environmental Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
			• MNRF Significant Wildlife Habitat Technical Guide • Significant Wildlife Habitat (SWH) Schedule Criteria for Ecoregion 6E • Proposed facility characteristics • Landfill design and operations data • Annual monitoring report data
Aquatic Ecosystems	Continued or expanded operation of the waste disposal facility may disturb the functioning of natural aquatic habitats and species, including rare, threatened or endangered species.	• Predicted changes in water quality • Predicted impact on aquatic habitat including fish habitat • Predicted impact on aquatic biota including rare, threatened or endangered species	• Fish and fish habitat survey data from previous studies and field studies • MNRF review letters of previous existing conditions reports • Mass balance models to estimate temperature, TSS and nutrients • Annual monitoring report data • Proposed facility characteristics • Landfill design and operations data
Socio-Economic Environment			
Economic			
Economic effects on/benefits to local community	The continued operation of the landfill could have economic effects on and/or provide economic benefits to the local community, which may include an increase or decrease in employment.	• Employment at site (number and duration) • Local business employment • Displacement of business activities • Opportunities for the provision and procurement of products and/or services	• Census and municipal data for the Township of North Stormont, United Counties of Stormont, Dundas and Glengarry, the City of Cornwall, and The Nation Municipality and Village of Casselman in the United Counties of Prescott-Russell • Proposed facility characteristics • Landfill design and operations data
Social			
Effects on local community	Waste disposal facilities can potentially affect local residents and businesses in the vicinity of the site.	• Number of residents • Number and type of local businesses • Predicted changes to use of property	• Mapping and field reconnaissance • Census information and municipal data • Proposed facility characteristics • Landfill design and operations data

Table B-1. Proposed Evaluation Criteria, Indicators and Data Sources for the Environmental Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Visual Impact of Facility	The contours of the waste disposal facility may affect the visual appeal of a landscape.	• Predicted changes in perceptions of landscapes and views.	• Site grading plans • Aerial mapping and field reconnaissance • Proposed facility characteristics • Existing landfill design and operations data • Regional topographic mapping
Cultural Environment			
Cultural Heritage Resources	Activities related to construction and operation of the landfill may result in direct or indirect impacts to identified cultural heritage resources.	• Proximity of known or potential cultural heritage resources to the landfill (known/potential cultural heritage resources will be assessed for potential direct or indirect impacts)	• Published data sources • Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) - Built Heritage and Cultural Heritage Landscapes Checklist • MHTSCI - Ontario Heritage Tool Kit • Cultural Heritage assessment • Commemorative statements • Proposed facility characteristics • Landfill design and operations data
Archaeological Resources	Archaeological resources are non-renewable cultural resources that can be destroyed by the construction and operation of a waste disposal facility.	• Archaeological resources on-site and in vicinity and predicted impacts on them	• Existing Stage 1 Archaeological Assessment for the EOWHF site • MHSTCI Correspondence • Stage 1 Archaeological Assessment for the future development lands
Built Environment			
Transportation			
Effects from Truck Transportation along Access Roads	Truck traffic associated with continued operations of the landfill may adversely affect residents, businesses, institutions and movement of farm vehicles in the site vicinity.	• Disturbance to traffic operations	• Existing information and traffic data • Proposed facility characteristics • Landfill design and operations data • Traffic Impact Study

Table B-1. Proposed Evaluation Criteria, Indicators and Data Sources for the Environmental Assessment

