ENVIRONMENTAL REQUIREMENTS

	Status Quo and Private Facilities	WTE[1]	MWP[2]	MWP and WTE[3]	New Landfill
Energy Recovery Potential *GWh of Energy Produced Over Facility Lifecycle (30 years)*	**LEAST PREFERRED**	**MOST PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**PREFERRED**
	• SROI Analysis: City will not benefit from energy recovery at third party site.	• WTE facilities generate steam from the combustion of waste which can be used in a district heating loop and/or run through a turbine to generate electricity. • SROI Analysis: Capable of generating up to 5,543 GWh of electricity over 30 years of operations (or approximately 185 GWh/yr on average). • Scenario also has the option to produce both electricity plus thermal energy that could be directed to the local district energy network. Assuming a 70/30 electricity to thermal energy split would result in up to 12 MWe (net) and 28 MWt, respectively.	• SROI Analysis: Technology does not have the ability to produce energy and requires significant power to operate.	• WTE facilities generate steam from the combustion of waste which can be used in a district heating loop or run through a turbine to generate electricity. Slightly less than WTE only option due to power needs of MWP facility and lower waste throughput. • SROI Analysis: Capable of generating up to 5,136 GWh of electricity over 30 years of operations (or approximately 171 GWh/yr on average). • Scenario also has the option to produce both electricity plus thermal energy that could be directed to the local district energy network. Assuming a 50/50 electricity to thermal energy split would result in up to 10 MWe (net) and 23 MWt, respectively.	• New landfill will be designed with the ability to generate electricity from landfill gas and/or ability to generate RNG from landfill gas. • SROI Analysis: Potential to generate and capture landfill gas for use as up to approximately 618 GWh of electricity over 30 years of operations (or approximately 21 GWh/yr on average). • Variability will depend on type and actual tonnage of waste and will be impacted by potential restrictions provincial policy on organic and food waste going to landfills.
Landfill Diversion Percentage *Percentage of Waste Generated by City that is Diverted Away from Landfills*	**LEAST PREFERRED**	**MOST PREFERRED**	**LESS PREFERRED**	**MOST PREFERRED**	**LEAST PREFERRED**
	• Diversion percentage would be 0% since all residual waste generated by the City is assumed to be directed to third-party waste management facilities.	• Up to 77% of the City-generated waste will be converted or recovered (e.g. metals) by the process and diverted away from disposal. The remaining 23% will be ash residue which is assumed to be disposed.	• Only 8% of incoming waste is estimated to be recoverable materials that will be diverted from third-party waste management facilities and/or disposal sites. • The remaining 92% of the incoming waste stream will require further processing or will end up being disposed. This percentage could be reduced if more processing equipment is installed or additional markets develop for lower quality/valuable materials.	• 79% of incoming waste is estimated to be diverted from third-party waste management facilities and/or disposal sites. Slightly higher than WTE option due to materials recovered from MWP process. • Estimated 21% of incoming waste stream will end up at third-party waste management facilities and/or disposal sites in the form of ash residue and process rejects. Slightly less than WTE option due to recovered materials from the MWP process on the front end.	• Approximately 0% diversion is assumed since most of the residual waste generated by the City will be landfilled and limited amount of materials will be recovered at the landfill.
Opportunity to Recover Marketable Commodities *Potential Tonnes of Marketable Material Recovered Over Lifecycle (Millions)*	**LEAST PREFERRED**	**PREFERRED**	**PREFERRED**	**MOST PREFERRED**	**LESS PREFERRED**
	• No diversion. Disposal only option with the assumption that no additional recovery will occur at the third-party waste management facilities.	• Ferrous and non-ferrous metals can be captured post-combustion (est. 3% of incoming waste stream). • SROI Analysis: Opportunity to recover post combustion metals estimated to be 0.26 Mt (8,635 tonnes annually) over the 30-year lifecycle of the facility.	• Opportunity to recover recyclable materials such as OCC, mixed paper, #1, #2, and mixed metals). • SROI Analysis: Opportunity to recover recyclable materials estimated to be 0.64 Mt (21,170 tonnes annually) over the 30-year lifecycle of the facility.	• Opportunity to recover recyclable materials (OCC, mixed paper, #1, #2, mixed metals) and post combustion recyclable materials. • SROI Analysis: Opportunity to recover recyclable material and post combustion metals estimated to be 0.87 Mt (29,091 tonnes annually) over the 30-year lifecycle of the facility.	• Disposal only option but assumes new landfill will be designed with some ability to recover select recoverable materials at landfill. Quantity is considered small and may vary by year so no detailed recovery quantities were estimated.

