FEASIBILITY STUDY FOR WASTE TO ENERGY AND MIXED WASTE PROCESSING

EXECUTIVE SUMMARY

Prepared For:

City of Ottawa
110 Laurier Avenue West
Ottawa, Ontario K1P 1J1

Prepared By:
HDR Corporation
300 Richmond Road, Suite 200
Ottawa, Ontario K1Z 6X6

Ottawa, Ontario

EXECUTIVE SUMMARY

The City of Ottawa, the Nation's capital and sixth largest City in Canada, has developed and is in the process of implementing a 30-year Solid Waste Master Plan (SWMP) with the aim of decreasing the amount of waste managed by the City and diverting as much waste as possible from landfill. Furthermore, the City's current primary disposal option, the Trail Road Waste Facility (Trail) is nearing capacity in the next 10 to 15 years, which emphasizes the need to identify alternative long-term waste management options to process, recover, and divert the City's remaining residual waste. Trail (per the 2024 Annual Monitoring Report) is forecasted to reach capacity between 2034-2035, based on status quo disposal rates. For the purposes of this Study, HDR has used 2035 as the assumed closing date of Trail, which is inline with the SWMP.

The City recognizes that there is no single solution to addressing future waste management challenges and developed the SWMP to address these issues through a multi-pronged approach, including looking for opportunities to maximize recovery of resources and energy in an environmentally sustainable manner.

The Waste Recovery and/or Treatment Facility Study Action Suite within the SWMP recommends the City advance a Feasibility Study and Business Case during the short-term to identify technology options that can reduce the amount of waste sent to landfill and potentially recover additional resources and energy. The City retained HDR Corporation (HDR) and KPMG to undertake the Feasibility Study and initiate the Business Case to evaluate the potential economic, environmental, and social impacts of implementing each of the long-term waste management options. The objective of these studies was to prepare a comprehensive, up-to-date, and substantiated comparison of the options for the future of residual waste management for the City of Ottawa. The City is also committed to managing residents' residual waste over the next 30 years and a guiding principle from the SWMP is "keeping waste local by treating residential waste within the City's boundaries, wherever operationally and economically feasible". These two points were considered throughout the preparation of the Feasibility Study.

The five options evaluated as part of the Feasibility Study are:

- **Option 1: Status Quo and Private Facilities.** Under this option, the City would continue to dispose of non-diverted waste for final disposal at Trail until it reaches capacity (estimated to be in 2035) and then negotiate waste supply agreements for disposal with one or several regional third-party waste management facilities.
- **Option 2: WTE Facility.** Under this option, the City would build a new WTE facility that can process all of their non-diverted waste with disposal of rejects and ash residue at a third-party waste management facility.
- **Option 3: MWP Facility.** Under this option, the City builds a MWP Facility that can process all of the City's non-diverted waste, recover additional recyclables and dispose of the remaining process residuals at a private third-party waste management facility.
- **Option 4. WTE and MWP Facilities.** Under this option, the City builds an MWP Facility to recover additional recyclables and builds a WTE facility to process and recover energy from the remaining residual waste. Reject and ash residue from WTE will be disposed of at a private third-party waste management facility.

- **Option 5. Construct a New Landfill.** Under this option, the City builds a new greenfield landfill within the region to take all non-recyclable residuals after Trail reaches capacity.

To successfully implement any of the options above, the City will need to undertake a planning and siting process, identify a preferred procurement and delivery approach, consider funding availability and opportunities, obtain the necessary regulatory and environmental approvals, and ultimately construct, operate, and maintain a solid waste management facility. Prior to the development of this Feasibility Study, a series of technical memorandums were developed that provided detailed background information and analysis on the different technology options and the steps that would be required for successful implementation. These technical memorandums, provided in the appendix, and the information therein were used to support the evaluation of the five (5) options in the Feasibility Study.