Evaluation Criteria	Rationale	Indicators	Data Sources
Current and Planned Future Land Use			
Effects on Current and Future Land Uses	The continued operation of the landfill may not be fully compatible with certain current and/or planned future land uses in the off-site study area. Waste disposal facilities can potentially affect the use and enjoyment of recreational resources in the vicinity of the site.	• Current land use • Planned land use • Type(s) and proximity of off-site recreational resources within 1 km of a landfill footprint potentially affected • Type(s) and proximity of off-site sensitive land uses (e.g., dwellings, churches, parks) within 1 km of a landfill footprint potentially affected	• United Counties of Stormont, Dundas and Glengarry Official Plan • Township of North Stormont Official Plan and Zoning By-law • Aerial photographic mapping and field reconnaissance • Published data on public recreational facilities/activities • Provincial Policy Statement • Proposed facility characteristics • Landfill design and operations data
Aggregate Extraction and Agricultural			
Aggregate Resources	Aggregate resources may be present in the area of the expanded landfill.	• Presence of known or identified aggregate resources and the predicted impact of impairment of their use due to the proposed footprint, construction and operation on-site	• Aggregate resources inventory mapping • Ontario geological survey • Borehole logs from previous field investigations • Proposed facility characteristics • Landfill design and operations data
Effects on Agricultural Land	Agricultural land may be affected by the development of the facility.	• Predicted loss of agricultural land use • Predicted impacts on surrounding agricultural operations • Type(s) and proximity of agricultural operations (e.g., organic, cash crop, livestock)	• Provincial Policy Statement • United Counties of Stormont, Dundas and Glengarry Official Plan • Township of North Stormont Official Plan and Zoning By-law • Aerial mapping and field reconnaissance • Canadian Lands Inventory mapping • Proposed facility characteristics • Landfill design and operations data • Agriculture Impact Assessment Study

Appendix B. Terms of Reference Commitments Table

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
The 'Do Nothing' alternative will be carried into the EA and considered against the preferred undertaking for assessing potential effects. *Section 3.1, page 6 of the ToR*	The 'Do Nothing' alternative was considered as the existing conditions and future background conditions in the EA against which the effects were assessed along with the advantages and disadvantages of the preferred alternative.	• Section 6 – Net Effects of the Alternative Methods • Section 8 – Net Effects Assessment of the Preferred Alternative
The ToR further identifies the 'alternative methods' that will be considered in the EA. These 'alternative methods' will be reviewed during the EA and modified if appropriate. Additional alternatives may be identified if warranted. Based on studies completed for the existing EOWHF design and on-going development, a limited range of laterally-oriented alternative methods or design options are available. The underlying silty clay soil provides significant attenuation capabilities and natural protection to groundwater. By increasing the peak height of the current landfill design (approximately 16 metres) the investigations have indicated that the underlying soils may become unstable. This may affect the overall landfill performance and, as a result, vertical expansion alternatives are not identified. This will be considered further in the development of the alternative methods during the EA. *Section 3.1, page 6 of the ToR*	The alternative methods were further developed and refined during the EA and documented in a Conceptual Design Report. A geotechnical feasibility study was conducted and is included as part of the Conceptual Design Report.	• Section 5 – Alternative Methods of Carrying Out the Undertaking • Supporting Document 2 – Conceptual Design Report
If approved by the Minister of Environment, Conservation and Parks, this ToR will provide the framework for preparing the EA Study Report. The ToR is not intended to present every detail of all the activities that will occur when preparing the EA. It is possible that, in carrying out the work described in this ToR, minor variations to methodologies may be necessary. These variations may include, but are not limited to: • modifications to the local study area to suit the requirements of each environmental component; • modifications to the alternatives, or identification of additional alternatives, considered; • modifications to studies or additional/expanded studies due to variations in the degree of environmental impact assumed at the time of preparation of this ToR or due to content and quality of information available; • modifications to the consultation and engagement plan; and • any other modifications required or available through changes to Acts or Regulations.	Modifications to the general study areas were required for some environmental components to appropriately assess the potential environmental effects of the future development. The conceptual designs of the alternative methods were developed in greater detail as part of the EA to confirm feasibility, constructability and approvability under the *Environmental Protection Act*. During the development of the conceptual designs for both alternative methods, refinements were made including the addition of a stage to Alternative Method 1.	Modifications to the study areas are described in Section 4 – Description of the Environment Potentially Affected. The conceptual designs for the alternative methods are described in Section 5 – Alternative Methods of Carrying Out the Undertaking and in Supporting Document 2 – Conceptual Design Report.