ENVIRONMENTAL REQUIREMENTS

	Status Quo and Private Facilities	WTE[1]	MWP[2]	MWP and WTE[3]	New Landfill
Emissions-Discharges to Air, Land and Water *Impacts to Air, Land and Water Quality*	**NEUTRAL**	**PREFERRED**	**NEUTRAL**	**PREFERRED**	**LEAST PREFERRED**
	• It is anticipated that there will be some increase in truck vehicle emissions for transport to third-party waste management facilities.	• Combustion process can yield air pollutant emissions, but there is a greater opportunity to significantly reduce these emissions through implementing advanced air pollution control systems. • Minor impacts to land due to significantly less reliance or need on third-party disposal sites for handling the lower amounts of ash generated. • Facility can be designed as a zero discharge facility for wastewater.	• The process itself yields no actual emissions to air, outside of waste collection vehicles and on-site mobile equipment. • Some potential to emit to land from ash residue generated and potential deposition of air emissions, but at a much lower quantity compared to most scenarios. • The process itself may produce some leachate and wastewater that will need to be managed/treated, but minimal amounts.	• WTE facility has the potential to produce higher emissions, but the total quantity would be less with the inclusion of the MWP component. • Least potential to emit to land from ash residue generated compared to other options due to MWP component, plus lower potential for deposition of air. emissions scenarios inclusion of the MWP component. • Minimal potential impacts to surface and ground waters, but the combined options will produce a combination of the stand-alone WTE and MWP options and is slightly higher.	• Landfill gas emissions, specifically methane, that are not captured by the gas recovery system. • Potential impacts to groundwater and surface water from leachate (including the potential impacts from the presence of PFAS). • Impacts to land from the construction and operation as a result from the landfill.
Potential for GHG Impacts [4] *Tonnes of GHG Emitted, Emissions Over Lifecycle (Millions)*	**LESS PREFERRED**	**NEUTRAL**	**PREFERRED**	**NEUTRAL**	**PREFERRED**

	• City would not have to manage any new disposal emissions as they will be managed by a third party waste facility. Emissions associated with 3rd party waste disposal cannot be quantified with certainty, and depending on disposal method and specifications, may be greater than the emissions projected on the other alternatives. Emissions from third party facilities would fall under community emissions and not the City of Ottawa corporate emissions. This alternative has a reduced score due to the potential risk of greater community emission impacts.
	• SROI Analysis:
	  ○ Corporate Emissions: 0.0086 Mt of anthropogenic emissions from waste transported during the Study period (0.3k tonnes/year).
	  ○ Community Emissions: Future emissions unknown due to uncertainty of 3rd party waste disposal facility.
	  ○ Biogenic Emissions: Future biogenic emissions unknown due to uncertainty of 3rd party waste disposal facility.
	  ○ Further community emissions will be released for over 100 years after the Study period due to the decomposition of waste disposed during that period.
		• WTE facilities can emit indirect forms of GHG in the form of NOx and SOx. However, these emissions can be significantly reduced via advanced air pollution control equipment.
		• SROI Analysis:
		  ○ Corporate Emissions: 4.1 Mt of anthropogenic emissions from waste transported, recycled, and combusted during the Study period (138k tonnes/year).
		  ○ Community Emissions: 0.019 Mt of anthropogenic emissions from waste disposed in the third party waste facility (0.6k tonnes a year).
		  ○ Biogenic Emissions: 5.5 Mt emitted (182k tonnes a year), 96% come from corporate emissions and 4% come from community emissions.
		  ○ Community emissions released for over 100 years after the Study period due to the decomposition of waste disposed are negligible since there is typically >1% organic material remaining in the ash residue after the combustion process.
			• The majority of GHG emissions from the MWP scenario comes from the disposing of process residuals and generation of methane (CH4) once those residuals are in a landfill.
			• SROI Analysis:
			  ○ Corporate Emissions: 0.107 Mt of anthropogenic emissions from waste transported, and recycled, during the Study period (3k tonnes/year).
			  ○ Community Emissions: 1.2 Mt of anthropogenic emissions from waste disposed in the third party waste facility (41k tonnes a year).
			  ○ Biogenic Emissions: 14.6 Mt emitted (488k tonnes a year), all of which come from community emissions.
			  ○ Almost all of emissions from the MWP scenario are attributable to community emissions from third-party waste management facilities that will need to take the residual waste stream remaining. These additional emissions will be released for over 100 years after the Study period due to the decomposition of waste disposed during that period.
				• GHG impacts from this option would be from NOx and SOx emissions but would be slightly less than the stand alone WTE option due to less material being combusted.
				• SROI Analysis:
				  ○ Corporate Emissions: 3.7 Mt of anthropogenic emissions from waste transported, recycled, and combusted during Study the period (127k tonnes/year).
				  ○ Community Emissions: 0.018 Mt of anthropogenic emissions from waste disposed in the third party waste facility (0.6k tonnes a year).
				  ○ Biogenic Emissions: 5.2 Mt emitted (175k tonnes a year), 96% come from corporate emissions and 4% come from community emissions.
				  ○ Community emissions released for over 100 years after the Study period due to the decomposition of waste disposed are negligible since there is typically >1% organic material remaining in the ash residue after the combustion process.
					• Landfills can emit GHG such as methane. The landfill gas capture system is estimated to capture 85-90% of these emissions.
					• SROI Analysis:
					  ○ Corporate Emissions: 1.3 Mt of anthropogenic emissions from waste disposed in the third party waste facility (44k tonnes a year).
					  ○ All emissions are corporate in the new landfill case.
					  ○ Biogenic Emissions: 16.0 Mt emitted (532k tonnes a year), all of which come from corporate emissions.
					  ○ Additional corporate emissions will be released for over 100 years after the Study period due to the decomposition of waste landfilled during that period.