A critical aspect of the Feasibility Study was summarizing the information compiled in the technical memorandums to perform a comparative evaluation of the five (5) solid waste management options. This included the development of key evaluation criteria subsets that were applied to each option, taking into consideration the potential environmental impacts, social impacts, economic impacts, and technical characteristics. A summary of the characteristics of the key evaluation criteria subsets are provided below:

i. The environmental criteria subsets assessed the nature of the potential impacts to the environment (e.g., air, water, land) that a technology or option may pose. Protection of the environment and public health was a key factor in evaluating whether the technology(ies) can be implemented in the City.

ii. The social criteria subsets assessed the potential impacts to the social environment, where the implementation of a specific technology could impact the way people live and interact in the area around the facility.

iii. The economical criteria subsets assessed the capital and operating costs of the technology or waste processing system, potential revenues produced by the option, and the overall financial feasibility.

iv. The technical criteria subsets assessed the commercial readiness of the technology, the technology's flexibility and suitability to handling the City's waste stream, and considered the operational history of all process steps, from waste receipt through energy conversion to management and recovery of material streams and handling of residuals.

Utilizing both quantitative and qualitative data and information, a weighting and scoring matrix was developed to evaluate, compare, and rank the five options being considered in this Feasibility Study. For each criterion, each option was rated as either most preferred, preferred, neutral, less preferred, or least preferred when compared against the other options. Furthermore, each of the grades were weighted to calculate a score for each criterion to support the ranking of each of the five options being considered. The criteria considered the triple bottom line analysis to identify the potential environmental, social, and financial contributions or impacts of each option versus performing an assessment based solely on a traditional technical or financial analysis.

Table ES-1 presents the results of the scoring of the comparative evaluation for the five solid waste management options considered in the Study

Table ES-1: Comparative Evaluation Scoring Results

ENVIRONMENTAL REQUIREMENTS					
	Status Quo and Private Facilities	WTE	MWP	MWP and WTE	New Landfill
Energy Recovery Potential	LEAST PREFERRED	MOST PREFERRED	LEAST PREFERRED	MOST PREFERRED	PREFERRED
Landfill Diversion Percentage	LEAST PREFERRED	MOST PREFERRED	LESS PREFERRED	MOST PREFERRED	LEAST PREFERRED
Opportunity to Recover Marketable Commodities	LEAST PREFERRED	PREFERRED	PREFERRED	MOST PREFERRED	LESS PREFERRED
Emissions-Discharges to Air, Land and Water	NEUTRAL	PREFERRED	NEUTRAL	PREFERRED	LEAST PREFERRED
Potential for GHG Impacts	LESS PREFERRED	NEUTRAL	PREFERRED	NEUTRAL	PREFERRED
SOCIAL REQUIREMENTS					
	Status Quo and Private Facilities	WTE	MWP	MWP and WTE	New Landfill
Potential Visual Impacts	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	LEAST PREFERRED
Other Nuisance Impacts	NEUTRAL	PREFERRED	PREFERRED	PREFERRED	LEAST PREFERRED
System Transportation Impacts	MOST PREFERRED	PREFERRED	LESS PREFERRED	PREFERRED	MOST PREFERRED
Potential for Property Value Impacts	MOST PREFERRED	NEUTRAL	NEUTRAL	LESS PREFERRED	LEAST PREFERRED
Opportunity for Community Support	MOST PREFERRED	LESS PREFERRED	NEUTRAL	LESS PREFERRED	LEAST PREFERRED
ECONOMIC/FINANCIAL REQUIREMENTS					
	Status Quo and Private Facilities	WTE	MWP	MWP and WTE	New Landfill
Capital Costs	MOST PREFERRED	LESS PREFERRED	PREFERRED	LESS PREFERRED	LESS PREFERRED
Operations and Maintenance Costs	NEUTRAL	NEUTRAL	LESS PREFERRED	LESS PREFERRED	PREFERRED
Revenue Generation Potential	LEAST PREFERRED	MOST PREFERRED	PREFERRED	MOST PREFERRED	PREFERRED
Overall Financial Feasibility	NEUTRAL	NEUTRAL	LESS PREFERRED	LESS PREFERRED	PREFERRED
TECHNICAL REQUIREMENTS					
	Status Quo and Private Facilities	WTE	MWP	MWP and WTE	New Landfill
Technical Complexity	MOST PREFERRED	LESS PREFERRED	LESS PREFERRED	LEAST PREFERRED	PREFERRED
Timing/Schedule Requirements	MOST PREFERRED	LESS PREFERRED	LESS PREFERRED	LESS PREFERRED	LESS PREFERRED
Feedstock Flexibility	NEUTRAL	PREFERRED	LESS PREFERRED	PREFERRED	MOST PREFERRED
Scalability	LESS PREFERRED	LESS PREFERRED	PREFERRED	LESS PREFERRED	PREFERRED
Process Reliability (Risk Potential)	LESS PREFERRED	PREFERRED	LESS PREFERRED	PREFERRED	MOST PREFERRED
Siting Requirements	MOST PREFERRED	NEUTRAL	NEUTRAL	NEUTRAL	LEAST PREFERRED
Approvals/Permitting/Regulatory Requirements for Implementation	MOST PREFERRED	LESS PREFERRED	PREFERRED	LESS PREFERRED	LEAST PREFERRED
Number and Complexity of Contracts	NEUTRAL	LESS PREFERRED	LESS PREFERRED	LEAST PREFERRED	PREFERRED