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
These examples are not intended to be exhaustive; rather, they are meant to set out the types of changes that may be considered minor and that could be accommodated within the framework of the ToR. The MECP will be consulted in the event of uncertainty as to whether a proposed change should be considered minor and accommodated within the approved ToR. *Section 3.2, page 7 of the ToR*		
Following approval of the ToR by the Minister of Environment, Conservation and Parks (the Minister), GFL will prepare the EA in accordance with the requirements of the approved ToR and EAA and submit to the Minister for review and approval. The EA will include: • a description of the purpose of the undertaking, as described in Section 4 of this ToR; • a description of the undertaking based on the consideration of alternative methods, as described in Section 6 of this ToR; • the rationale for the undertaking, as described in Section 5 of this ToR; • a description of the environment potentially affected by the undertaking (the description in Section 7 of the ToR will be expanded); • an assessment of the alternative methods of carrying out the undertaking based on the method outlined in Section 8 of this ToR. GFL intends to consider the alternatives described in Section 6 including: • a description of the effects that will be caused or that might reasonably be expected to be caused on the environment by the undertaking or the alternative methods; • a description of the mitigation measures that are necessary to prevent or reduce significant adverse effects on the environment; and • an evaluation of the advantages and disadvantages to the environment as a result of the undertaking; and • a description of the consultation and engagement process undertaken by GFL for the EA following the plan described in Section 9 of this ToR. *Section 3.3, page 7 of the ToR*	The EA was prepared in a manner that includes the items listed, as well as the requirements in the approved ToR and the *Ontario Environmental Assessment Act*.	• Section 3 – Overview of the Undertaking • Section 4 – Description of the Environment Potentially Affected by the Undertaking • Section 5 – Alternative Methods of Carrying Out the Undertaking • Section 6 – Net Effects of the Alternative Methods • Section 7 – Comparative Evaluation of the Net Effects and Identification of the Preferred Alternative • Section 8 – Net Effects of the Preferred Alternative • Section 9 – Consultation and Engagement
The purpose of the undertaking is to provide approximately 15.1 million cubic metres (m^3) of additional landfill disposal capacity at the existing EOWHF over a 20-year planning period. The undertaking will enable GFL to continue to provide disposal services for residual non-hazardous solid waste to their customers once the landfill	A description of the purpose of the undertaking is provided in the EA Study Report. The undertaking will provide approximately 15.1 million m^3 of additional	Section 3 – Overview of the Undertaking, Section 3.2 Purpose of the Undertaking

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
reaches its currently approved disposal capacity, and continue to provide economic support to the local community over the long term. No changes to the approved fill rates or site access routes are proposed. The purpose of the undertaking may be refined during the EA process and will be included in the EA Study Report. *Section 4, page 8 of the ToR*	landfill disposal capacity over a 20-year planning period within the On-site Study Area identified in the ToR.	
GFL has determined that the future development and on-going operation of the EOWHF landfill is the only reasonable option for the company, its customers, and the Province of Ontario. The other alternatives do not address GFL's business opportunity to meet long-term customer commitments or avoid business risks, and they are not supportive of the Ontario government priorities of addressing waste diversion and climate change. These alternatives, and the identification of the preferred 'alternative to', were presented to the public as part of consultation and engagement during the development of the ToR. The comments received on 'alternatives to' the undertaking identified that the future development of the landfill east of the EOWHF is an acceptable alternative; however, potential effects on noise, odour and visual impacts need to be considered along Highway 138 and Highway 417. The potential effects of the preferred alternative will be identified and assessed as part of the EA. *Section 6.1, page 24 of the ToR*	The potential effects of the preferred 'alternative to' were identified and assessed by assessing the effects of the two alternative methods in the EA.	• Section 6 – Net Effects of the Alternative Methods • Section 8 – Net Effects Assessment of the Preferred Alternative • Supporting Document 3 – Effects Assessment Reports
Two preliminary conceptual design alternatives have been developed, which will be refined, as appropriate, during the EA. These conceptual design alternatives are outlined below. These two alternatives are consistent with the design approach that has been approved and developed over the past 20 years for the existing EOWHF. There is limited potential to adjust the design by increasing the height of the landfill. Studies completed for the EOWHF have indicated that the underlying soils may become unstable due to increased landfill height and weight. As a result, the design alternatives are limited to varying lateral configurations with a consistent height. Both alternatives provide a landfill volume of approximately 15.1 million m^3 based on the approved fill rate of 755,000 tonnes per year over a 20-year planning period. Additional alternative methods may be identified and assessed as part of the EA if necessary.	The alternative methods were further developed and refined during the EA and documented in a Conceptual Design Report. A geotechnical feasibility study was conducted and is included as part of the Conceptual Design Report.	• Section 5 – Alternative Methods of Carrying Out the Undertaking • Supporting Document 2 – Conceptual Design Report