SOCIAL REQUIREMENTS					
	Status Quo and Private Facilities	**WTE[1]**	**MWP[2]**	**MWP and WTE[3]**	**New Landfill**
Potential Visual Impacts *Negative aesthetics associated with operations and structures required for the scenario*	**NEUTRAL**	**NEUTRAL**	**NEUTRAL**	**NEUTRAL**	**LEAST PREFERRED**
	• Third-party waste management facilities are existing facilities and are located in fairly remote areas so new visual impacts are not anticipated.	• Operation can mostly be contained inside the processing building and there is opportunity for architectural enhancements to approve aesthetics. Stack will create visual impacts depending on site location.	• Operation can mostly be contained inside the processing building and there is opportunity for architectural enhancements to approve aesthetics.	• Most potential for visual impacts for technology options due to the size of the buildings needed for the MWP and WTE facilities, plus the stack visual impacts.	• The size and outdoor nature of the operations at an active landfill site creates the worst potential visual impact.
Other Nuisance Impacts *Impacts associated with odour, dust, litter, and other nuisances that could be part of the scenario's operation.*	**NEUTRAL**	**PREFERRED**	**PREFERRED**	**PREFERRED**	**LEAST PREFERRED**
	• Potential City vehicles transporting waste to third-party waste management facilities would still cause odour, dust and litter. Although City does not own/operate the third-party locations there still be indirect negative potential impacts associated with odours, dust, and debris from City delivering waste to these locations.	• Operation will be contained within building to reduce/eliminate nuisance impacts, and odours will be controlled/eliminated by the combustion process.	• Operation can mostly be contained indoors, but there is the risk of odour impacts from the operation. These impacts could be mitigated with mechanical controls.	• Operation will be contained within building to reduce/eliminate nuisance impacts, and odours will be controlled/eliminated by the combustion process.	• The largest potential impact for odour, loose debris/litter, dust, and potential for vectors.
System Transportation Impacts [5] *Total Vehicle-Kilometres Travelled (Millions)*	**MOST PREFERRED**	**PREFERRED**	**LESS PREFERRED**	**PREFERRED**	**MOST PREFERRED**
	• Waste will be hauled directly to third-party waste management facility. • SROI Analysis: 11.2M VKT for existing condition (Approximately 373k VKT / year, over a 30-year Study period).	• Waste will be hauled directly to WTE facility; bypassed waste and ash will be hauled to a third-party waste management facility. • SROI Analysis: 13.5M VKT to haul process rejects to third-party waste management facility (Approximately 450k VKT / year, over a 30-year Study period).	• Waste will be hauled directly to MWP facility, bypassed waste and process residuals will be hauled to a third-party waste management facility. • SROI Analysis: 21.3M VKT to haul process rejects and bypassed waste (est. @ 15% of incoming waste stream) to third-party waste management facility (Approximately 701k VKT / year, over a 30-year Study period).	• Waste will be hauled directly to MWP and WTE facility, bypassed waste and process residuals will be hauled to a third-party waste management facility. • SROI Analysis: 13.3M VKT to haul ash and process rejects to a third-party waste management facility (Approximately 444k VKT / year, over a 30-year Study period).	• Waste will be hauled directly to the new landfill. • SROI Analysis: SROI Analysis: 11.2M VKT to haul waste to new City-owned landfill (Approximately 373k VKT / year, over a 30-year Study period).
Potential for Property Value Impacts *Effects of Value of Properties in the Vicinity of the Facilities*	**MOST PREFERRED**	**NEUTRAL**	**NEUTRAL**	**LESS PREFERRED**	**LEAST PREFERRED**
	• Existing facilities so no change over current property values would be anticipated, but future opportunities for commercial or residential development may be limited on closed third-party waste management facility/waste disposal sites.	• No significant impacts to property values are anticipated based on experience with existing facilities. Perceived environmental concerns could deter some home buyers.	• No significant impacts to property values are anticipated based on experience with existing facilities, but local resident concerns about an active waste processing site could deter some home buyers.	• No significant impacts to property values are anticipated based on experience with existing facilities. Perceived environmental concerns could deter some home buyers. • The MWP and WTE option will have the most number of vehicles entering and exiting the site, which will add to the negative perception and potential property value impacts.	• Highest potential to negatively impact property values versus other options. The large land size required for a landfill means there are more neighbouring properties that could be impacted.
	MOST PREFERRED	**LESS PREFERRED**	**NEUTRAL**	**LESS PREFERRED**	**LEAST PREFERRED**