Based on the results of the comparative evaluation, the five options are ranked below according to the most preferred option to the least preferred option:

1. **Option 2: WTE Facility (tie)**
1. **Option 1: Status Quo and Private Facilities (tie)**
3. **Option 4: WTE and MWP Facility**
4. **Option 3: MWP Facility**
5. **Option 5: New Landfill Facility**

The WTE facility option ranked in a tie for first as this option is assumed to offer significant environmental benefits, including a 77% landfill diversion rate and energy recovery, which aligns with the City's strategic priorities. However, the implementation of WTE technology presents substantial capital costs ($497 million – $862 million), a complex regulatory approval process, and potential public opposition. While WTE has the potential for long-term cost stabilization through energy revenue, its financial viability remains contingent on securing funding and identifying an appropriate delivery model that could potentially support some form of private investment in the facility.

The Status Quo and Private Facilities option also ranked first in the evaluation. Under this option, the City would continue disposing of non-diverted waste at Trail until it reaches capacity, after which waste would be sent to a regional third-party waste management facility for final disposal. This option ranked higher due to the minimal capital investment, regulatory simplicity, and ease of implementation. However, this option also exposes the City to long-term financial and environmental uncertainty and risks, because the City does not control the privately-owned solid waste management facility assets. The risks associated with the Status Quo and Private Facilities option include potential escalating landfill tipping fees, reducing airspace and/or capacity at regional waste facilities, limited control over disposal operations, and increased GHG emissions from waste transportation.

If the WTE facility option is ultimately selected as the preferred long-term approach for the City, the next steps in the implementation process will require detailed and careful planning. Based on changes to the Ontario Regulations (O.Reg. 101/07) since the implementation of the Durham York Energy Centre, specifically related to the Environmental Screening legislation, the approvals process could be shortened considerably from the timelines identified in the Study. A recent example of a WTE facility that has gone through the screening process is the planned redevelopment of the Emerald Energy from Waste Facility in Brampton, Ontario, which was completed early in 2025. At a minimum, the Environmental Screening process would allow the City to undertake a number of activities (including siting and some of the facility procurement) in advance; however, the City can decide to undertake, or the MECP has the option, to recommend a full EA status should the City or Minister deem it appropriate.

Depending on the preferred option selected, other preliminary next steps for the City would include performing a more detailed siting analysis, further refinement of design assumptions and the associated costs that will be used to finalize the Business Case. The refined design assumptions and criteria for the preferred option could also be used to perform a more in-depth market analysis for potential technology vendors, further evaluation of the risks and opportunities associated with different procurement and delivery models, funding options, and offtake agreements.