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
Section 6.2, page 25 of the ToR		
Alternative methods for treating landfill leachate and managing landfill gas will also be identified and assessed, as appropriate, during the EA. *Section 6.2, page 25 of the ToR*	Leachate generation and management and landfill gas management was identified for each alternative method and the potential effects were assessed as part of the EA.	• Section 5 – Alternative Methods of Carrying Out the Undertaking • Supporting Document 2 – Conceptual Design Report • Section 6 – Net Effects of the Alternative Methods • Section 8 – Net Effects Assessment of the Preferred Alternative • Supporting Document 3 – Effects Assessment Reports
GFL will qualitatively predict the effects for each alternative method on the environment. The assessment will be completed for each component based on the locations and conceptual designs for each alternative, including mitigation and the existing environmental conditions. *Section 6.2, page 25 of the ToR*	Existing environmental conditions were described and the effects of the alternative methods were predicted and assessed as part of the EA and mitigation measures were identified as necessary.	• Section 4 – Description of the Environment Potentially Affected by the Undertaking • Section 6 – Net Effects of the Alternative Methods • Section 10 – Monitoring and Commitments for the Undertaking • Supporting Document 1 – Existing Conditions Reports • Supporting Document 3 – Effects Assessment Reports
A more detailed description of the existing environmental conditions will be prepared as part of the EA. The existing conditions will be used to assess the potential effects of the alternatives on the environment. The actual determination of the anticipated potential environmental effects of the undertaking, potential mitigation/management measures, and net effects are not included in this ToR; however, these will be identified in the EA Study Report. *Section 7, page 27 of the ToR*	A more detailed description of the existing environmental conditions was prepared as part of the EA and used in the assessment of potential effects.	• Section 4 – Description of the Environment Potentially Affected by the Undertaking • Section 6 – Net Effects of the Alternative Methods • Section 8 – Net Effects Assessment of the Preferred Alternative • Supporting Document 1 – Existing Conditions Reports

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
		• Supporting Document 3 – Effects Assessment Reports
During the EA, existing conditions and potential effects will be considered in the context of two study areas: on-site and off-site. *Section 7, page 27 of the ToR*	The existing conditions and potential effects were considered in the context of On-site and Off-site Study Areas. Modifications to the general study areas were required for some environmental components to appropriately characterize existing conditions and assess the potential environmental effects of the future development.	• Section 4 – Description of the Environment Potentially Affected by the Undertaking • Section 6 – Net Effects of the Alternative Methods • Section 8 – Net Effects Assessment of the Preferred Alternative • Supporting Document 1 – Existing Conditions Reports • Supporting Document 3 – Effects Assessment Reports
The EAA defines the environment in a broad, general sense that comprises physical, biological and human considerations. In this EA the environment has been separated broadly into natural, socio-economic, cultural, and built components. The following sections present preliminary descriptions of the existing environmental conditions by environmental component. The EA Study Report will include more detailed descriptions of existing environmental conditions. The characterization of the existing environment for the EA will incorporate the results of past studies, field reconnaissance, additional baseline studies, and information from the data sources outlined in Appendix B, as applicable. *Section 7.2, page 28 of the ToR*	A more detailed description of the existing environmental conditions was prepared as part of the EA incorporating the results of past studies, field reconnaissance, additional baseline studies, and information from the data sources outlined in Appendix B of the ToR, as applicable.	• Section 4 – Description of the Environment Potentially Affected by the Undertaking • Supporting Document 1 – Existing Conditions Reports
The proposed method to be followed in the EA will be a qualitative comparison of the 'alternative methods' using criteria, indicators and data sources to identify the preferred alternative. An effects assessment will be carried out on the preferred alternative using the same criteria, indicators and data sources, and additional studies as required. *Section 8, page 44 of the ToR*	The potential effects of the alternative methods were predicted and a comparative evaluation was conducted to identify the preferred alternative. An effects assessment was then carried out on the preferred alternative using the same criteria, indicators and data sources.	• Section 6 – Net Effects of the Alternative Methods • Section 7 – Comparative Evaluation of Net Effects and Identification of the Preferred Alternative • Section 8 – Net Effects Assessment of the Preferred Alternative • Supporting Document 1 – Existing Conditions Reports