SOCIAL REQUIREMENTS					
	Status Quo and Private Facilities	**WTE[1]**	**MWP[2]**	**MWP and WTE[3]**	**New Landfill**
Opportunity for Community Support *Level of Acceptance in the Community, and Possibility of NIMBY Opposition*	• The third-party waste management facility would already exist and community opposition is not expected to be a new issue.	• Higher potential for community/social risks associated with opposition to project and potential (or perceived) health risks to the community. High potential for NIMBY opposition.	• Low potential to result in community/social risks. Technology is relatively accepted. Still chance for NIMBY opposition to a new solid waste facility.	• Potential for community/social risks associated with opposition to project and potential (or perceived) health risks to the community, but slightly less than WTE only option since there is more upfront recovery of recyclables. Still high potential for NIMBY opposition.	• Highest potential for community/social risks associated with opposition to project and potential (or perceived) health risks to the community. Significantly higher NIMBY opposition.
ECONOMIC/FINANCIAL REQUIREMENTS					
	Status Quo and Private Facilities	**WTE[1]**	**MWP[2]**	**MWP and WTE[3]**	**New Landfill**
Capital Costs *(Millions 2024$)*	**MOST PREFERRED** • Existing site with infrastructure already in place. No capital costs (e.g. $0). Any new or additional capital costs for modifications to the site will fall upon third-party waste management facility receiving the waste.	**LESS PREFERRED** • Real Value (Undiscounted 2024$): $663.5 M. Range anticipated to between $497 M - $862 M. • Includes construction, engineering, design, and land acquisition costs.	**PREFERRED** • Real Value (Undiscounted 2024$): $129.4 M. Range anticipated to between $97 M - $168 M. • Includes construction, engineering, design, and land acquisition costs.	**LESS PREFERRED** • Real Value (Undiscounted 2024$): $742.5 M. Range anticipated to between $556 M - $965 M. • Includes construction, engineering, design, and land acquisition costs.	**LESS PREFERRED** • Real Value (Undiscounted 2024$): $592.6 M. Range anticipated to between $439 M - $761 M. • Includes construction, engineering, design, and land acquisition costs. • Factors in capital costs for infrastructure (pipeline and connections) and gas conditioning requirements for converting landfill gas to RNG, which could be on the order of $45M-$60M installed costs if City was to own/operate.
Operations and Maintenance Costs [6],[7] *(Millions 2024$)*	**NEUTRAL** • Real Value (Undiscounted 2024$): $1,314 M (Estimated $43.8 M / year). • Solely comprises of hauling & disposal costs. Facility O&M costs for waste will fall upon third-party waste management facility owner/operator receiving the waste.	**NEUTRAL** • Real Value (Undiscounted 2024$): $1,405.2 M (Estimated $46.8 M / year). • Captures hauling & disposal costs, and facility O&M of new WTE facility, during the 30-year Study period. • Does not include indirect costs related to financing and debt service costs, which would add up to an additional $40 M annually.	**LESS PREFERRED** • Real Value (Undiscounted 2024$): $2,104.2 M (Estimated $70.1 M / year). • Captures hauling & disposal costs, and facility O&M of new MWP facility, during the 30-year Study period. • Does not include indirect costs related to financing and debt service costs, which would add up to an additional $8 M annually.	**LESS PREFERRED** • Real Value (Undiscounted 2024$): $2,184.6 M (Estimated $72.8 M / year). • Captures hauling & disposal costs, and facility O&M at the new MWP and WTE facilities, during 30-year Study period. • Does not include indirect costs related to financing and debt service costs, which would add up to an additional $44 M annually.	**PREFERRED** • Real Value (Undiscounted 2024$): $469.3M (Estimated $15.6 M / year). • Captures hauling & disposal costs, and facility O&M at new landfill with a RNG system, during the 30-year Study period. • Does not include indirect costs related to financing and debt service costs, which would add up to an additional $35 M annually. • Includes additional operating costs associated with operating and gas conditioning systems to convert landfill gas to RNG, estimated to be on the order of an additional $2M/yr if City was to own/operate.