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
		Supporting Document 3 – Effects Assessment Reports
The existing environment within the on-site and off-site study areas (Section 7.1) will be characterized in the EA Study Report. The characterization of the existing environment will address the five aspects of the environment as defined in the EAA, specifically: • natural environment; • built environment; • cultural environment; • social environment; and • economic environment. For the purposes of the EA, the social and economic environments have been combined into the socio-economic environment. *Section 8.1, page 44 of the ToR*	The existing conditions and potential effects were considered in the context of On-site and Off-site Study Areas for the five aspects of the environment as defined in the *Ontario Environmental Assessment Act*. For the purposes of the EA, the social and economic environments were combined into the socio-economic environment. Modifications to the general study areas were required for some environmental components to appropriately characterize existing conditions.	• Section 4 – Description of the Environment Potentially Affected by the Undertaking • Supporting Document 1 – Existing Conditions Reports
The alternative methods will be described in further detail in the EA Study Report. Alternative methods for treating landfill leachate and managing landfill gas will also be identified and described, as appropriate, during the EA. *Section 8.2, page 44-45 of the ToR*	The alternative methods were further developed and refined during the EA and documented in a Conceptual Design Report. Leachate generation and management and landfill gas management was identified for each alternative method as part of the EA.	• Section 5 – Alternative Methods of Carrying Out the Undertaking • Supporting Document 2 – Conceptual Design Report
The potential effects of each alternative method will be identified based upon application of the proposed evaluation criteria, indicators and data sources as outlined in Appendix B. The analysis of potential effects will be based on the maximum allowable waste receipt level for the EOWHF landfill. Actions necessary, or that may reasonably be expected to be necessary, to prevent or mitigate the potential effects will be identified, as appropriate. *Section 8.3, page 45 of the ToR*	The potential effects of each alternative method were identified part of the EA based upon application of the proposed evaluation criteria, indicators and data sources as outlined in Appendix B of the ToR. Potential effects were determined assuming the maximum allowable waste receipt level for the EOWHF landfill. Mitigation measures were identified as appropriate.	• Section 6 – Net Effects of the Alternative Methods • Section 8 – Net Effects Assessment of the Preferred Alternative • Supporting Document 3 – Effects Assessment Reports • Section 10 – Monitoring and Commitments for the Undertaking

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
The alternative methods will be assessed in a qualitative comparative process to determine the preferred alternative, using the criteria and indicators provided in Appendix B. These evaluation criteria and indicators will be finalized during the EA. The differences in net effects (the potential effect remaining following implementation of mitigation and/or management measures) will be used to identify and compare the advantages and disadvantages for each alternative. The comparison of alternatives will include a clear rationale for the selection of the preferred alternative. *Section 8.4, page 45 of the ToR*	A comparative evaluation of the net effects of the two alternative methods was conducted as part of the EA using the criteria and indicators provided in Appendix B of the ToR, which were finalized during the EA. The differences in net effects were used to provide a clear rationale for the selection of the preferred alternative.	The evaluation criteria and indicators used in the effects assessment are provided in Section 6.1.1. The comparative evaluation and selection of the preferred alternative is provided in Section 7 – Comparative Evaluation of Net Effects and Identification of the Preferred Alternative.
Following the identification of the preferred alternative, an effects assessment will be carried out on the preferred alternative considering the same criteria, indicators and data sources, and additional studies as required, taking into account possible mitigation and/or management measures and cumulative effects. The potential effects of the preferred alternative will be compared to the 'do nothing' alternative. The EA will also include a description of the preferred alternative's contribution to reducing GHG emissions and climate change, and the potential effect of climate change on the preferred alternative. *Section 8.5, page 45 of the ToR*	An effects assessment was conducted on the preferred alternative using the same criteria, indicators, etc. and consideration of mitigation measures. Cumulative effects were assessed as well as climate change considerations. The rationale for the undertaking includes a description of how the continued operation of the EOWHF landfill aligns with the Province of Ontario's Strategy for a Waste Free Ontario and Climate Change Action Plan goal of reducing GHG emissions. Climate change considerations in the design of the alternative methods are provided in the EA and Conceptual Design Report.	• Section 8 – Net Effects Assessment of the Preferred Alternative • Section 3 – Overview of the Undertaking • Section 5 - Alternative Methods of Carrying Out the Undertaking, Section 5.5 Climate Change Considerations • Supporting Document 2 – Conceptual Design Report
Consultation and engagement will be undertaken at key points in the process, as well as on an on-going basis, through the following activities as conditions permit: • Notice of Commencement for the EA: by mail, email, local newspapers, and on the project website, in both English and French languages, including details on the project, the EA process and contact information, as a minimum. *Section 9.2, page 49 of the ToR*	The Notice of Commencement for the EA was provided by mail, email, published in local newspapers, and provided on the project website, in both English and French languages.	• Section 9 – Consultation and Engagement, Section 9.3.1 Notice of Commencement • Supporting Document 4 – Record of Consultation and Engagement