ECONOMIC/FINANCIAL REQUIREMENTS

	Status Quo and Private Facilities	WTE[1]	MWP[2]	MWP and WTE[3]	New Landfill
Revenue Generation Potential *Total Revenue from Energy & Material Recovery (Millions 2024$)*	**LEAST PREFERRED** • Third-party waste management facility will benefit from the revenue generated due to LFG utilization, not the City.	**MOST PREFERRED** • Real Value (Undiscounted 2024$): $537.4 M (Estimated $17.9 M / year). • Established markets in Ottawa/Province for electricity and thermal energy generated, as well as established markets for post-combustion metals in Ontario. • The option to sell the thermal energy generated could result in up to $20M in additional revenues annually, plus up to an additional $5M-$6.5M in electrical revenues depending on the agreed upon energy pricing arrangements for the project.	**PREFERRED** • Real Value (Undiscounted 2024$): $133.4 M (Estimated $4.4 M / year). • Assumes recycled materials can be sold on secondary markets.	**MOST PREFERRED** • Real Value (Undiscounted 2024$): $631.0 M (Estimated $21.0 M / year). • Established markets in Ottawa/Province for electricity and thermal energy generated, as well as established markets for post-combustion metals in Ontario. • The option to sell thermal energy generated could result in up to $20M in additional revenues annually, plus up to an additional $5M-$6.5M in electrical revenues depending on the agreed upon energy pricing arrangements for the project.	**PREFERRED** • Real Value (Undiscounted 2024$): $56.0 M (Estimated $1.9 M / year). • Revenue generating potential from LFG collected and use for electricity generation, but may be less beneficial if operated/controlled by a third party. • Potential for revenue generation for converting landfill gas to RNG (as much as $12M per year per the City). Detailed impacts on the quantity of gas available (and impacts of potential ban on landfilling organics) and capital and operating costs will need to be further evaluated if scenario is advanced beyond feasibility phase.
Overall Financial Feasibility [6],[8],[9] *Total Cash Outflow (Millions 2024$)*	**NEUTRAL** • Present Value (Discounted): $606.1 M (Estimated $20.2 M / year, $77.6 / tonne). • Real Value (Undiscounted 2024$): $1,314 M (Estimated $43.8 M / year, $160.0 / tonne). • Most susceptible to changes in tipping fees for third-party waste management facilities. If the tip fee increases by $100 per tonne, net present cash outflow increases by 62.5%.	**NEUTRAL** • Present Value (Discounted): $933.4 M (Estimated $31.1 M / year, $119.5 / tonne). • Real Value (Undiscounted 2024$): $1,531.3 M (Estimated $51.0 M / year, $196.0 / tonne). • Minimal risk to changes in tipping fees for third-party waste management facilities due to lower amounts of waste generated requiring disposal. If the tip fee increases by $100 per tonne, net present cash outflow increases by 9.6%.	**LESS PREFERRED** • Present Value (Discounted): $1,307.0 M (Estimated $43.6 M / year, $167.3 / tonne). • Real Value (Undiscounted 2024$): $2,100.1 M (Estimated $70.0 M / year, $268.9 /tonne). • Highly susceptible to changes in tipping fees for third party waste facilities. If the tip fee increases by $100 per tonne, net present cash outflow increases by 34.3%.	**LESS PREFERRED** • Present Value (Discounted): $1,035.6 M (Estimated $34.5 M / year, $132.6 / tonne). • Real Value (Undiscounted 2024$): $2,296.1 M (Estimated $76.5 M / year, $294.0 / tonne). • Minimal risk to changes in tipping fees for third-party waste management facilities due to least amount of remaining waste that would require disposal. If the tip fee increases by $100 per tonne, net present cash outflow increases by 6.3%.	**PREFERRED** • Present Value (Discounted): $576.4 M (Estimated $19.2 M / year, $73.8 / tonne). • Real Value (Undiscounted 2024$): $1,005.9 M (Estimated $33.5 M / year, $128.8 / tonne).$1,005.9 M (Estimated $33.5 M / year, $128.8 / tonne). • Not susceptible to changes in tipping fees for third party waste facilities.

TECHNICAL REQUIREMENTS

	Status Quo and Private Facilities	WTE[1]	MWP[2]	MWP and WTE[3]	New Landfill
Technical Complexity *Amount and Complexity of Technology Required*	**MOST PREFERRED** • The City's waste will be going to third-party waste management facilities. No technical effort required by the City.	**LESS PREFERRED** • Amount of equipment, technology and the high-level of skill/education required to operate this scenario makes the level of complexity high.	**LESS PREFERRED** • Amount of equipment, technology and the higher level of skill required to operate technology makes the level of complexity high.	**LEAST PREFERRED** • Requires integration of the two most technologically complex options.	**PREFERRED** • Technical complexity is very low compared to other technological processing options.

TECHNICAL REQUIREMENTS

	Status Quo and Private Facilities	WTE[1]	MWP[2]	MWP and WTE[3]	New Landfill
	• Note that all technology scenarios will require at least some third-party waste management/disposal facility(ies).				
Timing/Schedule Requirements *Length of Time from Project Concept to Commercial Operations*	**MOST PREFERRED**	**LESS PREFERRED**	**LESS PREFERRED**	**LESS PREFERRED**	**LESS PREFERRED**
	• No significant timing or schedule requirements anticipated since no new infrastructure will be developed. • Contracts for waste disposal to be coordinated prior sending waste to third-party waste management facilities.	• The need to identify a site, complete the regulatory approval process, and the design and construction of the facility results in a longer implementation timeline (i.e. 7-10 years).	• The need to identify a site, complete the regulatory approval process, and design and construct the facility results in a longer implementation timeline; however, approval process and design/construction process could be faster than WTE or MWPand WTE options (i.e. 5-7 years).	• The need to identify a site, complete the regulatory approval process, and design and construct the facility results in a longer implementation timeline (i.e. 7-10 years).	• The need to identify a site large enough to accommodate the area to meet the landfill operational requirements, complete the regulatory approval process, and design and construct the facility results in a longer implementation timeline. Could range from 7-10 years.
Feedstock Flexibility *Restrictions on Types of Waste Accepted*	**NEUTRAL**	**PREFERRED**	**LESS PREFERRED**	**PREFERRED**	**MOST PREFERRED**
	• Little to no restrictions beyond unacceptable wastes by permit. City would be subject to third-party waste management facility's waste receiving and acceptance restrictions.	• Technology estimated to be able to process close to 99% of incoming material.	• Technology is able to accept a wide variety of materials, but a higher percentage (estimated at 15%) of incoming materials will need to be diverted from the process. • City's existing and future recycling and recovery efforts will inhibit the available materials that can be recovered and marketed by technology requiring much of the incoming materials to be directed to third-party waste management facilities.	• Technology estimated to be able to process close to 99% of incoming material based on the assumption that whatever cannot be passed through the MWP component will be sent directly to the WTE to be processed.	• Least amount of restrictions to accepting various materials as long as permitted/approved.
Scalability *Flexibility to either Increase or Decrease Capacity*	**LESS PREFERRED**	**LESS PREFERRED**	**PREFERRED**	**LESS PREFERRED**	**PREFERRED**
	• Existing locations with finite capacity (assuming additional expansion is not feasible). • Potential for competition with other jurisdictions for third-party waste management facility sites, which could limit the available capacity to receive all of the City's waste and will require future expansion that may impact City's long term plans.	• Some flexibility can be built into the design to accommodate changes to waste stream (either a 10-15% reduction or increase in capacity as required) and to take different materials if allowed by permit (e.g. sludge, other materials). Initial design can also take future expansion in mind (i.e. DYEC). • Facility capacity could be reduced by taking one or more units offline or reducing unit throughput.	• Would require upgrades if waste levels increase significantly, or if the City requires additional materials to be recovered (e.g. organics, specific commodities). The technology is less affected by drop in waste capacity. • Some flexibility to easily add equipment to recover more or different materials assuming building was designed to accommodate future expansion.	• Scalability would be comparable to both the stand-alone WTE and MWP.	• New cell construction and addition would be less restrictive than other options. • City will have greater control over the asset and the ability to accept additional waste.
	LESS PREFERRED	**PREFERRED**	**LESS PREFERRED**	**PREFERRED**	**MOST PREFERRED**