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
• Public Open House(s): to present the 'alternative methods', a description of the existing environmental conditions, the comparative evaluation criteria, the results of the assessment and comparative evaluation of the alternative methods, and the identification of the preferred alternative. The format of the Public Open Houses will be determined based on social gathering restrictions due to the pandemic. *Section 9.2, page 49 of the ToR*	Two public open houses were held during the EA. The first public open house provided an overview of the project, presented the EA process, provided information on the proposed alternatives being considered, the EA evaluation process and criteria, presented a summary of existing conditions, and the consultation and engagement process. The second public open house provided an update on the project and the assessment of alternative methods and presented the results of the comparative evaluation that was conducted to identify the preferred alternative.	• Section 9 – Consultation and Engagement, Section 9.3.2 Public Open Houses • Supporting Document 4 – Record of Consultation and Engagement
• Meetings/Tours: if possible, depending on social gathering restrictions due to the pandemic; *Section 9.2, page 49 of the ToR*	Four site tours at the EOWHF between October 2021 and June 2022.	• Section 9 – Consultation and Engagement, Section 9.3.6 Other Activities • Supporting Document 4 – Record of Consultation and Engagement
• Consultation and Engagement Report: summarizing the results of the open house(s) as well as comments received via fax, email or post will be prepared, including a record of comments and responses. *Section 9.2, page 49 of the ToR*	Public Open House Summary Reports were prepared following each public open house. In addition, the EA Study Report includes a Record of Consultation, which provides details of the consultation and engagement and comments/responses received during the EA.	• Supporting Document 4 – Record of Consultation and Engagement
• Website: established by GFL during the development of the ToR will be maintained during the EA to provide information, inform the public of consultation and engagement events, and provide a means for feedback. *Section 9.2, page 49 of the ToR*	A project-specific website (http://gflenv.com/moose-creek-eowhf) was launched during the ToR and maintained during the EA process.	• Section 9 – Consultation and Engagement, Section 9.3.4 Project Website

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
• Contact Person: provided for a GFL staff member to receive enquiries from interested parties for information and submit comments. *Section 9.2, page 49 of the ToR*	A project telephone number (613-538-2776 ext. 2223) and GFL staff contact person was established to receive comments and questions from the public.	• Section 9 – Consultation and Engagement, Section 9.3.5 Telephone Number and Contact
• Draft EA Study Report: provided to the public, agencies, and Indigenous communities who have submitted comments on the ToR and/or wish to receive a copy. Written comments on the draft report will be requested within 45 days of its submission to the MECP. Notice of the draft report availability will be provided by newspaper notice, mail, email, and on the project website. *Section 9.2, page 49 of the ToR*	The Draft EA Study Report is currently being distributed for review. Notice of the draft report availability has provided by newspaper notice, mail, email, and on the project website.	• Section 9 – Consultation and Engagement
• Final EA Study Report: provided to the public, agencies and Indigenous communities who have submitted comments on the Draft EA and/or wish to receive a copy. Notice of the final report availability will be provided by newspaper notice, mail, email, and on the project website. *Section 9.2, page 49 of the ToR*	The Final EA Study Report will be provided along with the required notice.	• Section 9 – Consultation and Engagement
If requested, additional consultation and engagement activities may be undertaken. GFL is prepared to discuss individual concerns and comments directly with potentially affected persons. Additional events may be held to address specific issues of concern, as warranted. *Section 9.2, page 50 of the ToR*	Other consultation and engagement activities have included an agency workshop on existing conditions, agency review of draft Existing Conditions Reports, and Community Liaison Committee meetings.	• Section 9 – Consultation and Engagement • Supporting Document 4 – Record of Consultation and Engagement
Notification and open house related materials will continue to be provided and made available in both English and French languages. Bilingual staff will also be available at GFL to respond to any comments or concerns. *Section 9.2, page 50 of the ToR*	All notification materials were prepared in both English and French, public open house materials were presented in English and French, and bilingual staff attended each public open house.	• Section 9 – Consultation and Engagement • Supporting Document 4 – Record of Consultation and Engagement
A Record of Consultation will be prepared as part of the EA which will include information about the EA consultation program, including copies of correspondence from and to the Proponent, information about and received at the public open houses and copies of comments, questions, issues, and concerns from stakeholders and members of the public, and how those questions, issues, and concerns were addressed. In accordance with Section 6.1(2)(e) of the EAA, a description of the consultation	A Record of Consultation has been prepared and a description of the consultation and engagement program carried out during the EA is provided in the EA Study Report.	• Section 9 – Consultation and Engagement • Supporting Document 4 – Record of Consultation and Engagement