TECHNICAL REQUIREMENTS

	Status Quo and Private Facilities	WTE[1]	MWP[2]	MWP and WTE[3]	New Landfill
Process Reliability (Risk Potential) *Reliability of Operations and Potential of Experiencing Downtime*	• City would have limited control of waste disposal operations and would need to rely on third-party waste management facility owner/operators with finite capacity without future expansion. • Limited available waste facility disposal capacity throughout the Province which is predicted to be further restricted by 2035, plus competition for disposal facility space with other jurisdictions (e.g. the GTA) could limit future third-party waste management facility availability for the disposal of City's waste, and higher market rates for disposal (e.g. tipping fees) will be likely.	• Technology has a high industry average reliability in North America (i.e. >90% available to process waste). • Technology does have scheduled and unscheduled downtime for maintenance, but the impacts on the waste processing/disposal can be mitigated if multiple units are constructed and the timing of outages and waste deliveries are coordinated with the operator. • Depending on ownership model, the City would have greater control of asset and tipping fees.	• Changes to commodity pricing may impact which materials are removed from the process vs. sent to disposal as process residuals. • Technology includes high wear equipment (shredders, trommels, etc.) that requires frequent maintenance and can result in extended downtime. Could be mitigated by installing multiple processing lines. • Given the expected amount of process residuals from the technology that will require disposal or further processing, City would still be heavily dependent on third-party waste management facility disposal contracts.	• Scenario would be similar to WTE option since MWP facility on the front end could be bypassed if that component is having maintenance issues.	• Operations are relatively simple and does not rely on complex processing equipment and systems to process waste materials that requires a lot of maintenance (other than mobile equipment and gas recovery systems). Shutdown periods for maintenance would be anticipated to have less of an impact than the technology options (WTE and MWP). • City is assumed to own the asset and would have greater control over available capacity.
Siting Requirements *Overall Area Requirements, Necessary Infrastructure and Utilities, Proximity to Major Highways*	**MOST PREFERRED** • Third-party waste management facilities will be responsible for site capacity or additional infrastructure required on existing sites.	**NEUTRAL** • Will require approximately 3-5 hectare (ha) site at a minimum and would require significant infrastructure upgrades for utilities (water, sewer, electric, potentially natural gas), as well as proximity to local power delivery centre for electrical interconnect.	**NEUTRAL** • Will require 3-5 ha site at a minimum to build facility and for infrastructure and setbacks, and would require significant infrastructure upgrades for utilities (water, sewer, electric, potentially natural gas) .	**NEUTRAL** • Will require approximately 8 ha site at a minimum to build the facility, slightly more land than the WTE or MWP due to the two operations and would require significant infrastructure upgrades for utilities (water, sewer, electric, potentially natural gas) as well as proximity to local power delivery centre for electrical interconnect.	**LEAST PREFERRED** • Requires the most land acquisition within the boundaries of the City of any of the options (approximately 200 ha).
Approvals/Permitting/Regulatory Requirements For Implementation *Number and Complexity of the Approvals Required to Implement the Process*	**MOST PREFERRED** • None. Third-party waste management facilities will have approvals and permits already in place. (e.g. only facilities that are approved to accept the waste will be considered).	**LESS PREFERRED** • Scenario would require a number of complex approvals and permitting requirements, including streamlined EA, approvals for air, water, and waste, as well as building permits, electrical interconnect, as well as testing requirements for stack emissions and ash testing that will be required throughout the operational life of the facility.	**PREFERRED** • Process would require a complex approvals process, but the permitting and long-term testing requirements would be far less complex than the WTE scenario. Some factors that impact permits will be whether a new build or existing building.	**LESS PREFERRED** • WTE component within scenario will require a number of complex approvals and permitting requirements, including streamlined EA, approvals for air, water, and waste as well as other permits such as building permits, electrical interconnect, as well as testing requirements for stack emissions and ash testing that will be required for the life of the facility.	**LEAST PREFERRED** • The approvals and permitting requirements for this option are anticipated to be onerous (e.g. Comprehensive EA and ECA approvals for waste, air, wastewater) as there exists specific regulations (e.g. O.Reg. 232/98) that spells out the standards for landfill design and stormwater management. In addition, additional permits from other agencies may be required.
Number and Complexity of Contracts *Amount and Sophistication of Agreements Needed to be Made for the Operation of the Facility*	**NEUTRAL** • Waste disposal agreements will need to be negotiated and re-negotiated for third-party waste management facilities.	**LESS PREFERRED** • Scenario will require a number of complex contracts, including an O&M Agreement with a third party, residue disposal agreements, and the electrical	**LESS PREFERRED** • Scenario will require complex contracts, including recovered materials off-taker agreements, possibly an O&M Agreement	**LEAST PREFERRED** • This scenario will have the greatest number of complex contracts as it will combine the number of contracts required for the stand-alone WTE and	**PREFERRED** • Scenario will require minimal contracting if owned and operated by the City. The most complex contract may be related to

TECHNICAL REQUIREMENTS					
	Status Quo and Private Facilities	**WTE[1]**	**MWP[2]**	**MWP and WTE[3]**	**New Landfill**
		interconnect and power purchase agreement.	with a third party, and a residue disposal agreement(s).	MWP options (including residual disposal agreements).	obtaining or leasing the land required for the landfill.

FOOTNOTES

General Note: Numbers included from the SROI analysis are shown as lifecycle amounts based on a 30-year Study period starting in 2035 (after the presumed closure of Trail). Annualized numbers will be shown in parenthesis. Annual numbers are based off the annual average of the lifecycle figures for the 30-year Study period (2035-2064) and may differ slightly from the annual figures from Technical Memo 1, which were based on the projected 2053 design capacity tonnage of 267,600 tonnes.

[1] This option also includes the need for a landfill to accept the ash produced from the combustion process (estimated to be 23% of the incoming tonnage by weight).
[2] This option also includes the need for a landfill to accept the unrecovered materials (estimated to be 92% of the incoming tonnage by weight).
[3] This option also includes the need for a landfill to accept the ash produced from the combustion process (estimated to be 21% of the incoming tonnage by weight).
[4] The City tracks community and corporate GHG emissions through annual GHG inventories and potential GHG emissions are scored including both community and corporate GHG emissions. A third-party waste management facility would fall under community GHG emissions. Third party waste facilities are assumed to be landfills in the emission modelling, unless otherwise stated. Emissions are reported as biogenic and anthropogenic terms, however only anthropogenic emissions are evaluated in the scoring.
[5] Comparison performed using quantitative results from SROI Analysis.
[6] Closure and Post Closure Costs at Trail are incurred in all scenarios and not included in the evaluation.
[7] Total O&M Costs includes hauling costs of $150 / tonne, and transportation costs of $10 / tonne. Values are escalated in line with inflation (assumed 2% per year).
[8] Rankings are based off present values of cash outflow, and sensitivity to tipping fee increases. Detailed results of discounted costs, discounted revenues, and the sensitivity analysis for the $250 tip fee are shown in Appendix A of the feasibility study.
[9] Total Cash Outflow = Capital Cost + Operations and Maintenance Costs – Revenue Generating Potential

Table 7-1: Summary of Final Scenario Rankings

		Status Quo and Private Facilities	WTE	MWP	MWP and WTE	New Landfill
Environmental Requirements	Score	**-7**	**+6**	**-1**	**+7**	**-3**
	Subcriteria Ranking	*5*	*2*	*3*	*1*	*4*
Social Requirements	Score	**+6**	**+1**	**0**	**0**	**-6**
	Subcriteria Ranking	*1*	*2*	*3*	*3*	*5*
Economic/Financial Requirements	Score	**0**	**+1**	**0**	**-1**	**+2**
	Subcriteria Ranking	*3*	*2*	*3*	*5*	*1*
Technical Requirements	Score	**+6**	**-3**	**-3**	**-5**	**+2**
	Subcriteria Ranking	*1*	*3*	*3*	*5*	*2*
Total (Score)		**+5**	**+5**	**-4**	**+1**	**-5**
Overall Final Scenario Ranking		*1*	*1*	***4***	***3***	***5***