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
and engagement program carried out by GFL during the EA, along with the results of the consultation and engagement, will be documented in the EA Study Report. *Section 9.2, page 50 of the ToR*		
During the EA, GFL will continue to engage with the following Indigenous communities and organizations in a manner consistent with any requests that might be received from each community: • Mohawk Council of Akwesasne; • Algonquins of Ontario; • Huron Wendat Nation Council; • Mohawks of the Bay of Quinte – Tyendinaga Mohawk Council; • Métis Nation of Ontario; and • Métis Nation of Ontario Ottawa Métis Council. GFL will provide written notification to the Indigenous communities and organizations consistent with the consultation and engagement program for the EA. *Section 9.3, page 50 to 51 of the ToR*	During the EA, GFL continued to engage with the Indigenous communities and organizations identified in the approved ToR. No additional Indigenous communities and organizations were identified with a potential interest in the project. Written notification was provided for each public open house and for the Draft EA Study Report review.	• Section 9 – Consultation and Engagement • Supporting Document 4 – Record of Consultation and Engagement
The EA will contain a list of commitments made by GFL during the ToR process and indicate how such commitments have been addressed in the EA. A list of commitments made by GFL during the preparation of the EA will also be included in the EA along with a framework for monitoring when and how all commitments will be fulfilled. *Section 10, page 51 of the ToR*	A list of commitments made by GFL during the ToR process has been developed along with a description of how the commitments have been addressed in the EA. A list of commitments made during the preparation of the EA is included in the EA Study Report.	• Appendix B – Terms of Reference Commitments Table • Section 10 – Monitoring and Commitments for the Undertaking
A strategy and schedule for compliance and effects monitoring will be developed and included in the EA. The monitoring plan will consider all relevant project phases: planning, detailed design, tendering, construction, establishment and post-establishment. Compliance monitoring is an assessment of whether an undertaking has been designed, constructed, implemented and/or operated in accordance with the commitments in the EA document and the conditions of approval. Effects monitoring consists of activities carried out by the proponent after the approval of the EA to determine the environmental effects of the undertaking. Monitoring requirements for effects related to the proposed undertaking are anticipated to be developed as a part of the Environmental Protection Act and Ontario Water		

Table B-1. Terms of Reference Commitments Table

Approved Terms of Reference Commitment	How was the Commitment Addressed	Where the Commitment is Addressed in the EA
Resources Act approval processes. *Section 10, page 51 of the ToR*		
For the purposes of preparing this ToR, flexibility is defined to include a minor variation or modification to the ToR itself, such as a change in consultation and engagement methods, existing conditions study methods, effects assessment methods, and to allow for refinement to things such as study areas, environmental criteria, indicators, and data sources. Therefore, the ToR has not established detailed existing conditions or a full suite of potential effects of the undertaking, for example; these will be determined during the EA and presented in the EA Study Report. It is noted that proposed minor modifications to the ToR will be discussed with the MECP prior to proceeding with the changes. *Section 11, page 52 of the ToR*	The requirement for environmental effects monitoring has been identified and is listed in the EA Study Report.	Section 10 – Monitoring and Commitments for the Undertaking
A list of the specific approvals required for the proposed undertaking will be provided in the EA. *Section 12, page 52 of the ToR*	The requirement for any other approvals has been identified and is listed in the EA Study Report.	Section 11 – Approvals